PP-Module for Bluetooth

Version: 1.0
2021-04-15
National Information Assurance Partnership

Revision History

Version	Date	Comment
1.0	2021-04-15	Initial Release

Contents

1 Introduction
1.1 Overview
1.2 Terms
1.2.1 Common Criteria Terms
1.2.2 Technical Terms
1.3 Compliant Targets of Evaluation
1.3.1 TOE Boundary
1.4 Use Cases
2 Conformance Claims
3 Security Problem Description
3.1 Threats
3.2 Assumptions
3.3 Organizational Security Policies
4 Security Objectives
4.1 Security Objectives for the TOE
4.2 Security Objectives for the Operational Environment
4.3 Security Objectives Rationale
5 Security Requirements
5.1 mobile devices PP Security Functional Requirements Direction
5.1.1 Modified SFRs
5.1.1.1 Security Management (FMT)
5.1.2 Additional SFRs
5.1.2.1 Security Management (FMT)
5.2 General Purpose Operating Systems PP Security Functional Requirements Direction
5.2.1 Modified SFRs
5.2.1.1 Security Management (FMT)
5.2.2 Additional SFRs
5.2.2.1 Security Management (FMT)
5.3 TOE Security Functional Requirements
5.3.1 Security Audit (FAU)
5.3.2 Cryptographic Support (FCS)
5.3.3 Identification and Authentication (FIA)
5.3.4 Trusted Path/Channels (FTP)
5.4 TOE Security Functional Requirements Rationale
5.5 TOE Security Assurance Requirements
6 Consistency Rationale
6.1 Protection Profile for mobile devices
6.1.1 Consistency of TOE Type
6.1.2 Consistency of Security Problem Definition
6.1.3 Consistency of Objectives
6.1.4 Consistency of Requirements
6.2 Protection Profile for General Purpose Operating Systems
6.2.1 Consistency of TOE Type
6.2.2 Consistency of Security Problem Definition
6.2.3 Consistency of Objectives
6.2.4 Consistency of Requirements
Appendix A - Optional SFRs
A.1 Strictly Optional Requirements
A.2 Objective Requirements
A.2.1 Identification and Authentication
A.3 Implementation-Based Requirements
Appendix B - Selection-Based Requirements
B.1 Trusted Path/Channels
Appendix C - Extended Component Definitions
C.1 Extended Components Table
C.2 Extended Component Definitions
C.2.1 Cryptographic Support (FCS)
C.2.1.1 FCS_CKM_EXT Cryptographic Key Management
C.2.2 Identification and Authentication (FIA)
C.2.2.1 FIA_BLT_EXT Bluetooth Pairing
C.2.3 Trusted Path/Channels (FTP)
C.2.3.1 FTP_BLT_EXT Bluetooth Trusted Communications
Appendix D - Implicitly Satisfied Requirements
Appendix E - Entropy Documentation and Assessment
Appendix F - Acronyms
Appendix G - Bibliography

1 Introduction

1.1 Overview

The scope of the Bluetooth PP-Module is to describe the security functionality of Bluetooth technology in terms of [CC] and to define functional and assurance requirements for the Bluetooth capability of mobile devices and operating systems. Bluetooth is a communications standard for short-range wireless transmissions. Bluetooth is implemented in many commercial devices as a method for wirelessly connecting devices or accessories. This PP-Module is intended for use with the following Base-PPs:

- General Purpose Operating System (GPOS) Protection Profile, Version 4.2.1
- Mobile Device Fundamentals (MDF) Protection Profile, Version 3.2

These Base-PPs are valid because consumer-grade desktop and mobile devices may both have Bluetooth hardware radios and so both desktop and mobile operating systems have the software/firmware capability to allow products to use them.

1.2 Terms

The following sections list Common Criteria and technology terms used in this document.

1.2.1 Common Criteria Terms

Assurance	Grounds for confidence that a TOE meets the SFRs [CC].
Base Protection Profile (Base-PP)	Protection Profile used as a basis to build a PP-Configuration.
Collaborative Protection Profile (cPP)	A Protection Profile developed by international technical communities and approved by multiple schemes
Common Criteria (CC)	Common Criteria for Information Technology Security Evaluation (International Standard ISO/IEC 15408).
Common Criteria Testing Laboratory	Within the context of the Common Criteria Evaluation and Validation Scheme (CCEVS), an IT security evaluation facility, accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) and approved by the NIAP Validation Body to conduct Common Criteria-based evaluations.
Common Evaluation Methodology (CEM)	Common Evaluation Methodology for Information Technology Security Evaluation.
Distributed TOE	A TOE composed of multiple components operating as a logical whole.
Extended Package (EP)	A deprecated document form for collecting SFRs that implement a particular protocol, technology, or functionality. See Functional Packages.
Functional Package (FP)	A document that collects SFRs for a particular protocol, technology, or functionality.
Operational Environment (OE)	Hardware and software that are outside the TOE boundary that support the TOE functionality and security policy.
Protection Profile (PP)	An implementation-independent set of security requirements for a category of products.
Protection Profile Configuration (PP-Configuration)	A comprehensive set of security requirements for a product type that consists of at least one Base-PP and at least one PP-Module.
Protection Profile Module (PP-Module)	An implementation-independent statement of security needs for a TOE type complementary to one or more Base Protection Profiles.
Security Assurance Requirement (SAR)	A requirement to assure the security of the TOE.

Security Functional Requirement (SFR)	A requirement for security enforcement by the TOE.
Security Target (ST)	A set of implementation-dependent security requirements for a specific product.
Target of Evaluation (TOE)	The product under evaluation.
TOE Security Functionality (TSF)	The security functionality of the product under evaluation.
TOE Summary Specification (TSS)	A description of how a TOE satisfies the SFRs in an ST.

1.2.2 Technical Terms

Authentication	Verifying the identity of communicating devices based on their Bluetooth address. Bluetooth does not provide native user authentication.
Authorization	Allowing the control of resources by ensuring that a device is authorized to use a service before permitting it to do so.
BD_ADDR	The Bluetooth device Address, which is used to identify a Bluetooth device.
BR/EDR	Bluetooth basic rate (BR) and enhanced data rate (EDR).
BR/EDR Controller	A term referring to the Bluetooth Radio, Baseband, Link Manager, and HCI layers.
BR/EDR Piconet Physical Channel	A Channel that is divided into time slots in which each slot is related to an RF hop frequency. Consecutive hops normally correspond to different RF hop frequencies and occur at a standard hop rate of 1600 hops per second. These consecutive hops follow a pseudo-random hopping sequence, hopping through a 79 RF channel set, or optionally fewer channels when Adaptive Frequency Hopping (AFH) is in use. BR/EDR/LE Bluetooth basic rate (BR), enhanced data rate (EDR) and low energy (LE).
Bluetooth	A wireless communication link operating in the unlicensed ISM band at 2.4 GHz using a frequency hopping transceiver. It allows real-time AV and data communications between Bluetooth Hosts. The link protocol is based on time slots.
Bluetooth Baseband	The part of the Bluetooth system that specifies or implements the medium access and physical layer procedures to support the exchange of real-time voice, data information streams, and ad hoc networking between Bluetooth devices.
Bluetooth Controller	A generic term referring to a Primary Controller with or without a Secondary Controller.
Bluetooth Device	A device that is capable of short-range wireless communications using the Bluetooth system.
Bluetooth Device Address	A 48 bit address used to identify each Bluetooth device.
Connect (to service)	The establishment of a connection to a service. If not already done, this also includes establishment of a physical link, logical transport, logical link and L2CAP channel.
Connectable device	A BR/EDR device in range that periodically listens on its page scan physical channel and will respond to a page on that channel. An LE device that is advertising using a connectable advertising event.
Connected devices	Two BR/EDR devices and with a physical link between them. Connecting A phase in the communication between devices when a connection between the devices is being established. The connecting phase follows after the link establishment phase is completed.
Connection	An interaction between two peer applications or higher layer protocols mapped onto an L2CAP channel.
Connection establishment	A procedure for creating a connection mapped onto a channel.
Connection event	A series of one or more pairs of interleaving data packets sent between a master and a slave on the same physical channel.

