



# FCC TEST REPORT

for

## 47 CFR Part 15 Subpart C

**Equipment** : Bluetooth Stereo Headset  
**Model No.** : MBSH-C3.2  
**FCC ID** : SI4-MBSHC32  
**Filing Type** : Certification  
**Applicant** : MAVIN TECHNOLOGY INC.  
3F, NO. 35, Hsin Tai Rd., Chupei City, Hsinchu County 302, Taiwan, R.O.C.

- The test result refers exclusively to the test presented test model / sample.
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- The data shown in this test report were carried out on Apr. 08, 2006 at **Sporton International Inc. LAB.**
- Report No.: FR5D2803, Report Version: Rev. 01

Dr. Daniel Lee  
EMC/SAR Director

***SPORTON International Inc.***

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### History of this test report

Report Issue Date: Apr. 13, 2006

| Report No. | Description |
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## 1. General Description of Equipment under Test

### 1.1 Applicant

**MAVIN TECHNOLOGY INC.**

3F, NO. 35, Hsin Tai Rd., Chupei City, Hsinchu County 302, Taiwan, R.O.C.

### 1.2 Manufacturer

**MAVIN TECHNOLOGY INC.**

3F, NO. 35, Hsin Tai Rd., Chupei City, Hsinchu County 302, Taiwan, R.O.C.

### 1.3 Basic Description of Equipment under Test

Equipment : Bluetooth Stereo Headset  
Model No. : MBSH-C3.2  
FCC ID : SI4-MBSHC32  
AC Power Cord : AC 120V, Wall-mount, 1.8 meter, 2pin  
Adapter : DVE, DSA-31S FEU

### 1.4 Feature of Equipment under Test

| Product Feature & Specification                       |                        |  |               |
|-------------------------------------------------------|------------------------|--|---------------|
| 1. Type of Modulation                                 | GFSK                   |  |               |
| 2. Number of Channels                                 | 79 Channels            |  |               |
| 3. Frequency Band                                     | 2.4GHz~2.4835GHz       |  |               |
| 4. Carrier Frequency of each channel                  | 2402MHz+n*1MHz, n=0~78 |  |               |
| 5. Channel Spacing                                    | 1MHz                   |  |               |
| 6. Maximum Output Power to Antenna (Normal Condition) | -0.19 dBm              |  |               |
| 7. Type of Antenna Connector                          | N/A                    |  |               |
| 8. Antenna Type                                       | PCB Antenna            |  |               |
| 9. Antenna Gain                                       | 0 dBi                  |  |               |
| 10. Function Type                                     | Transmitter            |  | Transceiver V |
| 11. Power Rating (DC/AC Voltage) :                    | 3.7V                   |  |               |

## 2 Test Configuration of Equipment under Test

### 2.1 Test Manner

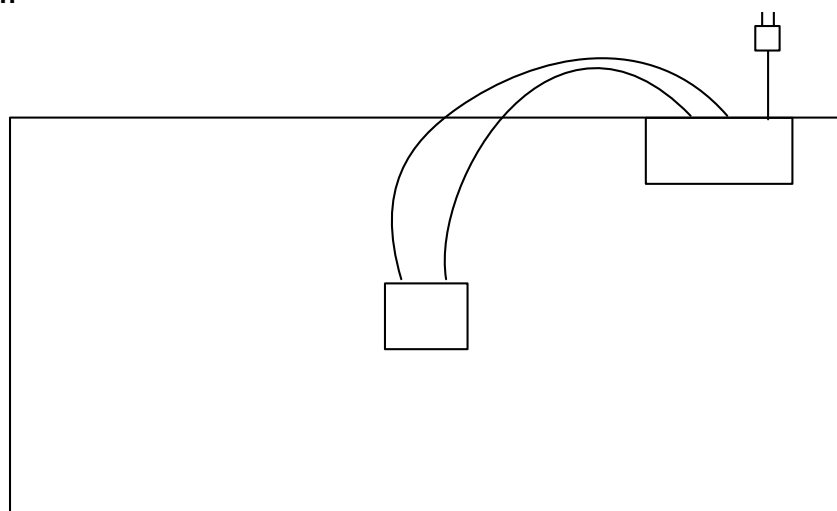
- The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.
- For spurious emission below 1GHz, only one channel of each application was tested because it is not related to channel selection.
- The EUT is programmed to transmit signal continuously for all testings.
- Frequency range investigated: conduction 150 kHz to 30 MHz, radiation 30 MHz to 25000MHz.

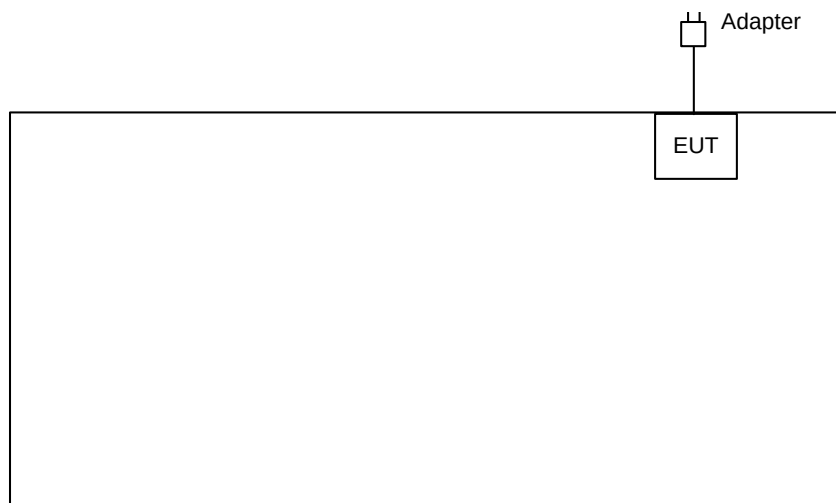
### 2.2 Test Mode

| Application        | Bluetooth                                                                        |
|--------------------|----------------------------------------------------------------------------------|
| Radiated Emission  | Mode 1: Tx_CH00_2402 MHz<br>Mode 2: Tx_CH39_2441 MHz<br>Mode 3: Tx_CH78_2480 MHz |
| Conducted Emission | Mode 1: Charging Mode                                                            |

### 2.3 Connection Diagram of Test System

#### Radiated Emission



**Conducted Emission****2.4 Ancillary Equipment List**

| Item | Asset       | Trade Name | Model Name | Power Cord                   |
|------|-------------|------------|------------|------------------------------|
| 1.   | Notebook    | DELL       | PP05L      | N/A                          |
| 2.   | RS232 Cable | N/A        | N/A        | Aluminum Foil-shielded, 0.5m |
| 3.   | USB Cable   | N/A        | N/A        | Weave-shielded, 0.5m         |



### **3. RF Utility**

Two executive programs "EMCTEST.EXE" under WIN XP, which generates a complete line of continuously repeating " H" pattern were used as the test software.

The programmed RF Utility "Bluetest" is installed in notebook to provide channel selection, power level, data rate and the application type. RF Utility can send transmitting signal for all testings.



## **4. General Information of Test**

Test Site Location : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park,  
Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.  
TEL : 886-3-327-3456  
FAX : 886-3-318-0055  
Test Site No : CO01-HY, 03CH06-HY

### **4.1 Test Voltage**

120V/ 60Hz

### **4.2 Standard for Methods of Measurement**

ANSI C63.4-2003

### **4.3 Test in Compliance with**

47 CFR Part 15 Subpart C

### **4.4 Frequency Range Investigated**

- a. Conduction: from 150 KHz to 30 MHz
- b. Radiation: from 30 MHz to 25000 MHz

### **4.5 Test Distance**

The test distance of radiated emission from antenna to EUT is 3 m.



## 5. Test Data and Test Result

### 5.1 List of Measurements and Examinations

#### The Emission Mode: Bluetooth

| FCC Rule                      | Description of Test                      | Result |
|-------------------------------|------------------------------------------|--------|
| 15.207                        | Conducted Emission                       | Pass   |
| <u>15.247(a)(1)</u>           | Hopping Channel Bandwidth                | Pass   |
| <u>15.247(a)(1)</u>           | Hopping Channel Separation               | Pass   |
| <u>15.247(a)(1)(iii)</u>      | Number of Hopping Frequency Used         | Pass   |
| <u>15.247(a)(1)(iii)</u>      | Dwell Time of Each Frequency             | Pass   |
| <u>15.247(b)</u>              | Output Power                             | Pass   |
| 15.247(c)                     | 100kHz Bandwidth of Frequency Band Edges | Pass   |
| 15.209(a)                     | Radiated Emission                        | Pass   |
| <u>15.203</u><br>15.247(b)(4) | Antenna Requirement                      | Pass   |



## 5.2 Band Edges Measurement

### 5.2.1 Measuring Instruments :

As described in chapter 6 of this test report.

### 5.2.2 Test Procedure :

1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 100 kHz bandwidth from band edge.
3. The band edges was measured and recorded.

### 5.2.3 Test Result :

- Application Type : BT
- Temperature : 25°C
- Relative Humidity : 58%
- Test Enginner : Anderson
- Test Result in BT lower band (Channel 00) : PASS
- Test Result in BT higher band (Channel 78) : PASS

### 5.2.4 Note on Band Edge Emission :

#### ➤Bluetooth

##### CH00 (Horizontal)

| Frequency | Level      | Over   | Limit      | Read   | Antenna | Preamp | Cable  | Ant  | Table | Remark  |
|-----------|------------|--------|------------|--------|---------|--------|--------|------|-------|---------|
|           |            | Limit  | Line       | Level  | Factor  | Factor | Loss   | Pos  | Pos   |         |
| ( MHz )   | ( dBuV/m ) | ( dB ) | ( dBuV/m ) | (dBuV) | ( dB )  | ( dB ) | ( dB ) | (cm) | (deg) |         |
| 2384.00   | 52.41      | -21.59 | 74.00      | 53.12  | 30.50   | 35.44  | 4.23   | 100  | 1     | Peak    |
| 2384.00   | 41.81      | -12.19 | 54.00      | 42.52  | 30.50   | 35.44  | 4.23   | 100  | 154   | Average |

##### CH00 (Vertical)

| Frequency | Level      | Over   | Limit      | Read   | Antenna | Preamp | Cable  | Ant  | Table | Remark  |
|-----------|------------|--------|------------|--------|---------|--------|--------|------|-------|---------|
|           |            | Limit  | Line       | Level  | Factor  | Factor | Loss   | Pos  | Pos   |         |
| ( MHz )   | ( dBuV/m ) | ( dB ) | ( dBuV/m ) | (dBuV) | ( dB )  | ( dB ) | ( dB ) | (cm) | (deg) |         |
| 2338.00   | 51.03      | -22.97 | 74.00      | 51.74  | 30.52   | 35.40  | 4.17   | 100  | 359   | Peak    |
| 2338.00   | 39.49      | -14.51 | 54.00      | 40.20  | 30.52   | 35.40  | 4.17   | 100  | 359   | Average |

**CH78 (Horizontal)**

| Frequency | Level      | Over   | Limit      | Read   | Antenna | Preamp | Cable  | Ant  | Table | Remark  |
|-----------|------------|--------|------------|--------|---------|--------|--------|------|-------|---------|
|           |            | Limit  | Line       | Level  | Factor  | Factor | Loss   | Pos  | Pos   |         |
| ( MHz )   | ( dBuV/m ) | ( dB ) | ( dBuV/m ) | (dBuV) | ( dB )  | ( dB ) | ( dB ) | (cm) | (deg) |         |
| 2483.50   | 73.34      | -0.66  | 74.00      | 74.08  | 30.41   | 35.51  | 4.36   | 100  | 360   | Peak    |
| 2483.50   | 46.76      | -7.24  | 54.00      | 47.50  | 30.41   | 35.51  | 4.36   | 100  | 156   | Average |

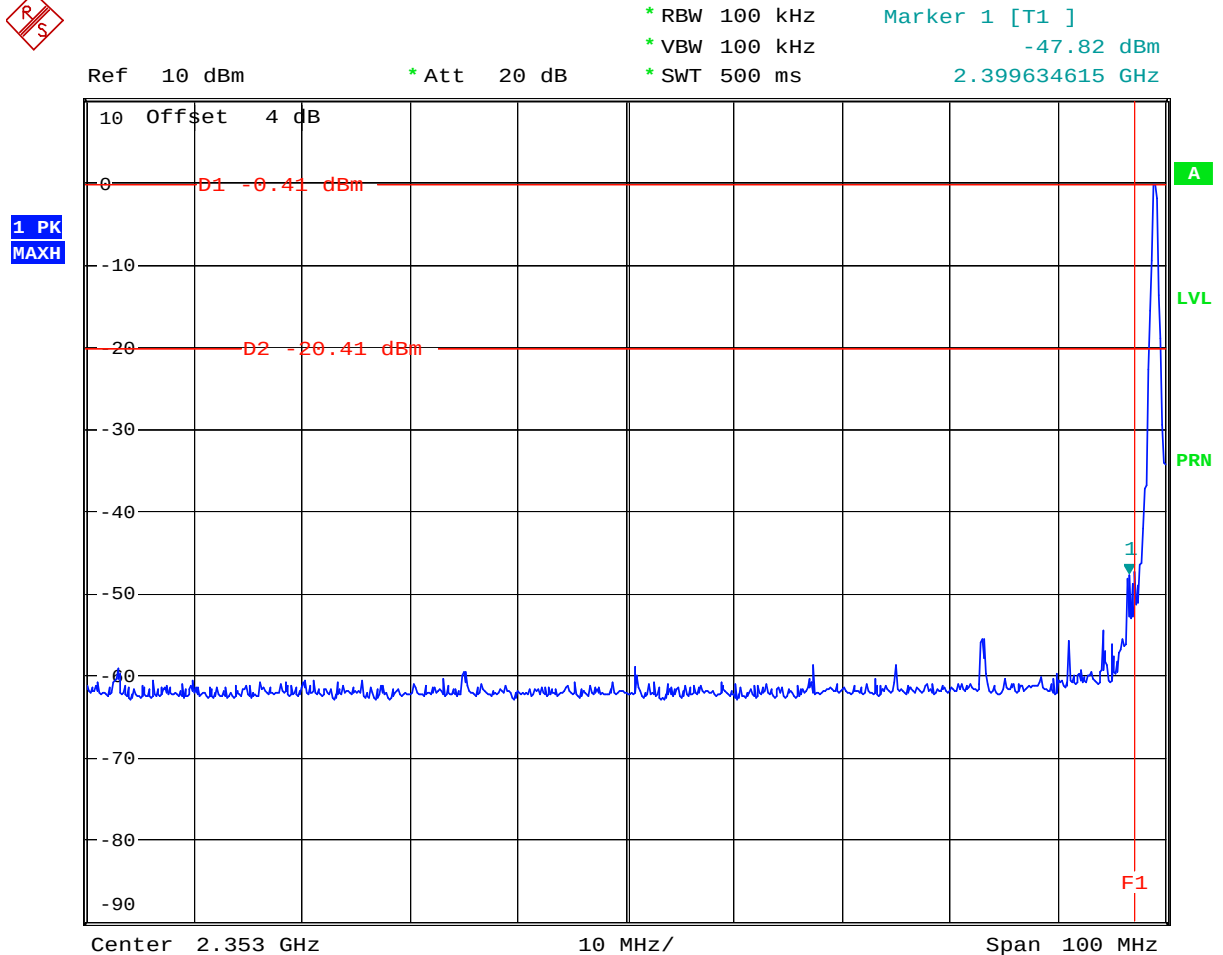
**CH78 (Vertical)**

| Frequency | Level      | Over   | Limit      | Read   | Antenna | Preamp | Cable  | Ant  | Table | Remark  |
|-----------|------------|--------|------------|--------|---------|--------|--------|------|-------|---------|
|           |            | Limit  | Line       | Level  | Factor  | Factor | Loss   | Pos  | Pos   |         |
| ( MHz )   | ( dBuV/m ) | ( dB ) | ( dBuV/m ) | (dBuV) | ( dB )  | ( dB ) | ( dB ) | (cm) | (deg) |         |
| 2483.50   | 66.19      | -7.81  | 74.00      | 66.93  | 30.41   | 35.51  | 4.36   | 100  | 357   | Peak    |
| 2483.50   | 43.75      | -10.25 | 54.00      | 44.49  | 30.41   | 35.51  | 4.36   | 104  | 162   | Average |



5.2.5 20dB Band Edge

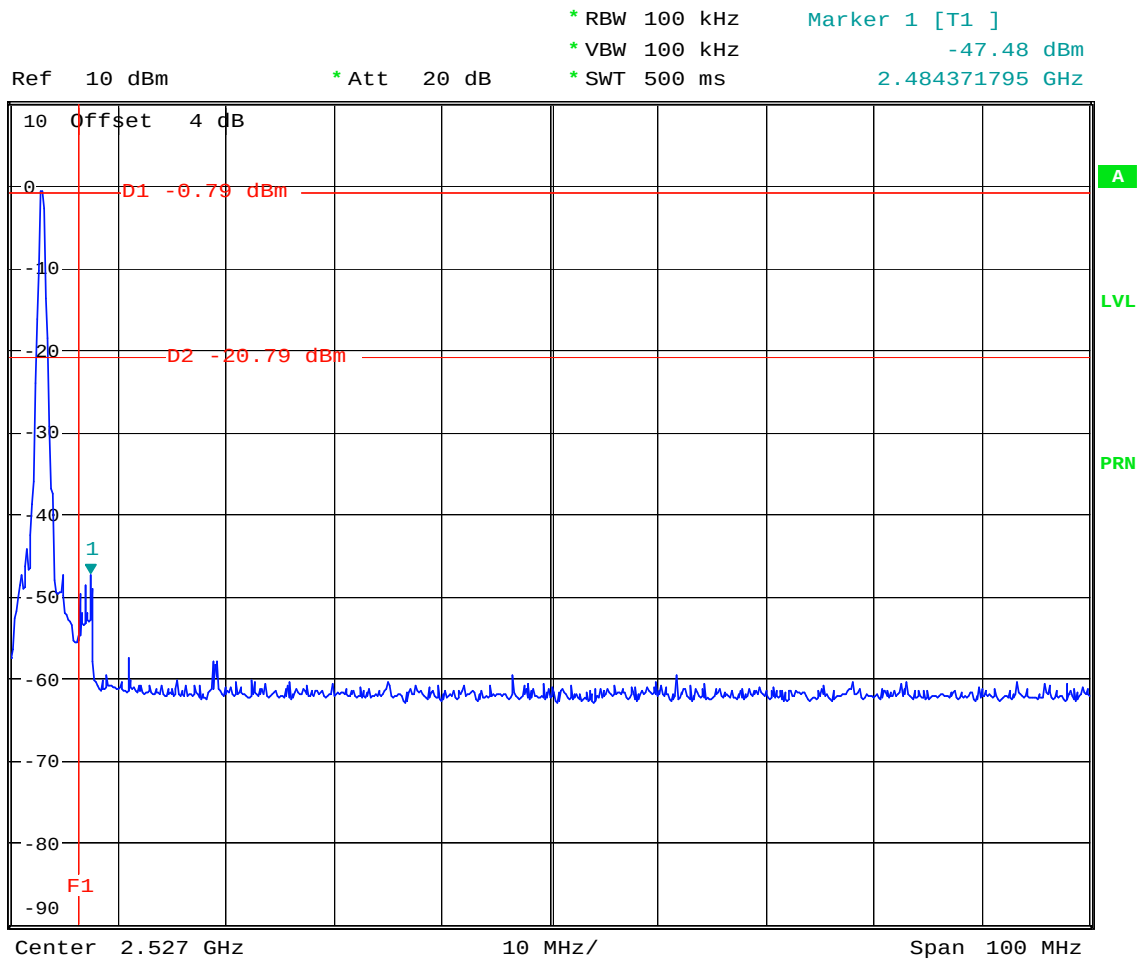
CH00



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CH78



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### 5.3 Hopping Channel Separation

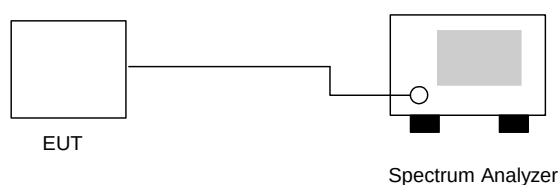
#### 5.3.1 Measuring Instruments :

As described in chapter 9 of this test report.

#### 5.3.2 Test Procedure :

1. The output of EUT was connected to the spectrum analyzer by a low loss cable..
2. Set RBW of spectrum analyzer to 100kHz and VBW to 100kHz.
3. The Hopping Channel Separation is defined as the channel is separated with the next channel.

#### 5.3.3 Test Setup Layout :



#### 5.3.4 Test Result : The spectrum analyzer plots are attached as below

- Application Type : BT
- Temperature : 25°C
- Relative Humidity : 58%
- Test Enginner : Anderson

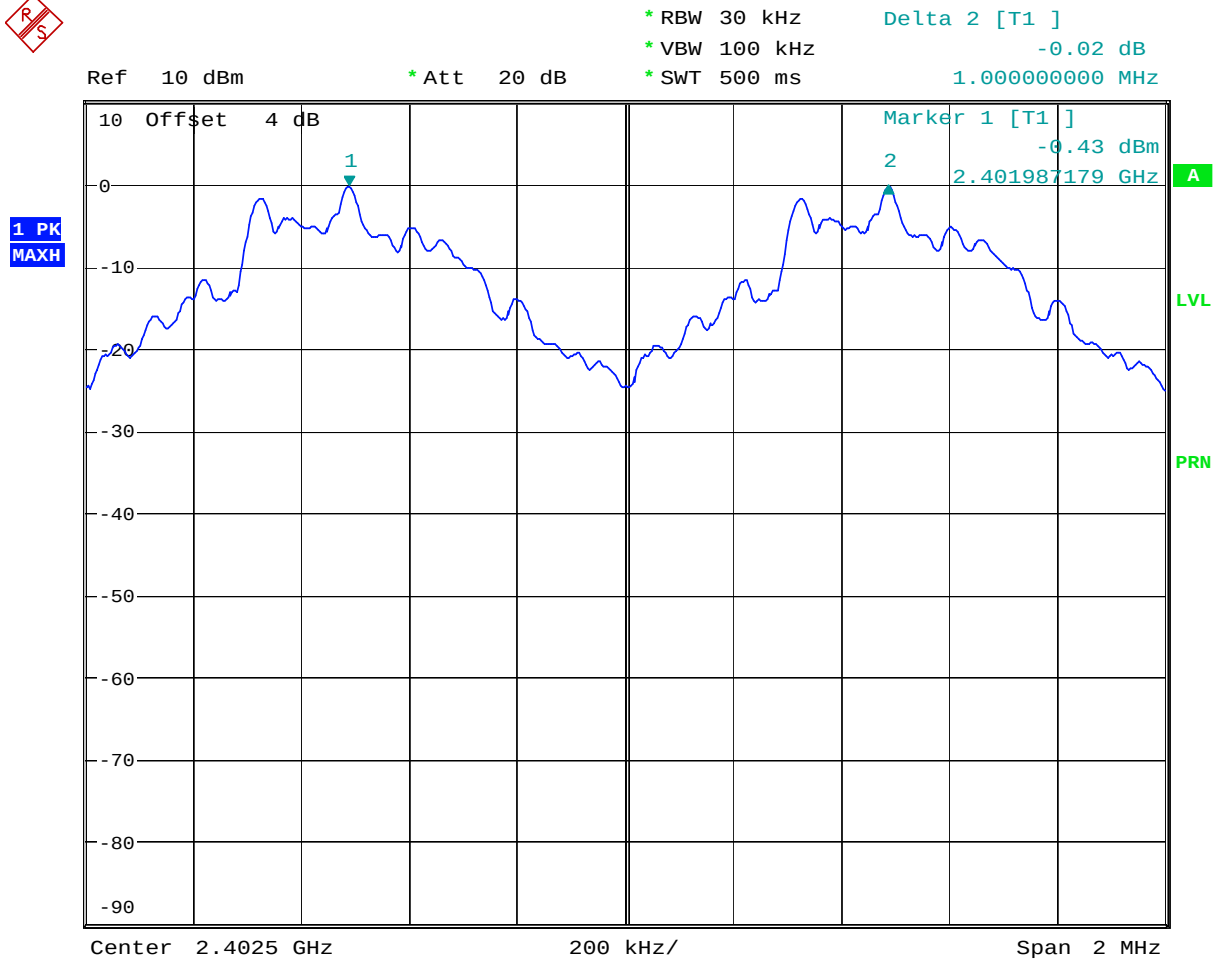
|         |           | Carrier Frequency |         | Limits | Plot     |
|---------|-----------|-------------------|---------|--------|----------|
| Channel | Frequency | Separation        |         |        |          |
|         | (MHz)     | ( MHz )           | ( MHz ) |        | Ref. No. |
| 00      | 2402      | 1.000             | 0.862   |        | Mode 1   |
| 39      | 2441      | 1.003             | 0.833   |        | Mode 2   |
| 78      | 2480      | 1.000             | 0.830   |        | Mode 3   |

