

# Framework Serial Communication Interface (FSCI) for Bluetooth® Low Energy (BLE) Host Stack Reference Manual

## 1 Introduction

This reference manual provides a detailed description of the Bluetooth® Low Energy (BLE) 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 BLE 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 BLE Host Stack FSCI functionality can be desktop applications, such as the [NXP Test Tool for Connectivity Products](#), or embedded systems that have a Bluetooth® LE applications which use BLE stack services via FSCI.

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## 1.2 Audience description

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

## 1.3 References

**Table 1 References Table**

| <b>Title</b>  | <b>Reference</b> | <b>Version</b> | <b>Location</b>  |
|---|------------------|----------------|--|
| Specification of the Bluetooth System                 | Core v4.2        | 2013           | <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 the installer  |

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

## 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 BLE Host Stack interface set

The BLE 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 BLE 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

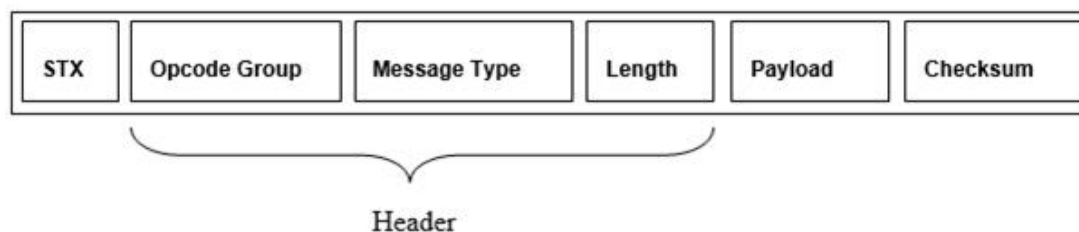
## 2.2.1 Interface description

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 figure below. 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**

| <b>Field Name</b> | <b>Length (bytes)</b> | <b>description</b>   |
|-------------------|-----------------------|--|
| STX               | 1                     | Used for synchronization over the serial interface.<br>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.   |

## 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 provides an XML representation of all these commands and events.

### 3.1 L2CAP CB Messages

#### 3.1.1 L2CAP.Confirm

##### Description

Status of the L2CAP request.

##### Parameters

Table 4 L2CAP.Confirm Parameters

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x41   |
| OpCode    | 1            | 0x80   |
| Length    | 1            | Length in bytes of the following parameters  |
| Status    | 2            | The status of the L2CAP request<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c |

|  |  |   |
|--|--|---|
|  |  | 0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A:<br>gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c<br>0x010D:<br>gHciConnectionRejectedDueToLimitedResources_c<br>0x010E:<br>gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F:<br>gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114:<br>gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115:<br>gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScoIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c |
|--|--|---|



|  |  |   |
|--|--|---|
|  |  | 0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c |
|--|--|---|

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|--|--|--|
|  |  | 0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c |
|--|--|--|

|  |  |   |
|--|--|---|
|  |  | 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
|--|--|---|

### 3.1.2 L2CAP-CancelConnection.Request

#### Description

Termination of an L2CAP channel.

#### Parameters

**Table 5 L2CAP-CancelConnection.Request Parameters**

| Parameter    | Size (bytes) | Comments   |
|--------------|--------------|--|
| OpGroup      | 1            | 0x41   |
| OpCode       | 1            | 0x0B   |
| Length       | 1            | Length in bytes of the following parameters  |
| LePsm        | 2            | Bluetooth SIG or Vendor LE_PSM   |
| Deviceld     | 1            | The Deviceld for which the command is intended   |
| RefuseReason | 2            | Refuse reason<br>Possible values:<br>0x0000: gSuccessful_c<br>0x0002: gLePsmNotSupported_c<br>0x0004: gNoResourcesAvailable_c<br>0x0005: gInsufficientAuthentication_c<br>0x0006: gInsufficientAuthorization_c<br>0x0007: gInsufficientEncryptionKeySize_c<br>0x0008: gInsufficientEncryption_c<br>0x0009: gInvalidSourceCid_c<br>0x000A: gSourceCidAlreadyAllocated_c<br>0x0100: gCommandRejected_c<br>0xFFFE: gResponseTimeout_c |

### 3.1.3 L2CAP-ConnectLePsm.Request

#### Description

L2CAP connect.

#### Parameters

**Table 6 L2CAP-ConnectLePsm.Request Parameters**

| Parameter      | Size (bytes) | Comments                                       |
|----------------|--------------|--|
| OpGroup        | 1            | 0x41   |
| OpCode         | 1            | 0x09   |
| Length         | 1            | Length in bytes of the following parameters    |
| LePsm          | 2            | Bluetooth SIG or Vendor LE_PSM                 |
| Deviceld       | 1            | The Deviceld for which the command is intended |
| InitialCredits | 2            | Initial credits                                |

### 3.1.4 L2CAP-DeregisterLePsm.Request

#### Description

Deregister LePsm.

#### Parameters

**Table 7 L2CAP-DeregisterLePsm.Request Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x41  |
| OpCode    | 1            | 0x08  |
| Length    | 1            | Length in bytes of the following parameters |
| LePsm     | 2            | Bluetooth SIG or Vendor LE_PSM              |

### 3.1.5 L2CAP-DisconnectLeCbChannel.Request

#### Description

L2CAP disconnect.

#### Parameters

**Table 8 L2CAP-DisconnectLeCbChannel.Request Parameters**

| Parameter  | Size (bytes) | Comments                                       |
|------------|--------------|--|
| OpGroup    | 1            | 0x41   |
| OpCode     | 1            | 0x0A   |
| Length     | 1            | Length in bytes of the following parameters    |
| Deviceld   | 1            | The Deviceld for which the command is intended |
| Channel Id | 2            | The L2CAP Channel Id assigned on the initiator |

### 3.1.6 L2CAP-LeCbData.Indication

#### Description

Data packet received through Credit-Based Channel.

#### Parameters

**Table 9 L2CAP-LeCbData.Indication Parameters**

| Parameter    | Size (bytes) | Comments  |
|--------------|--------------|---|
| OpGroup      | 1            | 0x41  |
| OpCode       | 1            | 0x88  |
| Length       | 1            | Length in bytes of the following parameters     |
| Deviceld     | 1            | The Deviceld 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 L2CAP-LePsmConnectionCompleteIndication

#### Description

Credit Based - Connection complete event.

#### Parameters

**Table 10 L2CAP-LePsmConnectionCompleteIndication Parameters**

| Parameter              | Size (bytes) | Comments  |
|------------------------|--------------|---|
| OpGroup                | 1            | 0x41  |
| OpCode                 | 1            | 0x84  |
| Length                 | 1            | Length in bytes of the following parameters   |
| InformationIncluded    | 1            | Information is included or not  |
| LeCbConnectionComplete | Variable     | Connection complete event data<br>Structure type parameter. See the detailed table below for parameter structure. |

**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<br>Possible values:<br>0x0000: gSuccessful_c<br>0x0002: gLePsmNotSupported_c<br>0x0004: gNoResourcesAvailable_c<br>0x0005: gInsufficientAuthentication_c<br>0x0006: gInsufficientAuthorization_c<br>0x0007: gInsufficientEncryptionKeySize_c<br>0x0008: gInsufficientEncryption_c<br>0x0009: gInvalidSourceCid_c<br>0x000A: gSourceCidAlreadyAllocated_c<br>0x0100: gCommandRejected_c<br>0xFFFE: gResponseTimeout_c |

### 3.1.8 L2CAP-LePsmConnectionRequest.Indication

#### Description

Credit Based - Connection request event.

#### Parameters

**Table 12 L2CAP-LePsmConnectionRequest.Indication Parameters**

| Parameter             | Size (bytes) | Comments   |
|-----------------------|--------------|--|
| OpGroup               | 1            | 0x41   |
| OpCode                | 1            | 0x83   |
| Length                | 1            | Length in bytes of the following parameters  |
| InformationIncluded   | 1            | Information is included or not   |
| LeCbConnectionRequest | Variable     | Connection request event data<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 13 LeCbConnectionRequest Parameter Structure**

| Structure Parameter | Size (bytes) | Comments                                       |
|---------------------|--------------|--|
| Deviceld            | 1            | The Deviceld 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 L2CAP-LePsmDisconnectNotification.Indication

#### Description

Credit Based - Disconnection notification event.

#### Parameters

**Table 14 L2CAP-LePsmDisconnectNotification.Indication Parameters**

| Parameter           | Size (bytes) | Comments  |
|---------------------|--------------|---|
| OpGroup             | 1            | 0x41  |
| OpCode              | 1            | 0x85  |
| Length              | 1            | Length in bytes of the following parameters   |
| InformationIncluded | 1            | Information is included or not  |
| LeCbDisconnection   | Variable     | Disconnection event data<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 15 LeCbDisconnection 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 |

### 3.1.10 L2CAP-LocalCreditsNotification.Indication

#### Description

Credit Based - Local credits notification event.

#### Parameters

**Table 16 L2CAP-LocalCreditsNotification.Indication Parameters**

| Parameter                    | Size (bytes) | Comments   |
|------------------------------|--------------|--|
| OpGroup                      | 1            | 0x41   |
| OpCode                       | 1            | 0x87   |
| Length                       | 1            | Length in bytes of the following parameters  |
| InformationIncluded          | 1            | Information is included or not   |
| LeCbLocalCreditsNotification | Variable     | Local credits notification event data<br>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 L2CAP-NoPeerCredits.Indication

#### Description

Credit Based - No peer credits event.

#### Parameters

**Table 18 L2CAP-NoPeerCredits.Indication Parameters**

| Parameter           | Size (bytes) | Comments  |
|---------------------|--------------|---|
| OpGroup             | 1            | 0x41  |
| OpCode              | 1            | 0x86  |
| Length              | 1            | Length in bytes of the following parameters   |
| InformationIncluded | 1            | Information is included or not  |
| LeCbNoPeerCredits   | Variable     | No peer credits event data<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 19 LeCbNoPeerCredits 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 |

### 3.1.12 L2CAP-RegisterLePsm.Request

#### Description

Register LePsm.

#### Parameters

**Table 20 L2CAP-RegisterLePsm.Request Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x41  |
| OpCode    | 1            | 0x07  |
| Length    | 1            | Length in bytes of the following parameters |
| LePsm     | 2            | Bluetooth SIG or Vendor LE_PSM              |
| LePsmMtu  | 2            | MTU value                                   |

### 3.1.13 L2CAP-SendLeCbData.Request

#### Description

Sends a data packet through a Credit Based Channel.

#### Parameters

**Table 21 L2CAP-SendLeCbData.Request Parameters**

| Parameter    | Size (bytes) | Comments                                       |
|--------------|--------------|--|
| OpGroup      | 1            | 0x41   |
| OpCode       | 1            | 0x0C   |
| 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 L2CAP-SendLeCredit.Request

#### Description

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

#### Parameters

**Table 22 L2CAP-SendLeCredit.Request Parameters**

| Parameter  | Size (bytes) | Comments                                       |
|------------|--------------|--|
| OpGroup    | 1            | 0x41   |
| OpCode     | 1            | 0x0D   |
| 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                  |

## 3.2 GATT Messages

### 3.2.1 GATT.Confirm

#### Description

Status of the GATT request.

#### Parameters

**Table 23 GATT.Confirm Parameters**

| Parameter | Size (bytes) | Comments  |
|-----------|--------------|---|
| OpGroup   | 1            | 0x44  |
| OpCode    | 1            | 0x80  |
| Length    | 1            | Length in bytes of the following parameters   |
| Status    | 2            | The status of the GATT request<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c<br>0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c |

|  |  |  |
|--|--|--|
|  |  | 0x010C: gHciCommandDisallowed_c<br>0x010D: gHciConnectionRejectedDueToLimitedResources_c<br>0x010E: gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScoIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c |
|--|--|--|

|  |  |   |
|--|--|---|
|  |  | 0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c |
|--|--|---|

|  |  |   |
|--|--|---|
|  |  | 0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c |
|--|--|---|



|  |  |   |
|--|--|---|
|  |  | 0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
|--|--|---|

### 3.2.2 GATTClient-DiscoverAllCharacteristicDescriptors.Request

#### Description

Initializes the Characteristic Descriptor Discovery procedure for a given Characteristic.

#### Parameters

**Table 24 GATTClient-DiscoverAllCharacteristicDescriptors.Request Parameters**

| Parameter          | Size (bytes) | Comments  |
|--------------------|--------------|---|
| OpGroup            | 1            | 0x44  |
| OpCode             | 1            | 0x0E  |
| Length             | 1            | Length in bytes of the following parameters   |
| Deviceld           | 1            | Device ID of the connected peer   |
| Characteristic     | Variable     | The characteristic within which descriptors should be searched<br><br>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 25 Characteristic Parameter Structure**

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

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

**Table 26 Value Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| Handle              | 2            | Attribute handle   |
| UuidType            | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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 27 Descriptors Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| Handle              | 2            | Attribute handle   |
| UuidType            | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>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 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 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  |

### 3.2.3 GATTClient-DiscoverAllCharacteristicsOfService.Request

#### Description

Initializes the Characteristic Discovery procedure for a given Service.

#### Parameters

**Table 30 GATTClient-DiscoverAllCharacteristicsOfService.Request Parameters**

| Parameter              | Size (bytes) | Comments   |
|------------------------|--------------|--|
| OpGroup                | 1            | 0x44   |
| OpCode                 | 1            | 0x0C   |
| Length                 | 1            | Length in bytes of the following parameters  |
| Deviceld               | 1            | Device ID of the connected peer  |
| Service                | Variable     | The service within which characteristics should be searched<br><br>Structure type parameter. See the detailed table below for parameter structure. |
| MaxNbOfCharacteristics | 1            | Maximum number of characteristics to be filled   |

**Table 31 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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br><br>"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<br><br>Structure type parameter. See the detailed table below for parameter structure.  |

|                      |          |  |
|----------------------|----------|--|
| NbOfIncludedServices | 1        | Size of the Included Services array  |
| IncludedServices     | Variable | Included Services array<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 32 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 33 Characteristics Parameter Structure**

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

**Table 34 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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                 | Variable     | UUID value<br>"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 35 Value Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| Handle              | 2            | Attribute handle   |
| UuidType            | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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 36 Descriptors Parameter Structure**

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| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| Handle              | 2            | Attribute handle   |
| UuidType            | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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 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 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  |



### 3.2.4 GATTClient-DiscoverAllPrimaryServices.Request

#### Description

Initializes the Primary Service Discovery procedure.

#### Parameters

**Table 40 GATTClient-DiscoverAllPrimaryServices.Request Parameters**

| Parameter       | Size (bytes) | Comments                                    |
|-----------------|--------------|---|
| OpGroup         | 1            | 0x44  |
| OpCode          | 1            | 0x09  |
| Length          | 1            | Length in bytes of the following parameters |
| Deviceld        | 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 41 GATTClient-DiscoverCharacteristicOfServiceByUuid.Request Parameters**

| Parameter              | Size (bytes) | Comments   |
|------------------------|--------------|--|
| OpGroup                | 1            | 0x44   |
| OpCode                 | 1            | 0x0D   |
| Length                 | 1            | Length in bytes of the following parameters  |
| DeviceId               | 1            | Device ID of the connected peer  |
| UuidType               | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                   | Variable     | UUID value<br>"Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| Service                | Variable     | The service within which characteristics should be searched<br>Structure type parameter. See the detailed table below for parameter structure.         |
| MaxNbOfCharacteristics | 1            | Maximum number of characteristics to be filled   |

**Table 42 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 43 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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                 | Variable | UUID value<br>"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<br>Structure type parameter. See the detailed table below for parameter structure.  |
| NbOfIncludedServices | 1        | Size of the Included Services array  |
| IncludedServices     | Variable | Included Services array<br>Structure type parameter. See the detailed table below for parameter structure.   |

**Table 44 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 45 Characteristics Parameter Structure**

| Structure Parameter | Size (bytes) | Comments  |
|---------------------|--------------|---|
| Properties          | 1            | Characteristic Properties as defined by GATT<br>Possible values:<br>0x00: gNone_c (No Properties selected)<br>0x01: gBroadcast_c (Characteristic can be broadcast)<br>0x02: gRead_c (Characteristic can be read)<br>0x04: gWriteWithoutRsp_c (Characteristic can be written without response) |

|                 |          |   |
|-----------------|----------|---|
|                 |          | 0x08: gWrite_c (Characteristic can be written with response)<br>0x10: gNotify_c (Characteristic can be notified)<br>0x20: gIndicate_c (Characteristic can be indicated)<br>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)<br>0x80: gExtendedProperties_c (Extended Characteristic properties) |
| Value           | Variable | Characteristic Value attribute<br>Structure type parameter. See the detailed table below for parameter structure.   |
| NbOfDescriptors | 1        | Size of the Characteristic Descriptors array  |
| Descriptors     | Variable | Characteristic Descriptors array<br>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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                 | Variable     | UUID value<br>"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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid           | Variable    | UUID value<br>"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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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            | 0x44   |
| OpCode          | 1            | 0x0A   |
| Length          | 1            | Length in bytes of the following parameters  |
| DeviceId        | 1            | Device ID of the connected peer  |
| UuidType        | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid            | Variable     | UUID value<br>"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            | 0x44  |
| OpCode    | 1            | 0x08  |
| Length    | 1            | Length in bytes of the following parameters |
| Deviceld  | 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            | 0x44  |
| OpCode                  | 1            | 0x0B  |
| Length                  | 1            | Length in bytes of the following parameters   |
| Deviceld                | 1            | Device ID of the connected peer   |
| Service                 | Variable     | The service within which inclusions should be searched<br>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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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<br>Structure type parameter. See the detailed table below for parameter structure.  |

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

**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)   |
| UuidType             | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                 | Variable     | UUID value<br>"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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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   |
| UuidType            | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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            | 0x44   |
| 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            | 0x44   |
| 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            | 0x44  |
| OpCode                    | 1            | 0x8F  |
| 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 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            | 0x44   |
| 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<br>Possible values:<br>0x00: gGattProcSuccess_c (The procedure was completed successfully)<br>0x01: gProcedureError_c (The procedure was terminated due to an error)   |
| Error           | 2            | If procedureResult is not gSuccess_c, this contains the error that terminated the procedure<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c |

|  |  |  |
|--|--|--|
|  |  | 0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c<br>0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A:<br>gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c<br>0x010D:<br>gHciConnectionRejectedDueToLimitedResources_c<br>0x010E:<br>gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F:<br>gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114:<br>gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115:<br>gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScoIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c |
|--|--|--|



|  |  |  |
|--|--|--|
|  |  | 0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c |
|--|--|--|

|  |  |  |
|--|--|--|
|  |  | 0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c |
|--|--|--|

|  |  |   |
|--|--|---|
|  |  | 0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
|--|--|---|

|                |          |  |
|----------------|----------|--|
| Characteristic | Variable | The characteristic within which descriptors were searched<br>Structure type parameter. See the detailed table below for parameter structure. |
|----------------|----------|--|

**Table 69 Characteristic Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| Properties          | 1            | Characteristic Properties as defined by GATT<br>Possible values:<br>0x00: gNone_c (No Properties selected)<br>0x01: gBroadcast_c (Characteristic can be broadcast)<br>0x02: gRead_c (Characteristic can be read)<br>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)<br>0x08: gWrite_c (Characteristic can be written with response)<br>0x10: gNotify_c (Characteristic can be notified)<br>0x20: gIndicate_c (Characteristic can be indicated)<br>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)<br>0x80: gExtendedProperties_c (Extended Characteristic properties) |
| Value               | Variable     | Characteristic Value attribute<br>Structure type parameter. See the detailed table below for parameter structure.  |
| NbOfDescriptors     | 1            | Size of the Characteristic Descriptors array   |
| Descriptors         | Variable     | Characteristic Descriptors array<br>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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits |

|                |             |  |
|----------------|-------------|--|
| Uuid           | Variable    | UUID value<br>"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   |
| UuidType            | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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**

| <b>UuidType</b> | <b>Structure Parameter</b> | <b>Size (bytes)</b> | <b>Comments</b> |
|-----------------|----------------------------|---------------------|-----------------|
| 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   |
|-----------------|--------------|--|
| OpGroup         | 1            | 0x44   |
| OpCode          | 1            | 0x86   |
| Length          | 1            | Length in bytes of the following parameters  |
| Deviceld        | 1            | Device ID identifying the active connection  |
| ProcedureResult | 1            | The result of the completed procedure<br>Possible values:<br>0x00: gGattProcSuccess_c (The procedure was completed successfully)<br>0x01: gProcedureError_c (The procedure was terminated due to an error)   |
| Error           | 2            | If procedureResult is not gSuccess_c, this contains the error that terminated the procedure<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c |