Creation of a secure connection	A procedure of establishing a connection, including authentication and encryption.
Creation of a trusted relationship	A procedure where the remote device is marked as a trusted device. This includes storing a common link key for future authentication, or pairing, when a link key is not available.
Device discovery	A procedure for retrieving the Bluetooth device address, clock, class-of-device field and used page scan mode from discoverable devices.
Discoverable Mode	A Bluetooth device that is performing inquiry scans in BR/EDR or advertising with a discoverable or connectable advertising event with a discoverable flag set in LE.
Discoverable device	A BR/EDR device in range that periodically listens on an inquiry scan physical channel and will respond to an inquiry on that channel. An LE device in range that is advertising with a connectable or scannable advertising event with a discoverable flag set in the advertising data. This device is in the discoverable mode.
Discovery procedure	A Bluetooth device that is carrying out the inquiry procedure in BR/EDR or scanning for advertisers using a discoverable or connectable advertising event with a discoverable flag set in LE.
Host	A logical entity defined as all of the layers below the non-core profiles and above the Host Controller interface (HCI); i.e. Bluetooth Host attached to a Bluetooth Controller may communicate with other Bluetooth Hosts attached to their Controllers as well.
L2CAP Channel	A logical connection on L2CAP level between two devices serving a single application or higher layer protocol.
L2CAP Channel establishment	A procedure for establishing a logical connection on L2CAP level.
LMP authentication	An LMP level procedure for verifying the identity of a remote device.
LMP pairing	A procedure that authenticates two devices and creates a common link key that can be used as a basis for a trusted relationship or a (single) secure connection.
Link	Shorthand for a logical link.
Link establishment	A procedure for establishing the default ACL link and hierarchy of links and channels between devices.
Link key	A secret that is known by two devices and is used to authenticate the link.
Logical Link Control and Adaptation Protocol (L2CAP)	A data link protocol used in the Bluetooth protocol stack.
Logical link	The lowest architectural level used to offer independent data transport services to clients of the Bluetooth system.
Name discovery	A procedure for retrieving the user-friendly name (the Bluetooth device name) of a connectable device.
OBEX Push	A method of Bluetooth one-way file transfer that is initiated by the entity that is providing the file.
PIN	A user-friendly value that can be used to authenticate connections to a device before pairing has taken place.
Paired device	A Bluetooth device for which a link key has been created (either before connection establishment was requested or during connecting phase).
Piconet	A collection of devices occupying a shared physical channel where one of the devices is the Piconet Master and the remaining devices are connected to it.
Piconet Master	The BR/EDR device in a piconet whose Bluetooth Clock and Bluetooth Device Address are used to define the piconet physical channel characteristics.
Piconet Slave	Any BR/EDR device in a piconet that is not the Piconet Master, but is connected to the Piconet Master.
RFCOMM	A transport protocol used in the Bluetooth protocol stack that emulates RS-232 serial port connections.
Trusted	A device that has a fixed relationship with another device and has full access to all services.

Device	
Unknown device	A Bluetooth device for which no information (Bluetooth Device Address, link key or other) is stored.
Untrusted Device	A device that does not have an established relationship with another Bluetooth device, which results in the untrusted device receiving restricted access to services.

1.3 Compliant Targets of Evaluation

The Target of Evaluation (TOE) in this PP-Module is a product that implements Bluetooth functionality. This PP-Module describes the extended security functionality of Bluetooth in terms of CC. This PP-Module extends the Protection Profile for General Purpose Operating Systems or Mobile Device Fundamentals. A compliant TOE will meet all mandatory SFRs defined in this PP-Module in addition to the mandatory SFRs of its claimed Base-PP. For each Base-PP, this PP-Module refines several of the Base-PP's SFRs so that they can accommodate the Bluetooth functionality defined by the PP-Module. A compliant TOE will claim all selection-based SFRs from this PP-Module and its Base-PP as needed based on the relevant selections in other requirements being chosen.

Note that [MDF] evaluation activities require certain tests to be performed against all radios present on the device. When the TOE also claims conformance to a PP-Configuration that includes this PP-Module, those tests are executed against the Bluetooth radio as well.

Also note that each Base-PP defines its own requirements for protection of data at rest. When the TOE also claims conformance to a PP-Configuration that includes this PP-Module, any data that is used by the TOE's Bluetooth implementation is expected to be stored using the same protection mechanisms.

1.3.1 TOE Boundary

The Bluetooth implementation is a logical component executing on an end user personal computing or mobile device. As such, the TOE must rely heavily on the TOE's operational environment (host platform, network stack, and operating system) for its execution domain and its proper usage. The TOE will rely on the IT environment to address much of the security functionality related to administrative functions. The physical boundary of the TOE includes the physical device on which it is installed, as this device will contain an internal or external Bluetooth radio that is used as the physical medium for transmitting and receiving data over the Bluetooth logical channel.

1.4 Use Cases

Requirements in this PP-Module are designed to address the security problems in at least the following use cases. These use cases are intentionally very broad, as many specific use cases exist within these larger categories.

[USE CASE 1] General-Purpose Operating System
: This use case is for a Bluetooth TOE that is part of a general-purpose operating system. Specifically, the Bluetooth TOE is expected to be part of the operating system itself and not a standalone third-party application that is installed on top of it.

[USE CASE 2] Mobile Device
: This use case is for a Bluetooth TOE that is part of a mobile operating system that runs on a mobile device. Specifically, the Bluetooth TOE is expected to be part of the mobile operating system itself and not a standalone third-party application that is acquired from the mobile vendor's application store.

2 Conformance Claims

Conformance Statement

This PP-Module inherits exact conformance as required from the specified Base-PP and as defined in the CC and CEM addenda for Exact Conformance, Selection-Based SFRs, and Optional SFRs (dated May 2017).

The following PPs and PP-Modules are allowed to be specified in a PP-Configuration with this PP-Module.

- PP-Module for VPN Client, Version 2.2
- PP-Module for MDM Agent, Version 1.0

CC Conformance Claims

This PP-Module is conformant to Parts 2 (extended) and 3 (extended) of Common Criteria Version 3.1, Release 5 [CC].

Package Claims

There are no package claims for this PP-Module.

3 Security Problem Description

All threats, assumptions, organizational security policies, and/or objectives that apply to this PP-Module are inherited from the Base-PP to which the TOE also conforms. This PP-Module does not add or remove any elements to the security problem definition given in the Base-PP. The SFRs defined in this PP-Module provide additional mechanisms for mitigating the threats already defined in the Base-PPs due to the fact that including a Bluetooth implementation introduces a new external interface to the underlying general-purpose OS or mobile device platform.

3.1 Threats

This PP-Module defines no additional threats beyond those defined in the base PPs. Note however that the SFRs defined in this PP-Module will assist in the mitigation of the following threats defined in the base PPs:

T.NETWORK_EAVESDROP
See MDF PP, Section 3.1 and GPOS PP, Section 3.1.

T.NETWORK_ATTACK
See MDF PP, Section 3.1 and GPOS PP, Section 3.1.

3.2 Assumptions

This document does not define any additional assumptions.

3.3 Organizational Security Policies

An organization deploying the TOE is expected to satisfy the organizational security policy listed below in addition to all organizational security policies defined by the claimed base PP.

This document does not define any additional OSPs.

4 Security Objectives

4.1 Security Objectives for the TOE

This PP-Module defines no additional TOE security objectives beyond those defined in the base PPs. Note however that the SFRs defined in this PP-Module will assist in the achievement of the following objectives defined in the base PP:

O.PROTECTED_COMMS
See MDF PP, Section 4.1 and GPOS PP, Section 4.1.

