



Regulatory Certification Testing

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Introduction

Companies designing a product using Amp'ed RF Bluetooth devices may need to obtain certification from the appropriate regulatory bodies of each region into which the product is sold. This guide is intended to provide information about the control of a Amp'ed RF Bluetooth device during regulatory testing.

1 Relevant Regulations and Standards

The following is a short list of some of the regulations and standards appropriate for testing Bluetooth devices:

FCC Section 15 – Includes:

Section 15.31 Measurement standards

Section 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

ANSI C63.4-1992 Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

ETSI ETS 300 328 - Radio Equipment and Systems (RES) Wideband data transmission systems Technical characteristics and test conditions for data transmission equipment operating in the 2.4 GHz ISM band and using spread spectrum modulation techniques

The above list is just a partial list of applicable regulations. Additional regulations may apply for RF devices in certain regions. Please consult with a test facility to determine exactly which regulations apply in the regions the

2 Test Commands

Amp'ed RF devices may be controlled using AT commands to enable and disable certain operations required during regulatory testing. The commands described in this application note are the ones most relevant to such testing.

The standard format of AT commands is:

at+ab command <parameters>

Note: the format after “at+” will accept ANY two characters in place of “ab”.



2.1 Static Tx/Rx Test

The txrxtest command causes the device to either transmit a continuous stream of packets of a specified type and modulation, or continuously listen on a specified channel. The format for the txrxtest command is:

```
at+ab txrxtest <off/on> <tx/rx> <channel> <data> <mode>
```

Where:

<Off/On> 0 is off, 1 is on

<Tx/Rx> 0 is Tx, 1 is Rx

<Channel> channel number, 0-78

<Data> 0 is "0" modulated, 1 is "1" modulated

<Mode> 0 – 3

0 Basic rate 1Mbps

1 Basic rate in Enhanced Data Rate for DM1 case

2 Enhanced Data Rate 2Mbps

3 Enhanced Data Rate 3Mbps

2.2 Tx Test

The testxmt command is used to transmit or receive data packets without having a Bluetooth connection. The device will transmit packets without whitening, according to the specified parameters using 3DH5 type packets with a payload size of 1021. This is similar to the transmitter tests in the Bluetooth Test Mode chapter of the Bluetooth Specification, but the device is master.

In this mode the Host can send the command again to change the parameters or to end the test mode.

After ending the test mode, an HCI_Reset command is needed to reset the firmware.

The two accepted formats for this command are:

```
at+ab testxmt <Pattern> <Frequency>
```

and

```
at+ab testxmt <Pattern> <BegCh> <EndCh>
```



Where:

- <Frequency> MHz value between 2402 and 2657
- <BegCh> Channel value between 0 and 78
- <EndCh> Channel value between <BegCh> and 78
- <Pattern> 1, 2, 3, 4, or 9.

- 1 Send zeroes.
- 2 Send ones.
- 3 Send 1010 pattern.
- 4 Random bit pattern
- 9 Send 11110000.

3 Japan TELEC Radio Equipment Test Commands

Using Hyperterminal with settings of 115Kbaud, 8 bit, no parity, 1 stop. Terminal every line with a carriage return.

3.1 Put the board in Hop Mode

at+ab reset

```
at+ab SendHci FCF4 80 80 80 80 04 01 00 00 0027 00043E2615AB 01
FFFFFFFFFFFFFFFFFFFFFFF
```

Note: Fill in the BD Address above from the test unit.

3.2 Put the board in CW Mode

Sends a 0 so this is offset-160KHz from center.

at+ab reset

```
at+ab SendHci FCF8 01 00 27 00 00
```

```
at+ab SendHci FC04 23 0020
```

```
at+ab SendHci FC04 25 0010
```

Sends a carrier only but is 40dB down from max transmit power



4 Transmitter Testing

The transmitter can be configured to operate as required using the `txrxtest` and the `testxmt` command.

4.1 Example #1

The following sequence of commands sets the device to transmit at full power, 1's modulated data, at the basic 1Mbps rate. Low/Middle/High channel measurements are being made in this example:

```
at+ab txrxtest 1 0 0 1 0
```

Make a measurement for channel 0

```
at+ab txrxtest 1 0 39 1 0
```

Make a measurement for channel 39

```
at+ab txrxtest 1 0 78 1 0
```

Make a measurement for channel 78

4.2 Example #2

In this example the device is transmitting full power, at the middle channel, basic data rate, and with 0's modulation.

```
at+ab txrxtest 1 0 39 0 0
```

4.3 Example #3

In this example the device is transmitting packets with a payload pattern of 1010 on a frequency of 2441MHz.

```
at+ab testxmt 3 2441
```

4.4 Example #4

In this example the device is transmitting packets with a random payload pattern using only the low band of channels between 0 and 19.

```
at+ab testxmt 4 0 19
```

5 Receiver Testing

The receiver can be configured to operate continuously on a specific channel using the `txrxtest` command.



Note: At this point it is very important that no other Bluetooth devices be within the device's range. The device is scanning on the specified channel and will connect with any other Bluetooth device that is performing inquiry on this channel. The device will not transmit on this channel unless it is responding to another Bluetooth device.

5.1 Example#1

In this example the device is put into receive only mode. The Low/Middle/High channels are tested.

```
at+ab txrxtest 1 1 0 0 0
```

Make a measurement

```
at+ab txrxtest 1 1 39 0 0
```

Make a measurement

```
at+ab txrxtest 1 1 78 0 0
```

Make a measurement