Introduction

This application note describes testing for certification of compliance with the Radio Law in Japan.

Target Device

RL78/G1D

Caution  Descriptions in this application note are examples for reference and actual procedures will differ with the system configuration and certification body. In addition, confirm the latest information on test standards and so on. This application note is created on the basis of available information as of November in 2015.

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1. Overview

This application note describes how to prepare an application for obtaining certification of compliance with the Radio Law in Japan and the operations involved in testing.

1.1 Related Documents

A document that is related to this application note is listed below for reference.

- Bluetooth® Low Energy Protocol Stack
  Sample Program Application Note (R01AN1375)
2. Preparing an Application

To make an application, carry out a preparatory examination and draw up the application forms.

2.1 The Preparatory Examination

Examine the frequency variation in continuous non-modulated transmission. Also examine the occupied bandwidths with and without spectrum spreading, the intensity of spurious or unwanted emissions, the variation of antenna power in the continuous transmission of a pseudo-random bit sequence, and the intensity of radio fields such as secondarily generated radio waves in reception. After that, confirm that the device is in conformity with the ARIB STD-T66 standard.

For a testing method, refer to TELEC-T401, a characteristics testing method for radio equipment for use in radio systems for low-power data communications using radio waves with frequency in the range from 2,400 MHz to 2,483.5 MHz (2.4-GHz-band advanced low-power data communications systems).

Items to be checked are listed below. All samples are tested around three frequencies: 2,402, 2,440, and 2,480 MHz. For the operations involved in testing, refer to 3. Operations Involved in Testing.

Declared antenna power: x.xx mW
OBW: 1.5 MHz

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Judge</th>
<th>Sample 1</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lower</td>
<td>2402 MHz</td>
<td>2440 MHz</td>
</tr>
<tr>
<td>Carrier Frequency</td>
<td>MHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>MHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difference</td>
<td>ppm</td>
<td>-50.00</td>
<td>50.00</td>
<td></td>
</tr>
<tr>
<td>Occupied Bandwidth</td>
<td>MHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td>MHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper</td>
<td>MHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bandwidth</td>
<td>MHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carrier Power</td>
<td>mW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difference</td>
<td>%</td>
<td>-80.0</td>
<td>20.0</td>
<td></td>
</tr>
<tr>
<td>Unwanted Emission (2374 to 2509.5 MHz (except for 2387 to 2496.5 MHz))</td>
<td>MHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unwanted Emission</td>
<td>uW/MHz</td>
<td>2.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2387 to 2496.5 MHz (except for 2400 to 2483.5 MHz))</td>
<td>MHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unwanted Emission</td>
<td>uW/MHz</td>
<td>25.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(30 to 2374 MHz)</td>
<td>MHz</td>
<td>2.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unwanted Emission</td>
<td>uW/MHz</td>
<td>2.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2509.5 to 12500 MHz)</td>
<td>MHz</td>
<td>2.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radiation (30 to 1000 MHz)</td>
<td>MHz</td>
<td>4.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radiation (1000 to 12500 MHz)</td>
<td>nW</td>
<td>20.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.2 Drawing up the Application Forms

Draw up the application forms listed below. Use the forms prescribed by the respective certification bodies.

- Design specifications
- Block diagrams of the radio equipment system
- Data on the antenna
- Table of manufacturing numbers vs. identifying codes
2.2.1 Design Specifications

Get the prescribed form from the given certification body and fill out the form. Examples of the entries are given below.

No. 3 Type Specifications of radio equipment used for citizen's band radio stations, cordless telephone radio stations, specified low-power radio stations, radio stations for low-power security systems, radio stations for low-power data communications systems, digital cordless telephone radio stations (TDMA Wideband, TDMA Narrowband, OFDMA), PHS land mobile stations, narrow-area communications system land mobile stations, and land mobile stations of 5 GHz band wireless access system, land mobile stations of a narrow-area communications system and radio station of an Ultra-wide band wireless system and 700MHz road traffic system.

