

# 11 ADVERTISING AND SCAN RESPONSE DATA FORMAT

The format of Advertising data and Scan Response data is shown in [Figure 11.1](#). The data consists of a significant part and a non-significant part. The significant part contains a sequence of AD structures. Each AD structure shall have a Length field of one octet, which contains the Length value, and a Data field of Length octets. The first octet of the Data field contains the AD type field. The content of the remaining Length – 1 octet in the Data field depends on the value of the AD type field and is called the AD data. The non-significant part extends the Advertising and Scan Response data to 31 octets and shall contain all-zero octets.

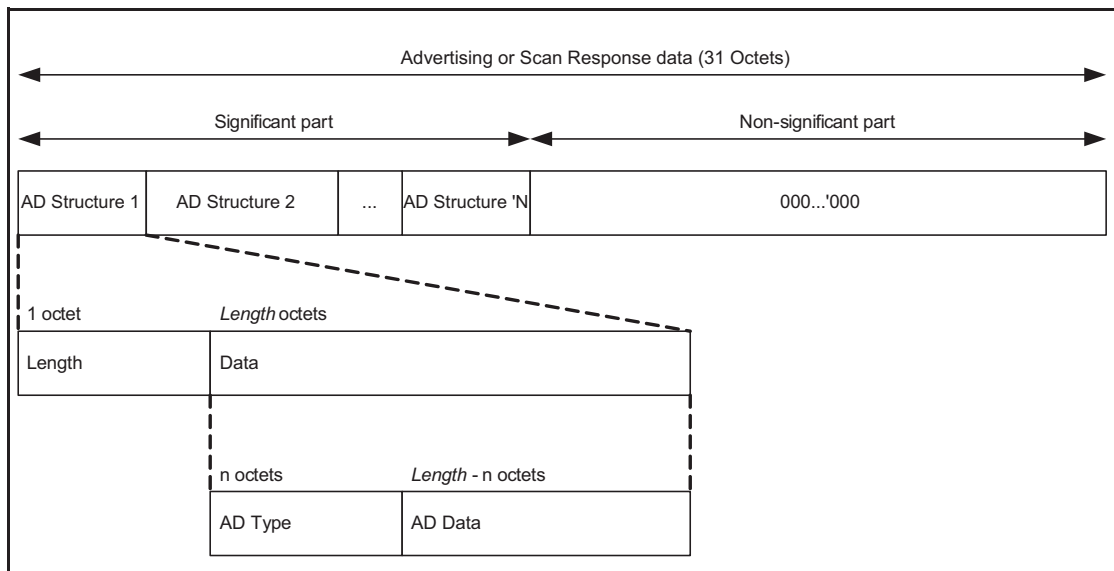


Figure 11.1: Advertising and Scan Response data format

If the Length field is set to zero, then the Data field has zero octets. This shall only occur to allow an early termination of the Advertising or Scan Response data.

Only the significant part of the Advertising or Scan Response data needs to be sent over the air.

The Advertising and Scan Response data is sent in advertising events. The Advertising Data is placed in the AdvData field of ADV\_IND, ADV\_NONCONN\_IND, and ADV\_SCAN\_IND packets. The Scan Response data is sent in the ScanRspData field of SCAN\_RSP packets.

## 11.1 AD TYPE DEFINITIONS

All AD types are listed in the Bluetooth [Assigned Numbers](#) document.



All numerical multi-byte entities and values shall use little-endian byte order.

### 11.1.1 Service UUIDs

A device may list the service UUIDs that it implements in its advertising data. Service UUIDs may be either 16-bit UUIDs or 128-bit UUIDs. The format of Service UUIDs for each type value is defined in [Table 18.2](#).

### 11.1.2 Local Name

The Local Name AD type contains the device name, either complete or shortened as defined in [Section 3.2.2](#). The AD type indicates if the name is complete or shortened. If the name is shortened, the complete device name can be read by reading the device name characteristic as defined in [Section 12](#). The Advertising and Scan Response data shall not contain more than one instance of the Local Name AD type. A shortened name shall only contain contiguous characters from the beginning of the full name. For example, if the device name is 'BT\_Device\_Name' then the shortened name over BR/EDR could be 'BT\_Device' while the shortened name on LE could be 'BT\_Dev'. The format of the data is defined in [Table 18.3](#).