4.2 Security Objectives for the Operational Environment

This PP-Module does not define any objectives for the Operational Environment.

No environmental security objectives have been identified that are specific to Bluetooth technology. However, any environmental security objectives defined in the Base-PPs will also apply to the portion of the TOE that implements Bluetooth.

4.3 Security Objectives Rationale

This section describes how the assumptions, threats, and organizational security policies map to the security objectives.

Table 1: Security Objectives Rationale

Threat, Assumption, or OSP	Security Objectives	Rationale
T.NETWORK_EAVESDROP	O.PROTECTED_COMMS	The threat T.NETWORK_EAVESDROP is countered by O.PROTECTED_COMMS as this provides the capability to communicate using Bluetooth as a means to maintain the confidentiality of data that are transmitted outside of the TOE.
T.NETWORK_ATTACK	O.PROTECTED_COMMS	The threat T.NETWORK_ATTACK is countered by O.PROTECTED_COMMS as this provides the capability to communicate using Bluetooth as a means to maintain the confidentiality of data that are transmitted outside of the TOE.

5 Security Requirements

This chapter describes the security requirements which have to be fulfilled by the product under evaluation. Those requirements comprise functional components from Part 2 and assurance components from Part 3 of [CC]. The following conventions are used for the completion of operations:

- **Refinement** operation (denoted by **bold text** or ~~strikethrough text~~): is used to add details to a requirement (including replacing an assignment with a more restrictive selection) or to remove part of the requirement that is made irrelevant through the completion of another operation, and thus further restricts a requirement.
- **Selection** (denoted by *italicized text*): is used to select one or more options provided by the [CC] in stating a requirement.
- **Assignment** operation (denoted by *italicized text*): is used to assign a specific value to an unspecified parameter, such as the length of a password. Showing the value in square brackets indicates assignment.
- **Iteration** operation: is indicated by appending the SFR name with a slash and unique identifier suggesting the purpose of the operation, e.g. "/EXAMPLE1."

5.1 mobile devices PP Security Functional Requirements Direction

In a PP-Configuration that includes mobile devices PP, the TOE is expected to rely on some of the security functions implemented by the as a whole and evaluated against the mobile devices PP. The following sections describe any modifications that the ST author must make to the SFRs defined in the mobile devices PP in addition to what is mandated by Section 5.3 TOE Security Functional Requirements.

5.1.1 Modified SFRs

The SFRs listed in this section are defined in the mobile devices PP and relevant to the secure operation of the TOE.

5.1.1.1 Security Management (FMT)

FMT_SMF_EXT.1 Specification of Management Functions

FMT_SMF_EXT.1.1

This PP-Module does not modify this SFR as it is defined in the MDF PP. However, note that this PP-Module requires the list of radios specified in the assignment for management function 4 ("enable/disable [**assignment:** *list of all radios*]") to include Bluetooth radios. Bluetooth BR/EDR and Bluetooth LE will be listed separately if the TSF provides the ability to enable/disable them separately (i.e., if management function BT-3 below is claimed). Otherwise, both interfaces will be treated as one radio for that assignment.

5.1.2 Additional SFRs

This section defines additional SFRs that must be added to the TOE boundary in order to implement the functionality in any PP-Configuration where the mobile devices PP is claimed as the Base-PP.

5.1.2.1 Security Management (FMT)

FMT_SMF_EXT.1/BT Specification of Management Functions

FMT_SMF_EXT.1.1/BT

The TSF shall be capable of performing the following **Bluetooth** management functions:

#	Management Function	Impl.	User Only	Admin	Admin Only
1	BT-1. Configure the Bluetooth trusted channel. • Disable/enable the Discoverable (for BR/EDR) and Advertising (for LE) modes;	M	O	O	O
2	BT-2. Change the Bluetooth device name (separately for BR/EDR and LE);	O	O	O	O
3	BT-3. Provide separate controls for turning the BR/EDR and LE radios on and off;	O	O	O	O
4	BT-4. Allow/disallow the following additional wireless technologies to be used with Bluetooth: [**selection**: *Wi-Fi, NFC, [**assignment**: other wireless technologies]*];	O	O	O	O

5	BT-5. Configure allowable methods of Out of Band pairing (for BR/EDR and LE);	O	O	O	O
6	BT-6. Disable/enable the Discoverable (for BR/EDR) and Advertising (for LE) modes separately;	O	O	O	O
7	BT-7. Disable/enable the Connectable mode (for BR/EDR and LE);	O	O	O	O
8	BT-8. Disable/enable the Bluetooth [**assignment**: *list of Bluetooth service and/or profiles available on the OS (for BR/EDR and LE)*];	O	O	O	O
9	BT-9. Specify minimum level of security for each pairing (for BR/EDR and LE);	O	O	O	O

Application Note: As is the case with the [MDF PP], the first column lists the management function, the second column lists whether it is mandatory to implement the function and the remaining columns indicate whether it is mandatory, optional, or prohibited to implement the function by role as follows:

- The third column indicates functions that are to be restricted to the user (i.e. not available to the administrator).
- The fourth column indicates functions that are available to the administrator. These functions can still be available to the user, as long as the function is not restricted to the administrator (column 5).
- The fifth column indicates whether the function is to be restricted to the administrator when the device is enrolled and the administrator applies the indicated policy (i.e., MDM administration). This does not prevent the user from modifying a setting to make the function stricter, but the user cannot undo the configuration enforced by the administrator.

For columns 2-5, an 'M' indicates that it is mandatory, an 'O' indicates that it is optional, and a '-' indicates that it is prohibited.

(BT-1.) Management of the Discoverable and Advertising mode and management of the Bluetooth device name are mandatory. All other management functions for Bluetooth are currently objective.

(BT-2. optional) Requires management of the Bluetooth device name separately for BR/EDR and LE radios.

(BT-4. optional) May include disabling Wi-Fi being used as a part of Bluetooth High Speed and/or disabling NFC as an Out of Band pairing method for Bluetooth. May also include other wireless technologies beyond those already specified.

(BT-8. optional) The Bluetooth services and/or profiles that may be disabled should be listed for the user or administrator either by service and/or profile name or by the types of applications for which the service and/or profile is used.

(BT-9. optional) The minimum level of security permitted may be configurable for each individual pairing or for all Bluetooth pairings.

- If the TSF supports any of the BR/EDR security modes in the following list; it should provide a mechanism for the user to choose the minimum level of security to enforce for a particular device during the pairing process: Security Mode 1 (any level); Security Mode 2; (any level); Security Mode 3; (any level); Security Mode 4; Levels 0;1;2 (aside from the services permitted to use Mode 4; Level 0 in Bluetooth Core Specification version 4.2; Vol. 3; Part C; p. 325).
- If the TSF supports any of the LE security modes in the following list; it should provide a mechanism for the user to choose the minimum level of security to enforce for a particular device during the pairing process: Security Mode 1: Levels 1, 2; Security Mode 2, (any level).
- Examples of levels of security are the use of legacy pairing; the use of different types of Secure Simple Pairing; a requirement for Man-in-the-Middle protection; the enforcement of Secure Connections Only mode; etc.

Function-specific Application Notes:

Management of the Discoverable and Advertising mode and management of the Bluetooth device name are mandatory. All other management functions for Bluetooth are currently objective.

Function 3 requires management of the Bluetooth device name separately for BR/EDR and LE radios.

May include disabling Wi-Fi being used as a part of Bluetooth High Speed and/or disabling NFC as an Out of Band pairing method for Bluetooth. May also include

other wireless technologies beyond those already specified.

The Bluetooth services and/or profiles that may be disabled should be listed for the user or administrator either by service and/or profile name or by the types of applications for which the service and/or profile is used.

The minimum level of security permitted may be configurable for each individual pairing or for all Bluetooth pairings.

