FCC TEST REPORT

for

47 CFR Part 15 Subpart C

Equipment	:	**Bluetooth Stereo Adapter**
Trade Name	:	**MAVIN, SURECOM, EDIMAX**
Model No.	:	**MBSA-C3.2, EP-2131, EB-STHK-W(Adapter), EB-STHK-B(Adapter)**
FCC ID	:	**SI4-MBSAC32**
Filing Type	:	**Certification**
Applicant	:	**MAVIN TECHNOLOGY INC.** 3F, NO. 35, Hsin Tai Rd., Chupei City, Hsinchu County 302, Taiwan, R.O.C.

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- The data shown in this test report were carried out on May 13, 2006 at **Sporton International Inc. LAB.**
- Report No.: FR650401, Report Version: Rev. 01

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History of this test report

Report Issue Date: Jun. 01, 2006

Report No.	Description

1. General Description of Equipment under Test

1.1 Applicant

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

1.2 Manufacturer

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

1.3 Basic Description of Equipment under Test

Equipment	: Bluetooth Stereo Adapter
Trade Name	: MAVIN, SURECOM, EDIMAX
Model No.	: MBSA-C3.2, EP-2131, EB-STHK-W(Adapter), EB-STHK-B(Adapter)
FCC ID	: SI4-MBSAC32
AC Power Cord	: AC 120V, Wall-mount, 1.2 meter, 2 pin

1.4 Feature of Equipment under Test

Product Feature & Specification				
1. Type of Modulation	GFSK			
2. Number of Channels	79 Channels			
3. Frequency Band	2.4GHz~2.4835GHz			
4. Carrier Frequency of each channel	2402MHz+n*1MHz, n=0~78			
5. Channel Spacing	1MHz			
6. Maximum Output Power to Antenna (Normal Condition)	0.72 dBm			
7. Type of Antenna Connector	N/A			
8. Antenna Type	Print Antenna			
9. Antenna Gain	0 dBi			
10. Function Type	Transmitter		Transceiver	V
11. Power Rating (DC/AC Voltage) :	3.7V / 300mA			

2 Test Configuration of Equipment under Test

2.1 Test Manner

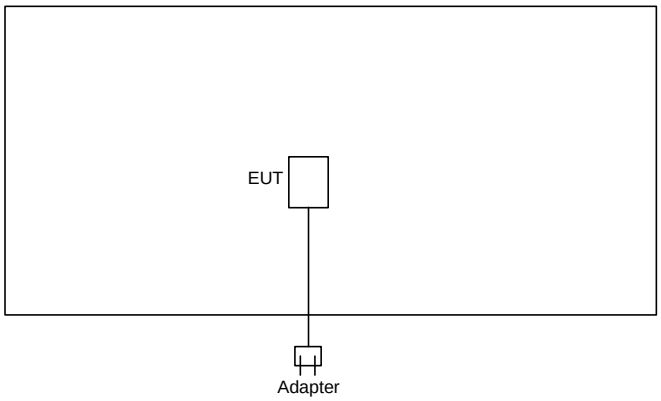
a. The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.
b. For spurious emission below 1GHz, only one channel of each application was tested because it is not related to 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	Mode 1: Tx_CH00_2402 MHz Mode 2: Tx_CH39_2441 MHz Mode 3: Tx_CH78_2480 MHz

2.3 Connection Diagram of Test System

Radiated Emission



2.4 Ancillary Equipment List

N/A

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	:	03CH06-HY

4.1 Test Voltage

120V/ 60Hz

4.2 Standard for Methods of Measurement

ANSI C63.4-2003

4.3 Test in Compliance with

47 CFR Part 15 Subpart C

4.4 Frequency Range Investigated

a. 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 Bandwidth	Pass
15.247(a)(1)	Hopping Channel Separation	Pass
15.247(a)(1)(iii)	Number of Hopping Frequency Used	Pass
15.247(a)(1)(iii)	Dwell Time of Each Frequency	Pass
15.247(b)	Output Power	Pass
15.247(c)	100kHz Bandwidth of Frequency Band Edges	Pass
15.209(a)	Radiated Emission	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 : BT
- Temperature : 28°C
- Relative Humidity : 48%
- Test Enginner : Sam

- Test Result in BT lower band (Channel 00) : PASS
- Test Result in BT higher band (Channel 78) : PASS

5.2.4 Note on Band Edge Emission：

➢Bluetooth

CH00 (Horizontal)

Frequency (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	53.13	-20.87	74.00	54.07	30.26	4.26	35.46	100	360	Peak
2390.00	38.99	-15.01	54.00	39.93	30.26	4.26	35.46	100	281	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	50.83	-23.17	74.00	51.77	30.26	4.26	35.46	100	0	Peak
2390.00	38.91	-15.09	54.00	39.85	30.26	4.26	35.46	174	159	Average

CH78 (Horizontal)

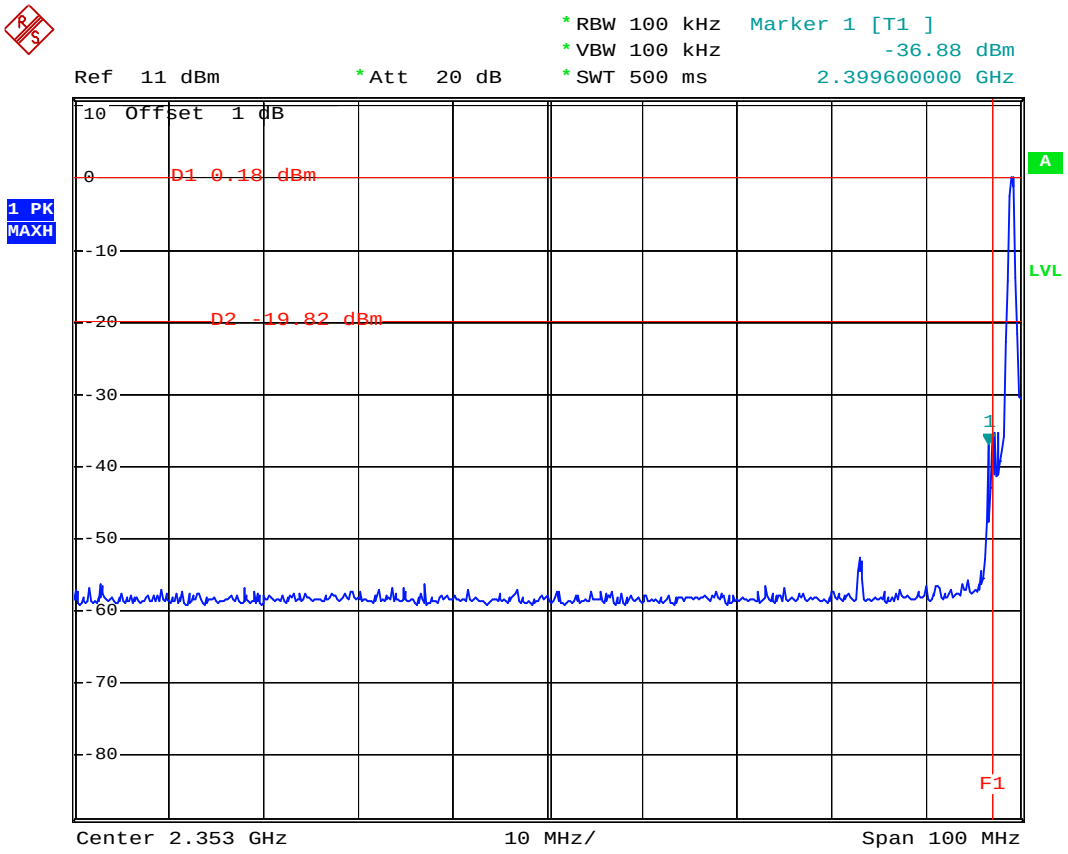
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.50	70.58	-3.42	74.00	71.44	30.29	4.36	35.51	100	0	Peak
2483.50	46.67	-7.33	54.00	47.53	30.29	4.36	35.51	100	268	Average

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	64.16	-9.84	74.00	65.02	30.29	4.36	35.51	100	0	Peak
2483.50	42.50	-11.50	54.00	43.36	30.29	4.36	35.51	100	358	Average

5.2.5 20dB Band Edge

CH00



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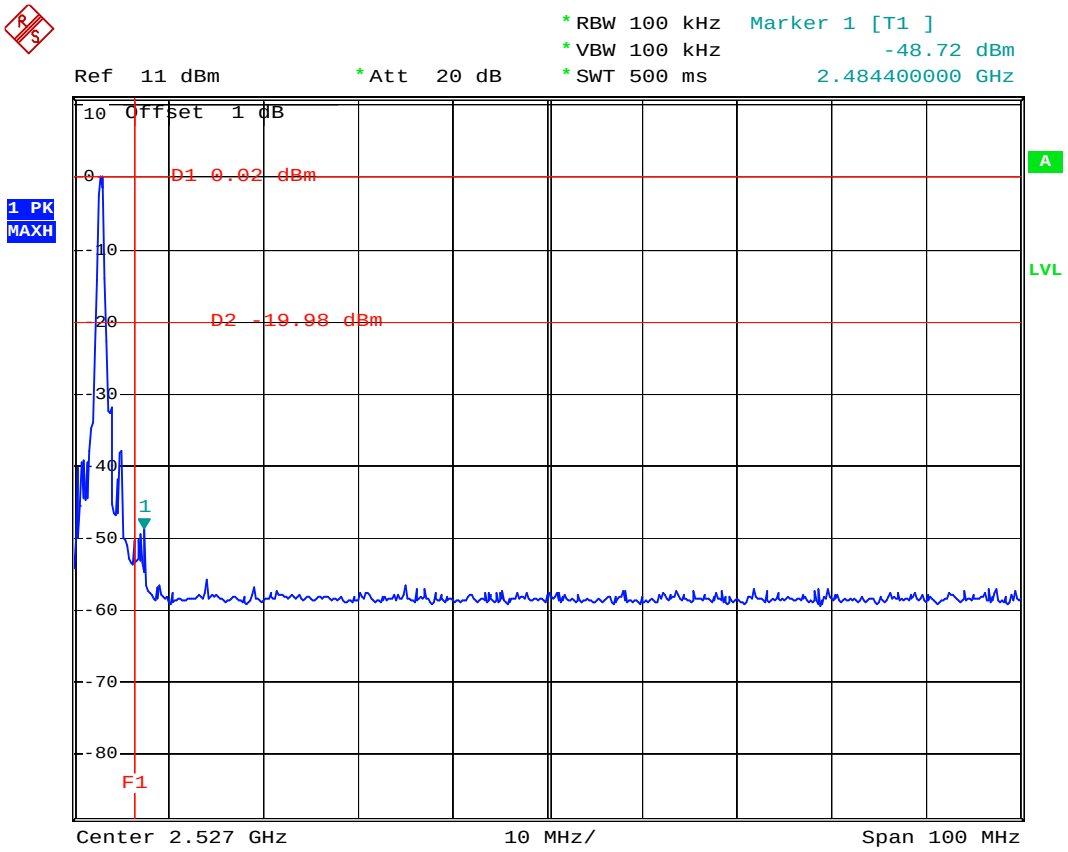
CH78



Date: 11.MAY.2006 16:26:04

5.3 Hopping Channel Separation

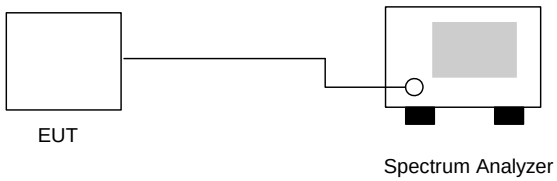
5.3.1 Measuring Instruments：

As described in chapter 9 of this test report.

5.3.2 Test Procedure：

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

5.3.3 Test Setup Layout：



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

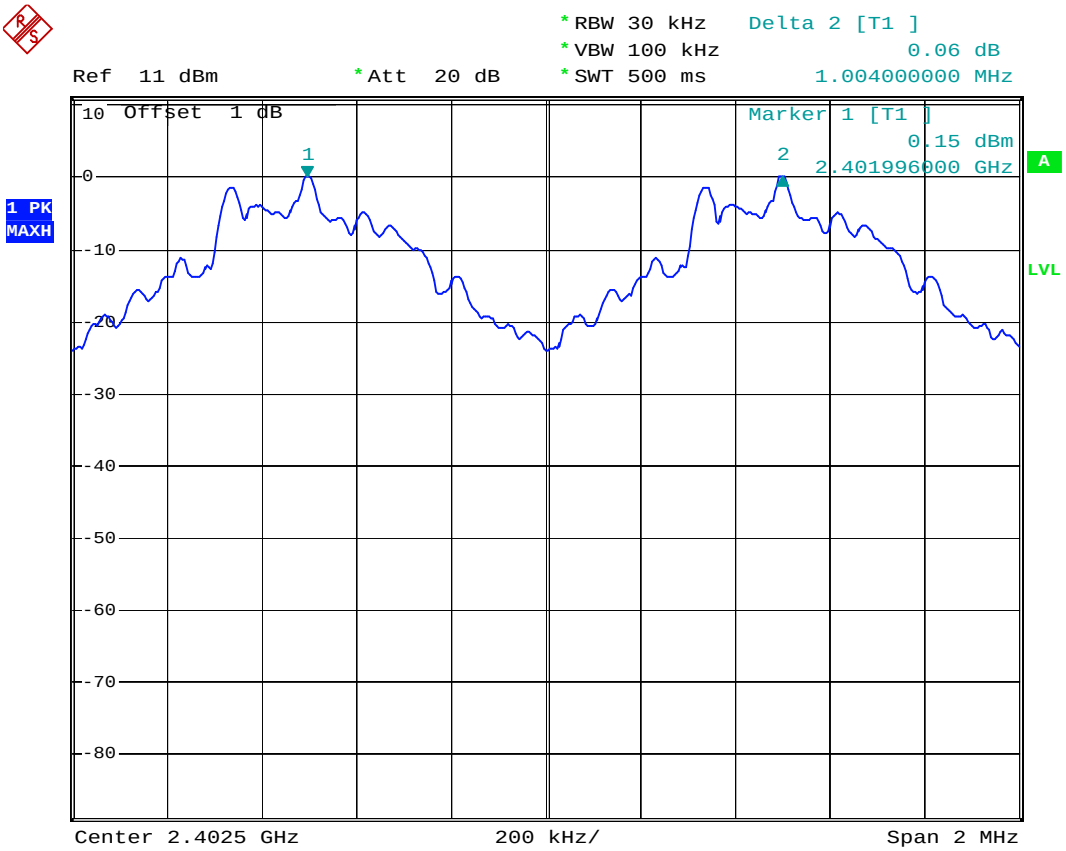
- Application Type : BT
- Temperature : 28°C
- Relative Humidity : 48%
- Test Enginner : Sam

Channel	Frequency (MHz)	Carrier Frequency Separation (MHz)	Limits (MHz)	Plot Ref. No.
00	2402	1.004	0.824	Mode 1
39	2441	1.000	0.826	Mode 2
78	2480	1.004	0.824	Mode 3

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

5.3.5 Hopping Channel Seperation

Mode 1



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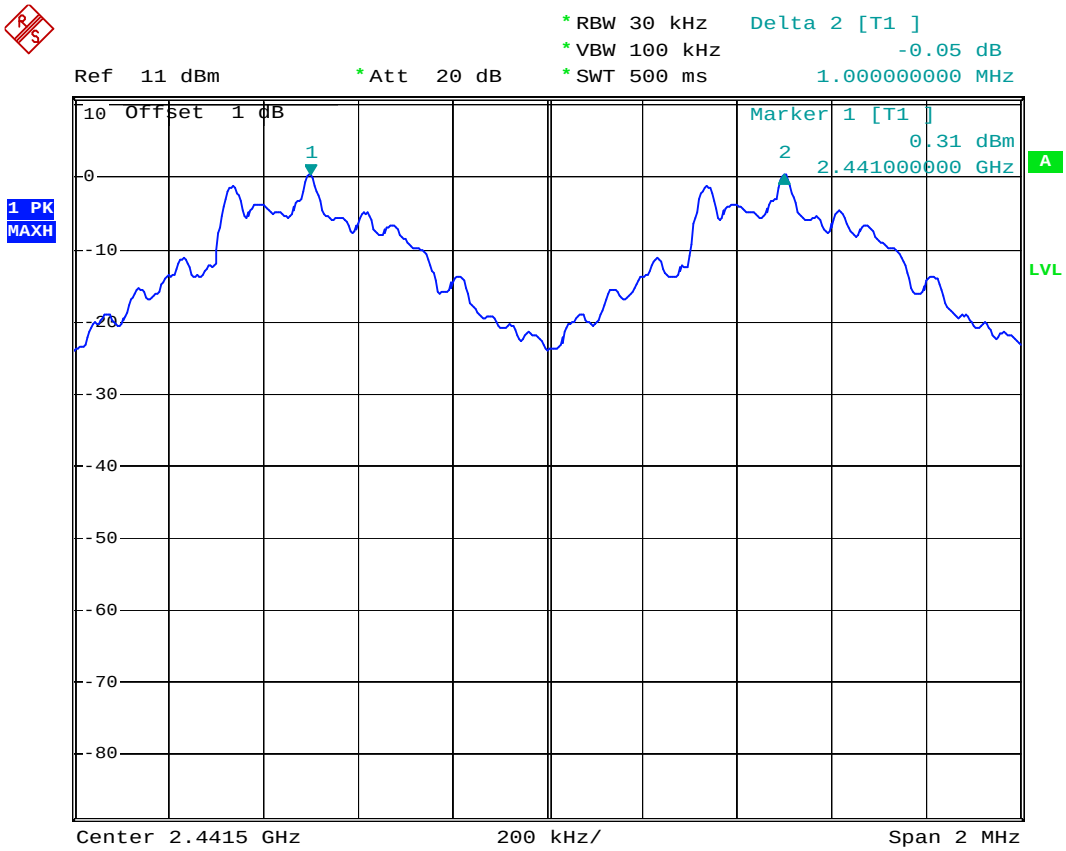
Mode 2