### 11.1.3 Flags

The Flags AD type contains several flag bits interpreted as boolean values.

Flags used over the LE physical channel are:

- Limited Discoverable Mode
- General Discoverable Mode
- BR/EDR Not Supported
- Simultaneous LE and BR/EDR to Same Device Capable (Controller)
- Simultaneous LE and BR/EDR to Same Device Capable (Host)

The Flags AD type shall not be included in the scan response data. The advertising data shall not contain more than one instance of the Flags AD type. The Flags AD type shall be included in the advertising data if any of the bits are non-zero. The Flags AD type may be omitted from the advertising data if all of the bits are zero. The format of Flags AD type is defined in [Table 18.1](#).

### 11.1.4 Manufacturer Specific Data

The Manufacturer Specific AD type is used for manufacturer specific data. See [Section 18.11](#).



### 11.1.5 TX Power Level

The TX Power Level AD type indicates the transmitted power level of the advertising packet. The format of TX Power Level AD is defined in [Table 18.4](#).

### 11.1.6 Security Manager Out of Band (OOB)

An out of band mechanism is used by the Security Manager to communicate discovery information as well as other information related to the pairing process. The format of Security Manager Out of Band AD is defined in [Section 18.7](#). This shall only be used over an out-of-band mechanism.

### 11.1.7 Security Manager TK Value

The Security Manager TK Value AD type is defined in [Section 18.6](#). This shall only be used over an out-of-band mechanism.

### 11.1.8 Slave Connection Interval Range

The Slave Connection Interval Range AD type contains the Peripheral's preferred connection interval range, for all logical connections.

Note: The minimum value depends on the battery considerations of the Peripheral and the maximum connection interval depends on the buffers available on the Peripheral.

The Central should use the information from the Peripheral's Slave Connection Interval Range AD type when establishing a connection.

The Slave Connection Interval Range AD type is defined in [Section 18.8](#).

### 11.1.9 Service Solicitation

One of the Service Solicitation AD types may be sent to invite other devices that expose one or more of the services specified in the Service Solicitation data to connect. The device should be in the undirected connectable mode and in one of the discoverable modes. This enables a Central providing one or more of these services to connect to this Peripheral, so that the Peripheral can use the services on the Central.

The Service Solicitation AD types are defined in [Section 18.9](#).

### 11.1.10 Service Data

The Service Data AD type consists of a service UUID with the data associated with that service.

The Service Data AD type is defined in [Section 18.10](#).



## 11.2 EXAMPLE ADVERTISING DATA

This is an example of advertising data with AD types:

Value	Notes
0x02	Length of this Data
0x01	AD type = Flags
0x01	LE Limited Discoverable Flag set
0x0A	Length of this Data
0x09	AD type = Complete local name
0x50	'P'
0x65	'e'
0x64	'd'
0x6F	'o'
0x6D	'm'
0x65	'e'
0x74	't'
0x65	'e'
0x72	'r'

## 18 APPENDIX C (NORMATIVE): EIR AND AD FORMATS

This section defines the data format used in the EIR data field and in the AD format.

### 18.1 FLAGS

The Flags field may be zero or more octets long. This allows the Flags field to be extended while using the minimum number of octets within the data packet. All octets that are 0x00 are not transmitted as long as all other octets after that octet are also 0x00.

