

# Framework Serial Connectivity Interface (FSCI) for Bluetooth® Low Energy Host Stack



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## **Chapter 4 Revision history..... 457**

# Chapter 1

## Introduction

This reference manual provides a detailed description of the Bluetooth® Low Energy Host Stack serial commands, communication packet structure, and usage of the Framework Serial Communication Interface (FSCI).

### 1.1 Scope and objective

This document describes the Bluetooth® LE Host Stack functionality through a serial communication interface to a host system. The typical serial interfaces are UART, SPI, and I2C. The typical applications employing the Bluetooth LE Host Stack FSCI functionality can be desktop applications, such as the NXP Test Tool for Connectivity Products, or embedded systems that have Bluetooth LE applications using Bluetooth LE stack services via FSCI.

### 1.2 Audience description

This reference manual is intended for profile designers, application designers, and users of the BLE Host Stack FSCI.

### 1.3 References

Table 1. References Table

Title	Reference	Version	Location
Specification of the Bluetooth System	Core v5.0	2016	<a href="http://www.bluetooth.org/en-us/specification/adopted-specifications">www.bluetooth.org/en-us/specification/adopted-specifications</a>
Bluetooth® Low Energy Host Stack API Reference Manual	BLEHSAPIRM	2015	Included in package

### 1.4 Definitions, acronyms, and abbreviations

Table 2. Acronyms Table

Term/Acronym	Definition
ATT	Attribute Protocol
BLE	Bluetooth Low Energy
FSCI	Framework Serial Communication Interface
GATT	Generic Attribute Profile
GATTDB	Generic Attribute Profile Database
GAP	Generic Access Profile

Table continues on the next page...



**Table 2. Acronyms Table (continued)**

HCI	Host Controller Interface
L2CAP	Logical Link Control and Adaptation
L2CAP CB	Logical Link Control and Adaptation Credit Based
SM	Security Manager

## Chapter 2

# Overview

The FSCI (Framework Serial Communication Interface) module supports interfacing the BLE Host Stack with a host or a PC tool (TestTool for Connectivity Products) using a serial communication line. If the FSCI is used with the NXP Test Tool for Connectivity products, this tool can use an XML file which contains a detailed meta-description for serial commands and events. This XML file is provided in software packages which include this document.

## 2.1 Bluetooth LE Host Stack interface set

The Bluetooth LE Host Stack layers that offer access using FSCI are GATT, GATTDB, L2CAP CB, and GAP. Each layer provides primitives that an upper layer (profile/application) uses to access services of that layer. This document includes a detailed list of the provided primitives.

## 2.2 Basic requirements

- IAR Embedded Workbench for ARM® architecture
- NXP development boards (to be loaded with the “ble\_fsci\_app” application)
- Optional Bluetooth LE sniffer for testing
- PC tool (TestTool for Connectivity Products) or another host processor capable of communicating through UART, USB, SPI, or I<sup>2</sup>C

### 2.2.1 Interface description

The FSCI module uses the Serial Manager and needs one of the following interfaces for communication:

- A 2-wire UART connection
- A 3-wire I<sup>2</sup>C connection
- A 5-wire SPI connection
- A USB connection

## 2.3 Overview and packet structure

The FSCI module sends and receives messages as shown in the below figure. This structure is not specific to a serial interface and is designed to offer the best communication reliability. The device is expecting messages in little-endian format and responds with messages in little-endian format.

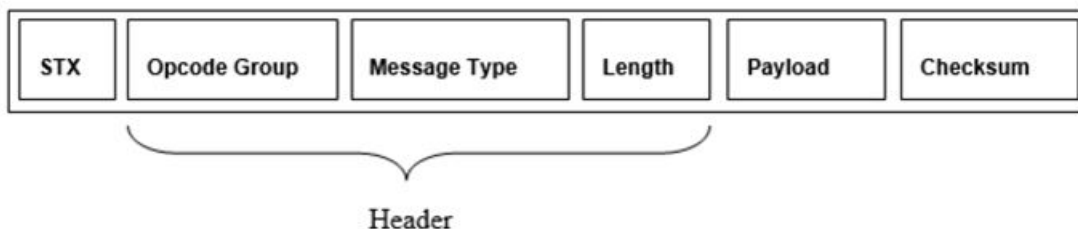


Figure 1. Packet Structure

**Table 3. Packet Field Description**

Field Name	Length (bytes)	Description
STX	1	Used for synchronization over the serial interface. The value is always 0x02.
Opcode Group	1	Distinguishes between different layers (for example, GAP, GATT, and GATTDB).
Message Type	1	Specifies the exact message opcode that is contained in the packet.
Length	2	The length of the packet payload, excluding the header and the checksum. The length field content shall be provided in little endian format.
Payload	Variable	Payload of the actual message.
Checksum	1	Checksum field used to check the data integrity of the packet.

## Chapter 3

# FSCI Messages Description

This chapter describes all L2CAP CB, GAP, GATT, and GATTDB commands (requests) and events (confirms and indications) in detail. The “BLE.xml” document found in the ble\_fsci\_app subfolder, and provides an XML representation of all these commands and events.

## 3.1 L2CAP Credit Based Messages

### 3.1.1 L2CAPCB.Confirm

#### Description

Status of the L2CAP request.

#### Parameters

Table 4. L2CAPCB.Confirm Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x42
OpCode	1	0x80
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*

Table 4. L2CAPCB.Confirm Parameters (continued)

Parameter	Size (bytes)	Comments
Status	2	<p>The status of the L2CAP request</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedResources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurityReasons_c</p> <p>0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c</p>

Table 4. L2CAPCB.Confirm Parameters (continued)

Parameter	Size (bytes)	Comments
		0x0110: gHciConnectionAcceptTimeoutExceeded_c
		0x0111: gHciUnsupportedFeatureOrParameterValue_c
		0x0112: gHciInvalidHciCommandParameters_c
		0x0113: gHciRemoteUserTerminatedConnection_c
		0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c
		0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c
		0x0116: gHciConnectionTerminatedByLocalHost_c
		0x0117: gHciRepeatedAttempts_c
		0x0118: gHciPairingNotAllowed_c
		0x0119: gHciUnknownLpmPdu_c
		0x011A: gHciUnsupportedRemoteFeature_c
		0x011B: gHciScoOffsetRejected_c
		0x011C: gHciScoIntervalRejected_c
		0x011D: gHciScoAirModeRejected_c
		0x011E: gHciInvalidLpmParameters_c
		0x011F: gHciUnspecifiedError_c
		0x0120: gHciUnsupportedLpmParameterValue_c
		0x0121: gHciRoleChangeNotAllowed_c
		0x0122: gHciLLResponseTimeout_c
		0x0123: gHciLmpErrorTransactionCollision_c
		0x0124: gHciLmpPduNotAllowed_c
		0x0125: gHciEncryptionModeNotAcceptable_c
		0x0126: gHciLinkKeyCannotBeChanged_c

Table 4. L2CAPCB.Confirm Parameters (continued)

Parameter	Size (bytes)	Comments
		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c
		0x013C: gHciDirectedAdvertisingTimeout_c

Table 4. L2CAPCB.Confirm Parameters (continued)

Parameter	Size (bytes)	Comments
		0x013D: gHciConnectionTerminatedDueToMicFailure_c
		0x013E: <b>gHciConnectionFailedToBeEstablishedOrSyncTimeout_c</b>
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c
		0x03FA: gL2caChannelAlreadyConnected_c



Table 4. L2CAPCB.Confirm Parameters (continued)

Parameter	Size (bytes)	Comments
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c
		0x0416: gSmInvalidHciEventParameter_c

**Table 4. L2CAPCB.Confirm Parameters (continued)**

Parameter	Size (bytes)	Comments
		0x0417: gSmLlConnectionEncryptionInProgress_c
		0x0418: gSmLlConnectionEncryptionFailure_c
		0x0419: gSmInsufficientResources_c
		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c
		0x041C: gSmReceivedTimerEventForUnknownDevice_c
		0x041D: gSmUnattainableLocalDeviceSecRequirements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySize_c
		0x041F: gSmUnattainableSlaveSecReqRequirements_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupported_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c
		0x0460: gSmTbResolvableAddressDoesNotMatch_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c
		0x0503: gAttWriteNotPermitted_c
		0x0504: gAttInvalidPdu_c

Table 4. L2CAPCB.Confirm Parameters (continued)

Parameter	Size (bytes)	Comments
		0x0505: gAttInsufficientAuthentication_c
		0x0506: gAttRequestNotSupported_c
		0x0507: gAttInvalidOffset_c
		0x0508: gAttInsufficientAuthorization_c
		0x0509: gAttPrepareQueueFull_c
		0x050A: gAttAttributeNotFound_c
		0x050B: gAttAttributeNotLong_c
		0x050C: gAttInsufficientEncryptionKeySize_c
		0x050D: gAttInvalidAttributeValueLength_c
		0x050E: gAttUnlikelyor_c
		0x050F: gAttInsufficientEncryption_c
		0x0510: gAttUnsupportedGroupType_c
		0x0511: gAttInsufficientResources_c
		0x0601: gGattAnotherProcedureInProgress_c
		0x0602: gGattLongAttributePacketsCorrupted_c
		0x0603: gGattMultipleAttributesOverflow_c
		0x0604: gGattUnexpectedReadMultipleResponseLength_c
		0x0605: gGattInvalidValueLength_c
		0x0606: gGattServerTimeout_c
		0x0607: gGattIndicationAlreadyInProgress_c
		0x0608: gGattClientConfirmationTimeout_c
		0x0701: gGapAdvDataTooLong_c
		0x0702: gGapScanRspDataTooLong_c
		0x0703: gGapDeviceNotBonded_c
		0x0704: gGapAnotherProcedureInProgress_c
		0x0801: gDevDbCccdLimitReached_c
		0x0802: gDevDbCccdNotFound_c
		0x0901: gGattDbInvalidHandle_c

**Table 4. L2CAPCB.Confirm Parameters (continued)**

Parameter	Size (bytes)	Comments
		0x0902: gGattDbCharacteristicNotFound_c
		0x0903: gGattDbCccdNotFound_c
		0x0904: gGattDbServiceNotFound_c
		0x0905: gGattDbDescriptorNotFound_c

### 3.1.2 L2CAPCB-CancelConnection.Request

#### Description

Termination of an L2CAP channel.

#### Parameters

**Table 5. L2CAPCB-CancelConnection.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x42
OpCode	1	0x06
Length	1	Length in bytes of the following parameters
LePsm	2	Bluetooth SIG or Vendor LE_PSM
DeviceId	1	The DeviceId for which the command is intended
RefuseReason	2	Refuse reason Possible values: 0x0000: gSuccessful_c 0x0002: gLePsmNotSupported_c 0x0004: gNoResourcesAvailable_c 0x0005: gInsufficientAuthentication_c 0x0006: gInsufficientAuthorization_c 0x0007: gInsufficientEncryptionKeySize_c 0x0008: gInsufficientEncryption_c 0x0009: gInvalidSourceCid_c 0x000A: gSourceCidAlreadyAllocated_c 0x000B: gTimerError_c 0x0100: gCommandRejected_c 0xFFFE: gResponseTimeout_c

### 3.1.3 L2CAPCB-ConnectLePsm.Request

#### Description

L2CAP connect.

#### Parameters

Table 6. L2CAPCB-ConnectLePsm.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x42
OpCode	1	0x04
Length	1	Length in bytes of the following parameters
LePsm	2	Bluetooth SIG or Vendor LE_PSM
DeviceId	1	The DeviceId for which the command is intended
InitialCredits	2	Initial credits

### 3.1.4 L2CAPCB-DeregisterLePsm.Request

#### Description

Deregister LePsm.

#### Parameters

Table 7. L2CAPCB-DeregisterLePsm.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x42
OpCode	1	0x03
Length	1	Length in bytes of the following parameters
LePsm	2	Bluetooth SIG or Vendor LE_PSM

### 3.1.5 L2CAPCB-DisconnectLeCbChannel.Request

#### Description

L2CAP disconnect.

#### Parameters

Table 8. L2CAPCB-DisconnectLeCbChannel.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x42
OpCode	1	0x05

*Table continues on the next page...*

**Table 8. L2CAPCB-DisconnectLeCbChannel.Request Parameters (continued)**

Length	1	Length in bytes of the following parameters
DeviceId	1	The DeviceId for which the command is intended
Channel Id	2	The L2CAP Channel Id assigned on the initiator

### 3.1.6 L2CAPCB-LeCbData.Indication

#### Description

Data packet received through Credit-Based Channel.

#### Parameters

**Table 9. L2CAPCB-LeCbData.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x42
OpCode	1	0x86
Length	1	Length in bytes of the following parameters
DeviceId	1	The DeviceId from which data packet is received
LePsm	2	Bluetooth SIG or Vendor LE_PSM
PacketLength	2	Length of the received data packet
Packet	PacketLength	The received data packet

### 3.1.7 L2CAPCB-LePsmConnectionComplete.Indication

#### Description

Credit Based - Connection complete event.

#### Parameters

**Table 10. L2CAPCB-LePsmConnectionComplete.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x42
OpCode	1	0x82
Length	1	Length in bytes of the following parameters
InformationIncluded	1	Information is included or not

*Table continues on the next page...*

**Table 10. L2CAPCB-LePsmConnectionComplete.Indication Parameters (continued)**

LeCbConnectionComplete	Variable	Connection complete event data Structure type parameter. See the detailed table below for parameter structure.
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**Table 11. LeCbConnectionComplete Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Deviceld	1	The Deviceld for which the command is intended
Channel Id	2	The L2CAP Channel Id assigned on the initiator
PeerMtu	2	Peer's MTU
PeerMps	2	Peer's MPS
InitialCredits	2	Initial credits
Result	2	Connection result Possible values: 0x0000: gSuccessful_c 0x0002: gLePsmNotSupported_c 0x0004: gNoResourcesAvailable_c 0x0005: gInsufficientAuthentication_c 0x0006: gInsufficientAuthorization_c 0x0007: gInsufficientEncryptionKeySize_c 0x0008: gInsufficientEncryption_c 0x0009: gInvalidSourceCid_c 0x000A: gSourceCidAlreadyAllocated_c 0x0100: gCommandRejected_c 0xFFFE: gResponseTimeout_c

### 3.1.8 L2CAPCB-LePsmConnectionRequest.Indication

#### Description

Credit Based - Connection request event.

#### Parameters

**Table 12. L2CAPCB-LePsmConnectionRequest.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x42

*Table continues on the next page...*

**Table 12. L2CAPCB-LePsmConnectionRequest.Indication Parameters (continued)**

OpCode	1	0x81
Length	1	Length in bytes of the following parameters
InformationIncluded	1	Information is included or not
LeCbConnectionRequest	Variable	Connection request event data Structure type parameter. See the detailed table below for parameter structure.

**Table 13. LeCbConnectionRequest Parameter Structure**

Structure Parameter	Size (bytes)	Comments
DeviceId	1	The DeviceId for which the command is intended
LePsm	2	Bluetooth SIG or Vendor LE_PSM
PeerMtu	2	Peer MTU
PeerMps	2	Peer MPS
InitialCredits	2	Initial credits

### 3.1.9 L2CAPCB-LePsmDisconnectNotification.Indication

#### Description

Credit Based - Disconnection notification event.

#### Parameters

**Table 14. L2CAPCB-LePsmDisconnectNotification.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x42
OpCode	1	0x83
Length	1	Length in bytes of the following parameters
InformationIncluded	1	Information is included or not
LeCbDisconnection	Variable	Disconnection event data Structure type parameter. See the detailed table below for parameter structure.

**Table 15. LeCbDisconnection Parameter Structure**

Structure Parameter	Size (bytes)	Comments
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*Table continues on the next page...*



**Table 15. LeCbDisconnection Parameter Structure (continued)**

Deviceld	1	The Deviceld for which the command is intended
Channel Id	2	The L2CAP Channel Id assigned on the initiator

### 3.1.10 L2CAPCB-LocalCreditsNotification.Indication

#### Description

Credit Based - Local credits notification event.

#### Parameters

**Table 16. L2CAPCB-LocalCreditsNotification.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x42
OpCode	1	0x85
Length	1	Length in bytes of the following parameters
InformationIncluded	1	Information is included or not
LeCbLocalCreditsNotification	Variable	Local credits notification event data Structure type parameter. See the detailed table below for parameter structure.

**Table 17. LeCbLocalCreditsNotification Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Deviceld	1	The Deviceld for which the command is intended
Channel Id	2	The L2CAP Channel Id assigned on the initiator
LocalCredits	2	Local credits

### 3.1.11 L2CAPCB-NoPeerCredits.Indication

#### Description

Credit Based - No peer credits event.

#### Parameters

**Table 18. L2CAPCB-NoPeerCredits.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x42

*Table continues on the next page...*

**Table 18. L2CAPCB-NoPeerCredits.Indication Parameters (continued)**

OpCode	1	0x84
Length	1	Length in bytes of the following parameters
InformationIncluded	1	Information is included or not
LeCbNoPeerCredits	Variable	No peer credits event data Structure type parameter. See the detailed table below for parameter structure.

**Table 19. LeCbNoPeerCredits Parameter Structure**

Structure Parameter	Size (bytes)	Comments
DeviceId	1	The DeviceId for which the command is intended
Channel Id	2	The L2CAP Channel Id assigned on the initiator

### 3.1.12 L2CAPCB-RegisterLePsm.Request

#### Description

Register LePsm.

#### Parameters

**Table 20. L2CAPCB-RegisterLePsm.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x42
OpCode	1	0x02
Length	1	Length in bytes of the following parameters
LePsm	2	Bluetooth SIG or Vendor LE_PSM
LePsmMtu	2	MTU value

### 3.1.13 L2CAPCB-SendLeCbData.Request

#### Description

Sends a data packet through a Credit Based Channel.

#### Parameters

**Table 21. L2CAPCB-SendLeCredit.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x42

*Table continues on the next page...*

**Table 21. L2CAPCB-SendLeCredit.Request Parameters (continued)**

OpCode	1	0x07
Length	1	Length in bytes of the following parameters
DeviceId	1	The DeviceId for which the command is intended
Channel Id	2	The L2CAP Channel Id assigned on the initiator
PacketLength	2	Length of the data packet to be sent
Packet	PacketLength	The data packet to be transmitted

### 3.1.14 L2CAPCB-SendLeCredit.Request

#### Description

Sends credits to a device when capable of receiving additional LE-frames.

#### Parameters

**Table 22. L2CAPCB-SendLeCredit.Request Parameters**

Parameters	Size (bytes)	Comments
OpGroup	1	0x42
OpCode	1	0x08
Length	1	Length in bytes of the following parameters
DeviceId	1	The DeviceID to which credits are given
Channel Id	2	The L2CAP Channel Id assigned on the initiator
Credits	2	Number of credits to be given

### 3.1.15 L2CAPCB-RegisterLeCbCallbacks.Request

#### Description

Registers callbacks for credit based data and control events on L2CAP.

#### Parameters

**Table 23. L2CAPCB-RegisterLeCbCallbacks.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x42
OpCode	1	0x01
Length	2	0x00 - This message does not have any parameters

## 3.2 GATT Messages

### 3.2.1 GATT.Confirm

**Description**

Status of the GATT request.

**Parameters**

**Table 24. GATT.Confirm Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x80
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*

Table 24. GATT.Confirm Parameters (continued)

Status	2	<p>The status of the GATT request</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p> <p>0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c</p>
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**Table 24. GATT.Confirm Parameters (continued)**

		0x0110: gHciConnectionAcceptTimeoutExceeded_c
		0x0111: gHciUnsupportedFeatureOrParameterValue_c
		0x0112: gHciInvalidHciCommandParameters_c
		0x0113: gHciRemoteUserTerminatedConnection_c
		0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c
		0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c
		0x0116: gHciConnectionTerminatedByLocalHost_c
		0x0117: gHciRepeatedAttempts_c
		0x0118: gHciPairingNotAllowed_c
		0x0119: gHciUnknownLpmPdu_c
		0x011A: gHciUnsupportedRemoteFeature_c
		0x011B: gHciScoOffsetRejected_c
		0x011C: gHciScoIntervalRejected_c
		0x011D: gHciScoAirModeRejected_c
		0x011E: gHciInvalidLpmParameters_c
		0x011F: gHciUnspecifiedError_c
		0x0120: gHciUnsupportedLpmParameterValue_c
		0x0121: gHciRoleChangeNotAllowed_c
		0x0122: gHciLLResponseTimeout_c
		0x0123: gHciLmpErrorTransactionCollision_c
		0x0124: gHciLmpPduNotAllowed_c
		0x0125: gHciEncryptionModeNotAcceptable_c
		0x0126: gHciLinkKeyCannotBeChanged_c

Table 24. GATT.Confirm Parameters (continued)

		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c
		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c

**Table 24. GATT.Confirm Parameters (continued)**

		gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c
		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c



Table 24. GATT.Confirm Parameters (continued)

	0x0401: gSmNullCBFunction_c
	0x0402: gSmCommandNotSupported_c
	0x0403: gSmUnexpectedCommand_c
	0x0404: gSmInvalidCommandCode_c
	0x0405: gSmInvalidCommandLength_c
	0x0406: gSmInvalidCommandParameter_c
	0x0407: gSmInvalidDeviceId_c
	0x0408: gSmInvalidInternalOperation_c
	0x0409: gSmInvalidConnectionHandle_c
	0x040A: gSmImproperKeyDistributionField_c
	0x040B: gSmUnexpectedKeyType_c
	0x040C: gSmUnexpectedPairingTerminationReason_c
	0x040D: gSmUnexpectedKeyset_c
	0x040E: gSmSmpTimeoutOccurred_c
	0x040F: gSmUnknownSmpPacketType_c
	0x0410: gSmInvalidSmpPacketLength_c
	0x0411: gSmInvalidSmpPacketParameter_c
	0x0412: gSmReceivedUnexpectedSmpPacket_c
	0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
	0x0414: gSmReceivedUnexpectedHciEvent_c
	0x0415: gSmReceivedHciEventFromUnknownDevice_c
	0x0416: gSmInvalidHciEventParameter_c
	0x0417: gSmLlConnectionEncryptionInProgress_c
	0x0418: gSmLlConnectionEncryptionFailure_c
	0x0419: gSmInsufficientResources_c

**Table 24. GATT.Confirm Parameters (continued)**

		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutO ccurred_c
		0x041C: gSmReceivedTimerEventForUnknownD evice_c
		0x041D: gSmUnattainableLocalDeviceSecRequir ements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySiz e_c
		0x041F: gSmUnattainableSlaveSecReqRequirem ents_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupporte d_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c
		0x0460: gSmTbResolvableAddressDoesNotMatc hLrk_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c
		0x0503: gAttWriteNotPermitted_c
		0x0504: gAttInvalidPdu_c
		0x0505: gAttInsufficientAuthentication_c
		0x0506: gAttRequestNotSupported_c
		0x0507: gAttInvalidOffset_c
		0x0508: gAttInsufficientAuthorization_c
		0x0509: gAttPrepareQueueFull_c
		0x050A: gAttAttributeNotFound_c

Table 24. GATT.Confirm Parameters (continued)

	0x050B: gAttAttributeNotLong_c
	0x050C: gAttInsufficientEncryptionKeySize_c
	0x050D: gAttInvalidAttributeValueLength_c
	0x050E: gAttUnlikelyor_c
	0x050F: gAttInsufficientEncryption_c
	0x0510: gAttUnsupportedGroupType_c
	0x0511: gAttInsufficientResources_c
	0x0601: gGattAnotherProcedureInProgress_c
	0x0602: gGattLongAttributePacketsCorrupted_c
	0x0603: gGattMultipleAttributesOverflow_c
	0x0604: gGattUnexpectedReadMultipleResponseLength_c
	0x0605: gGattInvalidValueLength_c
	0x0606: gGattServerTimeout_c
	0x0607: gGattIndicationAlreadyInProgress_c
	0x0608: gGattClientConfirmationTimeout_c
	0x0701: gGapAdvDataTooLong_c
	0x0702: gGapScanRspDataTooLong_c
	0x0703: gGapDeviceNotBonded_c
	0x0704: gGapAnotherProcedureInProgress_c
	0x0801: gDevDbCccdLimitReached_c
	0x0802: gDevDbCccdNotFound_c
	0x0901: gGattDbInvalidHandle_c
	0x0902: gGattDbCharacteristicNotFound_c
	0x0903: gGattDbCccdNotFound_c
	0x0904: gGattDbServiceNotFound_c
	0x0905: gGattDbDescriptorNotFound_c

## 3.2.2 GATTClient-DiscoverAllCharacteristicDescriptors.Request

### Description

Initializes the Characteristic Descriptor Discovery procedure for a given Characteristic.

### Parameters

**Table 25. GATTClient-DiscoverAllCharacteristicDescriptors.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x0E
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the connected peer
Characteristic	Variable	The characteristic within which descriptors should be searched  Structure type parameter. See the detailed table below for parameter structure.
EndingHandle	2	The last handle of the Characteristic
MaxNbOfDescriptors	1	Maximum number of descriptors to be filled

**Table 26. Characteristic Parameter Structure**

Structure Parameter	Size (bytes)	Comments
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*Table continues on the next page...*

**Table 26. Characteristic Parameter Structure (continued)**

Properties	1	<p>Characteristic Properties as defined by GATT</p> <p>Possible values:</p> <p>0x00: gNone_c (No Properties selected)</p> <p>0x01: gBroadcast_c (Characteristic can be broadcast)</p> <p>0x02: gRead_c (Characteristic can be read)</p> <p>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)</p> <p>0x08: gWrite_c (Characteristic can be written with response)</p> <p>0x10: gNotify_c (Characteristic can be notified)</p> <p>0x20: gIndicate_c (Characteristic can be indicated)</p> <p>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)</p> <p>0x80: gExtendedProperties_c (Extended Characteristic properties)</p>
Value	Variable	<p>Characteristic Value attribute</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p>
NbOfDescriptors	1	Size of the Characteristic Descriptors array
Descriptors	Variable	<p>Characteristic Descriptors array</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p>

**Table 27. Value Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle

*Table continues on the next page...*

**Table 27. Value Parameter Structure (continued)**

UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 28. Descriptors Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

Table 29. Uuid Parameter Structure

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

Table 30. Uuid Parameter Structure

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.2.3 GATTClient-DiscoverAllCharacteristicsOfService.Request

#### Description

Initializes the Characteristic Discovery procedure for a given Service.

#### Parameters

Table 31. GATTClient-DiscoverAllCharacteristicsOfService.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x0C
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the connected peer
Service	Variable	The service within which characteristics should be searched  Structure type parameter. See the detailed table below for parameter structure.
MaxNbOfCharacteristics	1	Maximum number of characteristics to be filled

Table 32. Service Parameter Structure

Structure Parameter	Size (bytes)	Comments
StartHandle	2	The handle of the Service Declaration attribute
EndHandle	2	The last handle belonging to this Service (followed by another Service declaration of the end of the database)

Table continues on the next page...

**Table 32. Service Parameter Structure (continued)**

UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
NbOfCharacteristics	1	Size of the Characteristic array
Characteristics	Variable	Characteristic array Structure type parameter. See the detailed table below for parameter structure.
NbOfIncludedServices	1	Size of the Included Services array
IncludedServices	Variable	Included Services array Structure type parameter. See the detailed table below for parameter structure.

**Table 33. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 34. Characteristics Parameter Structure**

Structure Parameter	Size (bytes)	Comments
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*Table continues on the next page...*



**Table 34. Characteristics Parameter Structure (continued)**

Properties	1	<p>Characteristic Properties as defined by GATT</p> <p>Possible values:</p> <p>0x00: gNone_c (No Properties selected)</p> <p>0x01: gBroadcast_c (Characteristic can be broadcast)</p> <p>0x02: gRead_c (Characteristic can be read)</p> <p>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)</p> <p>0x08: gWrite_c (Characteristic can be written with response)</p> <p>0x10: gNotify_c (Characteristic can be notified)</p> <p>0x20: gIndicate_c (Characteristic can be indicated)</p> <p>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)</p> <p>0x80: gExtendedProperties_c (Extended Characteristic properties)</p>
Value	Variable	<p>Characteristic Value attribute</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p>
NbOfDescriptors	1	Size of the Characteristic Descriptors array
Descriptors	Variable	<p>Characteristic Descriptors array</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p>

**Table 35. IncludedServices Parameter Structure**

Structure Parameter	Size (bytes)	Comments
StartHandle	2	The handle of the Service Declaration attribute
EndHandle	2	The last handle belonging to this Service (followed by another Service declaration of the end of the database)

*Table continues on the next page...*

**Table 35. IncludedServices Parameter Structure (continued)**

UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
NbOfCharacteristics	1	Size of the Characteristic array
NbOfIncludedServices	1	Size of the Included Services array

**Table 36. Value Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 37. Descriptors Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle

*Table continues on the next page...*

**Table 37. Descriptors Parameter Structure (continued)**

UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 38. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 39. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 40. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

## 3.2.4 GATTClient-DiscoverAllPrimaryServices.Request

### Description

Initializes the Primary Service Discovery procedure.

#### Parameters

**Table 41. GATTClient-DiscoverAllPrimaryServices.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x09
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the connected peer
MaxNbOfServices	1	Maximum number of services to be filled

### 3.2.5 GATTClient-DiscoverCharacteristicOfServiceByUuid.Request

#### Description

Initializes the Characteristic Discovery procedure for a given Service, with a given UUID.

#### Parameters

**Table 42. GATTClient-DiscoverCharacteristicOfServiceByUuid.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x0D
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the connected peer
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.

*Table continues on the next page...*

**Table 42. GATTClient-DiscoverCharacteristicOfServiceByUuid.Request Parameters (continued)**

Service	Variable	The service within which characteristics should be searched  Structure type parameter. See the detailed table below for parameter structure.
MaxNbOfCharacteristics	1	Maximum number of characteristics to be filled

**Table 43. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 44. Service Parameter Structure**

Structure Parameter	Size (bytes)	Comments
StartHandle	2	The handle of the Service Declaration attribute
EndHandle	2	The last handle belonging to this Service (followed by another Service declaration of the end of the database)
UuidType	1	UUID type  Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value  "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
NbOfCharacteristics	1	Size of the Characteristic array
Characteristics	Variable	Characteristic array  Structure type parameter. See the detailed table below for parameter structure.
NbOfIncludedServices	1	Size of the Included Services array

*Table continues on the next page...*

**Table 44. Service Parameter Structure (continued)**

IncludedServices	Variable	Included Services array  Structure type parameter. See the detailed table below for parameter structure.
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**Table 45. Characteristics Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Properties	1	Characteristic Properties as defined by GATT  Possible values: 0x00: gNone_c (No Properties selected) 0x01: gBroadcast_c (Characteristic can be broadcast) 0x02: gRead_c (Characteristic can be read) 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) 0x08: gWrite_c (Characteristic can be written with response) 0x10: gNotify_c (Characteristic can be notified) 0x20: gIndicate_c (Characteristic can be indicated) 0x40: gAuthSignedWrites_c (Characteristic can be written with signed data) 0x80: gExtendedProperties_c (Extended Characteristic properties)
Value	Variable	Characteristic Value attribute  Structure type parameter. See the detailed table below for parameter structure.
NbOfDescriptors	1	Size of the Characteristic Descriptors array
Descriptors	Variable	Characteristic Descriptors array  Structure type parameter. See the detailed table below for parameter structure.

**Table 46. IncludedServices Parameter Structure**

Structure Parameter	Size (bytes)	Comments
StartHandle	2	The handle of the Service Declaration attribute
EndHandle	2	The last handle belonging to this Service (followed by another Service declaration of the end of the database)
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
NbOfCharacteristics	1	Size of the Characteristic array
NbOfIncludedServices	1	Size of the Included Services array

**Table 47. Value Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 48. Descriptors Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value  "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 49. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 50. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 51. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits



## 3.2.6 GATTClient-DiscoverPrimaryServicesByUuid.Request

### Description

Initializes the Primary Service Discovery by UUID procedure.

### Parameters

**Table 52. GATTClient-DiscoverPrimaryServicesByUuid.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x0A
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the connected peer
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
MaxNbOfServices	1	Maximum number of services to be filled

**Table 53. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

## 3.2.7 GATTClient-ExchangeMtu.Request

### Description

Initializes the MTU Exchange procedure.

### Parameters

**Table 54. GATTClient-ExchangeMtu.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45

*Table continues on the next page...*

**Table 54. GATTClient-ExchangeMtu.Request Parameters (continued)**

OpCode	1	0x08
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the connected peer

## 3.2.8 GATTClient-FindIncludedServices.Request

### Description

Initializes the Find Included Services procedure.

### Parameters

**Table 55. GATTClient-FindIncludedServices.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x0B
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the connected peer
Service	Variable	The service within which inclusions should be searched  Structure type parameter. See the detailed table below for parameter structure.
MaxNbOfIncludedServices	1	Maximum number of included services to be filled

**Table 56. Service Parameter Structure**

Structure Parameter	Size (bytes)	Comments
StartHandle	2	The handle of the Service Declaration attribute
EndHandle	2	The last handle belonging to this Service (followed by another Service declaration of the end of the database)
UuidType	1	UUID type  Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits

*Table continues on the next page...*

**Table 56. Service Parameter Structure (continued)**

Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
NbOfCharacteristics	1	Size of the Characteristic array
Characteristics	Variable	Characteristic array Structure type parameter. See the detailed table below for parameter structure.
NbOfIncludedServices	1	Size of the Included Services array
IncludedServices	Variable	Included Services array Structure type parameter. See the detailed table below for parameter structure.

**Table 57. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 58. Characteristics Parameter Structure**

Structure Parameter	Size (bytes)	Comments
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*Table continues on the next page...*

**Table 58. Characteristics Parameter Structure (continued)**

Properties	1	<p>Characteristic Properties as defined by GATT</p> <p>Possible values:</p> <p>0x00: gNone_c (No Properties selected)</p> <p>0x01: gBroadcast_c (Characteristic can be broadcast)</p> <p>0x02: gRead_c (Characteristic can be read)</p> <p>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)</p> <p>0x08: gWrite_c (Characteristic can be written with response)</p> <p>0x10: gNotify_c (Characteristic can be notified)</p> <p>0x20: gIndicate_c (Characteristic can be indicated)</p> <p>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)</p> <p>0x80: gExtendedProperties_c (Extended Characteristic properties)</p>
Value	Variable	<p>Characteristic Value attribute</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p>
NbOfDescriptors	1	Size of the Characteristic Descriptors array
Descriptors	Variable	<p>Characteristic Descriptors array</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p>

**Table 59. IncludedServices Parameter Structure**

Structure Parameter	Size (bytes)	Comments
StartHandle	2	The handle of the Service Declaration attribute
EndHandle	2	The last handle belonging to this Service (followed by another Service declaration of the end of the database)

*Table continues on the next page...*

**Table 59. IncludedServices Parameter Structure (continued)**

UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
NbOfCharacteristics	1	Size of the Characteristic array
NbOfIncludedServices	1	Size of the Included Services array

**Table 60. Value Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 61. Descriptors Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle

*Table continues on the next page...*

**Table 61. Descriptors Parameter Structure (continued)**

UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 62. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 63. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 64. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

## 3.2.9 GATTClient-Indication.Indication

### Description

GATT Client indication.

#### Parameters

**Table 65. GATTClient-Indication.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x90
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
CharacteristicValueHandle	2	Handle of the Characteristic Value attribute to be indicated
ValueLength	2	Value array size
Value	ValueLength	The Characteristic value array

## 3.2.10 GATTClient-Init.Request

#### Description

Initializes the GATT Client functionality.

#### Parameters

**Table 66. GATTClient-Init.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x03
Length	1	0x00 - This message does not have any parameters

## 3.2.11 GATTClient-Notification.Indication

#### Description

GATT Client notification.

#### Parameters

**Table 67. GATTClient-Notification.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x8F
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*

**Table 67. GATTClient-Notification.Indication Parameters (continued)**

DeviceId	1	Device ID identifying the active connection
CharacteristicValueHandle	2	Handle of the Characteristic Value attribute to be notified
ValueLength	2	Value array size
Value	ValueLength	The Characteristic value array

### 3.2.12 GATTClient-ProcedureDiscoverAllCharacteristicDescriptors.Indication

#### Description

Specifies that the Characteristic Descriptor Discovery procedure for a given characteristic ended.

#### Parameters

**Table 68. GATTClient-ProcedureDiscoverAllCharacteristicDescriptors.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x88
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
ProcedureResult	1	The result of the completed procedure Possible values: 0x00: gGattProcSuccess_c (The procedure was completed successfully) 0x01: gProcedureError_c (The procedure was terminated due to an error)

*Table continues on the next page...*



**Table 68. GATTClient-ProcedureDiscoverAllCharacteristicDescriptors.Indication Parameters (continued)**

Error	2	<p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p>
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*Table continues on the next page...*

**Table 68. GATTClient-ProcedureDiscoverAllCharacteristicDescriptors.Indication Parameters (continued)**

	0x010F: gHciConnectionRejectedDueToUnacceptedBdAddr_c
	0x0110: gHciConnectionAcceptTimeoutExceeded_c
	0x0111: gHciUnsupportedFeatureOrParameterValue_c
	0x0112: gHciInvalidHciCommandParameters_c
	0x0113: gHciRemoteUserTerminatedConnection_c
	0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c
	0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c
	0x0116: gHciConnectionTerminatedByLocalHost_c
	0x0117: gHciRepeatedAttempts_c
	0x0118: gHciPairingNotAllowed_c
	0x0119: gHciUnknownLmpPdu_c
	0x011A: gHciUnsupportedRemoteFeature_c
	0x011B: gHciScoOffsetRejected_c
	0x011C: gHciScoIntervalRejected_c
	0x011D: gHciScoAirModeRejected_c
	0x011E: gHciInvalidLmpParameters_c
	0x011F: gHciUnspecifiedError_c
	0x0120: gHciUnsupportedLmpParameterValue_c
	0x0121: gHciRoleChangeNotAllowed_c
	0x0122: gHciLLResponseTimeout_c
	0x0123: gHciLmpErrorTransactionCollision_c
	0x0124: gHciLmpPduNotAllowed_c

*Table continues on the next page...*

**Table 68. GATTClient-ProcedureDiscoverAllCharacteristicDescriptors.Indication Parameters (continued)**

		0x0125: gHciEncryptionModeNotAcceptable_c
		0x0126: gHciLinkKeyCannotBeChanged_c
		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c

*Table continues on the next page...*

**Table 68. GATTClient-ProcedureDiscoverAllCharacteristicDescriptors.Indication Parameters (continued)**

		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c
		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c

*Table continues on the next page...*

**Table 68. GATTClient-ProcedureDiscoverAllCharacteristicDescriptors.Indication Parameters (continued)**

		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c

*Table continues on the next page...*

**Table 68. GATTClient-ProcedureDiscoverAllCharacteristicDescriptors.Indication Parameters (continued)**

		0x0416: gSmInvalidHciEventParameter_c
		0x0417: gSmLlConnectionEncryptionInProgress_c
		0x0418: gSmLlConnectionEncryptionFailure_c
		0x0419: gSmInsufficientResources_c
		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c
		0x041C: gSmReceivedTimerEventForUnknownDevice_c
		0x041D: gSmUnattainableLocalDeviceSecRequirements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySize_c
		0x041F: gSmUnattainableSlaveSecReqRequirements_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupported_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c
		0x0460: gSmTbResolvableAddressDoesNotMatch_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c

*Table continues on the next page...*

**Table 68. GATTClient-ProcedureDiscoverAllCharacteristicDescriptors.Indication Parameters (continued)**

	0x0503: gAttWriteNotPermitted_c
	0x0504: gAttInvalidPdu_c
	0x0505: gAttInsufficientAuthentication_c
	0x0506: gAttRequestNotSupported_c
	0x0507: gAttInvalidOffset_c
	0x0508: gAttInsufficientAuthorization_c
	0x0509: gAttPrepareQueueFull_c
	0x050A: gAttAttributeNotFound_c
	0x050B: gAttAttributeNotLong_c
	0x050C: gAttInsufficientEncryptionKeySize_c
	0x050D: gAttInvalidAttributeValueLength_c
	0x050E: gAttUnlikelyor_c
	0x050F: gAttInsufficientEncryption_c
	0x0510: gAttUnsupportedGroupType_c
	0x0511: gAttInsufficientResources_c
	0x0601: gGattAnotherProcedureInProgress_c
	0x0602: gGattLongAttributePacketsCorrupted_c
	0x0603: gGattMultipleAttributesOverflow_c
	0x0604: gGattUnexpectedReadMultipleResponseLength_c
	0x0605: gGattInvalidValueLength_c
	0x0606: gGattServerTimeout_c
	0x0607: gGattIndicationAlreadyInProgress_c
	0x0608: gGattClientConfirmationTimeout_c
	0x0701: gGapAdvDataTooLong_c
	0x0702: gGapScanRspDataTooLong_c
	0x0703: gGapDeviceNotBonded_c
	0x0704: gGapAnotherProcedureInProgress_c
	0x0801: gDevDbCccdLimitReached_c

*Table continues on the next page...*

**Table 68. GATTClient-ProcedureDiscoverAllCharacteristicDescriptors.Indication Parameters (continued)**

		0x0802: gDevDbCccdNotFound_c 0x0901: gGattDbInvalidHandle_c 0x0902: gGattDbCharacteristicNotFound_c 0x0903: gGattDbCccdNotFound_c 0x0904: gGattDbServiceNotFound_c 0x0905: gGattDbDescriptorNotFound_c
Characteristic	Variable	The characteristic within which descriptors were searched  Structure type parameter. See the detailed table below for parameter structure.

**Table 69. Characteristics Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Properties	1	Characteristic Properties as defined by GATT  Possible values: 0x00: gNone_c (No Properties selected) 0x01: gBroadcast_c (Characteristic can be broadcast) 0x02: gRead_c (Characteristic can be read) 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) 0x08: gWrite_c (Characteristic can be written with response) 0x10: gNotify_c (Characteristic can be notified) 0x20: gIndicate_c (Characteristic can be indicated) 0x40: gAuthSignedWrites_c (Characteristic can be written with signed data) 0x80: gExtendedProperties_c (Extended Characteristic properties)

*Table continues on the next page...*



**Table 69. Characteristics Parameter Structure (continued)**

Value	Variable	Characteristic Value attribute Structure type parameter. See the detailed table below for parameter structure.
NbOfDescriptors	1	Size of the Characteristic Descriptors array
Descriptors	Variable	Characteristic Descriptors array Structure type parameter. See the detailed table below for parameter structure.

**Table 70. Value Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 71. Descriptors Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle

*Table continues on the next page...*

**Table 71. Descriptors Parameter Structure (continued)**

UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 72. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 73. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.2.13 GATTClient-ProcedureDiscoverAllCharacteristics.Indication

#### Description

Specifies that the Characteristic Discovery procedure for a given service ended.

