FCC TEST REPORT

for

47 CFR Part 15 Subpart C

Equipment	:	**Wireless Terminal**
Trade Name	:	**Neo / CMCS**
Model No.	:	**CT-10 / Chia**
FCC ID.	:	**QDJ-0406CHAI1**
Filing Type	:	**Certification**
Applicant	:	**Chi Mei Communication Systems, Inc.** 11F, No. 39, Chung Hua RD. Sec. 1, Taipei 100, Taiwan

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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: July 22, 2004

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

Certificate No. : F462917

CERTIFICATE OF COMPLIANCE

for

47 CFR Part 15 Subpart C

Equipment : Wireless Terminal

Trade Name : Neo / CMCS

Model No. : CT-10 / Chia

FCC ID. : QDJ-0406CHAI1

Filing Type : Certification

Applicant : Chi Mei Communication Systems, Inc.
11F, No. 39, Chung Hua RD. Sec. 1, Taipei 100, Taiwan

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 - 2001** 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 July 22, 2004 at **SPORTON International Inc.** LAB.

Daniel Lee
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

Chi Mei Communication Systems, Inc.
11F, No. 39, Chung Hua RD. Sec. 1, Taipei 100, Taiwan

1.2. Manufacturer

Chi Mei Communication Systems, Inc.
No. 128, Sheng-Li Rd., Jen Te Shiang, Tainan County, Taiwan 717

1.3. Basic Description of Equipment under Test

Equipment	: Wireless Terminal
Trade Name	: Neo / CMCS
Model No.	: CT-10 / Chia
FCC ID	: QDJ-0406CHAI1
Power Supply Type	: Switching
AC Power Cord	: AC 120V, No-shielded, wall-mound, 1.5 meter, 2 pin

1.4. Feature of Equipment under Test

DUT Type :	Wireless Terminal
Trade Name :	Neo / CMCS
Model Name :	CT-10 / Chia
FCC ID :	QDJ-0406CHAI1
Tx & Rx Frequency :	2400 ~ 2483.5 MHz
HW Version :	0.2
SW Version :	1.0.183.0
Antenna Type :	Fixed Internal
Antenna Gain :	-3.5 dBi
Maximum Output Power :	-3 dBm
Type of Modulation :	GFSK
DUT Stage	Production Unit
Application Type :	Certification

2. Test Configuration of Equipment under Test

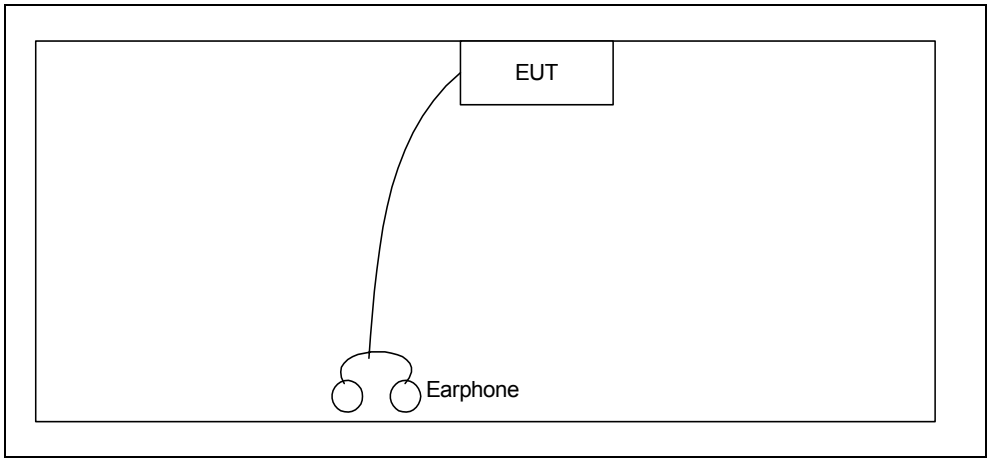
2.1. Test Manner

a. The EUT has been associated with peripherals pursuant to ANSI C63.4-2001 and configuration operated in a manner, which tended to maximize its emission characteristics in a typical application.
b. The complete test system included EUT for EMI test.
c. The following test modes were tested for conduction test:
   Mode 1: Link mode
d. The following test modes were tested for radiation test:
   Mode 1: 2402MHz (CH00)
   Mode 2: 2441MHz (CH39)
   Mode 3: 2480MHz (CH78)
e. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 25000MHz.

2.2. Description of Test System

Item	Asset	Model Name	Power Cord	S/N
1. Earphone		N/A	N/A	N/A

2.3. Connection Diagram of Test System



3. Operation of Equipment under Test

RF Utility can transmit continuous Tx through AT command on hyper terminal.

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, 03CH06-HY

4.1. Test Voltage

110V/60Hz

4.2. Standard for Methods of Measurement

ANSI C63.4-2001

4.3. Test in Compliance with

47 CFR Part 15 Subpart C

4.4. Frequency Range Investigated

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

4.5. Test Distance

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

5. Report of Measurements and Examinations

5.1. List of Measurements and Examinations

FCC Rule	Description of Test	Result
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 within a 30 Second Period	Pass
15.247(b)(1)	Output Power	Pass
15.247(c)	100KHz Bandwidth of Frequency Band Edges	Pass
15.207	Conducted Emission	Pass
15.209	Radiated Emission	Pass
15.203 15.247(B)(4)	Antenna Requirement	Pass

5.2. Hopping Channel Separation

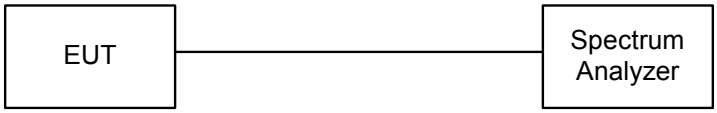
5.2.1. Measuring Instruments：

As described in chapter 7 of this test report.

5.2.2. Test Procedure：

1. The transmitter output was connected to the spectrum analyze directly.
2. Set RBW of spectrum analyzer to 30kHz and VBW to 100kHz.
3. The Hopping Channel Separation is defined as the channel is separated with the next channel.

5.2.3. Test Setup Layout：



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

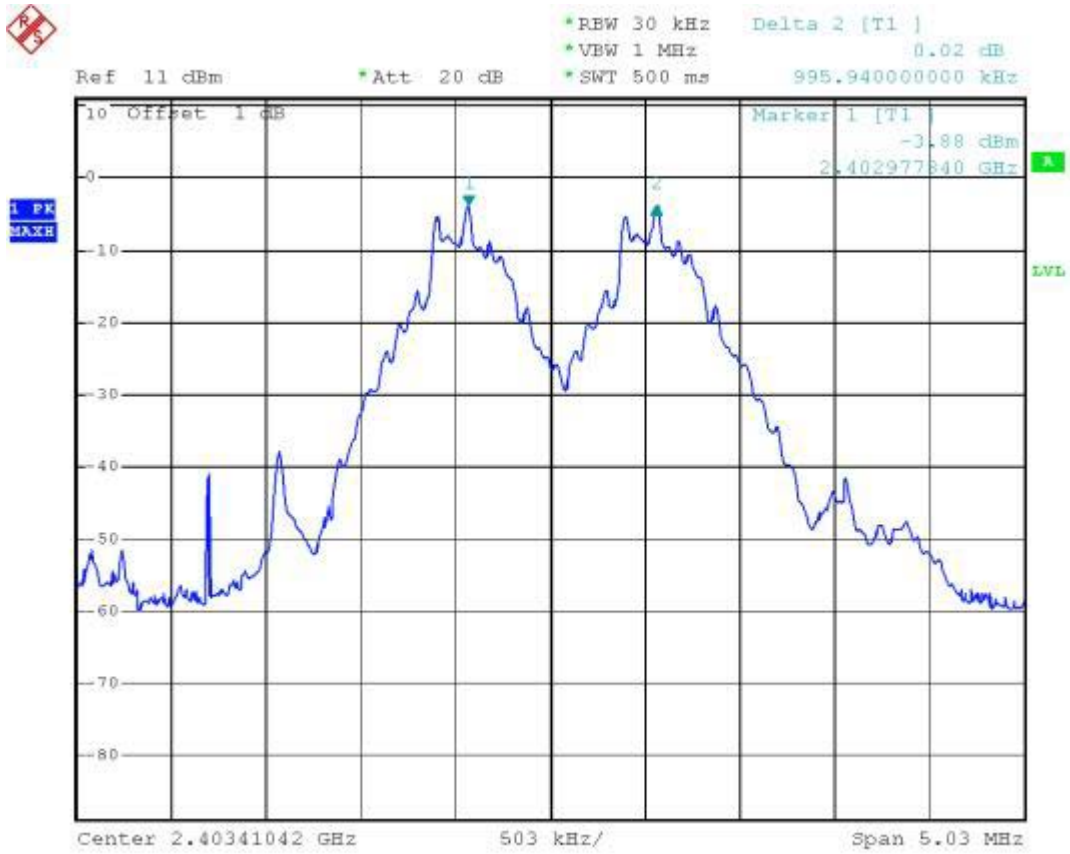
- Test Mode: Mode 1~Mode 3
- Temperature: 26°C
- Relative Humidity: 53%

Channel	Frequency (MHz)	Hopping Channel Separation (MHz)	Limits (MHz)	Plot Ref. No.
00	2402	0.99594	0.760	Mode 1
39	2441	0.99720	0.764	Mode 2
78	2480	0.10000	0.756	Mode 3