Value	Description	Bit	Information
0x01	Flags	0	LE Limited Discoverable Mode
		1	LE General Discoverable Mode
		2	BR/EDR Not Supported (i.e. bit 37 of LMP Extended Feature bits Page 0)
		3	Simultaneous LE and BR/EDR to Same Device Capable (Controller) (i.e. bit 49 of LMP Extended Feature bits Page 0)
		4	Simultaneous LE and BR/EDR to Same Device Capable (Host) (i.e. bit 66 of LMP Extended Feature bits Page 1)
		5..7	Reserved

Table 18.1: Flags



## 18.2 SERVICE

Value	Description	Information
0x02	16-bit Service UUIDs	More 16-bit UUIDs available
0x03	16-bit Service UUIDs	Complete list of 16-bit UUIDs available
0x04	32-bit Service UUIDs	More 32-bit UUIDs available
0x05	32-bit Service UUIDs	Complete list of 32-bit UUIDs available
0x06	128-bit Service UUIDs	More 128-bit UUIDs available
0x07	128-bit Service UUIDs	Complete list of 128-bit UUIDs available

Table 18.2: Service UUIDs

## 18.3 LOCAL NAME

Value	Description	Information
0x08	Local Name	Shortened local name
0x09	Local Name	Complete local name

Table 18.3: Local Name

## 18.4 TX POWER LEVEL

Value	Description	Information
0x0A	TX Power Level (1 byte)	0xXX:-127 to +127dBm Note: when the TX Power Level tag is not present, the TX power level of the packet is unknown.

Table 18.4: TX Power Level



### 18.5 SIMPLE PAIRING OPTIONAL OOB TAGS

Value	Description	Information
0x0D	Class of device (3 octets)	Format defined in <a href="#">Assigned Numbers</a>
0x0E	Simple Pairing Hash C (16 octets)	Format defined in <a href="#">[Vol. 2], Part H Section 7.2.2</a>
0x0F	Simple Pairing Randomizer R (16 octets)	Format defined in <a href="#">[Vol. 2], Part H Section 7.2.2</a>

Table 18.5: Optional OOB Tags

### 18.6 SECURITY MANAGER TK VALUE

Value	Description	Information
0x10	TK Value	Value as used in pairing over LE Physical channel. Format defined in <a href="#">[Vol. 3], Part H Section 2.3</a>

Table 18.6: Security Manager TK Value

### 18.7 SECURITY MANAGER OOB FLAGS

Value	Description	Bit	Information
0x11	Flag (1 octet)	0	OOB Flags Field (0 = OOB data not present, 1 = OOB data present)
		1	LE supported (Host) (i.e. bit 65 of LMP Extended Feature bits Page 1)
		2	Simultaneous LE and BR/EDR to Same Device Capable (Host) (i.e. bit 66 of LMP Extended Feature bits Page 1)
		3	Address type (0 = Public Address, 1 = Random Address)
		4.7	Reserved

Table 18.7: Security Manager OOB Flags



## 18.8 SLAVE CONNECTION INTERVAL RANGE

Value	Description	Information
0x12	Slave Connection Interval Range	<p>The first 2 octets defines the minimum value for the connection interval in the following manner:  <math>connInterval_{min} = Conn\_Interval\_Min * 1.25 \text{ ms}</math>                      Conn_Interval_Min range: 0x0006 to 0x0C80                      Value of 0xFFFF indicates no specific minimum.                      Values outside the range are reserved. (excluding 0xFFFF)</p> <p>The second 2 octets defines the maximum value for the connection interval in the following manner:  <math>connInterval_{max} = Conn\_Interval\_Max * 1.25 \text{ ms}</math>                      Conn_Interval_Max range: 0x0006 to 0x0C80                      Conn_Interval_Max shall be equal to or greater than the Conn_Interval_Min.                      Value of 0xFFFF indicates no specific maximum.                      Values outside the range are reserved (excluding 0xFFFF)</p>

Table 18.8: Slave Connection Interval Range

## 18.9 SERVICE SOLICITATION

Value	Description	Information
0x14	Service UUIDs	List of 16 bit Service UUIDs
0x15	Service UUIDs	List of 128 bit Service UUID

Table 18.9: Service Solicitation

## 18.10 SERVICE DATA

Value	Description	Information
0x16	Service Data (2 or more octets)	The first 2 octets contain the 16 bit Service UUID followed by additional service data

Table 18.10: Service Data





## 18.11 MANUFACTURER SPECIFIC DATA

Value	Description	Information
0xFF	Manufacturer Specific Data (2 or more octets)	The first 2 octets contain the Company Identifier Code followed by additional manufacturer specific data

Table 18.11: Manufacturer Specific Data