

<b>BLUETOOTH® DOC</b>	Date / Year-Month-Day 2011-12-27	Approved Adopted	Revision V10r00	Document No ScPS_SPEC
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## SCAN PARAMETERS SERVICE SPECIFICATION

### **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

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

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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

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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.

GATT Sub-Procedure	Requirement
Write Without Response	M
Notification	C.1
Write Characteristic Descriptors	C.1
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.

Characteristic Name	Requirement	Mandatory Properties	Optional Properties	Security Permissions
Scan Interval Window	M	WriteWithoutResponse		None
Scan Refresh	O	Notify		None

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](#).

Value	Description
0x00	Server requires refresh
0x01-0xFF	Reserved for future use

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

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Acronyms and Abbreviations	Meaning
GATT	Generic Attribute Profile
LE	Low Energy
UUID	Universally Unique Identifier

Table 3.1: Acronyms and Abbreviations

## **4 References**

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