Abstract:

This service enables a GATT Client to store the LE scan parameters it is using on a GATT Server device so that the GATT Server can utilize the information to adjust behavior to optimize power consumption and/or reconnection latency.
Revision History

<table>
<thead>
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<th>Revision</th>
<th>Date (yyyy-mm-dd)</th>
<th>Comments</th>
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<tbody>
<tr>
<td>D09r01</td>
<td>2011-08-08</td>
<td>Initial Draft</td>
</tr>
<tr>
<td>D09r02</td>
<td>2011-08-12</td>
<td>Removed support for Read Characteristic Value</td>
</tr>
<tr>
<td>D09r03</td>
<td>2011-08-19</td>
<td>Updated cross-references, created the clean draft</td>
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<tr>
<td>D09r04</td>
<td>2011-08-30</td>
<td>Addressed BARB comments</td>
</tr>
<tr>
<td>D09r05</td>
<td>2011-09-02</td>
<td>Addressed BARB comments</td>
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<tr>
<td>D09r06</td>
<td>2011-09-08</td>
<td>Modified section 2.2 and 2.3.1</td>
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<tr>
<td>D09r07</td>
<td>2011-09-12</td>
<td>Added comments from Terry, Removed Primary service indication</td>
</tr>
<tr>
<td>D09r08</td>
<td>2011-09-15</td>
<td>Added scan parameter value details.</td>
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<tr>
<td>D09r09</td>
<td>2011-09-26</td>
<td>Updated text to reflect “worst” case values</td>
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<tr>
<td>D09r10</td>
<td>2011-10-08</td>
<td>Added Scan Parameter Refresh characteristic. Added 2.5 to describe Server assumptions re: Scan Interval Window</td>
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<tr>
<td>D09r11</td>
<td>2011-10-12</td>
<td>Addressed BARB review comments (fixed properties in table 1-1 and expanded RFU in table 2-2)</td>
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<tr>
<td>D09r12</td>
<td>2011-11-02</td>
<td>Addressed BARB review comments, mandated SPS as Primary Service to avoid cross-profile dependency problems.</td>
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<tr>
<td>D09r13</td>
<td>2011-11-08</td>
<td>Addressed BARB review comments.</td>
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<tr>
<td>D10r00</td>
<td>2011-11-23</td>
<td>Removed extra whitespace in Section 2.3. Submitted as v1.0 voting object to BARB.</td>
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<td>V10r00</td>
<td>2011-12-27</td>
<td>Adopted by the Bluetooth SIG Board of Directors</td>
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Document Terminology

The Bluetooth SIG has adopted Section 13.1 of the IEEE Standards Style Manual, which dictates use of the words `shall`, `should`, `may`, and `can` in the development of documentation, as follows:

The word *shall* is used to indicate mandatory requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted (*shall* equals *is required to*).

The use of the word *must* is deprecated and shall not be used when stating mandatory requirements; *must* is used only to describe unavoidable situations.

The use of the word *will* is deprecated and shall not be used when stating mandatory requirements; *will* is only used in statements of fact.

The word *should* is used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain course of action is deprecated but not prohibited (*should* equals *is recommended that*).

The word *may* is used to indicate a course of action permissible within the limits of the standard (*may* equals *is permitted*).

The word *can* is used for statements of possibility and capability, whether material, physical, or causal (*can* equals *is able to*).
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1 Introduction

The Scan Parameters Service enables a GATT Server device to expose a characteristic for the GATT Client to write its scan interval and scan window on the GATT Server device, and enables a GATT Server to request a refresh of the GATT Client scan interval and scan window.

1.1 Conformance

If a server claims conformance to this Service, all capabilities indicated as mandatory for this Service shall be supported in the specified manner (process-mandatory). This also applies for all optional and conditional capabilities for which support is indicated. All mandatory capabilities, and optional and conditional capabilities for which support is indicated, are subject to verification as part of the Bluetooth qualification program.

1.2 Service Dependency

This service is not dependent upon any other services.

1.3 Bluetooth Specification Release Compatibility

This specification is compatible with any Bluetooth core specification [1] that includes the Generic Attribute Profile (GATT) specification and the Bluetooth Low Energy Controller specification.

1.4 GATT Sub-Procedure Requirements

Requirements in this section represent a minimum set of requirements for a Server. Other GATT sub-procedures may be used if supported by both Client and Server.

Table 1.1 summarizes additional GATT sub-procedure requirements beyond those required by all GATT Servers.

<table>
<thead>
<tr>
<th>GATT Sub-Procedure</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write Without Response</td>
<td>M</td>
</tr>
<tr>
<td>Notification</td>
<td>C.1</td>
</tr>
<tr>
<td>Write Characteristic Descriptors</td>
<td>C.1</td>
</tr>
</tbody>
</table>

C.1: Mandatory if Scan Refresh characteristic is supported, otherwise optional.