Note: Limits =25kHz or the 20dB bandwidth of the hopping channel, which ever is greater



5.3.5 Hopping Channel Separation

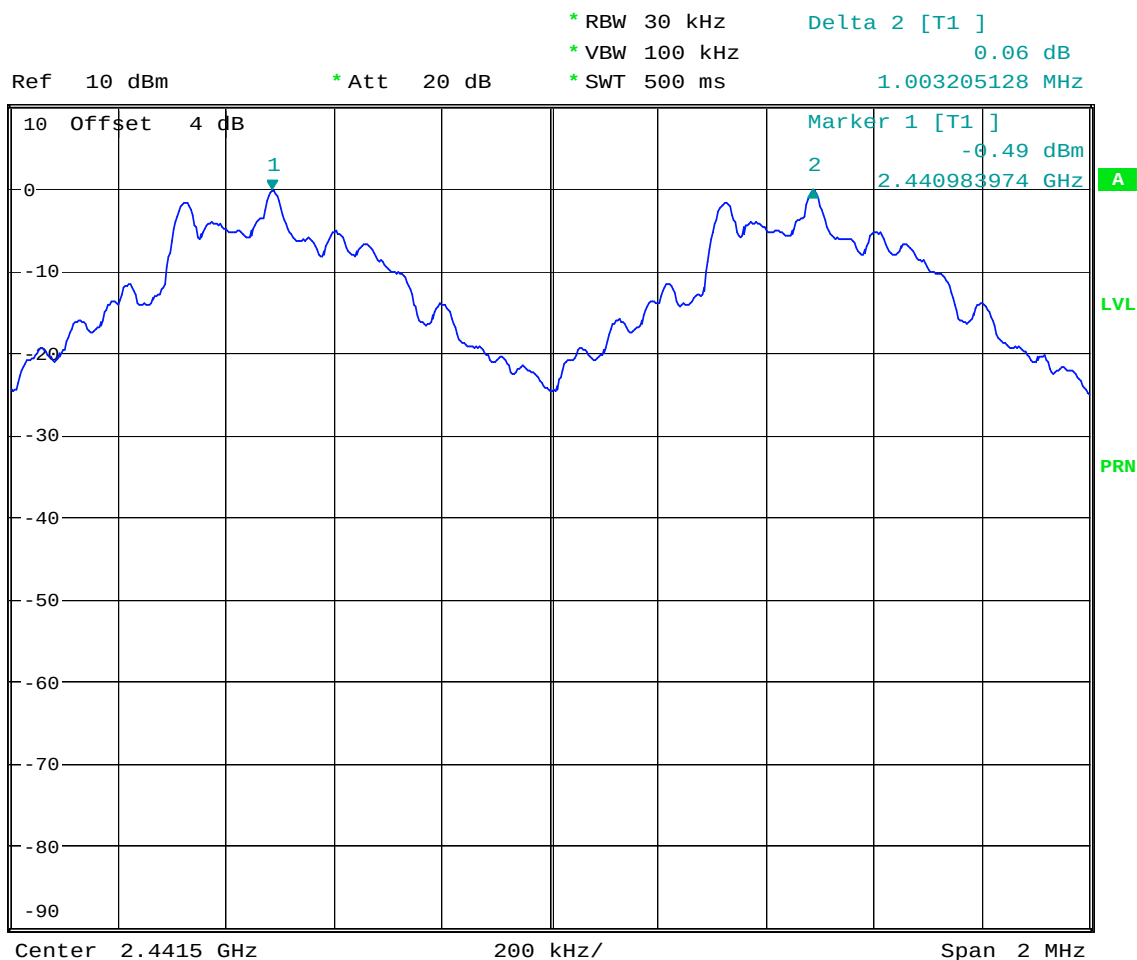
Mode 1



Date: 6.JAN.2006 21:11:26



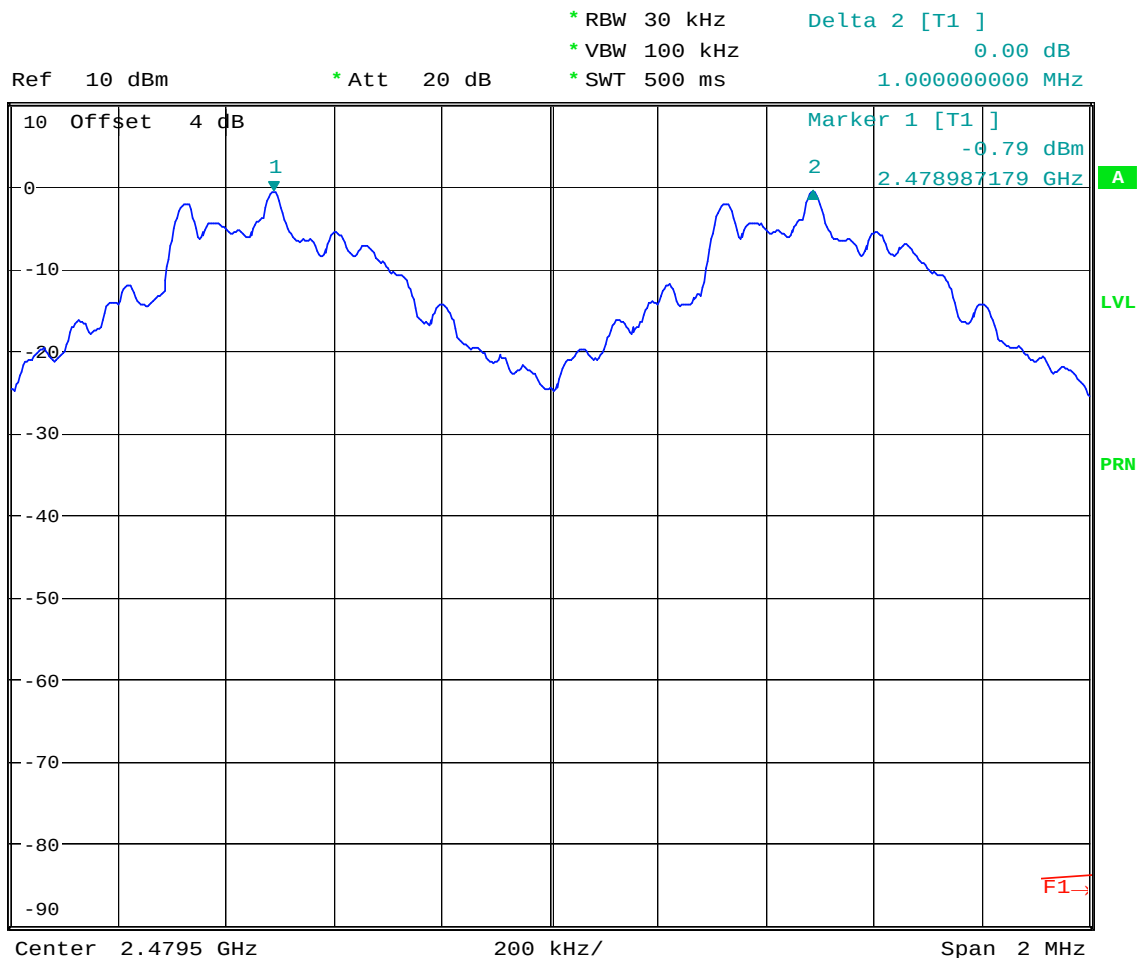
Mode 2



Date: 6. JAN. 2006 21:08:53



Mode 3



Date: 6. JAN. 2006 21:23:30

## 5.4 Number of Hopping Frequency

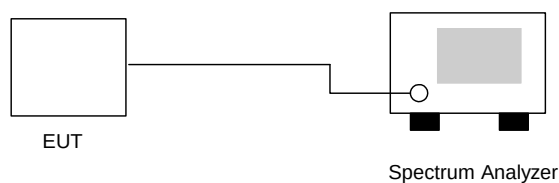
### 5.4.1 Measuring Instruments :

As described in chapter 9 of this test report.

### 5.4.2 Test Procedure :

1. The output of EUT was connected to the spectrum analyzer by a low loss cable.
2. Set RBW of spectrum analyzer to 100kHz and VBW to 100kHz.
3. The number of hopping frequency used is defined as the device has the numbers of total channel.

### 5.4.3 Test Setup Layout :



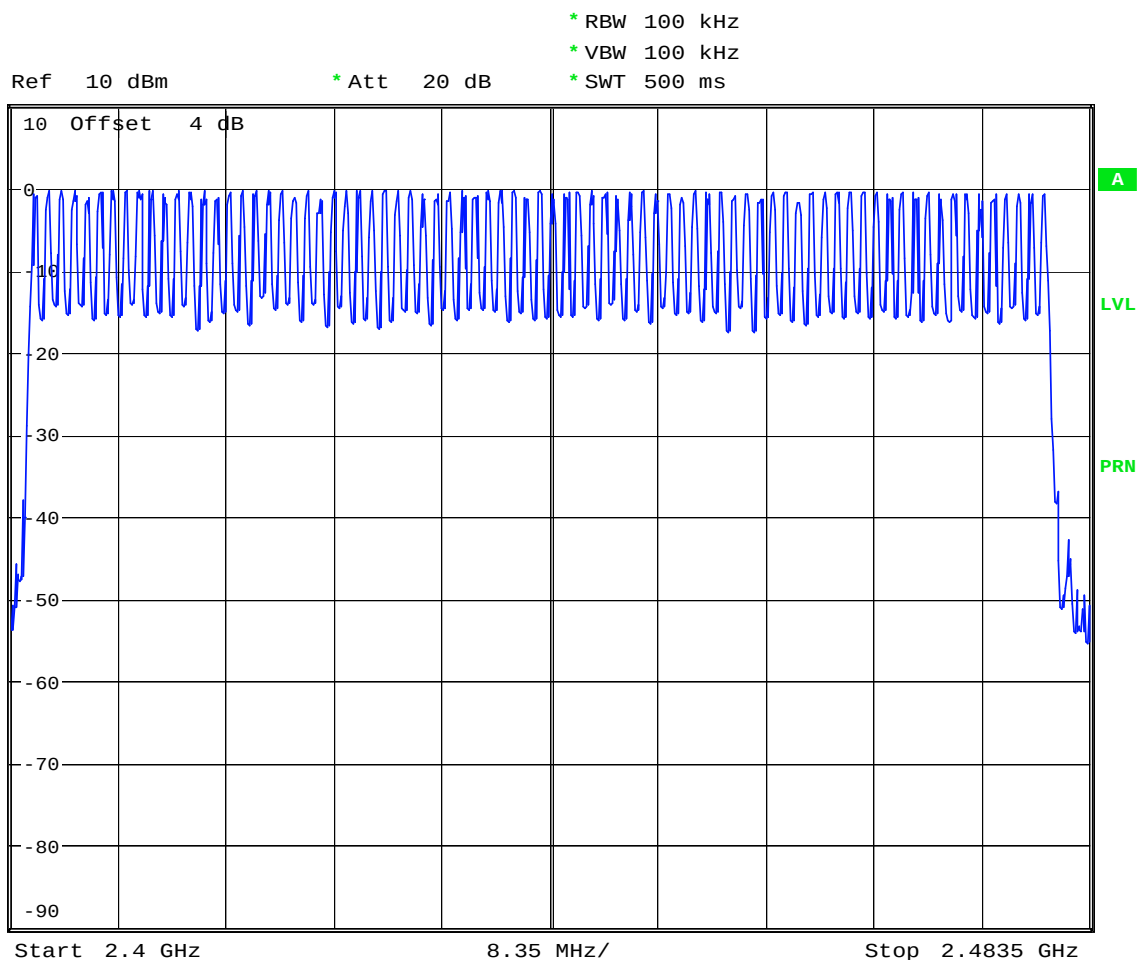
### 5.4.4 Test Result : See spectrum analyzer plots below

- Application Type : BT
- Temperature : 25°C,
- Relative Humidity : 58%
- Test Enginner : Anderson

| Number of Hopping Frequency<br>(Channel) | Limits<br>(Channel) |
|------------------------------------------|---------------------|
| 79                                       | 15                  |



5.4.5 Number of Hopping Frequency



Date: 6.JAN.2006 21:50:42

## 5.5 Hopping Channel Bandwidth

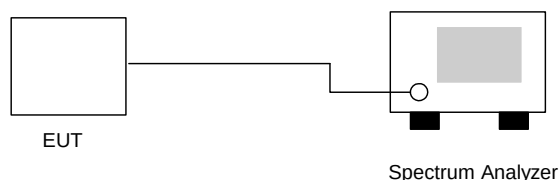
### 5.5.1 Measuring Instruments :

As described in chapter 9 of this test report.

### 5.5.2 Test Procedure :

1. The transmitter output was connected to the spectrum analyzer by a low loss cable.
2. Set RBW of spectrum analyzer to 30kHz and VBW to 300kHz.
3. The Hopping Channel bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20 dB.

### 5.5.3 Test Setup Layout :



### 5.5.4 Test Result : See spectrum analyzer plots below

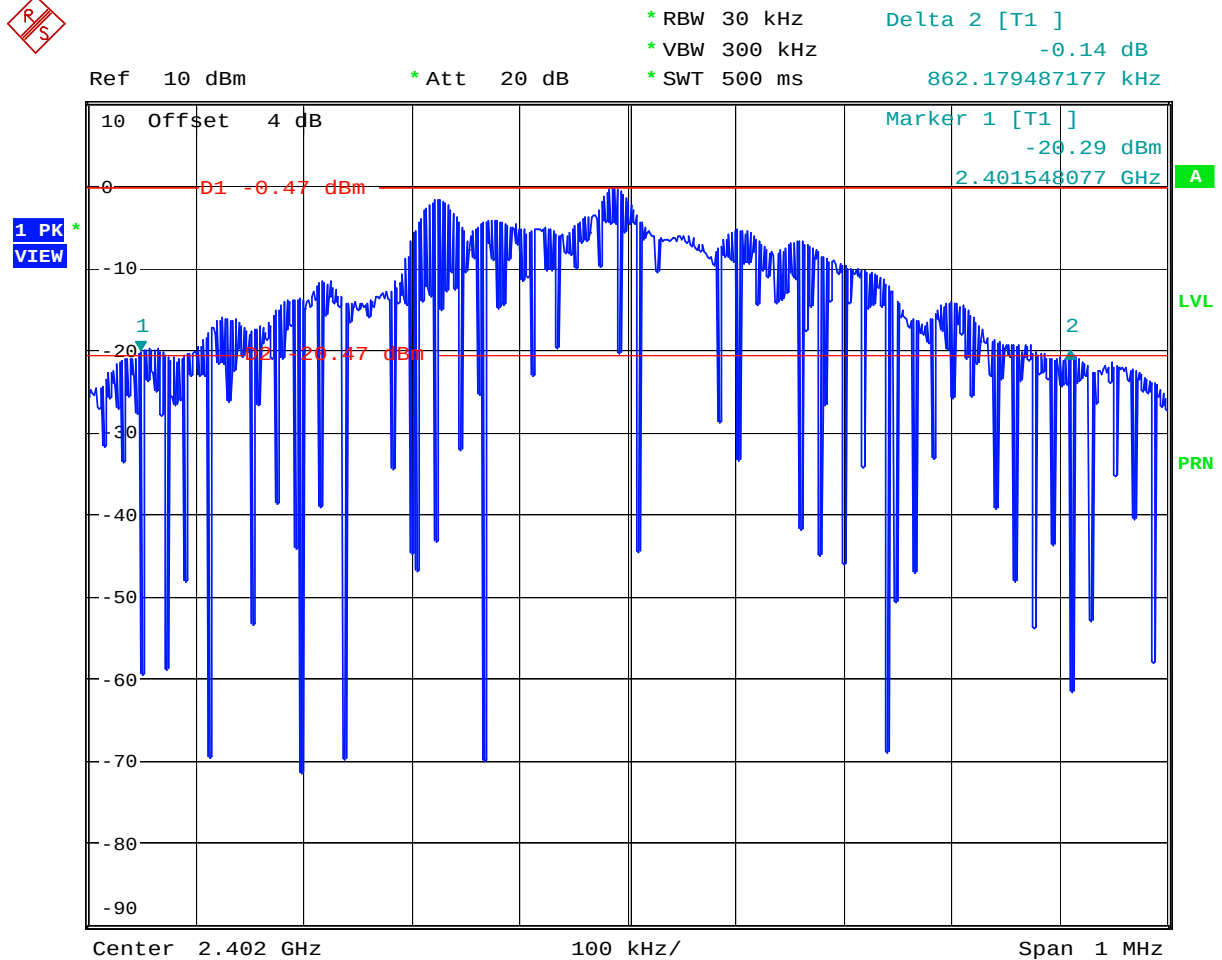
- Application Type : BT
- Temperature : 25°C,
- Relative Humidity : 58%
- Test Enginner : Anderson

| Channel | Frequency<br>(MHz) | Hopping Channel Bandwidth<br>(MHz) | Limits<br>(MHz) | Plot<br>Ref. No. |
|---------|--------------------|------------------------------------|-----------------|------------------|
| 00      | 2402               | 0.862                              | 1.000           | Mode 1           |
| 39      | 2441               | 0.833                              | 1.000           | Mode 2           |
| 78      | 2480               | 0.830                              | 1.000           | Mode 3           |



5.5.5 Hopping Channel Bandwidth

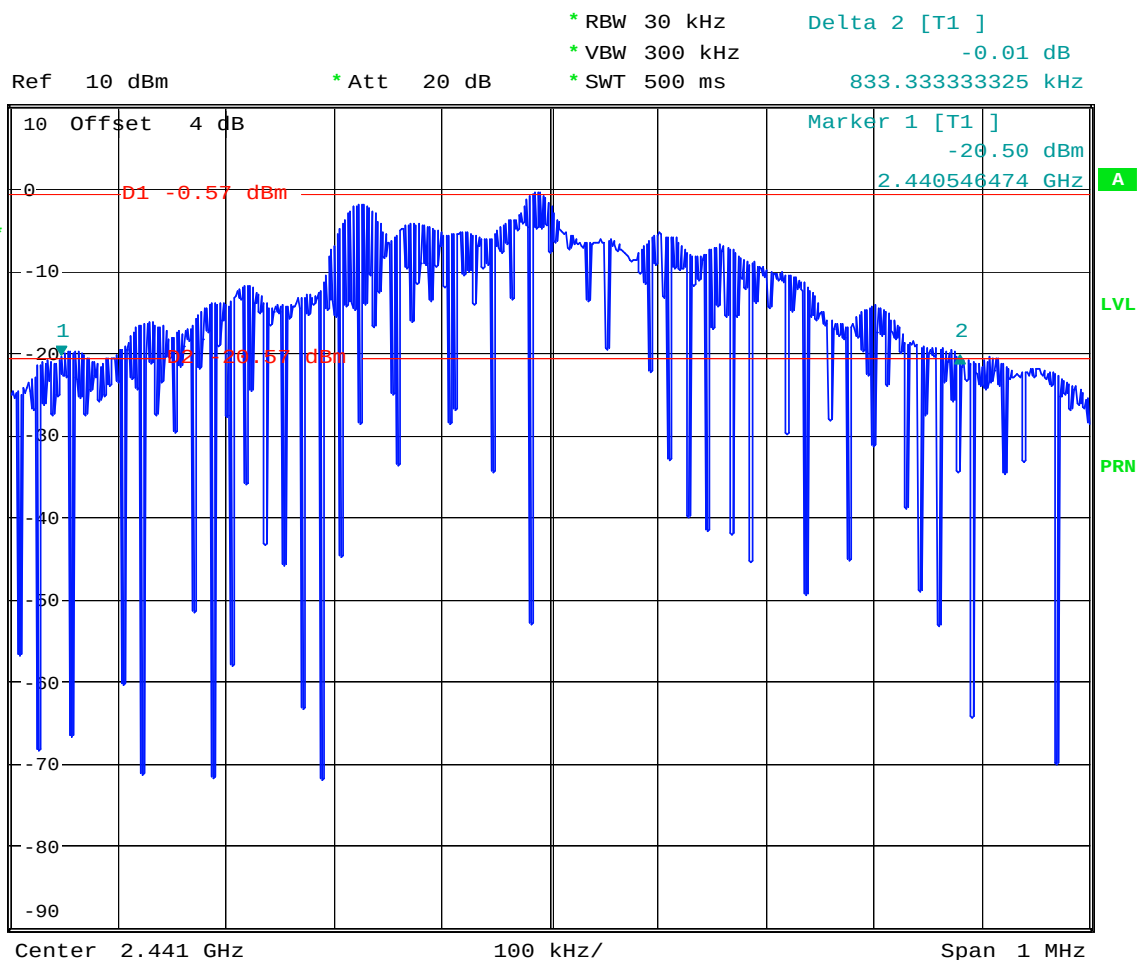
Mode 1



Date: 6. JAN. 2006 21:13:04



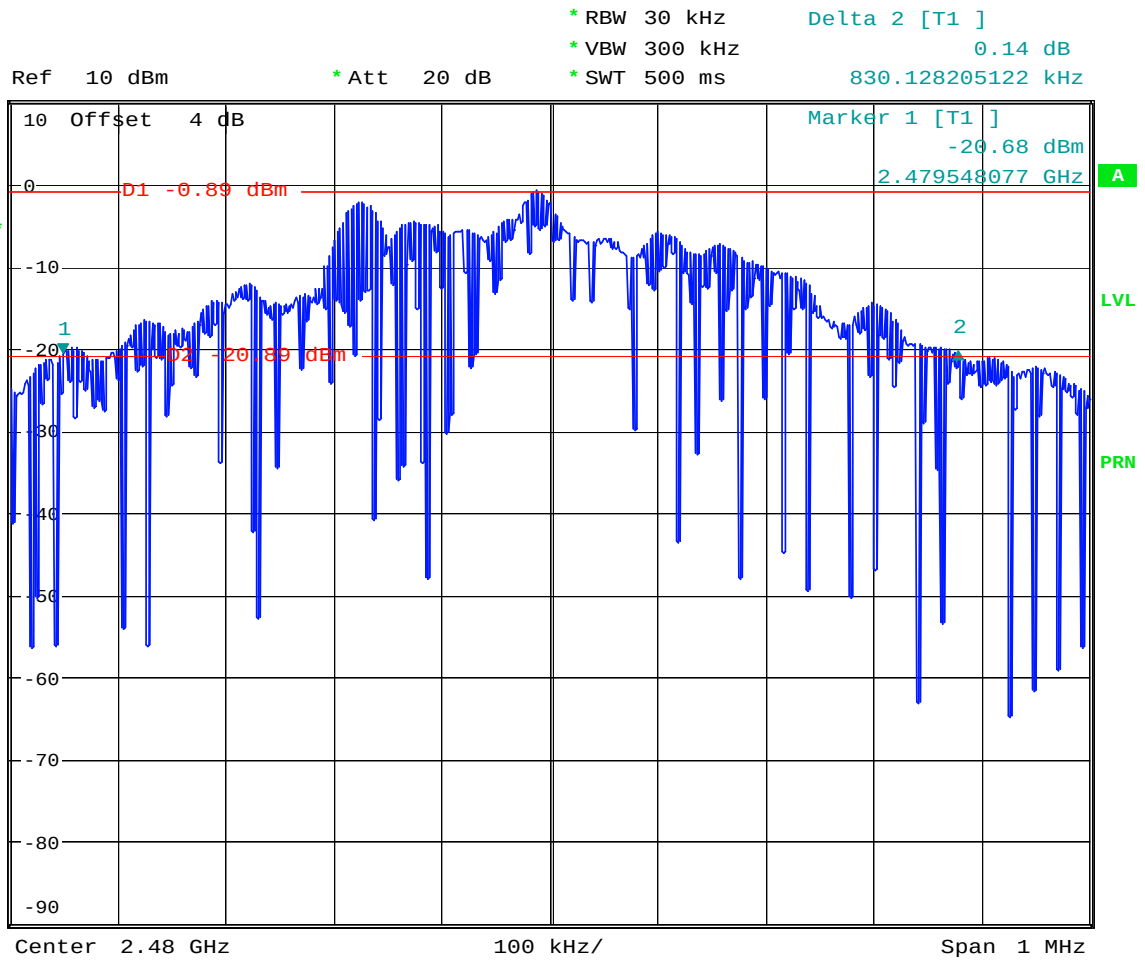
Mode 2



Date: 6. JAN. 2006 21:07:44



Mode 3



Date: 6. JAN. 2006 21:18:34

## 5.6 Dwell Time of Each Frequency

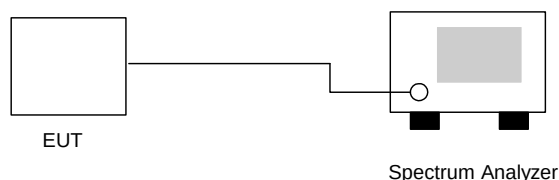
### 5.6.1 Measuring Instruments :

As described in chapter 9 of this test report.