#### Parameters

**Table 74. GATTClient-ProcedureDiscoverAllCharacteristics.Indication Parameters**

Parameter	Size (bytes)	Comments
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*Table continues on the next page...*

**Table 74. GATTClient-ProcedureDiscoverAllCharacteristics.Indication Parameters (continued)**

OpGroup	1	0x45
OpCode	1	0x86
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
ProcedureResult	1	<p>The result of the completed procedure</p> <p>Possible values:</p> <p>0x00: gGattProcSuccess_c (The procedure was completed successfully)</p> <p>0x01: gProcedureError_c (The procedure was terminated due to an error)</p>

*Table continues on the next page...*

**Table 74. GATTClient-ProcedureDiscoverAllCharacteristics.Indication Parameters (continued)**

Error	2	<p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p>
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**Table 74. GATTClient-ProcedureDiscoverAllCharacteristics.Indication Parameters (continued)**

	0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c
	0x0110: gHciConnectionAcceptTimeoutExceede d_c
	0x0111: gHciUnsupportedFeatureOrParameterV alue_c
	0x0112: gHciInvalidHciCommandParameters_c
	0x0113: gHciRemoteUserTerminatedConnection _c
	0x0114: gHciRemoteDeviceTerminatedConnectio nLowResources_c
	0x0115: gHciRemoteDeviceTerminatedConnectio nPowerOff_c
	0x0116: gHciConnectionTerminatedByLocalHost _c
	0x0117: gHciRepeatedAttempts_c
	0x0118: gHciPairingNotAllowed_c
	0x0119: gHciUnknownLpmPdu_c
	0x011A: gHciUnsupportedRemoteFeature_c
	0x011B: gHciScoOffsetRejected_c
	0x011C: gHciScoIntervalRejected_c
	0x011D: gHciScoAirModeRejected_c
	0x011E: gHciInvalidLpmParameters_c
	0x011F: gHciUnspecifiedError_c
	0x0120: gHciUnsupportedLpmParameterValue_c
	0x0121: gHciRoleChangeNotAllowed_c
	0x0122: gHciLLResponseTimeout_c
	0x0123: gHciLmpErrorTransactionCollision_c
	0x0124: gHciLmpPduNotAllowed_c

*Table continues on the next page...*

**Table 74. GATTClient-ProcedureDiscoverAllCharacteristics.Indication Parameters (continued)**

		0x0125: gHciEncryptionModeNotAcceptable_c
		0x0126: gHciLinkKeyCannotBeChanged_c
		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c

*Table continues on the next page...*

**Table 74. GATTClient-ProcedureDiscoverAllCharacteristics.Indication Parameters (continued)**

	0x013C: gHciDirectedAdvertisingTimeout_c
	0x013D: gHciConnectionTerminatedDueToMicFailure_c
	0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
	0x013F: gHciMacConnectionFailed_c
	0x0140: gHciCoarseClockAdjustmentRejected_c
	0x0141: gHciType0SubmapNotDefined_c
	0x0142: gHciUnknownAdvertisingIdentifier_c
	0x0143: gHciLimitReached_c
	0x0144: gHciOperationCancelledByHost_c
	0x01A0: gHciAlreadyInit_c
	0x01A1: gHciInvalidParameter_c
	0x01A2: gHciCallbackNotInstalled_c
	0x01A3: gHciCallbackAlreadyInstalled_c
	0x01A4: gHciCommandNotSupported_c
	0x01A5: gHciEventNotSupported_c
	0x01A6: gHciTransportError_c
	0x03F0: gL2caAlreadyInit_c
	0x03F1: gL2caInsufficientResources_c
	0x03F2: gL2caCallbackNotInstalled_c
	0x03F3: gL2caCallbackAlreadyInstalled_c
	0x03F4: gL2caLePsmInvalid_c
	0x03F5: gL2caLePsmAlreadyRegistered_c
	0x03F6: gL2caLePsmNotRegistered_c
	0x03F7: gL2caLePsmInsufficientResources_c
	0x03F8: gL2caChannelInvalid_c
	0x03F9: gL2caChannelClosed_c

*Table continues on the next page...*

**Table 74. GATTClient-ProcedureDiscoverAllCharacteristics.Indication Parameters (continued)**

		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c

*Table continues on the next page...*



**Table 74. GATTClient-ProcedureDiscoverAllCharacteristics.Indication Parameters (continued)**

	0x0416: gSmInvalidHciEventParameter_c
	0x0417: gSmLlConnectionEncryptionInProgress_c
	0x0418: gSmLlConnectionEncryptionFailure_c
	0x0419: gSmInsufficientResources_c
	0x041A: gSmOobDataAddressMismatch_c
	0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c
	0x041C: gSmReceivedTimerEventForUnknownDevice_c
	0x041D: gSmUnattainableLocalDeviceSecRequirements_c
	0x041E: gSmUnattainableLocalDeviceMinKeySize_c
	0x041F: gSmUnattainableSlaveSecReqRequirements_c
	0x0431: gSmPairingErrorPasskeyEntryFailed_c
	0x0432: gSmPairingErrorConfirmValueFailed_c
	0x0433: gSmPairingErrorCommandNotSupported_c
	0x0434: gSmPairingErrorInvalidParameters_c
	0x0435: gSmPairingErrorUnknownReason_c
	0x0460: gSmTbResolvableAddressDoesNotMatch_c
	0x0461: gSmTbInvalidDataSignature_c
	0x0501: gAttInvalidHandle_c
	0x0502: gAttReadNotPermitted_c

*Table continues on the next page...*

**Table 74. GATTClient-ProcedureDiscoverAllCharacteristics.Indication Parameters (continued)**

	0x0503: gAttWriteNotPermitted_c
	0x0504: gAttInvalidPdu_c
	0x0505: gAttInsufficientAuthentication_c
	0x0506: gAttRequestNotSupported_c
	0x0507: gAttInvalidOffset_c
	0x0508: gAttInsufficientAuthorization_c
	0x0509: gAttPrepareQueueFull_c
	0x050A: gAttAttributeNotFound_c
	0x050B: gAttAttributeNotLong_c
	0x050C: gAttInsufficientEncryptionKeySize_c
	0x050D: gAttInvalidAttributeValueLength_c
	0x050E: gAttUnlikelyor_c
	0x050F: gAttInsufficientEncryption_c
	0x0510: gAttUnsupportedGroupType_c
	0x0511: gAttInsufficientResources_c
	0x0601: gGattAnotherProcedureInProgress_c
	0x0602: gGattLongAttributePacketsCorrupted_c
	0x0603: gGattMultipleAttributesOverflow_c
	0x0604: gGattUnexpectedReadMultipleResponseLength_c
	0x0605: gGattInvalidValueLength_c
	0x0606: gGattServerTimeout_c
	0x0607: gGattIndicationAlreadyInProgress_c
	0x0608: gGattClientConfirmationTimeout_c
	0x0701: gGapAdvDataTooLong_c
	0x0702: gGapScanRspDataTooLong_c
	0x0703: gGapDeviceNotBonded_c
	0x0704: gGapAnotherProcedureInProgress_c
	0x0801: gDevDbCccdLimitReached_c

*Table continues on the next page...*

**Table 74. GATTClient-ProcedureDiscoverAllCharacteristics.Indication Parameters (continued)**

		0x0802: gDevDbCccdNotFound_c 0x0901: gGattDbInvalidHandle_c 0x0902: gGattDbCharacteristicNotFound_c 0x0903: gGattDbCccdNotFound_c 0x0904: gGattDbServiceNotFound_c 0x0905: gGattDbDescriptorNotFound_c
Service	Variable	The service within which characteristics were searched  Structure type parameter. See the detailed table below for parameter structure.

**Table 75. Service Parameter Structure**

Structure Parameter	Size (bytes)	Comments
StartHandle	2	The handle of the Service Declaration attribute
EndHandle	2	The last handle belonging to this Service (followed by another Service declaration of the end of the database)
UuidType	1	UUID type  Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value  "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
NbOfCharacteristics	1	Size of the Characteristic array
Characteristics	Variable	Characteristic array  Structure type parameter. See the detailed table below for parameter structure.
NbOfIncludedServices	1	Size of the Included Services array

*Table continues on the next page...*

**Table 75. Service Parameter Structure (continued)**

IncludedServices	Variable	Included Services array  Structure type parameter. See the detailed table below for parameter structure.
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**Table 76. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 77. Characteristics Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Properties	1	Characteristic Properties as defined by GATT  Possible values: 0x00: gNone_c (No Properties selected) 0x01: gBroadcast_c (Characteristic can be broadcast) 0x02: gRead_c (Characteristic can be read) 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) 0x08: gWrite_c (Characteristic can be written with response) 0x10: gNotify_c (Characteristic can be notified) 0x20: gIndicate_c (Characteristic can be indicated) 0x40: gAuthSignedWrites_c (Characteristic can be written with signed data) 0x80: gExtendedProperties_c (Extended Characteristic properties)
Value	Variable	Characteristic Value attribute  Structure type parameter. See the detailed table below for parameter structure.

*Table continues on the next page...*

**Table 77. Characteristics Parameter Structure (continued)**

NbOfDescriptors	1	Size of the Characteristic Descriptors array
Descriptors	Variable	Characteristic Descriptors array Structure type parameter. See the detailed table below for parameter structure.

**Table 78. IncludedServices Parameter Structure**

Structure Parameter	Size (bytes)	Comments
StartHandle	2	The handle of the Service Declaration attribute
EndHandle	2	The last handle belonging to this Service (followed by another Service declaration of the end of the database)
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
NbOfCharacteristics	1	Size of the Characteristic array
NbOfIncludedServices	1	Size of the Included Services array

**Table 79. Value Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits

*Table continues on the next page...*

**Table 79. Value Parameter Structure (continued)**

Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 80. Descriptors Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 81. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

Table 82. Uuid Parameter Structure

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

Table 83. Uuid Parameter Structure

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.2.14 GATTClient-ProcedureDiscoverAllPrimaryServices.Indication

#### Description

Specifies that the Primary Service Discovery procedure ended.

#### Parameters

Table 84. GATTClient-ProcedureDiscoverAllPrimaryServices.Indication Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x83
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
ProcedureResult	1	The result of the completed procedure Possible values: 0x00: gGattProcSuccess_c (The procedure was completed successfully) 0x01: gProcedureError_c (The procedure was terminated due to an error)

Table continues on the next page...

**Table 84. GATTClient-ProcedureDiscoverAllPrimaryServices.Indication Parameters (continued)**

Error	2	<p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p>
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**Table 84. GATTClient-ProcedureDiscoverAllPrimaryServices.Indication Parameters (continued)**

		0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c
		0x0110: gHciConnectionAcceptTimeoutExceede d_c
		0x0111: gHciUnsupportedFeatureOrParameterV alue_c
		0x0112: gHciInvalidHciCommandParameters_c
		0x0113: gHciRemoteUserTerminatedConnection _c
		0x0114: gHciRemoteDeviceTerminatedConnectio nLowResources_c
		0x0115: gHciRemoteDeviceTerminatedConnectio nPowerOff_c
		0x0116: gHciConnectionTerminatedByLocalHost _c
		0x0117: gHciRepeatedAttempts_c
		0x0118: gHciPairingNotAllowed_c
		0x0119: gHciUnknownLpmPdu_c
		0x011A: gHciUnsupportedRemoteFeature_c
		0x011B: gHciScoOffsetRejected_c
		0x011C: gHciScoIntervalRejected_c
		0x011D: gHciScoAirModeRejected_c
		0x011E: gHciInvalidLpmParameters_c
		0x011F: gHciUnspecifiedError_c
		0x0120: gHciUnsupportedLpmParameterValue_c
		0x0121: gHciRoleChangeNotAllowed_c
		0x0122: gHciLLResponseTimeout_c
		0x0123: gHciLmpErrorTransactionCollision_c
		0x0124: gHciLmpPduNotAllowed_c

*Table continues on the next page...*

**Table 84. GATTClient-ProcedureDiscoverAllPrimaryServices.Indication Parameters (continued)**

		0x0125: gHciEncryptionModeNotAcceptable_c
		0x0126: gHciLinkKeyCannotBeChanged_c
		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c

*Table continues on the next page...*

**Table 84. GATTClient-ProcedureDiscoverAllPrimaryServices.Indication Parameters (continued)**

		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c
		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c

*Table continues on the next page...*

**Table 84. GATTClient-ProcedureDiscoverAllPrimaryServices.Indication Parameters (continued)**

		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c

*Table continues on the next page...*

**Table 84. GATTClient-ProcedureDiscoverAllPrimaryServices.Indication Parameters (continued)**

		0x0416: gSmInvalidHciEventParameter_c
		0x0417: gSmLlConnectionEncryptionInProgress_c
		0x0418: gSmLlConnectionEncryptionFailure_c
		0x0419: gSmInsufficientResources_c
		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c
		0x041C: gSmReceivedTimerEventForUnknownDevice_c
		0x041D: gSmUnattainableLocalDeviceSecRequirements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySize_c
		0x041F: gSmUnattainableSlaveSecReqRequirements_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupported_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c
		0x0460: gSmTbResolvableAddressDoesNotMatch_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c

*Table continues on the next page...*

**Table 84. GATTClient-ProcedureDiscoverAllPrimaryServices.Indication Parameters (continued)**

	0x0503: gAttWriteNotPermitted_c
	0x0504: gAttInvalidPdu_c
	0x0505: gAttInsufficientAuthentication_c
	0x0506: gAttRequestNotSupported_c
	0x0507: gAttInvalidOffset_c
	0x0508: gAttInsufficientAuthorization_c
	0x0509: gAttPrepareQueueFull_c
	0x050A: gAttAttributeNotFound_c
	0x050B: gAttAttributeNotLong_c
	0x050C: gAttInsufficientEncryptionKeySize_c
	0x050D: gAttInvalidAttributeValueLength_c
	0x050E: gAttUnlikelyor_c
	0x050F: gAttInsufficientEncryption_c
	0x0510: gAttUnsupportedGroupType_c
	0x0511: gAttInsufficientResources_c
	0x0601: gGattAnotherProcedureInProgress_c
	0x0602: gGattLongAttributePacketsCorrupted_c
	0x0603: gGattMultipleAttributesOverflow_c
	0x0604: gGattUnexpectedReadMultipleResponseLength_c
	0x0605: gGattInvalidValueLength_c
	0x0606: gGattServerTimeout_c
	0x0607: gGattIndicationAlreadyInProgress_c
	0x0608: gGattClientConfirmationTimeout_c
	0x0701: gGapAdvDataTooLong_c
	0x0702: gGapScanRspDataTooLong_c
	0x0703: gGapDeviceNotBonded_c
	0x0704: gGapAnotherProcedureInProgress_c
	0x0801: gDevDbCccdLimitReached_c

*Table continues on the next page...*

**Table 84. GATTClient-ProcedureDiscoverAllPrimaryServices.Indication Parameters (continued)**

		0x0802: gDevDbCccdNotFound_c 0x0901: gGattDbInvalidHandle_c 0x0902: gGattDbCharacteristicNotFound_c 0x0903: gGattDbCccdNotFound_c 0x0904: gGattDbServiceNotFound_c 0x0905: gGattDbDescriptorNotFound_c
NbOfDiscoveredServices	1	Number of discovered services
DiscoveredServices	Variable	Discovered services  Structure type parameter. See the detailed table below for parameter structure.

**Table 85. DiscoveredServices Parameter Structure**

Structure Parameter	Size (bytes)	Comments
StartHandle	2	The handle of the Service Declaration attribute
EndHandle	2	The last handle belonging to this Service (followed by another Service declaration of the end of the database)
UuidType	1	UUID type  Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value  "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
NbOfCharacteristics	1	Size of the Characteristic array
Characteristics	Variable	Characteristic array  Structure type parameter. See the detailed table below for parameter structure.
NbOfIncludedServices	1	Size of the Included Services array

*Table continues on the next page...*

**Table 85. DiscoveredServices Parameter Structure (continued)**

IncludedServices	Variable	Included Services array  Structure type parameter. See the detailed table below for parameter structure.
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**Table 86. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 87. Characteristics Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Properties	1	Characteristic Properties as defined by GATT  Possible values: 0x00: gNone_c (No Properties selected) 0x01: gBroadcast_c (Characteristic can be broadcast) 0x02: gRead_c (Characteristic can be read) 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) 0x08: gWrite_c (Characteristic can be written with response) 0x10: gNotify_c (Characteristic can be notified) 0x20: gIndicate_c (Characteristic can be indicated) 0x40: gAuthSignedWrites_c (Characteristic can be written with signed data) 0x80: gExtendedProperties_c (Extended Characteristic properties)
Value	Variable	Characteristic Value attribute  Structure type parameter. See the detailed table below for parameter structure.

*Table continues on the next page...*



**Table 87. Characteristics Parameter Structure (continued)**

NbOfDescriptors	1	Size of the Characteristic Descriptors array
Descriptors	Variable	Characteristic Descriptors array Structure type parameter. See the detailed table below for parameter structure.

**Table 88. IncludedServices Parameter Structure**

Structure Parameter	Size (bytes)	Comments
StartHandle	2	The handle of the Service Declaration attribute
EndHandle	2	The last handle belonging to this Service (followed by another Service declaration of the end of the database)
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
NbOfCharacteristics	1	Size of the Characteristic array
NbOfIncludedServices	1	Size of the Included Services array

**Table 89. Value Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits

*Table continues on the next page...*

**Table 89. Value Parameter Structure (continued)**

Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 90. Descriptors Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 91. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

Table 92. Uuid Parameter Structure

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

Table 93. Uuid Parameter Structure

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.2.15 GATTClient-ProcedureDiscoverCharacteristicByUuid.Indication

#### Description

Specifies that the Characteristic Discovery procedure for a given service (with a given UUID) ended.

#### Parameters

Table 94. GATTClient-ProcedureDiscoverCharacteristicByUuid.Indication Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x87
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
ProcedureResult	1	The result of the completed procedure Possible values: 0x00: gGattProcSuccess_c (The procedure was completed successfully) 0x01: gProcedureError_c (The procedure was terminated due to an error)

Table continues on the next page...

**Table 94. GATTClient-ProcedureDiscoverCharacteristicByUuid.Indication Parameters (continued)**

Error	2	<p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p>
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*Table continues on the next page...*

**Table 94. GATTClient-ProcedureDiscoverCharacteristicByUuid.Indication Parameters (continued)**

		0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c
		0x0110: gHciConnectionAcceptTimeoutExceede d_c
		0x0111: gHciUnsupportedFeatureOrParameterV alue_c
		0x0112: gHciInvalidHciCommandParameters_c
		0x0113: gHciRemoteUserTerminatedConnection _c
		0x0114: gHciRemoteDeviceTerminatedConnectio nLowResources_c
		0x0115: gHciRemoteDeviceTerminatedConnectio nPowerOff_c
		0x0116: gHciConnectionTerminatedByLocalHost _c
		0x0117: gHciRepeatedAttempts_c
		0x0118: gHciPairingNotAllowed_c
		0x0119: gHciUnknownLpmPdu_c
		0x011A: gHciUnsupportedRemoteFeature_c
		0x011B: gHciScoOffsetRejected_c
		0x011C: gHciScoIntervalRejected_c
		0x011D: gHciScoAirModeRejected_c
		0x011E: gHciInvalidLpmParameters_c
		0x011F: gHciUnspecifiedError_c
		0x0120: gHciUnsupportedLpmParameterValue_c
		0x0121: gHciRoleChangeNotAllowed_c
		0x0122: gHciLLResponseTimeout_c
		0x0123: gHciLmpErrorTransactionCollision_c
		0x0124: gHciLmpPduNotAllowed_c

*Table continues on the next page...*

**Table 94. GATTClient-ProcedureDiscoverCharacteristicByUuid.Indication Parameters (continued)**

		0x0125: gHciEncryptionModeNotAcceptable_c
		0x0126: gHciLinkKeyCannotBeChanged_c
		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c

*Table continues on the next page...*

**Table 94. GATTClient-ProcedureDiscoverCharacteristicByUuid.Indication Parameters (continued)**

		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c
		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c

*Table continues on the next page...*

**Table 94. GATTClient-ProcedureDiscoverCharacteristicByUuid.Indication Parameters (continued)**

		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c

*Table continues on the next page...*



**Table 94. GATTClient-ProcedureDiscoverCharacteristicByUuid.Indication Parameters (continued)**

		0x0416: gSmInvalidHciEventParameter_c
		0x0417: gSmLlConnectionEncryptionInProgress_c
		0x0418: gSmLlConnectionEncryptionFailure_c
		0x0419: gSmInsufficientResources_c
		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c
		0x041C: gSmReceivedTimerEventForUnknownDevice_c
		0x041D: gSmUnattainableLocalDeviceSecRequirements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySize_c
		0x041F: gSmUnattainableSlaveSecReqRequirements_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupported_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c
		0x0460: gSmTbResolvableAddressDoesNotMatch_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c

*Table continues on the next page...*

**Table 94. GATTClient-ProcedureDiscoverCharacteristicByUuid.Indication Parameters (continued)**

	0x0503: gAttWriteNotPermitted_c
	0x0504: gAttInvalidPdu_c
	0x0505: gAttInsufficientAuthentication_c
	0x0506: gAttRequestNotSupported_c
	0x0507: gAttInvalidOffset_c
	0x0508: gAttInsufficientAuthorization_c
	0x0509: gAttPrepareQueueFull_c
	0x050A: gAttAttributeNotFound_c
	0x050B: gAttAttributeNotLong_c
	0x050C: gAttInsufficientEncryptionKeySize_c
	0x050D: gAttInvalidAttributeValueLength_c
	0x050E: gAttUnlikelyor_c
	0x050F: gAttInsufficientEncryption_c
	0x0510: gAttUnsupportedGroupType_c
	0x0511: gAttInsufficientResources_c
	0x0601: gGattAnotherProcedureInProgress_c
	0x0602: gGattLongAttributePacketsCorrupted_c
	0x0603: gGattMultipleAttributesOverflow_c
	0x0604: gGattUnexpectedReadMultipleResponseLength_c
	0x0605: gGattInvalidValueLength_c
	0x0606: gGattServerTimeout_c
	0x0607: gGattIndicationAlreadyInProgress_c
	0x0608: gGattClientConfirmationTimeout_c
	0x0701: gGapAdvDataTooLong_c
	0x0702: gGapScanRspDataTooLong_c
	0x0703: gGapDeviceNotBonded_c
	0x0704: gGapAnotherProcedureInProgress_c
	0x0801: gDevDbCccdLimitReached_c

*Table continues on the next page...*

**Table 94. GATTClient-ProcedureDiscoverCharacteristicByUuid.Indication Parameters (continued)**

		0x0802: gDevDbCccdNotFound_c 0x0901: gGattDbInvalidHandle_c 0x0902: gGattDbCharacteristicNotFound_c 0x0903: gGattDbCccdNotFound_c 0x0904: gGattDbServiceNotFound_c 0x0905: gGattDbDescriptorNotFound_c
NbOfCharacteristics	1	Number of discovered characteristics
Characteristics	Variable	Characteristics that were filled  Structure type parameter. See the detailed table below for parameter structure.

**Table 95. Characteristic Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Properties	1	Characteristic Properties as defined by GATT  Possible values: 0x00: gNone_c (No Properties selected) 0x01: gBroadcast_c (Characteristic can be broadcast) 0x02: gRead_c (Characteristic can be read) 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) 0x08: gWrite_c (Characteristic can be written with response) 0x10: gNotify_c (Characteristic can be notified) 0x20: gIndicate_c (Characteristic can be indicated) 0x40: gAuthSignedWrites_c (Characteristic can be written with signed data) 0x80: gExtendedProperties_c (Extended Characteristic properties)

*Table continues on the next page...*

**Table 95. Characteristic Parameter Structure (continued)**

Value	Variable	Characteristic Value attribute Structure type parameter. See the detailed table below for parameter structure.
NbOfDescriptors	1	Size of the Characteristic Descriptors array
Descriptors	Variable	Characteristic Descriptors array Structure type parameter. See the detailed table below for parameter structure.

**Table 96. Value Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 97. Descriptors Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle

*Table continues on the next page...*

**Table 97. Descriptors Parameter Structure (continued)**

UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 98. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 99. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.2.16 GATTClient-ProcedureDiscoverPrimaryServicesByUuid.Indication

#### Description

Specifies that the Primary Service Discovery by UUID procedure ended.

#### Parameters

**Table 100. GATTClient-ProcedureDiscoverPrimaryServicesByUuid.Indication Parameters**

Parameter	Size (bytes)	Comments
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*Table continues on the next page...*

**Table 100. GATTClient-ProcedureDiscoverPrimaryServicesByUuid.Indication Parameters (continued)**

OpGroup	1	0x45
OpCode	1	0x84
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
ProcedureResult	1	<p>The result of the completed procedure</p> <p>Possible values:</p> <p>0x00: gGattProcSuccess_c (The procedure was completed successfully)</p> <p>0x01: gProcedureError_c (The procedure was terminated due to an error)</p>

*Table continues on the next page...*

**Table 100. GATTClient-ProcedureDiscoverPrimaryServicesByUuid.Indication Parameters (continued)**

Error	2	<p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p>
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*Table continues on the next page...*

**Table 100. GATTClient-ProcedureDiscoverPrimaryServicesByUuid.Indication Parameters (continued)**

	0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c
	0x0110: gHciConnectionAcceptTimeoutExceede d_c
	0x0111: gHciUnsupportedFeatureOrParameterV alue_c
	0x0112: gHciInvalidHciCommandParameters_c
	0x0113: gHciRemoteUserTerminatedConnection _c
	0x0114: gHciRemoteDeviceTerminatedConnectio nLowResources_c
	0x0115: gHciRemoteDeviceTerminatedConnectio nPowerOff_c
	0x0116: gHciConnectionTerminatedByLocalHost _c
	0x0117: gHciRepeatedAttempts_c
	0x0118: gHciPairingNotAllowed_c
	0x0119: gHciUnknownLpmPdu_c
	0x011A: gHciUnsupportedRemoteFeature_c
	0x011B: gHciScoOffsetRejected_c
	0x011C: gHciScoIntervalRejected_c
	0x011D: gHciScoAirModeRejected_c
	0x011E: gHciInvalidLpmParameters_c
	0x011F: gHciUnspecifiedError_c
	0x0120: gHciUnsupportedLpmParameterValue_c
	0x0121: gHciRoleChangeNotAllowed_c
	0x0122: gHciLLResponseTimeout_c
	0x0123: gHciLmpErrorTransactionCollision_c
	0x0124: gHciLmpPduNotAllowed_c

*Table continues on the next page...*



**Table 100. GATTClient-ProcedureDiscoverPrimaryServicesByUuid.Indication Parameters (continued)**

		0x0125: gHciEncryptionModeNotAcceptable_c
		0x0126: gHciLinkKeyCannotBeChanged_c
		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c

*Table continues on the next page...*

**Table 100. GATTClient-ProcedureDiscoverPrimaryServicesByUuid.Indication Parameters (continued)**

		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c
		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c

*Table continues on the next page...*

**Table 100. GATTClient-ProcedureDiscoverPrimaryServicesByUuid.Indication Parameters (continued)**

		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c

*Table continues on the next page...*

**Table 100. GATTClient-ProcedureDiscoverPrimaryServicesByUuid.Indication Parameters (continued)**

		0x0416: gSmInvalidHciEventParameter_c
		0x0417: gSmLlConnectionEncryptionInProgress_c
		0x0418: gSmLlConnectionEncryptionFailure_c
		0x0419: gSmInsufficientResources_c
		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c
		0x041C: gSmReceivedTimerEventForUnknownDevice_c
		0x041D: gSmUnattainableLocalDeviceSecRequirements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySize_c
		0x041F: gSmUnattainableSlaveSecReqRequirements_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupported_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c
		0x0460: gSmTbResolvableAddressDoesNotMatch_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c

*Table continues on the next page...*

**Table 100. GATTClient-ProcedureDiscoverPrimaryServicesByUuid.Indication Parameters (continued)**

	0x0503: gAttWriteNotPermitted_c
	0x0504: gAttInvalidPdu_c
	0x0505: gAttInsufficientAuthentication_c
	0x0506: gAttRequestNotSupported_c
	0x0507: gAttInvalidOffset_c
	0x0508: gAttInsufficientAuthorization_c
	0x0509: gAttPrepareQueueFull_c
	0x050A: gAttAttributeNotFound_c
	0x050B: gAttAttributeNotLong_c
	0x050C: gAttInsufficientEncryptionKeySize_c
	0x050D: gAttInvalidAttributeValueLength_c
	0x050E: gAttUnlikelyor_c
	0x050F: gAttInsufficientEncryption_c
	0x0510: gAttUnsupportedGroupType_c
	0x0511: gAttInsufficientResources_c
	0x0601: gGattAnotherProcedureInProgress_c
	0x0602: gGattLongAttributePacketsCorrupted_c
	0x0603: gGattMultipleAttributesOverflow_c
	0x0604: gGattUnexpectedReadMultipleResponseLength_c
	0x0605: gGattInvalidValueLength_c
	0x0606: gGattServerTimeout_c
	0x0607: gGattIndicationAlreadyInProgress_c
	0x0608: gGattClientConfirmationTimeout_c
	0x0701: gGapAdvDataTooLong_c
	0x0702: gGapScanRspDataTooLong_c
	0x0703: gGapDeviceNotBonded_c
	0x0704: gGapAnotherProcedureInProgress_c
	0x0801: gDevDbCccdLimitReached_c

*Table continues on the next page...*

**Table 100. GATTClient-ProcedureDiscoverPrimaryServicesByUuid.Indication Parameters (continued)**

		0x0802: gDevDbCccdNotFound_c 0x0901: gGattDbInvalidHandle_c 0x0902: gGattDbCharacteristicNotFound_c 0x0903: gGattDbCccdNotFound_c 0x0904: gGattDbServiceNotFound_c 0x0905: gGattDbDescriptorNotFound_c
NbOfDiscoveredServices	1	Number of discovered services
DiscoveredServices	Variable	Discovered services  Structure type parameter. See the detailed table below for parameter structure.

**Table 101. DiscoveredServices Parameter Structure**

Structure Parameter	Size (bytes)	Comments
StartHandle	2	The handle of the Service Declaration attribute
EndHandle	2	The last handle belonging to this Service (followed by another Service declaration of the end of the database)
UuidType	1	UUID type  Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value  "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
NbOfCharacteristics	1	Size of the Characteristic array
Characteristics	Variable	Characteristic array  Structure type parameter. See the detailed table below for parameter structure.
NbOfIncludedServices	1	Size of the Included Services array

*Table continues on the next page...*

**Table 101. DiscoveredServices Parameter Structure (continued)**

IncludedServices	Variable	Included Services array  Structure type parameter. See the detailed table below for parameter structure.
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**Table 102. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 103. Characteristics Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Properties	1	Characteristic Properties as defined by GATT  Possible values: 0x00: gNone_c (No Properties selected) 0x01: gBroadcast_c (Characteristic can be broadcast) 0x02: gRead_c (Characteristic can be read) 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) 0x08: gWrite_c (Characteristic can be written with response) 0x10: gNotify_c (Characteristic can be notified) 0x20: gIndicate_c (Characteristic can be indicated) 0x40: gAuthSignedWrites_c (Characteristic can be written with signed data) 0x80: gExtendedProperties_c (Extended Characteristic properties)
Value	Variable	Characteristic Value attribute  Structure type parameter. See the detailed table below for parameter structure.

*Table continues on the next page...*

**Table 103. Characteristics Parameter Structure (continued)**

NbOfDescriptors	1	Size of the Characteristic Descriptors array
Descriptors	Variable	Characteristic Descriptors array Structure type parameter. See the detailed table below for parameter structure.

**Table 104. IncludedServices Parameter Structure**

Structure Parameter	Size (bytes)	Comments
StartHandle	2	The handle of the Service Declaration attribute
EndHandle	2	The last handle belonging to this Service (followed by another Service declaration of the end of the database)
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
NbOfCharacteristics	1	Size of the Characteristic array
NbOfIncludedServices	1	Size of the Included Services array

**Table 105. Value Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits

*Table continues on the next page...*



**Table 105. Value Parameter Structure (continued)**

Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 106. Descriptors Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 107. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 108. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 109. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.2.17 GATTClient-ProcedureExchangeMtu.Indication

#### Description

Specifies that the MTU exchange period ended.

#### Parameters

**Table 110. GATTClient-ProcedureExchangeMtu.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x82
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
ProcedureResult	1	<p>The result of the completed procedure</p> <p>Possible values:</p> <p>0x00: gGattProcSuccess_c (The procedure was completed successfully)</p> <p>0x01: gProcedureError_c (The procedure was terminated due to an error)</p>

*Table continues on the next page...*

**Table 110. GATTClient-ProcedureExchangeMtu.Indication Parameters (continued)**

Error	2	<p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p>
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**Table 110. GATTClient-ProcedureExchangeMtu.Indication Parameters (continued)**

		0x010F: gHciConnectionRejectedDueToUnaccept tableBdAddr_c
		0x0110: gHciConnectionAcceptTimeoutExceede d_c
		0x0111: gHciUnsupportedFeatureOrParameterV alue_c
		0x0112: gHciInvalidHciCommandParameters_c
		0x0113: gHciRemoteUserTerminatedConnection _c
		0x0114: gHciRemoteDeviceTerminatedConnectio nLowResources_c
		0x0115: gHciRemoteDeviceTerminatedConnectio nPowerOff_c
		0x0116: gHciConnectionTerminatedByLocalHost _c
		0x0117: gHciRepeatedAttempts_c
		0x0118: gHciPairingNotAllowed_c
		0x0119: gHciUnknownLpmPdu_c
		0x011A: gHciUnsupportedRemoteFeature_c
		0x011B: gHciScoOffsetRejected_c
		0x011C: gHciScoIntervalRejected_c
		0x011D: gHciScoAirModeRejected_c
		0x011E: gHciInvalidLpmParameters_c
		0x011F: gHciUnspecifiedError_c
		0x0120: gHciUnsupportedLpmParameterValue_c
		0x0121: gHciRoleChangeNotAllowed_c
		0x0122: gHciLLResponseTimeout_c
		0x0123: gHciLmpErrorTransactionCollision_c
		0x0124: gHciLmpPduNotAllowed_c
		0x0125: gHciEncryptionModeNotAcceptable_c

**Table 110. GATTClient-ProcedureExchangeMtu.Indication Parameters (continued)**

		0x0126: gHciLinkKeyCannotBeChanged_c
		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c
		0x013C: gHciDirectedAdvertisingTimeout_c

**Table 110. GATTClient-ProcedureExchangeMtu.Indication Parameters (continued)**

		0x013D: gHciConnectionTerminatedDueToMicFailure_c
		0x013E: gHciConnectionFailedToBeEstablished_c
		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c
		0x03FA: gL2caChannelAlreadyConnected_c

**Table 110. GATTClient-ProcedureExchangeMtu.Indication Parameters (continued)**

		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c
		0x0416: gSmInvalidHciEventParameter_c

**Table 110. GATTClient-ProcedureExchangeMtu.Indication Parameters (continued)**

		0x0417: gSmLlConnectionEncryptionInProgress_c
		0x0418: gSmLlConnectionEncryptionFailure_c
		0x0419: gSmInsufficientResources_c
		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c
		0x041C: gSmReceivedTimerEventForUnknownDevice_c
		0x041D: gSmUnattainableLocalDeviceSecRequirements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySize_c
		0x041F: gSmUnattainableSlaveSecReqRequirements_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupported_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c
		0x0460: gSmTbResolvableAddressDoesNotMatch_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c
		0x0503: gAttWriteNotPermitted_c
		0x0504: gAttInvalidPdu_c
		0x0505: gAttInsufficientAuthentication_c



**Table 110. GATTClient-ProcedureExchangeMtu.Indication Parameters (continued)**

	0x0506: gAttRequestNotSupported_c
	0x0507: gAttInvalidOffset_c
	0x0508: gAttInsufficientAuthorization_c
	0x0509: gAttPrepareQueueFull_c
	0x050A: gAttAttributeNotFound_c
	0x050B: gAttAttributeNotLong_c
	0x050C: gAttInsufficientEncryptionKeySize_c
	0x050D: gAttInvalidAttributeValueLength_c
	0x050E: gAttUnlikelyor_c
	0x050F: gAttInsufficientEncryption_c
	0x0510: gAttUnsupportedGroupType_c
	0x0511: gAttInsufficientResources_c
	0x0601: gGattAnotherProcedureInProgress_c
	0x0602: gGattLongAttributePacketsCorrupted_c
	0x0603: gGattMultipleAttributesOverflow_c
	0x0604: gGattUnexpectedReadMultipleResponseLength_c
	0x0605: gGattInvalidValueLength_c
	0x0606: gGattServerTimeout_c
	0x0607: gGattIndicationAlreadyInProgress_c
	0x0608: gGattClientConfirmationTimeout_c
	0x0701: gGapAdvDataTooLong_c
	0x0702: gGapScanRspDataTooLong_c
	0x0703: gGapDeviceNotBonded_c
	0x0704: gGapAnotherProcedureInProgress_c
	0x0801: gDevDbCccdLimitReached_c
	0x0802: gDevDbCccdNotFound_c
	0x0901: gGattDbInvalidHandle_c
	0x0902: gGattDbCharacteristicNotFound_c
	0x0903: gGattDbCccdNotFound_c

**Table 110. GATTClient-ProcedureExchangeMtu.Indication Parameters (continued)**

		0x0904: gGattDbServiceNotFound_c
		0x0905: gGattDbDescriptorNotFound_c

### 3.2.18 GATTClient-ProcedureFindIncludedServices.Indication

#### Description

Specifies that the Find Included Services procedure ended.

#### Parameters

**Table 111. GATTClient-ProcedureFindIncludedServices.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x85
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
ProcedureResult	1	<p>The result of the completed procedure</p> <p>Possible values:</p> <p>0x00: gGattProcSuccess_c (The procedure was completed successfully)</p> <p>0x01: gProcedureError_c (The procedure was terminated due to an error)</p>

*Table continues on the next page...*

**Table 111. GATTClient-ProcedureFindIncludedServices.Indication Parameters (continued)**

Error	2	<p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p>
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*Table continues on the next page...*

**Table 111. GATTClient-ProcedureFindIncludedServices.Indication Parameters (continued)**

		0x010F: gHciConnectionRejectedDueToUnaccept tableBdAddr_c
		0x0110: gHciConnectionAcceptTimeoutExceed d_c
		0x0111: gHciUnsupportedFeatureOrParameterV alue_c
		0x0112: gHciInvalidHciCommandParameters_c
		0x0113: gHciRemoteUserTerminatedConnection _c
		0x0114: gHciRemoteDeviceTerminatedConnectio nLowResources_c
		0x0115: gHciRemoteDeviceTerminatedConnectio nPowerOff_c
		0x0116: gHciConnectionTerminatedByLocalHost _c
		0x0117: gHciRepeatedAttempts_c
		0x0118: gHciPairingNotAllowed_c
		0x0119: gHciUnknownLpmPdu_c
		0x011A: gHciUnsupportedRemoteFeature_c
		0x011B: gHciScoOffsetRejected_c
		0x011C: gHciScoIntervalRejected_c
		0x011D: gHciScoAirModeRejected_c
		0x011E: gHciInvalidLpmParameters_c
		0x011F: gHciUnspecifiedError_c
		0x0120: gHciUnsupportedLpmParameterValue_c
		0x0121: gHciRoleChangeNotAllowed_c
		0x0122: gHciLLResponseTimeout_c
		0x0123: gHciLmpErrorTransactionCollision_c
		0x0124: gHciLmpPduNotAllowed_c

*Table continues on the next page...*

**Table 111. GATTClient-ProcedureFindIncludedServices.Indication Parameters (continued)**

		0x0125: gHciEncryptionModeNotAcceptable_c
		0x0126: gHciLinkKeyCannotBeChanged_c
		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c

*Table continues on the next page...*

**Table 111. GATTClient-ProcedureFindIncludedServices.Indication Parameters (continued)**

		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c
		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c

*Table continues on the next page...*

**Table 111. GATTClient-ProcedureFindIncludedServices.Indication Parameters (continued)**

		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c

*Table continues on the next page...*

**Table 111. GATTClient-ProcedureFindIncludedServices.Indication Parameters (continued)**

		0x0416: gSmInvalidHciEventParameter_c
		0x0417: gSmLlConnectionEncryptionInProgress_c
		0x0418: gSmLlConnectionEncryptionFailure_c
		0x0419: gSmInsufficientResources_c
		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c
		0x041C: gSmReceivedTimerEventForUnknownDevice_c
		0x041D: gSmUnattainableLocalDeviceSecRequirements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySize_c
		0x041F: gSmUnattainableSlaveSecReqRequirements_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupported_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c
		0x0460: gSmTbResolvableAddressDoesNotMatch_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c

*Table continues on the next page...*



**Table 111. GATTClient-ProcedureFindIncludedServices.Indication Parameters (continued)**

	0x0503: gAttWriteNotPermitted_c
	0x0504: gAttInvalidPdu_c
	0x0505: gAttInsufficientAuthentication_c
	0x0506: gAttRequestNotSupported_c
	0x0507: gAttInvalidOffset_c
	0x0508: gAttInsufficientAuthorization_c
	0x0509: gAttPrepareQueueFull_c
	0x050A: gAttAttributeNotFound_c
	0x050B: gAttAttributeNotLong_c
	0x050C: gAttInsufficientEncryptionKeySize_c
	0x050D: gAttInvalidAttributeValueLength_c
	0x050E: gAttUnlikelyor_c
	0x050F: gAttInsufficientEncryption_c
	0x0510: gAttUnsupportedGroupType_c
	0x0511: gAttInsufficientResources_c
	0x0601: gGattAnotherProcedureInProgress_c
	0x0602: gGattLongAttributePacketsCorrupted_c
	0x0603: gGattMultipleAttributesOverflow_c
	0x0604: gGattUnexpectedReadMultipleResponseLength_c
	0x0605: gGattInvalidValueLength_c
	0x0606: gGattServerTimeout_c
	0x0607: gGattIndicationAlreadyInProgress_c
	0x0608: gGattClientConfirmationTimeout_c
	0x0701: gGapAdvDataTooLong_c
	0x0702: gGapScanRspDataTooLong_c
	0x0703: gGapDeviceNotBonded_c
	0x0704: gGapAnotherProcedureInProgress_c
	0x0801: gDevDbCccdLimitReached_c

*Table continues on the next page...*

**Table 111. GATTClient-ProcedureFindIncludedServices.Indication Parameters (continued)**

		0x0802: gDevDbCccdNotFound_c 0x0901: gGattDbInvalidHandle_c 0x0902: gGattDbCharacteristicNotFound_c 0x0903: gGattDbCccdNotFound_c 0x0904: gGattDbServiceNotFound_c 0x0905: gGattDbDescriptorNotFound_c
Service	Variable	The service within which inclusions were searched  Structure type parameter. See the detailed table below for parameter structure.

**Table 112. Service Parameter Structure**

Structure Parameter	Size (bytes)	Comments
StartHandle	2	The handle of the Service Declaration attribute
EndHandle	2	The last handle belonging to this Service (followed by another Service declaration of the end of the database)
UuidType	1	UUID type  Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value  "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
NbOfCharacteristics	1	Size of the Characteristic array
Characteristics	Variable	Characteristic array  Structure type parameter. See the detailed table below for parameter structure.
NbOfIncludedServices	1	Size of the Included Services array

*Table continues on the next page...*

**Table 112. Service Parameter Structure (continued)**

IncludedServices	Variable	Included Services array  Structure type parameter. See the detailed table below for parameter structure.
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**Table 113. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 114. Characteristics Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Properties	1	Characteristic Properties as defined by GATT  Possible values: 0x00: gNone_c (No Properties selected) 0x01: gBroadcast_c (Characteristic can be broadcast) 0x02: gRead_c (Characteristic can be read) 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) 0x08: gWrite_c (Characteristic can be written with response) 0x10: gNotify_c (Characteristic can be notified) 0x20: gIndicate_c (Characteristic can be indicated) 0x40: gAuthSignedWrites_c (Characteristic can be written with signed data) 0x80: gExtendedProperties_c (Extended Characteristic properties)
Value	Variable	Characteristic Value attribute  Structure type parameter. See the detailed table below for parameter structure.

*Table continues on the next page...*

**Table 114. Characteristics Parameter Structure (continued)**

NbOfDescriptors	1	Size of the Characteristic Descriptors array
Descriptors	Variable	Characteristic Descriptors array Structure type parameter. See the detailed table below for parameter structure.

**Table 115. IncludedServices Parameter Structure**

Structure Parameter	Size (bytes)	Comments
StartHandle	2	The handle of the Service Declaration attribute
EndHandle	2	The last handle belonging to this Service (followed by another Service declaration of the end of the database)
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
NbOfCharacteristics	1	Size of the Characteristic array
NbOfIncludedServices	1	Size of the Included Services array

**Table 116. Value Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits

*Table continues on the next page...*

**Table 116. Value Parameter Structure (continued)**

Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 117. Descriptors Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 118. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

Table 119. Uuid Parameter Structure

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

Table 120. Uuid Parameter Structure

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.2.19 GATTClient- ProcedureReadCharacteristicDescriptor.Indication

#### Description

Specifies that the Characteristic Descriptor Read procedure for a given characteristic's descriptor ended.

#### Parameters

Table 121. GATTClient-ProcedureReadCharacteristicDescriptor.Indication Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x8D
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
ProcedureResult	1	The result of the completed procedure Possible values: 0x00: gGattProcSuccess_c (The procedure was completed successfully) 0x01: gProcedureError_c (The procedure was terminated due to an error)

Table continues on the next page...

**Table 121. GATTClient-ProcedureReadCharacteristicDescriptor.Indication Parameters (continued)**

Error	2	<p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p>
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*Table continues on the next page...*

**Table 121. GATTClient-ProcedureReadCharacteristicDescriptor.Indication Parameters (continued)**

		0x010F: gHciConnectionRejectedDueToUnacceptedBdAddr_c
		0x0110: gHciConnectionAcceptTimeoutExceeded_c
		0x0111: gHciUnsupportedFeatureOrParameterValue_c
		0x0112: gHciInvalidHciCommandParameters_c
		0x0113: gHciRemoteUserTerminatedConnection_c
		0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c
		0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c
		0x0116: gHciConnectionTerminatedByLocalHost_c
		0x0117: gHciRepeatedAttempts_c
		0x0118: gHciPairingNotAllowed_c
		0x0119: gHciUnknownLmpPdu_c
		0x011A: gHciUnsupportedRemoteFeature_c
		0x011B: gHciScoOffsetRejected_c
		0x011C: gHciScoIntervalRejected_c
		0x011D: gHciScoAirModeRejected_c
		0x011E: gHciInvalidLmpParameters_c
		0x011F: gHciUnspecifiedError_c
		0x0120: gHciUnsupportedLmpParameterValue_c
		0x0121: gHciRoleChangeNotAllowed_c
		0x0122: gHciLLResponseTimeout_c
		0x0123: gHciLmpErrorTransactionCollision_c
		0x0124: gHciLmpPduNotAllowed_c

*Table continues on the next page...*



**Table 121. GATTClient-ProcedureReadCharacteristicDescriptor.Indication Parameters (continued)**

		0x0125: gHciEncryptionModeNotAcceptable_c
		0x0126: gHciLinkKeyCannotBeChanged_c
		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c

*Table continues on the next page...*

**Table 121. GATTClient-ProcedureReadCharacteristicDescriptor.Indication Parameters (continued)**

		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c
		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c

*Table continues on the next page...*

**Table 121. GATTClient-ProcedureReadCharacteristicDescriptor.Indication Parameters (continued)**

		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c

*Table continues on the next page...*

**Table 121. GATTClient-ProcedureReadCharacteristicDescriptor.Indication Parameters (continued)**

		0x0416: gSmInvalidHciEventParameter_c
		0x0417: gSmLlConnectionEncryptionInProgress_c
		0x0418: gSmLlConnectionEncryptionFailure_c
		0x0419: gSmInsufficientResources_c
		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c
		0x041C: gSmReceivedTimerEventForUnknownDevice_c
		0x041D: gSmUnattainableLocalDeviceSecRequirements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySize_c
		0x041F: gSmUnattainableSlaveSecReqRequirements_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupported_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c
		0x0460: gSmTbResolvableAddressDoesNotMatch_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c

*Table continues on the next page...*

**Table 121. GATTClient-ProcedureReadCharacteristicDescriptor.Indication Parameters (continued)**

	0x0503: gAttWriteNotPermitted_c
	0x0504: gAttInvalidPdu_c
	0x0505: gAttInsufficientAuthentication_c
	0x0506: gAttRequestNotSupported_c
	0x0507: gAttInvalidOffset_c
	0x0508: gAttInsufficientAuthorization_c
	0x0509: gAttPrepareQueueFull_c
	0x050A: gAttAttributeNotFound_c
	0x050B: gAttAttributeNotLong_c
	0x050C: gAttInsufficientEncryptionKeySize_c
	0x050D: gAttInvalidAttributeValueLength_c
	0x050E: gAttUnlikelyor_c
	0x050F: gAttInsufficientEncryption_c
	0x0510: gAttUnsupportedGroupType_c
	0x0511: gAttInsufficientResources_c
	0x0601: gGattAnotherProcedureInProgress_c
	0x0602: gGattLongAttributePacketsCorrupted_c
	0x0603: gGattMultipleAttributesOverflow_c
	0x0604: gGattUnexpectedReadMultipleResponseLength_c
	0x0605: gGattInvalidValueLength_c
	0x0606: gGattServerTimeout_c
	0x0607: gGattIndicationAlreadyInProgress_c
	0x0608: gGattClientConfirmationTimeout_c
	0x0701: gGapAdvDataTooLong_c
	0x0702: gGapScanRspDataTooLong_c
	0x0703: gGapDeviceNotBonded_c
	0x0704: gGapAnotherProcedureInProgress_c
	0x0801: gDevDbCccdLimitReached_c

*Table continues on the next page...*

**Table 121. GATTClient-ProcedureReadCharacteristicDescriptor.Indication Parameters (continued)**

		0x0802: gDevDbCccdNotFound_c 0x0901: gGattDbInvalidHandle_c 0x0902: gGattDbCharacteristicNotFound_c 0x0903: gGattDbCccdNotFound_c 0x0904: gGattDbServiceNotFound_c 0x0905: gGattDbDescriptorNotFound_c
Descriptor	Variable	The characteristic descriptor whose value was read  Structure type parameter. See the detailed table below for parameter structure.