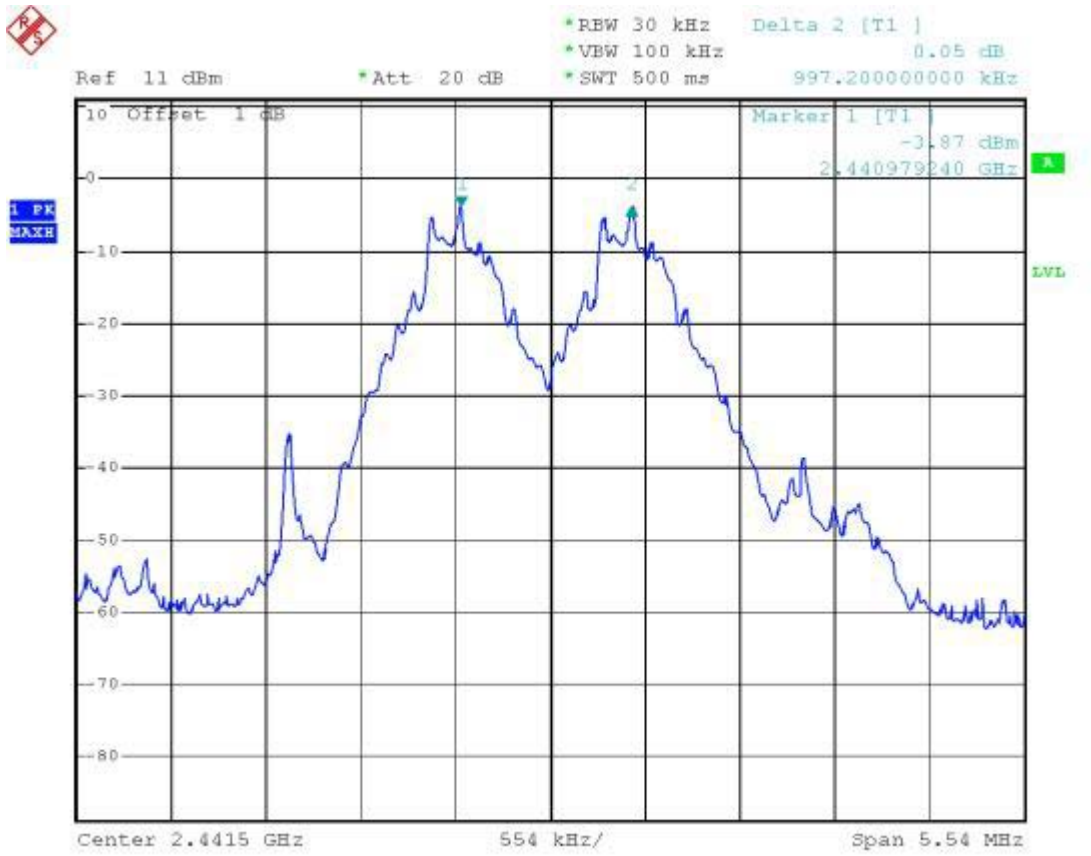
Remark: Limit is the greater one of 25kHz or the 20dB bandwidth of the hopping channel.

5.2.5 Hopping Channel Separation

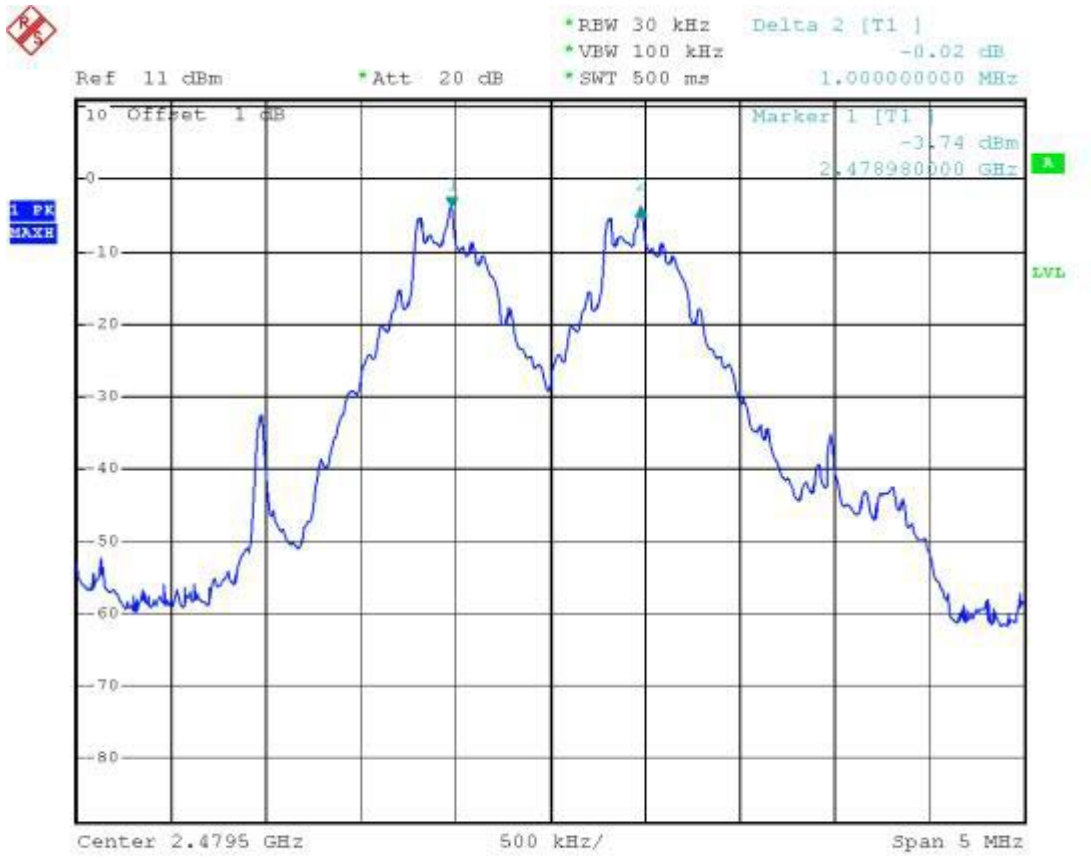
Mode 1: CH00 (2402MHz)



Mode 2: CH39 (2441MHz)



Mode 3: CH78 (2480MHz)



5.3. Number of Hopping Frequency

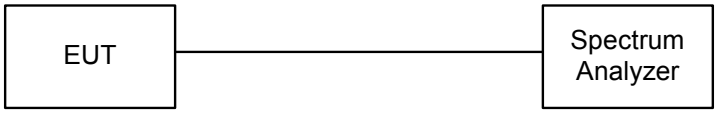
5.3.1. Measuring Instruments：

As described in chapter 7 of this test report.

5.3.2. Test Procedure：

1. The transmitter output was connected to the spectrum analyze directly.
2. Set RBW of spectrum analyzer to 100kHz and VBW to 100kHz.
3. The number of hopping frequency used is defined as the device has the numbers of total channel.