### 5.6.2 Test Procedure :

1. The transmitter output was connected to the spectrum analyzer by a low loss cable.
2. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
3. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
4. The calculate  $= 79 * 0.4 * (1600/79) * t$  (t = the time duration of one single pulse )

### 5.6.3 Test Setup Layout :



### 5.6.4 Test Result : See spectrum analyzer plots below

- Application Type : BT
- Temperature : 25°C
- Relative Humidity : 58%
- Test Enginner : Anderson

Ch00

| Package Mode | Average Hopping Channel | Package Transfer Time (us) | Dwell Time (s) | Limit (s) |
|--------------|-------------------------|----------------------------|----------------|-----------|
| DH1          | 10.1                    | 541.66                     | 0.173          | 0.4       |
| DH3          | 5.3                     | 1812.5                     | 0.304          | 0.4       |
| DH5          | 3.4                     | 3062.5                     | 0.329          | 0.4       |

**CH39**

| Package Mode | Average Hopping Channel | Package Transfer Time<br>(us) | Dwell Time<br>(s) | Limit<br>(s) |
|--------------|-------------------------|-------------------------------|-------------------|--------------|
| DH1          | 10.2                    | 544.87                        | 0.176             | 0.4          |
| DH3          | 5.3                     | 1820.51                       | 0.305             | 0.4          |
| DH5          | 3.4                     | 3046.47                       | 0.327             | 0.4          |

**CH78**

| Package Mode | Average Hopping Channel | Package Transfer Time<br>(us) | Dwell Time<br>(s) | Limit<br>(s) |
|--------------|-------------------------|-------------------------------|-------------------|--------------|
| DH1          | 10.5                    | 541.66                        | 0.180             | 0.4          |
| DH3          | 5.2                     | 1804.48                       | 0.297             | 0.4          |
| DH5          | 3.4                     | 3078.52                       | 0.331             | 0.4          |

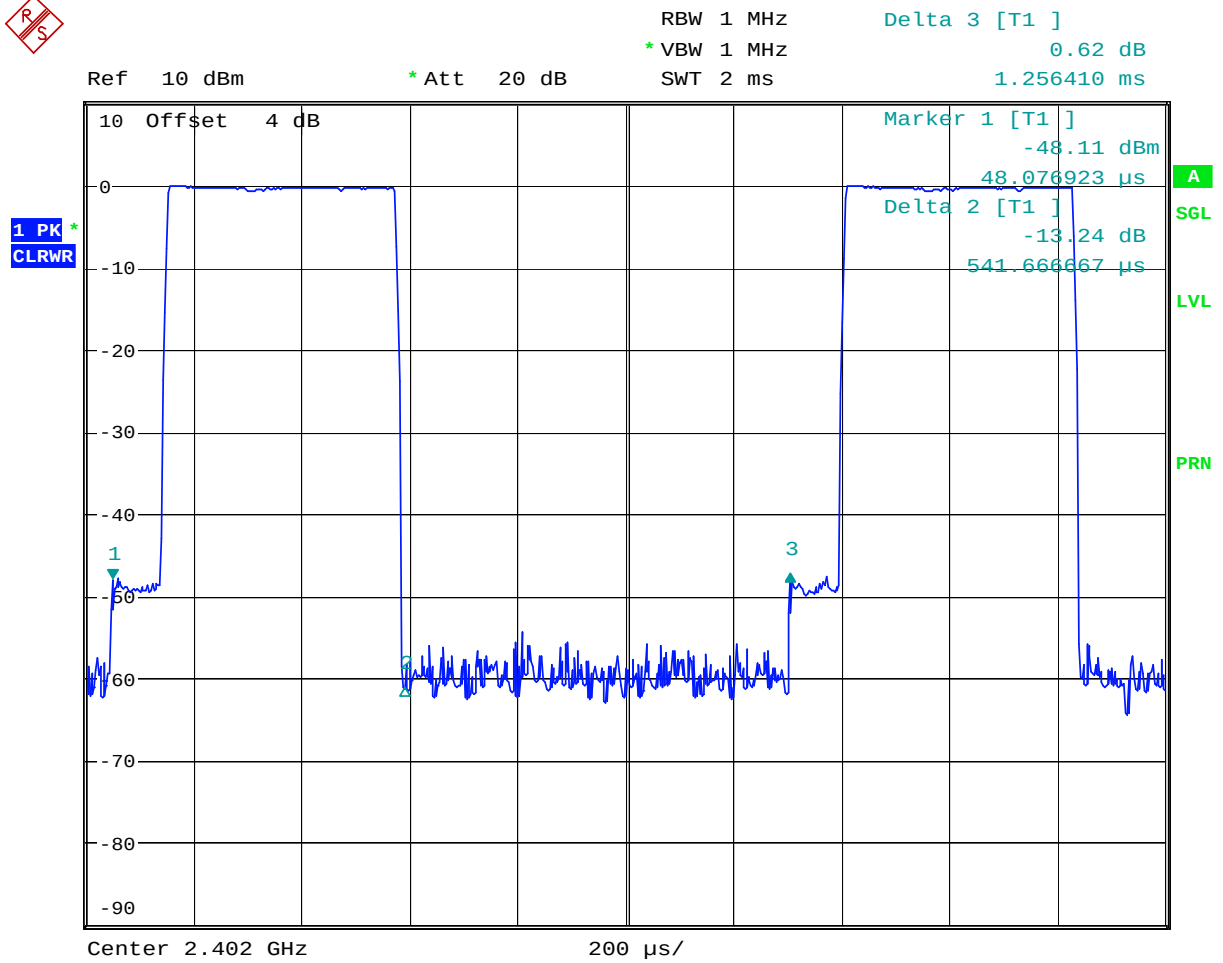
## ※ Remark:

1. Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time
2. 79channels come from the Hopping Channel number.
3. Average Hopping Channel = hops/sweep time
4. t: Package Transfer Time(us)

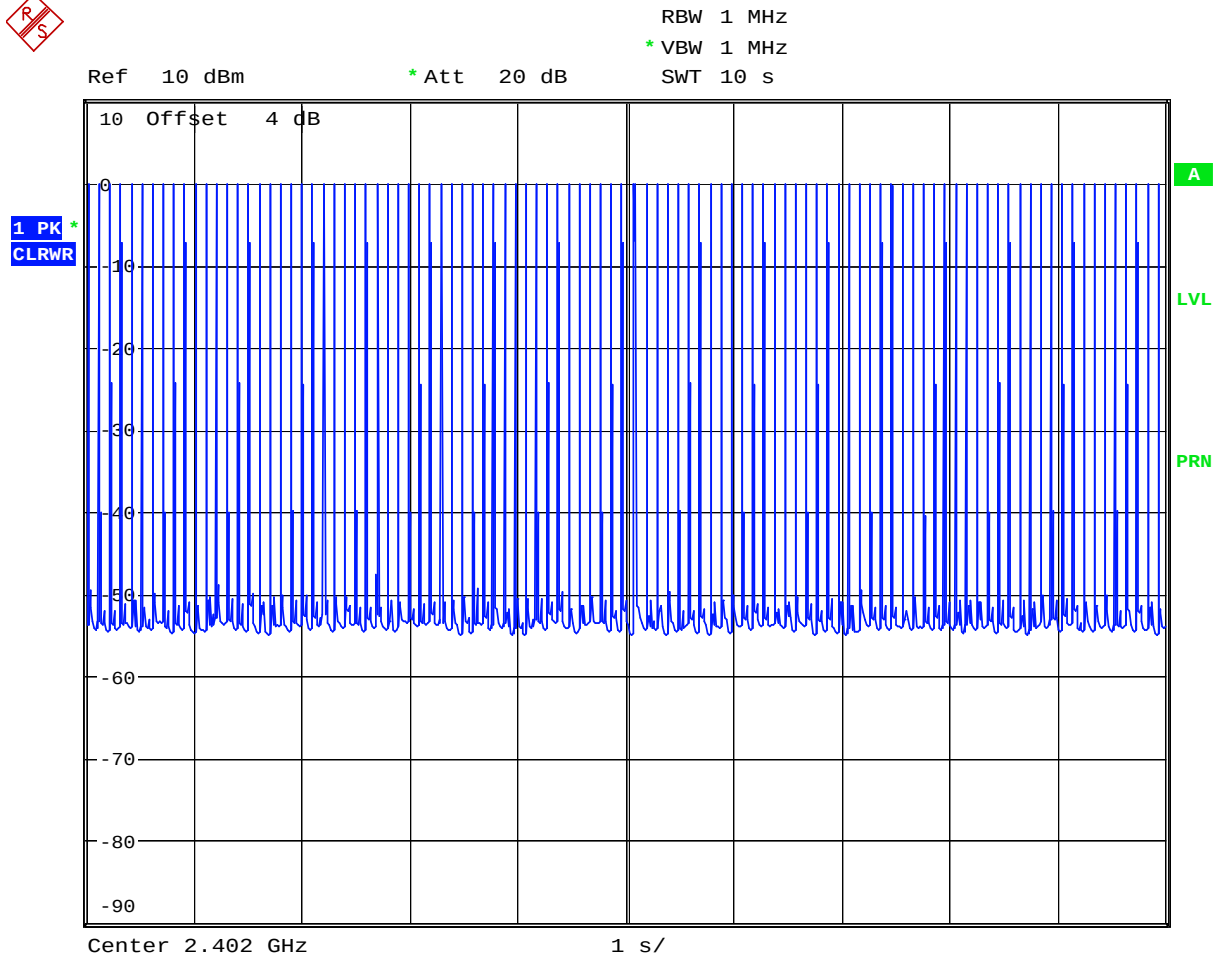


5.6.5 Dwell Time

DH1 (CH00)



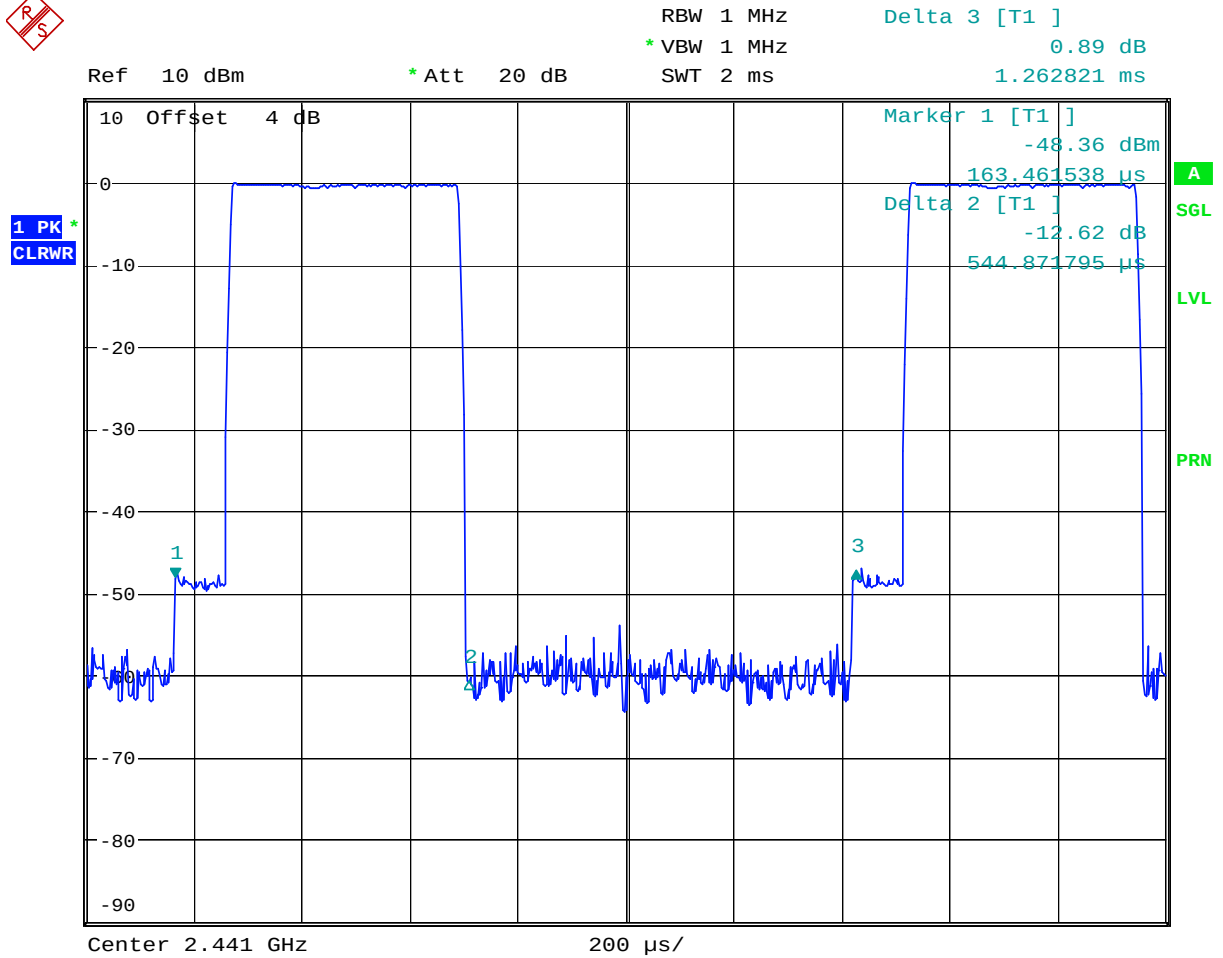
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DH1 (CH39)

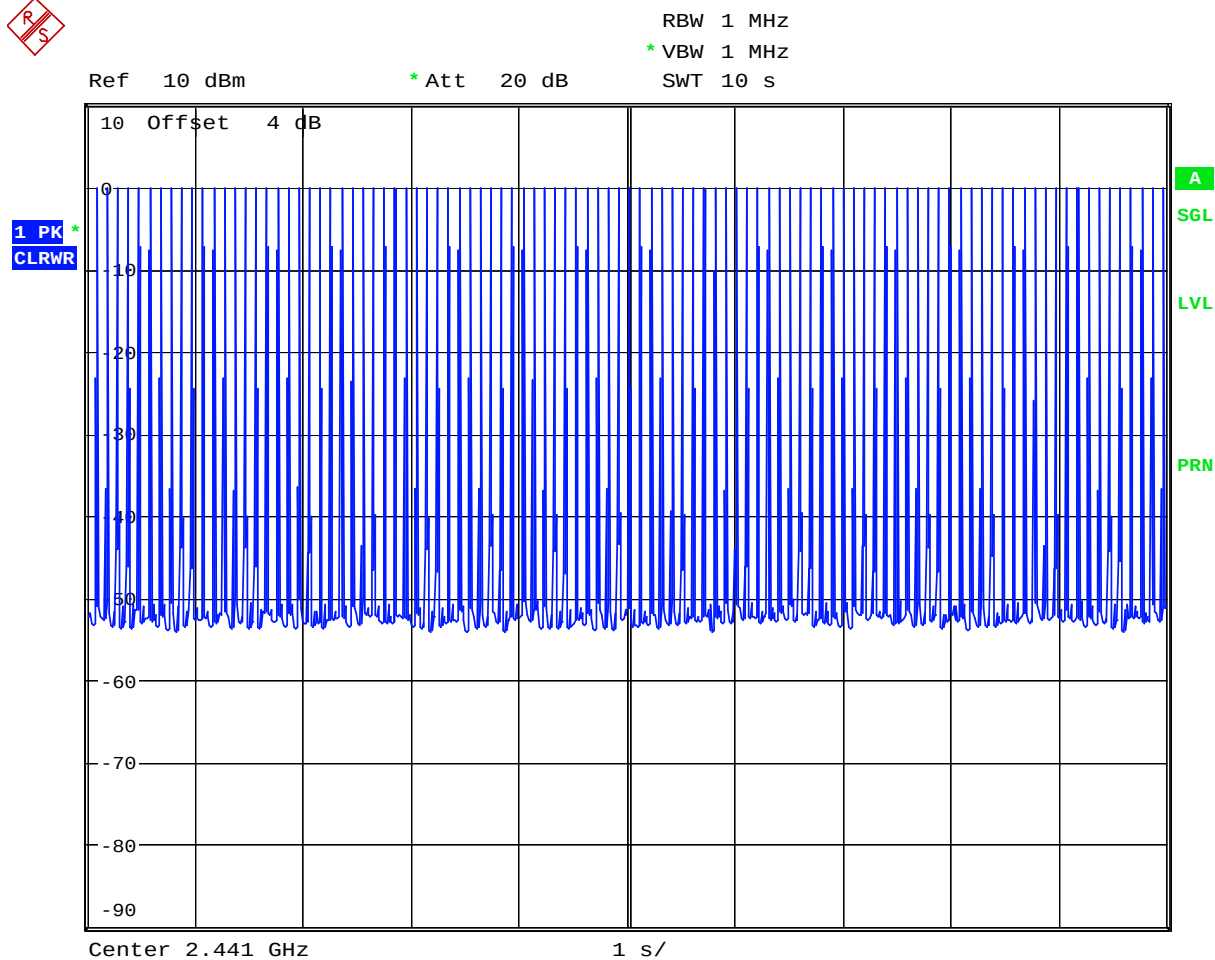


Date: 6. JAN. 2006 21:29:44



# FCC TEST REPORT

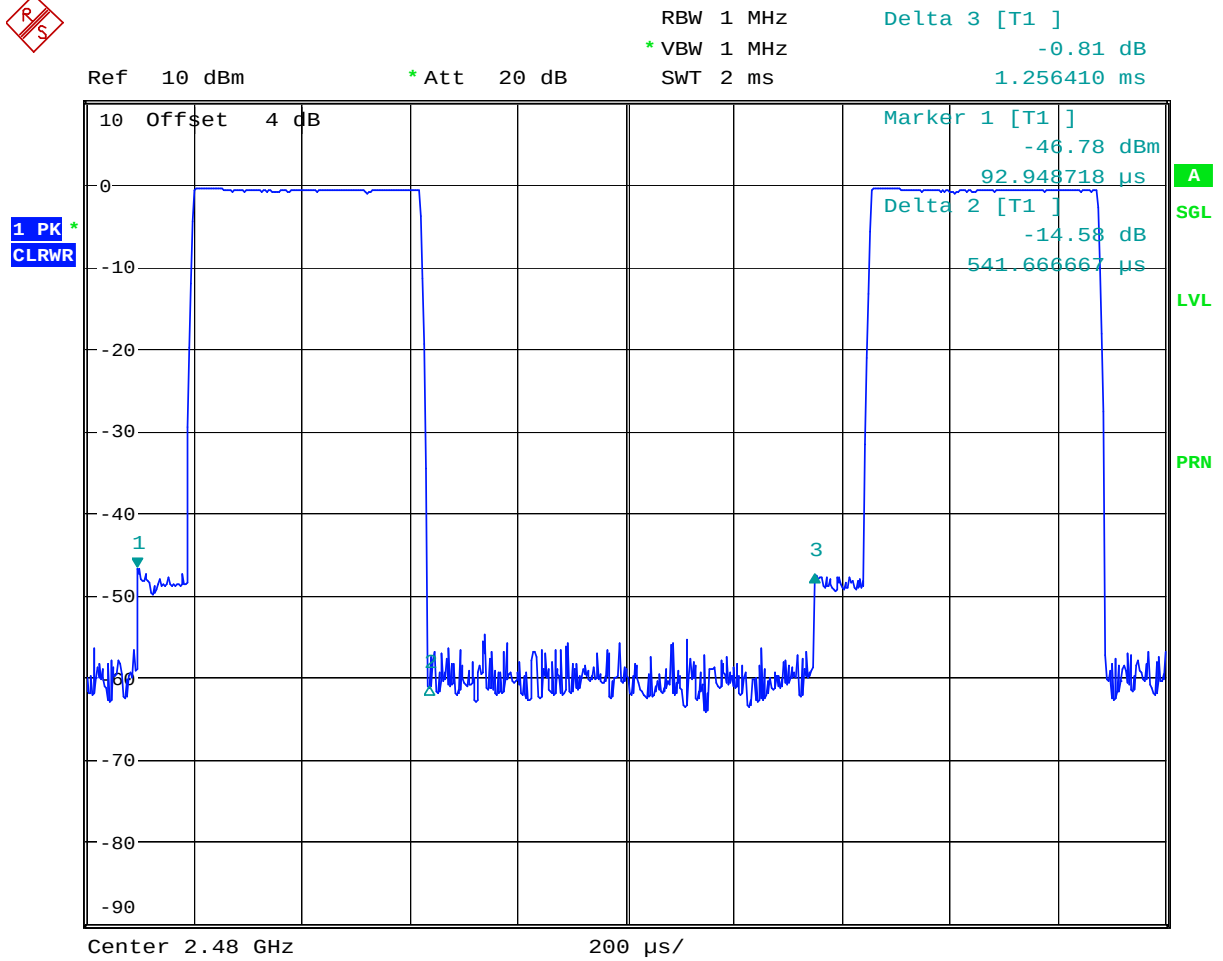
Report No. : FR5D2803



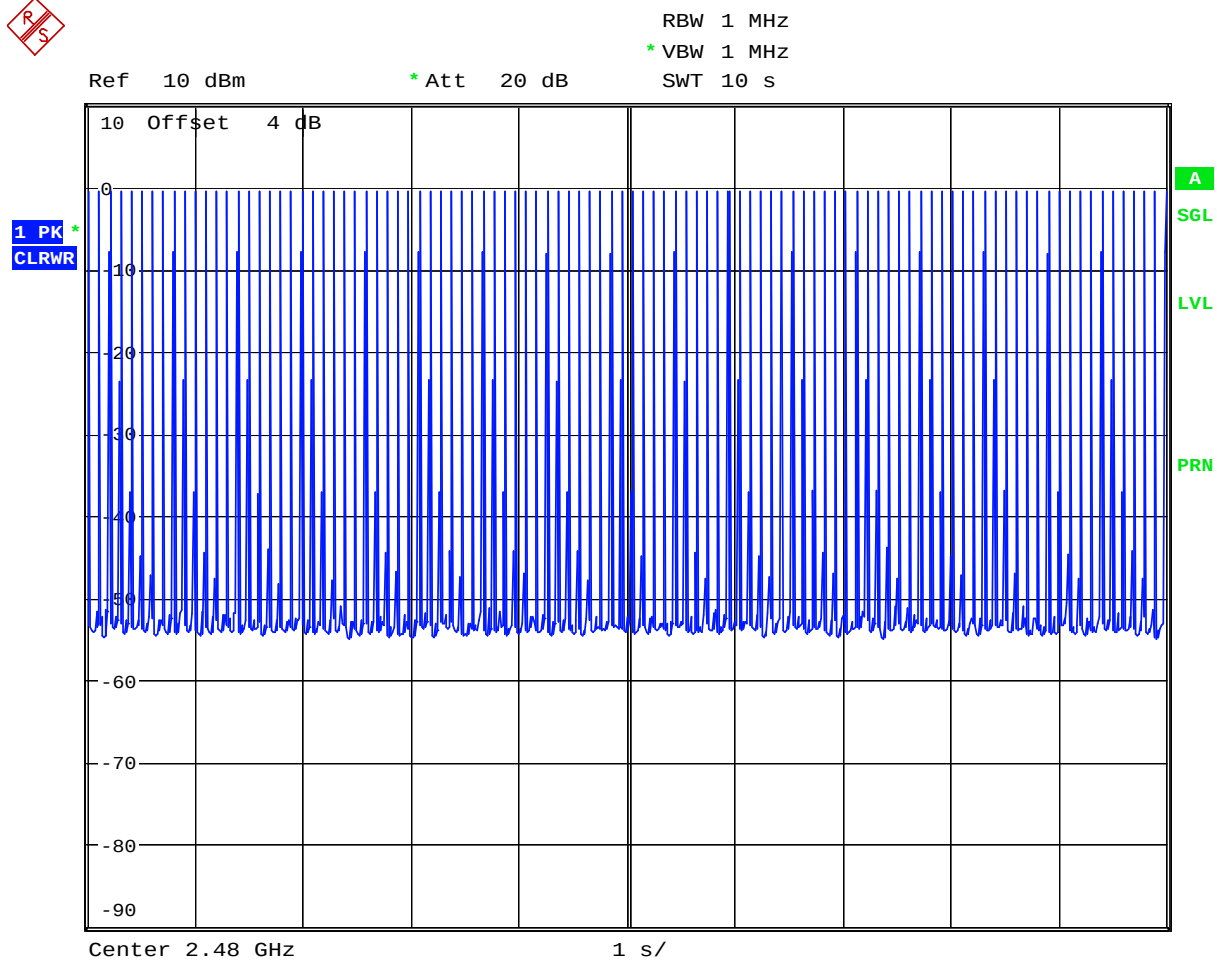
Date: 6.JAN.2006 21:44:19



DH1 (CH78)