**Table 122. Descriptor Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type  Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value  "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 123. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.2.20 GATTClient-ProcedureReadCharacteristicValue.Indication

#### Description

Specifies that the Characteristic Read procedure for a given characteristic ended.

#### Parameters

**Table 124. GATTClient-ProcedureReadCharacteristicValue.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x89
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
ProcedureResult	1	<p>The result of the completed procedure</p> <p>Possible values:</p> <p>0x00: gGattProcSuccess_c (The procedure was completed successfully)</p> <p>0x01: gProcedureError_c (The procedure was terminated due to an error)</p>

*Table continues on the next page...*

**Table 124. GATTClient-ProcedureReadCharacteristicValue.Indication Parameters (continued)**

Error	2	<p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p>
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*Table continues on the next page...*



**Table 124. GATTClient-ProcedureReadCharacteristicValue.Indication Parameters (continued)**

	0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c
	0x0110: gHciConnectionAcceptTimeoutExceede d_c
	0x0111: gHciUnsupportedFeatureOrParameterV alue_c
	0x0112: gHciInvalidHciCommandParameters_c
	0x0113: gHciRemoteUserTerminatedConnection _c
	0x0114: gHciRemoteDeviceTerminatedConnectio nLowResources_c
	0x0115: gHciRemoteDeviceTerminatedConnectio nPowerOff_c
	0x0116: gHciConnectionTerminatedByLocalHost _c
	0x0117: gHciRepeatedAttempts_c
	0x0118: gHciPairingNotAllowed_c
	0x0119: gHciUnknownLpmPdu_c
	0x011A: gHciUnsupportedRemoteFeature_c
	0x011B: gHciScoOffsetRejected_c
	0x011C: gHciScoIntervalRejected_c
	0x011D: gHciScoAirModeRejected_c
	0x011E: gHciInvalidLpmParameters_c
	0x011F: gHciUnspecifiedError_c
	0x0120: gHciUnsupportedLpmParameterValue_c
	0x0121: gHciRoleChangeNotAllowed_c
	0x0122: gHciLLResponseTimeout_c
	0x0123: gHciLmpErrorTransactionCollision_c
	0x0124: gHciLmpPduNotAllowed_c

*Table continues on the next page...*

**Table 124. GATTClient-ProcedureReadCharacteristicValue.Indication Parameters (continued)**

		0x0125: gHciEncryptionModeNotAcceptable_c
		0x0126: gHciLinkKeyCannotBeChanged_c
		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c

*Table continues on the next page...*

**Table 124. GATTClient-ProcedureReadCharacteristicValue.Indication Parameters (continued)**

		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c
		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c

*Table continues on the next page...*

**Table 124. GATTClient-ProcedureReadCharacteristicValue.Indication Parameters (continued)**

		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c

*Table continues on the next page...*

**Table 124. GATTClient-ProcedureReadCharacteristicValue.Indication Parameters (continued)**

	0x0416: gSmInvalidHciEventParameter_c
	0x0417: gSmLlConnectionEncryptionInProgress_c
	0x0418: gSmLlConnectionEncryptionFailure_c
	0x0419: gSmInsufficientResources_c
	0x041A: gSmOobDataAddressMismatch_c
	0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c
	0x041C: gSmReceivedTimerEventForUnknownDevice_c
	0x041D: gSmUnattainableLocalDeviceSecRequirements_c
	0x041E: gSmUnattainableLocalDeviceMinKeySize_c
	0x041F: gSmUnattainableSlaveSecReqRequirements_c
	0x0431: gSmPairingErrorPasskeyEntryFailed_c
	0x0432: gSmPairingErrorConfirmValueFailed_c
	0x0433: gSmPairingErrorCommandNotSupported_c
	0x0434: gSmPairingErrorInvalidParameters_c
	0x0435: gSmPairingErrorUnknownReason_c
	0x0460: gSmTbResolvableAddressDoesNotMatch_c
	0x0461: gSmTbInvalidDataSignature_c
	0x0501: gAttInvalidHandle_c
	0x0502: gAttReadNotPermitted_c

*Table continues on the next page...*

**Table 124. GATTClient-ProcedureReadCharacteristicValue.Indication Parameters (continued)**

	0x0503: gAttWriteNotPermitted_c
	0x0504: gAttInvalidPdu_c
	0x0505: gAttInsufficientAuthentication_c
	0x0506: gAttRequestNotSupported_c
	0x0507: gAttInvalidOffset_c
	0x0508: gAttInsufficientAuthorization_c
	0x0509: gAttPrepareQueueFull_c
	0x050A: gAttAttributeNotFound_c
	0x050B: gAttAttributeNotLong_c
	0x050C: gAttInsufficientEncryptionKeySize_c
	0x050D: gAttInvalidAttributeValueLength_c
	0x050E: gAttUnlikelyor_c
	0x050F: gAttInsufficientEncryption_c
	0x0510: gAttUnsupportedGroupType_c
	0x0511: gAttInsufficientResources_c
	0x0601: gGattAnotherProcedureInProgress_c
	0x0602: gGattLongAttributePacketsCorrupted_c
	0x0603: gGattMultipleAttributesOverflow_c
	0x0604: gGattUnexpectedReadMultipleResponseLength_c
	0x0605: gGattInvalidValueLength_c
	0x0606: gGattServerTimeout_c
	0x0607: gGattIndicationAlreadyInProgress_c
	0x0608: gGattClientConfirmationTimeout_c
	0x0701: gGapAdvDataTooLong_c
	0x0702: gGapScanRspDataTooLong_c
	0x0703: gGapDeviceNotBonded_c
	0x0704: gGapAnotherProcedureInProgress_c
	0x0801: gDevDbCccdLimitReached_c

*Table continues on the next page...*

**Table 124. GATTClient-ProcedureReadCharacteristicValue.Indication Parameters (continued)**

		0x0802: gDevDbCccdNotFound_c 0x0901: gGattDbInvalidHandle_c 0x0902: gGattDbCharacteristicNotFound_c 0x0903: gGattDbCccdNotFound_c 0x0904: gGattDbServiceNotFound_c 0x0905: gGattDbDescriptorNotFound_c
Characteristic	Variable	The characteristic whose value was read  Structure type parameter. See the detailed table below for parameter structure.

**Table 125. Characteristic Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Properties	1	Characteristic Properties as defined by GATT  Possible values: 0x00: gNone_c (No Properties selected) 0x01: gBroadcast_c (Characteristic can be broadcast) 0x02: gRead_c (Characteristic can be read) 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) 0x08: gWrite_c (Characteristic can be written with response) 0x10: gNotify_c (Characteristic can be notified) 0x20: gIndicate_c (Characteristic can be indicated) 0x40: gAuthSignedWrites_c (Characteristic can be written with signed data) 0x80: gExtendedProperties_c (Extended Characteristic properties)

*Table continues on the next page...*

**Table 125. Characteristic Parameter Structure (continued)**

Value	Variable	Characteristic Value attribute Structure type parameter. See the detailed table below for parameter structure.
NbOfDescriptors	1	Size of the Characteristic Descriptors array
Descriptors	Variable	Characteristic Descriptors array Structure type parameter. See the detailed table below for parameter structure.

**Table 126. Value Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 127. Descriptors Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle

*Table continues on the next page...*



**Table 127. Descriptors Parameter Structure (continued)**

UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 128. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 129. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.2.21 GATTClient-ProcedureReadMultipleCharacteristicValues.Indication

#### Description

Specifies that the Characteristic Read Multiple procedure ended.

#### Parameters

**Table 130. GATTClient-ProcedureReadMultipleCharacteristicValues.Indication Parameters**

Parameter	Size (bytes)	Comments
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*Table continues on the next page...*

**Table 130. GATTClient-ProcedureReadMultipleCharacteristicValues.Indication Parameters (continued)**

OpGroup	1	0x45
OpCode	1	0x8B
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
ProcedureResult	1	<p>The result of the completed procedure</p> <p>Possible values:</p> <p>0x00: gGattProcSuccess_c (The procedure was completed successfully)</p> <p>0x01: gProcedureError_c (The procedure was terminated due to an error)</p>

*Table continues on the next page...*

**Table 130. GATTClient-ProcedureReadMultipleCharacteristicValues.Indication Parameters (continued)**

Error	2	<p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p>
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**Table 130. GATTClient-ProcedureReadMultipleCharacteristicValues.Indication Parameters (continued)**

		0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c
		0x0110: gHciConnectionAcceptTimeoutExceede d_c
		0x0111: gHciUnsupportedFeatureOrParameterV alue_c
		0x0112: gHciInvalidHciCommandParameters_c
		0x0113: gHciRemoteUserTerminatedConnection _c
		0x0114: gHciRemoteDeviceTerminatedConnectio nLowResources_c
		0x0115: gHciRemoteDeviceTerminatedConnectio nPowerOff_c
		0x0116: gHciConnectionTerminatedByLocalHost _c
		0x0117: gHciRepeatedAttempts_c
		0x0118: gHciPairingNotAllowed_c
		0x0119: gHciUnknownLpmPdu_c
		0x011A: gHciUnsupportedRemoteFeature_c
		0x011B: gHciScoOffsetRejected_c
		0x011C: gHciScoIntervalRejected_c
		0x011D: gHciScoAirModeRejected_c
		0x011E: gHciInvalidLpmParameters_c
		0x011F: gHciUnspecifiedError_c
		0x0120: gHciUnsupportedLpmParameterValue_c
		0x0121: gHciRoleChangeNotAllowed_c
		0x0122: gHciLLResponseTimeout_c
		0x0123: gHciLmpErrorTransactionCollision_c
		0x0124: gHciLmpPduNotAllowed_c

*Table continues on the next page...*

**Table 130. GATTClient-ProcedureReadMultipleCharacteristicValues.Indication Parameters (continued)**

		0x0125: gHciEncryptionModeNotAcceptable_c
		0x0126: gHciLinkKeyCannotBeChanged_c
		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c

*Table continues on the next page...*

**Table 130. GATTClient-ProcedureReadMultipleCharacteristicValues.Indication Parameters (continued)**

		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c
		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c

*Table continues on the next page...*

**Table 130. GATTClient-ProcedureReadMultipleCharacteristicValues.Indication Parameters (continued)**

		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c

*Table continues on the next page...*

**Table 130. GATTClient-ProcedureReadMultipleCharacteristicValues.Indication Parameters (continued)**

		0x0416: gSmInvalidHciEventParameter_c
		0x0417: gSmLlConnectionEncryptionInProgress_c
		0x0418: gSmLlConnectionEncryptionFailure_c
		0x0419: gSmInsufficientResources_c
		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c
		0x041C: gSmReceivedTimerEventForUnknownDevice_c
		0x041D: gSmUnattainableLocalDeviceSecRequirements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySize_c
		0x041F: gSmUnattainableSlaveSecReqRequirements_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupported_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c
		0x0460: gSmTbResolvableAddressDoesNotMatch_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c

*Table continues on the next page...*



**Table 130. GATTClient-ProcedureReadMultipleCharacteristicValues.Indication Parameters (continued)**

	0x0503: gAttWriteNotPermitted_c
	0x0504: gAttInvalidPdu_c
	0x0505: gAttInsufficientAuthentication_c
	0x0506: gAttRequestNotSupported_c
	0x0507: gAttInvalidOffset_c
	0x0508: gAttInsufficientAuthorization_c
	0x0509: gAttPrepareQueueFull_c
	0x050A: gAttAttributeNotFound_c
	0x050B: gAttAttributeNotLong_c
	0x050C: gAttInsufficientEncryptionKeySize_c
	0x050D: gAttInvalidAttributeValueLength_c
	0x050E: gAttUnlikelyor_c
	0x050F: gAttInsufficientEncryption_c
	0x0510: gAttUnsupportedGroupType_c
	0x0511: gAttInsufficientResources_c
	0x0601: gGattAnotherProcedureInProgress_c
	0x0602: gGattLongAttributePacketsCorrupted_c
	0x0603: gGattMultipleAttributesOverflow_c
	0x0604: gGattUnexpectedReadMultipleResponseLength_c
	0x0605: gGattInvalidValueLength_c
	0x0606: gGattServerTimeout_c
	0x0607: gGattIndicationAlreadyInProgress_c
	0x0608: gGattClientConfirmationTimeout_c
	0x0701: gGapAdvDataTooLong_c
	0x0702: gGapScanRspDataTooLong_c
	0x0703: gGapDeviceNotBonded_c
	0x0704: gGapAnotherProcedureInProgress_c
	0x0801: gDevDbCccdLimitReached_c

*Table continues on the next page...*

**Table 130. GATTClient-ProcedureReadMultipleCharacteristicValues.Indication Parameters (continued)**

		0x0802: gDevDbCccdNotFound_c 0x0901: gGattDbInvalidHandle_c 0x0902: gGattDbCharacteristicNotFound_c 0x0903: gGattDbCccdNotFound_c 0x0904: gGattDbServiceNotFound_c 0x0905: gGattDbDescriptorNotFound_c
NbOfCharacteristics	1	Number of characteristics whose values were read
Characteristics	Variable	Characteristics whose values were read  Structure type parameter. See the detailed table below for parameter structure.

**Table 131. Characteristics Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Properties	1	Characteristic Properties as defined by GATT  Possible values: 0x00: gNone_c (No Properties selected) 0x01: gBroadcast_c (Characteristic can be broadcast) 0x02: gRead_c (Characteristic can be read) 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) 0x08: gWrite_c (Characteristic can be written with response) 0x10: gNotify_c (Characteristic can be notified) 0x20: gIndicate_c (Characteristic can be indicated) 0x40: gAuthSignedWrites_c (Characteristic can be written with signed data) 0x80: gExtendedProperties_c (Extended Characteristic properties)

*Table continues on the next page...*

**Table 131. Characteristics Parameter Structure (continued)**

Value	Variable	Characteristic Value attribute Structure type parameter. See the detailed table below for parameter structure.
NbOfDescriptors	1	Size of the Characteristic Descriptors array
Descriptors	Variable	Characteristic Descriptors array Structure type parameter. See the detailed table below for parameter structure.

**Table 132. Value Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 133. Descriptors Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle

*Table continues on the next page...*

**Table 133. Descriptors Parameter Structure (continued)**

UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 134. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 135. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

## 3.2.22 GATTClient-ProcedureReadUsingCharacteristicUuid.Indication

### Description

Specifies that the Characteristic Read by UUID procedure ended.

### Parameters

**Table 136. GATTClient-ProcedureReadUsingCharacteristicUuid.Indication Parameters**

Parameter	Size (bytes)	Comments
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*Table continues on the next page...*

**Table 136. GATTClient-ProcedureReadUsingCharacteristicUuid.Indication Parameters (continued)**

OpGroup	1	0x45
OpCode	1	0x8A
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
ProcedureResult	1	<p>The result of the completed procedure</p> <p>Possible values:</p> <p>0x00: gGattProcSuccess_c (The procedure was completed successfully)</p> <p>0x01: gProcedureError_c (The procedure was terminated due to an error)</p>

*Table continues on the next page...*

**Table 136. GATTClient-ProcedureReadUsingCharacteristicUuid.Indication Parameters (continued)**

Error	2	<p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p>
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*Table continues on the next page...*

**Table 136. GATTClient-ProcedureReadUsingCharacteristicUuid.Indication Parameters (continued)**

	0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c
	0x0110: gHciConnectionAcceptTimeoutExceede d_c
	0x0111: gHciUnsupportedFeatureOrParameterV alue_c
	0x0112: gHciInvalidHciCommandParameters_c
	0x0113: gHciRemoteUserTerminatedConnection _c
	0x0114: gHciRemoteDeviceTerminatedConnectio nLowResources_c
	0x0115: gHciRemoteDeviceTerminatedConnectio nPowerOff_c
	0x0116: gHciConnectionTerminatedByLocalHost _c
	0x0117: gHciRepeatedAttempts_c
	0x0118: gHciPairingNotAllowed_c
	0x0119: gHciUnknownLpmPdu_c
	0x011A: gHciUnsupportedRemoteFeature_c
	0x011B: gHciScoOffsetRejected_c
	0x011C: gHciScoIntervalRejected_c
	0x011D: gHciScoAirModeRejected_c
	0x011E: gHciInvalidLpmParameters_c
	0x011F: gHciUnspecifiedError_c
	0x0120: gHciUnsupportedLpmParameterValue_c
	0x0121: gHciRoleChangeNotAllowed_c
	0x0122: gHciLLResponseTimeout_c
	0x0123: gHciLmpErrorTransactionCollision_c
	0x0124: gHciLmpPduNotAllowed_c

*Table continues on the next page...*

**Table 136. GATTClient-ProcedureReadUsingCharacteristicUuid.Indication Parameters (continued)**

		0x0125: gHciEncryptionModeNotAcceptable_c
		0x0126: gHciLinkKeyCannotBeChanged_c
		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c

*Table continues on the next page...*



**Table 136. GATTClient-ProcedureReadUsingCharacteristicUuid.Indication Parameters (continued)**

		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c
		0x013E: gHciConnectionFailedToBeEstablished_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c

*Table continues on the next page...*

**Table 136. GATTClient-ProcedureReadUsingCharacteristicUuid.Indication Parameters (continued)**

		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c

*Table continues on the next page...*

**Table 136. GATTClient-ProcedureReadUsingCharacteristicUuid.Indication Parameters (continued)**

		0x0416: gSmInvalidHciEventParameter_c
		0x0417: gSmLlConnectionEncryptionInProgress_c
		0x0418: gSmLlConnectionEncryptionFailure_c
		0x0419: gSmInsufficientResources_c
		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c
		0x041C: gSmReceivedTimerEventForUnknownDevice_c
		0x041D: gSmUnattainableLocalDeviceSecRequirements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySize_c
		0x041F: gSmUnattainableSlaveSecReqRequirements_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupported_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c
		0x0460: gSmTbResolvableAddressDoesNotMatch_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c

*Table continues on the next page...*

**Table 136. GATTClient-ProcedureReadUsingCharacteristicUuid.Indication Parameters (continued)**

	0x0503: gAttWriteNotPermitted_c
	0x0504: gAttInvalidPdu_c
	0x0505: gAttInsufficientAuthentication_c
	0x0506: gAttRequestNotSupported_c
	0x0507: gAttInvalidOffset_c
	0x0508: gAttInsufficientAuthorization_c
	0x0509: gAttPrepareQueueFull_c
	0x050A: gAttAttributeNotFound_c
	0x050B: gAttAttributeNotLong_c
	0x050C: gAttInsufficientEncryptionKeySize_c
	0x050D: gAttInvalidAttributeValueLength_c
	0x050E: gAttUnlikelyor_c
	0x050F: gAttInsufficientEncryption_c
	0x0510: gAttUnsupportedGroupType_c
	0x0511: gAttInsufficientResources_c
	0x0601: gGattAnotherProcedureInProgress_c
	0x0602: gGattLongAttributePacketsCorrupted_c
	0x0603: gGattMultipleAttributesOverflow_c
	0x0604: gGattUnexpectedReadMultipleResponseLength_c
	0x0605: gGattInvalidValueLength_c
	0x0606: gGattServerTimeout_c
	0x0607: gGattIndicationAlreadyInProgress_c
	0x0608: gGattClientConfirmationTimeout_c
	0x0701: gGapAdvDataTooLong_c
	0x0702: gGapScanRspDataTooLong_c
	0x0703: gGapDeviceNotBonded_c
	0x0704: gGapAnotherProcedureInProgress_c
	0x0801: gDevDbCccdLimitReached_c

*Table continues on the next page...*

**Table 136. GATTClient-ProcedureReadUsingCharacteristicUuid.Indication Parameters (continued)**

		0x0802: gDevDbCccdNotFound_c 0x0901: gGattDbInvalidHandle_c 0x0902: gGattDbCharacteristicNotFound_c 0x0903: gGattDbCccdNotFound_c 0x0904: gGattDbServiceNotFound_c 0x0905: gGattDbDescriptorNotFound_c
NbOfReadBytes	2	The number of bytes that were read
ReadBytes	NbOfReadBytes	The bytes that were read

### 3.2.23 GATTClient-ProcedureWriteCharacteristicDescriptor.Indication

#### Description

Specifies that the Characteristic Descriptor Write procedure for a given characteristic's descriptor ended.

#### Parameters

**Table 137. GATTClient-ProcedureWriteCharacteristicDescriptor.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x8E
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
ProcedureResult	1	The result of the completed procedure Possible values: 0x00: gGattProcSuccess_c (The procedure was completed successfully) 0x01: gProcedureError_c (The procedure was terminated due to an error)

*Table continues on the next page...*

**Table 137. GATTClient-ProcedureWriteCharacteristicDescriptor.Indication Parameters (continued)**

Error	2	<p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p>
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Table 137. GATTClient-ProcedureWriteCharacteristicDescriptor.Indication Parameters (continued)

		0x010F: gHciConnectionRejectedDueToUnaccept- tableBdAddr_c
		0x0110: gHciConnectionAcceptTimeoutExceeded_c
		0x0111: gHciUnsupportedFeatureOrParameterValue_c
		0x0112: gHciInvalidHciCommandParameters_c
		0x0113: gHciRemoteUserTerminatedConnection_c
		0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c
		0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c
		0x0116: gHciConnectionTerminatedByLocalHost_c
		0x0117: gHciRepeatedAttempts_c
		0x0118: gHciPairingNotAllowed_c
		0x0119: gHciUnknownLmpPdu_c
		0x011A: gHciUnsupportedRemoteFeature_c
		0x011B: gHciScoOffsetRejected_c
		0x011C: gHciScoIntervalRejected_c
		0x011D: gHciScoAirModeRejected_c
		0x011E: gHciInvalidLmpParameters_c
		0x011F: gHciUnspecifiedError_c
		0x0120: gHciUnsupportedLmpParameterValue_c
		0x0121: gHciRoleChangeNotAllowed_c
		0x0122: gHciLLResponseTimeout_c
		0x0123: gHciLmpErrorTransactionCollision_c
		0x0124: gHciLmpPduNotAllowed_c
		0x0125: gHciEncryptionModeNotAcceptable_c

**Table 137. GATTClient-ProcedureWriteCharacteristicDescriptor.Indication Parameters (continued)**

		0x0126: gHciLinkKeyCannotBeChanged_c
		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c
		0x013C: gHciDirectedAdvertisingTimeout_c



Table 137. GATTClient-ProcedureWriteCharacteristicDescriptor.Indication Parameters (continued)

		0x013D: gHciConnectionTerminatedDueToMicFailure_c
		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c
		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c

**Table 137. GATTClient-ProcedureWriteCharacteristicDescriptor.Indication Parameters (continued)**

		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c
		0x0416: gSmInvalidHciEventParameter_c
		0x0417: gSmLlConnectionEncryptionInProgress_c

Table 137. GATTClient-ProcedureWriteCharacteristicDescriptor.Indication Parameters (continued)

		0x0418: gSmLlConnectionEncryptionFailure_c
		0x0419: gSmInsufficientResources_c
		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutO ccurred_c
		0x041C: gSmReceivedTimerEventForUnknownD evice_c
		0x041D: gSmUnattainableLocalDeviceSecRequir ements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySiz e_c
		0x041F: gSmUnattainableSlaveSecReqRequirem ents_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupporte d_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c
		0x0460: gSmTbResolvableAddressDoesNotMatc hIrk_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c
		0x0503: gAttWriteNotPermitted_c
		0x0504: gAttInvalidPdu_c
		0x0505: gAttInsufficientAuthentication_c
		0x0506: gAttRequestNotSupported_c
		0x0507: gAttInvalidOffset_c
		0x0508: gAttInsufficientAuthorization_c

**Table 137. GATTClient-ProcedureWriteCharacteristicDescriptor.Indication Parameters (continued)**

		0x0509: gAttPrepareQueueFull_c
		0x050A: gAttAttributeNotFound_c
		0x050B: gAttAttributeNotLong_c
		0x050C: gAttInsufficientEncryptionKeySize_c
		0x050D: gAttInvalidAttributeValueLength_c
		0x050E: gAttUnlikelyor_c
		0x050F: gAttInsufficientEncryption_c
		0x0510: gAttUnsupportedGroupType_c
		0x0511: gAttInsufficientResources_c
		0x0601: gGattAnotherProcedureInProgress_c
		0x0602: gGattLongAttributePacketsCorrupted_c
		0x0603: gGattMultipleAttributesOverflow_c
		0x0604: gGattUnexpectedReadMultipleResponseLength_c
		0x0605: gGattInvalidValueLength_c
		0x0606: gGattServerTimeout_c
		0x0607: gGattIndicationAlreadyInProgress_c
		0x0608: gGattClientConfirmationTimeout_c
		0x0701: gGapAdvDataTooLong_c
		0x0702: gGapScanRspDataTooLong_c
		0x0703: gGapDeviceNotBonded_c
		0x0704: gGapAnotherProcedureInProgress_c
		0x0801: gDevDbCccdLimitReached_c
		0x0802: gDevDbCccdNotFound_c
		0x0901: gGattDbInvalidHandle_c
		0x0902: gGattDbCharacteristicNotFound_c
		0x0903: gGattDbCccdNotFound_c
		0x0904: gGattDbServiceNotFound_c
		0x0905: gGattDbDescriptorNotFound_c

## 3.2.24 GATTClient-ProcedureWriteCharacteristicValue.Indication

### Description

Specifies that the Characteristic Write procedure for a given characteristic ended.

### Parameters

**Table 138. GATTClient-ProcedureWriteCharacteristicValue.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x8C
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
ProcedureResult	1	<p>The result of the completed procedure</p> <p>Possible values:</p> <p>0x00: gGattProcSuccess_c (The procedure was completed successfully)</p> <p>0x01: gProcedureError_c (The procedure was terminated due to an error)</p>

*Table continues on the next page...*

**Table 138. GATTClient-ProcedureWriteCharacteristicValue.Indication Parameters (continued)**

Error	2	<p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p>
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**Table 138. GATTClient-ProcedureWriteCharacteristicValue.Indication Parameters (continued)**

		0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c
		0x0110: gHciConnectionAcceptTimeoutExceede d_c
		0x0111: gHciUnsupportedFeatureOrParameterV alue_c
		0x0112: gHciInvalidHciCommandParameters_c
		0x0113: gHciRemoteUserTerminatedConnection _c
		0x0114: gHciRemoteDeviceTerminatedConnectio nLowResources_c
		0x0115: gHciRemoteDeviceTerminatedConnectio nPowerOff_c
		0x0116: gHciConnectionTerminatedByLocalHost _c
		0x0117: gHciRepeatedAttempts_c
		0x0118: gHciPairingNotAllowed_c
		0x0119: gHciUnknownLpmPdu_c
		0x011A: gHciUnsupportedRemoteFeature_c
		0x011B: gHciScoOffsetRejected_c
		0x011C: gHciScoIntervalRejected_c
		0x011D: gHciScoAirModeRejected_c
		0x011E: gHciInvalidLpmParameters_c
		0x011F: gHciUnspecifiedError_c
		0x0120: gHciUnsupportedLpmParameterValue_c
		0x0121: gHciRoleChangeNotAllowed_c
		0x0122: gHciLLResponseTimeout_c
		0x0123: gHciLmpErrorTransactionCollision_c
		0x0124: gHciLmpPduNotAllowed_c
		0x0125: gHciEncryptionModeNotAcceptable_c

**Table 138. GATTClient-ProcedureWriteCharacteristicValue.Indication Parameters (continued)**

		0x0126: gHciLinkKeyCannotBeChanged_c
		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c
		0x013C: gHciDirectedAdvertisingTimeout_c



**Table 138. GATTClient-ProcedureWriteCharacteristicValue.Indication Parameters (continued)**

		0x013D: gHciConnectionTerminatedDueToMicFailure_c
		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c
		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c

**Table 138. GATTClient-ProcedureWriteCharacteristicValue.Indication Parameters (continued)**

		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c
		0x0416: gSmInvalidHciEventParameter_c
		0x0417: gSmLlConnectionEncryptionInProgress_c

**Table 138. GATTClient-ProcedureWriteCharacteristicValue.Indication Parameters (continued)**

		0x0418: gSmLlConnectionEncryptionFailure_c
		0x0419: gSmInsufficientResources_c
		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutO ccurred_c
		0x041C: gSmReceivedTimerEventForUnknownD evice_c
		0x041D: gSmUnattainableLocalDeviceSecRequir ements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySiz e_c
		0x041F: gSmUnattainableSlaveSecReqRequirem ents_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupporte d_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c
		0x0460: gSmTbResolvableAddressDoesNotMatc hIrk_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c
		0x0503: gAttWriteNotPermitted_c
		0x0504: gAttInvalidPdu_c
		0x0505: gAttInsufficientAuthentication_c
		0x0506: gAttRequestNotSupported_c
		0x0507: gAttInvalidOffset_c
		0x0508: gAttInsufficientAuthorization_c

**Table 138. GATTClient-ProcedureWriteCharacteristicValue.Indication Parameters (continued)**

		0x0509: gAttPrepareQueueFull_c
		0x050A: gAttAttributeNotFound_c
		0x050B: gAttAttributeNotLong_c
		0x050C: gAttInsufficientEncryptionKeySize_c
		0x050D: gAttInvalidAttributeValueLength_c
		0x050E: gAttUnlikelyor_c
		0x050F: gAttInsufficientEncryption_c
		0x0510: gAttUnsupportedGroupType_c
		0x0511: gAttInsufficientResources_c
		0x0601: gGattAnotherProcedureInProgress_c
		0x0602: gGattLongAttributePacketsCorrupted_c
		0x0603: gGattMultipleAttributesOverflow_c
		0x0604: gGattUnexpectedReadMultipleResponseLength_c
		0x0605: gGattInvalidValueLength_c
		0x0606: gGattServerTimeout_c
		0x0607: gGattIndicationAlreadyInProgress_c
		0x0608: gGattClientConfirmationTimeout_c
		0x0701: gGapAdvDataTooLong_c
		0x0702: gGapScanRspDataTooLong_c
		0x0703: gGapDeviceNotBonded_c
		0x0704: gGapAnotherProcedureInProgress_c
		0x0801: gDevDbCccdLimitReached_c
		0x0802: gDevDbCccdNotFound_c
		0x0901: gGattDbInvalidHandle_c
		0x0902: gGattDbCharacteristicNotFound_c
		0x0903: gGattDbCccdNotFound_c
		0x0904: gGattDbServiceNotFound_c
		0x0905: gGattDbDescriptorNotFound_c

### 3.2.25 GATTClient-ProcedureWriteCharacteristicValue.Indication

#### Description

Specifies that the Characteristic Write procedure for a given characteristic ended.

#### Parameters

**Table 139. GATTClient-ProcedureWriteCharacteristicValue.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x8C
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
ProcedureResult	1	<p>The result of the completed procedure</p> <p>Possible values:</p> <p>0x00: gGattProcSuccess_c (The procedure was completed successfully)</p> <p>0x01: gProcedureError_c (The procedure was terminated due to an error)</p>

*Table continues on the next page...*

**Table 139. GATTClient-ProcedureWriteCharacteristicValue.Indication Parameters (continued)**

Error	2	<p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p>
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**Table 139. GATTClient-ProcedureWriteCharacteristicValue.Indication Parameters (continued)**

		0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c
		0x0110: gHciConnectionAcceptTimeoutExceede d_c
		0x0111: gHciUnsupportedFeatureOrParameterV alue_c
		0x0112: gHciInvalidHciCommandParameters_c
		0x0113: gHciRemoteUserTerminatedConnection _c
		0x0114: gHciRemoteDeviceTerminatedConnectio nLowResources_c
		0x0115: gHciRemoteDeviceTerminatedConnectio nPowerOff_c
		0x0116: gHciConnectionTerminatedByLocalHost _c
		0x0117: gHciRepeatedAttempts_c
		0x0118: gHciPairingNotAllowed_c
		0x0119: gHciUnknownLpmPdu_c
		0x011A: gHciUnsupportedRemoteFeature_c
		0x011B: gHciScoOffsetRejected_c
		0x011C: gHciScoIntervalRejected_c
		0x011D: gHciScoAirModeRejected_c
		0x011E: gHciInvalidLpmParameters_c
		0x011F: gHciUnspecifiedError_c
		0x0120: gHciUnsupportedLpmParameterValue_c
		0x0121: gHciRoleChangeNotAllowed_c
		0x0122: gHciLLResponseTimeout_c
		0x0123: gHciLmpErrorTransactionCollision_c
		0x0124: gHciLmpPduNotAllowed_c
		0x0125: gHciEncryptionModeNotAcceptable_c

**Table 139. GATTClient-ProcedureWriteCharacteristicValue.Indication Parameters (continued)**

		0x0126: gHciLinkKeyCannotBeChanged_c
		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c
		0x013C: gHciDirectedAdvertisingTimeout_c



**Table 139. GATTClient-ProcedureWriteCharacteristicValue.Indication Parameters (continued)**

		0x013D: gHciConnectionTerminatedDueToMicFailure_c
		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c
		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c

**Table 139. GATTClient-ProcedureWriteCharacteristicValue.Indication Parameters (continued)**

		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c
		0x0416: gSmInvalidHciEventParameter_c
		0x0417: gSmLlConnectionEncryptionInProgress_c

**Table 139. GATTClient-ProcedureWriteCharacteristicValue.Indication Parameters (continued)**

		0x0418: gSmLlConnectionEncryptionFailure_c
		0x0419: gSmInsufficientResources_c
		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutO ccurred_c
		0x041C: gSmReceivedTimerEventForUnknownD evice_c
		0x041D: gSmUnattainableLocalDeviceSecRequir ements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySiz e_c
		0x041F: gSmUnattainableSlaveSecReqRequirem ents_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupporte d_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c
		0x0460: gSmTbResolvableAddressDoesNotMatc hIrk_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c
		0x0503: gAttWriteNotPermitted_c
		0x0504: gAttInvalidPdu_c
		0x0505: gAttInsufficientAuthentication_c
		0x0506: gAttRequestNotSupported_c
		0x0507: gAttInvalidOffset_c
		0x0508: gAttInsufficientAuthorization_c

**Table 139. GATTClient-ProcedureWriteCharacteristicValue.Indication Parameters (continued)**

		0x0509: gAttPrepareQueueFull_c
		0x050A: gAttAttributeNotFound_c
		0x050B: gAttAttributeNotLong_c
		0x050C: gAttInsufficientEncryptionKeySize_c
		0x050D: gAttInvalidAttributeValueLength_c
		0x050E: gAttUnlikelyor_c
		0x050F: gAttInsufficientEncryption_c
		0x0510: gAttUnsupportedGroupType_c
		0x0511: gAttInsufficientResources_c
		0x0601: gGattAnotherProcedureInProgress_c
		0x0602: gGattLongAttributePacketsCorrupted_c
		0x0603: gGattMultipleAttributesOverflow_c
		0x0604: gGattUnexpectedReadMultipleResponseLength_c
		0x0605: gGattInvalidValueLength_c
		0x0606: gGattServerTimeout_c
		0x0607: gGattIndicationAlreadyInProgress_c
		0x0608: gGattClientConfirmationTimeout_c
		0x0701: gGapAdvDataTooLong_c
		0x0702: gGapScanRspDataTooLong_c
		0x0703: gGapDeviceNotBonded_c
		0x0704: gGapAnotherProcedureInProgress_c
		0x0801: gDevDbCccdLimitReached_c
		0x0802: gDevDbCccdNotFound_c
		0x0901: gGattDbInvalidHandle_c
		0x0902: gGattDbCharacteristicNotFound_c
		0x0903: gGattDbCccdNotFound_c
		0x0904: gGattDbServiceNotFound_c
		0x0905: gGattDbDescriptorNotFound_c

## 3.2.26 GATTClient-ReadCharacteristicDescriptor.Request

### Description

Initializes the Characteristic Descriptor Read procedure for a given Characteristic Descriptor.

### Parameters

**Table 140. GATTClient-ReadCharacteristicDescriptor.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x13
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the connected peer
Descriptor	Variable	The characteristic descriptor whose value must be read  Structure type parameter. See the detailed table below for parameter structure.
MaxReadBytes	2	Maximum number of bytes to be read

**Table 141. Descriptor Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type  Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value  "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

Table 142. Uuid Parameter Structure

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.2.27 GATTClient-ReadCharacteristicValue.Request

#### Description

Initializes the Characteristic Read procedure for a given Characteristic.

#### Parameters

Table 143. GATTClient-ReadCharacteristicValue.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x0F
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the connected peer
Characteristic	Variable	The characteristic whose value must be read  Structure type parameter. See the detailed table below for parameter structure.
MaxReadBytes	2	Maximum number of bytes to be read

Table 144. Characteristic Parameter Structure

Structure Parameter	Size (bytes)	Comments
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*Table continues on the next page...*

**Table 144. Characteristic Parameter Structure (continued)**

Properties	1	<p>Characteristic Properties as defined by GATT</p> <p>Possible values:</p> <p>0x00: gNone_c (No Properties selected)</p> <p>0x01: gBroadcast_c (Characteristic can be broadcast)</p> <p>0x02: gRead_c (Characteristic can be read)</p> <p>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)</p> <p>0x08: gWrite_c (Characteristic can be written with response)</p> <p>0x10: gNotify_c (Characteristic can be notified)</p> <p>0x20: gIndicate_c (Characteristic can be indicated)</p> <p>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)</p> <p>0x80: gExtendedProperties_c (Extended Characteristic properties)</p>
Value	Variable	<p>Characteristic Value attribute</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p>
NbOfDescriptors	1	Size of the Characteristic Descriptors array
Descriptors	Variable	<p>Characteristic Descriptors array</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p>

**Table 145. Value Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle

*Table continues on the next page...*

**Table 145. Value Parameter Structure (continued)**

UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 146. Descriptors Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array



Table 147. Uuid Parameter Structure

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

Table 148. Uuid Parameter Structure

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.2.28 GATTClient-ReadMultipleCharacteristicValues.Request

#### Description

Initializes the Characteristic Read Multiple procedure.

#### Parameters

Table 149. GATTClient-ReadMultipleCharacteristicValues.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x11
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the connected peer
NbOfCharacteristics	1	Number of characteristics in the array
Characteristics	Variable	Array of the characteristics whose values are to be read  Structure type parameter. See the detailed table below for parameter structure.

Table 150. Characteristics Parameter Structure

Structure Parameter	Size (bytes)	Comments
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*Table continues on the next page...*

**Table 150. Characteristics Parameter Structure (continued)**

Properties	1	<p>Characteristic Properties as defined by GATT</p> <p>Possible values:</p> <p>0x00: gNone_c (No Properties selected)</p> <p>0x01: gBroadcast_c (Characteristic can be broadcast)</p> <p>0x02: gRead_c (Characteristic can be read)</p> <p>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)</p> <p>0x08: gWrite_c (Characteristic can be written with response)</p> <p>0x10: gNotify_c (Characteristic can be notified)</p> <p>0x20: gIndicate_c (Characteristic can be indicated)</p> <p>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)</p> <p>0x80: gExtendedProperties_c (Extended Characteristic properties)</p>
Value	Variable	<p>Characteristic Value attribute</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p>
NbOfDescriptors	1	Size of the Characteristic Descriptors array
Descriptors	Variable	<p>Characteristic Descriptors array</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p>

**Table 151. Value Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle

*Table continues on the next page...*

**Table 151. Value Parameter Structure (continued)**

UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 152. Descriptors Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 153. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 154. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.2.29 GATTClient-ReadUsingCharacteristicUuid.Request

#### Description

Initializes the Characteristic Read by Uuid procedure.

#### Parameters

**Table 155. GATTClient-ReadUsingCharacteristicUUID.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x10
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the connected peer
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value  "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
HandleRangeIncluded	1	Boolean value which indicates if handle range is included or not

*Table continues on the next page...*

**Table 155. GATTClient-ReadUsingCharacteristicUUID.Request Parameters (continued)**

HandleRange	Variable	Handle range for the search Structure type parameter. See the detailed table below for parameter structure.
MaxReadBytes	2	Maximum number of bytes to be read

**Table 156. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

**Table 157. HandleRange Parameter Structure**

Structure Parameter	Size (bytes)	Comments
StartHandle	2	Start handle
EndHandle	2	End handle

### 3.2.30 GATTClient-RegisterIndicationCallback.Request

#### Description

Installs the application callback for Server Indications.

#### Parameters

**Table 158. GATTClient-RegisterIndicationCallback.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x07
Length	1	0x00 - This message does not have any parameters

### 3.2.31 GATTClient-RegisterNotificationCallback.Request

#### Description

Installs the application callback for Server Notifications.

#### Parameters

**Table 159. GATTClient-RegisterNotificationCallback.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45

*Table continues on the next page...*

**Table 159. GATTClient-RegisterNotificationCallback.Request Parameters (continued)**

OpCode	1	0x06
Length	1	0x00 - This message does not have any parameters

### 3.2.32 GATTClient-RegisterProcedureCallback.Request

#### Description

Installs the application callback for the GATT Client module Procedures.

#### Parameters

**Table 160. GATTClient-RegisterProcedureCallback.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x05
Length	1	0x00 - This message does not have any parameters

### 3.2.33 GATTClient-ResetProcedure.Request

#### Description

Resets any ongoing GATT Client procedure.

#### Parameters

**Table 161. GATTClient-ResetProcedure.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x04
Length	1	0x00 - This message does not have any parameters

### 3.2.34 GATTClient-WriteCharacteristicDescriptor.Request

#### Description

Initializes the Characteristic Descriptor Write procedure for a given Characteristic Descriptor.

#### Parameters

**Table 162. GATTClient-WriteCharacteristicDescriptor.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x14

*Table continues on the next page...*

**Table 162. GATTClient-WriteCharacteristicDescriptor.Request Parameters (continued)**

Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the connected peer
Descriptor	Variable	The characteristic descriptor whose value must be written  Structure type parameter. See the detailed table below for parameter structure.
ValueLength	2	Number of bytes to be written
Value	ValueLength	Array of bytes to be written

**Table 163. Descriptor Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type  Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value  "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 164. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.2.35 GATTClient-WriteCharacteristicValue.Request

#### Description

Initializes the Characteristic Write procedure for a given Characteristic.

#### Parameters

**Table 165. GATTClient-WriteCharacteristicValue.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x12
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the connected peer
Characteristic	Variable	The characteristic whose value must be written  Structure type parameter. See the detailed table below for parameter structure.
ValueLength	2	Number of bytes to be written
Value	ValueLength	Array of bytes to be written
WithoutResponse	1	Indicates if a Write Command will be used
SignedWrite	1	Indicates if a Signed Write will be performed
ReliableLongCharWrites	1	Indicates Reliable Long Writes
Csrk	16	The CSRK if signedWrite is TRUE, ignored otherwise

**Table 166. Characteristic Parameter Structure**

Structure Parameter	Size (bytes)	Comments
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*Table continues on the next page...*



**Table 166. Characteristic Parameter Structure (continued)**

Properties	1	<p>Characteristic Properties as defined by GATT</p> <p>Possible values:</p> <p>0x00: gNone_c (No Properties selected)</p> <p>0x01: gBroadcast_c (Characteristic can be broadcast)</p> <p>0x02: gRead_c (Characteristic can be read)</p> <p>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)</p> <p>0x08: gWrite_c (Characteristic can be written with response)</p> <p>0x10: gNotify_c (Characteristic can be notified)</p> <p>0x20: gIndicate_c (Characteristic can be indicated)</p> <p>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)</p> <p>0x80: gExtendedProperties_c (Extended Characteristic properties)</p>
Value	Variable	<p>Characteristic Value attribute</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p>
NbOfDescriptors	1	Size of the Characteristic Descriptors array
Descriptors	Variable	<p>Characteristic Descriptors array</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p>

**Table 167. Value Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle

*Table continues on the next page...*

**Table 167. Value Parameter Structure (continued)**

UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

**Table 168. Descriptors Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
ValueLength	2	Length of the attribute value array
MaxValueLength	2	Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed
Value	ValueLength	Attribute value array

Table 169. Uuid Parameter Structure

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

Table 170. Uuid Parameter Structure

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.2.36 GATT-GetMtu.Request

#### Description

Retrieves the MTU used with a given connected device.

#### Parameters

Table 171. GATT-GetMtu.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x02
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the connected peer

### 3.2.37 GATT-GetMtu.Indication

#### Description

Specifies the MTU used with a given connected device.

#### Parameters

Table 172. GATT-GetMtu.Indication Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x81
Length	1	Length in bytes of the following parameters
Mtu	2	MTU value

### 3.2.38 GATT-Init.Request

#### Description

Initializes the GATT module.

#### Parameters

Table 173. GATT-Init.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x01
Length	1	0x00 - This message does not have any parameters

### 3.2.39 GATTServer-AttributeRead.Indication

#### Description

GATT Server attribute read.