### Design Specifications

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Communication system</td>
</tr>
<tr>
<td>2.</td>
<td>Transmitter</td>
</tr>
<tr>
<td>(1)</td>
<td>Rated output power</td>
</tr>
<tr>
<td>(2)</td>
<td>Type emission and frequency range</td>
</tr>
<tr>
<td>(3)</td>
<td>Oscillation</td>
</tr>
<tr>
<td></td>
<td>Reference frequency: 32 MHz</td>
</tr>
<tr>
<td>(4)</td>
<td>Modulation</td>
</tr>
<tr>
<td>3.</td>
<td>Manufacturer</td>
</tr>
<tr>
<td></td>
<td>Name or model type</td>
</tr>
<tr>
<td></td>
<td>Serial number</td>
</tr>
<tr>
<td>4.</td>
<td>Antenna</td>
</tr>
<tr>
<td>(1)</td>
<td>Model and configuration</td>
</tr>
<tr>
<td>(2)</td>
<td>Gain</td>
</tr>
<tr>
<td>5.</td>
<td>Classification and model type or name of attachment</td>
</tr>
<tr>
<td></td>
<td>Controller: PC etc. via a serial interface Note 3</td>
</tr>
<tr>
<td>6.</td>
<td>Other specifications</td>
</tr>
<tr>
<td></td>
<td>No connection with public lines</td>
</tr>
<tr>
<td>7.</td>
<td>Attached drawings</td>
</tr>
<tr>
<td>8.</td>
<td>Remarks</td>
</tr>
<tr>
<td></td>
<td>Antenna impedance: 50 Ω, rated supply voltage: 3.0 V Note 4</td>
</tr>
</tbody>
</table>

Notes
1. In making an application, report a value such that any change from that given will be within the range from +20% to -80%.
2. Write the model, configuration, and gain such that all match the corresponding entries on the datasheet.
3. Describe the methods of operation in the examinations.
4. Give a description which explains that the high-frequency and modulation sections cannot readily be opened.
5. If the adaptive function is to be used, enter two values as the antenna power. These two values are only used in testing the power of the antenna. The larger of the two is used in other tests.
2.2.2 Block Diagram of the Radio Equipment System

The figure below is an example. Describe the overall system configuration, and include a detailed diagram of the RF blocks and details of interfaces between modules (manufacturer’s names, type numbers, and pin configurations). Describe them in accord with the actual system.

(1) System Configuration

Block Diagram of the Radio Equipment System

Model: XXXXXXX

![Block Diagram of the Radio Equipment System](image)

Type number: R5F11AGJ
(includes the radio function)

CPU

256-KB flash memory
(holds the identifying code)

RAM 20 KB

32-MHz clock

32-kHz clock

2402 to 2480 MHz
(2-MHz intervals, 40 waves)

F1D: 0.00XXX W

Serial interface

USB–serial conversion

3.0-V voltage

Regulator

(2) Detailed Diagram of the RF Block

![Detailed Diagram of the RF Block](image)
(3) Interfaces

Describe the manufacturer’s names, type numbers, and pin configurations of the modules and their interfaces.

Type number: XXXXXXX (manufacturer’s name)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal Name</th>
<th>Pin</th>
<th>Signal Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VSS (ground)</td>
<td>13</td>
<td>P02</td>
</tr>
<tr>
<td>2</td>
<td>VDD (power supply)</td>
<td>14</td>
<td>P10</td>
</tr>
<tr>
<td>3</td>
<td>P40</td>
<td>15</td>
<td>N.C.</td>
</tr>
<tr>
<td>4</td>
<td>N.C.</td>
<td>16</td>
<td>P22</td>
</tr>
<tr>
<td>5</td>
<td>RESET</td>
<td>17</td>
<td>N.C.</td>
</tr>
<tr>
<td>6</td>
<td>N.C.</td>
<td>18</td>
<td>P23</td>
</tr>
<tr>
<td>7</td>
<td>P60</td>
<td>19</td>
<td>N.C.</td>
</tr>
<tr>
<td>8</td>
<td>P61.</td>
<td>20</td>
<td>P16</td>
</tr>
<tr>
<td>9</td>
<td>P03</td>
<td>21</td>
<td>VSS</td>
</tr>
<tr>
<td>10</td>
<td>RxD (serial interface)</td>
<td>22</td>
<td>P30</td>
</tr>
<tr>
<td>11</td>
<td>P147</td>
<td>23</td>
<td>P120</td>
</tr>
<tr>
<td>12</td>
<td>TxD (serial interface)</td>
<td>24</td>
<td>N.C.</td>
</tr>
</tbody>
</table>
2.2.3 Data on the Antenna
Prepare the data (a datasheet) for the antenna including descriptions of its shape, dimensions, and data on gain as evidence on items such as the results of measuring gain.