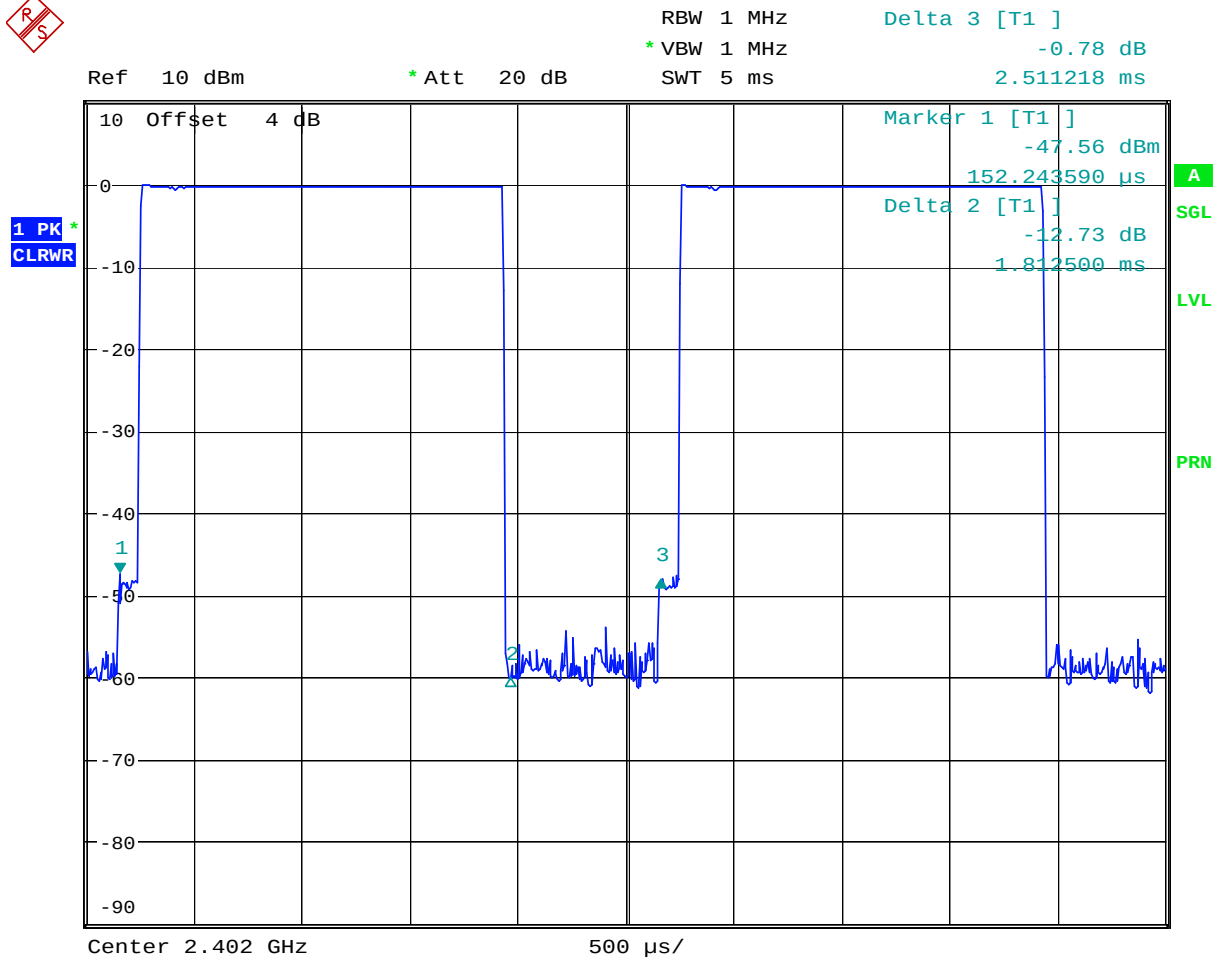
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DH3 (CH00)

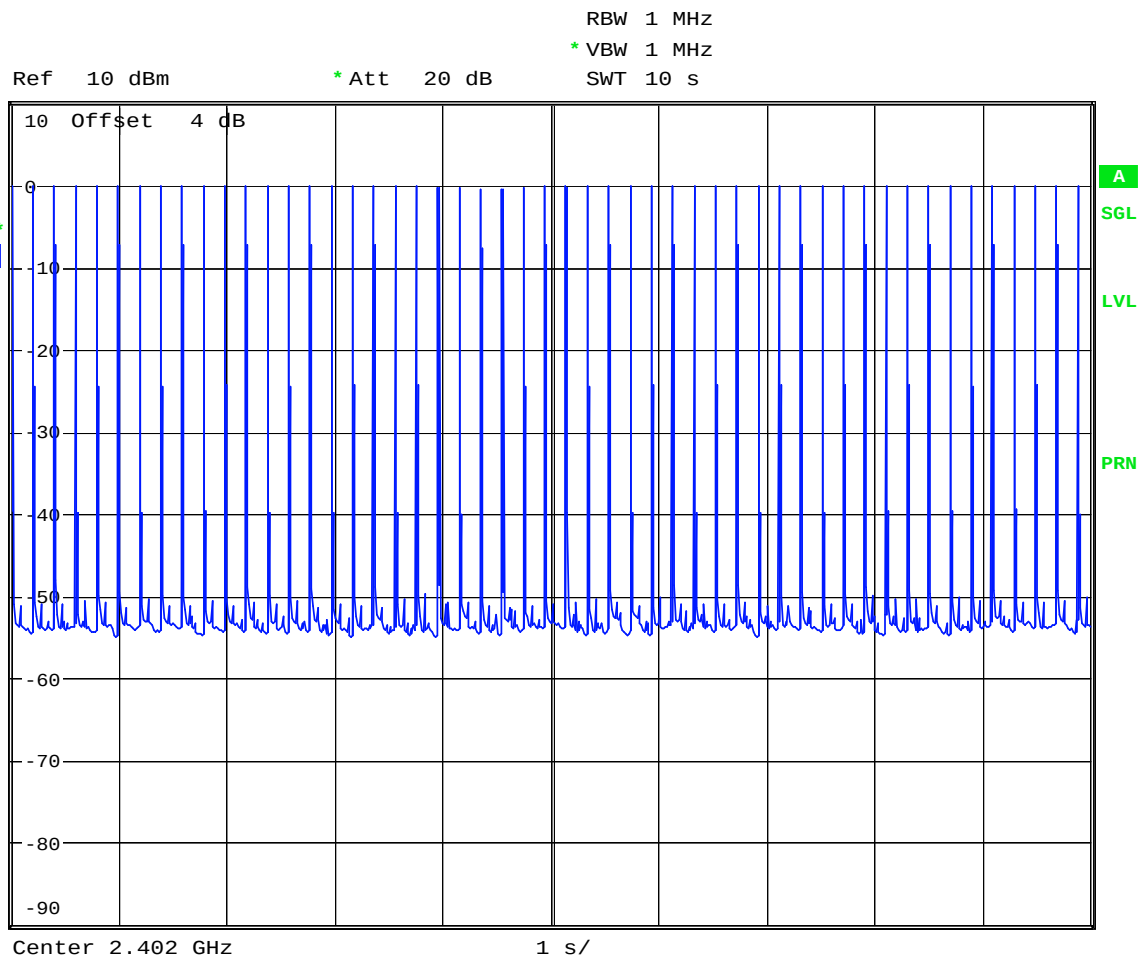


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# FCC TEST REPORT

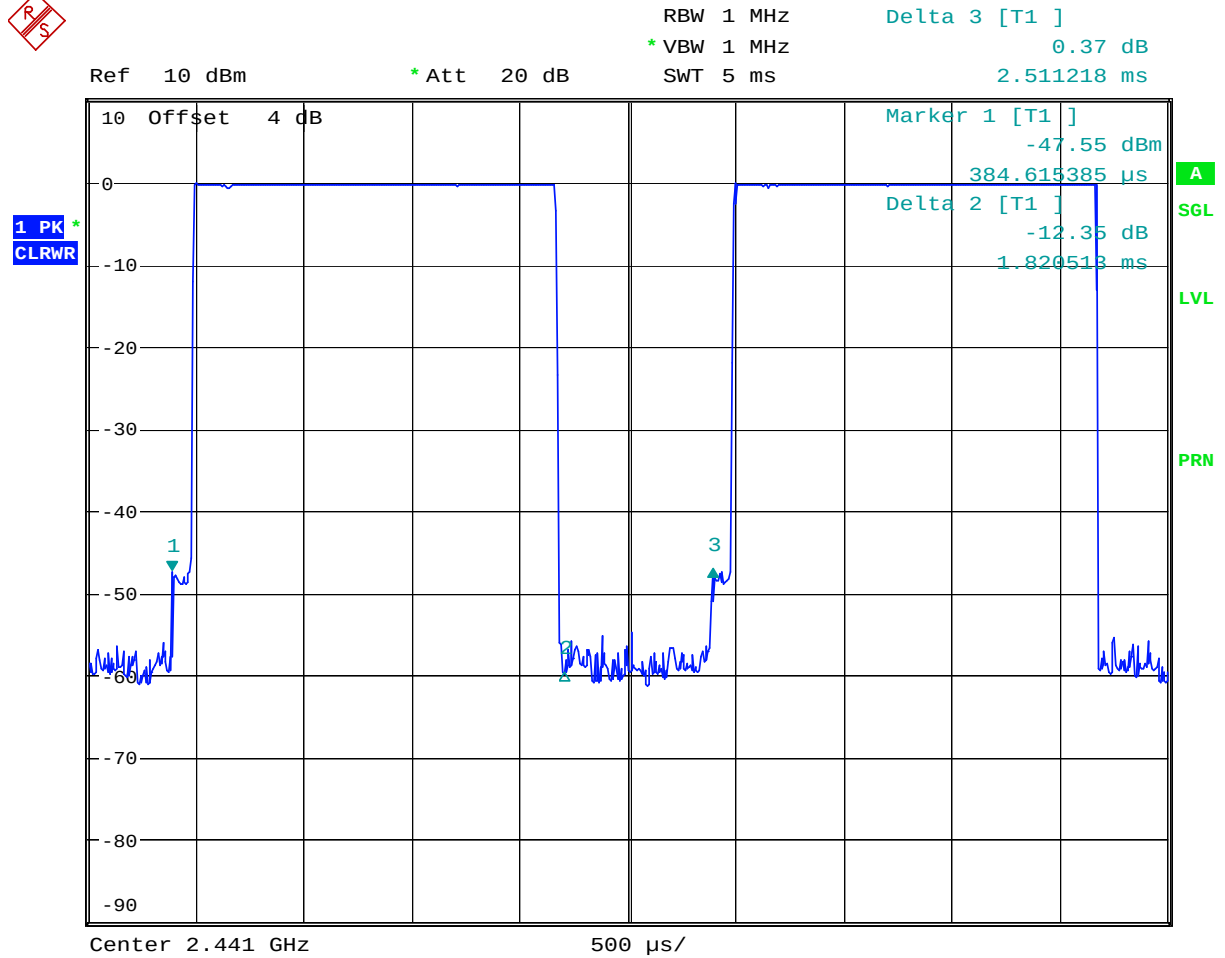
Report No. : FR5D2803



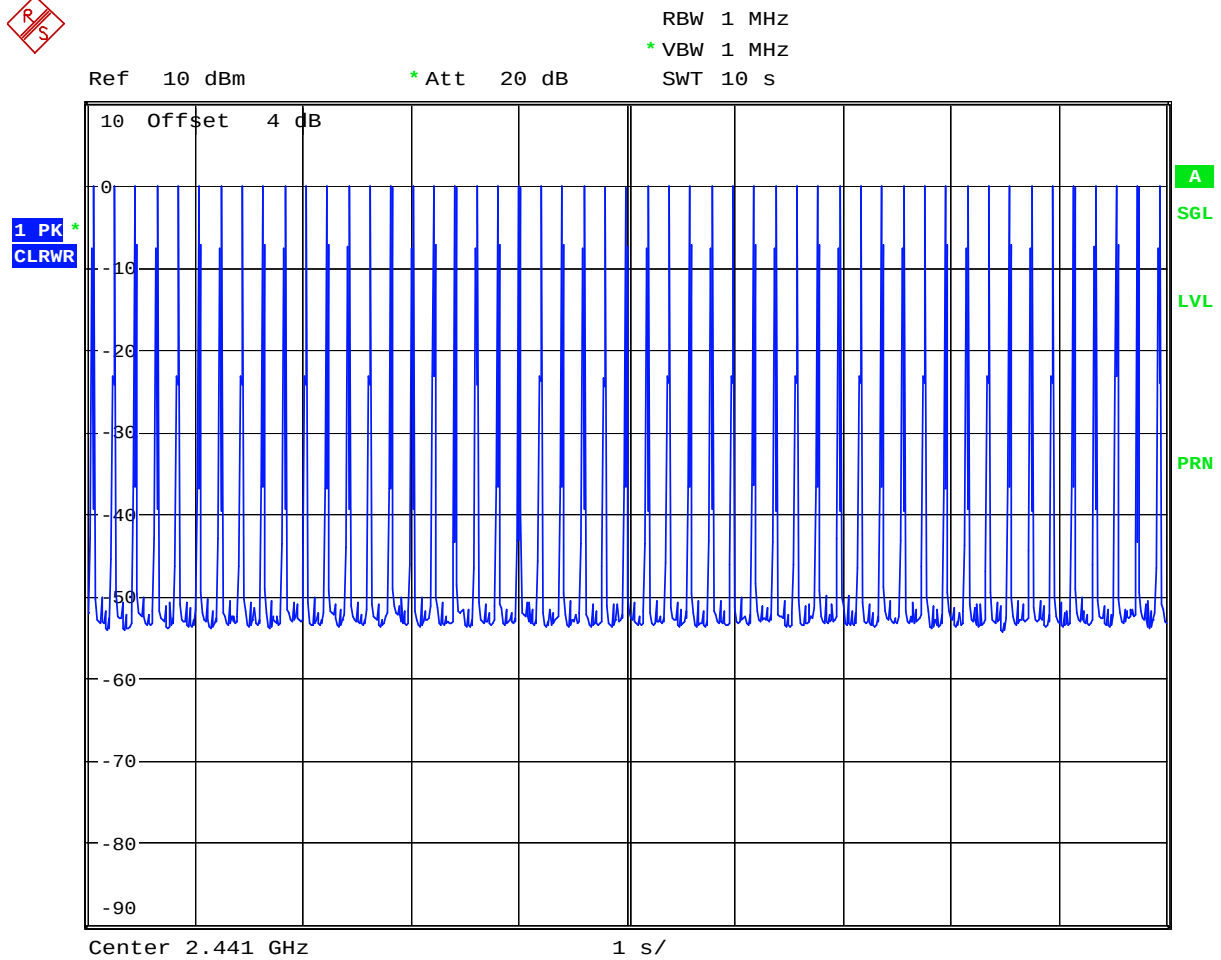
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DH3 (CH39)



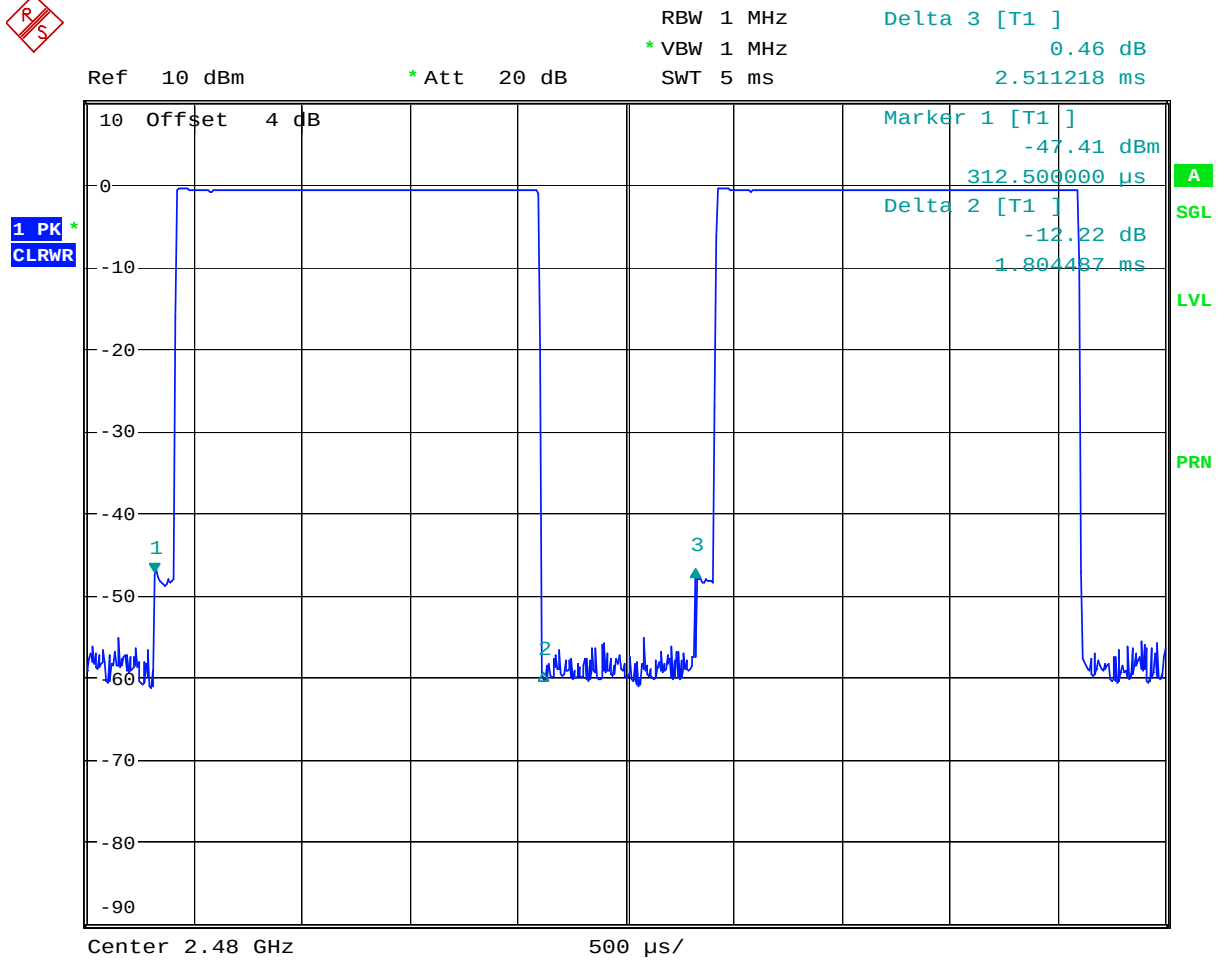
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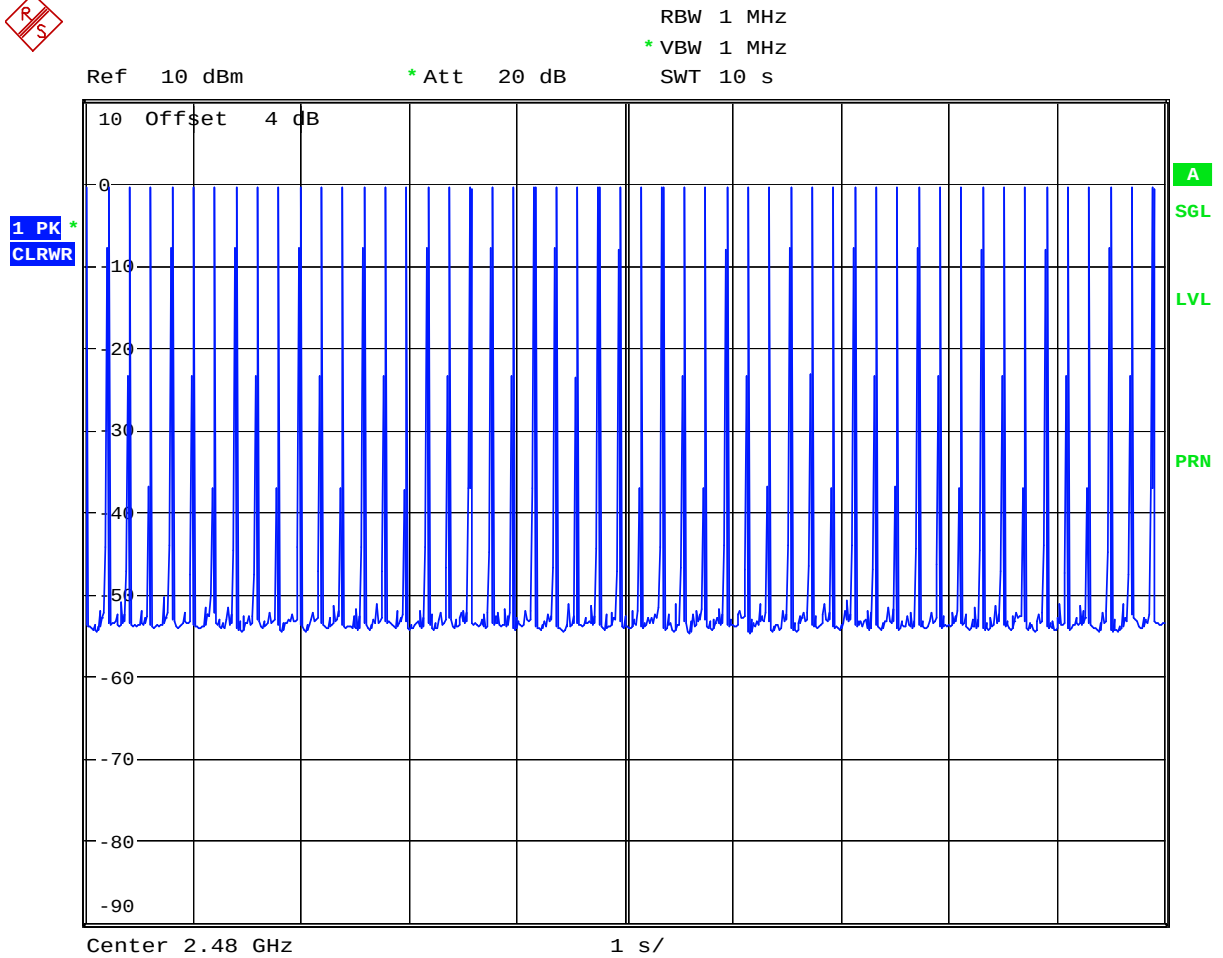
Date: 6.JAN.2006 21:39:56



DH3 (CH78)



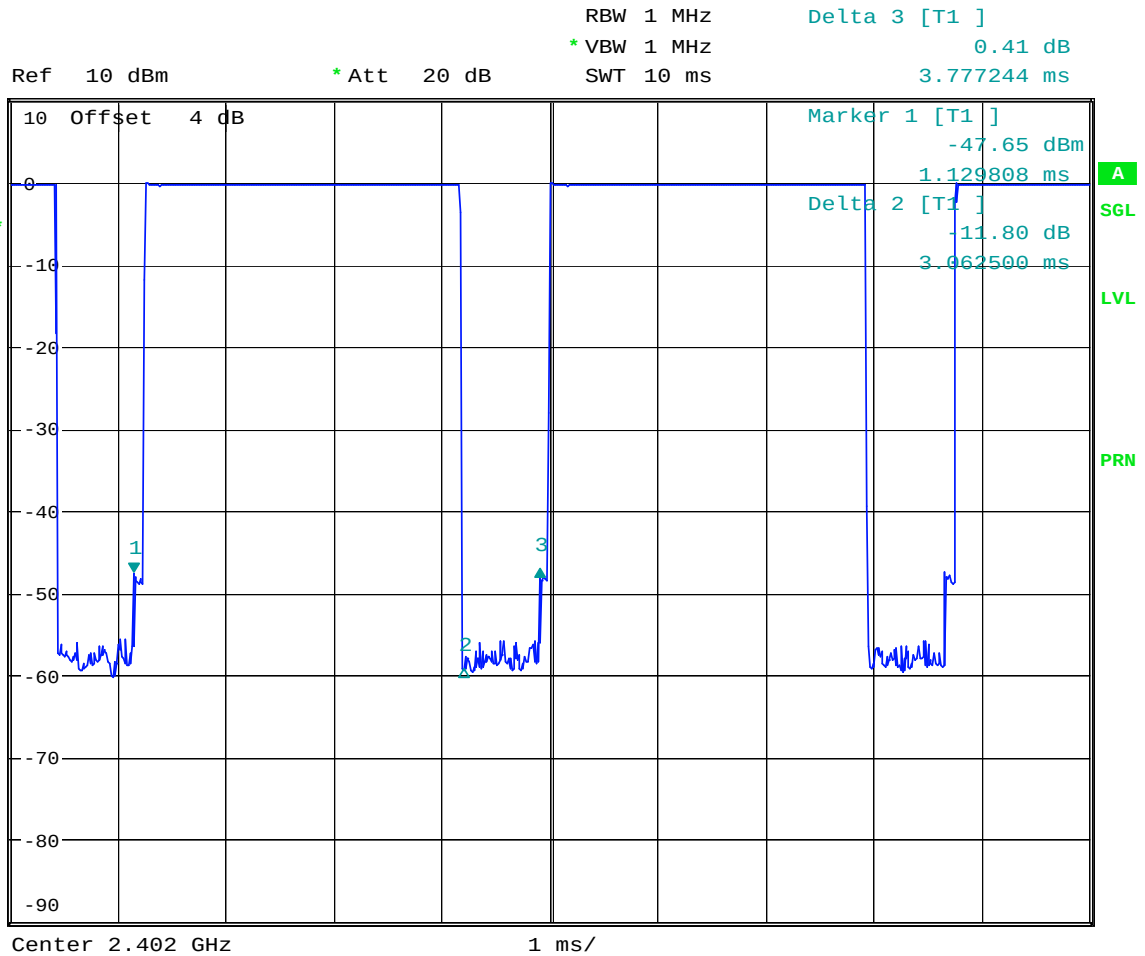
Date: 6. JAN. 2006 21:31:17



Date: 6.JAN.2006 21:40:53



DH5 (CH00)