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|  |  | 0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A:<br>gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c<br>0x010D:<br>gHciConnectionRejectedDueToLimitedResources_c<br>0x010E:<br>gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F:<br>gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114:<br>gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115:<br>gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScoIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c |
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|  |  | 0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c |
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|  |  | 0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceld_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLIConnectionEncryptionInProgress_c<br>0x0418: gSmLIConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c |
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|         |          | 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
| Service | Variable | The service within which characteristics were searched  |

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|  |  | Structure type parameter. See the detailed table below for parameter structure. |
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**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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                 | Variable     | UUID value<br>"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<br>Structure type parameter. See the detailed table below for parameter structure.  |
| NbOfIncludedServices | 1            | Size of the Included Services array  |
| IncludedServices     | Variable     | Included Services array<br>Structure type parameter. See the detailed table below for parameter structure.   |

**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<br>Possible values:<br>0x00: gNone_c (No Properties selected) |

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|                 |          | 0x01: gBroadcast_c (Characteristic can be broadcast)<br>0x02: gRead_c (Characteristic can be read)<br>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)<br>0x08: gWrite_c (Characteristic can be written with response)<br>0x10: gNotify_c (Characteristic can be notified)<br>0x20: gIndicate_c (Characteristic can be indicated)<br>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)<br>0x80: gExtendedProperties_c (Extended Characteristic properties) |
| Value           | Variable | Characteristic Value attribute<br>Structure type parameter. See the detailed table below for parameter structure.  |
| NbOfDescriptors | 1        | Size of the Characteristic Descriptors array   |
| Descriptors     | Variable | Characteristic Descriptors array<br>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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                 | Variable     | UUID value<br>"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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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**

| <b>UuidType</b> | <b>Structure Parameter</b> | <b>Size (bytes)</b> | <b>Comments</b> |
|-----------------|----------------------------|---------------------|-----------------|
| 0x01            | Uuid16Bits                 | 2                   | UUID 16 bits    |
| 0x02            | Uuid128Bits                | 16                  | UUID 128 bits   |
| 0x03            | Uuid32Bits                 | 4                   | UUID 32 bits    |

**Table 82 Uuid Parameter Structure**

| <b>UuidType</b> | <b>Structure Parameter</b> | <b>Size (bytes)</b> | <b>Comments</b> |
|-----------------|----------------------------|---------------------|-----------------|
| 0x01            | Uuid16Bits                 | 2                   | UUID 16 bits    |
| 0x02            | Uuid128Bits                | 16                  | UUID 128 bits   |
| 0x03            | Uuid32Bits                 | 4                   | UUID 32 bits    |

**Table 83 Uuid Parameter Structure**

| <b>UuidType</b> | <b>Structure Parameter</b> | <b>Size (bytes)</b> | <b>Comments</b> |
|-----------------|----------------------------|---------------------|-----------------|
| 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            | 0x44  |
| OpCode          | 1            | 0x83  |
| Length          | 1            | Length in bytes of the following parameters   |
| Deviceld        | 1            | Device ID identifying the active connection   |
| ProcedureResult | 1            | The result of the completed procedure<br>Possible values:<br>0x00: gGattProcSuccess_c (The procedure was completed successfully)<br>0x01: gProcedureError_c (The procedure was terminated due to an error)  |
| Error           | 2            | If procedureResult is not gSuccess_c, this contains the error that terminated the procedure<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c |



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|  |  | 0x0105: gHciAuthenticationFailure_c<br>0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A:<br>gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c<br>0x010D:<br>gHciConnectionRejectedDueToLimitedResources_c<br>0x010E:<br>gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F:<br>gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114:<br>gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115:<br>gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScolIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c |
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|  |  | 0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c |
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|--|--|---|
|  |  | 0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c |
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|  |  | 0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
|--|--|---|

|                        |          |  |
|------------------------|----------|--|
| NbOfDiscoveredServices | 1        | Number of discovered services  |
| DiscoveredServices     | Variable | Discovered services<br>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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                 | Variable     | UUID value<br>"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<br>Structure type parameter. See the detailed table below for parameter structure.  |
| NbOfIncludedServices | 1            | Size of the Included Services array  |
| IncludedServices     | Variable     | Included Services array<br>Structure type parameter. See the detailed table below for parameter structure.   |

**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<br>Possible values:<br>0x00: gNone_c (No Properties selected)<br>0x01: gBroadcast_c (Characteristic can be broadcast)<br>0x02: gRead_c (Characteristic can be read)<br>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)<br>0x08: gWrite_c (Characteristic can be written with response)<br>0x10: gNotify_c (Characteristic can be notified)<br>0x20: gIndicate_c (Characteristic can be indicated)<br>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)<br>0x80: gExtendedProperties_c (Extended Characteristic properties) |
| Value           | Variable | Characteristic Value attribute<br>Structure type parameter. See the detailed table below for parameter structure.  |
| NbOfDescriptors | 1        | Size of the Characteristic Descriptors array   |
| Descriptors     | Variable | Characteristic Descriptors array<br>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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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            | 0x44   |
| 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<br>Possible values:<br>0x00: gGattProcSuccess_c (The procedure was completed successfully)<br>0x01: gProcedureError_c (The procedure was terminated due to an error)   |
| Error           | 2            | If procedureResult is not gSuccess_c, this contains the error that terminated the procedure<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c |

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|--|--|--|
|  |  | 0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c<br>0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A:<br>gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c<br>0x010D:<br>gHciConnectionRejectedDueToLimitedResources_c<br>0x010E:<br>gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F:<br>gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114:<br>gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115:<br>gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScoIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c |
|--|--|--|

|  |  |  |
|--|--|--|
|  |  | 0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c |
|--|--|--|

|  |  |  |
|--|--|--|
|  |  | 0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c |
|--|--|--|

|  |  |   |
|--|--|---|
|  |  | 0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
|--|--|---|

|                     |          |   |
|---------------------|----------|---|
|                     |          |   |
| NbOfCharacteristics | 1        | Number of discovered characteristics  |
| Characteristics     | Variable | Characteristics that were filled<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 95 Characteristics Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| Properties          | 1            | Characteristic Properties as defined by GATT<br>Possible values:<br>0x00: gNone_c (No Properties selected)<br>0x01: gBroadcast_c (Characteristic can be broadcast)<br>0x02: gRead_c (Characteristic can be read)<br>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)<br>0x08: gWrite_c (Characteristic can be written with response)<br>0x10: gNotify_c (Characteristic can be notified)<br>0x20: gIndicate_c (Characteristic can be indicated)<br>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)<br>0x80: gExtendedProperties_c (Extended Characteristic properties) |
| Value               | Variable     | Characteristic Value attribute<br>Structure type parameter. See the detailed table below for parameter structure.  |
| NbOfDescriptors     | 1            | Size of the Characteristic Descriptors array   |
| Descriptors         | Variable     | Characteristic Descriptors array<br>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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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   |
| UuidType            | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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**

| <b>UuidType</b> | <b>Structure Parameter</b> | <b>Size (bytes)</b> | <b>Comments</b> |
|-----------------|----------------------------|---------------------|-----------------|
| 0x01            | Uuid16Bits                 | 2                   | UUID 16 bits    |
| 0x02            | Uuid128Bits                | 16                  | UUID 128 bits   |
| 0x03            | Uuid32Bits                 | 4                   | UUID 32 bits    |

**Table 99 Uuid Parameter Structure**

| <b>UuidType</b> | <b>Structure Parameter</b> | <b>Size (bytes)</b> | <b>Comments</b> |
|-----------------|----------------------------|---------------------|-----------------|
| 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  |
|-----------------|--------------|---|
| OpGroup         | 1            | 0x44  |
| OpCode          | 1            | 0x84  |
| Length          | 1            | Length in bytes of the following parameters   |
| Deviceld        | 1            | Device ID identifying the active connection   |
| ProcedureResult | 1            | The result of the completed procedure<br>Possible values:<br>0x00: gGattProcSuccess_c (The procedure was completed successfully)<br>0x01: gProcedureError_c (The procedure was terminated due to an error)  |
| Error           | 2            | If procedureResult is not gSuccess_c, this contains the error that terminated the procedure<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c |

|  |  |  |
|--|--|--|
|  |  | 0x0105: gHciAuthenticationFailure_c<br>0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A:<br>gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c<br>0x010D:<br>gHciConnectionRejectedDueToLimitedResources_c<br>0x010E:<br>gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F:<br>gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114:<br>gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115:<br>gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScolIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c |
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|  |  | 0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c |
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|  |  | 0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c |
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|  |  | 0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
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| NbOfDiscoveredServices | 1        | Number of discovered services  |
| DiscoveredServices     | Variable | Discovered services<br>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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                 | Variable     | UUID value<br>"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<br>Structure type parameter. See the detailed table below for parameter structure.  |
| NbOfIncludedServices | 1            | Size of the Included Services array  |
| IncludedServices     | Variable     | Included Services array<br>Structure type parameter. See the detailed table below for parameter structure.   |

**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<br>Possible values:<br>0x00: gNone_c (No Properties selected)<br>0x01: gBroadcast_c (Characteristic can be broadcast)<br>0x02: gRead_c (Characteristic can be read)<br>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)<br>0x08: gWrite_c (Characteristic can be written with response)<br>0x10: gNotify_c (Characteristic can be notified)<br>0x20: gIndicate_c (Characteristic can be indicated)<br>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)<br>0x80: gExtendedProperties_c (Extended Characteristic properties) |
| Value           | Variable | Characteristic Value attribute<br>Structure type parameter. See the detailed table below for parameter structure.  |
| NbOfDescriptors | 1        | Size of the Characteristic Descriptors array   |
| Descriptors     | Variable | Characteristic Descriptors array<br>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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits                     |
| Uuid                | Variable     | UUID value   |

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



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| 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 procedure ended.

#### Parameters

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

| Parameter       | Size (bytes) | Comments   |
|-----------------|--------------|--|
| OpGroup         | 1            | 0x44   |
| OpCode          | 1            | 0x82   |
| 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<br>Possible values:<br>0x00: gGattProcSuccess_c (The procedure was completed successfully)<br>0x01: gProcedureError_c (The procedure was terminated due to an error)   |
| Error           | 2            | If procedureResult is not gSuccess_c, this contains the error that terminated the procedure<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c |

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|  |  | 0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A:<br>gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c<br>0x010D:<br>gHciConnectionRejectedDueToLimitedResources_c<br>0x010E:<br>gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F:<br>gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114:<br>gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115:<br>gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScoIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c |
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|  |  | 0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c |
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|  |  | 0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c |
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|  |  | 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
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### 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            | 0x44   |
| OpCode          | 1            | 0x85   |
| 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<br>Possible values:<br>0x00: gGattProcSuccess_c (The procedure was completed successfully)<br>0x01: gProcedureError_c (The procedure was terminated due to an error)   |
| Error           | 2            | If procedureResult is not gSuccess_c, this contains the error that terminated the procedure<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c |

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|  |  | 0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A:<br>gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c<br>0x010D:<br>gHciConnectionRejectedDueToLimitedResources_c<br>0x010E:<br>gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F:<br>gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114:<br>gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115:<br>gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScoIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c |
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|  |  | 0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c |
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|  |  | 0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c |
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|---------|----------|---|
|         |          | 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
| Service | Variable | The service within which inclusions were searched   |

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|--|--|---|
|  |  | 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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                 | Variable     | UUID value<br>"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<br>Structure type parameter. See the detailed table below for parameter structure.  |
| NbOfIncludedServices | 1            | Size of the Included Services array  |
| IncludedServices     | Variable     | Included Services array<br>Structure type parameter. See the detailed table below for parameter structure.   |

**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<br>Possible values:<br>0x00: gNone_c (No Properties selected) |

|                 |          |  |
|-----------------|----------|--|
|                 |          | 0x01: gBroadcast_c (Characteristic can be broadcast)<br>0x02: gRead_c (Characteristic can be read)<br>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)<br>0x08: gWrite_c (Characteristic can be written with response)<br>0x10: gNotify_c (Characteristic can be notified)<br>0x20: gIndicate_c (Characteristic can be indicated)<br>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)<br>0x80: gExtendedProperties_c (Extended Characteristic properties) |
| Value           | Variable | Characteristic Value attribute<br>Structure type parameter. See the detailed table below for parameter structure.  |
| NbOfDescriptors | 1        | Size of the Characteristic Descriptors array   |
| Descriptors     | Variable | Characteristic Descriptors array<br>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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                 | Variable     | UUID value<br>"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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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            | 0x44   |
| 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<br>Possible values:<br>0x00: gGattProcSuccess_c (The procedure was completed successfully)<br>0x01: gProcedureError_c (The procedure was terminated due to an error)   |
| Error           | 2            | If procedureResult is not gSuccess_c, this contains the error that terminated the procedure<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c |



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|  |  | 0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c<br>0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A:<br>gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c<br>0x010D:<br>gHciConnectionRejectedDueToLimitedResources_c<br>0x010E:<br>gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F:<br>gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114:<br>gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115:<br>gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScoIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c |
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|  |  | 0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c |
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|--|--|--|
|  |  | 0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c |
|--|--|--|

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|--|--|---|
|  |  | 0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
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|------------|----------|---|
|            |          |   |
| Descriptor | Variable | The characteristic descriptor whose value was read<br>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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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            | 0x44   |
| OpCode          | 1            | 0x89   |
| 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<br>Possible values:<br>0x00: gGattProcSuccess_c (The procedure was completed successfully)<br>0x01: gProcedureError_c (The procedure was terminated due to an error)   |
| Error           | 2            | If procedureResult is not gSuccess_c, this contains the error that terminated the procedure<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c |

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|  |  | 0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A:<br>gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c<br>0x010D:<br>gHciConnectionRejectedDueToLimitedResources_c<br>0x010E:<br>gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F:<br>gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114:<br>gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115:<br>gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScoIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c |
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|  |  | 0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c |
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|  |  | 0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c |
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|                |          | 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
| Characteristic | Variable | The characteristic whose value was read   |

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|  |  | 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<br>Possible values:<br>0x00: gNone_c (No Properties selected)<br>0x01: gBroadcast_c (Characteristic can be broadcast)<br>0x02: gRead_c (Characteristic can be read)<br>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)<br>0x08: gWrite_c (Characteristic can be written with response)<br>0x10: gNotify_c (Characteristic can be notified)<br>0x20: gIndicate_c (Characteristic can be indicated)<br>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)<br>0x80: gExtendedProperties_c (Extended Characteristic properties) |
| Value               | Variable     | Characteristic Value attribute<br>Structure type parameter. See the detailed table below for parameter structure.  |
| NbOfDescriptors     | 1            | Size of the Characteristic Descriptors array   |
| Descriptors         | Variable     | Characteristic Descriptors array<br>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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>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   |
| UuidType            | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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**

| <b>UuidType</b> | <b>Structure Parameter</b> | <b>Size (bytes)</b> | <b>Comments</b> |
|-----------------|----------------------------|---------------------|-----------------|
| 0x01            | Uuid16Bits                 | 2                   | UUID 16 bits    |
| 0x02            | Uuid128Bits                | 16                  | UUID 128 bits   |
| 0x03            | Uuid32Bits                 | 4                   | UUID 32 bits    |

**Table 129 Uuid Parameter Structure**

| <b>UuidType</b> | <b>Structure Parameter</b> | <b>Size (bytes)</b> | <b>Comments</b> |
|-----------------|----------------------------|---------------------|-----------------|
| 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  |
|-----------------|--------------|---|
| OpGroup         | 1            | 0x44  |
| OpCode          | 1            | 0x8B  |
| Length          | 1            | Length in bytes of the following parameters   |
| Deviceld        | 1            | Device ID identifying the active connection   |
| ProcedureResult | 1            | The result of the completed procedure<br>Possible values:<br>0x00: gGattProcSuccess_c (The procedure was completed successfully)<br>0x01: gProcedureError_c (The procedure was terminated due to an error)  |
| Error           | 2            | If procedureResult is not gSuccess_c, this contains the error that terminated the procedure<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c |

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|  |  | 0x0105: gHciAuthenticationFailure_c<br>0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A:<br>gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c<br>0x010D:<br>gHciConnectionRejectedDueToLimitedResources_c<br>0x010E:<br>gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F:<br>gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114:<br>gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115:<br>gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScolIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c |
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|--|--|---|
|  |  | 0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c |
|--|--|---|



|  |  |   |
|--|--|---|
|  |  | 0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c |
|--|--|---|

|  |  |   |
|--|--|---|
|  |  | 0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
|--|--|---|

|                     |          |   |
|---------------------|----------|---|
| NbOfCharacteristics | 1        | Number of characteristics whose values were read  |
| Characteristics     | Variable | Characteristics whose values were read<br>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<br>Possible values:<br>0x00: gNone_c (No Properties selected)<br>0x01: gBroadcast_c (Characteristic can be broadcast)<br>0x02: gRead_c (Characteristic can be read)<br>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)<br>0x08: gWrite_c (Characteristic can be written with response)<br>0x10: gNotify_c (Characteristic can be notified)<br>0x20: gIndicate_c (Characteristic can be indicated)<br>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)<br>0x80: gExtendedProperties_c (Extended Characteristic properties) |
| Value               | Variable     | Characteristic Value attribute<br>Structure type parameter. See the detailed table below for parameter structure.  |
| NbOfDescriptors     | 1            | Size of the Characteristic Descriptors array   |
| Descriptors         | Variable     | Characteristic Descriptors array<br>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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits |

|                |             |  |
|----------------|-------------|--|
|                |             | 0x03: Uuid32Bits   |
| Uuid           | Variable    | UUID value<br>"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   |
| UuidType            | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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**

| <b>UuidType</b> | <b>Structure Parameter</b> | <b>Size (bytes)</b> | <b>Comments</b> |
|-----------------|----------------------------|---------------------|-----------------|
| 0x01            | Uuid16Bits                 | 2                   | UUID 16 bits    |
| 0x02            | Uuid128Bits                | 16                  | UUID 128 bits   |
| 0x03            | Uuid32Bits                 | 4                   | UUID 32 bits    |

**Table 135 Uuid Parameter Structure**

| <b>UuidType</b> | <b>Structure Parameter</b> | <b>Size (bytes)</b> | <b>Comments</b> |
|-----------------|----------------------------|---------------------|-----------------|
| 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   |
|-----------------|--------------|--|
| OpGroup         | 1            | 0x44   |
| OpCode          | 1            | 0x8A   |
| 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<br>Possible values:<br>0x00: gGattProcSuccess_c (The procedure was completed successfully)<br>0x01: gProcedureError_c (The procedure was terminated due to an error)   |
| Error           | 2            | If procedureResult is not gSuccess_c, this contains the error that terminated the procedure<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c |

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|  |  | 0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A:<br>gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c<br>0x010D:<br>gHciConnectionRejectedDueToLimitedResources_c<br>0x010E:<br>gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F:<br>gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114:<br>gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115:<br>gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScoIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c |
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|  |  | 0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c |
|--|--|---|



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|--|--|--|
|  |  | 0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLIConnectionEncryptionInProgress_c<br>0x0418: gSmLIConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c |
|--|--|--|

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|---------------|---|---|
|               |   | 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>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            | 0x44   |
| 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<br>Possible values:<br>0x00: gGattProcSuccess_c (The procedure was completed successfully)<br>0x01: gProcedureError_c (The procedure was terminated due to an error)   |
| Error           | 2            | If procedureResult is not gSuccess_c, this contains the error that terminated the procedure<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c |

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|  |  | 0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c<br>0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A:<br>gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c<br>0x010D:<br>gHciConnectionRejectedDueToLimitedResources_c<br>0x010E:<br>gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F:<br>gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114:<br>gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115:<br>gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScoIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c |
|--|--|---|

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|--|--|---|
|  |  | 0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c |
|--|--|---|

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|--|--|---|
|  |  | 0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c |
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|--|---|
|  | 0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c |
|--|---|

|  |  |   |
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|  |  | 0x0904: gGattDbServiceNotFound_c<br>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            | 0x44   |
| OpCode          | 1            | 0x8C   |
| 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<br>Possible values:<br>0x00: gGattProcSuccess_c (The procedure was completed successfully)<br>0x01: gProcedureError_c (The procedure was terminated due to an error)   |
| Error           | 2            | If procedureResult is not gSuccess_c, this contains the error that terminated the procedure<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c |



|  |  |   |
|--|--|---|
|  |  | 0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c<br>0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A:<br>gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c<br>0x010D:<br>gHciConnectionRejectedDueToLimitedResources_c<br>0x010E:<br>gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F:<br>gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114:<br>gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115:<br>gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScoIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c |
|--|--|---|

|  |  |   |
|--|--|---|
|  |  | 0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c |
|--|--|---|

|  |  |   |
|--|--|---|
|  |  | 0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c |
|--|--|---|

|  |   |
|--|---|
|  | 0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c |
|--|---|

|  |  |   |
|--|--|---|
|  |  | 0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
|--|--|---|

### 3.2.25 GATTClient-ReadCharacteristicDescriptor.Request

#### Description

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

#### Parameters

**Table 139 GATTClient-ReadCharacteristicDescriptor.Request Parameters**

| Parameter    | Size (bytes) | Comments  |
|--------------|--------------|---|
| OpGroup      | 1            | 0x44  |
| 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<br>Structure type parameter. See the detailed table below for parameter structure. |
| MaxReadBytes | 2            | Maximum number of bytes to be read  |

**Table 140 Descriptor Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| Handle              | 2            | Attribute handle   |
| UuidType            | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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 141 Uuid Parameter Structure**

| <b>UuidType</b> | <b>Structure Parameter</b> | <b>Size (bytes)</b> | <b>Comments</b> |
|-----------------|----------------------------|---------------------|-----------------|
| 0x01            | Uuid16Bits                 | 2                   | UUID 16 bits    |
| 0x02            | Uuid128Bits                | 16                  | UUID 128 bits   |
| 0x03            | Uuid32Bits                 | 4                   | UUID 32 bits    |

### 3.2.26 GATTClient-ReadCharacteristicValue.Request

#### Description

Initializes the Characteristic Read procedure for a given Characteristic.

