FCC TEST REPORT

for

47 CFR, Part 15, Subpart C

Equipment : Bluetooth USB Dongle Class II

Model No. : F8T003

FCC ID. : K7SF8T003V2

Filing Type : Certification

Applicant : **Belkin Corporation**
501 West Walnut Street Compton CA 90220-5221

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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.**

SPORTON International Inc.

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

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History of this test report

Original Report Issue Date: Jul. 03, 2003

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

Certificate No. : F361801-01

CERTIFICATE OF COMPLIANCE

for

47 CFR, Part 15, Subpart C

Equipment : Bluetooth USB Dongle Class II

Model No. : F8T003

FCC ID. : K7SF8T003V2

Filing Type : Certification

Applicant : **Belkin Corporation**
501 West Walnut Street Compton CA 90220-5221

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 - 1992** and the equipment under test was ***passed*** all test items required in FCC Part 15 subpart C, relative to the equipment under test. Testing was carried out on Jun. 27, 2003 at **SPORTON International Inc.** LAB.

July 07, 2003

K. J. Lin
Manager

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

1. General Description of Equipment under Test

1.1. Applicant

Belkin Corporation
501 West Walnut Street Compton CA 90220-5221

1.2. Manufacturer

J-THREE INTERNATIONAL HOLDING CO., LTD.
No. 1, Yu 3 Rd., Youth Industrial Park, Yang Mei,
Taoyuan Hsien, Taiwan 324

1.3. Basic Description of Equipment under Test

Equipment	: Bluetooth USB Dongle Class II
Model No.	: F8T003
FCC ID	: K7SF8T003V2
Trade Name	: Belkin
Power Supply Type	: From PC
AC Power Cord	: N/A

1.4. Feature of Equipment under Test

- Standard Bluetooth: V1.1
- Frequency Band: 2.400GHz ~ 2.480GHz unlicensed ISM band
- Spread Spectrum: FHSS (Frequency Hopping Spread Spectrum)
- Modulation method: GFSK (Gaussian Frequency Shift Keying)
- RF output power: Class II, -6dBm ~ 4 dBm
- Antenna: Printed Antenna, 0 +/- 1 dBi
- Working distance: Max. 10m in free space
- Sensitivity: < 0.1% BER at –80dBm
- Power consumption:
  -TX Typical: 65
  -RX Typical: 45
- I/O Interface: USB 1.1
- LED indicator: Single blue LED
- Flash Memory: 8 M Bits

Channel	Frequency	Channel	Frequency
00	2402	40	2442
01	2403	41	2443
02	2404	42	2444
03	2405	43	2445
04	2406	44	2446
05	2407	45	2447
06	2408	46	2448
07	2409	47	2449
08	2410	48	2450
09	2411	49	2451
10	2412	50	2452
11	2413	51	2453
12	2414	52	2454
13	2415	53	2455
14	2416	54	2456
15	2417	55	2457
16	2418	56	2458
17	2419	57	2459
18	2420	58	2460
19	2421	59	2461
20	2422	60	2462
21	2423	61	2463
22	2424	62	2464
23	2425	63	2465
24	2426	64	2466
25	2427	65	2467
26	2428	66	2468
27	2429	67	2469
28	2430	68	2470
29	2431	69	2471
30	2432	70	2472
31	2433	71	2473
32	2434	72	2474
33	2435	73	2475
34	2436	74	2476
35	2437	75	2477
36	2438	76	2478
37	2439	77	2479
38	2440	78	2480
39	2441		

2. Test Configuration of Equipment under Test

2.1. Test Manner

a. The EUT has been associated with notebook and peripherals pursuant to ANSI C63.4-1992 and configuration operated in a manner, which tended to maximize its emission characteristics in a typical application.

b. The complete test system included VIEWSONIC Monitor, LOGITECH PS/2 Keyboard, LOGITECH USB Mouse, Epson Printer, COMPAQ Notebook and EUT for EMI test.

c. The following test modes were pretested:

Mode 1: CH00（2402MHz）
Mode 2: CH39（2441MHz）
Mode 3: CH78（2480MHz）

b. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 24800MHz.

2.2. Description of Test System

Support Unit 1. -- Monitor (VIEWSONIC)

FCC ID	: N/A
Model No.	: VCDTS21553-3P
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0051
Data Cable	: Shielded, 1.7m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity

Support Unit 2. -- PS/2 Keyboard (LOGITECH)

FCC ID	: N/A
Model No.	: Y-SJ17
Serial No.	: SP0054
Data Cable	: Shielded, 1.7m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 3. – USB Mouse (LOGITECH)

FCC ID	: N/A
Model No.	: M-BE58
Serial No.	: SP0041
Data Cable	: Shielded, 1.7m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

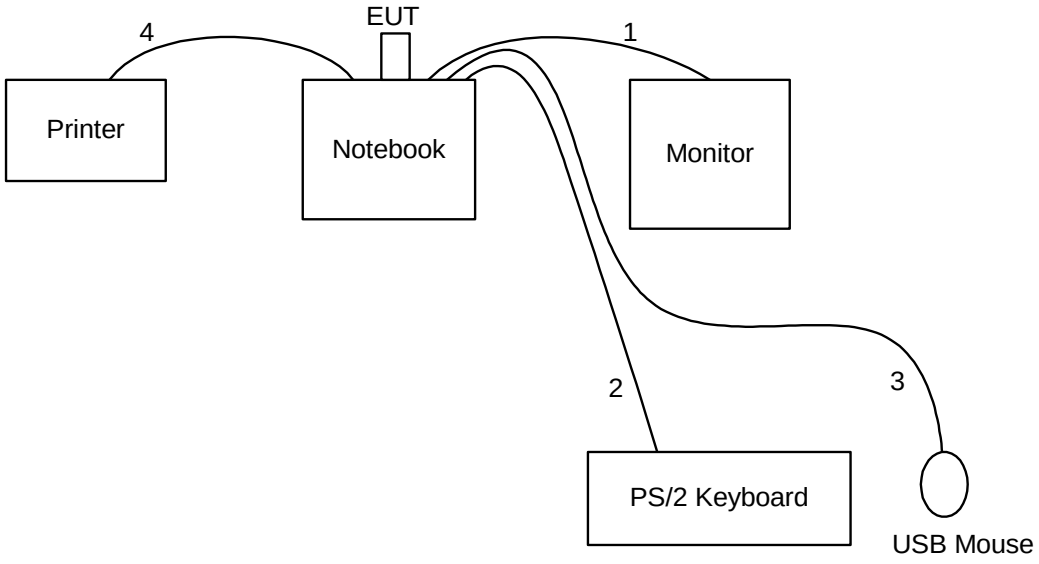
Support Unit 4. -- Printer (EPSON)

FCC ID	: N/A
Model No.	: STYLUS COLRO S680
Power Supply Type	: Linear
Power Cord	: Non-Shielded
Serial No.	: SP0048
Data Cable	: Shielded, 1.35m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 5. -- Notebook (COMPAQ)

FCC ID	: N/A
Model No.	: Presario 1500
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0036
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

2.3. Connection Diagram of Test System



1. The I/O cable is connected from Notebook to the support unit 1.
2. The I/O cable is connected from Notebook to the support unit 2.
3. The I/O cable is connected from Notebook to the support unit 3.
4. The I/O cable is connected from Notebook to the support unit 4.

3. Test Software

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

The program was executed as follows:

a. Turn on the power of all equipment.
b. The PC reads the test program from the hard disk drive and runs it.
c. The PC sends " H" messages to the monitor, and the monitor displays " H " patterns on the screen.
d. The PC sends " H " messages to the printer, then the printer prints them on the paper.
e. The PC sends " H " messages to the internal Hard Disk, and the Hard Disk reads and writes the message.
f. Repeat the steps from c to e.

At the same time, "Blue Test" was executed to keep transmitting signals at fixed frequency.

4. General Information of Test

Test Site Location	:	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiag, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-318-0055
Test Site No	:	CO01-HY, 03CH03-HY

4.1. Test Voltage

115V/60Hz

4.2. Standard for Methods of Measurement

ANSI C63.4-1992

4.3. Test in Compliance with

FCC Part 15, Subpart C 15.247

4.4. Frequency Range Investigated

a. Conduction: from 150 KHz to 30 MHz
b. Radiation: from 30 MHz to 24800MHz

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
15.107/15.207	Conducted Emission	Pass
15.247(a)(1)	Hopping Channel Separation	Pass
15.247(a)(1)(ii)	Number of Hopping Frequency Used	Pass
15.247(a)(1)(ii)	Hopping Channel Bandwidth	Pass
15.247(a)(1)(ii)	Dwell Time of Each Frequency within a 30 Second Period	Pass
15.247(b)	Output Power	Pass
15.247(c)	100KHz Bandwidth of Frequency Band Edges	Pass
15.203	Antenna Requirement	Pass

5.2. Hopping Channel Separation

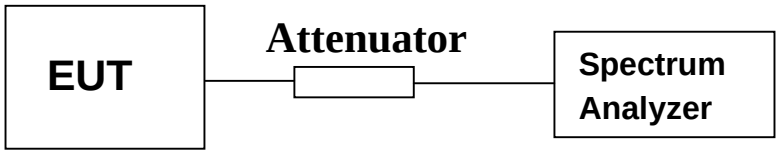
5.2.1. Measuring Instruments：

As described in chapter 9 of this test report.

5.2.2. Test Procedure：

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
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.

5.2.3. Test Setup Layout：

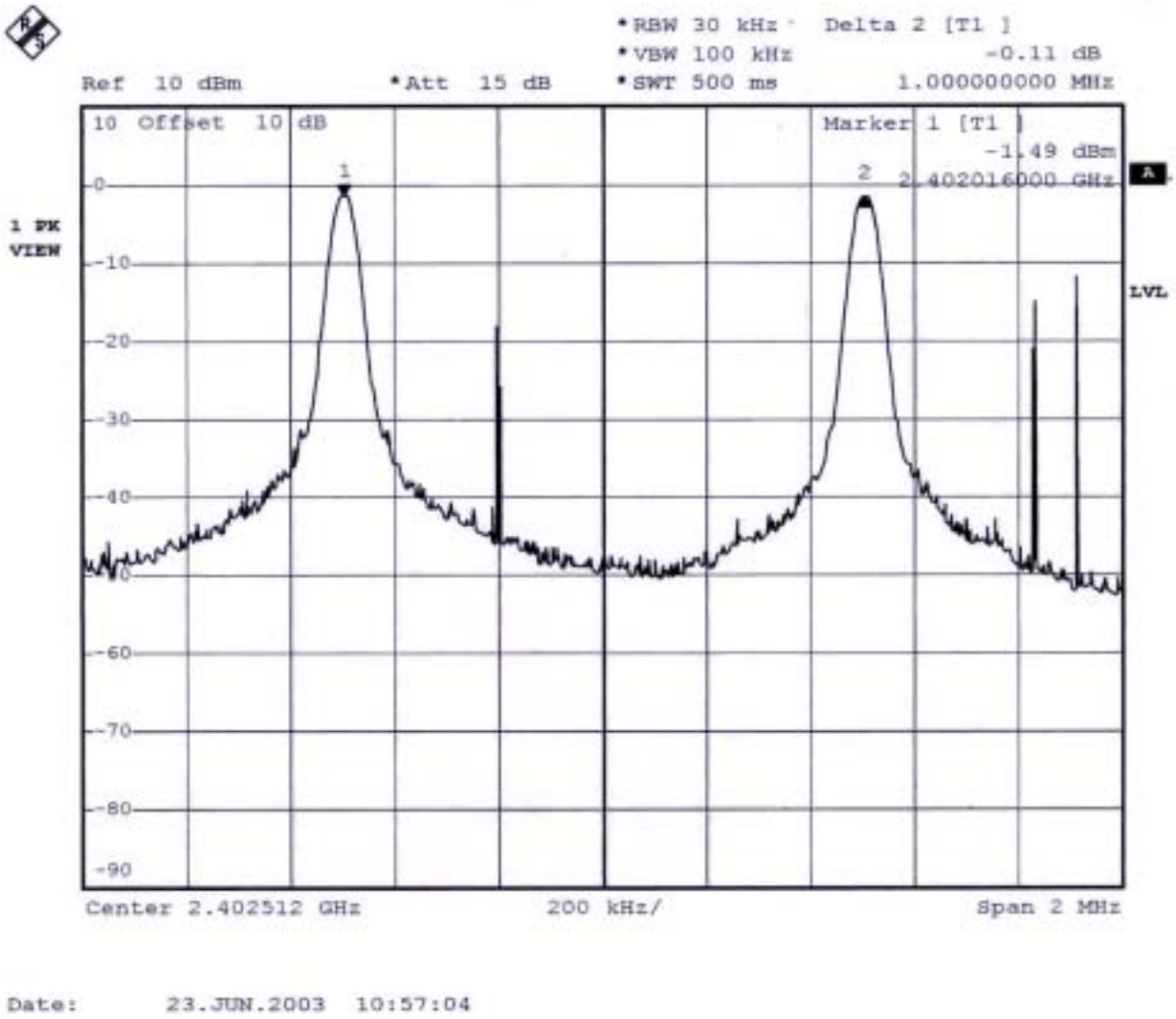


5.2.4. Test Result：The spectrum analyzer plots are attached as below

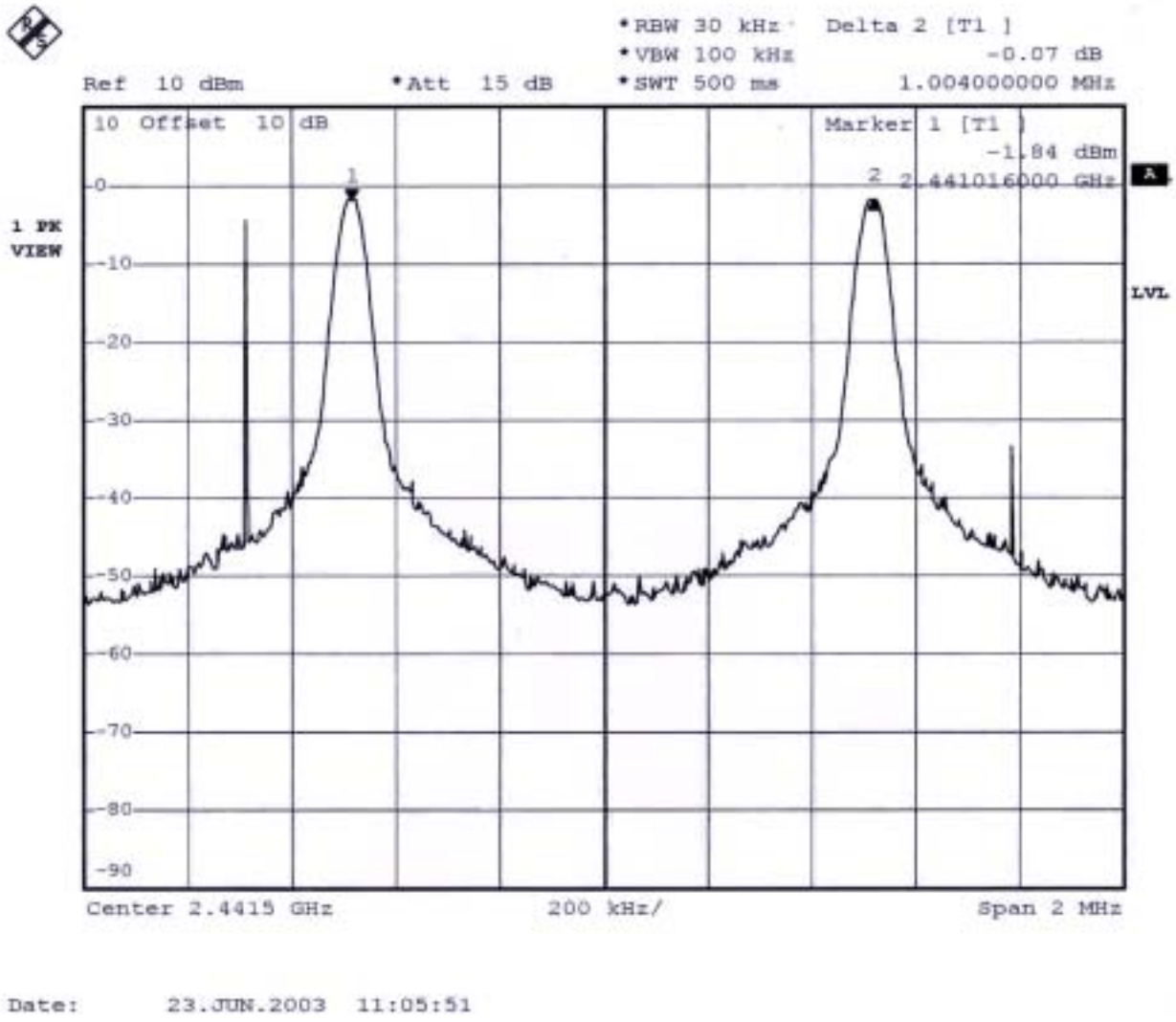
- Temperature: 26°C
- Relative Humidity: 72 %
- Duty cycle of the equipment during the test X ＝ 100%

Channel	Frequency (MHz)	Hopping Channel Separation (KHz)	Limits (KHz)	Plot Ref. No.
00	2402	1000.0000	25	1
39	2441	1004.0000	25	2
78	2480	1004.0000	25	3

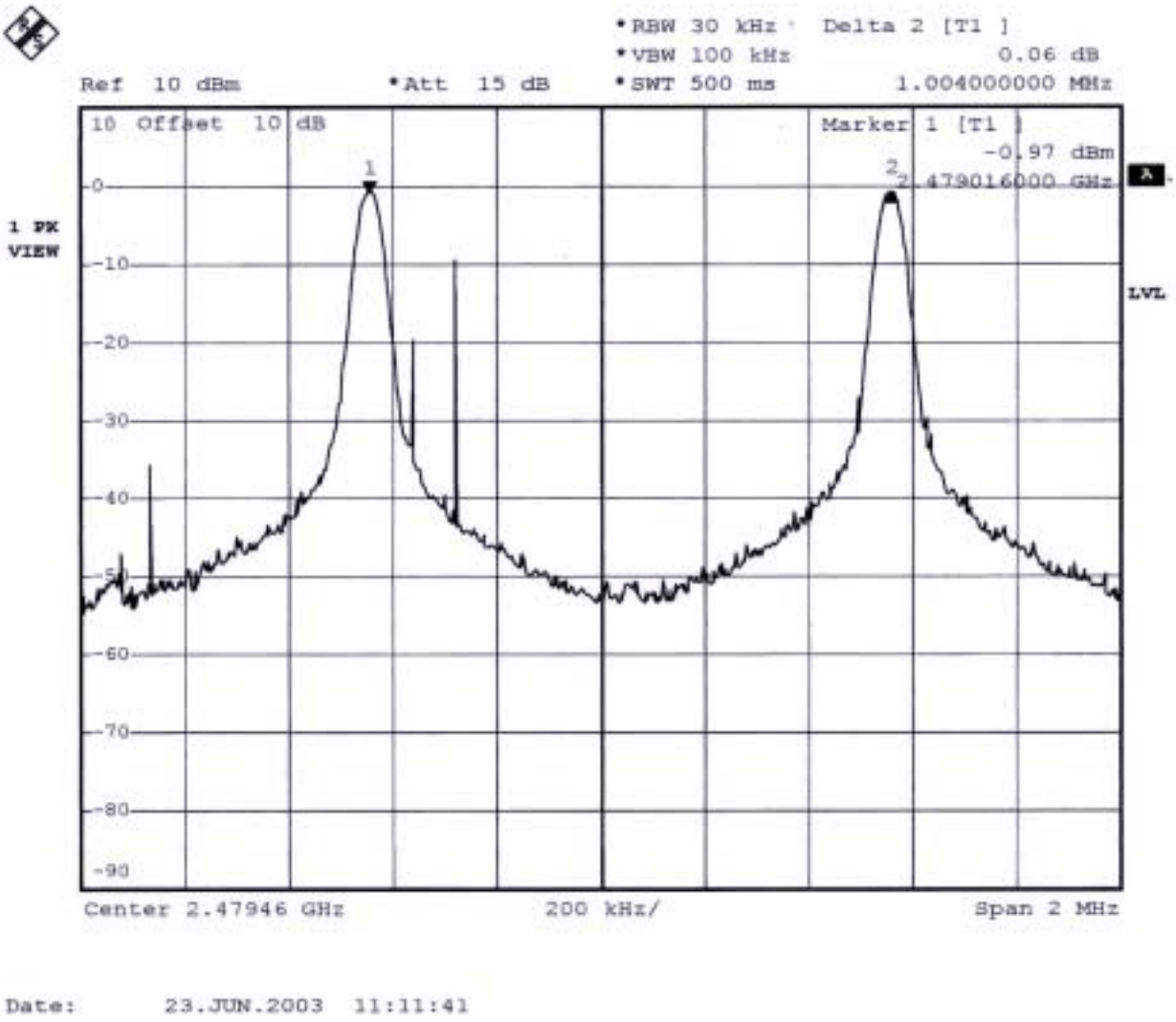
Plot 1 (Channel 00) :



Plot 2 (Channel 39) :



Plot 3 (Channel 78)：



5.2.5. Test Configuration（EUT Operating Condition）：

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies respectively.

5.3. Number of Hopping Frequency

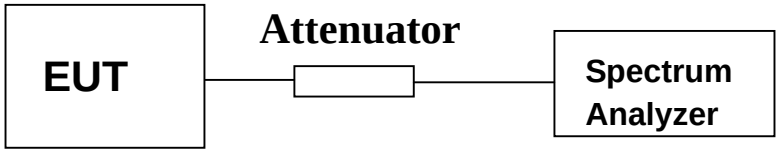
5.3.1. Measuring Instruments：

As described in chapter 9 of this test report.

5.3.2. Test Procedure：

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
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：

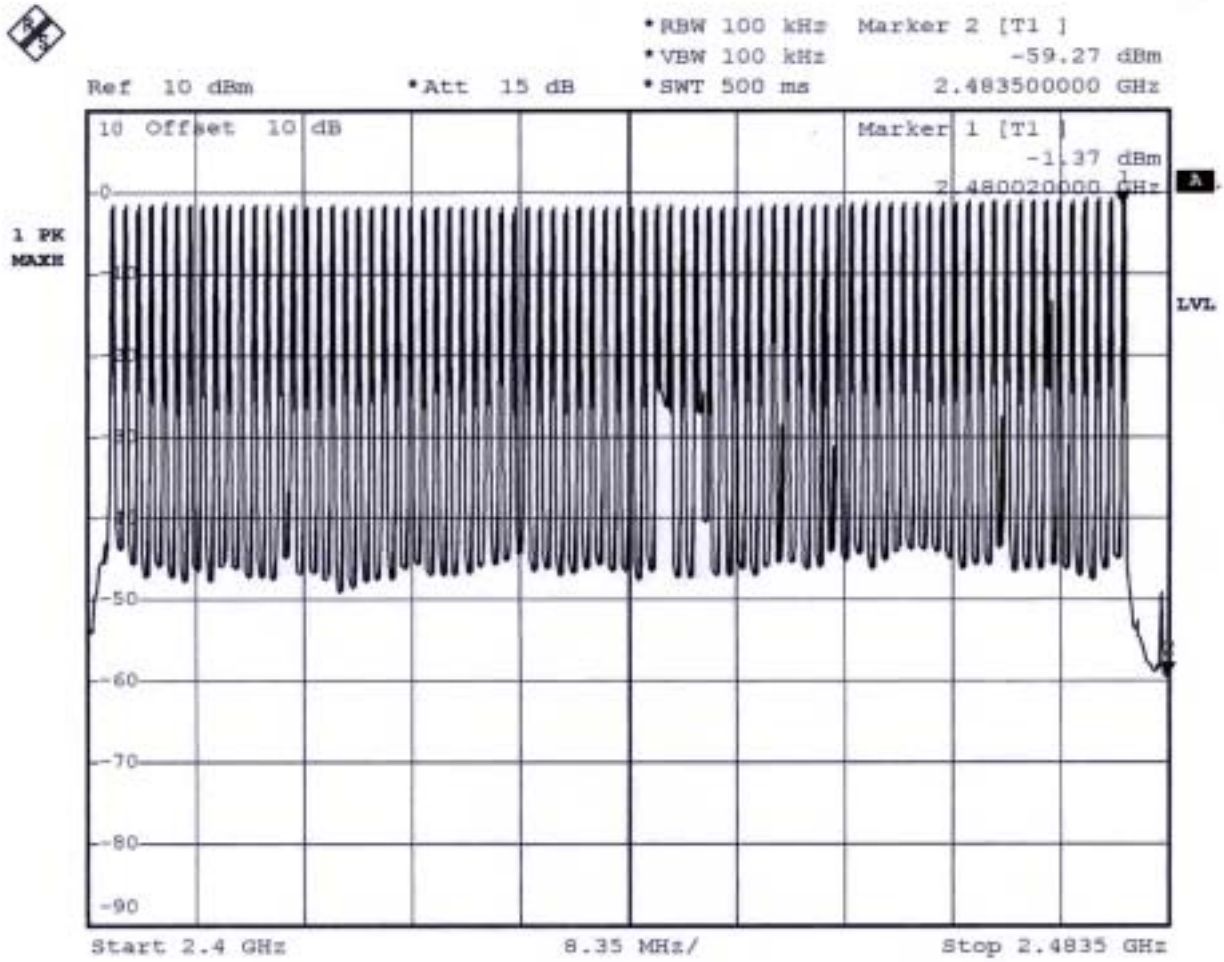


5.3.4. Test Result：See spectrum analyzer plots below

- Temperature: 26°C
- Relative Humidity: 72 %
- Duty cycle of the equipment during the test X ＝ 100%

Number of Hopping Frequency (Channel)	Limits (Channel)	Plot Ref. No.
79	75	1

Plot 1：



Date: 23.JUN.2003 11:20:45

5.4. Hopping Channel Bandwidth

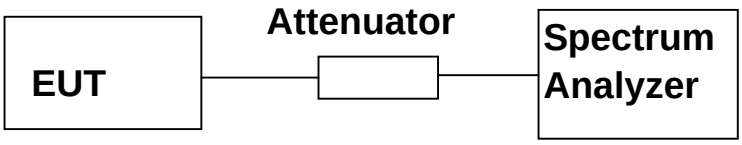
5.4.1. Measuring Instruments：

As described in chapter 9 of this test report.

5.4.2. Test Procedure：

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 100KHz and VBW to 100KHz.
3. The Hopping Channel bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20 dB.

5.4.3. Test Setup Layout：

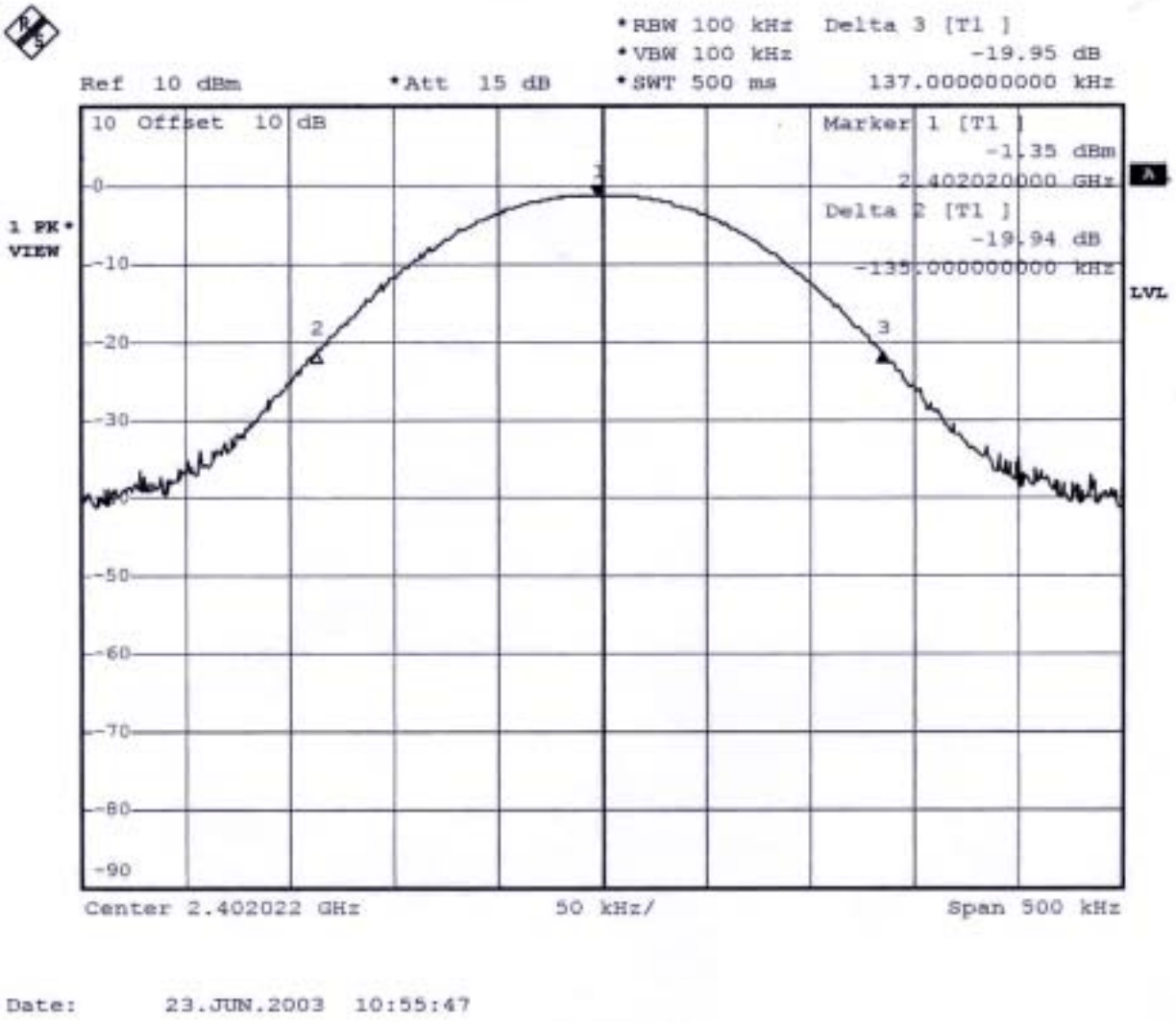


5.4.4. Test Result：See spectrum analyzer plots below

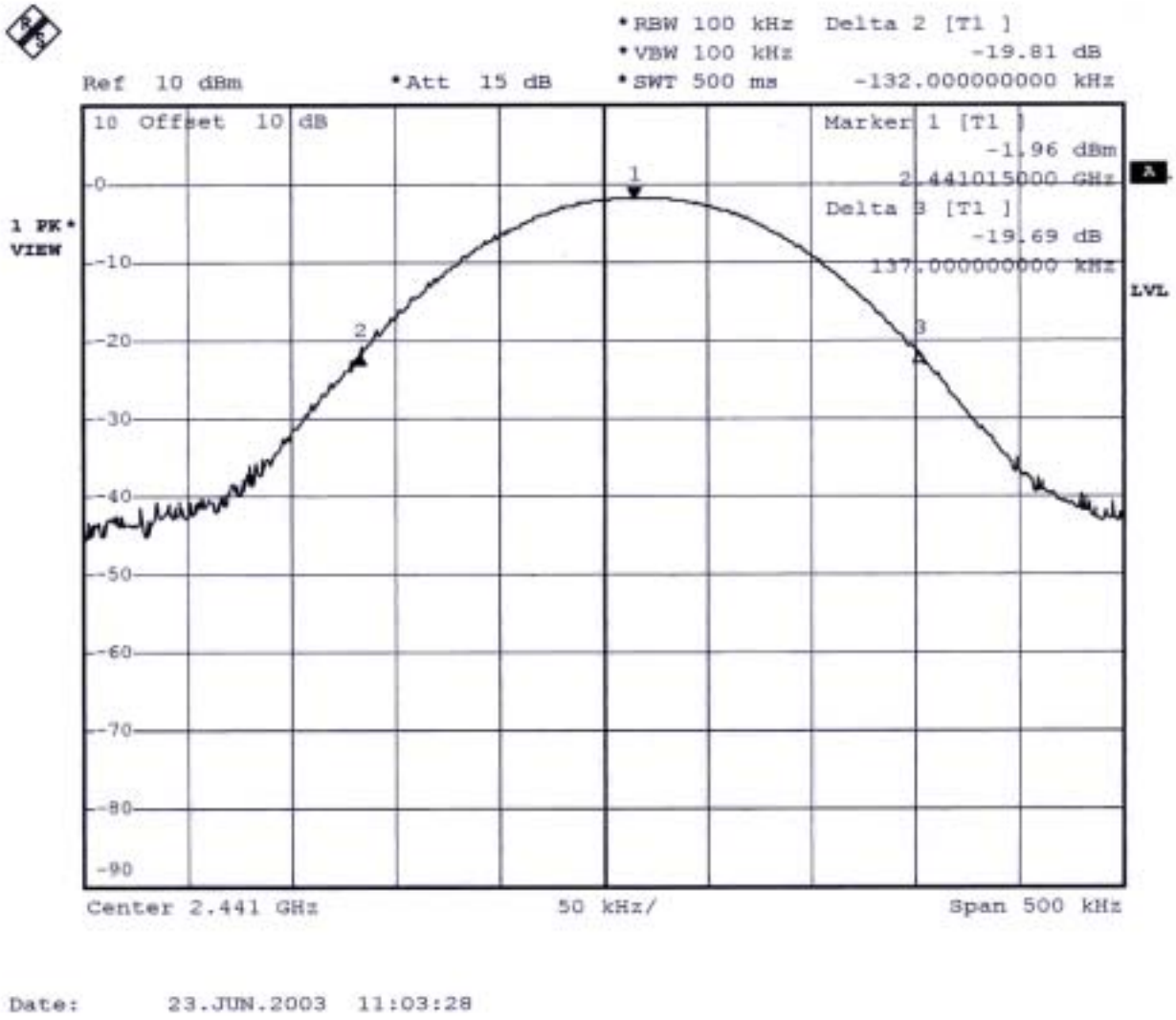
- Temperature: 26°C
- Relative Humidity: 72 %
- Duty cycle of the equipment during the test X ＝ 100%

