Emergency Profile

Bluetooth® Profile Specification

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- **Revision Date**: 2019-07-02
- **Group Prepared By**: PUID Working Group
- **Feedback Email**: rd-main@bluetooth.org

**Abstract:**
This specification proposes a profile that can configure and send emergency signals when required.
Revision History

<table>
<thead>
<tr>
<th>Revision Number</th>
<th>Date</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
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Contents

1 Introduction ................................................................................................................................................................. 5
  1.1 Profile dependencies .............................................................................................................................................. 5
  1.2 Conformance .......................................................................................................................................................... 5
  1.3 Bluetooth Specification release compatibility ........................................................................................................ 5
  1.4 Language ................................................................................................................................................................ 5
    1.4.1 Language conventions ........................................................................................................................................ 5
    1.4.2 Reserved for Future Use ...................................................................................................................................... 5
    1.4.3 Prohibited ........................................................................................................................................................... 6

2 Configuration .................................................................................................................................................................. 7
  2.1 Roles ......................................................................................................................................................................... 7
  2.2 Profile/Service role relationships ........................................................................................................................... 7
  2.3 Concurrency limitations/restrictions ........................................................................................................................ 7
  2.4 Topology limitations/restrictions ............................................................................................................................ 7
  2.5 Transport dependencies .............................................................................................................................................. 8

3 Emergency Emitter role requirements ....................................................................................................................... 9
  3.1 Emergency Emitter Behavior .................................................................................................................................. 9
    3.1.1 Service Data AD Type Field ................................................................................................................................ 9
    3.1.2 Emergency Configuration Service UUID ............................................................................................................ 10
    3.1.3 Emergency ID ...................................................................................................................................................... 10
    3.1.4 Emergency Text .................................................................................................................................................. 10

4 Emergency Inhibitor role requirements ...................................................................................................................... 11
  4.1 Emergency Configuration Service client requirements ............................................................................................ 11

5 Emergency Locator role requirements ........................................................................................................................ 12

6 Connection establishment procedures ....................................................................................................................... 13

7 Security considerations .................................................................................................................................................. 14

8 Privacy considerations .................................................................................................................................................. 15

9 Acronyms and abbreviations .......................................................................................................................................... 16

10 References ................................................................................................................................................................. 17
1 Introduction

This specification enables several emergency-related use cases like silver alert (missing senior citizen with Alzheimer's disease, dementia, or other mental disability), amber alert (missing child), general emergency alert (natural disaster, fire, building collapse), and pet finding.

1.1 Profile dependencies

This profile does not require any other profiles.

1.2 Conformance

If conformance to this specification is claimed, all capabilities indicated as mandatory for this specification shall be supported in the specified manner (process-mandatory). This also applies for all optional and conditional capabilities for which support is indicated.

1.3 Bluetooth Specification release compatibility

This specification is compatible with the Bluetooth Core Specification, v5.0 or later [1].

1.4 Language

1.4.1 Language conventions

The Bluetooth SIG has established the following conventions for use of the words shall, must, will, should, may, can, is, and note in the development of specifications:

<table>
<thead>
<tr>
<th>Word</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>shall</td>
<td>is required to – used to define requirements.</td>
</tr>
<tr>
<td>must</td>
<td>is used to express:</td>
</tr>
<tr>
<td></td>
<td>a natural consequence of a previously stated mandatory requirement.</td>
</tr>
<tr>
<td></td>
<td>OR</td>
</tr>
<tr>
<td></td>
<td>an indisputable statement of fact (one that is always true regardless of the circumstances).</td>
</tr>
<tr>
<td>will</td>
<td>it is true that – only used in statements of fact.</td>
</tr>
<tr>
<td>should</td>
<td>is recommended that – used to indicate that among several possibilities one is recommended as particularly suitable, but not required.</td>
</tr>
<tr>
<td>may</td>
<td>is permitted to – used to allow options.</td>
</tr>
<tr>
<td>can</td>
<td>is able to – used to relate statements in a causal manner.</td>
</tr>
<tr>
<td>is</td>
<td>is defined as – used to further explain elements that are previously required or allowed.</td>
</tr>
<tr>
<td>note</td>
<td>Used to indicate text that is included for informational purposes only and is not required in order to implement the specification. Each note is clearly designated as a “Note” and set off in a separate paragraph.</td>
</tr>
</tbody>
</table>

For clarity of the definition of those terms, see Core Specification Volume 1, Part E, Section 1.