#### Parameters

**Table 142 GATTClient-ReadCharacteristicValue.Request Parameters**

| Parameter      | Size (bytes) | Comments   |
|----------------|--------------|--|
| OpGroup        | 1            | 0x44   |
| OpCode         | 1            | 0x0F   |
| Length         | 1            | Length in bytes of the following parameters  |
| Deviceld       | 1            | Device ID of the connected peer  |
| Characteristic | Variable     | The characteristic whose value must be read<br>Structure type parameter. See the detailed table below for parameter structure. |
| MaxReadBytes   | 2            | Maximum number of bytes to be read   |

**Table 143 Characteristic Parameter Structure**

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



|                 |          |   |
|-----------------|----------|---|
| NbOfDescriptors | 1        | Size of the Characteristic Descriptors array  |
| Descriptors     | Variable | Characteristic Descriptors array<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 144 Value Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| Handle              | 2            | Attribute handle   |
| UuidType            | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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 145 Descriptors Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| Handle              | 2            | Attribute handle   |
| UuidType            | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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 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 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  |

### 3.2.27 GATTClient-ReadMultipleCharacteristicValues.Request

#### Description

Initializes the Characteristic Read Multiple procedure.

#### Parameters

**Table 148 GATTClient-ReadMultipleCharacteristicValues.Request Parameters**

| Parameter           | Size (bytes) | Comments  |
|---------------------|--------------|---|
| OpGroup             | 1            | 0x44  |
| 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<br><br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 149 Characteristics Parameter Structure**

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

**Table 150 Value Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| Handle              | 2            | Attribute handle   |
| UuidType            | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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 151 Descriptors Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| Handle              | 2            | Attribute handle   |
| UuidType            | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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 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 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  |

### 3.2.28 GATTClient-ReadUsingCharacteristicUuid.Request

#### Description

Initializes the Characteristic Read by UUID procedure.

#### Parameters

**Table 154 GATTClient-ReadUsingCharacteristicUuid.Request Parameters**

| Parameter           | Size (bytes) | Comments   |
|---------------------|--------------|--|
| OpGroup             | 1            | 0x44   |
| OpCode              | 1            | 0x10   |
| Length              | 1            | Length in bytes of the following parameters  |
| DeviceId            | 1            | Device ID of the connected peer  |
| UuidType            | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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   |
| HandleRange         | Variable     | Handle range for the search<br>Structure type parameter. See the detailed table below for parameter structure.   |
| MaxReadBytes        | 2            | Maximum number of bytes to be read   |

**Table 155 Uuid Parameter Structure**

| <b>UuidType</b> | <b>Structure Parameter</b> | <b>Size (bytes)</b> | <b>Comments</b> |
|-----------------|----------------------------|---------------------|-----------------|
| 0x01            | Uuid16Bits                 | 2                   | UUID 16 bits    |
| 0x02            | Uuid128Bits                | 16                  | UUID 128 bits   |
| 0x03            | Uuid32Bits                 | 4                   | UUID 32 bits    |

**Table 156 HandleRange Parameter Structure**

| <b>Structure Parameter</b> | <b>Size (bytes)</b> | <b>Comments</b> |
|----------------------------|---------------------|-----------------|
| StartHandle                | 2                   | Start handle    |
| EndHandle                  | 2                   | End handle      |

### 3.2.29 GATTClient-RegisterIndicationCallback.Request

#### Description

Installs the application callback for Server Indications.

#### Parameters

**Table 157 GATTClient-RegisterIndicationCallback.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x44   |
| OpCode    | 1            | 0x07   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.2.30 GATTClient-RegisterNotificationCallback.Request

#### Description

Installs the application callback for Server Notifications.

#### Parameters

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

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x44   |
| OpCode    | 1            | 0x06   |
| Length    | 1            | 0x00 - This message does not have any parameters |



### 3.2.31 GATTClient-RegisterProcedureCallback.Request

#### Description

Installs the application callback for the GATT Client module Procedures.

#### Parameters

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

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x44   |
| OpCode    | 1            | 0x05   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.2.32 GATTClient-ResetProcedure.Request

#### Description

Resets any ongoing GATT Client procedure.

#### Parameters

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

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x44   |
| OpCode    | 1            | 0x04   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.2.33 GATTClient-WriteCharacteristicDescriptor.Request

#### Description

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

#### Parameters

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

| Parameter   | Size (bytes) | Comments   |
|-------------|--------------|--|
| OpGroup     | 1            | 0x44   |
| OpCode      | 1            | 0x14   |
| 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<br><br>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 162 Descriptor Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| Handle              | 2            | Attribute handle   |
| UuidType            | 1            | UUID type<br><br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br><br>"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 163 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  |

### 3.2.34 GATTClient-WriteCharacteristicValue.Request

#### Description

Initializes the Characteristic Write procedure for a given Characteristic.

#### Parameters

**Table 164 GATTClient-WriteCharacteristicValue.Request Parameters**

| Parameter              | Size (bytes) | Comments  |
|------------------------|--------------|---|
| OpGroup                | 1            | 0x44  |
| 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<br>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 165 Characteristic Parameter Structure**

| Structure Parameter | Size (bytes) | Comments  |
|---------------------|--------------|---|
| Properties          | 1            | Characteristic Properties as defined by GATT<br>Possible values:<br>0x00: gNone_c (No Properties selected)<br>0x01: gBroadcast_c (Characteristic can be broadcast)<br>0x02: gRead_c (Characteristic can be read)<br>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)<br>0x08: gWrite_c (Characteristic can be written with response)<br>0x10: gNotify_c (Characteristic can be notified) |

|                 |          |   |
|-----------------|----------|---|
|                 |          | 0x20: gIndicate_c (Characteristic can be indicated)<br>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)<br>0x80: gExtendedProperties_c (Extended Characteristic properties) |
| Value           | Variable | Characteristic Value attribute<br>Structure type parameter. See the detailed table below for parameter structure.   |
| NbOfDescriptors | 1        | Size of the Characteristic Descriptors array  |
| Descriptors     | Variable | Characteristic Descriptors array<br>Structure type parameter. See the detailed table below for parameter structure.   |

**Table 166 Value Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| Handle              | 2            | Attribute handle   |
| UuidType            | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                | Variable     | UUID value<br>"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 167 Descriptors Parameter Structure**

| Structure Parameter | Size (bytes) | Comments                      |
|---------------------|--------------|-------------------------------|
| Handle              | 2            | Attribute handle              |
| UuidType            | 1            | UUID type<br>Possible values: |

|                |             |  |
|----------------|-------------|--|
|                |             | 0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits  |
| Uuid           | Variable    | UUID value<br><br>"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 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 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  |

### 3.2.35 GATT-GetMtu.Request

#### Description

Retrieves the MTU used with a given connected device.

#### Parameters

**Table 170 GATT-GetMtu.Request Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x44  |
| OpCode    | 1            | 0x02  |
| Length    | 1            | Length in bytes of the following parameters |
| Deviceld  | 1            | Device ID of the connected peer             |

### 3.2.36 GATT-GetMtu.Indication

#### Description

Specifies the MTU used with a given connected device.

#### Parameters

**Table 171 GATT-GetMtu.Indication Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x44  |
| OpCode    | 1            | 0x81  |
| Length    | 1            | Length in bytes of the following parameters |
| Mtu       | 2            | MTU value                                   |

### 3.2.37 GATT-Init.Request

#### Description

Initializes the GATT module.

#### Parameters

Table 172 GATT-Init.Request Parameters

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x44   |
| OpCode    | 1            | 0x01   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.2.38 GATTServer-AttributeRead.Indication

#### Description

GATT Server attribute read.

#### Parameters

Table 173 GATTServer-AttributeRead.Indication Parameters

| Parameter          | Size (bytes) | Comments  |
|--------------------|--------------|---|
| OpGroup            | 1            | 0x44  |
| OpCode             | 1            | 0x98  |
| Length             | 1            | Length in bytes of the following parameters   |
| Deviceld           | 1            | Device ID identifying the active connection   |
| AttributeReadEvent | Variable     | Attribute read event<br>Structure type parameter. See the detailed table below for parameter structure. |

Table 174 AttributeReadEvent Parameter Structure

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



### 3.2.39 GATTServer-AttributeWritten.Indication

#### Description

GATT Server attribute written.

#### Parameters

**Table 175 GATTServer-AttributeWritten.Indication Parameters**

| Parameter             | Size (bytes) | Comments   |
|-----------------------|--------------|--|
| OpGroup               | 1            | 0x44   |
| 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<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 176 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 |

### 3.2.40 GATTServer-AttributeWrittenWithoutResponse.Indication

#### Description

GATT Server attribute written without response.

#### Parameters

**Table 177 GATTServer-AttributeWrittenWithoutResponse.Indication Parameters**

| Parameter             | Size (bytes) | Comments   |
|-----------------------|--------------|--|
| OpGroup               | 1            | 0x44   |
| 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<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 178 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-CharacteristicCccdWritten.Indication

#### Description

GATT Server characteristic cccd written.

#### Parameters

**Table 179 GATTServer-CharacteristicCccdWritten.Indication Parameters**

| Parameter            | Size (bytes) | Comments   |
|----------------------|--------------|--|
| OpGroup              | 1            | 0x44   |
| 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<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 180 CharCccdWrittenEvent Parameter Structure**

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

### 3.2.42 GATTServer-Error.Indication

#### Description

GATT Server error.

#### Parameters

Table 181 GATTServer-Error.Indication Parameters

| Parameter      | Size (bytes) | Comments   |
|----------------|--------------|--|
| OpGroup        | 1            | 0x44   |
| OpCode         | 1            | 0x96   |
| Length         | 1            | Length in bytes of the following parameters  |
| Deviceld       | 1            | Device ID identifying the active connection  |
| ProcedureError | Variable     | Procedure error<br>Structure type parameter. See the detailed table below for parameter structure. |

Table 182 ProcedureError Parameter Structure

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| ProcedureType       | 1            | Procedure that generated error<br>Possible values:<br>0x00: gSendAttributeWrittenStatus_c (Procedure initiated by GattServer_SendAttributeWrittenStatus)<br>0x01: gSendAttributeReadStatus_c (Procedure initiated by GattServer_SendAttributeReadStatus)<br>0x02: gSendNotification_c (Procedure initiated by GattServer_SendNotification)<br>0x03: gSendIndication_c (Procedure initiated by GattServer_SendIndication) |
| Error               | 2            | Error generated<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c  |

|  |  |   |
|--|--|---|
|  |  | 0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c<br>0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A:<br>gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c<br>0x010D:<br>gHciConnectionRejectedDueToLimitedResources_c<br>0x010E:<br>gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F:<br>gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114:<br>gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115:<br>gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScoIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c |
|--|--|---|

|  |  |  |
|--|--|--|
|  |  | 0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c |
|--|--|--|

|  |  |   |
|--|--|---|
|  |  | 0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c |
|--|--|---|

|  |  |   |
|--|--|---|
|  |  | 0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c |
|--|--|---|



|  |  |   |
|--|--|---|
|  |  | 0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
|--|--|---|

### 3.2.43 GATTServer-HandleValueConfirmation.Indication

#### Description

GATT Server handle value confirmation.

#### Parameters

**Table 183 GATTServer-HandleValueConfirmation.Indication Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x44  |
| OpCode    | 1            | 0x92  |
| Length    | 1            | Length in bytes of the following parameters |
| Deviceld  | 1            | Device ID identifying the active connection |

### 3.2.44 GATTServer-Init.Request

#### Description

Initializes the GATT Server module.

#### Parameters

**Table 184 GATTServer-Init.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x44   |
| OpCode    | 1            | 0x15   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.2.45 GATTServer-LongCharacteristicWritten.Indication

#### Description

GATT Server long characteristic written.

#### Parameters

**Table 185 GATTServer-LongCharacteristicWritten.Indication Parameters**

| Parameter                      | Size (bytes) | Comments   |
|--------------------------------|--------------|--|
| OpGroup                        | 1            | 0x44   |
| OpCode                         | 1            | 0x97   |
| Length                         | 1            | Length in bytes of the following parameters  |
| Deviceld                       | 1            | Device ID identifying the active connection  |
| LongCharacteristicWrittenEvent | Variable     | Long characteristic written event<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 186 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         |

### 3.2.46 GATTServer-MtuChanged.Indication

#### Description

GATT Server MTU changed indication.

#### Parameters

**Table 187 GATTServer-MtuChanged.Indication Parameters**

| Parameter       | Size (bytes) | Comments   |
|-----------------|--------------|--|
| OpGroup         | 1            | 0x44   |
| OpCode          | 1            | 0x91   |
| Length          | 1            | Length in bytes of the following parameters  |
| Deviceld        | 1            | Device ID identifying the active connection  |
| MtuChangedEvent | Variable     | Mtu changed event<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 188 MtuChangedEvent Parameter Structure**

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

### 3.2.47 GATTServer-RegisterCallback.Request

#### Description

Installs an application callback for the GATT Server module.

#### Parameters

**Table 189 GATTServer-RegisterCallback.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x44   |
| OpCode    | 1            | 0x16   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.2.48 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 190 GATTServer-RegisterHandlesForReadNotifications.Request Parameters**

| Parameter        | Size (bytes) | Comments   |
|------------------|--------------|--|
| OpGroup          | 1            | 0x44   |
| 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<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 191 AttributeHandles Parameter Structure**

| Structure Parameter | Size (bytes) | Comments         |
|---------------------|--------------|------------------|
| Handle              | 2            | Attribute handle |

### 3.2.49 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 192 GATTServer-RegisterHandlesForWriteNotifications.Request Parameters**

| Parameter        | Size (bytes) | Comments   |
|------------------|--------------|--|
| OpGroup          | 1            | 0x44   |
| 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<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 193 AttributeHandles Parameter Structure**

| Structure Parameter | Size (bytes) | Comments         |
|---------------------|--------------|------------------|
| Handle              | 2            | Attribute handle |

### 3.2.50 GATTServer-SendAttributeReadStatus.Request

#### Description

Responds to an intercepted attribute read operation.

#### Parameters

**Table 194 GATTServer-SendAttributeReadStatus.Request Parameters**

| Parameter       | Size (bytes) | Comments                                    |
|-----------------|--------------|---|
| OpGroup         | 1            | 0x44  |
| OpCode          | 1            | 0x1E  |
| Length          | 1            | Length in bytes of the following parameters |
| Deviceld        | 1            | The device ID of the connected peer         |
| AttributeHandle | 2            | The attribute handle that was read          |
| Status          | 1            | The status of the read operation            |

### 3.2.51 GATTServer-SendAttributeWrittenStatus.Request

#### Description

Responds to a Control Point write operation.

#### Parameters

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

| Parameter       | Size (bytes) | Comments                                    |
|-----------------|--------------|---|
| OpGroup         | 1            | 0x44  |
| OpCode          | 1            | 0x18  |
| Length          | 1            | Length in bytes of the following parameters |
| Deviceld        | 1            | The device ID of the connected peer         |
| AttributeHandle | 2            | The attribute handle that was written       |
| Status          | 1            | The status of the write operation           |

### 3.2.52 GATTServer-SendIndication.Request

#### Description

Sends an indication to a peer GATT Client.

#### Parameters

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

| Parameter | Size (bytes) | Comments  |
|-----------|--------------|---|
| OpGroup   | 1            | 0x44  |
| OpCode    | 1            | 0x1A  |
| Length    | 1            | Length in bytes of the following parameters               |
| Deviceld  | 1            | The device ID of the connected peer                       |
| Handle    | 2            | Handle of the Value of the Characteristic to be indicated |

### 3.2.53 GATTServer-SendInstantValueIndication.Request

#### Description

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

#### Parameters

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

| Parameter   | Size (bytes) | Comments  |
|-------------|--------------|---|
| OpGroup     | 1            | 0x44  |
| OpCode      | 1            | 0x1C  |
| Length      | 1            | Length in bytes of the following parameters               |
| Deviceld    | 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                                      |

### 3.2.54 GATTServer-SendInstantValueNotification.Request

#### Description

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

#### Parameters

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

| Parameter   | Size (bytes) | Comments   |
|-------------|--------------|--|
| OpGroup     | 1            | 0x44   |
| OpCode      | 1            | 0x1B   |
| Length      | 1            | Length in bytes of the following parameters              |
| Deviceld    | 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                                      |



### 3.2.55 GATTServer-SendNotification.Request

#### Description

Sends a notification to a peer GATT Client.

#### Parameters

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

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x44   |
| 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 200 GATTDB.Confirm Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x45   |
| OpCode    | 1            | 0x80   |
| Length    | 1            | Length in bytes of the following parameters  |
| Status    | 2            | The status of the GATT Database request<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c<br>0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c |

|  |  |  |
|--|--|--|
|  |  | 0x010C: gHciCommandDisallowed_c<br>0x010D: gHciConnectionRejectedDueToLimitedResources_c<br>0x010E: gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScoIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c |
|--|--|--|

|  |  |   |
|--|--|---|
|  |  | 0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c |
|--|--|---|

|  |  |   |
|--|--|---|
|  |  | 0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c |
|--|--|---|

|  |  |   |
|--|--|---|
|  |  | 0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
|--|--|---|

### 3.3.2 GATTDBDynamic-AddCccd.Request

#### Description

Adds a CCCD in the database.