2.2.4 Table of Manufacturing Numbers vs. Identifying Codes
Create a table of correspondences between manufacturing numbers and identifying codes of the devices for which applications are being made. Examples of the entries are given below.

<table>
<thead>
<tr>
<th>Manufacturing Number</th>
<th>Identifying Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABC 0021</td>
<td>xx- xx- xx- xx- A0</td>
</tr>
<tr>
<td>ABC 0022</td>
<td>xx- xx- xx- xx- A1</td>
</tr>
<tr>
<td>ABC 0023</td>
<td>xx- xx- xx- xx- A2</td>
</tr>
<tr>
<td>ABC 0024</td>
<td>xx- xx- xx- xx- A3</td>
</tr>
<tr>
<td>ABC 0025</td>
<td>xx- xx- xx- xx- A4</td>
</tr>
<tr>
<td>ABC 0026</td>
<td>xx- xx- xx- xx- A5</td>
</tr>
<tr>
<td>ABC 0027</td>
<td>xx- xx- xx- xx- A6</td>
</tr>
<tr>
<td>ABC 0028</td>
<td>xx- xx- xx- xx- A7</td>
</tr>
<tr>
<td>ABC 0029</td>
<td>xx- xx- xx- xx- A8</td>
</tr>
<tr>
<td>ABC 0030</td>
<td>xx- xx- xx- xx- A9</td>
</tr>
<tr>
<td>ABC 0031</td>
<td>xx- xx- xx- xx- AA</td>
</tr>
<tr>
<td>ABC 0032</td>
<td>xx- xx- xx- xx- AB</td>
</tr>
<tr>
<td>ABC 0033</td>
<td>xx- xx- xx- xx- AC</td>
</tr>
<tr>
<td>ABC 0034</td>
<td>xx- xx- xx- xx- AD</td>
</tr>
<tr>
<td>ABC 0035</td>
<td>xx- xx- xx- xx- AE</td>
</tr>
<tr>
<td>ABC 0036</td>
<td>xx- xx- xx- xx- AF</td>
</tr>
<tr>
<td>ABC 0037</td>
<td>xx- xx- xx- xx- B0</td>
</tr>
<tr>
<td>ABC 0038</td>
<td>xx- xx- xx- xx- B1</td>
</tr>
<tr>
<td>ABC 0039</td>
<td>xx- xx- xx- xx- B2</td>
</tr>
<tr>
<td>ABC 0040</td>
<td>xx- xx- xx- xx- B3</td>
</tr>
<tr>
<td>ABC 0041</td>
<td>xx- xx- xx- xx- B4</td>
</tr>
<tr>
<td>ABC 0042</td>
<td>xx- xx- xx- xx- B5</td>
</tr>
<tr>
<td>ABC 0043</td>
<td>xx- xx- xx- xx- B6</td>
</tr>
<tr>
<td>ABC 0044</td>
<td>xx- xx- xx- xx- B7</td>
</tr>
<tr>
<td>ABC 0045</td>
<td>xx- xx- xx- xx- B8</td>
</tr>
</tbody>
</table>
3. Operations Involved in Testing

Use an SMA connector for connection to the measuring machine at the certification body. Connect the end of the antenna with the SMA connector.

The items to be examined and how the device is to operate during the given test are listed below. How to execute each of the operations by using the sample software for the Bluetooth Low Energy protocol stack software is described on the following pages.