#### Parameters

Table 174. GATTServer-AttributeRead.Indication Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x98
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
AttributeReadEvent	Variable	Attribute read event  Structure type parameter. See the detailed table below for parameter structure.

Table 175. AttributeReadEvent Parameter Structure

Structure Parameter	Size (bytes)	Comments
Handle	2	Handle of the attribute

### 3.2.40 GATTServer-AttributeWritten.Indication

#### Description

GATT Server attribute written.

#### Parameters

**Table 176. GATTServer-AttributeWritten.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x93
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
AttributeWrittenEvent	Variable	Attribute written event  Structure type parameter. See the detailed table below for parameter structure.

**Table 177. AttributeWrittenEvent Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Handle of the attribute
ValueLength	2	Length of the attribute value array
Value	ValueLength	Attribute value array attempted to be written

### 3.2.41 GATTServer-AttributeWrittenWithoutResponse.Indication

#### Description

GATT Server attribute written without response.

#### Parameters

**Table 178. GATTServer-AttributeWrittenWithoutResponse.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x95
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
AttributeWrittenEvent	Variable	Attribute written event  Structure type parameter. See the detailed table below for parameter structure.

**Table 179. AttributeWrittenEvent Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Handle of the attribute
ValueLength	2	Length of the attribute value array
Value	ValueLength	Attribute value array attempted to be written

### 3.2.42 GATTServer-CharacteristicCccdWritten.Indication

#### Description

GATT Server characteristic cccd written.

#### Parameters

**Table 180. GATTServer-CharacteristicCccdWritten.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x94
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
CharCccdWrittenEvent	Variable	Characteristic cccd written event Structure type parameter. See the detailed table below for parameter structure.

**Table 181. CharCccdWrittenEvent Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Handle of the CCCD attribute
NewCccd	1	New value of the CCCD Possible values: 0x00: gCccdEmpty_c 0x01: gCccdNotification_c 0x02: gCccdIndication_c

### 3.2.43 GATTServer-Error.Indication

#### Description

GATT Server error.

#### Parameters

**Table 182. GATTServer-Error.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x96
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
ProcedureError	Variable	Procedure error  Structure type parameter. See the detailed table below for parameter structure.

**Table 183. ProcedureError Parameter Structure**

Structure Parameter	Size (bytes)	Comments
ProcedureType	1	Procedure that generated error  Possible values:  0x00: gSendAttributeWrittenStatus_c (Procedure initiated by GattServer_SendAttributeWrittenStatus)  0x01: gSendAttributeReadStatus_c (Procedure initiated by GattServer_SendAttributeReadStatus)  0x02: gSendNotification_c (Procedure initiated by GattServer_SendNotification)  0x03: gSendIndication_c (Procedure initiated by GattServer_SendIndication)

*Table continues on the next page...*

**Table 183. ProcedureError Parameter Structure (continued)**

Error	2	<p>Error generated</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p> <p>0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c</p>
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**Table 183. ProcedureError Parameter Structure (continued)**

	0x0110: gHciConnectionAcceptTimeoutExceeded_c
	0x0111: gHciUnsupportedFeatureOrParameterValue_c
	0x0112: gHciInvalidHciCommandParameters_c
	0x0113: gHciRemoteUserTerminatedConnection_c
	0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c
	0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c
	0x0116: gHciConnectionTerminatedByLocalHost_c
	0x0117: gHciRepeatedAttempts_c
	0x0118: gHciPairingNotAllowed_c
	0x0119: gHciUnknownLpmPdu_c
	0x011A: gHciUnsupportedRemoteFeature_c
	0x011B: gHciScoOffsetRejected_c
	0x011C: gHciScoIntervalRejected_c
	0x011D: gHciScoAirModeRejected_c
	0x011E: gHciInvalidLpmParameters_c
	0x011F: gHciUnspecifiedError_c
	0x0120: gHciUnsupportedLpmParameterValue_c
	0x0121: gHciRoleChangeNotAllowed_c
	0x0122: gHciLLResponseTimeout_c
	0x0123: gHciLmpErrorTransactionCollision_c
	0x0124: gHciLmpPduNotAllowed_c
	0x0125: gHciEncryptionModeNotAcceptable_c
	0x0126: gHciLinkKeyCannotBeChanged_c

**Table 183. ProcedureError Parameter Structure (continued)**

		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c
		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c

**Table 183. ProcedureError Parameter Structure (continued)**

	0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
	0x013F: gHciMacConnectionFailed_c
	0x0140: gHciCoarseClockAdjustmentRejected_c
	0x0141: gHciType0SubmapNotDefined_c
	0x0142: gHciUnknownAdvertisingIdentifier_c
	0x0143: gHciLimitReached_c
	0x0144: gHciOperationCancelledByHost_c
	0x01A0: gHciAlreadyInit_c
	0x01A1: gHciInvalidParameter_c
	0x01A2: gHciCallbackNotInstalled_c
	0x01A3: gHciCallbackAlreadyInstalled_c
	0x01A4: gHciCommandNotSupported_c
	0x01A5: gHciEventNotSupported_c
	0x01A6: gHciTransportError_c
	0x03F0: gL2caAlreadyInit_c
	0x03F1: gL2caInsufficientResources_c
	0x03F2: gL2caCallbackNotInstalled_c
	0x03F3: gL2caCallbackAlreadyInstalled_c
	0x03F4: gL2caLePsmInvalid_c
	0x03F5: gL2caLePsmAlreadyRegistered_c
	0x03F6: gL2caLePsmNotRegistered_c
	0x03F7: gL2caLePsmInsufficientResources_c
	0x03F8: gL2caChannelInvalid_c
	0x03F9: gL2caChannelClosed_c
	0x03FA: gL2caChannelAlreadyConnected_c
	0x03FB: gL2caConnectionParametersRejected_c
	0x03FC: gL2caChannelBusy_c
	0x03FE: gL2caInvalidParameter_c
	0x03FF: gL2caError_c

**Table 183. ProcedureError Parameter Structure (continued)**

	0x0401: gSmNullCBFunction_c
	0x0402: gSmCommandNotSupported_c
	0x0403: gSmUnexpectedCommand_c
	0x0404: gSmInvalidCommandCode_c
	0x0405: gSmInvalidCommandLength_c
	0x0406: gSmInvalidCommandParameter_c
	0x0407: gSmInvalidDeviceId_c
	0x0408: gSmInvalidInternalOperation_c
	0x0409: gSmInvalidConnectionHandle_c
	0x040A: gSmImproperKeyDistributionField_c
	0x040B: gSmUnexpectedKeyType_c
	0x040C: gSmUnexpectedPairingTerminationReason_c
	0x040D: gSmUnexpectedKeyset_c
	0x040E: gSmSmpTimeoutOccurred_c
	0x040F: gSmUnknownSmpPacketType_c
	0x0410: gSmInvalidSmpPacketLength_c
	0x0411: gSmInvalidSmpPacketParameter_c
	0x0412: gSmReceivedUnexpectedSmpPacket_c
	0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
	0x0414: gSmReceivedUnexpectedHciEvent_c
	0x0415: gSmReceivedHciEventFromUnknownDevice_c
	0x0416: gSmInvalidHciEventParameter_c
	0x0417: gSmLlConnectionEncryptionInProgress_c
	0x0418: gSmLlConnectionEncryptionFailure_c
	0x0419: gSmInsufficientResources_c

**Table 183. ProcedureError Parameter Structure (continued)**

	0x041A: gSmOobDataAddressMismatch_c
	0x041B: gSmSmpPacketReceivedAfterTimeoutO ccurred_c
	0x041C: gSmReceivedTimerEventForUnknownD evice_c
	0x041D: gSmUnattainableLocalDeviceSecRequir ements_c
	0x041E: gSmUnattainableLocalDeviceMinKeySiz e_c
	0x041F: gSmUnattainableSlaveSecReqRequirem ents_c
	0x0431: gSmPairingErrorPasskeyEntryFailed_c
	0x0432: gSmPairingErrorConfirmValueFailed_c
	0x0433: gSmPairingErrorCommandNotSupporte d_c
	0x0434: gSmPairingErrorInvalidParameters_c
	0x0435: gSmPairingErrorUnknownReason_c
	0x0460: gSmTbResolvableAddressDoesNotMatc hLrk_c
	0x0461: gSmTbInvalidDataSignature_c
	0x0501: gAttInvalidHandle_c
	0x0502: gAttReadNotPermitted_c
	0x0503: gAttWriteNotPermitted_c
	0x0504: gAttInvalidPdu_c
	0x0505: gAttInsufficientAuthentication_c
	0x0506: gAttRequestNotSupported_c
	0x0507: gAttInvalidOffset_c
	0x0508: gAttInsufficientAuthorization_c
	0x0509: gAttPrepareQueueFull_c
	0x050A: gAttAttributeNotFound_c

**Table 183. ProcedureError Parameter Structure (continued)**

	0x050B: gAttAttributeNotLong_c
	0x050C: gAttInsufficientEncryptionKeySize_c
	0x050D: gAttInvalidAttributeValueLength_c
	0x050E: gAttUnlikelyor_c
	0x050F: gAttInsufficientEncryption_c
	0x0510: gAttUnsupportedGroupType_c
	0x0511: gAttInsufficientResources_c
	0x0601: gGattAnotherProcedureInProgress_c
	0x0602: gGattLongAttributePacketsCorrupted_c
	0x0603: gGattMultipleAttributesOverflow_c
	0x0604: gGattUnexpectedReadMultipleResponseLength_c
	0x0605: gGattInvalidValueLength_c
	0x0606: gGattServerTimeout_c
	0x0607: gGattIndicationAlreadyInProgress_c
	0x0608: gGattClientConfirmationTimeout_c
	0x0701: gGapAdvDataTooLong_c
	0x0702: gGapScanRspDataTooLong_c
	0x0703: gGapDeviceNotBonded_c
	0x0704: gGapAnotherProcedureInProgress_c
	0x0801: gDevDbCccdLimitReached_c
	0x0802: gDevDbCccdNotFound_c
	0x0901: gGattDbInvalidHandle_c
	0x0902: gGattDbCharacteristicNotFound_c
	0x0903: gGattDbCccdNotFound_c
	0x0904: gGattDbServiceNotFound_c
	0x0905: gGattDbDescriptorNotFound_c

### 3.2.44 GATTServer-HandleValueConfirmation.Indication

#### Description

GATT Server handle value confirmation.

#### Parameters

**Table 184. GATTServer-HandleValueConfirmation.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x92
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection

### 3.2.45 GATTServer-Init.Request

#### Description

Initializes the GATT Server module.

#### Parameters

**Table 185. GATTServer-Init.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x15
Length	1	0x00 - This message does not have any parameters

### 3.2.46 GATTServer-LongCharacteristicWritten.Indication

#### Description

GATT Server long characteristic written.

#### Parameters

**Table 186. GATTServer-LongCharacteristicWritten.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x97
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection

*Table continues on the next page...*

**Table 186. GATTServer-LongCharacteristicWritten.Indication Parameters (continued)**

LongCharacteristicWrittenEvent	Variable	Long characteristic written event  Structure type parameter. See the detailed table below for parameter structure.
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**Table 187. LongCharacteristicWrittenEvent Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Handle of the characteristic value
ValueLength	2	Length of the characteristic value
Value	ValueLength	Characteristic value array

### 3.2.47 GATTServer-MtuChanged.Indication

#### Description

GATT Server MTU changed indication.

#### Parameters

**Table 188. GATTServer-MtuChanged.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x91
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the active connection
MtuChangedEvent	Variable	Mtu changed event  Structure type parameter. See the detailed table below for parameter structure.

**Table 189. MtuChangedEvent Parameter Structure**

Structure Parameter	Size (bytes)	Comments
NewMtu	2	Value of the agreed ATT_MTU for this connection

### 3.2.48 GATTServer-RegisterCallback.Request

#### Description

Installs an application callback for the GATT Server module.

#### Parameters



Table 190. GATTServer-RegisterCallback.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x16
Length	1	0x00 - This message does not have any parameters

### 3.2.49 GATTServer-RegisterHandlesForReadNotifications.Request

#### Description

Registers the attribute handles that will be notified through the GATT Server callback when a GATT Client attempts to read the attributes' values.

#### Parameters

Table 191. GATTServer-RegisterHandlesForReadNotifications.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x1D
Length	1	Length in bytes of the following parameters
HandleCount	1	Number of handles in array
AttributeHandles	Variable	Statically allocated array of handles Structure type parameter. See the detailed table below for parameter structure.

Table 192. AttributeHandles Parameter Structure

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle

### 3.2.50 GATTServer-RegisterHandlesForWriteNotifications.Request

#### Description

Registers the attribute handles that will be notified through the GATT Server callback when a GATT Client attempts to modify the attributes' values.

#### Parameters

Table 193. GATTServer-RegisterHandlesForWriteNotifications.Request Parameters

Parameter	Size (bytes)	Comments
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*Table continues on the next page...*

**Table 193. GATTServer-RegisterHandlesForWriteNotifications.Request Parameters (continued)**

OpGroup	1	0x45
OpCode	1	0x17
Length	1	Length in bytes of the following parameters
HandleCount	1	Number of handles in array
AttributeHandles	Variable	Statically allocated array of handles Structure type parameter. See the detailed table below for parameter structure.

**Table 194. AttributeHandles Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Handle	2	Attribute handle

### 3.2.51 GATTServer-SendAttributeReadStatus.Request

#### Description

Responds to an intercepted attribute read operation.

#### Parameters

**Table 195. GATTServer-SendAttributeReadStatus.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x1E
Length	1	Length in bytes of the following parameters
DeviceId	1	The device ID of the connected peer
AttributeHandle	2	The attribute handle that was read
Status	1	The status of the read operation

### 3.2.52 GATTServer-SendAttributeWrittenStatus.Request

#### Description

Responds to a Control Point write operation.

#### Parameters

**Table 196. GATTServer-SendAttributeWrittenStatus.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45

*Table continues on the next page...*

**Table 196. GATTServer-SendAttributeWrittenStatus.Request Parameters (continued)**

OpCode	1	0x18
Length	1	Length in bytes of the following parameters
DeviceId	1	The device ID of the connected peer
AttributeHandle	2	The attribute handle that was written
Status	1	The status of the write operation

### 3.2.53 GATTServer-SendIndication.Request

#### Description

Sends an indication to a peer GATT Client.

#### Parameters

**Table 197. GATTServer-SendIndication.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x1A
Length	1	Length in bytes of the following parameters
DeviceId	1	The device ID of the connected peer
Handle	2	Handle of the Value of the Characteristic to be indicated

### 3.2.54 GATTServer-SendInstantValueIndication.Request

#### Description

Sends an indication to a peer GATT Client with data given as parameter, ignoring the GATT Database.

#### Parameters

**Table 198. GATTServer-SendInstantValueIndication.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x1C
Length	1	Length in bytes of the following parameters
DeviceId	1	The device ID of the connected peer
Handle	2	Handle of the Value of the Characteristic to be indicated
ValueLength	2	Length of data to be indicated
Value	ValueLength	Data to be indicated

### 3.2.55 GATTServer-SendInstantValueNotification.Request

#### Description

Sends a notification to a peer GATT Client with data given as parameter, ignoring the GATT Database.

#### Parameters

**Table 199. GATTServer-SendInstantValueNotification.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x1B
Length	1	Length in bytes of the following parameters
DeviceId	1	The device ID of the connected peer
Handle	2	Handle of the Value of the Characteristic to be notified
ValueLength	2	Length of data to be notified
Value	ValueLength	Data to be notified

### 3.2.56 GATTServer-SendNotification.Request

#### Description

Sends a notification to a peer GATT Client.

#### Parameters

**Table 200. GATTServer-SendNotification.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x45
OpCode	1	0x19
Length	1	Length in bytes of the following parameters
DeviceId	1	The device ID of the connected peer
Handle	2	Handle of the Value of the Characteristic to be notified

## 3.3 GATTDB\_App Messages

### 3.3.1 GATTDB.Confirm

#### Description

Status of the GATT Database (application) request.

#### Parameters

Table 201. GATTDB.Confirm Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x80
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*

**Table 201. GATTDB.Confirm Parameters (continued)**

Status	2	<p>The status of the GATT Database request</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p> <p>0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c</p>
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Table 201. GATTDB.Confirm Parameters (continued)

	0x0110: gHciConnectionAcceptTimeoutExceeded_c
	0x0111: gHciUnsupportedFeatureOrParameterValue_c
	0x0112: gHciInvalidHciCommandParameters_c
	0x0113: gHciRemoteUserTerminatedConnection_c
	0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c
	0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c
	0x0116: gHciConnectionTerminatedByLocalHost_c
	0x0117: gHciRepeatedAttempts_c
	0x0118: gHciPairingNotAllowed_c
	0x0119: gHciUnknownLpmPdu_c
	0x011A: gHciUnsupportedRemoteFeature_c
	0x011B: gHciScoOffsetRejected_c
	0x011C: gHciScoIntervalRejected_c
	0x011D: gHciScoAirModeRejected_c
	0x011E: gHciInvalidLpmParameters_c
	0x011F: gHciUnspecifiedError_c
	0x0120: gHciUnsupportedLpmParameterValue_c
	0x0121: gHciRoleChangeNotAllowed_c
	0x0122: gHciLLResponseTimeout_c
	0x0123: gHciLmpErrorTransactionCollision_c
	0x0124: gHciLmpPduNotAllowed_c
	0x0125: gHciEncryptionModeNotAcceptable_c
	0x0126: gHciLinkKeyCannotBeChanged_c

**Table 201. GATTDB.Confirm Parameters (continued)**

		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c
		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c



Table 201. GATTDB.Confirm Parameters (continued)

	0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
	0x013F: gHciMacConnectionFailed_c
	0x0140: gHciCoarseClockAdjustmentRejected_c
	0x0141: gHciType0SubmapNotDefined_c
	0x0142: gHciUnknownAdvertisingIdentifier_c
	0x0143: gHciLimitReached_c
	0x0144: gHciOperationCancelledByHost_c
	0x01A0: gHciAlreadyInit_c
	0x01A1: gHciInvalidParameter_c
	0x01A2: gHciCallbackNotInstalled_c
	0x01A3: gHciCallbackAlreadyInstalled_c
	0x01A4: gHciCommandNotSupported_c
	0x01A5: gHciEventNotSupported_c
	0x01A6: gHciTransportError_c
	0x03F0: gL2caAlreadyInit_c
	0x03F1: gL2caInsufficientResources_c
	0x03F2: gL2caCallbackNotInstalled_c
	0x03F3: gL2caCallbackAlreadyInstalled_c
	0x03F4: gL2caLePsmInvalid_c
	0x03F5: gL2caLePsmAlreadyRegistered_c
	0x03F6: gL2caLePsmNotRegistered_c
	0x03F7: gL2caLePsmInsufficientResources_c
	0x03F8: gL2caChannelInvalid_c
	0x03F9: gL2caChannelClosed_c
	0x03FA: gL2caChannelAlreadyConnected_c
	0x03FB: gL2caConnectionParametersRejected_c
	0x03FC: gL2caChannelBusy_c
	0x03FE: gL2caInvalidParameter_c
	0x03FF: gL2caError_c

**Table 201. GATTDB.Confirm Parameters (continued)**

	0x0401: gSmNullCBFunction_c
	0x0402: gSmCommandNotSupported_c
	0x0403: gSmUnexpectedCommand_c
	0x0404: gSmInvalidCommandCode_c
	0x0405: gSmInvalidCommandLength_c
	0x0406: gSmInvalidCommandParameter_c
	0x0407: gSmInvalidDeviceId_c
	0x0408: gSmInvalidInternalOperation_c
	0x0409: gSmInvalidConnectionHandle_c
	0x040A: gSmImproperKeyDistributionField_c
	0x040B: gSmUnexpectedKeyType_c
	0x040C: gSmUnexpectedPairingTerminationReason_c
	0x040D: gSmUnexpectedKeyset_c
	0x040E: gSmSmpTimeoutOccurred_c
	0x040F: gSmUnknownSmpPacketType_c
	0x0410: gSmInvalidSmpPacketLength_c
	0x0411: gSmInvalidSmpPacketParameter_c
	0x0412: gSmReceivedUnexpectedSmpPacket_c
	0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
	0x0414: gSmReceivedUnexpectedHciEvent_c
	0x0415: gSmReceivedHciEventFromUnknownDevice_c
	0x0416: gSmInvalidHciEventParameter_c
	0x0417: gSmLlConnectionEncryptionInProgress_c
	0x0418: gSmLlConnectionEncryptionFailure_c
	0x0419: gSmInsufficientResources_c

Table 201. GATTDB.Confirm Parameters (continued)

	0x041A: gSmOobDataAddressMismatch_c
	0x041B: gSmSmpPacketReceivedAfterTimeoutO ccurred_c
	0x041C: gSmReceivedTimerEventForUnknownD evice_c
	0x041D: gSmUnattainableLocalDeviceSecRequir ements_c
	0x041E: gSmUnattainableLocalDeviceMinKeySiz e_c
	0x041F: gSmUnattainableSlaveSecReqRequirem ents_c
	0x0431: gSmPairingErrorPasskeyEntryFailed_c
	0x0432: gSmPairingErrorConfirmValueFailed_c
	0x0433: gSmPairingErrorCommandNotSupporte d_c
	0x0434: gSmPairingErrorInvalidParameters_c
	0x0435: gSmPairingErrorUnknownReason_c
	0x0460: gSmTbResolvableAddressDoesNotMatc hLrk_c
	0x0461: gSmTbInvalidDataSignature_c
	0x0501: gAttInvalidHandle_c
	0x0502: gAttReadNotPermitted_c
	0x0503: gAttWriteNotPermitted_c
	0x0504: gAttInvalidPdu_c
	0x0505: gAttInsufficientAuthentication_c
	0x0506: gAttRequestNotSupported_c
	0x0507: gAttInvalidOffset_c
	0x0508: gAttInsufficientAuthorization_c
	0x0509: gAttPrepareQueueFull_c
	0x050A: gAttAttributeNotFound_c

**Table 201. GATTDB.Confirm Parameters (continued)**

	0x050B: gAttAttributeNotLong_c
	0x050C: gAttInsufficientEncryptionKeySize_c
	0x050D: gAttInvalidAttributeValueLength_c
	0x050E: gAttUnlikelyor_c
	0x050F: gAttInsufficientEncryption_c
	0x0510: gAttUnsupportedGroupType_c
	0x0511: gAttInsufficientResources_c
	0x0601: gGattAnotherProcedureInProgress_c
	0x0602: gGattLongAttributePacketsCorrupted_c
	0x0603: gGattMultipleAttributesOverflow_c
	0x0604: gGattUnexpectedReadMultipleResponseLength_c
	0x0605: gGattInvalidValueLength_c
	0x0606: gGattServerTimeout_c
	0x0607: gGattIndicationAlreadyInProgress_c
	0x0608: gGattClientConfirmationTimeout_c
	0x0701: gGapAdvDataTooLong_c
	0x0702: gGapScanRspDataTooLong_c
	0x0703: gGapDeviceNotBonded_c
	0x0704: gGapAnotherProcedureInProgress_c
	0x0801: gDevDbCccdLimitReached_c
	0x0802: gDevDbCccdNotFound_c
	0x0901: gGattDbInvalidHandle_c
	0x0902: gGattDbCharacteristicNotFound_c
	0x0903: gGattDbCccdNotFound_c
	0x0904: gGattDbServiceNotFound_c
	0x0905: gGattDbDescriptorNotFound_c

### 3.3.2 GATTDBDynamic-AddCccd.Request

#### Description

Adds a CCCD in the database.

#### Parameters

**Table 202. GATTDBDynamic-AddCccd.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x0F
Length	1	0x00 - This message does not have any parameters

### 3.3.3 GATTDBDynamic-AddCccd.Indication

#### Description

Adds a CCCD in the database.

#### Parameters

**Table 203. GATTDBDynamic-AddCccd.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x8B
Length	1	Length in bytes of the following parameters
CCCDHandle	2	Handle of the CCCD declaration

### 3.3.4 GATTDBDynamic-AddCharacteristicDeclarationAndValue.Request

#### Description

Adds a Characteristic declaration and its Value into the database.

#### Parameters

**Table 204. GATTDBDynamic-AddCharacteristicDeclarationAndValue.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x0D
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*

**Table 204. GATTDBDynamic-AddCharacteristicDeclarationAndValue.Request Parameters (continued)**

UuidType	1	<p>UUID type</p> <p>Possible values:</p> <p>0x01: Uuid16Bits</p> <p>0x02: Uuid128Bits</p> <p>0x03: Uuid32Bits</p>
Uuid	Variable	<p>UUID value</p> <p>"Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.</p>
CharacteristicProperties	1	<p>Characteristic properties</p> <p>Possible values:</p> <p>0x00: gNone_c (No Properties selected)</p> <p>0x01: gBroadcast_c (Characteristic can be broadcast)</p> <p>0x02: gRead_c (Characteristic can be read)</p> <p>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)</p> <p>0x08: gWrite_c (Characteristic can be written with response)</p> <p>0x10: gNotify_c (Characteristic can be notified)</p> <p>0x20: gIndicate_c (Characteristic can be indicated)</p> <p>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)</p> <p>0x80: gExtendedProperties_c (Extended Characteristic properties)</p>
MaxValueLength	2	If the Characteristic Value length is variable, this is the maximum length; for fixed lengths this must be set to 0
InitialValueLength	2	Value length at initialization; remains fixed if maxValueLength is set to 0, otherwise cannot be greater than maxValueLength
InitialValue	InitialValueLength	Contains the initial value of the Characteristic

*Table continues on the next page...*

**Table 204. GATTDBDynamic-AddCharacteristicDeclarationAndValue.Request Parameters (continued)**

ValueAccessPermissions	1	<p>Access permissions for the value attribute</p> <p>Possible values:</p> <p>0x00: gPermissionNone_c (No permissions selected)</p> <p>0x01: gPermissionFlagReadable_c (Attribute can be read)</p> <p>0x02: gPermissionFlagReadWithEncryption_c (Attribute may be read only if link is encrypted)</p> <p>0x04: gPermissionFlagReadWithAuthentication_c (Attribute may be read only by authenticated peers)</p> <p>0x08: gPermissionFlagReadWithAuthorization_c (Attribute may be read only by authorized peers)</p> <p>0x10: gPermissionFlagWritable_c (Attribute can be written)</p> <p>0x20: gPermissionFlagWriteWithEncryption_c (Attribute may be written only if link is encrypted)</p> <p>0x40: gPermissionFlagWriteWithAuthentication_c (Attribute may be written only by authenticated peers)</p> <p>0x80: gPermissionFlagWriteWithAuthorization_c (Attribute may be written only by authorized peers)</p>
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**Table 205. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.3.5 GATTDBDynamic-AddCharacteristicDeclarationAndValue.Indication

#### Description

Adds a Characteristic declaration and its Value into the database.

#### Parameters

**Table 206. GATTDBDynamic-AddCharacteristicDeclarationAndValue.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x89
Length	1	Length in bytes of the following parameters
CharacteristicHandle	2	Handle of the Characteristic declaration

### 3.3.6 GATTDBDynamic-AddCharacteristicDeclarationWithUniqueValue.Request

#### Description

Adds a Characteristic declaration with a Value contained in a universal value buffer.

#### Parameters

**Table 207. GATTDBDynamic-AddCharacteristicDeclarationWithUniqueValue.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x10
Length	1	Length in bytes of the following parameters
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.

*Table continues on the next page...*



**Table 207. GATTDDBDynamic-AddCharacteristicDeclarationWithUniqueValue.Request Parameters (continued)**

CharacteristicProperties	1	<p>Characteristic properties</p> <p>Possible values:</p> <p>0x00: gNone_c (No Properties selected)</p> <p>0x01: gBroadcast_c (Characteristic can be broadcast)</p> <p>0x02: gRead_c (Characteristic can be read)</p> <p>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)</p> <p>0x08: gWrite_c (Characteristic can be written with response)</p> <p>0x10: gNotify_c (Characteristic can be notified)</p> <p>0x20: gIndicate_c (Characteristic can be indicated)</p> <p>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)</p> <p>0x80: gExtendedProperties_c (Extended Characteristic properties)</p>
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*Table continues on the next page...*

**Table 207. GATTDBDynamic-AddCharacteristicDeclarationWithUniqueValue.Request Parameters (continued)**

ValueAccessPermissions	1	<p>Access permissions for the value attribute</p> <p>Possible values:</p> <p>0x00: gPermissionNone_c (No permissions selected)</p> <p>0x01: gPermissionFlagReadable_c (Attribute can be read)</p> <p>0x02: gPermissionFlagReadWithEncryption_c (Attribute may be read only if link is encrypted)</p> <p>0x04: gPermissionFlagReadWithAuthentication_c (Attribute may be read only by authenticated peers)</p> <p>0x08: gPermissionFlagReadWithAuthorization_c (Attribute may be read only by authorized peers)</p> <p>0x10: gPermissionFlagWritable_c (Attribute can be written)</p> <p>0x20: gPermissionFlagWriteWithEncryption_c (Attribute may be written only if link is encrypted)</p> <p>0x40: gPermissionFlagWriteWithAuthentication_c (Attribute may be written only by authenticated peers)</p> <p>0x80: gPermissionFlagWriteWithAuthorization_c (Attribute may be written only by authorized peers)</p>
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**Table 208. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.3.7 GATTDBDynamic-AddCharacteristicDeclarationWithUniqueValue.Indication

Description

Adds a Characteristic declaration with a Value contained in a universal value buffer.

#### Parameters

**Table 209. GATTDDBDynamic-AddCharacteristicDeclarationWithUniqueValue.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x8C
Length	1	Length in bytes of the following parameters
CharacteristicHandle	2	Handle of the Characteristic declaration

### 3.3.8 GATTDDBDynamic-AddCharacteristicDescriptor.Request

#### Description

Adds a Characteristic descriptor into the database.

#### Parameters

**Table 210. GATTDDBDynamic-AddCharacteristicDescriptor.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x0E
Length	1	Length in bytes of the following parameters
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.
DescriptorValueLength	2	Fixed length of the descriptor attribute value
Value	DescriptorValueLength	Initial value of the descriptor attribute

*Table continues on the next page...*

**Table 210. GATTDBDynamic-AddCharacteristicDescriptor.Request Parameters (continued)**

DescriptorAccessPermissions	1	<p>Access permissions for the descriptor attribute</p> <p>Possible values:</p> <p>0x00: gPermissionNone_c (No permissions selected)</p> <p>0x01: gPermissionFlagReadable_c (Attribute can be read)</p> <p>0x02: gPermissionFlagReadWithEncryption_c (Attribute may be read only if link is encrypted)</p> <p>0x04: gPermissionFlagReadWithAuthentication_c (Attribute may be read only by authenticated peers)</p> <p>0x08: gPermissionFlagReadWithAuthorization_c (Attribute may be read only by authorized peers)</p> <p>0x10: gPermissionFlagWritable_c (Attribute can be written)</p> <p>0x20: gPermissionFlagWriteWithEncryption_c (Attribute may be written only if link is encrypted)</p> <p>0x40: gPermissionFlagWriteWithAuthentication_c (Attribute may be written only by authenticated peers)</p> <p>0x80: gPermissionFlagWriteWithAuthorization_c (Attribute may be written only by authorized peers)</p>
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**Table 211. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.3.9 GATTDBDynamic-AddCharacteristicDescriptor.Indication

#### Description

Adds a Characteristic descriptor into the database.

**Parameters****Table 212. GATTDDBDynamic-AddCharacteristicDescriptor.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x8A
Length	1	Length in bytes of the following parameters
DescriptorHandle	2	Handle of the Descriptor declaration

**3.3.10 GATTDDBDynamic-AddIncludeDeclaration.Request****Description**

Adds an Include declaration into the database.

**Parameters****Table 213. GATTDDBDynamic-AddIncludeDeclaration.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x0C
Length	1	Length in bytes of the following parameters
IncludedServiceHandle	2	Handle of the included Service declaration
EndGroupHandle	2	Last handle of the included Service
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.

**Table 214. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits

*Table continues on the next page...*

**Table 214. Uuid Parameter Structure (continued)**

0x03	Uuid32Bits	4	UUID 32 bits
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### 3.3.11 GATTDBDynamic-AddIncludeDeclaration.Indication

#### Description

Adds an Include declaration into the database.

#### Parameters

**Table 215. GATTDBDynamic-AddIncludeDeclaration.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x88
Length	1	Length in bytes of the following parameters
IncludeHandle	2	Handle of the Include declaration

### 3.3.12 GATTDBDynamic-AddPrimaryServiceDeclaration.Request

#### Description

Adds a Primary Service declaration into the database.

#### Parameters

**Table 216. GATTDBDynamic-AddPrimaryServiceDeclaration.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x0A
Length	1	Length in bytes of the following parameters
DesiredHandle	2	The desired handle for the Primary Service declaration
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.

Table 217. Uuid Parameter Structure

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.3.13 GATTDBDynamic-AddPrimaryServiceDeclaration.Indication

#### Description

Adds a Primary Service declaration into the database.

#### Parameters

Table 218. GATTDBDynamic-AddPrimaryServiceDeclaration.Indication Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x86
Length	1	Length in bytes of the following parameters
ServiceHandle	2	Handle of the Service declaration

### 3.3.14 GATTDBDynamic-AddSecondaryServiceDeclaration.Request

#### Description

Adds a Secondary Service declaration into the database.

#### Parameters

Table 219. GATTDBDynamic-AddSecondaryServiceDeclaration.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x0B
Length	1	Length in bytes of the following parameters
DesiredHandle	2	The desired handle for the Secondary Service declaration

*Table continues on the next page...*

**Table 219. GATTDBDynamic-AddSecondaryServiceDeclaration.Request Parameters (continued)**

UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.

**Table 220. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.3.15 GATTDBDynamic-AddSecondaryServiceDeclaration.Indication

#### Description

Adds an Primary Service declaration into the database.

#### Parameters

**Table 221. GATTDBDynamic-AddSecondaryServiceDeclaration.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x87
Length	1	Length in bytes of the following parameters
ServiceHandle	2	Handle of the Service declaration

### 3.3.16 GATTDBDynamic-Init.Request

#### Description

Allocates smallest possible buffers and initializes an empty database.

#### Parameters



Table 222. GATTDDBDynamic-Init.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x08
Length	1	0x00 - This message does not have any parameters

### 3.3.17 GATTDDBDynamic-ReleaseDatabase.Request

#### Description

Releases the allocated buffers.

#### Parameters

Table 223. GATTDDBDynamic-ReleaseDatabase.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x09
Length	1	0x00 - This message does not have any parameters

### 3.3.18 GATTDDBDynamic-RemoveCharacteristic.Request

#### Description

Removes a Characteristic from the database.

#### Parameters

Table 224. GATTDDBDynamic-RemoveCharacteristic.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x12
Length	1	Length in bytes of the following parameters
CharacteristicHandle	2	Attribute handle of the Characteristic declaration

### 3.3.19 GATTDDBDynamic-RemoveService.Request

#### Description

Removes a Service from the database.

#### Parameters

**Table 225. GATTDBDynamic-RemoveService.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x11
Length	1	Length in bytes of the following parameters
ServiceHandle	2	Attribute handle of the Service declaration

### 3.3.20 GATTDB-FindCccdHandleForCharValueHandle.Request

#### Description

Finds the handle of a Characteristic's CCCD given the Characteristic's Value handle.

#### Parameters

**Table 226. GATTDB-FindCccdHandleForCharValueHandle.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x06
Length	1	Length in bytes of the following parameters
CharValueHandle	2	The handle of the characteristic value

### 3.3.21 GATTDB-FindCccdHandleForCharValueHandle.Indication

#### Description

Finds the handle of a Characteristic's CCCD (giving the Characteristic's Value handle).

#### Parameters

**Table 227. GATTDB-FindCccdHandleForCharValueHandle.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x84
Length	1	Length in bytes of the following parameters
CccdHandle	2	CCCD handle

### 3.3.22 GATTDB-FindCharValueHandleInService.Request

#### Description

Finds the handle of a Characteristic Value with a given UUID inside a service.

#### Parameters

**Table 228. GATTDB-FindCharValueHandleInService.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x05
Length	1	Length in bytes of the following parameters
ServiceHandle	2	The handle of the Service declaration
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.

**Table 229. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.3.23 GATTDB-FindCharValueHandleInService.Indication

#### Description

Finds the handle of a characteristic value (with a given UUID) inside a service.

#### Parameters

**Table 230. GATTDB-FindCharValueHandleInService.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x83
Length	1	Length in bytes of the following parameters
CharValueHandle	2	Characteristic value handle

### 3.3.24 GATTDB- FindDescriptorHandleForCharValueHandle.Request

#### Description

Finds the handle of a Characteristic Descriptor given the Characteristic's Value handle and Descriptor's UUID.

#### Parameters

**Table 231. GATTDB-FindDescriptorHandleForCharValueHandle.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x07
Length	1	Length in bytes of the following parameters
CharValueHandle	2	The handle of the characteristic value
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value  "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.

**Table 232. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.3.25 GATTDB- FindDescriptorHandleForCharValueHandle.Indication

#### Description

Finds the handle of a characteristic descriptor (giving the characteristic's value handle and descriptor's UUID).

#### Parameters

**Table 233. GATTDB-FindDescriptorHandleForCharValueHandle.Indication Parameters**

Parameter	Size (bytes)	Comments
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*Table continues on the next page...*

**Table 233. GATTDB-FindDescriptorHandleForCharValueHandle.Indication Parameters (continued)**

OpGroup	1	0x46
OpCode	1	0x85
Length	1	Length in bytes of the following parameters
DescriptorHandle	2	Descriptor handle

### 3.3.26 GATTDB-FindServiceHandle.Request

#### Description

Finds the handle of a Service Declaration with a given UUID inside the database.

#### Parameters

**Table 234. GATTDB-FindServiceHandle.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x04
Length	1	Length in bytes of the following parameters
StartHandle	2	The handle to start the search. Should be 0x0001 on the first call
UuidType	1	UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits
Uuid	Variable	UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.

**Table 235. Uuid Parameter Structure**

UuidType	Structure Parameter	Size (bytes)	Comments
0x01	Uuid16Bits	2	UUID 16 bits
0x02	Uuid128Bits	16	UUID 128 bits
0x03	Uuid32Bits	4	UUID 32 bits

### 3.3.27 GATTDB-FindServiceHandle.Indication

#### Description

Finds the handle of a Service Declaration with a given UUID inside the database.

#### Parameters

**Table 236. GATTDB-FindServiceHandle.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x82
Length	1	Length in bytes of the following parameters
ServiceHandle	2	Service handle

### 3.3.28 GATTDB-ReadAttribute.Request

#### Description

Reads an attribute from application level.

#### Parameters

**Table 237. GATTDB-ReadAttribute.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x03
Length	1	Length in bytes of the following parameters
Handle	2	The handle of the attribute to be read
MaxBytes	2	The maximum number of bytes to be read

### 3.3.29 GATTDB-ReadAttribute.Indication

#### Description

Reads an attribute value (from application level).

#### Parameters

**Table 238. GATTDB-ReadAttribute.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x81
Length	1	Length in bytes of the following parameters
ValueLength	2	Attribute value length
Value	ValueLength	Attribute value

### 3.3.30 GATTDB-WriteAttribute.Request

#### Description

Writes an attribute from the application level.

#### Parameters

Table 239. GATTDB-WriteAttribute.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x46
OpCode	1	0x02
Length	1	Length in bytes of the following parameters
Handle	2	The handle of the attribute to be written
ValueLength	2	The number of bytes to be written
Value	ValueLength	The value to be written

## 3.4 GAP Messages

### 3.4.1 BLE-HostInitialize.Request

#### Description

Performs master initialization of the BLE Host stack.

#### Parameters

Table 240. BLE-HostInitialize.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x47
OpCode	1	0x01
Length	1	0x00 - This message does not have any parameters

### 3.4.2 GAP.Confirm

#### Description

Status of the GAP request.

#### Parameters

Table 241. GAP.Confirm Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x48

*Table continues on the next page...*

**Table 241. GAP.Confirm Parameters (continued)**

OpCode	1	0x80
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*



Table 241. GAP.Confirm Parameters (continued)

Status	2	<p>The status of the GAP request</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p> <p>0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c</p>
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**Table 241. GAP.Confirm Parameters (continued)**

		0x0110: gHciConnectionAcceptTimeoutExceeded_c
		0x0111: gHciUnsupportedFeatureOrParameterValue_c
		0x0112: gHciInvalidHciCommandParameters_c
		0x0113: gHciRemoteUserTerminatedConnection_c
		0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c
		0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c
		0x0116: gHciConnectionTerminatedByLocalHost_c
		0x0117: gHciRepeatedAttempts_c
		0x0118: gHciPairingNotAllowed_c
		0x0119: gHciUnknownLpmPdu_c
		0x011A: gHciUnsupportedRemoteFeature_c
		0x011B: gHciScoOffsetRejected_c
		0x011C: gHciScoIntervalRejected_c
		0x011D: gHciScoAirModeRejected_c
		0x011E: gHciInvalidLpmParameters_c
		0x011F: gHciUnspecifiedError_c
		0x0120: gHciUnsupportedLpmParameterValue_c
		0x0121: gHciRoleChangeNotAllowed_c
		0x0122: gHciLLResponseTimeout_c
		0x0123: gHciLmpErrorTransactionCollision_c
		0x0124: gHciLmpPduNotAllowed_c
		0x0125: gHciEncryptionModeNotAcceptable_c
		0x0126: gHciLinkKeyCannotBeChanged_c

Table 241. GAP.Confirm Parameters (continued)

		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c
		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c

**Table 241. GAP.Confirm Parameters (continued)**

		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c
		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c

Table 241. GAP.Confirm Parameters (continued)

	0x0401: gSmNullCBFunction_c
	0x0402: gSmCommandNotSupported_c
	0x0403: gSmUnexpectedCommand_c
	0x0404: gSmInvalidCommandCode_c
	0x0405: gSmInvalidCommandLength_c
	0x0406: gSmInvalidCommandParameter_c
	0x0407: gSmInvalidDeviceId_c
	0x0408: gSmInvalidInternalOperation_c
	0x0409: gSmInvalidConnectionHandle_c
	0x040A: gSmImproperKeyDistributionField_c
	0x040B: gSmUnexpectedKeyType_c
	0x040C: gSmUnexpectedPairingTerminationReason_c
	0x040D: gSmUnexpectedKeyset_c
	0x040E: gSmSmpTimeoutOccurred_c
	0x040F: gSmUnknownSmpPacketType_c
	0x0410: gSmInvalidSmpPacketLength_c
	0x0411: gSmInvalidSmpPacketParameter_c
	0x0412: gSmReceivedUnexpectedSmpPacket_c
	0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
	0x0414: gSmReceivedUnexpectedHciEvent_c
	0x0415: gSmReceivedHciEventFromUnknownDevice_c
	0x0416: gSmInvalidHciEventParameter_c
	0x0417: gSmLlConnectionEncryptionInProgress_c
	0x0418: gSmLlConnectionEncryptionFailure_c
	0x0419: gSmInsufficientResources_c

**Table 241. GAP.Confirm Parameters (continued)**

		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutO ccurred_c
		0x041C: gSmReceivedTimerEventForUnknownD evice_c
		0x041D: gSmUnattainableLocalDeviceSecRequir ements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySiz e_c
		0x041F: gSmUnattainableSlaveSecReqRequirem ents_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupporte d_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c
		0x0460: gSmTbResolvableAddressDoesNotMatc hLrk_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c
		0x0503: gAttWriteNotPermitted_c
		0x0504: gAttInvalidPdu_c
		0x0505: gAttInsufficientAuthentication_c
		0x0506: gAttRequestNotSupported_c
		0x0507: gAttInvalidOffset_c
		0x0508: gAttInsufficientAuthorization_c
		0x0509: gAttPrepareQueueFull_c
		0x050A: gAttAttributeNotFound_c

Table 241. GAP.Confirm Parameters (continued)

	0x050B: gAttAttributeNotLong_c
	0x050C: gAttInsufficientEncryptionKeySize_c
	0x050D: gAttInvalidAttributeValueLength_c
	0x050E: gAttUnlikelyor_c
	0x050F: gAttInsufficientEncryption_c
	0x0510: gAttUnsupportedGroupType_c
	0x0511: gAttInsufficientResources_c
	0x0601: gGattAnotherProcedureInProgress_c
	0x0602: gGattLongAttributePacketsCorrupted_c
	0x0603: gGattMultipleAttributesOverflow_c
	0x0604: gGattUnexpectedReadMultipleResponseLength_c
	0x0605: gGattInvalidValueLength_c
	0x0606: gGattServerTimeout_c
	0x0607: gGattIndicationAlreadyInProgress_c
	0x0608: gGattClientConfirmationTimeout_c
	0x0701: gGapAdvDataTooLong_c
	0x0702: gGapScanRspDataTooLong_c
	0x0703: gGapDeviceNotBonded_c
	0x0704: gGapAnotherProcedureInProgress_c
	0x0801: gDevDbCccdLimitReached_c
	0x0802: gDevDbCccdNotFound_c
	0x0901: gGattDbInvalidHandle_c
	0x0902: gGattDbCharacteristicNotFound_c
	0x0903: gGattDbCccdNotFound_c
	0x0904: gGattDbServiceNotFound_c
	0x0905: gGattDbDescriptorNotFound_c

### 3.4.3 GAP-AcceptPairingRequest.Request

#### Description

Accepts the pairing request from a peer.

#### Parameters

**Table 242. GAP-AcceptPairingRequest.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x0F
Length	1	Length in bytes of the following parameters
DeviceId	1	The peer requesting authentication
PairingParameters	Variable	Pairing parameters as required by the SMP  Structure type parameter. See the detailed table below for parameter structure.