5.3.3. Test Setup Layout：

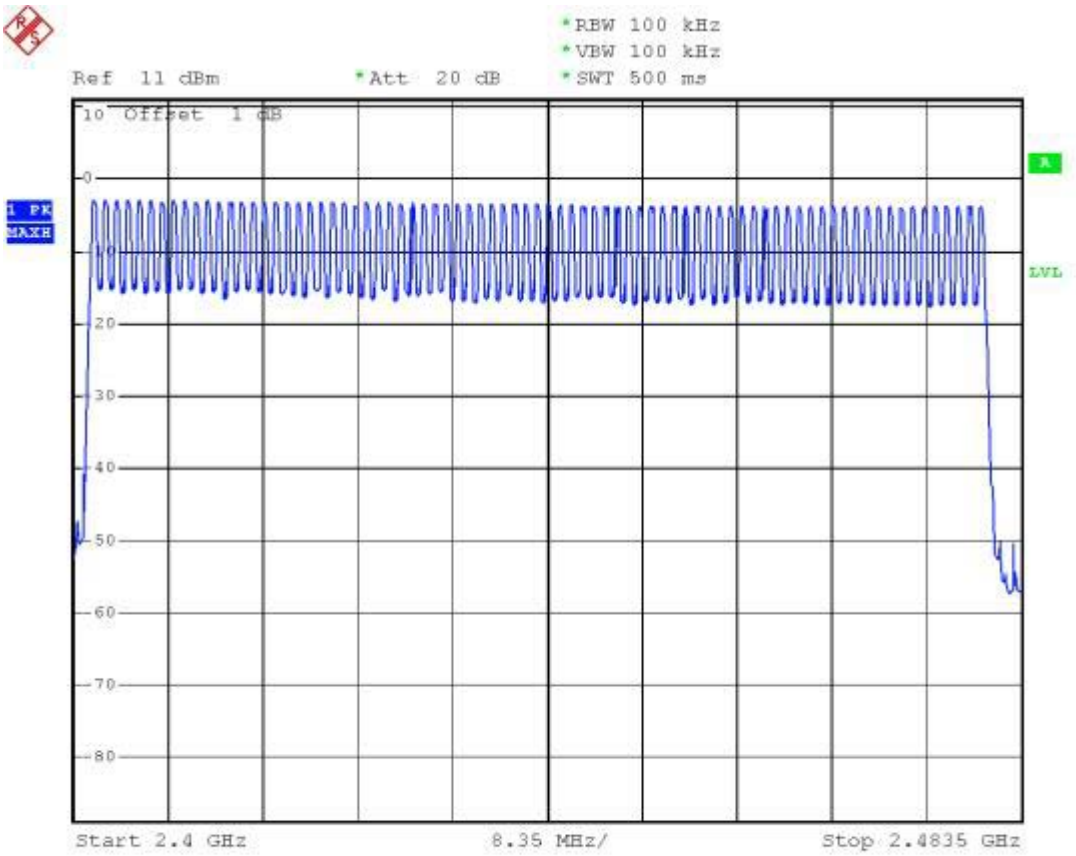


5.3.4. Test Result：See spectrum analyzer plots below

- Temperature: 26°C
- Relative Humidity: 53%

Number of Hopping Frequency (Channel)	Limits (Channel)
79	75

5.3.5 Number of Hopping Frequency



5.4. Hopping Channel Bandwidth

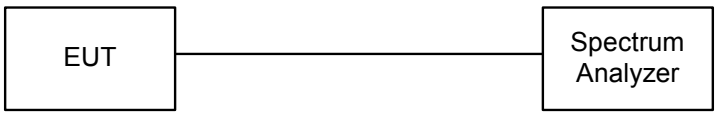
5.4.1 Measuring Instruments：

As described in chapter 7 of this test report.

5.4.2 Test Procedure：

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

5.4.3 Test Setup Layout：



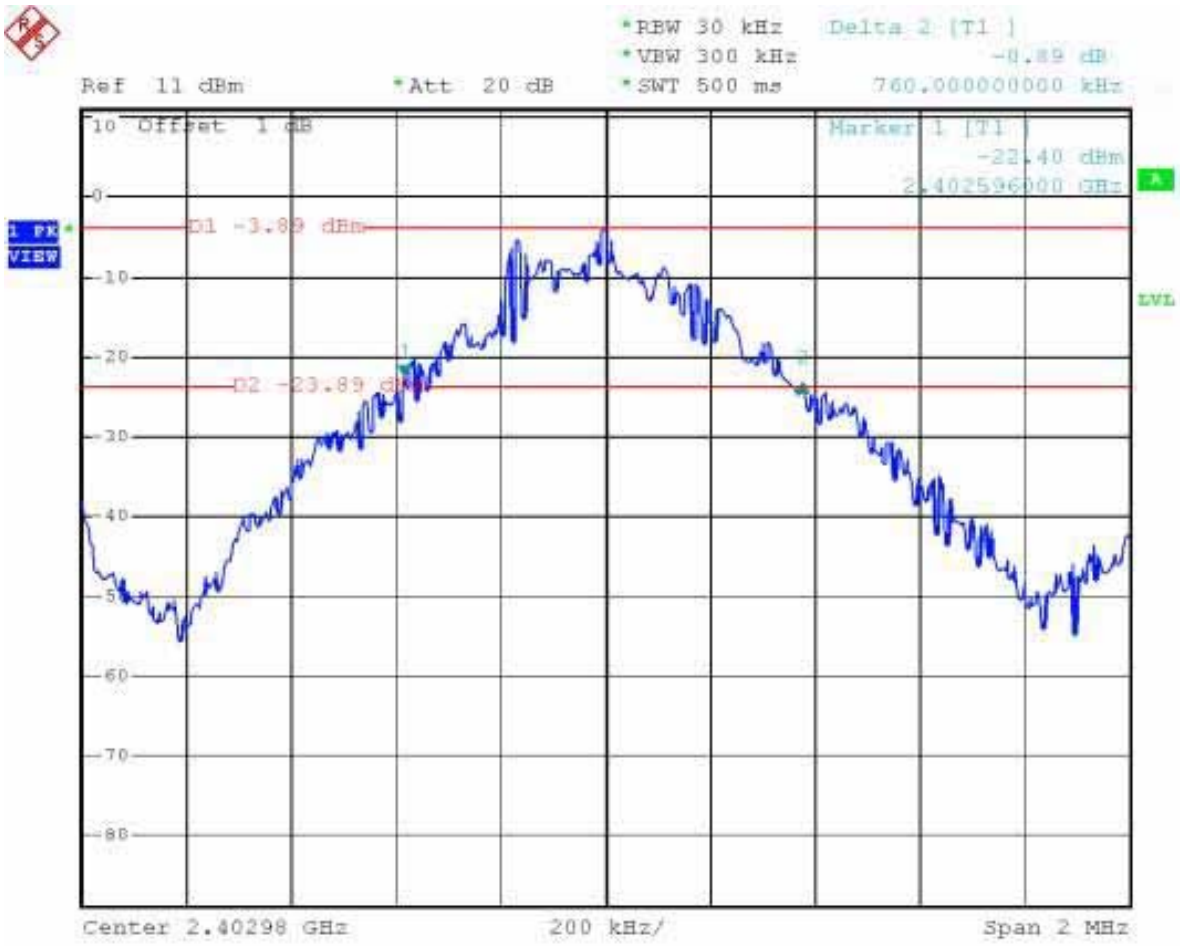
5.4.4 Test Result：See spectrum analyzer plots below

- Test Mode: Mode 1~Mode 3
- Temperature: 26°C
- Relative Humidity: 53%

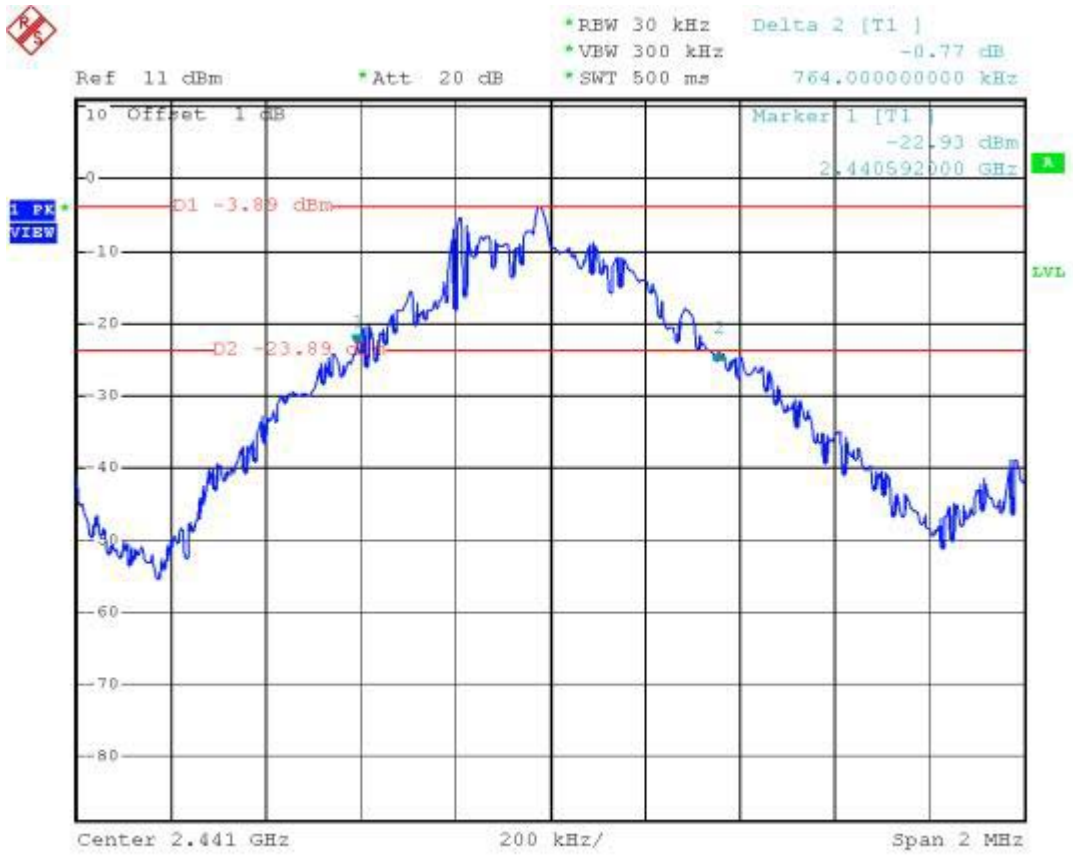
Channel	Frequency (MHz)	Hopping Channel Bandwidth (MHz)	Limits (MHz)	Plot Ref. No.
00	2402	0.760	1.0	Mode 1
39	2441	0.764	1.0	Mode 2
78	2480	0.756	1.0	Mode 3