<table>
<thead>
<tr>
<th>Item to be Examined</th>
<th>Operation of the Device to be Examined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency variation</td>
<td>Continuous wave (CW) transmission (non-modulated transmission)</td>
</tr>
<tr>
<td>Occupied bandwidth with and without spectrum spreading</td>
<td>Continuous transmission of a pseudo-random bit sequence</td>
</tr>
<tr>
<td>Intensity of spurious or unwanted emission</td>
<td>Continuous transmission of a pseudo-random bit sequence</td>
</tr>
<tr>
<td>Variation of antenna power</td>
<td>Continuous transmission of a pseudo-random bit sequence</td>
</tr>
<tr>
<td>Intensity of radio fields such as secondarily generated radio waves</td>
<td>Reception</td>
</tr>
<tr>
<td>Functions for preventing interference (between identifying codes)</td>
<td>Scanning, confirming the address of the other party (transmitting “Advertising” data to the machine on the opposite side)</td>
</tr>
</tbody>
</table>

The sample program files of the Bluetooth Low Energy protocol stack software use in the test are shown below. It can use files in either Embedded or Modem configurations.

For how to use the sample program file, refer to "5. Usage of Console-based Sample Program" in "Bluetooth® Low Energy Protocol Stack Sample Program" (R01AN1375).

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Sample program file name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embedded</td>
<td>RL78_G1D_CCE(CSCP,CPP).hex</td>
</tr>
<tr>
<td>Modem</td>
<td>RL78_G1D_CCM(CSCP,CPP).hex</td>
</tr>
</tbody>
</table>
3.1 Continuous Wave (CW) Transmission (Non-Modulated Transmission)

The vendor specific (VS) commands in the sample program can be used to employ the Bluetooth Low Energy protocol stack software for continuous wave (CW) transmission (non-modulated transmission).

<1> Start the sample program, and select “3.Vendor Specific Test”.

<2> Execute “1.VS Enable” and “5.VS Test_Set_Parameter”.
   For parameters, refer to the sample program.

<3> Starting continuous wave (CW) transmission (non-modulated transmission).
   Set a frequency and execute “3.VS Test_Tx_Start”.

<4> Stopping CW transmission.
   Execute “4.VS Test_End”.
   **Caution** To change the frequency, stop continuous transmission, and repeat step <3> above.

```
-- BLE Sample Program Vendor Specific Test Menu --
1.VS Enable
2.VS Test_Rx_Start
3.VS Test_Tx_Start
4.VS Test_End
5.VS Test_Set_Parameter
6.VS Test_Read_RSSI
7.VS Write BdAddress
8.VS Set_Tx_Power
9.VS GPIO Dir
10.VS GPIO Access
11.VS Flash_Management
12.VS Flash_Access
13.VS Flash_Operation
14.VS Flash_Get_Space
15.VS Flash_Get_EEL_Ver
16.VS Adapt_Enable
17.VS Set_Params
18.VS RF_Control
ESC Key: Menu exit
>> 1
   CMD -> VS Enable
   Status(RBLE_OK)
   >> 0 0 0 2
   CMD -> VS Test_Set_Parameter
   Status(RBLE_OK)
   >>
   rBLED VS EVENT (Set Test Parameters Complete) Status(RBLE_OK)
   >> 3 0 1 4
   CMD -> VS Test_Tx_Start
   Status(RBLE_OK)
   >>
   rBLED VS EVENT (TEST_TX_START_COMP) Status(RBLE_OK)
   >> 4
   CMD -> VS Test_End
   Status(RBLE_OK)
   >>
```

The part with the value “0” here indicates the setting for the frequency, as
XX = (frequency - 2402)/2.

- 2402 MHz = 0
- 2440 MHz = 19
- 2480 MHz = 39
3.2 Continuous Transmission of a Pseudo-Random Bit Sequence

Two power values are only used in testing the power of the antenna. The larger of the two is used in other tests.

<1> Start the sample program, and select "3. Vendor Specific Test".