Channel	Frequency (MHz)	Hopping Channel Bandwidth (MHz)	Limits (MHz)	Plot Ref. No.
00	2402	0.2720	1.0	1
39	2441	0.2690	1.0	2
78	2480	0.2680	1.0	3

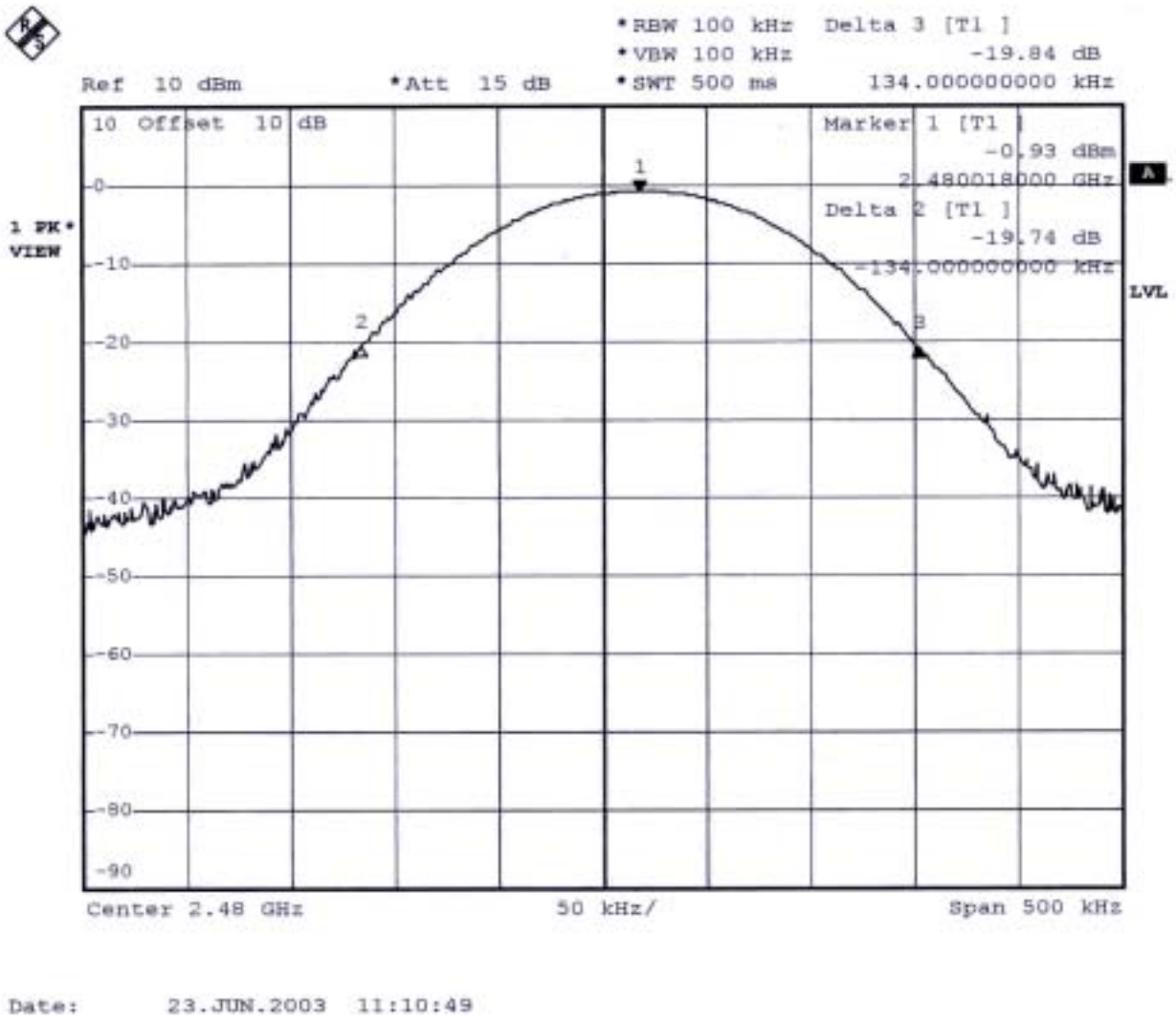
Plot 1 (Channel 00)



Plot 2 (Channel 39)



Plot 3 (Channel 78)



5.4.5. Test Configuration（EUT Operating Condition）：

Same as Section 5.2.5.

5.5. Dwell Time of Each Frequency within a 30 Seconds Period

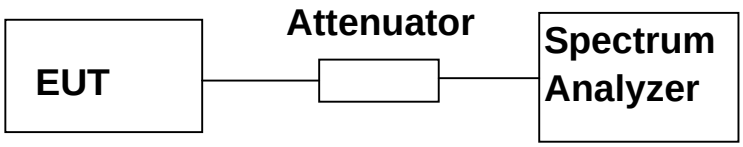
5.5.1. Measuring Instruments：

As described in chapter 9 of this test report.

5.5.2. Test Procedure：

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 100KHz and VBW to 100KHz.
3. Set the center frequency on any frequency would be measure and set the frequency span to zero span.

5.5.3. Test Setup Layout：

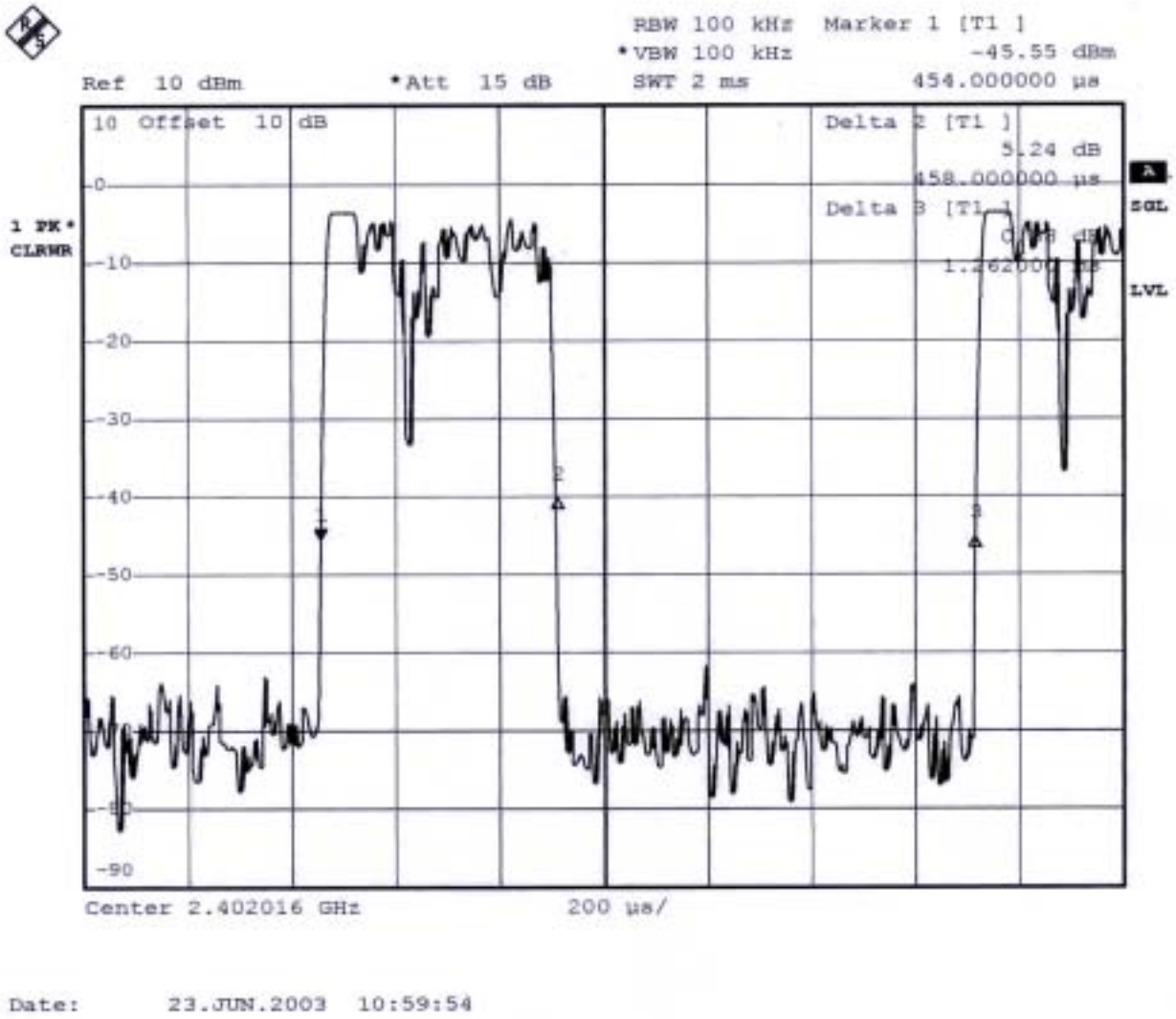


5.5.4. Test Result：See spectrum analyzer plots below

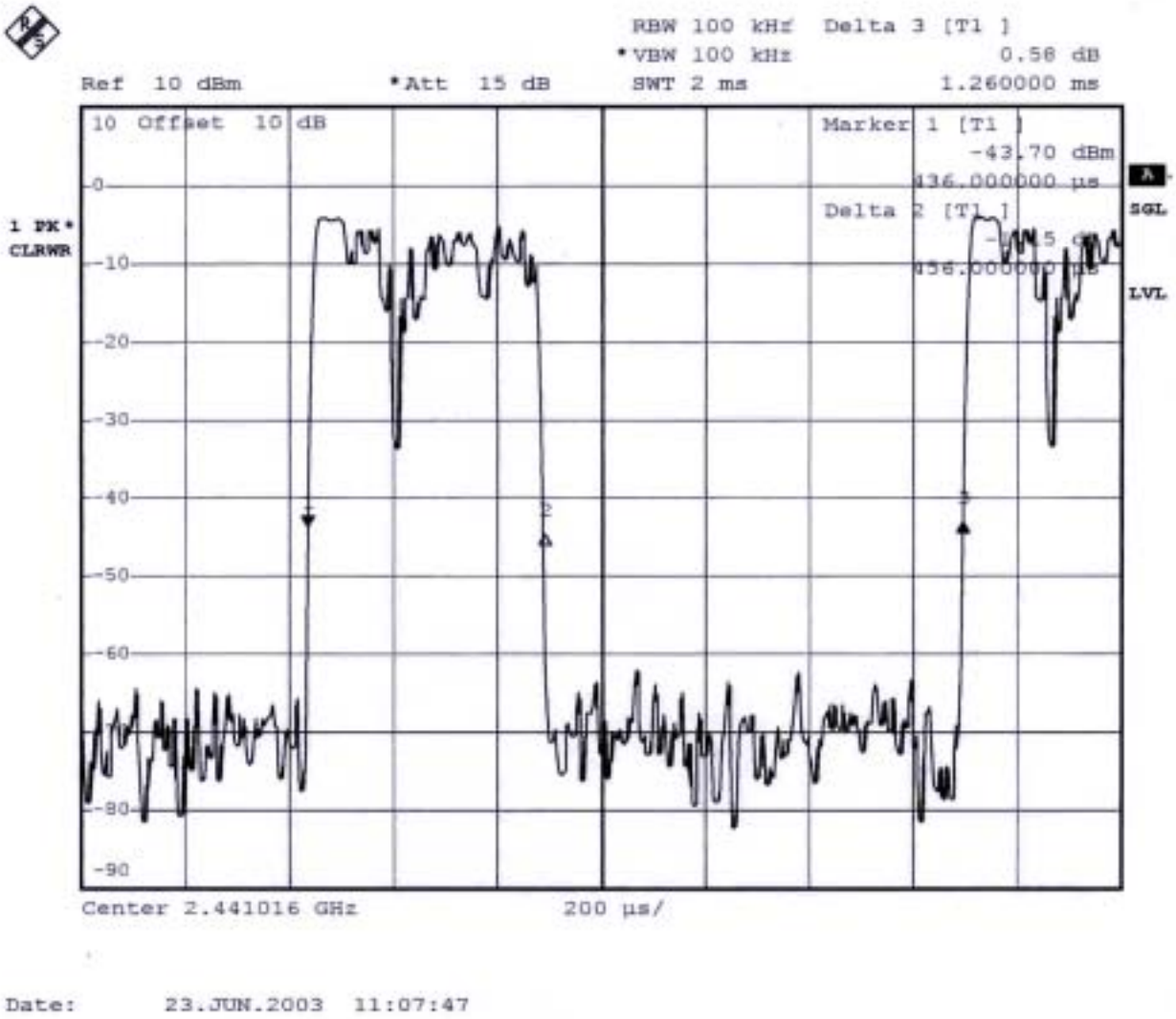
- Temperature: 26°C
- Relative Humidity: 72 %
- Duty cycle of the equipment during the test X ＝ 100%

Channel	Frequency (MHz)	Dwell Time (s)	Limits (s)	Plot Ref. No.
00	2402	0.137816205	0.4	1
39	2441	0.137432188	0.4	2
78	2480	0.137432188	0.4	3

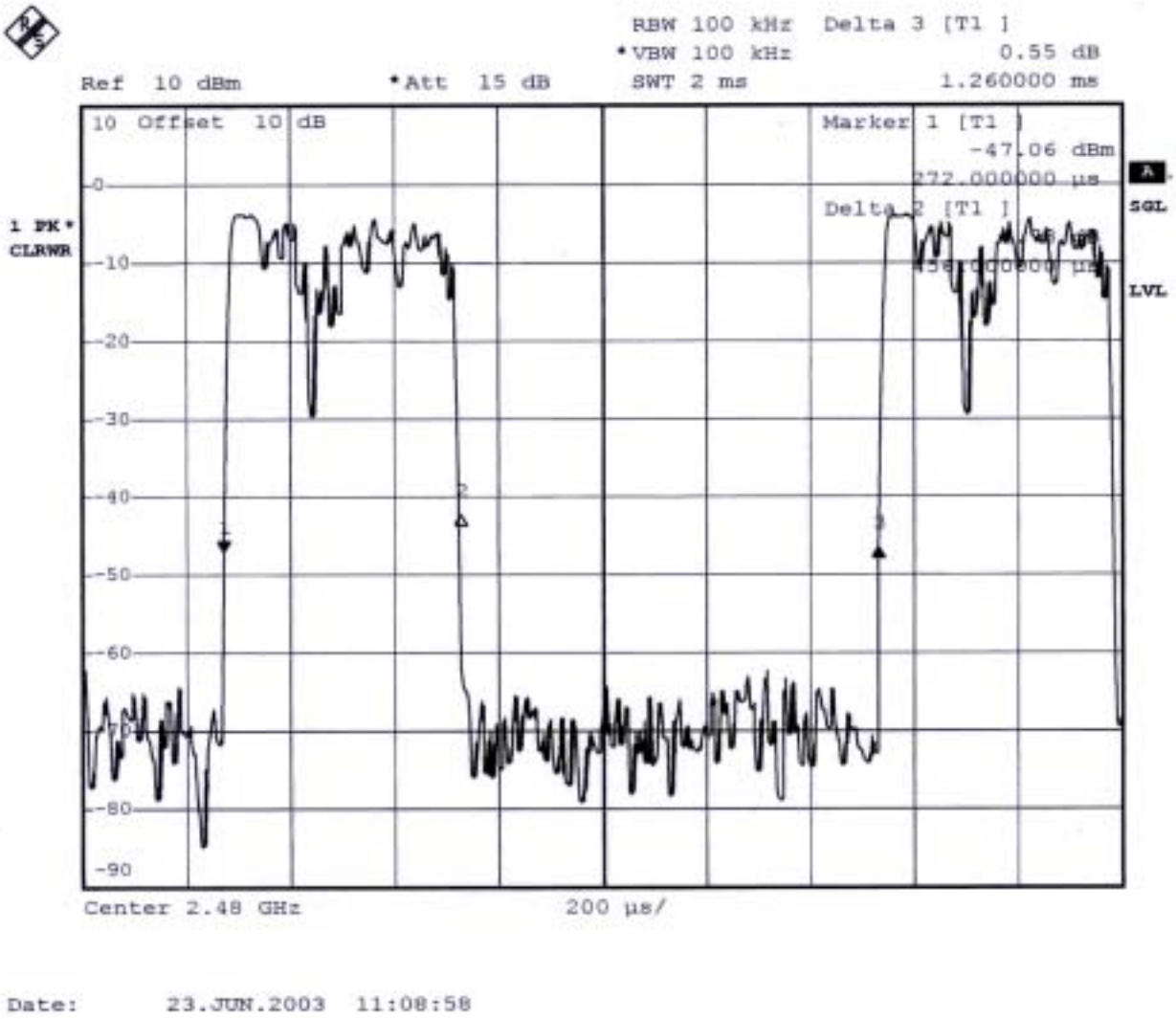
Plot 1 (Channel 00)



Plot 2 (Channel 39)



Plot 3 (Channel 78)



5.5.5. Test Configuration（EUT Operating Condition）：

Same as Section 5.2.5.

5.6. Output Power

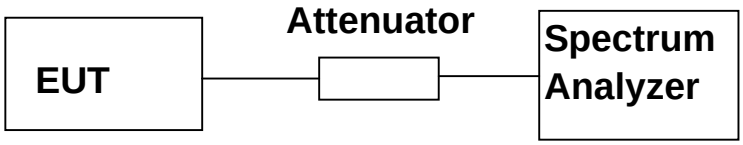
5.6.1. Measuring Instruments：

As described in chapter 9 of this test report.

5.6.2. Test Procedure：

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

5.6.3. Test Setup Layout：

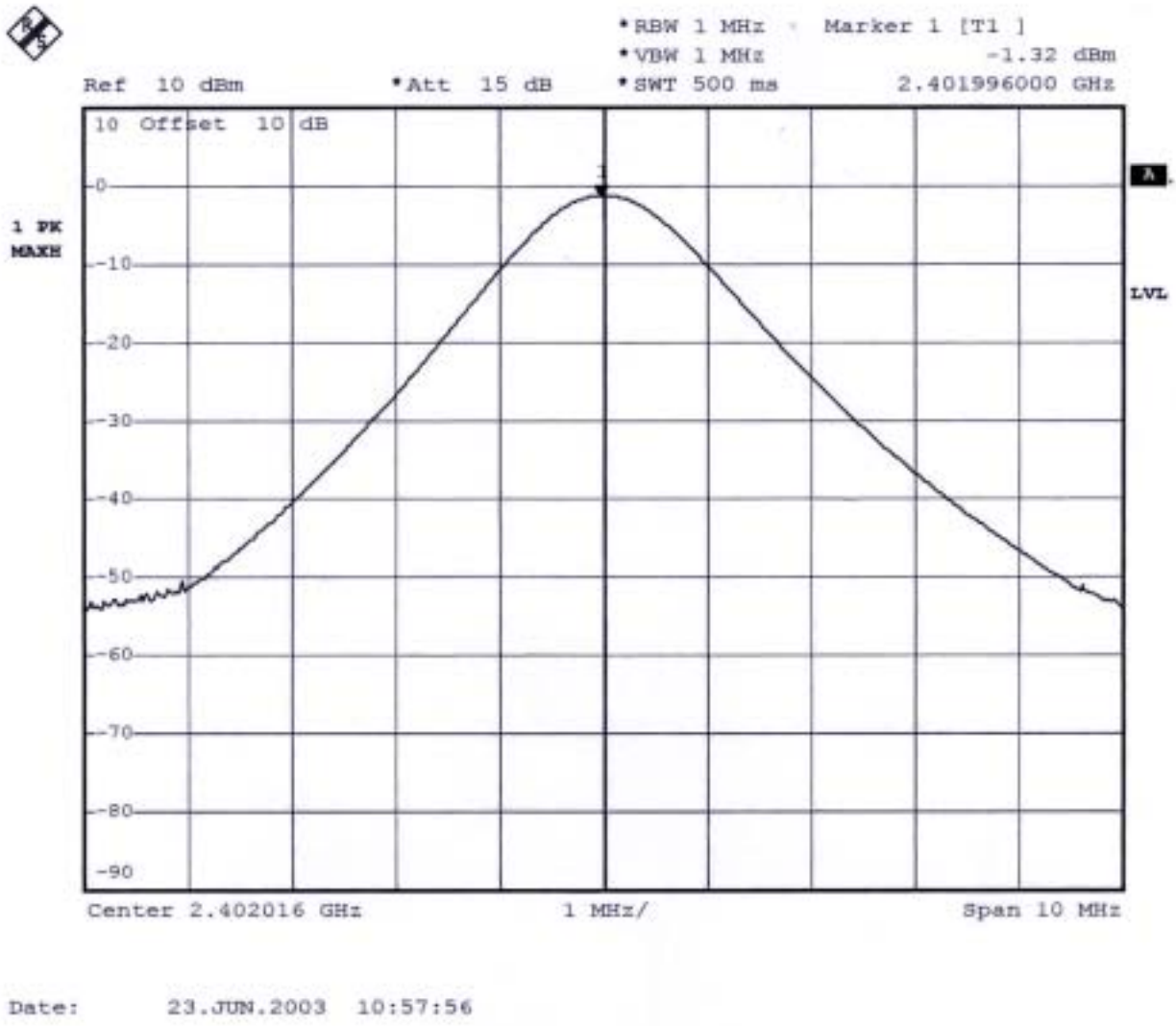


5.6.4. Test Result：See spectrum analyzer plots below

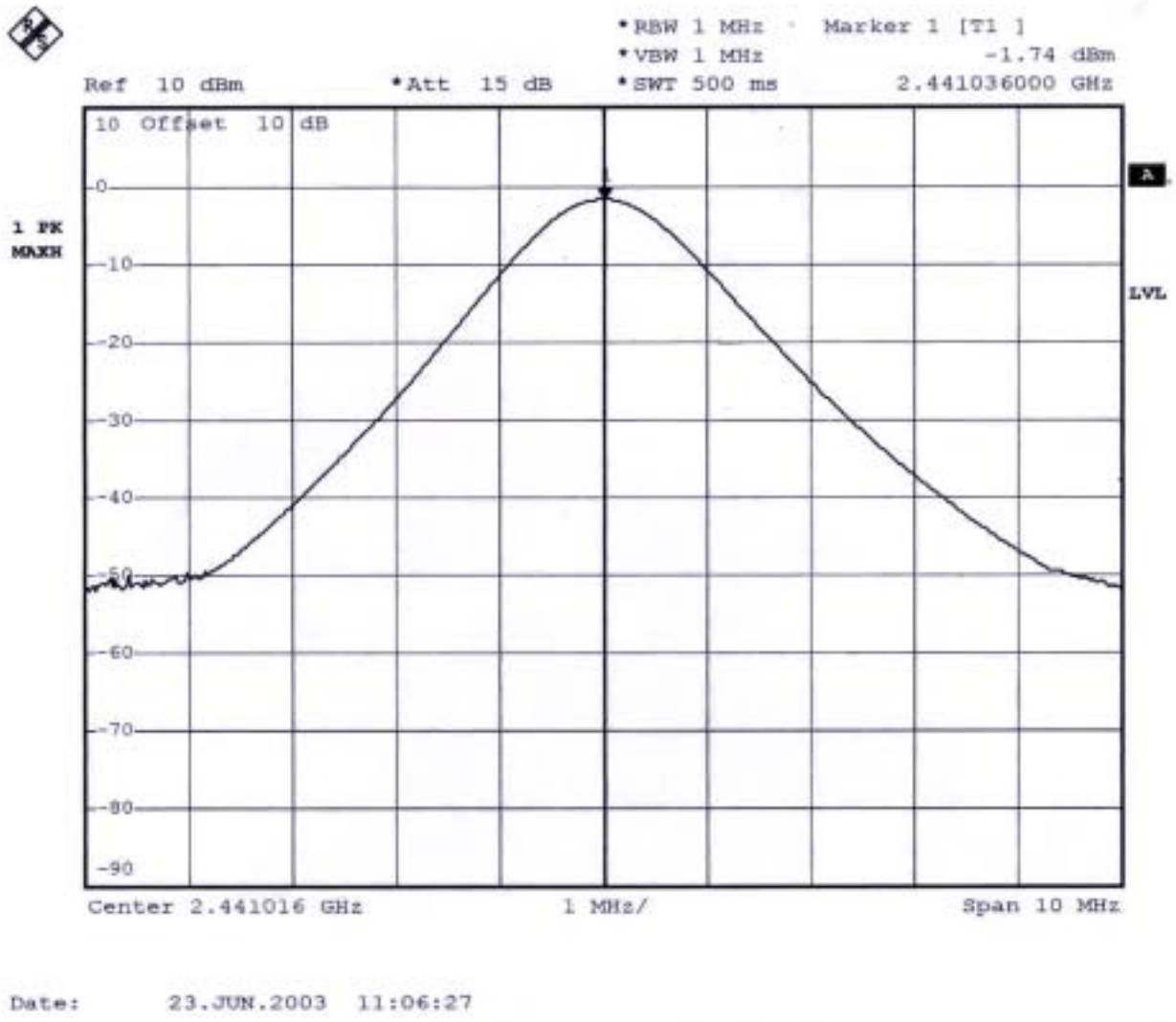
- Temperature: 26°C
- Relative Humidity: 72 %
- Duty cycle of the equipment during the test X ＝ 100%

Channel	Frequency (MHz)	Measured Output Power (dBm)	Measured Output Power (mWatt)	Limits (Watt/dBm)
00	2402	-1.32	0.73790423	1W/30 dBm
39	2441	-1.74	0.669884609	1W/30 dBm
78	2480	-0.83	0.82603795	1W/30 dBm

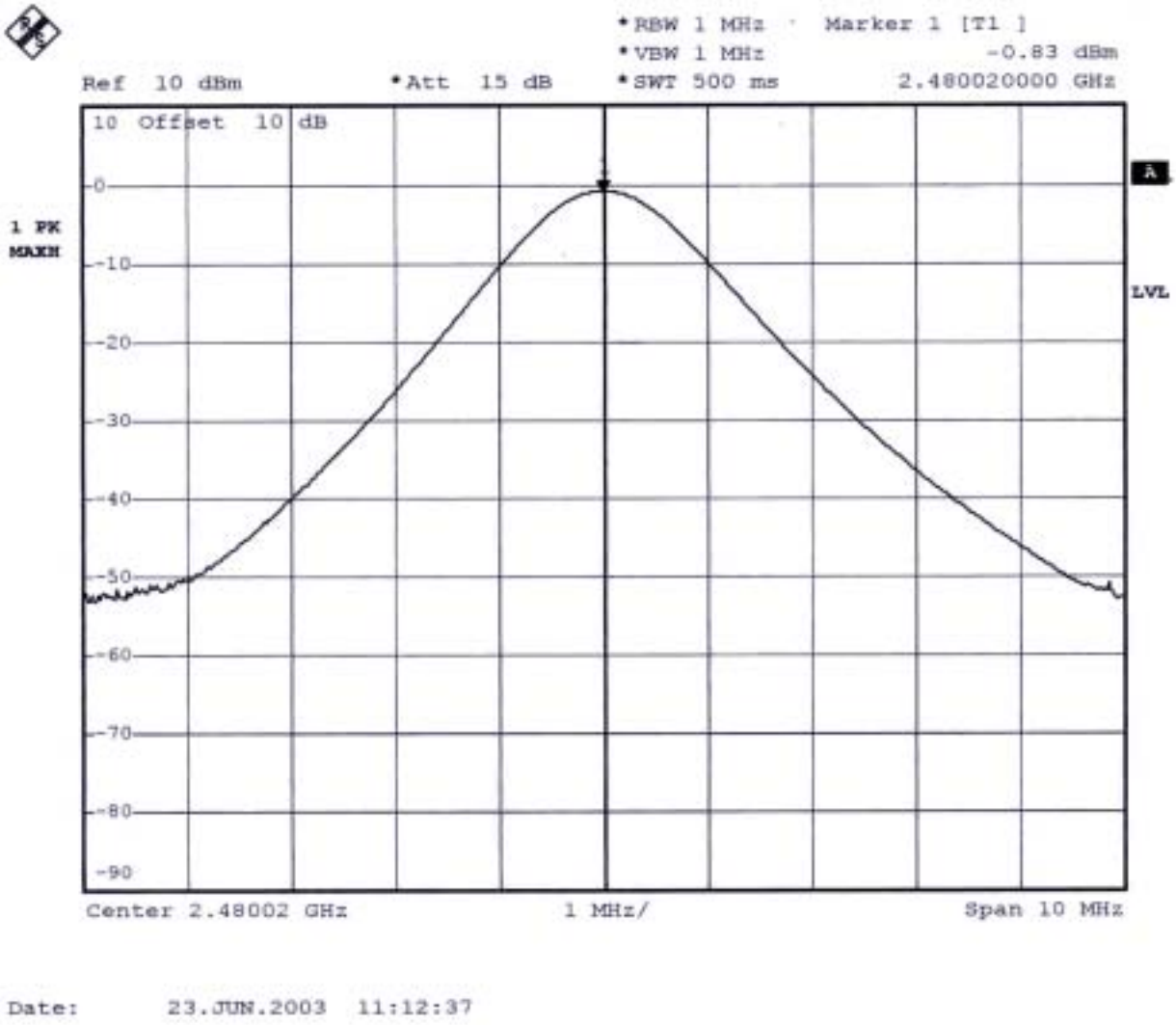
Plot 1 (Channel 00)



Plot 2 (Channel 39)



Plot 3 (Channel 78)



5.6.5. Test Configuration（EUT Operating Condition）：

Same as Section 5.2.5.

5.7. 100KHz Bandwidth of Frequency Band Edges

5.7.1. Measuring Instruments：

As described in chapter 9 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 convenient frequency span including 100 KHz bandwidth from band edge.
3. The band edges was measured and recorded.