#### Parameters

Table 201 GATTDBDynamic-AddCccd.Request Parameters

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x45   |
| 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 202 GATTDBDynamic-AddCccd.Indication Parameters

| Parameter  | Size (bytes) | Comments                                    |
|------------|--------------|---|
| OpGroup    | 1            | 0x45  |
| 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 203 GATTDBDynamic-AddCharacteristicDeclarationAndValue.Request Parameters**

| Parameter                | Size (bytes) | Comments  |
|--------------------------|--------------|---|
| OpGroup                  | 1            | 0x45  |
| OpCode                   | 1            | 0x0D  |
| Length                   | 1            | Length in bytes of the following parameters   |
| UuidType                 | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits  |
| Uuid                     | Variable     | UUID value<br>"Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.  |
| CharacteristicProperties | 1            | Characteristic properties<br>Possible values:<br>0x00: gNone_c (No Properties selected)<br>0x01: gBroadcast_c (Characteristic can be broadcast)<br>0x02: gRead_c (Characteristic can be read)<br>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)<br>0x08: gWrite_c (Characteristic can be written with response)<br>0x10: gNotify_c (Characteristic can be notified)<br>0x20: gIndicate_c (Characteristic can be indicated)<br>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)<br>0x80: gExtendedProperties_c (Extended Characteristic properties) |



|                        |                    |   |
|------------------------|--------------------|---|
| 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  |
| 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> |

**Table 204 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 205 GATTDBDynamic-AddCharacteristicDeclarationAndValue.Indication Parameters**

| Parameter            | Size (bytes) | Comments                                    |
|----------------------|--------------|---|
| OpGroup              | 1            | 0x45  |
| 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 206 GATTDBDynamic-AddCharacteristicDeclarationWithUniqueValue.Request Parameters**

| Parameter                | Size (bytes) | Comments  |
|--------------------------|--------------|---|
| OpGroup                  | 1            | 0x45  |
| OpCode                   | 1            | 0x10  |
| Length                   | 1            | Length in bytes of the following parameters   |
| UuidType                 | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits  |
| Uuid                     | Variable     | UUID value<br>"Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.  |
| CharacteristicProperties | 1            | Characteristic properties<br>Possible values:<br>0x00: gNone_c (No Properties selected)<br>0x01: gBroadcast_c (Characteristic can be broadcast)<br>0x02: gRead_c (Characteristic can be read)<br>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)<br>0x08: gWrite_c (Characteristic can be written with response)<br>0x10: gNotify_c (Characteristic can be notified)<br>0x20: gIndicate_c (Characteristic can be indicated)<br>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)<br>0x80: gExtendedProperties_c (Extended Characteristic properties) |

|                        |   |   |
|------------------------|---|---|
|                        |   |   |
| 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> |

**Table 207 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 208 GATTDBDynamic-AddCharacteristicDeclarationWithUniqueValue.Indication Parameters**

| Parameter            | Size (bytes) | Comments                                    |
|----------------------|--------------|---|
| OpGroup              | 1            | 0x45  |
| OpCode               | 1            | 0x8C  |
| Length               | 1            | Length in bytes of the following parameters |
| CharacteristicHandle | 2            | Handle of the Characteristic declaration    |

### 3.3.8 GATTDBDynamic-AddCharacteristicDescriptor.Request

#### Description

Adds a Characteristic descriptor into the database.

#### Parameters

**Table 209 GATTDBDynamic-AddCharacteristicDescriptor.Request Parameters**

| Parameter                   | Size (bytes)          | Comments   |
|-----------------------------|-----------------------|--|
| OpGroup                     | 1                     | 0x45   |
| OpCode                      | 1                     | 0x0E   |
| Length                      | 1                     | Length in bytes of the following parameters  |
| UuidType                    | 1                     | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                        | Variable              | UUID value<br>"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  |
| DescriptorAccessPermissions | 1                     | Access permissions for the descriptor attribute<br>Possible values:<br>0x00: gPermissionNone_c (No permissions selected)<br>0x01: gPermissionFlagReadable_c (Attribute can be read)<br>0x02: gPermissionFlagReadWithEncryption_c (Attribute may be read only if link is encrypted)<br>0x04: gPermissionFlagReadWithAuthentication_c (Attribute may be read only by authenticated peers)<br>0x08: gPermissionFlagReadWithAuthorization_c (Attribute may be read only by authorized peers)<br>0x10: gPermissionFlagWritable_c (Attribute can be written) |

|  |  |  |
|--|--|--|
|  |  | 0x20: gPermissionFlagWriteWithEncryption_c<br>(Attribute may be written only if link is encrypted)<br><br>0x40:<br>gPermissionFlagWriteWithAuthentication_c<br>(Attribute may be written only by authenticated peers)<br><br>0x80:<br>gPermissionFlagWriteWithAuthorization_c<br>(Attribute may be written only by authorized peers) |
|--|--|--|

**Table 210 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 211 GATTDBDynamic-AddCharacteristicDescriptor.Indication Parameters**

| Parameter        | Size (bytes) | Comments                                    |
|------------------|--------------|---|
| OpGroup          | 1            | 0x45  |
| OpCode           | 1            | 0x8A  |
| Length           | 1            | Length in bytes of the following parameters |
| DescriptorHandle | 2            | Handle of the Descriptor declaration        |

### 3.3.10 GATTDBDynamic-AddIncludeDeclaration.Request

#### Description

Adds an Include declaration into the database.

#### Parameters

**Table 212 GATTDBDynamic-AddIncludeDeclaration.Request Parameters**

| Parameter             | Size (bytes) | Comments   |
|-----------------------|--------------|--|
| OpGroup               | 1            | 0x45   |
| 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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid                  | Variable     | UUID value<br>"Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |

**Table 213 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  |



### 3.3.11 GATTDBDynamic-AddIncludeDeclaration.Indication

#### Description

Adds an Include declaration into the database.

#### Parameters

**Table 214 GATTDBDynamic-AddIncludeDeclaration.Indication Parameters**

| Parameter     | Size (bytes) | Comments                                    |
|---------------|--------------|---|
| OpGroup       | 1            | 0x45  |
| 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 215 GATTDBDynamic-AddPrimaryServiceDeclaration.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x45   |
| OpCode    | 1            | 0x0A   |
| Length    | 1            | Length in bytes of the following parameters  |
| UuidType  | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid      | Variable     | UUID value<br>"Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |

**Table 216 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 217 GATTDBDynamic-AddPrimaryServiceDeclaration.Indication Parameters**

| Parameter     | Size (bytes) | Comments                                    |
|---------------|--------------|---|
| OpGroup       | 1            | 0x45  |
| 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 218 GATTDBDynamic-AddSecondaryServiceDeclaration.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x45   |
| OpCode    | 1            | 0x0B   |
| Length    | 1            | Length in bytes of the following parameters  |
| UuidType  | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid      | Variable     | UUID value<br>"Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |

**Table 219 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 a Secondary Service declaration into the database.

#### Parameters

**Table 220 GATTDBDynamic-AddSecondaryServiceDeclaration.Indication Parameters**

| Parameter     | Size (bytes) | Comments                                    |
|---------------|--------------|---|
| OpGroup       | 1            | 0x45  |
| 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 221 GATTDBDynamic-Init.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x45   |
| OpCode    | 1            | 0x08   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.3.17 GATTDBDynamic-ReleaseDatabase.Request

#### Description

Releases the allocated buffers.

#### Parameters

**Table 222 GATTDBDynamic-ReleaseDatabase.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x45   |
| OpCode    | 1            | 0x09   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.3.18 GATTDBDynamic-RemoveCharacteristic.Request

#### Description

Removes a Characteristic from the database.

#### Parameters

**Table 223 GATTDBDynamic-RemoveCharacteristic.Request Parameters**

| Parameter            | Size (bytes) | Comments   |
|----------------------|--------------|--|
| OpGroup              | 1            | 0x45   |
| OpCode               | 1            | 0x12   |
| Length               | 1            | Length in bytes of the following parameters        |
| CharacteristicHandle | 2            | Attribute handle of the Characteristic declaration |

### 3.3.19 GATTDBDynamic-RemoveService.Request

#### Description

Removes a Service from the database.

#### Parameters

**Table 224 GATTDBDynamic-RemoveService.Request Parameters**

| Parameter     | Size (bytes) | Comments                                    |
|---------------|--------------|---|
| OpGroup       | 1            | 0x45  |
| 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 225 GATTDB-FindCccdHandleForCharValueHandle.Request Parameters**

| Parameter       | Size (bytes) | Comments                                    |
|-----------------|--------------|---|
| OpGroup         | 1            | 0x45  |
| 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 226 GATTDB-FindCccdHandleForCharValueHandle.Indication Parameters**

| Parameter  | Size (bytes) | Comments                                    |
|------------|--------------|---|
| OpGroup    | 1            | 0x45  |
| 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 227 GATTDB-FindCharValueHandleInService.Request Parameters**

| Parameter     | Size (bytes) | Comments   |
|---------------|--------------|--|
| OpGroup       | 1            | 0x45   |
| OpCode        | 1            | 0x05   |
| Length        | 1            | Length in bytes of the following parameters  |
| ServiceHandle | 2            | The handle of the Service declaration  |
| UuidType      | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid          | Variable     | UUID value<br>"Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |

**Table 228 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 229 GATTDB-FindCharValueHandleInService.Indication Parameters**

| Parameter       | Size (bytes) | Comments                                    |
|-----------------|--------------|---|
| OpGroup         | 1            | 0x45  |
| 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 230 GATTDB-FindDescriptorHandleForCharValueHandle.Request Parameters**

| Parameter       | Size (bytes) | Comments   |
|-----------------|--------------|--|
| OpGroup         | 1            | 0x45   |
| OpCode          | 1            | 0x07   |
| Length          | 1            | Length in bytes of the following parameters  |
| CharValueHandle | 2            | The handle of the characteristic value   |
| UuidType        | 1            | UUID type<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid            | Variable     | UUID value<br>"Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |

**Table 231 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 232 GATTDB-FindDescriptorHandleForCharValueHandle.Indication Parameters**

| Parameter        | Size (bytes) | Comments                                    |
|------------------|--------------|---|
| OpGroup          | 1            | 0x45  |
| 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 233 GATTDB-FindServiceHandle.Request Parameters**

| Parameter   | Size (bytes) | Comments   |
|-------------|--------------|--|
| OpGroup     | 1            | 0x45   |
| 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<br>Possible values:<br>0x01: Uuid16Bits<br>0x02: Uuid128Bits<br>0x03: Uuid32Bits   |
| Uuid        | Variable     | UUID value<br>"Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |

**Table 234 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 235 GATTDB-FindServiceHandle.Indication Parameters**

| Parameter     | Size (bytes) | Comments                                    |
|---------------|--------------|---|
| OpGroup       | 1            | 0x45  |
| OpCode        | 1            | 0x82  |
| Length        | 1            | Length in bytes of the following parameters |
| ServiceHandle | 2            | Service handle                              |

### 3.3.28 GATTDB-Init.Request

#### Description

Initializes the GATT database at runtime.

#### Parameters

**Table 236 GATTDB-Init.Request Parameters**

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

### 3.3.29 GATTDB-ReadAttribute.Request

#### Description

Reads an attribute from application level.

#### Parameters

Table 237 GATTDB-ReadAttribute.Request Parameters

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x45  |
| 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      |

### 3.3.30 GATTDB-ReadAttribute.Indication

#### Description

Reads an attribute value (from application level).

#### Parameters

Table 238 GATTDB-ReadAttribute.Indication Parameters

| Parameter   | Size (bytes) | Comments                                    |
|-------------|--------------|---|
| OpGroup     | 1            | 0x45  |
| OpCode      | 1            | 0x81  |
| Length      | 1            | Length in bytes of the following parameters |
| ValueLength | 2            | Attribute value length                      |
| Value       | ValueLength  | Attribute value                             |

### 3.3.31 GATTDB-WriteAttribute.Request

#### Description

Writes an attribute from the application level.

#### Parameters

**Table 239 GATTDB-WriteAttribute.Request Parameters**

| Parameter   | Size (bytes) | Comments                                    |
|-------------|--------------|---|
| OpGroup     | 1            | 0x45  |
| 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            | 0x47   |
| OpCode    | 1            | 0x80   |
| Length    | 1            | Length in bytes of the following parameters  |
| Status    | 2            | The status of the GAP request<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c |

|  |  |  |
|--|--|--|
|  |  | 0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c<br>0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A:<br>gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c<br>0x010D:<br>gHciConnectionRejectedDueToLimitedResources_c<br>0x010E:<br>gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F:<br>gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114:<br>gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115:<br>gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScoIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c |
|--|--|--|



|  |  |  |
|--|--|--|
|  |  | 0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c |
|--|--|--|

|  |  |   |
|--|--|---|
|  |  | 0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c |
|--|--|---|

|  |  |   |
|--|--|---|
|  |  | 0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c |
|--|--|---|

|  |  |   |
|--|--|---|
|  |  | 0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>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            | 0x47   |
| OpCode            | 1            | 0x0F   |
| Length            | 1            | Length in bytes of the following parameters  |
| Deviceld          | 1            | The peer requesting authentication   |
| PairingParameters | Variable     | Pairing parameters as required by the SMP<br>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<br>Possible values:<br>0x10: gMode1Level1_c (Mode 1 Level 1 - No Security)<br>0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication)<br>0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication)<br>0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing (BLE 4.2 only))<br>0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication)<br>0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication) |
| MaxEncryptionKeySize | 1            | Maximum LTK size supported by the device   |
| LocalloCapabilities  | 1            | I/O capabilities used to determine the pairing method<br>Possible values:  |

|                             |   |  |
|-----------------------------|---|--|
|                             |   | 0x00: gIoDisplayOnly_c (May display a PIN, no input)<br>0x01: gIoDisplayYesNo_c (May display a PIN and has a binary input (for example, YES and NO buttons))<br>0x02: gIoKeyboardOnly_c (Has keyboard input, no display)<br>0x03: gIoNone_c (No input and no display)<br>0x04: gIoKeyboardDisplay_c (Has keyboard input and display) |
| OobAvailable                | 1 | TRUE if this device has Out-of-Band data that can be used for authenticated pairing, FALSE otherwise   |
| CentralKeys                 | 1 | SMP keys to be distributed by the Central<br>Possible values:<br>0x00: gNoKeys_c (No key can be distributed)<br>0x01: gLtk_c (Long Term Key)<br>0x02: gLrk_c (Identity Resolving Key)<br>0x04: gCsrk_c (Connection Signature Resolving Key)  |
| PeripheralKeys              | 1 | SMP keys to be distributed by the Peripheral<br>Possible values:<br>0x00: gNoKeys_c (No key can be distributed)<br>0x01: gLtk_c (Long Term Key)<br>0x02: gLrk_c (Identity Resolving Key)<br>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   |

### 3.4.4 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            | 0x47  |
| OpCode      | 1            | 0x23  |
| Length      | 1            | Length in bytes of the following parameters   |
| AddressType | 1            | The address type (public or random)<br>Possible values:<br>0x00: gPublic_c<br>0x01: gRandom_c |
| Address     | 6            | The address of the white-listed device  |

### 3.4.5 GAP-AdvertisingEventCommandFailed.Indication

#### Description

Event received when advertising could not be enabled or disabled.

#### Parameters

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

| Parameter  | Size (bytes) | Comments  |
|------------|--------------|---|
| OpGroup    | 1            | 0x47  |
| OpCode     | 1            | 0x99  |
| Length     | 1            | Length in bytes of the following parameters   |
| 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: gHciSynchronousConnectionLimitToADeviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedResources_c</p> |



|  |  |   |
|--|--|---|
|  |  | 0x010E: gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScolIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c |
|--|--|---|

|  |  |   |
|--|--|---|
|  |  | 0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c |
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|  |  |   |
|--|--|---|
|  |  | 0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c |
|--|--|---|

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

### 3.4.6 GAP-AdvertisingEventStateChanged.Indication

#### Description

Event received when advertising has been successfully enabled or disabled.

#### Parameters

**Table 246 AdvertisingEventStateChanged.Indication Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x98   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.4.7 GAP-Authorize.Request

#### Description

Authorizes a peer for a certain attribute in the database.

#### Parameters

**Table 247 GAP-Authorize.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x07   |
| Length    | 1            | Length in bytes of the following parameters  |
| Deviceld  | 1            | The peer being authorized  |
| Handle    | 2            | The attribute handle   |
| Access    | 1            | GATT Database access type (the type of access granted - read or write)<br>Possible values:<br>0x00: gRead_c (Attempting to read the attribute)<br>0x01: gWrite_c (Attempting to write the attribute) |

### 3.4.8 GAP-CheckIfBonded.Request

#### Description

Verifies if a connected peer device is bonded.

#### Parameters

**Table 248 GAP-CheckIfBonded.Request Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x20  |
| Length    | 1            | Length in bytes of the following parameters |
| DeviceId  | 1            | Device ID of the GAP peer                   |

### 3.4.9 GAP-CheckIfBonded.Indication

#### Description

Returns whether a connected peer device is bonded or not.

#### Parameters

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

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x86  |
| Length    | 1            | Length in bytes of the following parameters |
| IsBonded  | 1            | Bonded flag                                 |

### 3.4.10 GAP-CheckIndicationStatus.Request

#### Description

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

**Table 250 Parameters GAP-CheckIndicationStatus.Request Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x0A  |
| Length    | 1            | Length in bytes of the following parameters |
| Deviceld  | 1            | The peer GATT client                        |
| Handle    | 2            | The handle of the CCCD                      |

### 3.4.11 GAP-CheckIndicationStatus.Indication

#### Description

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

#### Parameters

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

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x82  |
| Length    | 1            | Length in bytes of the following parameters |
| IsActive  | 1            | Indication status                           |

### 3.4.12 GAP-CheckNotificationStatus.Request

#### Description

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

#### Parameters

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

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x09  |
| Length    | 1            | Length in bytes of the following parameters |
| Deviceld  | 1            | The peer GATT client                        |
| Handle    | 2            | The handle of the CCCD                      |

### 3.4.13 GAP-CheckNotificationStatus.Indication

#### Description

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

#### Parameters

**Table 253 CheckNotificationStatus.Indication Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x81  |
| Length    | 1            | Length in bytes of the following parameters |
| IsActive  | 1            | Notification status                         |



### 3.4.14 GAP-ClearWhiteList.Request

#### Description

Removes all addresses from the White List.

#### Parameters

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

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x22   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.4.15 GAP-Connect.Request

#### Description

Connects to a scanned device.

#### Parameters

**Table 255 GAP-Connect.Request Parameters**

| Parameter                  | Size (bytes) | Comments  |
|----------------------------|--------------|---|
| OpGroup                    | 1            | 0x47  |
| OpCode                     | 1            | 0x1C  |
| Length                     | 1            | Length in bytes of the following parameters   |
| CreateConnectionParameters | Variable     | Create connection command parameters<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 256 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<br><br>Possible values: |

|                        |   |   |
|------------------------|---|---|
|                        |   | <p>0x00: gUseDeviceAddress_c (Initiates a connection with a specific device identified by its address)</p> <p>0x01: gUseWhiteList_c (Initiates connections with all the devices in the White List at the same time)</p> |
| OwnAddressType         | 1 | <p>Indicates whether the address used in connection requests will be the public address or the random address - default public address</p> <p>Possible values:</p> <p>0x00: gPublic_c</p> <p>0x01: gRandom_c</p>        |
| PeerAddressType        | 1 | <p>When connecting to a specific device, this indicates that device's address type - default public address</p> <p>Possible values:</p> <p>0x00: gPublic_c</p> <p>0x01: gRandom_c</p>                                   |
| PeerAddress            | 6 | <p>When connecting to a specific device, this indicates that device's address</p>   |
| ConnIntervalMin        | 2 | <p>The minimum desired connection interval - default 100ms</p>  |
| ConnIntervalMax        | 2 | <p>The maximum desired connection interval - default 200ms</p>  |
| ConnLatency            | 2 | <p>The desired connection latency (the maximum number of consecutive connection events the Slave is allowed to ignore) - default 0</p>  |
| SupervisionTimeout     | 2 | <p>The maximum time interval between consecutive over-the-air packets; if this timer expires, the connection is dropped - default 10s</p>   |
| ConnEventLengthMin     | 2 | <p>The minimum desired connection event length - default 0ms</p>  |
| ConnEventLengthMax     | 2 | <p>The maximum desired connection event length - default maximum possible, ~41 s</p>  |
| usePeerIdentityAddress | 1 | <p>TRUE if the address defined in the peerAddressType and peerAddress is an identity address</p>  |

### 3.4.16 GAP-ConnectionEventAuthenticationRejected.Indication

#### Description

A link encryption or pairing request has been rejected by the peer Slave.