**Table 243. PairingParameters Parameter Structure**

Structure Parameter	Size (bytes)	Comments
WithBonding	1	TRUE if this device is able to and wants to bond after pairing, FALSE otherwise
SecurityModeAndLevel	1	The desired security mode-level  Possible values:  0x10: gMode1Level1_c (Mode 1 Level 1 - No Security)  0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication)  0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication)  0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing)  0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication)  0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication)
MaxEncryptionKeySize	1	Maximum LTK size supported by the device

*Table continues on the next page...*



**Table 243. PairingParameters Parameter Structure (continued)**

LocalIoCapabilities	1	<p>I/O capabilities used to determine the pairing method</p> <p>Possible values:</p> <p>0x00: gIoDisplayOnly_c (May display a PIN, no input)</p> <p>0x01: gIoDisplayYesNo_c (May display a PIN and has a binary input (for example, YES and NO buttons))</p> <p>0x02: gIoKeyboardOnly_c (Has keyboard input, no display)</p> <p>0x03: gIoNone_c (No input and no display)</p> <p>0x04: gIoKeyboardDisplay_c (Has keyboard input and display)</p>
OobAvailable	1	TRUE if this device has Out-of-Band data that can be used for authenticated pairing, FALSE otherwise
CentralKeys	1	<p>SMP keys to be distributed by the Central</p> <p>Possible values:</p> <p>0x00: gNoKeys_c (No key can be distributed)</p> <p>0x01: gLtk_c (Long Term Key)</p> <p>0x02: glrk_c (Identity Resolving Key)</p> <p>0x04: gCsrk_c (Connection Signature Resolving Key)</p>
PeripheralKeys	1	<p>SMP keys to be distributed by the Peripheral</p> <p>Possible values:</p> <p>0x00: gNoKeys_c (No key can be distributed)</p> <p>0x01: gLtk_c (Long Term Key)</p> <p>0x02: glrk_c (Identity Resolving Key)</p> <p>0x04: gCsrk_c (Connection Signature Resolving Key)</p>
LeSecureConnectionSupported	1	indicates if device supports LE Secure Connections pairing
UseKeypressNotifications	1	Indicates if device supports Keypress Notification PDUs during Passkey Entry pairing

### 3.4.4 GAP-AddDeviceToWhiteList.Request

#### Description

Adds a device address to the White List.

#### Parameters

**Table 244. GAP-AddDeviceToWhiteList.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x23
Length	1	Length in bytes of the following parameters
AddressType	1	The address type (public or random) Possible values: 0x00: gPublic_c 0x01: gRandom_c
Address	6	The address of the white-listed device

### 3.4.5 GAP-AdvertisingEventAdvertisingSetTerminated.Indication

#### Description

Controller event - advertising was terminated in a given advertising set.

#### Parameters

**Table 245. GAP-AdvertisingEventAdvertisingSetTerminated.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xC7
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*

Table 245. GAP-AdvertisingEventAdvertisingSetTerminated.Indication Parameters (continued)

Parameter	Size (bytes)	Comments
Status	2	<p>The status of the request</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedResources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurityReasons_c</p>

Table continues on the next page...

**Table 245. GAP-AdvertisingEventAdvertisingSetTerminated.Indication Parameters (continued)**

Parameter	Size (bytes)	Comments
		0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c
		0x0110: gHciConnectionAcceptTimeoutExceeded_c
		0x0111: gHciUnsupportedFeatureOrParameterValue_c
		0x0112: gHciInvalidHciCommandParameters_c
		0x0113: gHciRemoteUserTerminatedConnection_c
		0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c
		0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c
		0x0116: gHciConnectionTerminatedByLocalHost_c
		0x0117: gHciRepeatedAttempts_c
		0x0118: gHciPairingNotAllowed_c
		0x0119: gHciUnknownLpmPdu_c
		0x011A: gHciUnsupportedRemoteFeature_c
		0x011B: gHciScoOffsetRejected_c
		0x011C: gHciScoIntervalRejected_c
		0x011D: gHciScoAirModeRejected_c
		0x011E: gHciInvalidLpmParameters_c
		0x011F: gHciUnspecifiedError_c
		0x0120: gHciUnsupportedLpmParameterValue_c
		0x0121: gHciRoleChangeNotAllowed_c
		0x0122: gHciLLResponseTimeout_c
		0x0123: gHciLmpErrorTransactionCollision_c
		0x0124: gHciLmpPduNotAllowed_c

*Table continues on the next page...*

Table 245. GAP-AdvertisingEventAdvertisingSetTerminated.Indication Parameters (continued)

Parameter	Size (bytes)	Comments
		0x0125: gHciEncryptionModeNotAcceptable_c
		0x0126: gHciLinkKeyCannotBeChanged_c
		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c

Table continues on the next page...

**Table 245. GAP-AdvertisingEventAdvertisingSetTerminated.Indication Parameters (continued)**

Parameter	Size (bytes)	Comments
		0x013B: gHciUnacceptableConnectionParameters_c
		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c
		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c

*Table continues on the next page...*

**Table 245. GAP-AdvertisingEventAdvertisingSetTerminated.Indication Parameters (continued)**

Parameter	Size (bytes)	Comments
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c
		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c

*Table continues on the next page...*

**Table 245. GAP-AdvertisingEventAdvertisingSetTerminated.Indication Parameters (continued)**

Parameter	Size (bytes)	Comments
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c
		0x0416: gSmInvalidHciEventParameter_c
		0x0417: gSmLlConnectionEncryptionInProgress_c
		0x0418: gSmLlConnectionEncryptionFailure_c
		0x0419: gSmInsufficientResources_c
		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c
		0x041C: gSmReceivedTimerEventForUnknownDevice_c
		0x041D: gSmUnattainableLocalDeviceSecRequirements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySize_c
		0x041F: gSmUnattainableSlaveSecReqRequirements_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupported_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c

*Table continues on the next page...*



Table 245. GAP-AdvertisingEventAdvertisingSetTerminated.Indication Parameters (continued)

Parameter	Size (bytes)	Comments
		0x0460: gSmTbResolvableAddressDoesNotMatch_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c
		0x0503: gAttWriteNotPermitted_c
		0x0504: gAttInvalidPdu_c
		0x0505: gAttInsufficientAuthentication_c
		0x0506: gAttRequestNotSupported_c
		0x0507: gAttInvalidOffset_c
		0x0508: gAttInsufficientAuthorization_c
		0x0509: gAttPrepareQueueFull_c
		0x050A: gAttAttributeNotFound_c
		0x050B: gAttAttributeNotLong_c
		0x050C: gAttInsufficientEncryptionKeySize_c
		0x050D: gAttInvalidAttributeValueLength_c
		0x050E: gAttUnlikelyor_c
		0x050F: gAttInsufficientEncryption_c
		0x0510: gAttUnsupportedGroupType_c
		0x0511: gAttInsufficientResources_c
		0x0601: gGattAnotherProcedureInProgress_c
		0x0602: gGattLongAttributePacketsCorrupted_c
		0x0603: gGattMultipleAttributesOverflow_c
		0x0604: gGattUnexpectedReadMultipleResponseLength_c
		0x0605: gGattInvalidValueLength_c
		0x0606: gGattServerTimeout_c
		0x0607: gGattIndicationAlreadyInProgress_c
		0x0608: gGattClientConfirmationTimeout_c

Table continues on the next page...

**Table 245. GAP-AdvertisingEventAdvertisingSetTerminated.Indication Parameters (continued)**

Parameter	Size (bytes)	Comments
		0x0701: gGapAdvDataTooLong_c 0x0702: gGapScanRspDataTooLong_c 0x0703: gGapDeviceNotBonded_c 0x0704: gGapAnotherProcedureInProgress_c 0x0801: gDevDbCccdLimitReached_c 0x0802: gDevDbCccdNotFound_c 0x0901: gGattDbInvalidHandle_c 0x0902: gGattDbCharacteristicNotFound_c 0x0903: gGattDbCccdNotFound_c 0x0904: gGattDbServiceNotFound_c 0x0905: gGattDbDescriptorNotFound_c
SID	1	Advertising set ID

### 3.4.6 GAP-AdvertisingEventExtAdvertisingSetRemoveCompleted.Indication

#### Description

Controller event - advertising set(s) removed successfully from the controller.

#### Parameters

**Table 246. GAP-AdvertisingEventExtAdvertisingSetRemoveCompleted.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xC8
Length	1	0x00 - This message does not have any parameters

### 3.4.7 GAP-AdvertisingEventExtAdvertisingStateChanged.Indication

#### Description

Controller event - extended advertising state changed indication.

#### Parameters

Table 247. GAP-AdvertisingEventExtAdvertisingStateChanged.Indication Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xC6
Length	1	0x00 - This message does not have any parameters

### 3.4.8 GAP-AdvertisingEventExtScanReqReceived.Indication

#### Description

Controller event - a SCAN\_REQ PDU or an AUX\_SCAN\_REQ PDU has been received.

#### Parameters

Table 248. GAP-AdvertisingEventExtScanReqReceived.Indication Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xC9
Length	1	Length in bytes of the following parameters
SID	1	Advertising set ID
ScannerAddressType	1	The type of the address of the scanner device  Possible values: 0x00: gPublic_c 0x01: gRandom_c
ScannerAddress	6	The address of the scanner device
ScannerAddressResolved	1	TRUE if the address contained in the ScannerAddressType and ScannerAddress fields corresponds to a Resolved Private Address

### 3.4.9 GAP-AdvertisingEventPeriodicAdvertisingStateChanged.Indication

#### Description

Controller event - Periodic advertising state changed indication.

#### Parameters

**Table 249. GAP-AdvertisingEventPeriodicAdvertisingStateChanged.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xCA
Length	1	0x00 - This message does not have any parameters

### 3.4.10 GAP-AdvertisingEventCommandFailed.Indication

#### Description

Event received when advertising could not be enabled or disabled.

#### Parameters

**Table 250. GAP-AdvertisingEventCommandFailed.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x99
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*

**Table 250. GAP-AdvertisingEventCommandFailed.Indication Parameters (continued)**

FailReason	2	<p>The reason of failure</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p> <p>0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c</p>
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**Table 250. GAP-AdvertisingEventCommandFailed.Indication Parameters (continued)**

		0x0110: gHciConnectionAcceptTimeoutExceeded_c
		0x0111: gHciUnsupportedFeatureOrParameterValue_c
		0x0112: gHciInvalidHciCommandParameters_c
		0x0113: gHciRemoteUserTerminatedConnection_c
		0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c
		0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c
		0x0116: gHciConnectionTerminatedByLocalHost_c
		0x0117: gHciRepeatedAttempts_c
		0x0118: gHciPairingNotAllowed_c
		0x0119: gHciUnknownLpmPdu_c
		0x011A: gHciUnsupportedRemoteFeature_c
		0x011B: gHciScoOffsetRejected_c
		0x011C: gHciScoIntervalRejected_c
		0x011D: gHciScoAirModeRejected_c
		0x011E: gHciInvalidLpmParameters_c
		0x011F: gHciUnspecifiedError_c
		0x0120: gHciUnsupportedLpmParameterValue_c
		0x0121: gHciRoleChangeNotAllowed_c
		0x0122: gHciLLResponseTimeout_c
		0x0123: gHciLmpErrorTransactionCollision_c
		0x0124: gHciLmpPduNotAllowed_c
		0x0125: gHciEncryptionModeNotAcceptable_c
		0x0126: gHciLinkKeyCannotBeChanged_c

Table 250. GAP-AdvertisingEventCommandFailed.Indication Parameters (continued)

		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c
		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c

**Table 250. GAP-AdvertisingEventCommandFailed.Indication Parameters (continued)**

		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c
		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c



Table 250. GAP-AdvertisingEventCommandFailed.Indication Parameters (continued)

	0x0401: gSmNullCBFunction_c
	0x0402: gSmCommandNotSupported_c
	0x0403: gSmUnexpectedCommand_c
	0x0404: gSmInvalidCommandCode_c
	0x0405: gSmInvalidCommandLength_c
	0x0406: gSmInvalidCommandParameter_c
	0x0407: gSmInvalidDeviceId_c
	0x0408: gSmInvalidInternalOperation_c
	0x0409: gSmInvalidConnectionHandle_c
	0x040A: gSmImproperKeyDistributionField_c
	0x040B: gSmUnexpectedKeyType_c
	0x040C: gSmUnexpectedPairingTerminationReason_c
	0x040D: gSmUnexpectedKeyset_c
	0x040E: gSmSmpTimeoutOccurred_c
	0x040F: gSmUnknownSmpPacketType_c
	0x0410: gSmInvalidSmpPacketLength_c
	0x0411: gSmInvalidSmpPacketParameter_c
	0x0412: gSmReceivedUnexpectedSmpPacket_c
	0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
	0x0414: gSmReceivedUnexpectedHciEvent_c
	0x0415: gSmReceivedHciEventFromUnknownDevice_c
	0x0416: gSmInvalidHciEventParameter_c
	0x0417: gSmLlConnectionEncryptionInProgress_c
	0x0418: gSmLlConnectionEncryptionFailure_c
	0x0419: gSmInsufficientResources_c

**Table 250. GAP-AdvertisingEventCommandFailed.Indication Parameters (continued)**

		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutO ccurred_c
		0x041C: gSmReceivedTimerEventForUnknownD evice_c
		0x041D: gSmUnattainableLocalDeviceSecRequir ements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySiz e_c
		0x041F: gSmUnattainableSlaveSecReqRequirem ents_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupporte d_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c
		0x0460: gSmTbResolvableAddressDoesNotMatc hLrk_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c
		0x0503: gAttWriteNotPermitted_c
		0x0504: gAttInvalidPdu_c
		0x0505: gAttInsufficientAuthentication_c
		0x0506: gAttRequestNotSupported_c
		0x0507: gAttInvalidOffset_c
		0x0508: gAttInsufficientAuthorization_c
		0x0509: gAttPrepareQueueFull_c
		0x050A: gAttAttributeNotFound_c

Table 250. GAP-AdvertisingEventCommandFailed.Indication Parameters (continued)

	0x050B: gAttAttributeNotLong_c
	0x050C: gAttInsufficientEncryptionKeySize_c
	0x050D: gAttInvalidAttributeValueLength_c
	0x050E: gAttUnlikelyor_c
	0x050F: gAttInsufficientEncryption_c
	0x0510: gAttUnsupportedGroupType_c
	0x0511: gAttInsufficientResources_c
	0x0601: gGattAnotherProcedureInProgress_c
	0x0602: gGattLongAttributePacketsCorrupted_c
	0x0603: gGattMultipleAttributesOverflow_c
	0x0604: gGattUnexpectedReadMultipleResponseLength_c
	0x0605: gGattInvalidValueLength_c
	0x0606: gGattServerTimeout_c
	0x0607: gGattIndicationAlreadyInProgress_c
	0x0608: gGattClientConfirmationTimeout_c
	0x0701: gGapAdvDataTooLong_c
	0x0702: gGapScanRspDataTooLong_c
	0x0703: gGapDeviceNotBonded_c
	0x0704: gGapAnotherProcedureInProgress_c
	0x0801: gDevDbCccdLimitReached_c
	0x0802: gDevDbCccdNotFound_c
	0x0901: gGattDbInvalidHandle_c
	0x0902: gGattDbCharacteristicNotFound_c
	0x0903: gGattDbCccdNotFound_c
	0x0904: gGattDbServiceNotFound_c
	0x0905: gGattDbDescriptorNotFound_c

### 3.4.11 GAP-AdvertisingEventStateChanged.Indication

#### Description

Event received when advertising was successfully enabled or disabled.

#### Parameters

**Table 251. GAP-AdvertisingEventStateChanged.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x98
Length	1	0x00 - This message does not have any parameters

### 3.4.12 GAP-Authorize.Request

#### Description

Authorizes a peer for a certain attribute in the database.

#### Parameters

**Table 252. GAP-Authorize.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x07
Length	1	Length in bytes of the following parameters
DeviceId	1	The peer being authorized
Handle	2	The attribute handle
Access	1	GATT Database access type (the type of access granted - read or write)  Possible values:  0x00: gRead_c (Attempting to read the attribute)  0x01: gWrite_c (Attempting to write the attribute)

### 3.4.13 GAP-BondCreated.Indication

#### Description

A bond has been created by the stack or the application.

#### Parameters

**Table 253. GAP-BondCreated.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xBD
Length	1	Length in bytes of the following parameters
NvmIndex	1	Index of the device in NVM bonding area
AddrType	1	BLE Address Type Possible values: 0x00: gPublic_c 0x01: gRandom_c
Addr	6	BLE Address

### 3.4.14 GAP-CheckIfBonded.Request

#### Description

Verifies if a connected peer device is bonded.

#### Parameters

**Table 254. GAP-CheckIfBonded.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x20
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the GAP peer

### 3.4.15 GAP-CheckIfBonded.Indication

#### Description

Returns whether a connected peer device is bonded or not.

#### Parameters

**Table 255. GAP-CheckIfBonded.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x86
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*

**Table 255. GAP-CheckIfBonded.Indication Parameters (continued)**

IsBonded	1	Bonded flag
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### 3.4.16 GAP-CheckIndicationStatus.Request

#### Description

Retrieves the indication status for a given client and a given CCCD handle.

#### Parameters

**Table 256. Parameters GAP-CheckIndicationStatus.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x0A
Length	1	Length in bytes of the following parameters
DeviceId	1	The peer GATT client
Handle	2	The handle of the CCCD

### 3.4.17 GAP-CheckIndicationStatus.Indication

#### Description

Returns the indication status for a given Client and a given CCCD handle.

#### Parameters

**Table 257. GAP-CheckIndicationStatus.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x82
Length	1	Length in bytes of the following parameters
IsActive	1	Indication status

### 3.4.18 GAP-CheckNotificationStatus.Request

#### Description

Retrieves the notification status for a given client and a given CCCD handle.

#### Parameters

**Table 258. GAP-CheckNotificationStatus.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48

*Table continues on the next page...*

**Table 258. GAP-CheckNotificationStatus.Request Parameters (continued)**

OpCode	1	0x09
Length	1	Length in bytes of the following parameters
DeviceId	1	The peer GATT client
Handle	2	The handle of the CCCD

### 3.4.19 GAP-CheckNotificationStatus.Indication

#### Description

Returns the notification status for a given Client and a given CCCD handle.

#### Parameters

**Table 259. GAP-CheckNotificationStatus.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x81
Length	1	Length in bytes of the following parameters
IsActive	1	Notification status

### 3.4.20 GAP-ClearWhiteList.Request

#### Description

Removes all addresses from the White List.

#### Parameters

**Table 260. GAP-ClearWhiteList.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x22
Length	1	0x00 - This message does not have any parameters

### 3.4.21 GAP-Connect.Request

#### Description

Connects to a scanned device.

#### Parameters

**Table 261. GAP-Connect.Request Parameters**

Parameter	Size (bytes)	Comments
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*Table continues on the next page...*

**Table 261. GAP-Connect.Request Parameters (continued)**

OpGroup	1	0x48
OpCode	1	0x1C
Length	1	Length in bytes of the following parameters
CreateConnectionParameters	Variable	Create connection command parameters Structure type parameter. See the detailed table below for parameter structure.

**Table 262. CreateConnectionParameters Parameter Structure**

Structure Parameter	Size (bytes)	Comments
ScanInterval	2	Scanning interval - default 10ms
ScanWindow	2	Scanning window - default 10ms
FilterPolicy	1	Indicates whether the connection request is issued for a specific device or for all the devices in the White List - default specific device  Possible values: 0x00: gUseDeviceAddress_c (Initiates a connection with a specific device identified by its address) 0x01: gUseWhiteList_c (Initiates connections with all the devices in the White List at the same time)
OwnAddressType	1	Indicates whether the address used in connection requests will be the public address or the random address - default public address  Possible values: 0x00: gPublic_c 0x01: gRandom_c
PeerAddressType	1	When connecting to a specific device, this indicates that device's address type - default public address  Possible values: 0x00: gPublic_c 0x01: gRandom_c

*Table continues on the next page...*



**Table 262. CreateConnectionParameters Parameter Structure (continued)**

PeerAddress	6	When connecting to a specific device, this indicates that device's address
ConnIntervalMin	2	The minimum desired connection interval - default 100ms
ConnIntervalMax	2	The maximum desired connection interval - default 200ms
ConnLatency	2	The desired connection latency (the maximum number of consecutive connection events the Slave is allowed to ignore) - default 0
SupervisionTimeout	2	The maximum time interval between consecutive over-the-air packets; if this timer expires, the connection is dropped - default 10s
ConnEventLengthMin	2	The minimum desired connection event length - default 0ms
ConnEventLengthMax	2	The maximum desired connection event length - default maximum possible, ~41 s
usePeerIdentityAddress	1	TRUE if the address defined in the peerAddressType and peerAddress is an identity address
Initiating_PHYs	1	Phy Flags

### 3.4.22 GAP-ConnectionEventAuthenticationRejected.Indication

#### Description

A link encryption or pairing request was rejected by the peer Slave.

#### Parameters

**Table 263. GAP-ConnectionEventAuthenticationRejected.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xA1
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection

*Table continues on the next page...*

**Table 263. GAP-ConnectionEventAuthenticationRejected.Indication Parameters (continued)**

RejectReason	1	<p>The reason of the rejection</p> <p>Possible values:</p> <p>0x02: gOobNotAvailable_c (This device does not have the required OOB for authenticated pairing)</p> <p>0x03: gIncompatibleIoCapabilities_c (The combination of I/O capabilities does not allow pairing with the desired level of security)</p> <p>0x05: gPairingNotSupported_c (This device does not support pairing)</p> <p>0x06: gLowEncryptionKeySize_c (The peer's encryption key size is too low for this device's required security level)</p> <p>0x08: gUnspecifiedReason_c (The host has rejected the pairing for an unknown reason)</p> <p>0x09: gRepeatedAttempts_c (This device is the target of repeated unsuccessful pairing attempts and does not allow further pairing attempts at the moment)</p> <p>0xF0: gLinkEncryptionFailed_c (Link could not be encrypted)</p>
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### 3.4.23 GAP-ConnectionEventChannelMapRead.Indication

#### Description

A channel map read operation has completed.

#### Parameters

**Table 264. GAP-ConnectionEventChannelMapRead.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xBF
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection
Channel Map	5	

### 3.4.24 GAP-ConnectionEventChannelMapReadFailure.Indication

#### Description

A channel map set operation has failed.

**Parameters****Table 265. GAP-ConnectionEventChannelMapReadFailure.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xC0
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*

**Table 265. GAP-ConnectionEventChannelMapReadFailure.Indication Parameters (continued)**

Parameter	Size (bytes)	Comments
FailReason	2	<p>Reason for channel read failure</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedResources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurityReasons_c</p> <p>0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c</p>

Table 265. GAP-ConnectionEventChannelMapReadFailure.Indication Parameters (continued)

Parameter	Size (bytes)	Comments
		0x0110: gHciConnectionAcceptTimeoutExceeded_c
		0x0111: gHciUnsupportedFeatureOrParameterValue_c
		0x0112: gHciInvalidHciCommandParameters_c
		0x0113: gHciRemoteUserTerminatedConnection_c
		0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c
		0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c
		0x0116: gHciConnectionTerminatedByLocalHost_c
		0x0117: gHciRepeatedAttempts_c
		0x0118: gHciPairingNotAllowed_c
		0x0119: gHciUnknownLpmPdu_c
		0x011A: gHciUnsupportedRemoteFeature_c
		0x011B: gHciScoOffsetRejected_c
		0x011C: gHciScoIntervalRejected_c
		0x011D: gHciScoAirModeRejected_c
		0x011E: gHciInvalidLpmParameters_c
		0x011F: gHciUnspecifiedError_c
		0x0120: gHciUnsupportedLpmParameterValue_c
		0x0121: gHciRoleChangeNotAllowed_c
		0x0122: gHciLLResponseTimeout_c
		0x0123: gHciLmpErrorTransactionCollision_c
		0x0124: gHciLmpPduNotAllowed_c
		0x0125: gHciEncryptionModeNotAcceptable_c
		0x0126: gHciLinkKeyCannotBeChanged_c

**Table 265. GAP-ConnectionEventChannelMapReadFailure.Indication Parameters (continued)**

Parameter	Size (bytes)	Comments
		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c
		0x013C: gHciDirectedAdvertisingTimeout_c

Table 265. GAP-ConnectionEventChannelMapReadFailure.Indication Parameters (continued)

Parameter	Size (bytes)	Comments
		0x013D: gHciConnectionTerminatedDueToMicFailure_c
		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c
		0x03FA: gL2caChannelAlreadyConnected_c

**Table 265. GAP-ConnectionEventChannelMapReadFailure.Indication Parameters (continued)**

Parameter	Size (bytes)	Comments
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c
		0x0416: gSmInvalidHciEventParameter_c



Table 265. GAP-ConnectionEventChannelMapReadFailure.Indication Parameters (continued)

Parameter	Size (bytes)	Comments
		0x0417: gSmLlConnectionEncryptionInProgress_c
		0x0418: gSmLlConnectionEncryptionFailure_c
		0x0419: gSmInsufficientResources_c
		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c
		0x041C: gSmReceivedTimerEventForUnknownDevice_c
		0x041D: gSmUnattainableLocalDeviceSecRequirements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySize_c
		0x041F: gSmUnattainableSlaveSecReqRequirements_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupported_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c
		0x0460: gSmTbResolvableAddressDoesNotMatch_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c
		0x0503: gAttWriteNotPermitted_c
		0x0504: gAttInvalidPdu_c

**Table 265. GAP-ConnectionEventChannelMapReadFailure.Indication Parameters (continued)**

Parameter	Size (bytes)	Comments
		0x0505: gAttInsufficientAuthentication_c
		0x0506: gAttRequestNotSupported_c
		0x0507: gAttInvalidOffset_c
		0x0508: gAttInsufficientAuthorization_c
		0x0509: gAttPrepareQueueFull_c
		0x050A: gAttAttributeNotFound_c
		0x050B: gAttAttributeNotLong_c
		0x050C: gAttInsufficientEncryptionKeySize_c
		0x050D: gAttInvalidAttributeValueLength_c
		0x050E: gAttUnlikelyor_c
		0x050F: gAttInsufficientEncryption_c
		0x0510: gAttUnsupportedGroupType_c
		0x0511: gAttInsufficientResources_c
		0x0601: gGattAnotherProcedureInProgress_c
		0x0602: gGattLongAttributePacketsCorrupted_c
		0x0603: gGattMultipleAttributesOverflow_c
		0x0604: gGattUnexpectedReadMultipleResponseLength_c
		0x0605: gGattInvalidValueLength_c
		0x0606: gGattServerTimeout_c
		0x0607: gGattIndicationAlreadyInProgress_c
		0x0608: gGattClientConfirmationTimeout_c
		0x0701: gGapAdvDataTooLong_c
		0x0702: gGapScanRspDataTooLong_c
		0x0703: gGapDeviceNotBonded_c
		0x0704: gGapAnotherProcedureInProgress_c
		0x0801: gDevDbCccdLimitReached_c
		0x0802: gDevDbCccdNotFound_c
		0x0901: gGattDbInvalidHandle_c

**Table 265. GAP-ConnectionEventChannelMapReadFailure.Indication Parameters (continued)**

Parameter	Size (bytes)	Comments
		0x0902: gGattDbCharacteristicNotFound_c
		0x0903: gGattDbCccdNotFound_c
		0x0904: gGattDbServiceNotFound_c
		0x0905: gGattDbDescriptorNotFound_c

### 3.4.25 GAP-ConnectionEventChannelSelectionAlgorithm2.Indication

#### Description

LE Channel Selection Algorithm #2 is used on the data channel connection.

#### Parameters

**Table 266. GAP-ConnectionEventDisconnected.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xD1
Length	1	Length in bytes of the following parameters
DeviceId	1	The DeviceId for which the command is intended

### 3.4.26 GAP-ConnectionEventConnected.Indication

#### Description

A connection was established.

#### Parameters

**Table 267. GAP-ConnectionEventConnected.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x9D
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection

*Table continues on the next page...*

**Table 267. GAP-ConnectionEventConnected.Indication Parameters (continued)**

ConnectionParameters	Variable	Connection parameters established by the Controller  Structure type parameter. See the detailed table below for parameter structure.
PeerAddressType	1	Connected device's address type  Possible values: 0x00: gPublic_c 0x01: gRandom_c
PeerAddress	6	Connected device's address
peerRpaResolved	1	TRUE if the address defined by peerAddressType and peerAddress is the identity address of the peer, and the peer used an RPA that was resolved by the Controller and is contained in the peerRpa field
peerRpa	6	Peer Resolvable Private Address if Controller Privacy is active and peerRpaResolved is TRUE
localRpaUsed	1	TRUE if the Controller has used an RPA contained in the localRpa field
localRpa	6	Local Resolvable Private Address if Controller Privacy is active and localRpaUsed is TRUE

**Table 268. Connection Parameters Parameter Structure**

Structure Parameter	Size (bytes)	Comments
ConnInterval	2	Interval between connection events
ConnLatency	2	Number of consecutive connection events the Slave may ignore
SupervisionTimeout	2	The maximum time interval between consecutive over-the-air packets; if this timer expires, the connection is dropped

*Table continues on the next page...*

**Table 268. Connection Parameters Parameter Structure (continued)**

MasterClockAccuracy	1	<p>Accuracy of master's clock, allowing for frame detection optimizations</p> <p>Possible values:</p> <p>0x00: gMasterClkAcc500ppm_c</p> <p>0x01: gMasterClkAcc250ppm_c</p> <p>0x02: gMasterClkAcc150ppm_c</p> <p>0x03: gMasterClkAcc100ppm_c</p> <p>0x04: gMasterClkAcc75ppm_c</p> <p>0x05: gMasterClkAcc50ppm_c</p> <p>0x06: gMasterClkAcc30ppm_c</p> <p>0x07: gMasterClkAcc20ppm_c</p>
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### 3.4.27 GAP-ConnectionEventDisconnected.Indication

#### Description

A connection is terminated.

#### Parameters

**Table 269. ConnectionEventDisconnected.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xAA
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection

*Table continues on the next page...*

**Table 269. ConnectionEventDisconnected.Indication Parameters (continued)**

Reason	2	Reason for disconnection Possible values: 0x0000: gBleSuccess_c 0x0001: gBleInvalidParameter_c 0x0002: gBleOverflow_c 0x0003: gBleUnavailable_c 0x0004: gBleFeatureNotSupported_c 0x0005: gBleOutOfMemory_c 0x0006: gBleAlreadyInitialized_c 0x0007: gBleOsError_c 0x0008: gBleUnexpectedError_c 0x0009: gBleInvalidState_c 0x0101: gHciUnknownHciCommand_c 0x0102: gHciUnknownConnectionIdentifier_c 0x0103: gHciHardwareFailure_c 0x0104: gHciPageTimeout_c 0x0105: gHciAuthenticationFailure_c 0x0106: gHciPinOrKeyMissing_c 0x0107: gHciMemoryCapacityExceeded_c 0x0108: gHciConnectionTimeout_c 0x0109: gHciConnectionLimitExceeded_c 0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c 0x010B: gHciAclConnectionAlreadyExists_c 0x010C: gHciCommandDisallowed_c 0x010D: gHciConnectionRejectedDueToLimitedR esources_c 0x010E: gHciConnectionRejectedDueToSecurity Reasons_c 0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c
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**Table 269. ConnectionEventDisconnected.Indication Parameters (continued)**

	0x0110: gHciConnectionAcceptTimeoutExceeded_c
	0x0111: gHciUnsupportedFeatureOrParameterValue_c
	0x0112: gHciInvalidHciCommandParameters_c
	0x0113: gHciRemoteUserTerminatedConnection_c
	0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c
	0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c
	0x0116: gHciConnectionTerminatedByLocalHost_c
	0x0117: gHciRepeatedAttempts_c
	0x0118: gHciPairingNotAllowed_c
	0x0119: gHciUnknownLpmPdu_c
	0x011A: gHciUnsupportedRemoteFeature_c
	0x011B: gHciScoOffsetRejected_c
	0x011C: gHciScoIntervalRejected_c
	0x011D: gHciScoAirModeRejected_c
	0x011E: gHciInvalidLpmParameters_c
	0x011F: gHciUnspecifiedError_c
	0x0120: gHciUnsupportedLpmParameterValue_c
	0x0121: gHciRoleChangeNotAllowed_c
	0x0122: gHciLLResponseTimeout_c
	0x0123: gHciLmpErrorTransactionCollision_c
	0x0124: gHciLmpPduNotAllowed_c
	0x0125: gHciEncryptionModeNotAcceptable_c
	0x0126: gHciLinkKeyCannotBeChanged_c

**Table 269. ConnectionEventDisconnected.Indication Parameters (continued)**

		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c
		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c



**Table 269. ConnectionEventDisconnected.Indication Parameters (continued)**

		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c
		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c

**Table 269. ConnectionEventDisconnected.Indication Parameters (continued)**

	0x0401: gSmNullCBFunction_c
	0x0402: gSmCommandNotSupported_c
	0x0403: gSmUnexpectedCommand_c
	0x0404: gSmInvalidCommandCode_c
	0x0405: gSmInvalidCommandLength_c
	0x0406: gSmInvalidCommandParameter_c
	0x0407: gSmInvalidDeviceId_c
	0x0408: gSmInvalidInternalOperation_c
	0x0409: gSmInvalidConnectionHandle_c
	0x040A: gSmImproperKeyDistributionField_c
	0x040B: gSmUnexpectedKeyType_c
	0x040C: gSmUnexpectedPairingTerminationReason_c
	0x040D: gSmUnexpectedKeyset_c
	0x040E: gSmSmpTimeoutOccurred_c
	0x040F: gSmUnknownSmpPacketType_c
	0x0410: gSmInvalidSmpPacketLength_c
	0x0411: gSmInvalidSmpPacketParameter_c
	0x0412: gSmReceivedUnexpectedSmpPacket_c
	0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
	0x0414: gSmReceivedUnexpectedHciEvent_c
	0x0415: gSmReceivedHciEventFromUnknownDevice_c
	0x0416: gSmInvalidHciEventParameter_c
	0x0417: gSmLlConnectionEncryptionInProgress_c
	0x0418: gSmLlConnectionEncryptionFailure_c
	0x0419: gSmInsufficientResources_c

**Table 269. ConnectionEventDisconnected.Indication Parameters (continued)**

		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutO ccurred_c
		0x041C: gSmReceivedTimerEventForUnknownD evice_c
		0x041D: gSmUnattainableLocalDeviceSecRequir ements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySiz e_c
		0x041F: gSmUnattainableSlaveSecReqRequirem ents_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupporte d_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c
		0x0460: gSmTbResolvableAddressDoesNotMatc hLrk_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c
		0x0503: gAttWriteNotPermitted_c
		0x0504: gAttInvalidPdu_c
		0x0505: gAttInsufficientAuthentication_c
		0x0506: gAttRequestNotSupported_c
		0x0507: gAttInvalidOffset_c
		0x0508: gAttInsufficientAuthorization_c
		0x0509: gAttPrepareQueueFull_c
		0x050A: gAttAttributeNotFound_c

**Table 269. ConnectionEventDisconnected.Indication Parameters (continued)**

	0x050B: gAttAttributeNotLong_c
	0x050C: gAttInsufficientEncryptionKeySize_c
	0x050D: gAttInvalidAttributeValueLength_c
	0x050E: gAttUnlikelyor_c
	0x050F: gAttInsufficientEncryption_c
	0x0510: gAttUnsupportedGroupType_c
	0x0511: gAttInsufficientResources_c
	0x0601: gGattAnotherProcedureInProgress_c
	0x0602: gGattLongAttributePacketsCorrupted_c
	0x0603: gGattMultipleAttributesOverflow_c
	0x0604: gGattUnexpectedReadMultipleResponseLength_c
	0x0605: gGattInvalidValueLength_c
	0x0606: gGattServerTimeout_c
	0x0607: gGattIndicationAlreadyInProgress_c
	0x0608: gGattClientConfirmationTimeout_c
	0x0701: gGapAdvDataTooLong_c
	0x0702: gGapScanRspDataTooLong_c
	0x0703: gGapDeviceNotBonded_c
	0x0704: gGapAnotherProcedureInProgress_c
	0x0801: gDevDbCccdLimitReached_c
	0x0802: gDevDbCccdNotFound_c
	0x0901: gGattDbInvalidHandle_c
	0x0902: gGattDbCharacteristicNotFound_c
	0x0903: gGattDbCccdNotFound_c
	0x0904: gGattDbServiceNotFound_c
	0x0905: gGattDbDescriptorNotFound_c

## 3.4.28 GAP-ConnectionEventEncryptionChanged.Indication

### Description

Link's encryption state has changed, for example, during pairing or after a reconnection with a bonded peer.

### Parameters

**Table 270. GAP-ConnectionEventEncryptionChanged.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xA8
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection
NewEncryptionState	1	TRUE if link has been encrypted, FALSE if encryption was paused or removed

## 3.4.29 GAP-ConnectionEventKeyExchangeRequest.Indication

### Description

The pairing procedure requires the SMP keys to be distributed to the peer.

### Parameters

**Table 271. GAP-ConnectionEventKeyExchangeRequest.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xA5
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection
RequestedKeys	1	Mask identifying the keys being requested  Possible values: 0x00: gNoKeys_c (No key can be distributed) 0x01: gLtk_c (Long Term Key) 0x02: gLrk_c (Identity Resolving Key) 0x04: gCsrk_c (Connection Signature Resolving Key)
RequestedLtkSize	1	Requested size of the encryption key

### 3.4.30 GAP-ConnectionEventKeysReceived.Indication

#### Description

SMP keys distributed by the peer during pairing were received.

#### Parameters

**Table 272. ConnectionEventKeysReceived.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xA6
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection
Keys	Variable	The SMP keys of the local device Structure type parameter. See the detailed table below for parameter structure.

**Table 273. Keys Parameter Structure**

Structure Parameter	Size (bytes)	Comments
LtkIncluded	1	Boolean value which indicates if LTK size and LTK are included or not
LtkInfo	Variable	LTK information (size and value) Structure type parameter. See the detailed table below for parameter structure.
IrkIncluded	1	Boolean value which indicates if IRK is included or not
Irk	16 x IrkIncluded	Identity Resolving Key
CsrkIncluded	1	Boolean value which indicates if CSRK is included or not
Csrk	16 x CsrkIncluded	Connection Signature Resolving Key
RandEdivInfo	Variable	Rand information (size and value) and Ediv Structure type parameter. See the detailed table below for parameter structure.
AddressIncluded	IrkIncluded	Boolean value which indicates if Address is included or not

*Table continues on the next page...*

**Table 273. Keys Parameter Structure (continued)**

AddressInfo	Variable	Address information (type and value) Structure type parameter. See the detailed table below for parameter structure.
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**Table 274. LtkInfo Parameter Structure**

Structure Parameter	Size (bytes)	Comments
LtkSize	1	Encryption Key Size
Ltk	LtkSize	Long Term (Encryption) Key

**Table 275. RandEdivInfo Parameter Structure**

Structure Parameter	Size (bytes)	Comments
RandSize	1	Random value size
Rand	RandSize	Random value used to identify the LTK
Ediv	2	EDIV value used to identify the LTK

**Table 276. AddressInfo Parameter Structure**

Structure Parameter	Size (bytes)	Comments
DeviceAddressType	1	Public or Random address Possible values: 0x00: gPublic_c 0x01: gRandom_c
DeviceAddress	6	Device Address

### 3.4.31 GAP-ConnectionEventLeDataLengthChanged.Indication

#### Description

The new TX/RX Data Length parameters.

#### Parameters

**Table 277. GAP-ConnectionEventLeDataLengthChanged.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xB0
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection

*Table continues on the next page...*

**Table 277. GAP-ConnectionEventLeDataLengthChanged.Indication Parameters (continued)**

LeDataLengthChanged	Variable	Connection Le Data Length Changed Event data  Structure type parameter. See the detailed table below for parameter structure.
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**Table 278. LeDataLengthChanged Parameter Structure**

Structure Parameter	Size (bytes)	Comments
MaxTxOctets	2	The maximum number of payload octets in a Link Layer Data Channel PDU to transmit on this connection
MaxTxTime	2	The maximum time that the local Controller will take to send a Link Layer Data Channel PDU on this connection
MaxRxOctets	2	The maximum number of payload octets in a Link Layer Data Channel PDU to receive on this connection
MaxRxTime	2	The maximum time that the local Controller will take to receive a Link Layer Data Channel PDU on this connection

### 3.4.32 GAP-ConnectionEventLeScDisplayNumericValue.Indication

#### Description

Event sent to display and confirm a Numeric Comparison Value when using the LE SC Numeric Comparison pairing method.

#### Parameters

**Table 279. GAP-ConnectionEventLeScDisplayNumericValue Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xB2
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection
ncValue	4	A number between 0 and 999999 decimal which must be confirmed by the user on both pairing devices

### 3.4.33 GAP-ConnectionEventLeScKeypressNotification.Indication

#### Description



Remote Keypress Notification received during Passkey Entry Pairing Method.

#### Parameters

**Table 280. GAP-ConnectionEventLeScKeyPressNotification.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xB3
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection
GapLeScKeyPressNotificationParams	Variable	Keypress notification type which denotes a passkey entry keypress action  Structure type parameter. See the detailed table below for parameter structure.

**Table 281. GapLeScKeyPressNotificationParams Parameter Structure**

Structure Parameter	Size (bytes)	Comments
keypressNotifType	1	Possible values: 0x00: gKnPasskeyEntryStarted_c 0x01: gKnPasskeyDigitStarted_c 0x02: gKnPasskeyDigitErased_c (gKnPasskeyDigitErased_c) 0x03: gKnPasskeyCleared_c 0x04: gKnPasskeyEntryCompleted_c

### 3.4.34 GAP-ConnectionEventLeScOobDataRequest.Indication

#### Description

Event sent to request LE SC OOB Data (r, Cr and Addr) received from a peer.

#### Parameters

**Table 282. GAP-ConnectionEventLeScOobDataRequest.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xB1
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection

### 3.4.35 GAP-ConnectionEventLongTermKeyRequest.Indication

#### Description

The bonded peer Master has requested link encryption and the LTK must be provided.

#### Parameters

**Table 283. GAP-ConnectionEventLongTermKeyRequest.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xA7
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection
Ediv	2	The Encryption Diversifier, as defined by the SMP
RandSize	1	Random number size
Rand	RandSize	The Random number, as defined by the SMP

### 3.4.36 GAP-ConnectionEventOobRequest.Indication

#### Description

Out-of-Band data must be provided for the pairing procedure.

#### Parameters

**Table 284. GAP-ConnectionEventOobRequest.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xA3
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection

### 3.4.37 GAP-ConnectionEventPairingComplete.Indication

#### Description

Pairing procedure is complete, either successfully or with failure.

#### Parameters

**Table 285. GAP-ConnectionEventPairingComplete.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48

*Table continues on the next page...*

**Table 285. GAP-ConnectionEventPairingComplete.Indication Parameters (continued)**

OpCode	1	0xA9
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection
PairingStatus	1	Pairing status Possible values: 0x01: PairingSuccessful (Pairing succeeded) 0x00: PairingFailed (Pairing failed)
PairingData	Variable	Information of pairing completion "Union" type parameter. Its structure is based on the value of parameter PairingStatus. See the detailed table below for parameter structure.

**Table 286. PairingData Parameter Structure**

PairingStatus	Structure Parameter	Size (bytes)	Comments
0x01	PairingSuccessful	Variable	Pairing successful data Structure type parameter. See the detailed table below for parameter structure.
0x00	PairingFailed	Variable	Pairing failed data Structure type parameter. See the detailed table below for parameter structure.