5.7.3. Test Result：

Test Result in lower band (Channel 00)： PASS

Test Result in higher band(Channel 78)： PASS

5.7.4. Note on Band edge Emission

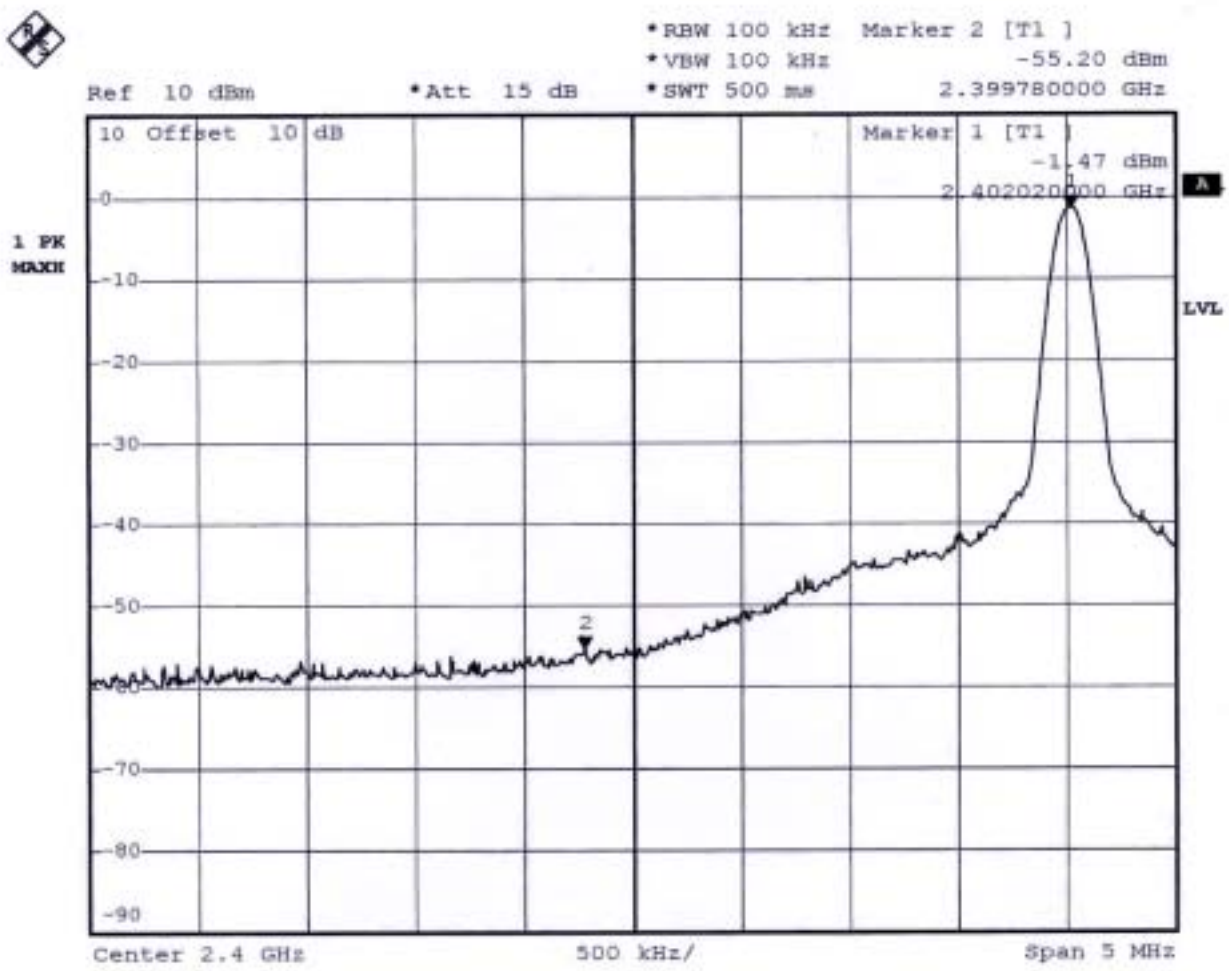
The band edge emission plot on page 30. shows 55.72dB delta between carrier maximum power and local maximum emission in the restricted band (2.4835GHz).

Polarity	The emission of carrier power strength (dBμV/m)	The maximum field strength in restrict band (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Result
H	90.41	34.69	74.00	-39.31	Peak	Pass
H	81.07	25.35	54.00	-28.65	Average	Pass
V	92.76	37.04	74.00	-36.96	Peak	Pass
V	88.22	32.50	54.00	-21.50	Average	Pass

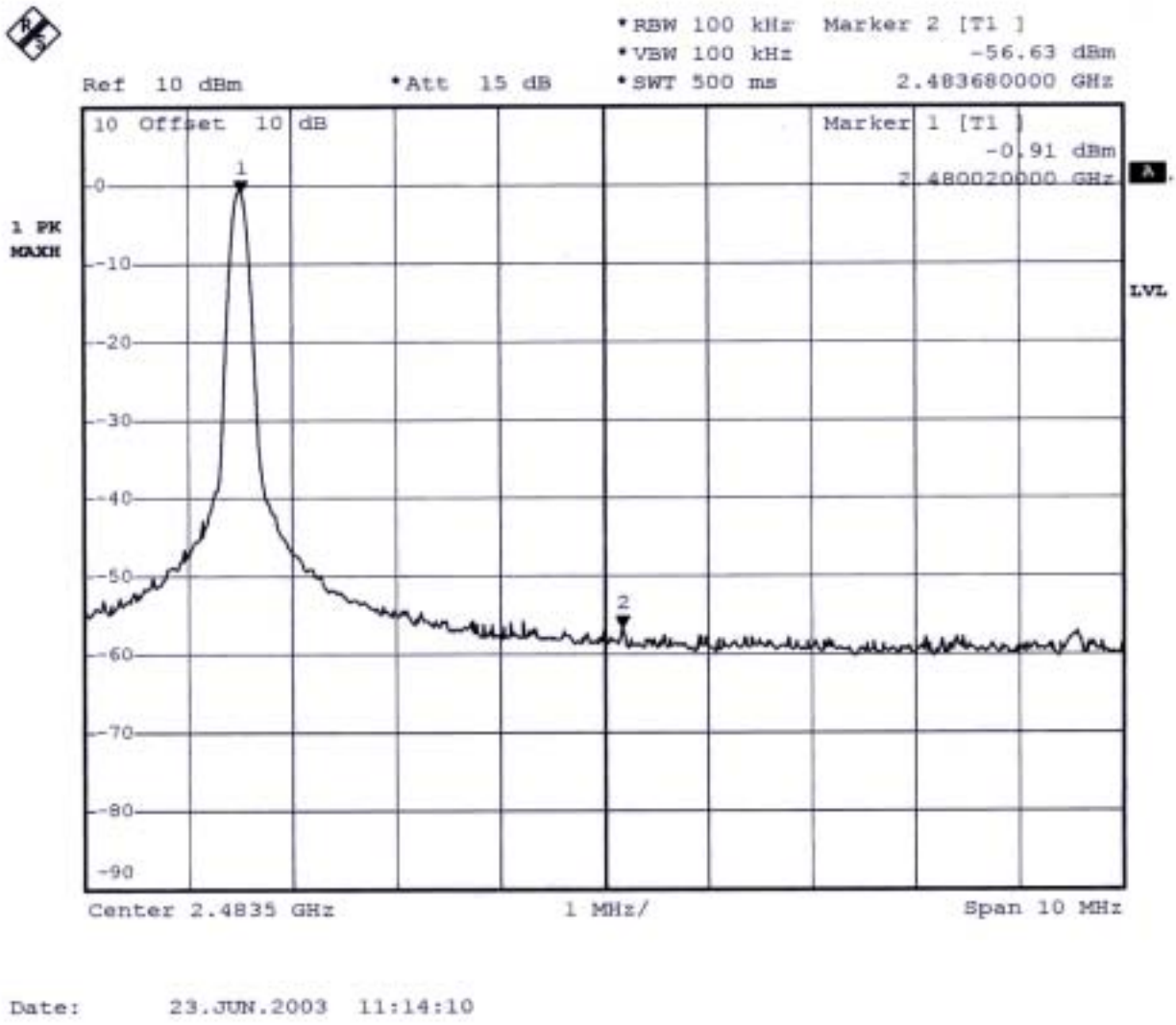
＊The maximum field strength in restricted band is the emission of carrier power strength subtract to the delta between carrier maximum power and local maximum emission in the restricted band.

The spectrum analyzer plots are attached as below：

Plot 1 (Channel 00)：



Plot 2 (Channel 78)：



Comments： All emissions in those 100kHz bandwidth are attenuated more than 20dB from carrier maximum power.

5.7.5. Test Configuration（EUT Operating Condition）：

The software provided by client to enable the EUT under transmission condition continuously at lowest, and highest channel frequencies respectively.

5.8. Test of Conducted Emission

Conducted Emissions were measured from 150 KHz to 30 MHz with a bandwidth of 9 KHz and return leads of the EUT according to the methods defined in ANSI C63.4-1992 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

5.8.1. Major Measuring Instruments：

● Test Receiver	(R&S ESCS 30)
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

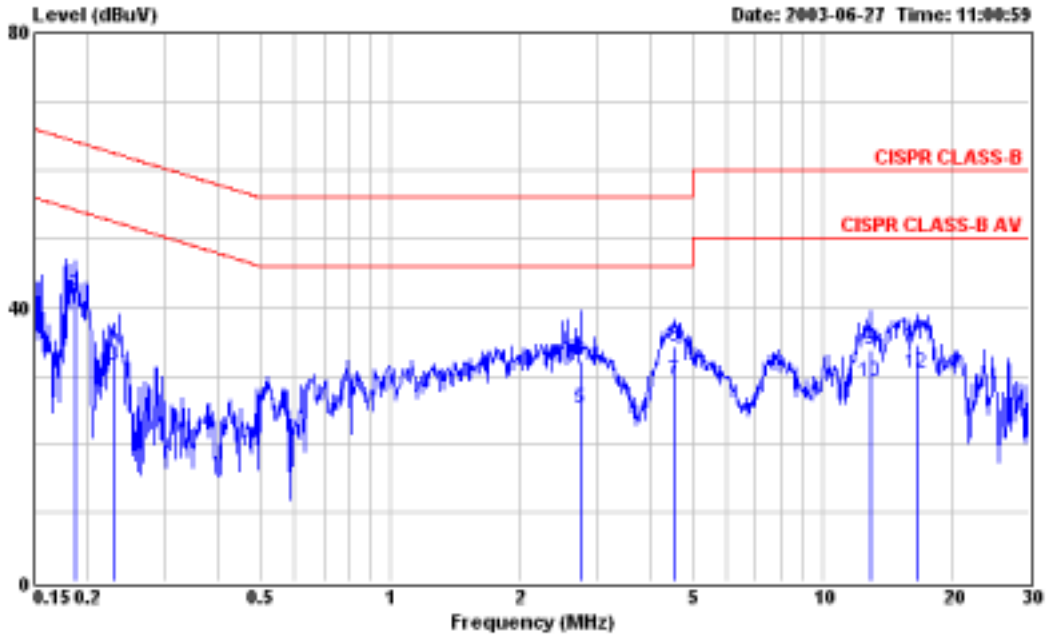
5.8.2. Test Procedures：

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 mains through a line impedance stabilization network (LISN).
c. All the support units are connect 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 Result of Conducted Emission：

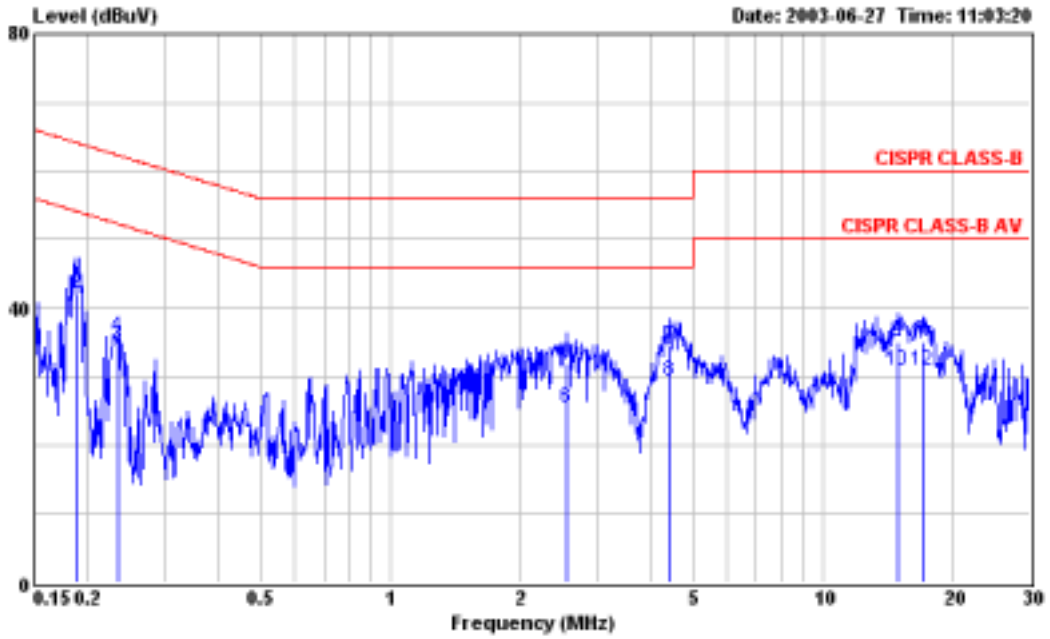
- Test Mode: Mode 1
- Frequency Range of Test: from 150KHz to 30 MHz
- 6dB Bandwidth: 9KHz
- Temperature: 25.9°C
- Relative Humidity: 56 %

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



Site : C001-HY
Condition : CISPR CLASS-B 2003 2001/008 LINE
EUT : Bluetooth USB Dongle Class II
Power : 110V/60Hz
Model :
Memo : TX CH00
Memo :

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.187	39.80	-14.37	54.17	39.65	0.10	0.05	Average
2	0.187	41.71	-22.46	64.17	41.56	0.10	0.05	QP
3	0.231	31.47	-20.96	52.43	31.33	0.10	0.04	Average
4	0.231	34.47	-27.96	62.43	34.33	0.10	0.04	QP
5	2.749	25.10	-20.90	46.00	24.94	0.10	0.06	Average
6	2.749	32.12	-23.88	56.00	31.96	0.10	0.06	QP
7	4.550	29.31	-16.69	46.00	29.08	0.11	0.12	Average
8	4.550	34.33	-21.67	56.00	34.10	0.11	0.12	QP
9	12.847	33.74	-26.26	60.00	33.24	0.20	0.30	QP
10	12.847	29.18	-20.82	50.00	28.68	0.20	0.30	Average
11	16.490	34.61	-25.39	60.00	34.02	0.23	0.36	QP
12	16.490	30.39	-19.61	50.00	29.80	0.23	0.36	Average



Site : C001-HY
Condition : CISPR CLASS-B 2003 2001/008 NEUTRAL
EUT : Bluetooth USB Dongle Class II
Power : 110V/60Hz
Model :
Memo : TX CH00
Memo :

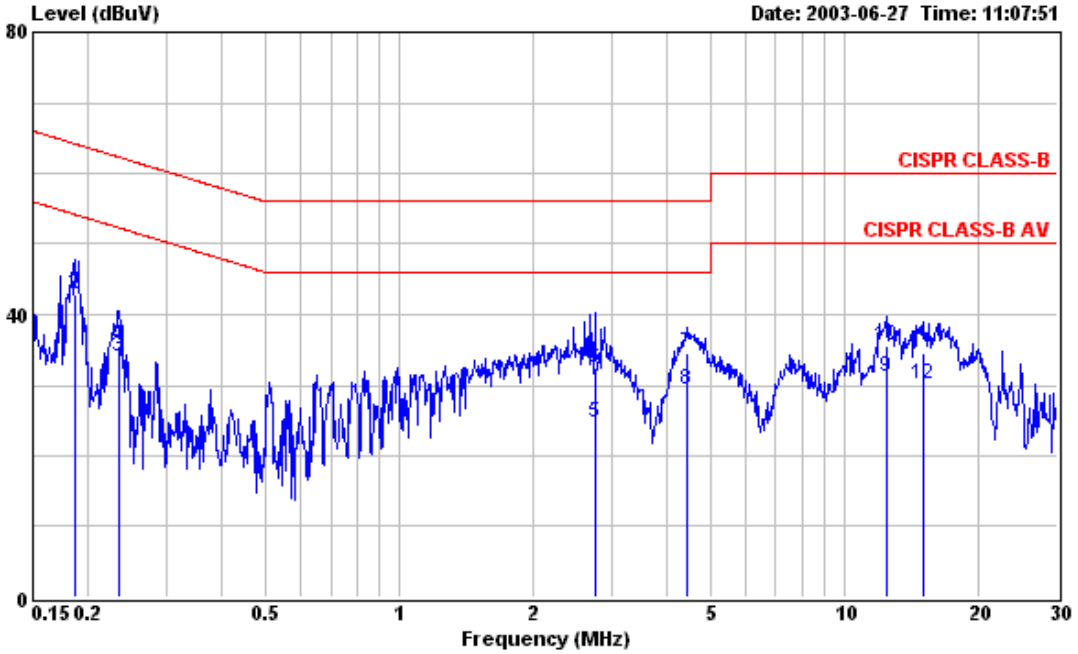
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.180	40.97	-13.17	54.14	40.82	0.10	0.05	Average
2	0.188	42.09	-22.05	64.14	41.94	0.10	0.05	QP
3	0.234	34.52	-17.79	52.31	34.38	0.10	0.04	Average
4	0.234	35.03	-26.48	62.31	35.69	0.10	0.04	QP
5	2.540	32.04	-23.96	56.00	31.86	0.13	0.05	QP
6	2.540	25.41	-20.59	46.00	25.23	0.13	0.05	Average
7	4.410	34.59	-21.41	56.00	34.28	0.20	0.11	QP
8	4.410	29.23	-16.77	46.00	28.92	0.20	0.11	Average
9	14.910	35.15	-24.85	60.00	34.51	0.30	0.34	QP
10	14.910	30.90	-19.10	50.00	30.26	0.30	0.34	Average
11	16.930	35.17	-24.83	60.00	34.51	0.30	0.36	QP
12	16.930	30.85	-19.15	50.00	30.19	0.30	0.36	Average

Test Engineer: _____

John Huang

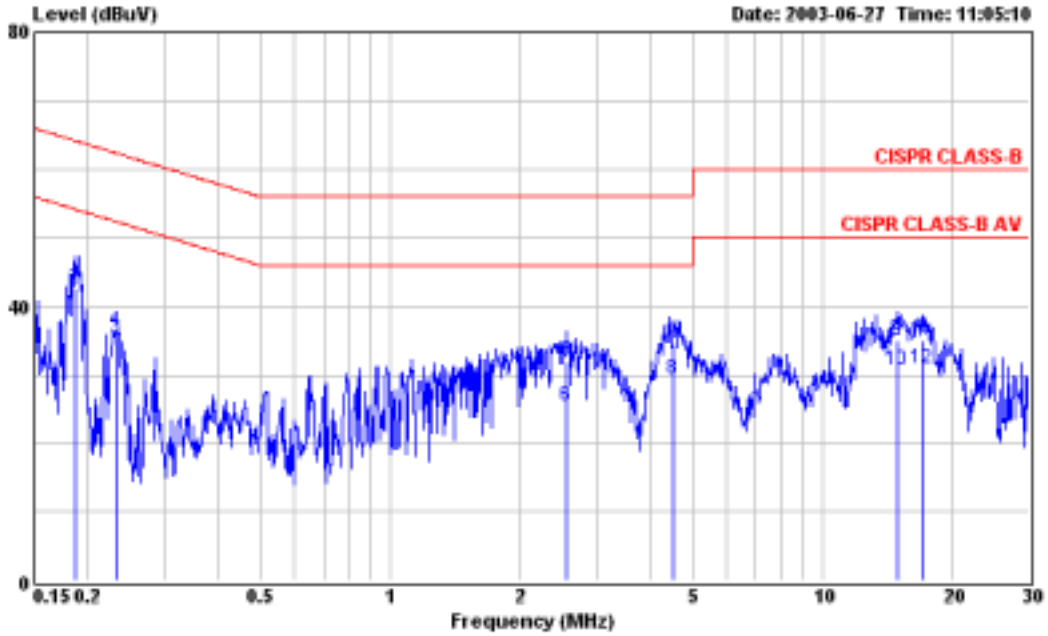
- Test Mode: Mode 2
- Frequency Range of Test: from 150KHz to 30 MHz
- 6dB Bandwidth: 9KHz
- Temperature: 25.9°C
- Relative Humidity: 56 %

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




```
Site      : C001-HY
Condition : CISPR CLASS-B 2003 2001/008 LINE
EUT       : Bluetooth USB Dongle Class II
Power     : 110V/60Hz
Model     :
Memo      : TX CH39
Memo      :
```

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.187	41.75	-12.42	54.17	41.60	0.10	0.05	Average
2	0.187	42.81	-21.36	64.17	42.66	0.10	0.05	QP
3	0.234	34.09	-18.22	52.31	33.95	0.10	0.04	Average
4	0.234	35.63	-26.68	62.31	35.49	0.10	0.04	QP
5	2.750	24.56	-21.44	46.00	24.40	0.10	0.06	Average
6	2.750	32.36	-23.64	56.00	32.20	0.10	0.06	QP
7	4.410	34.49	-21.51	56.00	34.27	0.11	0.11	QP
8	4.410	29.39	-16.61	46.00	29.17	0.11	0.11	Average
9	12.450	31.08	-18.92	50.00	30.59	0.20	0.29	Average
10	12.450	35.59	-24.41	60.00	35.10	0.20	0.29	QP
11	14.990	34.45	-25.55	60.00	33.91	0.20	0.34	QP
12	14.990	30.09	-19.91	50.00	29.55	0.20	0.34	Average



Site : C001-HY
Condition : CISPR CLASS-B 2003 2001/008 NEUTRAL
EUT : Bluetooth USB Dongle Class II
Power : 110V/60Hz
Model :
Memo : TX CH39
Memo :

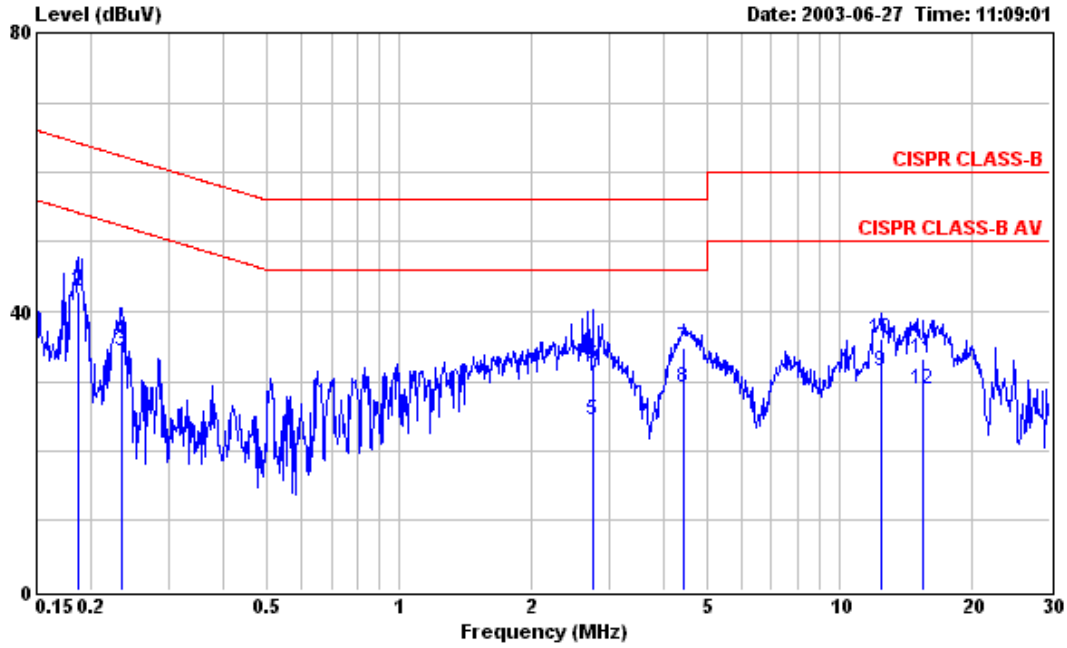
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.186	41.90	-12.29	54.19	41.75	0.10	0.05	Average
2	0.186	42.53	-21.66	64.19	42.38	0.10	0.05	QP
3	0.233	35.33	-17.02	52.35	35.19	0.10	0.04	Average
4	0.233	36.26	-26.09	62.35	36.12	0.10	0.04	QP
5	2.540	31.94	-24.06	56.00	31.76	0.13	0.05	QP
6	2.540	25.41	-20.59	46.00	25.23	0.13	0.05	Average
7	4.500	34.60	-21.40	56.00	34.28	0.20	0.12	QP
8	4.500	29.46	-16.54	46.00	29.14	0.20	0.12	Average
9	14.910	35.05	-24.95	60.00	34.41	0.30	0.34	QP
10	14.910	30.69	-19.31	50.00	30.05	0.30	0.34	Average
11	16.930	35.05	-24.95	60.00	34.39	0.30	0.36	QP
12	16.930	30.85	-19.15	50.00	30.19	0.30	0.36	Average

Test Engineer: _____

John Huang

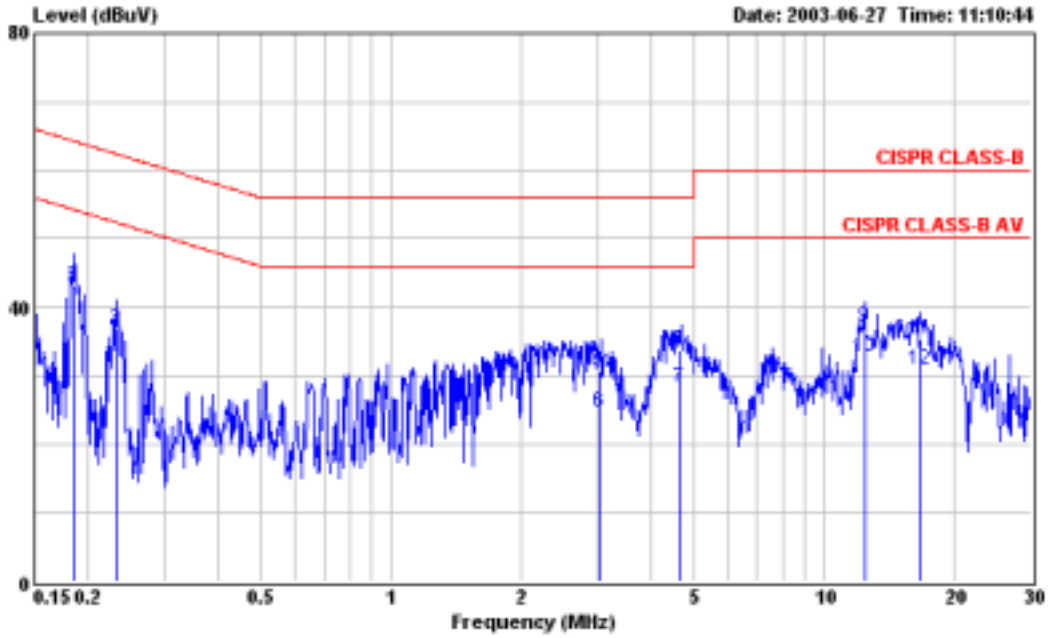
- Test Mode: Mode 3
- Frequency Range of Test: from 150KHz to 30 MHz
- 6dB Bandwidth: 9KHz
- Temperature: 25.9°C
- Relative Humidity: 56 %

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




```
Site      : C001-HY
Condition : CISPR CLASS-B 2003 2001/008 LINE
EUT       : Bluetooth USB Dongle Class II
Power     : 110V/60Hz
Model     :
Memo      : TX CH78
Memo      :
```

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.187	41.90	-12.27	54.17	41.75	0.10	0.05	Average
2	0.187	42.87	-21.30	64.17	42.72	0.10	0.05	QP
3	0.234	34.26	-18.05	52.31	34.12	0.10	0.04	Average
4	0.234	35.79	-26.52	62.31	35.65	0.10	0.04	QP
5	2.750	24.42	-21.58	46.00	24.26	0.10	0.06	Average
6	2.750	32.36	-23.64	56.00	32.20	0.10	0.06	QP
7	4.410	34.71	-21.29	56.00	34.49	0.11	0.11	QP
8	4.410	29.15	-16.85	46.00	28.93	0.11	0.11	Average
9	12.450	31.40	-18.60	50.00	30.91	0.20	0.29	Average
10	12.450	36.22	-23.78	60.00	35.73	0.20	0.29	QP
11	15.470	33.27	-26.73	60.00	32.71	0.21	0.35	QP
12	15.470	28.88	-21.12	50.00	28.32	0.21	0.35	Average



Site : C001-HY
Condition : CISPR CLASS-B 2003 2001/008 NEUTRAL
EUT : Bluetooth USB Dongle Class II
Power : 110V/60Hz
Model :
Memo : TX CH78
Memo :

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.185	42.55	-11.71	54.26	42.40	0.10	0.05	Average
2	0.185	43.08	-21.18	64.26	42.93	0.10	0.05	QP
3	0.233	36.87	-25.47	62.34	36.73	0.10	0.04	QP
4	0.233	36.08	-16.26	52.34	35.94	0.10	0.04	Average
5	3.040	30.64	-25.36	56.00	30.41	0.16	0.07	QP
6	3.040	24.76	-21.24	46.00	24.53	0.16	0.07	Average
7	4.620	28.21	-17.79	46.00	27.89	0.20	0.12	Average
8	4.620	33.70	-22.30	56.00	33.38	0.20	0.12	QP
9	12.400	37.03	-22.97	60.00	36.49	0.25	0.29	QP
10	12.400	32.62	-17.38	50.00	32.08	0.25	0.29	Average
11	16.660	35.29	-24.71	60.00	34.63	0.30	0.36	QP
12	16.660	30.97	-19.03	50.00	30.31	0.30	0.36	Average

Test Engineer: _____

John Huang

5.9. Test of Radiated Emission

Radiated emissions from 30 MHz to 24.8 GHz were measured according to the methods defines in ANSI C63.4-1992. The EUT was placed on a nonmetallic stand, 0.8 meter above the ground plane, as shown in section 4.6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions

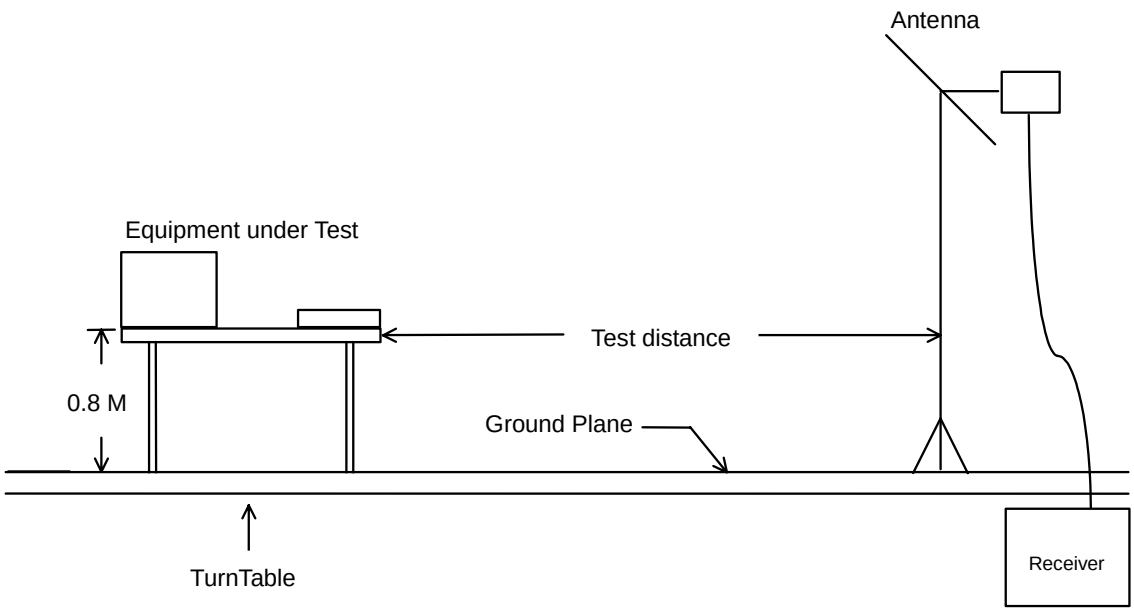
5.9.1. Major Measuring Instruments

● Amplifier	(MITEQ AFS44)
RF Gain	40 dB
Signal Input	100 MHz to 26.5 GHz
● Amplifier	(HP 8447D)
RF Gain	30 dB
Signal Input	100 KHz to 1.3 GHz
● Spectrum analyzer	(R&S FSP40)
Attenuation	10 dB
Start Frequency	1 GHz
Stop Frequency	24 GHz
Resolution Bandwidth	1 MHz
Video Bandwidth	1 MHz
Signal Input	9 KHz to 40 GHz
● Test Receiver	(SCHAFFNER SCR3501)
Resolution Bandwidth	120 KHz
Frequency Band	9 K – 1 GHz
Quasi-Peak Detector	ON for Quasi-Peak Mode
	OFF for Peak Mode

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 both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
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 turn table (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. 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 which do not have 3 dB margin 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 peak 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

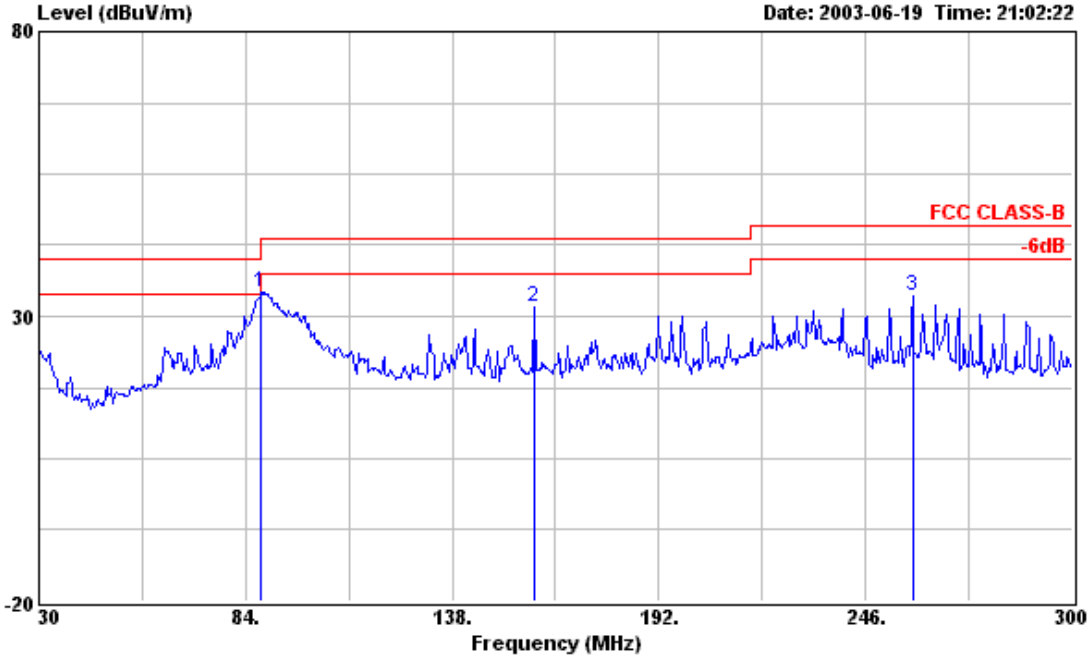


5.9.4. Test Result of Radiated Emission

- Test Mode: Mode 1
- Test Distance: 3 M
- Temperature: 26 °C
- Relative Humidity: 72 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

