



# FCC TEST REPORT

for

## 47 CFR Part 15 Subpart C

**Equipment** : Bluetooth 2.0+EDR USB Module  
**Trade Name** : Universal Scientific Industrial Co., Ltd.  
**Model No.** : BM-GP-CS-08A  
**FCC ID** : IXMBMGPCS08A  
**Filing Type** : Certification  
**Applicant** : **Universal Scientific Industrial Co., Ltd.**  
141, Lane 351, Taiping Road, Sec. 1, Tsao Tuen, Nan-Tou ,Taiwan

- The test result refers exclusively to the test presented test model / sample.
- Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.
- **Certificate or Test Report must not be used by the applicant to claim the product in this test report endorsement by NVLAP or any agency of U.S. government.**
- The data shown in this test report were carried out on Oct. 09, 2007 at **Sporton International Inc. LAB.**
- Report No.: FR7O0313, Report Version: Rev.02

Jones Tsai  
Manager

**SPORTON International Inc.**

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.



## Table of Contents

**History of this test report .....ii**

**1. General Description of Equipment under Test.....1**

    1.1 Applicant.....1

    1.2 Manufacturer .....1

    1.3 Basic Description of Equipment under Test.....1

    1.4 Feature of Equipment under Test.....1

**2. Test Configuration of Equipment under Test.....2**

    2.1 Test Manner .....2

    2.2 Test Mode.....2

    2.3 Ancillary Equipment List .....3

    2.4 Connection Diagram of Test System .....3

**3. RF Utility .....4**

**4. General Information of Test .....5**

    4.1 Test Voltage .....5

    4.2 Standard for Methods of Measurement .....5

    4.3 Test Compliance.....5

    4.4 Frequency Range .....5

    4.5 Test Distance.....5

**5. Test Data and Test Result .....6**

    5.1 List of Measurements and Examinations .....6

    5.2 Band Edges Measurement .....7

    5.3 Hopping Channel Separation.....16

    5.4 Number of Hopping Frequency.....27

    5.5 Hopping Channel Bandwidth .....32

    5.6 Dwell Time of Each Frequency.....43

    5.7 Peak Output Power Measurement.....63

    5.8 Radiated Emission Measurement.....74

    5.9 Antenna Requirements.....96

**6. List of Measuring Equipments Used .....97**

**7. Uncertainty Evaluation .....98**

**Appendix A. Photographs of EUT External**

**Appendix B. Photographs of EUT Internal**

**Appendix C. Photographs of Setup**



### History of this test report

Report Issue Date: Oct. 18, 2007

Report No.	Description



# 1. General Description of Equipment under Test

## 1.1 Applicant

Universal Scientific Industrial Co., Ltd.

141, Lane 351, Taiping Road, Sec. 1, Tsao Tuen, Nan-Tou ,Taiwan

## 1.2 Manufacturer

Universal Scientific Industrial Co., Ltd.

141, Lane 351, Taiping Road, Sec. 1, Tsao Tuen, Nan-Tou ,Taiwan

## 1.3 Basic Description of Equipment under Test

<b>Equipment</b>	Bluetooth 2.0+EDR USB Module
<b>Trade Name</b>	Universal Scientific Industrial Co., Ltd.
<b>Model No.</b>	BM-GP-CS-08A

Remark: Above EUT's information was declared by manufacturer. Please refer to the specifications of manufacturer or User's Manual for more detailed features description.

## 1.4 Feature of Equipment under Test

Product Feature & Specification			
1. Type of Modulation	1Mbps : GFSK 2Mbps : $\pi/4$ -DQPSK 3Mbps : 8-DPSK		
2. Number of Channels	2400 MHz ~ 2483.5 MHz		
3. Frequency Band	79		
4. Carrier Frequency of each channel	2402+n x 1 MHz; n = 0~78		
5. Channel Spacing	1 MHz		
6. Maximum Output Power to Antenna	0.62 dBm (BT_1Mbps) ;		
7. (Normal Condition)	0.43 dBm (BT_EDR_2Mbps) ; 0.59 dBm (BT_EDR_3Mbps)		
8. Type of Antenna Connector	N/A		
9. Antenna Type	PCB Antenna		
10. Antenna Gain	-2.95 dBi		
11. Function Type	Transmitter		Transceiver V



## 2. Test Configuration of Equipment under Test

### 2.1 Test Manner

- a. 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.
- b. The data rate, 1Mbps, was chosen to being tested, due to the highest RF output power.

Channel	Frequency	Data Rate/ Modulation					
		GFSK		$\pi/4$ -DQPSK		8-DPSK	
		1Mbps		2Mbps		3Mbps	
Ch00	2400MHz	0.62	dBm	0.43	dBm	0.59	dBm
Ch39	2441MHz	0.13	dBm	-0.12	dBm	-0.19	dBm
Ch78	2480MHz	0.23	dBm	0.41	dBm	0.06	dBm

Bluetooth uses frequency hopping spread spectrum (FHSS) operation which also facilities Bluetooth multiple access and coexistence among other types of wireless systems. The basic frequency-hopping pattern is a pseudo-random ordering of 79 channel frequencies in the ISM band and the hopping rate is nominally 1600 hops per second. The EDR modulation format uses one of two types of DPSK (Pi/4-DQPSK or 8-DPSK) in the payload section of the packet. As shown in figure, the EDR packet begins using GFSK modulation during the access code and header portions of the packet but changes to DPSK modulation after the guard time. Changing to a DPSK format allows increased data rates of 2 Mb/s or 3 Mb/s.

- c. The EUT is programmed to transmit signal continuously for all testings.
- d. Frequency range investigated: conduction 150 kHz to 30 MHz, radiation 30 MHz to 25000MHz.

### 2.2 Test Mode

Application			
Radiated Emission / RF Conducted	<b>BT Tx</b>	<b>BT Tx(EDR 2Mbps)</b>	<b>BT Tx(EDR 3Mbps)</b>
	Mode 1: CH00_2402 MHz	Mode4:CH00_2402MHz	Mode7:CH00_2402MHz
	Mode 2: CH39_2441 MHz	Mode5:CH39_2441MHz	Mode8:CH39_2441MHz
	Mode 3: CH78_2480 MHz	Mode6:CH78_2480MHz	Mode9:CH78_2480MHz

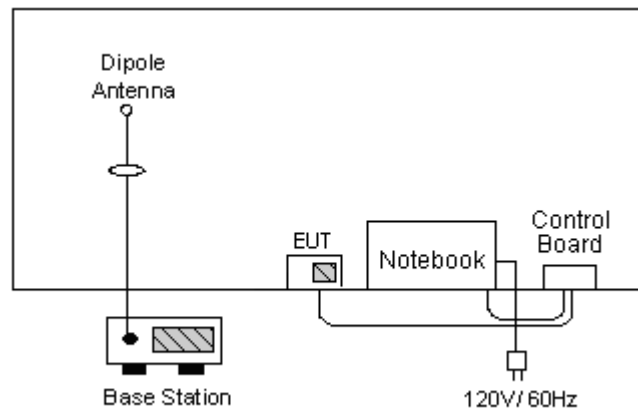
### 2.3 Ancillary Equipment List

Item	Asset	Trade Name	Model Name	FCC ID	Power Cord
1.	BT Base Station	Anritus	8852A	N/A	Unshielded, 1.8m

### 2.4 Connection Diagram of Test System

<Radiated Emission >

Bluetooth





### **3. RF Utility**

The programmed RF Utility is installed in EUT 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

AC 120V/ 60Hz

### 4.2 Standard for Methods of Measurement

ANSI C63.4-2003

### 4.3 Test Compliance

47 CFR Part 15 Subpart C

### 4.4 Frequency Range

- 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
15.247(a)(1)	Hopping Channel Separation	Pass
15.247(a)(1)(iii)	Number of Hopping Frequency Used	Pass
15.247(a)(1)	Hopping Channel Bandwidth	Pass
15.247(a)(1)(iii)	Dwell Time of Each Frequency	Pass
15.247(b)(1)	Maximum Peak Output Power	Pass
15.209(a)	Radiated Emission	Pass
15.247(c)	100kHz Bandwidth of Frequency Band Edges	Pass
15.203 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 : Bluetooth
- Temperature : 23~25°C
- Relative Humidity : 57~59%
- Test Enginner : Ken
  
- Test Result in BT lower band : PASS
- Test Result in BT higher band : PASS
- Test Result in BT EDR(2Mbps) lower band : PASS
- Test Result in BT EDR(2Mbps) higher band : PASS
- Test Result in BT EDR(3Mbps) lower band : PASS
- Test Result in BT EDR(3Mbps) higher band : PASS



5.2.4 Note on Band Edge Emission :

➤BT

CH00 (Horizontal)

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2390.00	46.01	-27.99	74.00	47.46	30.26	3.75	35.46	100	0	Peak
2390.00	36.13	-17.87	54.00	37.58	30.26	3.75	35.46	100	212	Average

CH00 (Vertical)

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2390.00	47.63	-26.37	74.00	49.08	30.26	3.75	35.46	100	0	Peak
2390.00	37.23	-16.77	54.00	38.68	30.26	3.75	35.46	100	232	Average

CH78 (Horizontal)

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.50	62.64	-11.36	74.00	64.00	30.29	3.86	35.51	100	0	Peak
2483.50	45.59	-8.41	54.00	46.95	30.29	3.86	35.51	100	213	Average

CH78 (Vertical)

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.50	62.23	-11.77	74.00	63.59	30.29	3.86	35.51	100	0	Peak
2483.50	45.45	-8.55	54.00	46.81	30.29	3.86	35.51	100	234	Average



➤BT EDR(2Mbps)

CH78 (Horizontal)

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.50	62.98	-11.02	74.00	64.34	30.29	3.86	35.51	100	0	Peak
2483.50	45.98	-8.02	54.00	47.34	30.29	3.86	35.51	132	161	Average

CH78 (Vertical)

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.50	44.35	-9.65	54.00	45.71	30.29	3.86	35.51	100	232	Average
2483.50	60.70	-13.30	74.00	62.06	30.29	3.86	35.51	100	0	Peak

➤BT EDR(3Mbps)

CH78 (Horizontal)

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.50	62.07	-11.93	74.00	63.43	30.29	3.86	35.51	100	0	Peak
2483.50	45.99	-8.01	54.00	47.35	30.29	3.86	35.51	134	161	Average

CH78 (Vertical)

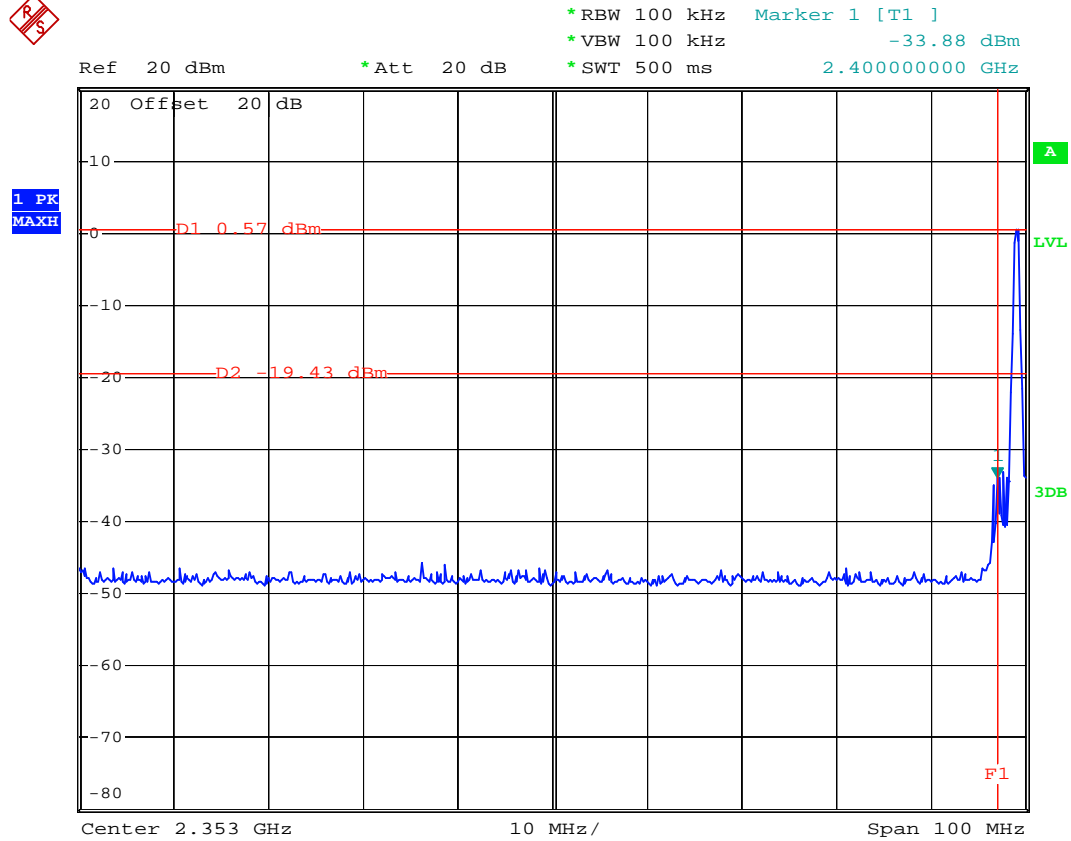
Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.50	61.15	-12.85	74.00	62.51	30.29	3.86	35.51	100	0	Peak
2483.50	44.65	-9.35	54.00	46.01	30.29	3.86	35.51	100	230	Average



5.2.5 20dB Band Edge

BT

CH00



Date: 5.OCT.2007 21:27:32



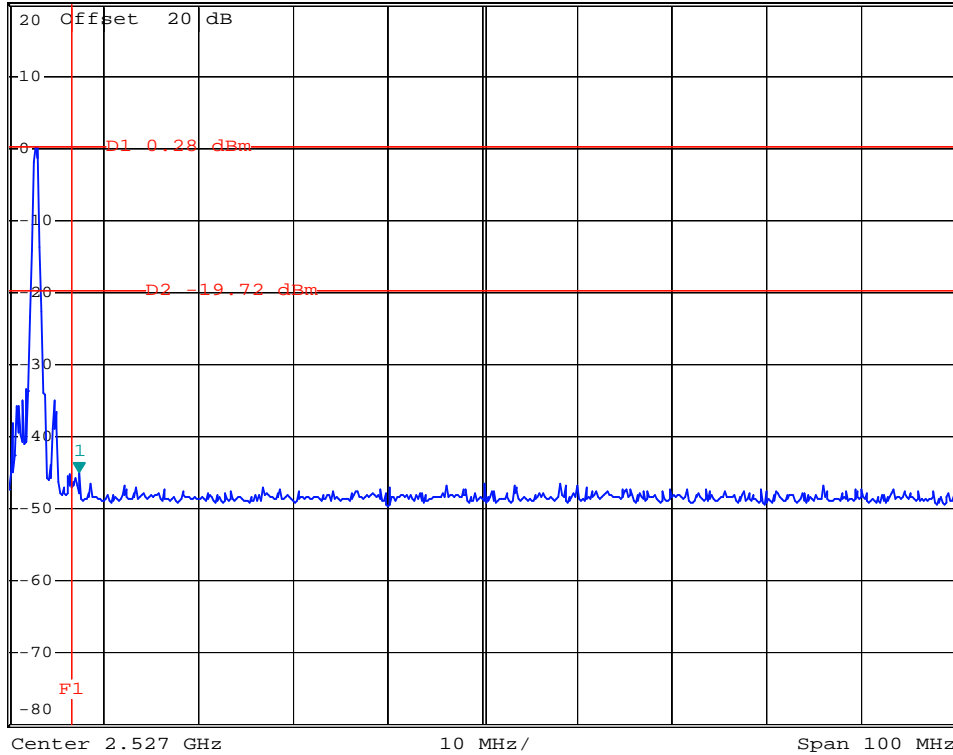
CH78



\*RBW 100 kHz    Marker 1 [T1 ]  
\*VBW 100 kHz                    -44.87 dBm  
\*SWT 500 ms                      2.484400000 GHz

Ref 20 dBm

\*Att 20 dB



Center 2.527 GHz

10 MHz/

Span 100 MHz

Date: 5.OCT.2007 21:05:35

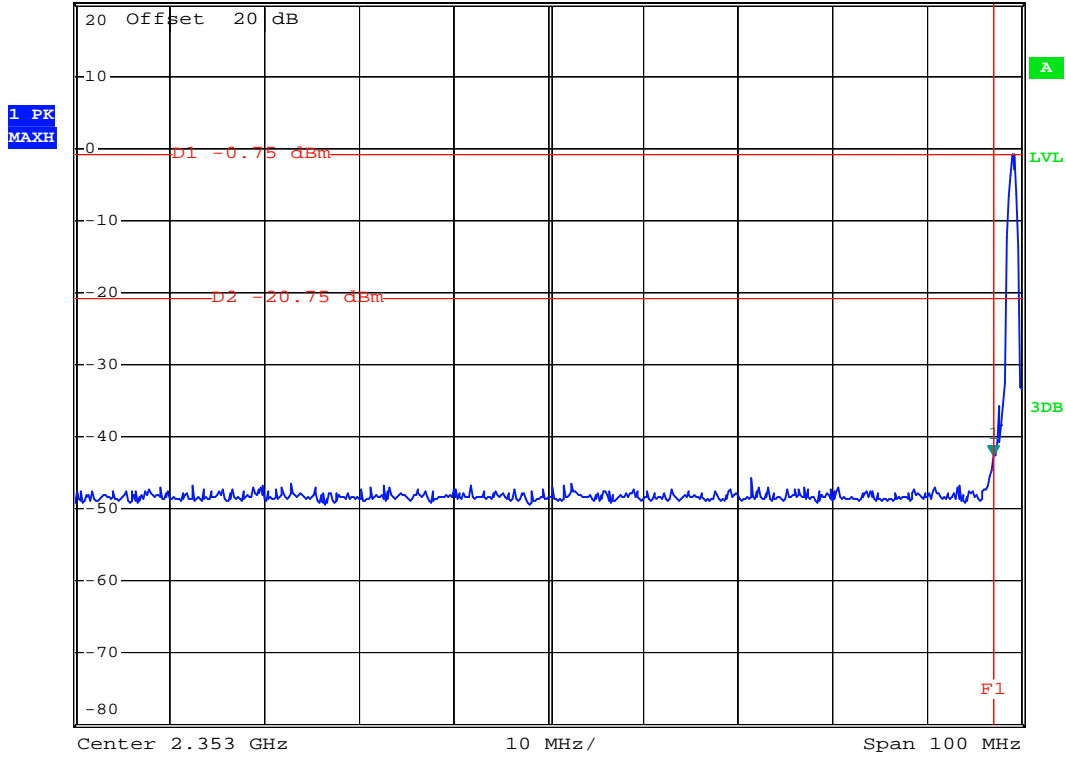


BT EDR(2Mbps)

CH00



Ref 20 dBm      \*Att 20 dB      \*RBW 100 kHz      Marker 1 [T1]      -42.53 dBm  
\*VBW 100 kHz      \*SWT 500 ms      2.400000000 GHz



Date: 5.OCT.2007 21:31:23



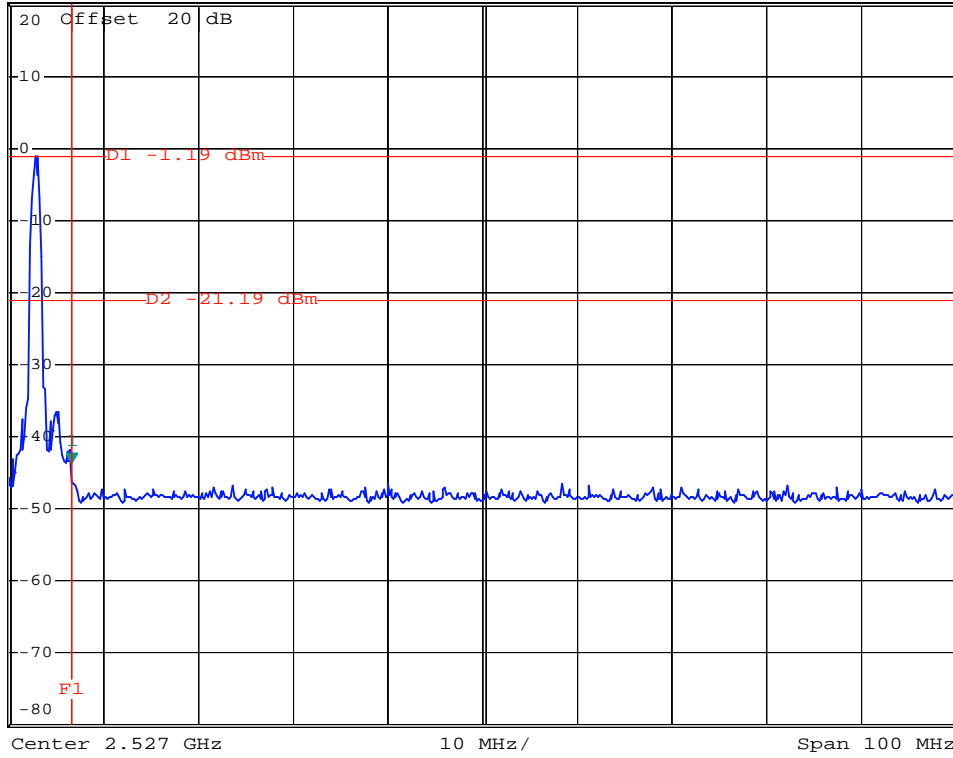
CH78



\*RBW 100 kHz    Marker 1 [T1 ]  
\*VBW 100 kHz                    -43.62 dBm  
\*SWT 500 ms                    2.483600000 GHz

Ref 20 dBm

\*Att 20 dB



Date: 5.OCT.2007 21:32:50



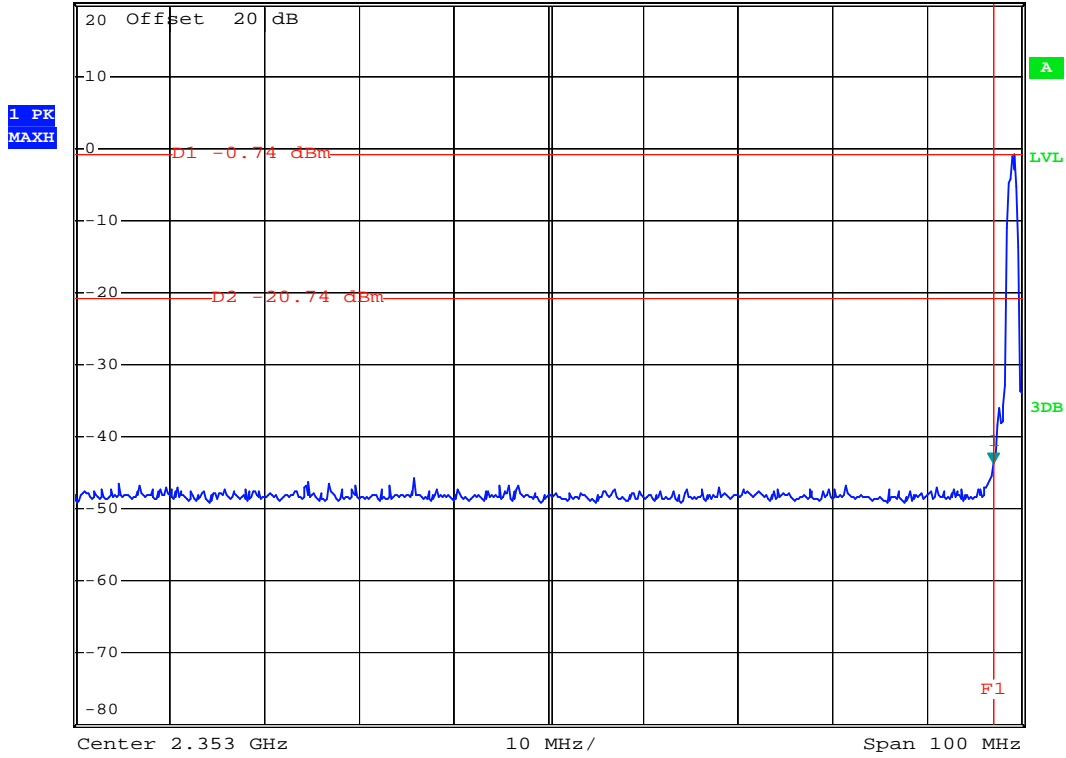


BT EDR(3Mbps)

CH00



Ref 20 dBm      \*Att 20 dB      \*RBW 100 kHz      Marker 1 [T1]      -43.62 dBm  
\*VBW 100 kHz      \*SWT 500 ms      2.400000000 GHz



Date: 5.OCT.2007 21:30:19



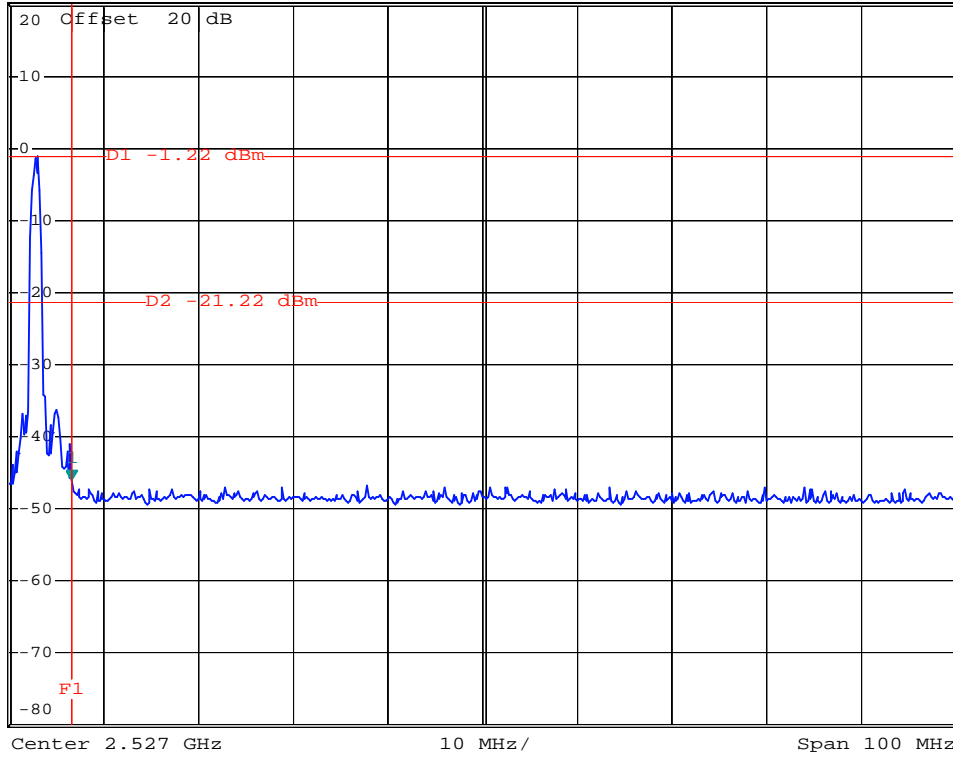
CH78



\*RBW 100 kHz    Marker 1 [T1 ]  
\*VBW 100 kHz                    -45.89 dBm  
\*SWT 500 ms                      2.48360000 GHz

Ref 20 dBm

\*Att 20 dB



Date: 5.OCT.2007 21:33:44

### 5.3 Hopping Channel Separation

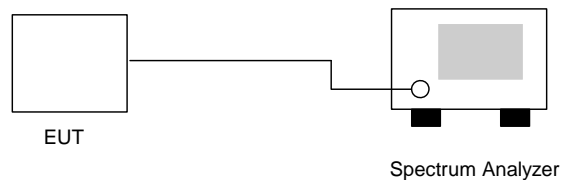
#### 5.3.1 Measuring Instruments :

As described in chapter 6 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 30kHz 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 : 23~25°C
- Relative Humidity : 57~59%
- Test Enginner : Ken

Channel	Frequency (MHz)	Carrier Frequency Separation ( MHz )	Limits ( MHz )	Plot Ref. No.
00	2402	1.004	0.552	Mode 1
39	2441	1.004	0.551	Mode 2
78	2480	1.004	0.549	Mode 3