5.4.5 Hopping Channel Bandwidth

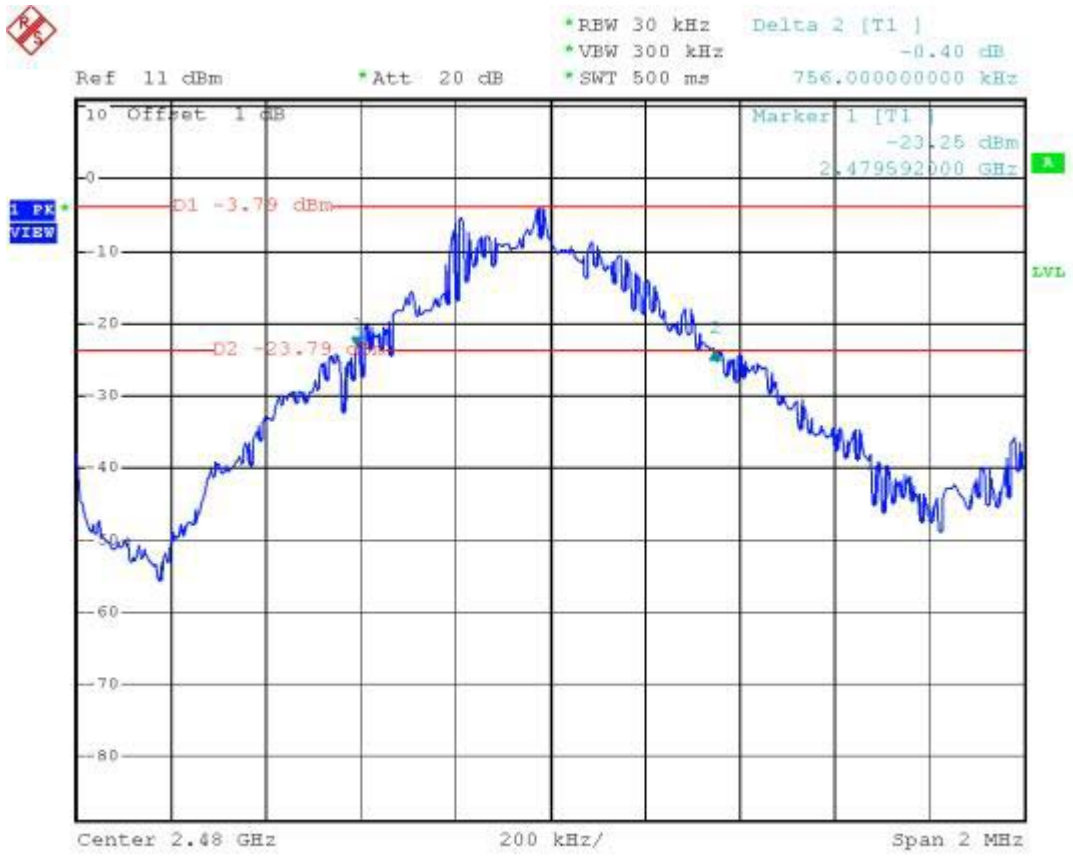
Mode 1: CH00 (2402MHz)



Mode 2: CH39 (2441MHz)



Mode 3: CH78 (2480MHz)



5.5 Dwell Time of Each Frequency within a 30 Seconds Period

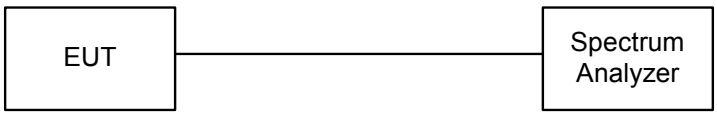
5.5.1 Measuring Instruments：

As described in chapter 7 of this test report.

5.5.2 Test Procedure：

1. The transmitter output was connected to the spectrum analyzer directly.
2. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
3. Set the center frequency on any frequency would be measured and set the frequency span to zero span.

5.5.3 Test Setup Layout：



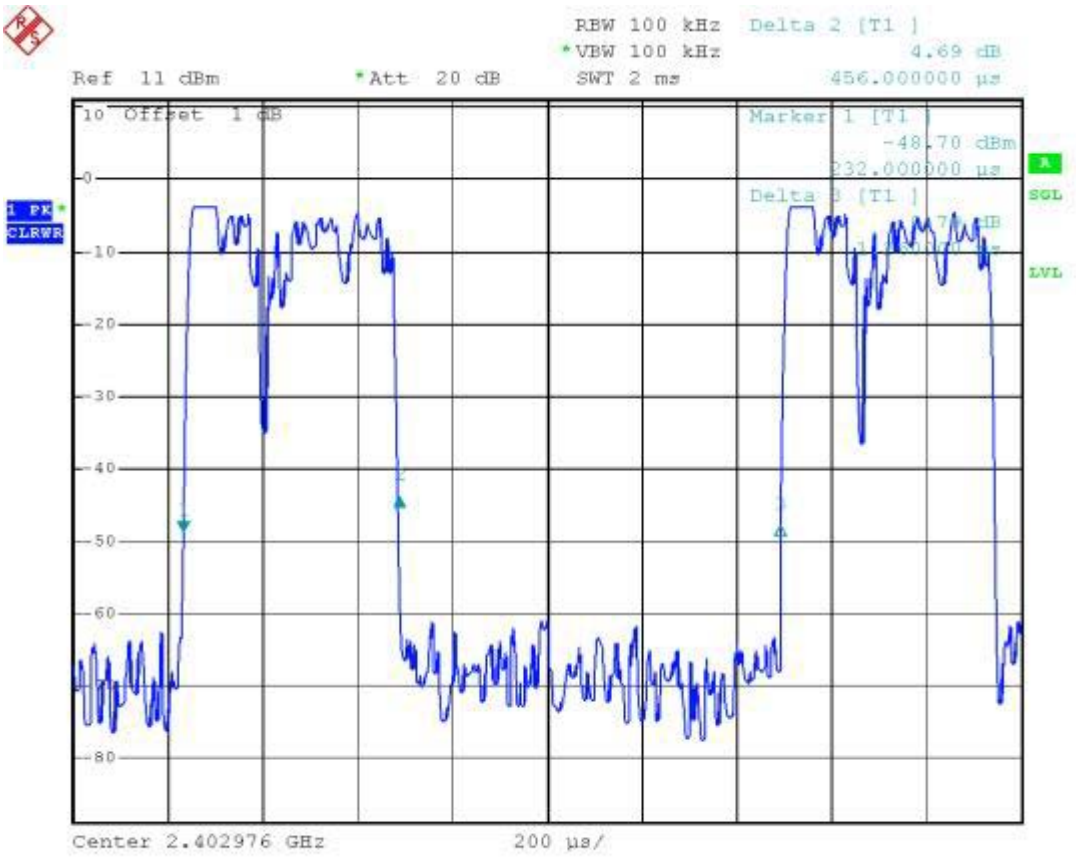
5.5.4 Test Result：See spectrum analyzer plots below

- Test Mode: Mode 1~Mode 3
- Temperature: 26°C
- Relative Humidity: 53%

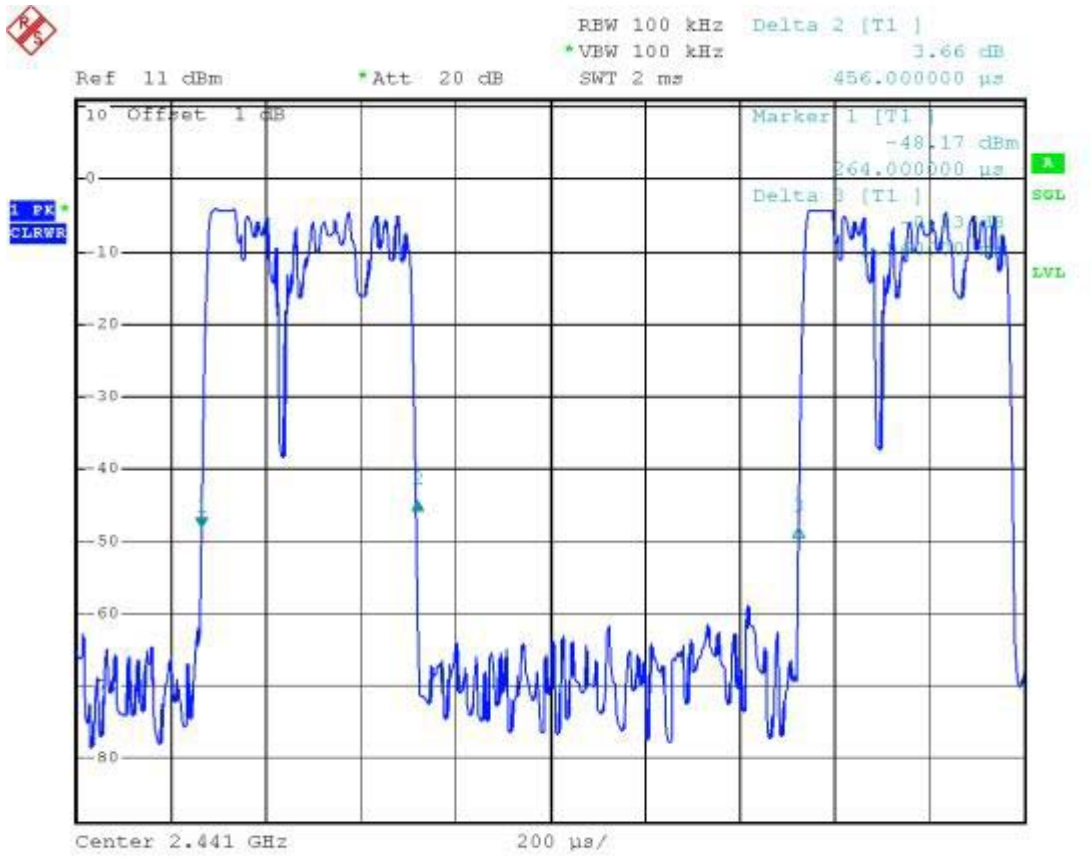
Channel	Frequency (MHz)	Dwell Time (s)	Limits (s)	Plot Ref. No.
00	2402	0.277	0.4	Mode 1
39	2441	0.277	0.4	Mode 2
78	2480	0.277	0.4	Mode 3

