



# FCC TEST REPORT

for

## 47 CFR Part 15 Subpart C

**Equipment** : GSM900/DCS1800/PCS1900 Tri Band Mobile Phone  
**Trade Name** : BenQ-Siemens  
**Model No.** : CF61  
**Marketing Name** : HERC5A  
**FCC ID** : JVPCF61  
**BenQ Ref. No.** : NL-6156  
**Filing Type** : Certification  
**Applicant** : **BenQ Corporation**  
157 Shan-Ying Road, Gueishan Taoyuan 333, Taiwan

- The test result refers exclusively to the test presented test model / sample.
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- **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 Apr. 11, 2006 at **Sporton International Inc. LAB.**
- Report No.: FR640711, Report Version: Rev. 01.

Dr. Daniel Lee  
EMC/SAR Director

***SPORTON International Inc.***

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***SPORTON International Inc.***

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Report Version: Rev. 01



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# 1. General Description of Equipment under Test

## 1.1. Applicant

**BenQ Corporation**

157 Shan-Ying Road, Gueishan Taoyuan 333, Taiwan

## 1.2. Manufacturer

**1. BenQ Corporation**

157 Shan-Ying Road, Gueishan Taoyuan 333, Taiwan

**2. BenQ (IT) Co., Ltd.**

No. 169, Zhujiang Road, New District, Suzhou, Jiangsu, P.R., China

## 1.3. Basic Description of Equipment under Test

Equipment	: GSM900/DCS1800/PCS1900 Tri Band Mobile Phone
Trade Name	: BenQ-Siemens
Model No.	: CF61
FCC ID	: JVPCF61
Power Supply Type	: Switching
AC Power Cord	: AC 120V, Wall-mount, 1.8 meter, 2 pin
Earphone	: 2C.43037.111
Adapter	: BenQ-Siemens, JSP054070UU
Battery	: BenQ-Siemens, 2C.2G0T0.001
Data Cable	: 5K.G6501.001



1.4. Feature of Equipment under Test

Product Feature & Specification			
1. Modulation Type/Data Rate	PCS: GMSK BT: GFSK		
2. Frequency Range.	PCS: 1850.2-1909.8 MHz(Tx), 1930.2-1989.8 MHz(Rx) BT: 2400 MHz ~ 2483.5 MHz		
3. Number of Channels	79		
4. Carrier Frequency of each channel	2402+ n*1 MHz, n= 0~78		
5. Channel Spacing	1 MHz		
6. Maximum Output Power to Antenna (Normal condition)	PCS: 29.78 dBm BT: 0.24 dBm		
7. Type of Antenna Connector	N/A		
8. Antenna Type	PCB Antenna		
9. Antenna Gain	-3 dBi		
10. HW Version	LPR4-4		
11. SW Version	V0.07		
12. Function Type	Transmitter		Transceiver V
13. Power Rating (DC/AC , Voltage)	3.7V / 750mA		
14. DUT Stage	Identical Prototype		



## 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. For spurious emission below 1GHz, only one channel of each application was tested because it is not related to channel selection.
- 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

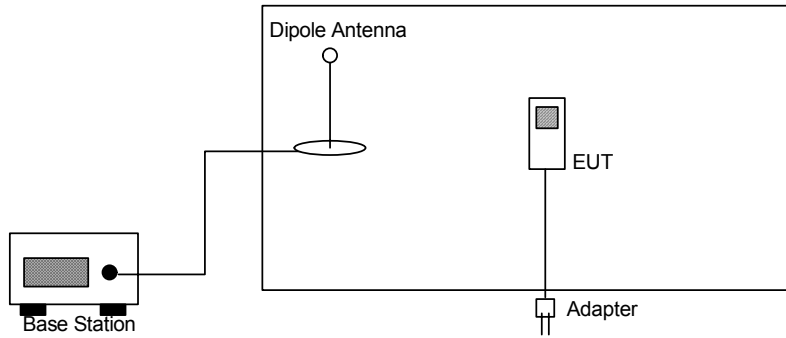
Application	Bluetooth
Radiated Emission and conducted test items	Mode 1: Tx_CH00_2402 MHz Mode 2: Tx_CH39_2441 MHz Mode 3: Tx_CH78_2480 MHz
Conducted Emission	Mode 1: PCS1900 Idle Mode + Adapter + Earphone + BT Link + Camera Mode 2: PCS1900 Idle Mode + Adapter + Earphone + BT Link + MP3 Mode 3: USB Link + Adapter

### 2.3. Ancillary Equipment List

Item	Equipment	Model No.	Power Cord
1.	Base Station (R&S)	CMU200	AC 100-240V
2.	Bluetooth Earphone (Free Style)	JD-100	N/A
3.	Notebook (DELL)	D400	N/A
4.	USB Mouse (Microsoft)	B75-00093	N/A
5.	USB Cable	N/A	Weave-shielded, 1m

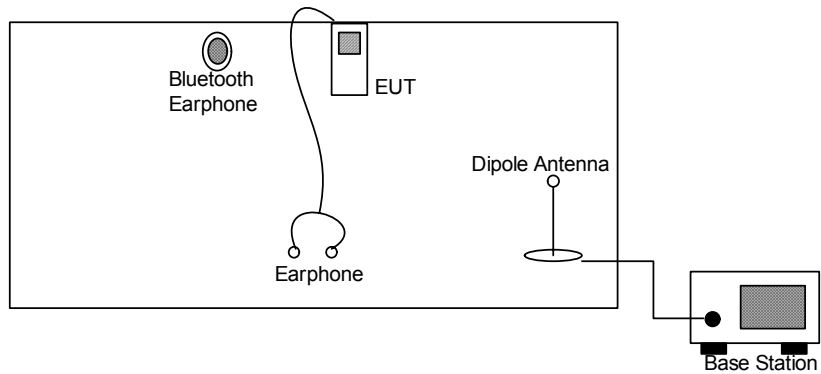
## 2.4. Connection Diagram of Test System

### <Radiation Emission>

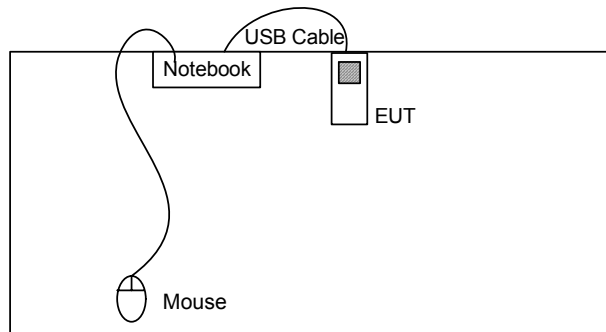


### <Conduction Emission>

#### Mode 1-2



#### Mode 3





### **3. RF Utility**

The EUT is in BT link mode with BT earphone for conducted emission or in BT continuous Tx Mode controlled by RF utility and base station simulator for radiation emission and other conducted tests.





## **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

### **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**

Conduction: from 150 kHz to 30 MHz  
Radiation: from 30 MHz to 25000MHz

### **4.5. Test Distance**

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



## 5. Report of Measurements and Examinations

### 5.1. List of Measurements and Examinations

FCC Rule	Description of Test	Result	Section
15.247(a)(1)	Hopping Channel Separation	Pass	5.2
15.247(a)(1)(iii)	Number of Hopping Frequency Used	Pass	5.3
15.247(a)(1)	Hopping Channel Bandwidth	Pass	5.4
15.247(a)(1)(iii)	Dwell Time of Each Frequency	Pass	5.5
15.247(b)(1)	Output Power	Pass	5.6
15.247(c)	100kHz Bandwidth of Frequency Band Edges	Pass	5.7
15.207	Conducted Emission	Pass	5.8
15.209	Radiated Emission	Pass	5.9
15.203	Antenna Requirement	Pass	5.10

## 5.2. Hopping Channel Separation

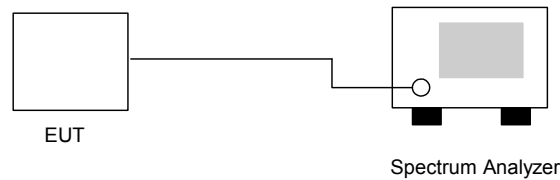
### 5.2.1. Measuring Instruments :

As described in chapter 6 of this test report.

### 5.2.2. Test Procedure :

1. The transmitter output was connected to the spectrum analyzer directly.
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.

### 5.2.3. Test Setup Layout :



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

- Temperature: 24°C
- Relative Humidity: 52%
- Test Engineer : James

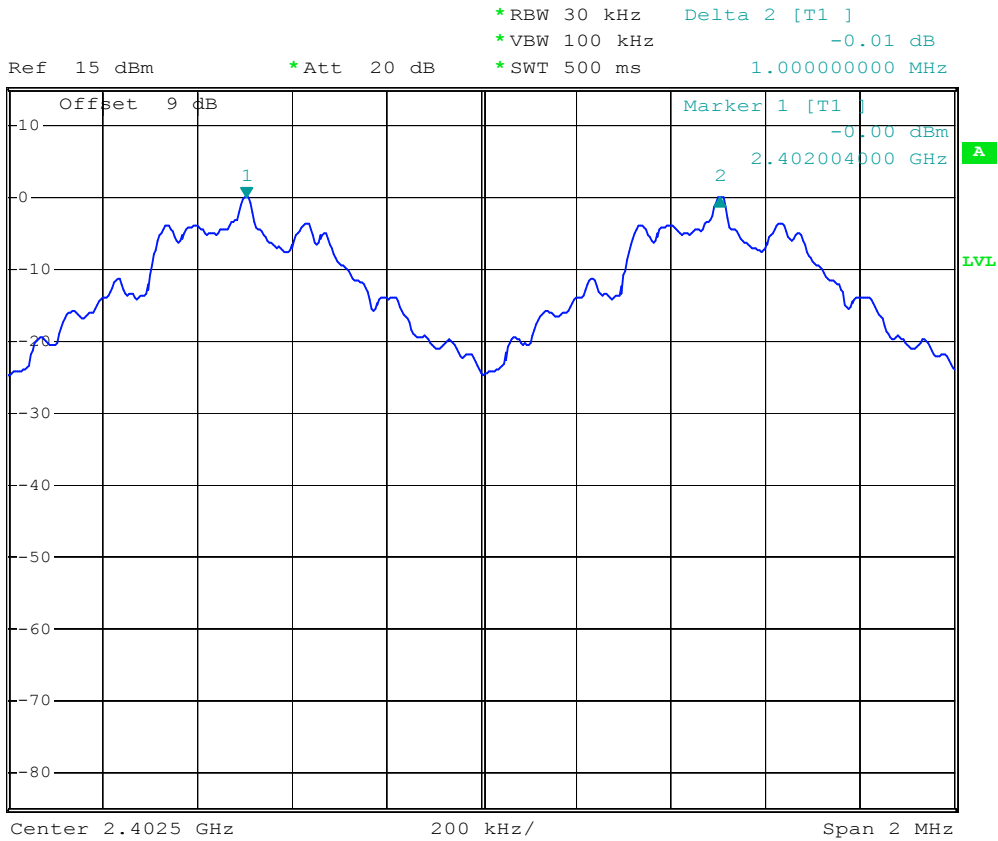
Channel	Frequency ( MHz )	Hopping Channel Separation ( MHz )	Limits ( MHz )	Plot Ref. No.
00	2402	1.000	0.870	Mode 1
39	2441	1.004	0.872	Mode 2
78	2480	1.004	0.870	Mode 3

Remark: Limit is the greater one of 25kHz or the 20dB bandwidth of the hopping channel.



5.2.5 Hopping Channel Separation

Mode 1: CH00 (2402MHz)



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Mode 2: CH39 (2441MHz)

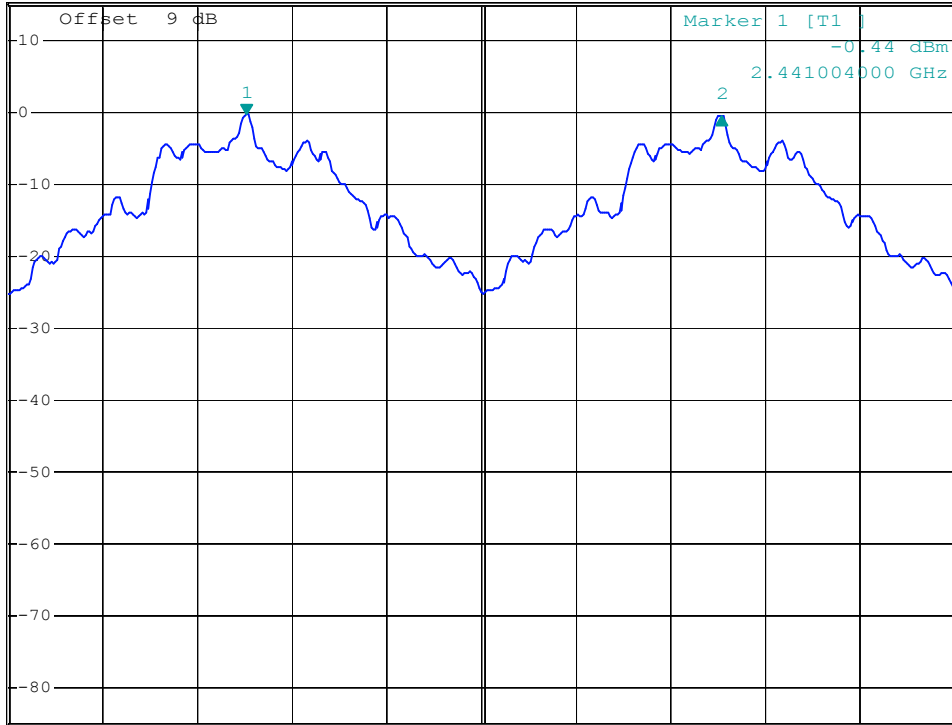


\*RBW 30 kHz    Delta 2 [T1 ]  
 \*VBW 100 kHz    -0.05 dB  
 \*SWT 500 ms    1.004000000 MHz

Ref 15 dBm

\*Att 20 dB

1 PK  
MAXH



Center 2.4415 GHz

200 kHz/

Span 2 MHz

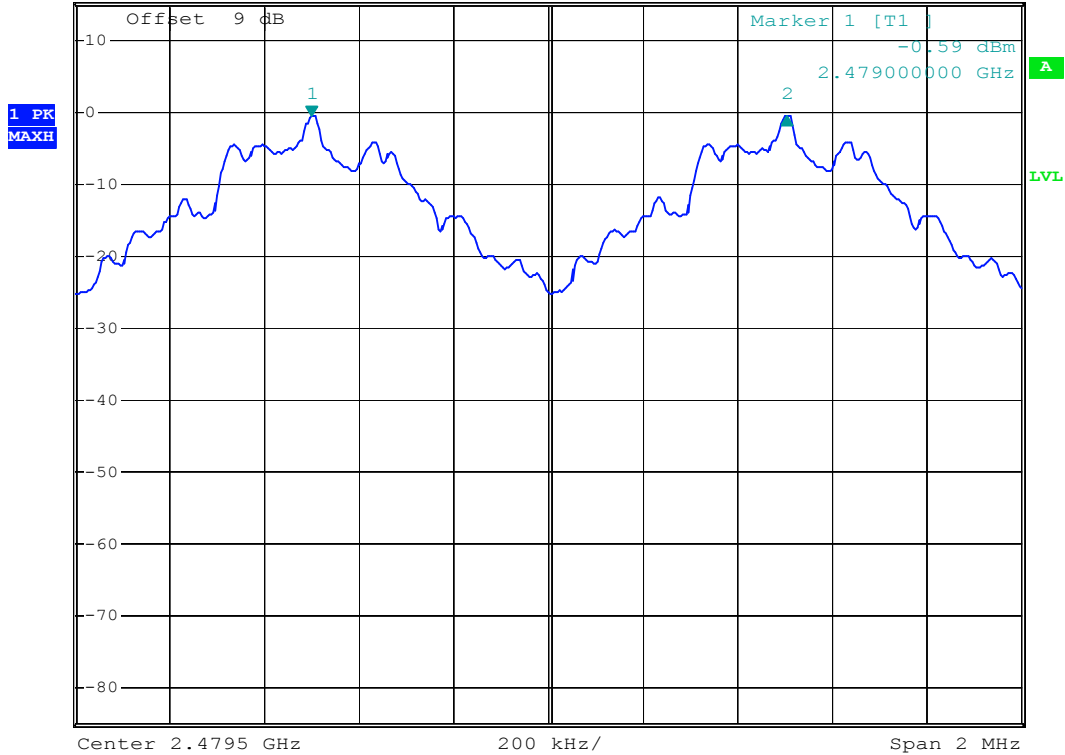
Date: 10.APR.2006 11:32:01



Mode 3: CH78 (2480MHz)



Ref 15 dBm      \*Att 20 dB      \*RBW 30 kHz      Delta 2 [T1 ]  
\*VBW 100 kHz      0.02 dB  
\*SWT 500 ms      1.004000000 MHz



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**5.3. Number of Hopping Frequency**

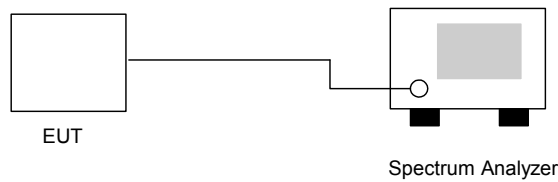
5.3.1. Measuring Instruments :

As described in chapter 6 of this test report.

5.3.2. Test Procedure :

1. The transmitter output was connected to the spectrum analyzer directly.
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.

5.3.3. Test Setup Layout :



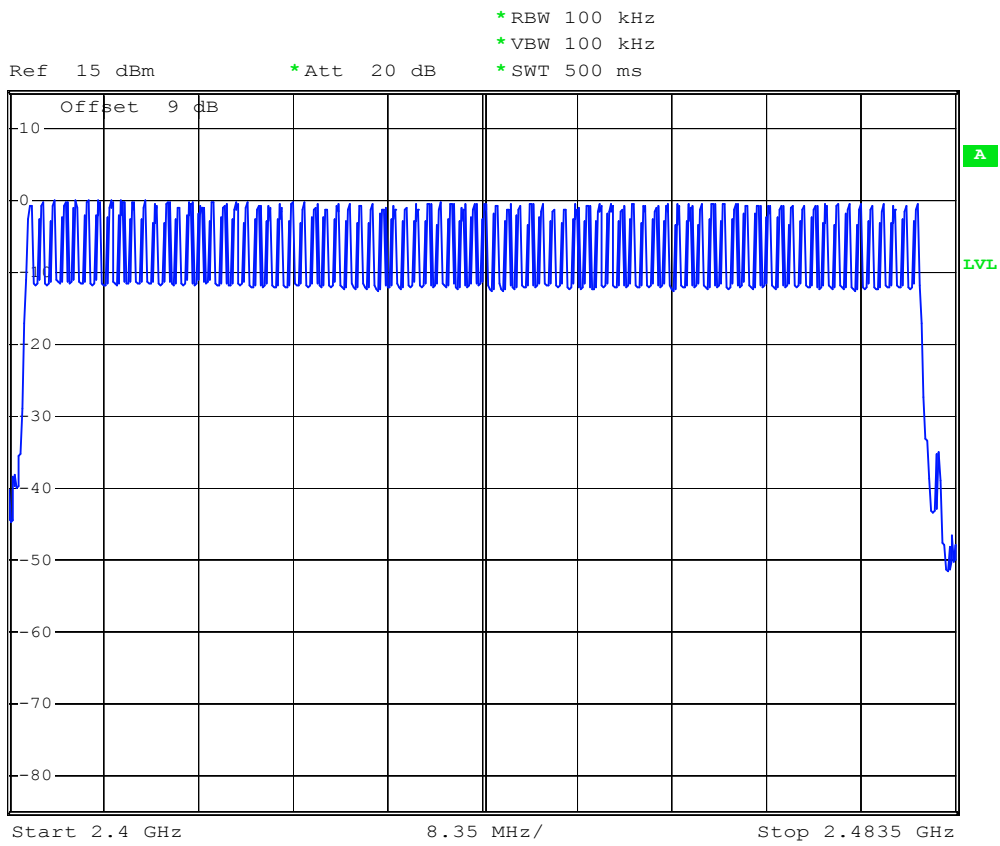
5.3.4. Test Result : See spectrum analyzer plots below

- Temperature: 24°C
- Relative Humidity: 52%
- Test Engineer : James

Number of Hopping Frequency (Channel)	Limits (Channel)
79	15



5.3.5 Number of Hopping Frequency



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### 5.4 Hopping Channel Bandwidth

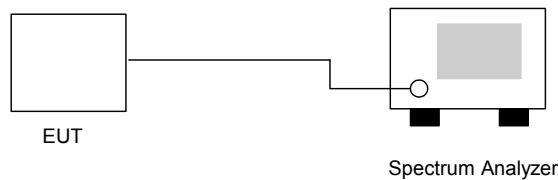
#### 5.4.1 Measuring Instruments :

As described in chapter 6 of this test report.

#### 5.4.2 Test Procedure :

1. The transmitter output was connected to the spectrum analyzer directly.
2. Set RBW of spectrum analyzer to 30kHz and VBW to 300kHz.
3. The Hopping Channel bandwidth is defined as the frequency range where the power is higher than peak power minus 20dB.