- If the TSF supports any of the BR/EDR security modes in the following list; it should provide a mechanism for the user to choose the minimum level of security to enforce for a particular device during the pairing process: Security Mode 1 (any level); Security Mode 2; (any level); Security Mode 3; (any level); Security Mode 4; Levels 0;1;2 (aside from the services permitted to use Mode 4; Level 0 in Bluetooth Core Specification version 4.2; Vol. 3; Part C; p. 325).
- If the TSF supports any of the LE security modes in the following list; it should provide a mechanism for the user to choose the minimum level of security to enforce for a particular device during the pairing process: Security Mode 1: Levels 1, 2; Security Mode 2, (any level).
- Examples of levels of security are the use of legacy pairing; the use of different types of Secure Simple Pairing; a requirement for Man-in-the-Middle protection; the enforcement of Secure Connections Only mode; etc.

5.2 General Purpose Operating Systems PP Security Functional Requirements Direction

In a PP-Configuration that includes General Purpose Operating Systems PP, the TOE is expected to rely on some of the security functions implemented by the as a whole and evaluated against the General Purpose Operating Systems PP. The following sections describe any modifications that the ST author must make to the SFRs defined in the General Purpose Operating Systems PP in addition to what is mandated by Section 5.3 TOE Security Functional Requirements.

5.2.1 Modified SFRs

The SFRs listed in this section are defined in the General Purpose Operating Systems PP and relevant to the secure operation of the TOE.

5.2.1.1 Security Management (FMT)

FMT_MOF_EXT.1 Management of Security Functions Behavior

FMT_MOF_EXT.1.1

There is no change to the text of this SFR. The SFR references FMT_SMF_EXT.1 and states that the OS shall permit the administrator role to perform the relevant functions listed in FMT_SMF_EXT.1. The function "Enable/Disable the Bluetooth interface" is listed as an optional management function in FMT_SMF_EXT.1 for both users and administrators. When this PP-Module is claimed, the administrator or user role must be able to enable/disable the Bluetooth interface. In other words, the function itself is moved from optional to mandatory, but this PP-Module does not require that it be implemented by a specific role. If the ST indicates that the administrator role can perform this function, then the restrictions imposed by FMT_MOF_EXT.1 will apply to it.

FMT_SMF_EXT.1 Specification of Management Functions

FMT_SMF_EXT.1.1

This PP-Module does not modify this SFR as it is defined in the GPOS PP. However, note that this PP-Module requires the function "Enable/disable Bluetooth interface" to be implemented, though this PP-Module does not mandate whether it be assigned to the Administrator or User role.

5.2.2 Additional SFRs

This section defines additional SFRs that must be added to the TOE boundary in order to implement the functionality in any PP-Configuration where the General Purpose Operating Systems PP is claimed as the Base-PP.

5.2.2.1 Security Management (FMT)

FMT_MOF_EXT.1/BT Management of Security Functions Behavior

FMT_MOF_EXT.1.1/BT

The OS shall restrict the ability to perform the function indicated in the "Administrator" column in FMT_SMF_EXT.1.1**/BT** to the administrator.

Application Note: The management functions in FMT_SMF_EXT.1/BT require the function BT-1 to be supported by the TOE and manageable by an Administrator at minimum. All other management functions, and what roles may perform them, are optional. The ST must make it clear which of these functions

are provided by the TOE and which roles are able to manage them.

FMT_SMF_EXT.1/BT Specification of Management Functions

FMT_SMF_EXT.1.1/BT

The OS shall be capable of performing the following **Bluetooth** management functions:

Function	Administrator	User
BT-1. Configure the Bluetooth trusted channel. • Disable/enable the Discoverable (for BR/EDR) and Advertising (for LE) modes;	X	O
BT-2. Change the Bluetooth device name (separately for BR/EDR and LE);	O	O
BT-3. Provide separate controls for turning the BR/EDR and LE radios on and off;	O	O
BT-4. Allow/disallow the following additional wireless technologies to be used with Bluetooth: [**selection**: *Wi-Fi*, *NFC*, *[**assignment**: other wireless technologies]*];	O	O
BT-5. Configure allowable methods of Out of Band pairing (for BR/EDR and LE);	O	O
BT-6. Disable/enable the Discoverable (for BR/EDR) and Advertising (for LE) modes separately;	O	O
BT-7. Disable/enable the Connectable mode (for BR/EDR and LE);	O	O
BT-8. Disable/enable the Bluetooth [**assignment**: *list of Bluetooth service and/or profiles available on the OS (for BR/EDR and LE)*];	O	O
BT-9. Specify minimum level of security for each pairing (for BR/EDR and LE);	O	O

Application Note: The ST should indicate which of the optional management functions are implemented in the TOE. This can be done by adjusting the "Administrator" and "User" columns to "X" according to which capabilities are present or not present, and for which privilege level.

(BT-1.) Management of the Discoverable and Advertising mode and management of the Bluetooth device name are mandatory. All other management functions for Bluetooth are currently objective.

(BT-2. optional) Requires management of the Bluetooth device name separately for BR/EDR and LE radios.

(BT-4. optional) May include disabling Wi-Fi being used as a part of Bluetooth High Speed and/or disabling NFC as an Out of Band pairing method for Bluetooth. May also include other wireless technologies beyond those already specified.

(BT-8. optional) The Bluetooth services and/or profiles that may be disabled should be listed for the user or administrator either by service and/or profile name or by the types of applications for which the service and/or profile is used.

(BT-9. optional) The minimum level of security permitted may be configurable for each individual pairing or for all Bluetooth pairings.

- If the TSF supports any of the BR/EDR security modes in the following list; it should provide a mechanism for the user to choose the minimum level of security to enforce for a particular device during the pairing process: Security Mode 1 (any level); Security Mode 2; (any level); Security Mode 3; (any level); Security Mode 4; Levels 0;1;2 (aside from the services permitted to use Mode 4; Level 0 in Bluetooth Core Specification version 4.2; Vol. 3; Part C; p. 325).
- If the TSF supports any of the LE security modes in the following list; it should provide a mechanism for the user to choose the minimum level of security to enforce for a particular device during the pairing process: Security Mode 1: Levels 1, 2; Security Mode 2, (any level).
- Examples of levels of security are the use of legacy pairing; the use of different types of Secure Simple Pairing; a requirement for Man-in-the-Middle protection; the enforcement of Secure Connections Only mode; etc.

5.3 TOE Security Functional Requirements

The following section describes the SFRs that must be satisfied by any TOE that claims conformance to this PP-Module. These SFRs must be claimed regardless of which PP-Configuration is used to define the TOE.

5.3.1 Security Audit (FAU)

FAU_GEN.1/BT Audit Data Generation (Bluetooth)

FAU_GEN.1.1/BT

The TSF shall be able to generate an audit record of the following auditable events:

a. Start-up and shutdown of the audit functions
b. All auditable events for the [*not selected*] level of audit
c. [*Specifically defined auditable events in the Auditable Events table*].

Table 2 Auditable Events

Requirement	Auditable Events	Additional Audit Record Contents
FCS_CKM_EXT.8	None.	
FIA_BLT_EXT.1	Failed user authorization of Bluetooth device.	User authorization decision (e.g., user rejected connection, incorrect pin entry).
	Failed user authorization for local Bluetooth Service.	Bluetooth address and name of device. Bluetooth profile. Identity of local service with [**selection**: *service ID, profile name*].
FIA_BLT_EXT.2	Initiation of Bluetooth connection.	Bluetooth address and name of device.
	Failure of Bluetooth connection.	Reason for failure.
FIA_BLT_EXT.3 (optional)	Duplicate connection attempt.	BD_ADDR of connection attempt.
FIA_BLT_EXT.4	None.	
FIA_BLT_EXT.5 (if claimed)	None.	
FIA_BLT_EXT.6	None.	
FIA_BLT_EXT.7	None.	
FTP_BLT_EXT.1	None.	
FTP_BLT_EXT.2	None.	
FTP_BLT_EXT.3/BR	None.	
FTP_BLT_EXT.3/LE (if claimed)	None.	