5.5.5 Dwell Time of Each Frequency

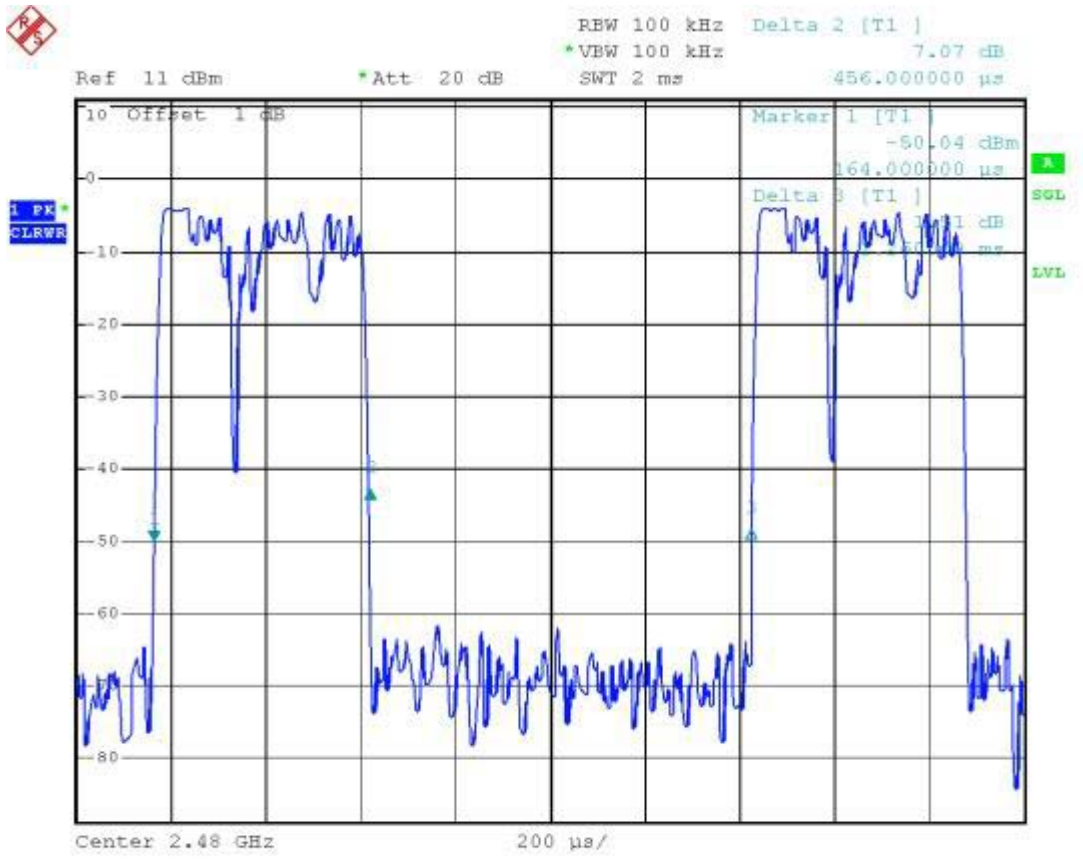
Mode 1: CH00 (2402MHz)



Mode 2: CH39 (2441MHz)



Mode 3: CH78 (2480MHz)



5.6 Output Power

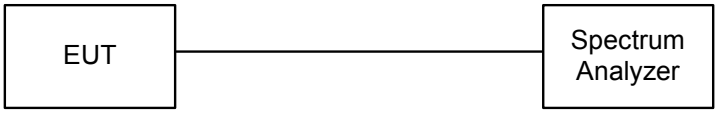
5.6.1 Measuring Instruments：

As described in chapter 7 of this test report.

5.6.2 Test Procedure：

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

5.6.3 Test Setup Layout：



5.6.4 Test Result：See spectrum analyzer plots below

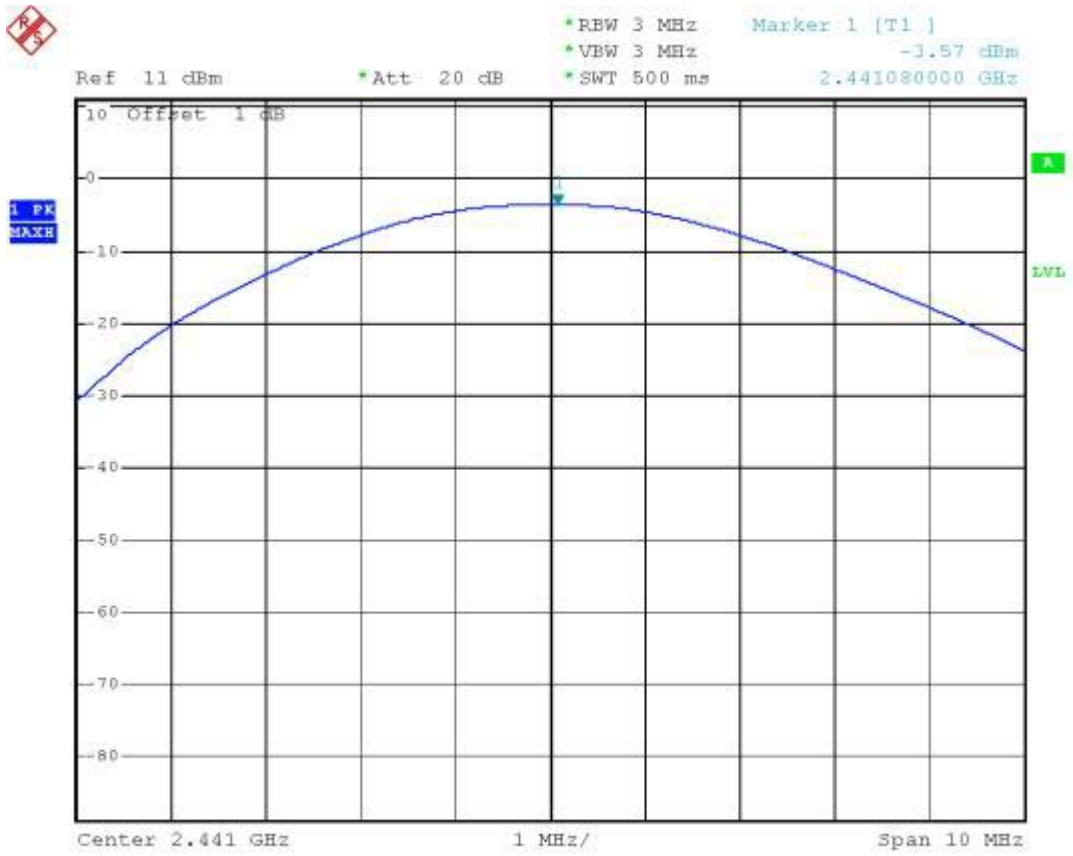
- Test Mode: Mode 1~Mode 3
- Temperature: 26°C
- Relative Humidity: 53%

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (Watt/dBm)	Plot Ref. No.
00	2402	-3.56	1W/30 dBm	Mode 1
39	2441	-3.57	1W/30 dBm	Mode 2
78	2480	-3.49	1W/30 dBm	Mode 3

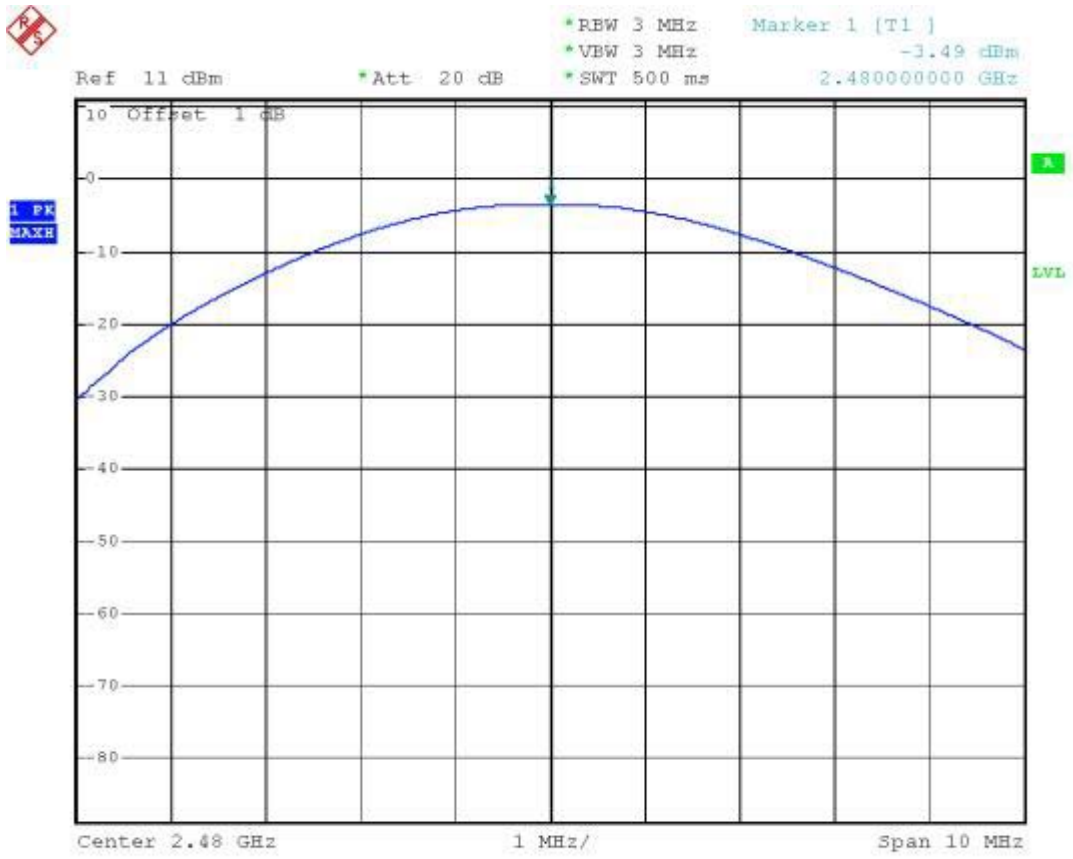
5.6.5 Output Power

Mode 1: CH00 (2402MHz)

Mode 2: CH39 (2441MHz)



Mode 3: CH78 (2480MHz)



5.7 100KHz Bandwidth of Frequency Band Edges

5.7.1 Measuring Instruments：

As described in chapter 7 of this test report.