#### Parameters

**Table 257 ConnectionEventAuthenticationRejected.Indication Parameters**

| Parameter    | Size (bytes) | Comments   |
|--------------|--------------|--|
| OpGroup      | 1            | 0x47   |
| OpCode       | 1            | 0xA1   |
| Length       | 1            | Length in bytes of the following parameters  |
| Deviceld     | 1            | Device ID identifying the connection   |
| 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> |

### 3.4.17 GAP-ConnectionEventConnected.Indication

#### Description

A connection has been established.

#### Parameters

**Table 258 GAP-ConnectionEventConnected.Indication Parameters**

| Parameter            | Size (bytes) | Comments   |
|----------------------|--------------|--|
| OpGroup              | 1            | 0x47   |
| OpCode               | 1            | 0x9D   |
| Length               | 1            | Length in bytes of the following parameters  |
| Deviceld             | 1            | Device ID identifying the connection   |
| ConnectionParameters | Variable     | Connection parameters established by the Controller<br>Structure type parameter. See the detailed table below for parameter structure.   |
| PeerAddressType      | 1            | Connected device's address type<br>Possible values:<br>0x00: gPublic_c<br>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 259 ConnectionParameters 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  |
| 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> |

### 3.4.18 GAP-ConnectionEventDisconnected.Indication

#### Description

A connection is terminated.

#### Parameters

**Table 260 ConnectionEventDisconnected.Indication Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0xAA   |
| Length    | 1            | Length in bytes of the following parameters  |
| Deviceld  | 1            | Device ID identifying the connection   |
| Reason    | 2            | Reason for disconnection<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c<br>0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c |

|  |  |   |
|--|--|---|
|  |  | 0x010D: gHciConnectionRejectedDueToLimitedResources_c<br>0x010E: gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScoIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c |
|--|--|---|

|  |  |   |
|--|--|---|
|  |  | 0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c |
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|  |  |   |
|--|--|---|
|  |  | 0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceld_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmInproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c |
|--|--|---|

|  |  |  |
|--|--|--|
|  |  | 0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
|--|--|--|

### 3.4.19 GAP-ConnectionEventEncryptionChanged.Indication

#### Description

Link's encryption state has changed, for example, during pairing or after a reconnection with a bonded peer.

#### Parameters

**Table 261 GAP-ConnectionEventEncryptionChanged.Indication Parameters**

| Parameter          | Size (bytes) | Comments   |
|--------------------|--------------|--|
| OpGroup            | 1            | 0x47   |
| OpCode             | 1            | 0xA8   |
| Length             | 1            | Length in bytes of the following parameters                                |
| Deviceld           | 1            | Device ID identifying the connection                                       |
| NewEncryptionState | 1            | TRUE if link has been encrypted, FALSE if encryption was paused or removed |

### 3.4.20 GAP-ConnectionEventKeyExchangeRequest.Indication

#### Description

The pairing procedure requires the SMP keys to be distributed to the peer.

#### Parameters

**Table 262 GAP-ConnectionEventKeyExchangeRequest.Indication Parameters**

| Parameter        | Size (bytes) | Comments  |
|------------------|--------------|---|
| OpGroup          | 1            | 0x47  |
| OpCode           | 1            | 0xA5  |
| Length           | 1            | Length in bytes of the following parameters   |
| Deviceld         | 1            | Device ID identifying the connection  |
| RequestedKeys    | 1            | Mask identifying the keys being requested<br>Possible values:<br>0x00: gNoKeys_c (No key can be distributed)<br>0x01: gLtk_c (Long Term Key)<br>0x02: glrk_c (Identity Resolving Key)<br>0x04: gCsrk_c (Connection Signature Resolving Key) |
| RequestedLtkSize | 1            | Requested size of the encryption key  |

### 3.4.21 GAP-ConnectionEventKeysReceived.Indication

#### Description

SMP keys distributed by the peer during pairing have been received.

#### Parameters

**Table 263 ConnectionEventKeysReceived.Indication Parameters**

| Parameter | Size (bytes) | Comments  |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0xA6  |
| Length    | 1            | Length in bytes of the following parameters   |
| Deviceld  | 1            | Device ID identifying the connection  |
| Keys      | Variable     | The SMP keys of the local device<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 264 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)<br>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<br>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 265 LtkInfo Parameter Structure**

| Structure Parameter | Size (bytes) | Comments                   |
|---------------------|--------------|----------------------------|
| LtkSize             | 1            | Encryption Key Size        |
| Ltk                 | LtkSize      | Long Term (Encryption) Key |

**Table 266 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 267 AddressInfo Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| DeviceAddressType   | 1            | Public or Random address<br>Possible values:<br>0x00: gPublic_c<br>0x01: gRandom_c |
| DeviceAddress       | 6            | Device Address   |

### 3.4.22 GAP-ConnectionEventLeDataLengthChanged.Indication

#### Description

The new TX/RX Data Length parameters.

#### Parameters

**Table 268 GAP-ConnectionEventLeDataLengthChanged.Indication Parameters**

| Parameter           | Size (bytes) | Comments  |
|---------------------|--------------|---|
| OpGroup             | 1            | 0x47  |
| OpCode              | 1            | 0xB0  |
| Length              | 1            | Length in bytes of the following parameters   |
| Deviceld            | 1            | Device ID identifying the connection  |
| LeDataLengthChanged | Variable     | Connection Le Data Length Changed Event data<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 269 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 |

### 3.4.23 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 270 GAP-ConnectionEventLeScDisplayNumericValue.Indication Parameters**

| Parameter | Size (bytes) | Comments  |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0xB2  |
| Length    | 1            | Length in bytes of the following parameters   |
| Deviceld  | 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 |

### 3.4.24 GAP-ConnectionEventLeScKeypressNotification.Indication

#### Description

Remote Keypress Notification received during Passkey Entry Pairing Method.

#### Parameters

**Table 271 GAP-ConnectionEventLeScKeypressNotification.Indication Parameters**

| Parameter                         | Size (bytes) | Comments  |
|-----------------------------------|--------------|---|
| OpGroup                           | 1            | 0x47  |
| OpCode                            | 1            | 0xB3  |
| Length                            | 1            | Length in bytes of the following parameters   |
| Deviceld                          | 1            | Device ID identifying the connection  |
| GapLeScKeypressNotificationParams | Variable     | Keypress notification type which denotes a passkey entry keypress action<br><br>Structure type parameter. See the detailed table below for parameter structure. |



**Table 272 GapLeScKeypressNotificationParams Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| keypressNotifType   | 1            | Possible values:<br>0x00: gKnPasskeyEntryStarted_c<br>0x01: gKnPasskeyDigitStarted_c<br>0x02: gKnPasskeyDigitErased_c<br>(gKnPasskeyDigitErased_c )<br>0x03: gKnPasskeyCleared_c<br>0x04: gKnPasskeyEntryCompleted_c |

### 3.4.25 GAP-ConnectionEventLeScOobDataRequest.Indication

#### Description

Event sent to request LE SC OOB Data (r, Cr and Addr) received from a peer.

#### Parameters

**Table 273 GAP-ConnectionEventLeScOobDataRequest.Indication Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0xB1  |
| Length    | 1            | Length in bytes of the following parameters |
| Deviceld  | 1            | Device ID identifying the connection        |

### 3.4.26 GAP-ConnectionEventLongTermKeyRequest.Indication

#### Description

The bonded peer Master has requested link encryption and the LTK must be provided.

#### Parameters

**Table 274 GAP-ConnectionEventLongTermKeyRequest.Indication Parameters**

| Parameter | Size (bytes) | Comments  |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0xA7  |
| Length    | 1            | Length in bytes of the following parameters       |
| Deviceld  | 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          |

### 3.4.27 GAP-ConnectionEventOobRequest.Indication

#### Description

Out-of-Band data must be provided for the pairing procedure.

#### Parameters

**Table 275 GAP-ConnectionEventOobRequest.Indication Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0xA3  |
| Length    | 1            | Length in bytes of the following parameters |
| Deviceld  | 1            | Device ID identifying the connection        |

### 3.4.28 GAP-ConnectionEventPairingComplete.Indication

#### Description

Pairing procedure is complete, either successfully or with failure.

#### Parameters

**Table 276 GAP-ConnectionEventPairingComplete.Indication Parameters**

| Parameter     | Size (bytes) | Comments   |
|---------------|--------------|--|
| OpGroup       | 1            | 0x47   |
| OpCode        | 1            | 0xA9   |
| Length        | 1            | Length in bytes of the following parameters  |
| DeviceId      | 1            | Device ID identifying the connection   |
| PairingStatus | 1            | Pairing status<br>Possible values:<br>0x01: PairingSuccessful (Pairing succeeded)<br>0x00: PairingFailed (Pairing failed)  |
| PairingData   | Variable     | Information of pairing completion<br>"Union" type parameter. Its structure is based on the value of parameter PairingStatus. See the detailed table below for parameter structure. |

**Table 277 PairingData Parameter Structure**

| PairingStatus | Structure Parameter | Size (bytes) | Comments   |
|---------------|---------------------|--------------|--|
| 0x01          | PairingSuccessful   | Variable     | Pairing successful data<br>Structure type parameter. See the detailed table below for parameter structure. |
| 0x00          | PairingFailed       | Variable     | Pairing failed data<br>Structure type parameter. See the detailed table below for parameter structure.     |

**Table 278 PairingSuccessful Parameter Structure**

| Structure Parameter | Size (bytes) | Comments                                |
|---------------------|--------------|---|
| WithBonding         | 1            | Indicates whether the devices is bonded |

**Table 279 PairingFailed Parameter Structure**

| Structure Parameter | Size (bytes) | Comments              |
|---------------------|--------------|-----------------------|
| FailReason          | 2            | The reason of failure |

|  |  |   |
|--|--|---|
|  |  | <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:<br/>gHciSynchronousConnectionLimitToADeviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D:<br/>gHciConnectionRejectedDueToLimitedResources_c</p> <p>0x010E:<br/>gHciConnectionRejectedDueToSecurityReasons_c</p> <p>0x010F:<br/>gHciConnectionRejectedDueToUnacceptableBdAddr_c</p> <p>0x0110: gHciConnectionAcceptTimeoutExceeded_c</p> <p>0x0111: gHciUnsupportedFeatureOrParameterValue_c</p> <p>0x0112: gHciInvalidHciCommandParameters_c</p> <p>0x0113: gHciRemoteUserTerminatedConnection_c</p> <p>0x0114:<br/>gHciRemoteDeviceTerminatedConnectionLowResources_c</p> <p>0x0115:<br/>gHciRemoteDeviceTerminatedConnectionPowerOff_c</p> <p>0x0116: gHciConnectionTerminatedByLocalHost_c</p> <p>0x0117: gHciRepeatedAttempts_c</p> <p>0x0118: gHciPairingNotAllowed_c</p> |
|--|--|---|

|  |  |  |
|--|--|--|
|  |  | 0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScolIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c |
|--|--|--|

|  |  |   |
|--|--|---|
|  |  | 0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c |
|--|--|---|

|  |  |   |
|--|--|---|
|  |  | 0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c |
|--|--|---|

|  |  |   |
|--|--|---|
|  |  | 0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
|--|--|---|



### 3.4.29 GAP-ConnectionEventPairingRequest.Indication

#### Description

A pairing request has been received from the peer Master.

#### Parameters

**Table 280 GAP-ConnectionEventPairingRequest.Indication Parameters**

| Parameter         | Size (bytes) | Comments  |
|-------------------|--------------|---|
| OpGroup           | 1            | 0x47  |
| OpCode            | 1            | 0x9E  |
| Length            | 1            | Length in bytes of the following parameters   |
| DeviceId          | 1            | Device ID identifying the connection  |
| PairingParameters | Variable     | Pairing parameters<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 281 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<br>Possible values:<br>0x10: gMode1Level1_c (Mode 1 Level 1 - No Security)<br>0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication)<br>0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication)<br>0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing (BLE 4.2 only))<br>0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication)<br>0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication) |
| MaxEncryptionKeySize | 1            | Maximum LTK size supported by the device   |
| LocalIoCapabilities  | 1            | I/O capabilities used to determine the pairing method<br>Possible values:  |

|                             |   |  |
|-----------------------------|---|--|
|                             |   | 0x00: gIoDisplayOnly_c (May display a PIN, no input)<br>0x01: gIoDisplayYesNo_c (May display a PIN and has a binary input (for example, YES and NO buttons))<br>0x02: gIoKeyboardOnly_c (Has keyboard input, no display)<br>0x03: gIoNone_c (No input and no display)<br>0x04: gIoKeyboardDisplay_c (Has keyboard input and display) |
| OobAvailable                | 1 | TRUE if this device has Out-of-Band data that can be used for authenticated pairing, FALSE otherwise   |
| CentralKeys                 | 1 | SMP keys to be distributed by the Central<br>Possible values:<br>0x00: gNoKeys_c (No key can be distributed)<br>0x01: gLtk_c (Long Term Key)<br>0x02: gLrk_c (Identity Resolving Key)<br>0x04: gCsrk_c (Connection Signature Resolving Key)  |
| PeripheralKeys              | 1 | SMP keys to be distributed by the Peripheral<br>Possible values:<br>0x00: gNoKeys_c (No key can be distributed)<br>0x01: gLtk_c (Long Term Key)<br>0x02: gLrk_c (Identity Resolving Key)<br>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   |

### 3.4.30 GAP-ConnectionEventPairingResponse.Indication

#### Description

A pairing response has been received from the peer Slave.

#### Parameters

**Table 282 GAP-ConnectionEventPairingResponse.Indication Parameters**

| Parameter         | Size (bytes) | Comments  |
|-------------------|--------------|---|
| OpGroup           | 1            | 0x47  |
| OpCode            | 1            | 0xA0  |
| Length            | 1            | Length in bytes of the following parameters   |
| Deviceld          | 1            | Device ID identifying the connection  |
| PairingParameters | Variable     | Pairing parameters<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 283 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<br>Possible values:<br>0x10: gMode1Level1_c (Mode 1 Level 1 - No Security)<br>0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication)<br>0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication)<br>0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing (BLE 4.2 only))<br>0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication)<br>0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication) |
| MaxEncryptionKeySize | 1            | Maximum LTK size supported by the device   |
| LocalloCapabilities  | 1            | I/O capabilities used to determine the pairing method<br>Possible values:  |

|                             |   |  |
|-----------------------------|---|--|
|                             |   | 0x00: gIoDisplayOnly_c (May display a PIN, no input)<br>0x01: gIoDisplayYesNo_c (May display a PIN and has a binary input (for example, YES and NO buttons))<br>0x02: gIoKeyboardOnly_c (Has keyboard input, no display)<br>0x03: gIoNone_c (No input and no display)<br>0x04: gIoKeyboardDisplay_c (Has keyboard input and display) |
| OobAvailable                | 1 | TRUE if this device has Out-of-Band data that can be used for authenticated pairing, FALSE otherwise   |
| CentralKeys                 | 1 | SMP keys to be distributed by the Central<br>Possible values:<br>0x00: gNoKeys_c (No key can be distributed)<br>0x01: gLtk_c (Long Term Key)<br>0x02: gLrk_c (Identity Resolving Key)<br>0x04: gCsrk_c (Connection Signature Resolving Key)  |
| PeripheralKeys              | 1 | SMP keys to be distributed by the Peripheral<br>Possible values:<br>0x00: gNoKeys_c (No key can be distributed)<br>0x01: gLtk_c (Long Term Key)<br>0x02: gLrk_c (Identity Resolving Key)<br>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   |

### 3.4.31 GAP-ConnectionEventParameterUpdateComplete.Indication

#### Description

The connection has new parameters.

#### Parameters

**Table 284 GAP-ConnectionEventParameterUpdateComplete.Indication Parameters**

| Parameter                         | Size (bytes) | Comments   |
|-----------------------------------|--------------|--|
| OpGroup                           | 1            | 0x47   |
| OpCode                            | 1            | 0xAF   |
| Length                            | 1            | Length in bytes of the following parameters  |
| Deviceld                          | 1            | Device ID identifying the connection   |
| ConnectionParameterUpdateComplete | Variable     | Connection parameter update complete event data<br><br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 285 ConnectionParameterUpdateComplete Parameter Structure**

| Structure Parameter | Size (bytes) | Comments  |
|---------------------|--------------|---|
| Status              | 2            | The status of the request<br><br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c<br>0x0106: gHciPinOrKeyMissing_c |

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|  |  | 0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A:<br>gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c<br>0x010D:<br>gHciConnectionRejectedDueToLimitedResources_c<br>0x010E:<br>gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F:<br>gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114:<br>gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115:<br>gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScoIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c |
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|  |  | 0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c |
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|--|--|---|
|  |  | 0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDevicId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLIConnectionEncryptionInProgress_c<br>0x0418: gSmLIConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c |
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|              |   | 0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
| ConnInterval | 2 | Connection interval  |

|                    |   |                     |
|--------------------|---|---------------------|
| ConnLatency        | 2 | Connection latency  |
| SupervisionTimeout | 2 | Supervision timeout |

### 3.4.32 GAP-ConnectionEventParameterUpdateRequest.Indication

#### Description

A connection parameter update request has been received.

#### Parameters

**Table 286 ConnectionEventParameterUpdateRequest.Indication Parameters**

| Parameter                        | Size (bytes) | Comments  |
|----------------------------------|--------------|---|
| OpGroup                          | 1            | 0x47  |
| 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<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 287 ConnectionParameterUpdateRequest Parameter Structure**

| Structure Parameter | Size (bytes) | Comments           |
|---------------------|--------------|--------------------|
| IntervalMin         | 2            | Minimum interval   |
| IntervalMax         | 2            | Maximum interval   |
| SlaveLatency        | 2            | Slave latency      |
| TimeoutMultiplier   | 2            | Timeout multiplier |

### 3.4.33 GAP-ConnectionEventPasskeyDisplay.Indication

#### Description

The pairing procedure requires this Slave to display the passkey for the Master's user.

#### Parameters

**Table 288 GAP-ConnectionEventPasskeyDisplay.Indication Parameters**

| Parameter         | Size (bytes) | Comments                                    |
|-------------------|--------------|---|
| OpGroup           | 1            | 0x47  |
| OpCode            | 1            | 0xA4  |
| Length            | 1            | Length in bytes of the following parameters |
| Deviceld          | 1            | Device ID identifying the connection        |
| PasskeyForDisplay | 4            | Passkey to be displayed by this Slave       |

### 3.4.34 GAP-ConnectionEventPasskeyRequest.Indication

#### Description

Peer Slave has requested a passkey (maximum 6 digit PIN) for the pairing procedure.

#### Parameters

**Table 289 GAP-ConnectionEventPasskeyRequest.Indication Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0xA2  |
| Length    | 1            | Length in bytes of the following parameters |
| Deviceld  | 1            | Device ID identifying the connection        |

### 3.4.35 GAP-ConnectionEventPowerReadFailure.Indication

#### Description

Power reading could not be performed.