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



- Application Type : BT EDR(2Mbps)
- Temperature : 23~25°C
- Relative Humidity : 57~59%
- Test Enginner : Ken

Channel	Frequency (MHz)	Carrier Frequency Separation ( MHz )	Limits ( MHz )	Plot Ref. No.
00	2402	1.000	0.821	Mode 4
39	2441	1.000	0.821	Mode 5
78	2480	1.000	0.819	Mode 6

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

- Application Type : BT EDR(3Mbps)
- Temperature : 23~25°C
- Relative Humidity : 57~59%
- Test Enginner : Ken

Channel	Frequency (MHz)	Carrier Frequency Separation ( MHz )	Limits ( MHz )	Plot Ref. No.
00	2402	1.000	0.835	Mode 7
39	2441	1.000	0.835	Mode 8
78	2480	1.000	0.832	Mode 9

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

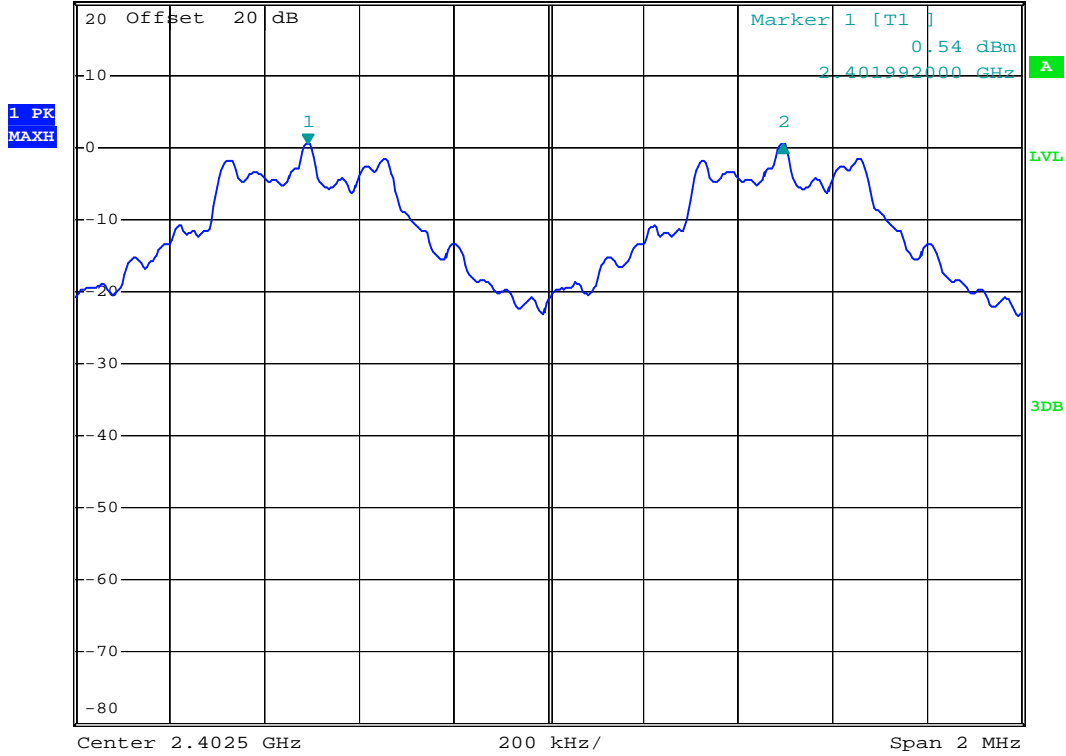


5.3.5 Hopping Channel Separation

Mode 1



Ref 20 dBm      \*Att 20 dB      \*RBW 30 kHz      Delta 2 [T1 ]  
\*VBW 100 kHz      -0.00 dB  
\*SWT 500 ms      1.004000000 MHz



Date: 5.OCT.2007 21:06:50



Mode 2

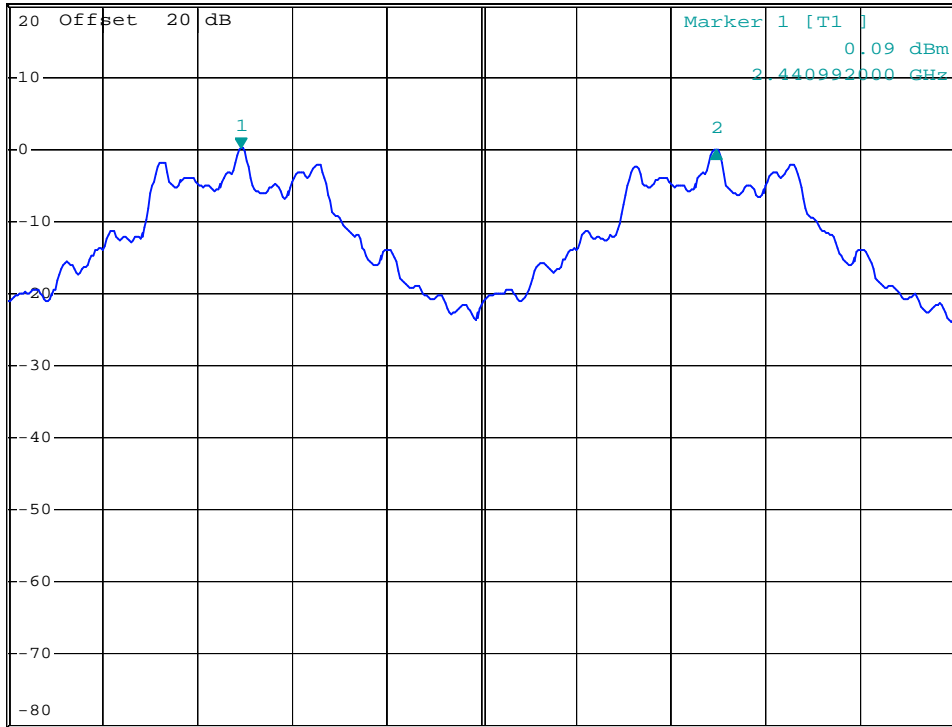


\*RBW 30 kHz    Delta 2 [T1 ]  
\*VBW 100 kHz    -0.09 dB  
\*SWT 500 ms    1.004000000 MHz

Ref 20 dBm

\*Att 20 dB

1. PR  
MAXH



Center 2.4415 GHz    200 kHz/    Span 2 MHz

Date: 5.OCT.2007 21:07:32



Mode 3

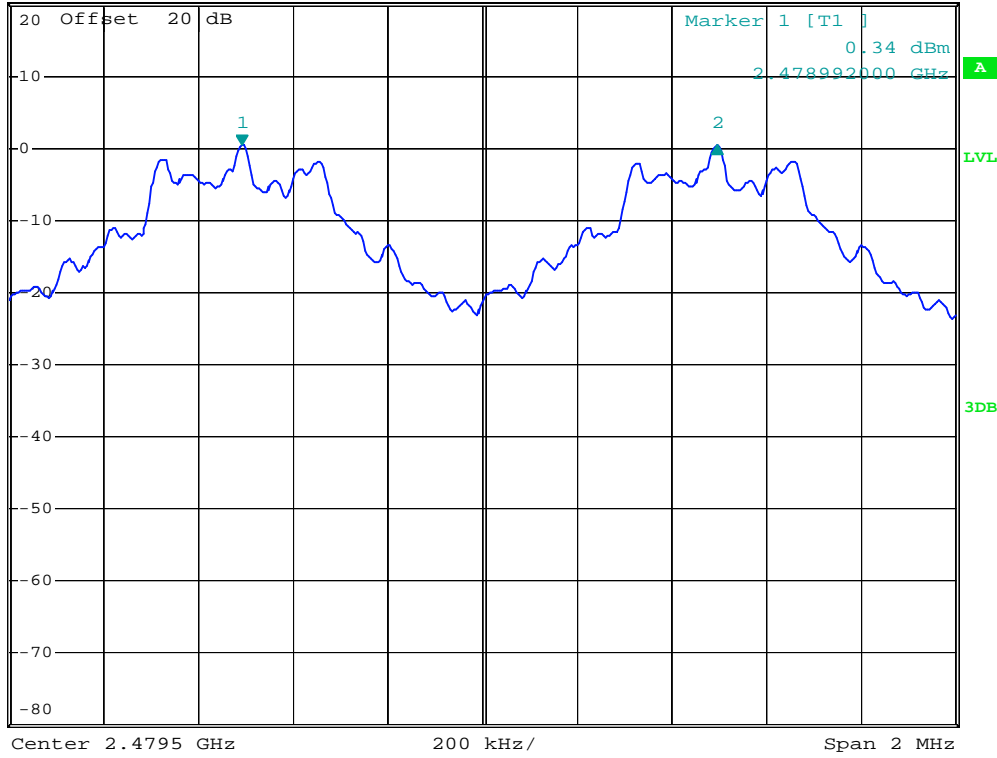


\*RBW 30 kHz    Delta 2 [T1 ]  
 \*VBW 100 kHz    0.01 dB  
 \*SWT 500 ms    1.004000000 MHz

Ref 20 dBm

\*Att 20 dB

1. PR  
MAXH



Date: 5.OCT.2007 21:08:25



Mode 4



\*RBW 30 kHz    Delta 2 [T1 ]  
 \*VBW 100 kHz    -0.12 dB  
 \*SWT 500 ms    1.000000000 MHz

Ref 20 dBm

\*Att 20 dB

1 PR  
MAXH



Center 2.4025 GHz

400 kHz/

Span 4 MHz

Date: 5.OCT.2007 21:43:23

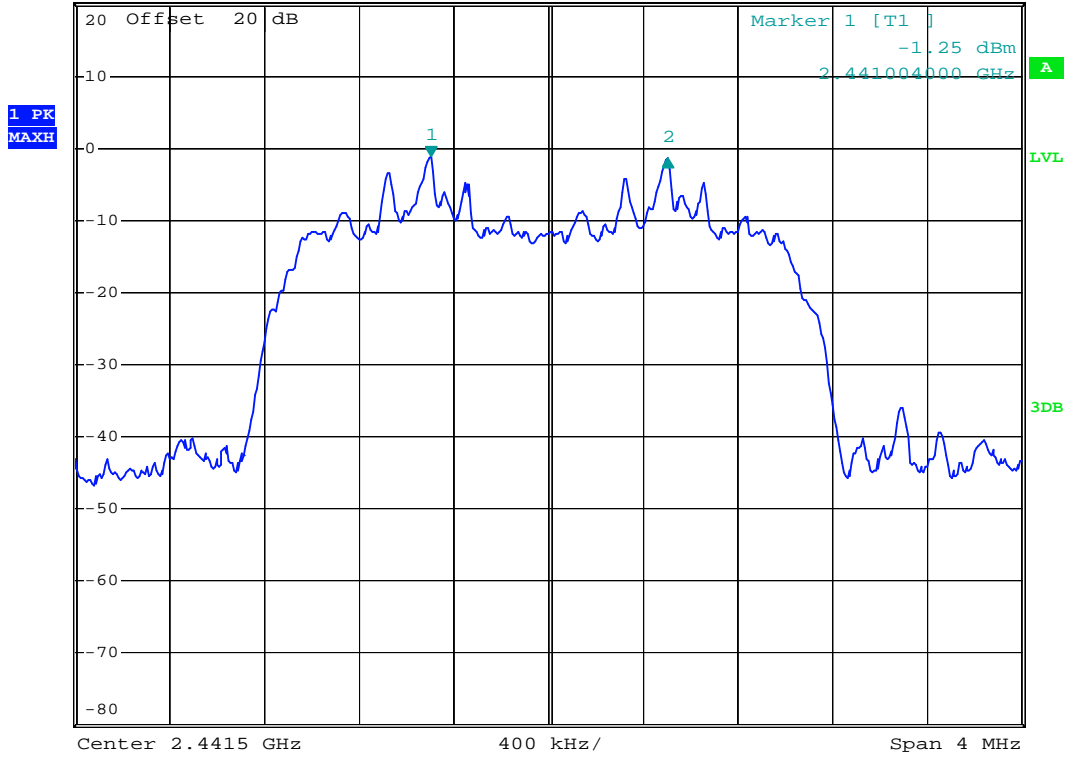




Mode 5



Ref 20 dBm      \*Att 20 dB      \*RBW 30 kHz      Delta 2 [T1 ]  
\*VBW 100 kHz      -0.27 dB  
\*SWT 500 ms      1.000000000 MHz



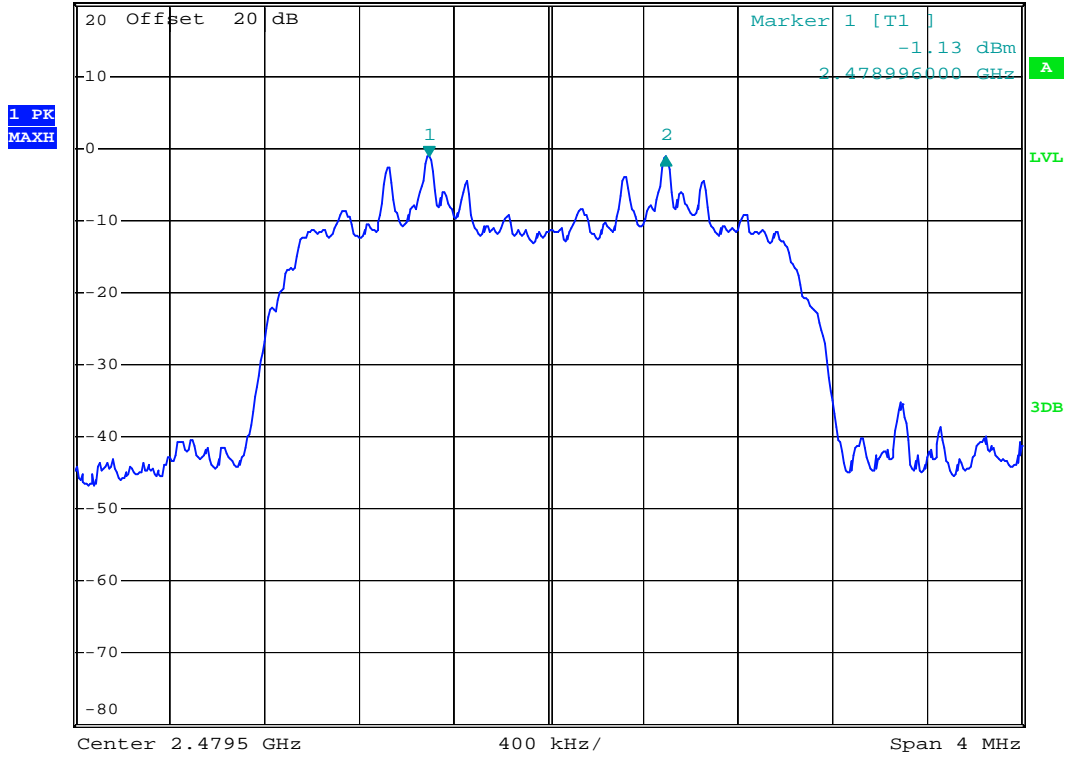
Date: 5.OCT.2007 21:44:15



Mode 6



Ref 20 dBm      \*Att 20 dB      \*RBW 30 kHz      Delta 2 [T1 ]  
\*VBW 100 kHz      -0.04 dB  
\*SWT 500 ms      1.000000000 MHz



Date: 5.OCT.2007 21:45:20



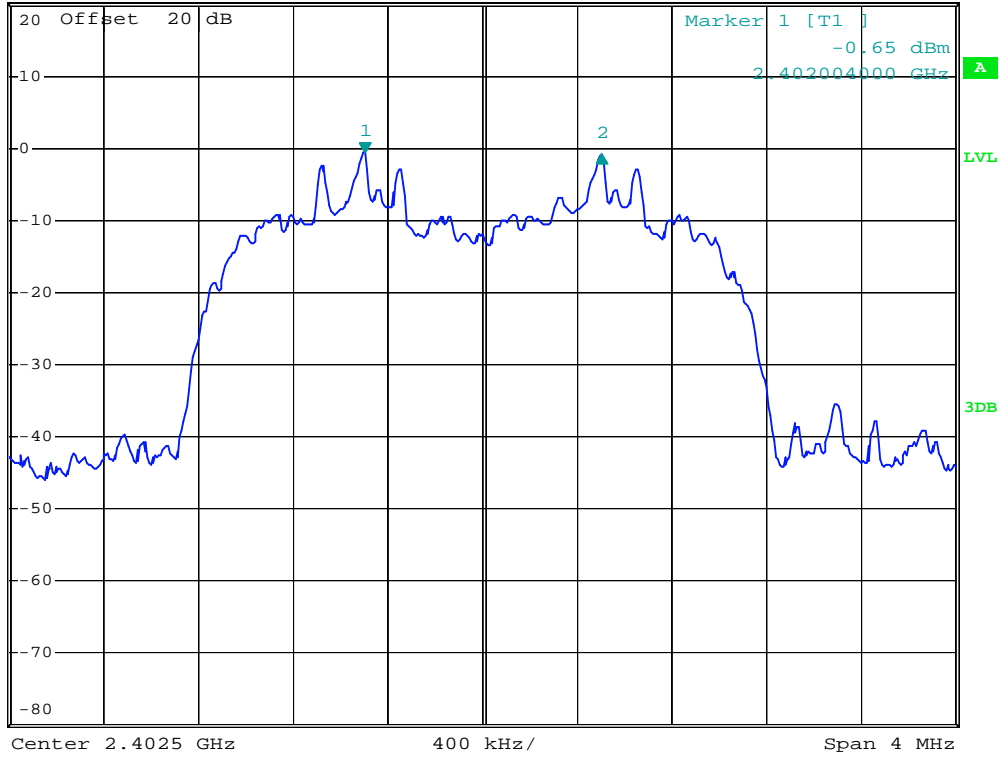
Mode 7



\*RBW 30 kHz    Delta 2 [T1 ]  
 \*VBW 100 kHz    -0.22 dB  
 \*Att 20 dB    \*SWT 500 ms    1.000000000 MHz

Ref 20 dBm

1. PR  
MAXH



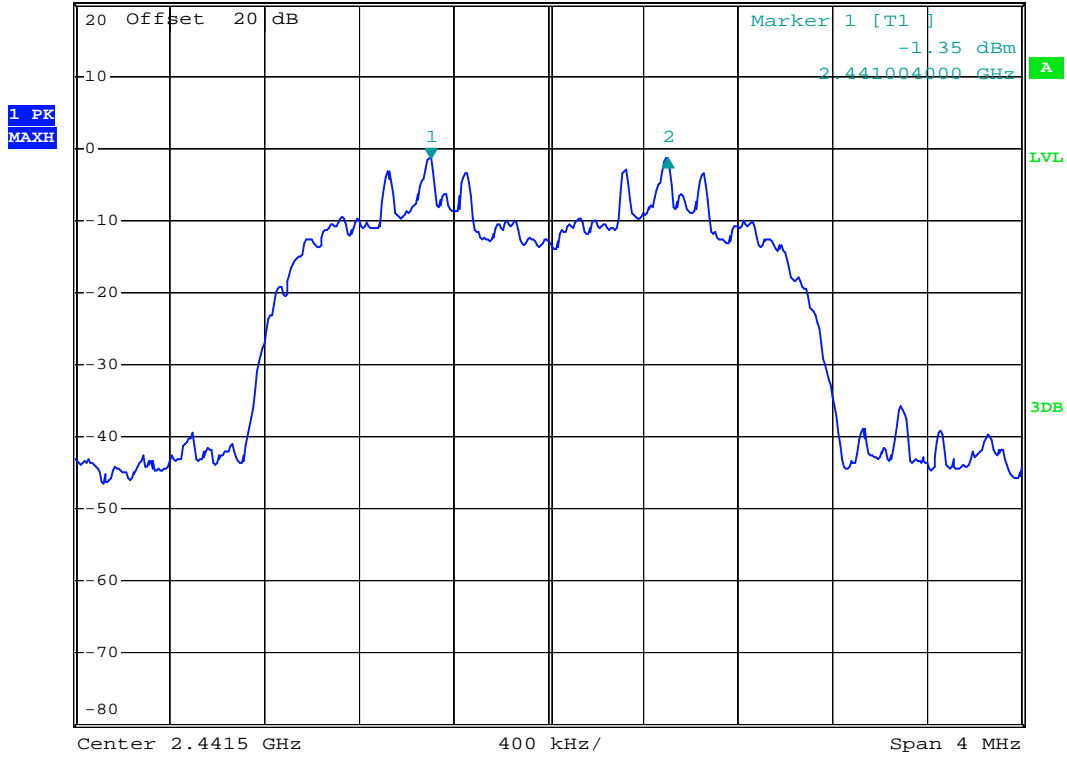
Date: 5.OCT.2007 21:46:30



Mode 8



Ref 20 dBm      \*Att 20 dB      \*RBW 30 kHz      Delta 2 [T1 ]  
\*VBW 100 kHz      -0.05 dB  
\*SWT 500 ms      1.000000000 MHz



Date: 5.OCT.2007 21:48:18



Mode 9

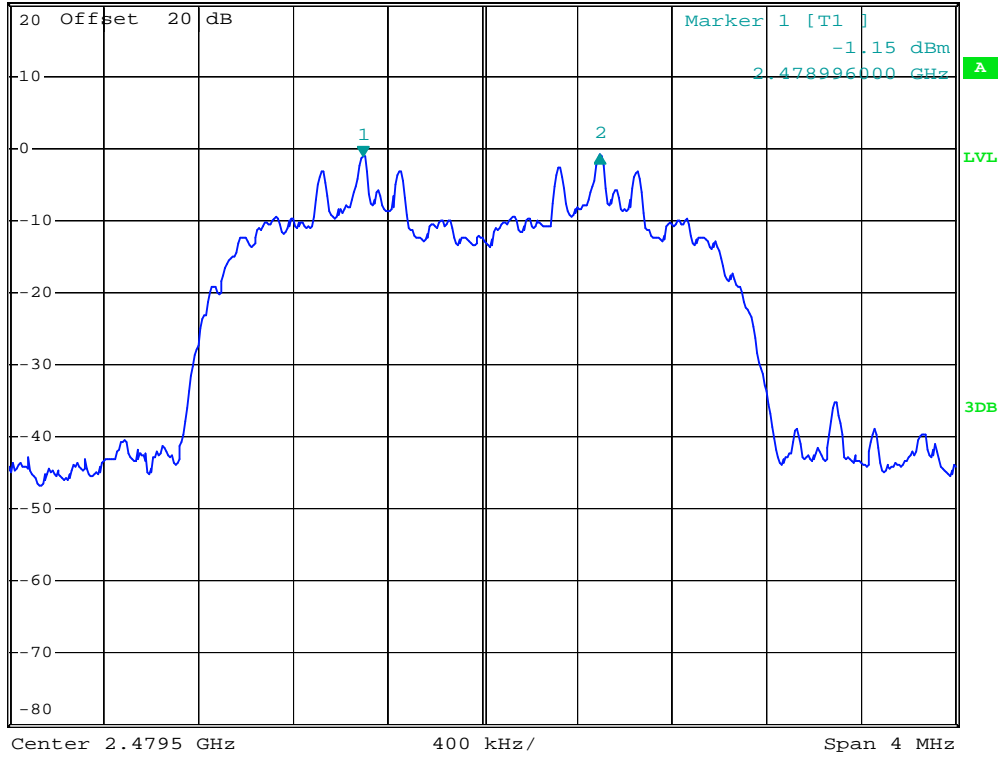


\*RBW 30 kHz    Delta 2 [T1 ]  
 \*VBW 100 kHz    0.17 dB  
 \*SWT 500 ms    1.000000000 MHz

Ref 20 dBm

\*Att 20 dB

1. PR  
MAXH



Date: 5.OCT.2007 21:50:44

## 5.4 Number of Hopping Frequency

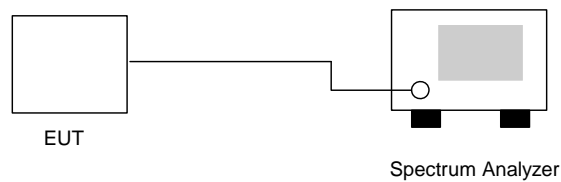
### 5.4.1 Measuring Instruments :

As described in chapter 6 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 : 23~25°C
- Relative Humidity : 57~59%
- Test Enginner : Ken

<b>Number of Hopping Frequency (Channel)</b>	<b>Limits (Channel)</b>
79	15

- Application Type : BT EDR(2Mbps)
- Temperature : 23~25°C
- Relative Humidity : 57~59%
- Test Enginner : Ken

<b>Number of Hopping Frequency (Channel)</b>	<b>Limits (Channel)</b>
79	15

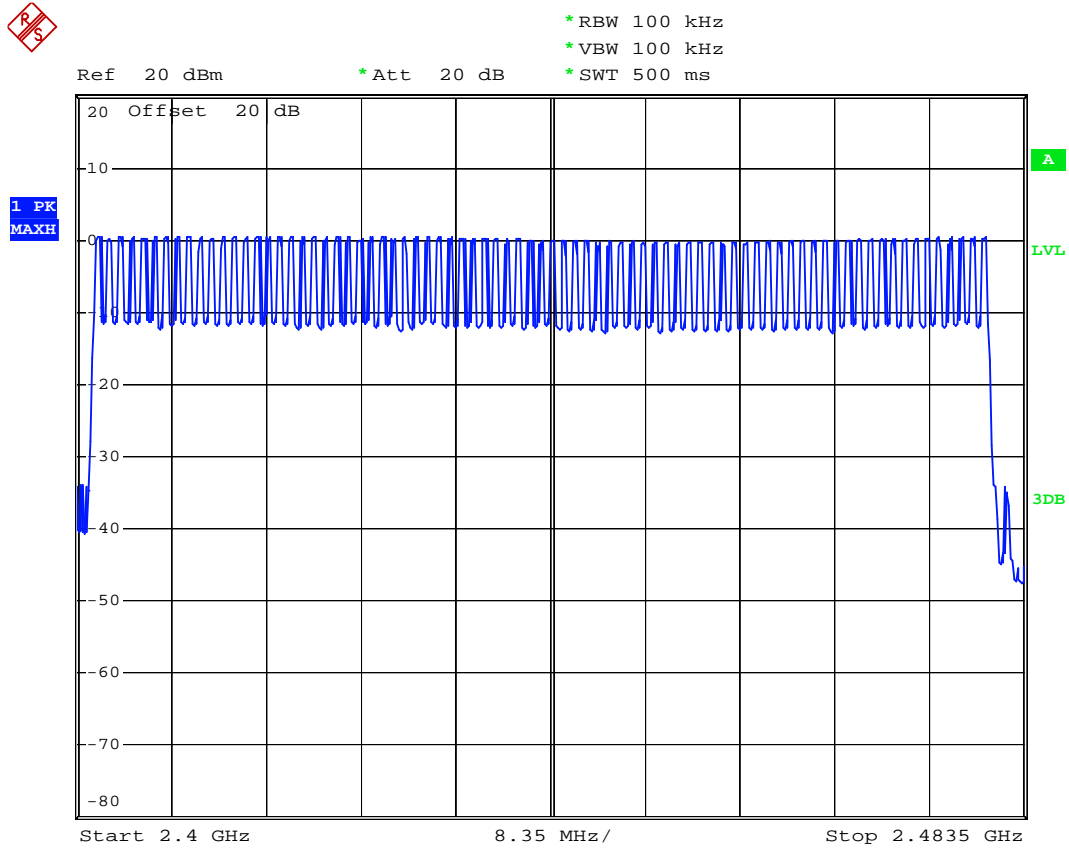
- Application Type : BT EDR(3Mbps)
- Temperature : 23~25°C
- Relative Humidity : 57~59%
- Test Enginner : Ken