5.7.2 Test Procedure：

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

5.7.3 Test Result：

- Test Mode: Mode 1 and Mode 3
- Temperature: 26°C
- Relative Humidity: 53%

Test Result in lower band (Channel 00)： PASS

Test Result in higher band(Channel 78)： PASS

5.7.4 Note on Band edge Emission

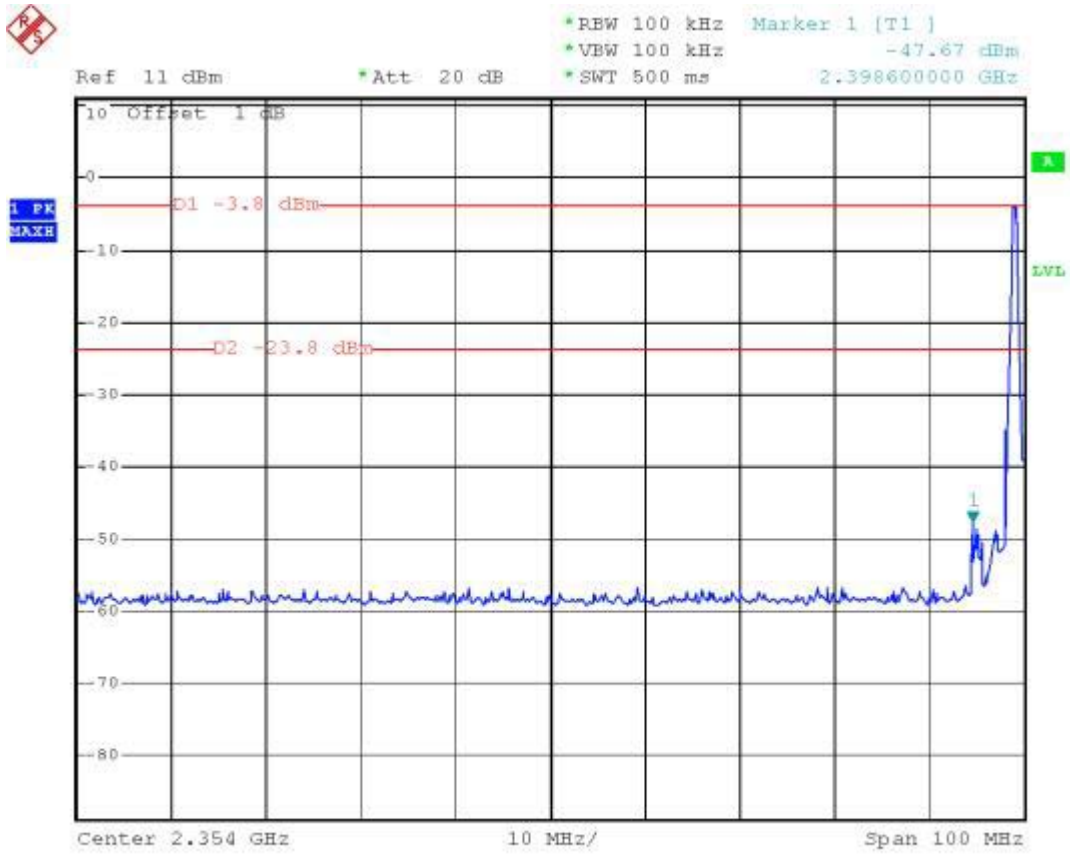
The band edge emission shows 44.08 dB delta between carrier maximum power and local maximum emission in the restricted band (2.390GHz).
The band edge emission shows 52.37 dB delta between carrier maximum power and local maximum emission in the restricted band (2.4835GHz)

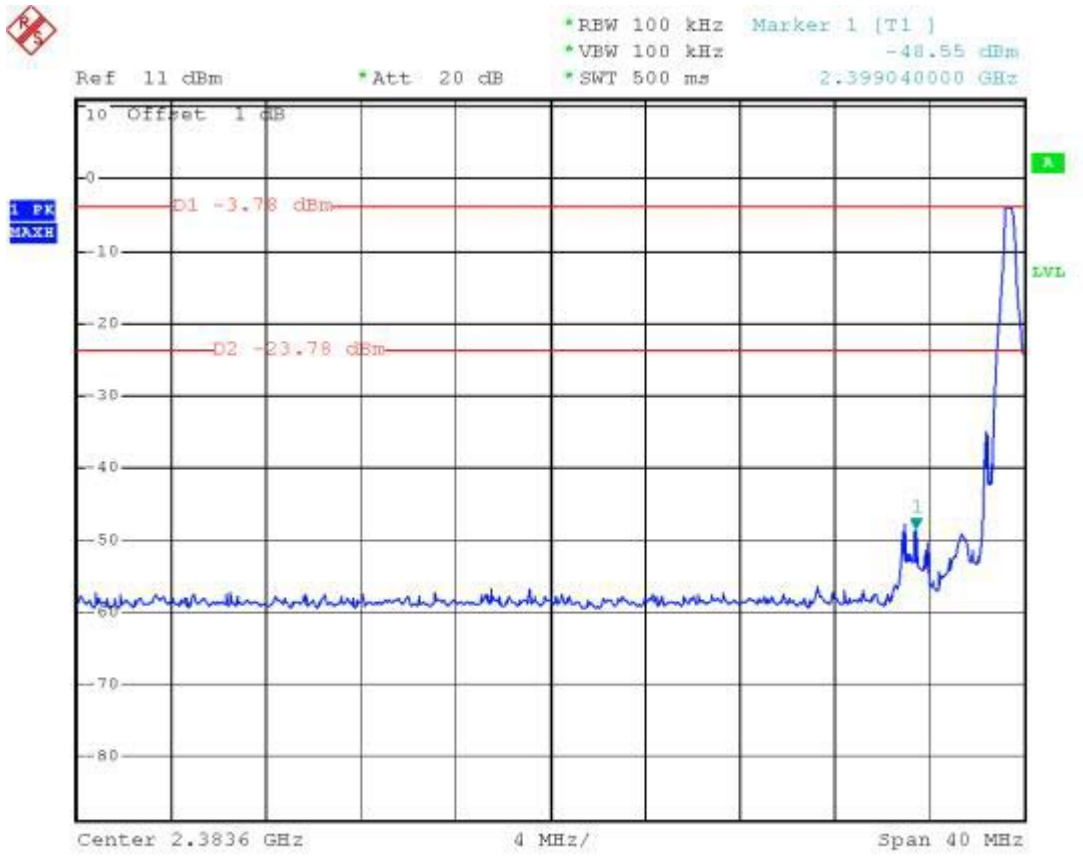
Channel	Polarity	The emission of carrier power strength	Frequency	The maximum field strength in band edge	Limit	Margin	Remark	Result
		(dB μ V/m)	(GHz)	(dB μ V/m)	(dB μ V/m)	(dB)		
00	H	91.19	2.39904	47.11	74	-26.89	Peak	Pass
	H	86.95	2.39904	42.87	54	-11.13	Average	Pass
	V	89.70	2.39904	45.62	74	-28.38	Peak	Pass
	V	83.64	2.39904	39.56	54	-14.44	Average	Pass
78	H	88.50	2.48366	36.13	74	-37.87	Peak	Pass
	H	82.41	2.48366	30.04	54	-23.96	Average	Pass
	V	84.25	2.48366	31.88	74	-42.12	Peak	Pass
	V	78.62	2.48366	26.25	54	-27.75	Average	Pass