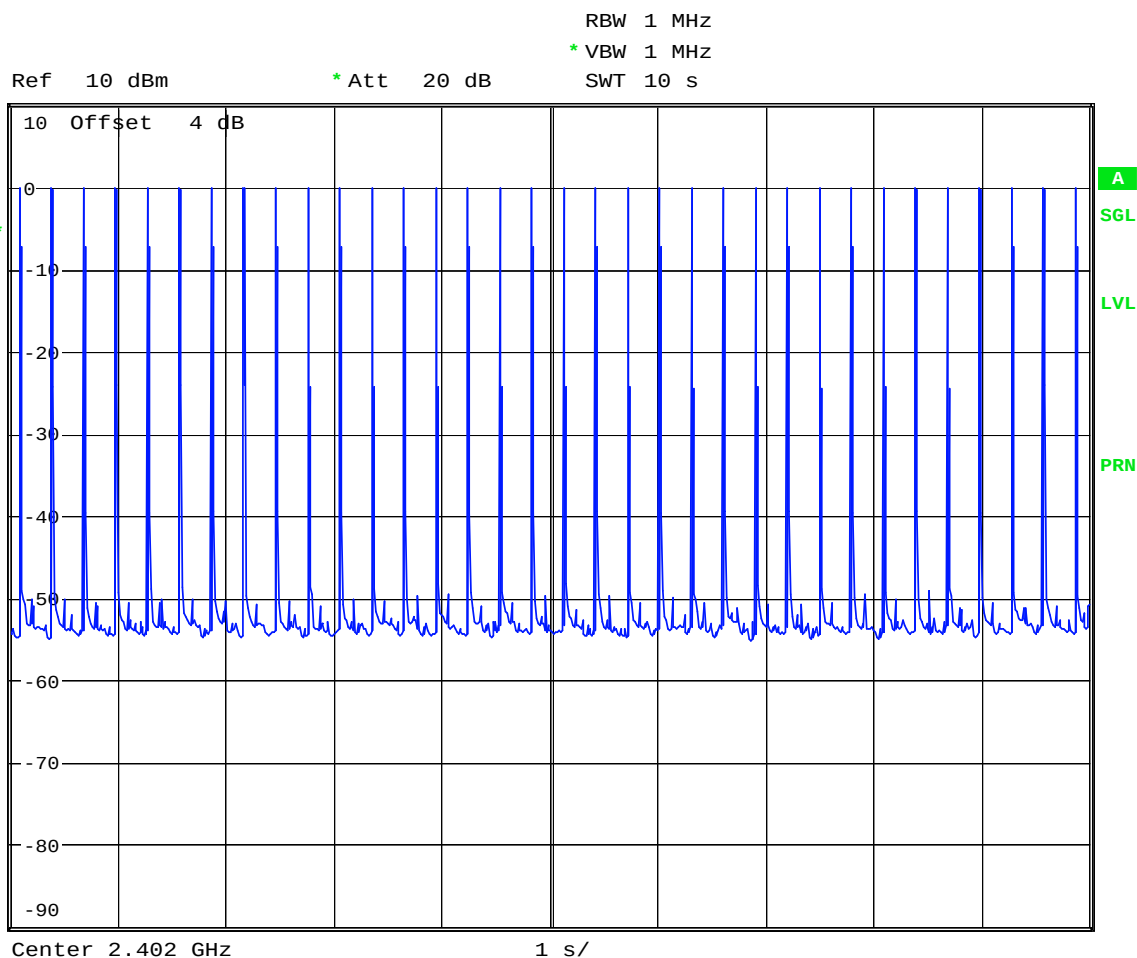


Date: 6. JAN. 2006 21:33:26



# FCC TEST REPORT

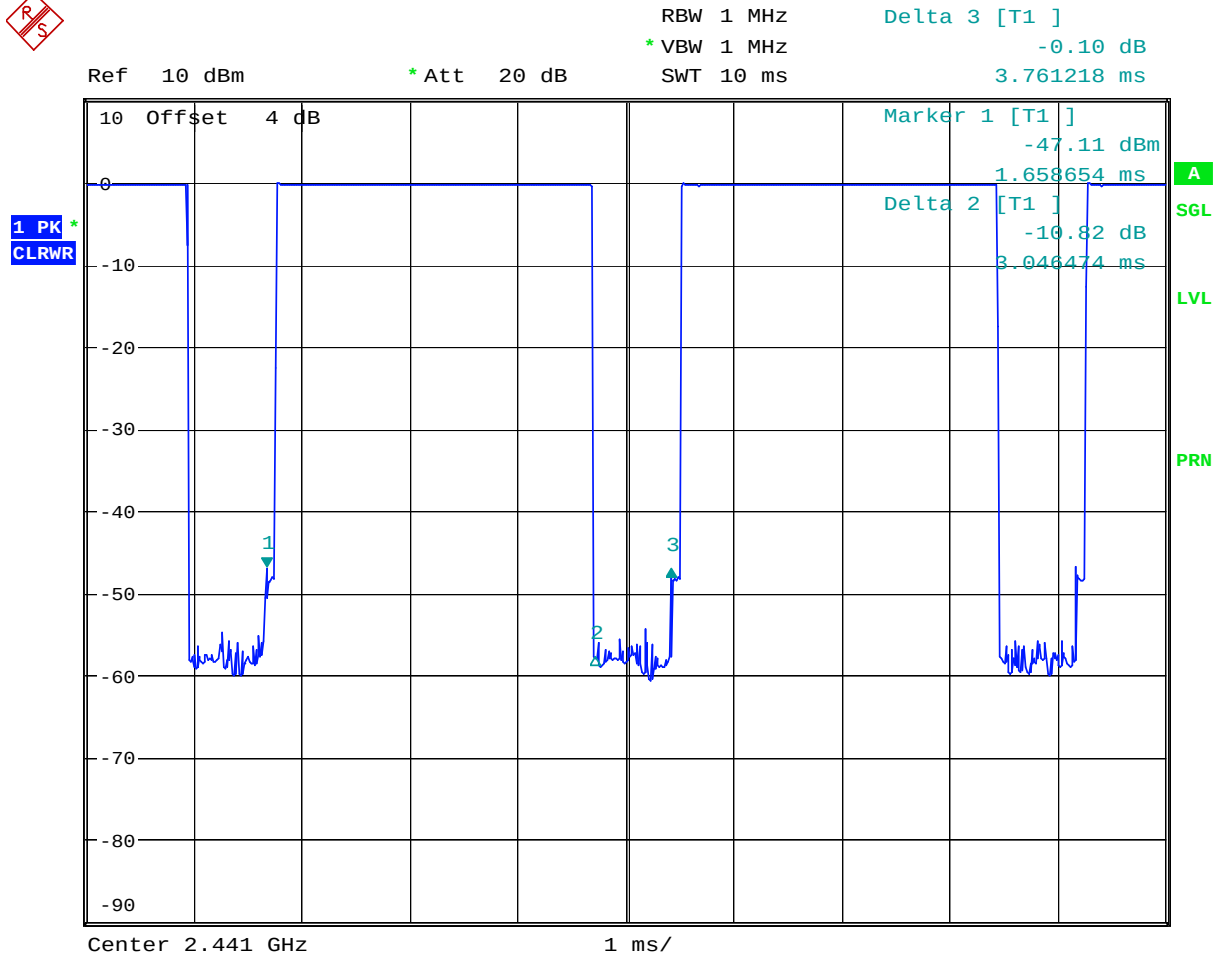
Report No. : FR5D2803



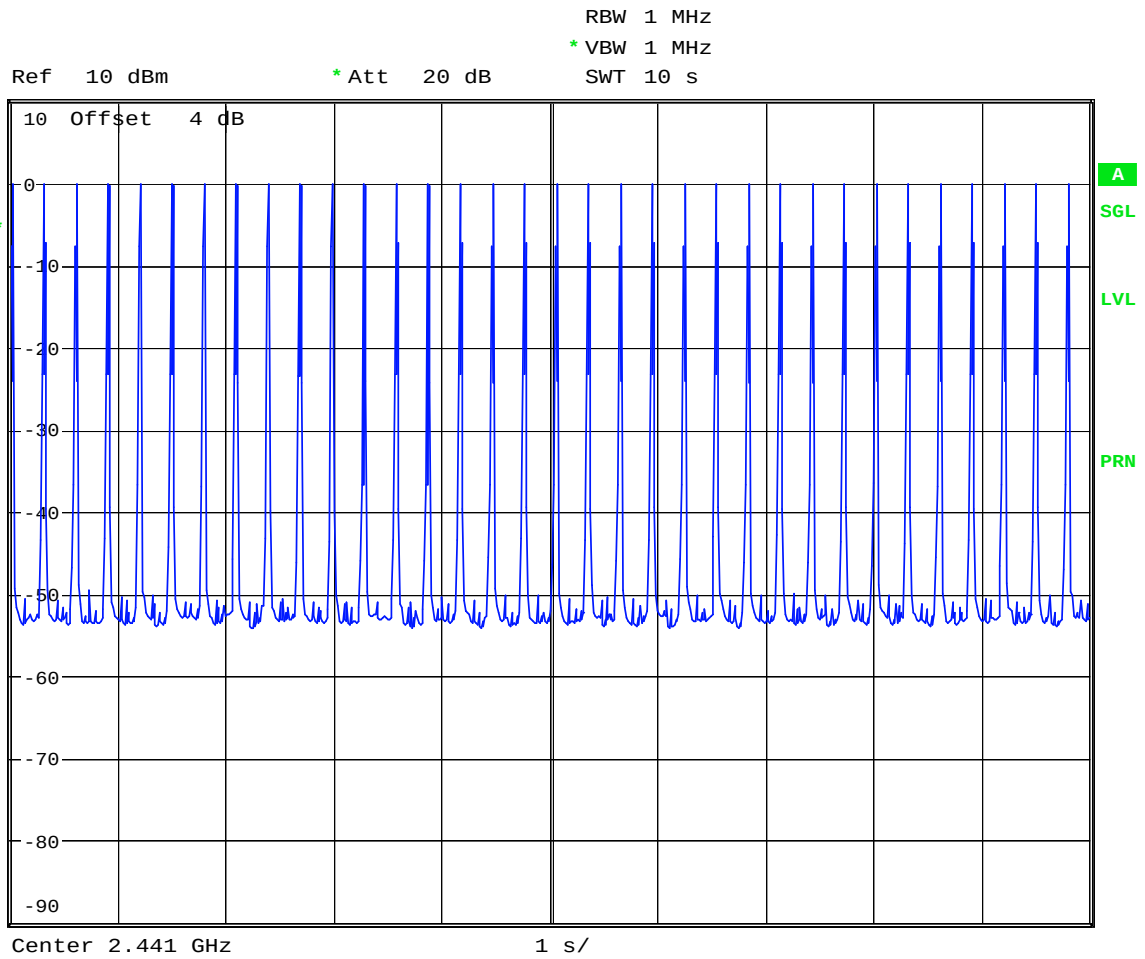
Date: 6. JAN. 2006 21:37:29



DH5 (CH39)



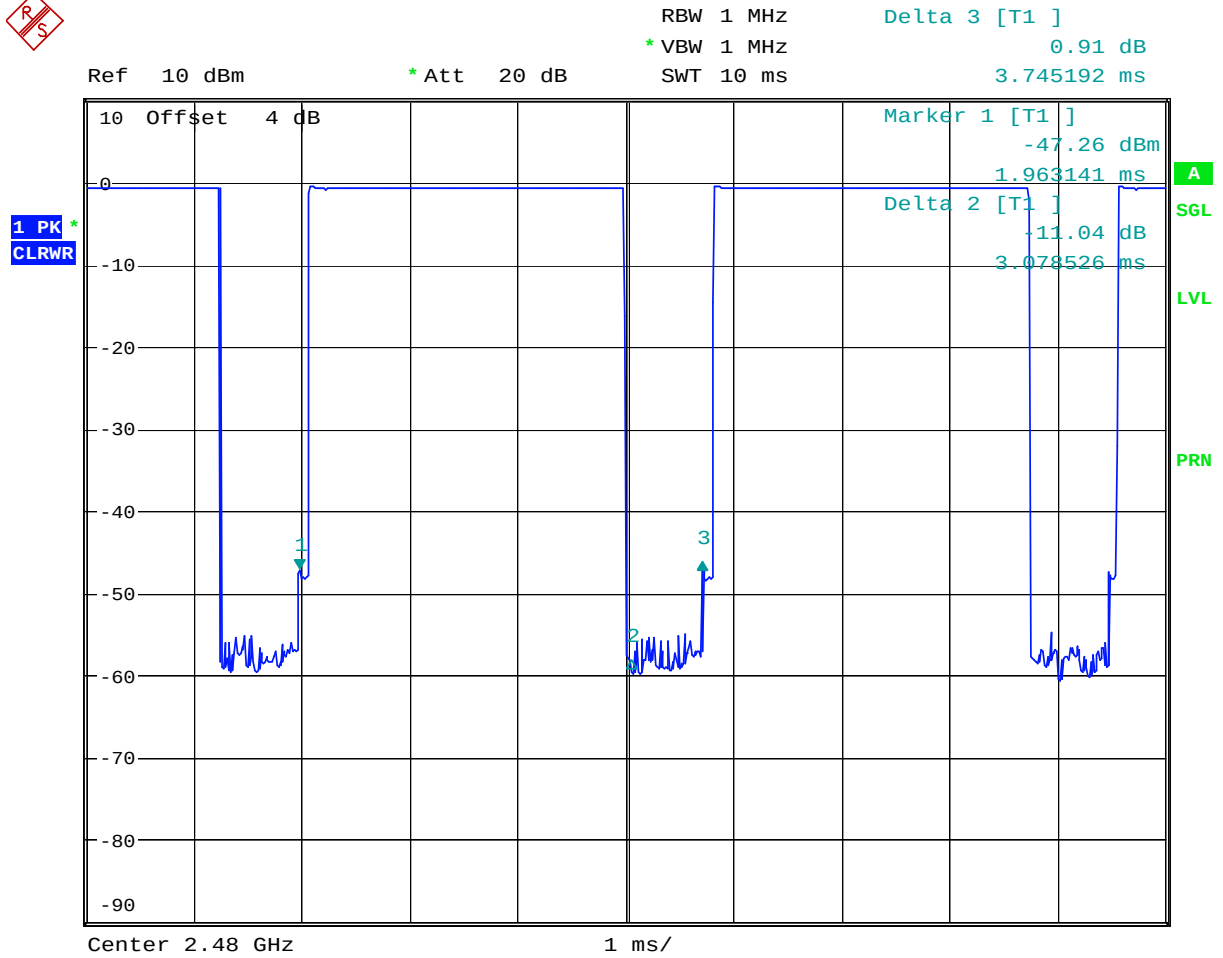
Date: 6. JAN. 2006 21:34:01



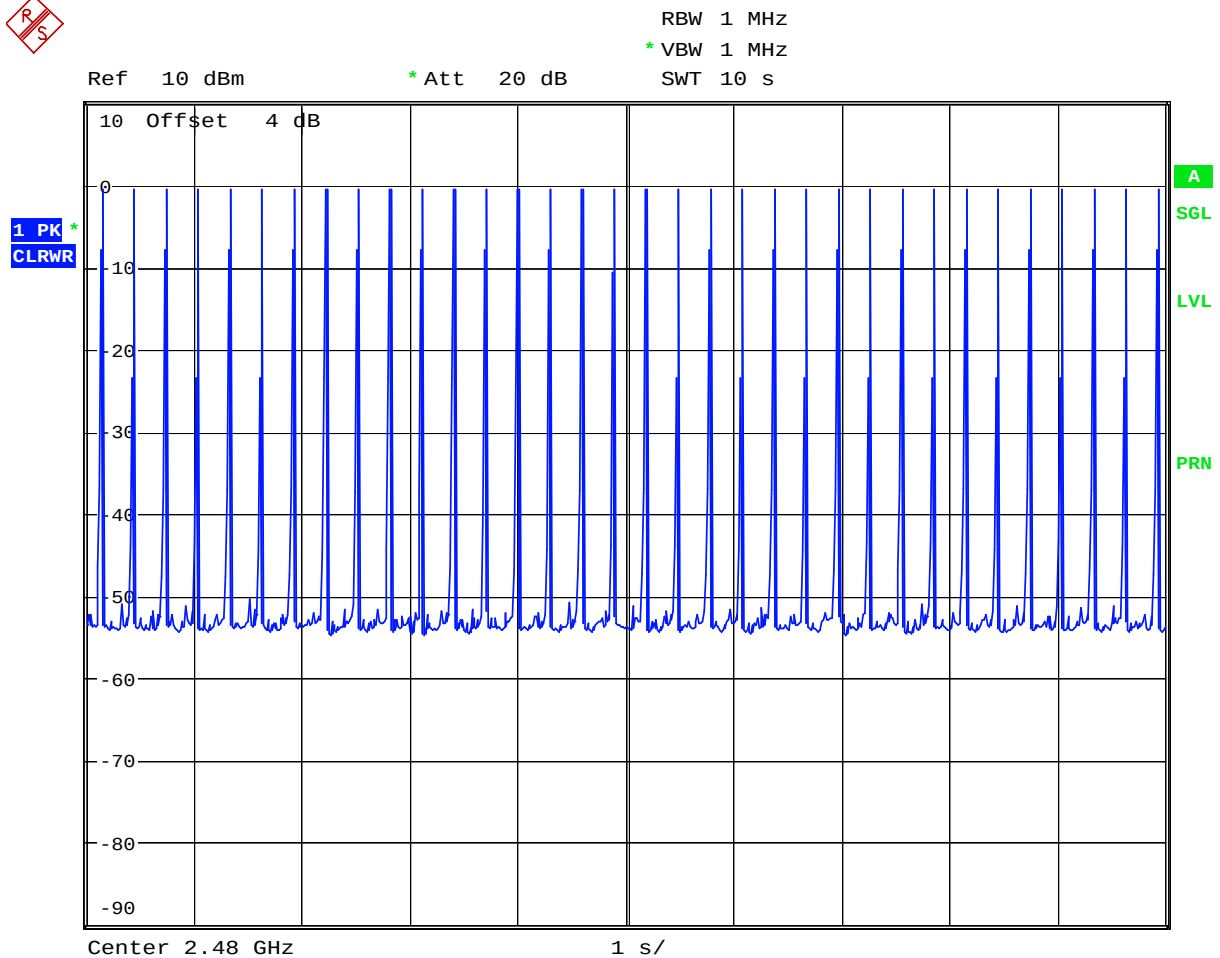
Date: 6. JAN. 2006 21:36:51



DH5 (CH78)



Date: 6. JAN. 2006 21:34:43



Date: 6. JAN. 2006 21:36:26

## 5.7 Peak Output Power Measurement

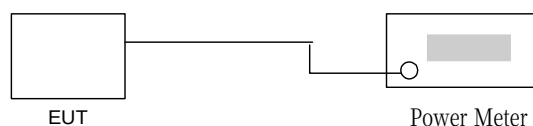
### 5.7.1 Measuring Instruments :

As described in chapter 6 of this test report.

### 5.7.2 Test Procedure :

1. The antenna port (RF output) of the EUT was connected to the input (RF input) of a power meter for WLAN measurement. The power is equal to the reading level on power meter plus cable loss at the EUT antenna terminal.
2. The antenna port(RF output) of the EUT was connected to the input (RF input) of a spectrum analyzer for BT measurement. The cable loss has been offset before testing.

### 5.7.3 Test Setup Layout :



### 5.7.4 Test Result :

- Application Type : BT
- Temperature : 25°C
- Relative Humidity : 58 %
- Test Enginner : Anderson

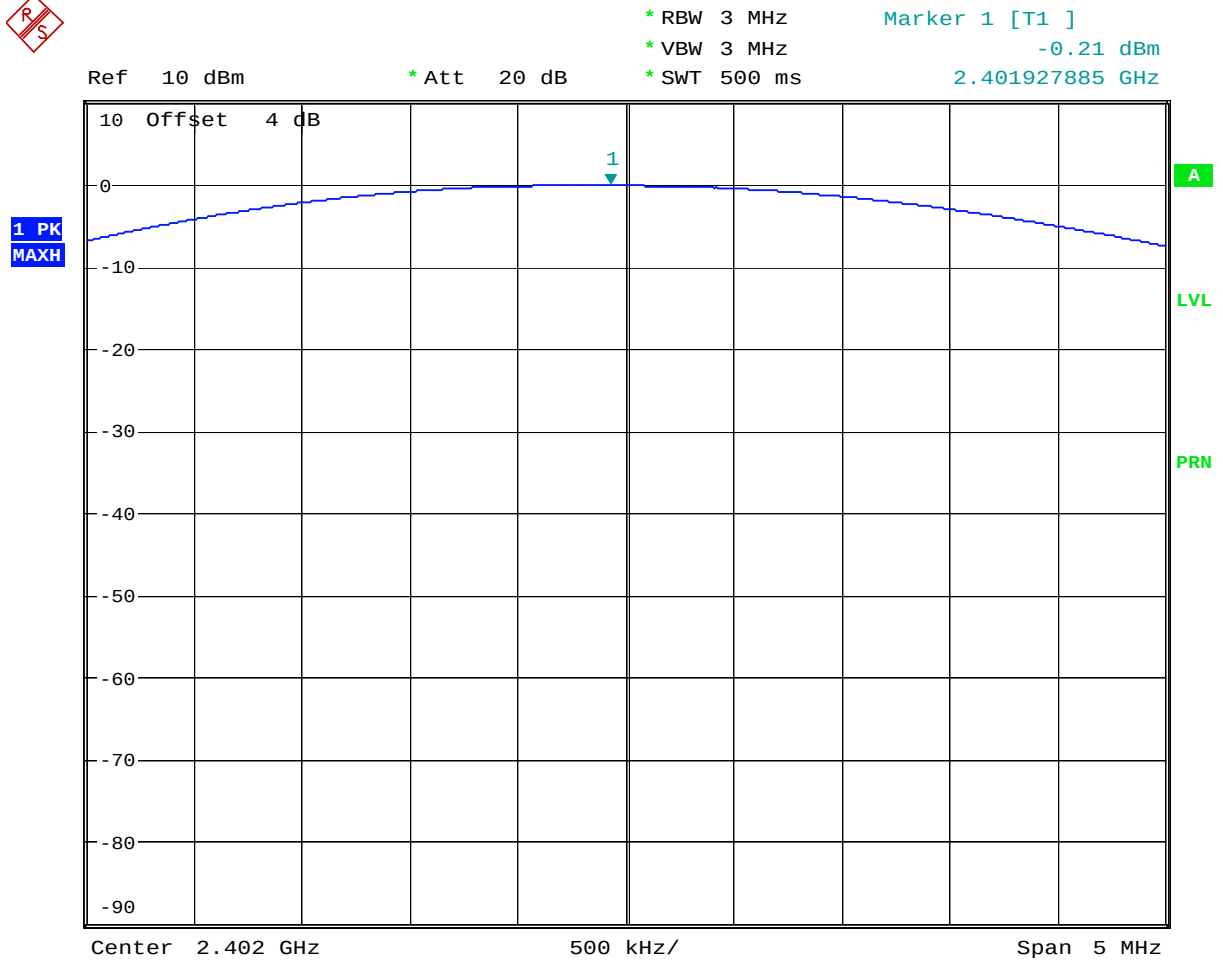
#### **BT**

| Channel | Frequency<br>(MHz) | Measured Output Power<br>(dBm) | Limits<br>(Watt/dBm ) |
|---------|--------------------|--------------------------------|-----------------------|
| 00      | 2402               | -0.21                          | 1W/30 dBm             |
| 39      | 2441               | -0.19                          | 1W/30 dBm             |
| 78      | 2480               | -0.58                          | 1W/30 dBm             |