<b>Number of Hopping Frequency (Channel)</b>	<b>Limits (Channel)</b>
79	15



5.4.5 Number of Hopping Frequency

BT

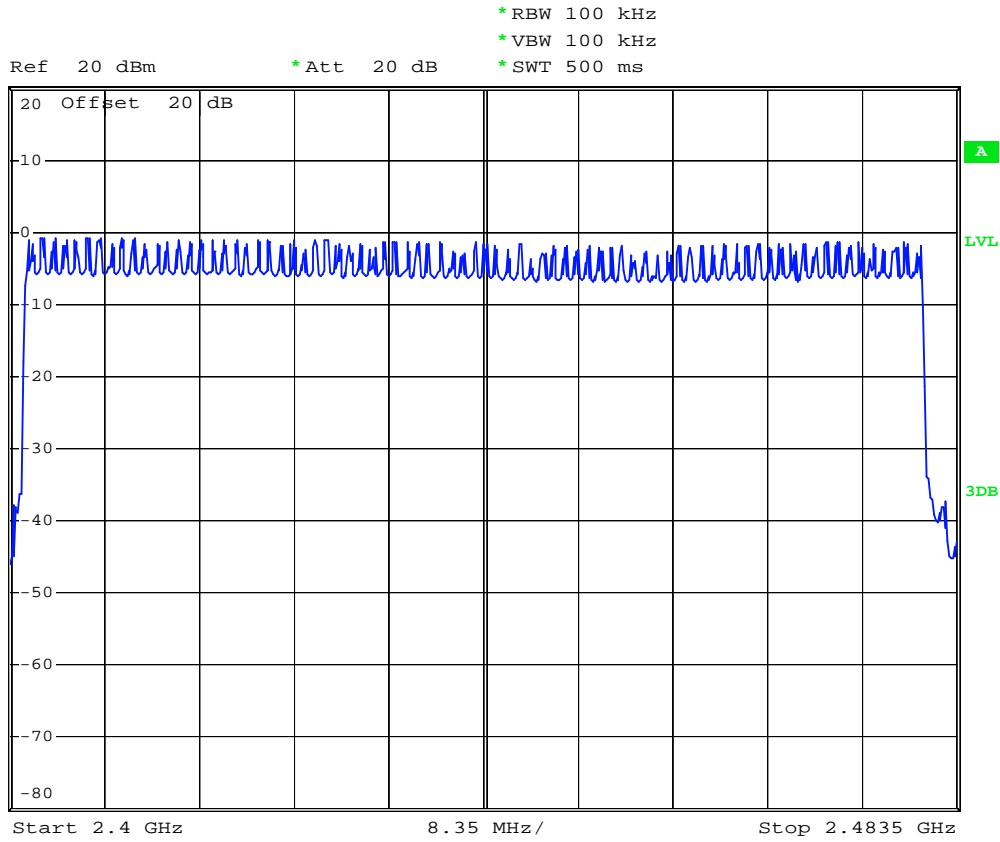


Date: 5.OCT.2007 21:25:43





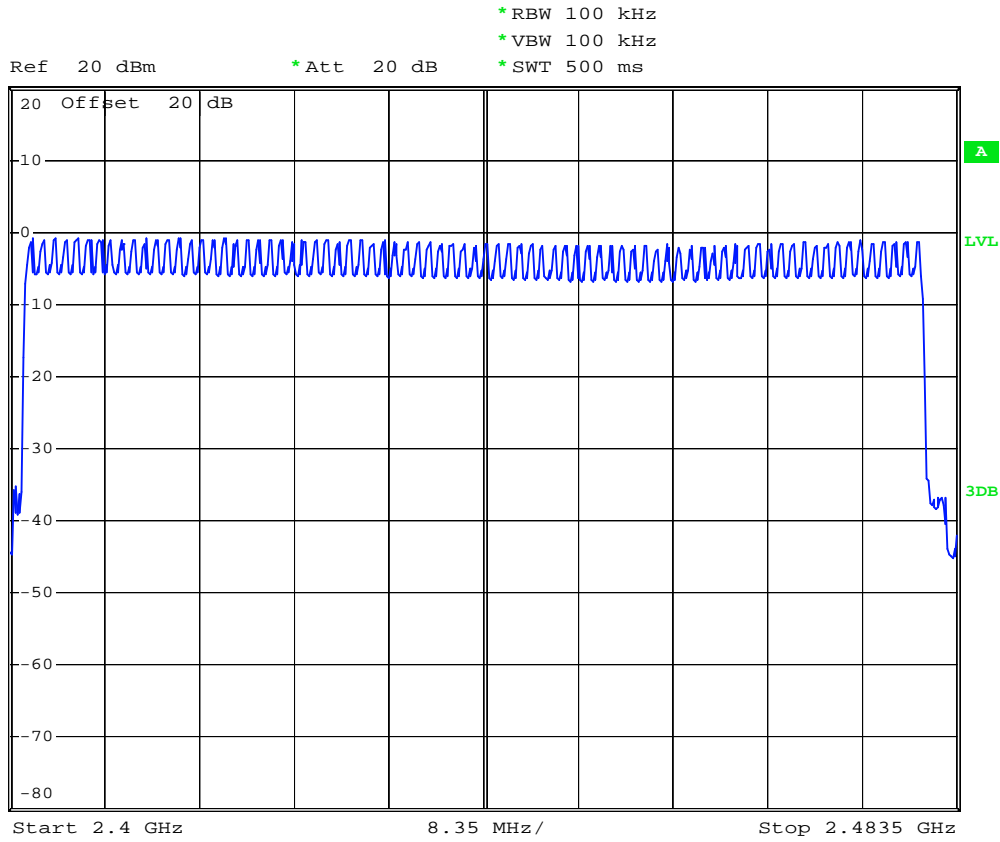
BT EDR(2Mbps)



Date: 5.OCT.2007 22:07:41



BT EDR(3Mbps)



Date: 5.OCT.2007 22:24:47

## 5.5 Hopping Channel Bandwidth

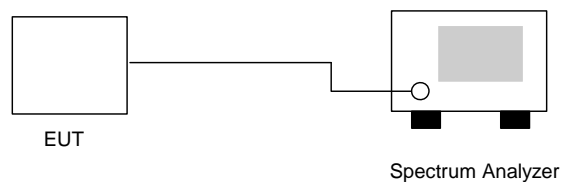
### 5.5.1 Measuring Instruments :

As described in chapter 6 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 : 23~25°C
- Relative Humidity : 57~59%
- Test Enginner : Ken

Channel	Frequency (MHz)	Hopping Channel Bandwidth (MHz)	Plot Ref. No.
00	2402	0.828	Mode 1
39	2441	0.826	Mode 2
78	2480	0.824	Mode 3

- Application Type : BT EDR(2Mbps)
- Temperature : 23~25°C
- Relative Humidity : 57~59%
- Test Enginner : Ken

Channel	Frequency (MHz)	Hopping Channel Bandwidth (MHz)	Plot Ref. No.
00	2402	1.232	Mode 4
39	2441	1.232	Mode 5
78	2480	1.228	Mode 6

- Application Type : BT EDR(3Mbps)
- Temperature : 23~25°C
- Relative Humidity : 57~59%
- Test Enginner : Ken

Channel	Frequency (MHz)	Hopping Channel Bandwidth (MHz)	Plot Ref. No.
00	2402	1.252	Mode 7
39	2441	1.252	Mode 8
78	2480	1.228	Mode 9

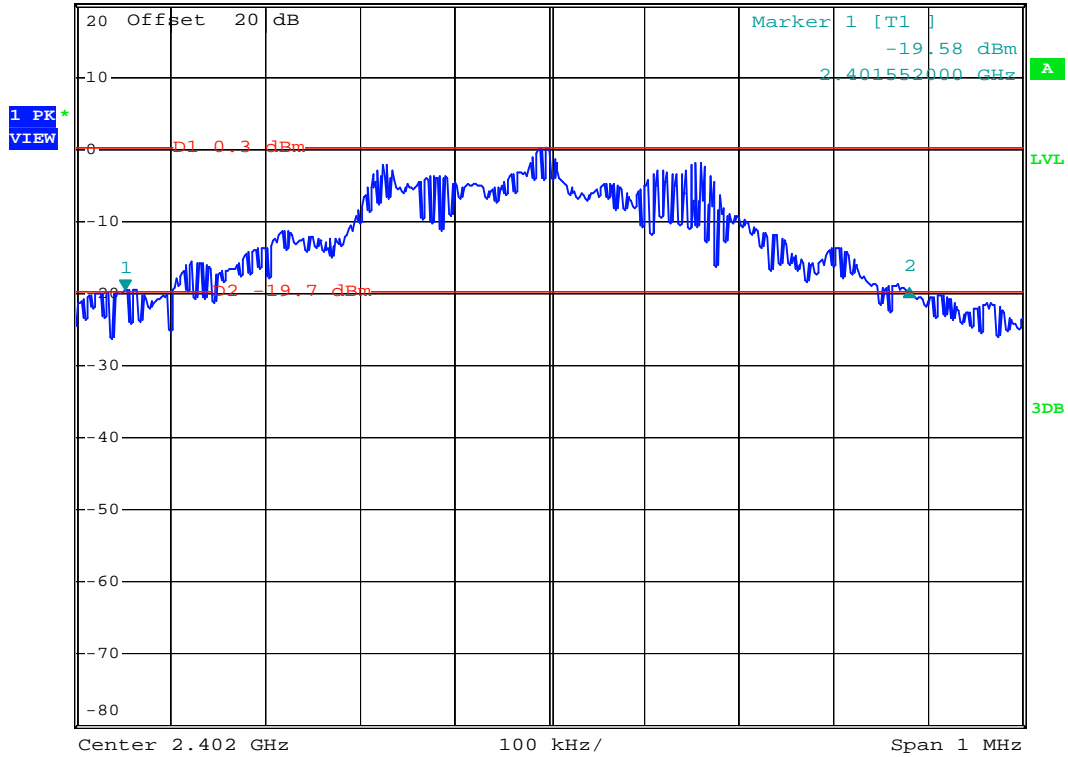


5.5.5 Hopping Channel Bandwidth

Mode 1



\*RBW 30 kHz Delta 2 [T1 ]  
\*VBW 300 kHz 0.31 dB  
\*SWT 500 ms 828.00000000 kHz  
Ref 20 dBm \*Att 20 dB



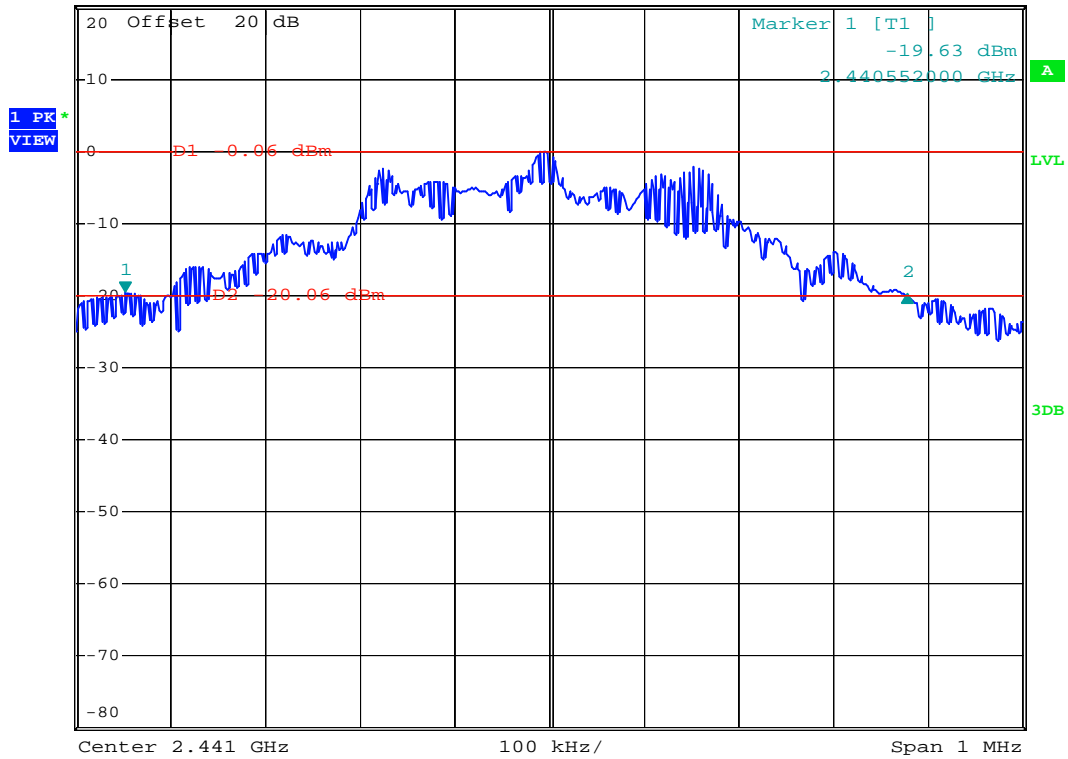
Date: 5.OCT.2007 20:59:33



Mode 2



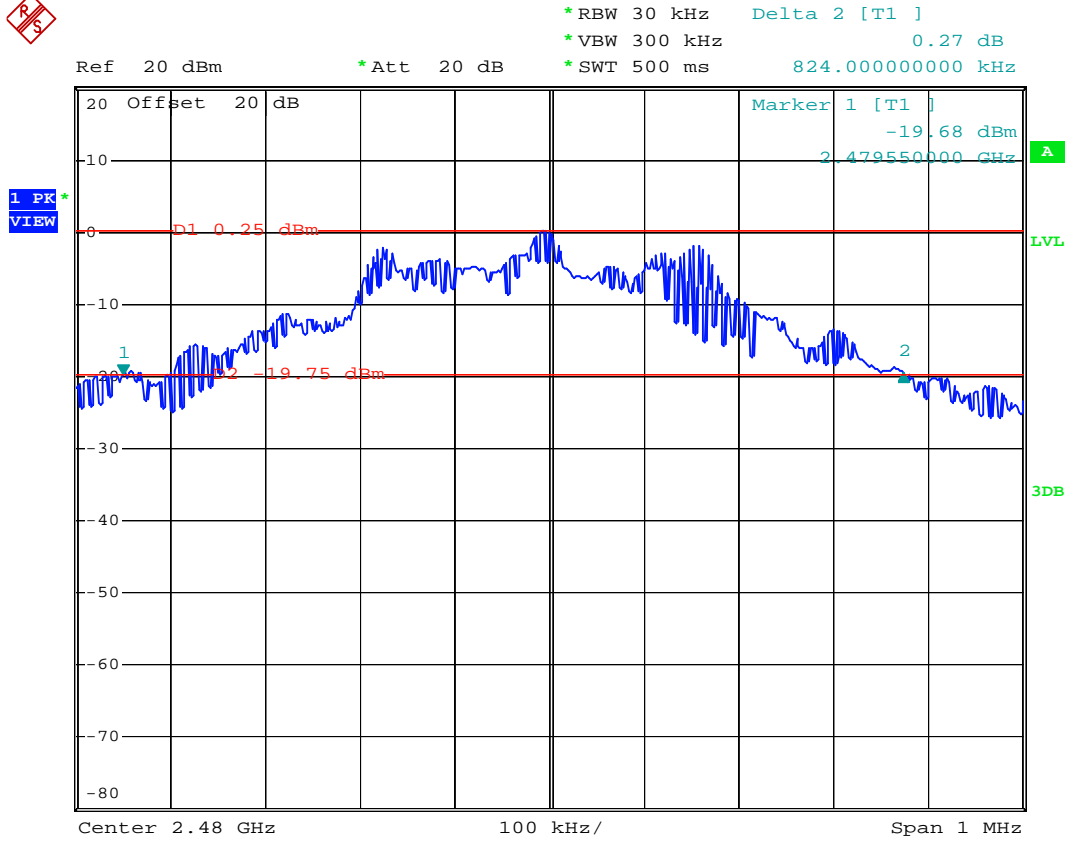
Ref 20 dBm      \*Att 20 dB      \*RBW 30 kHz      Delta 2 [T1 ]  
\*VBW 300 kHz      -0.26 dB  
\*SWT 500 ms      826.00000000 kHz



Date: 5.OCT.2007 21:00:45



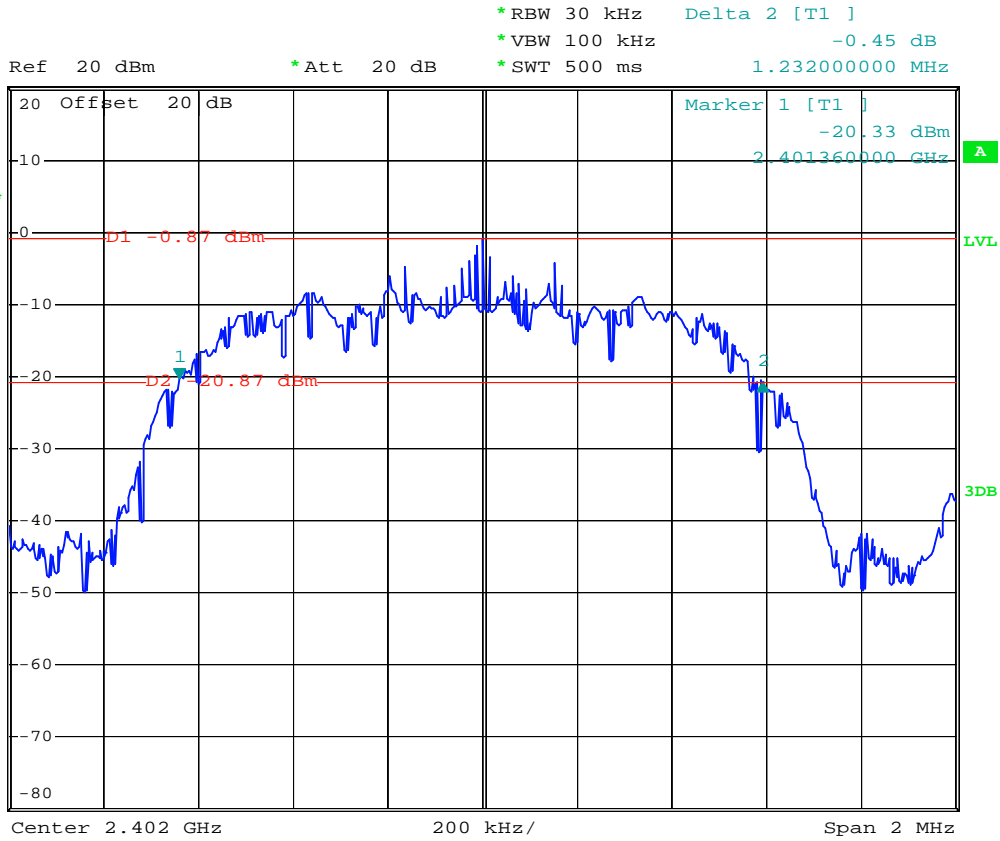
Mode 3



Date: 5.OCT.2007 21:02:01



Mode 4

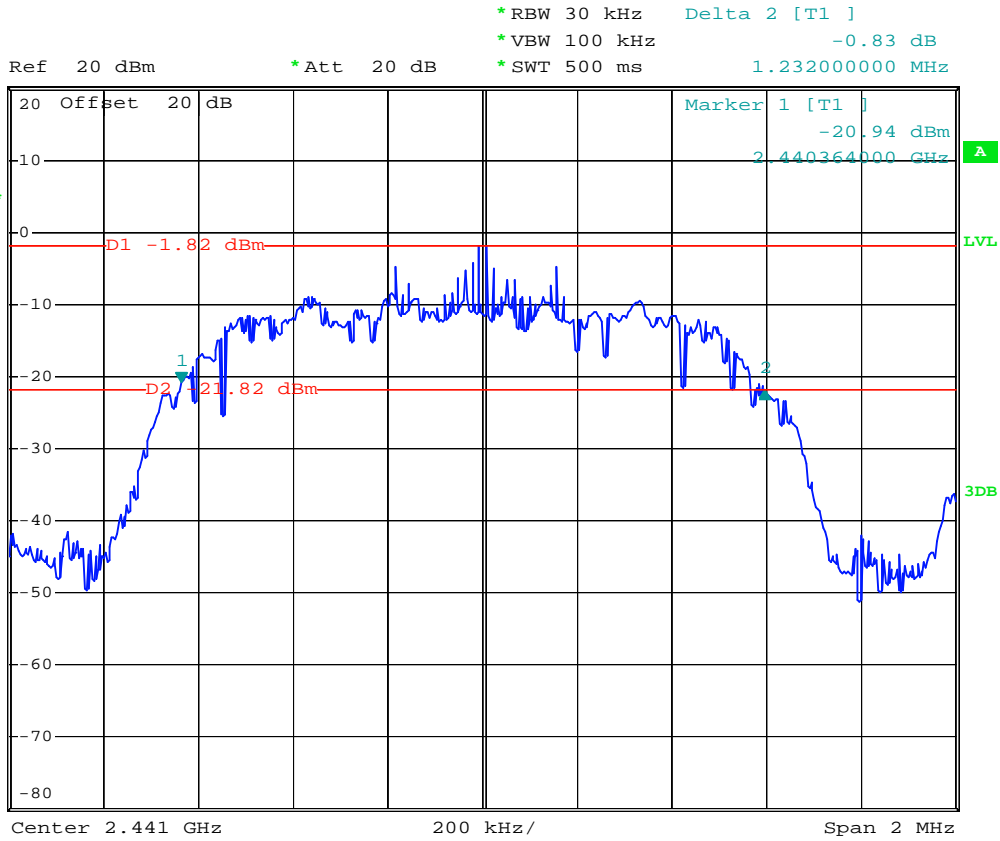


Date: 5.OCT.2007 21:36:12





Mode 5



Date: 5.OCT.2007 21:37:05



Mode 6

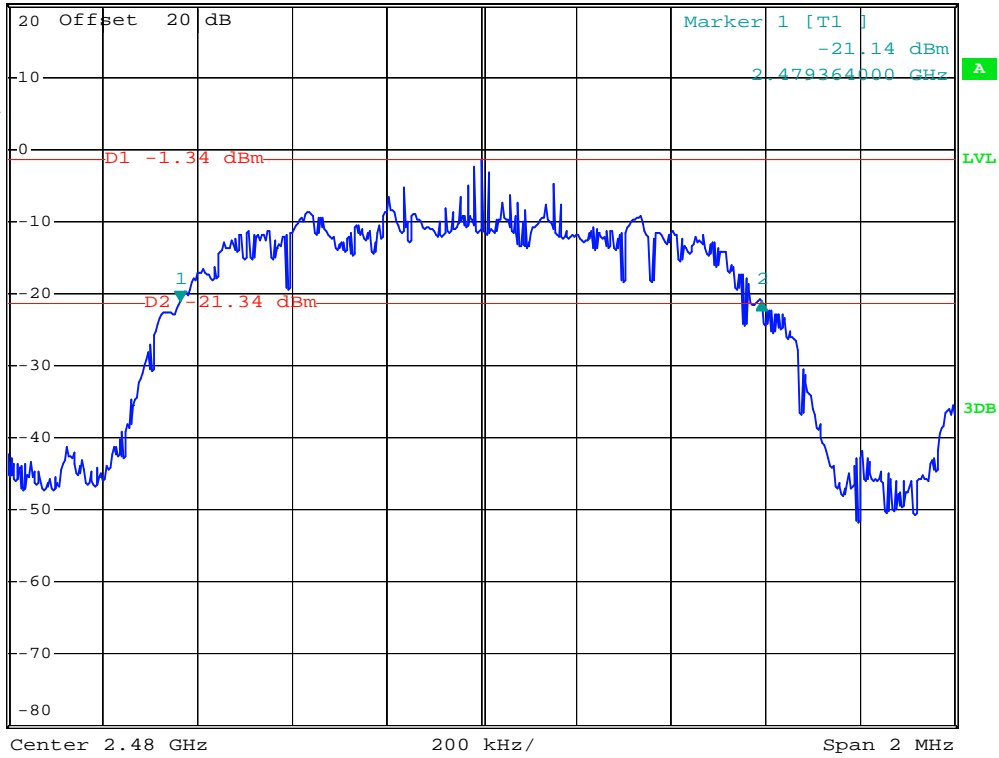


\*RBW 30 kHz Delta 2 [T1 ]  
\*VBW 100 kHz -0.05 dB  
\*SWT 500 ms 1.22800000 MHz

Ref 20 dBm

\*Att 20 dB

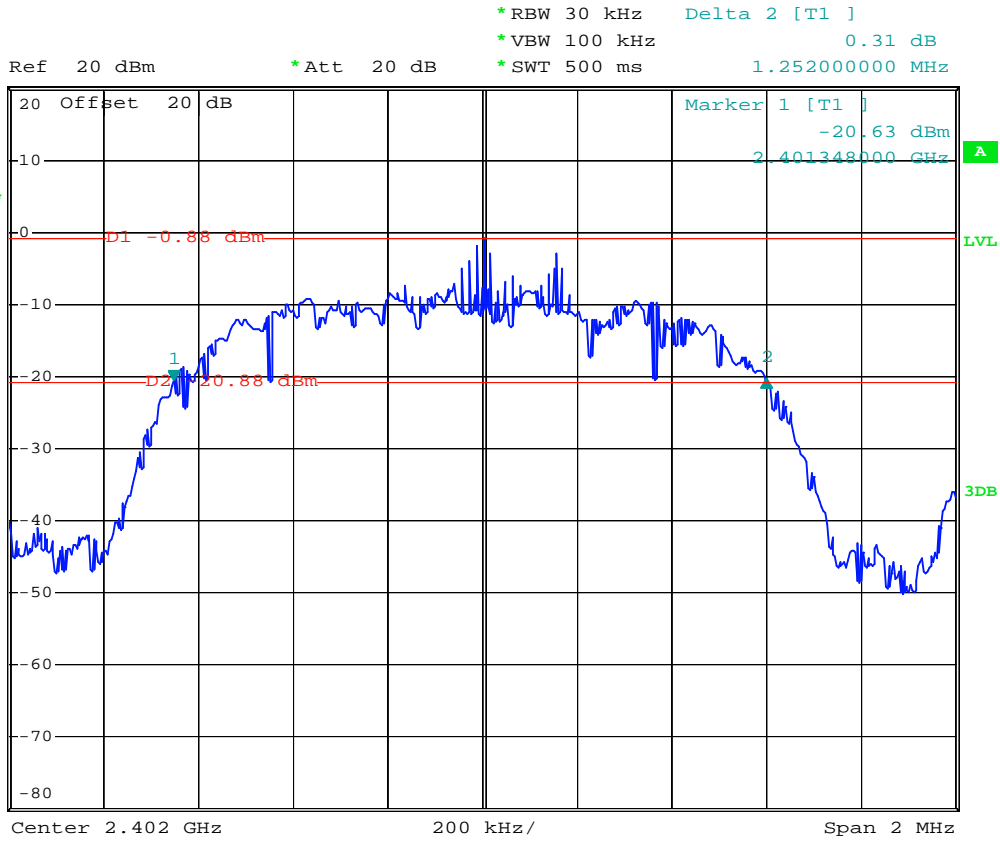
1 PK  
VIEW



Date: 5.OCT.2007 21:38:42



Mode 7



Date: 5.OCT.2007 21:39:46



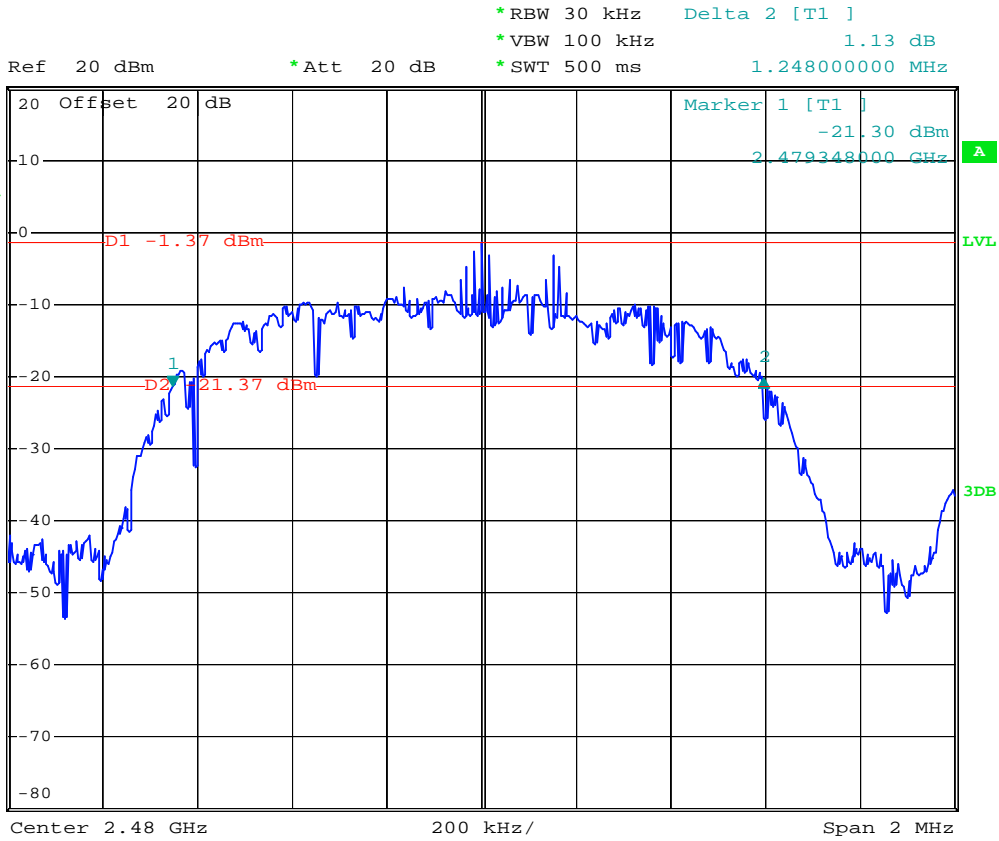
Mode 8



Date: 5.OCT.2007 21:40:30



Mode 9



Date: 5.OCT.2007 21:41:17

## 5.6 Dwell Time of Each Frequency

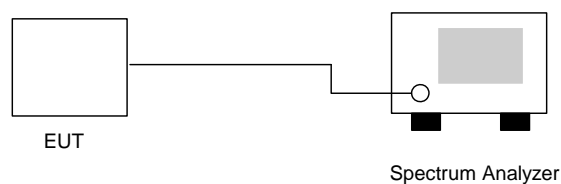
### 5.6.1 Measuring Instruments :