1.4.2 Reserved for Future Use

Where a field in a packet, Protocol Data Unit (PDU), or other data structure is described as "Reserved for Future Use" (irrespective of whether in uppercase or lowercase), the device creating the structure shall
set its value to zero unless otherwise specified. Any device receiving or interpreting the structure shall ignore that field; in particular, it shall not reject the structure because of the value of the field.

Where a field, parameter, or other variable object can take a range of values, and some values are described as "Reserved for Future Use," a device sending the object shall not set the object to those values. A device receiving an object with such a value should reject it, and any data structure containing it, as being erroneous; however, this does not apply in a context where the object is described as being ignored or it is specified to ignore unrecognized values.

When a field value is a bit field, unassigned bits can be marked as Reserved for Future Use and shall be set to 0. Implementations that receive a message that contains a Reserved for Future Use bit that is set to 1 shall process the message as if that bit was set to 0, except where specified otherwise.

The acronym RFU is equivalent to Reserved for Future Use.

1.4.1 Prohibited

When a field value is an enumeration, unassigned values can be marked as "Prohibited." These values shall never be used by an implementation, and any message received that includes a Prohibited value shall be ignored and shall not be processed and shall not be responded to.

Where a field, parameter, or other variable object can take a range of values, and some values are described as "Prohibited," devices shall not set the object to any of those Prohibited values. A device receiving an object with such a value should reject it, and any data structure containing it, as being erroneous.

"Prohibited" is never abbreviated.
2 Configuration

2.1 Roles

This profile defines the following three roles.

- Emergency Emitter: A device that can send (broadcast) an emergency signal.
- Emergency Inhibitor: A device that inhibits emergency alerts if the device has a connection to a related Emergency Emitter.
- Emergency Locator: A device that scans to detect any emergency signal coming from Emergency Emitters nearby.

2.2 Profile/Service role relationships

The Emergency Emitter device shall implement the Emergency Configuration Service [2].

The Emergency Inhibitor device is a device that does not need a Generic Attribute Profile (GATT) and is connected to the Emergency Emitter.

The Emergency Locator device is a device that does not need GATT and is scanning for broadcast emergency signals.

![Relationship between profile, services, and roles for Emergency Profile](image)

*Figure 2.1: Relationship between profile, services, and roles for Emergency Profile*

Note: Profile roles are represented by blue boxes, referenced profiles by red boxes, and services by gray boxes.

2.3 Concurrency limitations/restrictions

This profile does not impose any concurrency limitations or restrictions.

2.4 Topology limitations/restrictions

The Emergency Emitter shall act in the Generic Access Profile (GAP) Peripheral role when connected to an Emergency Inhibitor.

The Emergency Inhibitor shall act in the GAP Central role.

The Emergency Locator shall act in the GAP Observer role.
2.5 Transport dependencies

The Emergency Profile is only supported on Bluetooth Low Energy (LE) transport because of the requirements for broadcasting and power consumption.
# 3  Emergency Emitter role requirements

This section describes the Emergency Emitter requirements.

<table>
<thead>
<tr>
<th>Service</th>
<th>Emergency Emitter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Configuration Service</td>
<td>M</td>
</tr>
</tbody>
</table>

*Table 3.1: Emergency Emitter role service requirements*

M = Mandatory

## 3.1  Emergency Emitter behavior

When the link is lost, the Emergency Emitter device shall try to reconnect to a known Emergency Inhibitor device for an implementation dependent time, $T_{ALARM}$. A $T_{ALARM}$ of 30 seconds should be used for the silver alert use case.

If the connection is not re-established before $T_{ALARM}$ has expired, the Emergency Emitter shall include the Emergency Data specified in *Table 3.2* in its advertising data and implement one of the following behaviors.

- A device that allows reconnection to an inhibitor shall use the GAP undirected connectable mode to attempt to reconnect to a known inhibitor. If the connection is established, the Emergency Emitter shall stop advertising the Emergency Data.