**Table 287. PairingSuccessful Parameter Structure**

Structure Parameter	Size (bytes)	Comments
WithBonding	1	Indicates whether the devices is bonded

**Table 288. PairingFailed Parameter Structure**

Structure Parameter	Size (bytes)	Comments
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*Table continues on the next page...*

**Table 288. PairingFailed Parameter Structure (continued)**

FailReason	2	<p>The reason of failure</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p> <p>0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c</p>
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**Table 288. PairingFailed Parameter Structure (continued)**

	0x0110: gHciConnectionAcceptTimeoutExceeded_c
	0x0111: gHciUnsupportedFeatureOrParameterValue_c
	0x0112: gHciInvalidHciCommandParameters_c
	0x0113: gHciRemoteUserTerminatedConnection_c
	0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c
	0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c
	0x0116: gHciConnectionTerminatedByLocalHost_c
	0x0117: gHciRepeatedAttempts_c
	0x0118: gHciPairingNotAllowed_c
	0x0119: gHciUnknownLpmPdu_c
	0x011A: gHciUnsupportedRemoteFeature_c
	0x011B: gHciScoOffsetRejected_c
	0x011C: gHciScoIntervalRejected_c
	0x011D: gHciScoAirModeRejected_c
	0x011E: gHciInvalidLpmParameters_c
	0x011F: gHciUnspecifiedError_c
	0x0120: gHciUnsupportedLpmParameterValue_c
	0x0121: gHciRoleChangeNotAllowed_c
	0x0122: gHciLLResponseTimeout_c
	0x0123: gHciLmpErrorTransactionCollision_c
	0x0124: gHciLmpPduNotAllowed_c
	0x0125: gHciEncryptionModeNotAcceptable_c
	0x0126: gHciLinkKeyCannotBeChanged_c

**Table 288. PairingFailed Parameter Structure (continued)**

		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c
		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c

**Table 288. PairingFailed Parameter Structure (continued)**

	0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
	0x013F: gHciMacConnectionFailed_c
	0x0140: gHciCoarseClockAdjustmentRejected_c
	0x0141: gHciType0SubmapNotDefined_c
	0x0142: gHciUnknownAdvertisingIdentifier_c
	0x0143: gHciLimitReached_c
	0x0144: gHciOperationCancelledByHost_c
	0x01A0: gHciAlreadyInit_c
	0x01A1: gHciInvalidParameter_c
	0x01A2: gHciCallbackNotInstalled_c
	0x01A3: gHciCallbackAlreadyInstalled_c
	0x01A4: gHciCommandNotSupported_c
	0x01A5: gHciEventNotSupported_c
	0x01A6: gHciTransportError_c
	0x03F0: gL2caAlreadyInit_c
	0x03F1: gL2caInsufficientResources_c
	0x03F2: gL2caCallbackNotInstalled_c
	0x03F3: gL2caCallbackAlreadyInstalled_c
	0x03F4: gL2caLePsmInvalid_c
	0x03F5: gL2caLePsmAlreadyRegistered_c
	0x03F6: gL2caLePsmNotRegistered_c
	0x03F7: gL2caLePsmInsufficientResources_c
	0x03F8: gL2caChannelInvalid_c
	0x03F9: gL2caChannelClosed_c
	0x03FA: gL2caChannelAlreadyConnected_c
	0x03FB: gL2caConnectionParametersRejected_c
	0x03FC: gL2caChannelBusy_c
	0x03FE: gL2caInvalidParameter_c
	0x03FF: gL2caError_c

**Table 288. PairingFailed Parameter Structure (continued)**

		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c
		0x0416: gSmInvalidHciEventParameter_c
		0x0417: gSmLlConnectionEncryptionInProgress_c
		0x0418: gSmLlConnectionEncryptionFailure_c
		0x0419: gSmInsufficientResources_c



**Table 288. PairingFailed Parameter Structure (continued)**

	0x041A: gSmOobDataAddressMismatch_c
	0x041B: gSmSmpPacketReceivedAfterTimeoutO ccurred_c
	0x041C: gSmReceivedTimerEventForUnknownD evice_c
	0x041D: gSmUnattainableLocalDeviceSecRequir ements_c
	0x041E: gSmUnattainableLocalDeviceMinKeySiz e_c
	0x041F: gSmUnattainableSlaveSecReqRequirem ents_c
	0x0431: gSmPairingErrorPasskeyEntryFailed_c
	0x0432: gSmPairingErrorConfirmValueFailed_c
	0x0433: gSmPairingErrorCommandNotSupporte d_c
	0x0434: gSmPairingErrorInvalidParameters_c
	0x0435: gSmPairingErrorUnknownReason_c
	0x0460: gSmTbResolvableAddressDoesNotMatc hLrk_c
	0x0461: gSmTbInvalidDataSignature_c
	0x0501: gAttInvalidHandle_c
	0x0502: gAttReadNotPermitted_c
	0x0503: gAttWriteNotPermitted_c
	0x0504: gAttInvalidPdu_c
	0x0505: gAttInsufficientAuthentication_c
	0x0506: gAttRequestNotSupported_c
	0x0507: gAttInvalidOffset_c
	0x0508: gAttInsufficientAuthorization_c
	0x0509: gAttPrepareQueueFull_c
	0x050A: gAttAttributeNotFound_c

**Table 288. PairingFailed Parameter Structure (continued)**

		0x050B: gAttAttributeNotLong_c
		0x050C: gAttInsufficientEncryptionKeySize_c
		0x050D: gAttInvalidAttributeValueLength_c
		0x050E: gAttUnlikelyor_c
		0x050F: gAttInsufficientEncryption_c
		0x0510: gAttUnsupportedGroupType_c
		0x0511: gAttInsufficientResources_c
		0x0601: gGattAnotherProcedureInProgress_c
		0x0602: gGattLongAttributePacketsCorrupted_c
		0x0603: gGattMultipleAttributesOverflow_c
		0x0604: gGattUnexpectedReadMultipleResponseLength_c
		0x0605: gGattInvalidValueLength_c
		0x0606: gGattServerTimeout_c
		0x0607: gGattIndicationAlreadyInProgress_c
		0x0608: gGattClientConfirmationTimeout_c
		0x0701: gGapAdvDataTooLong_c
		0x0702: gGapScanRspDataTooLong_c
		0x0703: gGapDeviceNotBonded_c
		0x0704: gGapAnotherProcedureInProgress_c
		0x0801: gDevDbCccdLimitReached_c
		0x0802: gDevDbCccdNotFound_c
		0x0901: gGattDbInvalidHandle_c
		0x0902: gGattDbCharacteristicNotFound_c
		0x0903: gGattDbCccdNotFound_c
		0x0904: gGattDbServiceNotFound_c
		0x0905: gGattDbDescriptorNotFound_c

### 3.4.38 GAP-ConnectionEventPairingRequest.Indication

#### Description

A pairing request was received from the peer Master.

#### Parameters

**Table 289. GAP-ConnectionEventPairingRequest.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x9E
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection
PairingParameters	Variable	Pairing parameters  Structure type parameter. See the detailed table below for parameter structure.

**Table 290. PairingParameters Parameter Structure**

Structure Parameter	Size (bytes)	Comments
WithBonding	1	TRUE if this device is able to and wants to bond after pairing, FALSE otherwise
SecurityModeAndLevel	1	The desired security mode-level  Possible values:  0x10: gMode1Level1_c (Mode 1 Level 1 - No Security)  0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication)  0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication)  0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing)  0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication)  0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication)
MaxEncryptionKeySize	1	Maximum LTK size supported by the device

*Table continues on the next page...*

**Table 290. PairingParameters Parameter Structure (continued)**

LocalloCapabilities	1	<p>I/O capabilities used to determine the pairing method</p> <p>Possible values:</p> <p>0x00: gIoDisplayOnly_c (May display a PIN, no input)</p> <p>0x01: gIoDisplayYesNo_c (May display a PIN and has a binary input (for example, YES and NO buttons))</p> <p>0x02: gIoKeyboardOnly_c (Has keyboard input, no display)</p> <p>0x03: gIoNone_c (No input and no display)</p> <p>0x04: gIoKeyboardDisplay_c (Has keyboard input and display)</p>
OobAvailable	1	TRUE if this device has Out-of-Band data that can be used for authenticated pairing, FALSE otherwise
CentralKeys	1	<p>SMP keys to be distributed by the Central</p> <p>Possible values:</p> <p>0x00: gNoKeys_c (No key can be distributed)</p> <p>0x01: gLtk_c (Long Term Key)</p> <p>0x02: glrk_c (Identity Resolving Key)</p> <p>0x04: gCsrk_c (Connection Signature Resolving Key)</p>
PeripheralKeys	1	<p>SMP keys to be distributed by the Peripheral</p> <p>Possible values:</p> <p>0x00: gNoKeys_c (No key can be distributed)</p> <p>0x01: gLtk_c (Long Term Key)</p> <p>0x02: glrk_c (Identity Resolving Key)</p> <p>0x04: gCsrk_c (Connection Signature Resolving Key)</p>
LeSecureConnectionSupported	1	indicates if device supports LE Secure Connections pairing
UseKeypressNotifications	1	Indicates if device supports Keypress Notification PDUs during Passkey Entry pairing

### 3.4.39 GAP-ConnectionEventPairingResponse.Indication

#### Description

A pairing response was received from the peer Slave.

#### Parameters

**Table 291. GAP-ConnectionEventPairingResponse.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xA0
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection
PairingParameters	Variable	Pairing parameters Structure type parameter. See the detailed table below for parameter structure.

**Table 292. PairingParameters Parameter Structure**

Structure Parameter	Size (bytes)	Comments
WithBonding	1	TRUE if this device is able to and wants to bond after pairing, FALSE otherwise
SecurityModeAndLevel	1	The desired security mode-level Possible values: 0x10: gMode1Level1_c (Mode 1 Level 1 - No Security) 0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication) 0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication) 0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing) 0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication) 0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication)
MaxEncryptionKeySize	1	Maximum LTK size supported by the device

*Table continues on the next page...*

**Table 292. PairingParameters Parameter Structure (continued)**

LocalloCapabilities	1	<p>I/O capabilities used to determine the pairing method</p> <p>Possible values:</p> <p>0x00: gIoDisplayOnly_c (May display a PIN, no input)</p> <p>0x01: gIoDisplayYesNo_c (May display a PIN and has a binary input (for example, YES and NO buttons))</p> <p>0x02: gIoKeyboardOnly_c (Has keyboard input, no display)</p> <p>0x03: gIoNone_c (No input and no display)</p> <p>0x04: gIoKeyboardDisplay_c (Has keyboard input and display)</p>
OobAvailable	1	TRUE if this device has Out-of-Band data that can be used for authenticated pairing, FALSE otherwise
CentralKeys	1	<p>SMP keys to be distributed by the Central</p> <p>Possible values:</p> <p>0x00: gNoKeys_c (No key can be distributed)</p> <p>0x01: gLtk_c (Long Term Key)</p> <p>0x02: glrk_c (Identity Resolving Key)</p> <p>0x04: gCsrk_c (Connection Signature Resolving Key)</p>
PeripheralKeys	1	<p>SMP keys to be distributed by the Peripheral</p> <p>Possible values:</p> <p>0x00: gNoKeys_c (No key can be distributed)</p> <p>0x01: gLtk_c (Long Term Key)</p> <p>0x02: glrk_c (Identity Resolving Key)</p> <p>0x04: gCsrk_c (Connection Signature Resolving Key)</p>
LeSecureConnectionSupported	1	indicates if device supports LE Secure Connections pairing
UseKeypressNotifications	1	Indicates if device supports Keypress Notification PDUs during Passkey Entry pairing

### 3.4.40 GAP- ConnectionEventParameterUpdateComplete.Indication

#### Description

The connection has new parameters.

#### Parameters

**Table 293. GAP-ConnectionEventParameterUpdateComplete.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xAF
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection
ConnectionParameterUpdateComplete	Variable	Connection parameter update complete event data  Structure type parameter. See the detailed table below for parameter structure.

**Table 294. ConnectionParameterUpdateComplete Parameter Structure**

Structure Parameter	Size (bytes)	Comments
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*Table continues on the next page...*

**Table 294. ConnectionParameterUpdateComplete Parameter Structure (continued)**

Status	2	<p>The status of the request</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p> <p>0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c</p>
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*Table continues on the next page...*



**Table 294. ConnectionParameterUpdateComplete Parameter Structure (continued)**

	0x0110: gHciConnectionAcceptTimeoutExceeded_c
	0x0111: gHciUnsupportedFeatureOrParameterValue_c
	0x0112: gHciInvalidHciCommandParameters_c
	0x0113: gHciRemoteUserTerminatedConnection_c
	0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c
	0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c
	0x0116: gHciConnectionTerminatedByLocalHost_c
	0x0117: gHciRepeatedAttempts_c
	0x0118: gHciPairingNotAllowed_c
	0x0119: gHciUnknownLpmPdu_c
	0x011A: gHciUnsupportedRemoteFeature_c
	0x011B: gHciScoOffsetRejected_c
	0x011C: gHciScoIntervalRejected_c
	0x011D: gHciScoAirModeRejected_c
	0x011E: gHciInvalidLpmParameters_c
	0x011F: gHciUnspecifiedError_c
	0x0120: gHciUnsupportedLpmParameterValue_c
	0x0121: gHciRoleChangeNotAllowed_c
	0x0122: gHciLLResponseTimeout_c
	0x0123: gHciLmpErrorTransactionCollision_c
	0x0124: gHciLmpPduNotAllowed_c
	0x0125: gHciEncryptionModeNotAcceptable_c
	0x0126: gHciLinkKeyCannotBeChanged_c

*Table continues on the next page...*

**Table 294. ConnectionParameterUpdateComplete Parameter Structure (continued)**

	0x0127: gHciRequestedQosNotSupported_c
	0x0128: gHciInstantPassed_c
	0x0129: gHciPairingWithUnitKeyNotSupported_c
	0x012A: gHciDifferentTransactionCollision_c
	0x012B: gHciReserved_0x2B_c
	0x012C: gHciQosNotAcceptableParameter_c
	0x012D: gHciQosRejected_c
	0x012E: gHciChannelClassificationNotSupported_c
	0x012F: gHciInsufficientSecurity_c
	0x0130: gHciParameterOutOfMandatoryRange_c
	0x0131: gHciReserved_0x31_c
	0x0132: gHciRoleSwitchPending_c
	0x0133: gHciReserved_0x33_c
	0x0134: gHciReservedSlotViolation_c
	0x0135: gHciRoleSwitchFailed_c
	0x0136: gHciExtendedInquiryResponseTooLarge_c
	0x0137: gHciSecureSimplePairingNotSupportedByHost_c
	0x0138: gHciHostBusyPairing_c
	0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
	0x013A: gHciControllerBusy_c
	0x013B: gHciUnacceptableConnectionParameters_c
	0x013C: gHciDirectedAdvertisingTimeout_c

*Table continues on the next page...*

**Table 294. ConnectionParameterUpdateComplete Parameter Structure (continued)**

	0x013D: gHciConnectionTerminatedDueToMicFailure_c
	0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
	0x013F: gHciMacConnectionFailed_c
	0x0140: gHciCoarseClockAdjustmentRejected_c
	0x0141: gHciType0SubmapNotDefined_c
	0x0142: gHciUnknownAdvertisingIdentifier_c
	0x0143: gHciLimitReached_c
	0x0144: gHciOperationCancelledByHost_c
	0x01A0: gHciAlreadyInit_c
	0x01A1: gHciInvalidParameter_c
	0x01A2: gHciCallbackNotInstalled_c
	0x01A3: gHciCallbackAlreadyInstalled_c
	0x01A4: gHciCommandNotSupported_c
	0x01A5: gHciEventNotSupported_c
	0x01A6: gHciTransportError_c
	0x03F0: gL2caAlreadyInit_c
	0x03F1: gL2caInsufficientResources_c
	0x03F2: gL2caCallbackNotInstalled_c
	0x03F3: gL2caCallbackAlreadyInstalled_c
	0x03F4: gL2caLePsmInvalid_c
	0x03F5: gL2caLePsmAlreadyRegistered_c
	0x03F6: gL2caLePsmNotRegistered_c
	0x03F7: gL2caLePsmInsufficientResources_c
	0x03F8: gL2caChannelInvalid_c
	0x03F9: gL2caChannelClosed_c
	0x03FA: gL2caChannelAlreadyConnected_c

*Table continues on the next page...*

**Table 294. ConnectionParameterUpdateComplete Parameter Structure (continued)**

		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c
		0x0416: gSmInvalidHciEventParameter_c

*Table continues on the next page...*

**Table 294. ConnectionParameterUpdateComplete Parameter Structure (continued)**

	0x0417: gSmLlConnectionEncryptionInProgress_c
	0x0418: gSmLlConnectionEncryptionFailure_c
	0x0419: gSmInsufficientResources_c
	0x041A: gSmOobDataAddressMismatch_c
	0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c
	0x0431: gSmPairingErrorPasskeyEntryFailed_c
	0x0432: gSmPairingErrorConfirmValueFailed_c
	0x0433: gSmPairingErrorCommandNotSupported_c
	0x0434: gSmPairingErrorInvalidParameters_c
	0x0435: gSmPairingErrorUnknownReason_c
	0x0460: gSmTbResolvableAddressDoesNotMatch_c
	0x0461: gSmTbInvalidDataSignature_c
	0x0501: gAttInvalidHandle_c
	0x0502: gAttReadNotPermitted_c
	0x0503: gAttWriteNotPermitted_c
	0x0504: gAttInvalidPdu_c
	0x0505: gAttInsufficientAuthentication_c
	0x0506: gAttRequestNotSupported_c
	0x0507: gAttInvalidOffset_c
	0x0508: gAttInsufficientAuthorization_c
	0x0509: gAttPrepareQueueFull_c
	0x050A: gAttAttributeNotFound_c
	0x050B: gAttAttributeNotLong_c
	0x050C: gAttInsufficientEncryptionKeySize_c

*Table continues on the next page...*

**Table 294. ConnectionParameterUpdateComplete Parameter Structure (continued)**

		0x050D: gAttInvalidAttributeValueLength_c 0x050E: gAttUnlikelyor_c 0x050F: gAttInsufficientEncryption_c 0x0510: gAttUnsupportedGroupType_c 0x0511: gAttInsufficientResources_c 0x0601: gGattAnotherProcedureInProgress_c 0x0602: gGattLongAttributePacketsCorrupted_c 0x0603: gGattMultipleAttributesOverflow_c 0x0604: gGattUnexpectedReadMultipleResponseLength_c 0x0605: gGattInvalidValueLength_c 0x0606: gGattServerTimeout_c 0x0607: gGattIndicationAlreadyInProgress_c 0x0608: gGattClientConfirmationTimeout_c 0x0701: gGapAdvDataTooLong_c 0x0702: gGapScanRspDataTooLong_c 0x0703: gGapDeviceNotBonded_c 0x0704: gGapAnotherProcedureInProgress_c 0x0801: gDevDbCccdLimitReached_c 0x0802: gDevDbCccdNotFound_c 0x0901: gGattDbInvalidHandle_c 0x0902: gGattDbCharacteristicNotFound_c 0x0903: gGattDbCccdNotFound_c 0x0904: gGattDbServiceNotFound_c 0x0905: gGattDbDescriptorNotFound_c
ConnInterval	2	Connection interval
ConnLatency	2	Connection latency
SupervisionTimeout	2	Supervision timeout

### 3.4.41 GAP-ConnectionEventParameterUpdateRequest.Indication

#### Description

A connection parameter update request has been received.

#### Parameters

**Table 295. GAP-ConnectionEventParameterUpdateRequest.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xAE
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection
ConnectionParameterUpdateRequest	Variable	Connection parameter update request event data  Structure type parameter. See the detailed table below for parameter structure.

**Table 296. ConnectionParameterUpdateRequest Parameter Structure**

Structure Parameter	Size (bytes)	Comments
IntervalMin	2	Minimum interval
IntervalMax	2	Maximum interval
SlaveLatency	2	Slave latency
TimeoutMultiplier	2	Timeout multiplier

### 3.4.42 GAP-ConnectionEventPasskeyDisplay.Indication

#### Description

The pairing procedure requires this Slave to display the passkey for the Master's user.

#### Parameters

**Table 297. GAP-ConnectionEventPassKeyDisplay.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xA4
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection
PasskeyForDisplay	4	Passkey to be displayed by this Slave

### 3.4.43 GAP-ConnectionEventPasskeyRequest.Indication

#### Description

Peer Slave has requested a passkey (maximum 6 digit PIN) for the pairing procedure.

#### Parameters

**Table 298. GAP-ConnectionEventPasskeyRequest.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xA2
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection

### 3.4.44 GAP-ConnectionEventPowerReadFailure.Indication

#### Description

Power reading could not be performed.

#### Parameters

**Table 299. GAP-ConnectionEventPowerReadFailure.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xAD
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection

*Table continues on the next page...*



**Table 299. GAP-ConnectionEventPowerReadFailure.Indication Parameters (continued)**

FailReason	2	Reason for power reading failure Possible values: 0x0000: gBleSuccess_c 0x0001: gBleInvalidParameter_c 0x0002: gBleOverflow_c 0x0003: gBleUnavailable_c 0x0004: gBleFeatureNotSupported_c 0x0005: gBleOutOfMemory_c 0x0006: gBleAlreadyInitialized_c 0x0007: gBleOsError_c 0x0008: gBleUnexpectedError_c 0x0009: gBleInvalidState_c 0x0101: gHciUnknownHciCommand_c 0x0102: gHciUnknownConnectionIdentifier_c 0x0103: gHciHardwareFailure_c 0x0104: gHciPageTimeout_c 0x0105: gHciAuthenticationFailure_c 0x0106: gHciPinOrKeyMissing_c 0x0107: gHciMemoryCapacityExceeded_c 0x0108: gHciConnectionTimeout_c 0x0109: gHciConnectionLimitExceeded_c 0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c 0x010B: gHciAclConnectionAlreadyExists_c 0x010C: gHciCommandDisallowed_c 0x010D: gHciConnectionRejectedDueToLimitedR esources_c 0x010E: gHciConnectionRejectedDueToSecurity Reasons_c 0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c
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**Table 299. GAP-ConnectionEventPowerReadFailure.Indication Parameters (continued)**

		0x0110: gHciConnectionAcceptTimeoutExceeded_c
		0x0111: gHciUnsupportedFeatureOrParameterValue_c
		0x0112: gHciInvalidHciCommandParameters_c
		0x0113: gHciRemoteUserTerminatedConnection_c
		0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c
		0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c
		0x0116: gHciConnectionTerminatedByLocalHost_c
		0x0117: gHciRepeatedAttempts_c
		0x0118: gHciPairingNotAllowed_c
		0x0119: gHciUnknownLpmPdu_c
		0x011A: gHciUnsupportedRemoteFeature_c
		0x011B: gHciScoOffsetRejected_c
		0x011C: gHciScoIntervalRejected_c
		0x011D: gHciScoAirModeRejected_c
		0x011E: gHciInvalidLpmParameters_c
		0x011F: gHciUnspecifiedError_c
		0x0120: gHciUnsupportedLpmParameterValue_c
		0x0121: gHciRoleChangeNotAllowed_c
		0x0122: gHciLLResponseTimeout_c
		0x0123: gHciLmpErrorTransactionCollision_c
		0x0124: gHciLmpPduNotAllowed_c
		0x0125: gHciEncryptionModeNotAcceptable_c
		0x0126: gHciLinkKeyCannotBeChanged_c

**Table 299. GAP-ConnectionEventPowerReadFailure.Indication Parameters (continued)**

		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c
		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c

**Table 299. GAP-ConnectionEventPowerReadFailure.Indication Parameters (continued)**

		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c
		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c

**Table 299. GAP-ConnectionEventPowerReadFailure.Indication Parameters (continued)**

	0x0401: gSmNullCBFunction_c
	0x0402: gSmCommandNotSupported_c
	0x0403: gSmUnexpectedCommand_c
	0x0404: gSmInvalidCommandCode_c
	0x0405: gSmInvalidCommandLength_c
	0x0406: gSmInvalidCommandParameter_c
	0x0407: gSmInvalidDeviceId_c
	0x0408: gSmInvalidInternalOperation_c
	0x0409: gSmInvalidConnectionHandle_c
	0x040A: gSmImproperKeyDistributionField_c
	0x040B: gSmUnexpectedKeyType_c
	0x040C: gSmUnexpectedPairingTerminationReason_c
	0x040D: gSmUnexpectedKeyset_c
	0x040E: gSmSmpTimeoutOccurred_c
	0x040F: gSmUnknownSmpPacketType_c
	0x0410: gSmInvalidSmpPacketLength_c
	0x0411: gSmInvalidSmpPacketParameter_c
	0x0412: gSmReceivedUnexpectedSmpPacket_c
	0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
	0x0414: gSmReceivedUnexpectedHciEvent_c
	0x0415: gSmReceivedHciEventFromUnknownDevice_c
	0x0416: gSmInvalidHciEventParameter_c
	0x0417: gSmLlConnectionEncryptionInProgress_c
	0x0418: gSmLlConnectionEncryptionFailure_c
	0x0419: gSmInsufficientResources_c

**Table 299. GAP-ConnectionEventPowerReadFailure.Indication Parameters (continued)**

		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutO ccurred_c
		0x041C: gSmReceivedTimerEventForUnknownD evice_c
		0x041D: gSmUnattainableLocalDeviceSecRequir ements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySiz e_c
		0x041F: gSmUnattainableSlaveSecReqRequirem ents_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupporte d_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c
		0x0460: gSmTbResolvableAddressDoesNotMatc hLrk_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c
		0x0503: gAttWriteNotPermitted_c
		0x0504: gAttInvalidPdu_c
		0x0505: gAttInsufficientAuthentication_c
		0x0506: gAttRequestNotSupported_c
		0x0507: gAttInvalidOffset_c
		0x0508: gAttInsufficientAuthorization_c
		0x0509: gAttPrepareQueueFull_c
		0x050A: gAttAttributeNotFound_c

**Table 299. GAP-ConnectionEventPowerReadFailure.Indication Parameters (continued)**

		0x050B: gAttAttributeNotLong_c
		0x050C: gAttInsufficientEncryptionKeySize_c
		0x050D: gAttInvalidAttributeValueLength_c
		0x050E: gAttUnlikelyor_c
		0x050F: gAttInsufficientEncryption_c
		0x0510: gAttUnsupportedGroupType_c
		0x0511: gAttInsufficientResources_c
		0x0601: gGattAnotherProcedureInProgress_c
		0x0602: gGattLongAttributePacketsCorrupted_c
		0x0603: gGattMultipleAttributesOverflow_c
		0x0604: gGattUnexpectedReadMultipleResponseLength_c
		0x0605: gGattInvalidValueLength_c
		0x0606: gGattServerTimeout_c
		0x0607: gGattIndicationAlreadyInProgress_c
		0x0608: gGattClientConfirmationTimeout_c
		0x0701: gGapAdvDataTooLong_c
		0x0702: gGapScanRspDataTooLong_c
		0x0703: gGapDeviceNotBonded_c
		0x0704: gGapAnotherProcedureInProgress_c
		0x0801: gDevDbCccdLimitReached_c
		0x0802: gDevDbCccdNotFound_c
		0x0901: gGattDbInvalidHandle_c
		0x0902: gGattDbCharacteristicNotFound_c
		0x0903: gGattDbCccdNotFound_c
		0x0904: gGattDbServiceNotFound_c
		0x0905: gGattDbDescriptorNotFound_c

### 3.4.45 GAP-ConnectionEventRssiRead.Indication

#### Description

RSSI for an active connection has been read.

#### Parameters

**Table 300. GAP-ConnectionEventRssiRead.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xAB
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection
Rssi	1	Value of the RSSI

### 3.4.46 GAP-ConnectionEventSlaveSecurityRequest.Indication

#### Description

A Slave Security Request has been received from the peer Slave.

#### Parameters

**Table 301. Parameters GAP-ConnectionEventSlaveSecurityRequest.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x9F
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection
SlaveSecurityRequestParameters	Variable	Slave security request parameters Structure type parameter. See the detailed table below for parameter structure.

**Table 302. SlaveSecurityRequestParameters Parameter Structure**

Structure Parameter	Size (bytes)	Comments
BondAfterPairing	1	TRUE if the Slave supports bonding, FALSE otherwise
bAuthenticationRequired	1	TRUE if the slave requires authentication for MITM protection, FALSE otherwise



### 3.4.47 GAP-ConnectionEventTxPowerLevelRead.Indication

#### Description

TX power level for an active connection has been read.

#### Parameters

**Table 303. GAP-ConnectionEventTxPowerLevelRead.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xAC
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID identifying the connection
TxPowerLevel	1	Value of the TX power

### 3.4.48 GAP-ControllerReset.Request

#### Description

Resets the controller.

#### Parameters

**Table 304. GAP-ControllerReset.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x34
Length	1	0x00 - This message does not have any parameters

### 3.4.49 GAP-CreateRandomDeviceAddress.Request

#### Description

Requests the controller to create a random address.

#### Parameters

**Table 305. GAP-CreateRandomDeviceAddress.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x26
Length	1	Length in bytes of the following parameters
IrkIncluded	1	Boolean value which indicates if IRK is included or not

*Table continues on the next page...*

**Table 305. GAP-CreateRandomDeviceAddress.Request Parameters (continued)**

Irk	16 x IrkIncluded	The Identity Resolving Key to be used for a private resolvable address
RandomPartIncluded	IrkIncluded	Boolean value which indicates if random part is included or not
RandomPart	3 x RandomPartIncluded	Array containing the random part of a Private Resolvable Address

### 3.4.50 GAP-DenyLongTermKey.Request

#### Description

Rejects a long term key request from the controller.

#### Parameters

**Table 306. GAP-DenyLongTermKey.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x17
Length	1	Length in bytes of the following parameters
DeviceId	1	The GAP peer who requested encryption

### 3.4.51 GAP-Disconnect.Request

#### Description

Initiates disconnection from a connected peer device.

#### Parameters

**Table 307. GAP-Disconnect.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x1D
Length	1	Length in bytes of the following parameters
DeviceId	1	The connected peer to disconnect from

### 3.4.52 GAP-EnableControllerPrivacy.Request

#### Description

Enables or disables Controller Privacy (Enhanced Privacy feature).

#### Parameters

**Table 308. GAP-EnableControllerPrivacy.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x36
Length	1	Length in bytes of the following parameters
Enable	1	Enables or disables Controller Privacy
OwnIrk	16 x Enable	Local IRK
PeerIdCount	Enable	Size of PeerIdentities array
PeerIdentities	Variable	Array of peer identity addresses and IRKs  Structure type parameter. See the detailed table below for parameter structure.

**Table 309. PeerIdentities Parameters Structure**

Structure Parameter	Size (bytes)	Comments
	1	

### 3.4.53 GAP-EnableHostPrivacy.Request

#### Description

Enables or disables Host Privacy (automatic regeneration of a Private Address).

#### Parameters

**Table 310. GAP-EnableHostPrivacy.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x35
Length	1	Length in bytes of the following parameters
Enable	1	Enables or disables Host Privacy
Irk	16 x Enable	Local IRK to be used for Resolvable Private Address generation

### 3.4.54 GAP-EnableUpdateConnectionParameters.Request

#### Description

Updates the connection parameters.

#### Parameters

**Table 311. GAP-EnableUpdateConnectionParameters.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x32
Length	1	Length in bytes of the following parameters
DeviceId	1	The DeviceID for which the command is intended
Enable	1	Allow/dissalow the parameters update

### 3.4.55 GAP-EncryptLink.Request

#### Description

Encrypts the link with a bonded peer.

#### Parameters

**Table 312. GAP-EncryptLink.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x0E
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the peer

### 3.4.56 GAP-EnterPasskey.Request

#### Description

Enters the passkey requested by a peer during the pairing process.

#### Parameters

**Table 313. GAP-EnterPassKey.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x11
Length	1	Length in bytes of the following parameters
DeviceId	1	The GAP peer that requested a passkey entry
Passkey	4	The peer's secret passkey

### 3.4.57 GAP- GenericEventAdvertisingDataSetupComplete.Indication

#### Description

Controller event - advertising data setup completed.

#### Parameters

Table 314. GAP-GenericEventAdvertisingDataSetupComplete.Indication Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x8D
Length	1	0x00 - This message does not have any parameters

### 3.4.58 GAP- GenericEventAdvertisingParametersSetupComplete.Indication

#### Description

Controller event - advertising parameters setup completed.

#### Parameters

Table 315. GAP-GenericEventAdvertisingParametersSetupComplete.Indication Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x8C
Length	1	0x00 - This message does not have any parameters

### 3.4.59 GAP-GenericEventAdvertisingSetupFailed.Indication

#### Description

Controller event - advertising setup failed.

#### Parameters

Table 316. GAP-GenericEventAdvertisingSetupFailed.Indication Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x8B
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*

**Table 316. GAP-GenericEventAdvertisingSetupFailed.Indication Parameters (continued)**

SetupFailReason	2	<p>Setup fail reason</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p> <p>0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c</p>
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**Table 316. GAP-GenericEventAdvertisingSetupFailed.Indication Parameters (continued)**

		0x0110: gHciConnectionAcceptTimeoutExceeded_c
		0x0111: gHciUnsupportedFeatureOrParameterValue_c
		0x0112: gHciInvalidHciCommandParameters_c
		0x0113: gHciRemoteUserTerminatedConnection_c
		0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c
		0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c
		0x0116: gHciConnectionTerminatedByLocalHost_c
		0x0117: gHciRepeatedAttempts_c
		0x0118: gHciPairingNotAllowed_c
		0x0119: gHciUnknownLpmPdu_c
		0x011A: gHciUnsupportedRemoteFeature_c
		0x011B: gHciScoOffsetRejected_c
		0x011C: gHciScoIntervalRejected_c
		0x011D: gHciScoAirModeRejected_c
		0x011E: gHciInvalidLpmParameters_c
		0x011F: gHciUnspecifiedError_c
		0x0120: gHciUnsupportedLpmParameterValue_c
		0x0121: gHciRoleChangeNotAllowed_c
		0x0122: gHciLLResponseTimeout_c
		0x0123: gHciLmpErrorTransactionCollision_c
		0x0124: gHciLmpPduNotAllowed_c
		0x0125: gHciEncryptionModeNotAcceptable_c
		0x0126: gHciLinkKeyCannotBeChanged_c

**Table 316. GAP-GenericEventAdvertisingSetupFailed.Indication Parameters (continued)**

		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c
		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c



**Table 316. GAP-GenericEventAdvertisingSetupFailed.Indication Parameters (continued)**

		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c
		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c

**Table 316. GAP-GenericEventAdvertisingSetupFailed.Indication Parameters (continued)**

		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c
		0x0416: gSmInvalidHciEventParameter_c
		0x0417: gSmLIConnectionEncryptionInProgress_c
		0x0418: gSmLIConnectionEncryptionFailure_c
		0x0419: gSmInsufficientResources_c

**Table 316. GAP-GenericEventAdvertisingSetupFailed.Indication Parameters (continued)**

	0x041A: gSmOobDataAddressMismatch_c
	0x041B: gSmSmpPacketReceivedAfterTimeoutO ccurred_c
	0x041C: gSmReceivedTimerEventForUnknownD evice_c
	0x041D: gSmUnattainableLocalDeviceSecRequir ements_c
	0x041E: gSmUnattainableLocalDeviceMinKeySiz e_c
	0x041F: gSmUnattainableSlaveSecReqRequirem ents_c
	0x0431: gSmPairingErrorPasskeyEntryFailed_c
	0x0432: gSmPairingErrorConfirmValueFailed_c
	0x0433: gSmPairingErrorCommandNotSupporte d_c
	0x0434: gSmPairingErrorInvalidParameters_c
	0x0435: gSmPairingErrorUnknownReason_c
	0x0460: gSmTbResolvableAddressDoesNotMatc hLrk_c
	0x0461: gSmTbInvalidDataSignature_c
	0x0501: gAttInvalidHandle_c
	0x0502: gAttReadNotPermitted_c
	0x0503: gAttWriteNotPermitted_c
	0x0504: gAttInvalidPdu_c
	0x0505: gAttInsufficientAuthentication_c
	0x0506: gAttRequestNotSupported_c
	0x0507: gAttInvalidOffset_c
	0x0508: gAttInsufficientAuthorization_c
	0x0509: gAttPrepareQueueFull_c
	0x050A: gAttAttributeNotFound_c

**Table 316. GAP-GenericEventAdvertisingSetupFailed.Indication Parameters (continued)**

		0x050B: gAttAttributeNotLong_c
		0x050C: gAttInsufficientEncryptionKeySize_c
		0x050D: gAttInvalidAttributeValueLength_c
		0x050E: gAttUnlikelyor_c
		0x050F: gAttInsufficientEncryption_c
		0x0510: gAttUnsupportedGroupType_c
		0x0511: gAttInsufficientResources_c
		0x0601: gGattAnotherProcedureInProgress_c
		0x0602: gGattLongAttributePacketsCorrupted_c
		0x0603: gGattMultipleAttributesOverflow_c
		0x0604: gGattUnexpectedReadMultipleResponseLength_c
		0x0605: gGattInvalidValueLength_c
		0x0606: gGattServerTimeout_c
		0x0607: gGattIndicationAlreadyInProgress_c
		0x0608: gGattClientConfirmationTimeout_c
		0x0701: gGapAdvDataTooLong_c
		0x0702: gGapScanRspDataTooLong_c
		0x0703: gGapDeviceNotBonded_c
		0x0704: gGapAnotherProcedureInProgress_c
		0x0801: gDevDbCccdLimitReached_c
		0x0802: gDevDbCccdNotFound_c
		0x0901: gGattDbInvalidHandle_c
		0x0902: gGattDbCharacteristicNotFound_c
		0x0903: gGattDbCccdNotFound_c
		0x0904: gGattDbServiceNotFound_c
		0x0905: gGattDbDescriptorNotFound_c

### 3.4.60 GAP-GenericEventAdvTxPowerLevelRead.Indication

#### Description

Controller event - advertising transmission power level.

#### Parameters

**Table 317. GAP-GenericEventAdvTxPowerLevelRead.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x95
Length	1	Length in bytes of the following parameters
AdvTxPowerLevel	1	Advertising transmission power level (in dBm)

### 3.4.61 GAP-ControllerEnhancedNotification.Request

#### Description

Configure enhanced ADV/SCAN/CONN events in the controller.

#### Parameters

**Table 318. GAP-ControllerEnhancedNotification.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x40
Length	1	Length in bytes of the following parameters
EventType	2	Events to enable.
DeviceId	1	Device ID of the peer.

### 3.4.62 GAP-ControllerNotification.Indication

#### Description

ADV/SCAN/CONN notification event from the controller

#### Parameters

**Table 319. GAP-ControllerNotification.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xBC
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*

**Table 319. GAP-ControllerNotification.Indication Parameters (continued)**

Parameter	Size (bytes)	Comments
EventType	2	Events type.
DeviceId	1	Device ID identifying the connection
RSSI	1	RSSI, valid for Rx event types
Channel	1	Channel, valid for conn event over or Rx/Tx events
ConnEvCounter	2	Connection event counter, valid for conn event over or Conn Rx event
Status	1	Status of the request to select which events to be enabled/disabled

### 3.4.63 GAP- GenericEventControllerPrivacyStateChanged.Indication

#### Description

The Controller Privacy was enabled or disabled.

#### Parameters

**Table 320. GAP-GenericEventControllerPrivacyStateChanged.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xB7
Length	1	Length in bytes of the following parameters
NewControllerPrivacyState	1	Indicates the new state of the controller privacy: TRUE if enabled, FALSE if disabled

### 3.4.64 GAP-GenericEventControllerResetComplete.Indication

#### Description

The controller has been reset.

#### Parameters

**Table 321. GAP-GenericEventControllerResetComplete.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xB4
Length	1	0x00 - This message does not have any parameters

### 3.4.65 GAP-GenericEventCreateConnectionCanceled.Indication

#### Description

Controller event - create connection procedure canceled.

#### Parameters

Table 322. GAP-GenericEventCreateConnectionCanceled.Indication Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x93
Length	1	0x00 - This message does not have any parameters

### 3.4.66 GAP-GenericEventDeviceAddedToWhiteList.Indication

#### Description

Controller event - device added to White List.

#### Parameters

Table 323. GAP-GenericEventDeviceAddedToWhiteList.Indication Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x8F
Length	1	0x00 - This message does not have any parameters

### 3.4.67 GAP-GenericEventDeviceRemovedFromWhiteList.Indication

#### Description

Controller event - device removed from White List.

#### Parameters

Table 324. GAP-GenericEventDeviceRemovedFromWhiteList.Indication Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x90
Length	1	0x00 - This message does not have any parameters

### 3.4.68 GAP-GenericEventExtAdvertisingDataSetupComplete.Indication

#### Description

GAP-GenericEventExtAdvertisingDataSetupComplete.Indication

**Parameters****Table 325. GAP-GenericEventExtAdvertisingDataSetupComplete.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xC2
Length	1	0x00 - This message does not have any parameters

### 3.4.69 GAP- GenericEventExtAdvertisingParamSetupComplete.Indication

**Description**

Extended advertising parameters setup completed.

**Parameters****Table 326. GAP-GenericEventExtAdvertisingParamSetupComplete.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xC1
Length	1	0x00 - This message does not have any parameters

### 3.4.70 GAP-GenericEventInternalError.Indication

**Description**

Controller event - controller error.

**Parameters****Table 327. GAP-GenericEventInternalError.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x8A
Length	1	Length in bytes of the following parameters
InternalError	Variable	Internal Error event data  Structure type parameter. See the detailed table below for parameter structure.



**Table 328. InternalError Parameter Structure**

Structure Parameter	Size (bytes)	Comments
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*Table continues on the next page...*

**Table 328. InternalError Parameter Structure (continued)**

ErrorCode	2	<p>Error code</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p> <p>0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c</p>
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*Table continues on the next page...*

**Table 328. InternalError Parameter Structure (continued)**

	0x0110: gHciConnectionAcceptTimeoutExceeded_c
	0x0111: gHciUnsupportedFeatureOrParameterValue_c
	0x0112: gHciInvalidHciCommandParameters_c
	0x0113: gHciRemoteUserTerminatedConnection_c
	0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c
	0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c
	0x0116: gHciConnectionTerminatedByLocalHost_c
	0x0117: gHciRepeatedAttempts_c
	0x0118: gHciPairingNotAllowed_c
	0x0119: gHciUnknownLpmPdu_c
	0x011A: gHciUnsupportedRemoteFeature_c
	0x011B: gHciScoOffsetRejected_c
	0x011C: gHciScoIntervalRejected_c
	0x011D: gHciScoAirModeRejected_c
	0x011E: gHciInvalidLpmParameters_c
	0x011F: gHciUnspecifiedError_c
	0x0120: gHciUnsupportedLpmParameterValue_c
	0x0121: gHciRoleChangeNotAllowed_c
	0x0122: gHciLLResponseTimeout_c
	0x0123: gHciLmpErrorTransactionCollision_c
	0x0124: gHciLmpPduNotAllowed_c
	0x0125: gHciEncryptionModeNotAcceptable_c
	0x0126: gHciLinkKeyCannotBeChanged_c

*Table continues on the next page...*

**Table 328. InternalError Parameter Structure (continued)**

	0x0127: gHciRequestedQosNotSupported_c
	0x0128: gHciInstantPassed_c
	0x0129: gHciPairingWithUnitKeyNotSupported_c
	0x012A: gHciDifferentTransactionCollision_c
	0x012B: gHciReserved_0x2B_c
	0x012C: gHciQosNotAcceptableParameter_c
	0x012D: gHciQosRejected_c
	0x012E: gHciChannelClassificationNotSupported_c
	0x012F: gHciInsufficientSecurity_c
	0x0130: gHciParameterOutOfMandatoryRange_c
	0x0131: gHciReserved_0x31_c
	0x0132: gHciRoleSwitchPending_c
	0x0133: gHciReserved_0x33_c
	0x0134: gHciReservedSlotViolation_c
	0x0135: gHciRoleSwitchFailed_c
	0x0136: gHciExtendedInquiryResponseTooLarge_c
	0x0137: gHciSecureSimplePairingNotSupportedByHost_c
	0x0138: gHciHostBusyPairing_c
	0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
	0x013A: gHciControllerBusy_c
	0x013B: gHciUnacceptableConnectionParameters_c
	0x013C: gHciDirectedAdvertisingTimeout_c

*Table continues on the next page...*

**Table 328. InternalError Parameter Structure (continued)**

	0x013D: gHciConnectionTerminatedDueToMicFailure_c
	0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
	0x013F: gHciMacConnectionFailed_c
	0x0140: gHciCoarseClockAdjustmentRejected_c
	0x0141: gHciType0SubmapNotDefined_c
	0x0142: gHciUnknownAdvertisingIdentifier_c
	0x0143: gHciLimitReached_c
	0x0144: gHciOperationCancelledByHost_c
	0x01A0: gHciAlreadyInit_c
	0x01A1: gHciInvalidParameter_c
	0x01A2: gHciCallbackNotInstalled_c
	0x01A3: gHciCallbackAlreadyInstalled_c
	0x01A4: gHciCommandNotSupported_c
	0x01A5: gHciEventNotSupported_c
	0x01A6: gHciTransportError_c
	0x03F0: gL2caAlreadyInit_c
	0x03F1: gL2caInsufficientResources_c
	0x03F2: gL2caCallbackNotInstalled_c
	0x03F3: gL2caCallbackAlreadyInstalled_c
	0x03F4: gL2caLePsmInvalid_c
	0x03F5: gL2caLePsmAlreadyRegistered_c
	0x03F6: gL2caLePsmNotRegistered_c
	0x03F7: gL2caLePsmInsufficientResources_c
	0x03F8: gL2caChannelInvalid_c
	0x03F9: gL2caChannelClosed_c
	0x03FA: gL2caChannelAlreadyConnected_c

*Table continues on the next page...*

**Table 328. InternalError Parameter Structure (continued)**

		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c
		0x0416: gSmInvalidHciEventParameter_c

*Table continues on the next page...*

**Table 328. InternalError Parameter Structure (continued)**

	0x0417: gSmLlConnectionEncryptionInProgress_c
	0x0418: gSmLlConnectionEncryptionFailure_c
	0x0419: gSmInsufficientResources_c
	0x041A: gSmOobDataAddressMismatch_c
	0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c
	0x041C: gSmReceivedTimerEventForUnknownDevice_c
	0x041D: gSmUnattainableLocalDeviceSecRequirements_c
	0x041E: gSmUnattainableLocalDeviceMinKeySize_c
	0x041F: gSmUnattainableSlaveSecReqRequirements_c
	0x0431: gSmPairingErrorPasskeyEntryFailed_c
	0x0432: gSmPairingErrorConfirmValueFailed_c
	0x0433: gSmPairingErrorCommandNotSupported_c
	0x0434: gSmPairingErrorInvalidParameters_c
	0x0435: gSmPairingErrorUnknownReason_c
	0x0460: gSmTbResolvableAddressDoesNotMatch_c
	0x0461: gSmTbInvalidDataSignature_c
	0x0501: gAttInvalidHandle_c
	0x0502: gAttReadNotPermitted_c
	0x0503: gAttWriteNotPermitted_c
	0x0504: gAttInvalidPdu_c

*Table continues on the next page...*

**Table 328. InternalError Parameter Structure (continued)**

	0x0505: gAttInsufficientAuthentication_c
	0x0506: gAttRequestNotSupported_c
	0x0507: gAttInvalidOffset_c
	0x0508: gAttInsufficientAuthorization_c
	0x0509: gAttPrepareQueueFull_c
	0x050A: gAttAttributeNotFound_c
	0x050B: gAttAttributeNotLong_c
	0x050C: gAttInsufficientEncryptionKeySize_c
	0x050D: gAttInvalidAttributeValueLength_c
	0x050E: gAttUnlikelyor_c
	0x050F: gAttInsufficientEncryption_c
	0x0510: gAttUnsupportedGroupType_c
	0x0511: gAttInsufficientResources_c
	0x0601: gGattAnotherProcedureInProgress_c
	0x0602: gGattLongAttributePacketsCorrupted_c
	0x0603: gGattMultipleAttributesOverflow_c
	0x0604: gGattUnexpectedReadMultipleResponseLength_c
	0x0605: gGattInvalidValueLength_c
	0x0606: gGattServerTimeout_c
	0x0607: gGattIndicationAlreadyInProgress_c
	0x0608: gGattClientConfirmationTimeout_c
	0x0701: gGapAdvDataTooLong_c
	0x0702: gGapScanRspDataTooLong_c
	0x0703: gGapDeviceNotBonded_c
	0x0704: gGapAnotherProcedureInProgress_c
	0x0801: gDevDbCccdLimitReached_c
	0x0802: gDevDbCccdNotFound_c
	0x0901: gGattDbInvalidHandle_c

*Table continues on the next page...*



**Table 328. InternalError Parameter Structure (continued)**

		0x0902: gGattDbCharacteristicNotFound_c
		0x0903: gGattDbCccdNotFound_c
		0x0904: gGattDbServiceNotFound_c
		0x0905: gGattDbDescriptorNotFound_c

*Table continues on the next page...*

**Table 328. InternalError Parameter Structure (continued)**

ErrorSource	1	<p>Error source</p> <p>Possible values:</p> <p>0x00: gHciCommandStatus_c</p> <p>0x01: gCheckPrivateResolvableAddress_c</p> <p>0x02: gVerifySignature_c</p> <p>0x03: gAddNewConnection_c</p> <p>0x04: gResetController_c</p> <p>0x05: gSetEventMask_c</p> <p>0x06: gReadLeBufferSize_c</p> <p>0x07: gSetLeEventMask_c</p> <p>0x08: gReadDeviceAddress_c</p> <p>0x09: gReadLocalSupportedFeatures_c</p> <p>0x0A: gReadWhiteListSize_c</p> <p>0x0B: gClearWhiteList_c</p> <p>0x0C: gAddDeviceToWhiteList_c</p> <p>0x0D: gRemoveDeviceFromWhiteList_c</p> <p>0x0E: gCancelCreateConnection_c</p> <p>0x0F: gReadRadioPower_c</p> <p>0x10: gSetRandomAddress_c</p> <p>0x11: gCreateRandomAddress_c</p> <p>0x12: gEncryptLink_c</p> <p>0x13: gProvideLongTermKey_c</p> <p>0x14: gDenyLongTermKey_c</p> <p>0x15: gConnect_c</p> <p>0x16: gDisconnect_c</p> <p>0x17: gTerminatePairing_c</p> <p>0x18: gSendSlaveSecurityRequest_c</p> <p>0x19: gEnterPasskey_c</p> <p>0x1A: gProvideOob_c</p> <p>0x1B: gSendSmpKeys_c</p> <p>0x1C: gWriteSuggestedDefaultDataLength_c</p> <p>0x1D: gReadSuggestedDefaultDataLength_c</p> <p>0x1E: gUpdateLeDataLength_c</p>
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*Table continues on the next page...*

**Table 328. InternalError Parameter Structure (continued)**

		0x1F: gEnableHostPrivacy_c 0x20: gEnableControllerPrivacy_c 0x21: gLeScSendKeypressNotification_c 0x22: gLeScSetPeerOobData_c 0x23: gLeScGetLocalOobData_c 0x24: gLeScValidateNumericValue_c 0x25: gLeScRegeneratePublicKey_c 0x26: gLeSetResolvablePrivateAddressTimeout_c 0x27: gDefaultPairingProcedure_c 0x28: gLeControllerTest_c 0x29: gLeReadPhy_c 0x2A: gLeSetPhy_c 0x2B: gSaveKeys_c 0x2C: gSetChannelMap_c
HciCommandOpcode	2	HCI command operation code

### 3.4.71 GAP-GenericEventLeScLocalOobData.Indication

#### Description

Local OOB data used for LE Secure Connections pairing.