As described in chapter 6 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 : 23~25°C
- Relative Humidity : 57~59%
- Test Enginner : Ken

CH39

Package Mode	Average Hopping Channel	Package Transfer Time	Dwell Time	Limit
		(us)	(s)	(s)
DH1	8.7	465	0.128	0.4
DH3	4.4	1740	0.242	0.4
DH5	3.2	3040	0.307	0.4

※ Remark:

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



- Application Type : BT EDR(2Mbps)
- Temperature : 23~25°C
- Relative Humidity : 57~59%
- Test Enginner : Ken

CH39

Package Mode	Average Hopping Channel	Package Transfer Time	Dwell Time	Limit
		(us)	(s)	(s)
DH1	8.5	480	0.129	0.4
DH3	5.1	1740	0.280	0.4
DH5	4.1	3000	0.389	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)

- Application Type : BT EDR(3Mbps)
- Temperature : 23~25°C
- Relative Humidity : 57~59%
- Test Enginner : Ken

CH39

Package Mode	Average Hopping Channel	Package Transfer Time	Dwell Time	Limit
		(us)	(s)	(s)
DH1	8	476	0.120	0.4
DH3	4.8	1740	0.264	0.4
DH5	3.2	3020	0.305	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)

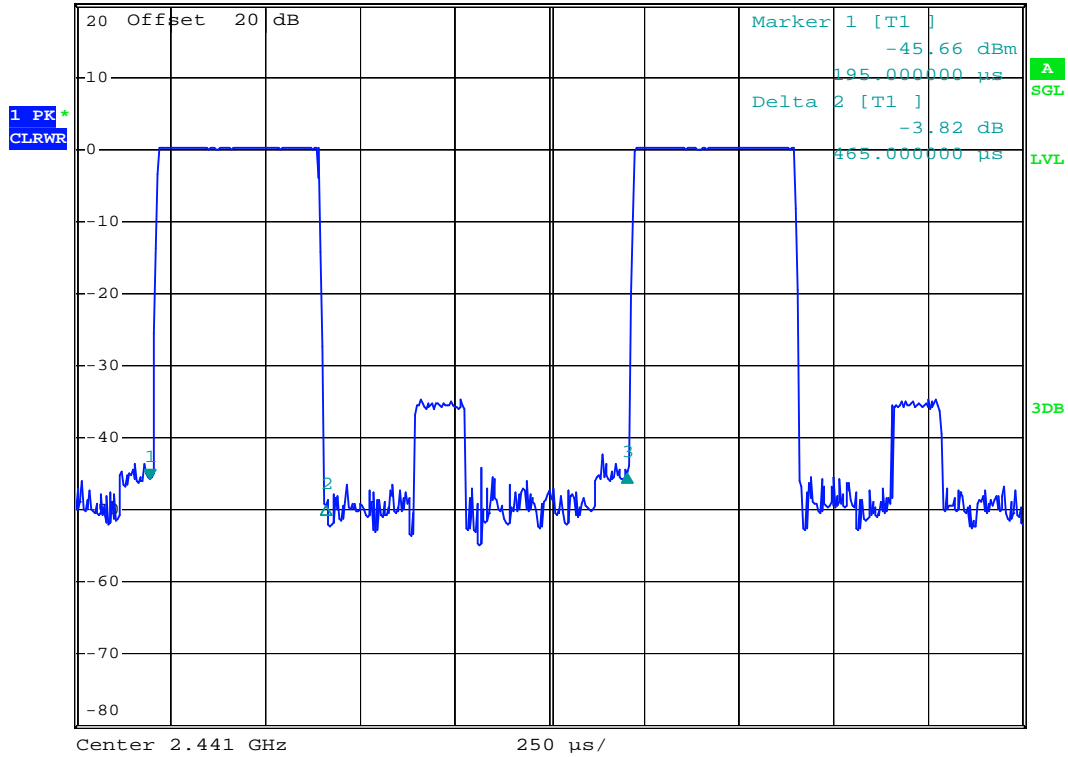


5.6.5 Dwell Time

BT(1Mbps)\_DH1 (CH39)

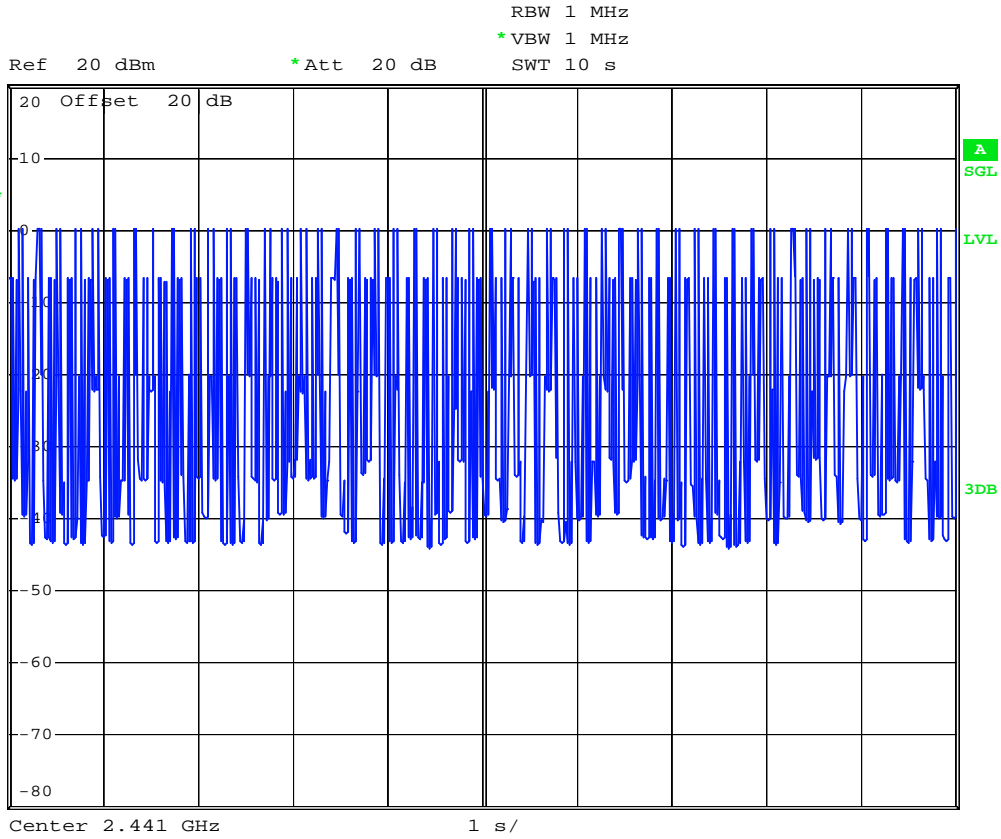


RBW 1 MHz      Delta 3 [T1 ]  
 \*VBW 1 MHz      0.77 dB  
 Ref 20 dBm      \*Att 20 dB      SWT 2.5 ms      1.260000 ms



Date: 5.OCT.2007 21:09:42

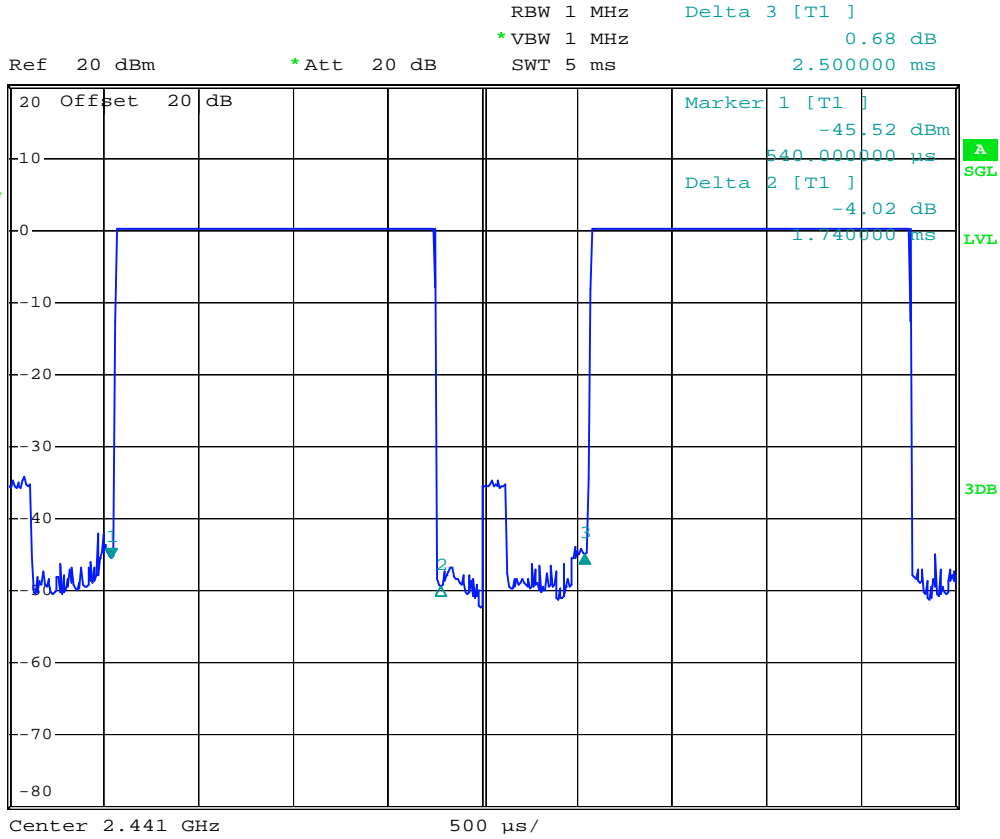




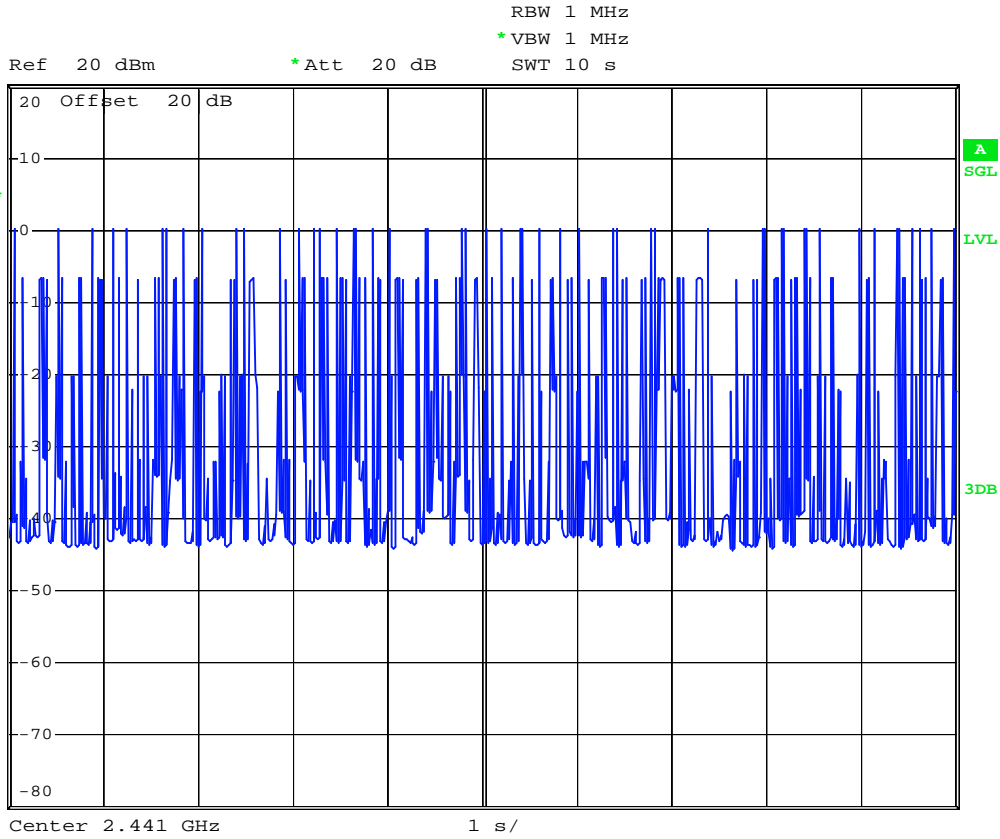
Date: 5.OCT.2007 21:13:01



BT(1Mbps)\_DH3 (CH39)



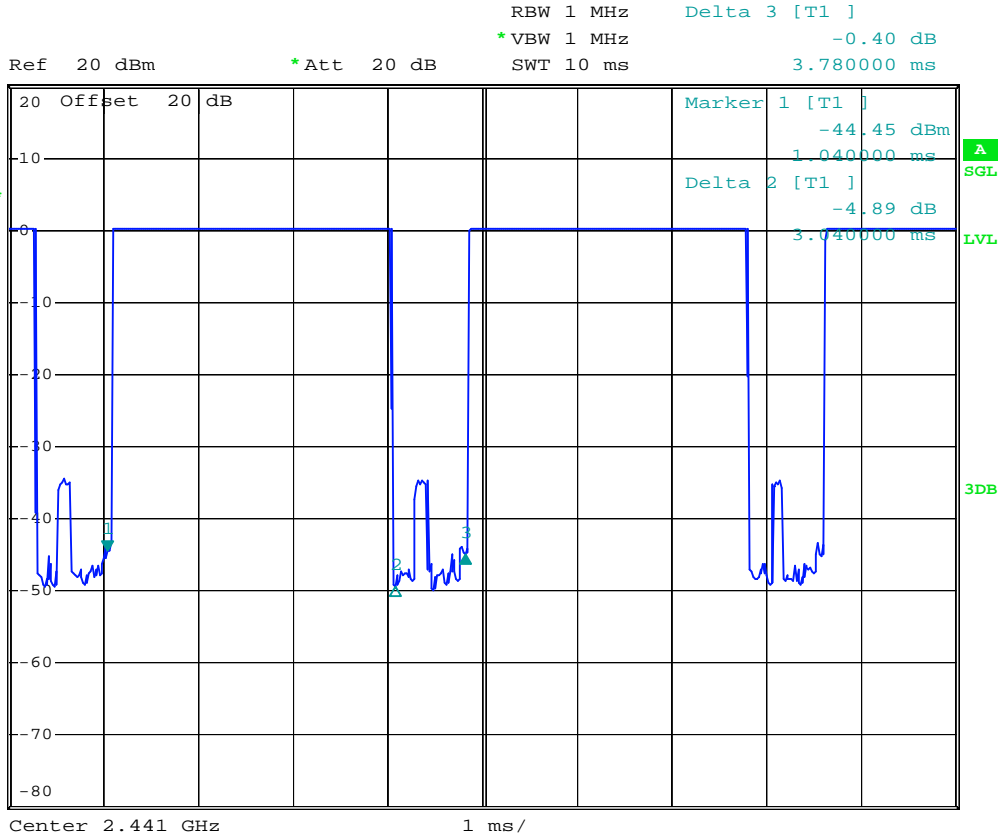
Date: 5.OCT.2007 21:10:34



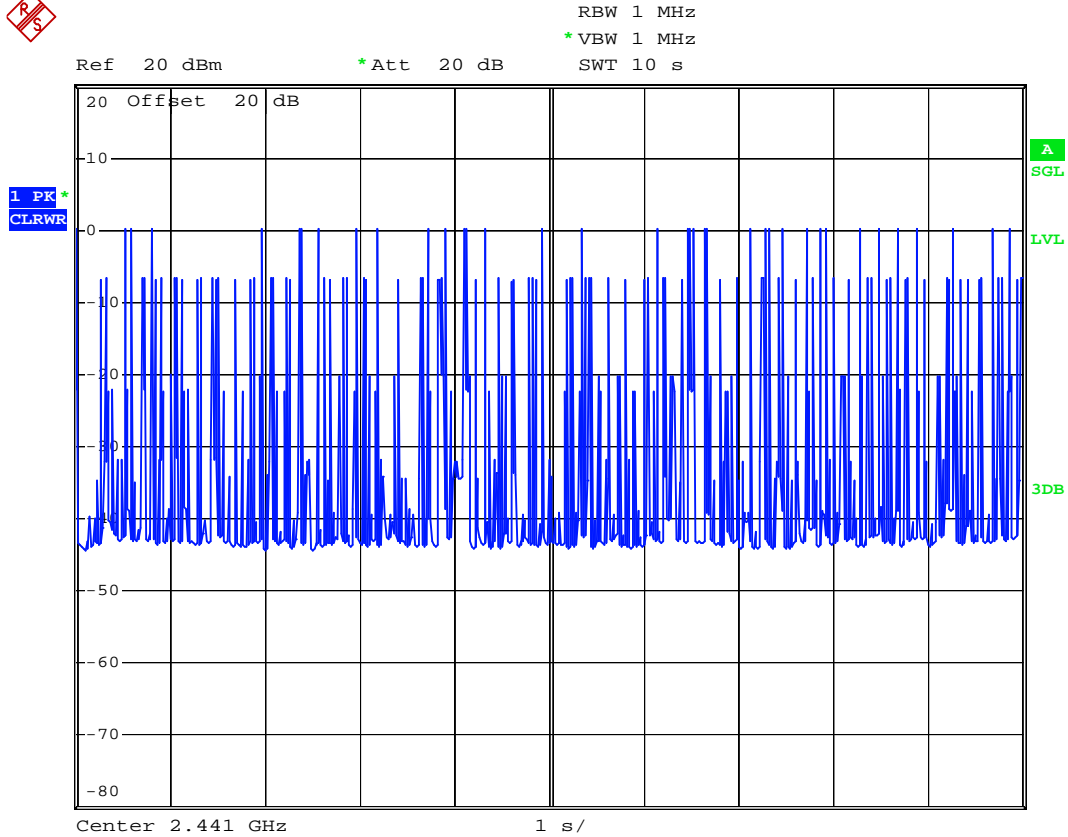
Date: 5.OCT.2007 21:13:29



BT(1Mbps)\_DH5 (CH39)



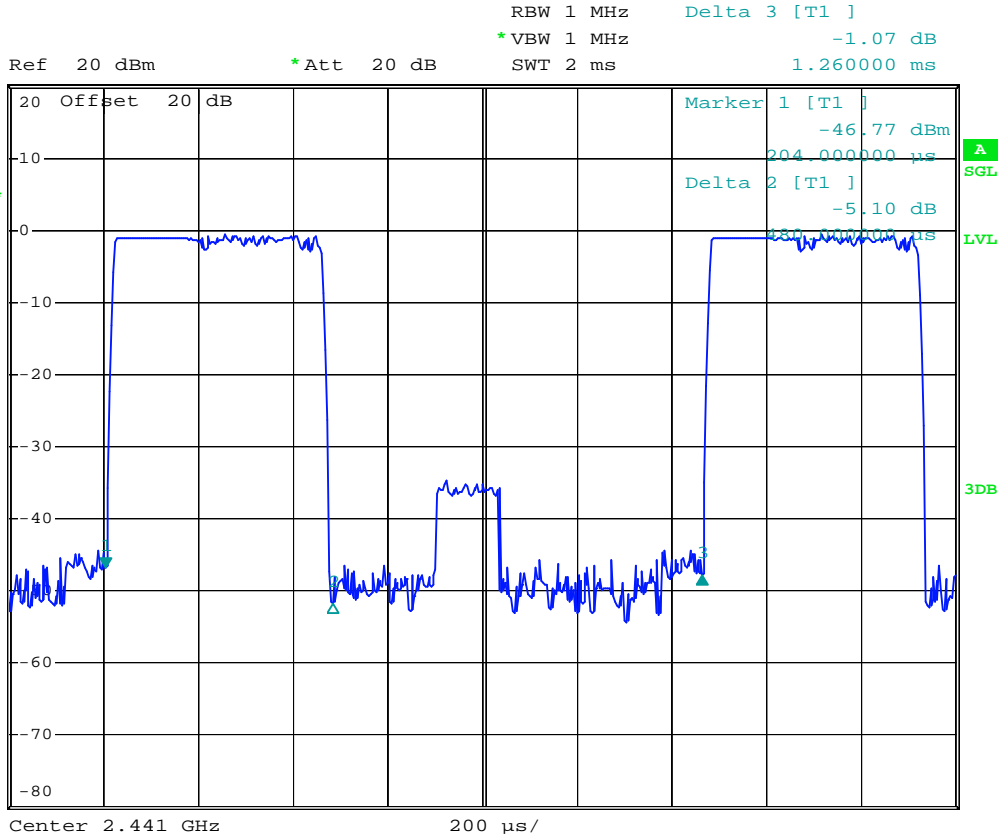
Date: 5.OCT.2007 21:11:25



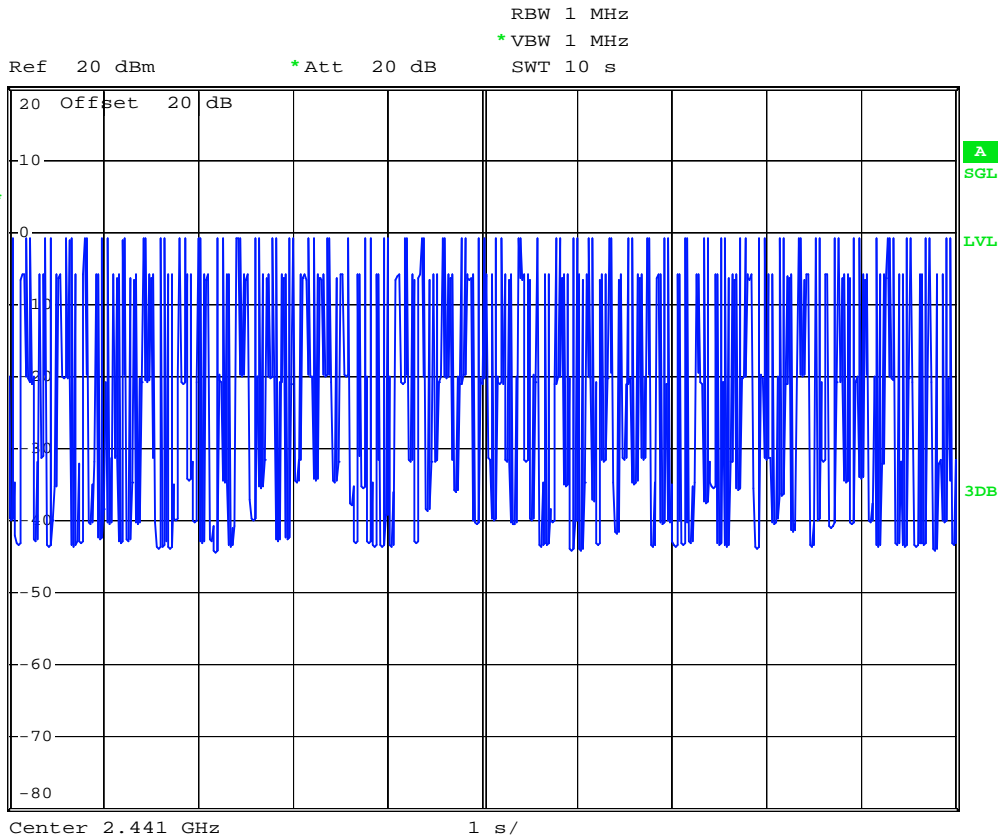
Date: 5.OCT.2007 21:13:55



BT-EDR(2Mbps)\_DH1(CH39)