<2> Execute "1. VS Enable" and "5. VS Test_Set_Parameter".
   For parameters, refer to the sample program.
   **Caution** If the adaptive function is being used to examine the variation of antenna power, two power values must be used in testing.
   Use "8. VS Set_Tx_Power" to set the power values.
   Parameters are as follows.
   -15 dBm = 1
   0 dBm = 9

<3> Starting continuous transmission of a pseudo-random bit sequence.
   Set a frequency and execute "3. VS Test_Tx_Start".

<4> Stopping continuous transmission.
   Execute "4. VS Test_End".
   **Caution** To change the frequency, stop continuous transmission, and repeat step <3> above.

```
-- BLE Sample Program Vendor Specific Test Menu --
1. VS Enable
2. VS Test_Rx_Start
3. VS Test_Tx_Start
4. VS Test_End
5. VS Test_Set_Parameter
6. VS Test_Read_RSSI
7. VS Write BdAddress
8. VS Set_Tx_Power
: 18. VS RF_Control
ESC Key: Menu exit

CMD -> VS Enable
Status(RBLE_OK)

CMD -> VS Test_Set_Parameter
Status(RBLE_OK)

rBLE VS EVENT (Set Test Parameters Complete) Status(RBLE_OK)

CMD -> VS Set_Tx_Power
Set to level 0x01 w/o connection
Status(RBLE_OK)

rBLE VS EVENT (Set Tx Power Complete) Status(RBLE_OK)

CMD -> VS Test_Tx_Start
Status(RBLE_OK)

rBLE VS EVENT (TEST_TX_START_COMP) Status(RBLE_OK)

CMD -> VS Test_End
Status(RBLE_OK)

rBLE VS EVENT (TEST_END_COMP) Status(RBLE_OK)
ReceivedPacketsCnt = 0
```

The part with the value "0" here indicates the setting for the frequency, as 
XX = (frequency - 2402)/2.

2402 MHz = 0
2440 MHz = 19
2480 MHz = 39
3.3 Reception

<1> Start the sample program, and select “3.Vendor Specific Test”.

<2> Execute “1.VS Enable” and “5.VS Test_Set_Parameter”.
   For parameters, refer to the sample program.

<3> Starting reception.
   Set a frequency and execute “2.VS Test_Rx_Start”.

<4> Stopping reception.
   Execute “4.VS Test_End”.
   Caution To change the frequency, stop reception, and repeat step <3> above.

```
-- BLE Sample Program Vendor Specific Test Menu --
1.VS Enable
2.VS Test_Rx_Start
3.VS Test_Tx_Start
4.VS Test_End
5.VS Test_Set_Parameter
6.VS Test_Read_RSSI
7.VS Write BdAddress
8.VS Set_Tx_Power
9.VS GPIO Dir
10.VS GPIO Access
11.VS Flash_Management
12.VS Flash_Access
13.VS Flash_Operation
14.VS Flash_Get_Space
15.VS Flash_Get_EEL_Ver
16.VS Adapt_Enable
17.VS Set_Params
18.VS RF_Control
ESC Key: Menu exit

>> 1
CMD -> VS Enable
   Status(RBLE_OK)
>> 5 0 0 0
CMD -> VS Test_Set_Parameter
   Status(RBLE_OK)
>>
rBLE VS EVENT (Set Test Parameters Complete) Status(RBLE_OK)
>> 2 0
CMD -> VS Test_Rx_Start
   Status(RBLE_OK)
>>
rBLE VS EVENT (TEST_RX_START_COMP) Status(RBLE_OK)
>> 4
CMD -> VS Test_End
   Status(RBLE_OK)
>>
rBLE VS EVENT (TEST_END_COMP) Status(RBLE_OK)
ReceivedPacketsCnt = 5108
>>
```

The part with the value “0” here indicates the setting for the frequency, as
XX = (frequency - 2402)/2.

- 2402 MHz = 0
- 2440 MHz = 19
- 2480 MHz = 39
3.4 Scanning

Before the start of scanning by the device being examined, the Advertising data must be transmitted to the machine on the opposite side.

3.4.1 Transmission of the Advertising Data

<1> Start the sample program, and select “1.GAP & SM & GATT Test”.

<2> Execute “1.GAP Reset”.

<3> Transmitting the Advertising data.