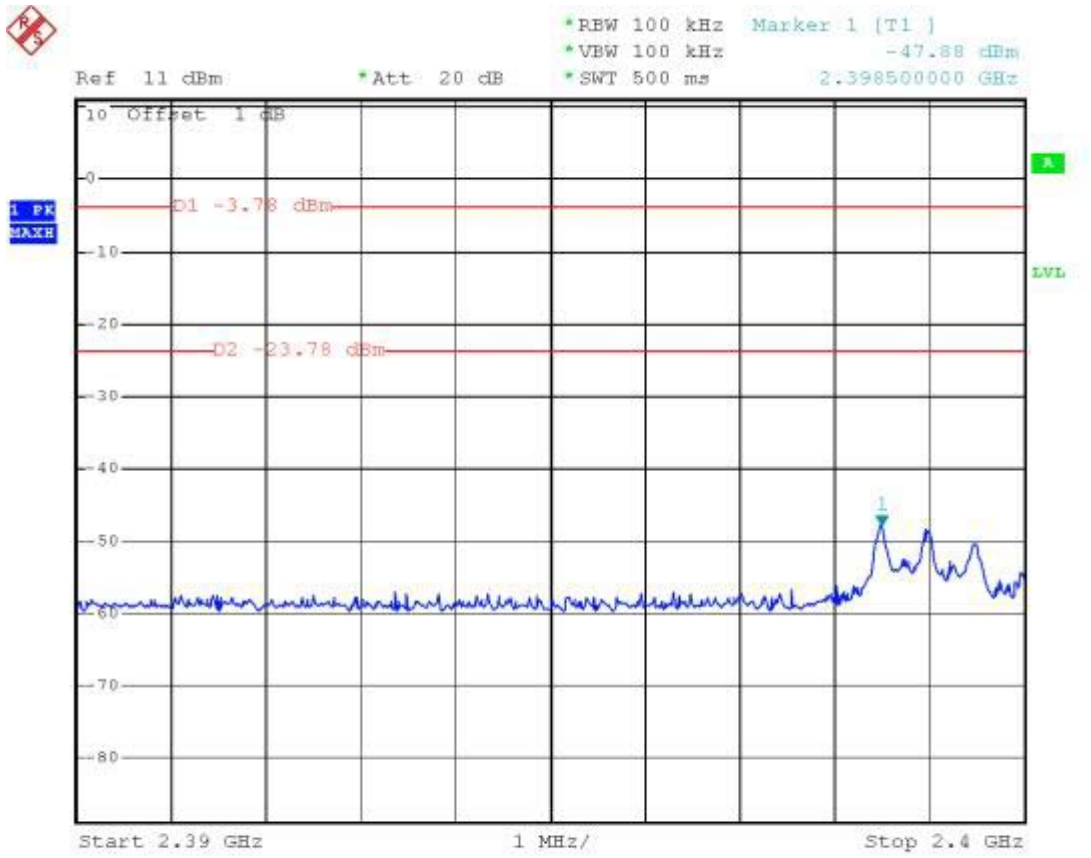
＊Remark: The data above can refer to radiated emission in section 5.9.

5.7.5 Frequency Band Edge

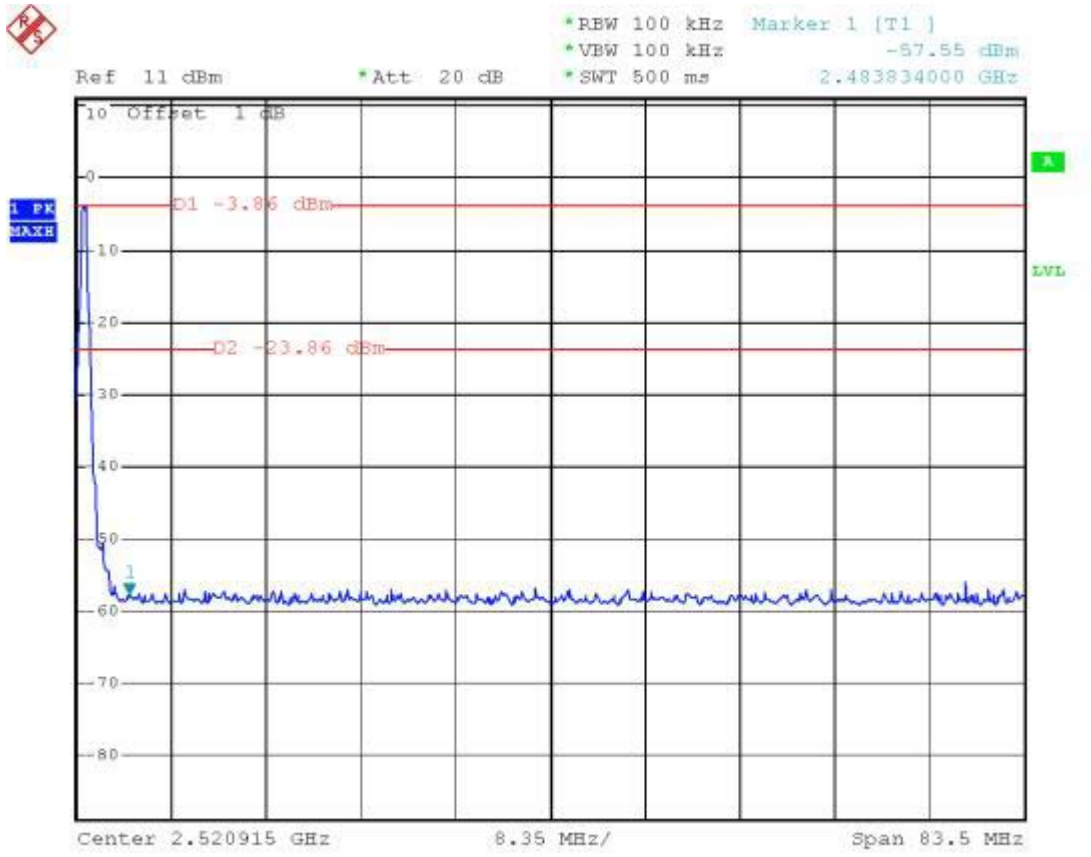
Mode 1: CH00 (2402 MHz)