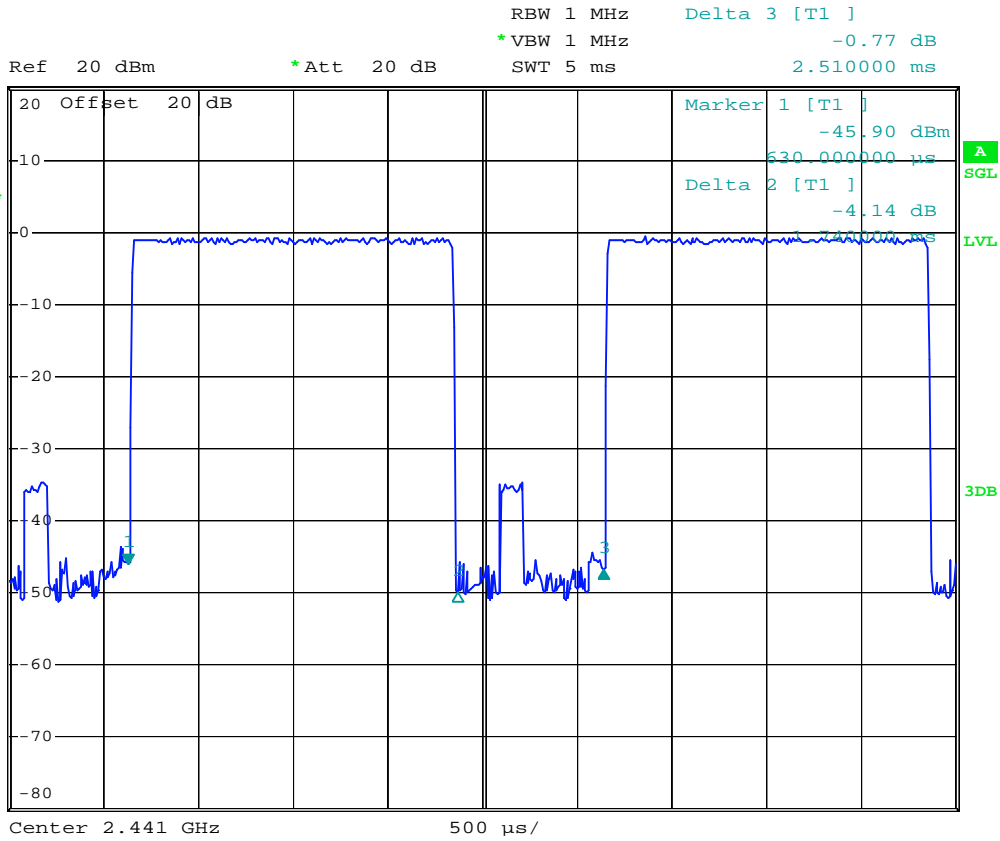
Date: 5.OCT.2007 21:52:37



Date: 5.OCT.2007 21:57:05

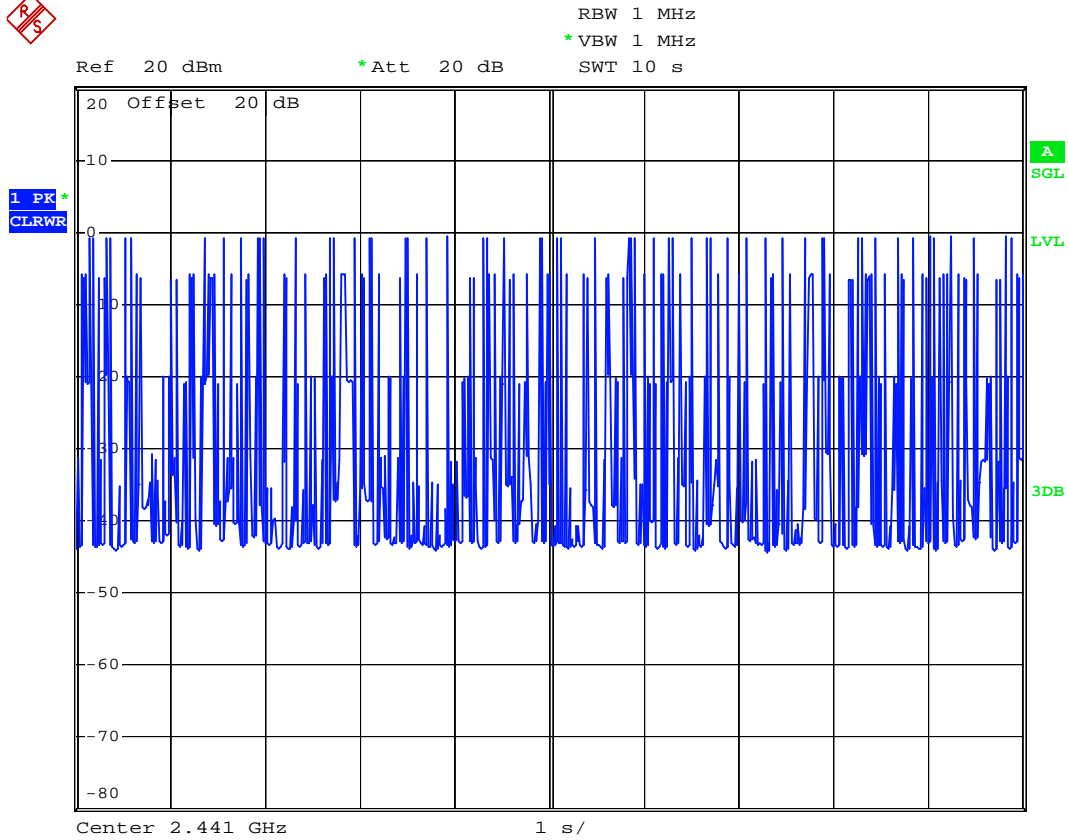


BT-EDR(2Mbps)\_DH3 (CH39)



Date: 5.OCT.2007 21:53:10

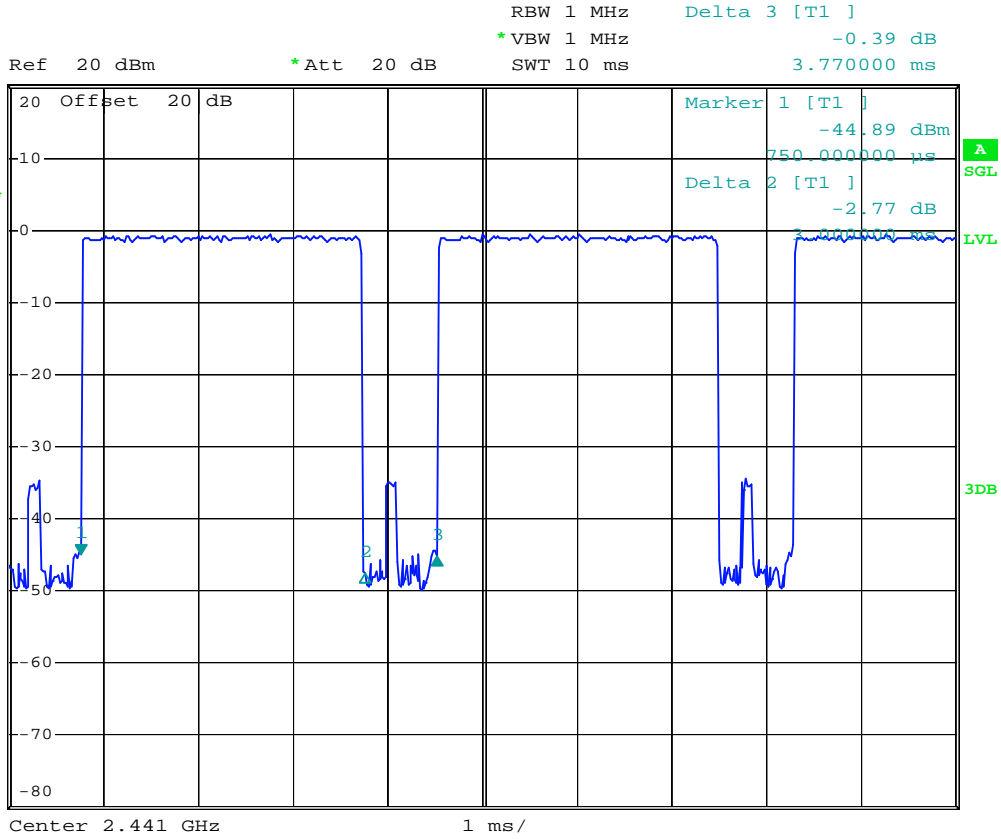




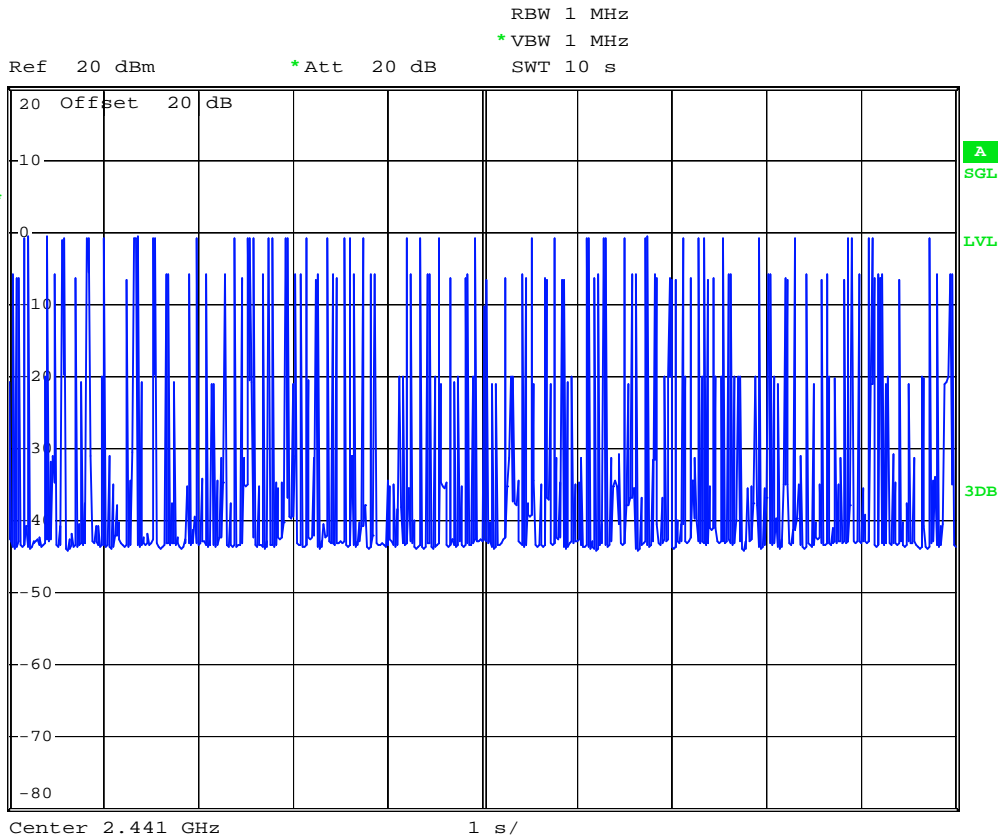
Date: 5.OCT.2007 21:58:13



BT-EDR(2Mbps)\_DH5 (CH39)



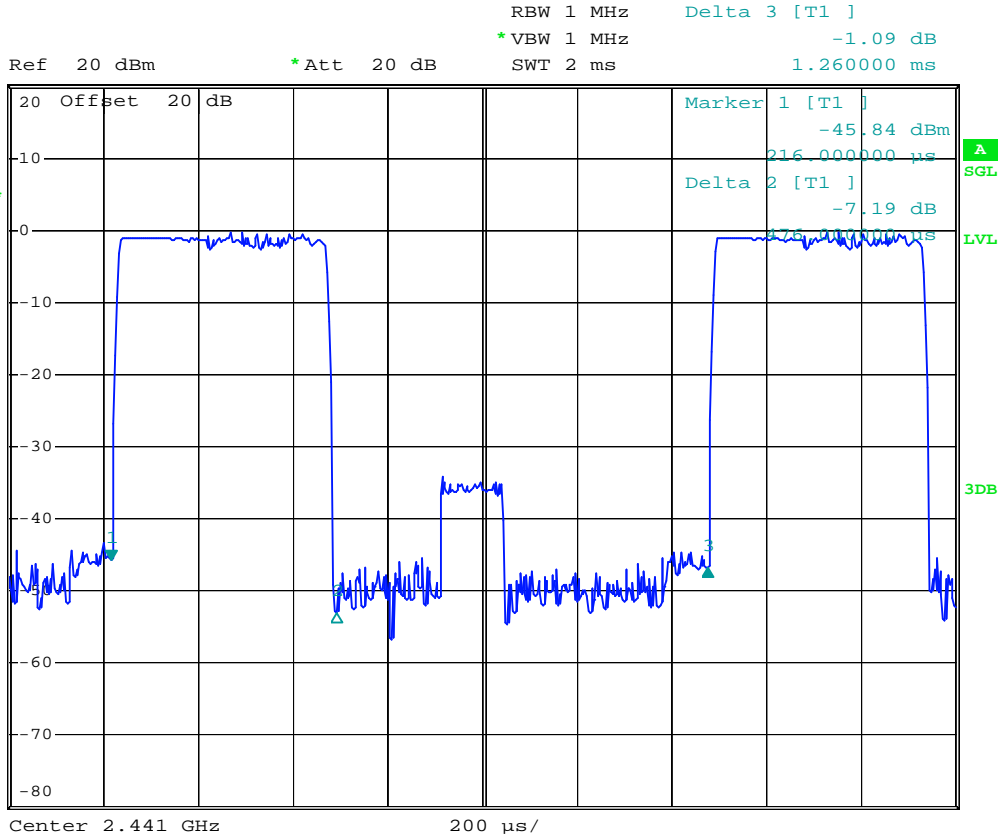
Date: 5.OCT.2007 21:53:54



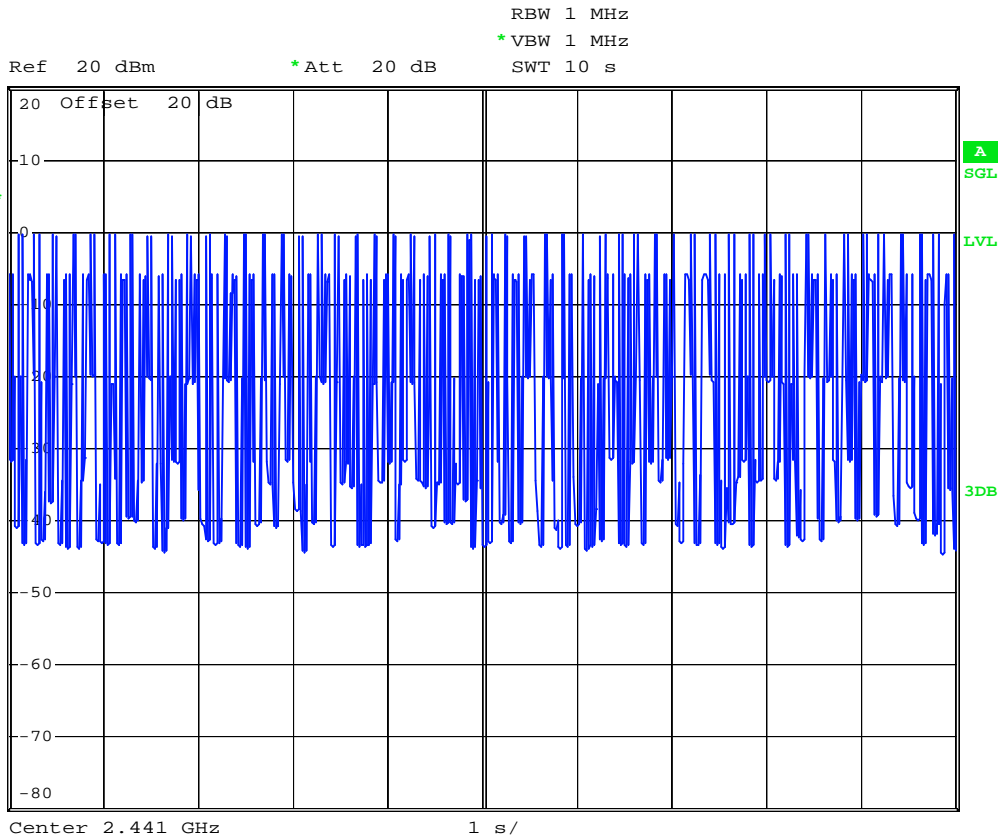
Date: 5.OCT.2007 21:58:41



BT-EDR(3Mbps)\_DH1 (CH39)



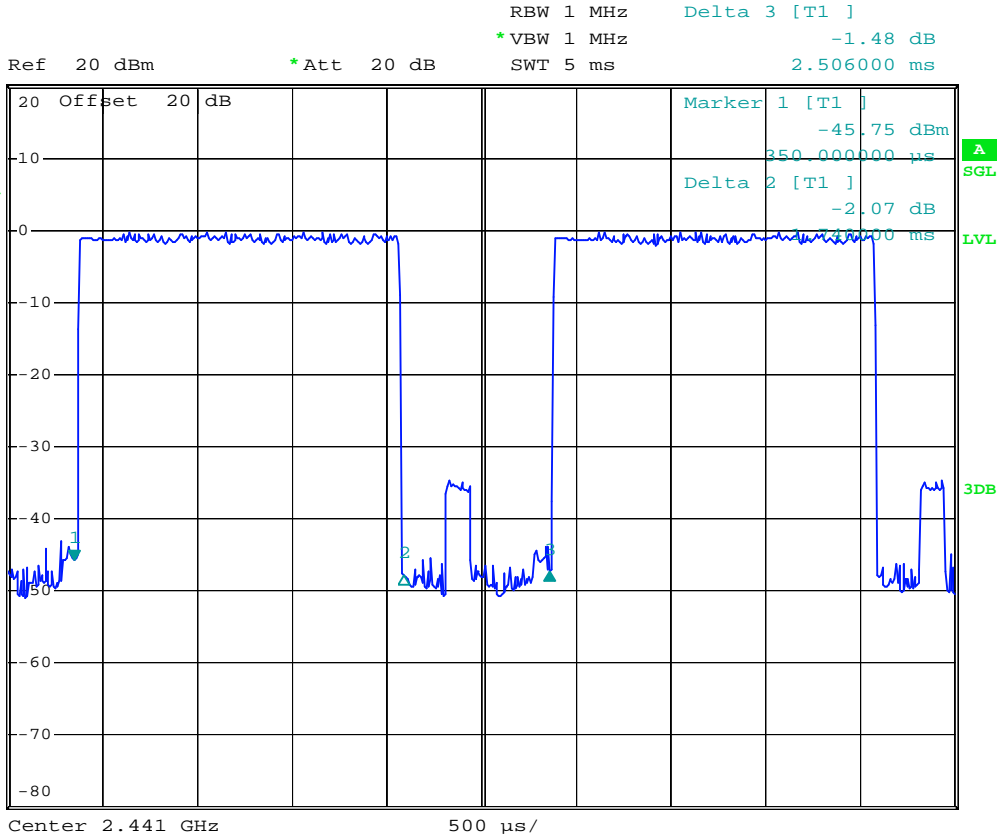
Date: 5.OCT.2007 21:54:41



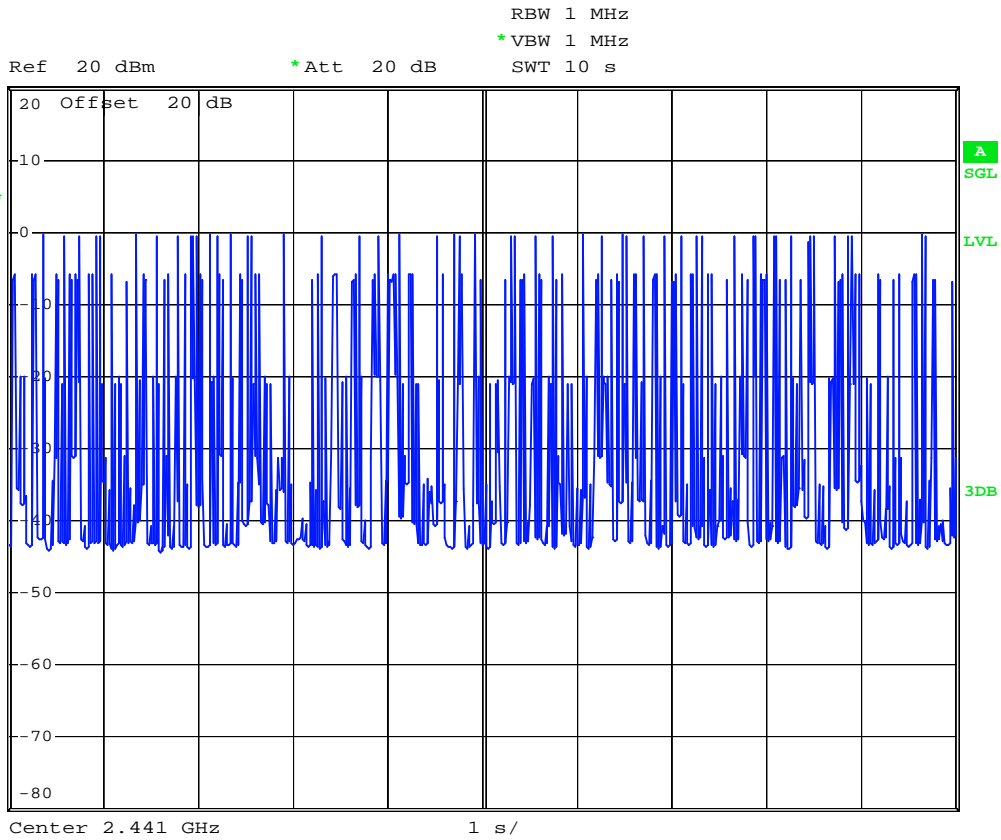
Date: 5.OCT.2007 21:59:14



BT-EDR(3Mbps)\_DH3 (CH39)



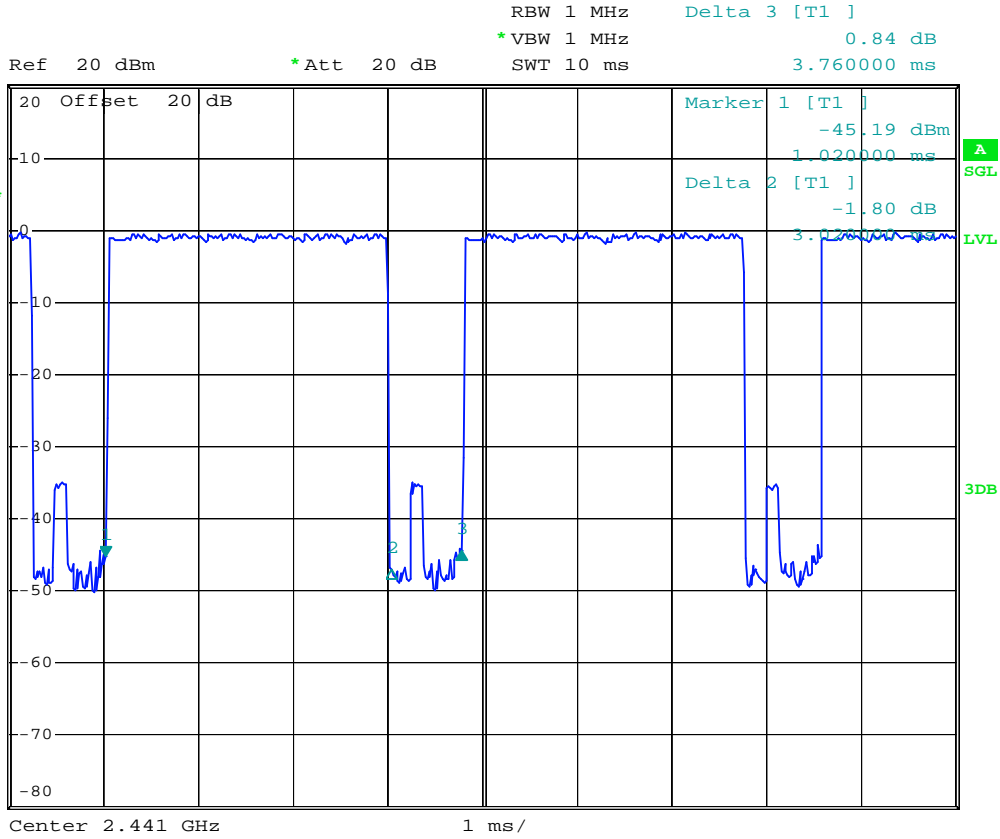
Date: 5.OCT.2007 21:55:34



Date: 5.OCT.2007 21:59:42

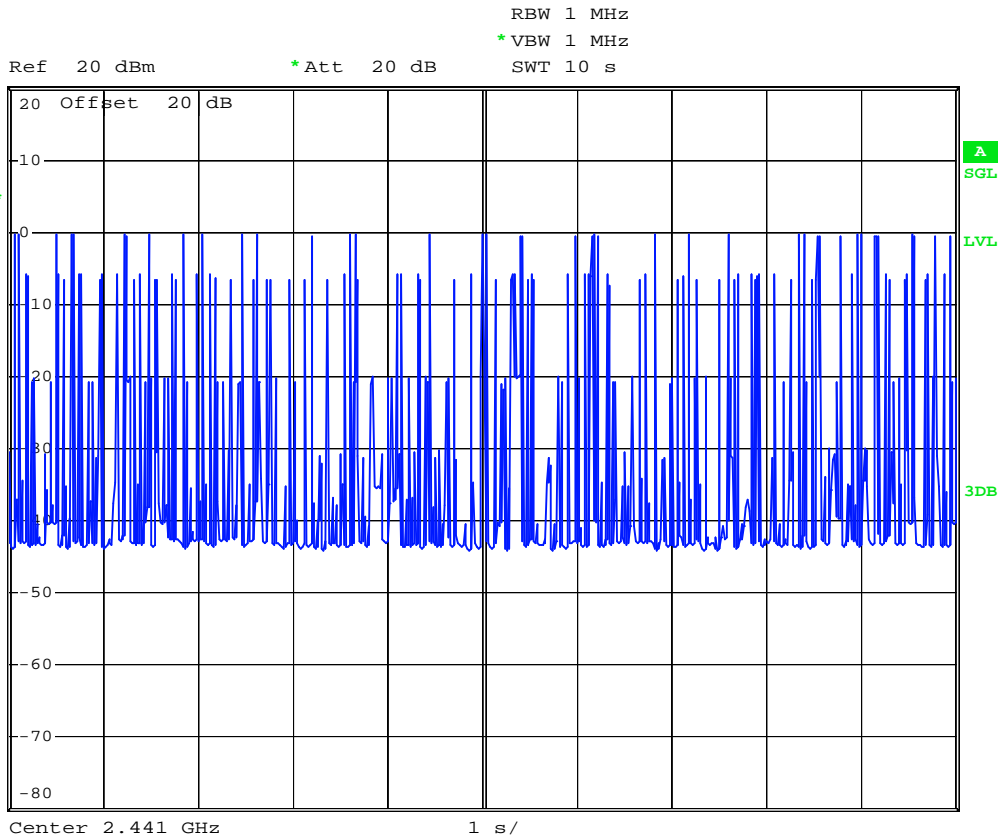


BT-EDR(3Mbps)\_DH5 (CH39)



Date: 5.OCT.2007 21:56:20





Date: 5.OCT.2007 22:00:07

## 5.7 Peak Output Power Measurement

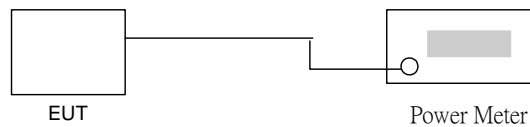
### 5.7.1 Measuring Instruments :

As described in chapter 6 of this test report.

### 5.7.2 Test Procedure :

The antenna port (RF output) of the EUT was connected to the input (RF input) of a spectrum analyzer for BT measurement. RBW and VBW are set to 3MHz. The cable loss has been offset before testing.