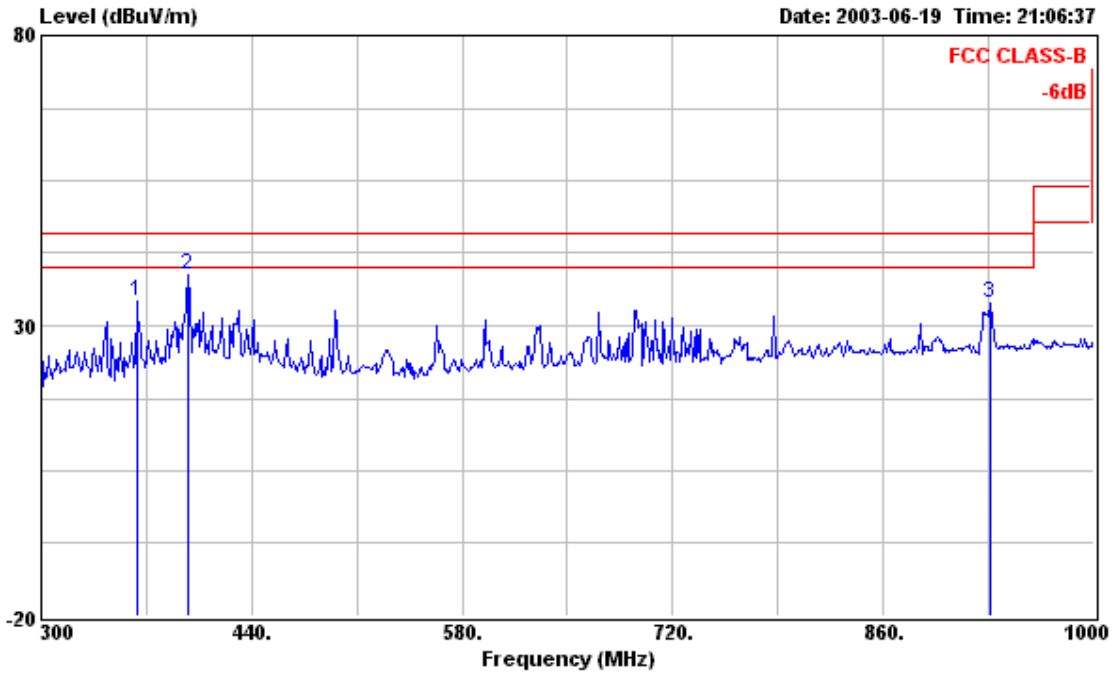
■ The test was passed at the minimum margin that marked by the frame in the following test record

■ Spurious Emission



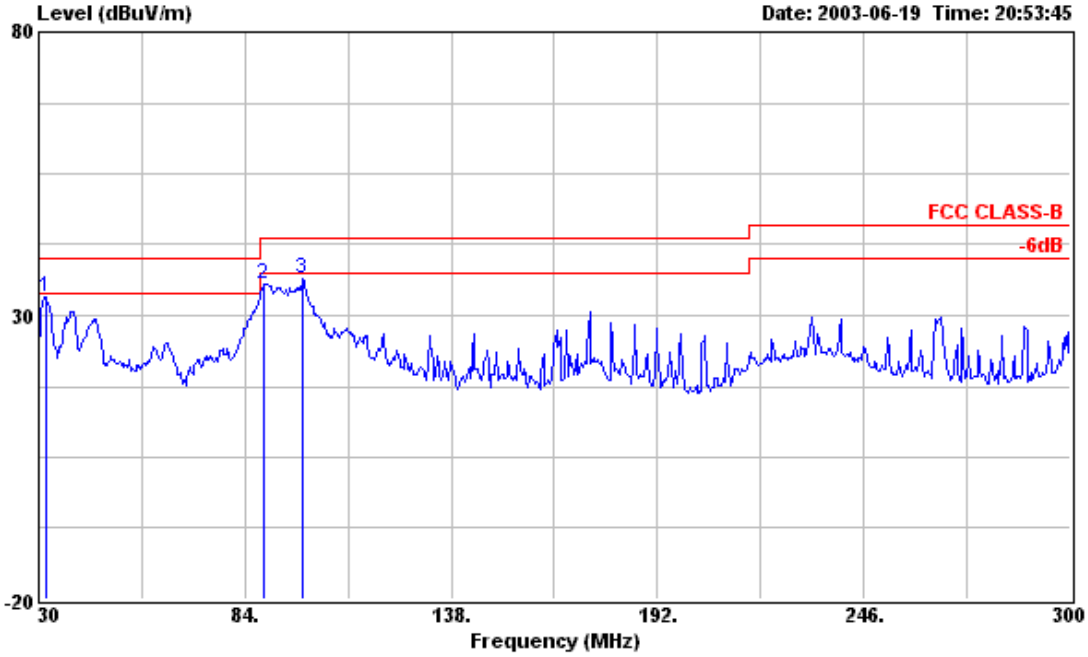

```
Site      : 03CH03-HY
Condition : 3m 03CH03-MAT HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH00 2402MHz
          : F361801
```

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	88.050	34.25	-9.25	43.50	51.07	8.39	1.81	27.02	Peak	---	---
2	159.330	31.55	-11.95	43.50	47.73	8.16	2.42	26.76	Peak	---	---
3	258.420	33.44	-12.56	46.00	45.13	11.69	3.22	26.60	Peak	---	---



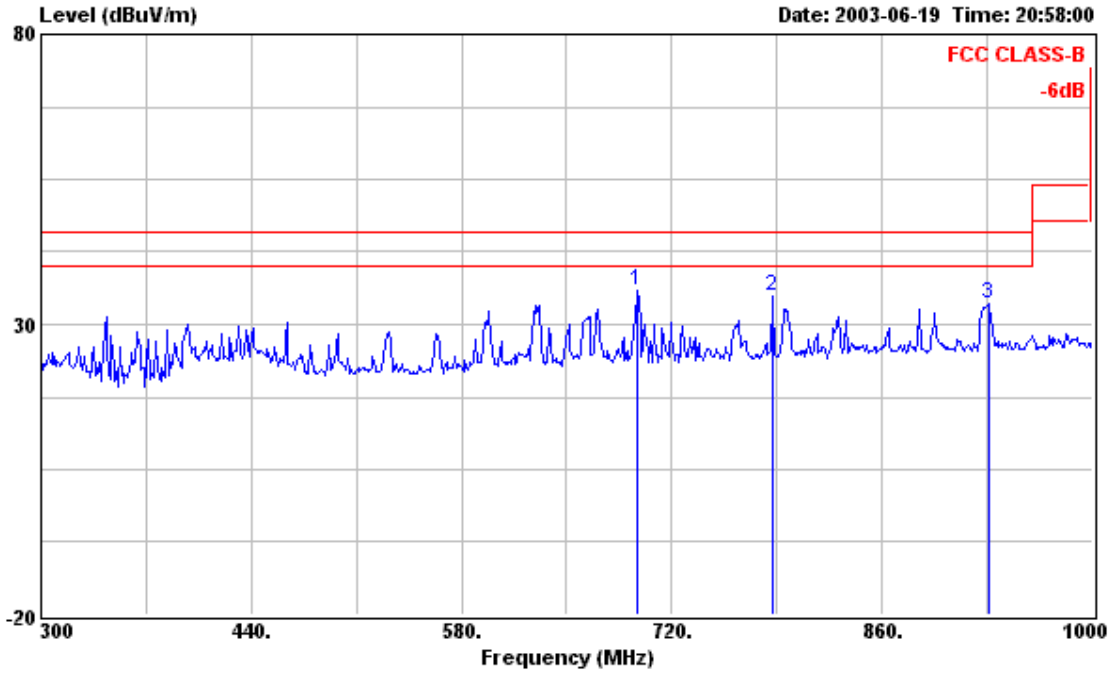
Site : 03CH03-HY
Condition : 3m 03CH03-MAT HORIZONTAL
EUT : Bluetooth USB Dongle Class 11
Power : 110V/60Hz
MODEL :
MEMO : TX CH0 2402MHz
: F361801

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	363.700	34.10	-11.90	46.00	43.61	13.46	4.01	26.98	Peak	---	---
2	397.300	38.77	-7.23	46.00	47.34	14.54	4.07	27.18	Peak	---	---
3	931.400	33.77	-12.23	46.00	34.93	19.52	7.03	27.71	Peak	---	---



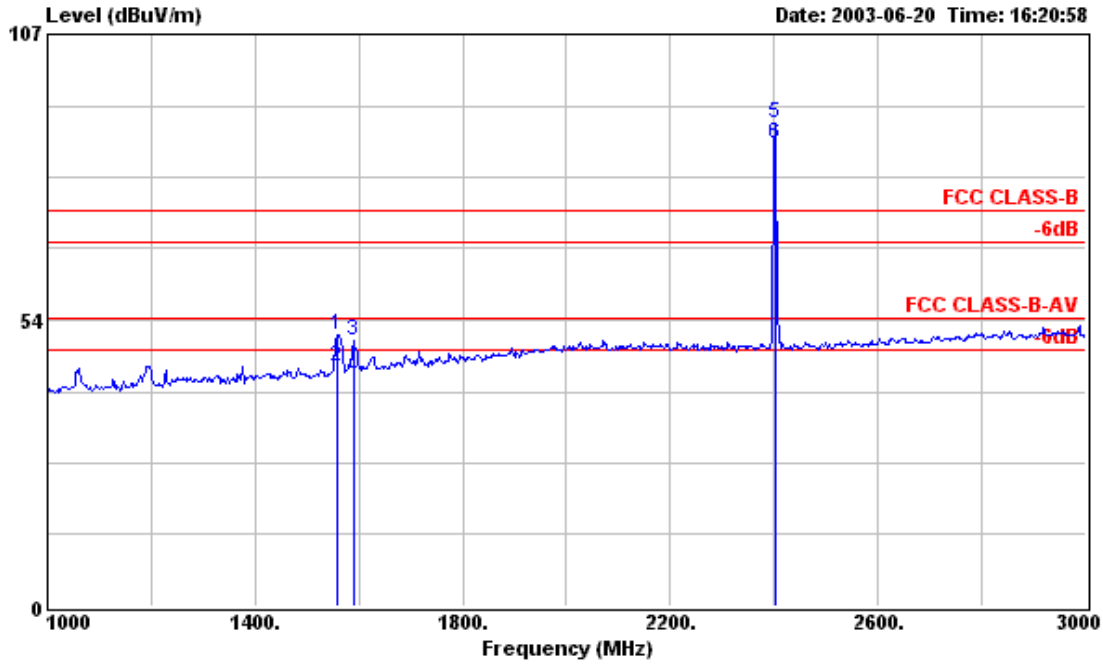
Site : 03CH03-HY
Condition : 3m 03CH03-MAT VERTICAL
EUT : Bluetooth USB Dongle Class 11
Power : 110V/60Hz
MODEL :
MEMO : TX CH00 2402MHz
: F361801

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	31.890	33.40	-6.60	40.00	45.17	14.29	1.04	27.10	Peak	100	45
2	89.130	35.56	-7.94	43.50	52.02	8.74	1.82	27.02	Peak	---	---
3	98.850	36.39	-7.11	43.50	52.21	9.29	1.89	27.00	Peak	---	---



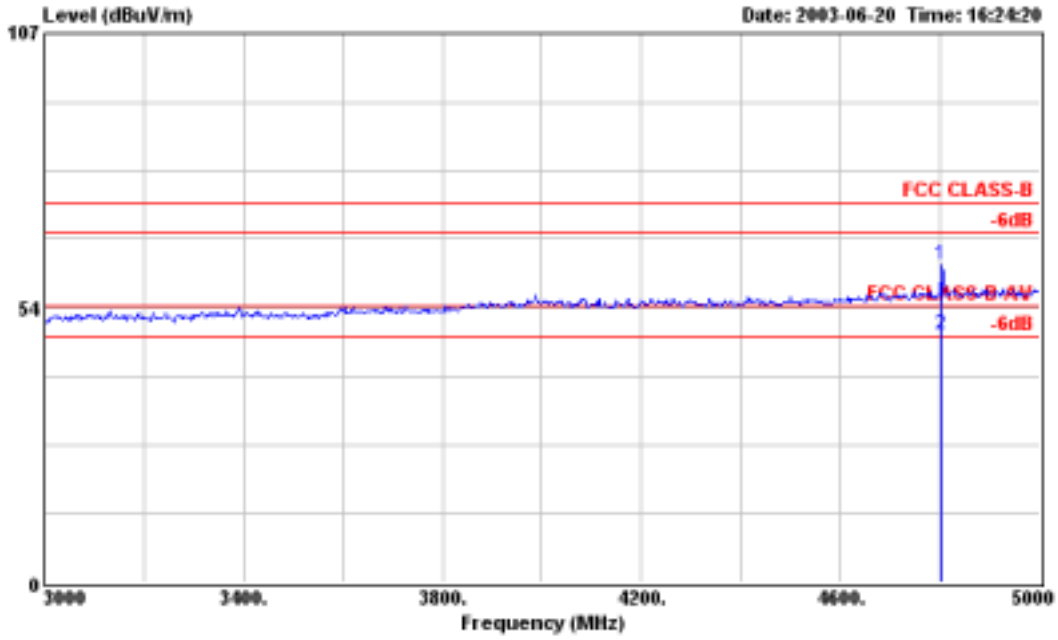
Site : 03CH03-HY
Condition : 3m 03CH03-MAT VERTICAL
EUT : Bluetooth USB Dongle Class 11
Power : 110V/60Hz
MODEL :
MEMO : TX CH00 2402MHz
: F361801

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	696.900	35.96	-10.04	46.00	40.05	17.98	5.93	28.00	Peak	---	---
2	786.500	34.74	-11.26	46.00	37.72	18.68	6.34	28.00	Peak	---	---
3	931.400	33.47	-12.53	46.00	34.63	19.52	7.03	27.71	Peak	---	---

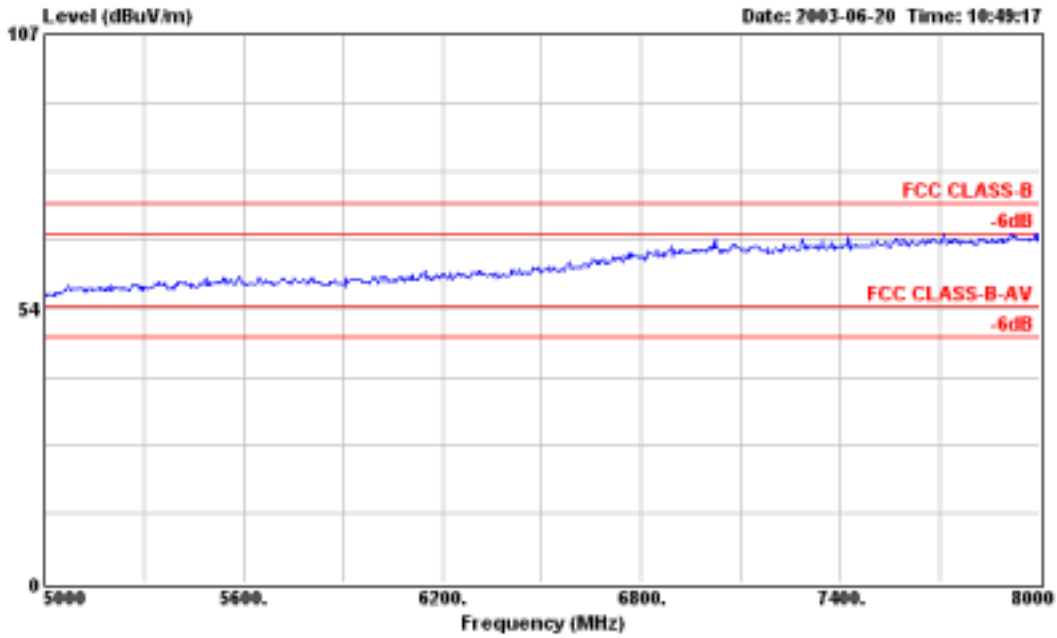


Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT : Bluetooth USB Dongle Class 11
Power : 110V/60Hz
MODEL :
MEMO : TX CH00 2402MHz
: F361801

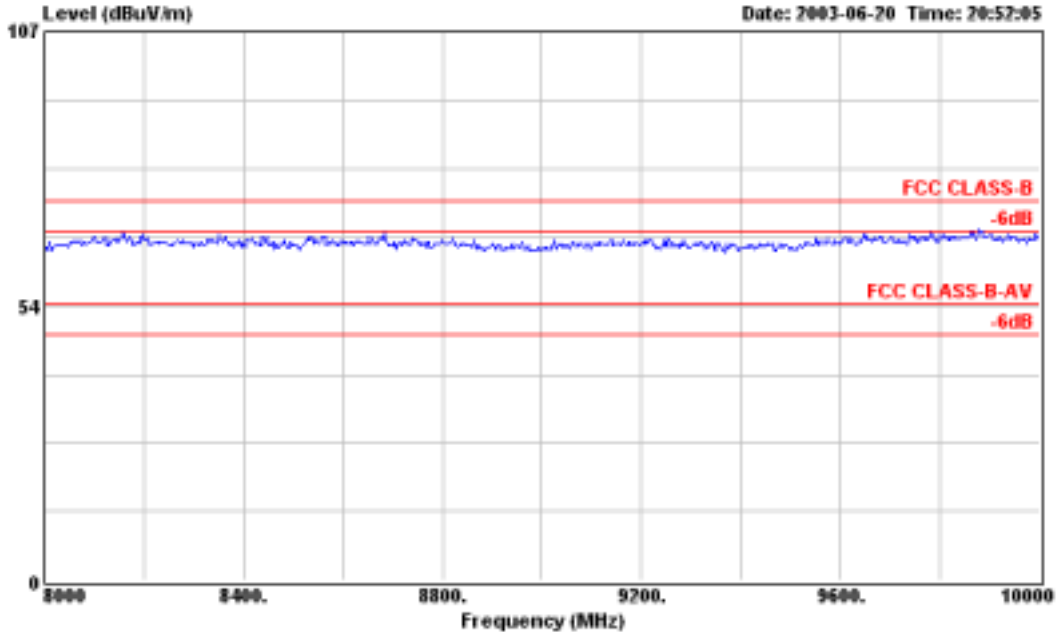
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1558.000	50.83	-23.17	74.00	57.21	27.34	4.82	38.54	Peak	---	---
2	1558.000	44.81	-9.19	54.00	51.19	27.34	4.82	38.54	Average	---	---
3	1590.000	49.70	-24.30	74.00	55.79	27.58	4.88	38.55	Peak	---	---
4	1590.000	42.65	-31.35	74.00	48.74	27.58	4.88	38.55	Peak	---	---



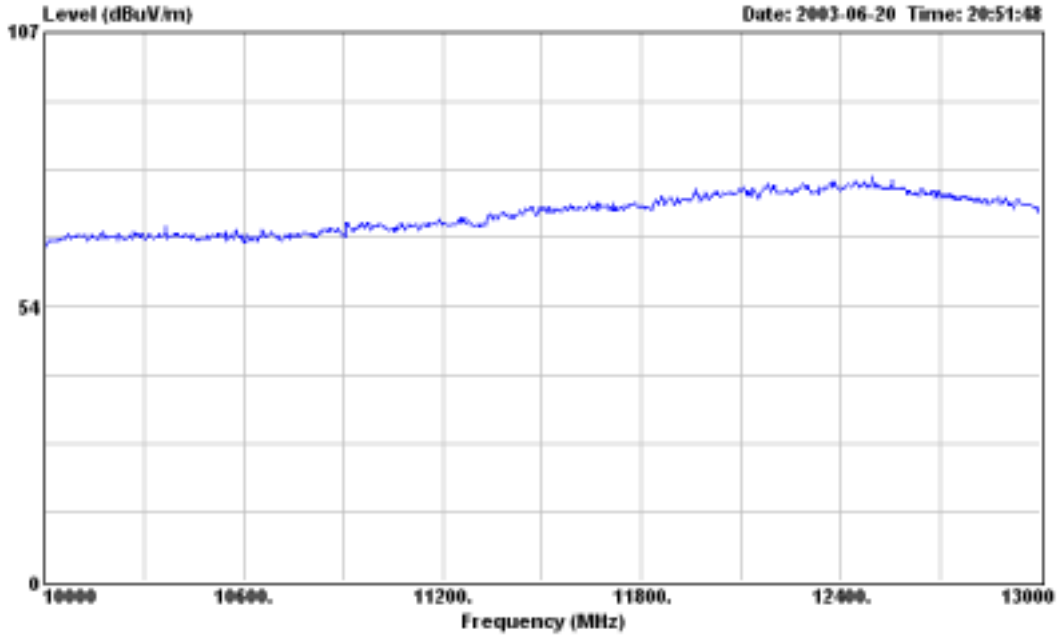

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH00 2402MHz
          : F361801
```



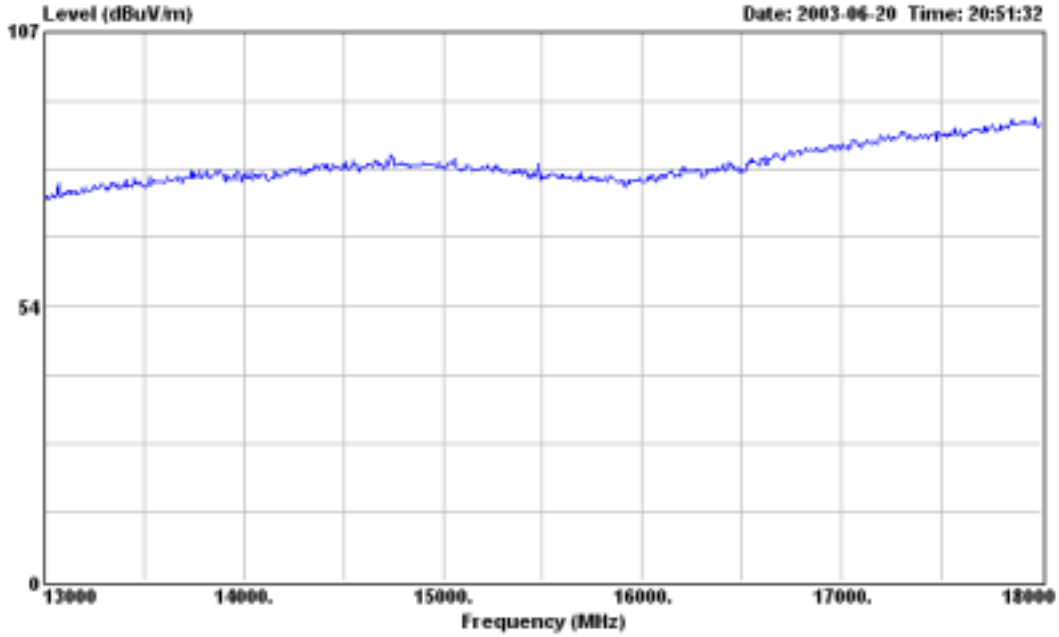

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH00 2402MHz
          : F361801
```



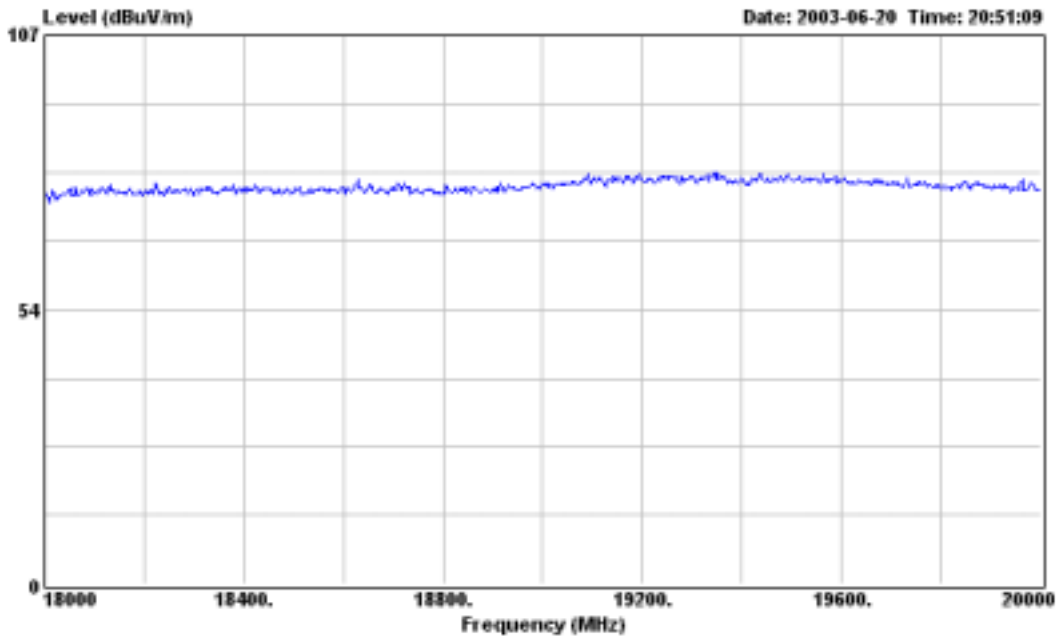

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH00 2402MHz
          : F361801
```



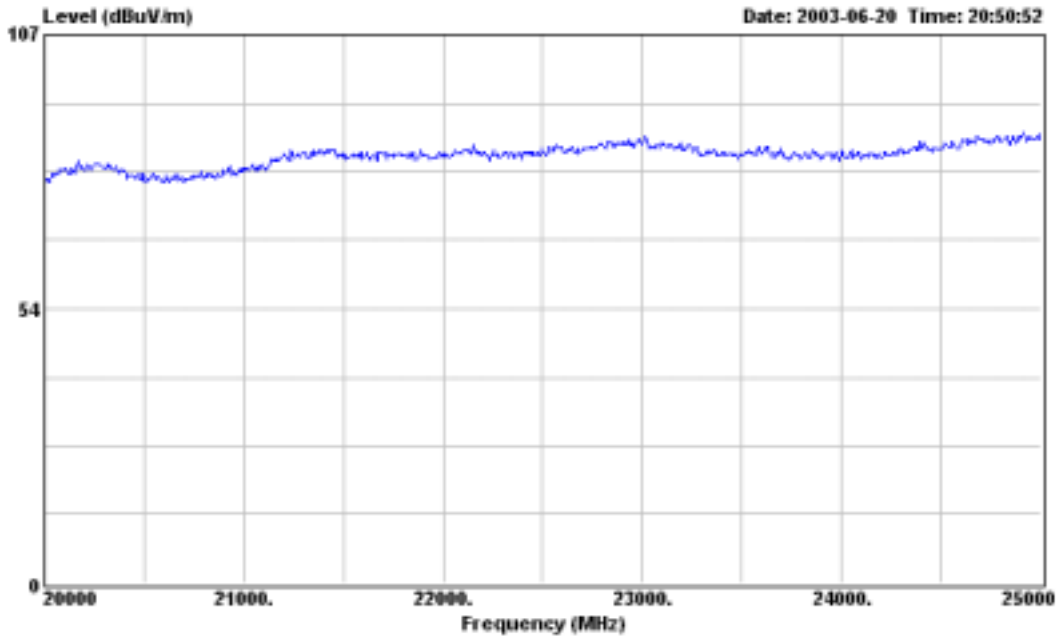

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH00 2402MHz
          : F361801
```



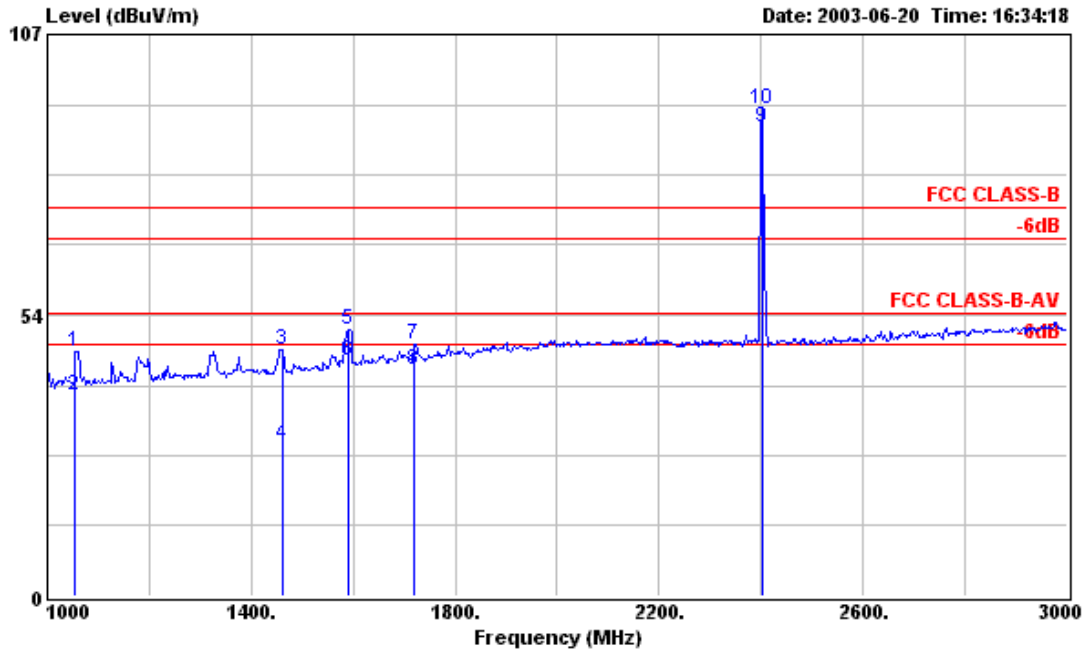

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH00 2402MHz
          : F361801
```




```
Site      : 03CH03-HY
Condition : 3m 40G-HORN-02/12/21 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH00 2402MHz
          : F361801
```

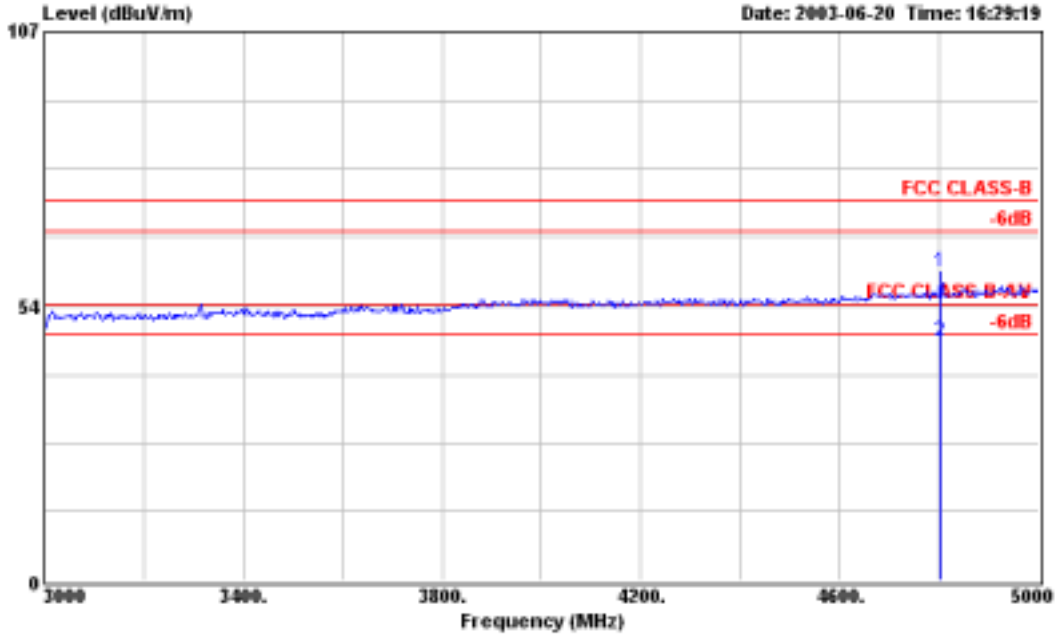