#### Parameters

**Table 290 GAP-ConnectionEventPowerReadFailure.Indication Parameters**

| Parameter  | Size (bytes) | Comments   |
|------------|--------------|--|
| OpGroup    | 1            | 0x47   |
| OpCode     | 1            | 0xAD   |
| Length     | 1            | Length in bytes of the following parameters  |
| Deviceld   | 1            | Device ID identifying the connection   |
| FailReason | 2            | Reason for power reading failure<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c<br>0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c |

|  |  |   |
|--|--|---|
|  |  | 0x010D: gHciConnectionRejectedDueToLimitedResources_c<br>0x010E: gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScoIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c |
|--|--|---|

|  |  |   |
|--|--|---|
|  |  | 0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c |
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|  |  | 0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmInproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c |
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|  |  |  |
|--|--|--|
|  |  | 0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
|--|--|--|



### 3.4.36 GAP-ConnectionEventRssiRead.Indication

#### Description

RSSI for an active connection has been read.

#### Parameters

**Table 291 GAP-ConnectionEventRssiRead.Indication Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0xAB  |
| Length    | 1            | Length in bytes of the following parameters |
| Deviceld  | 1            | Device ID identifying the connection        |
| Rssi      | 1            | Value of the RSSI                           |

### 3.4.37 GAP-ConnectionEventSlaveSecurityRequest.Indication

#### Description

A Slave Security Request has been received from the peer Slave.

**Table 292 Parameters GAP-ConnectionEventSlaveSecurityRequest.Indication Parameters**

| Parameter                      | Size (bytes) | Comments   |
|--------------------------------|--------------|--|
| OpGroup                        | 1            | 0x47   |
| OpCode                         | 1            | 0x9F   |
| Length                         | 1            | Length in bytes of the following parameters  |
| Deviceld                       | 1            | Device ID identifying the connection   |
| SlaveSecurityRequestParameters | Variable     | Slave security request parameters<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 293 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 |

### 3.4.38 GAP-ConnectionEventTxPowerLevelRead.Indication

#### Description

TX power level for an active connection has been read.

#### Parameters

**Table 294 GAP-ConnectionEventTxPowerLevelRead.Indication Parameters**

| Parameter    | Size (bytes) | Comments                                    |
|--------------|--------------|---|
| OpGroup      | 1            | 0x47  |
| 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                       |

### 3.4.39 GAP-ControllerReset.Request

#### Description

Reset the controller.

#### Parameters

**Table 295 GAP-ControllerReset.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x34   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.4.40 GAP-CreateRandomDeviceAddress.Request

#### Description

Requests the controller to create a random address.

#### Parameters

**Table 296 GAP-CreateRandomDeviceAddress.Request Parameters**

| Parameter          | Size (bytes)           | Comments   |
|--------------------|------------------------|--|
| OpGroup            | 1                      | 0x47   |
| OpCode             | 1                      | 0x26   |
| Length             | 1                      | Length in bytes of the following parameters                            |
| IrkIncluded        | 1                      | Boolean value which indicates if IRK is included or not                |
| 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       |

### 3.4.41 GAP-DenyLongTermKey.Request

#### Description

Rejects a long term key request from the controller.

#### Parameters

**Table 297 GAP-DenyLongTermKey.Request Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x17  |
| Length    | 1            | Length in bytes of the following parameters |
| Deviceld  | 1            | The GAP peer who requested encryption       |

### 3.4.42 GAP-Disconnect.Request

#### Description

Initiates disconnection from a connected peer device.

#### Parameters

**Table 298 GAP-Disconnect.Request Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x1D  |
| Length    | 1            | Length in bytes of the following parameters |
| Deviceld  | 1            | The connected peer to disconnect from       |

### 3.4.43 GAP-EnableControllerPrivacy.Request

#### Description

Enables or disables Controller Privacy (Enhanced Privacy feature).

#### Parameters

**Table 299 GAP-EnableControllerPrivacy.Request Parameters**

| Parameter      | Size (bytes) | Comments   |
|----------------|--------------|--|
| OpGroup        | 1            | 0x47   |
| 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<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 300 PeerIdentities Parameter Structure**

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|----------|
|                     | 1            |          |

### 3.4.44 GAP-EnableHostPrivacy.Request

#### Description

Enables or disables Host Privacy (automatic regeneration of a Private Address).

#### Parameters

**Table 301 GAP-EnableHostPrivacy.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| 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 |

### 3.4.45 GAP-EnableUpdateConnectionParameters.Request

#### Description

Update the connection parameters.

#### Parameters

**Table 302 GAP-EnableUpdateConnectionParameters.Request Parameters**

| Parameter | Size (bytes) | Comments                                       |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| 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/dissallow the parameters update          |

### 3.4.46 GAP-EncryptLink.Request

#### Description

Encrypts the link with a bonded peer.

#### Parameters

**Table 303 GAP-EncryptLink.Request Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x0E  |
| Length    | 1            | Length in bytes of the following parameters |
| Deviceld  | 1            | Device ID of the peer                       |

### 3.4.47 GAP-EnterPasskey.Request

#### Description

Enters the passkey requested by a peer during the pairing process.

#### Parameters

**Table 304 GAP-EnterPasskey.Request Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x11  |
| Length    | 1            | Length in bytes of the following parameters |
| Deviceld  | 1            | The GAP peer that requested a passkey entry |
| Passkey   | 4            | The peer's secret passkey                   |

### 3.4.48 GAP-GenericEventAdvertisingDataSetupComplete.Indication

#### Description

Controller event - advertising data setup completed.

#### Parameters

**Table 305 GAP-GenericEventAdvertisingDataSetupComplete.Indication Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x8D   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.4.49 GAP- GenericEventAdvertisingParametersSetupComplete.Indication

#### Description

Controller event - advertising parameters setup completed.

#### Parameters

**Table 306 GAP-GenericEventAdvertisingParametersSetupComplete.Indication Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x8C   |
| Length    | 1            | 0x00 - This message does not have any parameters |



### 3.4.50 GAP-GenericEventAdvertisingSetupFailed.Indication

#### Description

Controller event - advertising setup failed.

#### Parameters

**Table 307 GAP-GenericEventAdvertisingSetupFailed.Indication Parameters**

| Parameter       | Size (bytes) | Comments   |
|-----------------|--------------|--|
| OpGroup         | 1            | 0x47   |
| OpCode          | 1            | 0x8B   |
| Length          | 1            | Length in bytes of the following parameters  |
| SetupFailReason | 2            | Setup fail reason<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c<br>0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c<br>0x0109: gHciConnectionLimitExceeded_c<br>0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c<br>0x010D: gHciConnectionRejectedDueToLimitedResources_c |

|  |  |   |
|--|--|---|
|  |  | 0x010E: gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScolIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c |
|--|--|---|

|  |  |   |
|--|--|---|
|  |  | 0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c |
|--|--|---|

|  |  |   |
|--|--|---|
|  |  | 0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmInproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c |
|--|--|---|

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

### 3.4.51 GAP-GenericEventAdvTxPowerLevelRead.Indication

#### Description

Controller event - advertising transmission power level.

#### Parameters

**Table 308 GAP-GenericEventAdvTxPowerLevelRead.Indication Parameters**

| Parameter       | Size (bytes) | Comments                                      |
|-----------------|--------------|---|
| OpGroup         | 1            | 0x47  |
| OpCode          | 1            | 0x95  |
| Length          | 1            | Length in bytes of the following parameters   |
| AdvTxPowerLevel | 1            | Advertising transmission power level (in dBm) |

### 3.4.52 GAP-GenericEventControllerPrivacyStateChanged.Indication

#### Description

The Controller Privacy was enabled or disabled.

#### Parameters

**Table 309 GAP-GenericEventControllerPrivacyStateChanged.Indication Parameters**

| Parameter                 | Size (bytes) | Comments  |
|---------------------------|--------------|---|
| OpGroup                   | 1            | 0x47  |
| 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 |

### 3.4.53 GAP-GenericEventControllerResetComplete.Indication

#### Description

The controller has been reset.

#### Parameters

**Table 310 GAP-GenericEventControllerResetComplete.Indication Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0xB4   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.4.54 GAP-GenericEventCreateConnectionCanceled.Indication

#### Description

Controller event - create connection procedure canceled.

#### Parameters

**Table 311 GAP-GenericEventCreateConnectionCanceled.Indication Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x93   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.4.55 GAP-GenericEventDeviceAddedToWhiteList.Indication

#### Description

Controller event - device added to White List.

#### Parameters

**Table 312 GAP-GenericEventDeviceAddedToWhiteList.Indication Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x8F   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.4.56 GAP-GenericEventDeviceRemovedFromWhiteList.Indication

#### Description

Controller event - device removed from White List.

#### Parameters

**Table 313 GAP-GenericEventDeviceRemovedFromWhiteList.Indication Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x90   |
| Length    | 1            | 0x00 - This message does not have any parameters |



### 3.4.57 GAP-GenericEventInitializationComplete.Indication

#### Description

Controller event - initialization complete.

#### Parameters

**Table 314 GAP-GenericEventInitializationComplete.Indication Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x89   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.4.58 GAP-GenericEventInternalError.Indication

#### Description

Controller event - controller error.

#### Parameters

**Table 315 GAP-GenericEventInternalError.Indication Parameters**

| Parameter     | Size (bytes) | Comments   |
|---------------|--------------|--|
| OpGroup       | 1            | 0x47   |
| OpCode        | 1            | 0x8A   |
| Length        | 1            | Length in bytes of the following parameters  |
| InternalError | Variable     | Internal Error event data<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 316 InternalError Parameter Structure**

| Structure Parameter | Size (bytes) | Comments  |
|---------------------|--------------|---|
| ErrorCode           | 2            | Error code<br>Possible values:<br>0x0000: gBleSuccess_c<br>0x0001: gBleInvalidParameter_c<br>0x0002: gBleOverflow_c<br>0x0003: gBleUnavailable_c<br>0x0004: gBleFeatureNotSupported_c<br>0x0005: gBleOutOfMemory_c<br>0x0006: gBleAlreadyInitialized_c<br>0x0007: gBleOsError_c<br>0x0008: gBleUnexpectedError_c<br>0x0009: gBleInvalidState_c<br>0x0101: gHciUnknownHciCommand_c<br>0x0102: gHciUnknownConnectionIdentifier_c<br>0x0103: gHciHardwareFailure_c<br>0x0104: gHciPageTimeout_c<br>0x0105: gHciAuthenticationFailure_c<br>0x0106: gHciPinOrKeyMissing_c<br>0x0107: gHciMemoryCapacityExceeded_c<br>0x0108: gHciConnectionTimeout_c |

|  |  |   |
|--|--|---|
|  |  | 0x0109: gHciConnectionLimitExceeded_c<br>0x010A:<br>gHciSynchronousConnectionLimitToADeviceExceeded_c<br>0x010B: gHciAclConnectionAlreadyExists_c<br>0x010C: gHciCommandDisallowed_c<br>0x010D:<br>gHciConnectionRejectedDueToLimitedResources_c<br>0x010E:<br>gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F:<br>gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114:<br>gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115:<br>gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScoIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c |
|--|--|---|

|  |  |  |
|--|--|--|
|  |  | 0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c<br>0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c |
|--|--|--|

|  |  |  |
|--|--|--|
|  |  | 0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c<br>0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLIConnectionEncryptionInProgress_c<br>0x0418: gSmLIConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c |
|--|--|--|

|             |   |  |
|-------------|---|--|
|             |   | 0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c<br>0x0509: gAttPrepareQueueFull_c<br>0x050A: gAttAttributeNotFound_c<br>0x050B: gAttAttributeNotLong_c<br>0x050C: gAttInsufficientEncryptionKeySize_c<br>0x050D: gAttInvalidAttributeValueLength_c<br>0x050E: gAttUnlikelyor_c<br>0x050F: gAttInsufficientEncryption_c<br>0x0510: gAttUnsupportedGroupType_c<br>0x0511: gAttInsufficientResources_c<br>0x0601: gGattAnotherProcedureInProgress_c<br>0x0602: gGattLongAttributePacketsCorrupted_c<br>0x0603: gGattMultipleAttributesOverflow_c<br>0x0604: gGattUnexpectedReadMultipleResponseLength_c<br>0x0605: gGattInvalidValueLength_c<br>0x0606: gGattServerTimeout_c<br>0x0607: gGattIndicationAlreadyInProgress_c<br>0x0608: gGattClientConfirmationTimeout_c<br>0x0701: gGapAdvDataTooLong_c<br>0x0702: gGapScanRspDataTooLong_c<br>0x0703: gGapDeviceNotBonded_c<br>0x0801: gDevDbCccdLimitReached_c<br>0x0802: gDevDbCccdNotFound_c<br>0x0901: gGattDbInvalidHandle_c<br>0x0902: gGattDbCharacteristicNotFound_c<br>0x0903: gGattDbCccdNotFound_c<br>0x0904: gGattDbServiceNotFound_c<br>0x0905: gGattDbDescriptorNotFound_c |
| ErrorSource | 1 | Error source<br>Possible values:<br>0x00: gHciCommandStatus_c<br>0x01: gCheckPrivateResolvableAddress_c  |

|                  |   |  |
|------------------|---|--|
|                  |   | 0x02: gVerifySignature_c<br>0x03: gAddNewConnection_c<br>0x04: gResetController_c<br>0x05: gSetEventMask_c<br>0x06: gReadLeBufferSize_c<br>0x07: gSetLeEventMask_c<br>0x08: gReadDeviceAddress_c<br>0x09: gReadLocalSupportedFeatures_c<br>0x0A: gReadWhiteListSize_c<br>0x0B: gClearWhiteList_c<br>0x0C: gAddDeviceToWhiteList_c<br>0x0D: gRemoveDeviceFromWhiteList_c<br>0x0E: gCancelCreateConnection_c<br>0x0F: gReadRadioPower_c<br>0x10: gSetRandomAddress_c<br>0x11: gCreateRandomAddress_c<br>0x12: gEncryptLink_c<br>0x13: gProvideLongTermKey_c<br>0x14: gDenyLongTermKey_c<br>0x15: gConnect_c<br>0x16: gDisconnect_c<br>0x17: gTerminatePairing_c<br>0x18: gSendSlaveSecurityRequest_c<br>0x19: gEnterPasskey_c<br>0x1A: gProvideOob_c<br>0x1B: gSendSmpKeys_c<br>0x1C: gWriteSuggestedDefaultDataLength_c<br>0x1D: gReadSuggestedDefaultDataLength_c<br>0x1E: gUpdateLeDataLength_c<br>0x1F: gEnableControllerPrivacy_c<br>0x20: gLeScSendKeypressNotification_c<br>0x21: gLeScSetPeerOobData_c<br>0x22: gLeScGetLocalOobData_c<br>0x23: gLeScValidateNumericValue_c<br>0x24: gLeScRegeneratePublicKey_c<br>0x25: gLeSetResolvablePrivateAddressTimeout_c |
| HciCommandOpcode | 2 | HCI command operation code   |

### 3.4.59 GAP-GenericEventLeScLocalOobData.Indication

#### Description

Local OOB data used for LE Secure Connections pairing.

#### Parameters

**Table 317 GAP-GenericEventLeScLocalOobData.Indication Parameters**

| Parameter    | Size (bytes) | Comments                                    |
|--------------|--------------|---|
| OpGroup      | 1            | 0x47  |
| 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)         |

### 3.4.60 GAP-GenericEventPrivateResolvableAddressVerified.Indication

#### Description

Controller event - Private Resolvable Address verified.

#### Parameters

**Table 318 GAP-GenericEventPrivateResolvableAddressVerified.Indication Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x96  |
| Length    | 1            | Length in bytes of the following parameters |
| Verified  | 1            | Private Resolvable Address verified         |



### 3.4.61 GAP-GenericEventPublicAddressRead.Indication

#### Description

Controller event - public address read.

#### Parameters

**Table 319 GAP-GenericEventPublicAddressRead.Indication Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x94  |
| Length    | 1            | Length in bytes of the following parameters |
| Address   | 6            | Public address                              |

### 3.4.62 GAP-GenericEventRandomAddressReady.Indication

#### Description

Controller event - random address ready.

#### Parameters

**Table 320 GAP-GenericEventRandomAddressReady.Indication Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x92  |
| Length    | 1            | Length in bytes of the following parameters |
| Address   | 6            | Random address                              |

### 3.4.63 GAP-GenericEventRandomAddressSet.Indication

#### Description

Controller event - Private Resolvable Address verified.

#### Parameters

**Table 321 GAP-GenericEventRandomAddressSet.Indication Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x97   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.4.64 GAP-GenericEventWhiteListCleared.Indication

#### Description

Controller event - White List cleared.

#### Parameters

**Table 322 GAP-GenericEventWhiteListCleared.Indication Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x91   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.4.65 GAP-GenericEventWhiteListSizeRead.Indication

#### Description

Controller event - White List size.

#### Parameters

**Table 323 GAP-GenericEventWhiteListSizeRead.Indication Parameters**

| Parameter     | Size (bytes) | Comments                                    |
|---------------|--------------|---|
| OpGroup       | 1            | 0x47  |
| OpCode        | 1            | 0x8E  |
| Length        | 1            | Length in bytes of the following parameters |
| WhiteListSize | 1            | White list size                             |

### 3.4.66 GAP-GetBondedDeviceName.Request

#### Description

Retrieves the name of a bonded device.

#### Parameters

**Table 324 GAP-GetBondedDeviceName.Request Parameters**

| Parameter   | Size (bytes) | Comments  |
|-------------|--------------|---|
| OpGroup     | 1            | 0x47  |
| 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 |

### 3.4.67 GAP-GetBondedDeviceName.Indication

#### Description

Returns the name of a bonded device.

#### Parameters

**Table 325 GAP-GetBondedDeviceName.Indication Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x88  |
| Length    | 1            | Length in bytes of the following parameters |
| NameSize  | 1            | The name size                               |
| Name      | NameSize     | The name value                              |

### 3.4.68 GAP-GetBondedDevicesCount.Request

#### Description

Retrieves the number of bonded devices.

#### Parameters

**Table 326 GAP-GetBondedDevicesCount.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x28   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.4.69 GAP-GetBondedDevicesCount.Indication

#### Description

Returns the number of bonded devices.

#### Parameters

**Table 327 GAP-GetBondedDevicesCount.Indication Parameters**

| Parameter         | Size (bytes) | Comments                                    |
|-------------------|--------------|---|
| OpGroup           | 1            | 0x47  |
| OpCode            | 1            | 0x87  |
| Length            | 1            | Length in bytes of the following parameters |
| NbOfBondedDevices | 1            | Number of bonded devices                    |

### 3.4.70 GAP-GetBondedDevicesIdentityInformation.Request

#### Description

Retrieves a list of the identity information of bonded devices, if any.

#### Parameters

**Table 328 GAP-GetBondedDevicesIdentityInformation.Request Parameters**

| Parameter  | Size (bytes) | Comments                                    |
|------------|--------------|---|
| OpGroup    | 1            | 0x47  |
| OpCode     | 1            | 0x3C  |
| Length     | 1            | Length in bytes of the following parameters |
| maxDevices | 1            | Maximum number of addresses to be obtained  |

### 3.4.71 GAP-GetBondedStaticAddresses.Request

#### Description

Retrieves a list of the static addresses of bonded devices.

#### Parameters

**Table 329 GAP-GetBondedStaticAddresses.Request Parameters**

| Parameter      | Size (bytes) | Comments                                    |
|----------------|--------------|---|
| OpGroup        | 1            | 0x47  |
| OpCode         | 1            | 0x0B  |
| Length         | 1            | Length in bytes of the following parameters |
| MaxNbOfDevices | 1            | Maximum number of addresses to be obtained  |

### 3.4.72 GAP-GetBondedStaticAddresses.Indication

#### Description

Returns a list with the static addresses of bonded devices.

#### Parameters

**Table 330 GAP-GetBondedStaticAddresses.Indication Parameters**

| Parameter           | Size (bytes)               | Comments                                    |
|---------------------|----------------------------|---|
| OpGroup             | 1                          | 0x47  |
| OpCode              | 1                          | 0x83  |
| Length              | 1                          | Length in bytes of the following parameters |
| NbOfDeviceAddresses | 1                          | The number of device addresses              |
| DeviceAddresses     | 6 x<br>NbOfDeviceAddresses | Device addresses list                       |

### 3.4.73 GAP-LeScGetLocalOobData.Request

#### Description

Retrieve local OOB data used for LE Secure Connections pairing.