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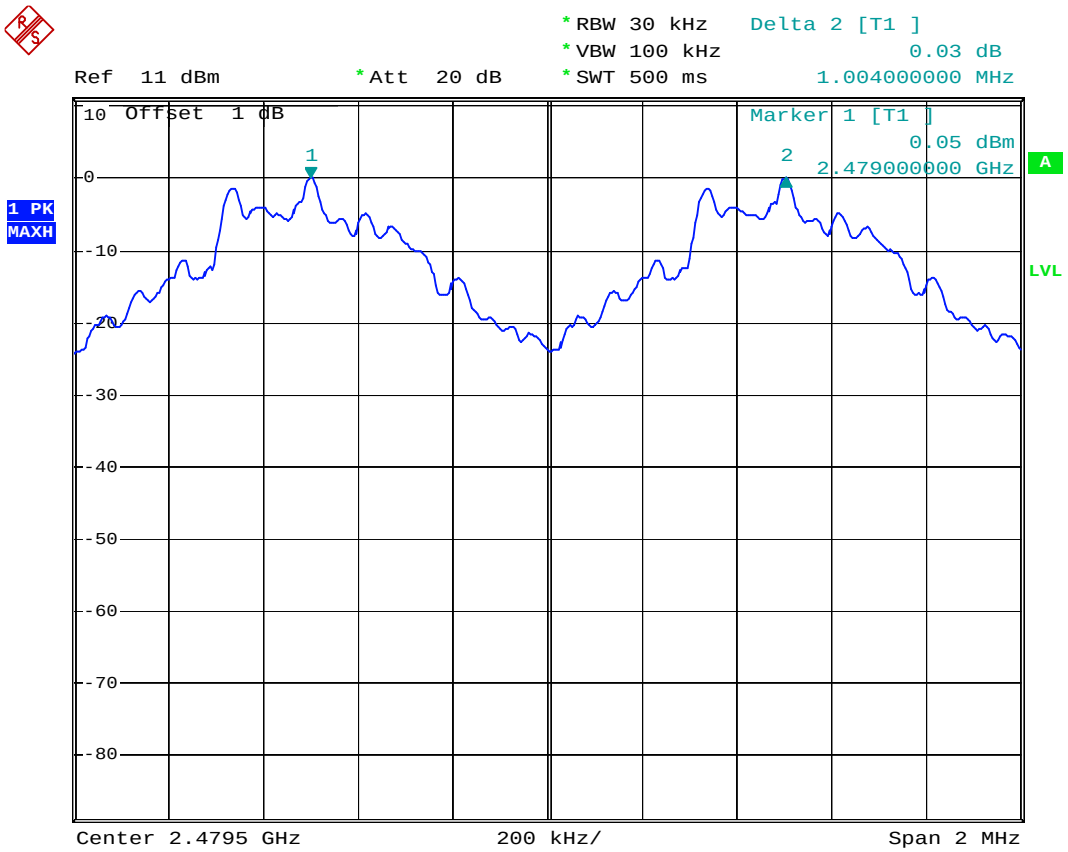
Mode 3



Date: 11.MAY.2006 16:28:06

5.4 Number of Hopping Frequency

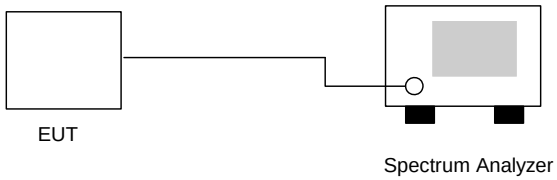
5.4.1 Measuring Instruments：

As described in chapter 9 of this test report.

5.4.2 Test Procedure：

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

5.4.3 Test Setup Layout：

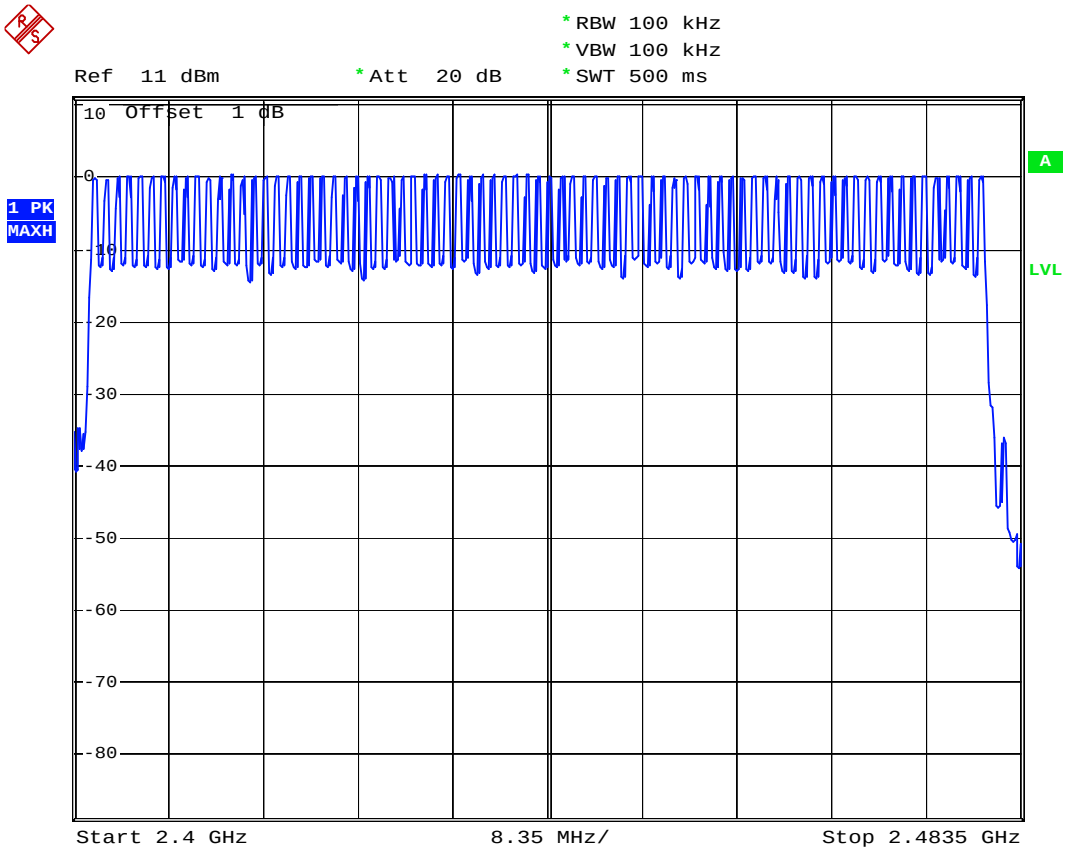


5.4.4 Test Result：See spectrum analyzer plots below

- Application Type : BT
- Temperature : 28°C,
- Relative Humidity : 48%
- Test Enginner : Sam

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

5.4.5 Number of Hopping Frequency



Date: 11.MAY.2006 17:01:59

5.5 Hopping Channel Bandwidth

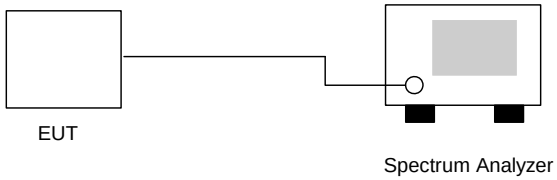
5.5.1 Measuring Instruments：

As described in chapter 9 of this test report.

5.5.2 Test Procedure：

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

5.5.3 Test Setup Layout：



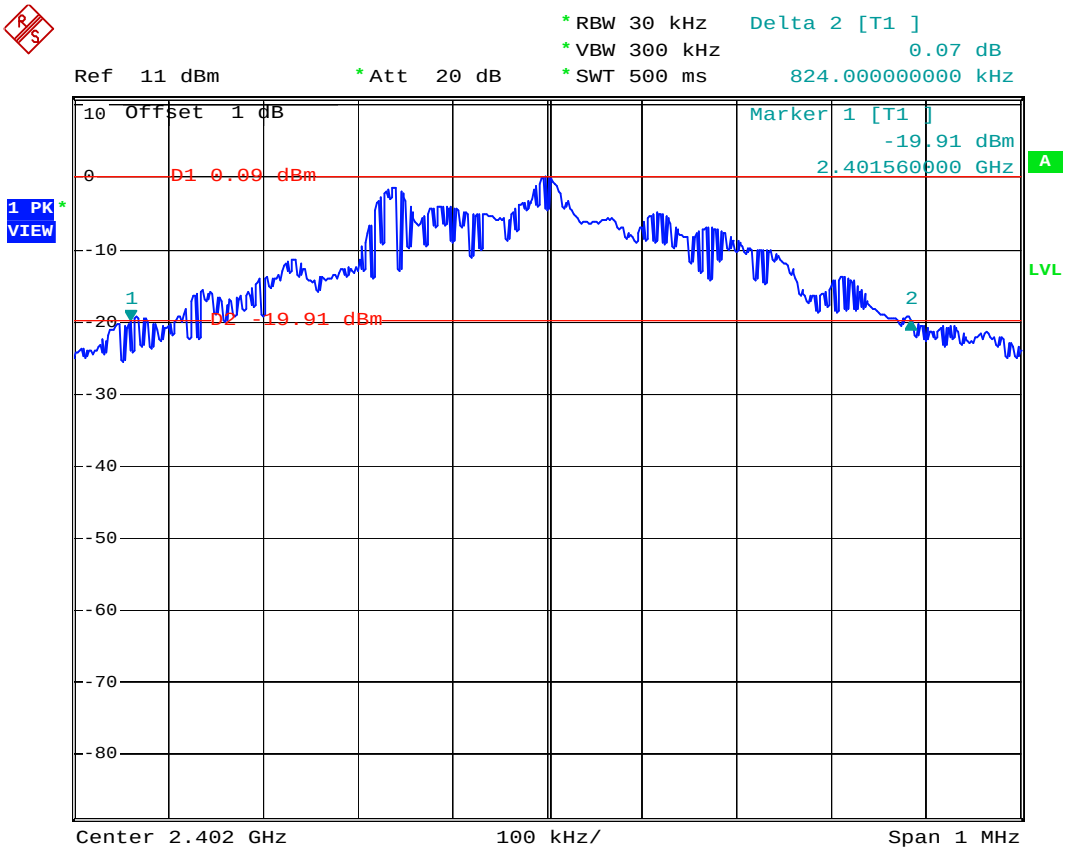
5.5.4 Test Result：See spectrum analyzer plots below

- Application Type : BT
- Temperature : 28°C,
- Relative Humidity : 48%
- Test Enginner : Sam

Channel	Frequency (MHz)	Hopping Channel Bandwidth (MHz)	Limits (MHz)	Plot Ref. No.
00	2402	0.824	1.000	Mode 1
39	2441	0.826	1.000	Mode 2
78	2480	0.824	1.000	Mode 3

5.5.5 Hopping Channel Bandwidth

Mode 1



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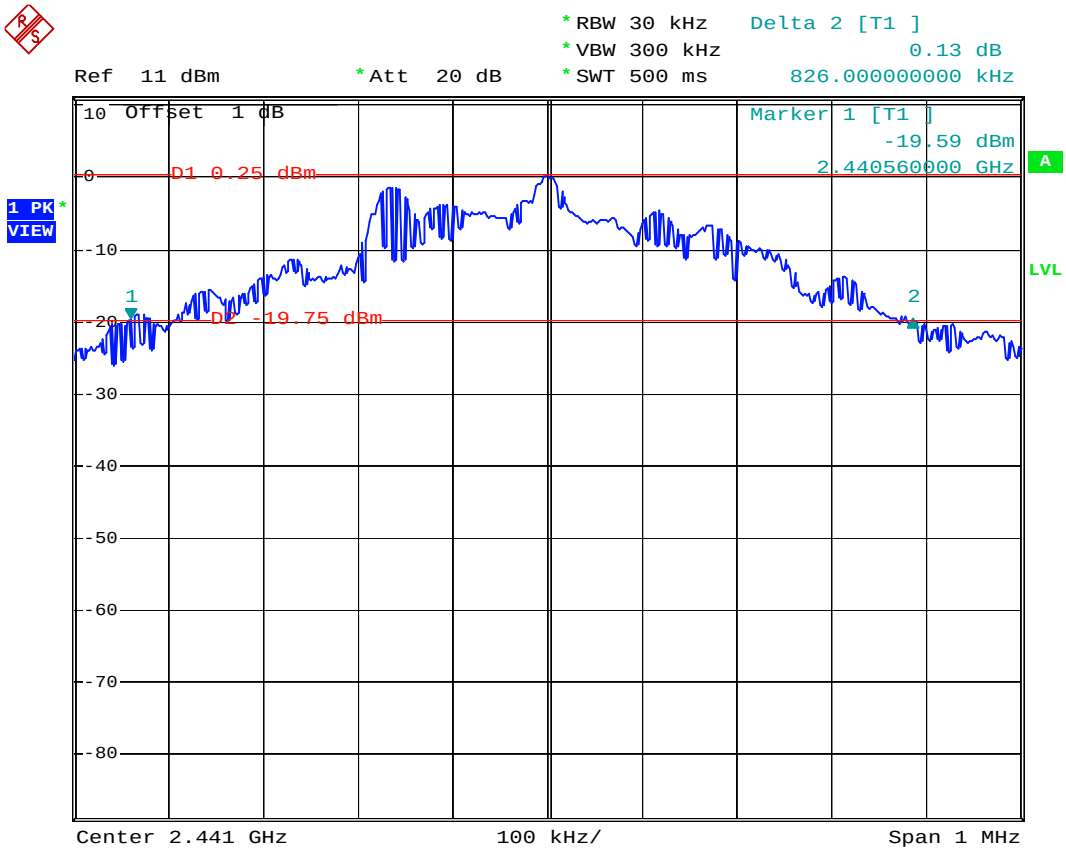
Mode 2



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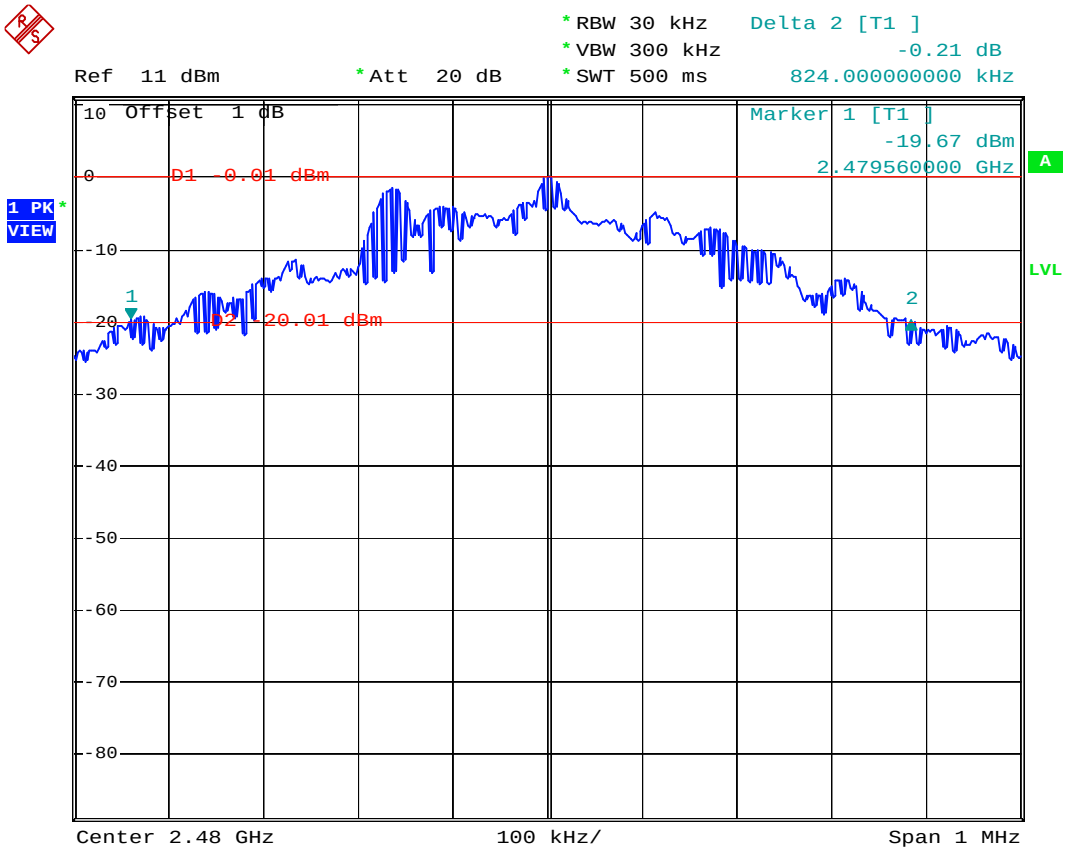
Mode 3



Date: 11.MAY.2006 16:22:50

5.6 Dwell Time of Each Frequency

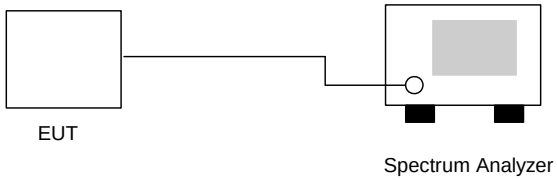
5.6.1 Measuring Instruments：

As described in chapter 9 of this test report.