```
Site      : 03CH03-HY
Condition : 3m 40G-HORN-02/12/21 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH00 2402MHz
          : F361801
```

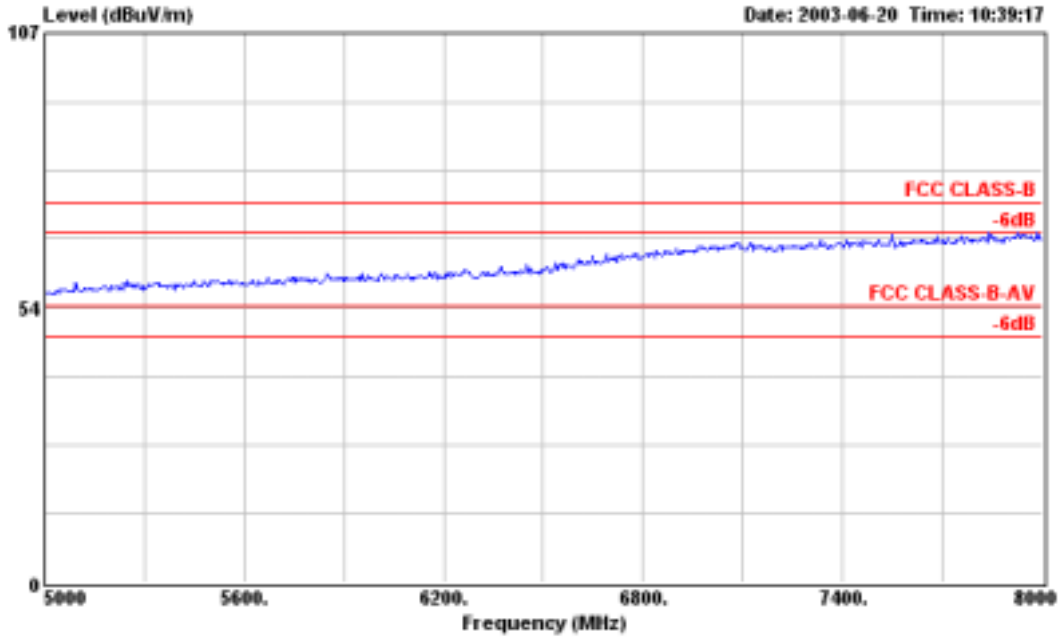


Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT : Bluetooth USB Dongle Class 11
Power : 110V/60Hz
MODEL :
MEMO : TX CH00 2402MHz
: F361801

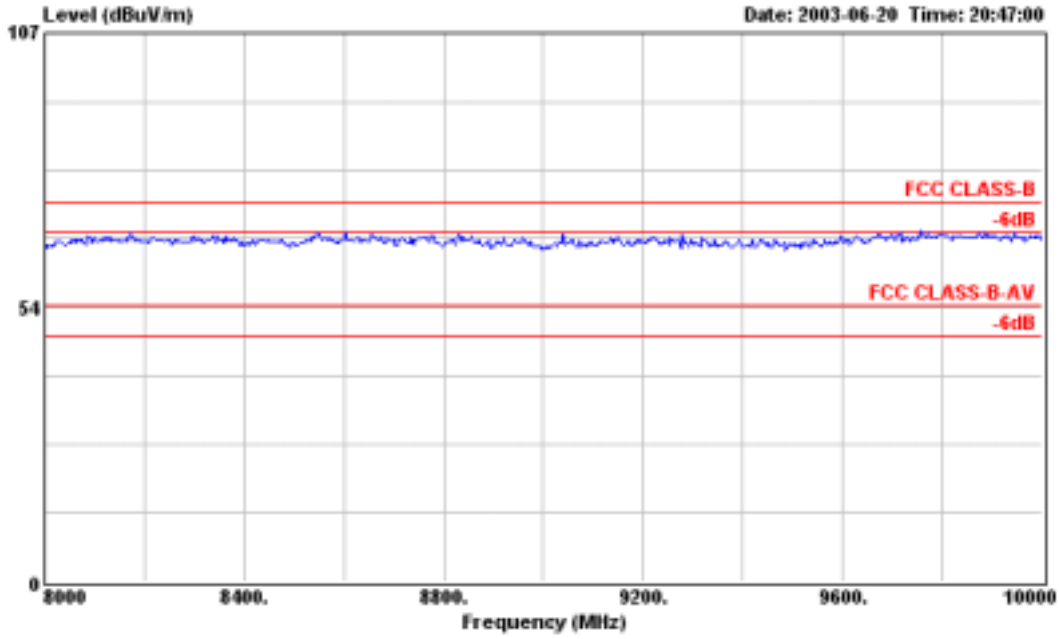
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1054.000	46.67	-27.33	74.00	55.96	25.05	4.02	38.36	Peak	---	---
2	1054.000	38.34	-35.66	74.00	47.63	25.05	4.02	38.36	Peak	---	---
3	1460.000	47.03	-26.97	74.00	54.20	26.70	4.64	38.51	Peak	---	---
4	1460.000	28.96	-45.04	74.00	36.13	26.70	4.64	38.51	Peak	---	---
5	1590.000	50.89	-23.11	74.00	56.98	27.58	4.88	38.55	Peak	---	---
6	1590.000	44.78	-29.22	74.00	50.87	27.58	4.88	38.55	Peak	---	---
7	1718.000	47.90	-26.10	74.00	52.81	28.53	5.14	38.58	Peak	---	---
8	1718.000	42.95	-31.05	74.00	47.86	28.53	5.14	38.58	Peak	---	---



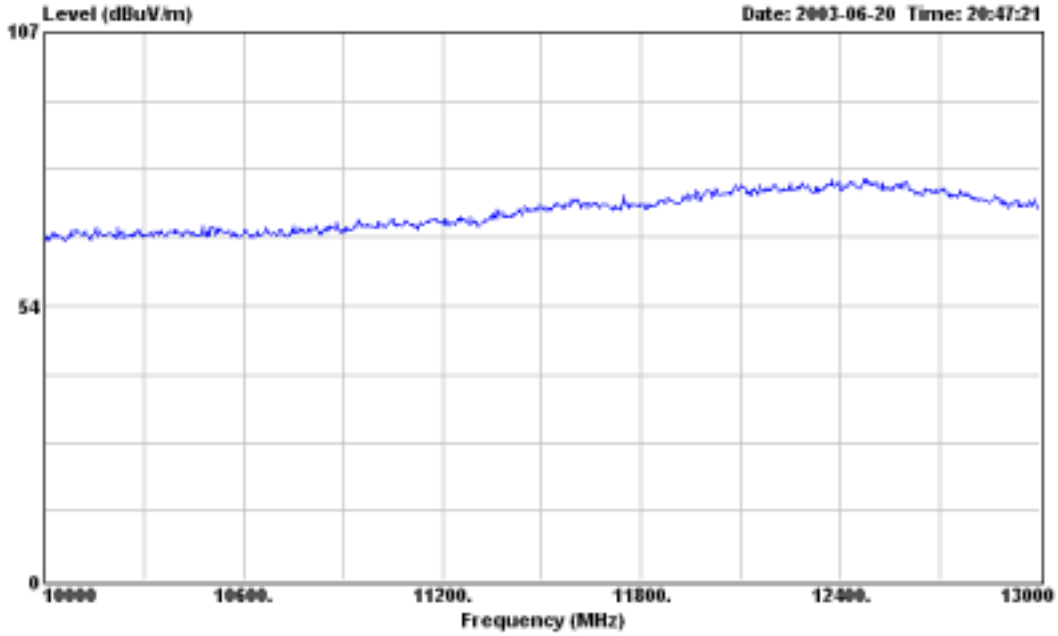

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH00 2402MHz
          : F361801
```



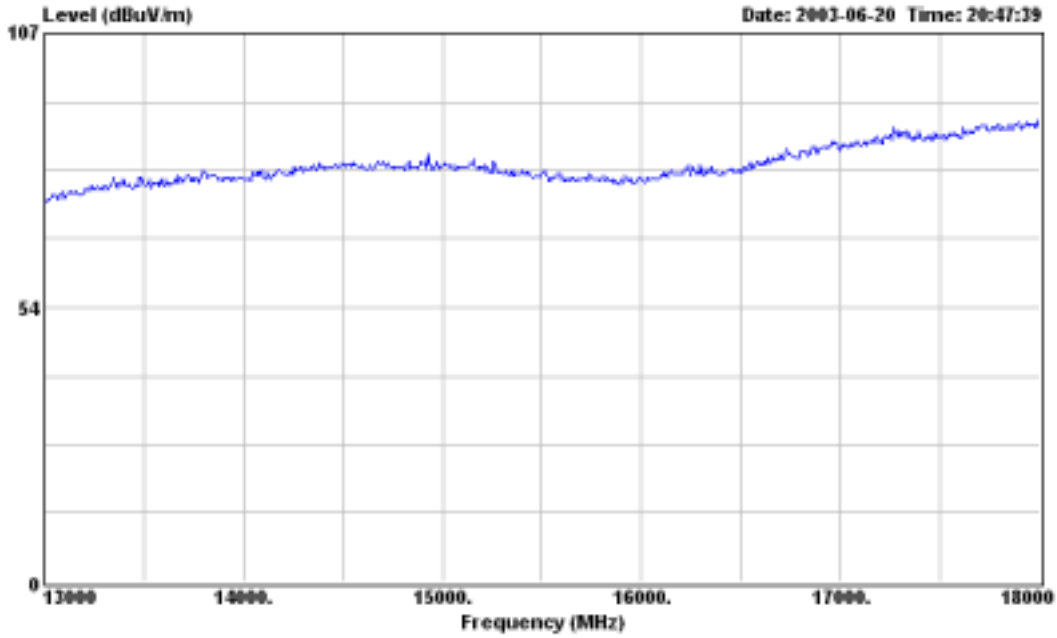

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH00 2402MHz
          : F361801
```



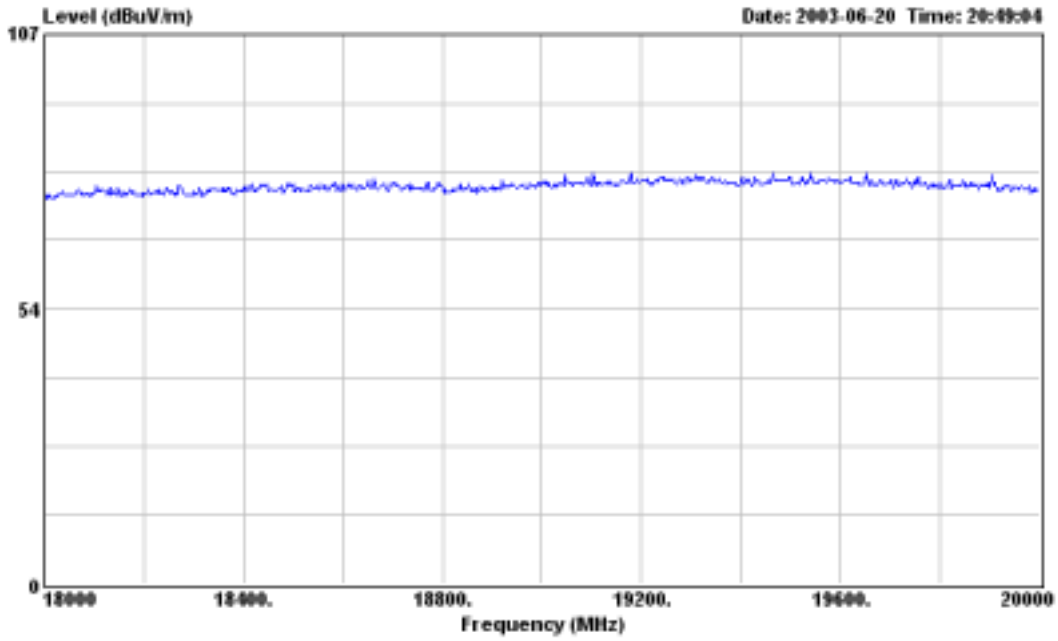

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH00 2402MHz
          : F361801
```



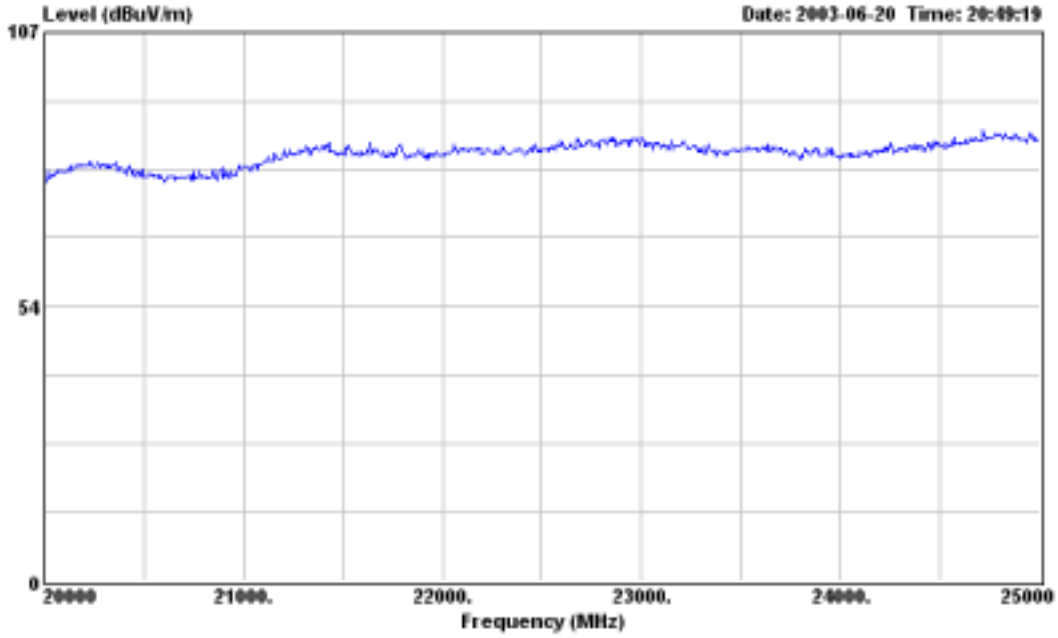

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH00 2402MHz
          : F361801
```




```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH00 2402MHz
          : F361801
```




```
Site      : 03CH03-HY
Condition : 3m 40G-HORN-02/12/21 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH00 2402MHz
          : F361801
```




```
Site      : 03CH03-HY
Condition : 3m 40G-HORN-02/12/21 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH00 2402MHz
          : F361801
```

■ Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Limits (uV/m)	Emission (dBuV/m)	Level (uV/m)	Margin (dB)	Detect Mode
2404.000	H	30.19	6.21	54.03	-	-	90.43	33227.68		Peak
2404.000	H	30.19	6.21	50.12	-	-	86.52	21183.61		A.V.
4804.000	H	33.21	9.05	19.57	74.00	5011.87	61.83	1234.53	-12.17	Peak
4804.000	H	33.21	9.05	5.89	54.00	501.19	48.15	255.56	-5.85	A.V.
2404.000	V	30.19	6.21	52.75	-	-	89.15	28674.77		A.V.
2404.000	V	30.19	6.21	56.52	-	-	92.92	44258.84		Peak
4804.000	V	33.21	9.05	17.71	74.00	5011.87	59.97	996.55	-14.03	Peak
4804.000	V	33.21	9.05	4.19	54.00	501.19	46.45	210.14	-7.55	A.V.
7206.000	V/H						-			Peak, A.V.
9608.000	V/H						-			Peak, A.V.
12010.000	V/H						-			Peak, A.V.
14412.000	V/H						-			Peak, A.V.
16814.000	V/H						-			Peak, A.V.
19216.000	V/H						-			Peak, A.V.
21618.000	V/H						-			Peak, A.V.
24020.000	V/H						-			Peak, A.V.

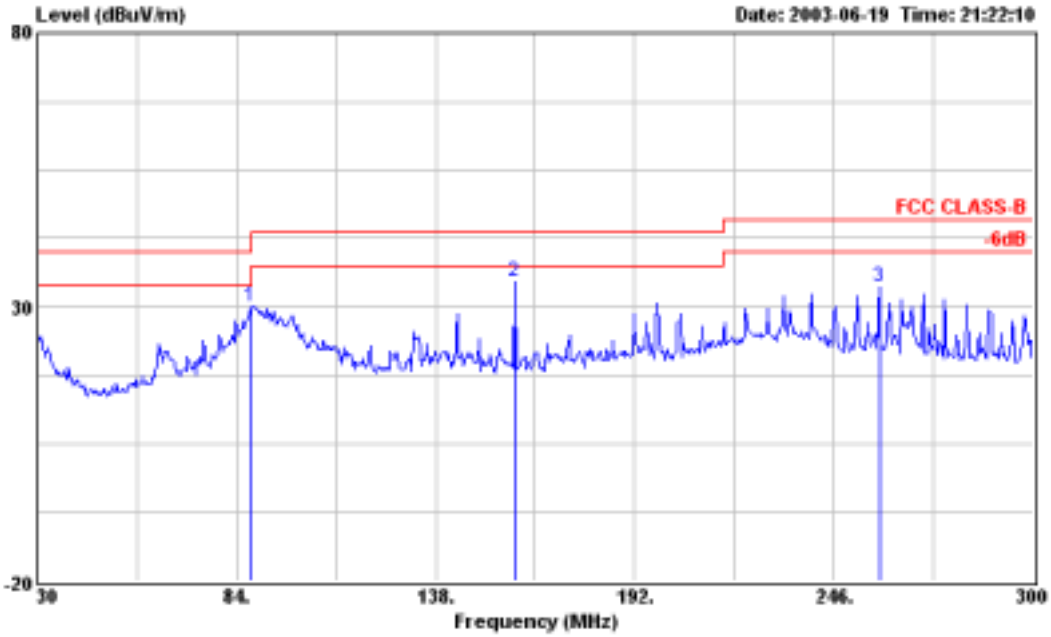
Remark: The emission emitted by the EUT is too low to be measured except the emission listed above

Test Engineer: Jay
Jay Zhong

- Test Mode: Mode 2
- Test Distance: 3 M
- Temperature: 26 °C
- Relative Humidity: 72 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

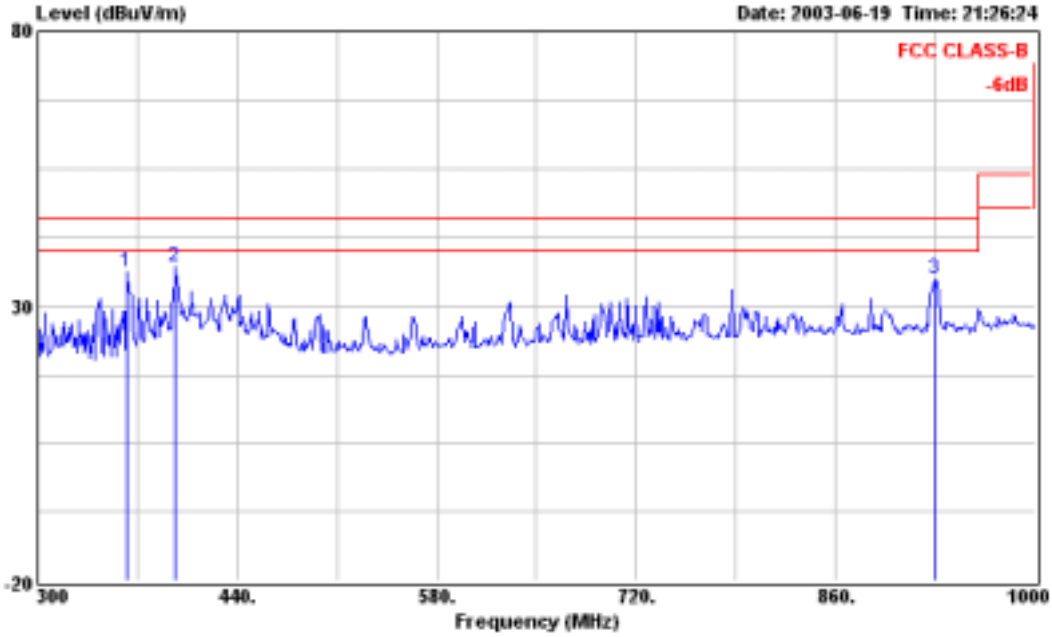
■ **The test was passed at the minimum margin that marked by the frame in the following test record**

■ Spurious Emission



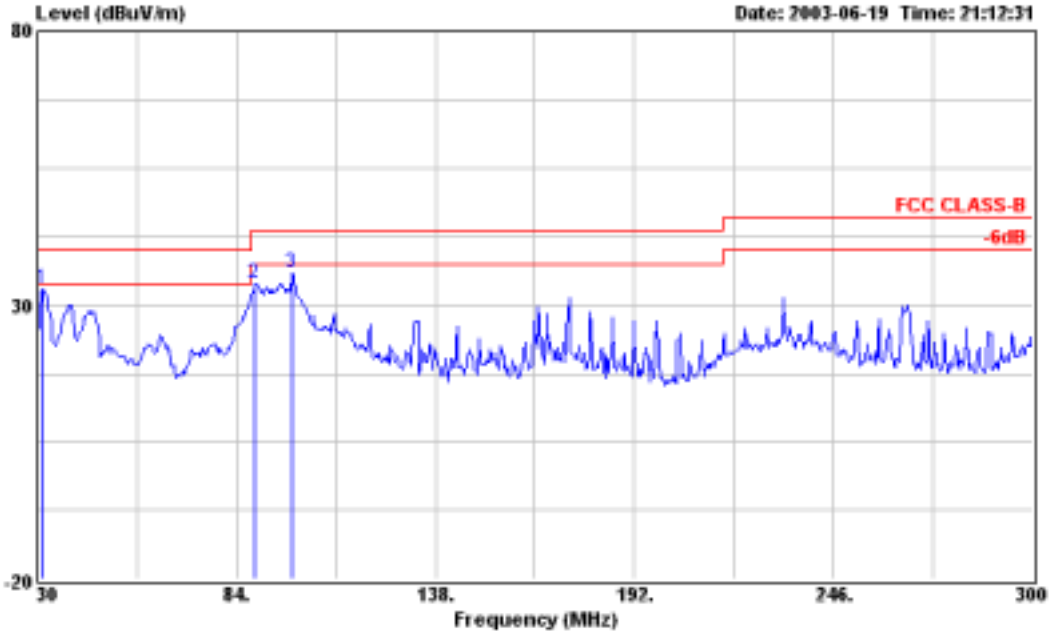
Site : 03CH03-HY
Condition : 3m 03CH03-MAT HORIZONTAL
EUT : Bluetooth USB Dongle Class 11
Power : 110V/60Hz
MODEL :
MEMO : TX CH39 2441MHz
: F361801

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	88.050	29.95	-13.55	43.50	46.77	8.39	1.81	27.02	Peak	---	---
2	159.330	34.43	-9.07	43.50	50.61	8.16	2.42	26.76	Peak	---	---
3	258.420	33.48	-12.52	46.00	45.17	11.69	3.22	26.60	Peak	---	---



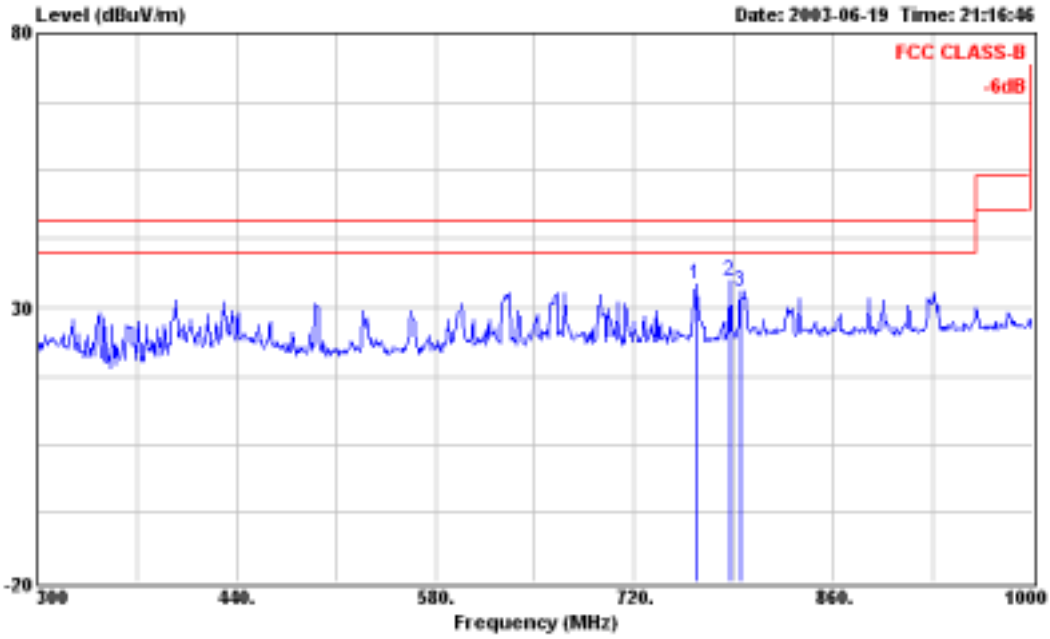
Site : 03CH03-HY
Condition : 3m 03CH03-MAT HORIZONTAL
EUT : Bluetooth USB Dongle Class 11
Power : 110V/60Hz
MODEL :
MEMO : TX CH39 2441MHz
: F361801

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	363.000	36.31	-9.69	46.00	45.85	13.43	4.01	26.98	Peak	---	---
2	396.600	37.21	-8.79	46.00	45.80	14.52	4.07	27.18	Peak	---	---
3	929.300	34.87	-11.13	46.00	36.05	19.52	7.01	27.71	Peak	---	---



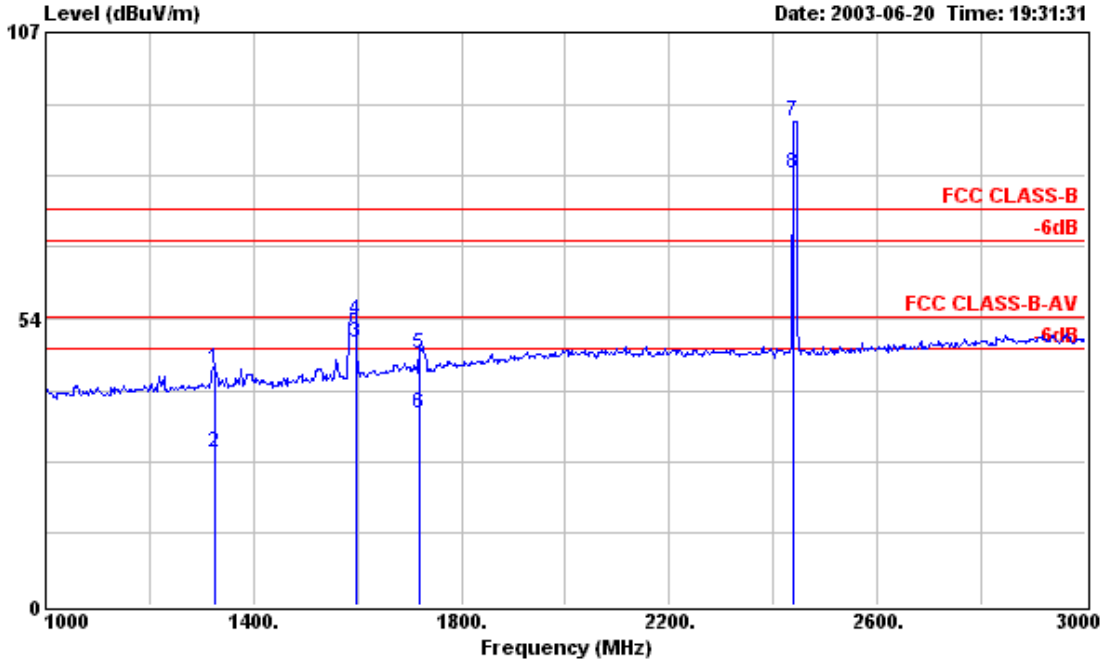
Site : 03CH03-HY
Condition : 3m 03CH03-MAT VERTICAL
EUT : Bluetooth USB Dongle Class 11
Power : 110V/60Hz
MODEL :
MEMO : TX CH39 2441MHz
: F361801

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	31.620	32.93	-7.07	40.00	44.59	14.40	1.04	27.10	Peak	---	---
2	89.130	33.08	-9.62	43.50	50.34	8.74	1.82	27.02	Peak	---	---
3	98.850	35.74	-7.76	43.50	51.56	9.29	1.89	27.00	Peak	---	---



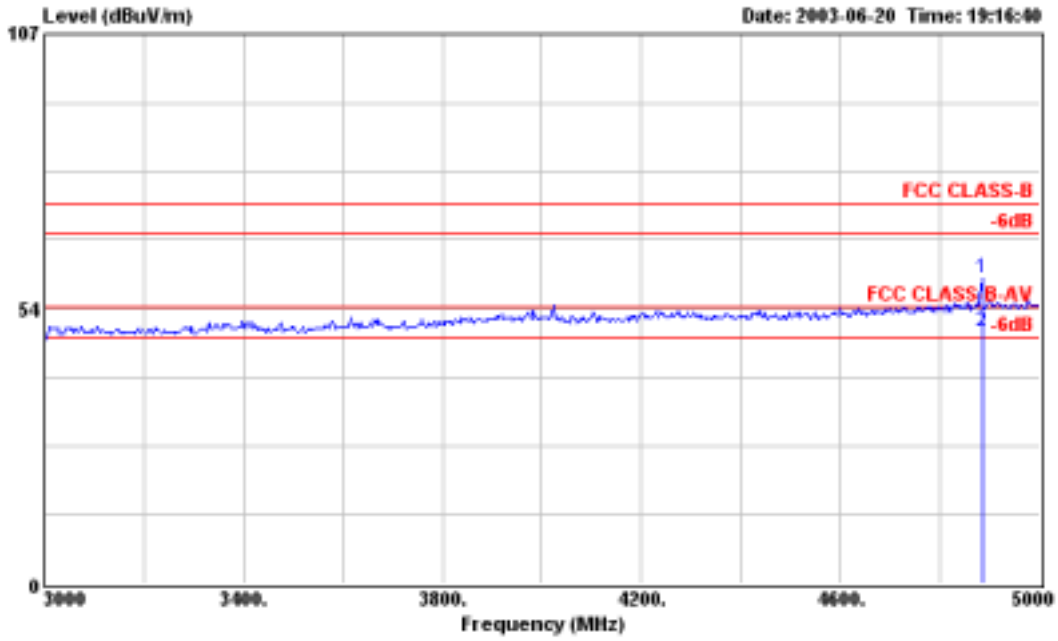
Site : 03CH03-HY
Condition : 3m 03CH03-MAT VERTICAL
EUT : Bluetooth USB Dongle Class 11
Power : 110V/60Hz
MODEL :
MEMO : TX CH39 2441MHz
: F361801

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	763.400	34.33	-11.67	46.00	37.72	18.51	6.10	28.00	Peak	---	---
2	786.500	34.92	-11.08	46.00	37.90	18.68	6.34	28.00	Peak	---	---
3	794.200	32.94	-13.06	46.00	35.72	18.74	6.40	28.00	Peak	---	---

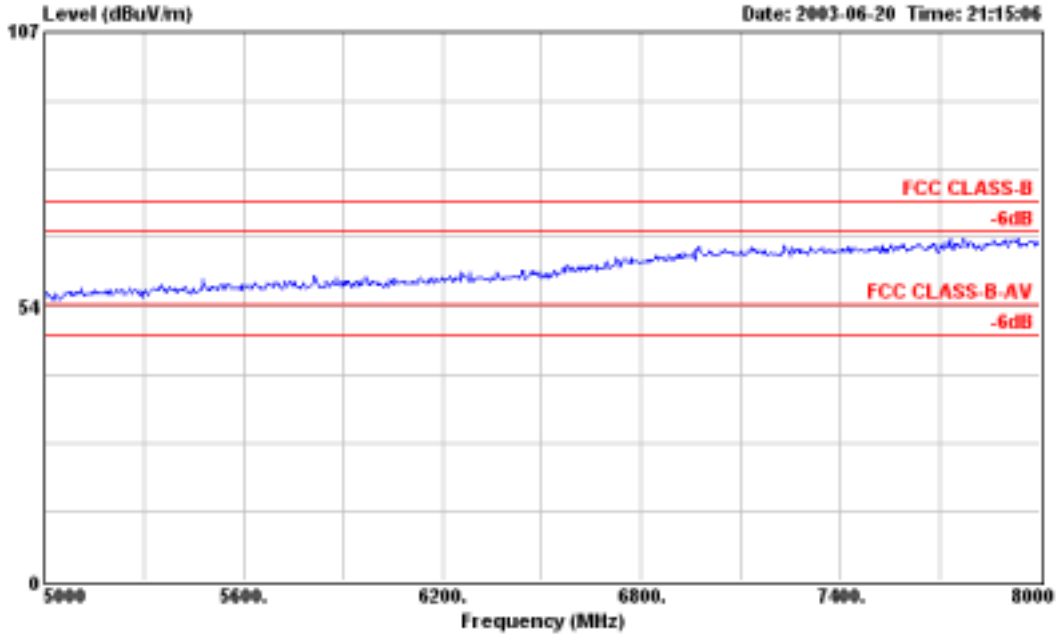


Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT : Bluetooth USB Dongle Class 11
Power : 110V/60Hz
MODEL :
MEMO : TX CH39 2441MHz
: F361801

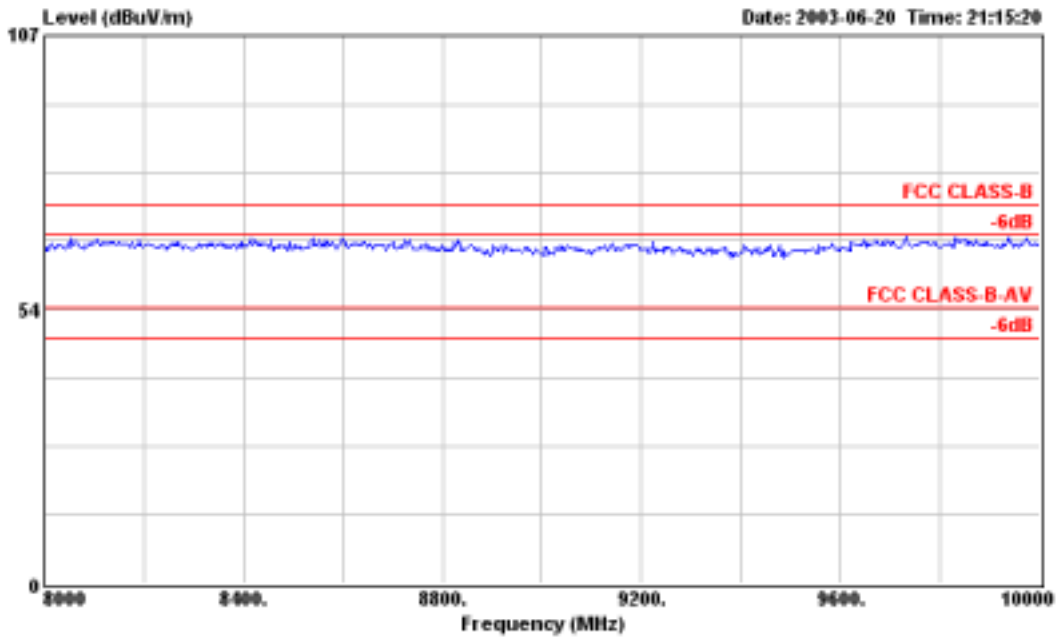
		Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1		1324.000	44.19	-29.81	74.00	52.08	26.14	4.43	38.46	Peak	---	---
2		1324.000	28.40	-25.60	54.00	36.29	26.14	4.43	38.46	Average	---	---
3	!	1596.000	49.13	-4.87	54.00	55.17	27.62	4.89	38.55	Average	100	170
4		1596.000	53.11	-20.89	74.00	59.15	27.62	4.89	38.55	Peak	---	---
5		1718.000	46.73	-27.27	74.00	51.64	28.53	5.14	38.58	Peak	---	---
6		1718.000	35.77	-38.23	74.00	40.68	28.53	5.14	38.58	Peak	---	---



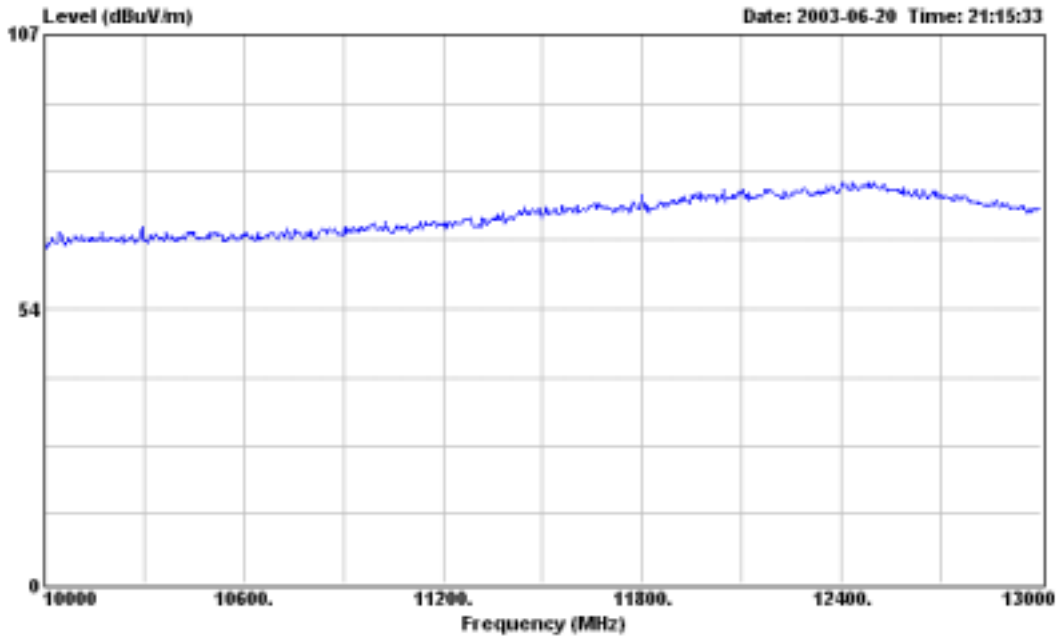

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH39 2441MHz
          : F361801
```