Execute “5.GAP Broadcast_Enable”.

```
-- BLE Sample Program GAP & SM & GATT Test Menu --
  1.GAP Reset
  2.GAP Set_Name
  3.GAP Observation_Enable
  4.GAP Observation_Disable
  5.GAP Broadcast_Enable
  6.GAP Broadcast_Disable
  7.GAP Set_Bonding_Mode
  8.GAP Set_Security_Request
  9.GAP Get_Device_Info
 10.GAP Get_White_List_Size
   :  
43.GATT Execute_Write_Char_Request
44.GATT Notify_Request
45.GATT Indicate_Request
47.GATT Write_Response
48.GATT Set_Permission
49.GATT Set_Data
ESC Key: Menu exit

> 1
CMD -> GAP Reset
 Status(RBLE_OK)
```

```
>>
rBLE GAP EVENT (RESET RESULT) Status(RBLE_OK)
rBLE Version = Major(01),Minor(10)

> 5
CMD -> GAP Broadcast_Enable
Select Parameter No 0
 Status(RBLE_OK)
```

```
>>
rBLE GAP EVENT (BROADCAST_ENABLE_COMP) Status(RBLE_OK)
>>
```
3.4.2 Scanning

<1> Execute “1.GAP Reset”.

<2> Start of searching for devices.

Execute “15.GAP Device_Search” to scan for the addresses of other parties.

```
--- BLE Sample Program GAP & SM & GATT Test Menu ---
1. GAP Reset
2. GAP Set_Name
   :
15. GAP Device_Search
   :
48. GATT Set_Permission
49. GATT Set_Data
ESC Key: Menu exit

>> 1
CMD -> GAP Reset
Status(RBLE_OK)

>> rBLE GAP EVENT (RESET_RESULT) Status(RBLE_OK)
rBLE Version = Major(01), Minor(10)
>> 15
CMD -> GAP Device_Search
Execute General Discovery
Status(RBLE_OK)

>> rBLE GAP EVENT (DEVICE_SEARCH_RESULT_IND)
EventType(0x0), AddressType(0x0)
Addr[ab:cd:11:00:00:07]
Data(0x10)
0x02,0x01,0x06,0x0c,0x09,0x52,0x65,0x6e
0x65,0x73,0x61,0x73,0x2d,0x42,0x4c,0x45
RSSI(-32)

>> rBLE GAP EVENT (DEVICE_SEARCH_RESULT_IND)
EventType(0x4), AddressType(0x0)
Addr[ab:cd:11:00:00:07]
Data(0x0)

>> rBLE GAP EVENT (DEVICE_SEARCH_RESULT_IND)
EventType(0x0), AddressType(0x1)
Addr[1a:e5:d5:54:ec:b7]
Data(0x1d)
0x02,0x04,0x24,0x00,0x34,0x00,0x48,0x54,0x49
0x57,0x20,0x00,0x00,0x00,0x07,0xff,0x00
0x24,0xe4,0x2d,0xdf,0x4c
RSSI(-80)

>> rBLE GAP EVENT (DEVICE_SEARCH_RESULT_IND)
EventType(0x4), AddressType(0x1)
Addr[1a:e5:d5:54:ec:b7]

>> rBLE GAP EVENT (DEVICE_SEARCH_COMP)
```

Read this part to confirm the address of the other party.
4. Others

4.1 Writing BD Addresses

To receive certification, a BD address must be assigned to each of the devices. The procedure for writing BD addresses is given below.

<1> Start the sample program, and select “3. Vendor Specific Test”.
<2> Starting management of access to the data flash memory.
   Execute “1. VS Enable” and “11. Flash_Management”.
   For parameters, refer to the sample program.
<3> Setting the address where the BD address will be stored.
   Execute “7. VS Write BdAddress”.
   For parameters, refer to the sample program.
<4> Stopping management of access to the data flash memory.
   Execute “11. VS Flash_Management”.
   For parameters, refer to the sample program.