#### Parameters

**Table 329. GAP-GenericEventLeScLocalOobData.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xB6
Length	1	Length in bytes of the following parameters
RandomValue	16	LE SC OOB r (Random value)
ConfirmValue	16	LE SC OOB Cr (Random Confirm value)

### 3.4.72 GAP-GenericEventPeriodicAdvCreateSyncCancelled.Indication

#### Description

Controller event - periodic advertising create sync procedure canceled.

#### Parameters

**Table 330. GenericEventPeriodicAdvCreateSyncCancelled.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xD0
Length	1	0x00 - This message does not have any parameters

### 3.4.73 GAP- GenericEventPeriodicAdvDataSetupComplete.Indication

**Description**

Periodic advertising data setup completed.

**Parameters****Table 331. GAP-GenericEventPeriodicAdvDataSetupComplete.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xC4
Length	1	0x00 - This message does not have any parameters

### 3.4.74 GAP- GenericEventPeriodicAdvListUpdateComplete.Indication

**Description**

An update to the periodic advertiser list was successfully made.

**Parameters****Table 332. GAP-GenericEventPeriodicAdvListUpdateComplete.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xC5
Length	1	0x00 - This message does not have any parameters

### 3.4.75 GAP- GenericEventPeriodicAdvParamSetupComplete.Indication

**Description**

Periodic advertising parameters setup completed.

**Parameters**

**Table 333. GAP-GenericEventPeriodicAdvParamSetupComplete.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xC3
Length	1	0x00 - This message does not have any parameters

### 3.4.76 GAP- GenericEventPrivateResolvableAddressVerified.Indication

#### Description

Controller event - Private Resolvable Address verified.

#### Parameters

**Table 334. GAP-GenericEventPrivateResolvableAddressVerified.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x96
Length	1	Length in bytes of the following parameters
Verified	1	Private Resolvable Address verified

### 3.4.77 GAP-GenericEventPublicAddressRead.Indication

#### Description

Controller event - public address read.

#### Parameters

**Table 335. GAP-GenericEventPublicAddressRead.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x94
Length	1	Length in bytes of the following parameters
Address	6	Public address

### 3.4.78 GAP-GenericEventRandomAddressReady.Indication

#### Description

Controller event - random address ready.

#### Parameters

**Table 336. GAP-GenericEventRandomAddressReady.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x92
Length	1	Length in bytes of the following parameters
Address	6	Random address

### 3.4.79 GAP-GenericEventRandomAddressSet.Indication

#### Description

Controller event - Private Resolvable Address verified.

#### Parameters

**Table 337. GAP-GenericEventRandomAddressSet.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x97
Length	1	0x00 - This message does not have any parameters

### 3.4.80 GAP-GenericEventTxPowerLevelSetComplete.Indication

#### Description

Tx Power Level set completed.

#### Parameters

**Table 338. GAP-GenericEventTxPowerLevelSetComplete.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xB9
Length	1	Length in bytes of the following parameters
status	1	Indicates the status of the Set Tx Power Level request

### 3.4.81 GAP-GenericEventWhiteListCleared.Indication

#### Description

Controller event - White List cleared.

#### Parameters

Table 339. GAP-GenericEventWhiteListCleared.Indication Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x91
Length	1	0x00 - This message does not have any parameters

### 3.4.82 GAP-GenericEventWhiteListSizeRead.Indication

#### Description

Controller event - White List size.

#### Parameters

Table 340. GAP-GenericEventWhiteListSizeRead.Indication Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x8E
Length	1	Length in bytes of the following parameters
WhiteListSize	1	White list size

### 3.4.83 GAP-GetBondedDeviceName.Request

#### Description

Retrieves the name of a bonded device.

#### Parameters

Table 341. GAP-GetBondedDeviceName.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x29
Length	1	Length in bytes of the following parameters
NvmIndex	1	Index of the device in NVM bonding area
MaxNameSize	1	Maximum number of characters to be copied, including the terminating NULL character

### 3.4.84 GAP-GetBondedDeviceName.Indication

#### Description

Returns the name of a bonded device.

**Parameters****Table 342. GAP-GetBondedDeviceName.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x88
Length	1	Length in bytes of the following parameters
NameSize	1	The name size
Name	NameSize	The name value

**3.4.85 GAP-GetBondedDevicesCount.Request****Description**

Retrieves the number of bonded devices.

**Parameters****Table 343. GAP-GetBondedDevicesCount.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x28
Length	1	0x00 - This message does not have any parameters

**3.4.86 GAP-GetBondedDevicesCount.Indication****Description**

Returns the number of bonded devices.

**Parameters****Table 344. GAP-GetBondedDevicesCount.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x87
Length	1	Length in bytes of the following parameters
NbOfBondedDevices	1	Number of bonded devices

**3.4.87 GAP-GetBondedDevicesIdentityInformation.Request****Description**

Retrieves a list of the identity information of bonded devices, if any.

**Parameters**



**Table 345. GAP-GetBondedDevicesIdentityInformation.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x3C
Length	1	Length in bytes of the following parameters
maxDevices	1	Maximum number of addresses to be obtained

### 3.4.88 GAP-GetBondedDevicesIdentityInformation.Indication

#### Description

Returns a list of the identity information of bonded devices.

#### Parameters

**Table 346. GAP-GetBondedDevicesIdentityInformation.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xBB
Length	1	Length in bytes of the following parameters
NbOfDeviceIdentityAddresses	1	The number of device identity addresses
IdentityAddresses	Variable	Identity addresses list Structure type parameter. See detailed table below for parameter structure.

**Table 347. IdentityAddresses Parameter Structure**

Structure Parameter	Size (bytes)	Comments
IdentityAddressType	1	Identity Address Type Possible values: 0x00: gPublic_c 0x01: gRandom_c
IdentityAddress	6	Identity Address
Irk	16	Identity Resolving Key

### 3.4.89 GAP-LeReadPhy.Request

#### Description

Read the Tx and Rx Phy on the connection with a device.

#### Parameters

**Table 348. GAP-LeReadPhy.Request**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x3E
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the peer

### 3.4.90 GAP-LeScSetPeerOobData.Request

#### Description

Sets peer OOB data used for LE Secure Connections pairing.

#### Parameters

**Table 349. GAP-LeScSetPeerOobData.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x3A
Length	1	Length in bytes of the following parameters
DeviceId	1	The DeviceID for which the command is intended
RandomValue	16	LE SC OOB r (Random value)
ConfirmValue	16	LE SC OOB Cr (Random Confirm value)

### 3.4.91 GAP-LeScPublicKeyRegenerated.Indication

#### Description

The private/public key pair used for LE Secure Connections pairing has been regenerated.

#### Parameters

**Table 350. GAP-LeScPublicKeyRegenerated.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xB5
Length	1	0x00 - This message does not have any parameters

### 3.4.92 GAP-LeScRegeneratePublicKey.Request

#### Description

Regenerates the private/public key pair used for LE Secure Connections pairing.

**Parameters****Table 351. GAP-LeScRegeneratePublicKey.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x37
Length	1	0x00 - This message does not have any parameters

**3.4.93 GAP-LeScSendKeypressNotificationPrivacy.Request****Description**

Sends a Keypress Notification to the peer.

**Parameters****Table 352. GAP-LeScSendKeypressNotification.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x3B
Length	1	Length in bytes of the following parameters
DeviceId	1	The DeviceID for which the command is intended
GapLeScKeypressNotificationParams	Variable	Keypress notification type which denotes a passkey entry keypress action  Structure type parameter. See the detailed table below for parameter structure.

**Table 353. GapLeScKeypressNotificationParams Parameter Structure**

Structure Parameter	Size (bytes)	Comments
keypressNotifType	1	Possible values:  0x00: gKnPasskeyEntryStarted_c 0x01: gKnPasskeyDigitStarted_c 0x02: gKnPasskeyDigitErased_c (gKnPasskeyDigitErased_c ) 0x03: gKnPasskeyCleared_c 0x04: gKnPasskeyEntryCompleted_c

**3.4.94 GAP-LeScGetLocalOobData.Request****Description**

Retrieves local OOB data used for LE Secure Connections pairing.

#### Parameters

**Table 354. GAP-LeScGetLocalOobData.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x39
Length	1	0x00 - This message does not have any parameters

### 3.4.95 GAP-LeScValidateNumericValue.Request

#### Description

Validates the numeric value during the Numeric Comparison LE Secure Connections pairing.

#### Parameters

**Table 355. GAP-LeScValidateNumericValue.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x38
Length	1	Length in bytes of the following parameters
DeviceId	1	The DeviceID for which the command is intended
Valid	1	TRUE if user has indicated that numeric values are matched, FALSE otherwise

### 3.4.96 GAP-LeSetPhy.Request

#### Description

Set the Tx and Rx Phy on the connection with a device or all subsequent connections.

#### Parameters

**Table 356. GAP-LeSetPhy.Request**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x3F
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the peer.

*Table continues on the next page...*

**Table 356. GAP-LeSetPhy.Request (continued)**

allPhys	1	Bit mask indicating Host preferences on Tx and Rx Phy
txPhys	1	Bit mask indicating Host preferences on Tx Phy
rxPhys	1	Bit mask indicating Host preferences on Rx Phy
phyOptions	2	Host preferences on Coded Phy Possible values: 0x00: gLeCodingNoPreference_c (Host has no preference on the LE Coded Phy) 0x01: gLeCodingS2_c (Host prefers to use S=2 on the LE Coded Phy) 0x02: gLeCodingS8_c (Host prefers to use S=8 on the LE Coded Phy)

### 3.4.97 GAP-LoadCustomPeerInformation.Request

#### Description

Loads the custom peer information in raw data format.

#### Parameters

**Table 357. GAP-LoadCustomPeerInformation.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x1F
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the GAP peer
Offset	2	Data offset (offset from the beginning)
InfoSize	2	Data size

### 3.4.98 GAP-LoadCustomPeerInformation.Indication

#### Description

Returns the custom peer information in raw data format.

#### Parameters

**Table 358. GAP-LoadCustomPeerInformation.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x85
Length	1	Length in bytes of the following parameters
InfoSize	2	Data size
Info	InfoSize	Data value

### 3.4.99 GAP-LoadEncryptionInformation.Request

#### Description

Loads encryption key for a bonded device.

#### Parameters

**Table 359. GAP-LoadEncryptionInformation.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x18
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the peer

### 3.4.100 GAP-LoadEncryptionInformation.Indication

#### Description

Returns the encryption key for a bonded device.

#### Parameters

**Table 360. GAP-LoadEncryptionInformation.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x84
Length	1	Length in bytes of the following parameters
LtkSize	1	LTK size
Ltk	LtkSize	LTK value

### 3.4.101 GAP-LoadKeys.Request

#### Description

Load the bond keys from an NVM index.

## Parameters

Table 361. GAP-LoadKeys.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x41
Length	1	Length in bytes of the following parameters
NvmIndex	1	Index of the device in NVM bonding area

### 3.4.102 GAP-Pair.Request

## Description

Initiate pairing with a peer device.

## Parameters

Table 362. GAP-Pair.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x0C
Length	1	Length in bytes of the following parameters
Deviceld	1	The peer to pair with
PairingParameters	Variable	Pairing parameters as required by the SMP  Structure type parameter. See the detailed table below for parameter structure.

Table 363. Pairing Parameters Structure

Structure Parameter	Size (bytes)	Comments
WithBonding	1	TRUE if this device is able to and wants to bond after pairing, FALSE otherwise

*Table continues on the next page...*

**Table 363. Pairing Parameters Structure (continued)**

SecurityModeAndLevel	1	<p>The desired security mode-level</p> <p>Possible values:</p> <p>0x10: gMode1Level1_c (Mode 1 Level 1 - No Security)</p> <p>0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication)</p> <p>0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication)</p> <p>0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing)</p> <p>0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication)</p> <p>0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication)</p>
MaxEncryptionKeySize	1	Maximum LTK size supported by the device
LocalIoCapabilities	1	<p>I/O capabilities used to determine the pairing method</p> <p>Possible values:</p> <p>0x00: gIoDisplayOnly_c (May display a PIN, no input)</p> <p>0x01: gIoDisplayYesNo_c (May display a PIN and has a binary input (for example, YES and NO buttons))</p> <p>0x02: gIoKeyboardOnly_c (Has keyboard input, no display)</p> <p>0x03: gIoNone_c (No input and no display)</p> <p>0x04: gIoKeyboardDisplay_c (Has keyboard input and display)</p>
OobAvailable	1	TRUE if this device has Out-of-Band data that can be used for authenticated pairing, FALSE otherwise

*Table continues on the next page...*



**Table 363. Pairing Parameters Structure (continued)**

CentralKeys	1	SMP keys to be distributed by the Central Possible values: 0x00: gNoKeys_c (No key can be distributed) 0x01: gLtk_c (Long Term Key) 0x02: glrk_c (Identity Resolving Key) 0x04: gCsrk_c (Connection Signature Resolving Key)
PeripheralKeys	1	SMP keys to be distributed by the Peripheral Possible values: 0x00: gNoKeys_c (No key can be distributed) 0x01: gLtk_c (Long Term Key) 0x02: glrk_c (Identity Resolving Key) 0x04: gCsrk_c (Connection Signature Resolving Key)
LeSecureConnectionSupported	1	indicates if device supports LE Secure Connections pairing
UseKeypressNotifications	1	Indicates if device supports Keypress Notification PDUs during Passkey Entry pairing

### 3.4.103 GAP-PeriodicAdvCreateSync.Request

#### Description

Synchronize with a periodic advertiser.

#### Parameters

**Table 364. GAP-PeriodicAdvCreateSync.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x5A
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*

**Table 364. GAP-PeriodicAdvCreateSync.Request Parameters (continued)**

Parameter	Size (bytes)	Comments
FilterPolicy	1	Periodic advertising create sync request parameters  Possible values:  0x00: gUseCommandParameters_c (Use the SID, peerAddressType, and peerAddress parameters to determine which advertiser to listen to)  0x01: gUsePeriodicAdvList_c (Use the Periodic Advertiser List to determine which advertiser to listen to)
SID	1	Periodic advertising create sync request parameters
DeviceAddressType	1	Periodic advertising create sync request parameters  Possible values:  0x00: gPublic_c  0x01: gRandom_c
DeviceAddress	6	Periodic advertising create sync request parameters
SkipCount	2	Periodic advertising create sync request parameters
Timeout	2	Periodic advertising create sync request parameters

### 3.4.104 GAP-PeriodicAdvTerminateSync.Request

#### Description

Stop reception of the periodic advertising identified by the SID parameter.

#### Parameters

**Table 365. GAP-PeriodicAdvTerminateSync.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x5B
Length	1	Length in bytes of the following parameters
SyncHandle	2	Sync_Handle to be used to identify the periodic advertiser

### 3.4.105 GAP-ProvideLongTermKey.Request

#### Description

Provides the Long Term Key to the controller for encryption setup.

#### Parameters

**Table 366. GAP-ProvideLongTermKey.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x16
Length	1	Length in bytes of the following parameters
DeviceId	1	The GAP peer who requested encryption
LtkSize	1	The Long Term Key size
Ltk	LtkSize	The Long Term Key

### 3.4.106 GAP-ProvideOob.Request

#### Description

Provides the Out Of Band data for SMP pairing process.

#### Parameters

**Table 367. GAP-ProvideOob.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x12
Length	1	Length in bytes of the following parameters
DeviceId	1	The pairing device
Oob	16	OOB data

### 3.4.107 GAP-ReadChannelMap.Request

#### Description

Read the channel map from a connected peer.

#### Parameters

**Table 368. GAP-ReadChannelMap.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48

*Table continues on the next page...*

**Table 368. GAP-ReadChannelMap.Request Parameters (continued)**

Parameter	Size (bytes)	Comments
OpCode	1	0x44
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the peer.

### 3.4.108 GAP-ReadPublicDeviceAddress.Request

#### Description

Reads the device's public address from the controller.

#### Parameters

**Table 369. GAP-ReadPublicDeviceAddress.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x25
Length	1	0x00 - This message does not have any parameters

### 3.4.109 GAP-ReadRadioPowerLevel.Request

#### Description

Reads the power level of the controller's radio.

#### Parameters

**Table 370. GAP-ReadRadioPowerLevel.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x2C
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*

**Table 370. GAP-ReadRadioPowerLevel.Request Parameters (continued)**

TxReadType	1	Transmission read type Possible values: 0x00: gTxPowerCurrentLevelInConnection_c (Reading the instantaneous TX power level in a connection) 0x01: gTxPowerMaximumLevelInConnection_c (Reading the maximum TX power level achieved during a connection) 0x02: gTxPowerLevelForAdvertising_c (Reading the TX power on the advertising channels) 0x03: gRssi_c (Reading the Received Signal Strength Indication in a connection)
DeviceId	1	The DeviceId for which the command is intended

### 3.4.110 GAP-ReadWhiteListSize.Request

#### Description

Retrieves the size of the White List.

#### Parameters

**Table 371. GAP-ReadWhiteListSize.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x21
Length	1	0x00 - This message does not have any parameters

### 3.4.111 GAP-RegisterDeviceSecurityRequirements.Request

#### Description

Registers the device security requirements.

#### Parameters

**Table 372. GAP-RegisterDeviceSecurityRequirements.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48

*Table continues on the next page...*

**Table 372. GAP-RegisterDeviceSecurityRequirements.Request Parameters (continued)**

OpCode	1	0x02
Length	1	Length in bytes of the following parameters
SecurityRequirementsIncluded	1	Boolean value which indicates if security requirements are included or not
SecurityRequirements	Variable	Device security requirements Structure type parameter. See the detailed table below for parameter structure.

**Table 373. SecurityRequirements Parameter Structure**

Structure Parameter	Size (bytes)	Comments
MasterSecurityRequirements	Variable	Security requirements added to all services Structure type parameter. See the detailed table below for parameter structure.
NbOfServices	1	Number of service-specific requirements
GapServiceSecurityRequirements	Variable	Array of service-specific requirements Structure type parameter. See the detailed table below for parameter structure.

**Table 374. MasterSecurityRequirements Parameter Structure**

Structure Parameter	Size (bytes)	Comments
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*Table continues on the next page...*

**Table 374. MasterSecurityRequirements Parameter Structure (continued)**

SecurityModeLevel	1	Security mode and level Possible values: 0x10: gMode1Level1_c (Mode 1 Level 1 - No Security) 0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication) 0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication) 0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing) 0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication) 0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication)
Authorization	1	Authorization required
MinimumEncryptionKeySize	2	Minimum encryption key (LTK) size

**Table 375. GapServiceSecurityRequirements Parameter Structure**

Structure Parameter	Size (bytes)	Comments
ServiceHandle	2	Handle of the Service declaration in the GATT Database
Requirements	Variable	Requirements for all attributes in this service  Structure type parameter. See the detailed table below for parameter structure.

**Table 376. Requirements Parameter Structure**

Structure Parameter	Size (bytes)	Comments
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*Table continues on the next page...*

**Table 376. Requirements Parameter Structure (continued)**

SecurityModeLevel	1	Security mode and level Possible values: 0x10: gMode1Level1_c (Mode 1 Level 1 - No Security) 0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication) 0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication) 0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing) 0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication) 0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication)
Authorization	1	Authorization required
MinimumEncryptionKeySize	2	Minimum encryption key (LTK) size

### 3.4.112 GAP-RejectKeyExchangeRequest.Request

#### Description

Rejects the Key Exchange procedure with a paired peer.

#### Parameters

**Table 377. GAP-RejectKeyExchangeRequest.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x15
Length	1	Length in bytes of the following parameters
DeviceId	1	The GAP peer who requested the Key Exchange procedure

### 3.4.113 GAP-RejectPairing.Request

#### Description

Rejects the peer's authentication request.

#### Parameters

**Table 378. GAP-RejectPairing.Request Parameters**

Parameter	Size (bytes)	Comments
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*Table continues on the next page...*



**Table 378. GAP-RejectPairing.Request Parameters (continued)**

OpGroup	1	0x48
OpCode	1	0x10
Length	1	Length in bytes of the following parameters
DeviceId	1	The GAP peer who requested authentication
Reason	1	Pairing reject reason Possible values: 0x02: gOobNotAvailable_c (This device does not have the required OOB for authenticated pairing) 0x03: gIncompatibleIoCapabilities_c (The combination of I/O capabilities does not allow pairing with the desired level of security) 0x05: gPairingNotSupported_c (This device does not support pairing) 0x06: gLowEncryptionKeySize_c (The peer's encryption key size is too low for this device's required security level) 0x08: gUnspecifiedReason_c (The host has rejected the pairing for an unknown reason) 0x09: gRepeatedAttempts_c (This device is the target of repeated unsuccessful pairing attempts and does not allow further pairing attempts at the moment) 0xF0: gLinkEncryptionFailed_c (Link could not be encrypted)

### 3.4.114 GAP-RejectPasskeyRequest.Request

#### Description

Rejects the passkey request from a peer.

#### Parameters

**Table 379. GAP-RejectPasskeyRequest.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x13

*Table continues on the next page...*

**Table 379. GAP-RejectPasskeyRequest.Request Parameters (continued)**

Length	1	Length in bytes of the following parameters
DeviceId	1	The GAP peer that requested a passkey entry

### 3.4.115 GAP-RemoveAdvertisingSet.Request

#### Description

Remove an advertising set from the Controller.

#### Parameters

**Table 380. GAP-RemoveAdvertisingSet.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x52
Length	1	Length in bytes of the following parameters
SID	1	Advertising set to remove or 0xFF to remove all

### 3.4.116 GAP-RemoveAllBonds.Request

#### Description

Removes all bonds with other devices.

#### Parameters

**Table 381. GAP-RemoveAllBonds.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x2B
Length	1	0x00 - This message does not have any parameters

### 3.4.117 GAP-RemoveBond.Request

#### Description

Removes the bond with a device.

#### Parameters

**Table 382. GAP-RemoveBond.Request Parameters**

Parameter	Size (bytes)	Comments
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*Table continues on the next page...*

**Table 382. GAP-RemoveBond.Request Parameters (continued)**

OpGroup	1	0x48
OpCode	1	0x2A
Length	1	Length in bytes of the following parameters
NvmIndex	1	Index of the device in NVM bonding area

### 3.4.118 GAP-RemoveDeviceFromWhiteList.Request

#### Description

Removes a device address from the White List.

#### Parameters

**Table 383. GAP-RemoveDeviceFromWhiteList.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x24
Length	1	Length in bytes of the following parameters
AddressType	1	The address type (public or random) Possible values: 0x00: gPublic_c 0x01: gRandom_c
Address	6	The address of the white-listed device

### 3.4.119 GAP-SaveCccd.Request

#### Description

Save the CCCD value for a specific client and CCCD handle.

#### Parameters

**Table 384. GAP-SaveCccd.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x08
Length	1	Length in bytes of the following parameters
DeviceId	1	The peer GATT client

*Table continues on the next page...*

**Table 384. GAP-SaveCccd.Request Parameters (continued)**

Handle	2	The handle of the CCCD as defined in the GATT Database
Cccd	1	<p>The bit mask representing the CCCD value to be saved</p> <p>Possible values:</p> <p>0x00: gEmpty_c (Nothing is enabled)</p> <p>0x01: gNotification_c (Enables notifications)</p> <p>0x02: gIndication_c (Enabled indications)</p>

### 3.4.120 GAP-SaveCustomPeerInformation.Request

#### Description

Saves custom peer information in raw data format.

#### Parameters

**Table 385. GAP-SaveCustomPeerInformation.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x1E
Length	1	Length in bytes of the following parameters
DeviceId	1	Device ID of the GAP peer
Offset	2	Data offset (offset from the beginning)
InfoSize	2	Data size
Info	InfoSize	Data

### 3.4.121 GAP-SaveDeviceName.Request

#### Description

Saves the name of a bonded device.

#### Parameters

**Table 386. GAP-SaveDeviceName.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x27
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*

**Table 386. GAP-SaveDeviceName.Request Parameters (continued)**

DeviceId	1	Device ID for the active peer which name is saved
NameSize	1	Number of characters to be saved
Name	NameSize	Array of characters holding the name

## 3.4.122 GAP-SaveKeys.Request

### Description

Save the bond keys to an NVM index.

### Parameters

**Table 387. GAP-SaveKeys.Request**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x42
Length	1	Length in bytes of the following parameters
NvmIndex	1	Index of the device in NVM bonding area
Keys	Variable	The SMP keys distributed by the peer Structure type parameter. See detailed table below for parameter structure.
LeSc	1	LE SC connections pairing
Authenticated	1	Peer was authenticated during pairing

**Table 388. Keys Parameter Structure**

Structure Parameter	Size (bytes)	Comments
LtkIncluded	1	Boolean value which indicates if LTK size and LTK are included or not
LtkInfo	Variable	LTK information (size and value) Structure type parameter. See detailed table below for parameter structure.
IrkIncluded	1	Boolean value which indicates if IRK is included or not
Irk	16 x IrkIncluded	Identity Resolving Key
CsrkIncluded	1	Boolean value which indicates if CSRK is included or not
Csrk	16 x CsrkIncluded	Connection Signature Resolving Key

*Table continues on the next page...*

**Table 388. Keys Parameter Structure (continued)**

Structure Parameter	Size (bytes)	Comments
RandEdivInfo	Variable	Rand information (size and value) and Ediv  Structure type parameter. See detailed table below for parameter structure.
AddressIncluded	IrkIncluded	Boolean value which indicates if Address is included or not
AddressInfo	Variable	Address information (type and value)  Structure type parameter. See detailed table below for parameter structure.

**Table 389. LtkInfo Parameter Structure**

Structure Parameter	Size (bytes)	Comments
LtkSize	1	Encryption Key Size
Ltk	LtkSize	Long Term (Encryption) Key

**Table 390. RandEdivInfo Parameter Structure**

Structure Parameter	Size (bytes)	Comments
RandSize	1	Random value size
Rand	RandSize	Random value used to identify the LTK
Ediv	2	EDIV value used to identify the LTK

**Table 391. AddressInfo Parameter Structure**

Structure Parameter	Size (bytes)	Comments
DeviceAddressType	1	Public or Random address  Possible values: 0x00: gPublic_c 0x01: gRandom_c
DeviceAddress	6	Device Address

### 3.4.123 GAP-ScanningEventCommandFailed.Indication

#### Description

Event received when scanning could not be enabled or disabled.

#### Parameters

**Table 392. GAP-ScanningEventCommandFailed.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x9B
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*

**Table 392. GAP-ScanningEventCommandFailed.Indication Parameters (continued)**

FailReason	2	<p>The reason of failure</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p> <p>0x010F: gHciConnectionRejectedDueToUnaccep tableBdAddr_c</p>
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**Table 392. GAP-ScanningEventCommandFailed.Indication Parameters (continued)**

	0x0110: gHciConnectionAcceptTimeoutExceeded_c
	0x0111: gHciUnsupportedFeatureOrParameterValue_c
	0x0112: gHciInvalidHciCommandParameters_c
	0x0113: gHciRemoteUserTerminatedConnection_c
	0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c
	0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c
	0x0116: gHciConnectionTerminatedByLocalHost_c
	0x0117: gHciRepeatedAttempts_c
	0x0118: gHciPairingNotAllowed_c
	0x0119: gHciUnknownLpmPdu_c
	0x011A: gHciUnsupportedRemoteFeature_c
	0x011B: gHciScoOffsetRejected_c
	0x011C: gHciScoIntervalRejected_c
	0x011D: gHciScoAirModeRejected_c
	0x011E: gHciInvalidLpmParameters_c
	0x011F: gHciUnspecifiedError_c
	0x0120: gHciUnsupportedLpmParameterValue_c
	0x0121: gHciRoleChangeNotAllowed_c
	0x0122: gHciLLResponseTimeout_c
	0x0123: gHciLmpErrorTransactionCollision_c
	0x0124: gHciLmpPduNotAllowed_c
	0x0125: gHciEncryptionModeNotAcceptable_c
	0x0126: gHciLinkKeyCannotBeChanged_c

**Table 392. GAP-ScanningEventCommandFailed.Indication Parameters (continued)**

		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c
		0x013B: gHciUnacceptableConnectionParameters_c
		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c

**Table 392. GAP-ScanningEventCommandFailed.Indication Parameters (continued)**

		gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c
		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c

**Table 392. GAP-ScanningEventCommandFailed.Indication Parameters (continued)**

		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c
		0x0416: gSmInvalidHciEventParameter_c
		0x0417: gSmLIConnectionEncryptionInProgress_c
		0x0418: gSmLIConnectionEncryptionFailure_c
		0x0419: gSmInsufficientResources_c

**Table 392. GAP-ScanningEventCommandFailed.Indication Parameters (continued)**

	0x041A: gSmOobDataAddressMismatch_c
	0x041B: gSmSmpPacketReceivedAfterTimeoutO ccurred_c
	0x041C: gSmReceivedTimerEventForUnknownD evice_c
	0x041D: gSmUnattainableLocalDeviceSecRequir ements_c
	0x041E: gSmUnattainableLocalDeviceMinKeySiz e_c
	0x041F: gSmUnattainableSlaveSecReqRequirem ents_c
	0x0431: gSmPairingErrorPasskeyEntryFailed_c
	0x0432: gSmPairingErrorConfirmValueFailed_c
	0x0433: gSmPairingErrorCommandNotSupporte d_c
	0x0434: gSmPairingErrorInvalidParameters_c
	0x0435: gSmPairingErrorUnknownReason_c
	0x0460: gSmTbResolvableAddressDoesNotMatc hLrk_c
	0x0461: gSmTbInvalidDataSignature_c
	0x0501: gAttInvalidHandle_c
	0x0502: gAttReadNotPermitted_c
	0x0503: gAttWriteNotPermitted_c
	0x0504: gAttInvalidPdu_c
	0x0505: gAttInsufficientAuthentication_c
	0x0506: gAttRequestNotSupported_c
	0x0507: gAttInvalidOffset_c
	0x0508: gAttInsufficientAuthorization_c
	0x0509: gAttPrepareQueueFull_c
	0x050A: gAttAttributeNotFound_c

**Table 392. GAP-ScanningEventCommandFailed.Indication Parameters (continued)**

		0x050B: gAttAttributeNotLong_c
		0x050C: gAttInsufficientEncryptionKeySize_c
		0x050D: gAttInvalidAttributeValueLength_c
		0x050E: gAttUnlikelyor_c
		0x050F: gAttInsufficientEncryption_c
		0x0510: gAttUnsupportedGroupType_c
		0x0511: gAttInsufficientResources_c
		0x0601: gGattAnotherProcedureInProgress_c
		0x0602: gGattLongAttributePacketsCorrupted_c
		0x0603: gGattMultipleAttributesOverflow_c
		0x0604: gGattUnexpectedReadMultipleResponseLength_c
		0x0605: gGattInvalidValueLength_c
		0x0606: gGattServerTimeout_c
		0x0607: gGattIndicationAlreadyInProgress_c
		0x0608: gGattClientConfirmationTimeout_c
		0x0701: gGapAdvDataTooLong_c
		0x0702: gGapScanRspDataTooLong_c
		0x0703: gGapDeviceNotBonded_c
		0x0704: gGapAnotherProcedureInProgress_c
		0x0801: gDevDbCccdLimitReached_c
		0x0802: gDevDbCccdNotFound_c
		0x0901: gGattDbInvalidHandle_c
		0x0902: gGattDbCharacteristicNotFound_c
		0x0903: gGattDbCccdNotFound_c
		0x0904: gGattDbServiceNotFound_c
		0x0905: gGattDbDescriptorNotFound_c

### 3.4.124 GAP-ScanningEventDeviceScanned.Indication

#### Description

Event received when an advertising device has been scanned.

#### Parameters

**Table 393. GAP-ScanningEventDeviceScanned.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x9C
Length	1	Length in bytes of the following parameters
ScannedDevice	Variable	Scanned device information Structure type parameter. See the detailed table below for parameter structure.

**Table 394. ScannedDevice Parameter Structure**

Structure Parameter	Size (bytes)	Comments
AddressType	1	Device's advertising address type Possible values: 0x00: gPublic_c 0x01: gRandom_c
Address	6	Device's advertising address
Rssi	1	RSSI on the advertising channel; may be compared to the TX power contained in the AD Structure of type gAdTxPowerLevel_c to estimate distance from the advertiser
DataLength	1	Length of the advertising or scan response data
Data	DataLength	Advertising or scan response data

*Table continues on the next page...*

**Table 394. ScannedDevice Parameter Structure (continued)**

AdvEventType	1	Advertising report type, indicating what type of event generated this data (advertising, scan response)  Possible values:  0x00: gBleAdvRepAdvInd_c (Connectable undirected advertising (ADV_IND))  0x01: gBleAdvRepAdvDirectInd_c (Connectable directed advertising (ADV_DIRECT_IND))  0x02: gBleAdvRepAdvScanInd_c (Scannable undirected advertising (ADV_SCAN_IND))  0x03: gBleAdvRepAdvNonconnInd_c (Non Connectable undirected advertising (ADV_NONCONN_IND))  0x04: gBleAdvRepScanRsp_c (Scan Response (SCAN_RSP))
DirectRpaUsed	1	TRUE if directed advertising with Resolvable Private Address as Direct Address was detected while Enhanced Privacy is enabled
DirectRpa	6	Resolvable Private Address set as Direct Address for directed advertising
advertisingAddressResolved	1	TRUE if the address contained in the addressType and aAddress fields is the identity address of a resolved RPA from the Advertising Address field

### 3.4.125 GAP-ScanningEventExtDeviceScanned.Indication

#### Description

Event received when an extended advertising device has been scanned.

#### Parameters

**Table 395. GAP-ScanningEventExtDeviceScanned.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xCB
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*



**Table 395. GAP-ScanningEventExtDeviceScanned.Indication Parameters (continued)**

Parameter	Size (bytes)	Comments
AddressType	1	Device's advertising address type Possible values: 0x00: gPublic_c 0x01: gRandom_c
Address	6	Device's advertising address
SID	1	Advertising set ID
AdvertisingAddressResolved	1	TRUE if the address contained in the addressType and aAddress fields is the identity address of a resolved RPA from the Advertising Address field
AdvEventProperties	2	Advertising report properties, indicating what type of event generated this data (advertising, scan response)
Rssi	1	Value of the RSSI
TxPower	1	The Tx power level of the advertiser
PrimaryPHY	1	Advertiser PHY for primary channel
SecondaryPHY	1	Advertiser PHY for secondary channel
PeriodicAdvInterval	2	Interval of the periodic advertising. Zero if not periodic advertising
DirectRpaUsed	1	TRUE if directed advertising with Resolvable Private Address as Direct Address was detected while Enhanced Privacy is enabled
DirectRpaType	1	Resolvable Private Address type Possible values: 0x00: gPublic_c 0x01: gRandom_c
DirectRpa	6	Resolvable Private Address set as Direct Address for directed advertising
DataLength	2	Length of the advertising or scan response data
Data	DataLength	Advertising or scan response data

### 3.4.126 GAP- ScanningEventPeriodicAdvSyncEstablished.Indication

#### Description

Controller event - periodic advertising sync established indication.

**Parameters****Table 396. GAP-ScanningEventPeriodicAdvSyncEstablished.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xCC
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*

**Table 396. GAP-ScanningEventPeriodicAdvSyncEstablished.Indication Parameters (continued)**

Parameter	Size (bytes)	Comments
Status	2	<p>Periodic advertising sync status</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToAD eviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedR esources_c</p> <p>0x010E: gHciConnectionRejectedDueToSecurity Reasons_c</p>

*Table continues on the next page...*

**Table 396. GAP-ScanningEventPeriodicAdvSyncEstablished.Indication Parameters (continued)**

Parameter	Size (bytes)	Comments
		0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c
		0x0110: gHciConnectionAcceptTimeoutExceeded_c
		0x0111: gHciUnsupportedFeatureOrParameterValue_c
		0x0112: gHciInvalidHciCommandParameters_c
		0x0113: gHciRemoteUserTerminatedConnection_c
		0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c
		0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c
		0x0116: gHciConnectionTerminatedByLocalHost_c
		0x0117: gHciRepeatedAttempts_c
		0x0118: gHciPairingNotAllowed_c
		0x0119: gHciUnknownLpmPdu_c
		0x011A: gHciUnsupportedRemoteFeature_c
		0x011B: gHciScoOffsetRejected_c
		0x011C: gHciScoIntervalRejected_c
		0x011D: gHciScoAirModeRejected_c
		0x011E: gHciInvalidLpmParameters_c
		0x011F: gHciUnspecifiedError_c
		0x0120: gHciUnsupportedLpmParameterValue_c
		0x0121: gHciRoleChangeNotAllowed_c
		0x0122: gHciLLResponseTimeout_c
		0x0123: gHciLmpErrorTransactionCollision_c
		0x0124: gHciLmpPduNotAllowed_c

*Table continues on the next page...*

Table 396. GAP-ScanningEventPeriodicAdvSyncEstablished.Indication Parameters (continued)

Parameter	Size (bytes)	Comments
		0x0125: gHciEncryptionModeNotAcceptable_c
		0x0126: gHciLinkKeyCannotBeChanged_c
		0x0127: gHciRequestedQosNotSupported_c
		0x0128: gHciInstantPassed_c
		0x0129: gHciPairingWithUnitKeyNotSupported_c
		0x012A: gHciDifferentTransactionCollision_c
		0x012B: gHciReserved_0x2B_c
		0x012C: gHciQosNotAcceptableParameter_c
		0x012D: gHciQosRejected_c
		0x012E: gHciChannelClassificationNotSupported_c
		0x012F: gHciInsufficientSecurity_c
		0x0130: gHciParameterOutOfMandatoryRange_c
		0x0131: gHciReserved_0x31_c
		0x0132: gHciRoleSwitchPending_c
		0x0133: gHciReserved_0x33_c
		0x0134: gHciReservedSlotViolation_c
		0x0135: gHciRoleSwitchFailed_c
		0x0136: gHciExtendedInquiryResponseTooLarge_c
		0x0137: gHciSecureSimplePairingNotSupportedByHost_c
		0x0138: gHciHostBusyPairing_c
		0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c
		0x013A: gHciControllerBusy_c

Table continues on the next page...

**Table 396. GAP-ScanningEventPeriodicAdvSyncEstablished.Indication Parameters (continued)**

Parameter	Size (bytes)	Comments
		0x013B: gHciUnacceptableConnectionParameters_c
		0x013C: gHciDirectedAdvertisingTimeout_c
		0x013D: gHciConnectionTerminatedDueToMicFailure_c
		0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c
		0x013F: gHciMacConnectionFailed_c
		0x0140: gHciCoarseClockAdjustmentRejected_c
		0x0141: gHciType0SubmapNotDefined_c
		0x0142: gHciUnknownAdvertisingIdentifier_c
		0x0143: gHciLimitReached_c
		0x0144: gHciOperationCancelledByHost_c
		0x01A0: gHciAlreadyInit_c
		0x01A1: gHciInvalidParameter_c
		0x01A2: gHciCallbackNotInstalled_c
		0x01A3: gHciCallbackAlreadyInstalled_c
		0x01A4: gHciCommandNotSupported_c
		0x01A5: gHciEventNotSupported_c
		0x01A6: gHciTransportError_c
		0x03F0: gL2caAlreadyInit_c
		0x03F1: gL2caInsufficientResources_c
		0x03F2: gL2caCallbackNotInstalled_c
		0x03F3: gL2caCallbackAlreadyInstalled_c
		0x03F4: gL2caLePsmInvalid_c
		0x03F5: gL2caLePsmAlreadyRegistered_c
		0x03F6: gL2caLePsmNotRegistered_c
		0x03F7: gL2caLePsmInsufficientResources_c

*Table continues on the next page...*

**Table 396. GAP-ScanningEventPeriodicAdvSyncEstablished.Indication Parameters (continued)**

Parameter	Size (bytes)	Comments
		0x03F8: gL2caChannelInvalid_c
		0x03F9: gL2caChannelClosed_c
		0x03FA: gL2caChannelAlreadyConnected_c
		0x03FB: gL2caConnectionParametersRejected_c
		0x03FC: gL2caChannelBusy_c
		0x03FE: gL2caInvalidParameter_c
		0x03FF: gL2caError_c
		0x0401: gSmNullCBFunction_c
		0x0402: gSmCommandNotSupported_c
		0x0403: gSmUnexpectedCommand_c
		0x0404: gSmInvalidCommandCode_c
		0x0405: gSmInvalidCommandLength_c
		0x0406: gSmInvalidCommandParameter_c
		0x0407: gSmInvalidDeviceId_c
		0x0408: gSmInvalidInternalOperation_c
		0x0409: gSmInvalidConnectionHandle_c
		0x040A: gSmImproperKeyDistributionField_c
		0x040B: gSmUnexpectedKeyType_c
		0x040C: gSmUnexpectedPairingTerminationReason_c
		0x040D: gSmUnexpectedKeyset_c
		0x040E: gSmSmpTimeoutOccurred_c
		0x040F: gSmUnknownSmpPacketType_c
		0x0410: gSmInvalidSmpPacketLength_c
		0x0411: gSmInvalidSmpPacketParameter_c
		0x0412: gSmReceivedUnexpectedSmpPacket_c
		0x0413: gSmReceivedSmpPacketFromUnknownDevice_c

*Table continues on the next page...*

**Table 396. GAP-ScanningEventPeriodicAdvSyncEstablished.Indication Parameters (continued)**

Parameter	Size (bytes)	Comments
		0x0414: gSmReceivedUnexpectedHciEvent_c
		0x0415: gSmReceivedHciEventFromUnknownDevice_c
		0x0416: gSmInvalidHciEventParameter_c
		0x0417: gSmLlConnectionEncryptionInProgress_c
		0x0418: gSmLlConnectionEncryptionFailure_c
		0x0419: gSmInsufficientResources_c
		0x041A: gSmOobDataAddressMismatch_c
		0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c
		0x041C: gSmReceivedTimerEventForUnknownDevice_c
		0x041D: gSmUnattainableLocalDeviceSecRequirements_c
		0x041E: gSmUnattainableLocalDeviceMinKeySize_c
		0x041F: gSmUnattainableSlaveSecReqRequirements_c
		0x0431: gSmPairingErrorPasskeyEntryFailed_c
		0x0432: gSmPairingErrorConfirmValueFailed_c
		0x0433: gSmPairingErrorCommandNotSupported_c
		0x0434: gSmPairingErrorInvalidParameters_c
		0x0435: gSmPairingErrorUnknownReason_c

*Table continues on the next page...*



Table 396. GAP-ScanningEventPeriodicAdvSyncEstablished.Indication Parameters (continued)

Parameter	Size (bytes)	Comments
		0x0460: gSmTbResolvableAddressDoesNotMatch_c
		0x0461: gSmTbInvalidDataSignature_c
		0x0501: gAttInvalidHandle_c
		0x0502: gAttReadNotPermitted_c
		0x0503: gAttWriteNotPermitted_c
		0x0504: gAttInvalidPdu_c
		0x0505: gAttInsufficientAuthentication_c
		0x0506: gAttRequestNotSupported_c
		0x0507: gAttInvalidOffset_c
		0x0508: gAttInsufficientAuthorization_c
		0x0509: gAttPrepareQueueFull_c
		0x050A: gAttAttributeNotFound_c
		0x050B: gAttAttributeNotLong_c
		0x050C: gAttInsufficientEncryptionKeySize_c
		0x050D: gAttInvalidAttributeValueLength_c
		0x050E: gAttUnlikelyor_c
		0x050F: gAttInsufficientEncryption_c
		0x0510: gAttUnsupportedGroupType_c
		0x0511: gAttInsufficientResources_c
		0x0601: gGattAnotherProcedureInProgress_c
		0x0602: gGattLongAttributePacketsCorrupted_c
		0x0603: gGattMultipleAttributesOverflow_c
		0x0604: gGattUnexpectedReadMultipleResponseLength_c
		0x0605: gGattInvalidValueLength_c
		0x0606: gGattServerTimeout_c
		0x0607: gGattIndicationAlreadyInProgress_c
		0x0608: gGattClientConfirmationTimeout_c

Table continues on the next page...