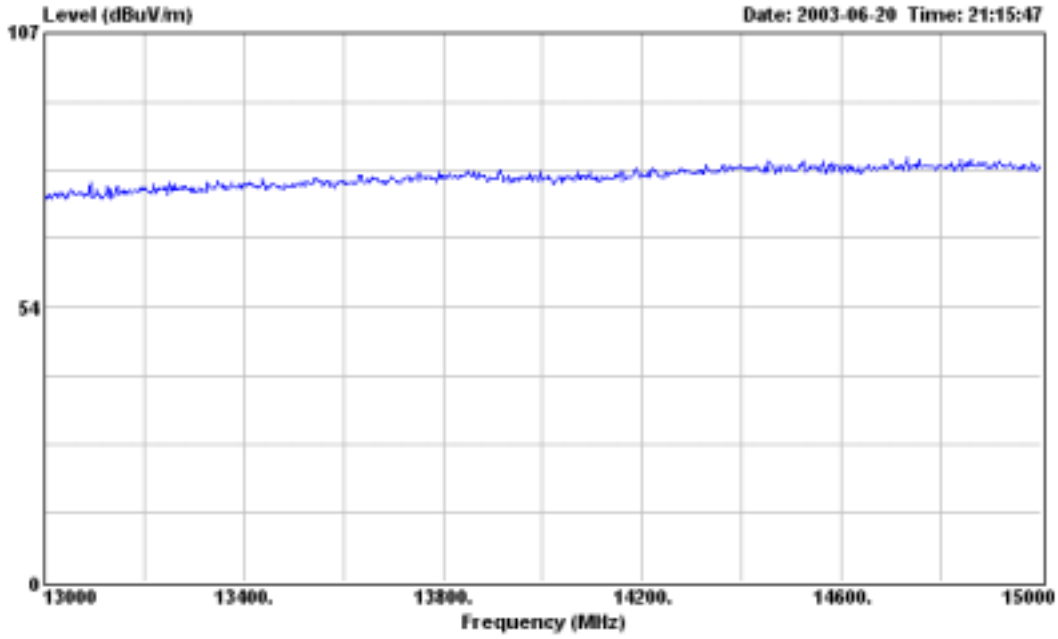

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH39 2441MHz
          : F361801
```



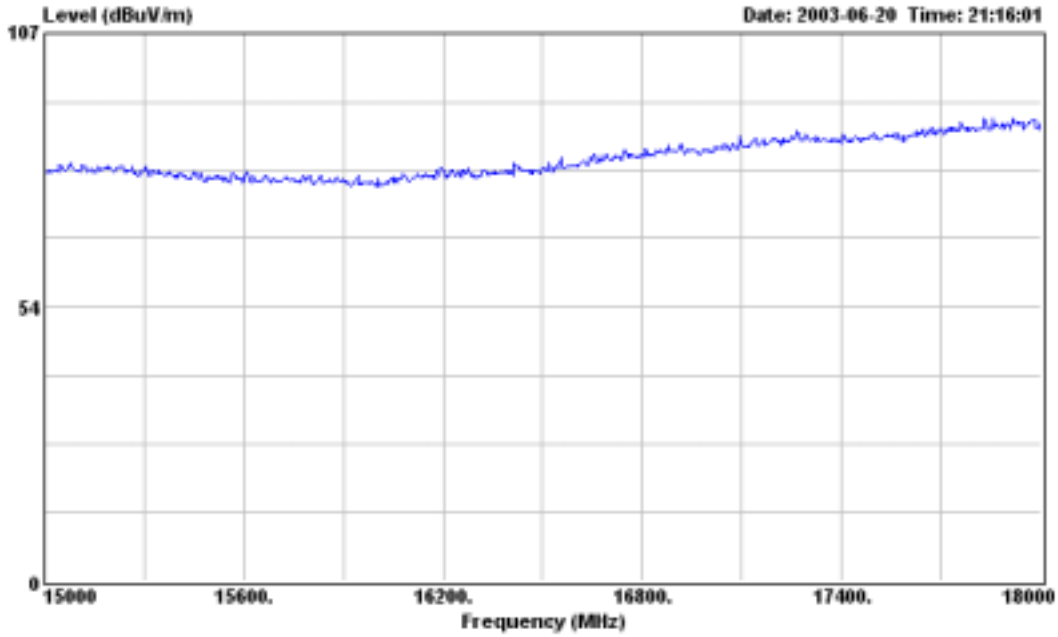

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH39 2441MHz
          : F361801
```



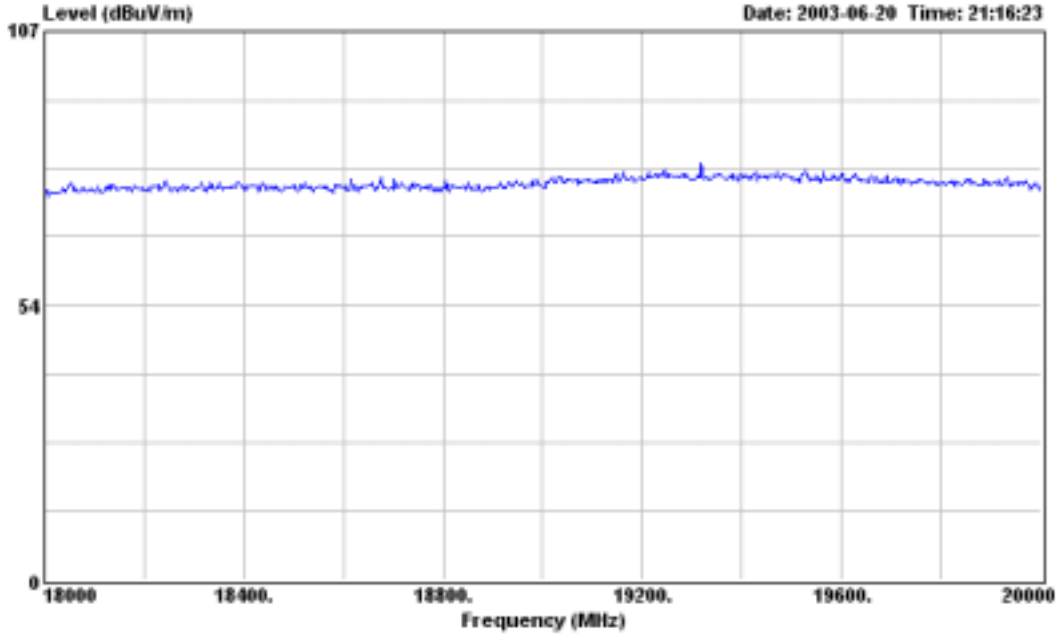

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH39 2441MHz
          : F361801
```



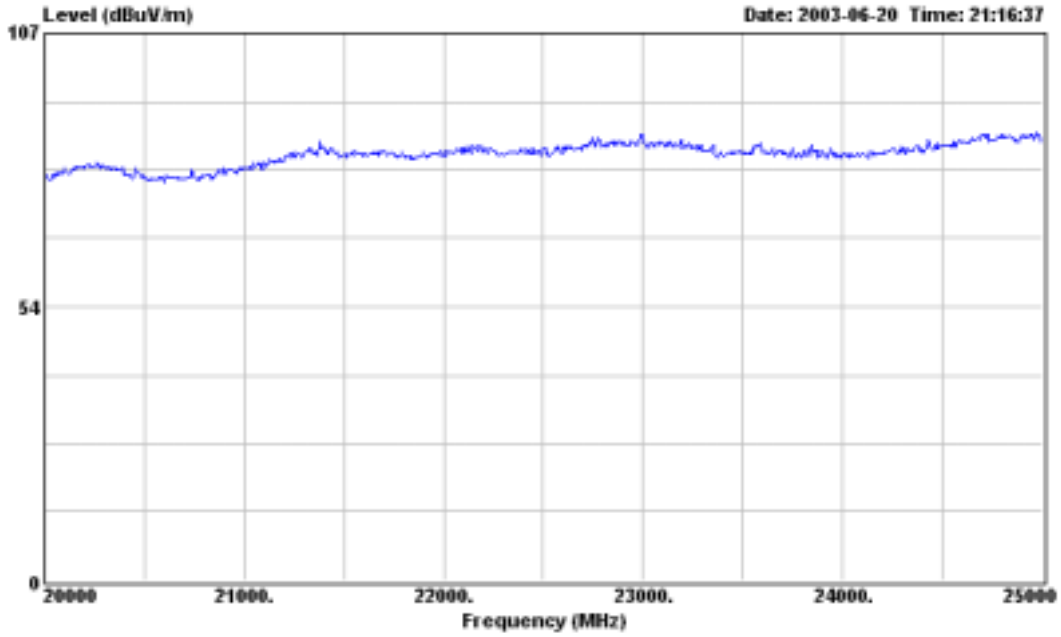

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH39 2441MHz
          : F361801
```



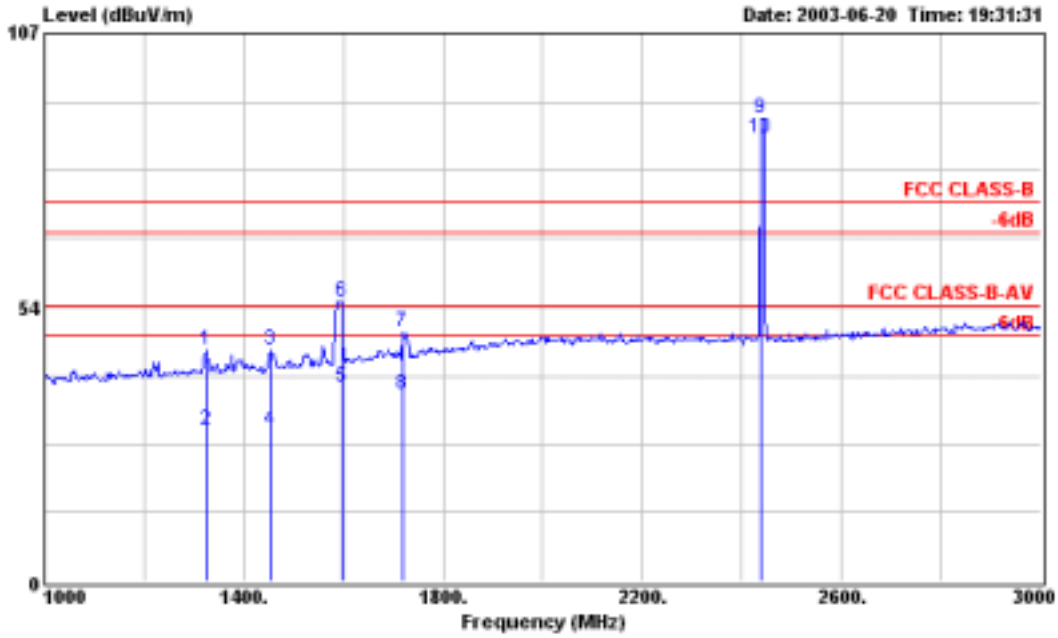

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH39 2441MHz
          : F361801
```




```
Site      : 03CH03-HY
Condition : 3m 40G-HORN-02/12/21 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH39 2441MHz
          : F361801
```

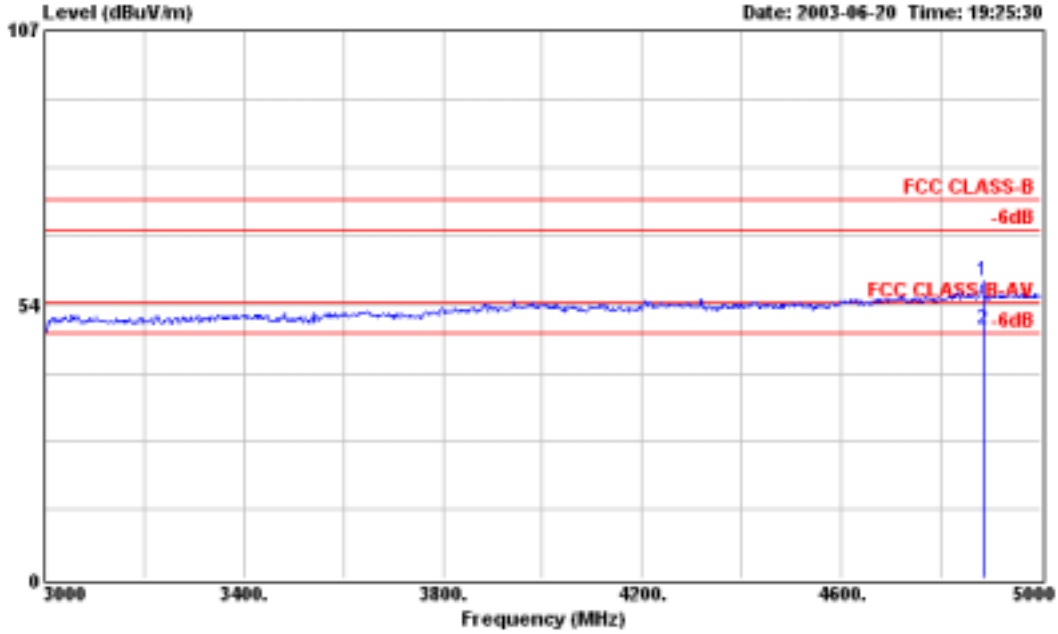



```
Site      : 03CH03-HY
Condition : 3m 40G-HORN-02/12/21 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH39 2441MHz
          : F361801
```

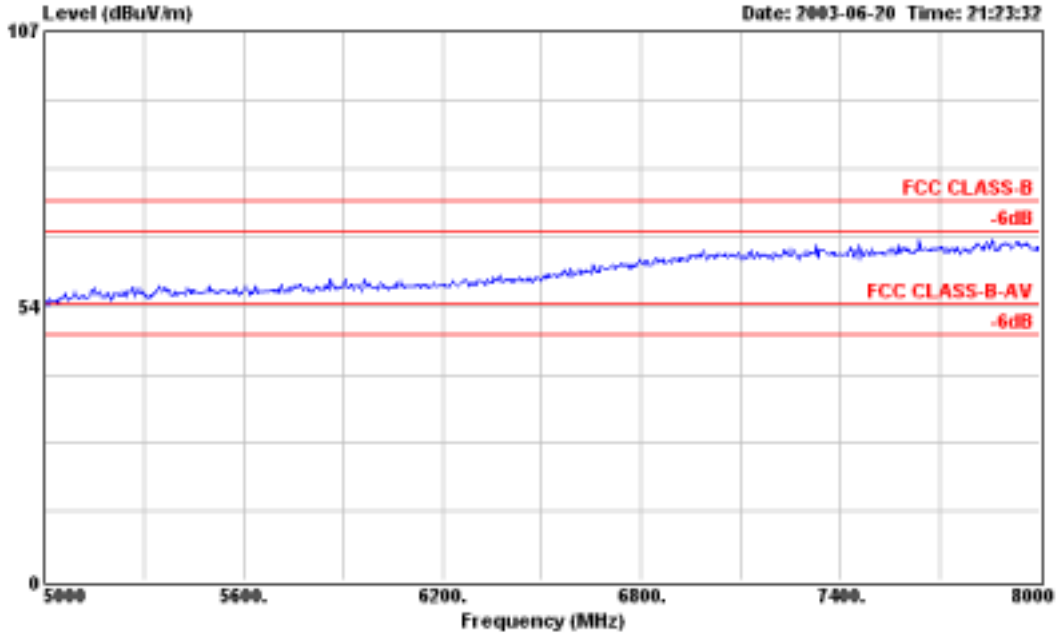


Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT : Bluetooth USB Dongle Class 11
Power : 110V/60Hz
MODEL :
MEMO : TX CH39 2441MHz
: F361801

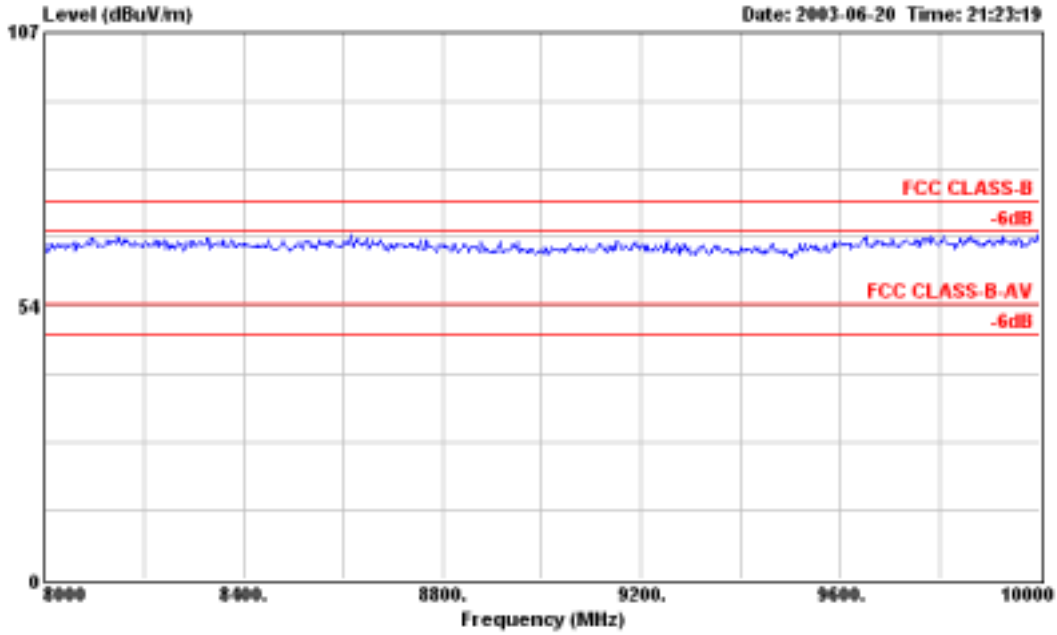
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1324.000	45.22	-28.78	74.00	53.11	26.14	4.43	38.46	Peak	---	---
2	1324.000	29.56	-24.44	54.00	37.45	26.14	4.43	38.46	Average	---	---
3	1454.000	45.15	-28.85	74.00	52.36	26.67	4.63	38.51	Peak	---	---
4	1454.000	29.62	-24.38	54.00	36.83	26.67	4.63	38.51	Average	---	---
5	1596.000	37.85	-16.15	54.00	43.89	27.62	4.89	38.55	Average	---	---
6	1596.000	54.68	-19.32	74.00	60.72	27.62	4.89	38.55	Peak	---	---
7	1718.000	48.70	-25.30	74.00	53.61	28.53	5.14	38.58	Peak	---	---
8	1718.000	36.31	-37.69	74.00	41.22	28.53	5.14	38.58	Peak	---	---



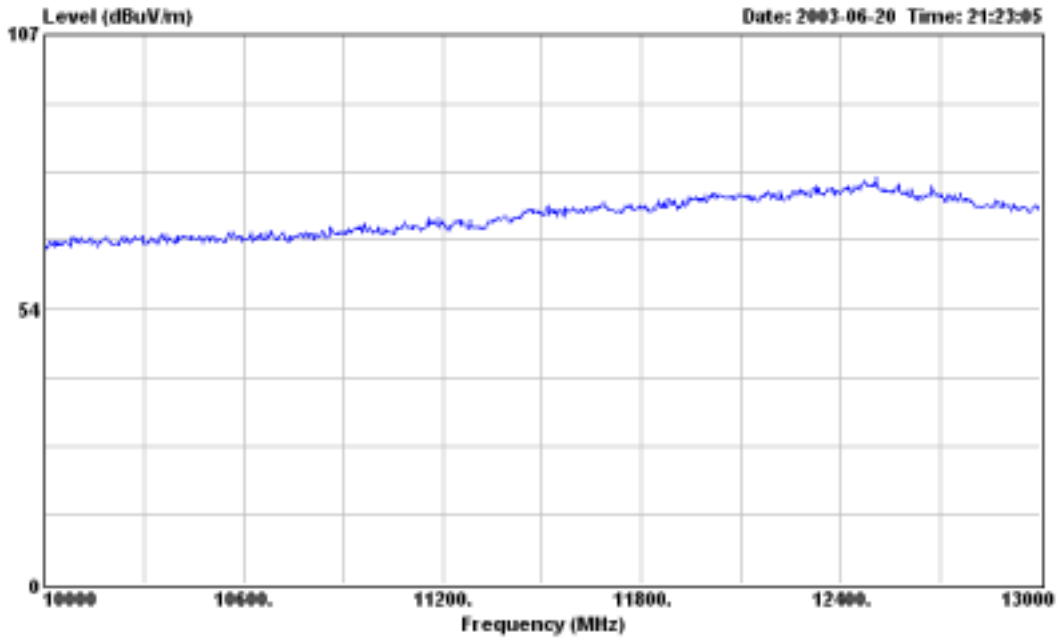

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH39 2441MHz
          : F361801
```



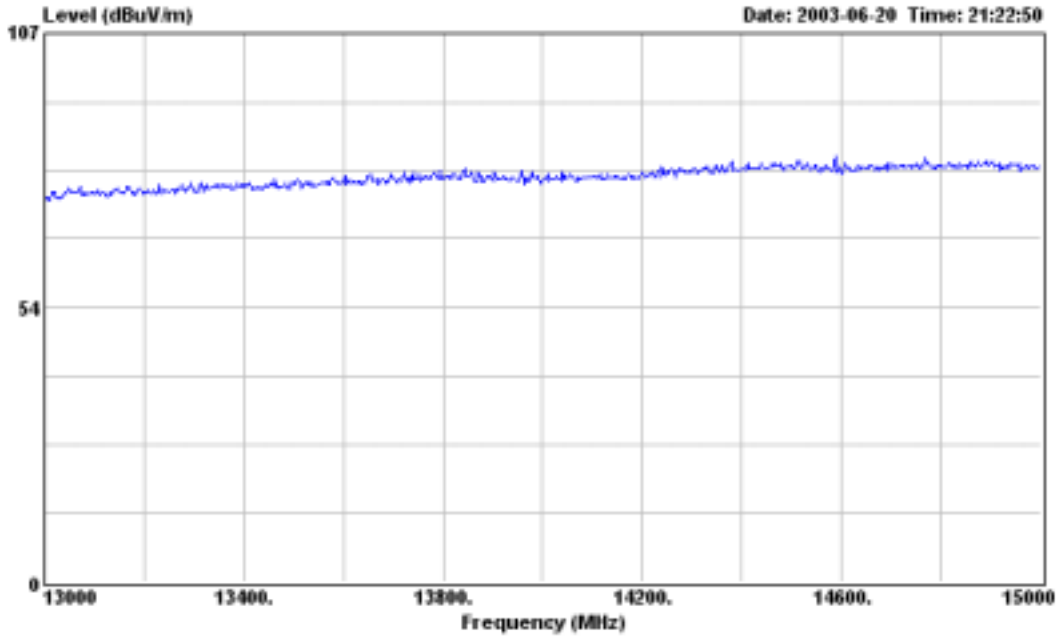

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH39 2441MHz
          : F361801
```



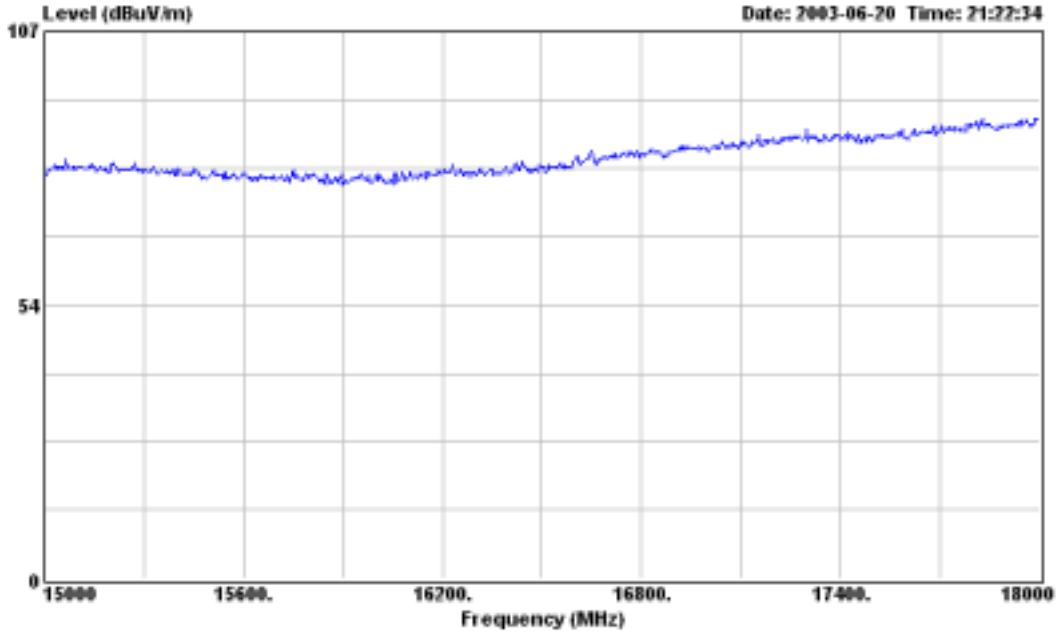

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH39 2441MHz
          : F361801
```



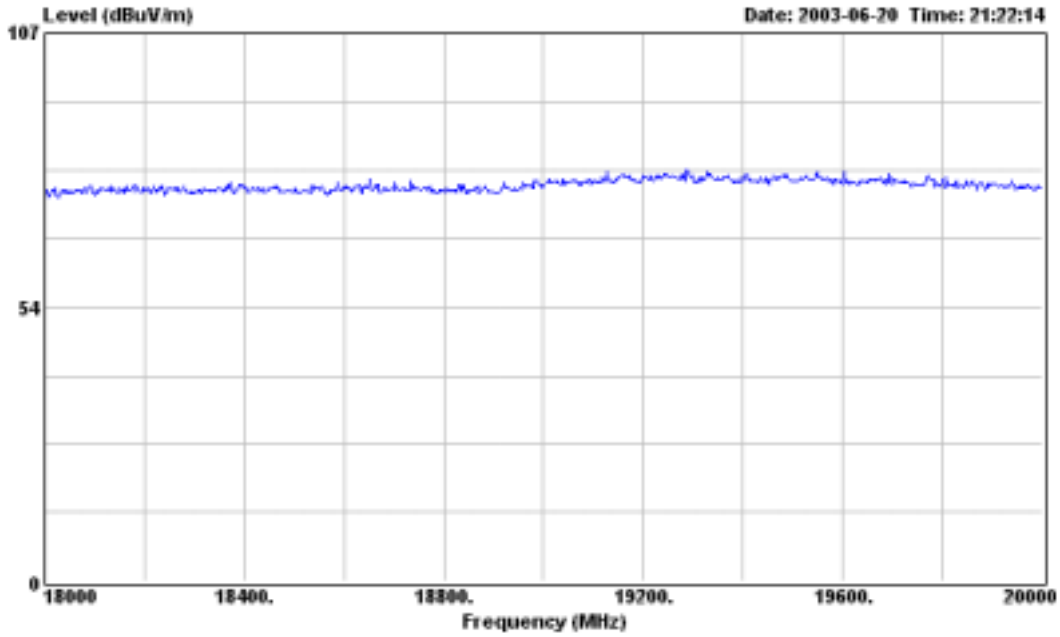

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH39 2441MHz
          : F361801
```



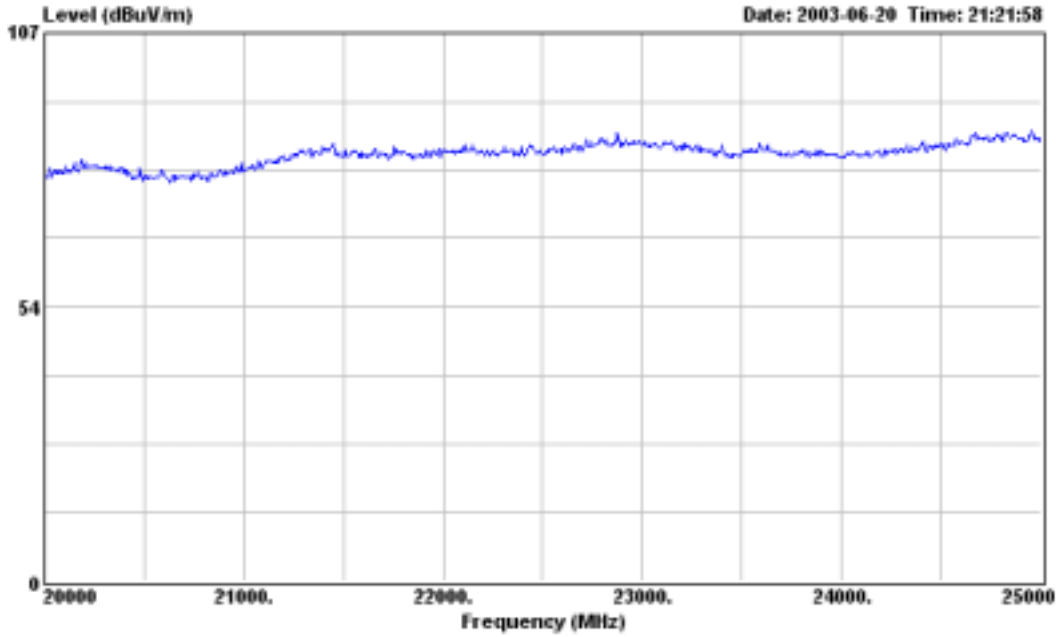

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH39 2441MHz
          : F361801
```




```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH39 2441MHz
          : F361801
```




```
Site      : 03CH03-HY
Condition : 3m 40G-HORN-02/12/21 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH39 2441MHz
          : F361801
```




```
Site      : 03CH03-HY
Condition : 3m 40G-HORN-02/12/21 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH39 2441MHz
          : F361801
```

■ Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Limits (uV/m)	Emission (dBuV/m)	Level (uV/m)	Margin (dB)	Detect Mode
2438.000	H	30.15	6.26	53.97	-	-	90.38	33036.95		Peak
2438.000	H	30.15	6.26	44.34	-	-	80.75	10901.84		A.V.
4884.000	H	33.46	9.10	16.81	74.00	5011.87	59.37	930.04	-14.63	Peak
4884.000	H	33.46	9.10	6.45	54.00	501.19	49.01	282.16	-4.99	A.V.
2438.000	V	30.15	6.26	53.94	-	-	90.35	32923.05		Peak
2438.000	V	30.15	6.26	50.17	-	-	86.58	21330.45		A.V.
4884.000	V	33.46	9.10	15.38	74.00	5011.87	57.94	788.86	-16.06	Peak
4884.000	V	33.46	9.10	5.94	54.00	501.19	48.50	266.07	-5.50	A.V.
7323.000	V/H						-			Peak, A.V.
9764.000	V/H						-			Peak, A.V.
12205.000	V/H						-			Peak, A.V.
14646.000	V/H						-			Peak, A.V.
17087.000	V/H						-			Peak, A.V.
19528.000	V/H						-			Peak, A.V.
21969.000	V/H						-			Peak, A.V.
24410.000	V/H						-			Peak, A.V.