5.7.5 Output Power

Mode 1: CH00 (2402MHz)



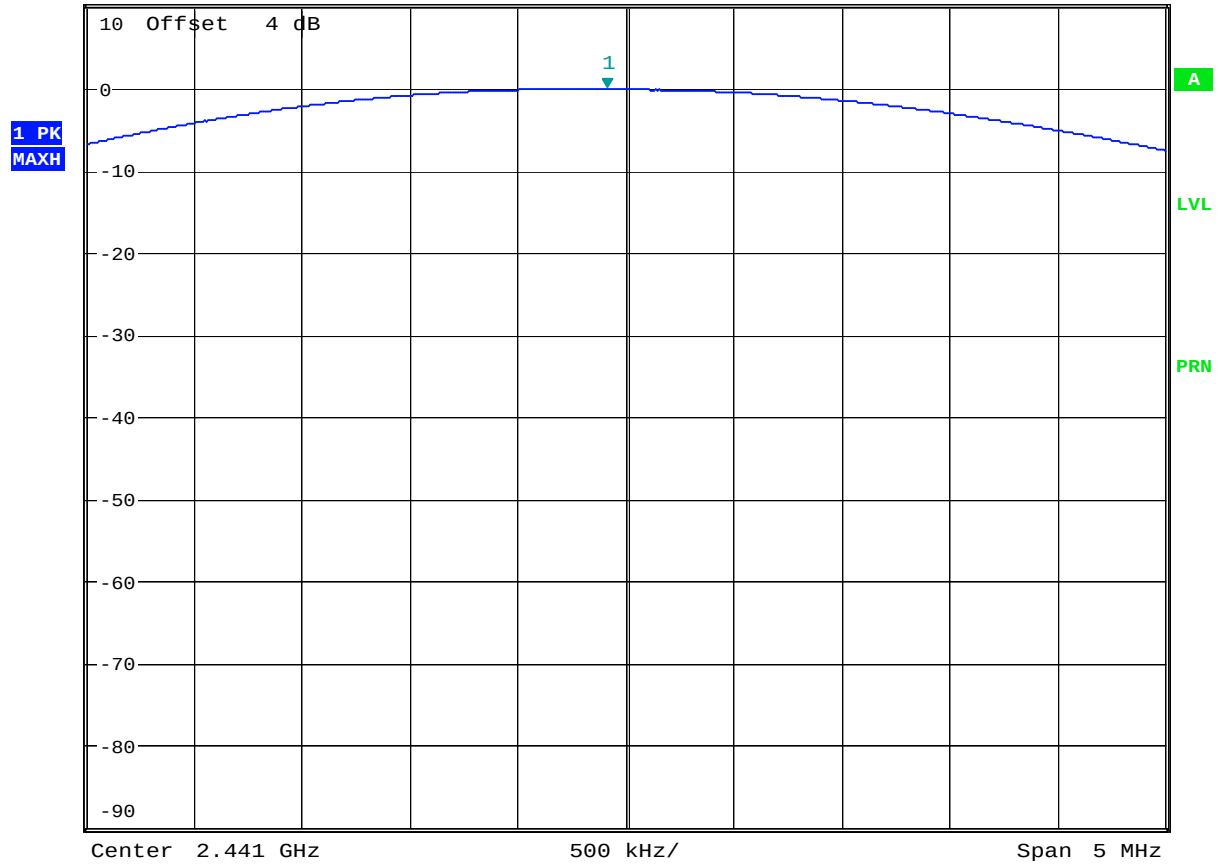
Date: 6. JAN. 2006 21:16:22



Mode 2: CH39 (2441MHz)



Ref 10 dBm \* Att 20 dB \* RBW 3 MHz \* VBW 3 MHz \* SWT 500 ms Marker 1 [T1 ]  
-0.19 dBm  
2.440911859 GHz



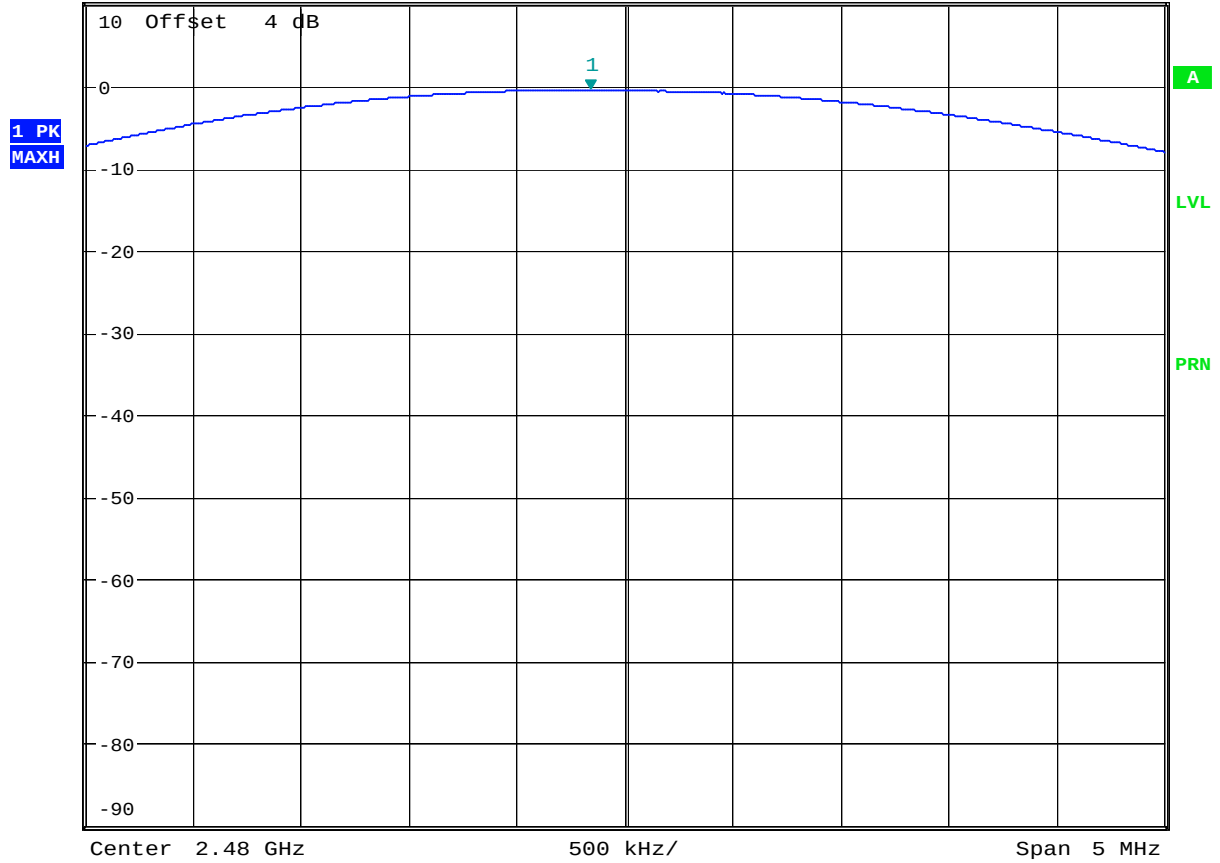
Date: 6. JAN. 2006 21:06:06



Mode 3: CH78 (2480MHz)



Ref 10 dBm \* Att 20 dB \* RBW 3 MHz \* VBW 3 MHz \* SWT 500 ms Marker 1 [T1] -0.58 dBm 2.479839744 GHz



Date: 6. JAN. 2006 21:17:13



## **5.8 Conducted Emission**

### **5.8.1 Measuring Instruments**

As described in chapter 6 of this test Report.

### **5.8.2 Test Procedures :**

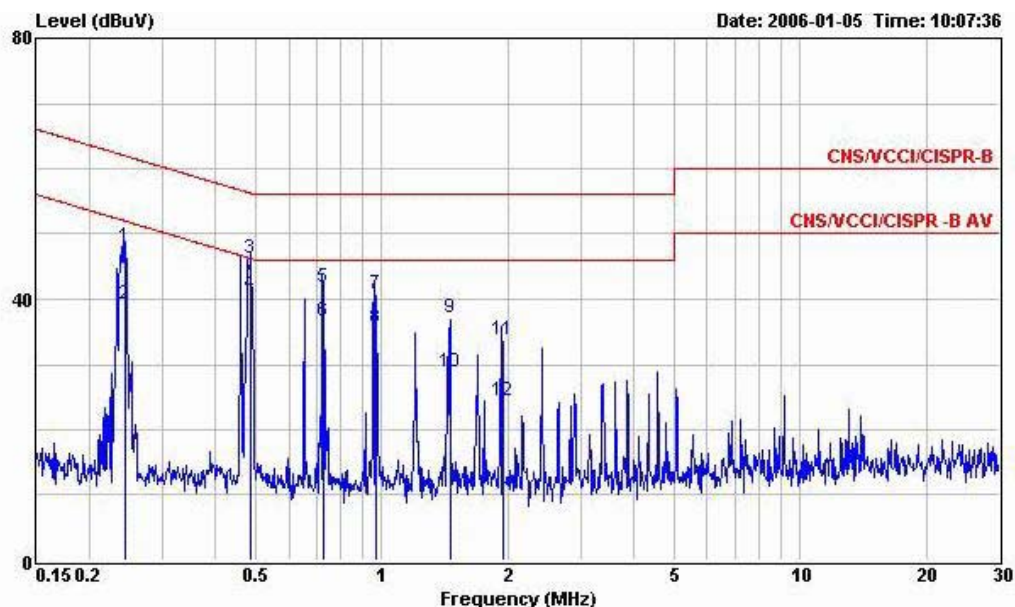
- a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- b. Connect EUT to the power port of a line impedance stabilization network (LISN).
- c. All the support units are connected to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150 kHz to 30 MHz was searched.
- h. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.



## 5.8.3 Test Data

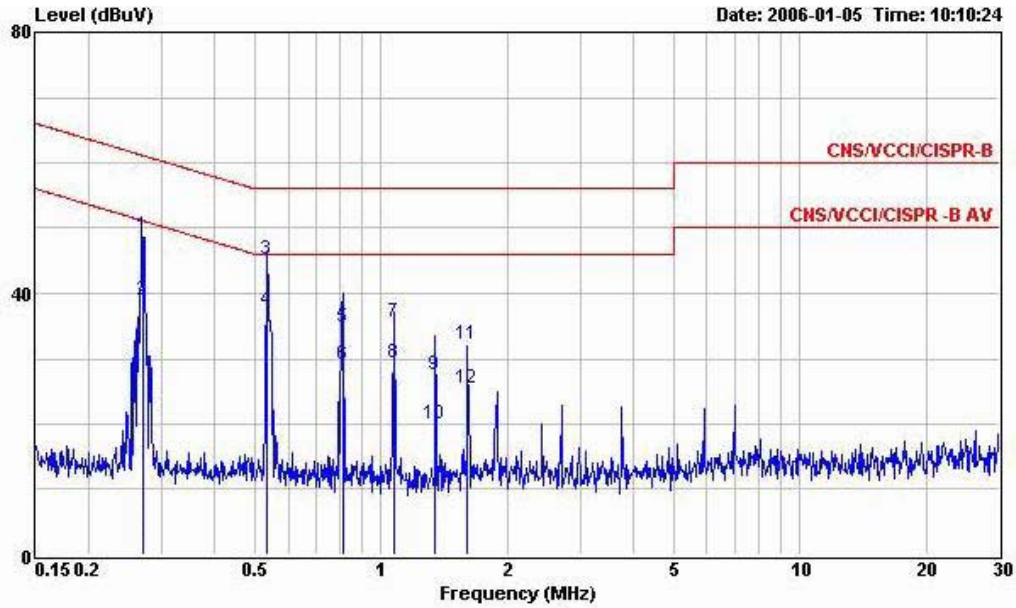
- Temperature : 25 °C
- Relating Humidity : 58 %
- Test Enginner : Anderson
- Test Mode : Mode 1

■ The test that passed at minimum margin was marked by the frame in the following table.



Site : CO01-HY  
Condition : CNS/VCCI/CISPR-B 2001/004 200505 LINE  
EUT : Bluetooth Headset\_BC03-MM-7\*7(Sporty)  
Power : 120Vac/50Hz  
Model : FR5D2803  
Memo : Charging Mode  
Memo :

|    | Freq  | Level | Over   | Limit | Read  | Probe  | Cable |         |
|----|-------|-------|--------|-------|-------|--------|-------|---------|
|    | MHz   | dBuV  | Limit  | Line  | Level | Factor | Loss  | Remark  |
|    |       |       | dB     | dBuV  | dBuV  | dB     | dB    |         |
| 1  | 0.243 | 48.04 | -13.97 | 62.01 | 47.88 | 0.06   | 0.10  | QP      |
| 2  | 0.243 | 39.28 | -12.73 | 52.01 | 39.12 | 0.06   | 0.10  | Average |
| 3  | 0.485 | 46.20 | -10.06 | 56.26 | 46.07 | 0.07   | 0.06  | QP      |
| 4  | 0.485 | 40.66 | -5.60  | 46.26 | 40.53 | 0.07   | 0.06  | Average |
| 5  | 0.727 | 41.89 | -14.11 | 56.00 | 41.73 | 0.09   | 0.07  | QP      |
| 6  | 0.727 | 36.51 | -9.49  | 46.00 | 36.35 | 0.09   | 0.07  | Average |
| 7  | 0.971 | 40.85 | -15.15 | 56.00 | 40.66 | 0.11   | 0.08  | QP      |
| 8  | 0.971 | 35.55 | -10.45 | 46.00 | 35.36 | 0.11   | 0.08  | Average |
| 9  | 1.459 | 37.12 | -18.88 | 56.00 | 36.92 | 0.11   | 0.09  | QP      |
| 10 | 1.459 | 28.80 | -17.20 | 46.00 | 28.60 | 0.11   | 0.09  | Average |
| 11 | 1.945 | 33.80 | -22.20 | 56.00 | 33.59 | 0.11   | 0.10  | QP      |
| 12 | 1.945 | 24.54 | -21.46 | 46.00 | 24.33 | 0.11   | 0.10  | Average |



Site : CO01-HY  
Condition : CNS/VCCI/CISPR-B 2001/004 200505 NEUTRAL  
EUT : Bluetooth Headset\_BC03-MM-7\*7(Sporty)  
Power : 120Vac/60Hz  
Model : FR5D2803  
Memo : Charging Mode  
Memo :  
Memo :

|    | Freq  | Level | Over   | Limit | Read  | Probe  | Cable |         |
|----|-------|-------|--------|-------|-------|--------|-------|---------|
|    | MHz   | dBuV  | Limit  | Line  | Level | Factor | Loss  | Remark  |
| 1  | 0.269 | 48.74 | -12.41 | 61.15 | 48.54 | 0.11   | 0.09  | QP      |
| 2  | 0.269 | 39.04 | -12.11 | 51.15 | 38.84 | 0.11   | 0.09  | Average |
| 3  | 0.535 | 45.29 | -10.71 | 56.00 | 45.07 | 0.15   | 0.07  | QP      |
| 4  | 0.535 | 37.49 | -8.51  | 46.00 | 37.27 | 0.15   | 0.07  | Average |
| 5  | 0.809 | 34.92 | -21.08 | 56.00 | 34.64 | 0.20   | 0.08  | QP      |
| 6  | 0.809 | 29.16 | -16.84 | 46.00 | 28.88 | 0.20   | 0.08  | Average |
| 7  | 1.074 | 35.52 | -20.48 | 56.00 | 35.21 | 0.23   | 0.08  | QP      |
| 8  | 1.074 | 29.24 | -16.76 | 46.00 | 28.93 | 0.23   | 0.08  | Average |
| 9  | 1.343 | 27.54 | -28.46 | 56.00 | 27.22 | 0.23   | 0.09  | QP      |
| 10 | 1.343 | 19.92 | -26.08 | 46.00 | 19.60 | 0.23   | 0.09  | Average |
| 11 | 1.610 | 32.27 | -23.73 | 56.00 | 31.95 | 0.23   | 0.09  | QP      |
| 12 | 1.610 | 25.41 | -20.59 | 46.00 | 25.09 | 0.23   | 0.09  | Average |

## **5.9 Radiated Emission Measurement**

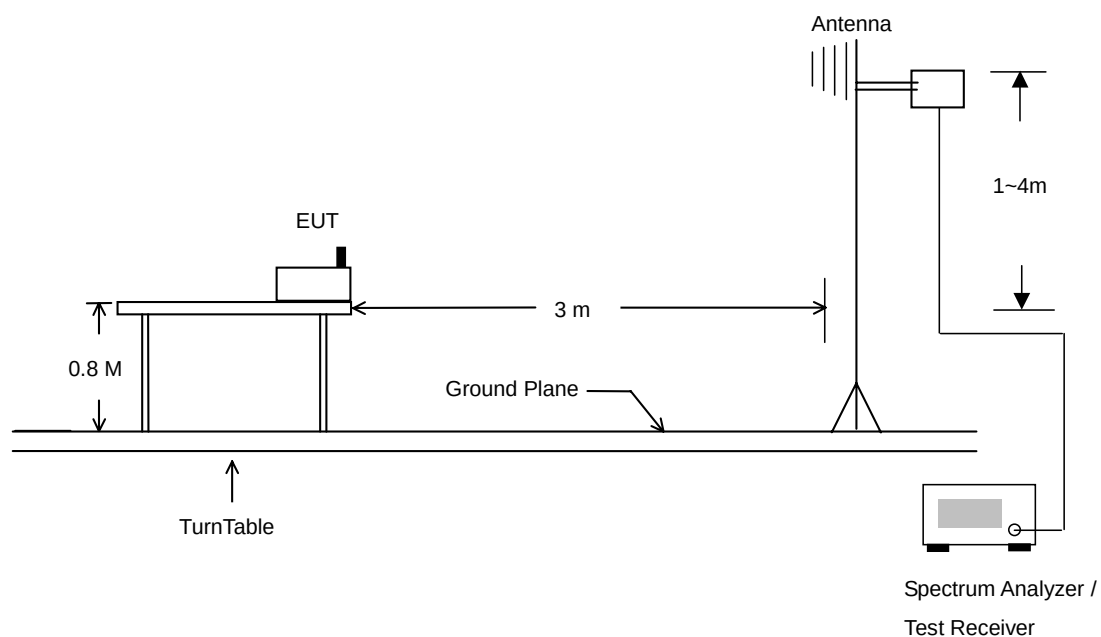
### **5.9.1 Measuring Instruments**

As described in chapter 6 of this Report.

### **5.9.2 Test Procedures**

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
- e. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. For testing below 1GHz, If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the quasi-peak method and reported.
- h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

### 5.9.3 Typical Test Setup Layout of Radiated Emission

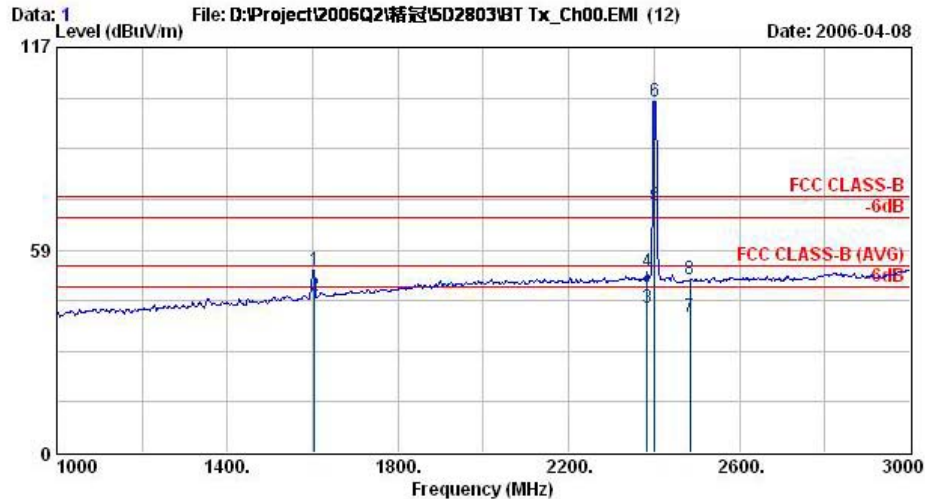




## 5.9.4 Test Data

- Test Mode : Mode 1
- Polarization : Horizontal

■ The test that passed at minimum margin was marked by the frame in the following table.



Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 HORIZONTAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR 5D2803  
Memo : Bluetooth Tx\_Ch00:2402MHz

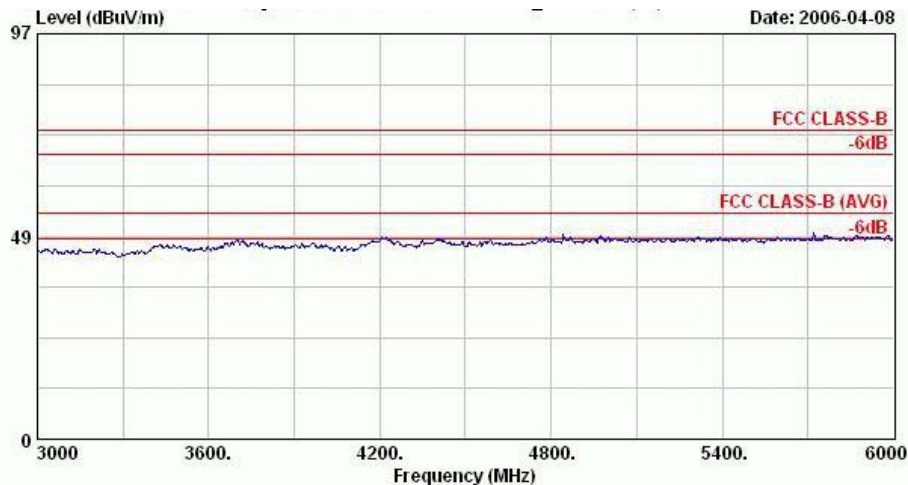
|     | Freq    | Level  | Over   | Limit  | ReadAntenna | Preamp | Cable | Ant  | Table | Remark      |
|-----|---------|--------|--------|--------|-------------|--------|-------|------|-------|-------------|
|     | MHz     | dBuV/m | Limit  | Line   | Level       | Factor | Loss  | Pos  | Pos   |             |
|     |         |        | dB     | dBuV/m | dBuV        | dB/m   | dB    | cm   | deg   |             |
| 1 @ | 1604.00 | 52.80  | -21.20 | 74.00  | 57.41       | 27.50  | 35.59 | 3.48 | 100   | 1 Peak      |
| 2 @ | 1604.00 | 45.09  | -8.91  | 54.00  | 49.70       | 27.50  | 35.59 | 3.48 | 100   | 24 Average  |
| 3 @ | 2384.00 | 41.81  | -12.19 | 54.00  | 42.52       | 30.50  | 35.44 | 4.23 | 100   | 154 Average |
| 4 @ | 2384.00 | 52.41  | -21.59 | 74.00  | 53.12       | 30.50  | 35.44 | 4.23 | 100   | 1 Peak      |
| 5 @ | 2402.00 | 71.40  |        |        | 72.11       | 30.48  | 35.46 | 4.26 | 100   | 154 Average |
| 6 @ | 2402.00 | 101.43 |        |        | 102.14      | 30.48  | 35.46 | 4.26 | 100   | 1 Peak      |
| 7 @ | 2484.00 | 39.32  | -14.68 | 54.00  | 40.06       | 30.41  | 35.51 | 4.36 | 100   | 154 Average |
| 8 @ | 2484.00 | 49.89  | -24.11 | 74.00  | 50.63       | 30.41  | 35.51 | 4.36 | 100   | 1 Peak      |

Remark: #5 and #6 Fundamental Signal.