#### Parameters

**Table 331 GAP-LeScGetLocalOobData.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x39   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.4.74 GAP-LeScPublicKeyRegenerated.Indication

#### Description

The private/public key pair used for LE Secure Connections pairing has been regenerated.

#### Parameters

**Table 332 GAP-LeScPublicKeyRegenerated.Indication Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0xB5   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.4.75 GAP-LeScRegeneratePublicKey.Request

#### Description

Regenerate the private/public key pair used for LE Secure Connections pairing.

#### Parameters

**Table 333 GAP-LeScRegeneratePublicKey.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x37   |
| Length    | 1            | 0x00 - This message does not have any parameters |



### 3.4.76 GAP-LeScSendKeypressNotificationPrivacy.Request

#### Description

Send a Keypress Notification to the peer.

#### Parameters

**Table 334 GAP-LeScSendKeypressNotificationPrivacy.Request Parameters**

| Parameter                         | Size (bytes) | Comments  |
|-----------------------------------|--------------|---|
| OpGroup                           | 1            | 0x47  |
| 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<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 335 GapLeScKeypressNotificationParams Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| keypressNotifType   | 1            | Possible values:<br>0x00: gKnPasskeyEntryStarted_c<br>0x01: gKnPasskeyDigitStarted_c<br>0x02: gKnPasskeyDigitErased_c<br>(gKnPasskeyDigitErased_c )<br>0x03: gKnPasskeyCleared_c<br>0x04: gKnPasskeyEntryCompleted_c |

### 3.4.77 GAP-LeScSetPeerOobData.Request

#### Description

Set peer OOB data used for LE Secure Connections pairing.

#### Parameters

**Table 336 GAP-LeScSetPeerOobData.Request Parameters**

| Parameter    | Size (bytes) | Comments                                       |
|--------------|--------------|--|
| OpGroup      | 1            | 0x47   |
| 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)            |

### 3.4.78 GAP-LeScValidateNumericValue.Request

#### Description

Validate the numeric value during the Numeric Comparison LE Secure Connections pairing.

**Table 337 Parameters GAP-LeScValidateNumericValue.Request Parameters**

| Parameter | Size (bytes) | Comments  |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| 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 |

### 3.4.79 GAP-LoadCustomPeerInformation.Request

#### Description

Loads the custom peer information in raw data format.

#### Parameters

**Table 338 GAP-LoadCustomPeerInformation.Request Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x1F  |
| Length    | 1            | Length in bytes of the following parameters |
| Deviceld  | 1            | Device ID of the GAP peer                   |
| Offset    | 2            | Data offset (offset from the beginning)     |
| InfoSize  | 2            | Data size                                   |

### 3.4.80 GAP-LoadCustomPeerInformation.Indication

#### Description

Returns the custom peer information in raw data format.

#### Parameters

**Table 339 GAP-LoadCustomPeerInformation.Indication Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x85  |
| Length    | 1            | Length in bytes of the following parameters |
| InfoSize  | 2            | Data size                                   |
| Info      | InfoSize     | Data value                                  |

### 3.4.81 GAP-LoadEncryptionInformation.Request

#### Description

Loads encryption key for a bonded device.

#### Parameters

**Table 340 GAP-LoadEncryptionInformation.Request Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x18  |
| Length    | 1            | Length in bytes of the following parameters |
| Deviceld  | 1            | Device ID of the peer                       |

### 3.4.82 GAP-LoadEncryptionInformation.Indication

#### Description

Returns the encryption key for a bonded device.

#### Parameters

**Table 341 GAP-LoadEncryptionInformation.Indication Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x84  |
| Length    | 1            | Length in bytes of the following parameters |
| LtkSize   | 1            | LTK size                                    |
| Ltk       | LtkSize      | LTK value                                   |

### 3.4.83 GAP-Pair.Request

#### Description

Initiate pairing with a peer device.

#### Parameters

**Table 342 GAP-Pair.Request Parameters**

| Parameter         | Size (bytes) | Comments   |
|-------------------|--------------|--|
| OpGroup           | 1            | 0x47   |
| 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<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 343 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<br>Possible values:<br>0x10: gMode1Level1_c (Mode 1 Level 1 - No Security)<br>0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication)<br>0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication)<br>0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing (BLE 4.2 only))<br>0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication)<br>0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication) |
| MaxEncryptionKeySize | 1            | Maximum LTK size supported by the device   |
| LocalloCapabilities  | 1            | I/O capabilities used to determine the pairing method<br>Possible values:  |

|                             |   |  |
|-----------------------------|---|--|
|                             |   | 0x00: gIoDisplayOnly_c (May display a PIN, no input)<br>0x01: gIoDisplayYesNo_c (May display a PIN and has a binary input (for example, YES and NO buttons))<br>0x02: gIoKeyboardOnly_c (Has keyboard input, no display)<br>0x03: gIoNone_c (No input and no display)<br>0x04: gIoKeyboardDisplay_c (Has keyboard input and display) |
| OobAvailable                | 1 | TRUE if this device has Out-of-Band data that can be used for authenticated pairing, FALSE otherwise   |
| CentralKeys                 | 1 | SMP keys to be distributed by the Central<br>Possible values:<br>0x00: gNoKeys_c (No key can be distributed)<br>0x01: gLtk_c (Long Term Key)<br>0x02: gLrk_c (Identity Resolving Key)<br>0x04: gCsrk_c (Connection Signature Resolving Key)  |
| PeripheralKeys              | 1 | SMP keys to be distributed by the Peripheral<br>Possible values:<br>0x00: gNoKeys_c (No key can be distributed)<br>0x01: gLtk_c (Long Term Key)<br>0x02: gLrk_c (Identity Resolving Key)<br>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   |

### 3.4.84 GAP-ProvideLongTermKey.Request

#### Description

Provides the Long Term Key to the controller for encryption setup.

#### Parameters

**Table 344 GAP-ProvideLongTermKey.Request Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x16  |
| Length    | 1            | Length in bytes of the following parameters |
| Deviceld  | 1            | The GAP peer who requested encryption       |
| LtkSize   | 1            | The Long Term Key size                      |
| Ltk       | LtkSize      | The Long Term Key                           |

### 3.4.85 GAP-ProvideOob.Request

#### Description

Provides the Out Of Band data for SMP pairing process.

#### Parameters

**Table 345 GAP-ProvideOob.Request Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x12  |
| Length    | 1            | Length in bytes of the following parameters |
| Deviceld  | 1            | The pairing device                          |
| Oob       | 16           | OOB data                                    |

### 3.4.86 GAP-ReadPublicDeviceAddress.Request

#### Description

Reads the device's public address from the controller.

#### Parameters

**Table 346 GAP-ReadPublicDeviceAddress.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x25   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.4.87 GAP-ReadRadioPowerLevel.Request

#### Description

Reads the power level of the controller's radio.

#### Parameters

**Table 347 GAP-ReadRadioPowerLevel.Request Parameters**

| Parameter  | Size (bytes) | Comments   |
|------------|--------------|--|
| OpGroup    | 1            | 0x47   |
| OpCode     | 1            | 0x2C   |
| Length     | 1            | Length in bytes of the following parameters  |
| TxReadType | 1            | Transmission read type<br>Possible values:<br>0x00: gTxPowerCurrentLevelInConnection_c (Reading the instantaneous TX power level in a connection)<br>0x01: gTxPowerMaximumLevelInConnection_c (Reading the maximum TX power level achieved during a connection)<br>0x02: gTxPowerLevelForAdvertising_c (Reading the TX power on the advertising channels)<br>0x03: gRssi_c (Reading the Received Signal Strength Indication in a connection) |
| Deviceld   | 1            | The Deviceld for which the command is intended   |



### 3.4.88 GAP-ReadWhiteListSize.Request

#### Description

Retrieves the size of the White List.

#### Parameters

**Table 348 GAP-ReadWhiteListSize.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x21   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.4.89 GAP-RegisterDeviceSecurityRequirements.Request

#### Description

Registers the device security requirements.

#### Parameters

**Table 349 GAP-RegisterDeviceSecurityRequirements.Request Parameters**

| Parameter                    | Size (bytes) | Comments  |
|------------------------------|--------------|---|
| OpGroup                      | 1            | 0x47  |
| 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<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 350 SecurityRequirements Parameter Structure**

| Structure Parameter            | Size (bytes) | Comments   |
|--------------------------------|--------------|--|
| MasterSecurityRequirements     | Variable     | Security requirements added to all services<br>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 351 MasterSecurityRequirements Parameter Structure**

| Structure Parameter      | Size (bytes) | Comments   |
|--------------------------|--------------|--|
| SecurityModeLevel        | 1            | Security mode and level<br>Possible values:<br>0x10: gMode1Level1_c (Mode 1 Level 1 - No Security)<br>0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication)<br>0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication)<br>0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing (BLE 4.2 only))<br>0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication)<br>0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication) |
| Authorization            | 1            | Authorization required   |
| MinimumEncryptionKeySize | 2            | Minimum encryption key (LTK) size  |

**Table 352 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<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 353 Requirements Parameter Structure**

| Structure Parameter | Size (bytes) | Comments  |
|---------------------|--------------|---|
| SecurityModeLevel   | 1            | Security mode and level<br>Possible values:<br>0x10: gMode1Level1_c (Mode 1 Level 1 - No Security)<br>0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication)<br>0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication) |

|                          |   |   |
|--------------------------|---|---|
|                          |   | 0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing (BLE 4.2 only))<br>0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication)<br>0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication) |
| Authorization            | 1 | Authorization required  |
| MinimumEncryptionKeySize | 2 | Minimum encryption key (LTK) size   |

### 3.4.90 GAP-RejectKeyExchangeRequest.Request

#### Description

Rejects the Key Exchange procedure with a paired peer.

#### Parameters

**Table 354 GAP-RejectKeyExchangeRequest.Request Parameters**

| Parameter | Size (bytes) | Comments  |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x15  |
| Length    | 1            | Length in bytes of the following parameters           |
| Deviceld  | 1            | The GAP peer who requested the Key Exchange procedure |

### 3.4.91 GAP-RejectPairing.Request

#### Description

Rejects the peer's authentication request.

#### Parameters

**Table 355 GAP-RejectPairing.Request Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x10  |
| Length    | 1            | Length in bytes of the following parameters |
| Deviceld  | 1            | The GAP peer who requested authentication   |

|        |   |   |
|--------|---|---|
| Reason | 1 | Pairing reject reason<br>Possible values:<br>0x02: gOobNotAvailable_c (This device does not have the required OOB for authenticated pairing)<br>0x03: gIncompatibleIoCapabilities_c (The combination of I/O capabilities does not allow pairing with the desired level of security)<br>0x05: gPairingNotSupported_c (This device does not support pairing)<br>0x06: gLowEncryptionKeySize_c (The peer's encryption key size is too low for this device's required security level)<br>0x08: gUnspecifiedReason_c (The host has rejected the pairing for an unknown reason)<br>0x09: gRepeatedAttempts_c (This device is the target of repeated unsuccessful pairing attempts and does not allow further pairing attempts at the moment)<br>0xF0: gLinkEncryptionFailed_c (Link could not be encrypted) |
|--------|---|---|

### 3.4.92 GAP-RejectPasskeyRequest.Request

#### Description

Rejects the passkey request from a peer.

#### Parameters

**Table 356 GAP-RejectPasskeyRequest.Request Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x13  |
| Length    | 1            | Length in bytes of the following parameters |
| Deviceld  | 1            | The GAP peer that requested a passkey entry |

### 3.4.93 GAP-RemoveAllBonds.Request

#### Description

Removes all bonds with other devices.

#### Parameters

**Table 357 GAP-RemoveAllBonds.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x2B   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.4.94 GAP-RemoveBond.Request

#### Description

Removes the bond with a device.

#### Parameters

**Table 358 GAP-RemoveBond.Request Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x2A  |
| Length    | 1            | Length in bytes of the following parameters |
| NvmIndex  | 1            | Index of the device in NVM bonding area     |

### 3.4.95 GAP-RemoveDeviceFromWhiteList.Request

#### Description

Removes a device address from the White List.

#### Parameters

**Table 359 GAP-RemoveDeviceFromWhiteList.Request Parameters**

| Parameter   | Size (bytes) | Comments  |
|-------------|--------------|---|
| OpGroup     | 1            | 0x47  |
| OpCode      | 1            | 0x24  |
| Length      | 1            | Length in bytes of the following parameters   |
| AddressType | 1            | The address type (public or random)<br>Possible values:<br>0x00: gPublic_c<br>0x01: gRandom_c |
| Address     | 6            | The address of the white-listed device  |

### 3.4.96 GAP-SaveCccd.Request

#### Description

Save the CCCD value for a specific client and CCCD handle.

#### Parameters

**Table 360 GAP-SaveCccd.Request Parameters**

| Parameter | Size (bytes) | Comments  |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x08  |
| Length    | 1            | Length in bytes of the following parameters   |
| Deviceld  | 1            | The peer GATT client  |
| Handle    | 2            | The handle of the CCCD as defined in the GATT Database  |
| Cccd      | 1            | The bit mask representing the CCCD value to be saved<br>Possible values:<br>0x00: gEmpty_c (Nothing is enabled)<br>0x01: gNotification_c (Enables notifications)<br>0x02: gIndication_c (Enabled indications) |

### 3.4.97 GAP-SaveCustomPeerInformation.Request

#### Description

Saves custom peer information in raw data format.

#### Parameters

**Table 361 GAP-SaveCustomPeerInformation.Request Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| 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  |



### 3.4.98 GAP-SaveDeviceName.Request

#### Description

Saves the name of a bonded device.

#### Parameters

**Table 362 GAP-SaveDeviceName.Request Parameters**

| Parameter | Size (bytes) | Comments  |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x27  |
| Length    | 1            | Length in bytes of the following parameters       |
| Deviceld  | 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              |

### 3.4.99 GAP-ScanningEventCommandFailed.Indication

#### Description

Event received when scanning could not be enabled or disabled.

#### Parameters

**Table 363 GAP-ScanningEventCommandFailed.Indication Parameters**

| Parameter  | Size (bytes) | Comments  |
|------------|--------------|---|
| OpGroup    | 1            | 0x47  |
| OpCode     | 1            | 0x9B  |
| Length     | 1            | Length in bytes of the following parameters   |
| 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: gHciSynchronousConnectionLimitToADeviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> <p>0x010D: gHciConnectionRejectedDueToLimitedResources_c</p> |

|  |  |   |
|--|--|---|
|  |  | 0x010E: gHciConnectionRejectedDueToSecurityReasons_c<br>0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c<br>0x0110: gHciConnectionAcceptTimeoutExceeded_c<br>0x0111: gHciUnsupportedFeatureOrParameterValue_c<br>0x0112: gHciInvalidHciCommandParameters_c<br>0x0113: gHciRemoteUserTerminatedConnection_c<br>0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c<br>0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c<br>0x0116: gHciConnectionTerminatedByLocalHost_c<br>0x0117: gHciRepeatedAttempts_c<br>0x0118: gHciPairingNotAllowed_c<br>0x0119: gHciUnknownLpmPdu_c<br>0x011A: gHciUnsupportedRemoteFeature_c<br>0x011B: gHciScoOffsetRejected_c<br>0x011C: gHciScolIntervalRejected_c<br>0x011D: gHciScoAirModeRejected_c<br>0x011E: gHciInvalidLpmParameters_c<br>0x011F: gHciUnspecifiedError_c<br>0x0120: gHciUnsupportedLpmParameterValue_c<br>0x0121: gHciRoleChangeNotAllowed_c<br>0x0122: gHciLLResponseTimeout_c<br>0x0123: gHciLmpErrorTransactionCollision_c<br>0x0124: gHciLmpPduNotAllowed_c<br>0x0125: gHciEncryptionModeNotAcceptable_c<br>0x0126: gHciLinkKeyCannotBeChanged_c<br>0x0127: gHciRequestedQosNotSupported_c<br>0x0128: gHciInstantPassed_c<br>0x0129: gHciPairingWithUnitKeyNotSupported_c<br>0x012A: gHciDifferentTransactionCollision_c<br>0x012B: gHciReserved_0x2B_c<br>0x012C: gHciQosNotAcceptableParameter_c<br>0x012D: gHciQosRejected_c<br>0x012E: gHciChannelClassificationNotSupported_c<br>0x012F: gHciInsufficientSecurity_c<br>0x0130: gHciParameterOutOfMandatoryRange_c<br>0x0131: gHciReserved_0x31_c<br>0x0132: gHciRoleSwitchPending_c |
|--|--|---|

|  |  |  |
|--|--|--|
|  |  | 0x0133: gHciReserved_0x33_c<br>0x0134: gHciReservedSlotViolation_c<br>0x0135: gHciRoleSwitchFailed_c<br>0x0136: gHciExtendedInquiryResponseTooLarge_c<br>0x0137: gHciSecureSimplePairingNotSupportedByHost_c<br>0x0138: gHciHostBusyPairing_c<br>0x0139:<br>gHciConnectionRejectedDueToNoSuitableChannelFound_c<br>0x013A: gHciControllerBusy_c<br>0x013B: gHciUnacceptableConnectionParameters_c<br>0x013C: gHciDirectedAdvertisingTimeout_c<br>0x013D: gHciConnectionTerminatedDueToMicFailure_c<br>0x013E: gHciConnectionFailedToBeEstablished_c<br>0x013F: gHciMacConnectionFailed_c<br>0x0140: gHciCoarseClockAdjustmentRejected_c<br>0x01A0: gHciAlreadyInit_c<br>0x01A1: gHciInvalidParameter_c<br>0x01A2: gHciCallbackNotInstalled_c<br>0x01A3: gHciCallbackAlreadyInstalled_c<br>0x01A4: gHciCommandNotSupported_c<br>0x01A5: gHciEventNotSupported_c<br>0x01A6: gHciTransportError_c<br>0x03F0: gL2caAlreadyInit_c<br>0x03F1: gL2caInsufficientResources_c<br>0x03F2: gL2caCallbackNotInstalled_c<br>0x03F3: gL2caCallbackAlreadyInstalled_c<br>0x03F4: gL2caLePsmInvalid_c<br>0x03F5: gL2caLePsmAlreadyRegistered_c<br>0x03F6: gL2caLePsmNotRegistered_c<br>0x03F7: gL2caLePsmInsufficientResources_c<br>0x03F8: gL2caChannelInvalid_c<br>0x03F9: gL2caChannelClosed_c<br>0x03FA: gL2caChannelAlreadyConnected_c<br>0x03FB: gL2caConnectionParametersRejected_c<br>0x03FC: gL2caChannelBusy_c<br>0x03FE: gL2caInvalidParameter_c<br>0x03FF: gL2caError_c<br>0x0401: gSmNullCBFunction_c<br>0x0402: gSmCommandNotSupported_c<br>0x0403: gSmUnexpectedCommand_c |
|--|--|--|

|  |  |   |
|--|--|---|
|  |  | 0x0404: gSmInvalidCommandCode_c<br>0x0405: gSmInvalidCommandLength_c<br>0x0406: gSmInvalidCommandParameter_c<br>0x0407: gSmInvalidDeviceId_c<br>0x0408: gSmInvalidInternalOperation_c<br>0x0409: gSmInvalidConnectionHandle_c<br>0x040A: gSmImproperKeyDistributionField_c<br>0x040B: gSmUnexpectedKeyType_c<br>0x040C: gSmUnexpectedPairingTerminationReason_c<br>0x040D: gSmUnexpectedKeyset_c<br>0x040E: gSmSmpTimeoutOccurred_c<br>0x040F: gSmUnknownSmpPacketType_c<br>0x0410: gSmInvalidSmpPacketLength_c<br>0x0411: gSmInvalidSmpPacketParameter_c<br>0x0412: gSmReceivedUnexpectedSmpPacket_c<br>0x0413: gSmReceivedSmpPacketFromUnknownDevice_c<br>0x0414: gSmReceivedUnexpectedHciEvent_c<br>0x0415: gSmReceivedHciEventFromUnknownDevice_c<br>0x0416: gSmInvalidHciEventParameter_c<br>0x0417: gSmLlConnectionEncryptionInProgress_c<br>0x0418: gSmLlConnectionEncryptionFailure_c<br>0x0419: gSmInsufficientResources_c<br>0x041A: gSmOobDataAddressMismatch_c<br>0x041A: gSmSmpPacketReceivedAfterTimeoutOccurred_c<br>0x0431: gSmPairingErrorPasskeyEntryFailed_c<br>0x0432: gSmPairingErrorConfirmValueFailed_c<br>0x0433: gSmPairingErrorCommandNotSupported_c<br>0x0434: gSmPairingErrorInvalidParameters_c<br>0x0435: gSmPairingErrorUnknownReason_c<br>0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c<br>0x0461: gSmTbInvalidDataSignature_c<br>0x0501: gAttInvalidHandle_c<br>0x0502: gAttReadNotPermitted_c<br>0x0503: gAttWriteNotPermitted_c<br>0x0504: gAttInvalidPdu_c<br>0x0505: gAttInsufficientAuthentication_c<br>0x0506: gAttRequestNotSupported_c<br>0x0507: gAttInvalidOffset_c<br>0x0508: gAttInsufficientAuthorization_c |
|--|--|---|

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

### 3.4.100 GAP-ScanningEventDeviceScanned.Indication

#### Description

Event received when an advertising device has been scanned.