#### 5.4.3 Test Setup Layout :



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

- Temperature: 24°C
- Relative Humidity: 52%
- Test Engineer : James

Channel	Frequency (MHz)	Hopping Channel Bandwidth (MHz)	Limits (MHz)	Plot Ref. No.
00	2402	0.870	1.0	Mode 1
39	2441	0.872	1.0	Mode 2
78	2480	0.870	1.0	Mode 3

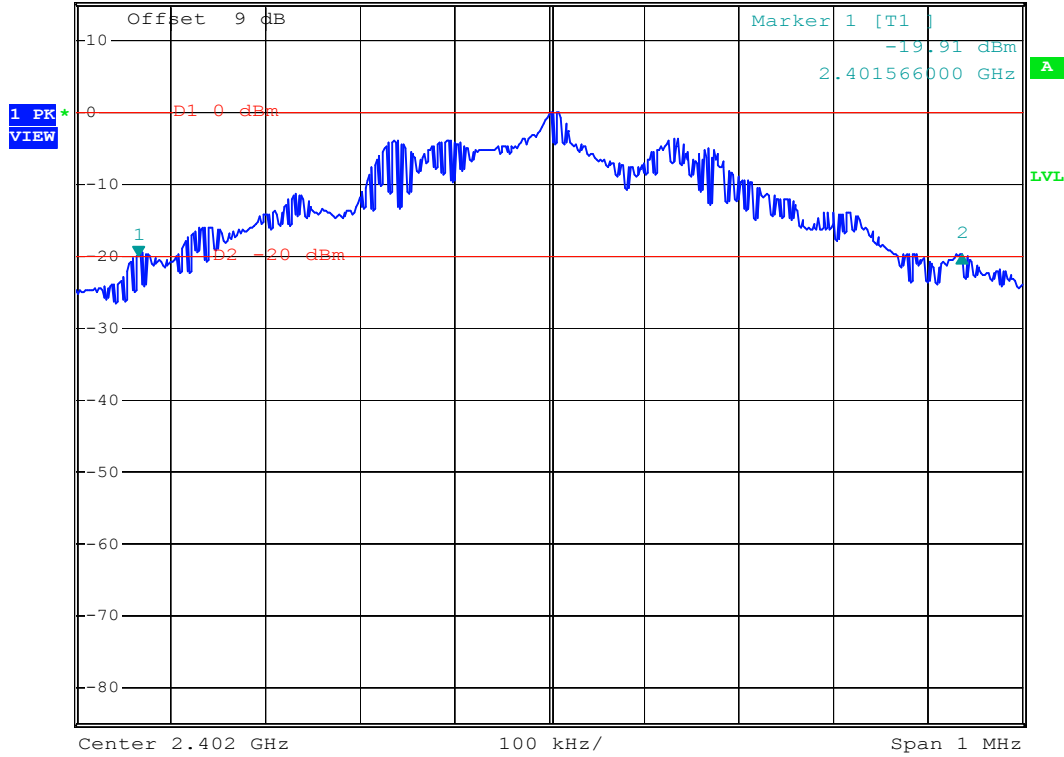


5.4.5 Hopping Channel Bandwidth

Mode 1: CH00 (2402MHz)



\*RBW 30 kHz    Delta 2 [T1 ]  
 \*VBW 300 kHz    0.03 dB  
 \*SWT 500 ms    870.00000000 kHz  
 Ref 15 dBm    \*Att 20 dB



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Mode 2: CH39 (2441MHz)

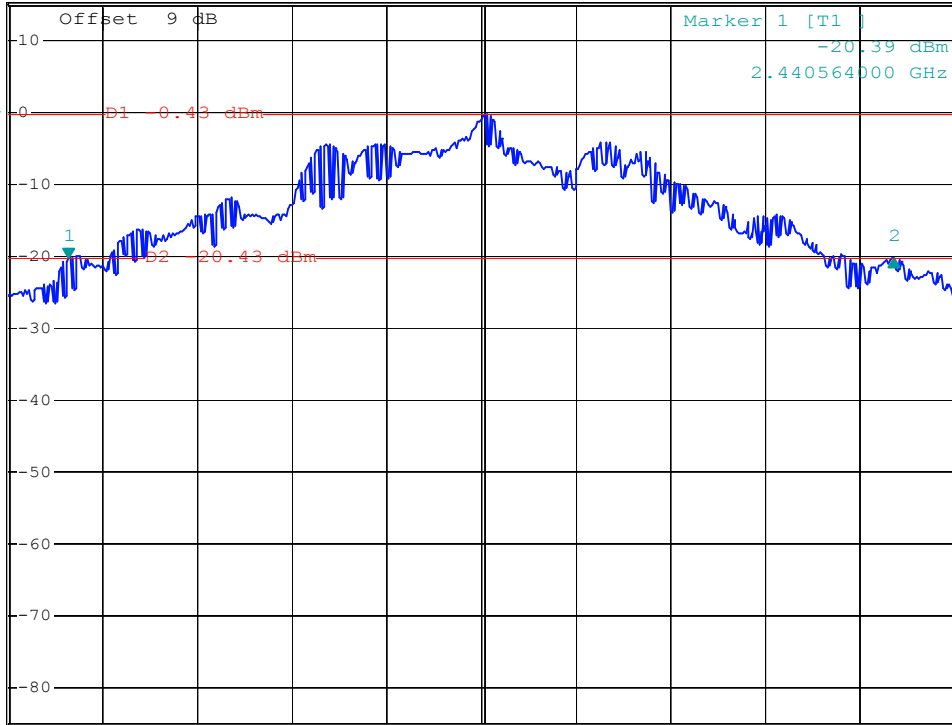


\*RBW 30 kHz    Delta 2 [T1 ]  
 \*VBW 300 kHz    0.05 dB  
 \*SWT 500 ms    872.000000000 kHz

Ref 15 dBm

\*Att 20 dB

1 PK VIEW



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Mode 3: CH78 (2480MHz)

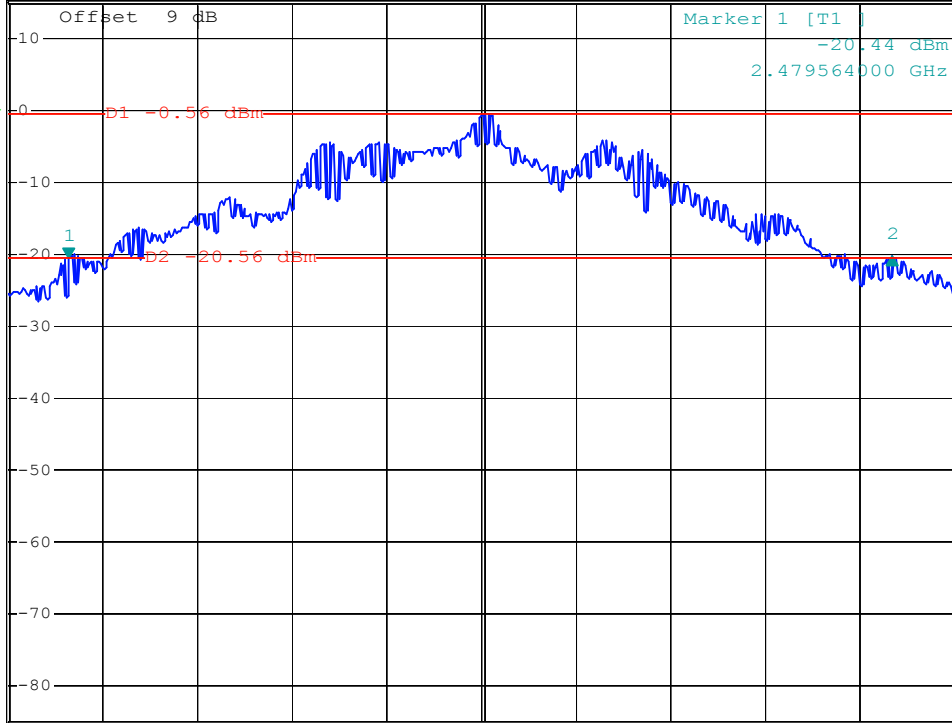


\*RBW 30 kHz    Delta 2 [T1 ]  
 \*VBW 300 kHz    0.03 dB  
 \*SWT 500 ms    870.000000000 kHz

Ref 15 dBm

\*Att 20 dB

1 PK VIEW



Center 2.48 GHz

100 kHz/

Span 1 MHz

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### 5.5 Dwell Time of Each Frequency

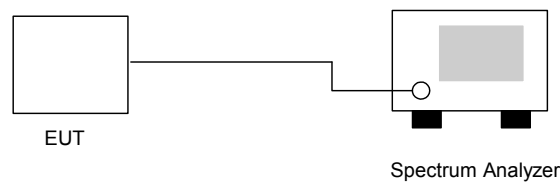
#### 5.5.1 Measuring Instruments :

As described in chapter 6 of this test report.

#### 5.5.2 Test Procedure :

1. The transmitter output was connected to the spectrum analyzer directly.
2. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
3. Set the center frequency on any frequency would be measured and set the frequency span to zero span.
4. The equation =  $79 \times 0.4 \times (1600/79) \times t$  ( t = the time duration of one single pulse )

#### 5.5.3 Test Setup Layout :



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

- Temperature: 24°C
- Relative Humidity: 52%
- Test Engineer : James

Ch00

Package Mode	Average Hopping Channel	Package Transfer Time (us)	Dwell Time (s)	Limit (s)
DH1	7.8	460	0.113	0.4
DH3	3.7	1716	0.201	0.4
DH5	3.3	3026	0.316	0.4



CH39

Package Mode	Average Hopping Channel	Package Transfer Time (us)	Dwell Time (s)	Limit (s)
DH1	8.3	456	0.120	0.4
DH3	4.5	1726	0.245	0.4
DH5	2.9	3006	0.275	0.4

CH78

Package Mode	Average Hopping Channel	Package Transfer Time (us)	Dwell Time (s)	Limit (s)
DH1	8.7	456	0.125	0.4
DH3	4.9	1726	0.267	0.4
DH5	3.4	3006	0.323	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)

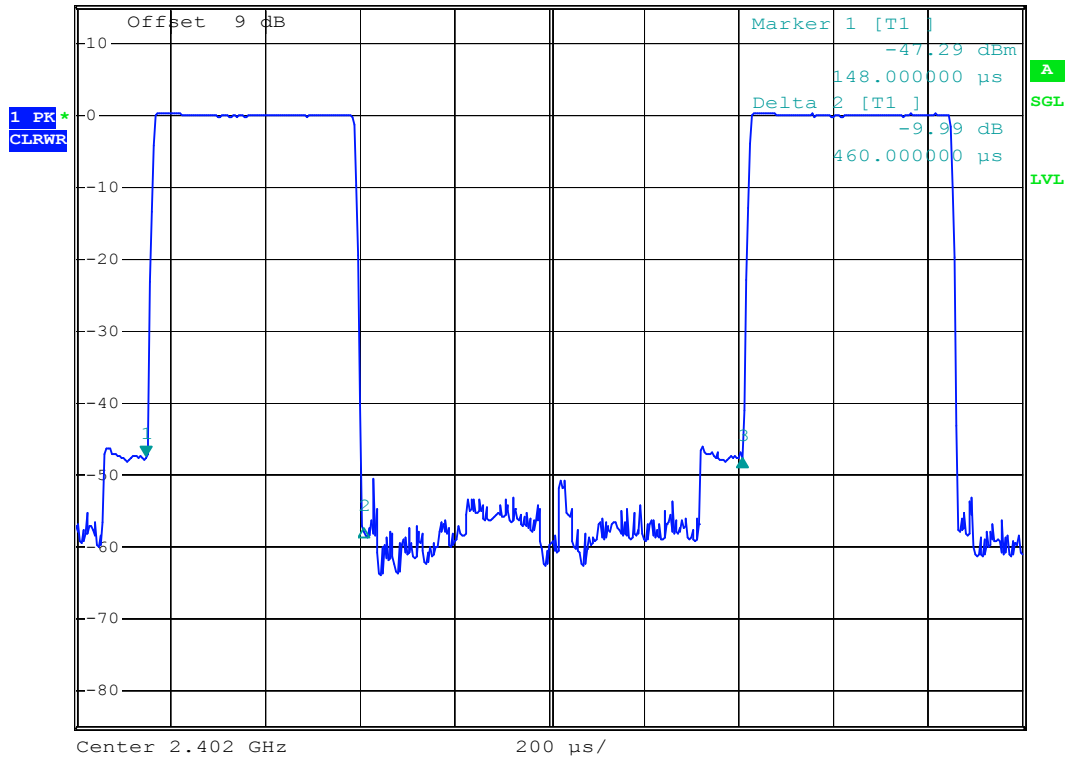


5.5.5 Dwell Time

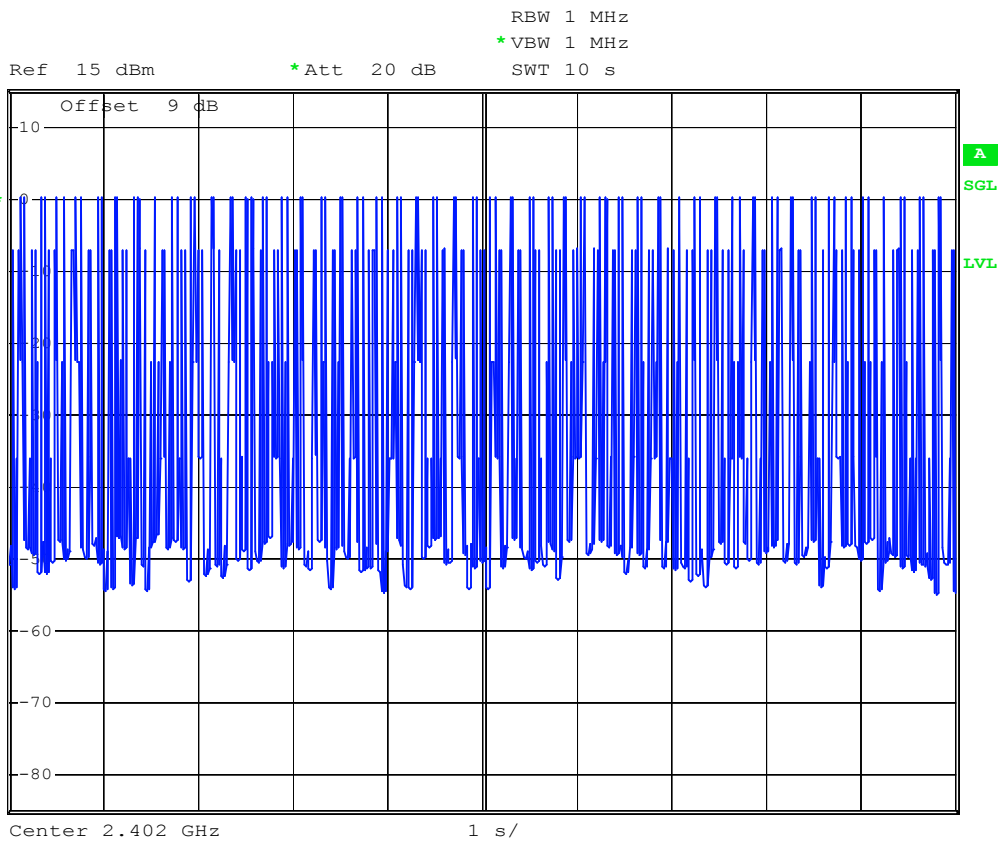
DH1 (CH00)



Ref 15 dBm      \*Att 20 dB      RBW 1 MHz      Delta 3 [T1 ]  
\*VBW 1 MHz      -0.18 dB  
SWT 2 ms      1.260000 ms



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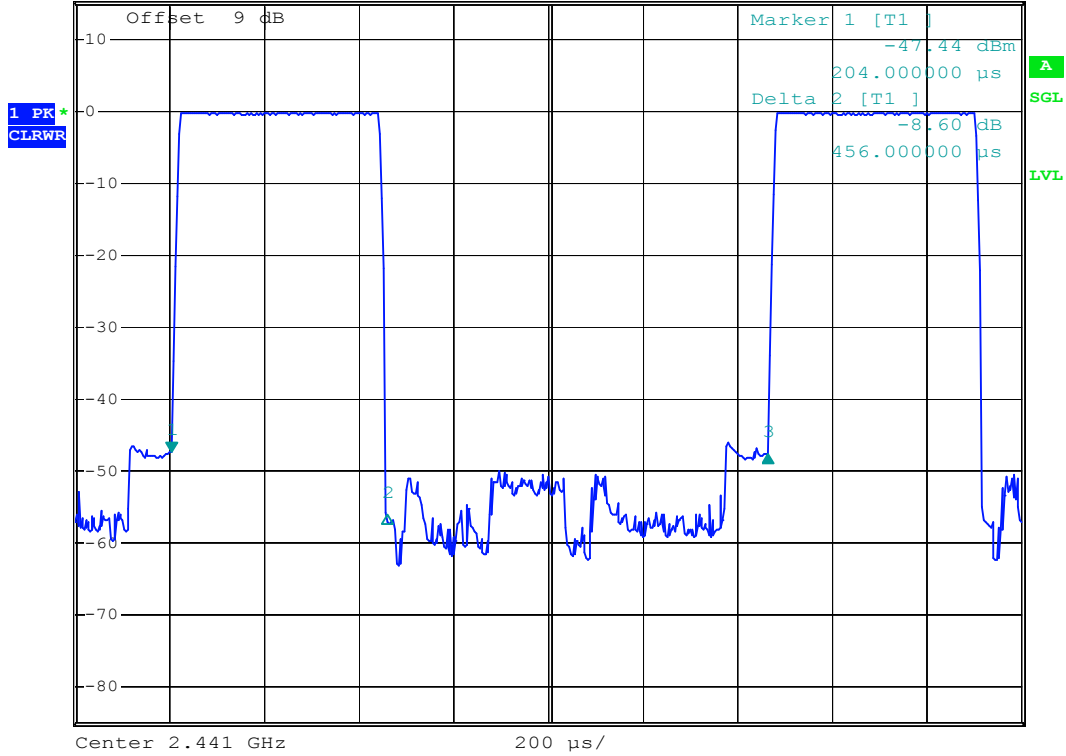




DH1 (CH39)



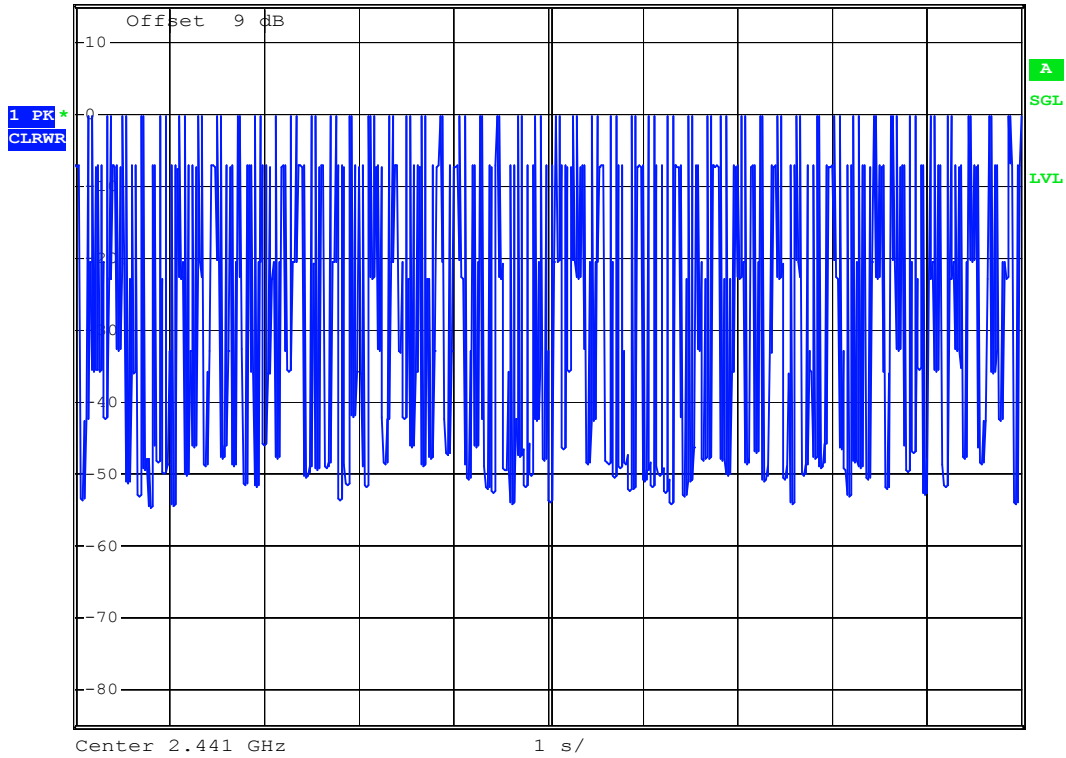
RBW 1 MHz      Delta 3 [T1 ]  
 \*VBW 1 MHz      -0.27 dB  
 Ref 15 dBm      \*Att 20 dB      SWT 2 ms      1.260000 ms



Date: 10.APR.2006 11:37:24



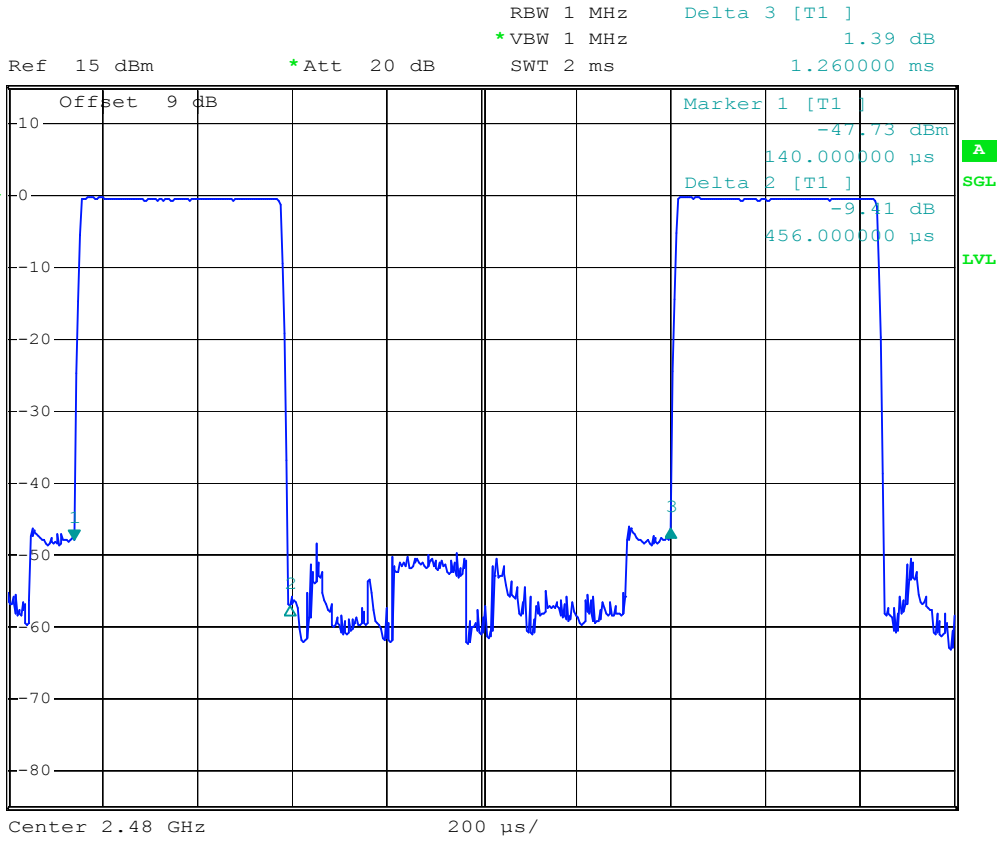
Ref 15 dBm      \*Att 20 dB      RBW 1 MHz  
\*VBW 1 MHz      SWT 10 s