### 5.7.3 Test Setup Layout :



### 5.7.4 Test Result :

- Application Type : BT
- Temperature : 23~25°C
- Relative Humidity : 57~59%
- Test Enginner : Ken

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (Watt/dBm )
00	2402	0.62	1W/30 dBm
39	2441	0.13	1W/30 dBm
78	2480	0.23	1W/30 dBm



- Application Type : BT EDR(2Mbps)
- Temperature : 23~25°C
- Relative Humidity : 57~59%
- Test Enginner : Ken

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (Watt/dBm )
00	2402	0.43	1W/30 dBm
39	2441	-0.12	1W/30 dBm
78	2480	0.41	1W/30 dBm

- Application Type : BT EDR(3Mbps)
- Temperature : 23~25°C
- Relative Humidity : 57~59%
- Test Enginner : Ken

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (Watt/dBm )
00	2402	0.59	1W/30 dBm
39	2441	-0.19	1W/30 dBm
78	2480	0.06	1W/30 dBm

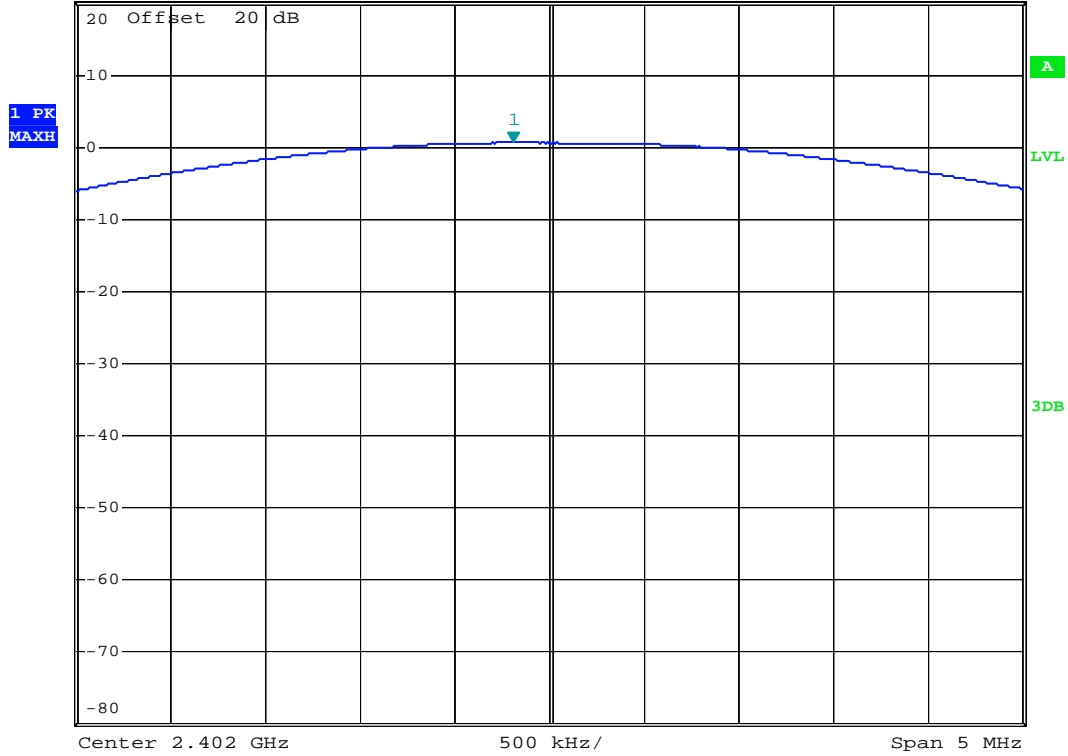


5.7.5 Output Power

Bluetooth(1Mbps) Mode : CH00 (2402MHz)



Ref 20 dBm      \*Att 20 dB      \*RBW 3 MHz      Marker 1 [T1 ]  
\*VBW 3 MHz      0.62 dBm  
\*SWT 500 ms      2.401810000 GHz



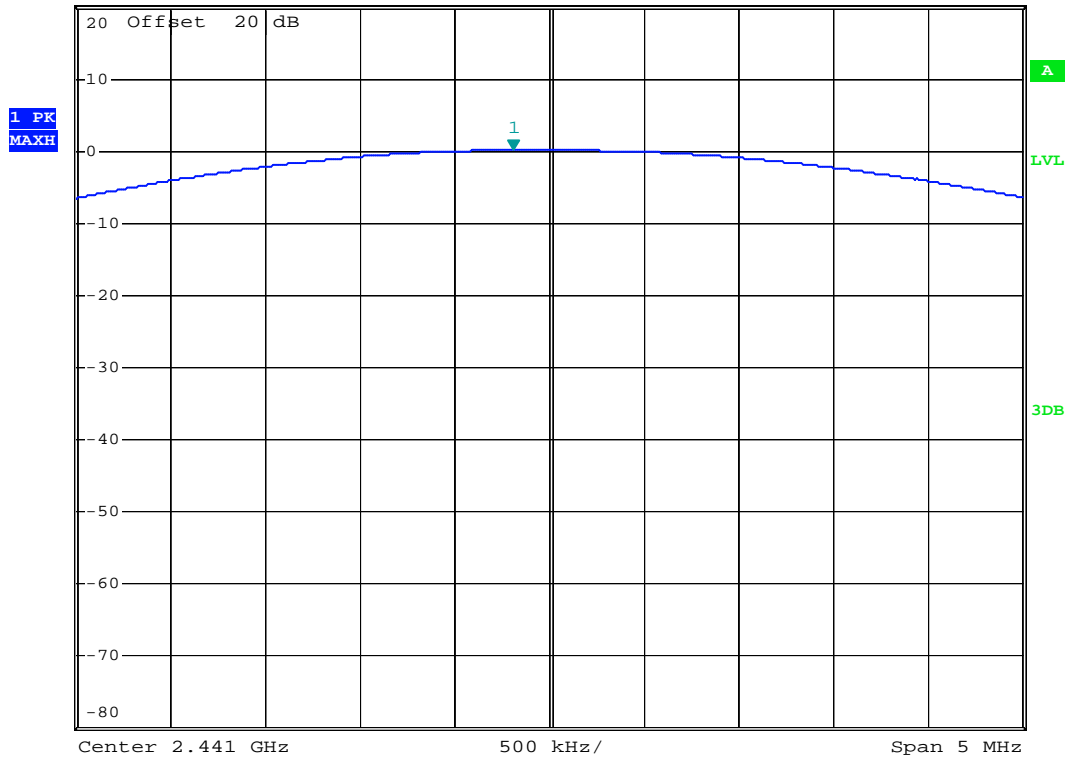
Date: 5.OCT.2007 04:41:03



Bluetooth(1Mbps) Mode : CH39 (2441MHz)



Ref 20 dBm      \*Att 20 dB      \*RBW 3 MHz      Marker 1 [T1]      0.13 dBm  
\*VBW 3 MHz      \*SWT 500 ms      2.440810000 GHz



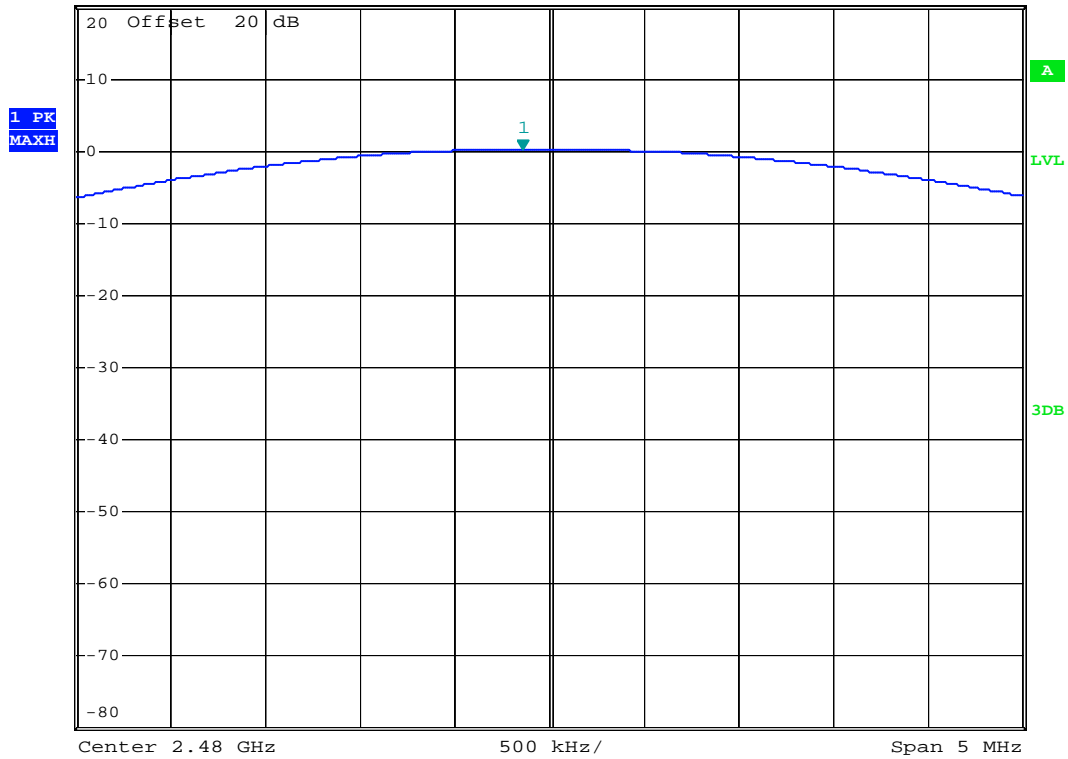
Date: 5.OCT.2007 04:41:44



Bluetooth(1Mbps) Mode : CH78 (2480MHz)



Ref 20 dBm      \*Att 20 dB      \*RBW 3 MHz      Marker 1 [T1]      0.23 dBm  
\*VBW 3 MHz      \*SWT 500 ms      2.479860000 GHz



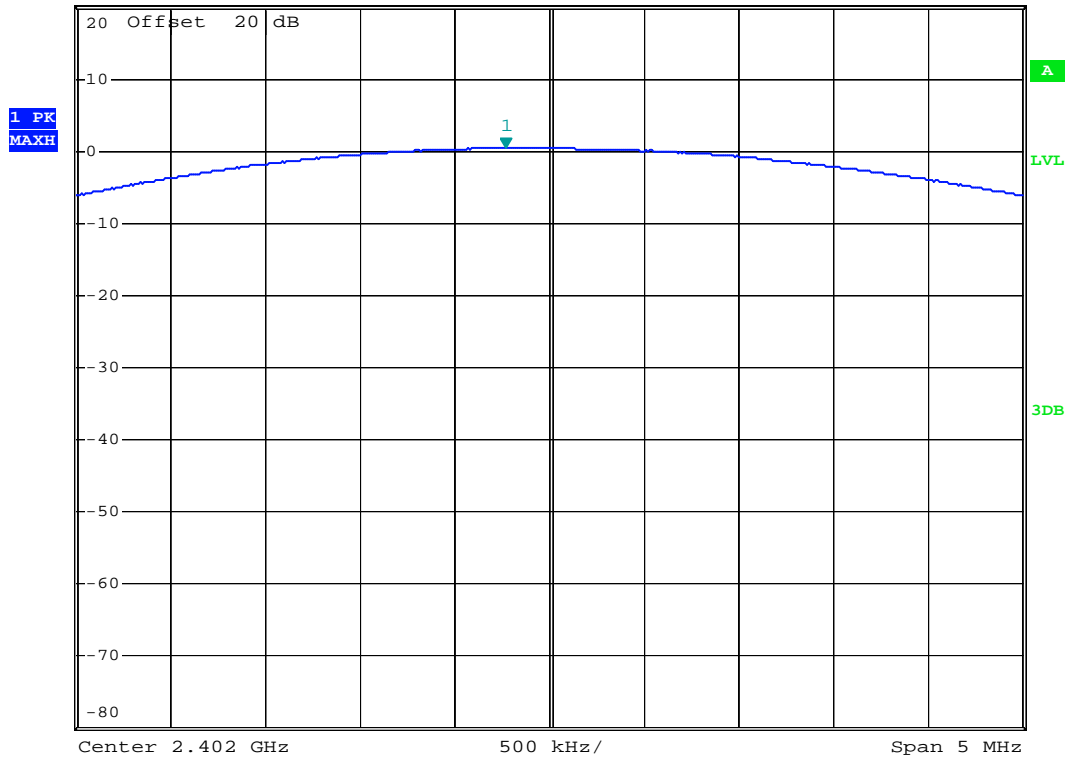
Date: 5.OCT.2007 04:43:53



Bluetooth(2Mbps) Mode : CH00 (2402MHz)



Ref 20 dBm      \*Att 20 dB      \*RBW 3 MHz      Marker 1 [T1]      0.43 dBm  
\*VBW 3 MHz      \*SWT 500 ms      2.401770000 GHz



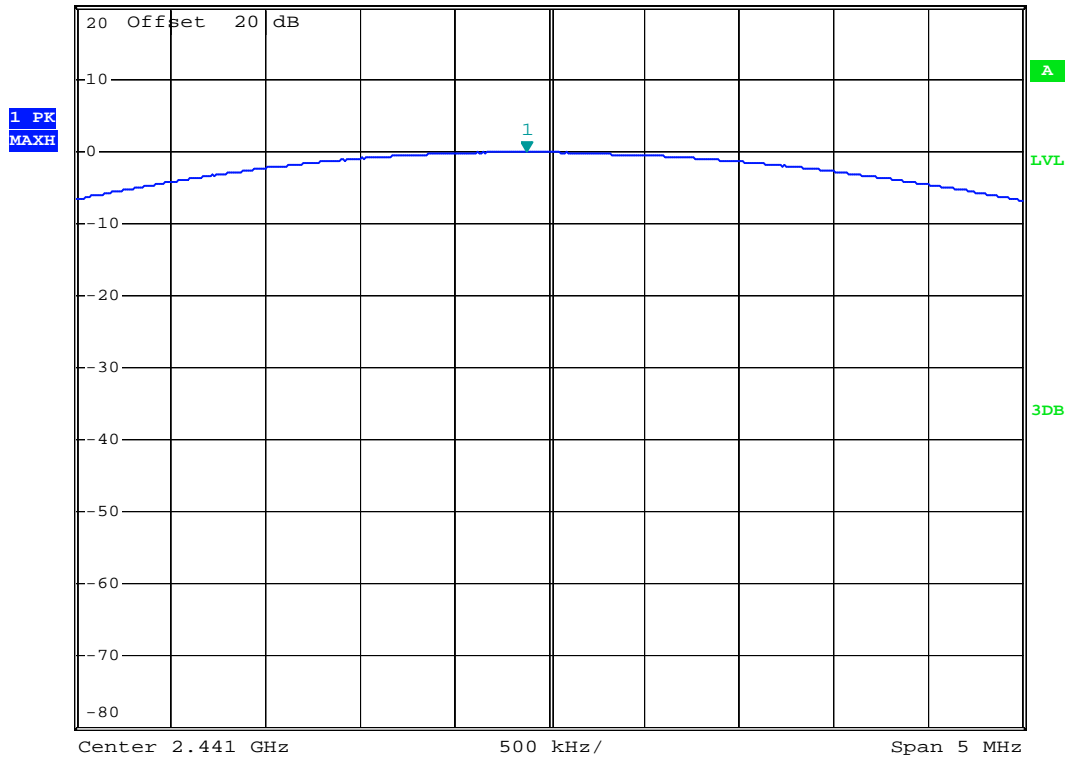
Date: 5.OCT.2007 04:48:19



Bluetooth(2Mbps) Mode : CH39 (2441MHz)



Ref 20 dBm      \*Att 20 dB      \*RBW 3 MHz      Marker 1 [T1]      \*VBW 3 MHz      -0.12 dBm  
\*SWT 500 ms      2.440880000 GHz



Date: 5.OCT.2007 04:49:01

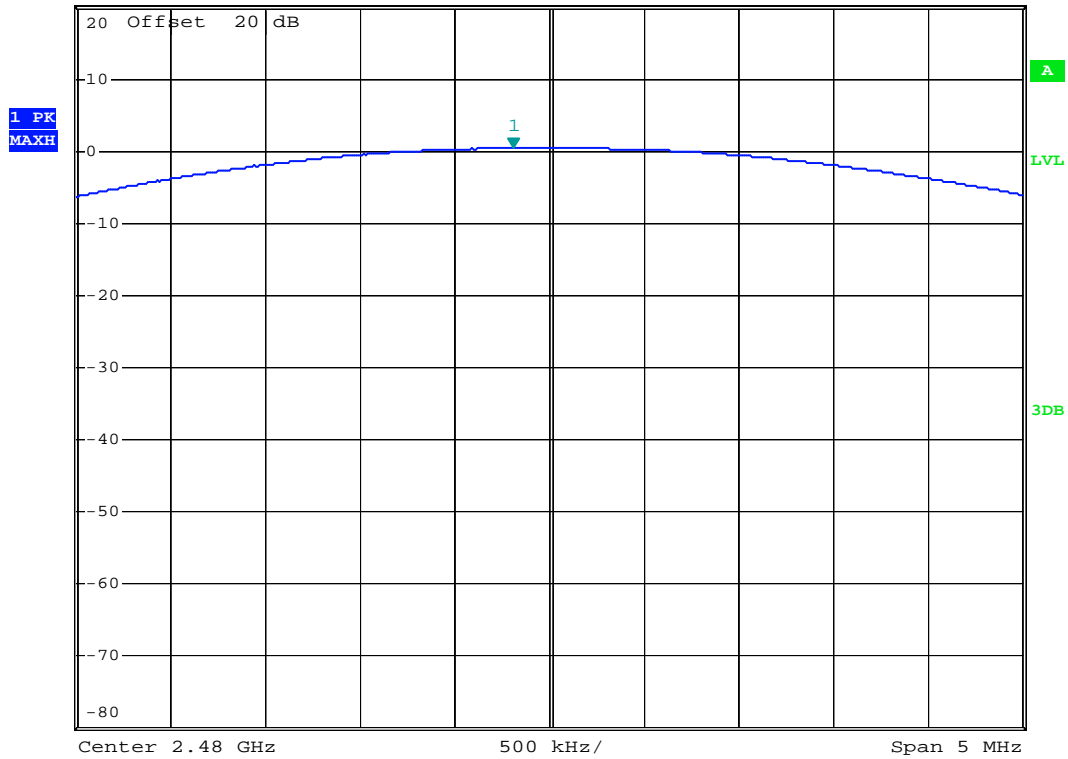




Bluetooth(2Mbps) Mode : CH78 (2480MHz)



Ref 20 dBm      \*Att 20 dB      \*RBW 3 MHz      Marker 1 [T1]      0.41 dBm  
\*VBW 3 MHz      \*SWT 500 ms      2.479810000 GHz



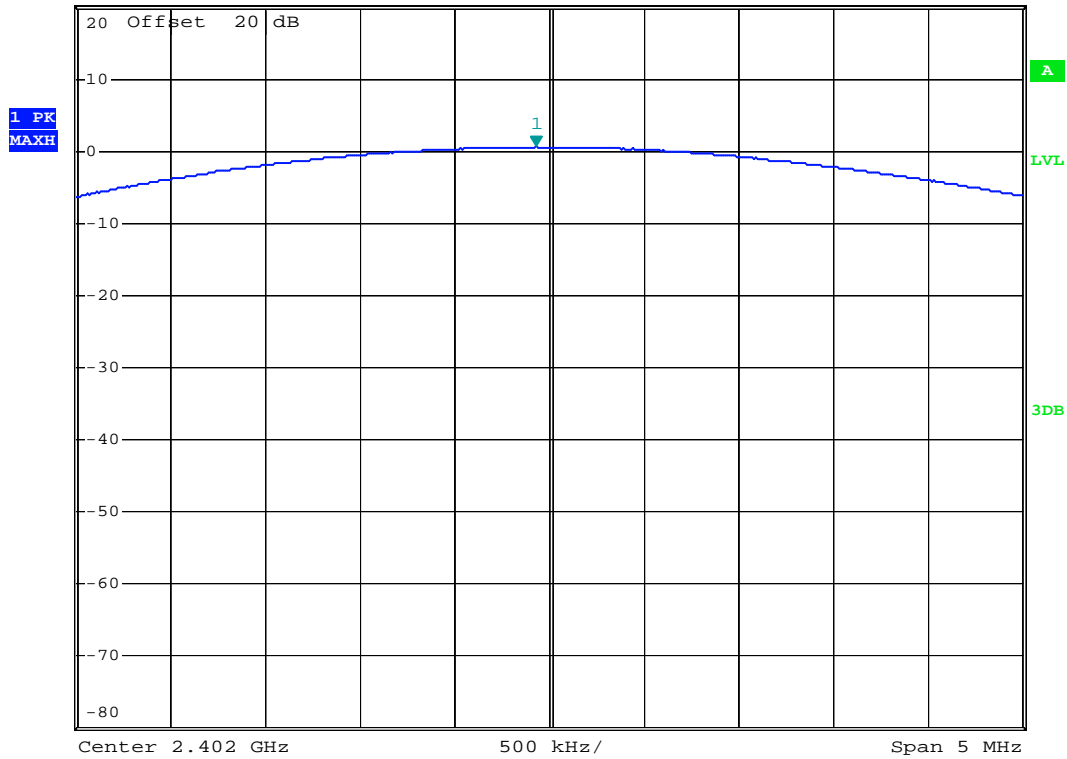
Date: 5.OCT.2007 04:47:27



Bluetooth(3Mbps) Mode : CH00 (2402MHz)



Ref 20 dBm      \*Att 20 dB      \*RBW 3 MHz      Marker 1 [T1]      0.59 dBm  
\*VBW 3 MHz      \*SWT 500 ms      2.401930000 GHz



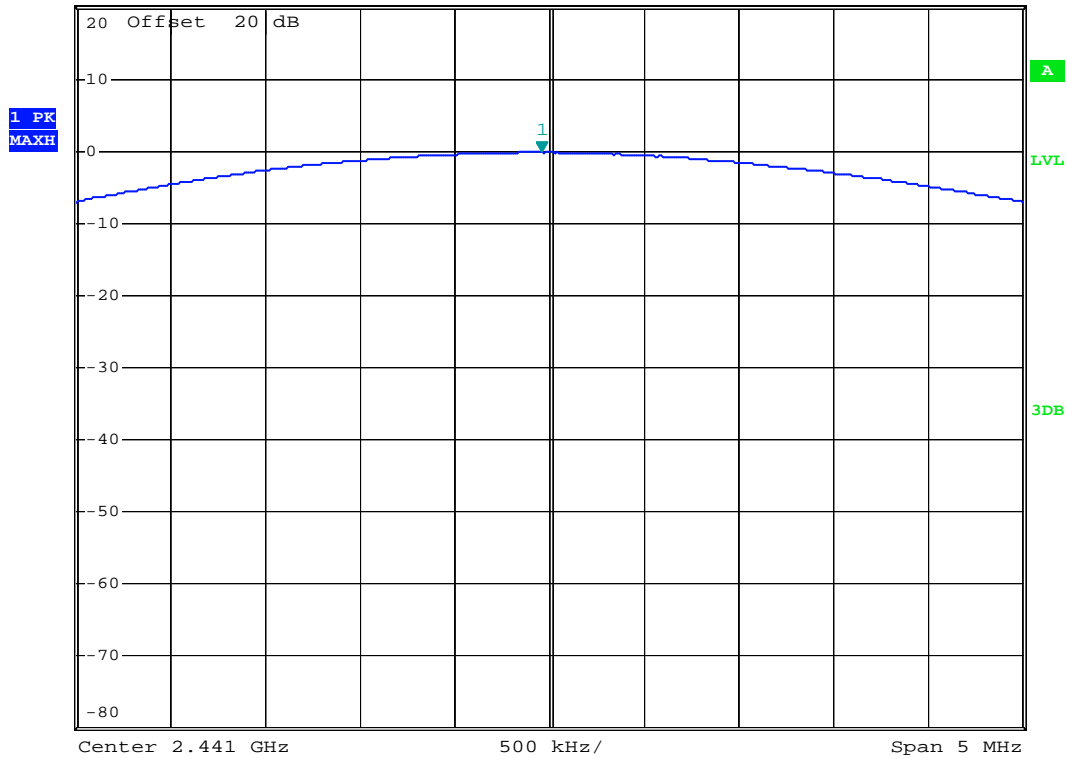
Date: 5.OCT.2007 04:50:44



Bluetooth(3Mbps) Mode : CH39 (2441MHz)



Ref 20 dBm      \*Att 20 dB      \*RBW 3 MHz      Marker 1 [T1]      \*VBW 3 MHz      -0.19 dBm  
\*SWT 500 ms      2.440960000 GHz



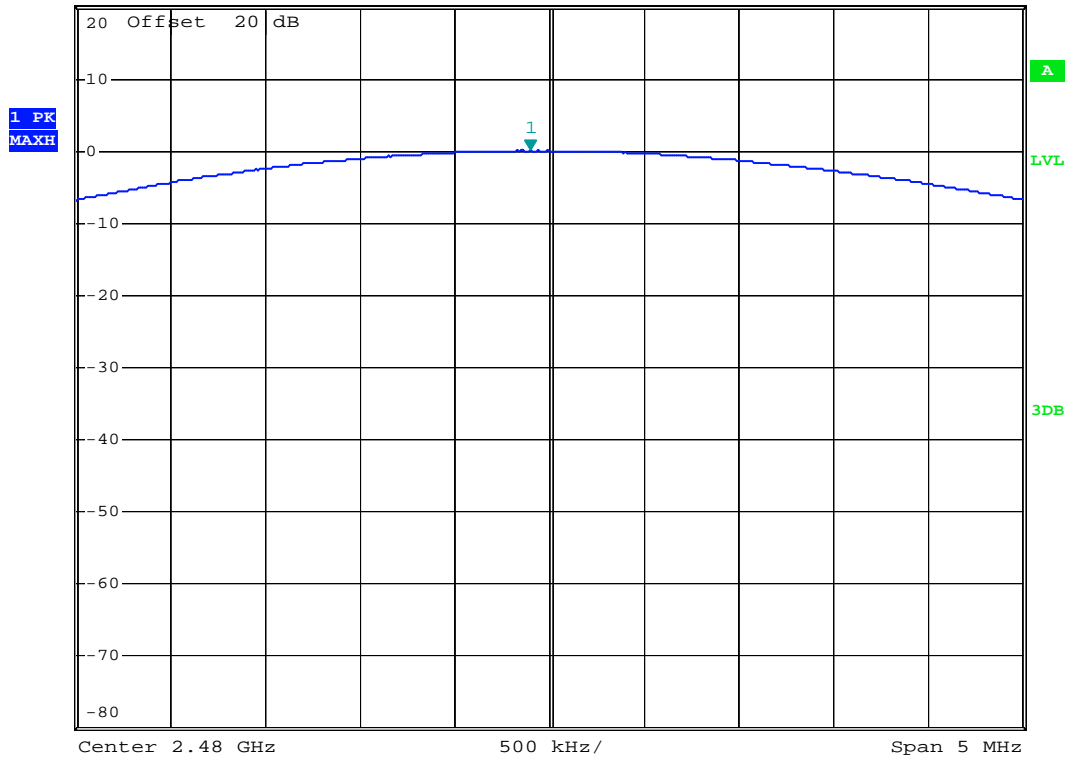
Date: 5.OCT.2007 04:51:43



Bluetooth(3Mbps) Mode : CH78 (2480MHz)



Ref 20 dBm      \*Att 20 dB      \*RBW 3 MHz      Marker 1 [T1]      0.06 dBm  
\*VBW 3 MHz      \*SWT 500 ms      2.479900000 GHz



Date: 5.OCT.2007 04:52:38



## **5.8 Radiated Emission Measurement**

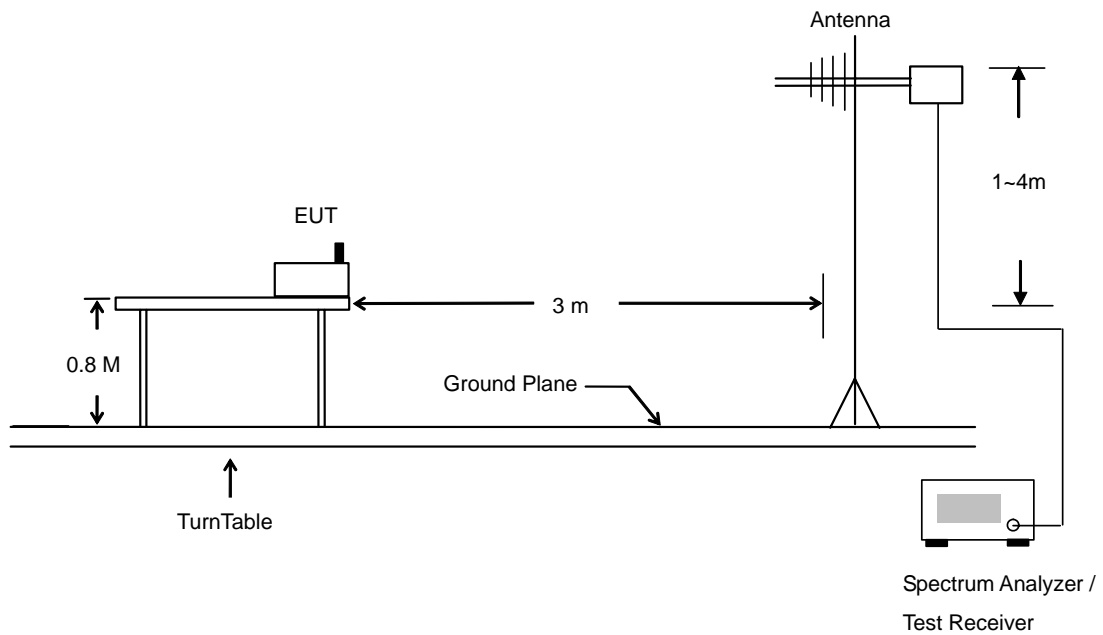
### **5.8.1 Measuring Instruments**

As described in chapter 6 of this Report.