**Table 396. GAP-ScanningEventPeriodicAdvSyncEstablished.Indication Parameters (continued)**

Parameter	Size (bytes)	Comments
		0x0701: gGapAdvDataTooLong_c 0x0702: gGapScanRspDataTooLong_c 0x0703: gGapDeviceNotBonded_c 0x0704: gGapAnotherProcedureInProgress_c 0x0801: gDevDbCccdLimitReached_c 0x0802: gDevDbCccdNotFound_c 0x0901: gGattDbInvalidHandle_c 0x0902: gGattDbCharacteristicNotFound_c 0x0903: gGattDbCccdNotFound_c 0x0904: gGattDbServiceNotFound_c 0x0905: gGattDbDescriptorNotFound_c
SyncHandle	2	Sync_Handle to be used to identify the periodic advertiser

### 3.4.127 GAP-ScanningEventPeriodicAdvSyncLost.Indication

#### Description

Controller event - the controller has not received a periodic advertising packet identified by the handle within the timeout period.

#### Parameters

**Table 397. GAP-ScanningEventPeriodicAdvSyncLost.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xCE
Length	1	Length in bytes of the following parameters
SyncHandle	2	Sync_Handle to be used to identify the periodic advertiser

### 3.4.128 GAP-ScanningEventPeriodicAdvSyncTerminated.Indication

#### Description

Controller event - the controller stopped receiving periodic advertisements.

#### Parameters

**Table 398. GAP-ScanningEventPeriodicAdvSyncTerminated.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xCD
Length	1	0x00 - This message does not have any parameters

### 3.4.129 GAP-ScanningEventPeriodicDeviceScanned.Indication

#### Description

Event received when periodic advertising has been received.

#### Parameters

**Table 399. GAP-ScanningEventPeriodicDeviceScanned.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0xCF
Length	1	Length in bytes of the following parameters
SyncHandle	2	Sync Handle
Rssi	1	Value of the RSSI
TxPower	1	The Tx power level of the advertiser
DataLength	2	Length of the advertising or scan response data
Data	DataLength	Advertising or scan response data

### 3.4.130 GAP-ScanningEventStateChanged.Indication

#### Description

Event received when scanning had been successfully enabled or disabled.

#### Parameters

**Table 400. GAP-ScanningEventStateChanged.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x9A
Length	1	0x00 - This message does not have any parameters

### 3.4.131 GAP-SendSlaveSecurityRequest.Request

#### Description

Informs the peer Master about local security requirements.

#### Parameters

**Table 401. GAP-SendSlaveSecurityRequest.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x0D
Length	1	Length in bytes of the following parameters
DeviceId	1	The GAP peer to pair with
BondAfterPairing	1	Specifies if bonding is supported
SecurityModeLevel	1	<p>The level of security requested</p> <p>Possible values:</p> <p>0x10: gMode1Level1_c (Mode 1 Level 1 - No Security)</p> <p>0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication)</p> <p>0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication)</p> <p>0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing)</p> <p>0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication)</p> <p>0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication)</p>

### 3.4.132 GAP-SendSmpKeys.Request

#### Description

Sends the SMP keys during SMP Key Exchange procedure.

#### Parameters

**Table 402. GAP-SendSmpKeys.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x14
Length	1	Length in bytes of the following parameters
DeviceId	1	The GAP peer who initiated the procedure

*Table continues on the next page...*

**Table 402. GAP-SendSmpKeys.Request Parameters (continued)**

Keys	Variable	The SMP keys of the local device Structure type parameter. See the detailed table below for parameter structure.
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**Table 403. Keys Parameter Structure**

Structure Parameter	Size (bytes)	Comments
LtkIncluded	1	Boolean value which indicates if LTK size and LTK are included or not
LtkInfo	Variable	LTK information (size and value) Structure type parameter. See the detailed table below for parameter structure.
IrkIncluded	1	Boolean value which indicates if IRK is included or not
Irk	16 x IrkIncluded	Identity Resolving Key
CsrkIncluded	1	Boolean value which indicates if CSRK is included or not
Csrk	16 x CsrkIncluded	Connection Signature Resolving Key
RandEdivInfo	Variable	Rand information (size and value) and Ediv Structure type parameter. See the detailed table below for parameter structure.
AddressIncluded	IrkIncluded	Boolean value which indicates if Address is included or not
AddressInfo	Variable	Address information (type and value) Structure type parameter. See the detailed table below for parameter structure.

**Table 404. LtkInfo Parameter Structure**

Structure Parameter	Size (bytes)	Comments
LtkSize	1	Encryption Key Size
Ltk	LtkSize	Long Term (Encryption) Key

**Table 405. RandEdivInfo Parameter Structure**

Structure Parameter	Size (bytes)	Comments
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*Table continues on the next page...*

**Table 405. RandEdivInfo Parameter Structure (continued)**

RandSize	1	Random value size
Rand	RandSize	Random value used to identify the LTK
Ediv	2	EDIV value used to identify the LTK

**Table 406. AddressInfo Parameter Structure**

Structure Parameter	Size (bytes)	Comments
DeviceAddressType	1	Public or Random address  Possible values: 0x00: gPublic_c 0x01: gRandom_c
DeviceAddress	6	Device Address

### 3.4.133 GAP-SetAdvertisingData.Request

#### Description

Sets the advertising and scan response data.

#### Parameters

**Table 407. GAP-SetAdvertisingData.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x04
Length	1	Length in bytes of the following parameters
AdvertisingDataIncluded	1	Boolean value which indicates if advertising data is included or not
AdvertisingData	Variable	Advertising data  Structure type parameter. See the detailed table below for parameter structure.
ScanResponseDataIncluded	1	Boolean value which indicates if scan response data is included or not
ScanResponseData	Variable	Scan response data  Structure type parameter. See the detailed table below for parameter structure.

**Table 408. AdvertisingData Parameter Structure**

Structure Parameter	Size (bytes)	Comments
NbOfAdStructures	1	Number of advertising data structures
AdStructures	Variable	Advertising data structures Structure type parameter. See the detailed table below for parameter structure.

**Table 409. AdStructures Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Length	1	Advertising data length

*Table continues on the next page...*

**Table 409. AdStructures Parameter Structure (continued)**

Type	1	<p>Advertising data type</p> <p>Possible values:</p> <p>0x01: gAdFlags_c (Defined by the Bluetooth SIG)</p> <p>0x02: gAdIncomplete16bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x03: gAdComplete16bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x04: gAdIncomplete32bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x05: gAdComplete32bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x06: gAdIncomplete128bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x07: gAdComplete128bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x08: gAdShortenedLocalName_c (Defined by the Bluetooth SIG)</p> <p>0x09: gAdCompleteLocalName_c (Defined by the Bluetooth SIG)</p> <p>0x0A: gAdTxPowerLevel_c (Defined by the Bluetooth SIG)</p> <p>0x0D: gAdClassOfDevice_c (Defined by the Bluetooth SIG)</p> <p>0x0E: gAdSimplePairingHashC192_c (Defined by the Bluetooth SIG)</p> <p>0x0F: gAdSimplePairingRandomizerR192_c (Defined by the Bluetooth SIG)</p> <p>0x10: gAdSecurityManagerTkValue_c (Defined by the Bluetooth SIG)</p> <p>0x11: gAdSecurityManagerOobFlags_c (Defined by the Bluetooth SIG)</p> <p>0x12: gAdSlaveConnectionIntervalRange_c (Defined by the Bluetooth SIG)</p> <p>0x14: gAdServiceSolicitationList16bit_c (Defined by the Bluetooth SIG)</p> <p>0x15: gAdServiceSolicitationList128bit_c (Defined by the Bluetooth SIG)</p> <p>0x16: gAdServiceData16bit_c (Defined by the Bluetooth SIG)</p>
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**Table 409. AdStructures Parameter Structure (continued)**

		0x17: gAdPublicTargetAddress_c (Defined by the Bluetooth SIG)  0x18: gAdRandomTargetAddress_c (Defined by the Bluetooth SIG)  0x19: gAdAppearance_c (Defined by the Bluetooth SIG)  0x1A: gAdAdvertisingInterval_c (Defined by the Bluetooth SIG)  0x1B: gAdLeDeviceAddress_c (Defined by the Bluetooth SIG)  0x1C: gAdLeRole_c (Defined by the Bluetooth SIG)  0x1D: gAdSimplePairingHashC256_c (Defined by the Bluetooth SIG)  0x1E: gAdSimplePairingRandomizerR256_c (Defined by the Bluetooth SIG)  0x1F: gAdServiceSolicitationList32bit_c (Defined by the Bluetooth SIG)  0x20: gAdServiceData32bit_c (Defined by the Bluetooth SIG)  0x21: gAdServiceData128bit_c (Defined by the Bluetooth SIG)  0x3D: gAd3dInformationData_c (Defined by the Bluetooth SIG)  0xFF: gAdManufacturerSpecificData_c (Defined by the Bluetooth SIG)
Data	Length	Advertising data

**Table 410. ScanResponseData Parameter Structure**

Structure Parameter	Size (bytes)	Comments
NbOfAdStructures	1	Number of advertising data structures
AdStructures	Variable	Advertising data structures  Structure type parameter. See the detailed table below for parameter structure.

**Table 411. AdStructures Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Length	1	Advertising data length

*Table continues on the next page...*

**Table 411. AdStructures Parameter Structure (continued)**

Type	1	<p>Advertising data type</p> <p>Possible values:</p> <p>0x01: gAdFlags_c (Defined by the Bluetooth SIG)</p> <p>0x02: gAdIncomplete16bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x03: gAdComplete16bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x04: gAdIncomplete32bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x05: gAdComplete32bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x06: gAdIncomplete128bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x07: gAdComplete128bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x08: gAdShortenedLocalName_c (Defined by the Bluetooth SIG)</p> <p>0x09: gAdCompleteLocalName_c (Defined by the Bluetooth SIG)</p> <p>0x0A: gAdTxPowerLevel_c (Defined by the Bluetooth SIG)</p> <p>0x0D: gAdClassOfDevice_c (Defined by the Bluetooth SIG)</p> <p>0x0E: gAdSimplePairingHashC192_c (Defined by the Bluetooth SIG)</p> <p>0x0F: gAdSimplePairingRandomizerR192_c (Defined by the Bluetooth SIG)</p> <p>0x10: gAdSecurityManagerTkValue_c (Defined by the Bluetooth SIG)</p> <p>0x11: gAdSecurityManagerOobFlags_c (Defined by the Bluetooth SIG)</p> <p>0x12: gAdSlaveConnectionIntervalRange_c (Defined by the Bluetooth SIG)</p> <p>0x14: gAdServiceSolicitationList16bit_c (Defined by the Bluetooth SIG)</p> <p>0x15: gAdServiceSolicitationList128bit_c (Defined by the Bluetooth SIG)</p> <p>0x16: gAdServiceData16bit_c (Defined by the Bluetooth SIG)</p>
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*Table continues on the next page...*

**Table 411. AdStructures Parameter Structure (continued)**

		0x17: gAdPublicTargetAddress_c (Defined by the Bluetooth SIG) 0x18: gAdRandomTargetAddress_c (Defined by the Bluetooth SIG) 0x19: gAdAppearance_c (Defined by the Bluetooth SIG) 0x1A: gAdAdvertisingInterval_c (Defined by the Bluetooth SIG) 0x1B: gAdLeDeviceAddress_c (Defined by the Bluetooth SIG) 0x1C: gAdLeRole_c (Defined by the Bluetooth SIG) 0x1D: gAdSimplePairingHashC256_c (Defined by the Bluetooth SIG) 0x1E: gAdSimplePairingRandomizerR256_c (Defined by the Bluetooth SIG) 0x1F: gAdServiceSolicitationList32bit_c (Defined by the Bluetooth SIG) 0x20: gAdServiceData32bit_c (Defined by the Bluetooth SIG) 0x21: gAdServiceData128bit_c (Defined by the Bluetooth SIG) 0x3D: gAd3dInformationData_c (Defined by the Bluetooth SIG) 0xFF: gAdManufacturerSpecificData_c (Defined by the Bluetooth SIG)
Data	Length	Advertising data

### 3.4.134 GAP-SetAdvertisingParameters.Request

#### Description

Sets the advertising parameters.

#### Parameters

**Table 412. GAP-SetAdvertisingParameters.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x03
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*

**Table 412. GAP-SetAdvertisingParameters.Request Parameters (continued)**

AdvertisingParameters	Variable	Advertising parameters Structure type parameter. See the detailed table below for parameter structure.
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**Table 413. AdvertisingParameters Parameter Structure**

Structure Parameter	Size (bytes)	Comments
MinInterval	2	Minimum desired advertising interval - default 1.28s
MaxInterval	2	Maximum desired advertising interval - default 1.28s
AdvertisingType	1	Advertising type - default connectable undirected  Possible values: 0x00: gConnectableUndirected_c (Answers to both connect and scan requests) 0x01: gDirectedHighDutyCycle_c (Answers only to connect requests; smaller advertising interval for quicker connection) 0x02: gScannable_c (Answers only to scan requests) 0x03: gNonConnectable_c (Does not answer to connect nor scan requests) 0x04: gDirectedLowDutyCycle_c (Answers only to connect requests; larger advertising interval)
OwnAddressType	1	Indicates whether the advertising address will be the public address or the random address  Possible values: 0x00: gPublic_c 0x01: gRandom_c

*Table continues on the next page...*

**Table 413. AdvertisingParameters Parameter Structure (continued)**

PeerAddressType	1	Address type of the peer; only used in directed advertising and Enhanced Privacy  Possible values: 0x00: gPublic_c 0x01: gRandom_c
PeerAddress	6	Address of the peer
ChannelMap	1	Bit mask indicating which of the three advertising channels will be used - default all three  Possible values: 0x01: gChannel37_c (Bit for channel 37) 0x02: gChannel38_c (Bit for channel 38) 0x04: gChannel39_c (Bit for channel 39)
FilterPolicy	1	Indicates whether the connect and scan requests are filtered using the White List - default does not use White List  Possible values: 0x00: gProcessAll_c (Accept all connect and scan requests) 0x01: gProcessConnAllScanWL_c (Accept all connect requests, but scan requests only from devices in White List) 0x02: gProcessScanAllConnWL_c (Accept all scan requests, but connect requests only from devices in White List) 0x03: gProcessWhiteListOnly_c (Accept connect and scan requests only from devices in White List)

### 3.4.135 GAP-SetChannelMap.Request

#### Description

Set a channel classification in the Controller.

#### Parameters

**Table 414. GAP-SetChannelMap.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48

*Table continues on the next page...*

**Table 414. GAP-SetChannelMap.Request Parameters (continued)**

Parameter	Size (bytes)	Comments
OpCode	1	0x43
Length	1	Length in bytes of the following parameters
Channel Map	5	

### 3.4.136 GAP-SetDefaultPairingParameters.Request

#### Description

Sets the default pairing parameters to be used by automatic pairing procedures.

#### Parameters

**Table 415. GAP-SetDefaultPairingParameters.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x30
Length	1	Length in bytes of the following parameters
PairingParametersIncluded	1	Boolean value which indicates if pairing parameters are included or not
PairingParameters	Variable	Pairing parameters as required by the SMP  Structure type parameter. See the detailed table below for parameter structure.

**Table 416. PairingParameters Parameter Structure**

Structure Parameter	Size (bytes)	Comments
WithBonding	1	TRUE if this device is able to and wants to bond after pairing, FALSE otherwise

*Table continues on the next page...*

**Table 416. PairingParameters Parameter Structure (continued)**

SecurityModeAndLevel	1	<p>The desired security mode-level</p> <p>Possible values:</p> <p>0x10: gMode1Level1_c (Mode 1 Level 1 - No Security)</p> <p>0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication)</p> <p>0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication)</p> <p>0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing)</p> <p>0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication)</p> <p>0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication)</p>
MaxEncryptionKeySize	1	Maximum LTK size supported by the device
LocalloCapabilities	1	<p>I/O capabilities used to determine the pairing method</p> <p>Possible values:</p> <p>0x00: gIoDisplayOnly_c (May display a PIN, no input)</p> <p>0x01: gIoDisplayYesNo_c (May display a PIN and has a binary input (for example, YES and NO buttons))</p> <p>0x02: gIoKeyboardOnly_c (Has keyboard input, no display)</p> <p>0x03: gIoNone_c (No input and no display)</p> <p>0x04: gIoKeyboardDisplay_c (Has keyboard input and display)</p>
OobAvailable	1	TRUE if this device has Out-of-Band data that can be used for authenticated pairing, FALSE otherwise

*Table continues on the next page...*

**Table 416. PairingParameters Parameter Structure (continued)**

CentralKeys	1	SMP keys to be distributed by the Central Possible values: 0x00: gNoKeys_c (No key can be distributed) 0x01: gLtk_c (Long Term Key) 0x02: glrk_c (Identity Resolving Key) 0x04: gCsrk_c (Connection Signature Resolving Key)
PeripheralKeys	1	SMP keys to be distributed by the Peripheral Possible values: 0x00: gNoKeys_c (No key can be distributed) 0x01: gLtk_c (Long Term Key) 0x02: glrk_c (Identity Resolving Key) 0x04: gCsrk_c (Connection Signature Resolving Key)
LeSecureConnectionSupported	1	indicates if device supports LE Secure Connections pairing
UseKeypressNotifications	1	Indicates if device supports Keypress Notification PDUs during Passkey Entry pairing

### 3.4.137 GAP-SetExtAdvertisingData.Request

#### Description

Sets the extended advertising and extended scan response data.

#### Parameters

**Table 417. GAP-SetExtAdvertisingData.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x58
Length	1	Length in bytes of the following parameters
SID	1	Advertising set
AdvertisingDataIncluded	1	Boolean value which indicates if extended advertising data is included or not

*Table continues on the next page...*



**Table 417. GAP-SetExtAdvertisingData.Request Parameters (continued)**

Parameter	Size (bytes)	Comments
ExtAdvertisingData	Variable	Extended Advertising data Structure type parameter. See detailed table below for parameter structure.
ScanResponseDataIncluded	1	Boolean value which indicates if extended scan response data is included or not
ExtScanResponseData	Variable	Extended Scan response data Structure type parameter. See detailed table below for parameter structure.

**Table 418. ExtAdvertisingData Parameter Structure**

Structure Parameter	Size (bytes)	Comments
NbOfAdStructures	1	Number of advertising data structures
AdStructures	Variable	Advertising data structures Structure type parameter. See detailed table below for parameter structure.

**Table 419. AdStructures Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Length	1	Advertising data length

*Table continues on the next page...*

Table 419. AdStructures Parameter Structure (continued)

Structure Parameter	Size (bytes)	Comments
Type	1	<p>Advertising data type</p> <p>Possible values:</p> <p>0x01: gAdFlags_c (Defined by the Bluetooth SIG)</p> <p>0x02: gAdIncomplete16bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x03: gAdComplete16bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x04: gAdIncomplete32bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x05: gAdComplete32bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x06: gAdIncomplete128bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x07: gAdComplete128bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x08: gAdShortenedLocalName_c (Defined by the Bluetooth SIG)</p> <p>0x09: gAdCompleteLocalName_c (Defined by the Bluetooth SIG)</p> <p>0x0A: gAdTxPowerLevel_c (Defined by the Bluetooth SIG)</p> <p>0x0D: gAdClassOfDevice_c (Defined by the Bluetooth SIG)</p> <p>0x0E: gAdSimplePairingHashC192_c (Defined by the Bluetooth SIG)</p> <p>0x0F: gAdSimplePairingRandomizerR192_c (Defined by the Bluetooth SIG)</p> <p>0x10: gAdSecurityManagerTkValue_c (Defined by the Bluetooth SIG)</p> <p>0x11: gAdSecurityManagerOobFlags_c (Defined by the Bluetooth SIG)</p> <p>0x12: gAdSlaveConnectionIntervalRange_c (Defined by the Bluetooth SIG)</p> <p>0x14: gAdServiceSolicitationList16bit_c (Defined by the Bluetooth SIG)</p> <p>0x15: gAdServiceSolicitationList128bit_c (Defined by the Bluetooth SIG)</p>

Table continues on the next page...

Table 419. AdStructures Parameter Structure (continued)

Structure Parameter	Size (bytes)	Comments
		0x16: gAdServiceData16bit_c (Defined by the Bluetooth SIG) 0x17: gAdPublicTargetAddress_c (Defined by the Bluetooth SIG) 0x18: gAdRandomTargetAddress_c (Defined by the Bluetooth SIG) 0x19: gAdAppearance_c (Defined by the Bluetooth SIG) 0x1A: gAdAdvertisingInterval_c (Defined by the Bluetooth SIG) 0x1B: gAdLeDeviceAddress_c (Defined by the Bluetooth SIG) 0x1C: gAdLeRole_c (Defined by the Bluetooth SIG) 0x1D: gAdSimplePairingHashC256_c (Defined by the Bluetooth SIG) 0x1E: gAdSimplePairingRandomizerR256_c (Defined by the Bluetooth SIG) 0x1F: gAdServiceSolicitationList32bit_c (Defined by the Bluetooth SIG) 0x20: gAdServiceData32bit_c (Defined by the Bluetooth SIG) 0x21: gAdServiceData128bit_c (Defined by the Bluetooth SIG) 0x3D: gAd3dInformationData_c (Defined by the Bluetooth SIG) 0xFF: gAdManufacturerSpecificData_c (Defined by the Bluetooth SIG)
Data	Length	Advertising data

Table 420. ExtScanResponseData Parameter Structure

Structure Parameter	Size (bytes)	Comments
NbOfAdStructures	1	Number of advertising data structures
AdStructures	Variable	Advertising data structures Structure type parameter. See detailed table below for parameter structure.

**Table 421. AdStructures Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Length	1	Advertising data length

*Table continues on the next page...*

Table 421. AdStructures Parameter Structure (continued)

Structure Parameter	Size (bytes)	Comments
Type	1	<p>Advertising data type</p> <p>Possible values:</p> <p>0x01: gAdFlags_c (Defined by the Bluetooth SIG)</p> <p>0x02: gAdIncomplete16bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x03: gAdComplete16bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x04: gAdIncomplete32bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x05: gAdComplete32bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x06: gAdIncomplete128bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x07: gAdComplete128bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x08: gAdShortenedLocalName_c (Defined by the Bluetooth SIG)</p> <p>0x09: gAdCompleteLocalName_c (Defined by the Bluetooth SIG)</p> <p>0x0A: gAdTxPowerLevel_c (Defined by the Bluetooth SIG)</p> <p>0x0D: gAdClassOfDevice_c (Defined by the Bluetooth SIG)</p> <p>0x0E: gAdSimplePairingHashC192_c (Defined by the Bluetooth SIG)</p> <p>0x0F: gAdSimplePairingRandomizerR192_c (Defined by the Bluetooth SIG)</p> <p>0x10: gAdSecurityManagerTkValue_c (Defined by the Bluetooth SIG)</p> <p>0x11: gAdSecurityManagerOobFlags_c (Defined by the Bluetooth SIG)</p> <p>0x12: gAdSlaveConnectionIntervalRange_c (Defined by the Bluetooth SIG)</p> <p>0x14: gAdServiceSolicitationList16bit_c (Defined by the Bluetooth SIG)</p> <p>0x15: gAdServiceSolicitationList128bit_c (Defined by the Bluetooth SIG)</p>

Table continues on the next page...

Table 421. AdStructures Parameter Structure (continued)

Structure Parameter	Size (bytes)	Comments
		0x16: gAdServiceData16bit_c (Defined by the Bluetooth SIG) 0x17: gAdPublicTargetAddress_c (Defined by the Bluetooth SIG) 0x18: gAdRandomTargetAddress_c (Defined by the Bluetooth SIG) 0x19: gAdAppearance_c (Defined by the Bluetooth SIG) 0x1A: gAdAdvertisingInterval_c (Defined by the Bluetooth SIG) 0x1B: gAdLeDeviceAddress_c (Defined by the Bluetooth SIG) 0x1C: gAdLeRole_c (Defined by the Bluetooth SIG) 0x1D: gAdSimplePairingHashC256_c (Defined by the Bluetooth SIG) 0x1E: gAdSimplePairingRandomizerR256_c (Defined by the Bluetooth SIG) 0x1F: gAdServiceSolicitationList32bit_c (Defined by the Bluetooth SIG) 0x20: gAdServiceData32bit_c (Defined by the Bluetooth SIG) 0x21: gAdServiceData128bit_c (Defined by the Bluetooth SIG) 0x3D: gAd3dInformationData_c (Defined by the Bluetooth SIG) 0xFF: gAdManufacturerSpecificData_c (Defined by the Bluetooth SIG)
Data	Length	Advertising data

### 3.4.138 GAP-SetExtAdvertisingParameters.Request

#### Description

Sets the advertising parameters.

#### Parameters

Table 422. GAP-SetExtAdvertisingParameters.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x48

Table continues on the next page...

Table 422. GAP-SetExtAdvertisingParameters.Request Parameters (continued)

Parameter	Size (bytes)	Comments
OpCode	1	0x50
Length	1	Length in bytes of the following parameters
SID	1	Advertising set ID
MinInterval	4	Minimum desired advertising interval - default 1.28s
MaxInterval	4	Maximum desired advertising interval - default 1.28s
OwnAddressType	1	Bluetooth device address types Possible values: 0x00: gPublic_c 0x01: gRandom_c
OwnRandomAddress	6	Bluetooth device address
PeerAddressType	1	Bluetooth device address types Possible values: 0x00: gPublic_c 0x01: gRandom_c
PeerAddress	6	Bluetooth device address
ChannelMap	1	Bit mask indicating which of the three advertising channels will be used - default all three
FilterPolicy	1	Indicates whether the connect and scan requests are filtered using the White List - default does not use White List Possible values: 0x00: gProcessAll_c (Accept all connect and scan requests) 0x01: gProcessConnAllScanWL_c (Accept all connect requests, but scan requests only from devices in White List) 0x02: gProcessScanAllConnWL_c (Accept all scan requests, but connect requests only from devices in White List) 0x03: gProcessWhiteListOnly_c (Accept connect and scan requests only from devices in White List)

Table continues on the next page...

**Table 422. GAP-SetExtAdvertisingParameters.Request Parameters (continued)**

Parameter	Size (bytes)	Comments
AdvProperties	2	Extended Advertising Properties
AdvTxPowerLevel	1	Advertising transmission power level (in dBm)
PrimaryAdvPHY	1	Phy Mode Possible values: 0x01: gLePhy1M_c 0x02: gLePhy2M_c 0x03: gLePhyCoded_c
SecondaryAdvPHY	1	Phy Mode Possible values: 0x01: gLePhy1M_c 0x02: gLePhy2M_c 0x03: gLePhyCoded_c
SecondaryAdvMaxSkip	1	Maximum advertising events the Controller can skip before sending the AUX_ADV_IND packets on the secondary advertising channel. If 0, AUX_ADV_IND shall be sent prior to the next advertising event
EnableScanReqNotification	1	Host is notified on scan requests

### 3.4.139 GAP-SetLocalPasskey.Request

#### Description

Sets the SMP passkey for this device.

#### Parameters

**Table 423. GAP-SetLocalPasskey.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x19
Length	1	Length in bytes of the following parameters
Passkey	4	The SMP passkey

### 3.4.140 GAP-SetPeriodicAdvertisingData.Request

#### Description

Sets the extended advertising and extended scan response data.



## Parameters

Table 424. GAP-SetPeriodicAdvertisingData.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x59
Length	1	Length in bytes of the following parameters
SID	1	Advertising set
PeriodicAdvertisingData	Variable	Extended Advertising data Structure type parameter. See detailed table below for parameter structure.

Table 425. PeriodicAdvertisingData Parameter Structure

Structure Parameter	Size (bytes)	Comments
NbOfAdStructures	1	Number of advertising data structures
AdStructures	Variable	Advertising data structures Structure type parameter. See detailed table below for parameter structure.

Table 426. AdStructures Parameter Structure

Structure Parameter	Size (bytes)	Comments
Length	1	Advertising data length

*Table continues on the next page...*

**Table 426. AdStructures Parameter Structure (continued)**

Structure Parameter	Size (bytes)	Comments
Type	1	<p>Advertising data type</p> <p>Possible values:</p> <p>0x01: gAdFlags_c (Defined by the Bluetooth SIG)</p> <p>0x02: gAdIncomplete16bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x03: gAdComplete16bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x04: gAdIncomplete32bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x05: gAdComplete32bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x06: gAdIncomplete128bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x07: gAdComplete128bitServiceList_c (Defined by the Bluetooth SIG)</p> <p>0x08: gAdShortenedLocalName_c (Defined by the Bluetooth SIG)</p> <p>0x09: gAdCompleteLocalName_c (Defined by the Bluetooth SIG)</p> <p>0x0A: gAdTxPowerLevel_c (Defined by the Bluetooth SIG)</p> <p>0x0D: gAdClassOfDevice_c (Defined by the Bluetooth SIG)</p> <p>0x0E: gAdSimplePairingHashC192_c (Defined by the Bluetooth SIG)</p> <p>0x0F: gAdSimplePairingRandomizerR192_c (Defined by the Bluetooth SIG)</p> <p>0x10: gAdSecurityManagerTkValue_c (Defined by the Bluetooth SIG)</p> <p>0x11: gAdSecurityManagerOobFlags_c (Defined by the Bluetooth SIG)</p> <p>0x12: gAdSlaveConnectionIntervalRange_c (Defined by the Bluetooth SIG)</p> <p>0x14: gAdServiceSolicitationList16bit_c (Defined by the Bluetooth SIG)</p> <p>0x15: gAdServiceSolicitationList128bit_c (Defined by the Bluetooth SIG)</p>

*Table continues on the next page...*

Table 426. AdStructures Parameter Structure (continued)

Structure Parameter	Size (bytes)	Comments
		0x16: gAdServiceData16bit_c (Defined by the Bluetooth SIG)
		0x17: gAdPublicTargetAddress_c (Defined by the Bluetooth SIG)
		0x18: gAdRandomTargetAddress_c (Defined by the Bluetooth SIG)
		0x19: gAdAppearance_c (Defined by the Bluetooth SIG)
		0x1A: gAdAdvertisingInterval_c (Defined by the Bluetooth SIG)
		0x1B: gAdLeDeviceAddress_c (Defined by the Bluetooth SIG)
		0x1C: gAdLeRole_c (Defined by the Bluetooth SIG)
		0x1D: gAdSimplePairingHashC256_c (Defined by the Bluetooth SIG)
		0x1E: gAdSimplePairingRandomizerR256_c (Defined by the Bluetooth SIG)
		0x1F: gAdServiceSolicitationList32bit_c (Defined by the Bluetooth SIG)
		0x20: gAdServiceData32bit_c (Defined by the Bluetooth SIG)
		0x21: gAdServiceData128bit_c (Defined by the Bluetooth SIG)
		0x3D: gAd3dInformationData_c (Defined by the Bluetooth SIG)
		0xFF: gAdManufacturerSpecificData_c (Defined by the Bluetooth SIG)
Data	Length	Advertising data

### 3.4.141 GAP-SetPeriodicAdvParameters.Request

#### Description

Sets the advertising parameters.

#### Parameters

Table 427. GAP-SetPeriodicAdvParameters.Request Parameters

Parameter	Size (bytes)	Comments
OpGroup	1	0x48

*Table continues on the next page...*

**Table 427. GAP-SetPeriodicAdvParameters.Request Parameters (continued)**

Parameter	Size (bytes)	Comments
OpCode	1	0x55
Length	1	Length in bytes of the following parameters
SID	1	Advertising set ID
IncludeTxPower	1	Include TxPower in the advertising PDU
MinInterval	2	Minimum advertising interval for periodic advertising
MaxInterval	2	Maximum advertising interval for periodic advertising

### 3.4.142 GAP-SetRandomAddress.Request

#### Description

Sets a random address into the controller.

#### Parameters

**Table 428. GAP-SetRandomAddress.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x2E
Length	1	Length in bytes of the following parameters
Address	6	The Private Resolvable, Private Non-Resolvable, or Static Random Address

### 3.4.143 GAP-SetScanMode.Request

#### Description

Sets internal scan filters and actions.

#### Parameters

**Table 429. GAP-SetScanMode.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x2F
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*

**Table 429. GAP-SetScanMode.Request Parameters (continued)**

ScanMode	1	<p>The scan mode to be activated.</p> <p>Possible values:</p> <p>0x00: gDefaultScan_c (Reports all scanned devices to the application)</p> <p>0x01: gLimitedDiscovery_c (Reports only devices in Limited Discoverable Mode, in other words, containing the Flags AD with the LE Limited Discoverable Flag set)</p> <p>0x02: gGeneralDiscovery_c (Reports only devices in General Discoverable Mode, in other words, containing the Flags AD with the LE General Discoverable Flag set)</p> <p>0x03: gAutoConnect_c (Automatically connects with devices with known addresses and does not report any scanned device to the application)</p>
AutoConnectParams	Variable	<p>Parameters for the Auto Connect Scan Mode</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p>

**Table 430. AutoConnectParams Parameter Structure**

Structure Parameter	Size (bytes)	Comments
NbOfAddresses	1	Number of device addresses to automatically connect to
WriteInWhiteList	1	If set to TRUE, the device addresses will be written in the White List before scanning is enabled
AutoConnectData	Variable	<p>The connection request parameters</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p>

**Table 431. AutoConnectData Parameter Structure**

Structure Parameter	Size (bytes)	Comments
ScanInterval	2	Scanning interval - default 10ms
ScanWindow	2	Scanning window - default 10ms

*Table continues on the next page...*

**Table 431. AutoConnectData Parameter Structure (continued)**

FilterPolicy	1	Indicates whether the connection request is issued for a specific device or for all the devices in the White List - default specific device  Possible values:  0x00: gUseDeviceAddress_c (Initiates a connection with a specific device identified by its address)  0x01: gUseWhiteList_c (Initiates connections with all the devices in the White List at the same time)
OwnAddressType	1	Indicates whether the address used in connection requests will be the public address or the random address - default public address  Possible values:  0x00: gPublic_c  0x01: gRandom_c
PeerAddressType	1	When connecting to a specific device, this indicates that device's address type - default public address  Possible values:  0x00: gPublic_c  0x01: gRandom_c
PeerAddress	6	When connecting to a specific device, this indicates that device's address
ConnIntervalMin	2	The minimum desired connection interval - default 100ms
ConnIntervalMax	2	The maximum desired connection interval - default 200ms
ConnLatency	2	The desired connection latency (the maximum number of consecutive connection events the Slave is allowed to ignore) - default 0
SupervisionTimeout	2	The maximum time interval between consecutive over-the-air packets; if this timer expires, the connection is dropped - default 10s
ConnEventLengthMin	2	The minimum desired connection event length - default 0ms

*Table continues on the next page...*

**Table 431. AutoConnectData Parameter Structure (continued)**

ConnEventLengthMax	2	The maximum desired connection event length - default maximum possible, ~41 s
usePeerIdentityAddress	1	TRUE if the address defined in the peerAddressType and peerAddress is an identity address
Initiating_PHYs	1	Phy Flags

### 3.4.144 GAP-SetTxPowerLevel.Request

#### Description

Sets a Transmission power level in the controller.

#### Parameters

**Table 432. GAP-SetTxPowerLevel.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x3D
Length	1	Length in bytes of the following parameters
powerLevel	1	power level value as described by the controller interface
channelType	1	Advertising or Connection channel type for the Tx power level  Possible values: 0x00: Advertising 0x01: Connection

### 3.4.145 GAP-StartAdvertising.Request

#### Description

Commands the controller to start advertising.

#### Parameters

**Table 433. GAP-StartAdvertising.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x05
Length	1	0x00 - This message does not have any parameters

### 3.4.146 GAP-StartExtAdvertising.Request

#### Description

Commands the controller to start advertising.

#### Parameters

**Table 434. GAP-StartExtAdvertising.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x51
Length	1	Length in bytes of the following parameters
SID	1	Advertising set ID
Duration	2	The duration of the advertising - Time = N * 10 ms
MaxExtAdvEvents	1	The maximum number of advertising events

### 3.4.147 GAP-StartPeriodicAdvertising.Request

#### Description

Start Periodic Advertising for a set Id.

#### Parameters

**Table 435. GAP-StartPeriodicAdvertising.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x56
Length	1	Length in bytes of the following parameters
SID	1	Advertising set

### 3.4.148 GAP-StartScanning.Request

#### Description

Sets the scanning parameters (optionally) and begins scanning.

#### Parameters

**Table 436. GAP-StartScanning.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x1A

*Table continues on the next page...*



**Table 436. GAP-StartScanning.Request Parameters (continued)**

Length	1	Length in bytes of the following parameters
ScanningParametersIncluded	1	Boolean value which indicates if scanning parameters are included or not
ScanningParameters	Variable	The scanning parameters Structure type parameter. See the detailed table below for parameter structure.
ScanningPHYS	1	Scanning PHYs
Duration	2	Scan duration - Time = N * 10ms
Period	2	Periodic scanning - Time = N * 1.28s

**Table 437. ScanningParameters Parameter Structure**

Structure Parameter	Size (bytes)	Comments
Type	1	Scanning type - default passive  Possible values:  0x00: gPassive_c (Passive Scanning - advertising packets are immediately reported to the Host)  0x01: gActive_c (Active Scanning - the scanner sends scan requests to the advertiser and reports to the Host after the scan response is received)
Interval	2	Scanning interval - default 10ms
Window	2	Scanning window - default 10ms
OwnAddressType	1	Indicates whether the address used in scan requests will be the public address or the random address - default public address  Possible values:  0x00: gPublic_c  0x01: gRandom_c

*Table continues on the next page...*

**Table 437. ScanningParameters Parameter Structure (continued)**

FilterPolicy	1	<p>Indicates whether the advertising packets are filtered using the White List - default does not use White List</p> <p>Possible values:</p> <p>0x00: gScanAll_c (Scans all advertising packets)</p> <p>0x01: gScanWithWhiteList_c (Scans advertising packets using the White List)</p>
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### 3.4.149 GAP-StopAdvertising.Request

#### Description

Commands the controller to stop advertising.

#### Parameters

**Table 438. GAP-StopAdvertising.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x06
Length	1	0x00 - This message does not have any parameters

### 3.4.150 GAP-StopExtAdvertising.Request

#### Description

Commands the controller to stop advertising.

#### >Parameters

**Table 439. GAP-StopExtAdvertising.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x53
Length	1	Length in bytes of the following parameters
SID	1	Advertising set to be disabled or 0xFF to disable all

### 3.4.151 GAP-StopPeriodicAdvertising.Request

#### Description

Stop Periodic Advertising for a set Id.

#### Parameters

**Table 440. GAP-StopPeriodicAdvertising.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x57
Length	1	Length in bytes of the following parameters
SID	1	Advertising set

### 3.4.152 GAP-StopScanning.Request

#### Description

Commands the controller to stop scanning.

#### Parameters

**Table 441. GAP-StopScanning.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x1B
Length	1	0x00 - This message does not have any parameters

### 3.4.153 GAP-UpdateConnectionParameters.Request

#### Description

Request a set of new connection parameters.

#### Parameters

**Table 442. GAP-UpdateConnectionParameters.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x31
Length	1	Length in bytes of the following parameters
DeviceId	1	The DeviceID for which the command is intended
IntervalMin	2	The minimum value for the connection event interval
IntervalMax	2	The maximum value for the connection event interval
SlaveLatency	2	The slave latency parameter
TimeoutMultiplier	2	The connection timeout parameter

*Table continues on the next page...*

**Table 442. GAP-UpdateConnectionParameters.Request Parameters (continued)**

MinCeLength	2	The minimum connection event length
MaxCeLength	2	The maximum connection event length

### 3.4.154 Gap-UpdateLeDataLength.Request

#### Description

Update the Tx Data parameters.

#### Parameters

**Table 443. GAP-UpdateLeDataLength.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x33
Length	1	Length in bytes of the following parameters
DeviceId	1	The DeviceID for which the command is intended
TxOctets	2	Maximum transmission number of payload octets
TxTime	2	Maximum transmission time

### 3.4.155 GAP-UpdatePeriodicAdvList.Request

#### Description

Commands the controller to update the periodic advertiser list.

#### Parameters

**Table 444. GAP-UpdatePeriodicAdvList.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x54
Length	1	Length in bytes of the following parameters

*Table continues on the next page...*

**Table 444. GAP-UpdatePeriodicAdvList.Request Parameters (continued)**

Parameter	Size (bytes)	Comments
Operation	1	The operation to be executed on the list Possible values: 0x00: gAddDevice_c (Add device to periodic advertiser list) 0x01: gRemoveDevice_c (Remove device from periodic advertiser list) 0x02: gRemoveAllDevices_c (Remove all devices from periodic advertiser list)
DeviceAddressType	1	Bluetooth device address types Possible values: 0x00: gPublic_c 0x01: gRandom_c
DeviceAddress	6	Bluetooth device address
SID	1	Advertising set ID

### 3.4.156 GAP-VerifyPrivateResolvableAddress.Request

#### Description

Verifies a Private Resolvable Address with a bonded device's IRK.

#### Parameters

**Table 445. GAP-VerifyPrivateResolvableAddress.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0x48
OpCode	1	0x2D
Length	1	Length in bytes of the following parameters
NvmIndex	1	Index of the device in NVM bonding area whose IRK must be checked
Address	6	The Private Resolvable Address to be verified

## 3.5 FSCI Messages

### 3.5.1 FSCI-AllowDeviceToSleep.Request

#### Description

FSCI-AllowDeviceToSleep.Request description.

#### Parameters

**Table 446. FSCI-AllowDeviceToSleep.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0xA3
OpCode	1	0x70
Length	1	Length in bytes of the following parameters
Signal Host When Wake Up	1	Possible values: 0x00: FALSE 0x01: TRUE
Deep Sleep Duration	4	Deep sleep duration in units of 16 us. Default value is 5 s
Deep Sleep Mode	1	Deep sleep mode selection.

### 3.5.2 FSCI-AllowDeviceToSleep.Confirm

#### Description

FSCI-AllowDeviceToSleep.Request description.

#### Parameters

**Table 447. FSCI-AllowDeviceToSleep.Confirm Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0xA4
OpCode	1	0x70
Length	1	Length in bytes of the following parameters
Status	1	Possible values: 0x00: gSuccess (Success) 0xFF: gError (Error)

### 3.5.3 FSCI-Error.Indication

#### Description

FSCI is reporting an error condition.

#### Parameters

**Table 448. FSCI-Error.Indication Parameters**

Parameter	Size (bytes)	Comments
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*Table continues on the next page...*

**Table 448. FSCI-Error.Indication Parameters (continued)**

OpGroup	1	0xA4
OpCode	1	0xFE
Length	1	Length in bytes of the following parameters
Status	1	Occurred error Possible values: 0x00: gFsciSuccess_c 0xF0: gFsciSAPDisabled_c 0xF3: gFsciAppMsgTooBig_c 0xF4: gFsciOutOfMessages_c 0xF7: gFsciUnknownOpcodeGroup_c 0xF8: gFsciOpcodeGroupsIsDisabled_c 0xFD: gFsciUnknownOpcode_c 0xFE: gFsciTooBig_c 0xFF: gFsciError_c

### 3.5.4 FSCI-GetWakeupReason.Request

#### Description

FSCI-GetWakeupReason.Request description.

#### Parameters

**Table 449. FSCI-GetWakeupReason.Request Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0xA3
OpCode	1	0x72
Length	1	0x00 - This message does not have any parameters

### 3.5.5 FSCI-GetWakeupReason.Response

#### Description

FSCI-GetWakeupReason.Response description.

#### Parameters

**Table 450. FSCI-GetWakeupReason.Response Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0xA4

*Table continues on the next page...*

**Table 450. FSCI-GetWakeupReason.Response Parameters (continued)**

OpCode	1	0x72
Length	1	Length in bytes of the following parameters
WakeUpReason	1	Wake Up Reason

### 3.5.6 FSCI-WakeUp.Indication

#### Description

FSCI-WakeUp.Indication description.

#### Parameters

**Table 451. FSCI-WakeUp.Indication Parameters**

Parameter	Size (bytes)	Comments
OpGroup	1	0xA4
OpCode	1	0x71
Length	1	0x00 - This message does not have any parameters



# Chapter 4

## Revision history

This table summarizes revisions to this document

Revision number	Date	Substantive changes
0	09/2016	Initial release
6	04/2019	Updated for K32W032 PRC2 Release

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