5.6.2 Test Procedure：

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

5.6.3 Test Setup Layout：



5.6.4 Test Result：See spectrum analyzer plots below

- Application Type : BT
- Temperature : 28°C,
- Relative Humidity : 48%
- Test Enginner : Sam

Ch00

Package Mode	Average Hopping Channel	Package Transfer Time (us)	Dwell Time (s)	Limit (s)
DH1	10	548	0.173	0.4
DH3	5.2	1824	0.300	0.4
DH5	3.4	3106	0.334	0.4

CH39

Package Mode	Average Hopping Channel	Package Transfer Time (us)	Dwell Time (s)	Limit (s)
DH1	10.1	552	0.176	0.4
DH3	5.1	1804	0.291	0.4
DH5	3.4	3106	0.334	0.4

CH78

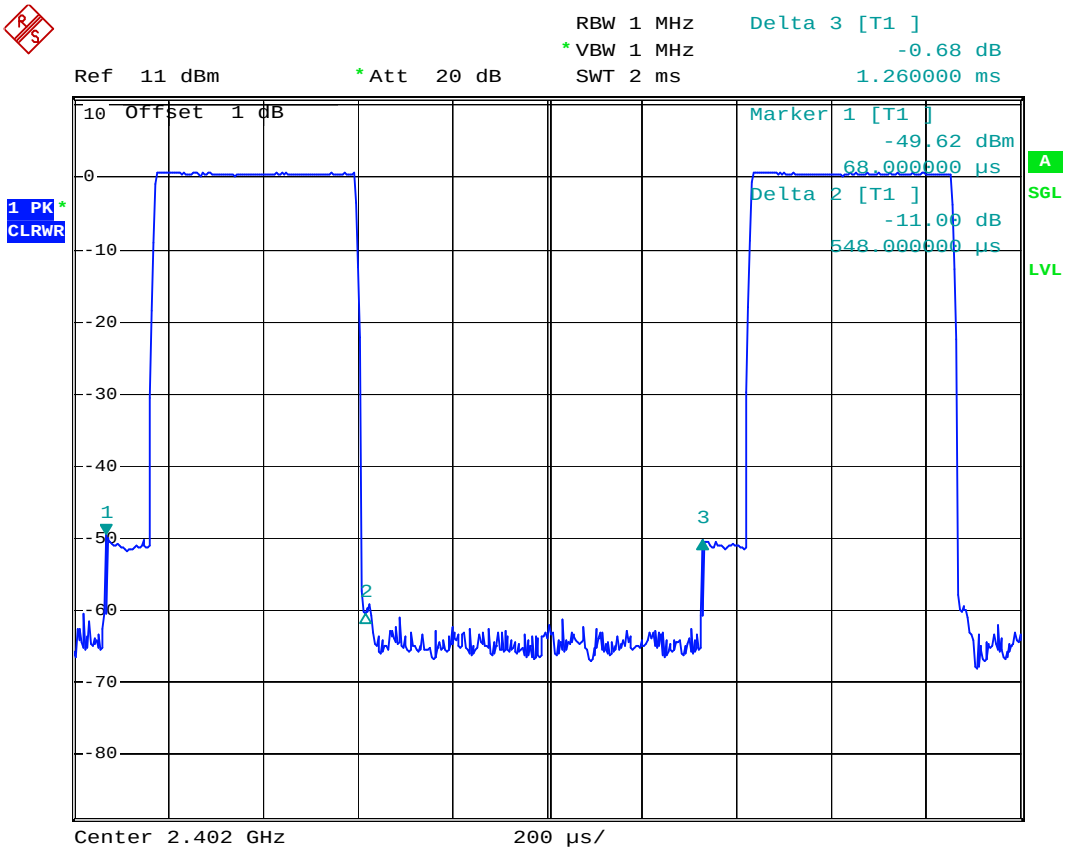
Package Mode	Average Hopping Channel	Package Transfer Time (us)	Dwell Time (s)	Limit (s)
DH1	10	544	0.172	0.4
DH3	5.2	1826	0.300	0.4
DH5	3.4	3106	0.334	0.4

※ Remark:

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

5.6.5 Dwell Time

DH1 (CH00)



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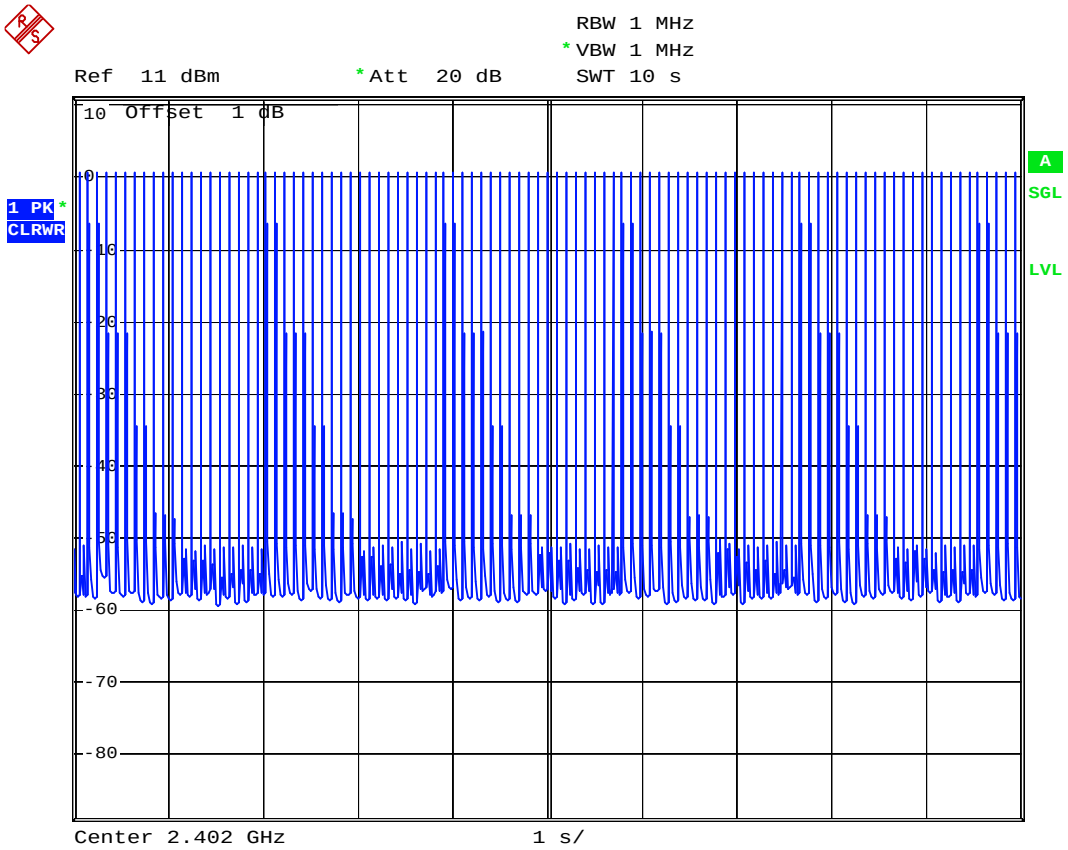

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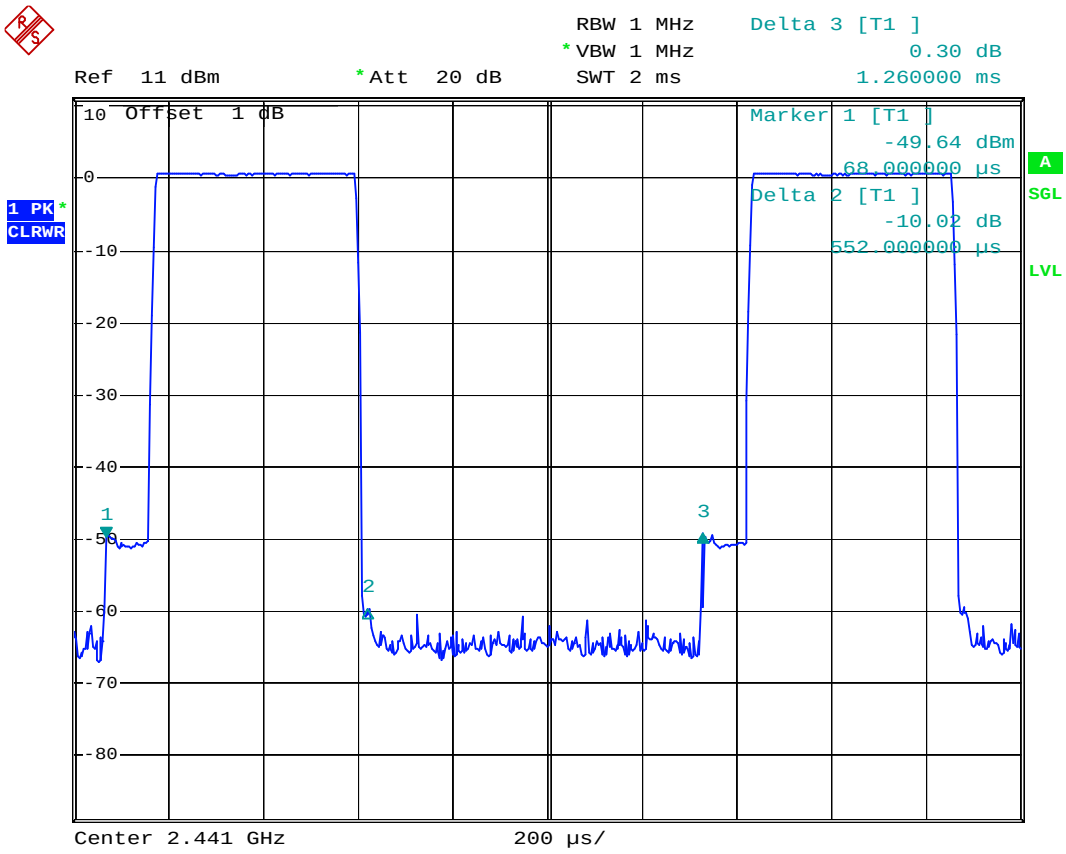
DH1 (CH39)



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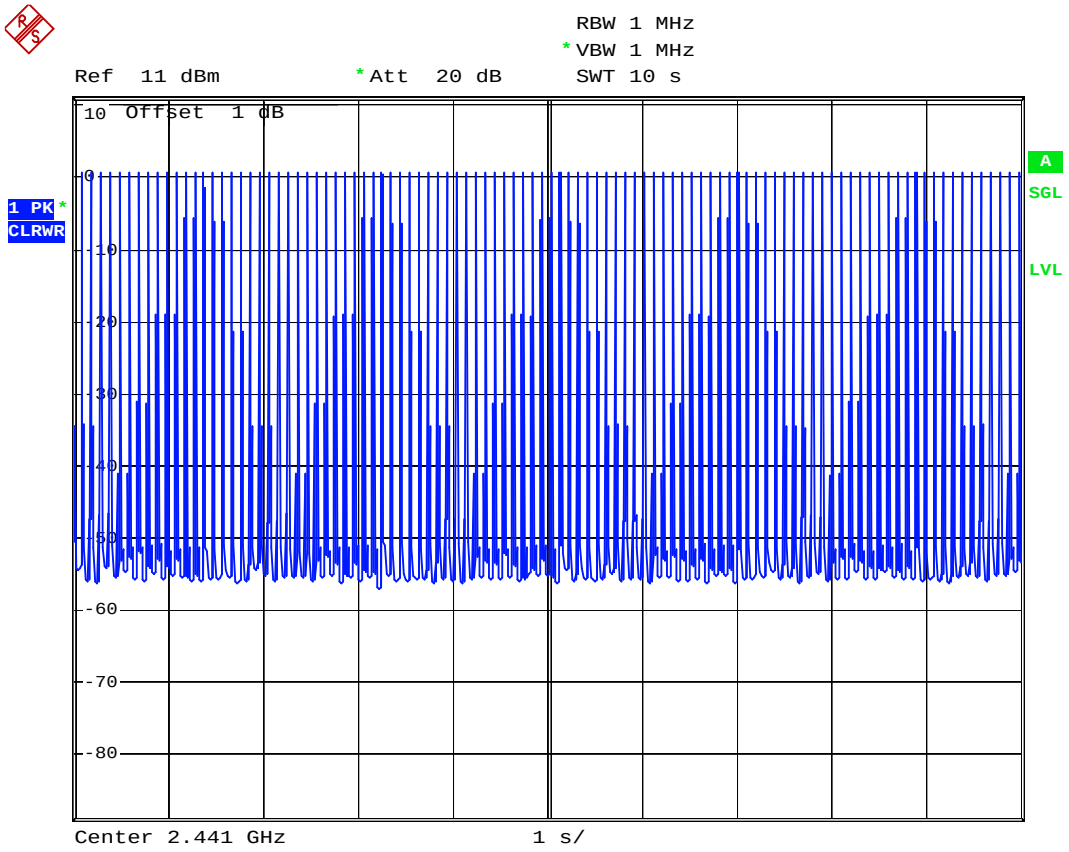

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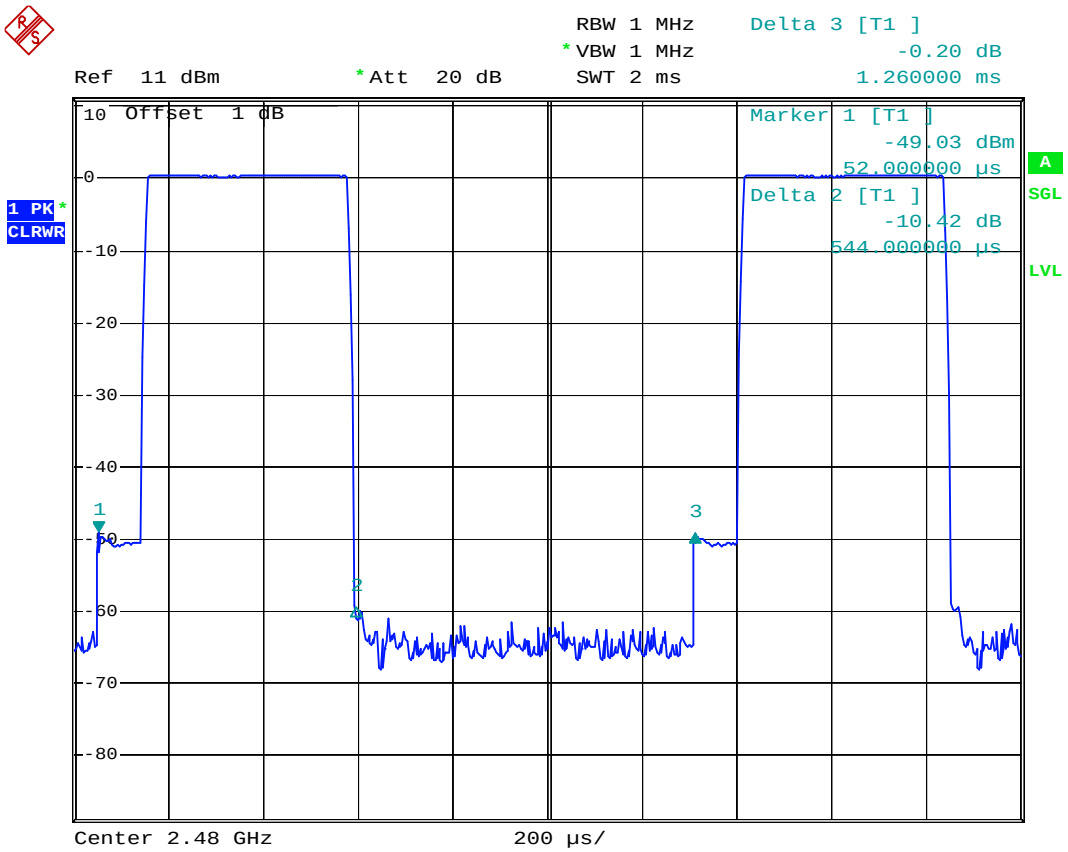
DH1 (CH78)



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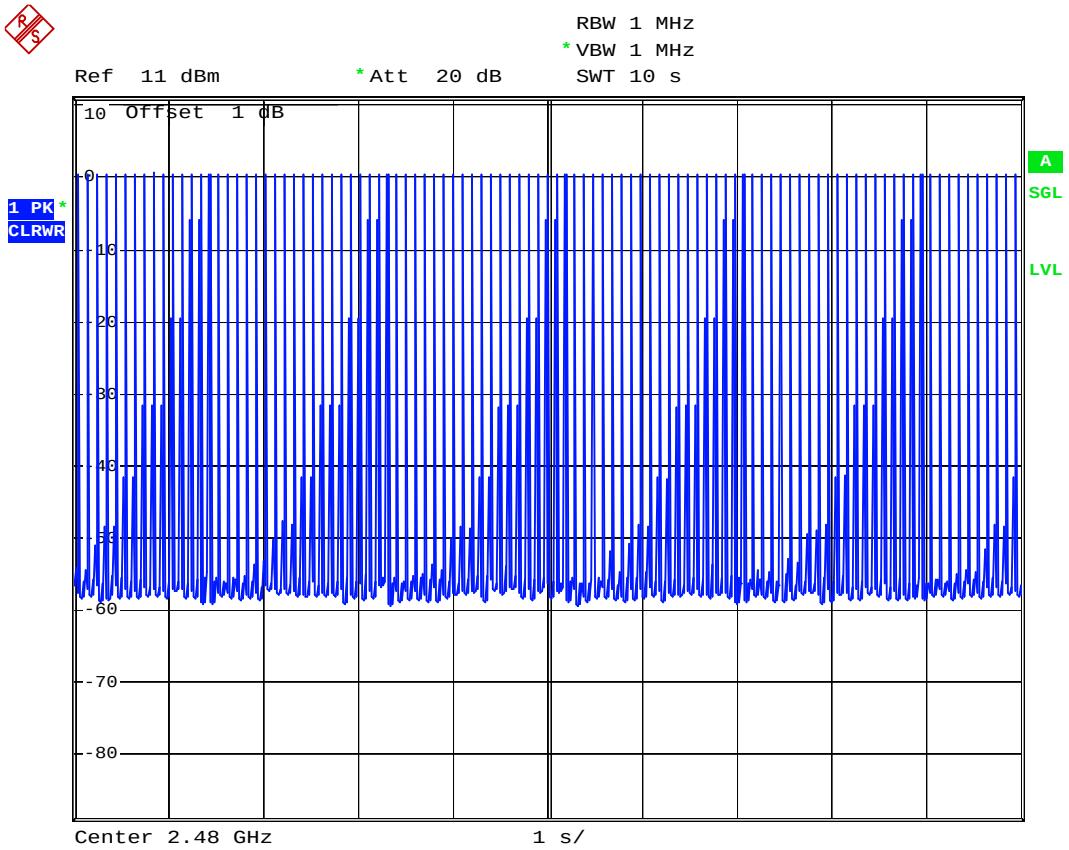