Date: 10.APR.2006 11:49:30



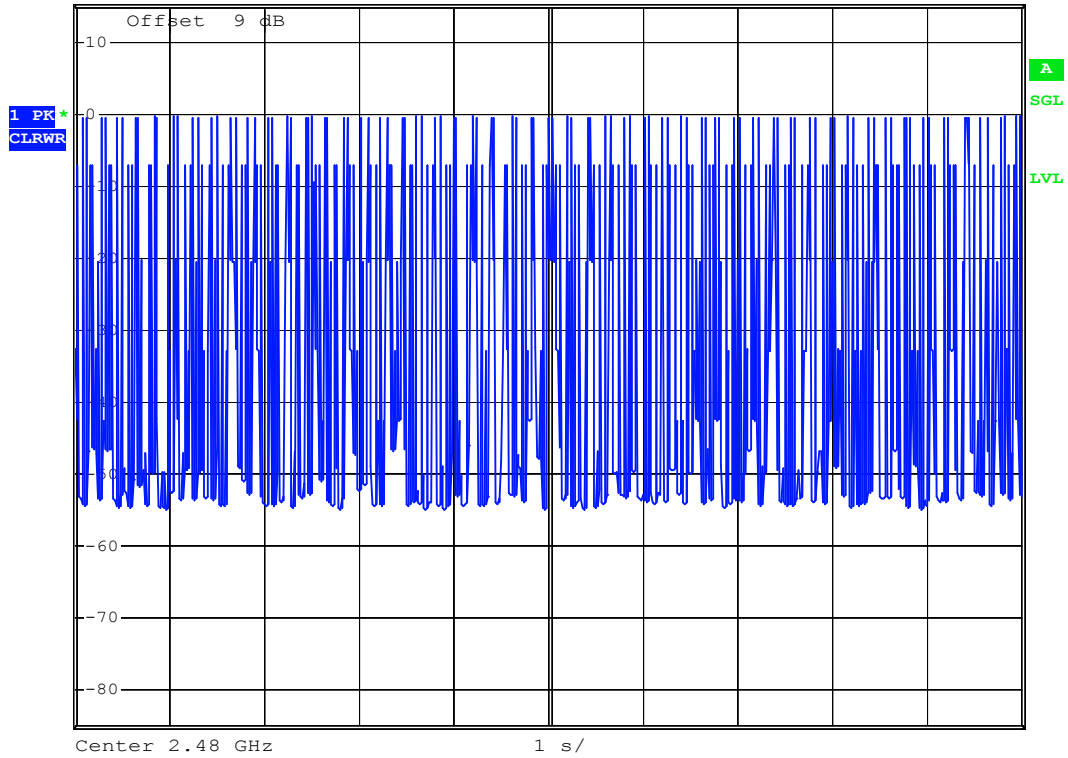
DH1 (CH78)



Date: 10.APR.2006 11:38:06



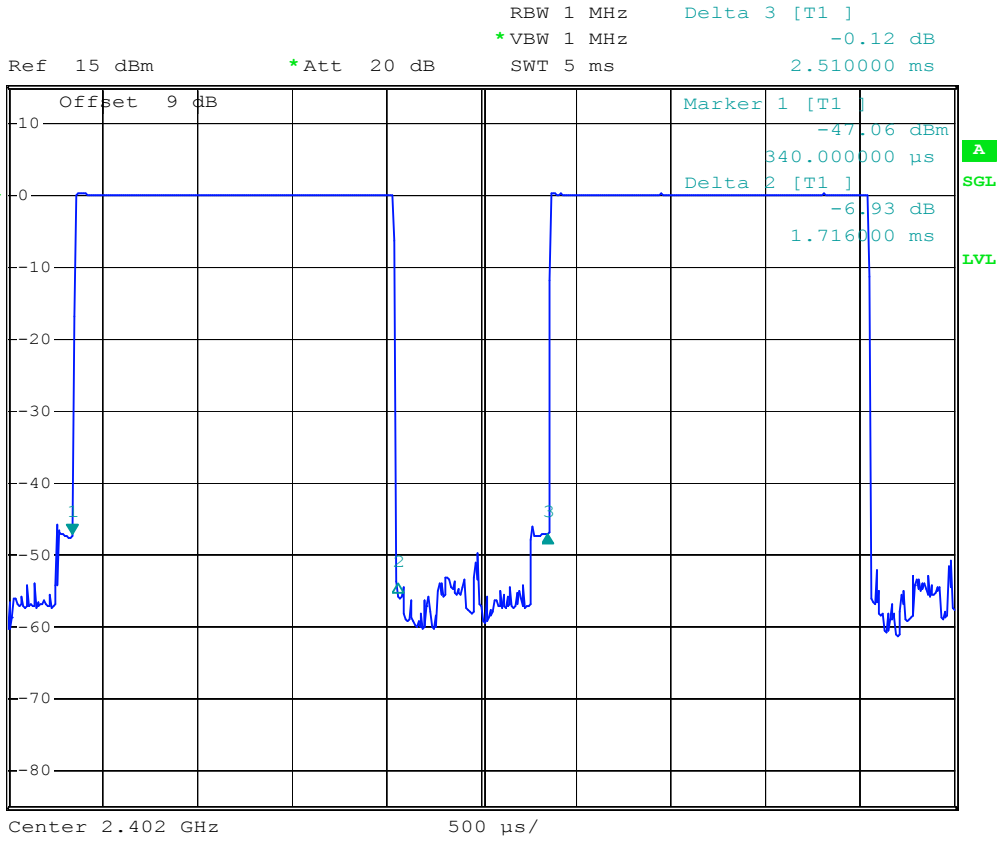
Ref 15 dBm      \*Att 20 dB      RBW 1 MHz  
\*VBW 1 MHz      SWT 10 s



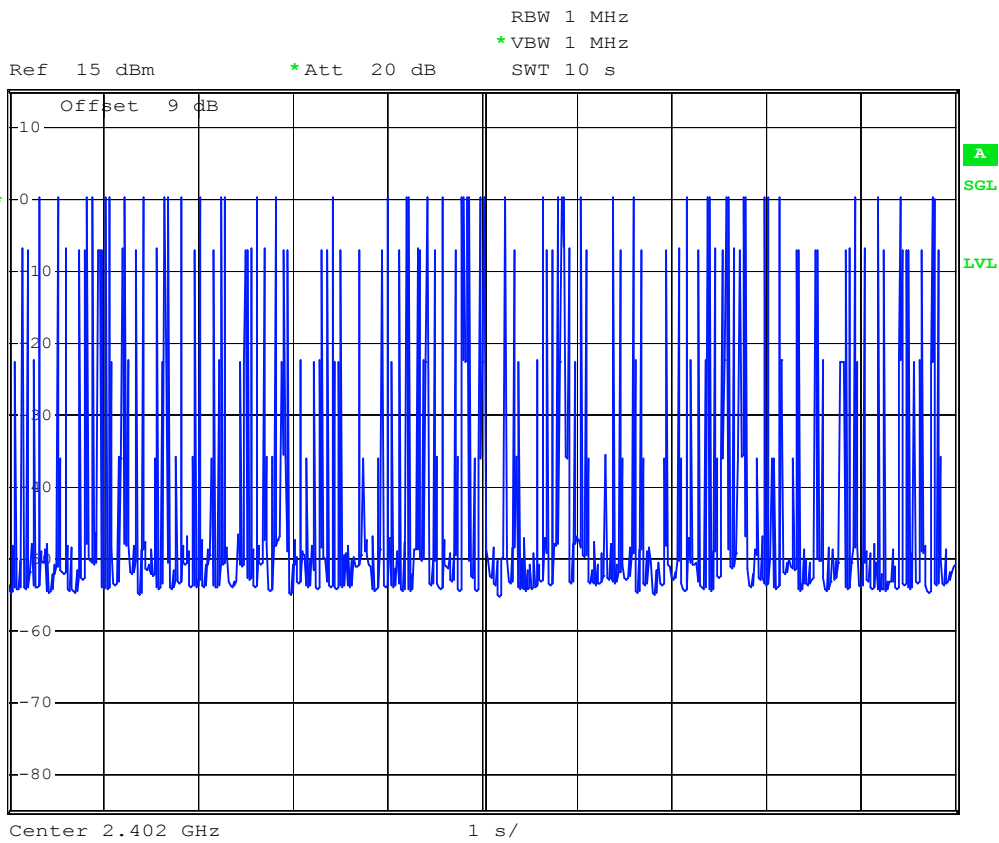
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DH3 (CH00)



Date: 10.APR.2006 11:38:51



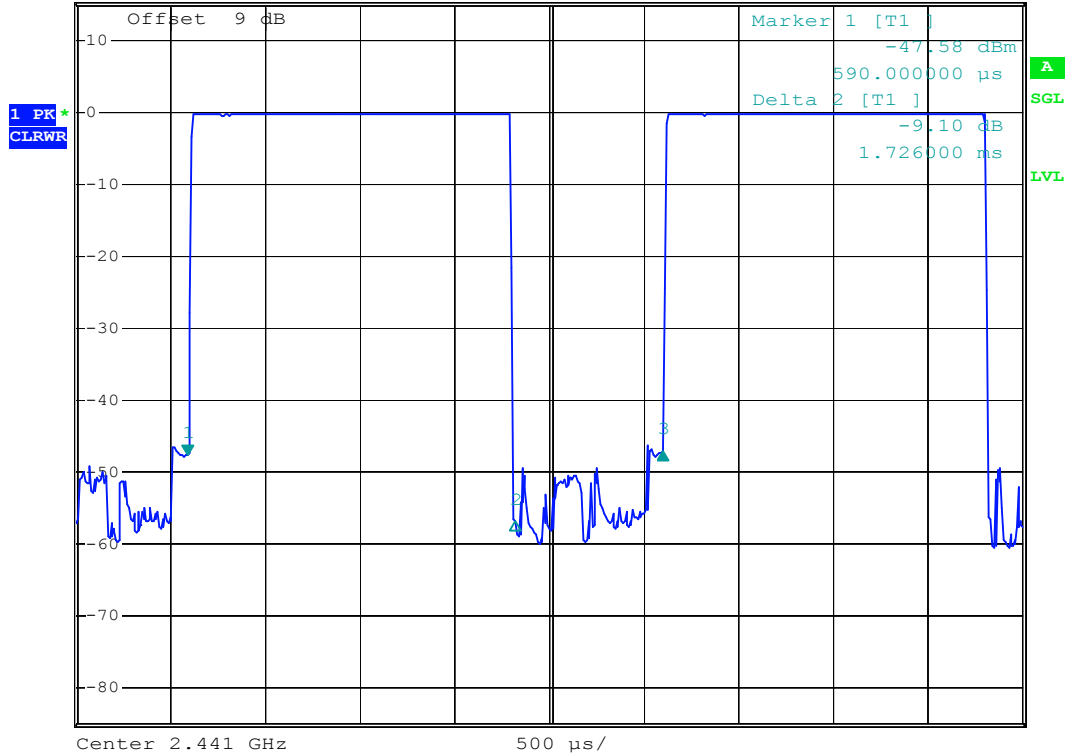
Date: 10.APR.2006 11:51:08



DH3 (CH39)



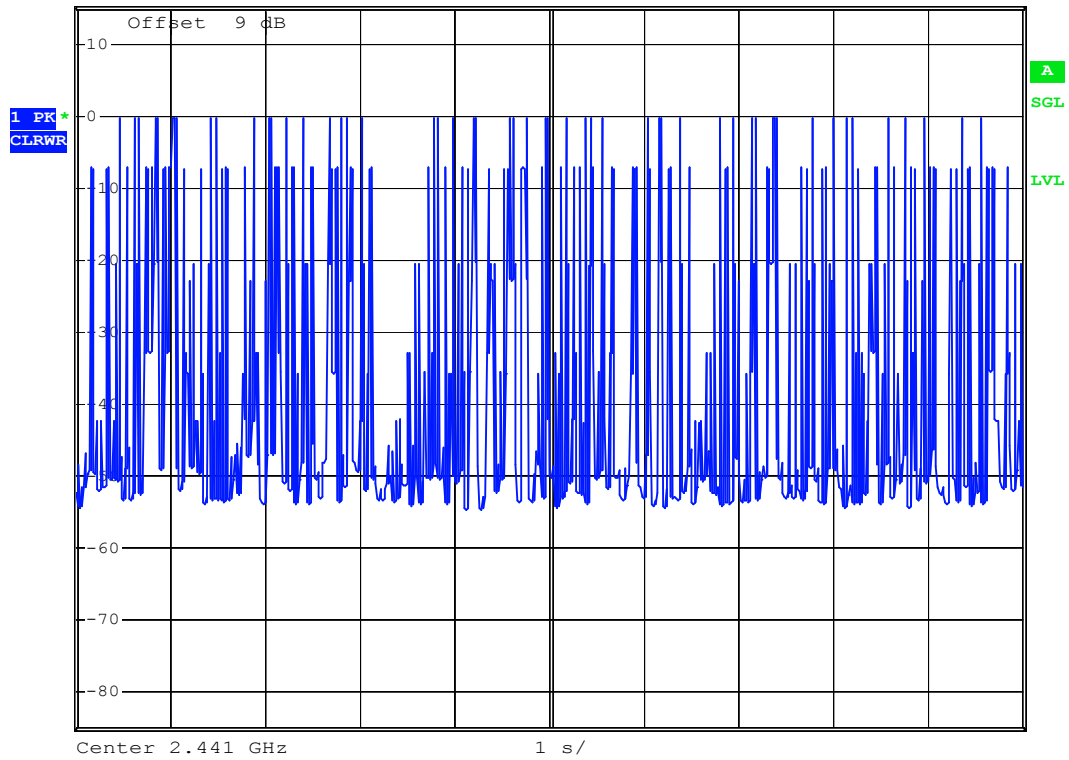
RBW 1 MHz      Delta 3 [T1 ]  
 \*VBW 1 MHz      0.53 dB  
 Ref 15 dBm      \*Att 20 dB      SWT 5 ms      2.510000 ms



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Ref 15 dBm      \*Att 20 dB      RBW 1 MHz  
\*VBW 1 MHz      SWT 10 s



Date: 10.APR.2006 11:51:35

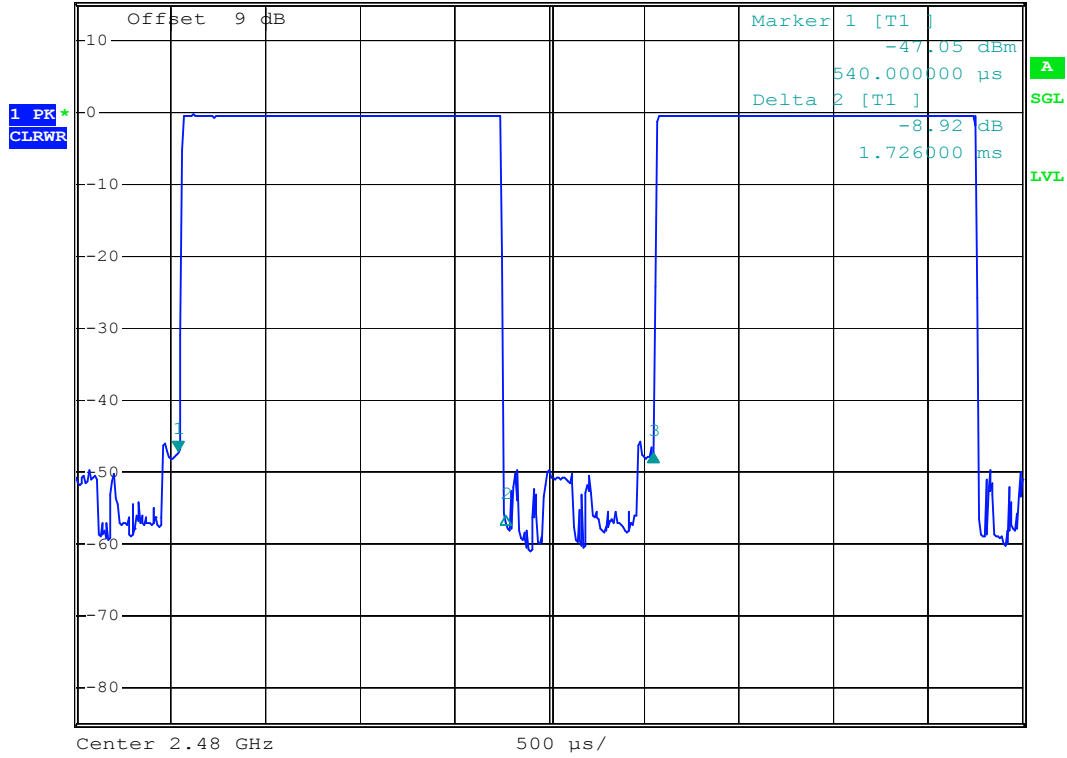




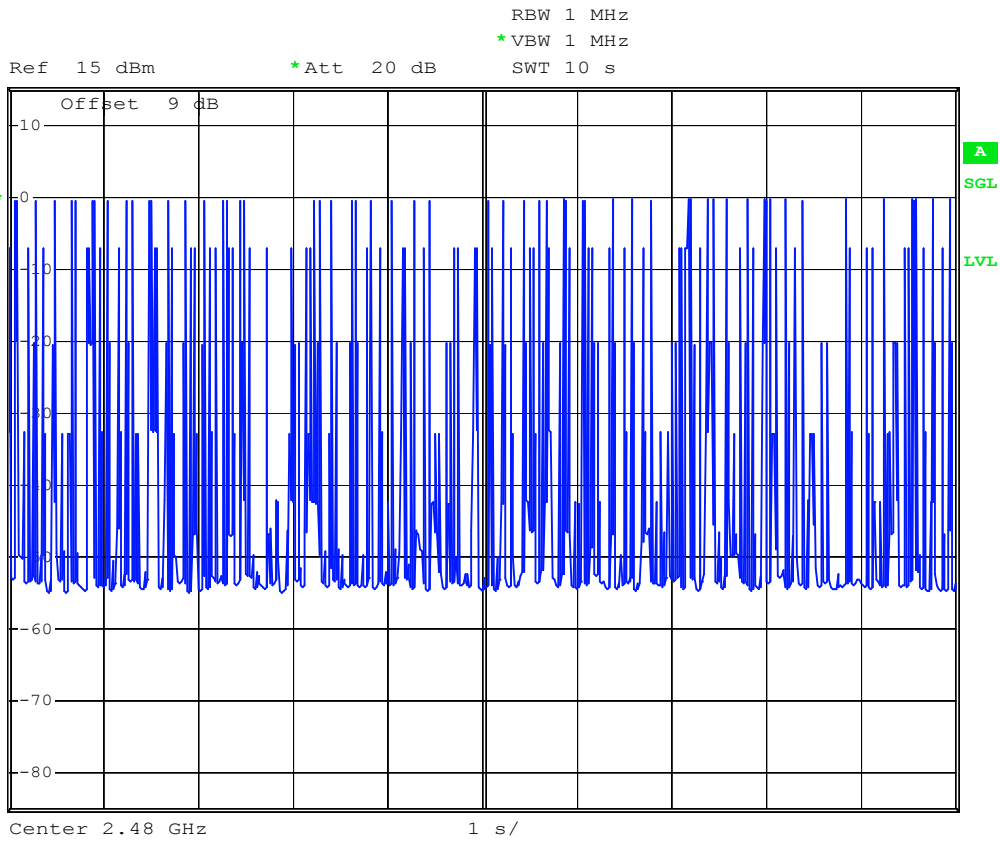
DH3 (CH78)



RBW 1 MHz      Delta 3 [T1 ]  
 \*VBW 1 MHz      -0.28 dB  
 Ref 15 dBm      \*Att 20 dB      SWT 5 ms      2.510000 ms