Table 1.1: GATT sub-procedure requirements

1.5 Transport Dependencies

This service shall operate over LE transport only.

1.6 Error Codes

This service does not define any application error codes that are used in Attribute Protocol.
1.7 Byte Transmission Order

All characteristics used with this service shall be transmitted with the least significant octet first (i.e. little endian). The least significant octet is identified in the characteristic definitions in [2].
2 Service Requirements

2.1 Service Declaration

Only one instance of the Scan Parameters Service shall be allowed on a Server.

The service UUID shall be set to «Scan Parameters Service». The UUID value assigned to «Scan Parameters Service» is defined in [2].

2.2 Service Type

The Scan Parameters Service shall be instantiated as a «Primary Service».

2.3 Characteristic Overview

The Scan Parameters Service shall expose the Scan Interval Window and Scan Refresh characteristics as shown in Table 2.1. No more than one instance of the Scan Interval Window characteristic or the Scan Refresh characteristic shall exist in a Scan Parameters Service.

<table>
<thead>
<tr>
<th>Characteristic Name</th>
<th>Requirement</th>
<th>Mandatory Properties</th>
<th>Optional Properties</th>
<th>Security Permissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scan Interval Window</td>
<td>M</td>
<td>WriteWithoutResponse</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>Scan Refresh</td>
<td>O</td>
<td>Notify</td>
<td></td>
<td>None</td>
</tr>
</tbody>
</table>

*Table 2.1: Scan Parameters characteristics*

Notes:

- Security Permissions of “None” means that this service does not impose any requirements.
- Properties not listed as mandatory or optional are excluded.

2.4 Scan Interval Window Characteristic

The Scan Interval Window characteristic is used to store the scan parameters of the Client.

2.4.1 Scan Interval Window Characteristic Behavior

The scan parameters stored in the Scan Interval Window characteristic are the last known values of LE_Scan Interval and LE_Scan Window of the Client.

The Scan Interval Window characteristic is written using the GATT “WriteWithoutResponse” sub-procedure.

2.4.2 Scan Interval Window Characteristic Value

The Scan Interval Window characteristic is composed of two 16-bit values:

- LE_Scan_Interval
- LE_Scan_Window
The format and values of these fields are the same as the HCI LE Create Connection Command’s LE_Scan_Interval and LE_Scan_Window parameters as defined in [1] Volume 2, Part E, Section 7.8.12.

The default values for LE_Scan_Interval and LE_Scan_Window may be recommended by higher-layer profiles.

### 2.5 Scan Refresh Characteristic

The Scan Refresh characteristic is used to notify the Client that the Server requires the Scan Interval Window characteristic to be written with the latest values upon notification.

#### 2.5.1 Scan Refresh Characteristic Behavior

The Scan Refresh characteristic value is notified to the Client using the GATT Notification sub-procedure.

#### 2.5.2 Scan Refresh Characteristic Value

The Scan Refresh characteristic value is a single octet whose value is defined in Table 2.2.

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x00</td>
<td>Server requires refresh</td>
</tr>
<tr>
<td>0x01-0xFF</td>
<td>Reserved for future use</td>
</tr>
</tbody>
</table>

*Table 2.2: Scan Refresh characteristic value*

#### 2.5.2.1 Scan Refresh Characteristic Descriptors

The Client Characteristic Configuration Descriptor for the Scan Refresh characteristic is used to configure the characteristic for notifications.

### 2.6 Server Assumptions

When disconnected, the possibility that the Client changes its scanning behavior exists; the Server therefore should assume the characteristic value stored represents the last known values of the Client scanning behavior, specifically:

- **LE_Scan_Interval**: the maximum LE_Scan_Interval of the Client.
- **LE_Scan_Window**: the minimum LE_Scan_Window of the Client corresponding to the LE_Scan_Interval.
3 Acronyms and Abbreviations

<table>
<thead>
<tr>
<th>Acronyms and Abbreviations</th>
<th>Meaning</th>
</tr>
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<tbody>
<tr>
<td>GATT</td>
<td>Generic Attribute Profile</td>
</tr>
<tr>
<td>LE</td>
<td>Low Energy</td>
</tr>
<tr>
<td>UUID</td>
<td>Universally Unique Identifier</td>
</tr>
</tbody>
</table>

Table 3.1: Acronyms and Abbreviations
4 References

[1] Bluetooth Core Specification v4.0
[2] Characteristic and Descriptor descriptions are accessible via the Bluetooth SIG Assigned Numbers.