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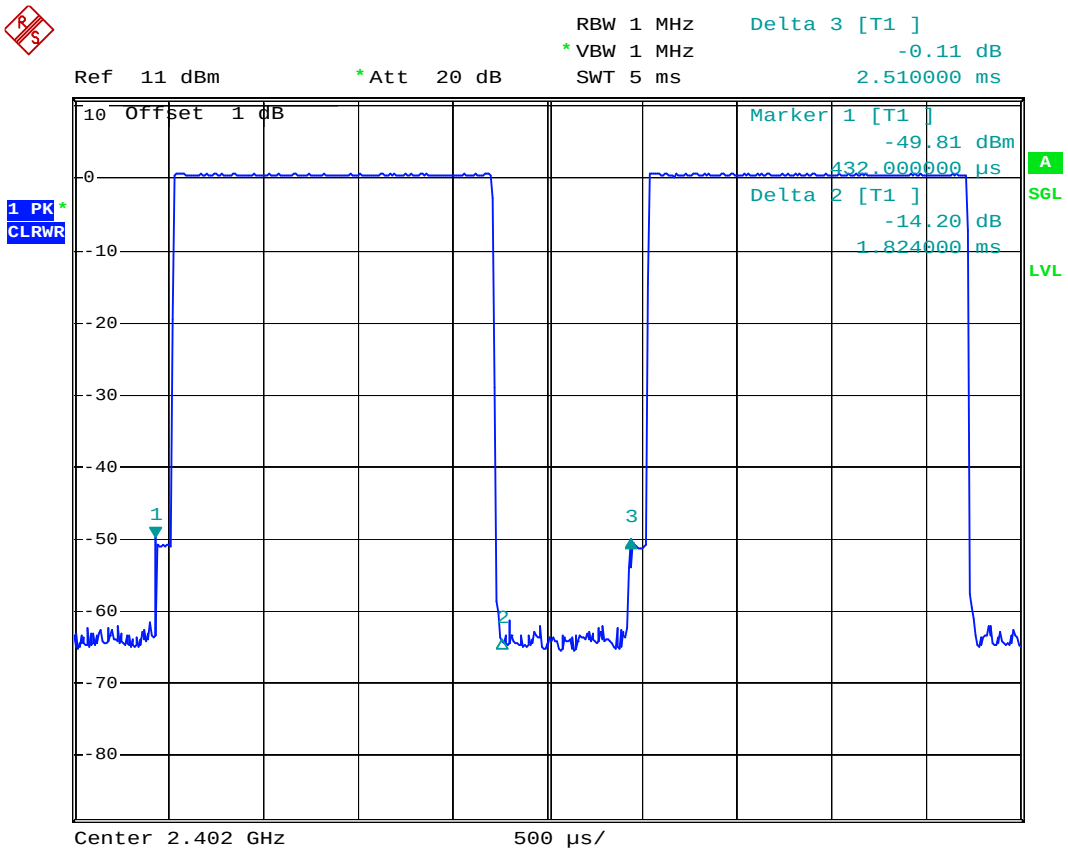
DH3 (CH00)



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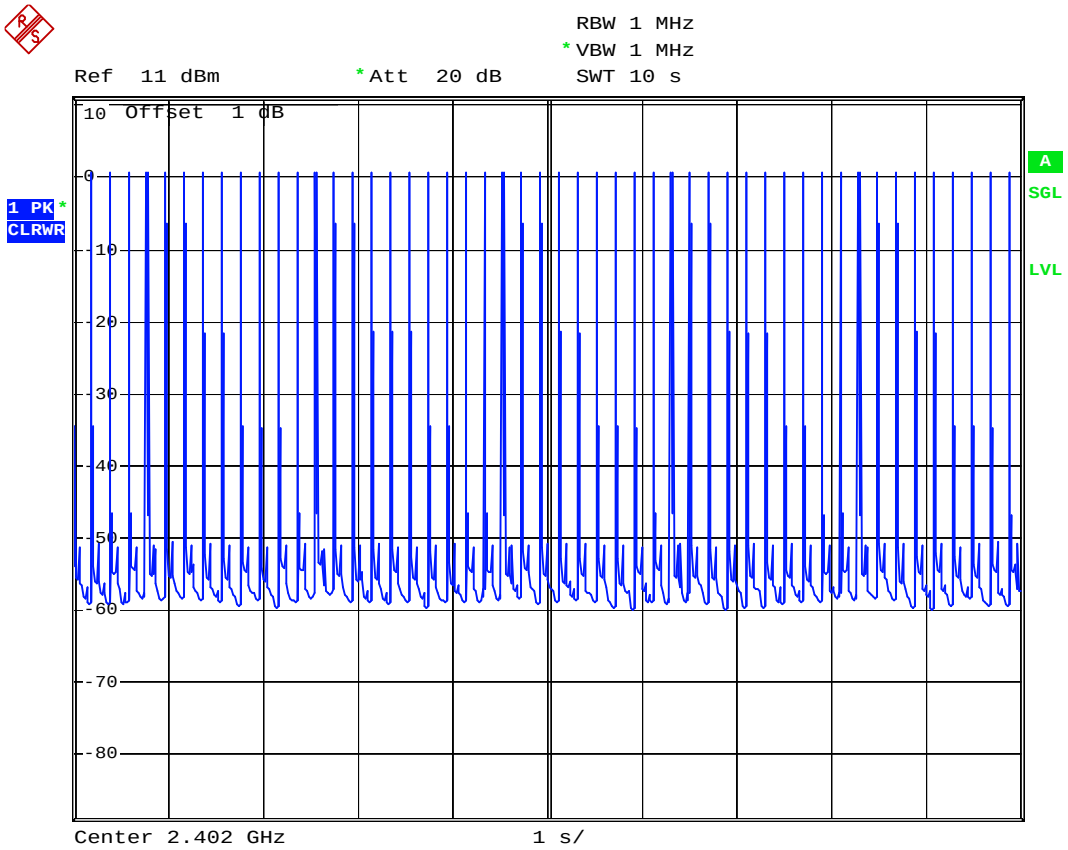

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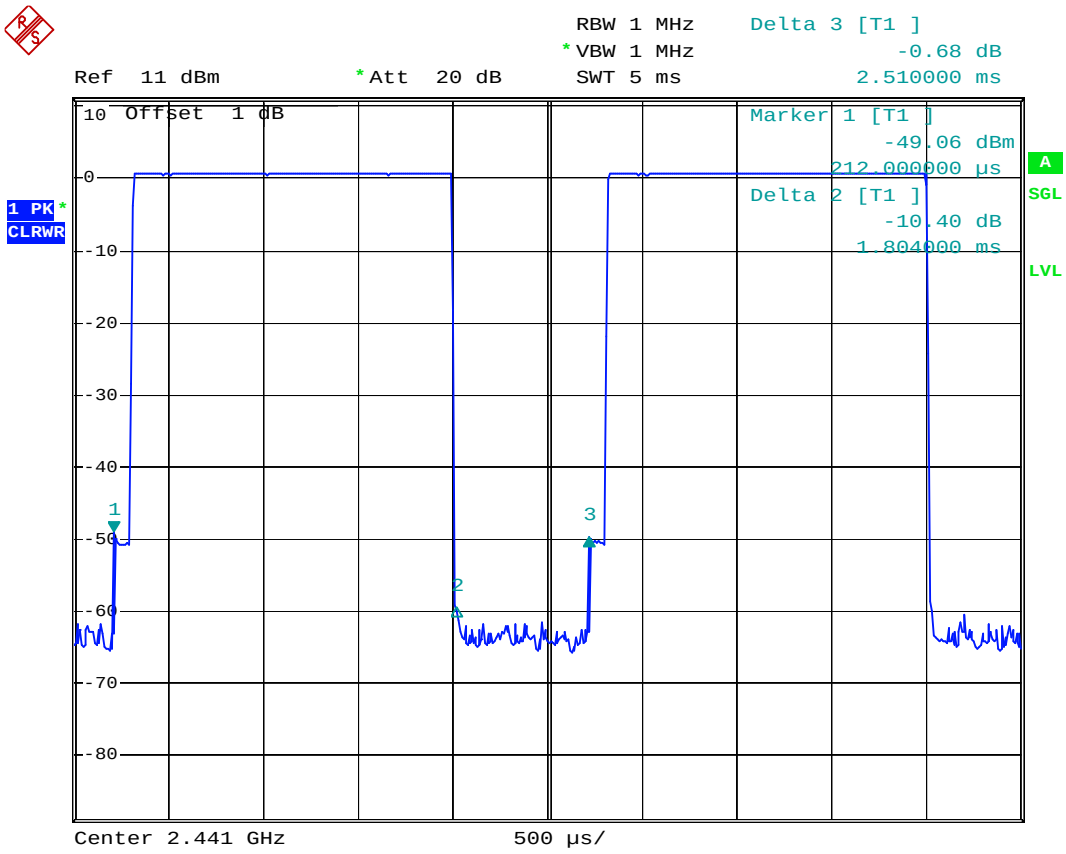
DH3 (CH39)



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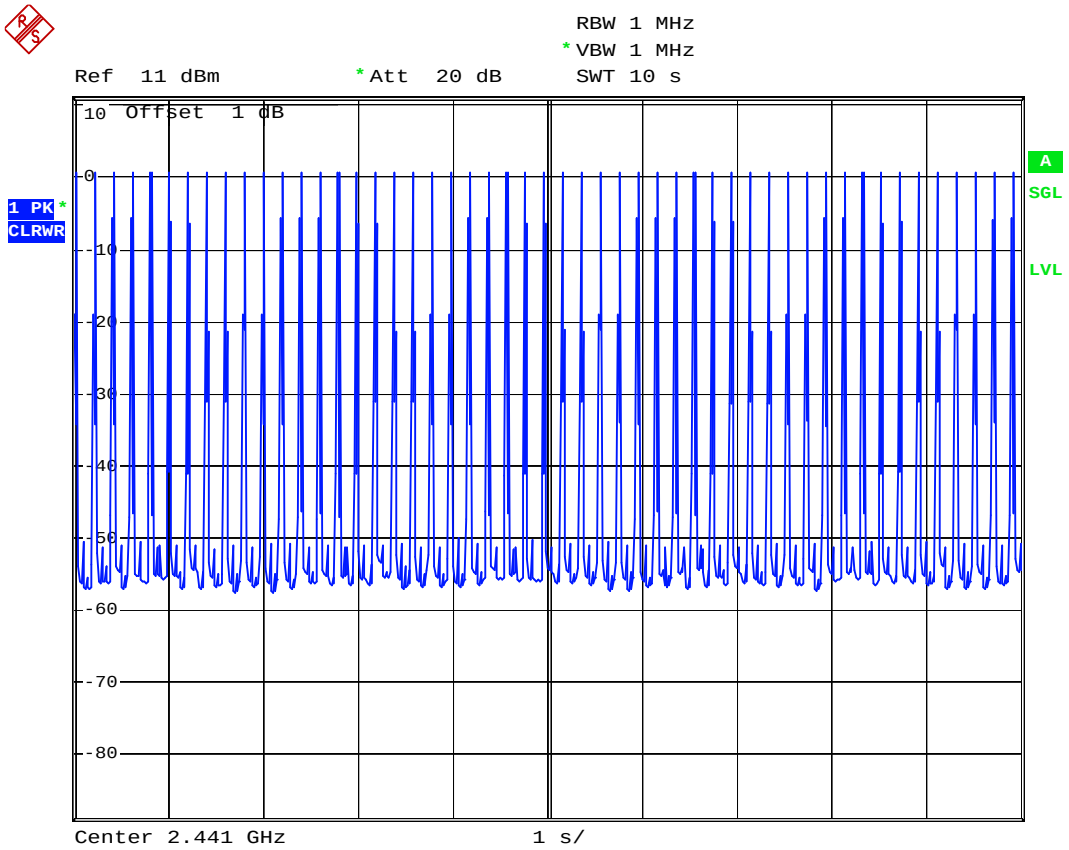

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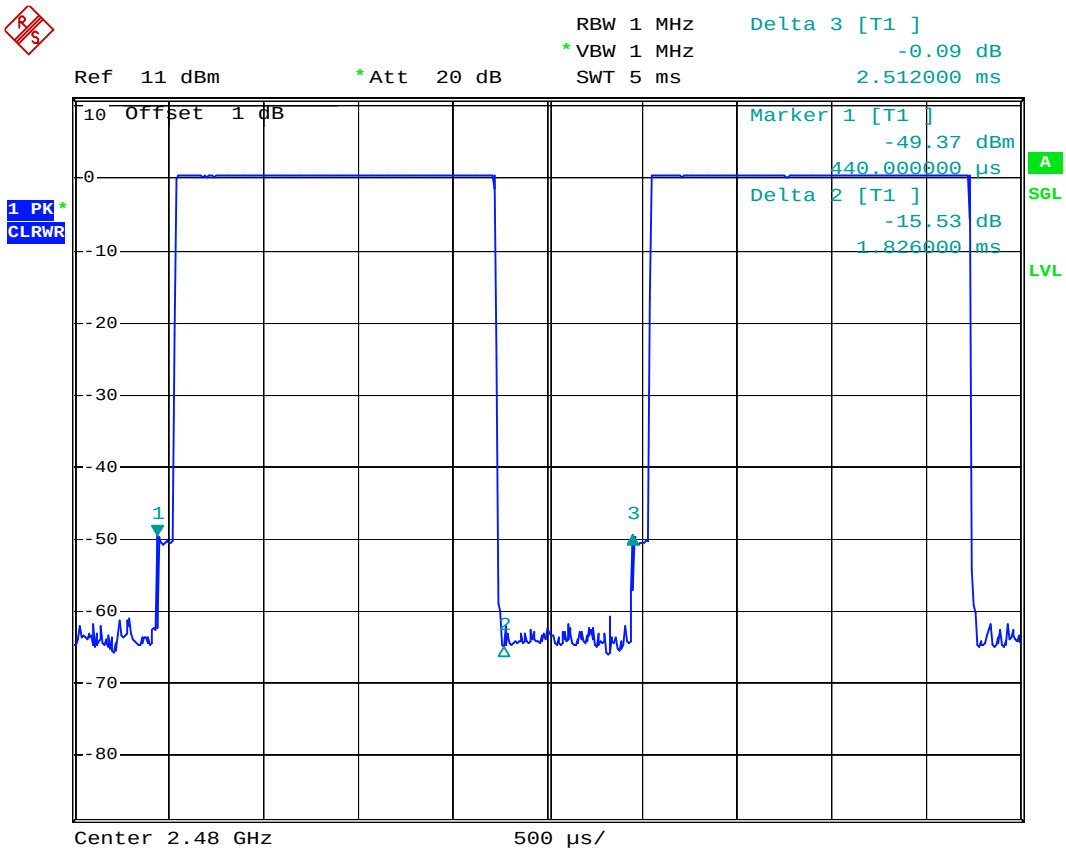
DH3 (CH78)



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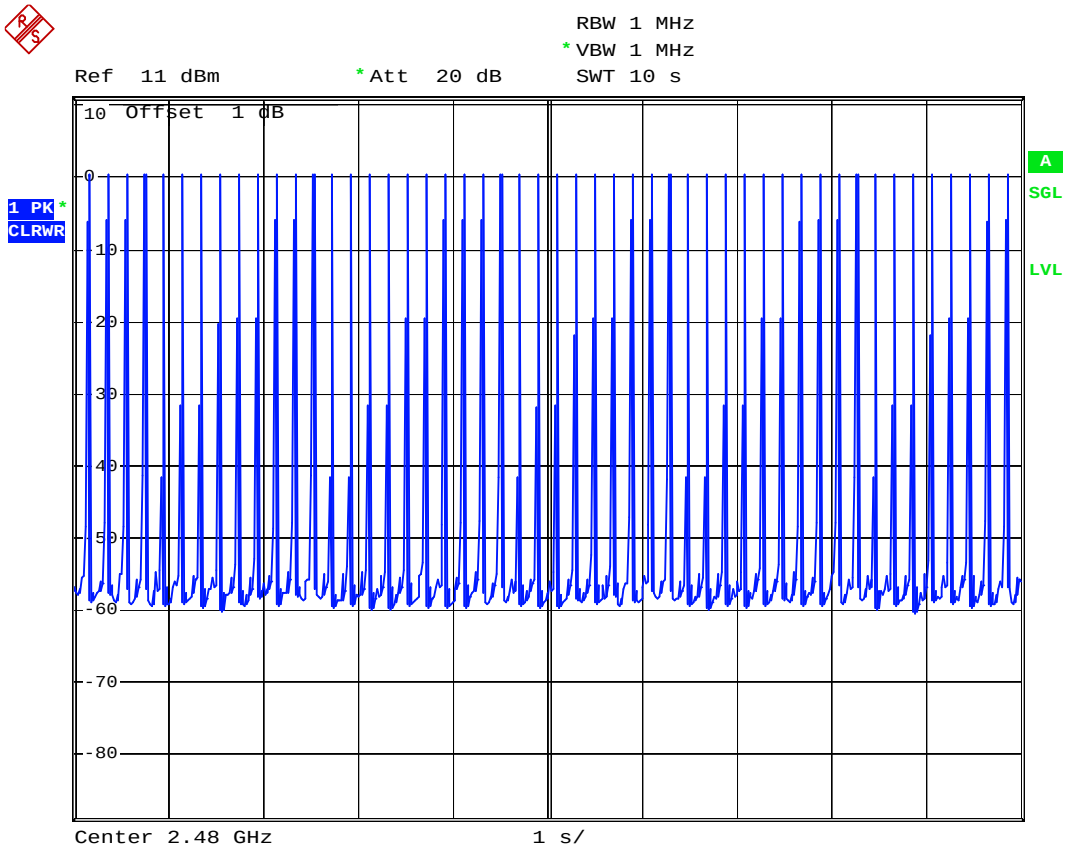