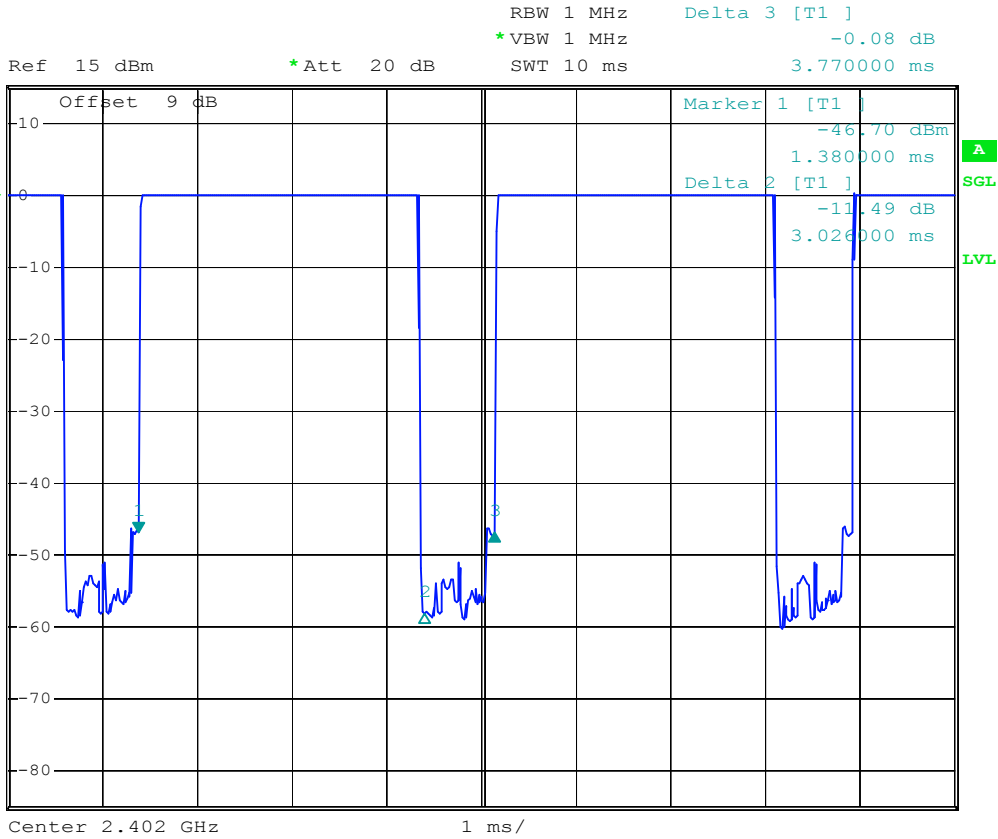
Date: 10.APR.2006 11:40:04



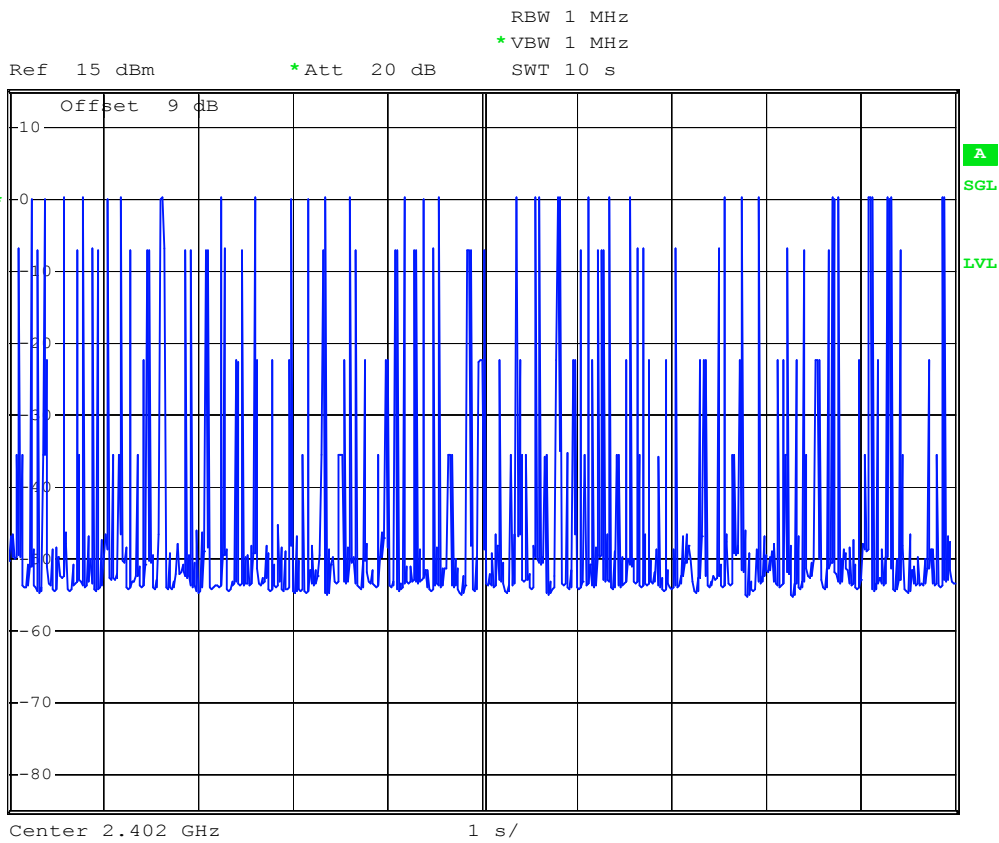
Date: 10.APR.2006 11:52:04



DH5 (CH00)



Date: 10.APR.2006 11:40:46



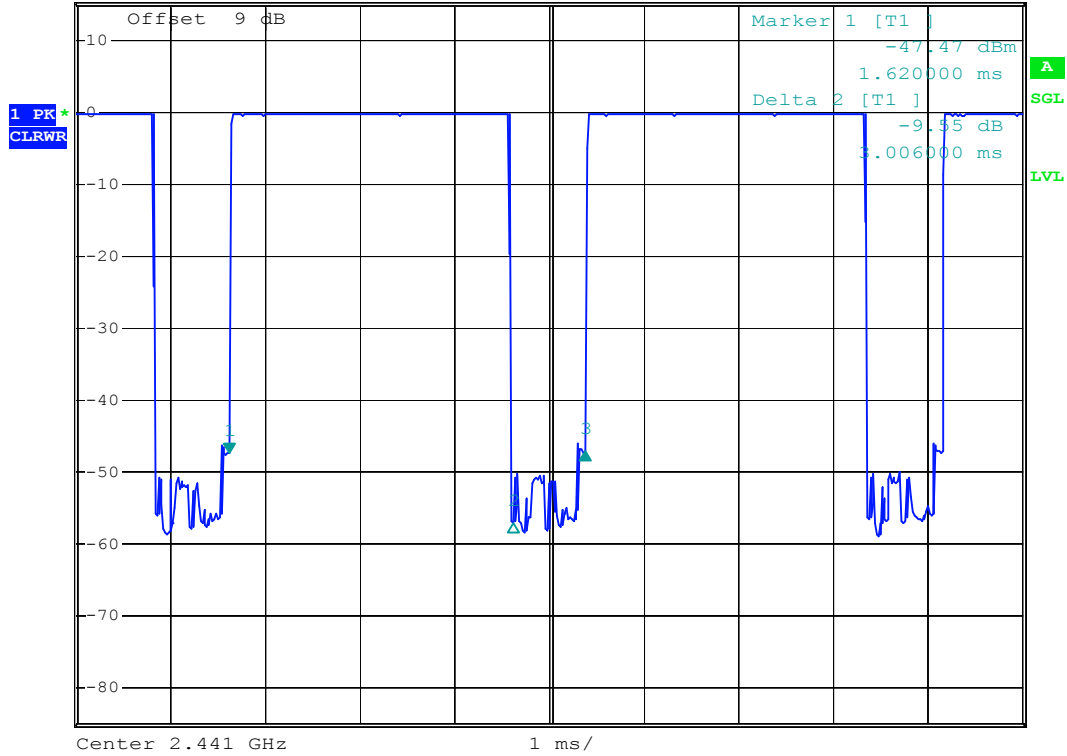
Date: 10.APR.2006 11:54:57



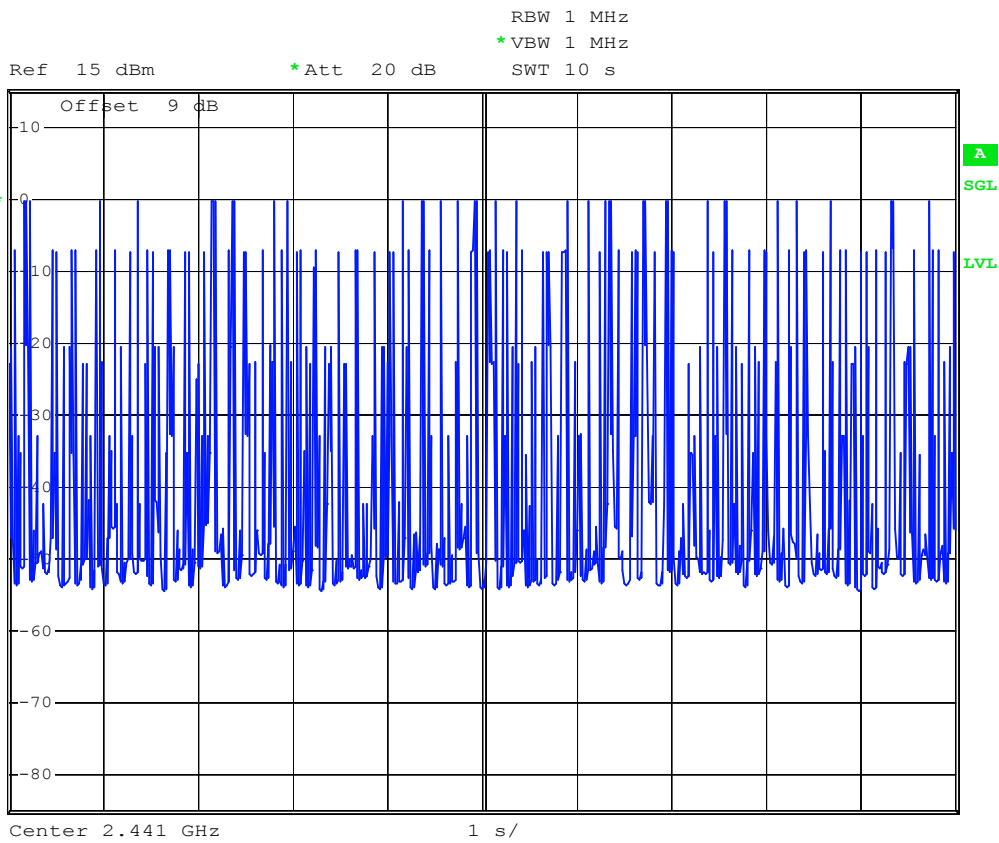
DH5 (CH39)



RBW 1 MHz      Delta 3 [T1 ]  
 \*VBW 1 MHz      0.32 dB  
 Ref 15 dBm      \*Att 20 dB      SWT 10 ms      3.770000 ms



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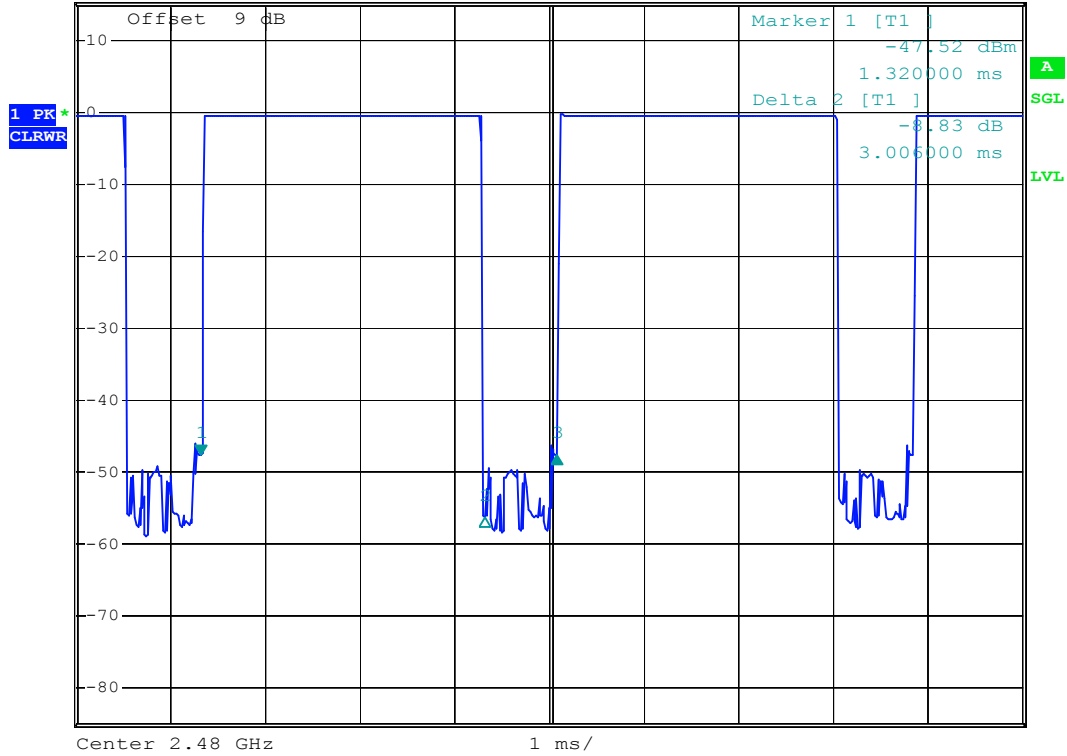
Date: 10.APR.2006 11:53:20



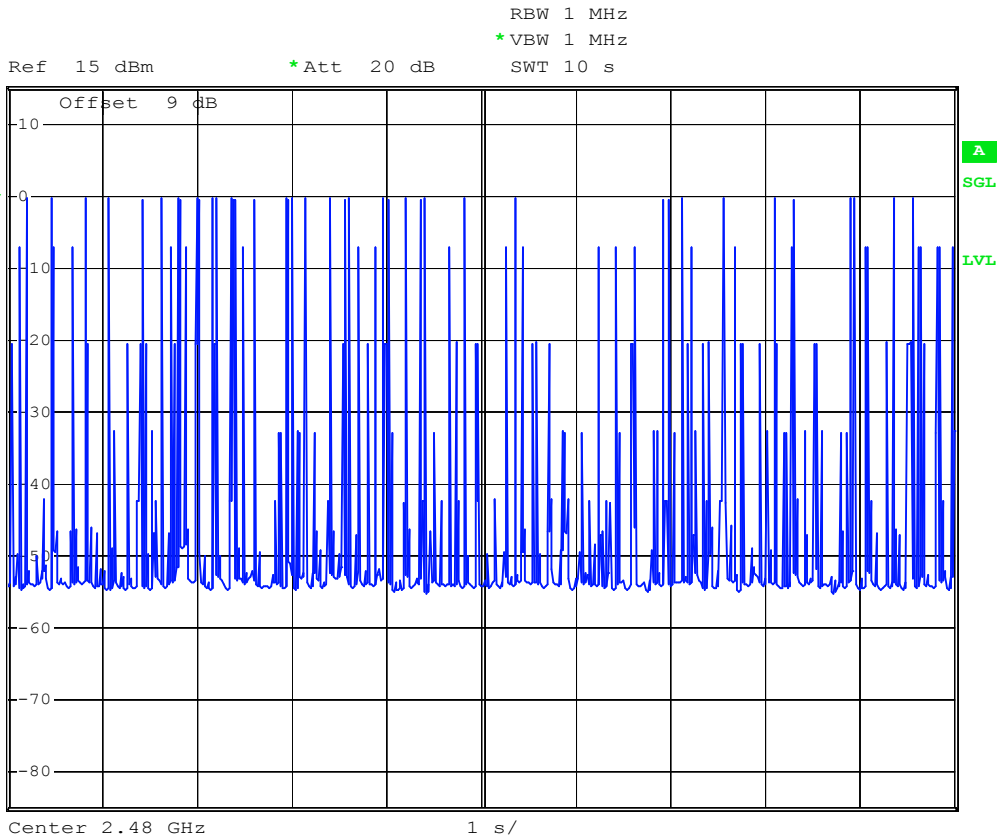
DH5 (CH78)



RBW 1 MHz      Delta 3 [T1 ]  
 \*VBW 1 MHz      -0.03 dB  
 Ref 15 dBm      \*Att 20 dB      SWT 10 ms      3.770000 ms



Date: 10.APR.2006 11:42:52



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## 5.6 Output Power

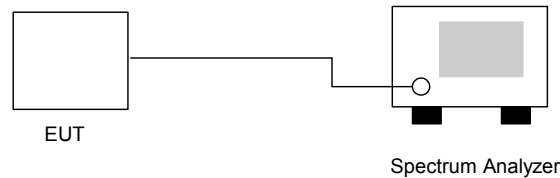
### 5.6.1 Measuring Instruments :

As described in chapter 6 of this test report.

### 5.6.2 Test Procedure :

1. The transmitter output was connected to the spectrum analyzer directly.
2. The center frequency of the spectrum analyzer was set to the fundamental frequency and set RBW to 3MHz and VBW to 3MHz.

### 5.6.3 Test Setup Layout :



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

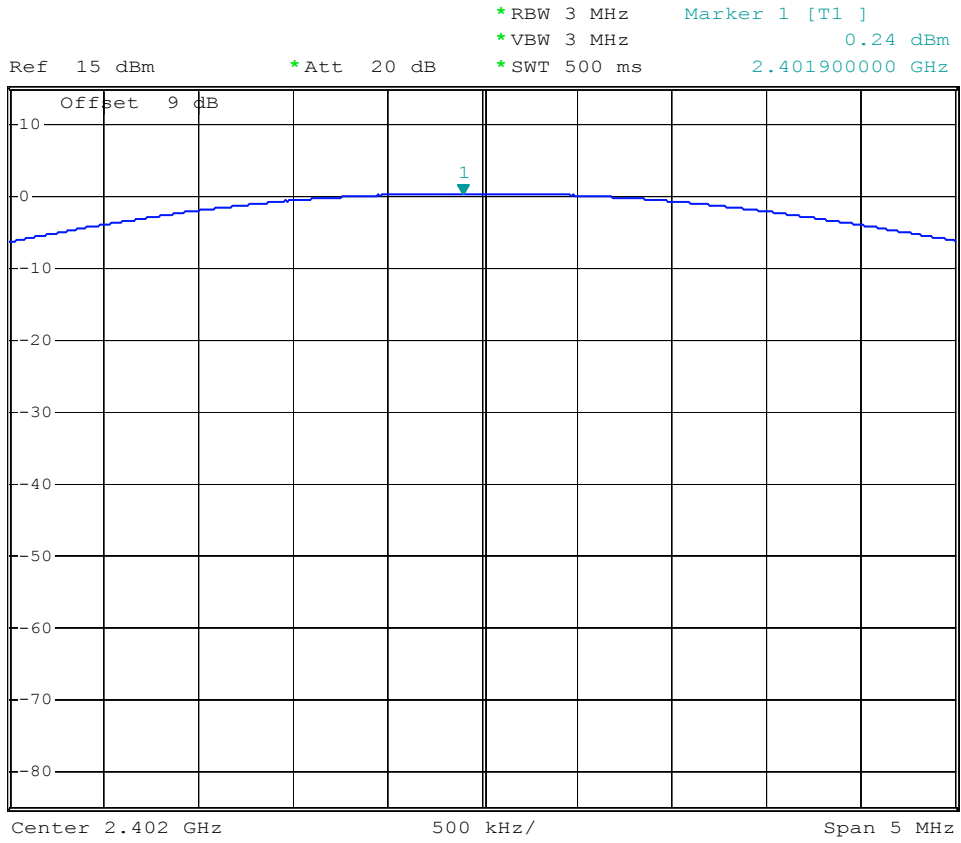
- Temperature: 24°C
- Relative Humidity: 52%
- Test Engineer : James

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (Watt/dBm )	Plot Ref. No.
00	2402	0.24	1W/30 dBm	Mode 1
39	2441	-0.18	1W/30 dBm	Mode 2
78	2480	-0.27	1W/30 dBm	Mode 3



5.6.5 Output Power

Mode 1: CH00 (2402MHz)



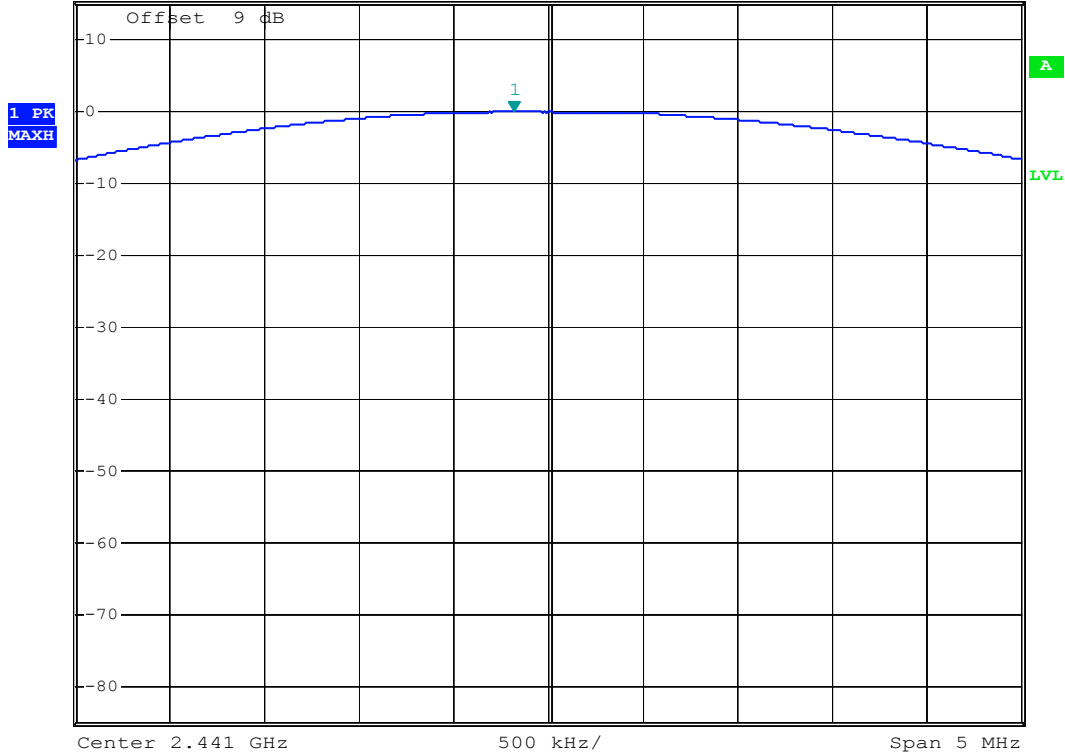
Date: 10.APR.2006 11:16:56



Mode 2: CH39 (2441MHz)