FAU_GEN.1.2/BT

The TSF shall record within each audit record at least the following information:

a. Date and time of the event
b. Type of event
c. Subject identity
d. The outcome (success or failure) of the event
e. [*Additional information in the Auditable Events table*].

Application Note: It is not feasible for the FIA_BLT_EXT.3 event to be audited if the rejection is performed at the HCI layer because the Bluetooth standard does not provide a notification interface for this behavior in the HCI. This is why the event is labeled as optional. However, if the rejection is performed above the HCI layer, it is expected that a conformant TOE should implement this functionality.

5.3.2 Cryptographic Support (FCS)

FCS_CKM_EXT.8 Bluetooth Key Generation

FCS_CKM_EXT.8.1

The TSF shall generate public/private ECDH key pairs every [**assignment**: *frequency of and/or criteria for new key pair generation*].

Application Note: There are multiple acceptable ways of keeping ECDH key pairs adequately fresh, including a time-based approach such that the same key pairs will not be used for more than, for instance, 24 hours. Alternatively, the criteria might be linked to the number of passed or failed authentication attempts. As a starting point to determine reasonable authentication attempt-based replacement criteria, note that the Bluetooth specification (v4.1, Vol. 2, 5.1) suggests mitigating repeated authentication attempts by changing a device's private key after three failed authentication attempts from any BD_ADDR, after ten successful pairings from any BD_ADDR, or after a combination of these such that any three successful pairings count as one failed pairing.

This requirement also applies to Bluetooth LE if the TOE supports LE Secure Connections, which was introduced in version 4.2 of the specification.

5.3.3 Identification and Authentication (FIA)

FIA_BLT_EXT.1 Bluetooth User Authorization

FIA_BLT_EXT.1.1

The TSF shall require explicit user authorization before pairing with a remote Bluetooth device.

Application Note: User authorization includes explicit actions like affirming the remote device's name, expressing an intent to connect to the remote device, and entering relevant pairing information (e.g. PINs; numeric codes; or "yes/no" responses). The user must have to explicitly permit all pairing attempts; even when bonding is not taking place. Because explicit user action must be required to permit pairing; it must not be possible for applications to programmatically enter pairing information (e.g. PINs; numeric codes; or "yes/no" responses) during the pairing process. The absence of public APIs for programmatic authorization is not sufficient to meet this requirement; hidden or private APIs must be absent as well.

FIA_BLT_EXT.2 Bluetooth Mutual Authentication

FIA_BLT_EXT.2.1

The TSF shall require Bluetooth mutual authentication between devices prior to any data transfer over the Bluetooth link.

Application Note: If devices are not already paired, the pairing process must be initiated. If the devices are already paired, mutual authentication based on the current link key must succeed before any data passes over the link.

FIA_BLT_EXT.3 Rejection of Duplicate Bluetooth Connections

FIA_BLT_EXT.3.1

The TSF shall discard pairing and session initialization attempts from a Bluetooth device address (BD_ADDR) to which an active session already exists.

Application Note: Session is defined as the time interval for which the TSF is actively connected to another device. Thus, the session terminates when the device disconnects from the TSF. If the TOE has an active session to a remote Bluetooth device, new session initialization and/or pairing attempts from devices claiming the same Bluetooth device address may be malicious and should be rejected/ignored. Only one session to a single remote BD_ADDR may be supported at a time.

FIA_BLT_EXT.4 Secure Simple Pairing

FIA_BLT_EXT.4.1

The TOE shall support Bluetooth Secure Simple Pairing, both in the host and the controller.

FIA_BLT_EXT.4.2

The TOE shall support Secure Simple Pairing during the pairing process.

Application Note: The Bluetooth host and controller each support a particular version of the Bluetooth Core Specification and a particular set of features. Support for various features is indicated by each side during the Link Manager Protocol (LMP) Features Exchange. Refer to the Bluetooth specification [Bluetooth] for feature definitions, including the definitions of Secure Simple

Pairing (Controller Support) and Secure Simple Pairing (Host Support).

FIA_BLT_EXT.6 Trusted Bluetooth Device User Authorization

FIA_BLT_EXT.6.1

The TSF shall require explicit user authorization before granting trusted remote devices access to services associated with the following Bluetooth profiles: [**assignment**: *list of Bluetooth profiles*].

Application Note: In addition to pairing, it may be appropriate to require explicit user action to authorize a particular remote device to access certain Bluetooth services. The TSF may choose to require this additional action for all devices or only for those devices that do not have a required level of trust.

It is strongly preferred that for each device, the TSF maintains a list of devices trusted to use for that particular service. However, the TSF might designate certain devices as having a trusted device relationship with the TOE and granting them "blanket" access to all services.

Furthermore, it may be the case that the TSF allows movement of devices from the untrusted to the trusted category for a particular service after the user provides explicit authorization for the device to use the service. For example, it may be appropriate to require that the user provide explicit, manual authorization before a remote device may use the OBEX service for an object transfer the first time. The user might be given the option to permit future connections to that service by the particular device without requiring explicit authorization each time.

FIA_BLT_EXT.7 Untrusted Bluetooth Device User Authorization

FIA_BLT_EXT.7.1

The TSF shall require explicit user authorization before granting untrusted remote devices access to services associated with the following Bluetooth profiles: [**assignment**: *list of Bluetooth profiles*].

Application Note: FIA_BLT_EXT.7 differs from FIA_BLT_EXT.6 because a conformant TOE may distinguish between "trusted" and "untrusted" devices such that the TSF grants "untrusted" devices access to fewer services following pairing. However, this behavior is not required; if the TSF does not treat "trusted" and "untrusted" devices any differently, the ST author may complete the assignments in FIA_BLT_EXT.6.1 and FIA_BLT_EXT.7.1 with lists of Bluetooth profiles.

5.3.4 Trusted Path/Channels (FTP)

FTP_BLT_EXT.1 Bluetooth Encryption

FTP_BLT_EXT.1.1

The TSF shall enforce the use of encryption when transmitting data over the Bluetooth trusted channel for BR/EDR and [**selection**: *LE*, *no other connections*].

Application Note: LE is selectable because not all conformant TOEs include support for LE. If LE is supported, it is expected that the TSF be able to provide encryption for this interface. Selection of LE in FTP_BLT_EXT.1.1 requires the inclusion of the selection-based SFR FTP_BLT_EXT.3/LE.

FTP_BLT_EXT.1.2

The TSF shall use key pairs per FCS_CKM_EXT.8 for Bluetooth encryption.

FTP_BLT_EXT.2 Persistence of Bluetooth Encryption

FTP_BLT_EXT.2.1

The TSF shall [**selection**: *restart encryption*, *terminate the connection*] if the remote device stops encryption while connected to the TOE.

Application Note: Permitting devices to terminate and/or restart encryption in the middle of a connection weakens user data protection. Note that an encryption pause request, which includes a request to stop encryption, stops encryption only temporarily. This requirement is not intended to address the encryption pause feature.

FTP_BLT_EXT.3/BR Bluetooth Encryption Parameters (BR/EDR)

FTP_BLT_EXT.3.1/BR

The TSF shall set the minimum encryption key size to [**assignment**: *key size larger than or equal to 128 bits*] for [*BR/EDR*] and not negotiate encryption key sizes smaller than the minimum size.

Application Note: Encryption is mandatory for BR/EDR connections when both devices support Secure Simple Pairing. Minimum encryption requirements will

be set and verified for each Bluetooth profile/application.