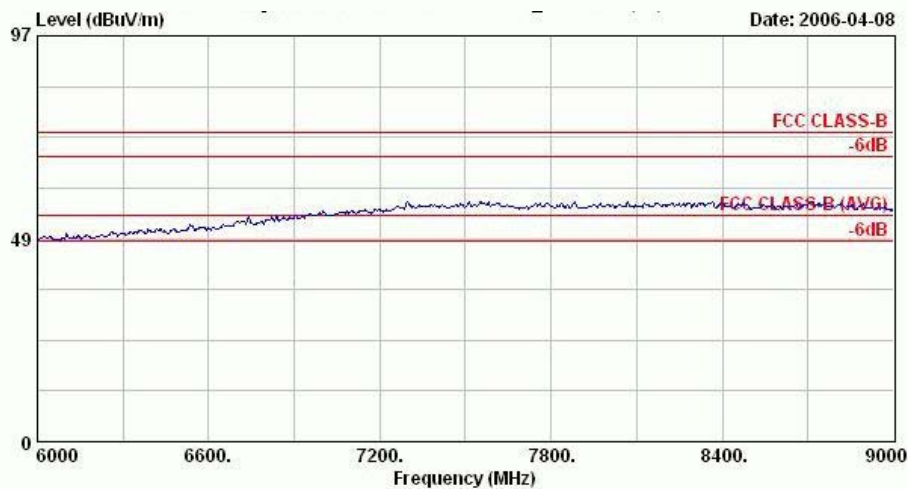


## FCC TEST REPORT

Report No. : FR5D2803



Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 HORIZONTAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR 5D2803  
Memo : Bluetooth Tx\_Ch00:2402MHz

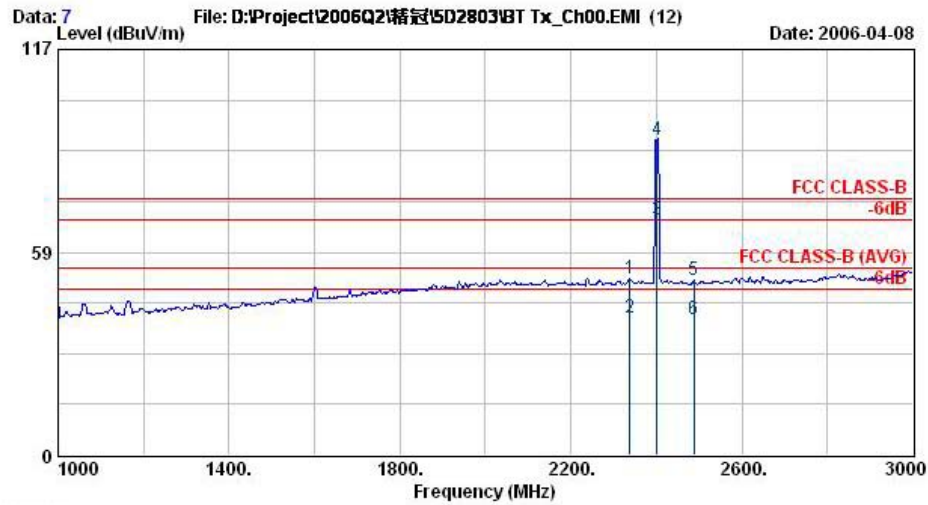


Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 HORIZONTAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR 5D2803  
Memo : Bluetooth Tx\_Ch00:2402MHz



- Polarization : Vertical

■ The test that passed at minimum margin was marked by the frame in the following table.



Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 VERTICAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR SD2803  
Memo : Bluetooth Tx\_Ch00:2402MHz

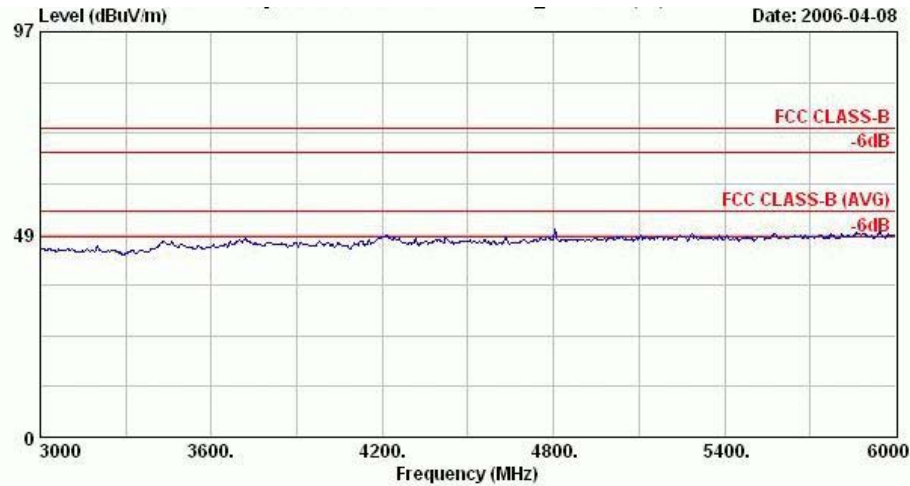
| Bluetooth 12-Chs 2402MHz |         |        |            |            |             |        |        |      |       |     |         |
|--------------------------|---------|--------|------------|------------|-------------|--------|--------|------|-------|-----|---------|
|                          | Freq    | Level  | Over Limit | Limit Line | ReadAntenna | Preamp | Cable  | Ant  | Table |     |         |
|                          | MHz     | dBuV/m | dB         | dBuV/m     | Level       | Factor | Factor | Loss | Pos   | Pos | Remark  |
|                          |         |        |            |            | dBuV        | dB/m   | dB     | dB   | cm    | deg |         |
| 1                        | 2338.00 | 51.03  | -22.97     | 74.00      | 51.74       | 30.52  | 35.40  | 4.17 | 100   | 359 | Peak    |
| 2                        | 2338.00 | 39.49  | -14.51     | 54.00      | 40.20       | 30.52  | 35.40  | 4.17 | 100   | 359 | Average |
| 3 X                      | 2402.00 | 67.70  |            |            | 68.41       | 30.48  | 35.46  | 4.26 | 110   | 163 | Average |
| 4 @                      | 2402.00 | 91.11  |            |            | 91.83       | 30.48  | 35.46  | 4.26 | 100   | 359 | Peak    |
| 5                        | 2488.00 | 50.26  | -23.74     | 74.00      | 51.01       | 30.40  | 35.51  | 4.36 | 100   | 359 | Peak    |
| 6                        | 2488.00 | 39.31  | -14.69     | 54.00      | 40.06       | 30.40  | 35.51  | 4.36 | 100   | 359 | Average |

Remark: #3 and #4 Fundamental Signal.

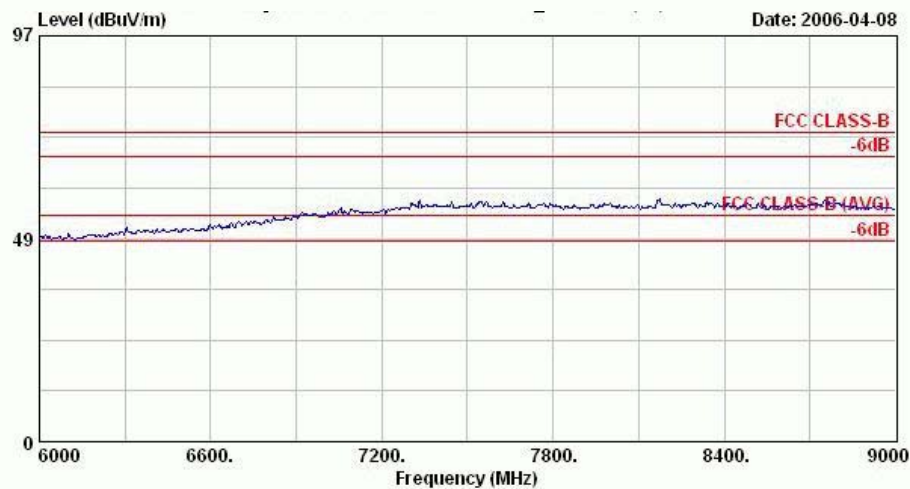


## FCC TEST REPORT

Report No. : FR5D2803



Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 VERTICAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR 5D2803  
Memo : Bluetooth Tx\_Ch00:2402MHz

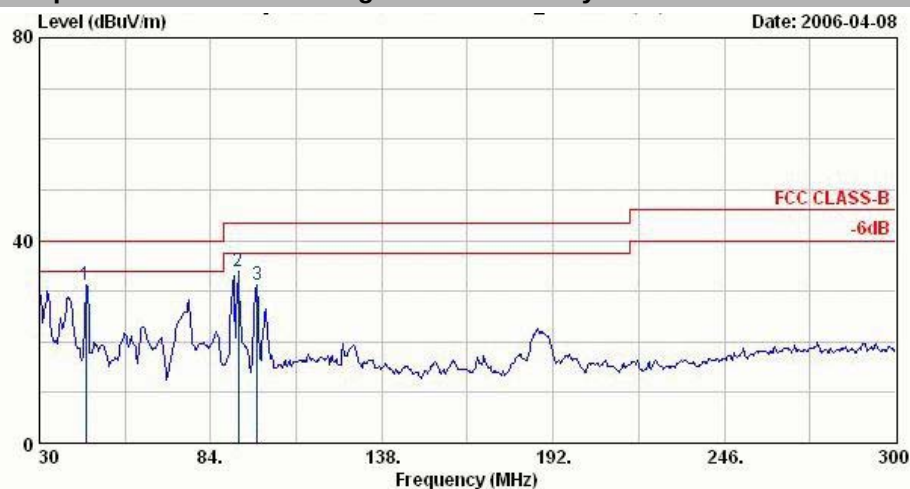


Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 VERTICAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR 5D2803  
Memo : Bluetooth Tx\_Ch00:2402MHz



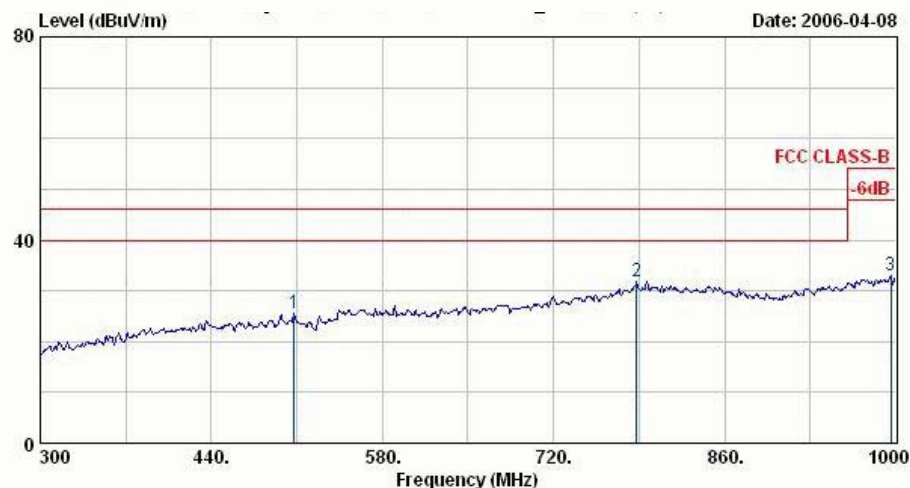
- Test Mode : Mode 2
- Polarization : Horizontal

The test that passed at minimum margin was marked by the frame in the following table.



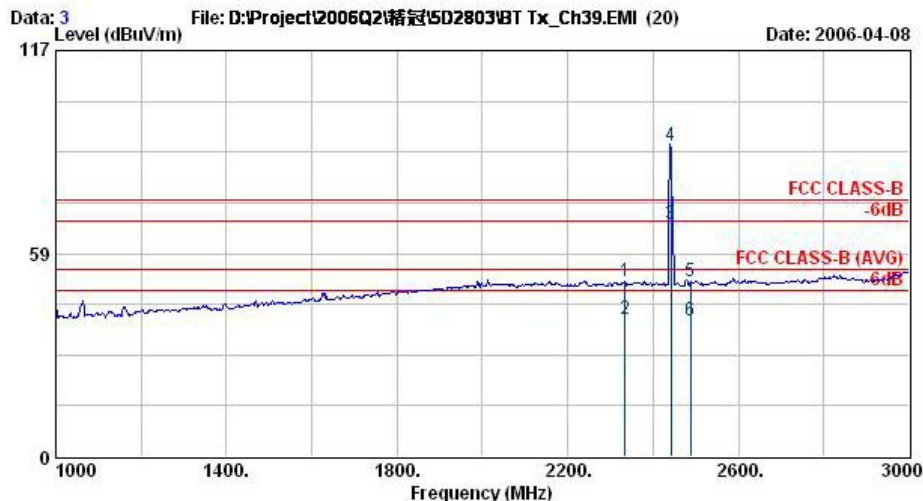
Site : 03CH06-HY  
Condition : BI-LOG-2004-1122 HORIZONTAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR 5D2803  
Memo : Bluetooth Tx\_Ch39:2441MHz

|     | Freq  | Level  | Over   | Limit  | ReadAntenna | Preamp | Cable | Ant  | Table |          |
|-----|-------|--------|--------|--------|-------------|--------|-------|------|-------|----------|
|     | MHz   | dBuV/m | Limit  | Line   | Level       | Factor | Loss  | Pos  | Pos   | Remark   |
|     |       |        | dB     | dBuV/m | dBuV        | dB/m   | dB    | cm   | deg   |          |
| 1 @ | 44.58 | 31.10  | -8.90  | 40.00  | 48.99       | 12.10  | 31.62 | 1.63 | 142   | 331 Peak |
| 2 @ | 92.64 | 33.78  | -9.72  | 43.50  | 53.45       | 9.47   | 31.47 | 2.34 | 400   | 0 Peak   |
| 3 @ | 98.58 | 31.37  | -12.13 | 43.50  | 49.95       | 10.32  | 31.32 | 2.42 | 400   | 0 Peak   |



Site : 03CH06-HY  
Condition : BI-LOG-2004-1122 HORIZONTAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR 5D2803  
Memo : Bluetooth Tx\_Ch39:2441MHz

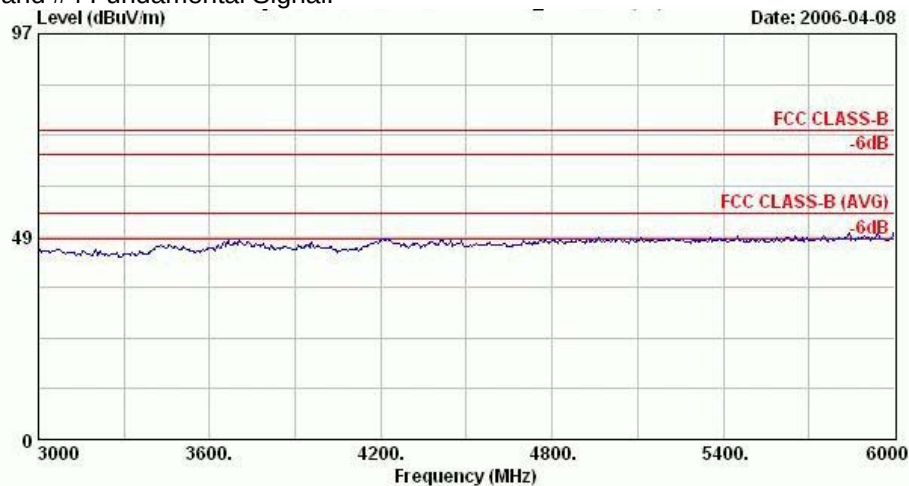
|     | Freq   | Level  | Over   | Limit  | ReadAntenna | Preamp | Cable | Ant  | Table |        |
|-----|--------|--------|--------|--------|-------------|--------|-------|------|-------|--------|
|     | MHz    | dBuV/m | Limit  | Line   | Level       | Factor | Loss  | Pos  | Pos   | Remark |
|     |        |        | dB     | dBuV/m | dBuV        | dB/m   | dB    | cm   | deg   |        |
| 1 @ | 507.90 | 25.67  | -20.33 | 46.00  | 33.38       | 17.00  | 30.53 | 5.81 | 100   | 0 Peak |
| 2 @ | 787.90 | 31.89  | -14.11 | 46.00  | 33.07       | 21.54  | 30.14 | 7.42 | 100   | 0 Peak |
| 3 @ | 995.80 | 32.95  | -21.05 | 54.00  | 32.20       | 22.85  | 30.51 | 8.41 | 100   | 0 Peak |



Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 HORIZONTAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR SD2803  
Memo : Bluetooth Tx\_Ch39:2441MHz

|     | Freq    | Level  | Over   | Limit  | ReadAntenna | Preamp | Cable | Ant  | Table | Remark      |
|-----|---------|--------|--------|--------|-------------|--------|-------|------|-------|-------------|
|     | MHz     | dBuV/m | dB     | dBuV/m | dBuV        | dB/m   | dB    | dB   | cm    | deg         |
| 1 @ | 2334.00 | 50.35  | -23.65 | 74.00  | 51.04       | 30.54  | 35.40 | 4.17 | 100   | 359 Peak    |
| 2 @ | 2334.00 | 39.50  | -14.50 | 54.00  | 40.20       | 30.54  | 35.40 | 4.17 | 104   | 153 Average |
| 3 @ | 2441.00 | 66.76  |        |        | 67.49       | 30.44  | 35.49 | 4.33 | 104   | 153 Average |
| 4 @ | 2441.00 | 89.81  |        |        | 90.54       | 30.44  | 35.49 | 4.33 | 100   | 359 Peak    |
| 5 @ | 2488.00 | 50.40  | -23.60 | 74.00  | 51.15       | 30.40  | 35.51 | 4.36 | 100   | 359 Peak    |
| 6 @ | 2488.00 | 39.30  | -14.70 | 54.00  | 40.05       | 30.40  | 35.51 | 4.36 | 104   | 153 Average |

Remark: #3 and #4 Fundamental Signal.

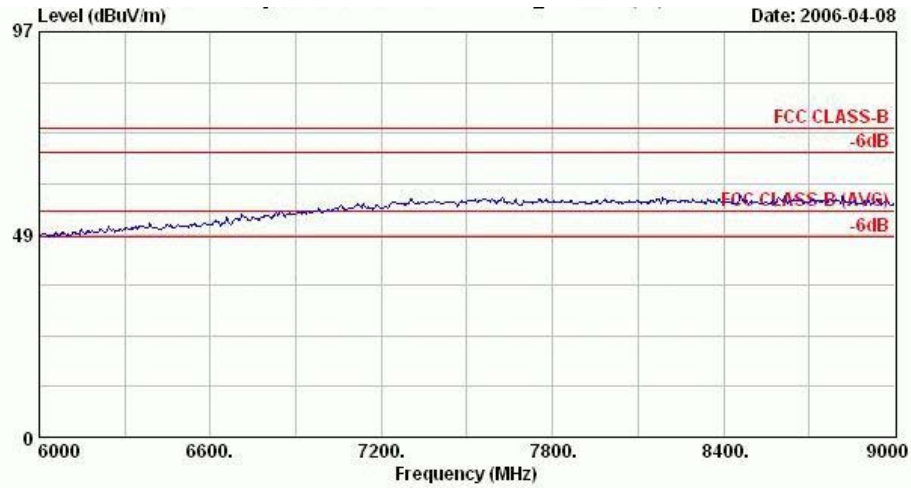


Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 HORIZONTAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR SD2803  
Memo : Bluetooth Tx\_Ch39:2441MHz



## FCC TEST REPORT

Report No. : FR5D2803

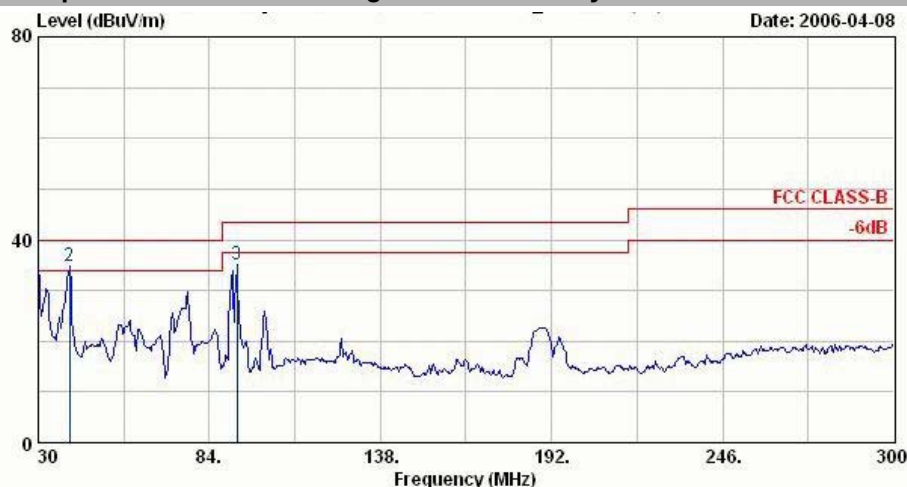


Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 HORIZONTAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR 5D2803  
Memo : Bluetooth Tx\_Ch39:2441MHz



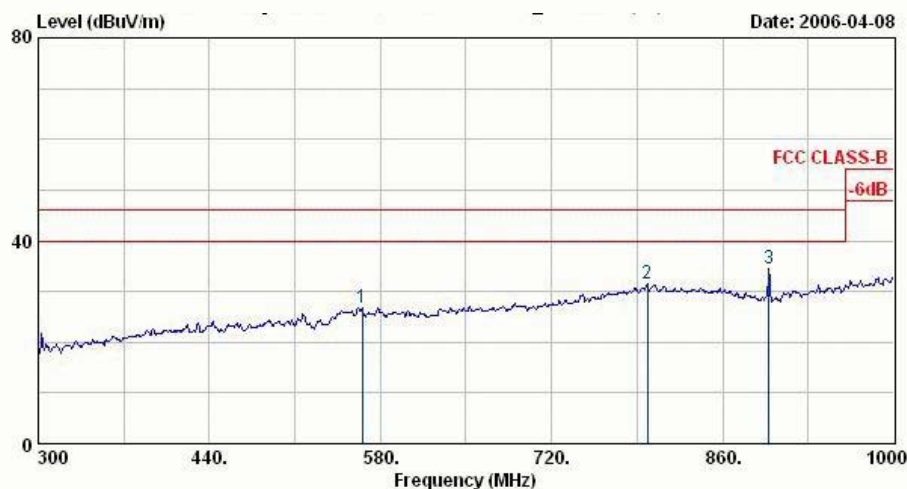
- Polarization : Vertical

■ The test that passed at minimum margin was marked by the frame in the following table.



Site : 03CH06-HY  
Condition : BI-LOG-2004-1122 VERTICAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR 5D2803  
Memo : Bluetooth Tx\_Ch39:2441MHz

|     | Freq  | Level  | Over  | Limit  | ReadAntenna | Preamp | Cable | Ant  | Table | Remark   |
|-----|-------|--------|-------|--------|-------------|--------|-------|------|-------|----------|
|     | MHz   | dBuV/m | dB    | dBuV/m | dBuV        | dB/m   | dB    | dB   | cm    | deg      |
| 1 @ | 30.00 | 34.03  | -5.97 | 40.00  | 45.44       | 18.73  | 31.49 | 1.35 | 400   | 0 Peak   |
| 2 @ | 39.99 | 34.70  | -5.30 | 40.00  | 50.10       | 14.83  | 31.74 | 1.51 | 100   | 244 Peak |
| 3 @ | 92.64 | 35.05  | -8.45 | 43.50  | 54.72       | 9.47   | 31.47 | 2.34 | 400   | 0 Peak   |



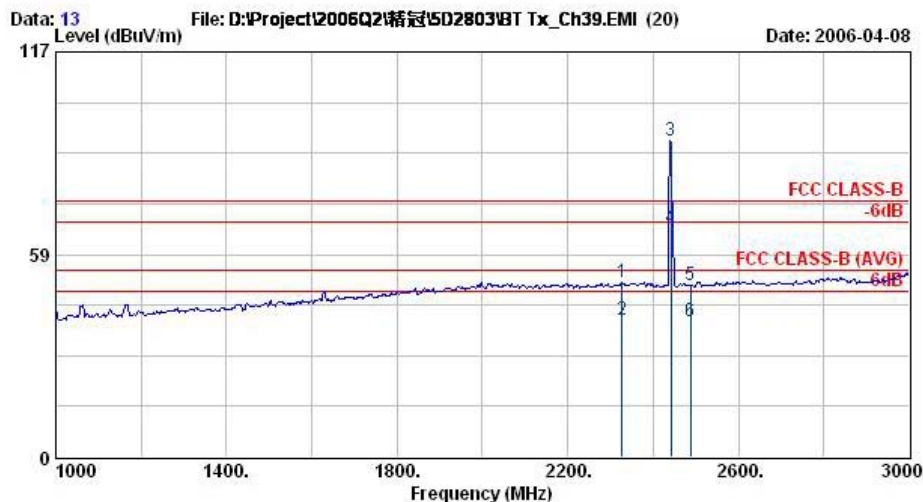
Site : 03CH06-HY  
Condition : BI-LOG-2004-1122 VERTICAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR 5D2803  
Memo : Bluetooth Tx\_Ch39:2441MHz

|     | Freq   | Level  | Over   | Limit  | ReadAntenna | Preamp | Cable | Ant  | Table | Remark |
|-----|--------|--------|--------|--------|-------------|--------|-------|------|-------|--------|
|     | MHz    | dBuV/m | dB     | dBuV/m | dBuV        | dB/m   | dB    | dB   | cm    | deg    |
| 1 @ | 565.30 | 26.90  | -19.10 | 46.00  | 32.97       | 18.46  | 30.68 | 6.15 | 100   | 0 Peak |
| 2 @ | 798.40 | 31.53  | -14.47 | 46.00  | 32.37       | 21.84  | 30.13 | 7.45 | 100   | 0 Peak |
| 3 @ | 897.80 | 34.55  | -11.45 | 46.00  | 37.21       | 19.98  | 30.59 | 7.96 | 100   | 0 Peak |



# FCC TEST REPORT

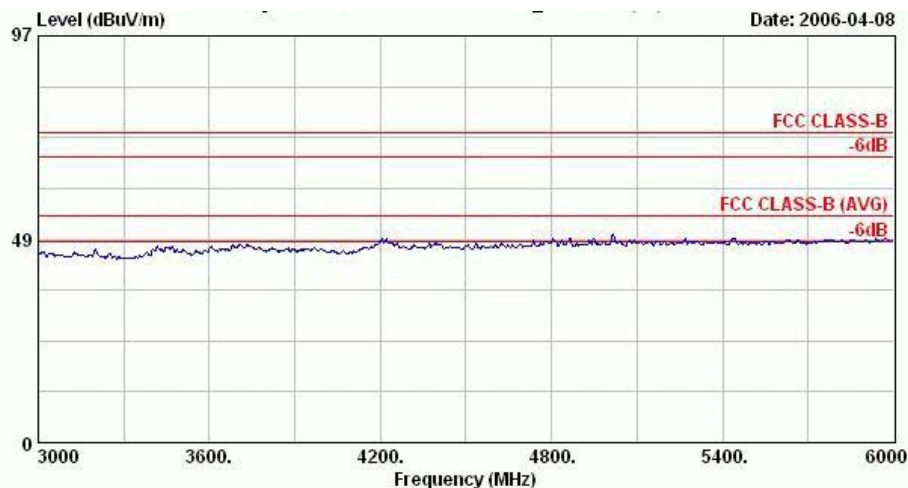
Report No. : FR5D2803



Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 VERTICAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR 5D2803  
Memo : Bluetooth Tx\_Ch39:2441MHz

|     | Freq    | Level  | Over   | Limit  | ReadAntenna | Preampl | Cable | Ant  | Table |             |
|-----|---------|--------|--------|--------|-------------|---------|-------|------|-------|-------------|
|     | MHz     | dBuV/m | Limit  | Line   | Level       | Factor  | Loss  | Pos  | Pos   | Remark      |
|     |         |        | dB     | dBuV/m | dBuV        | dB/m    | dB    | cm   | deg   |             |
| 1 @ | 2328.00 | 50.43  | -23.57 | 74.00  | 51.13       | 30.54   | 35.40 | 4.17 | 100   | 6 Peak      |
| 2 @ | 2328.00 | 39.49  | -14.51 | 54.00  | 40.19       | 30.54   | 35.40 | 4.17 | 108   | 190 Average |
| 3 @ | 2441.00 | 91.29  |        |        | 92.01       | 30.44   | 35.49 | 4.33 | 100   | 6 Peak      |
| 4 @ | 2441.00 | 66.06  |        |        | 66.79       | 30.44   | 35.49 | 4.33 | 108   | 190 Average |
| 5 @ | 2488.00 | 49.64  | -24.36 | 74.00  | 50.39       | 30.40   | 35.51 | 4.36 | 100   | 6 Peak      |
| 6 @ | 2488.00 | 39.31  | -14.69 | 54.00  | 40.06       | 30.40   | 35.51 | 4.36 | 108   | 190 Average |

Remark: #3 and #4 Fundamental Signal.