Ref 15 dBm      \*Att 20 dB      \*RBW 3 MHz      Marker 1 [T1]      -0.18 dBm  
\*VBW 3 MHz      2.440820000 GHz  
\*SWT 500 ms



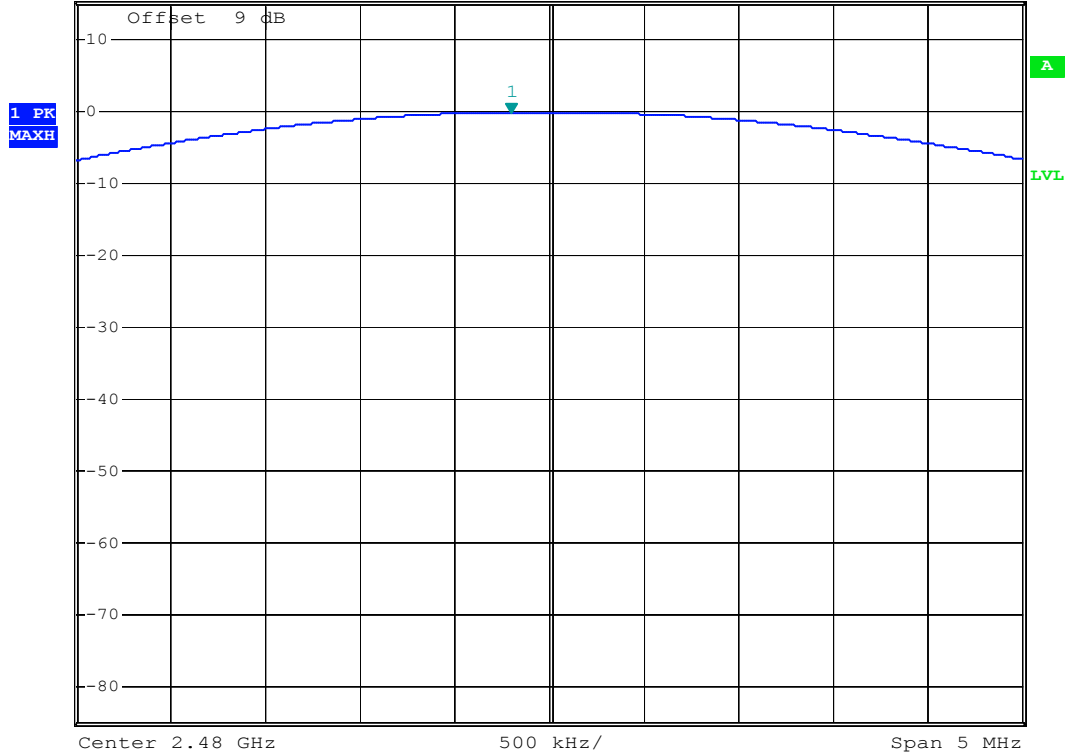
Date: 10.APR.2006 11:17:17



Mode 3: CH78 (2480MHz)



Ref 15 dBm      \*Att 20 dB      \*RBW 3 MHz      Marker 1 [T1]      -0.27 dBm  
\*VBW 3 MHz      2.479800000 GHz  
\*SWT 500 ms



Date: 10.APR.2006 11:17:41



### 5.7 100kHz Bandwidth of Frequency Band Edges

#### 5.7.1 Measuring Instruments :

As described in chapter 6 of this test report.

#### 5.7.2 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 for the conducted measurement, and RBW/VBW=1MHz/1MHz for peak measurement and RBW/VBW=1MHz/300Hz for average measurement in the radiated measurement.
3. The band edges was measured and recorded.

#### 5.7.3 Test Result :

- Temperature: 24°C
- Relative Humidity: 52%
- Test Engineer : James

Test Result in lower band (Channel 00) : PASS

Test Result in higher band(Channel 78) : PASS

#### 5.7.4 Note on Band edge Emission

##### CH00 (Horizontal)

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level (dBuV)	Antenna Factor ( dB )	Preamp Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Detect Mode
2328.00	49.79	-24.21	74.00	50.48	30.54	35.40	4.17	200	0	Peak
2328.00	38.14	-15.86	54.00	38.48	30.54	35.40	4.17	100	207	Average

##### CH00 (Vertical)

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level (dBuV)	Antenna Factor ( dB )	Preamp Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Detect Mode
2318.00	50.62	-23.38	74.00	51.32	30.54	35.40	4.17	187	0	Peak
2318.00	38.17	-15.83	54.00	38.87	30.54	35.40	4.17	100	87	Average



CH78 (Horizontal)

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Preamplifier Factor ( dB )	Cable Loss ( dB )	Antenna Pos ( cm )	Table Pos ( deg )	Detect Mode
2483.50	44.71	-9.29	54.00	45.45	30.41	35.51	4.36	100	182	Average
2483.50	58.28	-15.72	74.00	59.02	30.41	35.51	4.36	200	0	Peak

CH78 (Vertical)

Frequency ( MHz )	Level ( dBuV/m )	Over Limit ( dB )	Limit Line ( dBuV/m )	Read Level ( dBuV )	Antenna Factor ( dB )	Preamplifier Factor ( dB )	Cable Loss ( dB )	Antenna Pos ( cm )	Table Pos ( deg )	Detect Mode
2483.50	58.65	-15.35	74.00	59.39	30.41	35.51	4.36	100	0	Peak
2483.50	44.84	-9.16	54.00	45.58	30.41	35.51	4.36	100	110	Average

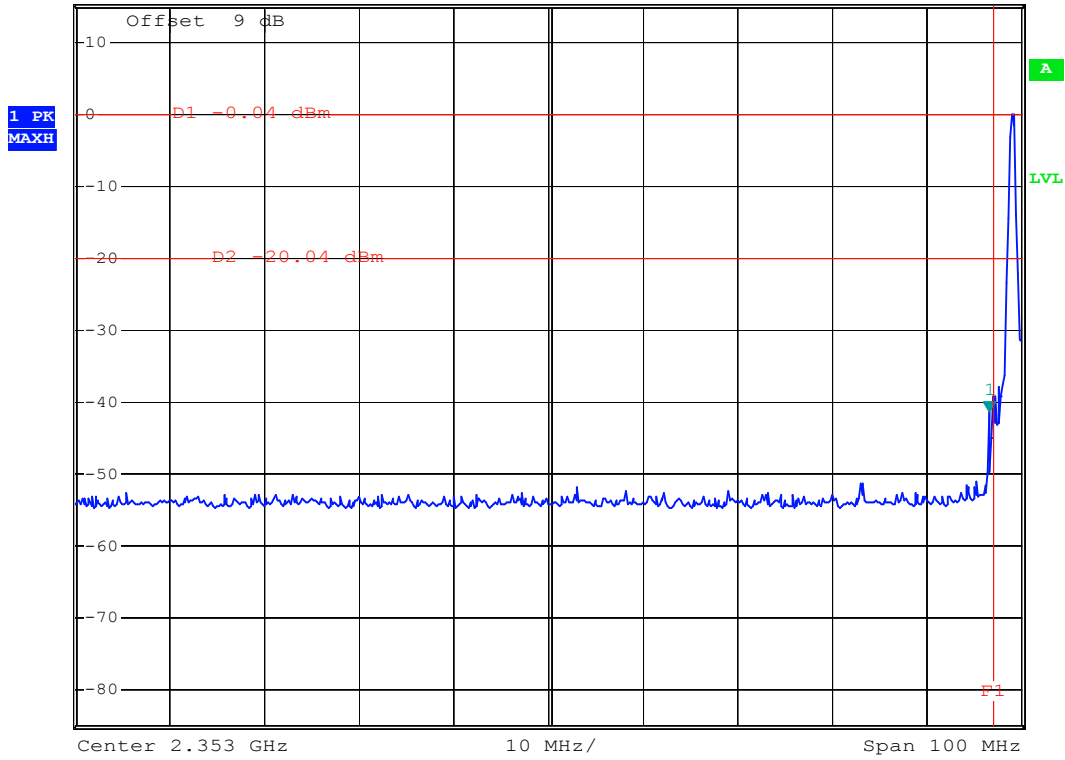


5.7.5 Frequency Band Edge

Mode 1: CH00 (2402 MHz)



Ref 15 dBm      \*Att 20 dB      \*RBW 100 kHz      Marker 1 [T1 ]  
\*VBW 100 kHz      -41.40 dBm  
\*SWT 500 ms      2.399600000 GHz



Date: 10.APR.2006 11:27:37



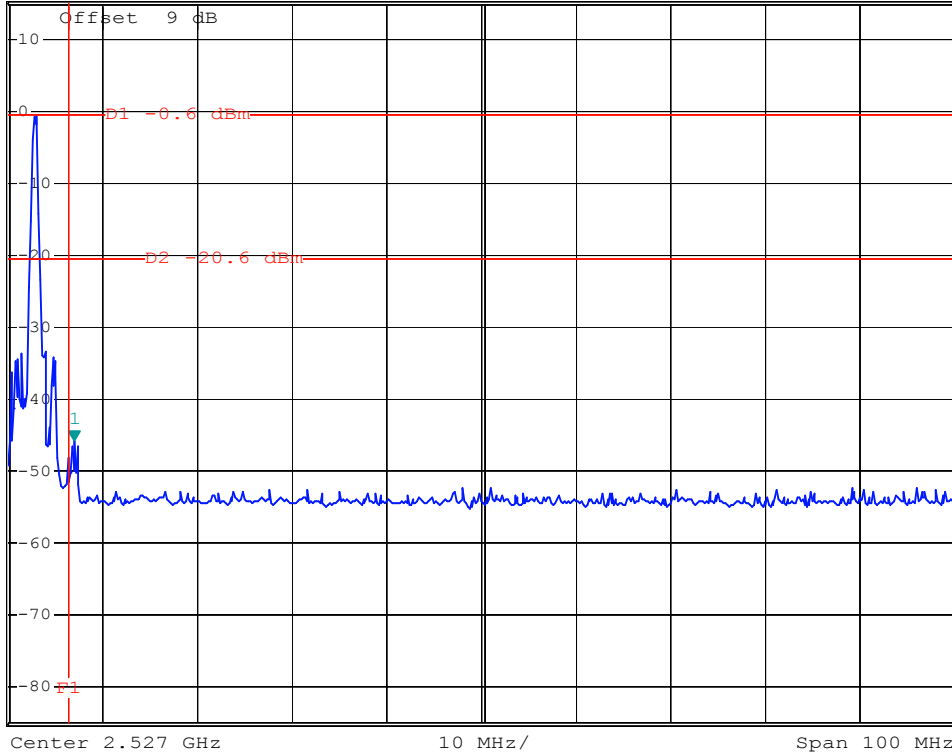
Mode 3: CH78 (2480 MHz)



\*RBW 100 kHz    Marker 1 [T1 ]  
\*VBW 100 kHz                    -45.74 dBm  
\*SWT 500 ms                    2.483900000 GHz

Ref 15 dBm

\*Att 20 dB



Date: 10.APR.2006 11:29:18





## **5.8 Conducted Emission**

### **5.8.1 Measuring Instruments**

As described in chapter 6 of this test Report.

### **5.8.2 Test Procedures :**

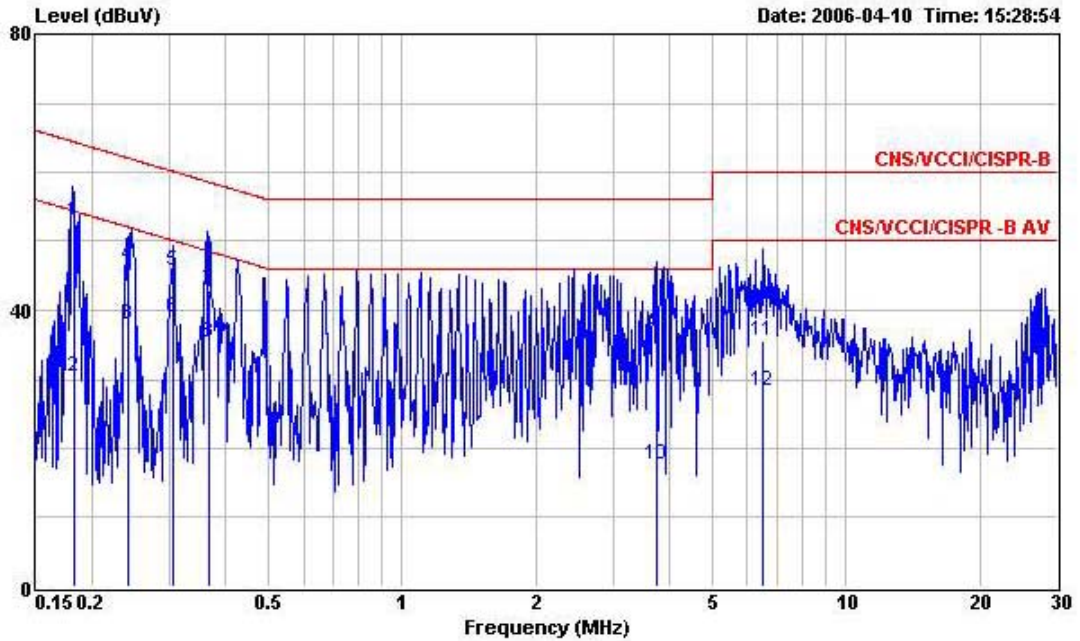
- a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- b. Connect EUT to the power port of a line impedance stabilization network (LISN).
- c. All the support units are connected to the other LISN.
- 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 Test Mode 1

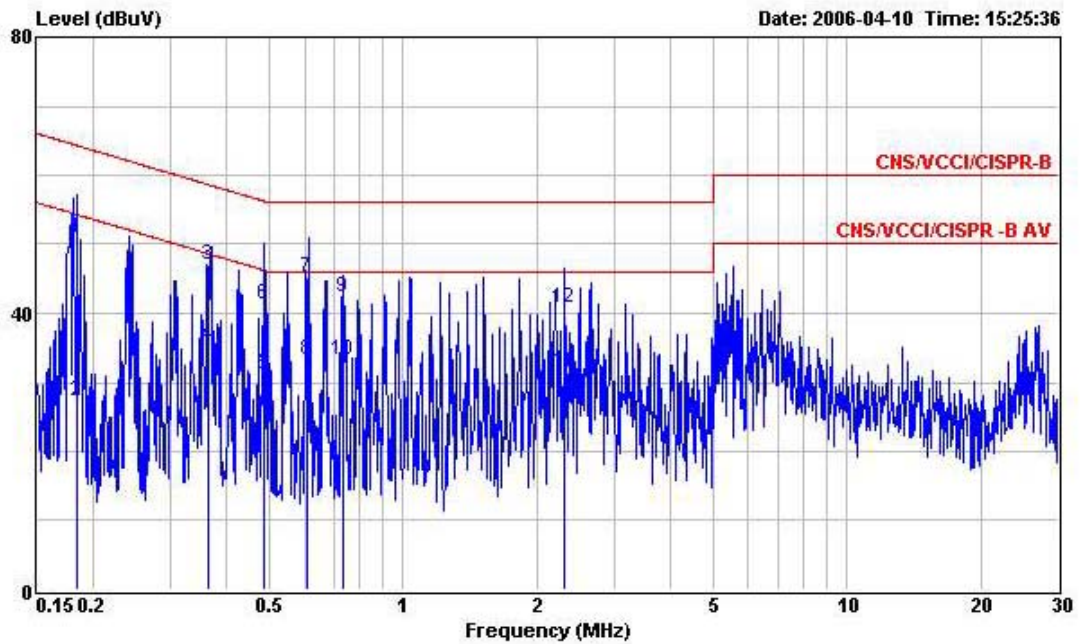
- Temperature: 24°C
- Relative Humidity: 52%
- Test Engineer: Andy

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



Site : CO01-HV  
 Condition : CNS/VCCI/CISPR-B 2001/004 200505 LINE  
 EUT : GSM900/1800/1900 Mobile Phone(Bluetooth)  
 Power : 120V/60Hz  
 Model : FD640711  
 Memo : PCS1900 Idle+Adapter+Earphone+BT Link  
 Memo : +Camera  
 Memo :

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.182	52.98	-11.41	64.39	52.84	0.06	0.08	QP
2	0.182	30.34	-24.05	54.39	30.20	0.06	0.08	Average
3	0.242	37.87	-14.17	52.04	37.73	0.06	0.08	Average
4	0.242	46.60	-15.44	62.04	46.46	0.06	0.08	QP
5	0.305	45.84	-14.27	60.11	45.72	0.06	0.06	QP
6	0.305	38.95	-11.16	50.11	38.83	0.06	0.06	Average
7	0.369	42.85	-15.68	58.53	42.74	0.06	0.05	QP
8	0.369	35.23	-13.30	48.53	35.12	0.06	0.05	Average
9	3.760	36.76	-19.24	56.00	36.41	0.20	0.15	QP
10	3.760	17.56	-28.44	46.00	17.21	0.20	0.15	Average
11	6.521	35.61	-24.39	60.00	35.19	0.21	0.21	QP
12	6.521	28.23	-21.77	50.00	27.81	0.21	0.21	Average



Site : CO01-HV  
 Condition : CNS/VCCI/CISPR-B 2001/004 200505 NEUTRAL  
 EUT : GSM900/1800/1900 Mobile Phone(Bluetooth)  
 Power : 120V/60Hz  
 Model : FD640711  
 Memo : PCS1900 Idle+Adapter+Earphone+BT Link  
 Memo : +Camera  
 Memo :

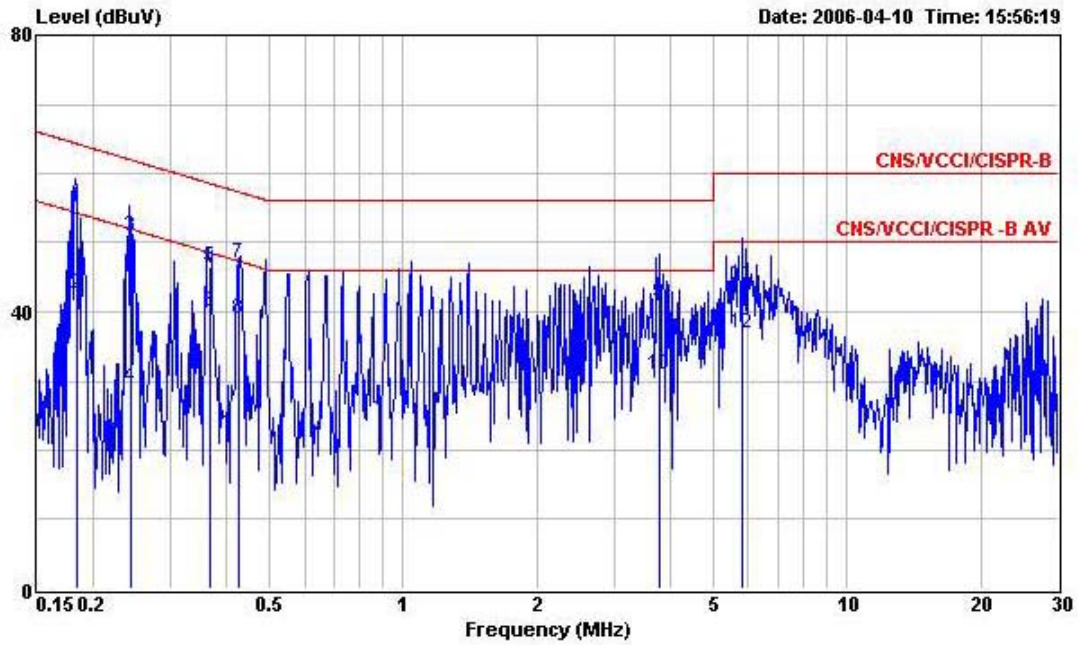
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.184	50.92	-13.38	64.30	50.73	0.11	0.08	QP
2	0.184	27.32	-26.98	54.30	27.13	0.11	0.08	Average
3	0.365	47.04	-11.57	58.61	46.88	0.11	0.05	QP
4	0.365	35.44	-13.17	48.61	35.28	0.11	0.05	Average
5	0.487	31.21	-15.02	46.23	31.02	0.14	0.05	Average
6	0.487	41.41	-14.82	56.23	41.22	0.14	0.05	QP
7	0.608	45.31	-10.69	56.00	45.09	0.16	0.06	QP
8	0.608	33.21	-12.79	46.00	32.99	0.16	0.06	Average
9	0.731	42.27	-13.73	56.00	42.01	0.19	0.07	QP
10	0.731	33.36	-12.64	46.00	33.10	0.19	0.07	Average
11	2.310	31.35	-14.65	46.00	31.01	0.23	0.11	Average
12	2.310	40.87	-15.13	56.00	40.53	0.23	0.11	QP



5.8.4 Test Data Test Mode 2

- Temperature: 24°C
- Relative Humidity: 52%
- Test Engineer: Andy

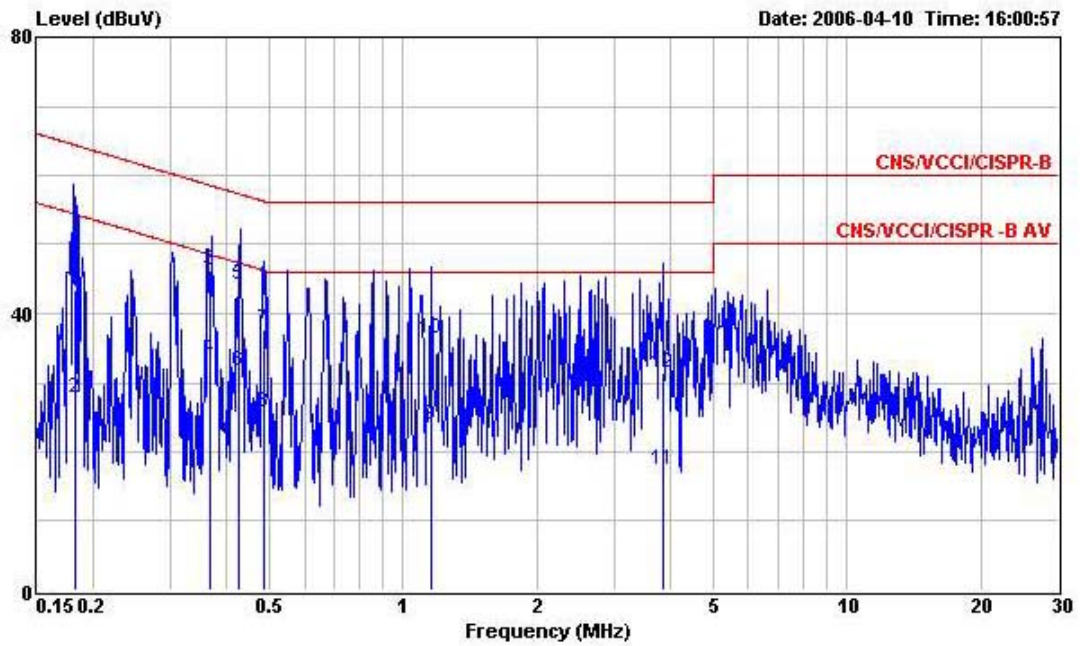
■ The test that passed at minimum margin was marked by the frame in the following table.