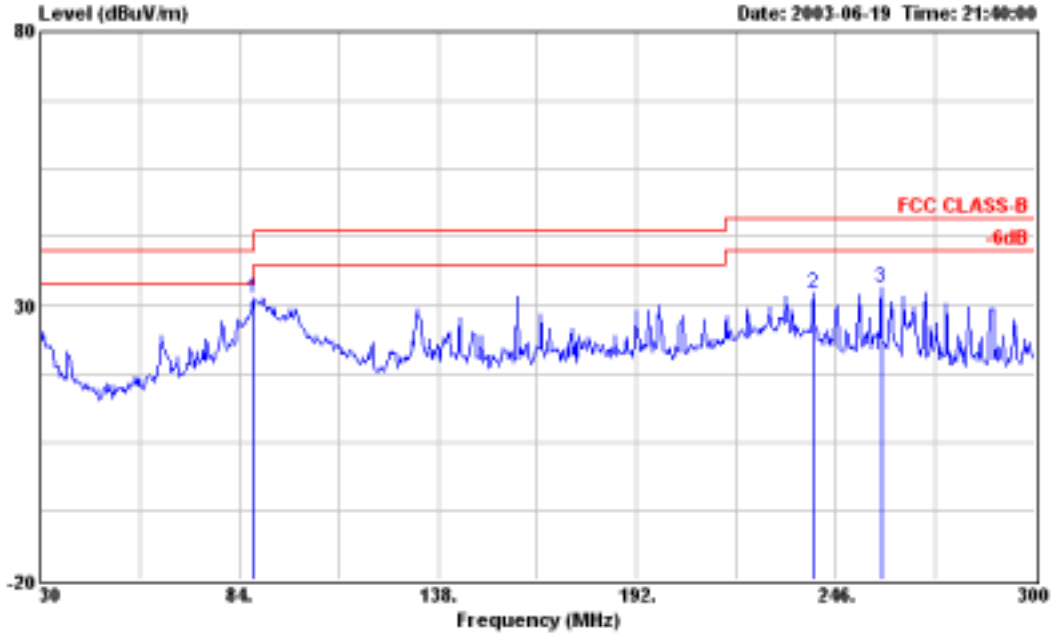
Remark: The emission emitted by the EUT is too low to be measured except the emission listed above

Test Engineer: Jay
Jay Zhong

- Test Mode: Mode 3
- Test Distance: 3 M
- Temperature: 26 °C
- Relative Humidity: 72 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

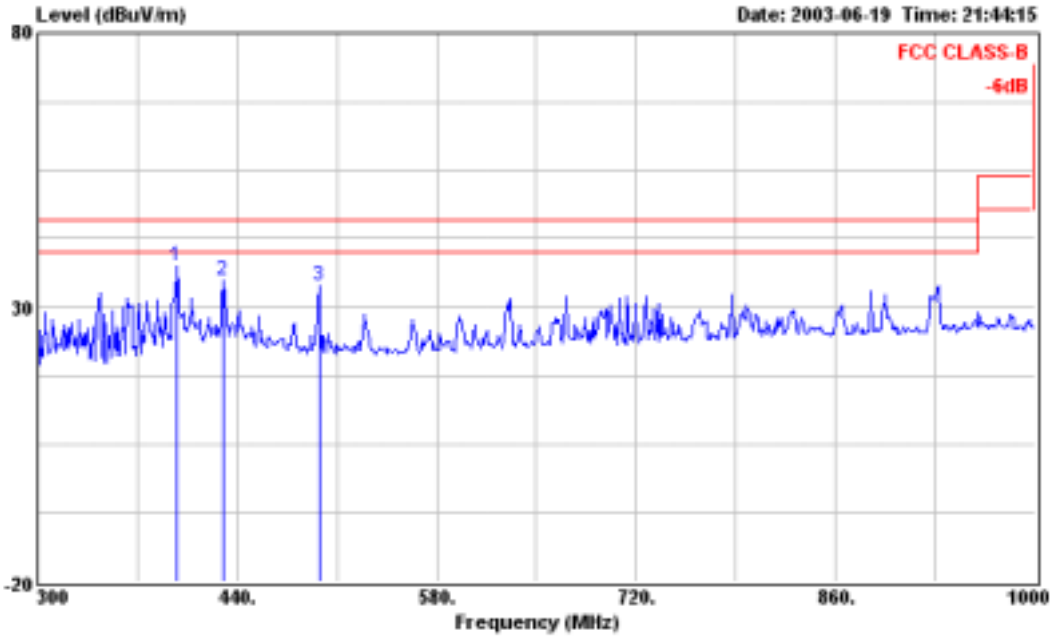
■ The test was passed at the minimum margin that marked by the frame in the following test record

■ Spurious Emission



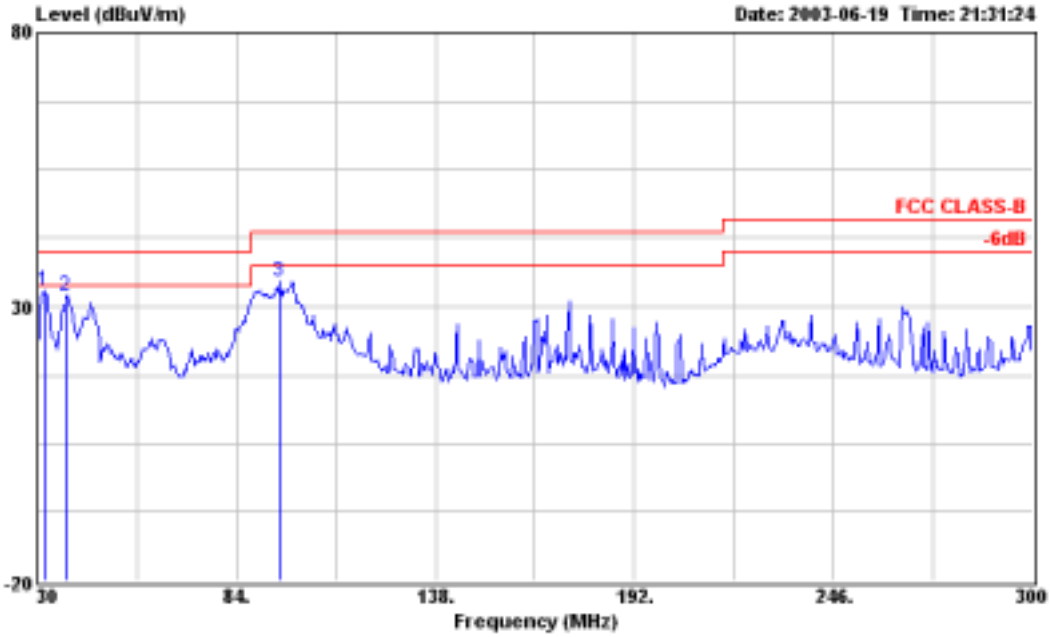
Site : 03CH03-HY
Condition : 3m 03CH03-MAT HORIZONTAL
EUT : Bluetooth USB Dongle Class 11
Power : 110V/60Hz
MODEL :
MEMO : TX CH78 2480MHz
: F361801

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	87.780	31.39	-8.61	40.00	48.29	8.32	1.80	27.02	Peak	---	---
2	240.060	32.33	-13.67	46.00	44.92	10.92	3.09	26.60	Peak	---	---
3	258.420	33.25	-12.75	46.00	44.94	11.69	3.22	26.60	Peak	---	---



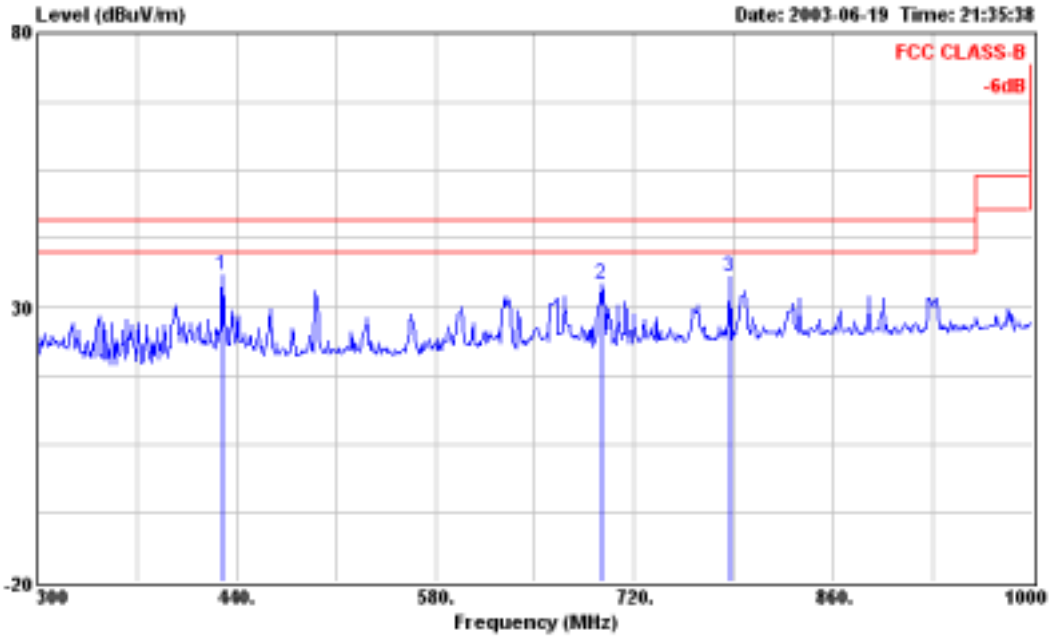
Site : 03CH03-HY
Condition : 3m 03CH03-MAT HORIZONTAL
EUT : Bluetooth USB Dongle Class 11
Power : 110V/60Hz
MODEL :
MEMO : TX CH78 2480MHz
: F361801

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	398.000	37.36	-8.64	46.00	45.90	14.57	4.08	27.19	Peak	---	---
2	430.200	34.87	-11.13	46.00	42.89	15.06	4.27	27.35	Peak	---	---
3	497.400	33.78	-12.22	46.00	40.85	15.99	4.63	27.69	Peak	---	---



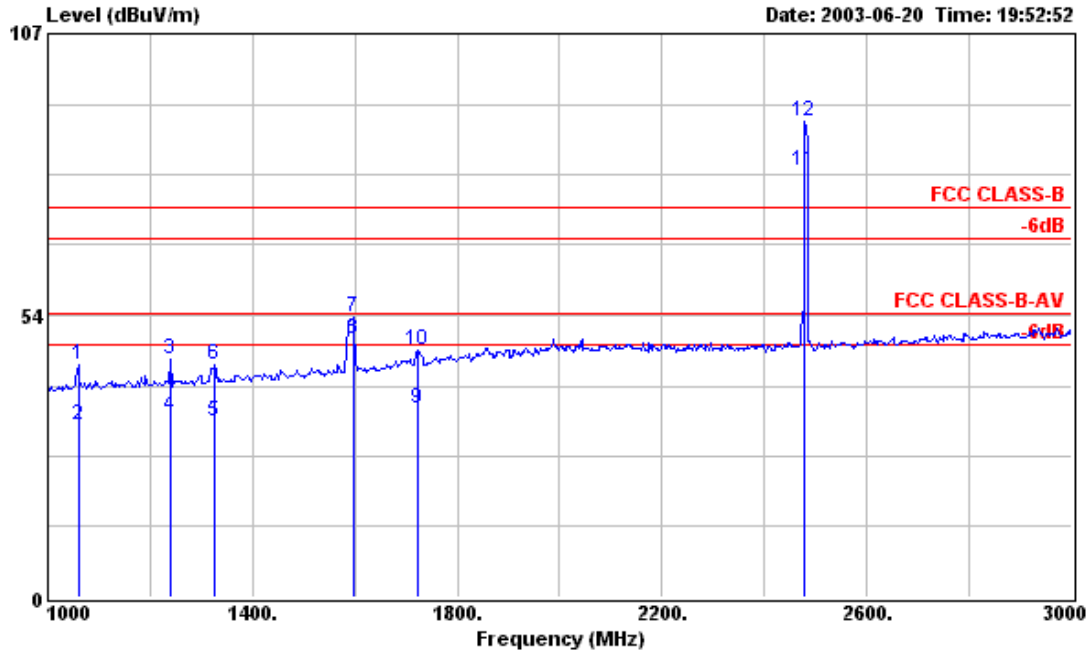
Site : 03CH03-HY
Condition : 3m 03CH03-MAT VERTICAL
EUT : Bluetooth USB Dongle Class 11
Power : 110V/60Hz
MODEL :
MEMO : TX CH78 2480MHz
: F361801

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	31.890	32.90	-7.10	40.00	44.67	14.29	1.04	27.10	Peak	---	---
2	37.560	31.92	-8.08	40.00	46.02	11.85	1.15	27.10	Peak	---	---
3	95.610	34.54	-8.96	43.50	50.58	9.11	1.86	27.01	Peak	---	---



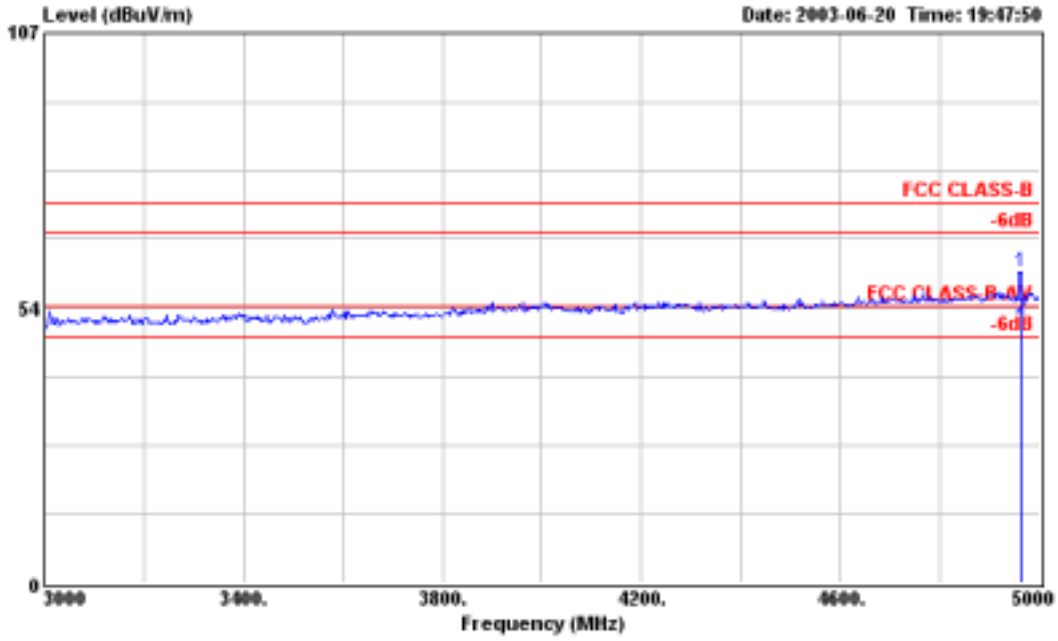
Site : 03CH03-HY
Condition : 3m 03CH03-MAT VERTICAL
EUT : Bluetooth USB Dongle Class 11
Power : 110V/60Hz
MODEL :
MEMO : TX CH78 2480MHz
: F361801

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	430.200	35.73	-10.27	46.00	43.75	15.06	4.27	27.35	Peak	---	---
2	696.900	34.31	-11.69	46.00	38.40	17.98	5.93	28.00	Peak	---	---
3	786.500	35.63	-10.37	46.00	38.61	18.68	6.34	28.00	Peak	---	---

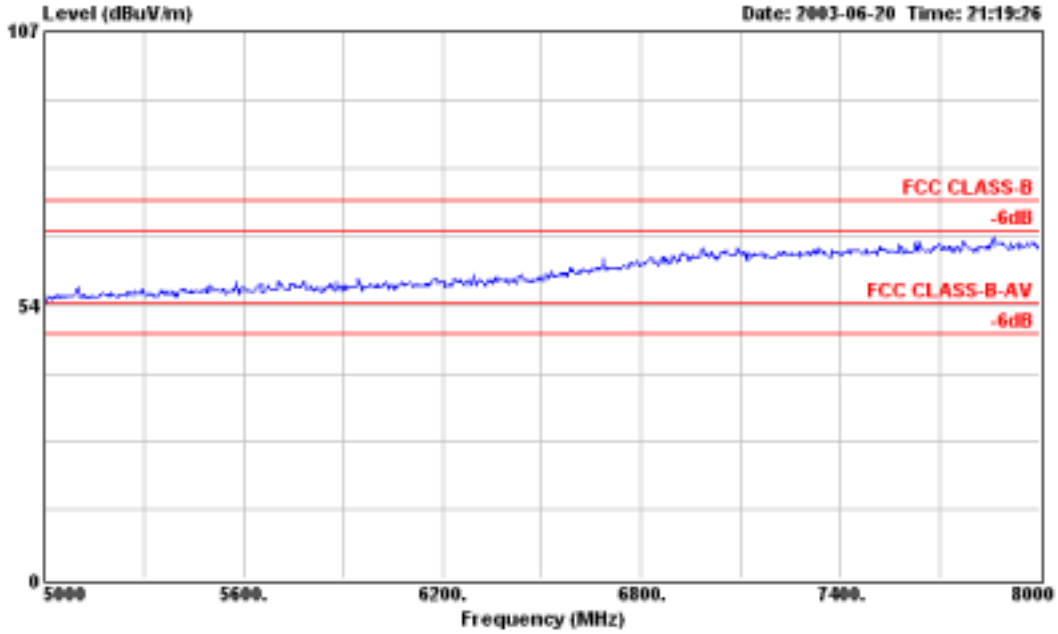


Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT : Bluetooth USB Dongle Class 11
Power : 110V/60Hz
MODEL :
MEMO : TX CH78 2480MHz
: F361801

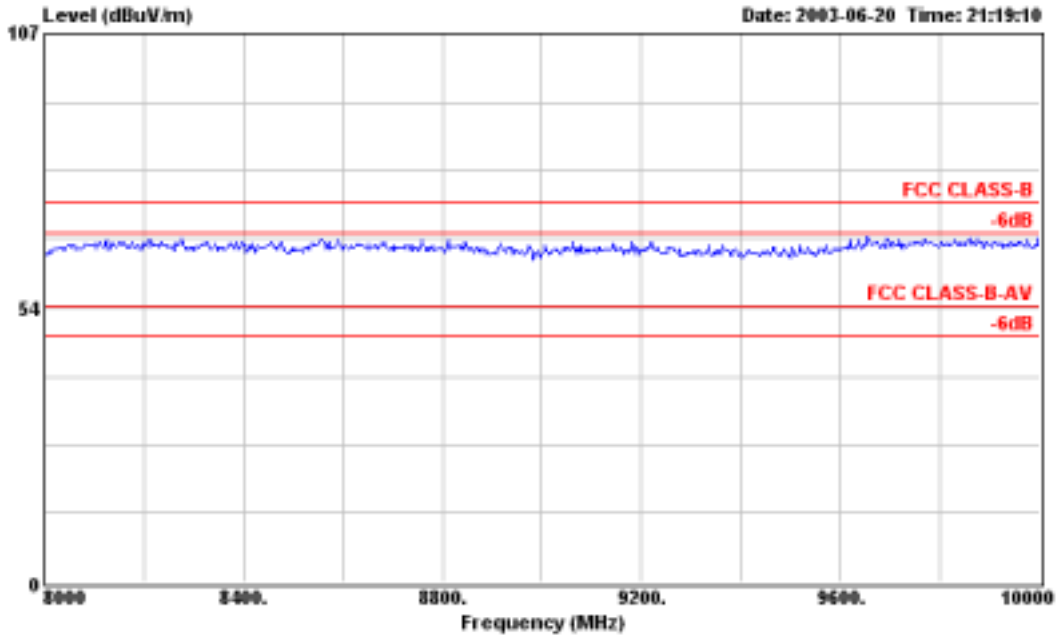
		Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1		1060.000	44.12	-29.88	74.00	53.37	25.08	4.03	38.36	Peak	---	---
2		1060.000	32.52	-21.48	54.00	41.77	25.08	4.03	38.36	Average	---	---
3		1238.000	45.10	-28.90	74.00	53.43	25.80	4.30	38.43	Peak	---	---
4		1238.000	34.31	-19.69	54.00	42.64	25.80	4.30	38.43	Average	---	---
5		1326.000	33.25	-20.75	54.00	41.12	26.15	4.44	38.46	Average	---	---
6		1326.000	43.96	-30.04	74.00	51.83	26.15	4.44	38.46	Peak	---	---
7		1596.000	53.02	-20.98	74.00	59.06	27.62	4.89	38.55	Peak	---	---
8	!	1596.000	49.09	-4.91	54.00	55.13	27.62	4.89	38.55	Average	100	96
9		1724.000	35.81	-18.19	54.00	40.67	28.57	5.15	38.58	Average	---	---
10		1724.000	46.85	-27.15	74.00	51.71	28.57	5.15	38.58	Peak	---	---



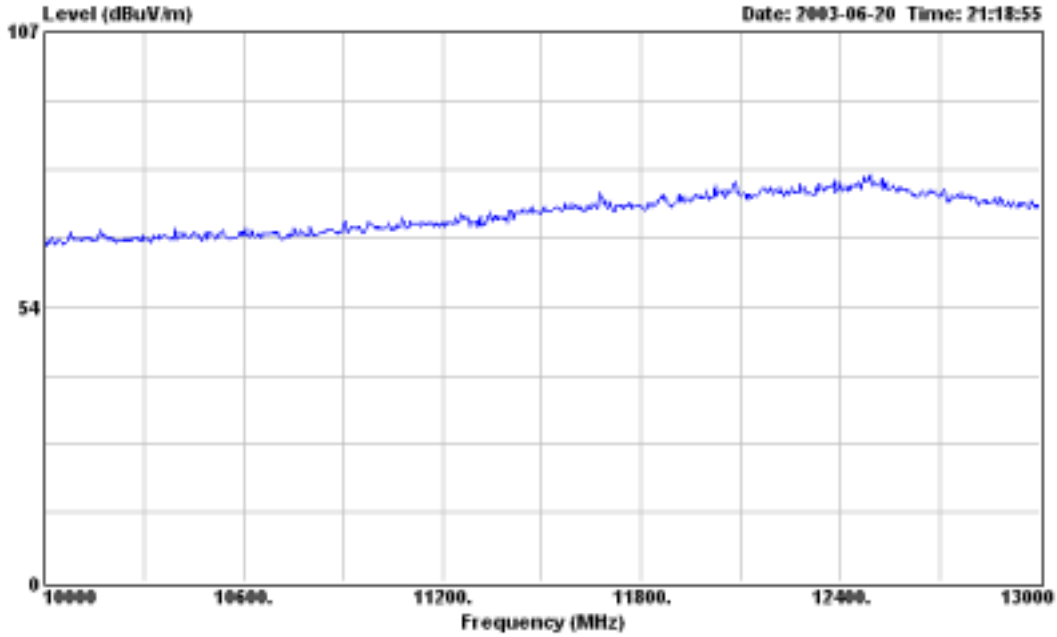

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH78 2480MHz
          : F361801
```



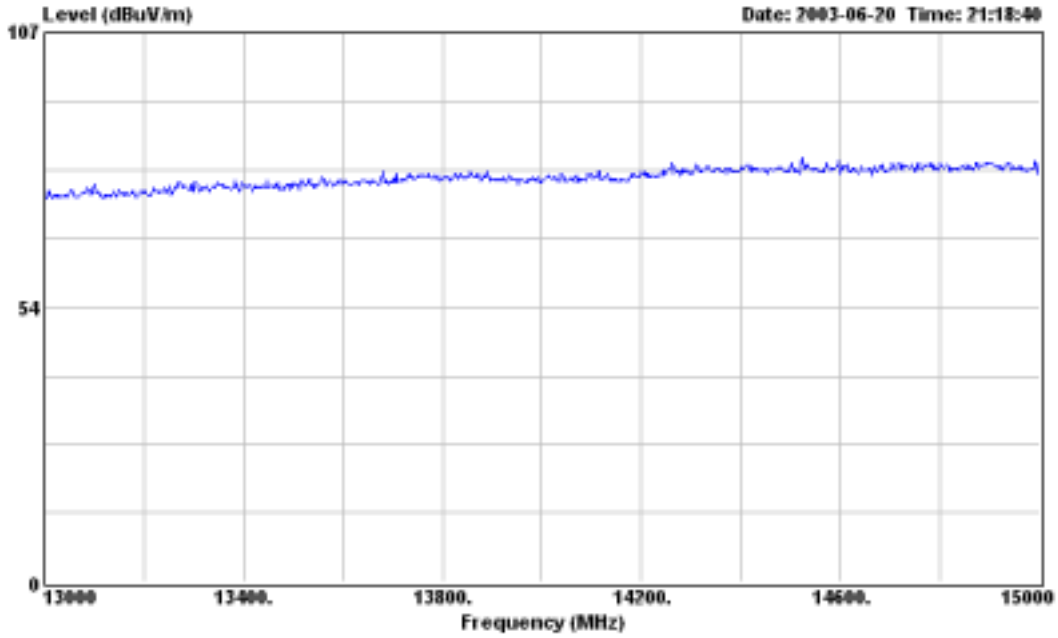

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH78 2480MHz
          : F361801
```



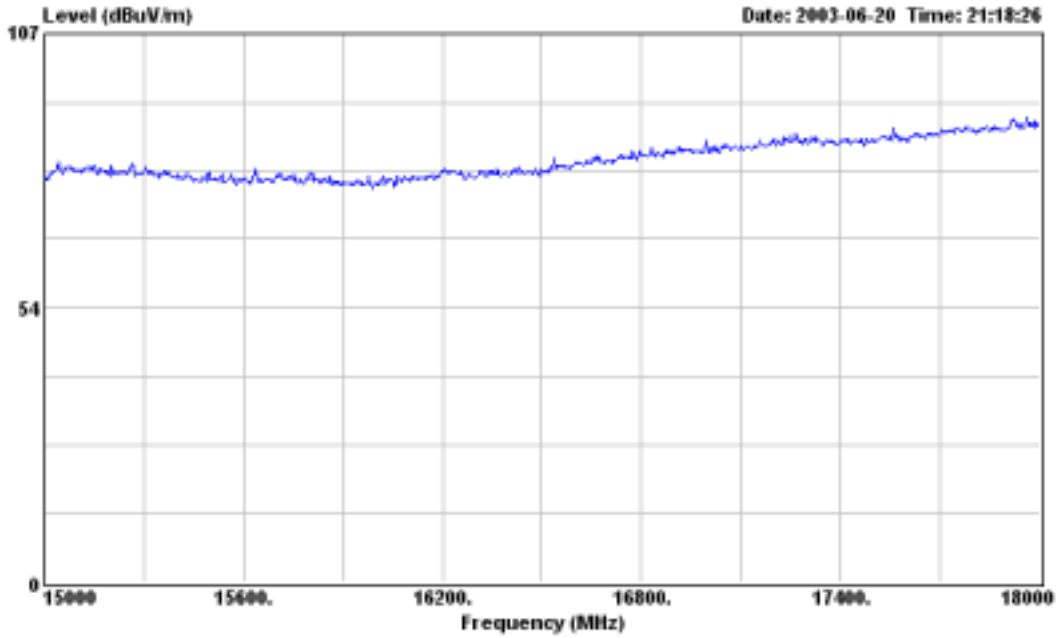

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH78 2480MHz
          : F361801
```



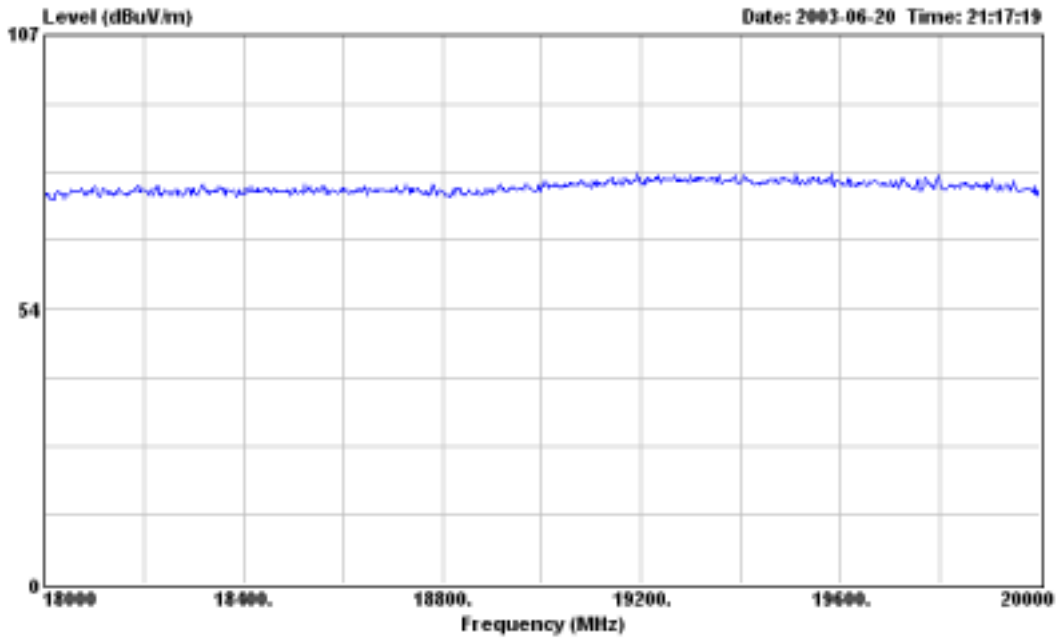

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH78 2480MHz
          : F361801
```