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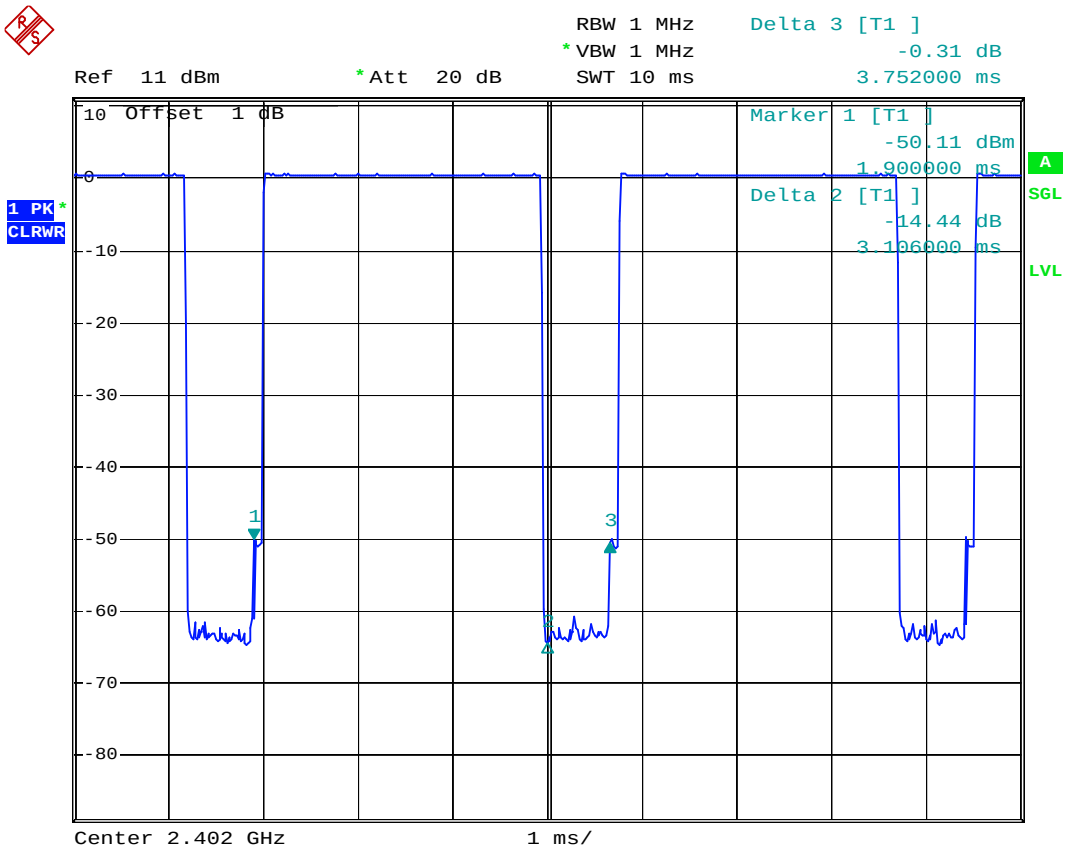
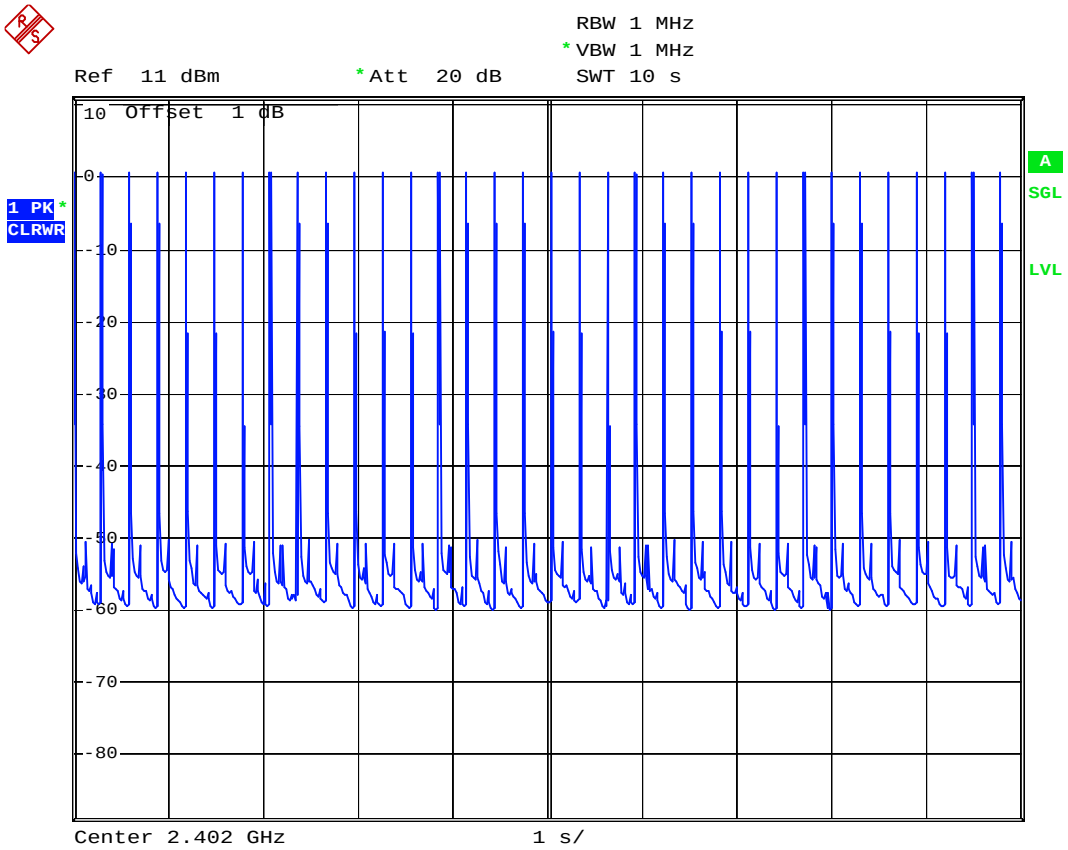
DH5 (CH00)

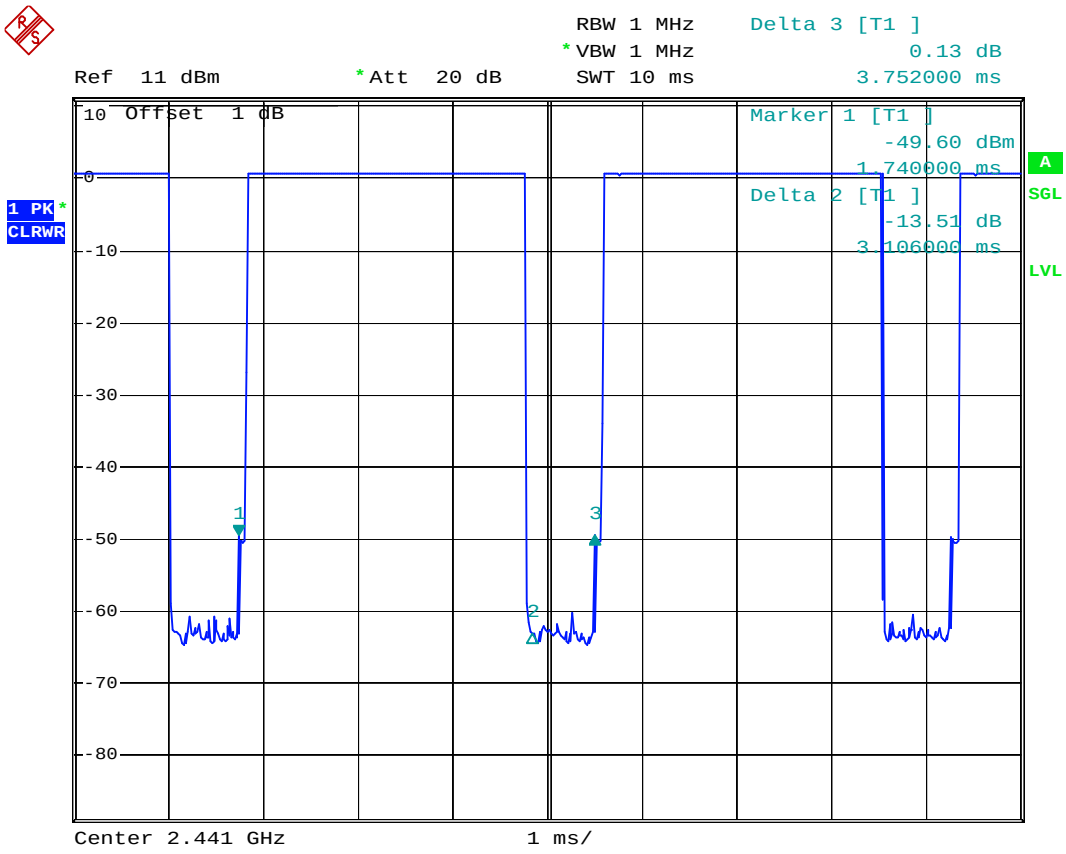


Date: 11.MAY.2006 16:35:00

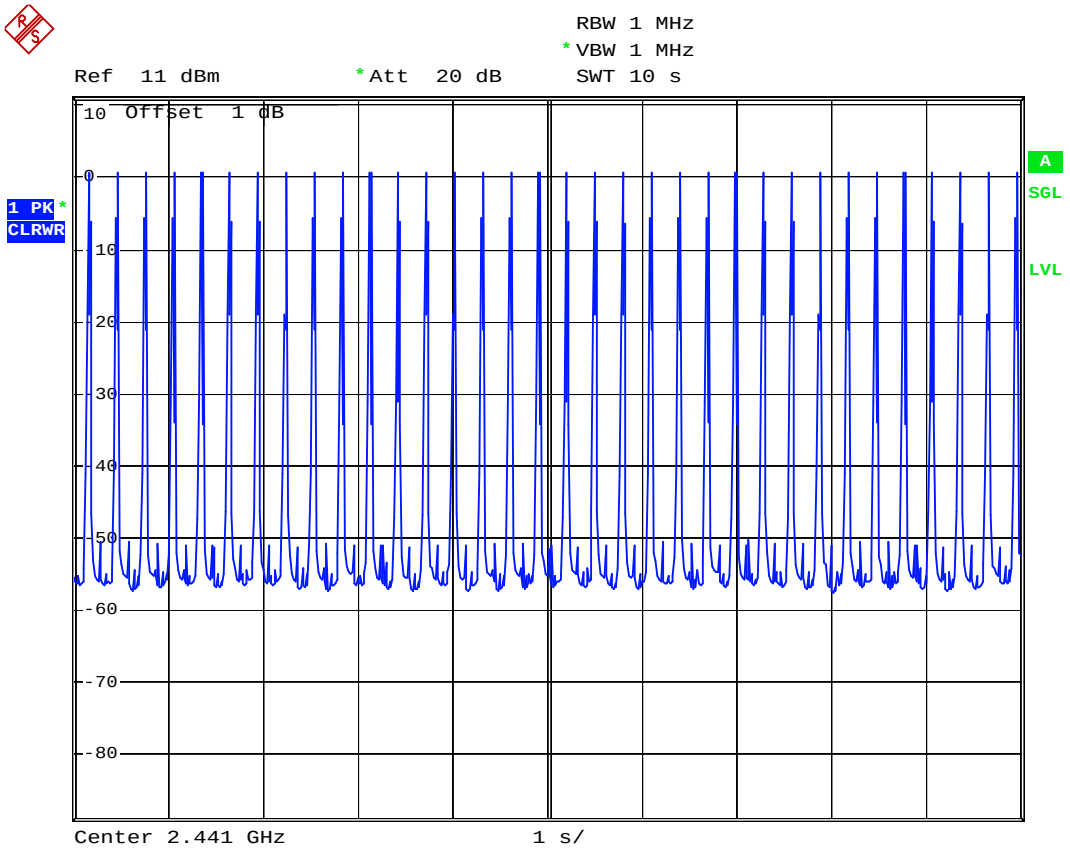


Date: 11.MAY.2006 16:48:04

DH5 (CH39)

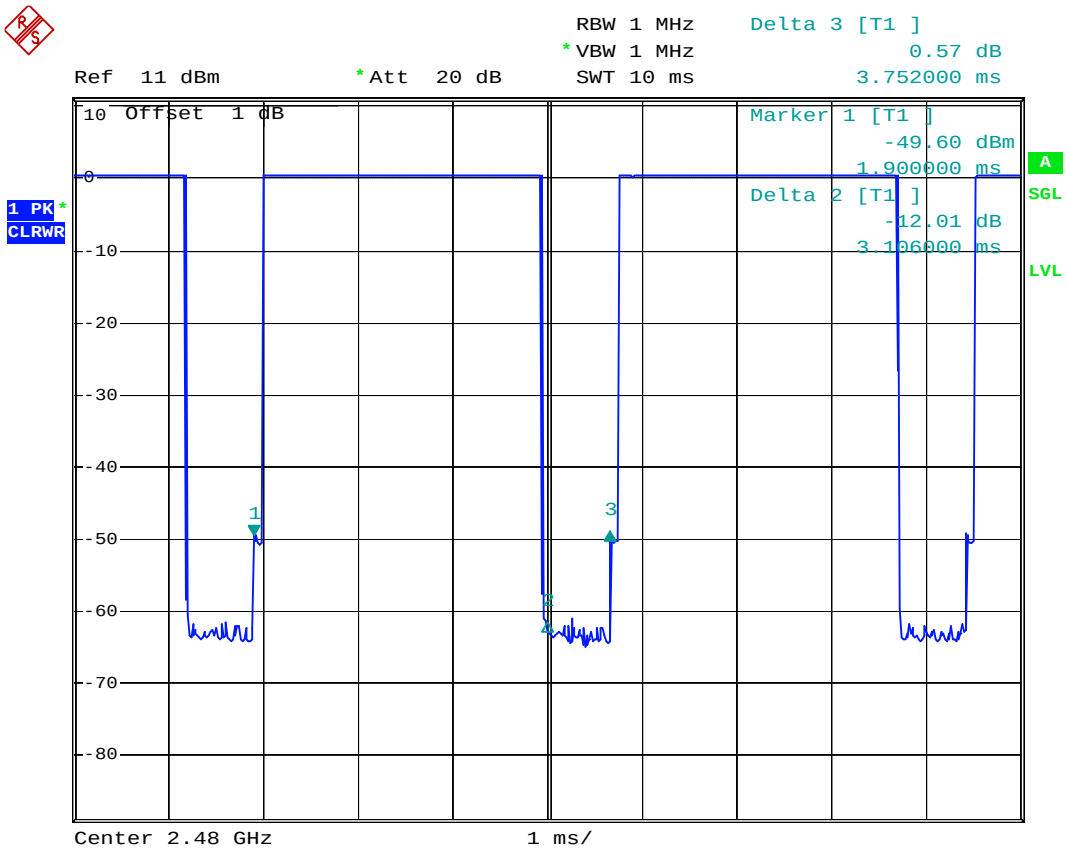


Date: 11.MAY.2006 16:35:41

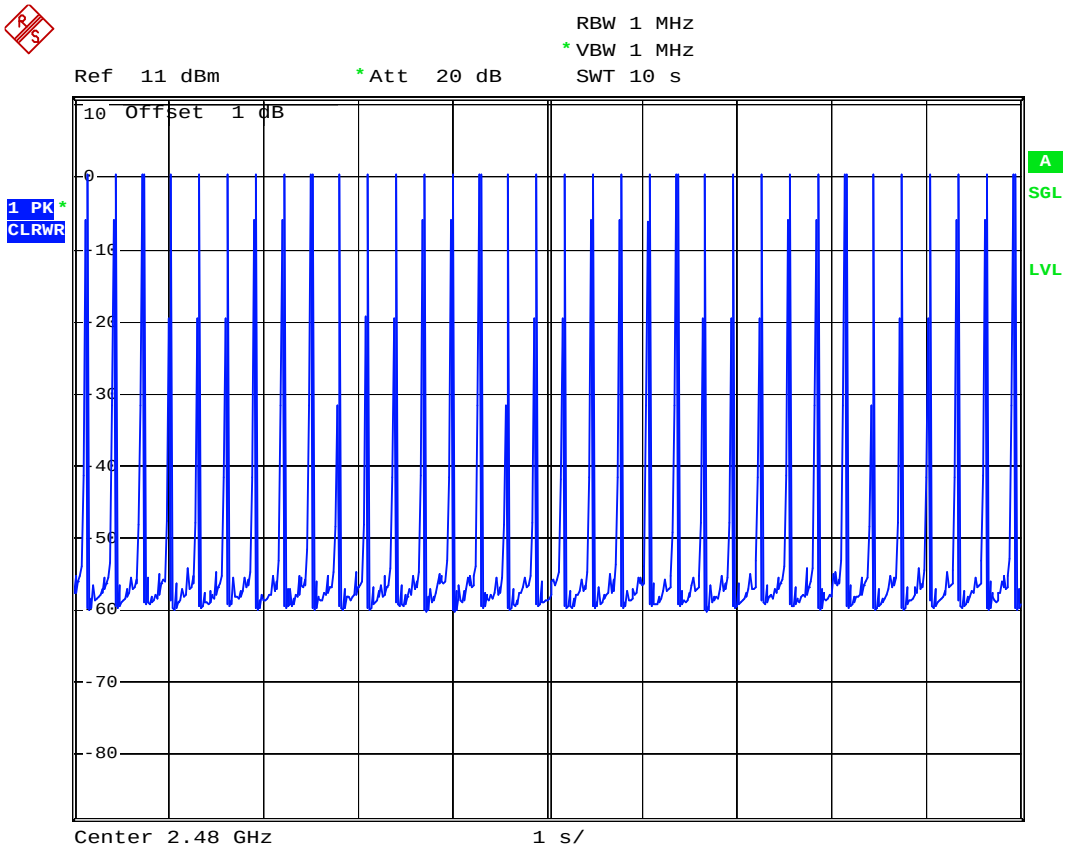


Date: 11.MAY.2006 16:48:25

DH5 (CH78)



Date: 11.MAY.2006 16:36:29



Date: 11.MAY.2006 16:48:46

5.7 Peak Output Power Measurement

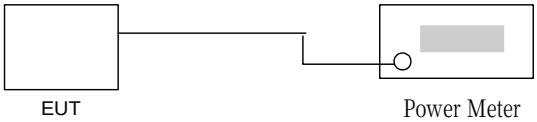
5.7.1 Measuring Instruments：

As described in chapter 6 of this test report.