- A device that does not allow reconnection to an inhibitor shall enter the GAP Broadcast mode (as defined in [1] Vol 3, Part C).

<table>
<thead>
<tr>
<th>Fields</th>
<th>Data Type</th>
<th>Size (octets)</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Data AD Type (Section 3.1.1)</td>
<td>uint8</td>
<td>1</td>
<td>M</td>
</tr>
<tr>
<td>Emergency Configuration Service UUID (Section 3.1.2)</td>
<td>UUID</td>
<td>2</td>
<td>M</td>
</tr>
<tr>
<td>Emergency ID (Section 3.1.3)</td>
<td>uint8</td>
<td>6</td>
<td>M</td>
</tr>
<tr>
<td>Emergency Text (Section 3.1.4)</td>
<td>utf8</td>
<td>1 to 20</td>
<td>O</td>
</tr>
</tbody>
</table>

*Table 3.2: Emergency Data*

M: Mandatory

O: Optional

### 3.1.1  Service Data AD Type field

The Service Data AD Type field shall be included in Emergency Emitter advertising. The Service Data Advertising Data (AD) Type is defined in the GAP section of the Bluetooth Core Specification [1].
3.1.2 Emergency Configuration Service UUID
The Universally Unique Identifier (UUID) of the Emergency Configuration Service shall be included in the Emergency Emitter advertising. The Emergency Configuration Service UUID is a Bluetooth SIG assigned number [3].

3.1.3 Emergency ID
The Emergency ID field of the Emergency Emitter advertising data shall be set to the characteristic value of the Emergency ID characteristic exposed by the Emergency Configuration Service instantiated on the Emergency Emitter device.

3.1.4 Emergency Text
If the Emergency Configuration Service instantiated on the Emergency Emitter device exposes an Emergency Text characteristic, the Emergency Text field of the Emergency Emitter advertising data shall be set to the characteristic value of that Emergency Text characteristic.
4 Emergency Inhibitor role requirements

The Emergency Inhibitor should use one of the GAP connection establishment procedures to connect to Emergency Emitter devices in GAP undirected connectable mode.

Note: The Emergency Inhibitor may feed information about link loss to cloud or other infrastructure to enhance the use case.

4.1 Emergency Configuration Service client requirements

There are no mandatory requirements for the Emergency Inhibitor to discover or interact with the Emergency Configuration Service in the Emergency Emitter, but it might be useful for some implementations.
5 Emergency Locator role requirements

The Emergency Locator shall use the GAP Observation Procedure to scan for advertisements broadcast from the Emergency Emitter.

Note: Depending on how the use case is implemented, the Emergency ID can be used locally on the Emergency Locator device and/or communicated to other devices. The Emergency Text is primarily intended for display on the Emergency Locator device to provide some information to the user.
6 Connection establishment procedures

The connection is established according to the requirements of GAP.
7 Security considerations

The Emergency Emitter shall support LE security mode 1 and levels 2 or 3.

The Emergency Inhibitor shall support LE security mode 1 and levels 2 and 3. The Emergency Inhibitor should accept the LE security mode and security level combination requested by the Emergency Emitter.
8 Privacy considerations

The connection between the Emergency Inhibitor and the Emergency Emitter should use the Bluetooth privacy feature for LE functionality.

Note: When alerting by advertising the Emergency ID and Emergency Text, the device will be trackable. This is a wanted behavior for the use cases addressed by this profile.
# 9 Acronyms and abbreviations

<table>
<thead>
<tr>
<th>Acronym/Abbreviation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>AD</td>
<td>Advertising Data</td>
</tr>
<tr>
<td>GAP</td>
<td>Generic Access Profile</td>
</tr>
<tr>
<td>GATT</td>
<td>Generic Attribute Profile</td>
</tr>
<tr>
<td>LE</td>
<td>Bluetooth Low Energy functionality</td>
</tr>
<tr>
<td>UUID</td>
<td>Universally Unique Identifier</td>
</tr>
</tbody>
</table>

*Table 9.1: Acronyms and abbreviations*
10 References

[1] Bluetooth Core Specification, v5.0 or later
[3] Service UUIDs, Characteristic, and Descriptor descriptions accessible via the Bluetooth SIG Assigned Numbers