### **5.8.2 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.

5.8.3 Typical Test Setup Layout of Radiated Emission

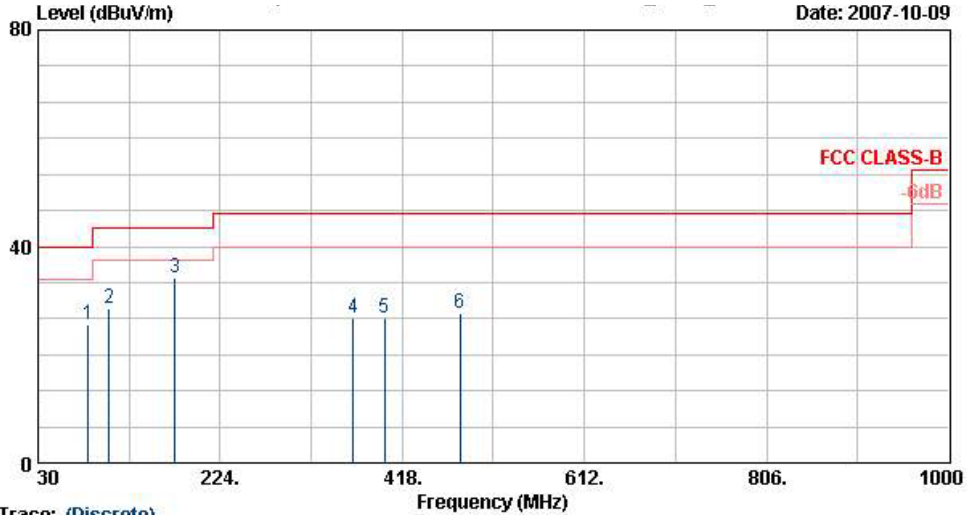




5.8.4 Test Data

- Temperature : 23~25°C
- Relating Humidity : 57~59%
- Test Enginner : Sam
- Test Mode : Mode 1
- Polarization : Horizontal (30MHz-1GHz)

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



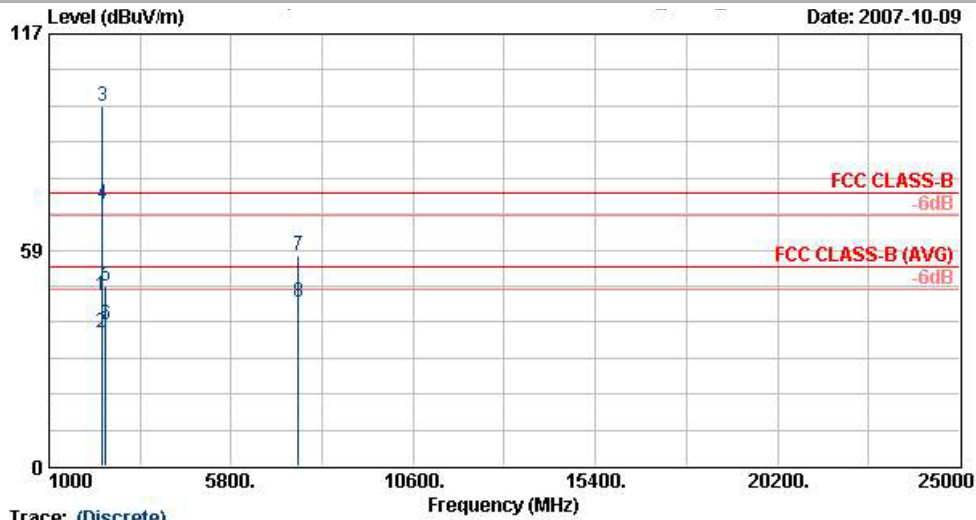
Trace: (Discrete)  
 Site : 03CH06-HY  
 Condition : FCC CLASS-B 3m LF-ANT(951121) HORIZONTAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_Ch00;2402MHz  
 Data Rate : DH1  
 Plane : E2

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	83.73	25.58	-14.42	40.00	47.71	7.97	0.99	31.10	---	---	Peak
2	105.33	28.61	-14.89	43.50	47.17	11.44	1.09	31.10	---	---	Peak
3	175.53	34.06	-9.44	43.50	53.88	9.76	1.45	31.02	100	185	Peak
4	365.80	26.67	-19.33	46.00	40.52	14.89	2.14	30.89	---	---	Peak
5	399.40	26.91	-19.09	46.00	39.78	15.76	2.23	30.86	---	---	Peak
6	479.90	27.67	-18.33	46.00	38.86	17.09	2.53	30.81	---	---	Peak



- Polarization : Horizontal (1GHz-25GHz)

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



Trace: (Discrete)  
 Site : 03CH06-HY  
 Condition : FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_Ch00;2402MHz  
 Data Rate : DH1  
 Plane : E2

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	2390.00	46.01	-27.99	74.00	47.46	30.26	3.75	35.46	100	0	Peak
2	2390.00	36.13	-17.87	54.00	37.58	30.26	3.75	35.46	100	212	Average
3 X	2402.00	97.43			98.85	30.26	3.77	35.46	100	0	Peak
4 X	2402.00	71.06			72.49	30.26	3.77	35.46	100	212	Average
5	2498.00	48.71	-25.29	74.00	50.06	30.30	3.88	35.53	100	0	Peak
6	2498.00	38.10	-15.90	54.00	39.45	30.30	3.88	35.53	100	212	Average
7	7566.00	56.92	-17.08	74.00	46.32	38.99	7.64	36.04	100	0	Peak
8	7566.00	44.33	-9.67	54.00	33.73	38.99	7.64	36.04	100	90	Average

Remark:

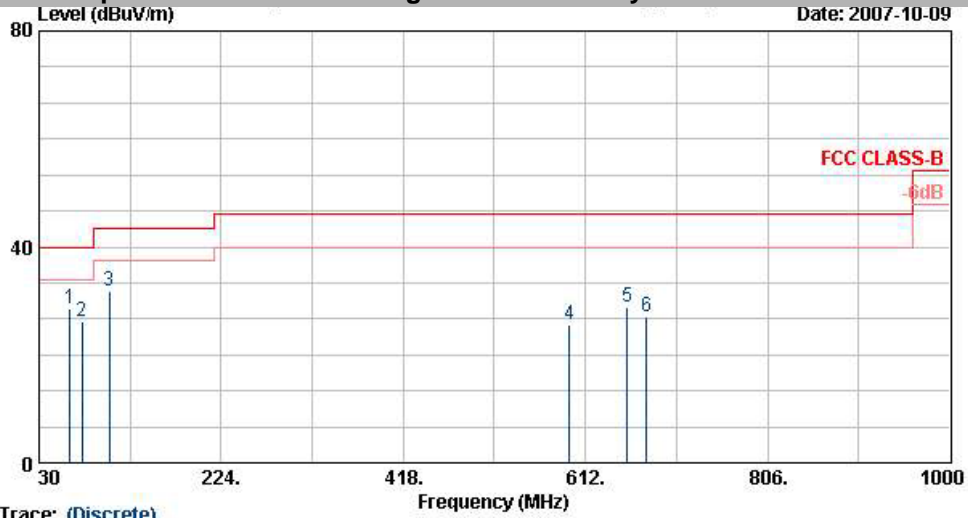
1. "3" represents the Fundamental Signal
2. "4" represents the Fundamental Signal





- Polarization : Vertical (30MHz-1GHz)

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



Trace: (Discrete)

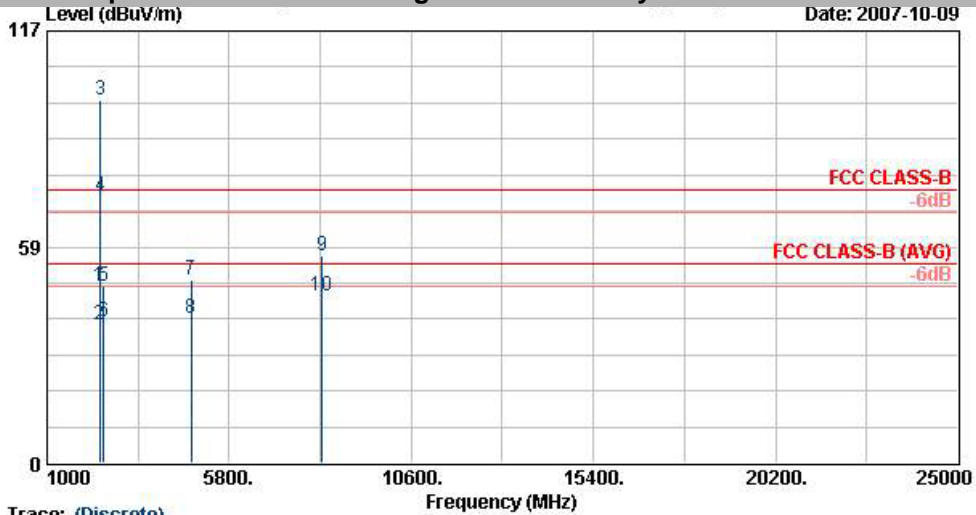
Site : 03CH06-HY  
 Condition : FCC CLASS-B 3m LF-ANT(951121) VERTICAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_Ch00;2402MHz  
 Data Rate : DH1  
 Plane : E2

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	62.94	28.42	-11.58	40.00	52.02	6.70	0.88	31.18	---	---	Peak
2	75.63	26.29	-13.71	40.00	49.25	7.23	0.95	31.15	---	---	Peak
3	104.79	31.94	-11.56	43.50	50.57	11.37	1.09	31.10	100	233	Peak
4	595.40	25.46	-20.54	46.00	34.76	18.42	2.94	30.67	---	---	Peak
5	656.30	28.88	-17.12	46.00	37.69	18.71	3.12	30.64	---	---	Peak
6	677.30	27.12	-18.88	46.00	35.77	18.79	3.18	30.62	---	---	Peak



- Polarization : Vertical (1GHz-25GHz)

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



Trace: (Discrete)

Site : 03CH06-HY  
 Condition : FCC CLASS-B 3m SHF-EHF HORN VERTICAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_Ch00;2402MHz  
 Data Rate : DH1  
 Plane : E2

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	2390.00	47.63	-26.37	74.00	49.08	30.26	3.75	35.46	100	0 Peak
2	2390.00	37.23	-16.77	54.00	38.68	30.26	3.75	35.46	100	232 Average
3 @	2402.00	98.11	24.11	74.00	99.54	30.26	3.77	35.46	100	0 Peak
4 X	2402.00	72.09			73.52	30.26	3.77	35.46	100	232 Average
5	2498.00	47.94			49.29	30.30	3.88	35.53	100	0 Peak
6	2498.00	38.09	-15.91	54.00	39.44	30.30	3.88	35.53	100	232 Average
7	4804.00	49.48	-24.52	74.00	46.87	32.88	5.83	36.10	100	0 Peak
8	4804.00	39.02	-14.98	54.00	36.41	32.88	5.83	36.10	100	333 Average
9	8247.00	56.28	-17.72	74.00	44.79	39.41	8.06	35.98	100	0 Peak
10	8247.00	45.31	-8.69	54.00	33.83	39.41	8.06	35.98	100	248 Average

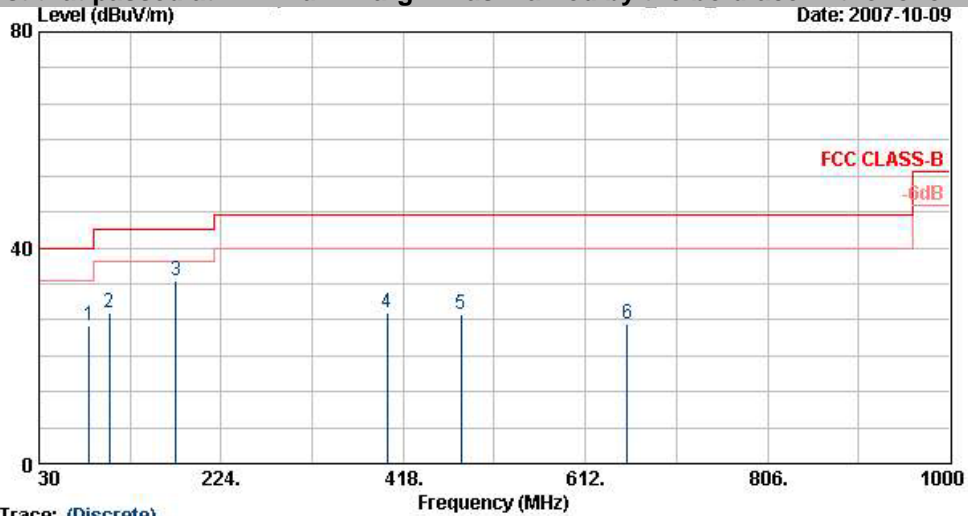
Remark:

1. "3" represents the Fundamental Signal
2. "4" represents the Fundamental Signal



- Test Mode : Mode 2
- Polarization : Horizontal (30MHz-1GHz)

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



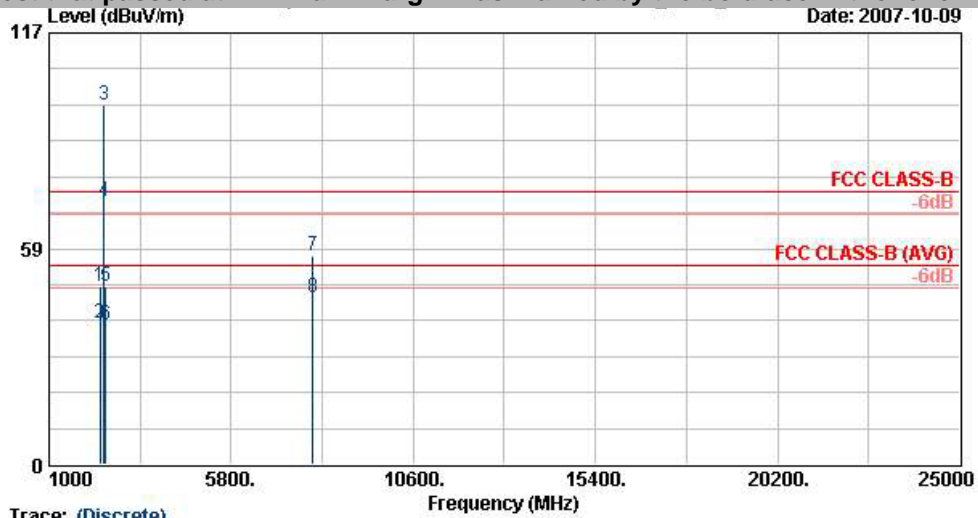
Trace: (Discrete)  
 Site : D3CH06-HY  
 Condition : FCC CLASS-B 3m LF-ANT(951121) HORIZONTAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_Ch39;2441MHz  
 Data Rate : DH1  
 Plane : E2

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	83.73	25.60	-14.40	40.00	47.73	7.97	0.99	31.10	---	---	Peak
2	104.79	27.89	-15.61	43.50	46.53	11.37	1.09	31.10	---	---	Peak
3	175.53	33.97	-9.53	43.50	53.78	9.76	1.45	31.02	100	177	Peak
4	400.80	27.81	-18.19	46.00	40.66	15.78	2.23	30.86	---	---	Peak
5	479.90	27.70	-18.30	46.00	38.89	17.09	2.53	30.81	---	---	Peak
6	656.30	25.78	-20.22	46.00	34.59	18.71	3.12	30.64	---	---	Peak



- Polarization : Horizontal (1GHz-25GHz)

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



Trace: (Discrete)

Site : 03CH06-HY  
 Condition : FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_Ch39;2441MHz  
 Data Rate : DHI  
 Plane : E2

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	2348.00	48.47	-25.53	74.00	49.95	30.24	3.71	35.42	100	0	Peak
2	2348.00	38.20	-15.80	54.00	39.68	30.24	3.71	35.42	100	222	Average
3 @	2441.00	97.51			98.91	30.28	3.82	35.49	100	0	Peak
4 X	2441.00	71.32			72.72	30.28	3.82	35.49	100	222	Average
5	2488.00	48.47	-25.53	74.00	49.82	30.30	3.86	35.51	100	0	Peak
6	2488.00	38.04	-15.96	54.00	39.39	30.30	3.86	35.51	100	222	Average
7	7962.00	56.49	-17.51	74.00	45.02	39.55	7.78	35.86	100	0	Peak
8	7962.00	45.11	-8.89	54.00	33.64	39.55	7.78	35.86	100	100	Average

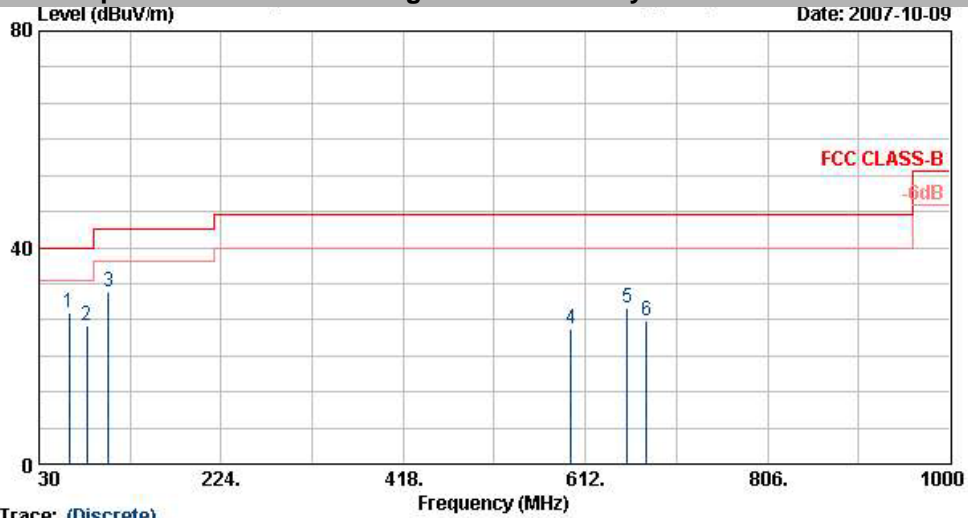
Remark:

1. "3" represents the Fundamental Signal
2. "4" represents the Fundamental Signal



- Polarization : Vertical (30MHz-1GHz)

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



Trace: (Discrete)

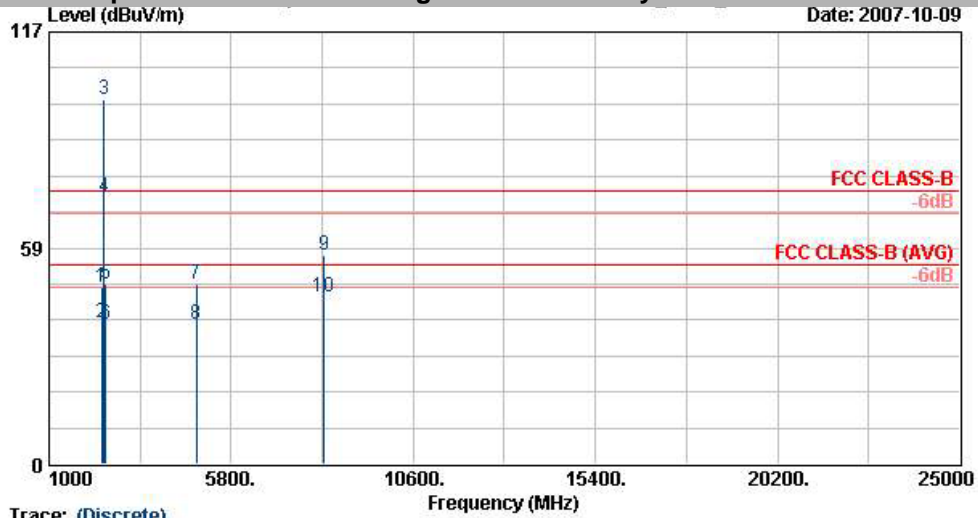
Site : 03CH06-HY  
 Condition : FCC CLASS-B 3m LP-ANT(951121) VERTICAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_Ch39;2441MHz  
 Data Rate : DH1  
 Plane : E2

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	62.13	28.01	-11.99	40.00	51.66	6.67	0.87	31.20	---	---	Peak
2	81.03	25.54	-14.46	40.00	47.99	7.67	0.98	31.09	---	---	Peak
3	103.98	31.69	-11.81	43.50	50.42	11.29	1.08	31.11	100	235	Peak
4	596.80	25.04	-20.96	46.00	34.33	18.43	2.95	30.67	---	---	Peak
5	656.30	28.80	-17.20	46.00	37.61	18.71	3.12	30.64	---	---	Peak
6	677.30	26.50	-19.50	46.00	35.14	18.79	3.18	30.62	---	---	Peak



- Polarization : Vertical (1GHz-25GHz)

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



Trace: (Discrete)  
 Site : 03CH06-HY  
 Condition : FCC CLASS-B 3m SHF-EHF HORN VERTICAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_Ch39;2441MHz  
 Data Rate : DH1  
 Plane : E2

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBUV/m	dB	dBUV/m	dBUV	dB/m	dB	dB	cm	deg	
1	2384.00	47.96	-26.04	74.00	49.39	30.25	3.75	35.44	100	0	Peak
2	2384.00	38.30	-15.70	54.00	39.74	30.25	3.75	35.44	100	233	Average
3 @	2441.00	98.62			100.00	30.28	3.82	35.47	100	0	Peak
4 X	2441.00	72.37			73.77	30.28	3.82	35.49	100	233	Average
5	2498.00	48.63	-25.37	74.00	49.98	30.30	3.88	35.53	100	0	Peak
6	2498.00	37.99	-16.01	54.00	39.34	30.30	3.88	35.53	100	233	Average
7	4882.00	48.54	-25.46	74.00	45.68	33.14	5.88	36.16	100	0	Peak
8	4882.00	38.01	-15.99	54.00	35.15	33.14	5.88	36.16	100	332	Average
9	8241.00	56.76	-17.24	74.00	45.28	39.41	8.06	35.98	100	0	Peak
10	8241.00	45.11	-8.89	54.00	33.63	39.41	8.06	35.98	100	12	Average

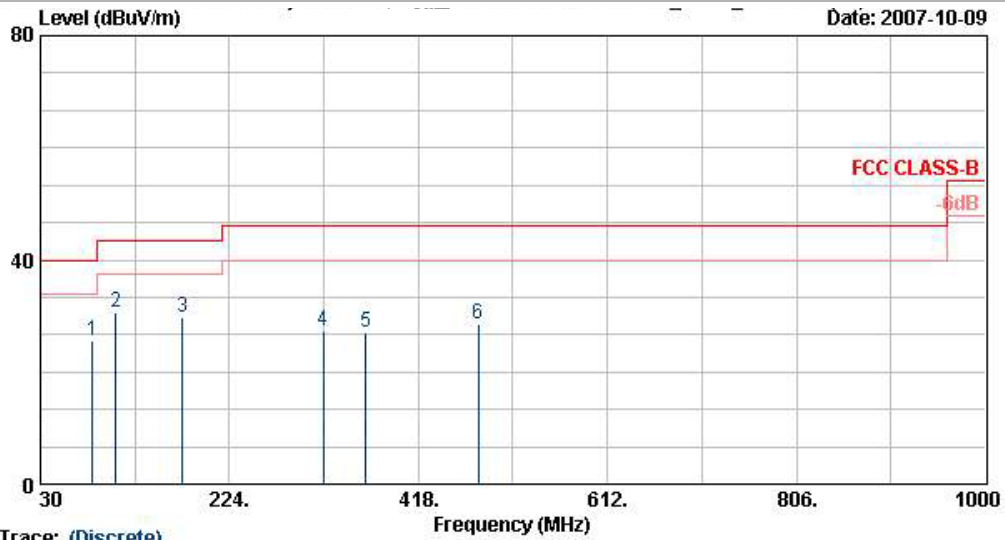
Remark:

1. "3" represents the Fundamental Signal
2. "4" represents the Fundamental Signal



- Test Mode : Mode 3
- Polarization : Horizontal (30MHz-1GHz)

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



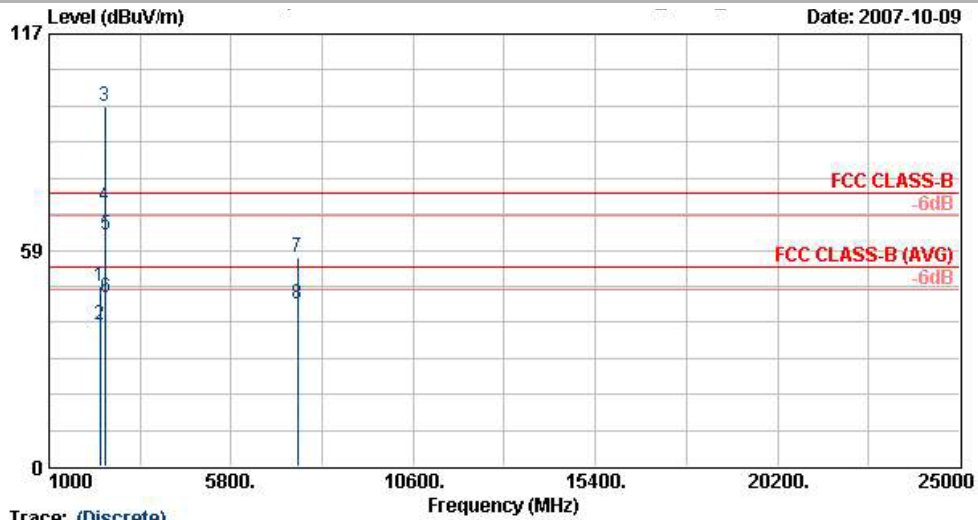
Site : 03CH06-HY  
 Condition : FCC CLASS-B 3m LF-ANT(851121) HORIZONTAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_CH78;2480MHz  
 Data Rate : DH1  
 Plane : E2

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBUV/m	dB	dBUV/m	dBUV	dB/m	dB	dB	cm	deg	
1	83.73	25.51	-14.49	40.00	47.64	7.97	0.99	31.10	---	---	Peak
2	107.49	30.48	-13.02	43.50	48.84	11.60	1.10	31.06	100	65	Peak
3	175.53	29.80	-13.70	43.50	49.62	9.76	1.45	31.02	---	---	Peak
4	320.30	27.39	-18.61	46.00	42.58	13.73	2.00	30.92	---	---	Peak
5	364.40	27.04	-18.96	46.00	40.92	14.87	2.14	30.89	---	---	Peak
6	479.90	28.41	-17.59	46.00	39.60	17.09	2.53	30.81	---	---	Peak



- Polarization : Horizontal (1GHz-25GHz)

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



Trace: (Discrete)  
 Site : 03CH06-HY  
 Condition : FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_CH78;2480MHz  
 Data Rate : DH1  
 Plane : E2

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	2354.00	48.58	-25.42	74.00	50.05	30.24	3.71	35.42	100	0	Peak
2	2354.00	38.25	-15.75	54.00	39.72	30.24	3.71	35.42	100	213	Average
3 X	2480.00	97.34			98.70	30.29	3.86	35.51	100	0	Peak
4 X	2480.00	70.42			71.78	30.29	3.86	35.51	100	213	Average
5	2483.50	62.64	-11.36	74.00	64.00	30.29	3.86	35.51	100	0	Peak
<b>6</b>	<b>2483.50</b>	<b>45.59</b>	<b>-8.41</b>	<b>54.00</b>	<b>46.95</b>	<b>30.29</b>	<b>3.86</b>	<b>35.51</b>	<b>100</b>	<b>213</b>	<b>Average</b>
7	7557.00	56.45	-17.55	74.00	45.86	38.99	7.63	36.04	100	0	Peak
8	7557.00	43.93	-10.07	54.00	33.34	38.99	7.63	36.04	100	154	Average

Remark:

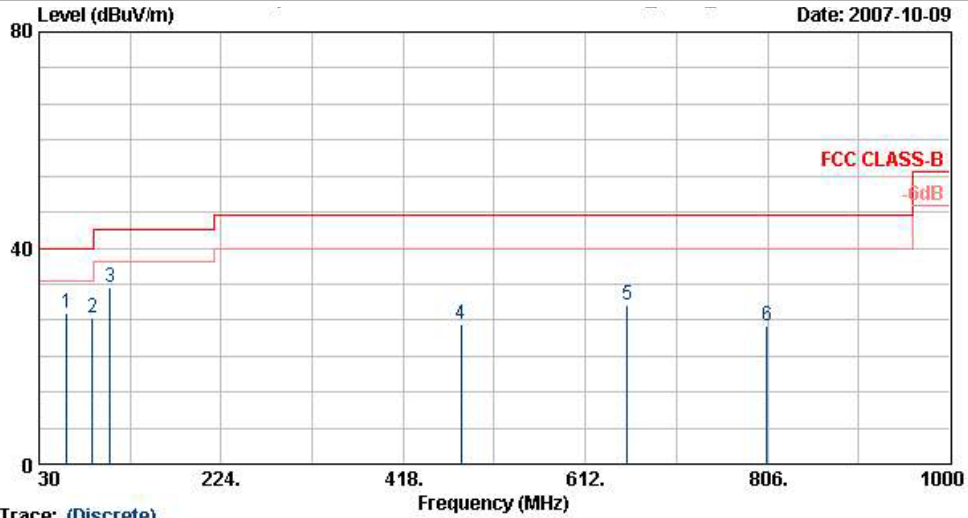
1. "3" represents the Fundamental Signal
2. "4" represents the Fundamental Signal