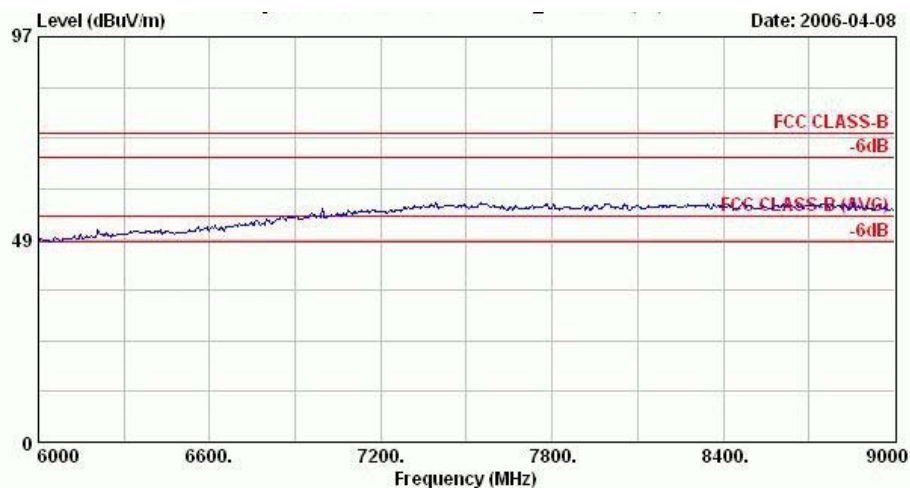


Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 VERTICAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR 5D2803  
Memo : Bluetooth Tx\_Ch39:2441MHz



## FCC TEST REPORT

Report No. : FR5D2803

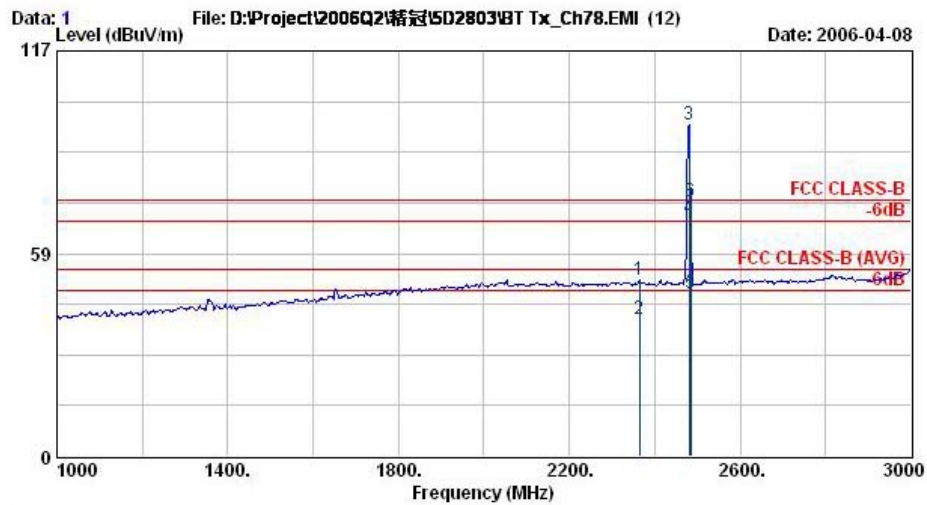


Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 VERTICAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR 5D2803  
Memo : Bluetooth Tx\_Ch39:2441MHz



- Test Mode : Mode 3
- Polarization : Horizontal

■ The test that passed at minimum margin was marked by the frame in the following table.



Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 HORIZONTAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR 5D2803  
Memo : Bluetooth Tx\_Ch78.2480MHz

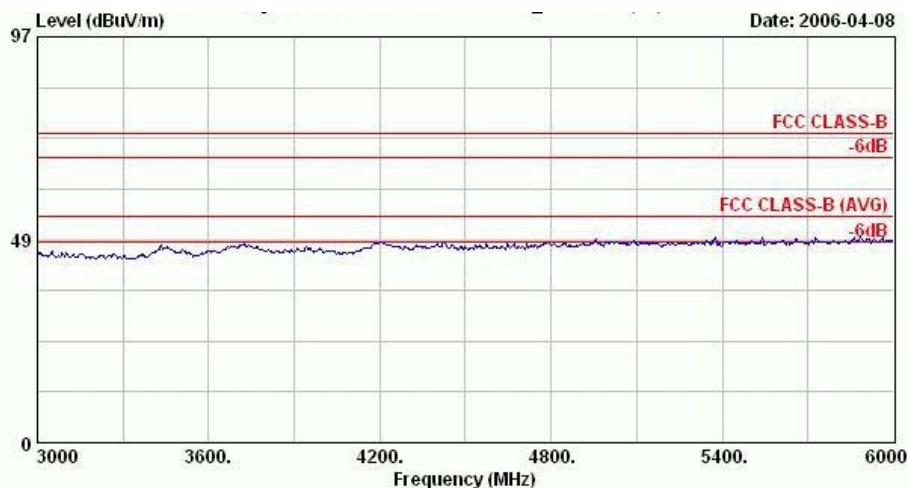
|     | Freq    | Level  | Over   | Limit  | ReadAntenna | Preamp | Cable | Ant  | Table | Remark      |
|-----|---------|--------|--------|--------|-------------|--------|-------|------|-------|-------------|
|     | MHz     | dBuV/m | dB     | dBuV/m | dBuV        | dB/m   | dB    | dB   | cm    | deg         |
| 1 @ | 2364.00 | 50.74  | -23.26 | 74.00  | 51.45       | 30.51  | 35.42 | 4.20 | 100   | 360 Peak    |
| 2 @ | 2364.00 | 39.43  | -14.57 | 54.00  | 40.14       | 30.51  | 35.42 | 4.20 | 100   | 156 Average |
| 3 @ | 2480.00 | 95.53  |        |        | 96.27       | 30.41  | 35.51 | 4.36 | 100   | 360 Peak    |
| 4 @ | 2480.00 | 68.90  |        |        | 69.64       | 30.41  | 35.51 | 4.36 | 100   | 156 Average |
| 5 @ | 2483.50 | 46.76  | -7.24  | 54.00  | 47.50       | 30.41  | 35.51 | 4.36 | 100   | 156 Average |
| 6 @ | 2483.50 | 73.34  | -0.66  | 74.00  | 74.08       | 30.41  | 35.51 | 4.36 | 100   | 360 Peak    |

Remark: #3 and #4 Fundamental Signal.

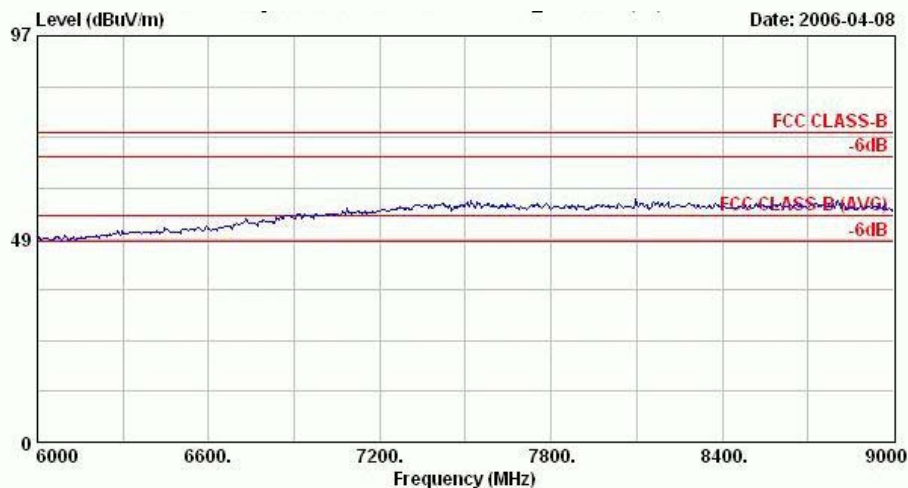


## FCC TEST REPORT

Report No. : FR5D2803



Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 HORIZONTAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR 5D2803  
Memo : Bluetooth Tx\_Ch78:2480MHz

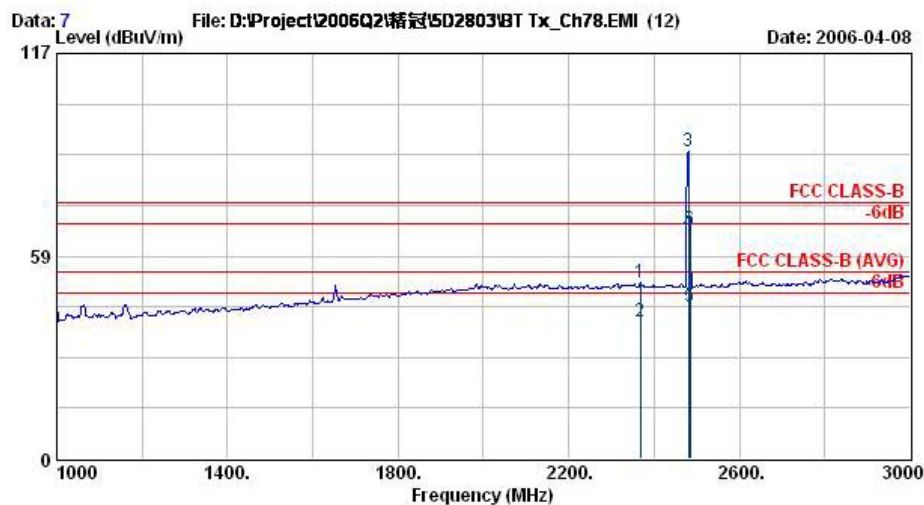


Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 HORIZONTAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR 5D2803  
Memo : Bluetooth Tx\_Ch78:2480MHz



- Polarization : Vertical

■ The test that passed at minimum margin was marked by the frame in the following table.



Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 VERTICAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR 5D2803  
Memo : Bluetooth Tx\_Ch78:2480MHz

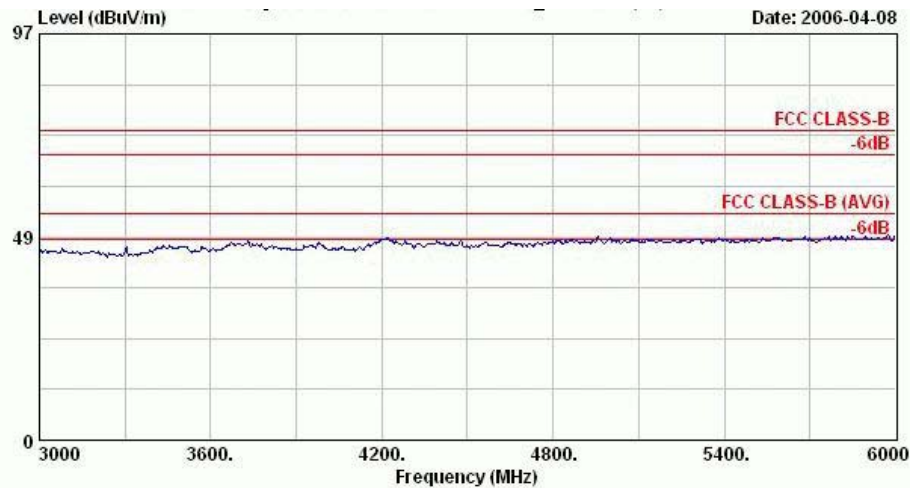
|     | Freq    | Level  | Over   | Limit  | ReadAntenna | Preamp | Cable | Ant | Table |         |
|-----|---------|--------|--------|--------|-------------|--------|-------|-----|-------|---------|
|     | MHz     | dBuV/m | Limit  | Line   | Level       | Factor | Loss  | Pos | Pos   | Remark  |
|     |         |        | dB     | dBuV/m | dBuV        | dB/m   | dB    | cm  | deg   |         |
| 1 @ | 2368.00 | 50.99  | -23.01 | 74.00  | 51.69       | 30.51  | 35.44 | 100 | 357   | Peak    |
| 2 @ | 2368.00 | 39.39  | -14.61 | 54.00  | 40.09       | 30.51  | 35.44 | 104 | 162   | Average |
| 3 @ | 2480.00 | 88.72  |        |        | 89.46       | 30.41  | 35.51 | 100 | 357   | Peak    |
| 4 @ | 2480.00 | 65.26  |        |        | 66.00       | 30.41  | 35.51 | 104 | 162   | Average |
| 5 @ | 2483.50 | 43.75  | -10.25 | 54.00  | 44.49       | 30.41  | 35.51 | 104 | 162   | Average |
| 6 @ | 2483.50 | 66.19  | -7.81  | 74.00  | 66.93       | 30.41  | 35.51 | 100 | 357   | Peak    |

Remark: #3 and #4 Fundamental Signal.

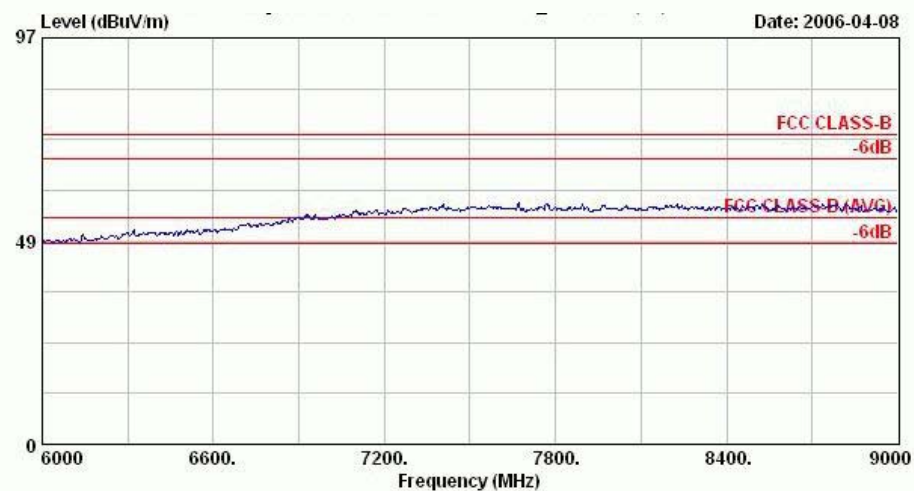


## FCC TEST REPORT

Report No. : FR5D2803



Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 VERTICAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR 5D2803  
Memo : Bluetooth Tx\_Ch78:2480MHz



Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 VERTICAL  
EUT : Bluetooth Headset\_BC03-MM\_7\*7(Sporty)  
Power : For Notebook  
Model : FR 5D2803  
Memo : Bluetooth Tx\_Ch78:2480MHz

Remark: There is no more obvious spurious emission except the listings above.



## **5.10 Antenna Requirements**

### **5.10.1 Standard Applicable**

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no other antenna except assembled by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

### **5.10.2 Antenna Connected Construction**

The antenna used in this product is PCB antenna. There is no connector on antenna port and it is considered to meet antenna requirement of FCC.

### **5.10.3 Antenna Gain**

The antenna gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

## 6. List of Measuring Equipments Used

| Instrument          | Manufacturer       | Model No. | Serial No. | Characteristics | Calibration Date | Due Date      | Remark                |
|---------------------|--------------------|-----------|------------|-----------------|------------------|---------------|-----------------------|
| EMC Receiver        | R&S                | ESCS 30   | 100174     | 9kHz – 2.75GHz  | Oct. 19, 2005    | Oct. 19, 2006 | Conduction (CO01-HY)  |
| LISN                | MessTec            | NNB-2/16Z | 2001/009   | 9kHz – 30MHz    | Apr. 26, 2005    | Apr. 26, 2006 | Conduction (CO01-HY)  |
| LISN (Support Unit) | MessTec            | NNB-2/16Z | 2001/004   | 9kHz – 30MHz    | Apr. 20, 2005    | Apr. 20, 2006 | Conduction (CO01-HY)  |
| EMI Filter          | LINDGREN           | LRE-2060  | 1004       | < 450Hz         | N/A              | N/A           | Conduction (CO01-HY)  |
| EMI Filter          | LINDGREN           | N6006     | 201052     | 0 – 60Hz        | N/A              | N/A           | Conduction (CO01-HY)  |
| RF Cable-CON        | Suhner Switzerland | RG223/U   | CB029      | 9kHz – 30MHz    | Dec. 22, 2005    | Dec. 22, 2006 | Conduction (CO01-HY)  |
| Spectrum analyzer   | Agilent            | E4408B    | MY44211030 | 9KHz-26.5GHz    | Jul. 25, 2005    | Jul. 24, 2006 | Radiation (03CH06-HY) |
| Receiver            | R&S                | ESCS30    | 100356     | 9KHz-2.75GHz    | Jun. 28, 2005    | Jun. 27, 2006 | Radiation (03CH06-HY) |
| Controller          | CT                 | SC100     | N/A        | N/A             | N/A              | N/A           | Radiation (03CH06-HY) |
| Bilog Antenna       | SCHAFFNER          | CBL6112B  | 2885       | 30MHz -2GHz     | Nov. 22, 2004    | Nov. 22, 2006 | Radiation (03CH06-HY) |
| Horn Antenna        | Com-Power          | AH118     | 071025     | 1G-18G          | Feb. 1, 2005     | Feb. 1, 2007  | Radiation (03CH06-HY) |
| SHF-EHF Horn        | SCHWARZBECK        | BBHA 9170 | 9170-249   | 14G - 40G       | Jul. 21, 2005    | Jul. 20, 2006 | Radiation (03CH06-HY) |
| Amplifier           | MITEQ              | AMF-6F    | 997165     | 26G - 40G       | Jul. 21, 2005    | Jul. 20, 2006 | Radiation (03CH06-HY) |
| Turn Table          | HD                 | DS 420    | 420/650/00 | 0 ~ 360 degree  | N/A              | N/A           | Radiation (03CH06-HY) |
| Antenna Mast        | HD                 | MA 240    | 240/560/00 | 1 m - 4 m       | N/A              | N/A           | Radiation (03CH06-HY) |

## 7. Uncertainty Evaluation

### Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

| Contribution                                                           | Uncertainty of $x_i$ |                          | $u(x_i)$ |
|------------------------------------------------------------------------|----------------------|--------------------------|----------|
|                                                                        | dB                   | Probability Distribution |          |
| Receiver reading                                                       | 0.10                 | Normal(k=2)              | 0.05     |
| Cable loss                                                             | 0.10                 | Normal(k=2)              | 0.05     |
| AMN insertion loss                                                     | 2.50                 | Rectangular              | 0.63     |
| Receiver Spec                                                          | 1.50                 | Rectangular              | 0.43     |
| Site imperfection                                                      | 1.39                 | Rectangular              | 0.80     |
| Mismatch                                                               | +0.34/-0.35          | U-shape                  | 0.24     |
| <b>combined standard uncertainty Uc(y)</b>                             | <b>1.13</b>          |                          |          |
| <b>Measuring uncertainty for a level of confidence of 95% U=2Uc(y)</b> | <b>2.26</b>          |                          |          |

### Uncertainty of Radiated Emission Measurement (30MHz ~ 1000MHz)

| Contribution                                                           | Uncertainty of $x_i$ |                          | $u(x_i)$ |
|------------------------------------------------------------------------|----------------------|--------------------------|----------|
|                                                                        | dB                   | Probability Distribution |          |
| Receiver reading                                                       | 0.41                 | Normal(k=2)              | 0.21     |
| Antenna factor calibration                                             | 0.83                 | Normal(k=2)              | 0.42     |
| Cable loss calibration                                                 | 0.25                 | Normal(k=2)              | 0.13     |
| Pre Amplifier Gain calibration                                         | 0.27                 | Normal(k=2)              | 0.14     |
| RCV/SPA specification                                                  | 2.50                 | Rectangular              | 0.72     |
| Antenna Factor Interpolation for Frequency                             | 1.00                 | Rectangular              | 0.29     |
| Site imperfection                                                      | 1.43                 | Rectangular              | 0.83     |
| Mismatch                                                               | +0.39/-0.41          | U-shaped                 | 0.28     |
| <b>combined standard uncertainty Uc(y)</b>                             | <b>1.27</b>          |                          |          |
| <b>Measuring uncertainty for a level of confidence of 95% U=2Uc(y)</b> | <b>2.54</b>          |                          |          |

**Uncertainty of Radiated Emission Measurement (1GHz ~ 40GHz)**

| Contribution                                                                                                                                  | Uncertainty of $x_i$ |                          | $u(x_i)$ | $C_i$ | $C_i * u(x_i)$ |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------------------|----------|-------|----------------|
|                                                                                                                                               | dB                   | Probability Distribution |          |       |                |
| Receiver reading                                                                                                                              | ±0.10                | Normal(k=1)              | 0.10     | 1     | 0.10           |
| Antenna factor calibration                                                                                                                    | ±1.70                | Normal(k=2)              | 0.85     | 1     | 0.85           |
| Cable loss calibration                                                                                                                        | ±0.50                | Normal(k=2)              | 0.25     | 1     | 0.25           |
| Receiver Correction                                                                                                                           | ±2.00                | Rectangular              | 1.15     | 1     | 1.15           |
| Antenna Factor Directional                                                                                                                    | ±1.50                | Rectangular              | 0.87     | 1     | 0.87           |
| Site imperfection                                                                                                                             | ±2.80                | Triangular               | 1.14     | 1     | 1.14           |
| Mismatch<br>Receiver VSWR $\Gamma_1 = 0.197$<br>Antenna VSWR $\Gamma_2 = 0.194$<br>Uncertainty = $20\log(1 - \Gamma_1 * \Gamma_2 * \Gamma_3)$ | +0.34/-0.35          | U-shaped                 | 0.244    | 1     | 0.244          |
| <b>Combined standard uncertainty <math>U_c(y)</math></b>                                                                                      | <b>2.36</b>          |                          |          |       |                |
| <b>Measuring uncertainty for a level of confidence of 95% <math>U = 2U_c(y)</math></b>                                                        | <b>4.72</b>          |                          |          |       |                |