Site : CO01-HY  
 Condition : CNS/VCCI/CISPR-B 2001/004 200505 LINE  
 EUT : GSM900/1800/1900 Mobile Phone(Bluetooth)  
 Power : 120V/60Hz  
 Model : FD640711  
 Memo : PCS1900 Idle+Adapter+Earphone+BT Link  
 Memo : +MP3  
 Memo :

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.183	54.94	-9.39	64.33	54.80	0.06	0.08	QP
2	0.183	42.55	-11.78	54.33	42.41	0.06	0.08	Average
3	0.245	50.81	-11.13	61.94	50.67	0.06	0.08	QP
4	0.245	29.05	-22.89	51.94	28.91	0.06	0.08	Average
5	0.367	46.47	-12.10	58.57	46.36	0.06	0.05	QP
6	0.367	40.10	-8.47	48.57	39.99	0.06	0.05	Average
7	0.425	47.14	-10.20	57.34	47.04	0.06	0.04	QP
8	0.425	38.86	-8.48	47.34	38.76	0.06	0.04	Average
9	3.785	41.21	-14.79	56.00	40.85	0.20	0.16	QP
10	3.785	30.79	-15.21	46.00	30.43	0.20	0.16	Average
11	5.795	43.96	-16.04	60.00	43.55	0.21	0.20	QP
12	5.795	36.91	-13.09	50.00	36.50	0.21	0.20	Average





Site : CO01-HY  
 Condition : CNS/VCCI/CISPR-B 2001/004 200505 NEUTRAL  
 EUT : GSM900/1800/1900 Mobile Phone (Bluetooth)  
 Power : 120V/60Hz  
 Model : FD640711  
 Memo : PCS1900 Idle+Adapter+Earphone+BT Link  
 Memo : +MP3  
 Memo :

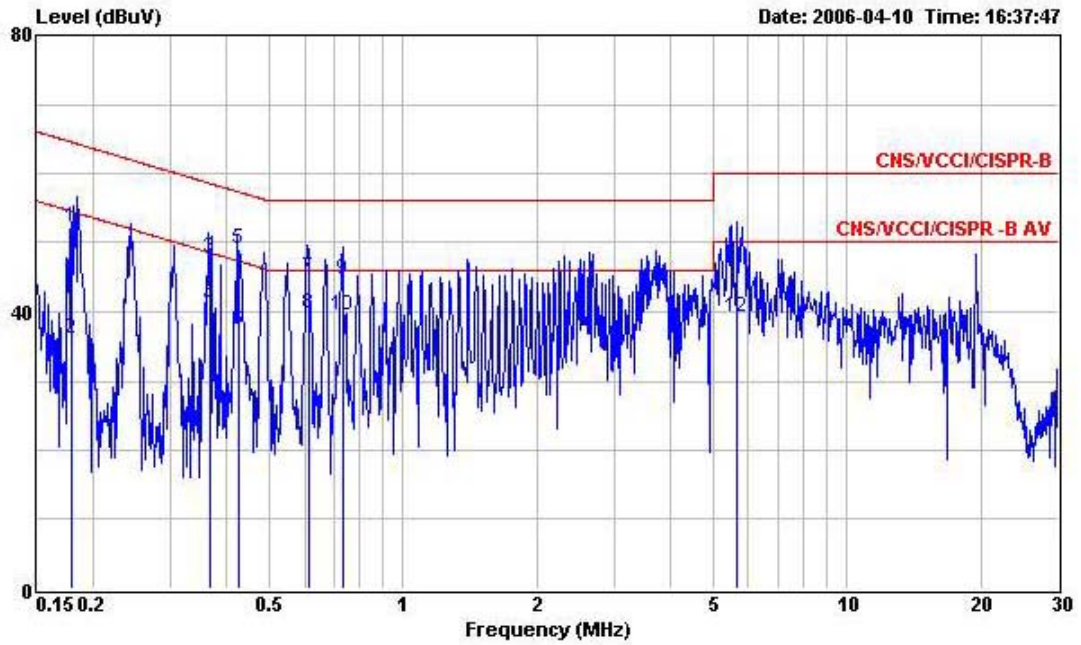
	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.182	43.29	-21.09	64.38	43.10	0.11	0.08	QP
2	0.182	27.67	-26.71	54.38	27.48	0.11	0.08	Average
3	0.368	46.30	-12.26	58.56	46.14	0.11	0.05	QP
4	0.368	33.55	-15.01	48.56	33.39	0.11	0.05	Average
5	0.427	44.18	-13.13	57.31	44.02	0.12	0.04	QP
6	0.427	31.68	-15.63	47.31	31.52	0.12	0.04	Average
7	0.485	37.54	-18.72	56.26	37.36	0.13	0.05	QP
8	0.485	25.83	-20.43	46.26	25.65	0.13	0.05	Average
9	1.162	23.87	-22.13	46.00	23.56	0.23	0.08	Average
10	1.162	36.35	-19.65	56.00	36.04	0.23	0.08	QP
11	3.844	17.49	-28.51	46.00	17.10	0.23	0.16	Average
12	3.844	31.42	-24.58	56.00	31.03	0.23	0.16	QP



5.8.5 Test Data Test Mode 3

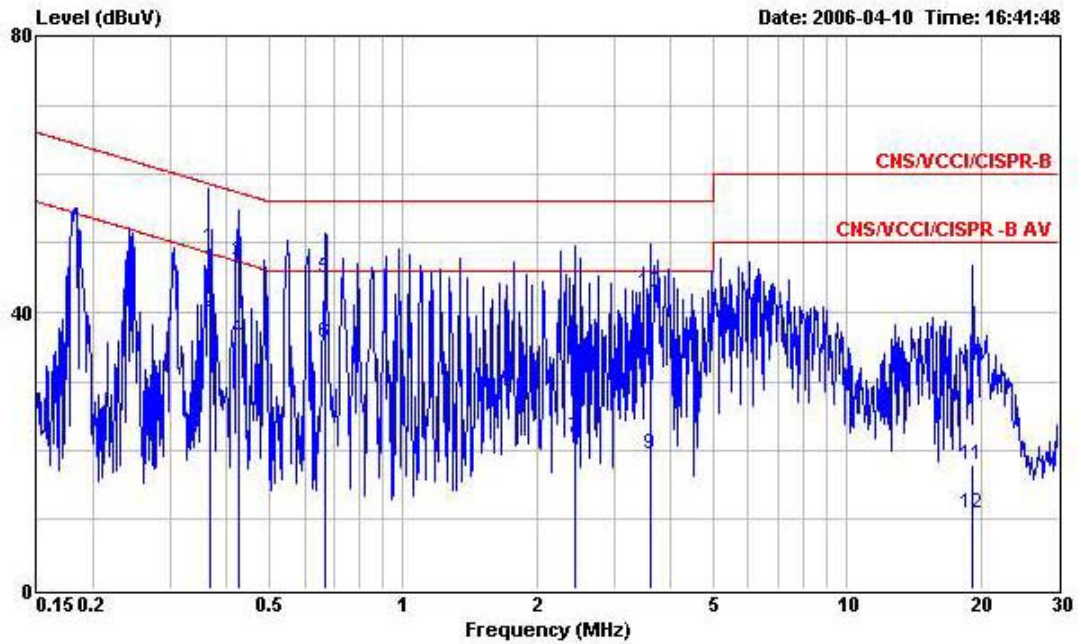
- Temperature: 24°C
- Relative Humidity: 52%
- Test Engineer: Andy

■ 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 : GSM900/1800/1900 Mobile Phone(Bluetooth)  
 Power : 120V/60Hz  
 Model : FD640711  
 Memo : USB link+Adapter  
 Memo :  
 Memo :

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.180	52.24	-12.27	64.51	52.10	0.06	0.08	QP
2	0.180	36.19	-18.32	54.51	36.05	0.06	0.08	Average
3	0.368	47.86	-10.69	58.55	47.75	0.06	0.05	QP
4	0.368	40.70	-7.85	48.55	40.59	0.06	0.05	Average
5	0.425	49.21	-8.14	57.35	49.11	0.06	0.04	QP
6	0.425	37.45	-9.90	47.35	37.35	0.06	0.04	Average
7	0.611	44.97	-11.03	56.00	44.83	0.08	0.06	QP
8	0.611	39.80	-6.20	46.00	39.66	0.08	0.06	Average
9	0.731	44.71	-11.29	56.00	44.55	0.09	0.07	QP
10	0.731	39.47	-6.53	46.00	39.31	0.09	0.07	Average
11	5.650	46.75	-13.25	60.00	46.34	0.21	0.20	QP
12	5.650	39.34	-10.66	50.00	38.93	0.21	0.20	Average



Site : CO01-HY  
 Condition : CNS/VCCI/CISPR-B 2001/004 200505 NEUTRAL  
 EUT : GSM900/1800/1900 Mobile Phone(Bluetooth)  
 Power : 120V/60Hz  
 Model : FD640711  
 Memo : USB link+Adapter  
 Memo :  
 Memo :

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.366	49.29	-9.29	58.58	49.13	0.11	0.05	QP
2	0.366	39.96	-8.62	48.58	39.80	0.11	0.05	Average
3	0.427	47.15	-10.17	57.32	46.99	0.12	0.04	QP
4	0.427	35.98	-11.34	47.32	35.82	0.12	0.04	Average
5	0.667	44.94	-11.06	56.00	44.70	0.18	0.06	QP
6	0.667	35.62	-10.38	46.00	35.38	0.18	0.06	Average
7	2.434	21.82	-24.18	46.00	21.47	0.23	0.12	Average
8	2.434	35.40	-20.60	56.00	35.05	0.23	0.12	QP
9	3.598	19.37	-26.63	46.00	18.99	0.23	0.15	Average
10	3.598	42.81	-13.19	56.00	42.43	0.23	0.15	QP
11	19.220	17.91	-42.09	60.00	17.11	0.42	0.38	QP
12	19.220	10.90	-39.10	50.00	10.10	0.42	0.38	Average

## 5.9 Radiated Emission Measurement

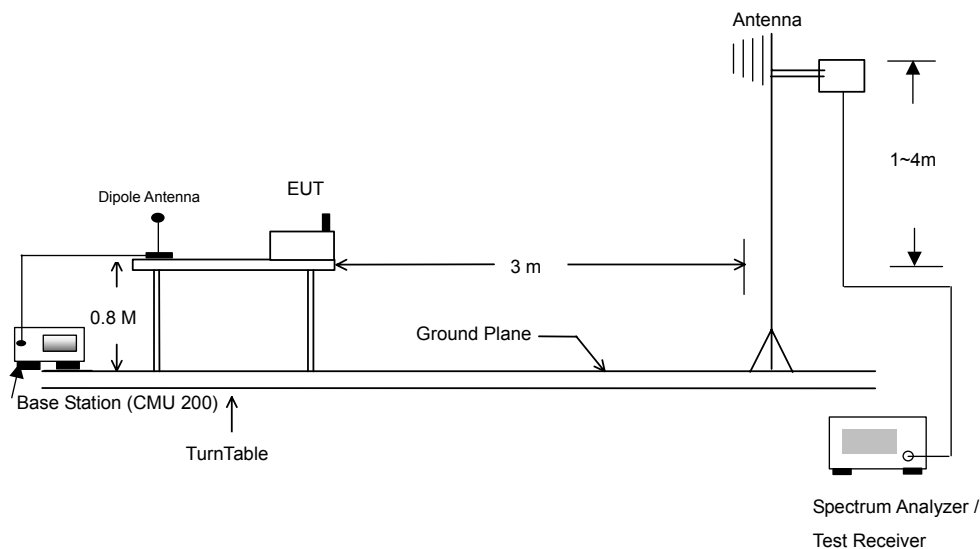
### 5.9.1 Measuring Instruments

As described in chapter 6 of this Report.

### 5.9.2 Test Procedures

1. The EUT was placed on a rotatable table top 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. 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.
5. 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.
6. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
7. 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.
8. 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



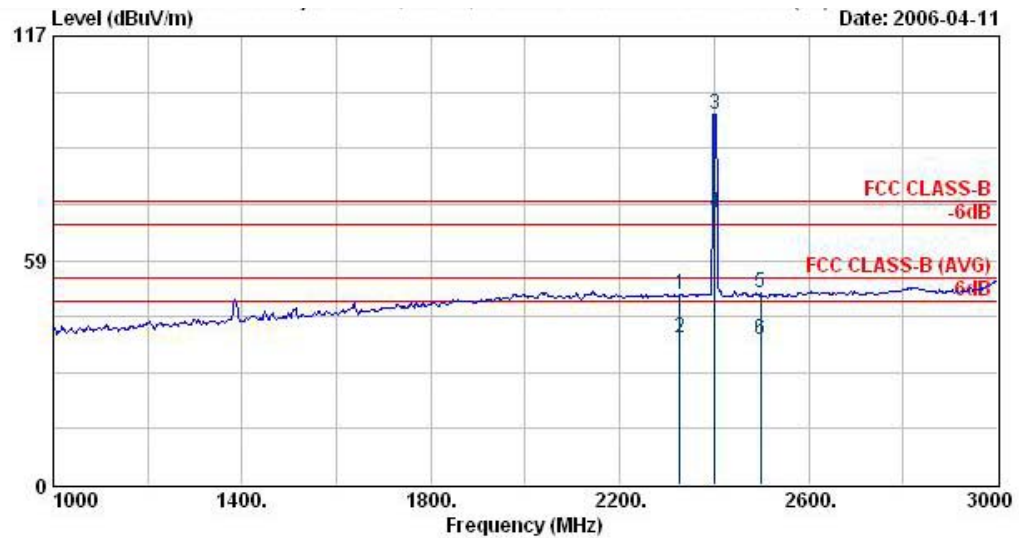




5.9.4 Test Data

- Temperature : 26 °C
- Relating Humidity : 53 %
- Test Engineer : Anderson
- Test Mode : Mode 1
- Polarization : Horizontal

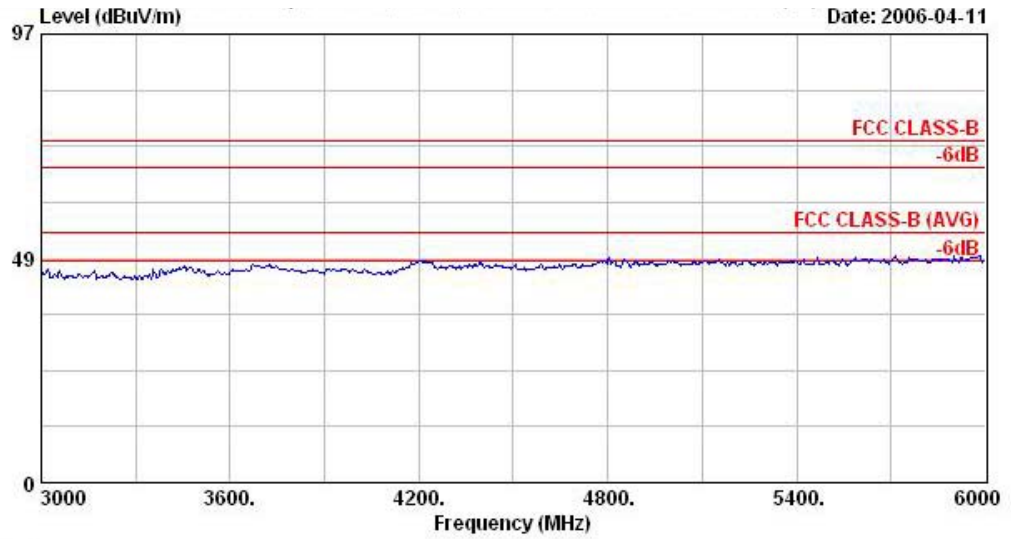
■ The test that passed at the minimum margin was marked by the frame in the following test record



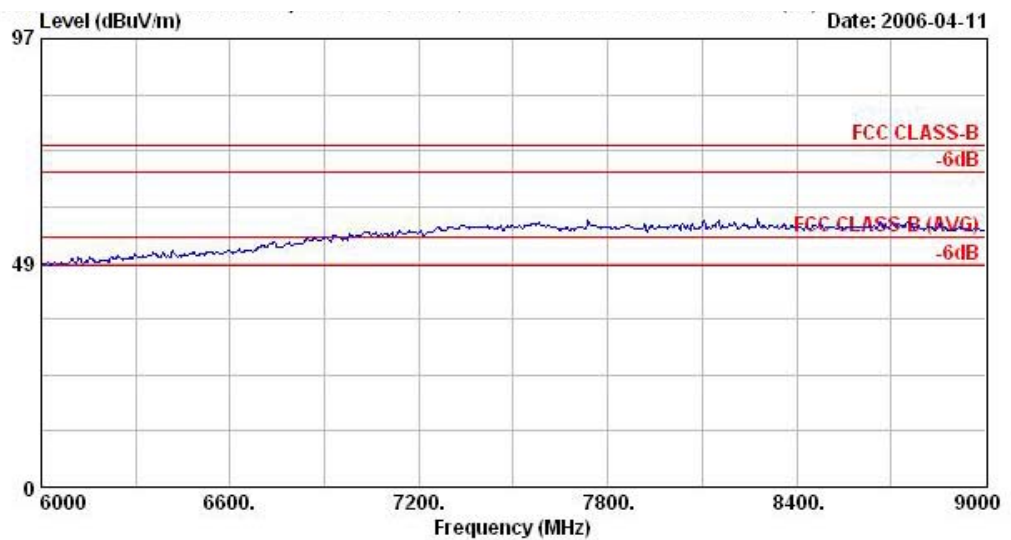
Site : 03CH06-HY  
 Condition : HF-ANT-071025-940201 HORIZONTAL  
 EUT : GSM900/1800/1900 Mobile Phone  
 Power : 120Vac/60Hz  
 Model : FR640711  
 Memo : BT TX CH00,2402MHz  
 Plane : E1

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Preamp Factor	Cable Loss	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg	
1	2328.00	49.79	-24.21	74.00	50.48	30.54	35.40	4.17	200	0 Peak
2	2328.00	38.14	-15.86	54.00	38.84	30.54	35.40	4.17	100	207 Average
3 @	2402.00	96.69			97.40	30.48	35.46	4.26	200	0 Peak
4 X	2402.00	70.93			71.64	30.48	35.46	4.26	100	207 Average
5	2498.00	49.94	-24.06	74.00	50.68	30.40	35.53	4.39	200	0 Peak
6	2498.00	38.01	-15.99	54.00	38.75	30.40	35.53	4.39	100	207 Average

Remark: #3 and #4 Fundamental Signal.



Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 HORIZONTAL  
EUT : GSM900/1800/1900 Mobile Phone  
Power : 120Vac/60Hz  
Model : FR640711  
Memo : BT TX CH00,2402MHz  
Plane : E1

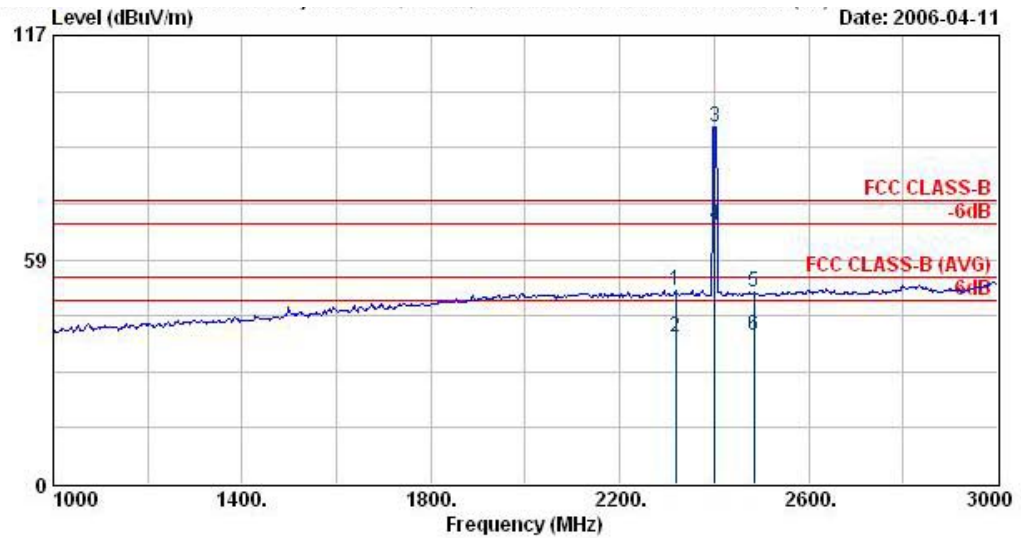


Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 HORIZONTAL  
EUT : GSM900/1800/1900 Mobile Phone  
Power : 120Vac/60Hz  
Model : FR640711  
Memo : BT TX CH00,2402MHz  
Plane : E1



- Test Mode : Mode 1
- Polarization : Vertical

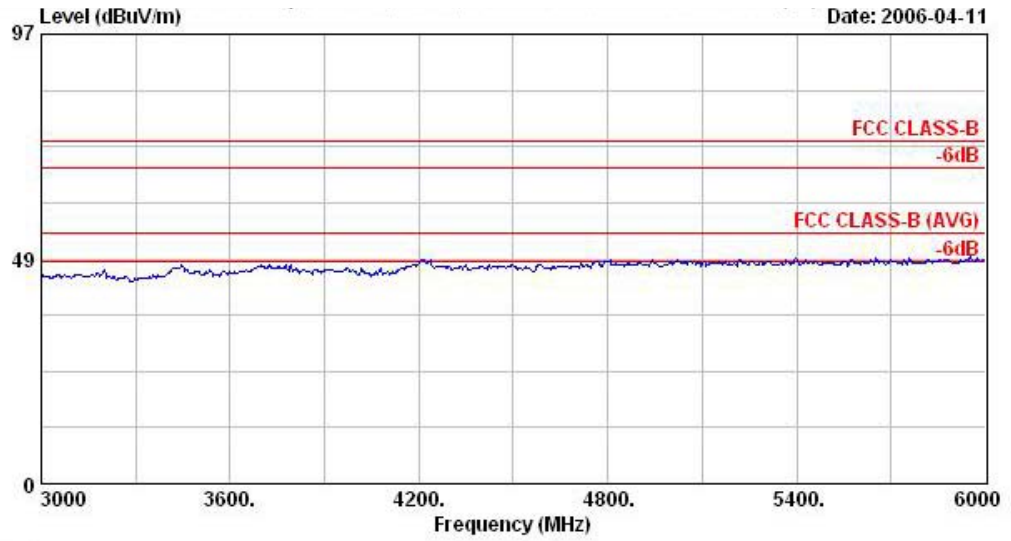
**The test that passed at minimum margin was marked by the frame in the following table.**



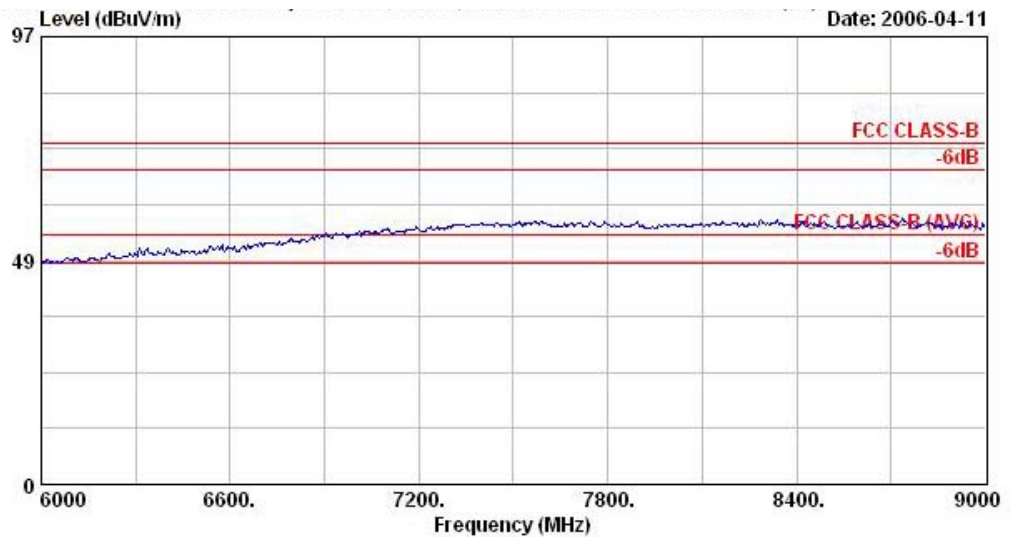
Site : 03CH06-HY  
 Condition : HF-ANT-071025-940201 VERTICAL  
 EUT : GSM900/1800/1900 Mobile Phone  
 Power : 120Vac/60Hz  
 Model : FR640711  
 Memo : BT TX CH00,2402MHz  
 Plane : E1

	Freq	Level	Over	Limit	Read	Antenna	Preamp	Cable	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	2318.00	50.62	-23.38	74.00	51.32	30.54	35.40	4.17	187	0	Peak
2	2318.00	38.17	-15.83	54.00	38.87	30.54	35.40	4.17	100	87	Average
3 X	2402.00	93.01			93.72	30.48	35.46	4.26	187	0	Peak
4 X	2402.00	67.45			68.16	30.48	35.46	4.26	100	87	Average
5	2484.00	49.86	-24.14	74.00	50.59	30.41	35.51	4.36	187	0	Peak
6	2484.00	38.52	-15.48	54.00	39.26	30.41	35.51	4.36	100	87	Average

Remark: #3 and #4 Fundamental Signal.



Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 VERTICAL  
EUT : GSM900/1800/1900 Mobile Phone  
Power : 120Vac/60Hz  
Model : FR640711  
Memo : BT TX CH00,2402MHz  
Plane : E1

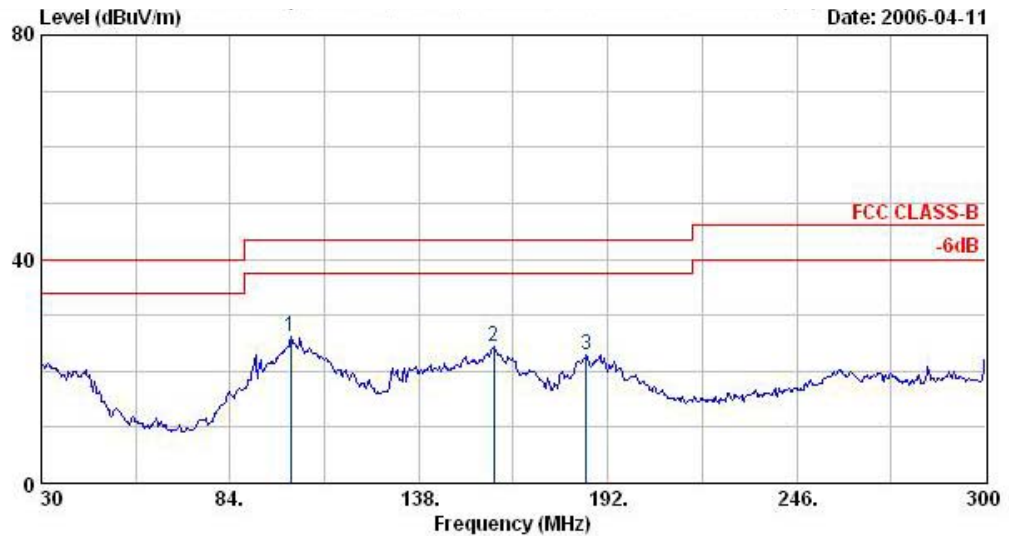


Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 VERTICAL  
EUT : GSM900/1800/1900 Mobile Phone  
Power : 120Vac/60Hz  
Model : FR640711  
Memo : BT TX CH00,2402MHz  
Plane : E1



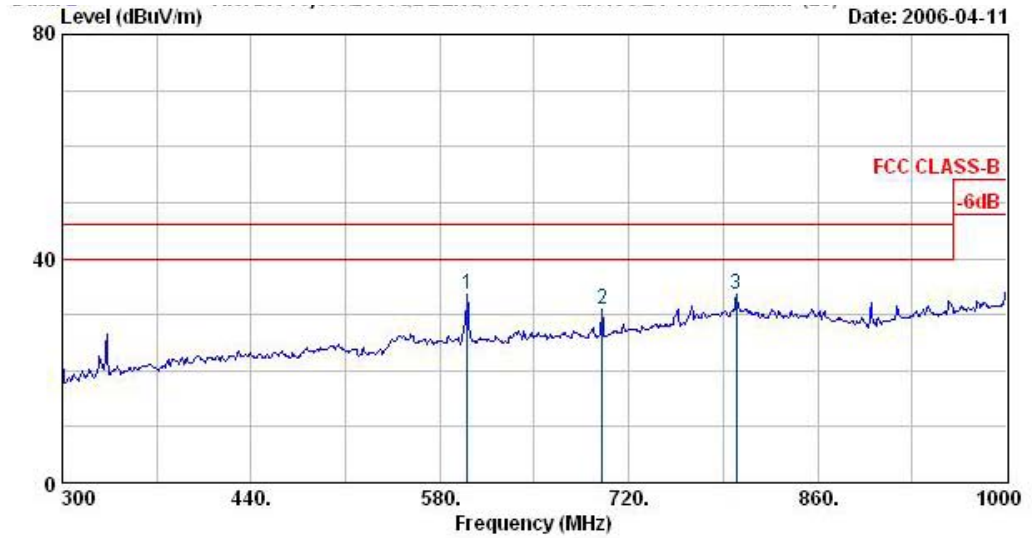
- Test Mode : Mode 2
- Polarization : Horizontal

**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 : GSM900/1800/1900 Mobile Phone  
 Power : 120Vac/60Hz  
 Model : FR640711  
 Memo : BT TX CH39,2441MHz  
 Plane : E1

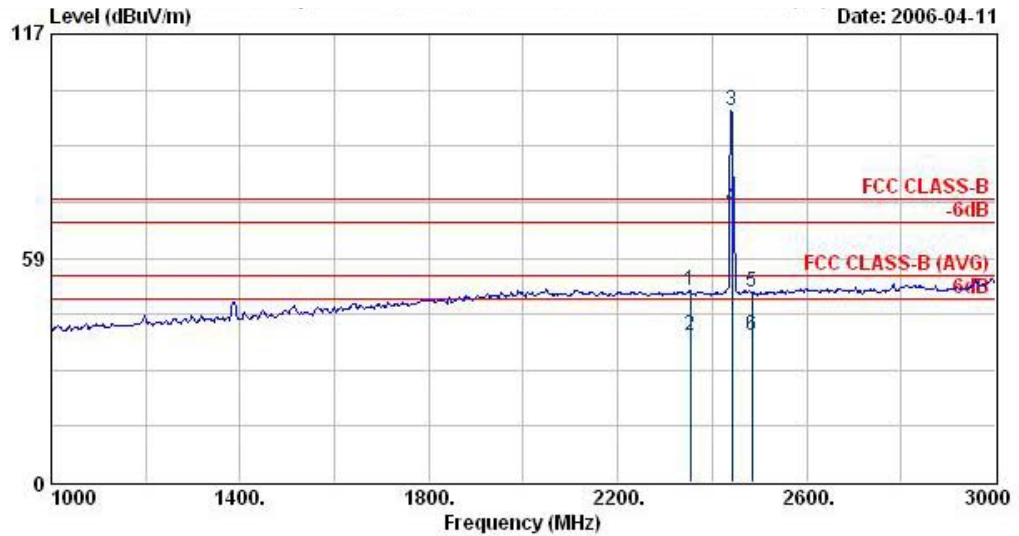
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	101.28	26.28	-17.22	43.50	44.54	10.57	31.29	2.46	400	0	Peak
2 @	159.33	24.40	-19.10	43.50	42.72	10.22	31.64	3.10	400	0	Peak
3 @	185.79	22.88	-20.62	43.50	41.34	9.35	31.18	3.37	400	0	Peak



Site : 03CH06-HY  
 Condition : BI-LOG-2004-1122 HORIZONTAL  
 EUT : GSM900/1800/1900 Mobile Phone  
 Power : 120Vac/60Hz  
 Model : FR640711  
 Memo : BT TX CH39,2441MHz  
 Plane : E1

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Preamp Factor	Cable Loss	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg	
1 @	600.30	33.65	-12.35	46.00	40.00	17.94	30.64	6.35	100	0 Peak
2 @	700.40	30.99	-15.01	46.00	35.63	19.04	30.61	6.93	100	0 Peak
3 @	799.80	33.68	-12.32	46.00	34.45	21.90	30.12	7.45	100	214 Peak

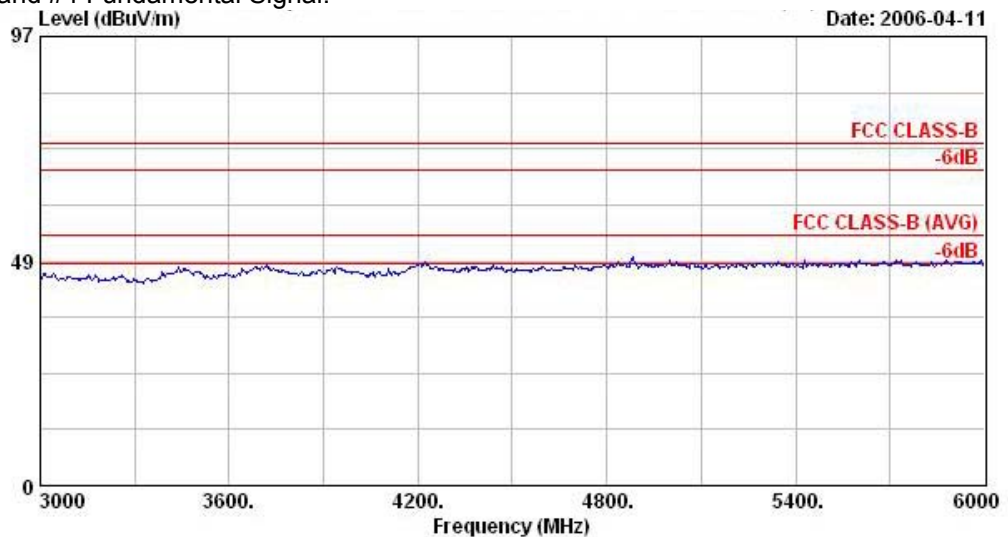




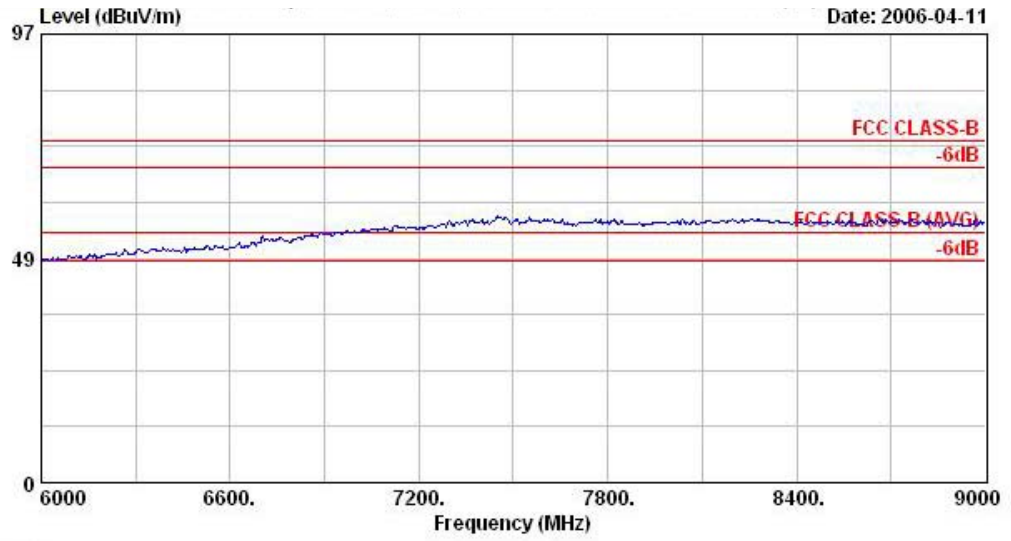
Site : 03CH06-HY  
 Condition : HF-ANT-071025-940201 HORIZONTAL  
 EUT : GSM900/1800/1900 Mobile Phone  
 Power : 120Vac/60Hz  
 Model : FR640711  
 Memo : BT TX CH39,2441MHz  
 Plane : E1

	Freq	Level	Over	Limit	ReadAntenna	Preamp	Cable	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg	
1 @	2354.00	50.02	-23.98	74.00	50.73	30.51	35.42	4.20	200	0 Peak
2 @	2354.00	38.34	-15.66	54.00	39.05	30.51	35.42	4.20	100	188 Average
3 @	2441.00	96.83			97.57	30.44	35.47	4.29	200	0 Peak
4 @	2441.00	71.66			72.39	30.44	35.49	4.33	100	188 Average
5 @	2484.00	49.54	-24.46	74.00	50.28	30.41	35.51	4.36	200	0 Peak
6 @	2484.00	38.18	-15.82	54.00	38.92	30.41	35.51	4.36	100	188 Average

Remark: #3 and #4 Fundamental Signal.



Site : 03CH06-HY  
 Condition : HF-ANT-071025-940201 HORIZONTAL  
 EUT : GSM900/1800/1900 Mobile Phone  
 Power : 120Vac/60Hz  
 Model : FR640711  
 Memo : BT TX CH39,2441MHz  
 Plane : E1



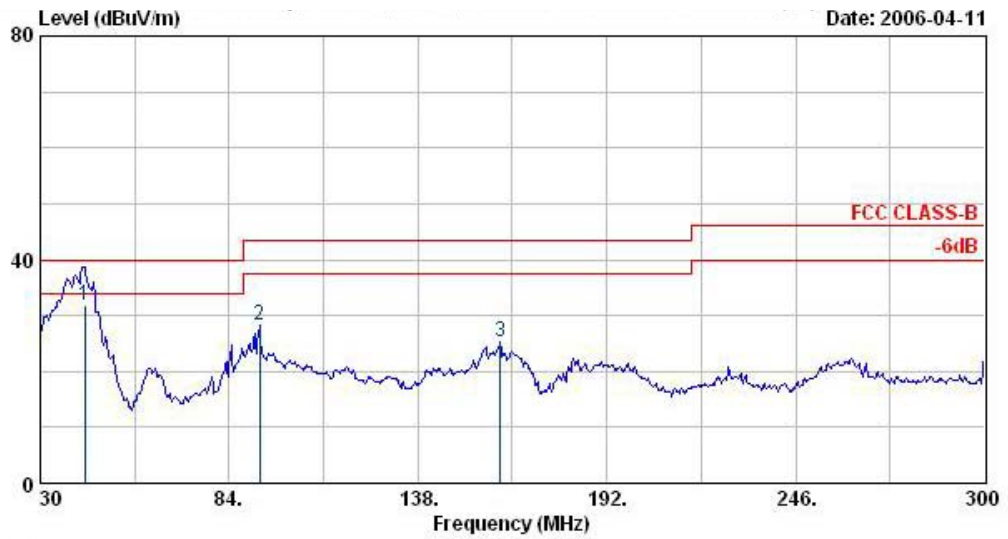
Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 HORIZONTAL  
EUT : GSM900/1800/1900 Mobile Phone  
Power : 120Vac/60Hz  
Model : FR640711  
Memo : BT TX CH39,2441MHz  
Plane : E1





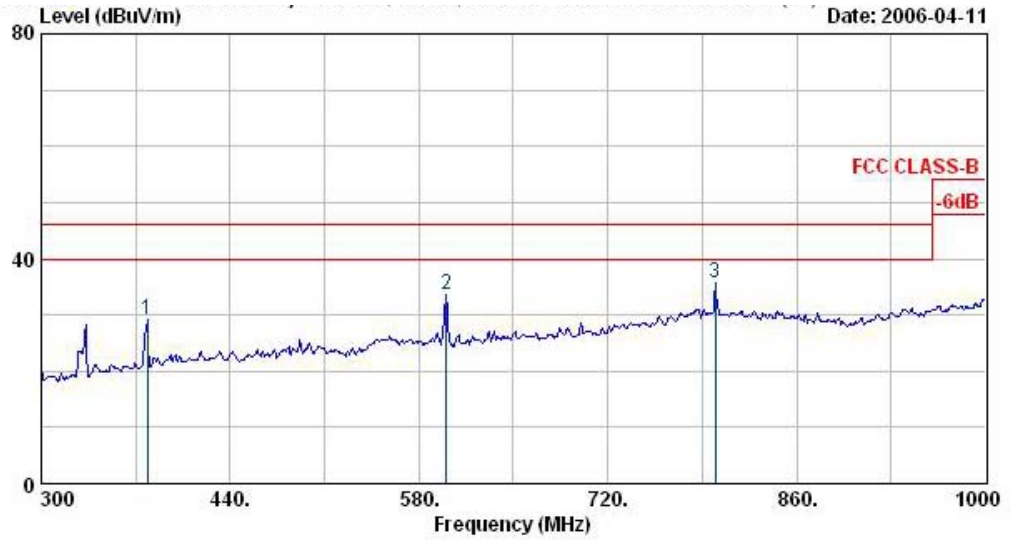
- Test Mode : Mode 2
- Polarization : Vertical