- Polarization : Vertical (30MHz-1GHz)

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



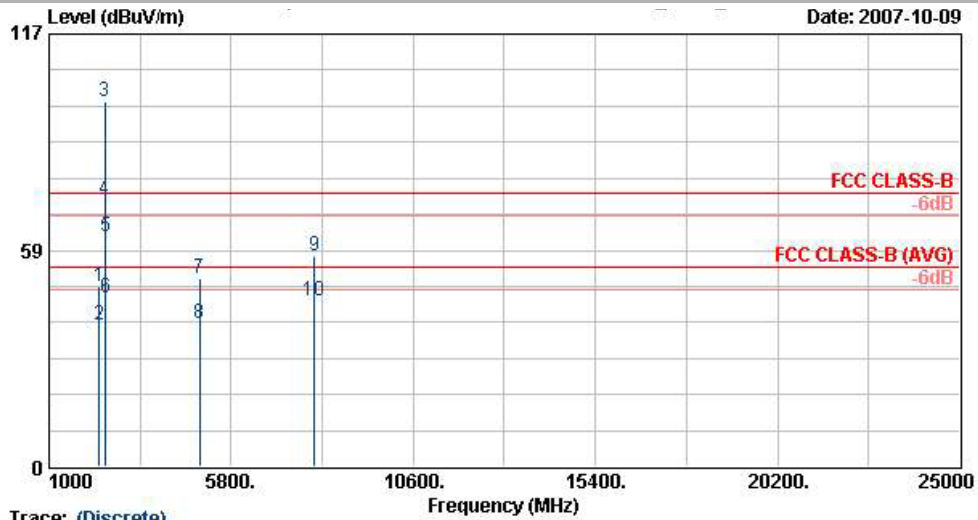
Trace: (Discrete)  
 Site : 03CH06-HY  
 Condition : FCC CLASS-B 3m LF-ANT(951121) VERTICAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_CH78;2480MHz  
 Data Rate : DH1  
 Plane : E2

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB	dB	cm	deg	
1	59.43	28.04	-11.96	40.00	51.66	6.77	0.85	31.23	---	Peak
2	87.24	26.92	-13.08	40.00	48.44	8.58	1.02	31.12	---	Peak
3	105.33	32.80	-10.70	43.50	51.36	11.44	1.09	31.10	100	99 Peak
4	479.90	25.99	-20.01	46.00	37.18	17.09	2.53	30.81	---	Peak
5	656.30	29.44	-16.56	46.00	38.26	18.71	3.12	30.64	---	Peak
6	805.40	25.60	-20.40	46.00	32.80	19.85	3.43	30.48	---	Peak



- Polarization : Vertical (1GHz-25GHz)

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



Trace: (Discrete)  
 Site : 03CH06-HY  
 Condition : FCC CLASS-B 3m SHF-EHF HORN VERTICAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_CH78;2480MHz  
 Data Rate : DH1  
 Plane : E2

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	2314.00	48.68	-25.32	74.00	50.20	30.22	3.66	35.40	100	0	Peak
2	2314.00	38.25	-15.75	54.00	39.76	30.22	3.66	35.40	100	234	Average
3 @	2480.00	98.89			100.25	30.29	3.86	35.51	100	0	Peak
4 X	2480.00	72.26			73.62	30.29	3.86	35.51	100	234	Average
5	2483.50	62.23	-11.77	74.00	63.59	30.29	3.86	35.51	100	0	Peak
6	2483.50	45.45	-8.55	54.00	46.81	30.29	3.86	35.51	100	234	Average
7	4960.00	51.05	-22.95	74.00	47.88	33.47	5.93	36.23	100	0	Peak
8	4960.00	38.92	-15.08	54.00	35.75	33.47	5.93	36.23	100	202	Average
9	7992.00	56.92	-17.08	74.00	45.40	39.58	7.79	35.85	100	0	Peak
10	7992.00	44.65	-9.35	54.00	33.13	39.58	7.79	35.85	100	86	Average

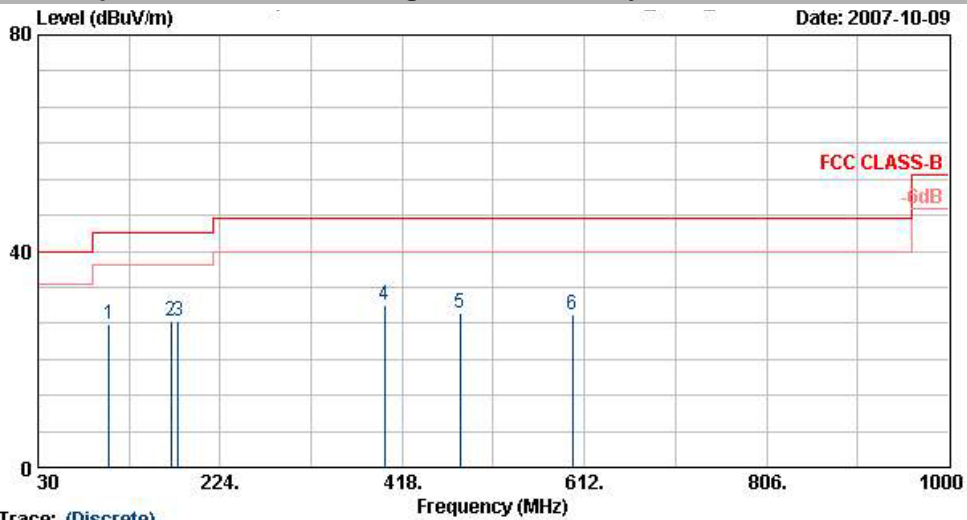
Remark:

1. "3" represents the Fundamental Signal
2. "4" represents the Fundamental Signal



- Test Mode : Mode 6
- Polarization : Horizontal (30MHz-1GHz)

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



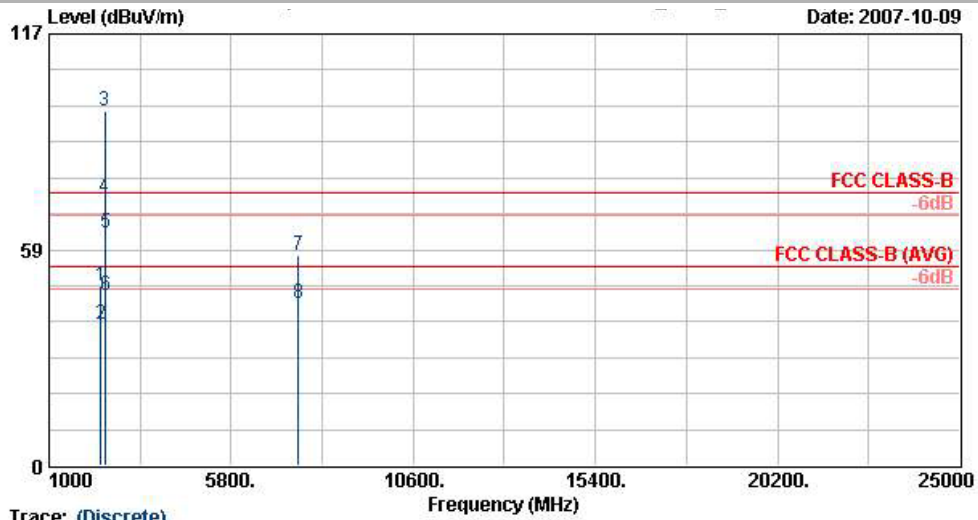
Trace: (Discrete)  
 Site : 03CH06-HY  
 Condition : FCC CLASS-B 3m LF-ANT(951121) HORIZONTAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_Ch78;2480MHz  
 Data Rate : 2-DH1  
 Plane : E2

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	105.33	26.61	-16.89	43.50	45.17	11.44	1.09	31.10	---	---	Peak
2	171.48	27.00	-16.50	43.50	46.69	9.88	1.43	31.00	---	---	Peak
3	179.58	27.15	-16.35	43.50	47.23	9.50	1.46	31.04	---	---	Peak
4 @	399.40	29.91	-16.09	46.00	42.78	15.76	2.23	30.86	100	30	Peak
5	479.20	28.49	-17.51	46.00	39.70	17.08	2.52	30.81	---	---	Peak
6	598.90	28.25	-17.75	46.00	37.51	18.45	2.95	30.66	---	---	Peak



- Polarization : Horizontal (1GHz-25GHz)

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



Trace: (Discrete)  
 Site : 03CH06-HY  
 Condition : FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_CH78;2480MHz  
 Data Rate : 2-DH1  
 Plane : E2

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBUV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBUV/m	dBUV	dB/m	dB	dB	cm	deg	
1	2364.00	48.79	-25.21	74.00	50.23	30.24	3.73	35.42	100	0	Peak
2 @	2364.00	38.13	-15.87	54.00	39.58	30.24	3.73	35.42	132	161	Average
3 @	2480.00	96.19			97.55	30.29	3.86	35.51	100	0	Peak
4 @	2480.00	72.77			74.13	30.29	3.86	35.51	132	161	Average
5 @	2483.50	62.98	-11.02	74.00	64.34	30.29	3.86	35.51	100	0	Peak
<b>6 @</b>	<b>2483.50</b>	<b>45.98</b>	<b>-8.02</b>	<b>54.00</b>	<b>47.34</b>	<b>30.29</b>	<b>3.86</b>	<b>35.51</b>	<b>132</b>	<b>161</b>	<b>Average</b>
7	7566.00	56.82	-17.18	74.00	46.22	38.99	7.64	36.04	100	0	Peak
8 @	7566.00	43.90	-10.10	54.00	33.30	38.99	7.64	36.04	100	255	Average

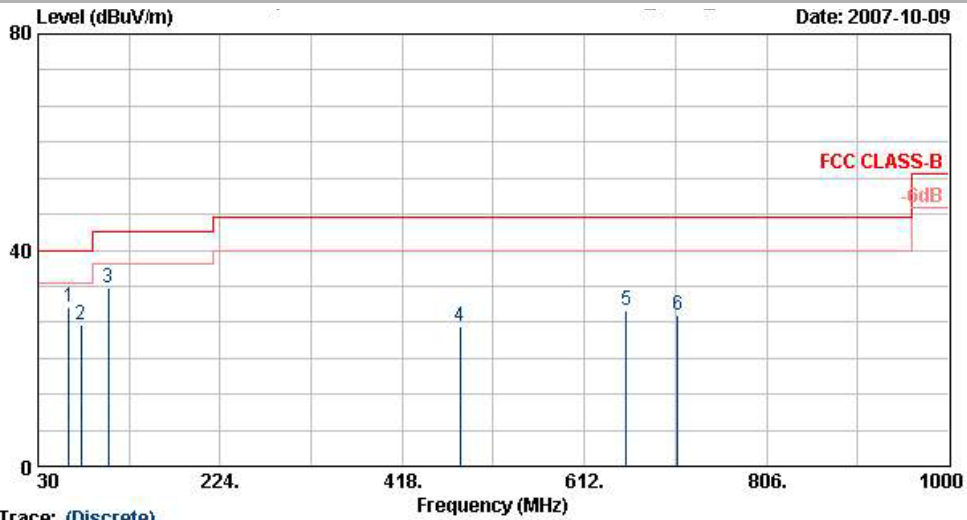
Remark:

1. "3" represents the Fundamental Signal
2. "4" represents the Fundamental Signal



- Polarization : Vertical (30MHz-1GHz)

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



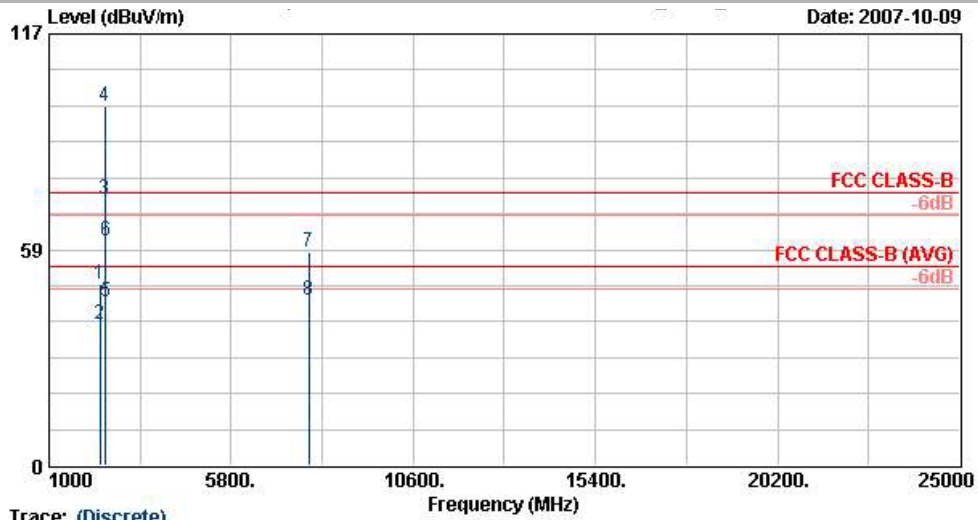
Trace: (Discrete)  
 Site : 03CH06-HY  
 Condition : FCC CLASS-B 3m LF-ANT(951121) VERTICAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_CH78;2460MHz  
 Data Rate : 2-DH1  
 Plane : E2

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	62.94	29.42	-10.58	40.00	53.02	6.70	0.88	31.18	---	---	Peak
2 @	75.63	26.29	-13.71	40.00	49.25	7.23	0.95	31.15	---	---	Peak
3 @	104.79	32.94	-10.56	43.50	51.57	11.37	1.09	31.10	100	36	Peak
4	479.90	25.91	-20.09	46.00	37.10	17.09	2.53	30.81	---	---	Peak
5	656.30	28.88	-17.12	46.00	37.69	18.71	3.12	30.64	---	---	Peak
6	710.90	27.98	-18.02	46.00	36.30	18.99	3.27	30.58	---	---	Peak



- Polarization : Vertical (1GHz-25GHz)

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



Trace: (Discrete)  
 Site : D3CH06-HY  
 Condition : FCC CLASS-B 3m SHF-EHF HORN VERTICAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_CH78;2480MHz  
 Data Rate : 2-DH1  
 Plane : E2

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	2348.00	49.08	-24.92	74.00	50.56	30.24	3.71	35.42	100	0 Peak
2 @	2348.00	38.07	-15.93	54.00	39.55	30.24	3.71	35.42	100	232 Average
3 @	2480.00	72.12			73.48	30.29	3.86	35.51	100	232 Average
4 @	2480.00	97.46			98.82	30.29	3.86	35.51	100	0 Peak
5 @	2483.50	44.35	-9.65	54.00	45.71	30.29	3.86	35.51	100	232 Average
6 @	2483.50	60.70	-13.30	74.00	62.06	30.29	3.86	35.51	100	0 Peak
7	7842.00	57.73	-16.27	74.00	46.54	39.37	7.73	35.91	100	0 Peak
8 @	7842.00	44.59	-9.41	54.00	33.40	39.37	7.73	35.91	100	266 Average

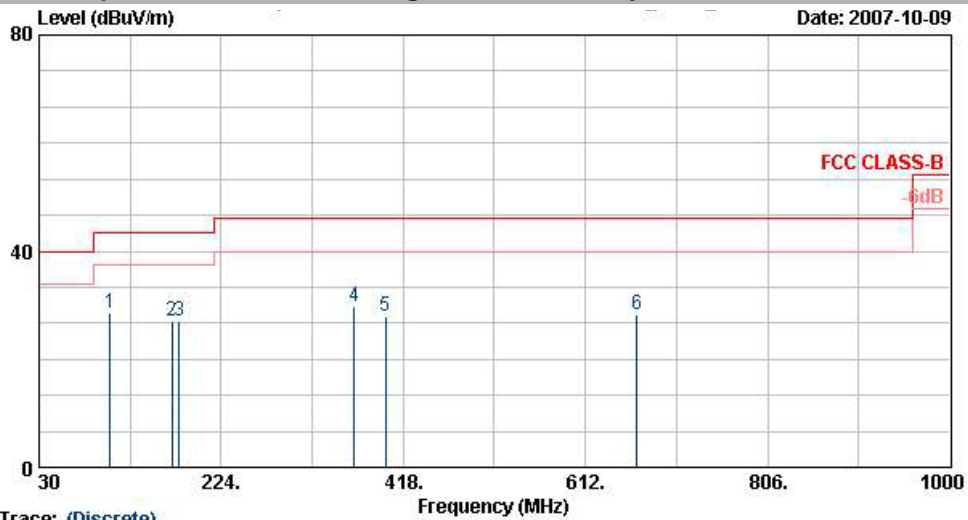
Remark:

1. "3" represents the Fundamental Signal
2. "4" represents the Fundamental Signal



- Test Mode : Mode 9
- Polarization : Horizontal (30MHz-1GHz)

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



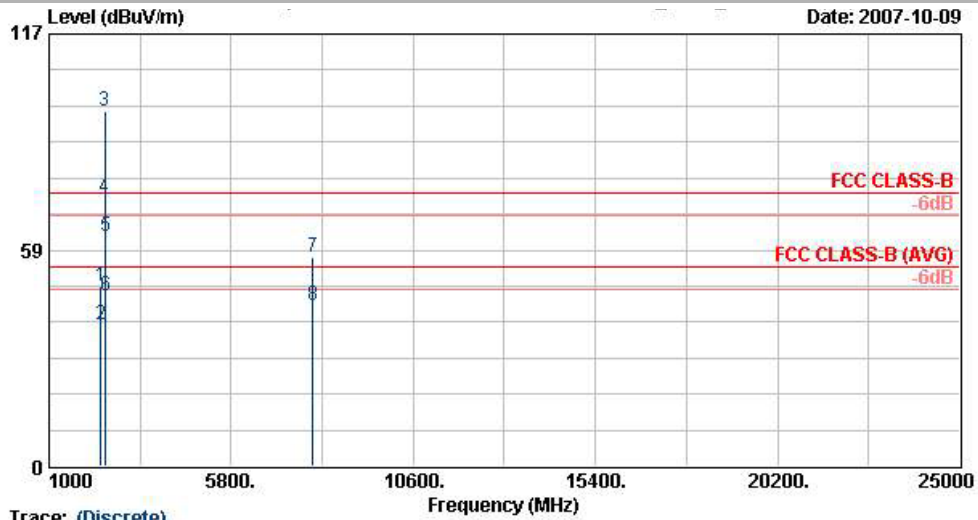
Trace: (Discrete)  
 Site : 03CH06-HY  
 Condition : FCC CLASS-B 3m LF-ANT(951121) HORIZONTAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_Ch78;2480MHz  
 Data Rate : 3-DH1  
 Plane : E2

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	105.33	28.61	-14.89	43.50	47.17	11.44	1.09	31.10	100	374	Peak
2	171.48	27.00	-16.50	43.50	46.69	9.88	1.43	31.00	---	---	Peak
3	179.58	27.15	-16.35	43.50	47.23	9.50	1.46	31.04	---	---	Peak
4	365.80	29.67	-16.33	46.00	43.52	14.89	2.14	30.89	---	---	Peak
5	399.40	27.91	-18.09	46.00	40.78	15.76	2.23	30.86	---	---	Peak
6	666.80	28.18	-17.82	46.00	36.91	18.75	3.15	30.63	---	---	Peak



- Polarization : Horizontal (1GHz-25GHz)

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



Trace: (Discrete)  
 Site : 03CH06-HY  
 Condition : FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_CH78;2480MHz  
 Data Rate : 3-DH1  
 Plane : E2

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	2368.00	48.62	-25.38	74.00	50.09	30.24	3.73	35.44	100	0	Peak
2	2368.00	38.11	-15.89	54.00	39.57	30.24	3.73	35.44	134	161	Average
3 @	2480.00	96.08			97.43	30.29	3.86	35.51	100	0	Peak
4 @	2480.00	72.84			74.20	30.29	3.86	35.51	134	161	Average
5 @	2483.50	62.07	-11.93	74.00	63.43	30.29	3.86	35.51	100	0	Peak
<b>6 @</b>	<b>2483.50</b>	<b>45.99</b>	<b>-8.01</b>	<b>54.00</b>	<b>47.35</b>	<b>30.29</b>	<b>3.86</b>	<b>35.51</b>	<b>134</b>	<b>161</b>	<b>Average</b>
7	7962.00	56.44	-17.56	74.00	44.97	39.55	7.78	35.86	100	0	Peak
8 @	7962.00	43.57	-10.43	54.00	32.10	39.55	7.78	35.86	100	241	Average

Remark:!

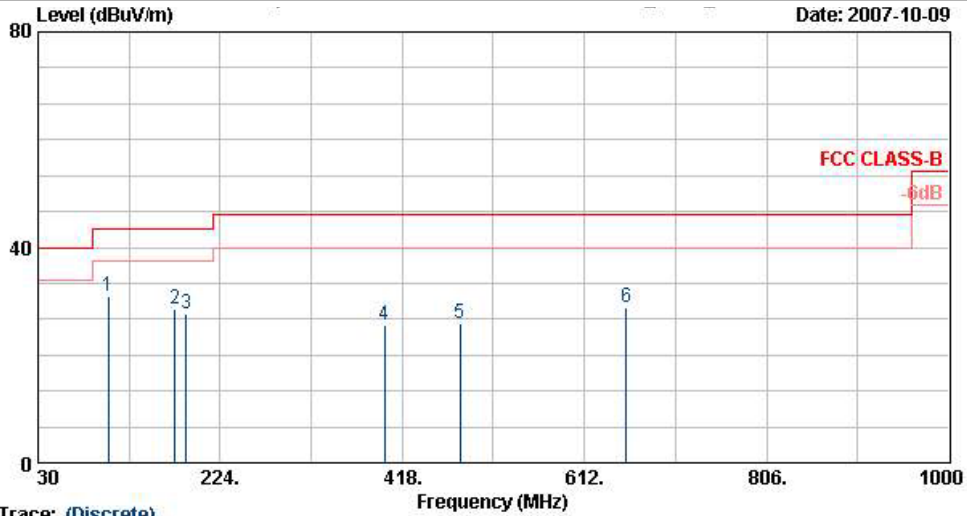
1. "3" represents the Fundamental Signal
2. "4" represents the Fundamental Signal





- Polarization : Vertical (30MHz-1GHz)

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



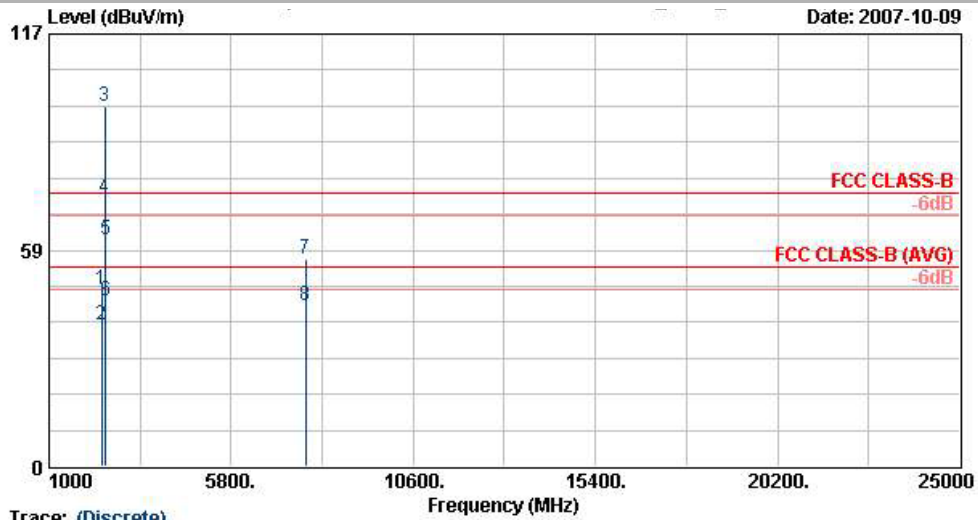
Trace: (Discrete)  
 Site : D3CH06-HY  
 Condition : FCC CLASS-B 3m LF-ANT(951121) VERTICAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_CH78;2480MHz  
 Data Rate : 3-DH1  
 Plane : E2

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	104.79	30.94	-12.56	43.50	49.57	11.37	1.09	31.10	100	263	Peak
2 @	175.53	28.67	-14.83	43.50	48.48	9.76	1.45	31.02	---	---	Peak
3	187.68	27.51	-15.99	43.50	47.65	9.38	1.50	31.02	---	---	Peak
4	399.40	25.70	-20.30	46.00	38.57	15.76	2.23	30.86	---	---	Peak
5	479.90	25.91	-20.09	46.00	37.10	17.09	2.53	30.81	---	---	Peak
6	656.30	28.88	-17.12	46.00	37.69	18.71	3.12	30.64	---	---	Peak



- Polarization : Vertical (1GHz-25GHz)

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



Trace: (Discrete)  
 Site : 03CH06-HY  
 Condition : FCC CLASS-B 3m SHF-EHF HORN VERTICAL  
 EUT : Bluetooth Module  
 Power : From System  
 Model : FR 700313  
 Mode : BT Tx\_CH78;2480MHz  
 Data Rate : 3-DH1  
 Plane : E2

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	2384.00	48.06	-25.94	74.00	49.49	30.25	3.75	35.44	100	0	Peak
2	2384.00	38.10	-15.90	54.00	39.54	30.25	3.75	35.44	100	230	Average
3 @	2480.00	97.49			98.85	30.29	3.86	35.51	100	0	Peak
4 @	2480.00	72.58			73.94	30.29	3.86	35.51	100	230	Average
5 @	2483.50	61.15	-12.85	74.00	62.51	30.29	3.86	35.51	100	0	Peak
6 @	2483.50	44.65	-9.35	54.00	46.01	30.29	3.86	35.51	100	230	Average
7	7761.00	56.20	-17.80	74.00	45.16	39.27	7.71	35.95	100	0	Peak
8 @	7761.00	43.53	-10.47	54.00	32.50	39.27	7.71	35.95	100	205	Average

Remark:

1. "3" represents the Fundamental Signal
2. "4" represents the Fundamental Signal



## **5.9 Antenna Requirements**

### **5.9.1 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.

### **5.9.2 Antenna Connected Construction**

The antennas used in this product are PCB Antenna for both WLAN and BT and it is considered to meet antenna requirement of FCC.

### **5.9.3 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	100132	9kHz – 2.75GHz	Jul. 14, 2007	Jul. 13, 2008	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001/004	9kHz – 30MHz	Mar. 30, 2007	Mar. 29, 2008	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	2001/009	9kHz – 30MHz	Mar. 30, 2007	Mar. 29, 2008	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. 04, 2006	Dec. 03, 2007	Conduction (CO01-HY)
Isolation Transformer	Erika Fiedler OHG	D-65396 Walluf	58	45MHz-2.15GHz	N/A	N/A	Conduction (CO01-HY)
Spectrum Analyzer	Agilent	E4408B	MY44211030	9KHz-26.5GHz	Oct. 05, 2007	Oct. 04, 2008	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESCS30	100356	9KHz-2.75GHz	Jul. 26, 2007	Jul. 25, 2008	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Nov. 20, 2006	Nov. 19, 2007	Radiation (03CH06-HY)
Double Ridge Horn Antenna	Com-Power	AH118	071025	1G-18G	Jun. 04, 2007	Jun. 03, 2008	Radiation (03CH06-HY)
SHF-EHF Horn	SCHWARZBECK	BBHA 9170	9170-249	14G - 40G	Nov. 20, 2006	Nov. 19, 2008	Radiation (03CH06-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1G - 26.5G	Nov. 15, 2006	Nov. 14, 2007	Radiation (03CH06-HY)
Pre Amplifier	Mini Circuits	ZKL-2	D092004-1	10~2500MHz	Nov. 15, 2006	Nov. 14, 2007	Radiation (03CH06-HY)
Base Station Simulator	R & S	CMU200	106656	WCDMA	Nov. 20, 2006	Nov. 19, 2007	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 Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ 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>				