Caution  Apply a hardware reset so that the Generic Access Profile (GAP) will reflect the new setting for the BD address.

```
--- BLE Sample Program Vendor Specific Test Menu ---
1. VS Enable
2. VS Test_Rx_Start
3. VS Test_Tx_Start
4. VS Test_End
5. VS Test_Set_Parameter
6. VS Test_Read_RSSI
7. VS Write BdAddress
8. VS Set_Tx_Power
9. VS GPIO Dir
10. VS GPIO Access
11. VS Flash_Management
12. VS Flash_Access
18. VS RF_Control
ESC Key: Menu exit

>> 1
CMD -> VS Enable
Status(RBLE_OK)

>> 11 0
CMD -> VS Flash_Management
Command: 0
Status(RBLE_OK)

>> rBLE VS EVENT (Data Flash Management Complete) Status(RBLE_OK)
Started.

>> 7 0x123456 0x789abc
CMD -> VS Write BdAddress
Addr[12:34:56:78:9a:bc]
Status(RBLE_OK)

>> rBLE VS EVENT (Write BD Address Complete) Status(RBLE_OK)

>> 11 1
CMD -> VS Flash_Management
Command: 1
Status(RBLE_OK)

>> rBLE VS EVENT (Data Flash Management Complete) Status(RBLE_OK)
Stopped.

>>
```
4.2 Confirming a BD Address

You can now confirm the new setting for the BD address. The procedure for doing so is given below.

<1> Start the sample program, and select “1.GAP & SM & GATT Test”.
<2> Execute “1.GAP Reset”.
<3> Confirming the BD address. Execute ”9.GAP Get_Device_Info”.

```
-- BLE Sample Program GAP & SM & GATT Test Menu --
1.GAP Reset
2.GAP Set_Name
3.GAP Observation_Enable
4.GAP Observation_Disable
5.GAP Broadcast_Enable
6.GAP Broadcast_Disable
7.GAP Set_Bonding_Mode
8.GAP Set_Security_Request
9.GAP Get_Device_Info
10.GAP Get_White_List_Size
: 45.GATT Indicate_Request
47.GATT Write_Response
48.GATT Set_Permission
49.GATT Set_Data
ESC Key: Menu exit

>> 1
CMD -> GAP Reset
Status(RBLE_OK)
>>
rBLE GAP EVENT (RESET RESULT) Status(RBLE_OK)
rBLE Version = Major(01),Minor(10)
>> 9
CMD -> GAP Get_Device_Info
Status(RBLE_OK)
>>
rBLE GAP EVENT (GET_DEVICE_INFO_COMP) Status(RBLE_OK)
Addr[12:34:56:78:9a:bc]
HCI Version(0x08), HCI SubVersion(0x0002)
LMP Version(0x08), LMP SubVersion(0x0002)
HOST Version(0x08), HOST SubVersion(0x0002)
Manufacture Name(0x36)
>>
```
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General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unit products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

1. Handling of Unused Pins
   Handle unused pins in accordance with the directions given under Handling of Unused Pins in the manual.
   - The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible. Unused pins should be handled as described under Handling of Unused Pins in the manual.

2. Processing at Power-on
   The state of the product is undefined at the moment when power is supplied.
   - The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the moment when power is supplied. In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the moment when power is supplied until the reset process is completed. In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the moment when power is supplied until the power reaches the level at which resetting has been specified.

3. Prohibition of Access to Reserved Addresses
   Access to reserved addresses is prohibited.
   - The reserved addresses are provided for the possible future expansion of functions. Do not access these addresses; the correct operation of LSI is not guaranteed if they are accessed.

4. Clock Signals
   After applying a reset, only release the reset line after the operating clock signal has become stable. When switching the clock signal during program execution, wait until the target clock signal has stabilized.
   - When the clock signal is generated with an external resonator (or from an external oscillator) during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Moreover, when switching to a clock signal produced with an external resonator (or by an external oscillator) while program execution is in progress, wait until the target clock signal is stable.

5. Differences between Products
   Before changing from one product to another, i.e. to a product with a different part number, confirm that the change will not lead to problems.
   - The characteristics of Microprocessing unit or Microcontroller unit products in the same group but having a different part number may differ in terms of the internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.
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