5.4 TOE Security Functional Requirements Rationale

The following rationale provides justification for each security objective for the TOE, showing that the SFRs are suitable to meet and achieve the security objectives:

Table 3: SFR Rationale

Objective	Addressed by	Rationale
O.PROTECTED_COMMS	FIA_BLT_EXT.1	FIA_BLT_EXT.1 supports the objective by ensuring that Bluetooth communications are not initiated without user approval.
	FIA_BLT_EXT.2	FIA_BLT_EXT.2 supports the objective by requiring the TSF to implement Bluetooth mutual authentication.
	FIA_BLT_EXT.3	FIA_BLT_EXT.3 supports the objective by preventing Bluetooth spoofing by rejecting connections with duplicate device addresses.
	FIA_BLT_EXT.4	FIA_BLT_EXT.4 supports the objective by defining the TSF's implementation of Bluetooth Secure Simple Pairing.
	FIA_BLT_EXT.5	FIA_BLT_EXT.5 supports the objective by requiring the TSF to support Secure Connections Only mode for the supported Bluetooth communication channels.
	FIA_BLT_EXT.6	FIA_BLT_EXT.6 supports the objective by requiring the TSF to specify the Bluetooth profiles that it requires explicit user authorization to grant access to for trusted devices.
	FTP_BLT_EXT.1	FTP_BLT_EXT.1 supports the objective by requiring the TSF to implement encryption to protect Bluetooth communications
	FTP_BLT_EXT.2	FTP_BLT_EXT.2 supports the objective by requiring the TSF to prevent data transmission over Bluetooth if the paired device is not using encryption.

5.5 TOE Security Assurance Requirements

This PP-Module does not define any SARs beyond those defined within the Base-PPs to which it can claim conformance. It is important to note that a TOE that is evaluated against this PP-Module is inherently evaluated against the mobile devices PP, and General Purpose Operating Systems PP as well. These PPs include a number of EAs associated with both Security Functional Requirements (SFRs) and SARs. Additionally, this PP-Module includes a number of SFR-based EAs that similarly refine the SARs of the Base-PPs. The evaluation laboratory will evaluate the TOE against the chosen Base-PP and supplement that evaluation with the necessary SFRs that are taken from this PP-Module.

6 Consistency Rationale

6.1 Protection Profile for mobile devices

6.1.1 Consistency of TOE Type

If this PP-Module is used to extend the MDF PP, the TOE type for the overall TOE is still a mobile device. However, one of the functions of the device must be the ability for it to have Bluetooth capability. The TOE boundary is simply extended to include that functionality.

6.1.2 Consistency of Security Problem Definition

The threats that apply to this PP-Module are inherited from the Base-PP to which the TOE also conforms. This PP-Module does not add or remove any elements to the security problem definition given in the MDF PP.

PP-Module Threat, Assumption, OSP	Consistency Rationale
T.NETWORK_EAVESDROP	This threat comes directly from both base PPs.
T.NETWORK_ATTACK	This threat comes directly from both base PPs.

6.1.3 Consistency of Objectives

The objectives that apply to this PP-Module are inherited from the Base-PP to which the TOE also conforms. This PP-Module does not add or remove any elements to the objectives given in the MDF PP. The objectives for the TOEs are consistent with the mobile devices PP based on the following rationale:

PP-Module TOE Objective	Consistency Rationale
O.PROTECTED_COMMS	This objective comes directly from the PP.

6.1.4 Consistency of Requirements

This PP-Module identifies several SFRs from the mobile devices PP that are needed to support Bluetooth functionality. This is considered to be consistent because the functionality provided by the mobile devices PP is being used for its intended purpose. The PP-Module also identifies a number of modified SFRs from the mobile devices PP as well as new SFRs that are used entirely to provide functionality for Bluetooth. The rationale for why this does not conflict with the claims defined by the mobile devices PP are as follows:

PP-Module Requirement	Consistency Rationale
Modified SFRs	
FMT_SMF_EXT.1	This SFR is unchanged from its definition in the Base-PP; the only change required by this PP-Module is how to interpret it in the context of Bluetooth capabilities.
Additional SFRs	
FMT_SMF_EXT.1/BT	The ST author is instructed to complete an assignment in the SFR with information related to Bluetooth, and to include additional management functions in this SFR based on the Bluetooth capability defined by the PP-Module.
Mandatory SFRs	
FAU_GEN.1/BT	The PP-Module defines auditable events for Bluetooth that extends the audit functionality defined in each Base-PP.
FCS_CKM_EXT.8	
FIA_BLT_EXT.1	
FIA_BLT_EXT.2	
FIA_BLT_EXT.3	
FIA_BLT_EXT.4	
FIA_BLT_EXT.6	
FIA_BLT_EXT.7	
FTP_BLT_EXT.1	
FTP_BLT_EXT.2	
FTP_BLT_EXT.3/BR	
Optional SFRs	

This PP-Module does not define any Optional requirements.

Selection-based SFRs
FTP_BLT_EXT.3/LE
Objective SFRs
FIA_BLT_EXT.5
Implementation-Dependent SFRs

This PP-Module does not define any Implementation-Dependent requirements.

6.2 Protection Profile for General Purpose Operating Systems

6.2.1 Consistency of TOE Type

If this PP-Module is used to extend the [GPOS PP], the TOE type for the overall TOE is still a generic operating system. However, one of the functions of the generic operating system must be the ability for it to have Bluetooth capability. The TOE boundary is simply extended to include that functionality.

6.2.2 Consistency of Security Problem Definition

The threats that apply to this PP-Module are inherited from the Base-PP to which the TOE also conforms. This PP-Module does not add or remove any elements to the security problem definition given in the GPOS PP.

PP-Module Threat, Assumption, OSP	Consistency Rationale
T.NETWORK_EAVESDROP	This threat comes directly from both base PPs.
T.NETWORK_ATTACK	This threat comes directly from both base PPs.

6.2.3 Consistency of Objectives

The objectives that apply to this PP-Module are inherited from the Base-PP to which the TOE also conforms. This PP-Module does not add or remove any elements to the objectives given in the GPOS PP. The objectives for the TOEs are consistent with the General Purpose Operating Systems PP based on the following rationale:

PP-Module TOE Objective	Consistency Rationale
O.PROTECTED_COMMS	This objective comes directly from the PP.

6.2.4 Consistency of Requirements

This PP-Module identifies several SFRs from the General Purpose Operating Systems PP that are needed to support Bluetooth functionality. This is considered to be consistent because the functionality provided by the General Purpose Operating Systems PP is being used for its intended purpose. The PP-Module also identifies a number of modified SFRs from the General Purpose Operating Systems PP as well as new SFRs that are used entirely to provide functionality for Bluetooth. The rationale for why this does not conflict with the claims defined by the General Purpose Operating Systems PP are as follows:

PP-Module Requirement	Consistency Rationale
Modified SFRs	
FMT_MOF_EXT.1	This SFR is unchanged from its definition in the Base-PP; the only change required by this PP-Module is how to interpret it in the context of Bluetooth capabilities.
FMT_SMF_EXT.1	This SFR is unchanged from its definition in the Base-PP; the only change required by this PP-Module is how to interpret it in the context of Bluetooth capabilities.
Additional SFRs	
FMT_MOF_EXT.1/BT	The ST author is required to associate all claimed management functions with the administrative privileges required to execute them. This PP-Module simply extends this requirement to apply to the management functions added and mandated by the PP-Module.
FMT_SMF_EXT.1/BT	The ST author is required to include an optional management function defined in the Base-PP that relates to Bluetooth, and to include additional management functions in this SFR based on the Bluetooth capability defined by the PP-Module.
Mandatory SFRs	
FAU_GEN.1/BT	The PP-Module defines auditable events for Bluetooth that extends the audit functionality defined in each Base-PP.

FCS_CKM_EXT.8
FIA_BLT_EXT.1
FIA_BLT_EXT.2
FIA_BLT_EXT.3
FIA_BLT_EXT.4
FIA_BLT_EXT.6
FIA_BLT_EXT.7
FTP_BLT_EXT.1
FTP_BLT_EXT.2
FTP_BLT_EXT.3/BR
Optional SFRs
This PP-Module does not define any Optional requirements.
Selection-based SFRs
FTP_BLT_EXT.3/LE
Objective SFRs
FIA_BLT_EXT.5
Implementation-Dependent SFRs
This PP-Module does not define any Implementation-Dependent requirements.