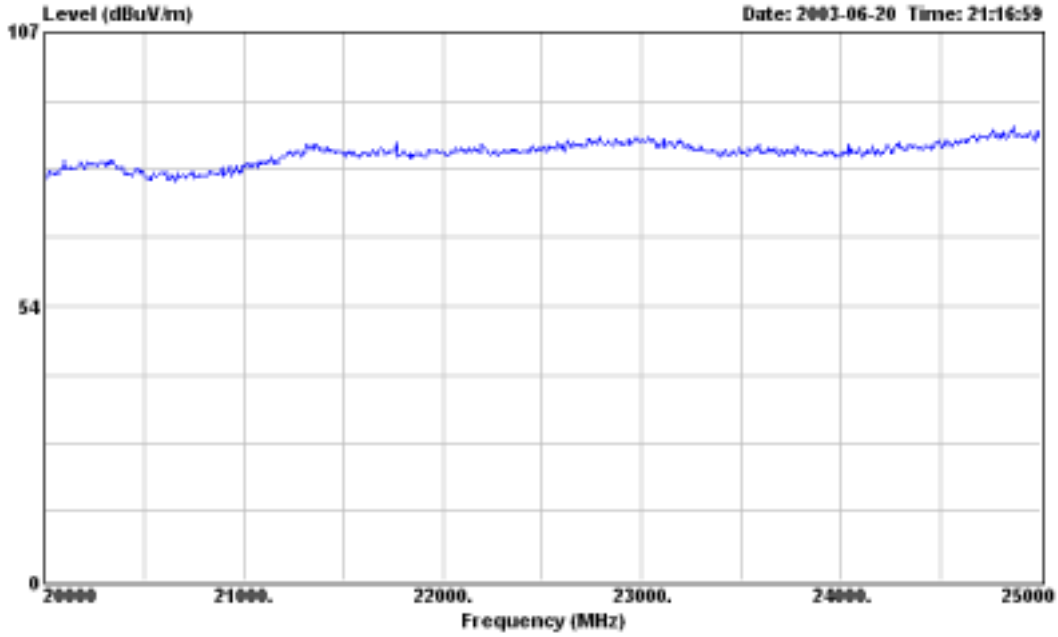
Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT : Bluetooth USB Dongle Class 11
Power : 110V/60Hz
MODEL :
MEMO : TX CH78 2480MHz
: F361801



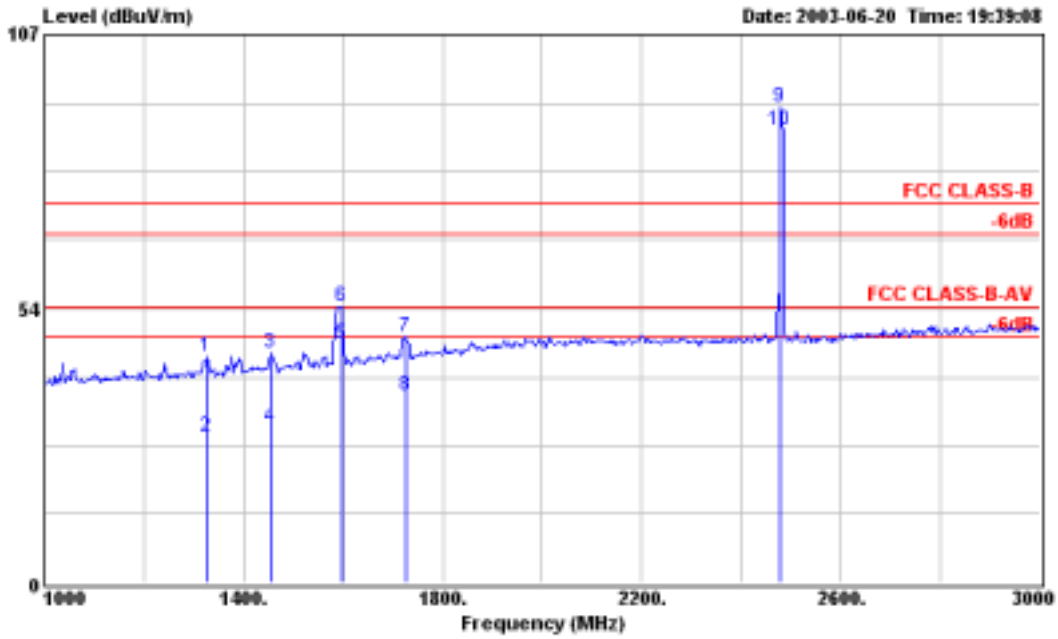

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH78 2480MHz
          : F361801
```




```
Site      : 03CH03-HY
Condition : 3m 40G-HORN-02/12/21 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH78 2480MHz
          : F361801
```

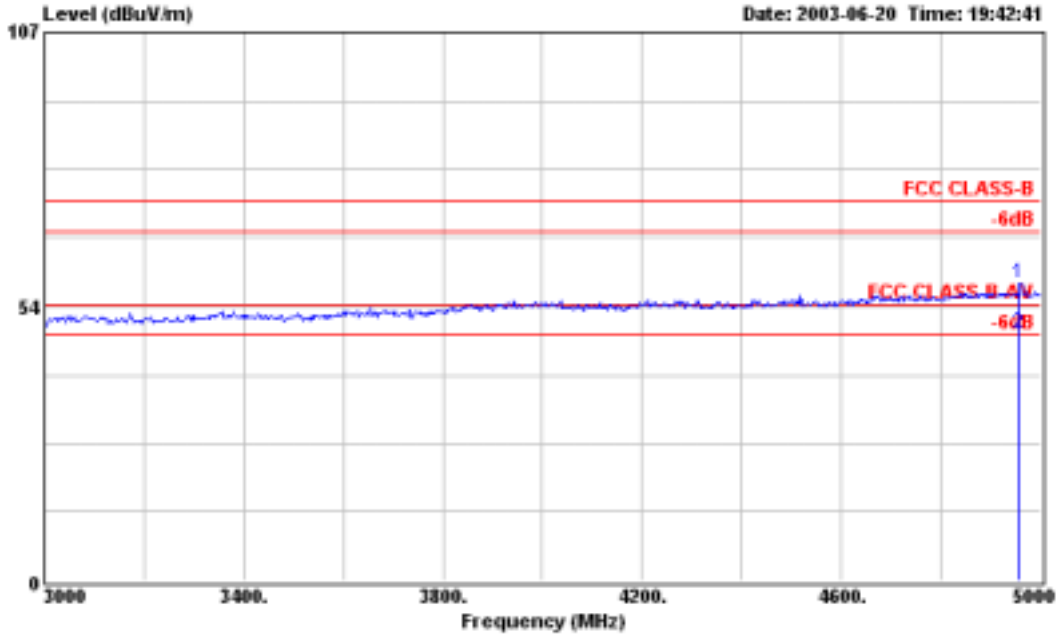



```
Site      : 03CH03-HY
Condition : 3m 40G-HORN-02/12/21 HORIZONTAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     : ---
MEMO      : TX CH78 2480MHz
          : F361801
```

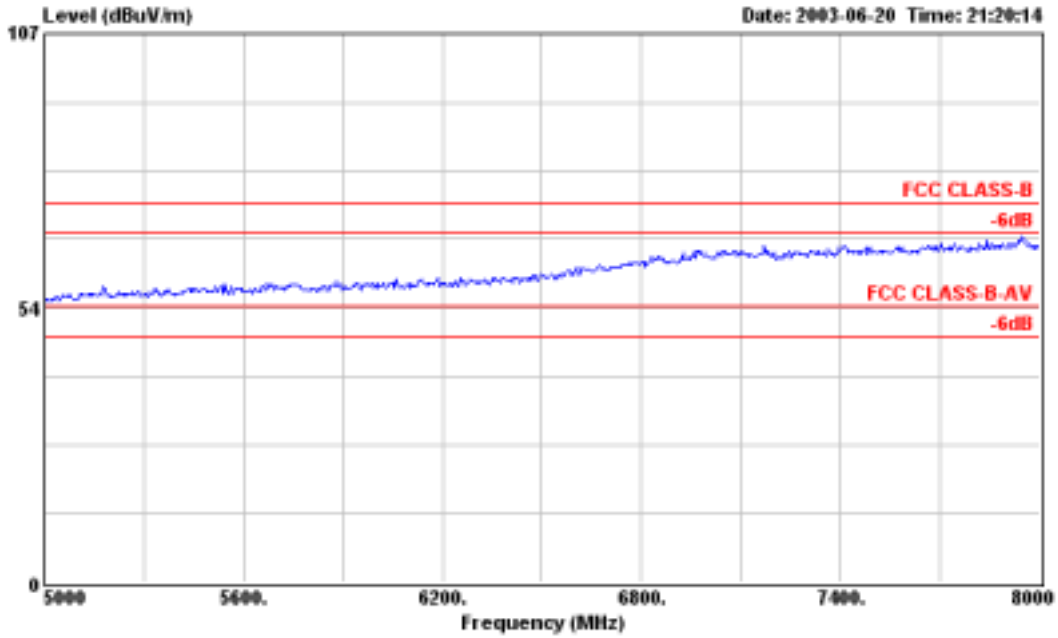


Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT : Bluetooth USB Dongle Class 11
Power : 110V/60Hz
MODEL :
MEMO : TX CH78 2480MHz
: F361801

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1326.000	44.01	-29.99	74.00	51.88	26.15	4.44	38.46	Peak	---	---
2	1326.000	28.45	-25.55	54.00	36.32	26.15	4.44	38.46	Average	---	---
3	1454.000	44.00	-29.20	74.00	52.01	26.67	4.63	38.51	Peak	---	---
4	1454.000	30.31	-23.69	54.00	37.52	26.67	4.63	38.51	Average	---	---
5	1596.000	46.51	-7.49	54.00	52.55	27.62	4.89	38.55	Average	---	---
6	1596.000	53.82	-20.18	74.00	59.86	27.62	4.89	38.55	Peak	---	---
7	1726.000	47.97	-26.03	74.00	52.81	28.59	5.15	38.58	Peak	---	---
8	1726.000	36.50	-17.50	54.00	41.34	28.59	5.15	38.58	Average	---	---




```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH78 2480MHz
          : F361801
```




```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
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MODEL     :
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          : F361801
```
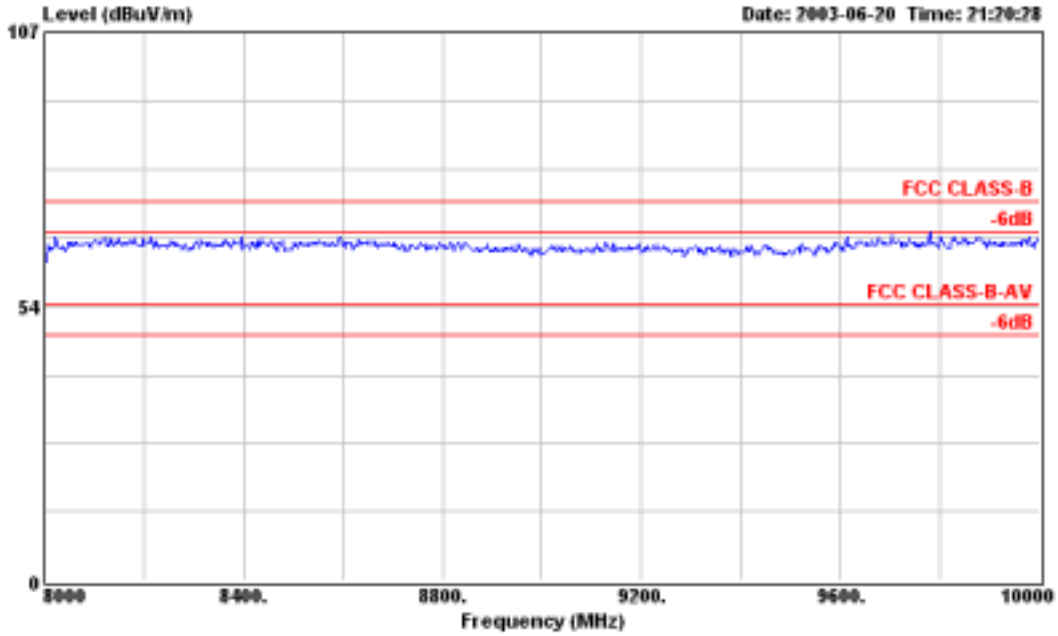
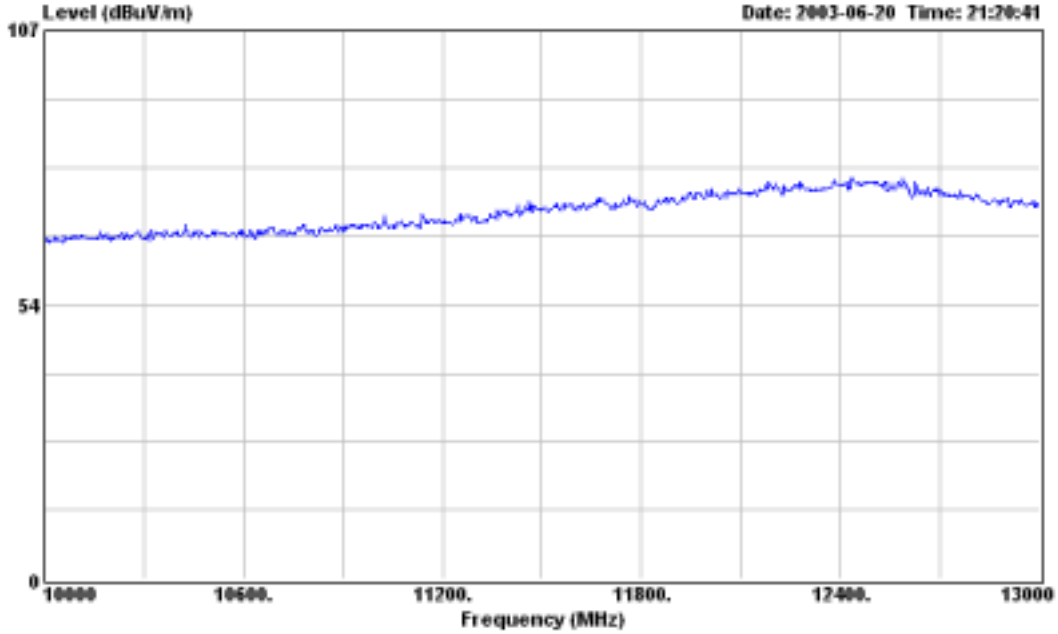
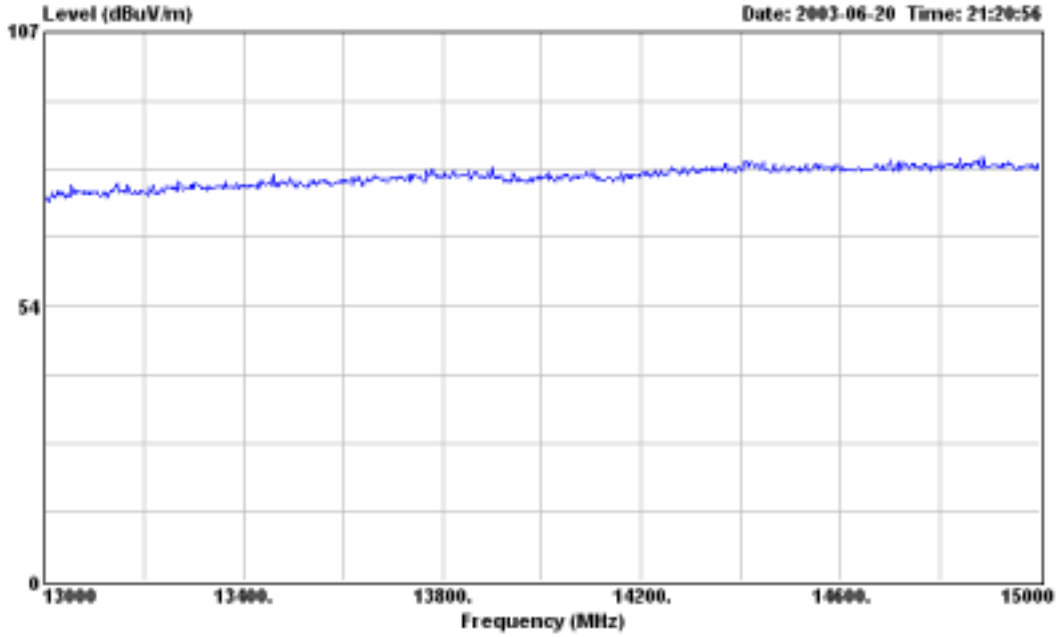



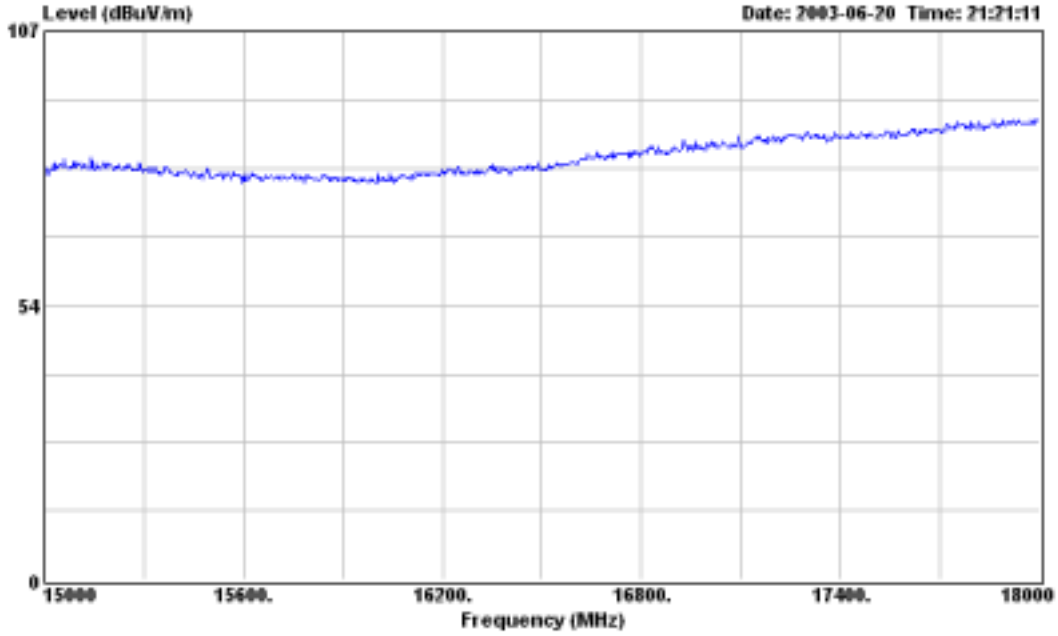

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH78 2480MHz
          : F361801
```



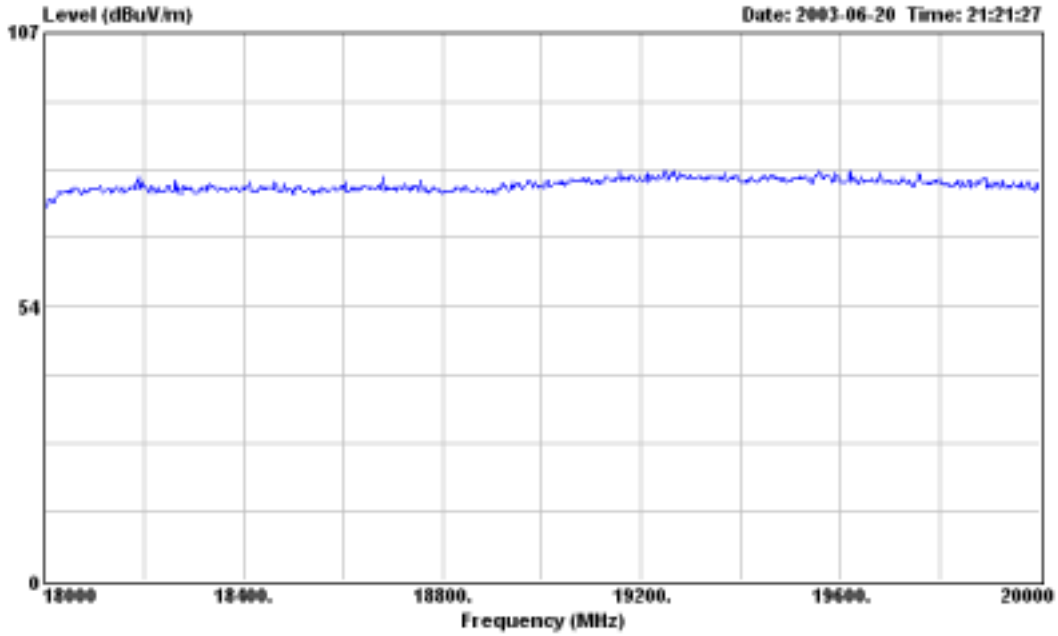

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH78 2480MHz
          : F361801
```



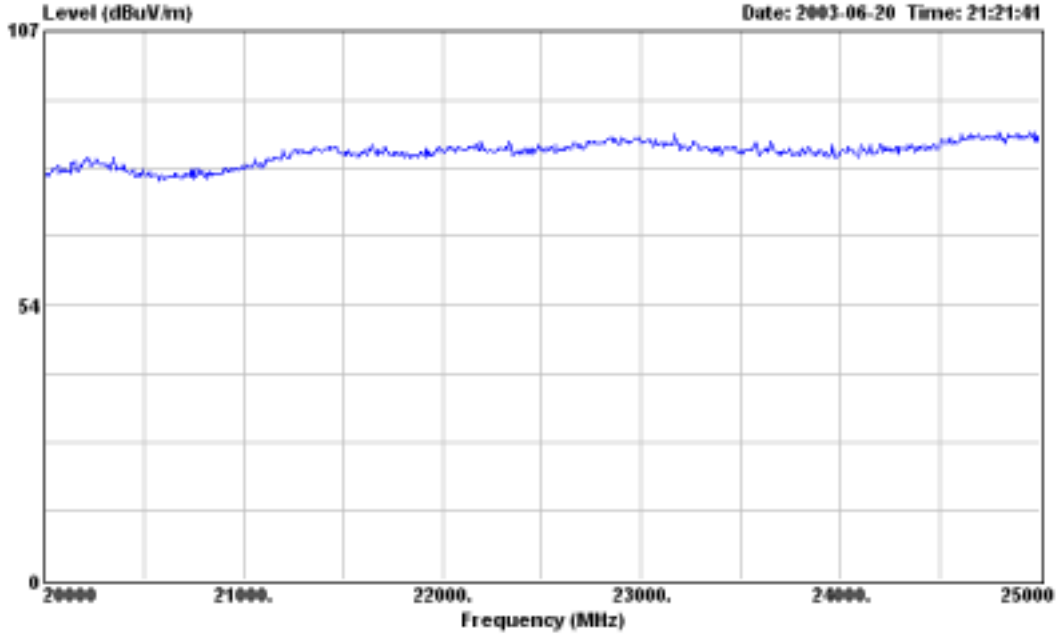

```
Site      : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH78 2480MHz
          : F361801
```



Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT : Bluetooth USB Dongle Class 11
Power : 110V/60Hz
MODEL :
MEMO : TX CH78 2480MHz
: F361801




```
Site      : 03CH03-HY
Condition : 3m 40G-HORN-02/12/21 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     :
MEMO      : TX CH78 2480MHz
          : F361801
```




```
Site      : 03CH03-HY
Condition : 3m 40G-HORN-02/12/21 VERTICAL
EUT       : Bluetooth USB Dongle Class 11
Power     : 110V/60Hz
MODEL     : ---
MEMO      : TX CH78 2480MHz
          : F361801
```

■ Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Limits (uV/m)	Emission (dBuV/m)	Level (uV/m)	Margin (dB)	Detect Mode
2478.000	H	30.11	6.31	44.65	-	-	81.07	11310.97		A.V.
2478.000	H	30.11	6.31	53.99	-	-	90.41	33151.26		Peak
4964.000	H	33.72	9.14	17.72	74.00	5011.87	60.58	1069.05	-13.42	Peak
4964.000	H	33.72	9.14	8.44	54.00	501.19	51.30	367.28	-2.70	A.V.
2478.000	V	30.11	6.31	56.34	-	-	92.76	43451.02		Peak
2478.000	V	30.11	6.31	51.80	-	-	88.22	25763.21		A.V.
4958.000	V	33.70	9.14	15.13	74.00	5011.87	57.97	791.59	-16.03	Peak
4958.000	V	33.70	9.14	5.36	54.00	501.19	48.20	257.04	-5.80	A.V.
7440.000	V/H						-			Peak, A.V.
9920.000	V/H						-			Peak, A.V.
12400.000	V/H						-			Peak, A.V.
14880.000	V/H						-			Peak, A.V.
17360.000	V/H						-			Peak, A.V.
19840.000	V/H						-			Peak, A.V.
22320.000	V/H						-			Peak, A.V.
24800.000	V/H						-			Peak, A.V.

Remark: The emission emitted by the EUT is too low to be measured except the emission listed above

Test Engineer: Jay

Jay Zhong

6. Antenna Requirements

The EUT use a undetachable antenna. It is considered meet antenna requirement of FCC.

6.1.1. Standard Applicable

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

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

6.1.2. Antenna Connected Construction

The maximum Gain antenna used in this product is dipole antenna.

7. RF Exposure

FCC Rules and Regulations Part 1.1307,1.1310,2.1091,2.1093:

RF Exposure Compliance

7.1.1. Limit For Maximum Permissible Exposure (MPE)

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm2)	Averaging Time |E|2,|H|2 or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm2)	Averaging Time |E|2,|H|2 or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

F=frequency in MHz *Plane-wave equivalent power density

7.1.2. MPE Calculations

$$E\ (V/m) = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power Density:} \quad Pd\ (mW/cm^2) = \frac{E^2}{3770}$$

E＝Electric field (V/m)

P＝Peak output power (mW)

G＝Antenna numeric gain (numeric)

d＝Separation distance (m)

Because the EUT is belong to General Population/ Uncontrolled Exposure. So the Limit of Power Density is 10 W/m2. We can change the formula to:

$$d = \sqrt{\frac{30 \times P \times G}{3770}}$$

Channel NO.	Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (W)	Calculated RF Exposure Separation Distance (m)	Minimum RF Exposure Separation Distance (m)
Channel 1	1.00	1.26	-1.32	0.0007	0.0027	0.20
Channel 6	1.00	1.26	-1.74	0.0007	0.0026	0.20
Channel 11	1.00	1.26	-0.83	0.0008	0.0029	0.20

7.1.3. FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm (8 inches) during normal operation. Proposed RF exposure safety information to include in User's Manual.

8. EMI Suppression Component List

No EMI suppression components.

9. Antenna Factor & Cable Loss

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	15.35	1.00	1000	24.30	3.89
35	13.63	1.08	2000	31.10	5.41
40	11.11	1.18	3000	29.60	6.92
45	10.59	1.24	4000	30.80	8.24
50	6.47	1.30	5000	34.20	9.22
55	5.83	1.38	6000	33.30	10.25
60	5.18	1.44	7000	37.80	11.61
65	4.81	1.52	8000	39.40	11.78
70	4.43	1.59	9000	38.40	12.59
75	5.10	1.68	10000	38.90	13.84
80	5.91	1.75	11000	41.10	14.64
85	7.33	1.77	12000	42.70	14.12
90	8.74	1.83	13000	43.90	16.01
95	9.05	1.85	14000	43.70	13.76
100	9.36	1.90	15000	43.40	14.30
110	9.65	2.01	16000	40.90	15.16
120	9.97	2.06	17000	44.40	15.88
130	10.51	2.16	18000	47.10	16.09
140	10.32	2.24	19000	37.60	16.98
150	9.42	2.34	20000	37.30	16.21
160	8.09	2.42	21000	37.00	20.13
170	7.43	2.56	22000	38.00	19.24
180	7.60	2.62	23000	38.70	19.64
190	7.43	2.67	24000	38.60	20.54
200	7.26	2.76	25000	38.90	20.14
220	9.11	2.92	14000	43.70	13.76
240	10.88	3.09	15000	43.40	14.30
260	11.75	3.23	16000	40.90	15.16
280	11.55	3.38	17000	44.40	15.88
300	11.36	3.51	18000	47.10	16.09
320	12.03	3.63	19000	37.60	16.98
340	12.69	3.73	20000	37.30	16.21
360	13.33	4.03	21000	37.00	20.13
380	14.00	4.00	22000	38.00	19.24
400	14.63	4.09	23000	38.70	19.64
450	15.33	4.31	24000	38.60	20.54
500	16.03	4.64	25000	38.90	20.14
550	16.65	5.09			
600	17.29	5.49			
650	17.64	5.82			
700	18.00	5.94			
750	18.39	6.16			
800	18.79	6.58			
850	19.10	6.72			
900	19.42	6.81			
950	19.58	7.10			
1000	19.75	7.41			

10. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100132	9 KHz – 2.75 GHz	Jun. 12, 2003	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001-008	9 KHz – 30 MHz	Apr. 29, 2003	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	2001-009	9 KHz – 30 MHz	Apr. 29, 2003	Conduction (CO01-HY)
EMI Filter	LINDGREN	LRE-2060	1004	< 450 Hz	N/A	Conduction (CO01-HY)
EMI Filter	LINDGREN	N6006	201052	0 ~ 60 Hz	N/A	Conduction (CO01-HY)
RF Cable-CON	Suhner Switzerland	RG223/U	CB029	9KHz~30MHz	Jan. 07, 2003	Conduction (CO01-HY)
50 ohm BNC type Terminal	NOBLE	50ohm	TM009	50 ohm	Apr. 24, 2003	Conduction (CO01-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	Jun. 22, 2002	Radiation (03CH03-HY)
Spectrum analyzer	R&S	FSP40	100004/040	9KHZ~40GHz	Aug. 07, 2002	Radiation (03CH03-HY)
Receiver	SCHAFFNER	SCR 3501	417	9 KHz –1GHz	Feb. 20, 2003	Radiation (03CH03-HY)
Amplifier	HP	8447D	2944A09072	100KHz – 1.3GHz	Oct. 21, 2002	Radiation (03CH03-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2687	30MHz –2GHz	Dec. 21, 2002	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Jan. 02, 2003	Radiation (03CH03-HY)
Amplifier	MITEQ	AFS44	879981	100MHz~26.5GHz	Aug. 12, 2002	Radiation (03CH03-HY)
Horn Antenna	COM-POWER	AH-118	10094	1GHz – 18GHz	Apr. 10, 2003	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
RF Cable-HIGH	Jye Bao	RG142	CB030-HIGH	1GHz~29.5GHz	Mar. 14, 2003	Radiation (03CH03-HY)
Power meter	R&S	NRVS	100444	DC~40GHz	May 28, 2003	Conducted
Power sensor	R&S	NRV-Z55	100049	DC~40GHz	May 28, 2003	Conducted
Power Sensor	R&S	NRV-Z32	100057	30MHz-6GHz	May 28, 2003	Conducted
AC power source	HPC	HPA-500W	HPA-9100024	AC 0~300V	May 27, 2003	Conducted
Temp. and Humidity	KSON	THS-C3L	612	N/A	Oct. 02, 2002	Conducted
Power meter	R&S	NRVS	100444	DC~40GHz	May 28, 2003	Conducted

※ Calibration Interval of instruments listed above is one year.

11. Uncertainty of Test Site

Uncertainty of Radiated Emission Measurement

Contribution	Probability Distribution	3m
Antenna factor calibration	normal(k=2)	±1
cable loss calibration	normal(k=2)	±0.3
RCV/SPA specification	rectangular	±2
Antenna Directivity	rectangular	±3
Antenna Factor V.S. Height	rectangular	±2
Antenna Factor Interpolation for Frequency	rectangular	±0.25
site imperfection	rectangular	±2
Mismatch Receiver VSWR $\Gamma 1=0.09$ Antenna VSWR $\Gamma 2=0.67$ Uncertainty=20log(1-$\Gamma 1*\Gamma 2$)	U-shaped	±0.54
combined standard uncertainty Ue(y)	normal	±2.7
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	normal (k=2)	±5.4

$U=\sqrt{\{(1/2)^2+(0.3/2)^2+(2^2+0.5^2+2^2+0.25^2+2^2)/3+(0.54)^2/2\}}=2.2$ for 10m test distance

$U=\sqrt{\{(1/2)^2+(0.3/2)^2+(2^2+3^2+2^2+0.25^2+2^2)/3+(0.54)^2/2\}}=2.7$ for 3m test distance

Uncertainty of Conducted Emission Measurement

Contribution	Probability Distribution	150KHz – 30MHz
Cable and I/P attenuator calibration	normal(k=2)	±0.3
RCV/SPA specification	rectangular	±2
LISN coupling specification	rectangular	±1.5
Transducer factor frequency interpolation	rectangular	±0.2
Mismatch Receiver VSWR $\Gamma 1=0.09$ LISN VSWR $\Gamma 2=0.33$ Uncertainty=20log(1-$\Gamma 1*\Gamma 2$)	U-shaped	0.2
combined standard uncertainty Ue(y)	normal	±1.66
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	normal (k=2)	±3.32

$U=\sqrt{\{(0.3/2)^2+(2^2+1.5^2+0.2^2)/3+(0.2)^2/2\}}=1.66$