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



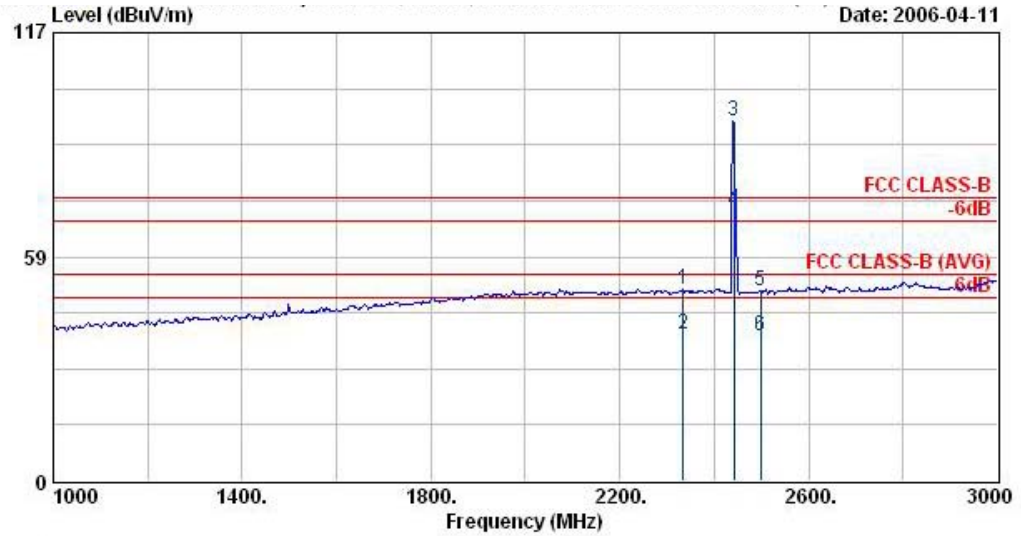
Site : 03CH06-HY  
 Condition : BI-LOG-2004-1122 VERTICAL  
 EUT : GSM900/1800/1900 Mobile Phone  
 Power : 120Vac/60Hz  
 Model : FR640711  
 Memo : BT TX CH39,2441MHz  
 Plane : E1

	Freq	Level	Over	Limit	ReadAntenna	Preamp	Cable	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg	
1 @	42.69	31.91	-8.09	40.00	48.80	13.19	31.67	1.58	100	336 OP
2 @	92.64	28.38	-15.12	43.50	48.04	9.47	31.47	2.34	400	0 Peak
3 @	161.49	25.19	-18.31	43.50	43.43	10.23	31.60	3.12	400	0 Peak



Site : 03CH06-HY  
 Condition : BI-LOG-2004-1122 VERTICAL  
 EUT : GSM900/1800/1900 Mobile Phone  
 Power : 120Vac/60Hz  
 Model : FR640711  
 Memo : BT TX CH39,2441MHz  
 Plane : E1

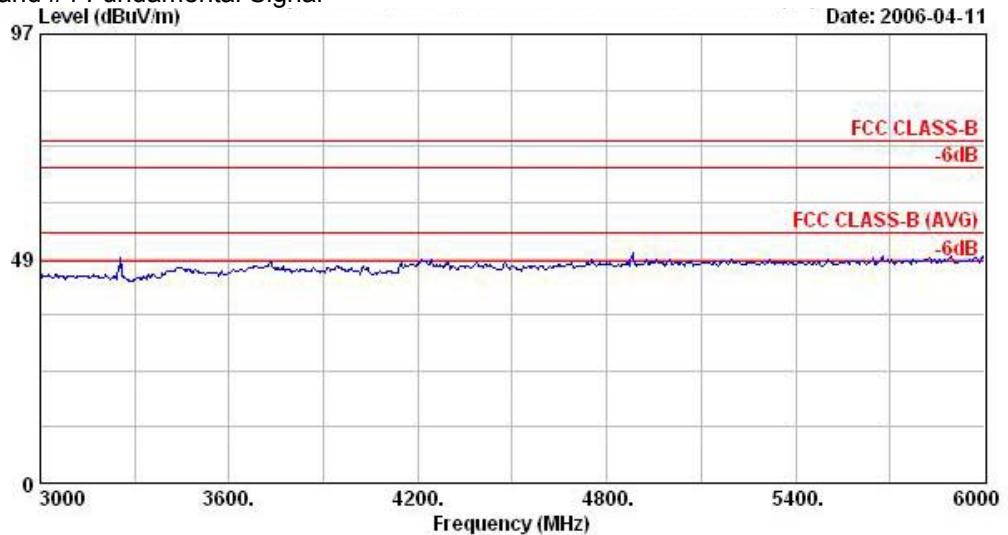
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	378.40	29.23	-16.77	46.00	40.01	15.24	30.90	4.88	100	0	Peak
2 @	600.30	33.73	-12.27	46.00	40.07	17.94	30.64	6.35	100	0	Peak
3 @	799.80	35.62	-10.38	46.00	36.39	21.90	30.12	7.45	100	0	Peak



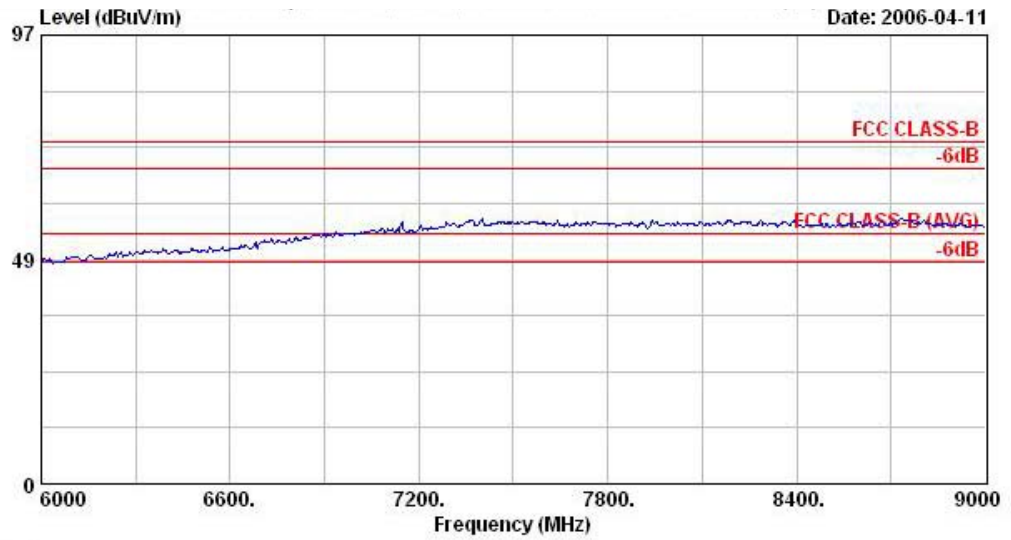
Site : 03CH06-HY  
 Condition : HF-ANT-071025-940201 VERTICAL  
 EUT : GSM900/1800/1900 Mobile Phone  
 Power : 120Vac/60Hz  
 Model : FR640711  
 Memo : BT TX CH39,2441MHz  
 Plane : E1

	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 @	2334.00	50.21	-23.79	74.00	50.91	30.54	35.40	200	0	Peak
2 @	2334.00	38.40	-15.60	54.00	39.10	30.54	35.40	110	257	Average
3 @	2441.00	94.09			94.83	30.44	35.47	200	0	Peak
4 @	2441.00	70.24			70.97	30.44	35.49	110	257	Average
5 @	2498.00	49.44	-24.56	74.00	50.18	30.40	35.53	200	0	Peak
6 @	2498.00	37.98	-16.02	54.00	38.72	30.40	35.53	110	257	Average

Remark: #3 and #4 Fundamental Signal



Site : 03CH06-HY  
 Condition : HF-ANT-071025-940201 VERTICAL  
 EUT : GSM900/1800/1900 Mobile Phone  
 Power : 120Vac/60Hz  
 Model : FR640711  
 Memo : BT TX CH39,2441MHz  
 Plane : E1

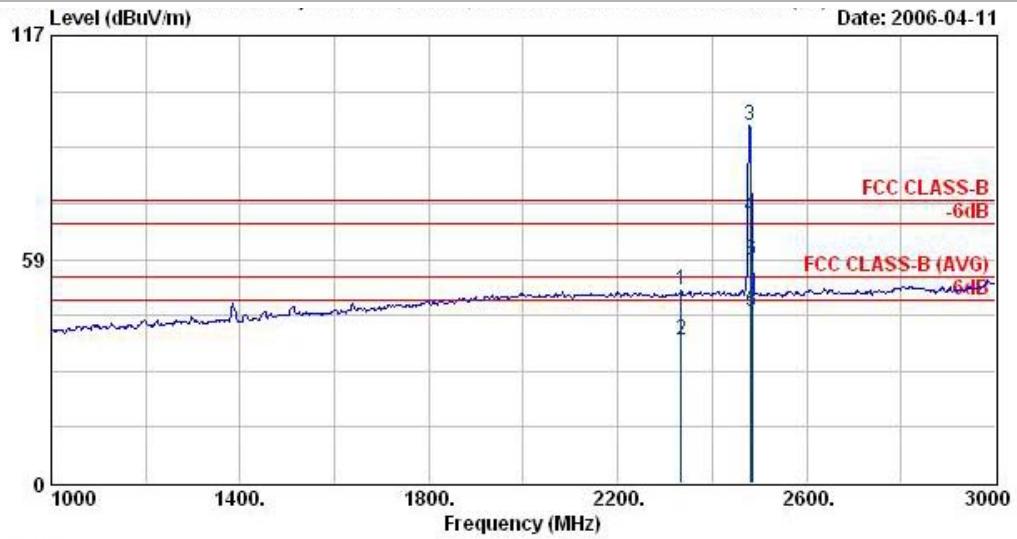


Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 VERTICAL  
EUT : GSM900/1800/1900 Mobile Phone  
Power : 120Vac/60Hz  
Model : FR640711  
Memo : BT TX CH39,2441MHz  
Plane : E1



- Test Mode : Mode 3
- Polarization : Horizontal

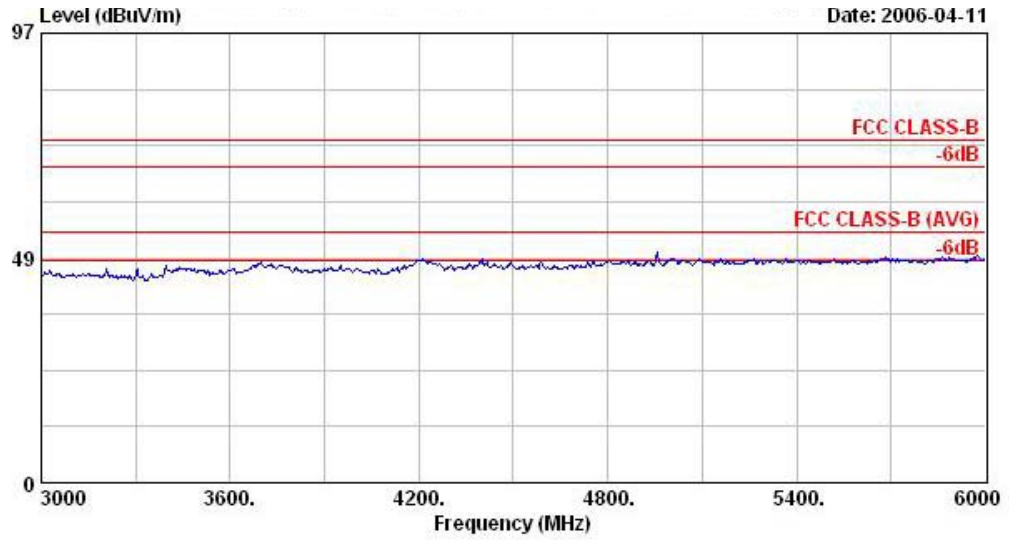
■ The test that passed at minimum margin was marked by the frame in the following table.



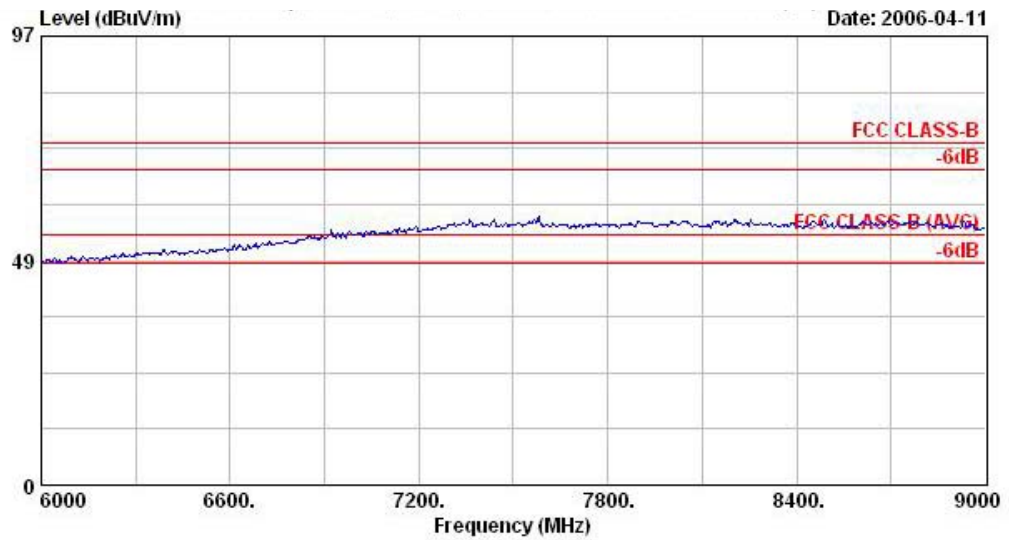
Site : 03CH06-HY  
 Condition : HF-ANT-071025-940201 HORIZONTAL  
 EUT : GSM900/1800/1900 Mobile Phone  
 Power : 120Vac/60Hz  
 Model : FR640711  
 Memo : BT TX CH78,2480MHz  
 Plane : E1

	Freq	Level	Over	Limit	Read	Antenna	Preamp	Cable	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	2334.00	50.66	-23.34	74.00	51.36	30.54	35.40	4.17	200	0	Peak
2 @	2334.00	37.39	-16.61	54.00	38.09	30.54	35.40	4.17	100	182	Average
3 @	2480.00	93.36			94.10	30.41	35.51	4.36	200	0	Peak
4 @	2480.00	69.78			70.52	30.41	35.51	4.36	100	182	Average
5 @	2483.50	44.71	-9.29	54.00	45.45	30.41	35.51	4.36	100	182	Average
6 @	2483.50	58.28	-15.72	74.00	59.02	30.41	35.51	4.36	200	0	Peak

Remark: #2 and #3 and #4 Fundamental Signal.



Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 HORIZONTAL  
EUT : GSM900/1800/1900 Mobile Phone  
Power : 120Vac/60Hz  
Model : FR640711  
Memo : BT TX CH78,2480MHz  
Plane : E1

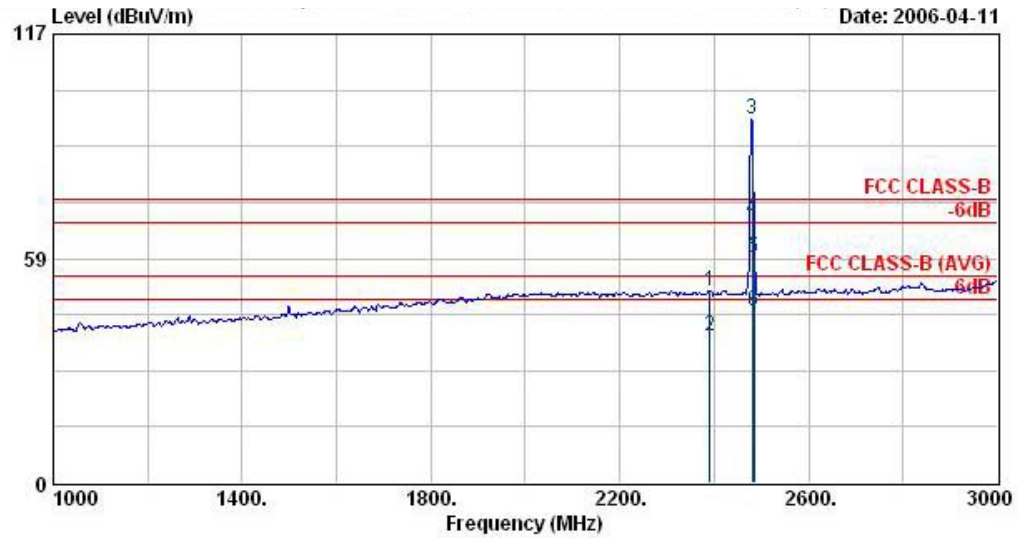


Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 HORIZONTAL  
EUT : GSM900/1800/1900 Mobile Phone  
Power : 120Vac/60Hz  
Model : FR640711  
Memo : BT TX CH78,2480MHz  
Plane : E1



- Test Mode : Mode 3
- Polarization : Vertical

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

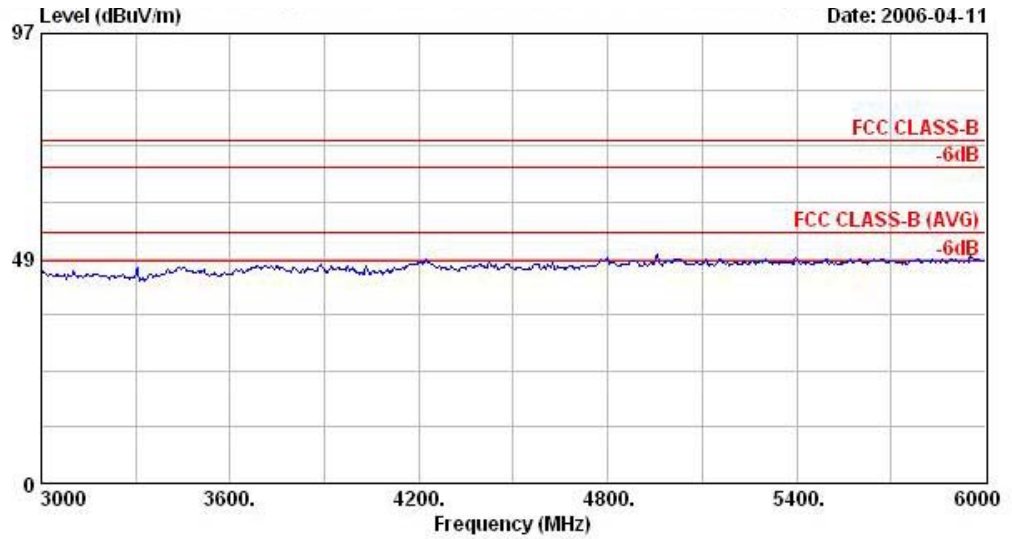


Site : 03CH06-HY  
 Condition : HF-ANT-071025-940201 VERTICAL  
 EUT : GSM900/1800/1900 Mobile Phone  
 Power : 120Vac/60Hz  
 Model : FR640711  
 Memo : BT TX CH78,2480MHz  
 Plane : E1

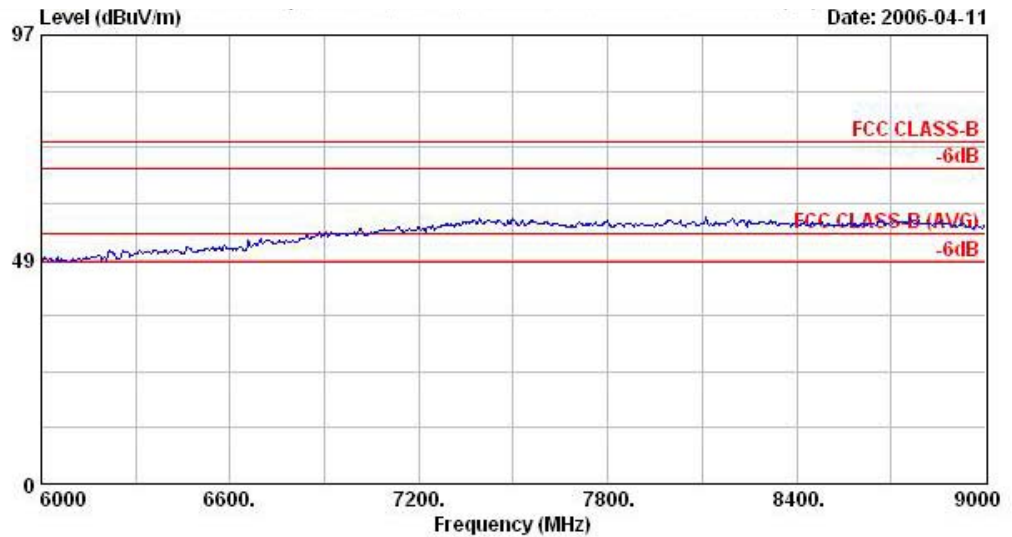
	Freq	Level	Over	Limit	ReadAntenna	Preamp	Cable	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg	
1 @	2390.00	49.95	-24.05	74.00	50.66	30.48	35.46	4.26	100	0 Peak
2 @	2390.00	38.24	-15.76	54.00	38.95	30.48	35.46	4.26	100	110 Average
3 @	2480.00	94.95			95.68	30.41	35.51	4.36	100	0 Peak
4 @	2480.00	68.77			69.51	30.41	35.51	4.36	100	110 Average
5 @	2483.50	58.65	-15.35	74.00	59.39	30.41	35.51	4.36	100	0 Peak
6 @	2483.50	44.84	-9.16	54.00	45.58	30.41	35.51	4.36	100	110 Average

Remark: #3 and #4 Fundamental Signal.





Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 VERTICAL  
EUT : GSM900/1800/1900 Mobile Phone  
Power : 120Vac/60Hz  
Model : FR640711  
Memo : BT TX CH78,2480MHz  
Plane : E1



Site : 03CH06-HY  
Condition : HF-ANT-071025-940201 VERTICAL  
EUT : GSM900/1800/1900 Mobile Phone  
Power : 120Vac/60Hz  
Model : FR640711  
Memo : BT TX CH78,2480MHz  
Plane : E1

Remark: There is no more obvious 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 a PCB antenna without connector and it is considered to meet antenna requirement of FCC.

### **5.10.3 Antenna Gain**

The antenna gain of EUT is less than 6dBi. 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)
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, 2006	Jun. 27, 2007	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. 22, 2006	Feb. 22, 2007	Radiation (03CH06-HY)
SHF-EHF Horn	SCHWARZBECK	BBHA 9170	9170-249	14G - 40G	Jul. 21, 2005	Jul. 20, 2006	Radiation (03CH06-HY)
HF Amplifier	MITEQ	AFS44	973248	0.1G - 26.5G	Nov. 23, 2005	Nov. 22, 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 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 Uc(y)</b>	<b>2.36</b>				
<b>Measuring uncertainty for a level of confidence of 95% U=2Ue(y)</b>	<b>4.72</b>				