Appendix A - Optional SFRs

A.1 Strictly Optional Requirements

This PP-Module does not define any Strictly Optional SFRs.

A.2 Objective Requirements

A.2.1 Identification and Authentication

FIA_BLT_EXT.5 Bluetooth Secure Connections

FIA_BLT_EXT.5.1

The TOE shall support Secure Connections Only mode for Bluetooth BR/EDR and [**selection**: *Bluetooth LE*, *no other Bluetooth protocol*].

Application Note: The specification states that Secure Connections Only Mode, also called "FIPS Mode," should be used when security is more important than backwards compatibility. From the specification, "The Host will enforce that the P-256 elliptic curve is used during pairing; the secure authentication sequences are used; and AES-CCM is used for encryption." Also, "if a BR/EDR/LE device is configured in Secure Connections Only Mode, then a transport will only be used when Secure Connections is supported by both devices."

A.3 Implementation-Based Requirements

This PP-Module does not define any Implementation-Based SFRs.

Appendix B - Selection-Based Requirements

B.1 Trusted Path/Channels

FTP_BLT_EXT.3/LE Bluetooth Encryption Parameters (LE)

The inclusion of this selection-based component depends upon selection in FTP_BLT_EXT.1.1.

FTP_BLT_EXT.3.1/LE

The TSF shall set the minimum encryption key size to [**assignment**: *key size larger than or equal to 128 bits*] for [*LE*] and not negotiate encryption key sizes smaller than the minimum size.

Application Note: The TOE must implement encryption for Bluetooth BR/EDR as required by FTP_BLT_EXT.1.1. A conformant TOE does not need to support Bluetooth LE; however, if it does, then it must also support encryption for it. FTP_BLT_EXT.3/LE must therefore be claimed if 'LE' is selected in FTP_BLT_EXT.1.1.

Appendix C - Extended Component Definitions

This appendix contains the definitions for all extended requirements specified in the Module.

C.1 Extended Components Table

All extended components specified in the Module are listed in this table:

Table 4: Extended Component Definitions

Functional Class	Functional Components
Cryptographic Support (FCS)	FCS_CKM_EXT Cryptographic Key Management
Identification and Authentication (FIA)	FIA_BLT_EXT Bluetooth Pairing
Trusted Path/Channels (FTP)	FTP_BLT_EXT Bluetooth Trusted Communications

C.2 Extended Component Definitions

C.2.1 Cryptographic Support (FCS)

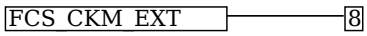
This Module defines the following extended components as part of the FCS class originally defined by CC Part 2:

C.2.1.1 FCS_CKM_EXT Cryptographic Key Management

Family Behavior

Components in this family define requirements for cryptographic key management beyond those which are specified in the Part 2 family FCS_CKM.

Component Leveling



FCS_CKM_EXT.8, Bluetooth Key Generation, requires the TSF to generate key pairs used for Bluetooth over a specified time period or in response to some observed event.

Management: FCS_CKM_EXT.8

No specific management functions are identified.

Audit: FCS_CKM_EXT.8

There are no auditable events foreseen.

FCS_CKM_EXT.8 Bluetooth Key Generation

Hierarchical to: No other components.

Dependencies to: FCS_CKM.1 Cryptographic Key Generation

FPT_STM.1 Reliable Time Stamps

FTP_BLT_EXT.1 Bluetooth Encryption

FCS_CKM_EXT.8.1

The TSF shall generate public/private ECDH key pairs every [**assignment**: *frequency of and/or criteria for new key pair generation*].

C.2.2 Identification and Authentication (FIA)

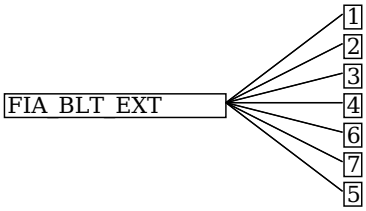
This Module defines the following extended components as part of the FIA class originally defined by CC Part 2:

C.2.2.1 FIA_BLT_EXT Bluetooth Pairing

Family Behavior

Components in this family define Bluetooth-specific identification and authentication requirements.

Component Leveling



FIA_BLT_EXT.1, Bluetooth User Authorization, requires the TSF to have explicit user authorization before allowing a Bluetooth pairing.

FIA_BLT_EXT.2, Bluetooth Mutual Authentication, requires the TSF to enforce mutual authentication for Bluetooth.

FIA_BLT_EXT.3, Rejection of Duplicate Bluetooth Connections, requires the TSF to reject duplicate attempts to connect to Bluetooth.

FIA_BLT_EXT.4, Secure Simple Pairing, requires the TSF to support Secure Simple Pairing.

FIA_BLT_EXT.6, Trusted Bluetooth Device User Authorization, requires the TSF to have explicit user authentication before associating trusted services with Bluetooth.

FIA_BLT_EXT.7, Untrusted Bluetooth Device User Authorization, requires the TSF to have explicit user authentication before associating untrusted services with Bluetooth.

FIA_BLT_EXT.5, Bluetooth Secure Connections, requires the TSF to support Secure Connections Only mode.

Management: FIA_BLT_EXT.1

No specific management functions are identified.

Audit: FIA_BLT_EXT.1

The following actions should be auditable if FAU_GEN Security audit data generation is included in the PP/ST:

- Failed user authorization of Bluetooth device.
- Failed user authorization for local Bluetooth device.

FIA_BLT_EXT.1 Bluetooth User Authorization

Hierarchical to: No other components.

Dependencies to: No dependencies.

FIA_BLT_EXT.1.1

The TSF shall require explicit user authorization before pairing with a remote Bluetooth device.

Management: FIA_BLT_EXT.2

No specific management functions are identified.

Audit: FIA_BLT_EXT.2

The following actions should be auditable if FAU_GEN Security audit data generation is included in the PP/ST:

- Initiation of Bluetooth connection.
- Failure of Bluetooth connection.

FIA_BLT_EXT.2 Bluetooth Mutual Authentication

Hierarchical to: No other components.

Dependencies to: FIA_BLT_EXT.1 Bluetooth User Authorization

FIA_BLT_EXT.2.1

The TSF shall require Bluetooth mutual authentication between devices prior to any data transfer over the Bluetooth link.

Management: FIA_BLT_EXT.3

No specific management functions are identified.

Audit: FIA_BLT_EXT.3

The following actions should be auditable if FAU_GEN Security audit data generation is included in the PP/ST:

- Duplicate connection attempt.

FIA_BLT_EXT.3 Rejection of Duplicate Bluetooth Connections

Hierarchical to: No other components.

Dependencies to: FIA_BLT_EXT.1 Bluetooth User Authorization

FIA_BLT_EXT.3.1

The TSF shall discard pairing and session initialization attempts from a Bluetooth device address (BD_ADDR) to which an active session already exists.

Management: FIA_BLT_EXT.4

No specific management functions are identified.

Audit: FIA_BLT_EXT.4

There are no auditable events foreseen.

FIA_BLT_EXT.4 Secure Simple Pairing

Hierarchical to: No other components.

Dependencies to: FIA_BLT_EXT.1 Bluetooth User Authorization

FIA_BLT_EXT.4.1

The TOE shall support Bluetooth Secure Simple Pairing, both in the host and the controller.

FIA_BLT_EXT.4.2

The TOE shall support Secure Simple Pairing during the pairing process.

Management: FIA_BLT_EXT.6

The following actions could be considered for the management functions in FMT:

- Ability to specify the services that require explicit user authorization before trusted devices can use them.

Audit: FIA_BLT_EXT.6

There are no auditable events foreseen.