5.7.2 Test Procedure：

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

5.7.3 Test Setup Layout：



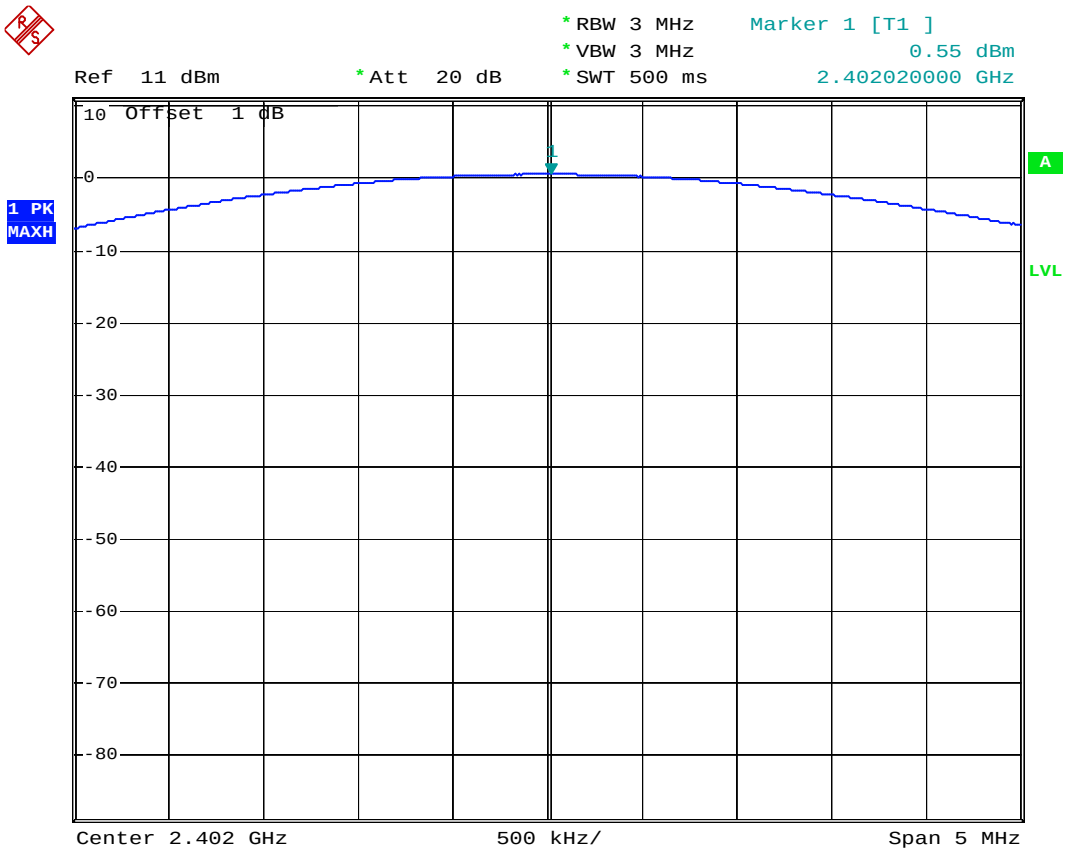
5.7.4 Test Result：

- Application Type : BT
- Temperature : 28°C,
- Relative Humidity : 48%
- Test Enginner : Sam

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (Watt/dBm)
00	2402	0.55	1W/30 dBm
39	2441	0.72	1W/30 dBm
78	2480	0.46	1W/30 dBm

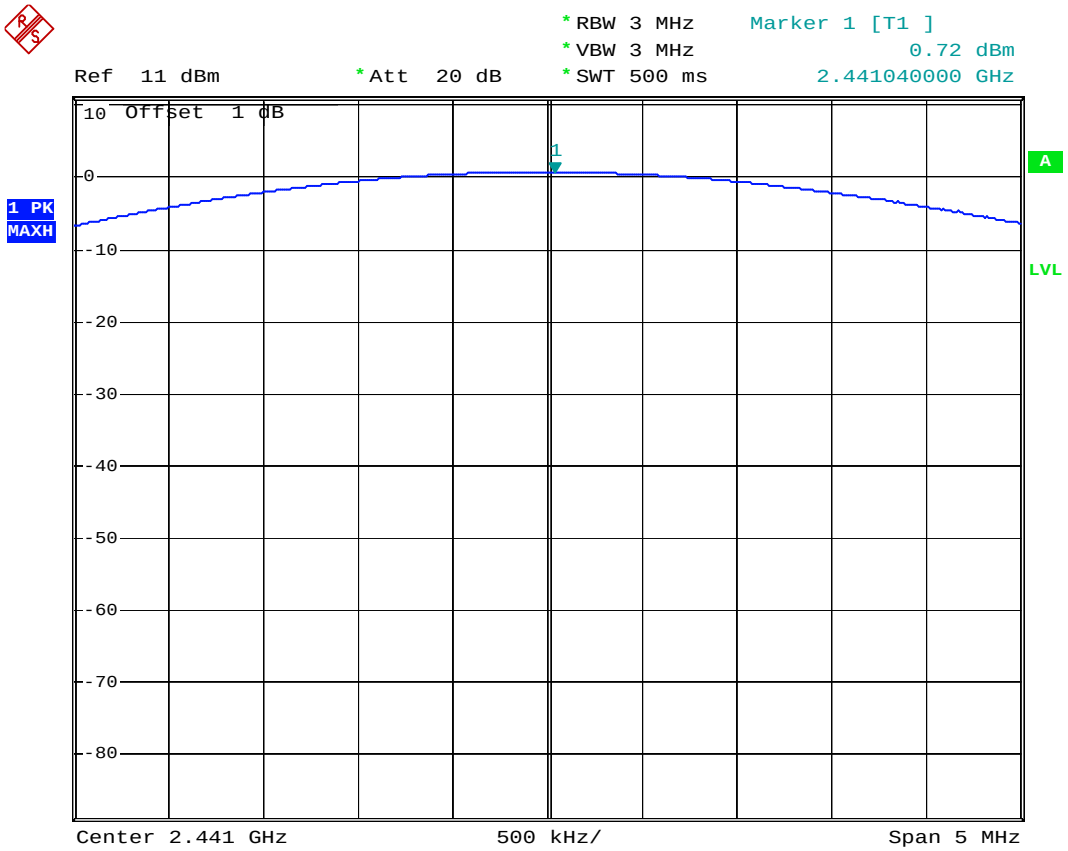
5.7.5 Output Power

Mode 1: CH00 (2402MHz)



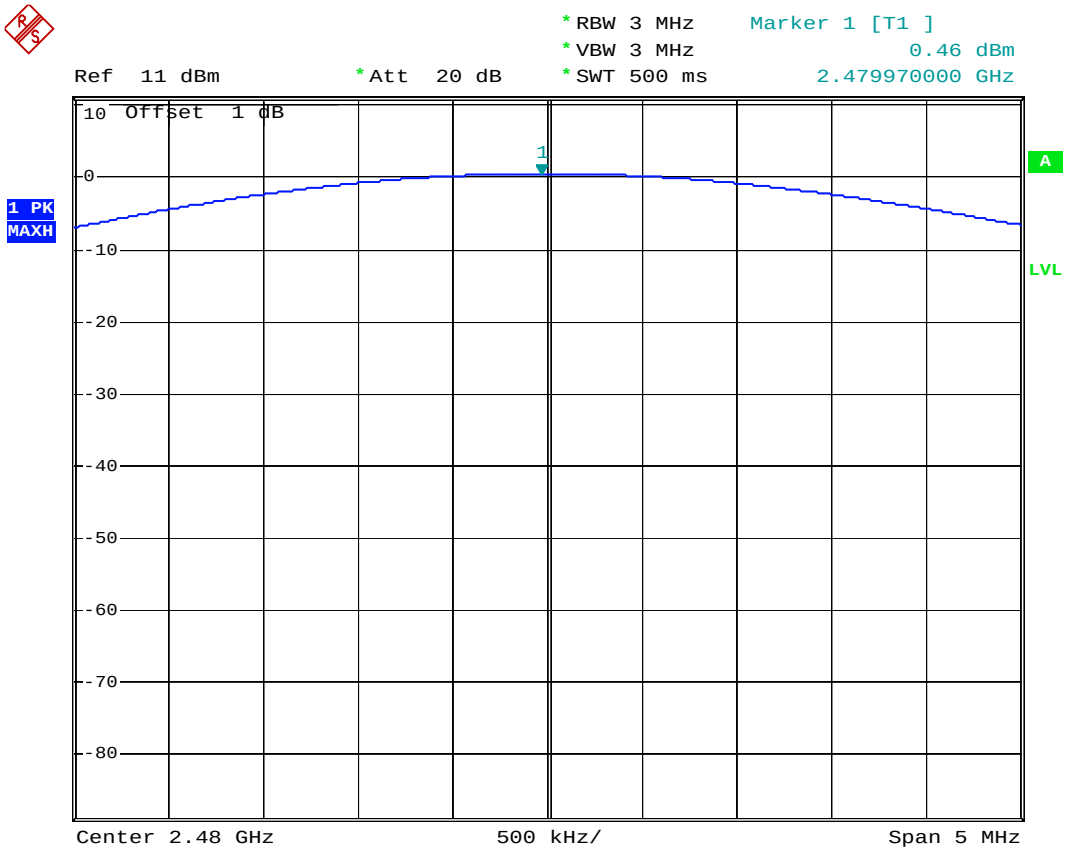
Date: 11.MAY.2006 16:18:00

Mode 2: CH39 (2441MHz)



Date: 11.MAY.2006 16:17:31

Mode 3: CH78 (2480MHz)



Date: 11.MAY.2006 16:18:27

5.8 Radiated Emission Measurement

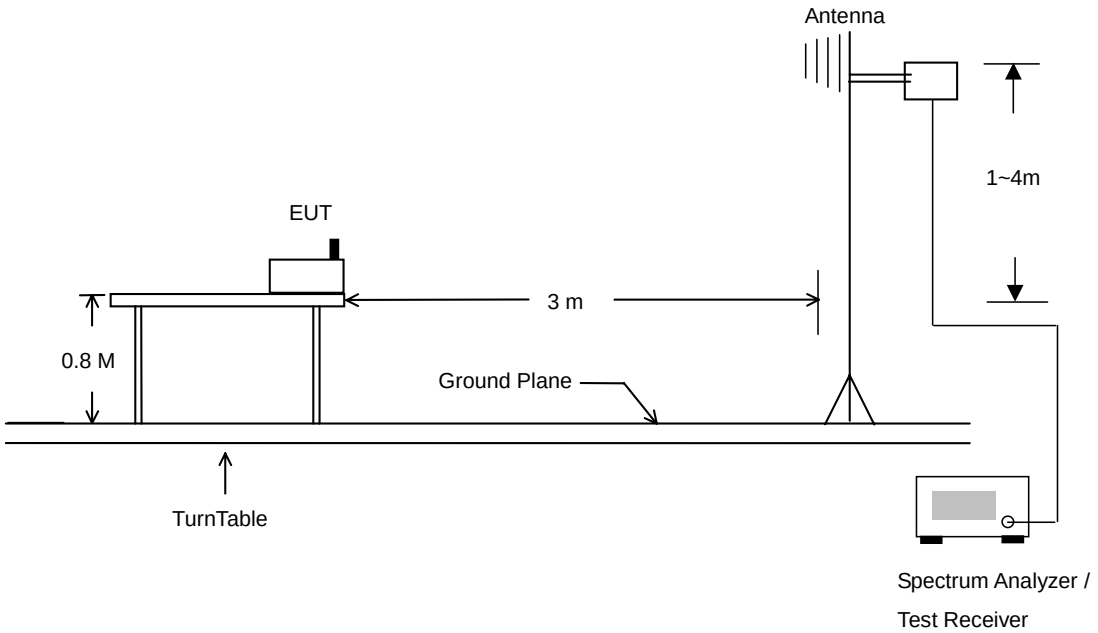
5.9.1 Measuring Instruments

As described in chapter 6 of this Report.

5.9.2 Test Procedures

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

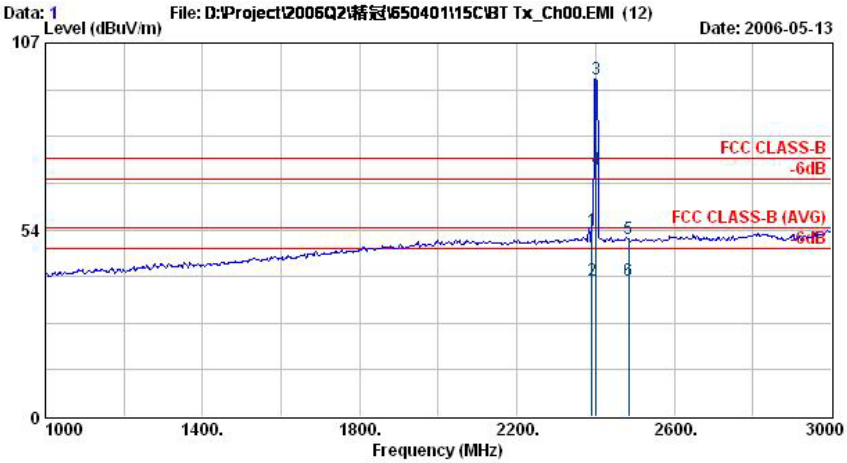
5.9.3 Typical Test Setup Layout of Radiated Emission



5.9.4 Test Data

- Test Mode : Mode 1
- Polarization : Horizontal

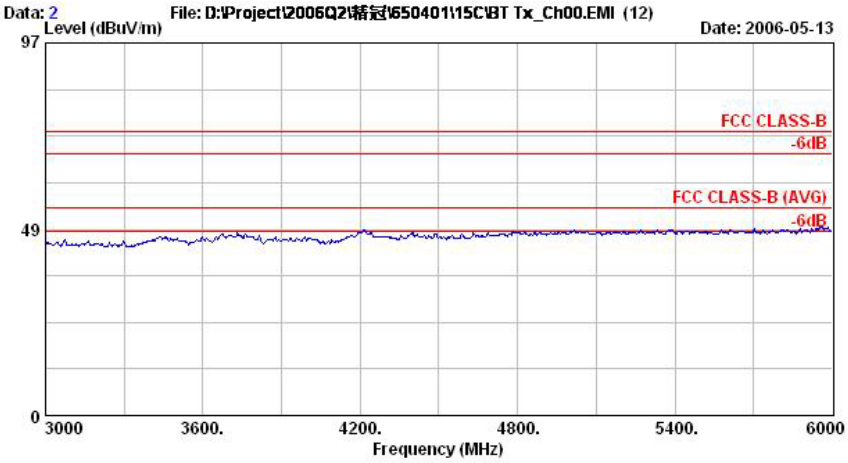
■ The test that passed at minimum margin was marked by the frame in the following table.