#### Parameters

**Table 364 GAP-ScanningEventDeviceScanned.Indication Parameters**

| Parameter     | Size (bytes) | Comments  |
|---------------|--------------|---|
| OpGroup       | 1            | 0x47  |
| OpCode        | 1            | 0x9C  |
| Length        | 1            | Length in bytes of the following parameters   |
| ScannedDevice | Variable     | Scanned device information<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 365 ScannedDevice Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| AddressType         | 1            | Device's advertising address type<br>Possible values:<br>0x00: gPublic_c<br>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  |
| AdvEventType        | 1            | Advertising report type, indicating what type of event generated this data (advertising, scan response)<br>Possible values:<br>0x00: gBleAdvRepAdvInd_c (Connectable undirected advertising (ADV_IND))<br>0x01: gBleAdvRepAdvDirectInd_c (Connectable directed advertising (ADV_DIRECT_IND))<br>0x02: gBleAdvRepAdvScanInd_c (Scannable undirected advertising (ADV_SCAN_IND)) |

|                            |   |  |
|----------------------------|---|--|
|                            |   | 0x03: gBleAdvRepAdvNonconnInd_c (Non Connectable undirected advertising (ADV_NONCONN_IND))<br>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  |

### 3.4.101 GAP-ScanningEventStateChanged.Indication

#### Description

Event received when scanning had been successfully enabled or disabled.

#### Parameters

**Table 366 GAP-ScanningEventStateChanged.Indication Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x9A   |
| Length    | 1            | 0x00 - This message does not have any parameters |



### 3.4.102 GAP-SendSlaveSecurityRequest.Request

#### Description

Informs the peer Master about local security requirements.

#### Parameters

**Table 367 GAP-SendSlaveSecurityRequest.Request Parameters**

| Parameter         | Size (bytes) | Comments   |
|-------------------|--------------|--|
| OpGroup           | 1            | 0x47   |
| 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            | The level of security requested<br>Possible values:<br>0x10: gMode1Level1_c (Mode 1 Level 1 - No Security)<br>0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication)<br>0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication)<br>0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing (BLE 4.2 only))<br>0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication)<br>0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication) |

### 3.4.103 GAP-SendSmpKeys.Request

#### Description

Sends the SMP keys during SMP Key Exchange procedure.

#### Parameters

**Table 368 GAP-SendSmpKeys.Request Parameters**

| Parameter | Size (bytes) | Comments  |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x14  |
| Length    | 1            | Length in bytes of the following parameters   |
| Deviceld  | 1            | The GAP peer who initiated the procedure  |
| Keys      | Variable     | The SMP keys of the local device<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 369 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)<br>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<br>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 370 LtkInfo Parameter Structure**

| Structure Parameter | Size (bytes) | Comments                   |
|---------------------|--------------|----------------------------|
| LtkSize             | 1            | Encryption Key Size        |
| Ltk                 | LtkSize      | Long Term (Encryption) Key |

**Table 371 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 372 AddressInfo Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| DeviceAddressType   | 1            | Public or Random address<br>Possible values:<br>0x00: gPublic_c<br>0x01: gRandom_c |
| DeviceAddress       | 6            | Device Address   |

### 3.4.104 GAP-SetAdvertisingData.Request

#### Description

Sets the advertising and scan response data.

#### Parameters

**Table 373 GAP-SetAdvertisingData.Request Parameters**

| Parameter                | Size (bytes) | Comments  |
|--------------------------|--------------|---|
| OpGroup                  | 1            | 0x47  |
| 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<br>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<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 374 AdvertisingData Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| NbOfAdStructures    | 1            | Number of advertising data structures  |
| AdStructures        | Variable     | Advertising data structures<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 375 AdStructures Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| Length              | 1            | Advertising data length  |
| Type                | 1            | Advertising data type<br>Possible values:<br>0x01: gAdFlags_c (Defined by the Bluetooth SIG)<br>0x02: gAdIncomplete16bitServiceList_c (Defined by the Bluetooth SIG) |

|  |  |  |
|--|--|--|
|  |  | <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> <p>0x17: gAdPublicTargetAddress_c (Defined by the Bluetooth SIG)</p> <p>0x18: gAdRandomTargetAddress_c (Defined by the Bluetooth SIG)</p> <p>0x19: gAdAppearance_c (Defined by the Bluetooth SIG)</p> <p>0x1A: gAdAdvertisingInterval_c (Defined by the Bluetooth SIG)</p> <p>0x1B: gAdLeDeviceAddress_c (Defined by the Bluetooth SIG)</p> <p>0x1C: gAdLeRole_c (Defined by the Bluetooth SIG)</p> <p>0x1D: gAdSimplePairingHashC256_c (Defined by the Bluetooth SIG)</p> |
|--|--|--|

|      |        |   |
|------|--------|---|
|      |        | 0x1E: gAdSimplePairingRandomizerR256_c (Defined by the Bluetooth SIG)<br>0x1F: gAdServiceSolicitationList32bit_c (Defined by the Bluetooth SIG)<br>0x20: gAdServiceData32bit_c (Defined by the Bluetooth SIG)<br>0x21: gAdServiceData128bit_c (Defined by the Bluetooth SIG)<br>0x3D: gAd3dInformationData_c (Defined by the Bluetooth SIG)<br>0xFF: gAdManufacturerSpecificData_c (Defined by the Bluetooth SIG) |
| Data | Length | Advertising data  |

**Table 376 ScanResponseData Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| NbOfAdStructures    | 1            | Number of advertising data structures  |
| AdStructures        | Variable     | Advertising data structures<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 377 AdStructures Parameter Structure**

| Structure Parameter | Size (bytes) | Comments  |
|---------------------|--------------|---|
| Length              | 1            | Advertising data length   |
| Type                | 1            | Advertising data type<br>Possible values:<br>0x01: gAdFlags_c (Defined by the Bluetooth SIG)<br>0x02: gAdIncomplete16bitServiceList_c (Defined by the Bluetooth SIG)<br>0x03: gAdComplete16bitServiceList_c (Defined by the Bluetooth SIG)<br>0x04: gAdIncomplete32bitServiceList_c (Defined by the Bluetooth SIG)<br>0x05: gAdComplete32bitServiceList_c (Defined by the Bluetooth SIG)<br>0x06: gAdIncomplete128bitServiceList_c (Defined by the Bluetooth SIG)<br>0x07: gAdComplete128bitServiceList_c (Defined by the Bluetooth SIG)<br>0x08: gAdShortenedLocalName_c (Defined by the Bluetooth SIG)<br>0x09: gAdCompleteLocalName_c (Defined by the Bluetooth SIG) |

|  |  |  |
|--|--|--|
|  |  | <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> <p>0x17: gAdPublicTargetAddress_c (Defined by the Bluetooth SIG)</p> <p>0x18: gAdRandomTargetAddress_c (Defined by the Bluetooth SIG)</p> <p>0x19: gAdAppearance_c (Defined by the Bluetooth SIG)</p> <p>0x1A: gAdAdvertisingInterval_c (Defined by the Bluetooth SIG)</p> <p>0x1B: gAdLeDeviceAddress_c (Defined by the Bluetooth SIG)</p> <p>0x1C: gAdLeRole_c (Defined by the Bluetooth SIG)</p> <p>0x1D: gAdSimplePairingHashC256_c (Defined by the Bluetooth SIG)</p> <p>0x1E: gAdSimplePairingRandomizerR256_c (Defined by the Bluetooth SIG)</p> <p>0x1F: gAdServiceSolicitationList32bit_c (Defined by the Bluetooth SIG)</p> <p>0x20: gAdServiceData32bit_c (Defined by the Bluetooth SIG)</p> <p>0x21: gAdServiceData128bit_c (Defined by the Bluetooth SIG)</p> <p>0x3D: gAd3dInformationData_c (Defined by the Bluetooth SIG)</p> <p>0xFF: gAdManufacturerSpecificData_c (Defined by the Bluetooth SIG)</p> |
|--|--|--|

|      |        |                  |
|------|--------|------------------|
| Data | Length | Advertising data |
|------|--------|------------------|



### 3.4.105 GAP-SetAdvertisingParameters.Request

#### Description

Sets the advertising parameters.

#### Parameters

**Table 378 GAP-SetAdvertisingParameters.Request Parameters**

| Parameter             | Size (bytes) | Comments  |
|-----------------------|--------------|---|
| OpGroup               | 1            | 0x47  |
| OpCode                | 1            | 0x03  |
| Length                | 1            | Length in bytes of the following parameters   |
| AdvertisingParameters | Variable     | Advertising parameters<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 379 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<br>Possible values:<br>0x00: gConnectableUndirected_c (Answers to both connect and scan requests)<br>0x01: gDirectedHighDutyCycle_c (Answers only to connect requests; smaller advertising interval for quicker connection)<br>0x02: gScannable_c (Answers only to scan requests)<br>0x03: gNonConnectable_c (Does not answer to connect nor scan requests)<br>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<br>Possible values:<br>0x00: gPublic_c<br>0x01: gRandom_c   |

|                 |   |   |
|-----------------|---|---|
|                 |   |   |
| PeerAddressType | 1 | Address type of the peer; only used in directed advertising and Enhanced Privacy<br>Possible values:<br>0x00: gPublic_c<br>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<br>Possible values:<br>0x01: gChannel37_c (Bit for channel 37)<br>0x02: gChannel38_c (Bit for channel 38)<br>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<br>Possible values:<br>0x00: gProcessAll_c (Accept all connect and scan requests)<br>0x01: gProcessConnAllScanWL_c (Accept all connect requests, but scan requests only from devices in White List)<br>0x02: gProcessScanAllConnWL_c (Accept all scan requests, but connect requests only from devices in White List)<br>0x03: gProcessWhiteListOnly_c (Accept connect and scan requests only from devices in White List) |

### 3.4.106 GAP-SetDefaultPairingParameters.Request

#### Description

Sets the default pairing parameters to be used by automatic pairing procedures.

#### Parameters

**Table 380 GAP-SetDefaultPairingParameters.Request Parameters**

| Parameter                 | Size (bytes) | Comments  |
|---------------------------|--------------|---|
| OpGroup                   | 1            | 0x47  |
| 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 138 - 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<br>Possible values:<br>0x10: gMode1Level1_c (Mode 1 Level 1 - No Security)<br>0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication)<br>0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication)<br>0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing (BLE 4.2 only))<br>0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication)<br>0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication) |
| MaxEncryptionKeySize | 1            | Maximum LTK size supported by the device   |
| LocalloCapabilities  | 1            | I/O capabilities used to determine the pairing method  |

|                             |   |   |
|-----------------------------|---|---|
|                             |   | <p>Possible values:</p> <p>0x00: gloDisplayOnly_c (May display a PIN, no input)</p> <p>0x01: gloDisplayYesNo_c (May display a PIN and has a binary input (for example, YES and NO buttons))</p> <p>0x02: gloKeyboardOnly_c (Has keyboard input, no display)</p> <p>0x03: gloNone_c (No input and no display)</p> <p>0x04: gloKeyboardDisplay_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  |

### 3.4.107 GAP-SetLocalPasskey.Request

#### Description

Sets the SMP passkey for this device.

#### Parameters

**Table 381 GAP-SetLocalPasskey.Request Parameters**

| Parameter | Size (bytes) | Comments                                    |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| OpCode    | 1            | 0x19  |
| Length    | 1            | Length in bytes of the following parameters |
| Passkey   | 4            | The SMP passkey                             |

### 3.4.108 GAP-SetRandomAddress.Request

#### Description

Sets a random address into the controller.

#### Parameters

**Table 382 GAP-SetRandomAddress.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x2E   |
| Length    | 1            | Length in bytes of the following parameters                              |
| Address   | 6            | The Private Resolvable, Private Non-Resolvable, or Static Random Address |

### 3.4.109 GAP-SetScanMode.Request

#### Description

Sets internal scan filters and actions.

#### Parameters

**Table 383 GAP-SetScanMode.Request Parameters**

| Parameter         | Size (bytes) | Comments   |
|-------------------|--------------|--|
| OpGroup           | 1            | 0x47   |
| OpCode            | 1            | 0x2F   |
| Length            | 1            | Length in bytes of the following parameters  |
| ScanMode          | 1            | The scan mode to be activated.<br>Possible values:<br>0x00: gDefaultScan_c (Reports all scanned devices to the application)<br>0x01: gLimitedDiscovery_c (Reports only devices in Limited Discoverable Mode, in other words, containing the Flags AD with the LE Limited Discoverable Flag set)<br>0x02: gGeneralDiscovery_c (Reports only devices in General Discoverable Mode, in other words, containing the Flags AD with the LE General Discoverable Flag set)<br>0x03: gAutoConnect_c (Automatically connects with devices with known addresses and does not report any scanned device to the application) |
| AutoConnectParams | Variable     | Parameters for the Auto Connect Scan Mode<br>Structure type parameter. See the detailed table below for parameter structure.   |

**Table 384 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     | The connection request parameters<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 385 AutoConnectData 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<br><br>Possible values:<br><br>0x00: gUseDeviceAddress_c (Initiates a connection with a specific device identified by its address)<br><br>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<br><br>Possible values:<br><br>0x00: gPublic_c<br><br>0x01: gRandom_c   |
| PeerAddressType     | 1            | When connecting to a specific device, this indicates that device's address type - default public address<br><br>Possible values:<br><br>0x00: gPublic_c<br><br>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                                 |
| 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 |

### 3.4.110 GAP-StartAdvertising.Request

#### Description

Commands the controller to start advertising.

#### Parameters

**Table 386 GAP-StartAdvertising.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x05   |
| Length    | 1            | 0x00 - This message does not have any parameters |



### 3.4.111 GAP-StartScanning.Request

#### Description

Sets the scanning parameters (optionally) and begins scanning.

#### Parameters

**Table 387 GAP-StartScanning.Request Parameters**

| Parameter                  | Size (bytes) | Comments   |
|----------------------------|--------------|--|
| OpGroup                    | 1            | 0x47   |
| OpCode                     | 1            | 0x1A   |
| 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<br>Structure type parameter. See the detailed table below for parameter structure. |

**Table 388 ScanningParameters Parameter Structure**

| Structure Parameter | Size (bytes) | Comments   |
|---------------------|--------------|--|
| Type                | 1            | Scanning type - default passive<br>Possible values:<br>0x00: gPassive_c (Passive Scanning - advertising packets are immediately reported to the Host)<br>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<br>Possible values:<br>0x00: gPublic_c<br>0x01: gRandom_c  |
| FilterPolicy        | 1            | Indicates whether the advertising packets are filtered using the White List - default does not use White List  |

|  |  |  |
|--|--|--|
|  |  | <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> |
|--|--|--|

### 3.4.112 GAP-StopAdvertising.Request

#### Description

Commands the controller to stop advertising.

#### Parameters

**Table 389 GAP-StopAdvertising.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x06   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.4.113 GAP-StopScanning.Request

#### Description

Commands the controller to stop scanning.

#### Parameters

**Table 390 GAP-StopScanning.Request Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| OpCode    | 1            | 0x1B   |
| Length    | 1            | 0x00 - This message does not have any parameters |

### 3.4.114 GAP-UpdateConnectionParameters.Request

#### Description

Request a set of new connection parameters.

#### Parameters

**Table 391 GAP-UpdateConnectionParameters.Request Parameters**

| Parameter         | Size (bytes) | Comments  |
|-------------------|--------------|---|
| OpGroup           | 1            | 0x47  |
| 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                    |
| MinCeLength       | 2            | The minimum connection event length                 |
| MaxCeLength       | 2            | The maximum connection event length                 |

### 3.4.115 Gap-UpdateLeDataLength.Request

#### Description

Update the Tx Data parameters.

#### Parameters

**Table 392 Gap-UpdateLeDataLength.Request Parameters**

| Parameter | Size (bytes) | Comments                                       |
|-----------|--------------|--|
| OpGroup   | 1            | 0x47   |
| 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                      |

### 3.4.116 GAP-VerifyPrivateResolvableAddress.Request

#### Description

Verifies a Private Resolvable Address with a bonded device's IRK.

#### Parameters

**Table 393 GAP-VerifyPrivateResolvableAddress.Request Parameters**

| Parameter | Size (bytes) | Comments  |
|-----------|--------------|---|
| OpGroup   | 1            | 0x47  |
| 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 394 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:<br>0x00: FALSE<br>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.Confirm description.

#### Parameters

**Table 395 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:<br>0x00: gSuccess (Success)<br>0xFF: gError (Error) |

### 3.5.3 FSCI-Error.Indication

#### Description

FSCI is reporting an error condition.

#### Parameters

**Table 396 FSCI-Error.Indication Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0xA4   |
| OpCode    | 1            | 0xFE   |
| Length    | 1            | Length in bytes of the following parameters  |
| Status    | 1            | Occurred error<br>Possible values:<br>0x00: gFsciSuccess_c<br>0xF0: gFsciSAPDisabled_c<br>0xF3: gFsciAppMsgTooBig_c<br>0xF4: gFsciOutOfMessages_c<br>0xF7: gFsciUnknownOpcodeGroup_c<br>0xF8: gFsciOpcodeGroupsIsDisabled_c<br>0xFD: gFsciUnknownOpcode_c<br>0xFE: gFsciTooBig_c<br>0xFF: gFsciError_c |

### 3.5.4 FSCI-GetWakeupReason.Request

#### Description

FSCI-GetWakeupReason.Request description.

#### Parameters

**Table 397 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 398 FSCI-GetWakeupReason.Response Parameters**

| Parameter    | Size (bytes) | Comments                                    |
|--------------|--------------|---|
| OpGroup      | 1            | 0xA4  |
| 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 399 FSCI-WakeUp.Indication Parameters**

| Parameter | Size (bytes) | Comments   |
|-----------|--------------|--|
| OpGroup   | 1            | 0xA4   |
| OpCode    | 1            | 0x71   |
| Length    | 1            | 0x00 - This message does not have any parameters |



## 4 Revision history

This table summarizes revisions to this document.

| Table 400 Revision history |         |                        |
|----------------------------|---------|------------------------|
| Revision number            | Date    | Substantive changes    |
| 0                          | 06/2015 | Initial release        |
| 1                          | 10/2015 | Added new applications |
| 2                          | 04/2016 | Added new BLE 4.2 API  |
| 3                          | 07/2016 | Updates for Kinetis W  |
| 4                          | 09/2016 | Public information     |

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