FIA_BLT_EXT.6 Trusted Bluetooth Device User Authorization

Hierarchical to: No other components.

Dependencies to: FIA_BLT_EXT.1 Bluetooth User Authorization

FIA_BLT_EXT.6.1

The TSF shall require explicit user authorization before granting trusted remote devices access to services associated with the following Bluetooth profiles: [**assignment**: *list of Bluetooth profiles*].

Management: FIA_BLT_EXT.7

The following actions could be considered for the management functions in FMT:

- Ability to specify the services that require explicit user authorization before untrusted devices can use them.

Audit: FIA_BLT_EXT.7

There are no auditable events foreseen.

FIA_BLT_EXT.7 Untrusted Bluetooth Device User Authorization

Hierarchical to: No other components.

Dependencies to: FIA_BLT_EXT.1 Bluetooth User Authorization

FIA_BLT_EXT.7.1

The TSF shall require explicit user authorization before granting untrusted remote devices access to services associated with the following Bluetooth profiles: [**assignment**: *list of Bluetooth profiles*].

Management: FIA_BLT_EXT.5

No specific management functions are identified.

Audit: FIA_BLT_EXT.5

There are no auditable events foreseen.

FIA_BLT_EXT.5 Bluetooth Secure Connections

Hierarchical to: No other components.

Dependencies to: FIA_BLT_EXT.1 Bluetooth User Authorization

FIA_BLT_EXT.5.1

The TOE shall support Secure Connections Only mode for Bluetooth BR/EDR and [**selection**: *Bluetooth LE, no other Bluetooth protocol*].

C.2.3 Trusted Path/Channels (FTP)

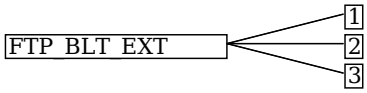
This Module defines the following extended components as part of the FTP class originally defined by CC Part 2:

C.2.3.1 FTP_BLT_EXT Bluetooth Trusted Communications

Family Behavior

Components in this family define requirements for Bluetooth encryption.

Component Leveling



FTP_BLT_EXT.1, Bluetooth Encryption, requires the TSF to enforce encryption when transmitting over Bluetooth.

FTP_BLT_EXT.2, Persistence of Bluetooth Encryption, requires the TSF to ensure encryption for the duration of the use of the Bluetooth channel.

FTP_BLT_EXT.3, Bluetooth Encryption Parameters, specifies the key sizes used for Bluetooth.

Management: FTP_BLT_EXT.1

No specific management functions are identified.

Audit: FTP_BLT_EXT.1

There are no auditable events foreseen.

FTP_BLT_EXT.1 Bluetooth Encryption

Hierarchical to: No other components.

Dependencies to: FCS_CKM_EXT.8 Bluetooth Key Generation

FIA_BLT_EXT.1 Bluetooth User Authorization

FTP_BLT_EXT.1.1

The TSF shall enforce the use of encryption when transmitting data over the Bluetooth trusted channel for BR/EDR and [**assignment**: *list of other connection modes*].

FTP_BLT_EXT.1.2

The TSF shall use key pairs per FCS_CKM_EXT.8 for Bluetooth encryption.

Management: FTP_BLT_EXT.2

No specific management functions are identified.

Audit: FTP_BLT_EXT.2

There are no auditable events foreseen.

FTP_BLT_EXT.2 Persistence of Bluetooth Encryption

Hierarchical to: No other components.

Dependencies to: FTP_BLT_EXT.1 Bluetooth Encryption

FTP_BLT_EXT.2.1

The TSF shall [**selection**: *restart encryption*, *terminate the connection*] if the remote device stops encryption while connected to the TOE.

Management: FTP_BLT_EXT.3

The following actions could be considered for the management functions in FMT:

- Specification of minimum encryption key size.

Audit: FTP_BLT_EXT.3

There are no auditable events foreseen.

FTP_BLT_EXT.3 Bluetooth Encryption Parameters

Hierarchical to: No other components.

Dependencies to: FTP_BLT_EXT.1 Bluetooth Encryption

FTP_BLT_EXT.3.1

The TSF shall set the minimum encryption key size to [**assignment**: *key size larger than or equal to 128 bits*] for [**assignment**: *Bluetooth protocol*].

Appendix D - Implicitly Satisfied Requirements

This appendix lists requirements that should be considered satisfied by products successfully evaluated against this PP-Module. However, these requirements are not featured explicitly as SFRs and should not be included in the ST. They are not included as standalone SFRs because it would increase the time, cost, and complexity of evaluation. This approach is permitted by [CC] Part 1, 8.2 Dependencies between components.

This information benefits systems engineering activities which call for inclusion of particular security controls. Evaluation against the PP-Module provides evidence that these controls are present and have been evaluated.

Requirement	Rationale for Satisfaction
FCS_CKM.1 - Cryptographic Key Generation	FCS_CKM_EXT.8 has a dependency on FCS_CKM.1 for the generation of ECDH key pairs. This dependency is implicitly satisfied in this PP-Module because both Base-PPs the PP-Module is intended to extend define this SFR and specify ECDH key generation as a required capability of the TOE. Therefore, a conformant TOE will always have this capability.
FPT_STM.1 - Reliable Time Stamps	FCS_CKM_EXT.8 has a dependency on FPT_STM.1 because key generation may be triggered by a given time period elapsing. When the TOE claims conformance to [MDF], this dependency is satisfied explicitly through the Base-PP's definition of FPT_STM.1. When the TOE claims conformance to [GPOS], this dependency is satisfied implicitly through that PP's A.PLATFORM assumption of a trustworthy computing platform, which can be reasonably assumed to include a hardware real-time clock.

Appendix E - Entropy Documentation and Assessment

The TOE does not require any additional supplementary information to describe its entropy sources beyond the requirements outlined in the Base-PPs.

Appendix F - Acronyms

Acronym	Meaning
ACL	Asynchronous Connection-Less
AES	Advanced Encryption Standard
AES-CCM	AES Counter with CBC-MAC Mode
AFH	Adaptive Frequency Hopping
API	Application Programming Interface
BR	Basic Rate
Base-PP	Base Protection Profile
CC	Common Criteria
CEM	Common Evaluation Methodology
ECDH	Elliptic Curve Diffie-Hellman
EDR	Enhanced Data Rate
EP	Extended Package
FP	Functional Package
FTP	File Transfer Protocol
HCI	Host Controller Interface
L2CAP	Logical Link Control and Adaptation Protocol
LE	Low Energy
LMP	Link Manager Protocol
MDF	Mobile Device Fundamentals
OBEX	Object Exchange
OE	Operational Environment
PP	Protection Profile
PP-Configuration	Protection Profile Configuration
PP-Module	Protection Profile Module
SAR	Security Assurance Requirement
SFR	Security Functional Requirement
ST	Security Target
TOE	Target of Evaluation
TSF	TOE Security Functionality
TSFI	TSF Interface
TSS	TOE Summary Specification
cPP	Collaborative Protection Profile

Appendix G - Bibliography

Identifier	Title
[Bluetooth]	Bluetooth Core Specifications, version 5.2; December 2019,
[CC]	Common Criteria for Information Technology Security Evaluation - • Part 1: Introduction and General Model, CCMB-2017-04-001, Version 3.1 Revision 5, April 2017. • Part 2: Security Functional Components, CCMB-2017-04-002, Version 3.1 Revision 5, April 2017. • Part 3: Security Assurance Components, CCMB-2017-04-003, Version 3.1 Revision 5, April 2017.
[CEM]	Common Evaluation Methodology for Information Technology Security - Evaluation Methodology, CCMB-2017-04-004, Version 3.1, Revision 5, April 2017.
[GPOS]	Protection Profile for General Purpose Operating Systems, Version 4.2.1, April 22, 2019
[MDF]	Protection Profile for Mobile Device Fundamentals, Version 3.2, April 15, 2021