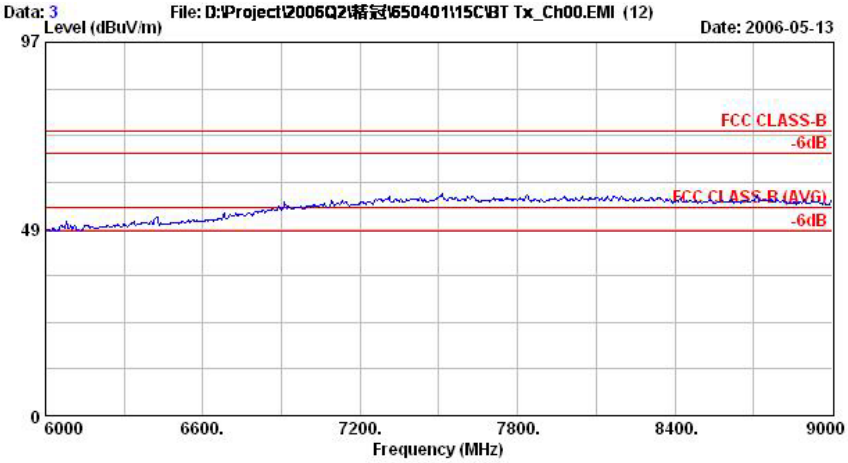
Site : 03CH06-HY
Condition : HF-ANT-060410 HORIZONTAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch00:2402MHz
Plane : E2

	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 @	2390.00	53.13	-20.87	74.00	54.07	30.26	4.26	35.46	100	360	Peak
2 @	2390.00	38.99	-15.01	54.00	39.93	30.26	4.26	35.46	100	281	Average
3 @	2402.00	96.56			97.50	30.26	4.26	35.46	100	360	Peak
4 @	2402.00	70.83			71.77	30.26	4.26	35.46	100	281	Average
5 @	2483.50	50.92	-23.08	74.00	51.78	30.29	4.36	35.51	100	360	Peak
6 @	2483.50	38.89	-15.11	54.00	39.75	30.29	4.36	35.51	100	281	Average

Remark: #3 and #4 Fundamental Signal



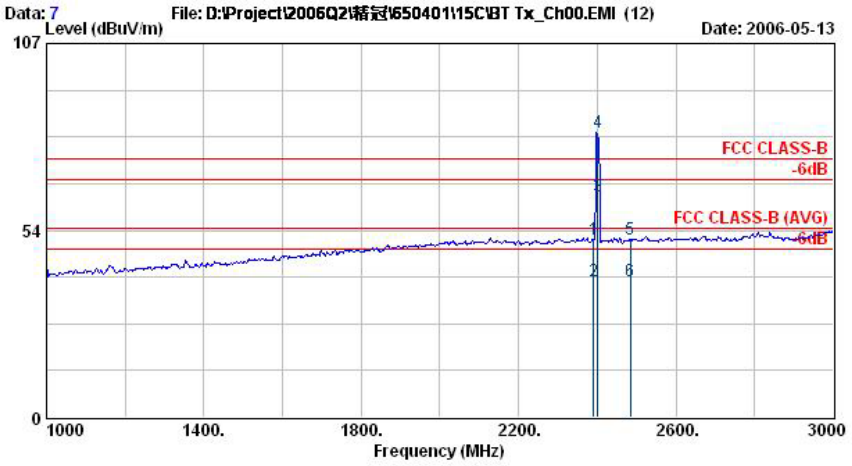
Site : 03CH06-HY
Condition : HF-ANT-060410 HORIZONTAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch00:2402MHz
Plane : E2



Site : 03CH06-HY
Condition : HF-ANT-060410 HORIZONTAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch00:2402MHz
Plane : E2

- Polarization : Vertical

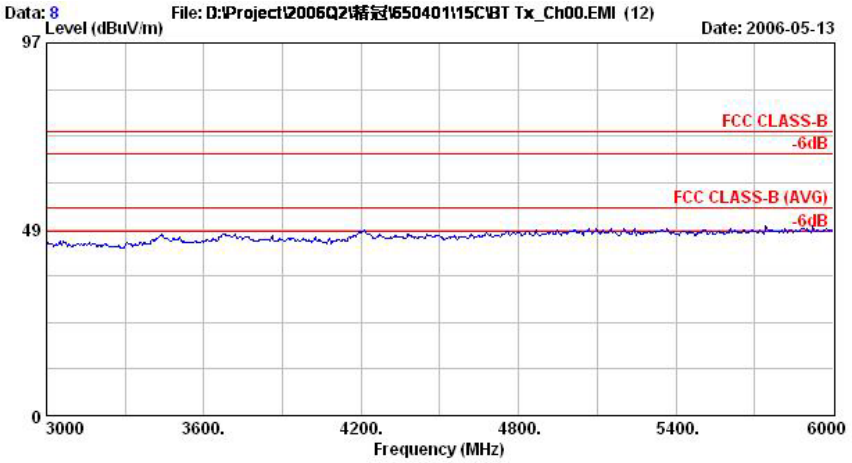
■ The test that passed at minimum margin was marked by the frame in the following table.



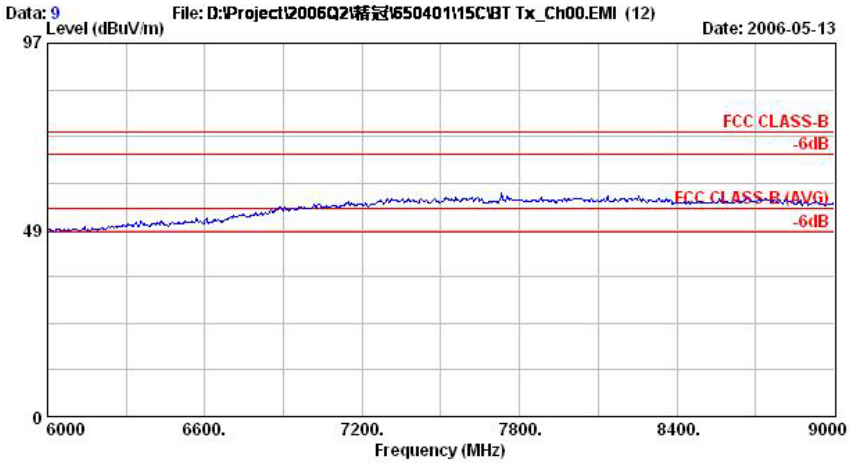
Site : 03CH06-HY
Condition : HF-ANT-060410 VERTICAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch00:2402MHz
Plane : E2

	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 @	2390.00	50.83	-23.17	74.00	51.77	30.26	4.26	35.46	100	0	Peak
2 @	2390.00	38.91	-15.09	54.00	39.85	30.26	4.26	35.46	174	159	Average
3 @	2402.00	63.43			64.37	30.26	4.26	35.46	174	159	Average
4 @	2402.00	81.40			82.34	30.26	4.26	35.46	100	0	Peak
5 @	2483.50	50.85	-23.15	74.00	51.71	30.29	4.36	35.51	100	0	Peak
6 @	2483.50	38.90	-15.10	54.00	39.76	30.29	4.36	35.51	174	159	Average

Remark: #3 and #4 Fundamental Signal



Site : 03CH06-HY
Condition : HF-ANT-060410 VERTICAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch00:2402MHz
Plane : E2

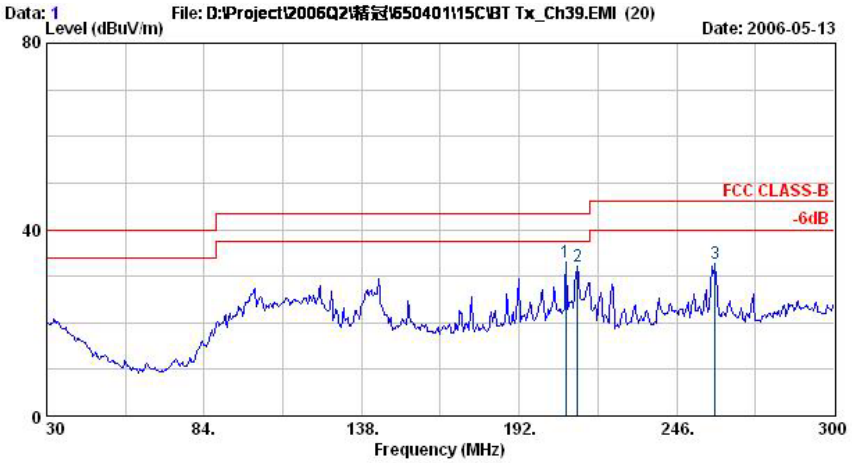


Site : 03CH06-HY
Condition : HF-ANT-060410 VERTICAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch00:2402MHz
Plane : E2

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

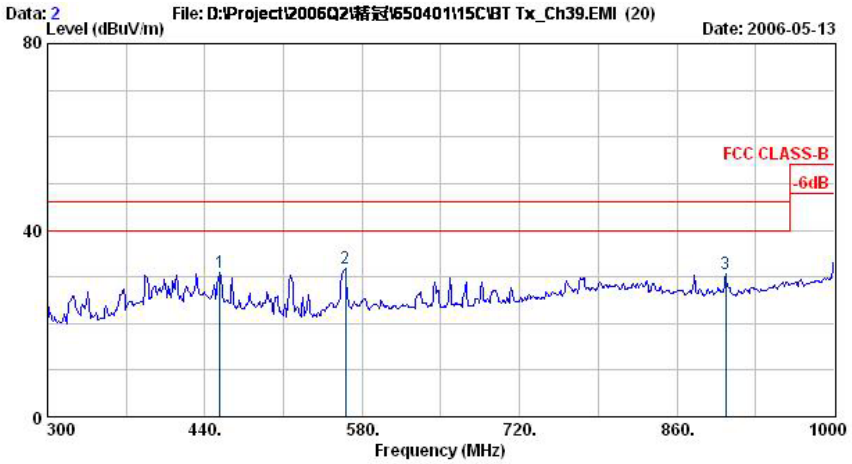
- Test Mode : Mode 2
- Polarization : Horizontal

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



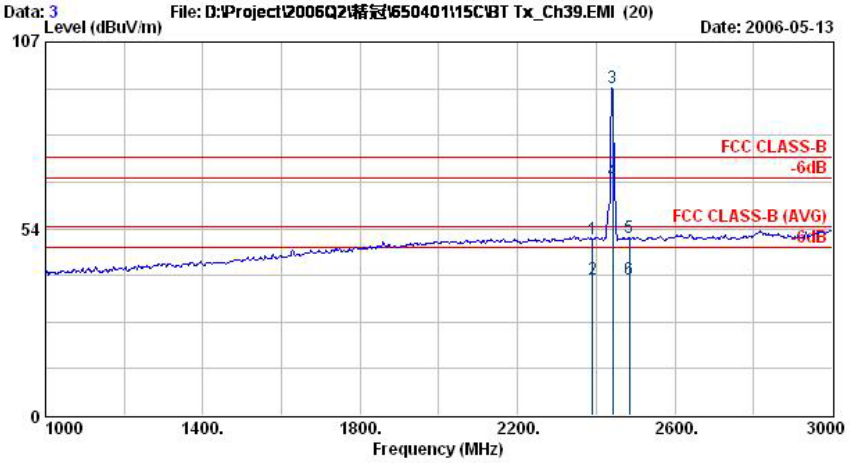
Site : 03CH06-HY
Condition : BI-LOG-2004-1122 HORIZONTAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch39:2441MHz
Plane : E2

	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	207.93	33.10	-10.40	43.50	49.41	9.77	2.66	28.74	400	178	Peak
2	211.98	32.02	-11.48	43.50	48.43	9.66	2.68	28.76	400	0	Peak
3	259.23	32.65	-13.35	46.00	45.97	12.78	2.87	28.97	400	0	Peak



Site : 03CH06-HY
Condition : BI-LOG-2004-1122 HORIZONTAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch39:2441MHz
Plane : E2

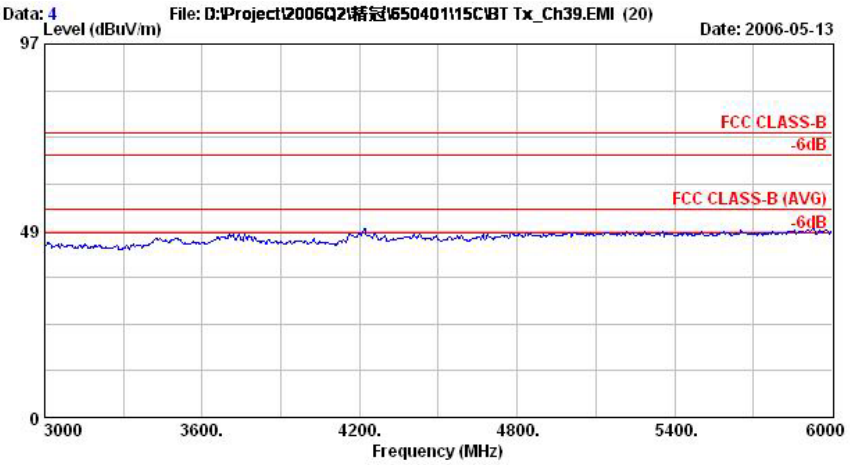
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	453.30	30.80	-15.20	46.00	39.15	16.45	4.02	28.81	100	0	Peak
2	565.30	31.73	-14.27	46.00	37.82	18.46	4.45	29.00	100	0	Peak
3	903.40	30.67	-15.33	46.00	33.47	20.03	5.87	28.69	100	0	Peak



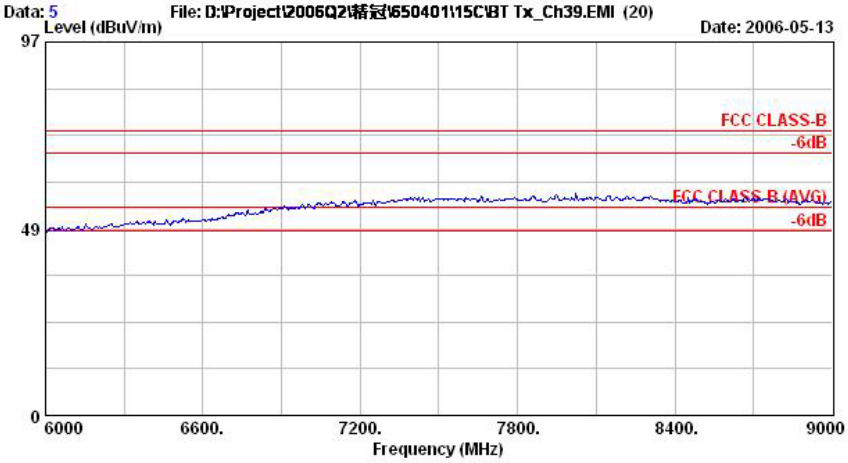
Site : 03CH06-HY
Condition : HF-ANT-060410 HORIZONTAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch39:2441MHz
Plane : E2

	Freq MHz	Level dBuV/m	Over Limit dB	Limit Line dBuV/m	Read Level dBuV	Antenna Factor dB/m	Cable Loss dB	Preamp Factor dB	Ant Pos cm	Table Pos deg	Remark
1	2390.00	50.67	-23.33	74.00	51.60	30.26	4.26	35.46	100	360	Peak
2	2390.00	38.91	-15.09	54.00	39.85	30.26	4.26	35.46	149	281	Average
3 @	2441.00	93.88			94.78	30.28	4.29	35.47	100	360	Peak
4 @	2441.00	67.09			67.98	30.28	4.33	35.49	149	281	Average
5	2483.50	50.81	-23.19	74.00	51.66	30.29	4.36	35.51	100	360	Peak
6	2483.50	38.91	-15.09	54.00	39.77	30.29	4.36	35.51	149	281	Average

Remark: #3 and #4 Fundamental Signal



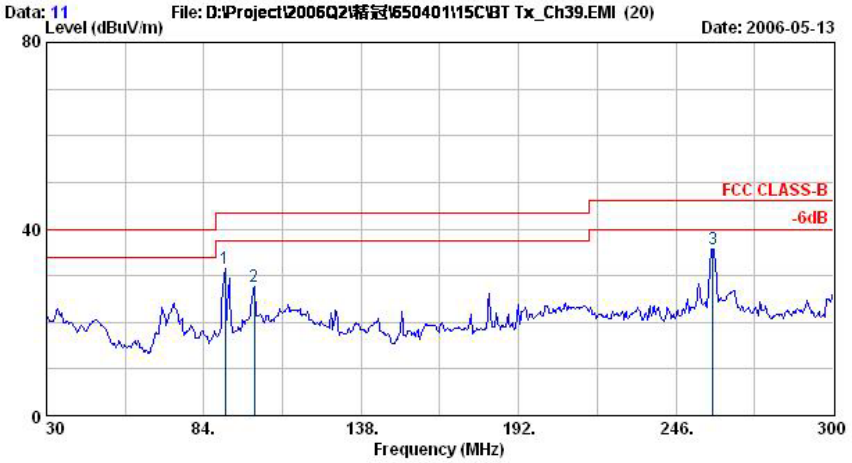
Site : 03CH06-HY
Condition : HF-ANT-060410 HORIZONTAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch39:2441MHz
Plane : E2



Site : 03CH06-HY
Condition : HF-ANT-060410 HORIZONTAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch39:2441MHz
Plane : E2

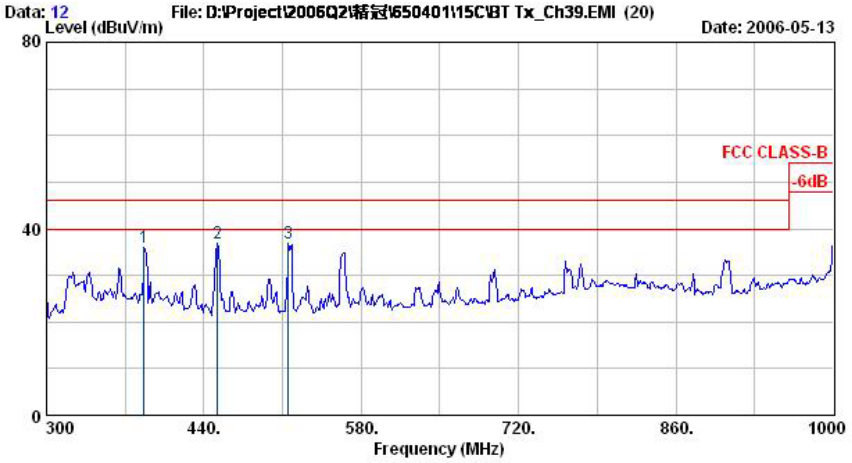
- Polarization : Vertical

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



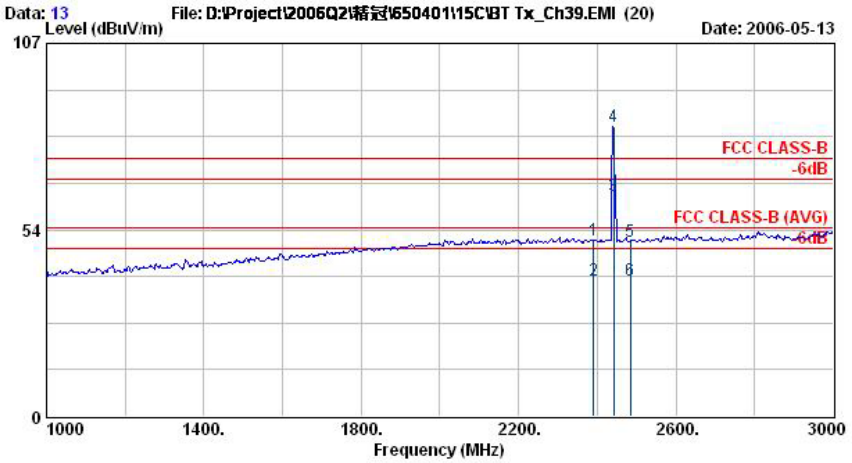
Site : 03CH06-HY
Condition : BI-LOG-2004-1122 VERTICAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch39:2441MHz
Plane : E2

	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	91.29	31.46	-12.04	43.50	49.41	9.18	1.68	28.81	400	0	Peak
2	101.28	27.53	-15.97	43.50	44.18	10.57	1.65	28.87	400	0	Peak
3	258.69	35.75	-10.25	46.00	49.06	12.78	2.87	28.97	400	0	Peak



Site : 03CH06-HY
Condition : BI-LOG-2004-1122 VERTICAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch39:2441MHz
Plane : E2

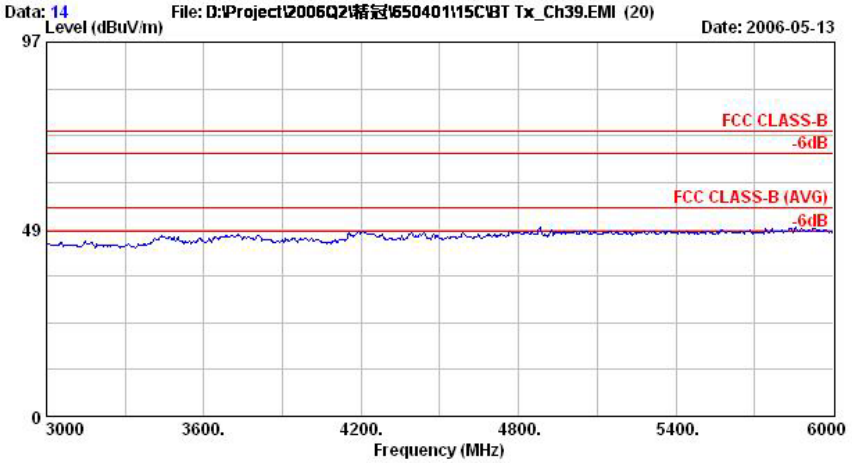
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	386.80	36.00	-10.00	46.00	45.92	15.50	3.68	29.10	100	0	Peak
2 @	451.90	36.98	-9.02	46.00	45.34	16.43	4.02	28.81	100	68	Peak
3	514.90	36.77	-9.23	46.00	44.51	16.92	4.25	28.91	100	0	Peak



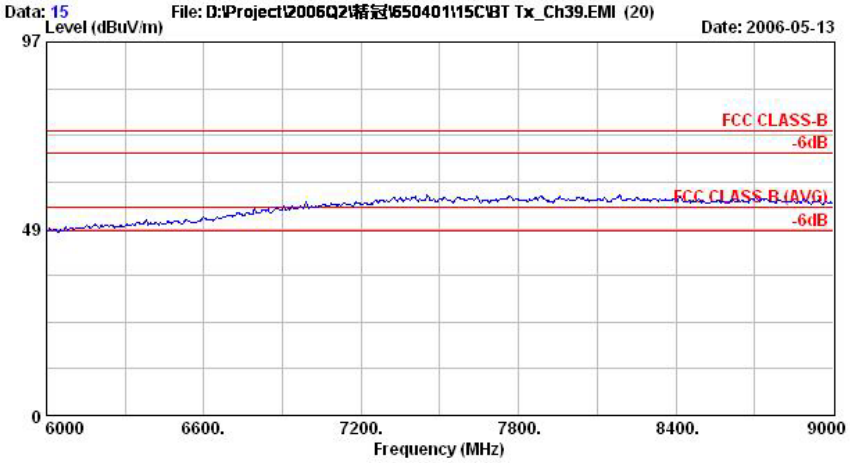
Site : 03CH06-HY
Condition : HF-ANT-060410 VERTICAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch39:2441MHz
Plane : E2

	Freq MHz	Level dBuV/m	Over Limit dB	Limit Line dBuV/m	Read Level dBuV	Antenna Factor dB/m	Cable Loss dB	Preamp Factor dB	Ant Pos cm	Table Pos deg	Remark
1	2390.00	50.55	-23.45	74.00	51.48	30.26	4.26	35.46	100	0	Peak
2	2390.00	38.91	-15.09	54.00	39.85	30.26	4.26	35.46	176	357	Average
3 @	2441.00	63.11			64.00	30.28	4.33	35.49	176	357	Average
4 @	2441.00	82.94			83.84	30.28	4.29	35.47	100	0	Peak
5	2483.50	50.27	-23.73	74.00	51.13	30.29	4.36	35.51	100	0	Peak
6	2483.50	38.93	-15.07	54.00	39.79	30.29	4.36	35.51	176	357	Average

Remark: #3 and #4 Fundamental Signal



Site : 03CH06-HY
Condition : HF-ANT-060410 VERTICAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch39:2441MHz
Plane : E2

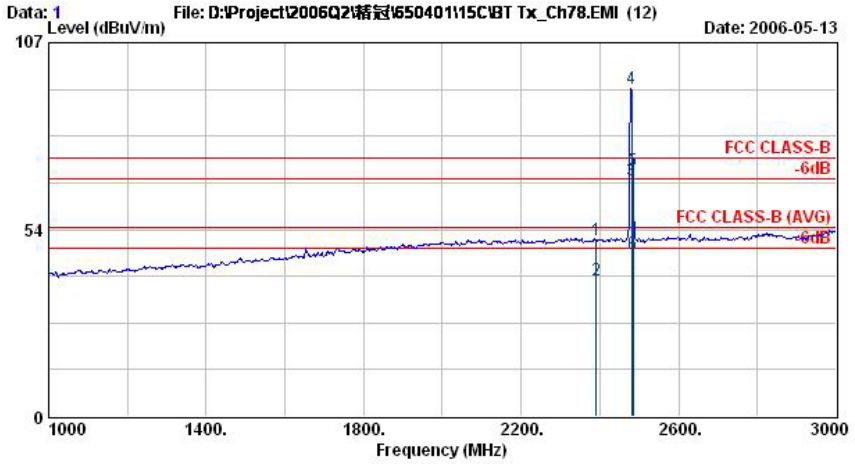


Site : 03CH06-HY
Condition : HF-ANT-060410 VERTICAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch39:2441MHz
Plane : E2

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

- Test Mode : Mode 3
- Polarization : Horizontal

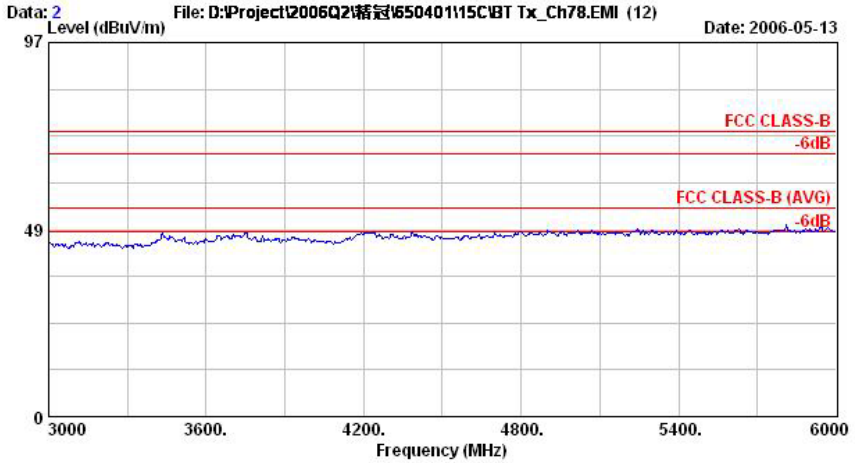
■ The test that passed at minimum margin was marked by the frame in the following table.



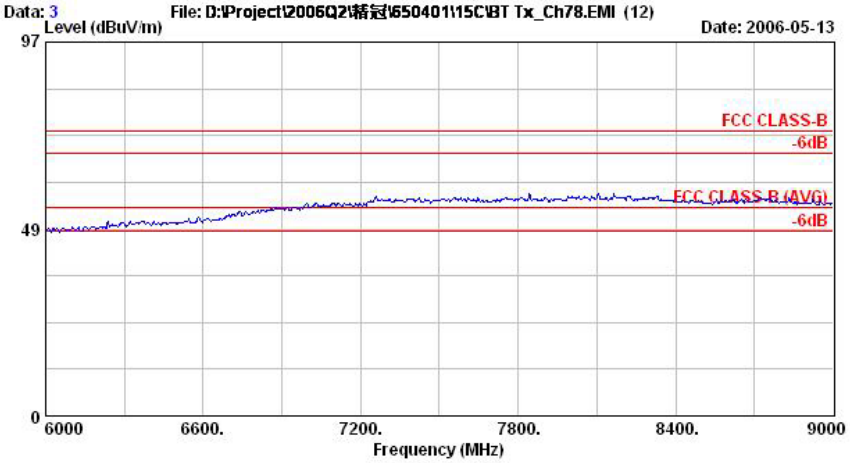
Site : 03CH06-HY
Condition : HF-ANT-060410 HORIZONTAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch78:2480MHz
Plane : E2

	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 @	2390.00	50.60	-23.40	74.00	51.53	30.26	4.26	35.46	100	0	Peak
2 @	2390.00	38.90	-15.10	54.00	39.84	30.26	4.26	35.46	100	268	Average
3 @	2480.00	67.45			68.31	30.29	4.36	35.51	100	268	Average
4 @	2480.00	93.73			94.59	30.29	4.36	35.51	100	0	Peak
5 @	2483.50	70.58	-3.42	74.00	71.44	30.29	4.36	35.51	100	0	Peak
6 @	2483.50	46.67	-7.33	54.00	47.53	30.29	4.36	35.51	100	268	Average

Remark: #3 and #4 Fundamental Signal



Site : 03CH06-HY
Condition : HF-ANT-060410 HORIZONTAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch78:2480MHz
Plane : E2

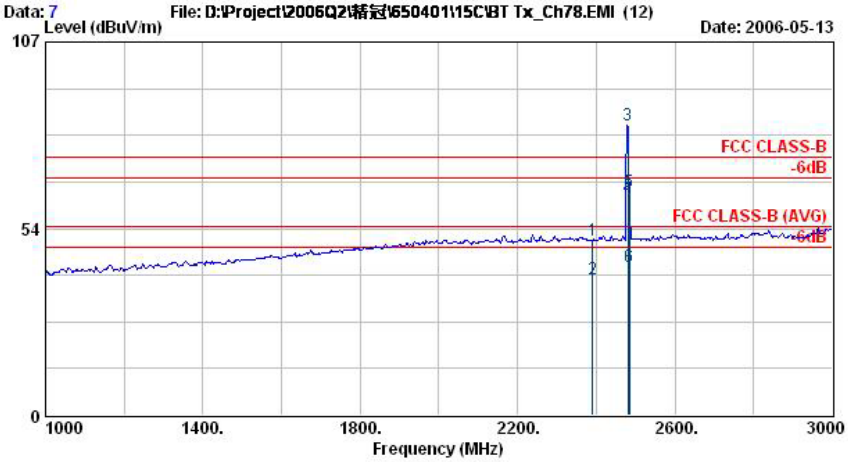


Site : 03CH06-HY
Condition : HF-ANT-060410 HORIZONTAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch78:2480MHz
Plane : E2

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

- Polarization : Vertical

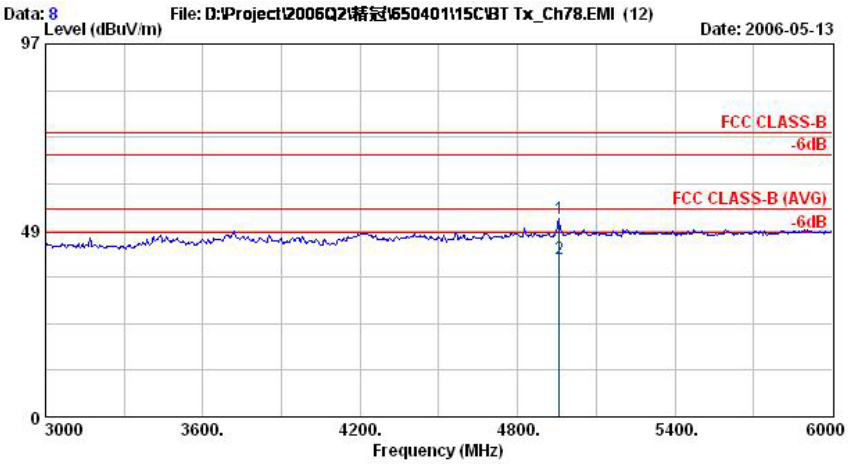
■ **The test that passed at minimum margin was marked by the frame in the following table.**



Site : 03CH06-HY
Condition : HF-ANT-060410 VERTICAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch78:2480MHz
Plane : E2

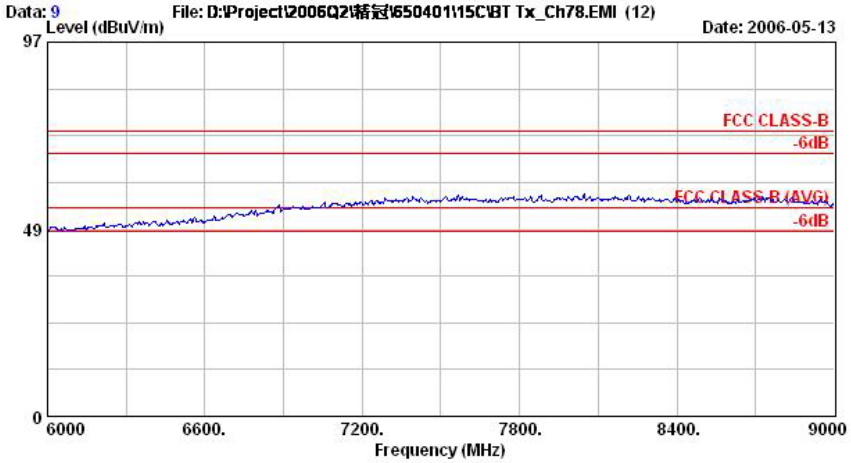
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	2390.00	50.22	-23.78	74.00	51.15	30.26	4.26	35.46	100	0	Peak
2 @	2390.00	38.87	-15.13	54.00	39.81	30.26	4.26	35.46	100	358	Average
3 @	2480.00	83.33			84.19	30.29	4.36	35.51	100	0	Peak
4 @	2480.00	62.33			63.19	30.29	4.36	35.51	100	358	Average
5 @	2483.50	64.16	-9.84	74.00	65.02	30.29	4.36	35.51	100	0	Peak
6 @	2483.50	42.50	-11.50	54.00	43.36	30.29	4.36	35.51	100	358	Average

Remark: #3 and #4 Fundamental Signal



Site : 03CH06-HY
Condition : HF-ANT-060410 VERTICAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch78:2480MHz
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 @	4960.00	51.57	-22.43	74.00	47.93	33.47	6.39	36.23	200	360	Peak
2 @	4960.00	41.03	-12.97	54.00	37.40	33.47	6.39	36.23	153	257	Average



Site : 03CH06-HY
Condition : HF-ANT-060410 VERTICAL
EUT : Bluetooth Stereo Adapter
Power : 120Vac/60Hz
Model : FR 650401
Memo : Bluetooth Tx_Ch78:2480MHz
Plane : E2

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

5.9 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 print antenna. There is no connector on antenna port and it is considered to meet antenna requirement of FCC.

5.10.3 Antenna Gain

The antenna gain of EUT is less than 6 dBi. Therefore, it is not necessany to reduce maximum peak output powen 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	Jun. 28, 2005	Jun. 28, 2006	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001/008	9kHz – 30MHz	Mar. 29, 2006	Mar. 29, 2007	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	2001/009	9kHz – 30MHz	Apr. 19, 2006	Apr. 19, 2007	Conduction (CO01-HY)
EMI Filter	LINDGREN	LRE-2060	1004	< 450Hz	N/A	N/A	Conduction (CO01-HY)
EMI Filter	LINDGREN	N6006	201052	0 – 60Hz	N/A	N/A	Conduction (CO01-HY)
RF Cable-CON	Suhner Switzerland	RG223/U	CB029	9kHz – 30MHz	Dec. 22, 2005	Dec. 22, 2006	Conduction (CO01-HY)
Spectrum analyzer	Agilent	E4408B	MY44211030	9KHz-26.5GHz	Jul. 25, 2005	Jul. 24, 2006	Radiation (03CH06-HY)
Receiver	R&S	ESCS30	100356	9KHz-2.75GHz	Jun. 28, 2005	Jun. 27, 2006	Radiation (03CH06-HY)
Controller	CT	SC100	N/A	N/A	N/A	N/A	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Nov. 22, 2004	Nov. 22, 2006	Radiation (03CH06-HY)
Horn Antenna	Com-Power	AH118	071025	1G-18G	Feb. 1, 2005	Feb. 1, 2007	Radiation (03CH06-HY)
SHF-EHF Horn	SCHWARZBECK	BBHA 9170	9170-249	14G - 40G	Jul. 21, 2005	Jul. 20, 2006	Radiation (03CH06-HY)
Amplifier	MITEQ	AMF-6F	997165	26G - 40G	Jul. 21, 2005	Jul. 20, 2006	Radiation (03CH06-HY)
Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	N/A	Radiation (03CH06-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	N/A	Radiation (03CH06-HY)

7. Uncertainty Evaluation

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

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

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
combined standard uncertainty Uc(y)	**1.27**		
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)	**2.54**		

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

Contribution	Uncertainty of x_i		$u(x_i)$	Ci	$Ci*u(x_i)$
	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 Γ1= 0.197 Antenna VSWR Γ2= 0.194 Uncertainty=20log(1-Γ1*Γ2*Γ3)	+0.34/-0.35	U-shaped	0.244	1	0.244
Combined standard uncertainty Uc(y)	**2.36**				
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	**4.72**				