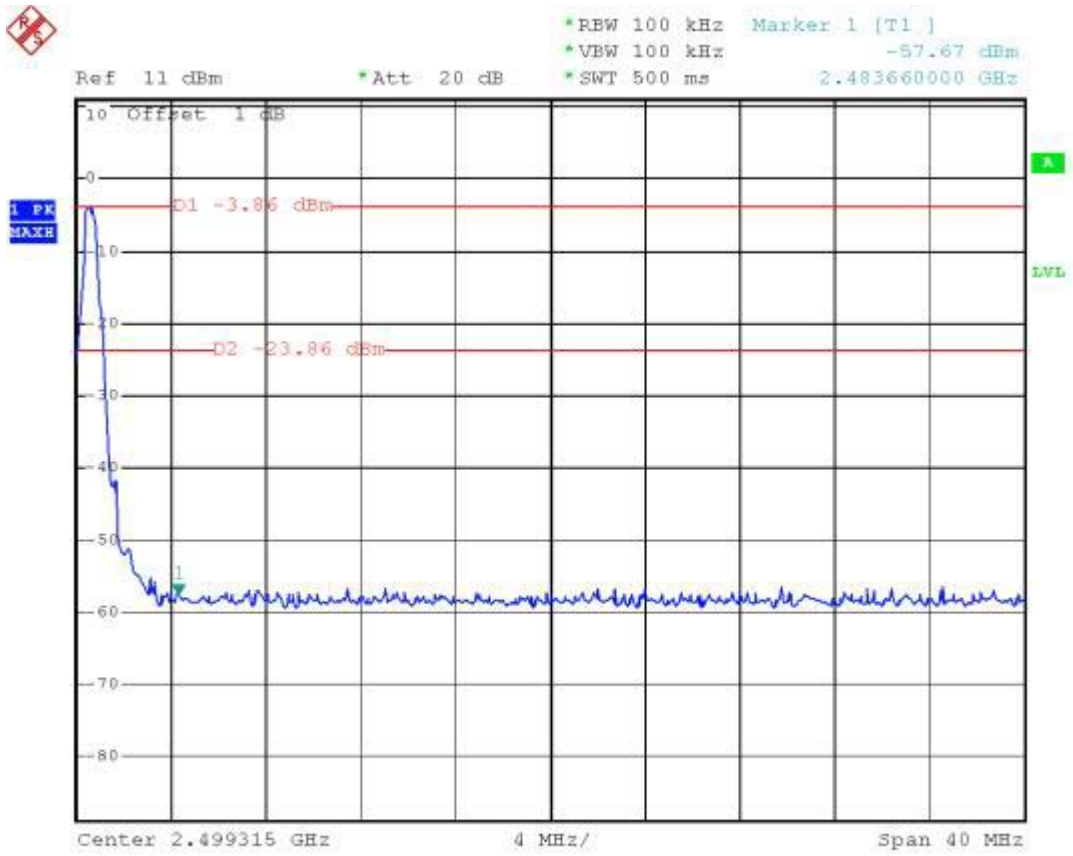


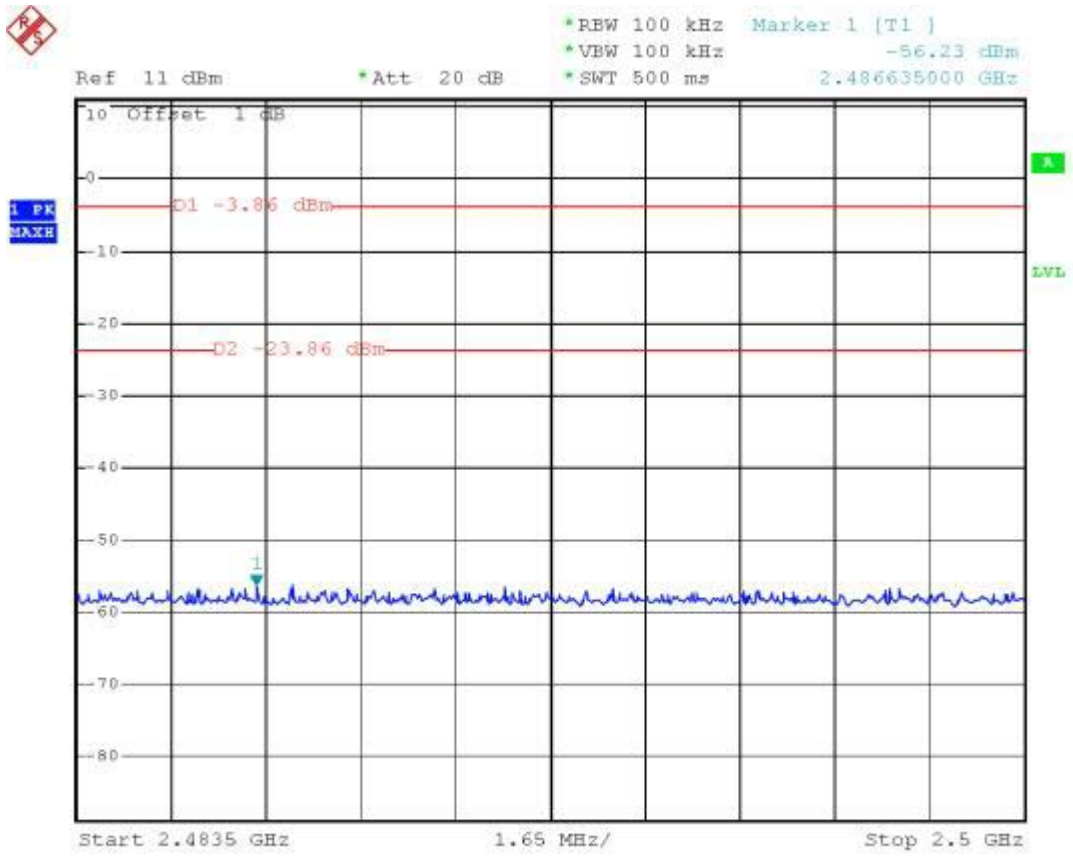

*RBW 100 kHz
Marker 1 [T1]
*VBW 100 kHz
-48.55 dBm
Ref 11 dBm
*Att 20 dB
*SWT 500 ms
2.399040000 GHz
10 Offset 1 dB
D1 -3.78 dBm
D2 -23.78 dBm
1 PK MAXH
A
LVL
Center 2.3836 GHz
4 MHz/
Span 40 MHz


RBW 100 kHz
VBW 100 kHz
SWT 500 ms
Marker 1 [T1]
-47.88 dBm
2.398500000 GHz
Ref 11 dBm
Att 20 dB
Offset 1 dB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
D1 -3.78 dBm
D2 -23.78 dBm
1 PK
MAXH
A
LVL
Start 2.39 GHz
1 MHz/
Stop 2.4 GHz

Mode 3: CH78 (2480 MHz)




*RBW 100 kHz
Marker 1 [T1]
*VBW 100 kHz
-57.67 dBm
Ref 11 dBm
*Att 20 dB
*SWT 500 ms
2.483660000 GHz
10 Offset 1 dB
0
D1 -3.86 dBm
10
20
D2 -23.86 dBm
30
40
50
60
70
80
1 PK
MAXH
A
LVL
Center 2.499315 GHz
4 MHz/
Span 40 MHz


RBW 100 kHz
VBW 100 kHz
SWT 500 ms
Marker 1 [T1]
-56.23 dBm
2.486635000 GHz
Ref 11 dBm
Att 20 dB
Offset 1 dB
D1 -3.86 dBm
D2 -23.86 dBm
1 PK MAXH
A
LVL
Start 2.4835 GHz
1.65 MHz/
Stop 2.5 GHz

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 C63.4-2001 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

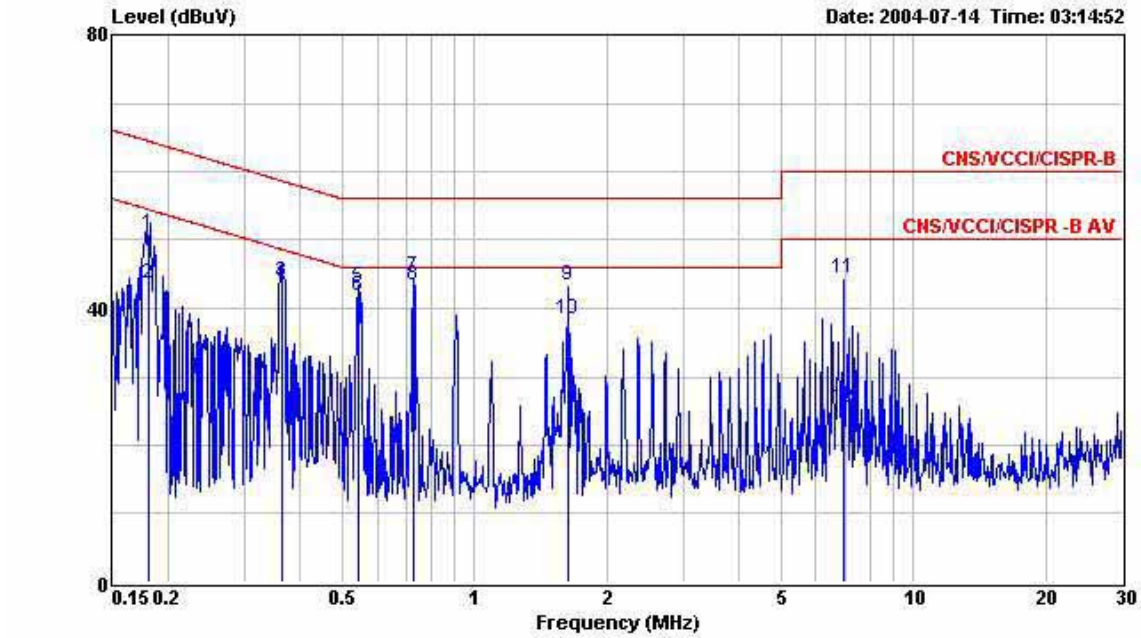
5.8.2 Test Procedures：

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 port of a line impedance stabilization network (LISN).
c. All the support units are connected to the other LISN.
d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
e. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
f. Both sides of AC line were checked for maximum conducted interference.
g. The frequency range from 150 KHz to 30 MHz was searched.
h. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

5.8.3 Test Result of Conducted Emission：

- Test Mode: Mode 1
- Frequency Range of Test: from 150KHz to 30 MHz
- Temperature: 26°C
- Relative Humidity: 53%
- Test Date: July 22, 2004

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

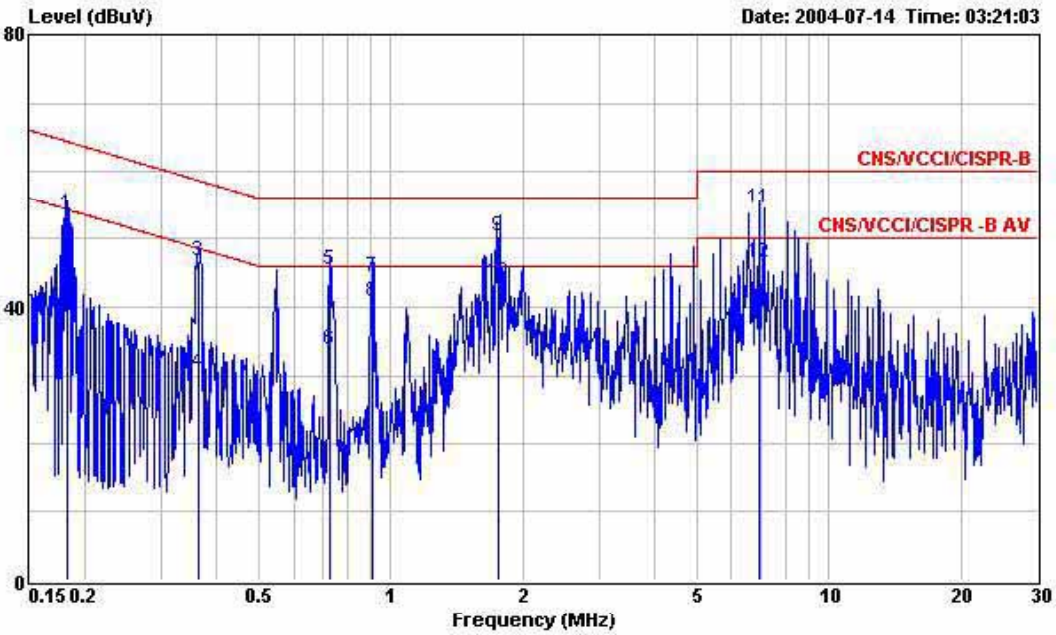


Site : CO01-HY
Condition : CNS/VCCI/CISPR-B 2003 2001/008 LINE
EUT : Wireless Terminal

Power : 120Vac/60Hz
Model : CT-10

Memo : LINK MODE

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.181	50.90	-13.53	64.43	50.79	0.10	0.01	QP
2	0.181	43.70	-10.73	54.43	43.59	0.10	0.01	Average
3	0.363	43.99	-14.68	58.67	43.86	0.10	0.03	QP
4	0.363	43.63	-5.04	48.67	43.50	0.10	0.03	Average
5	0.546	43.22	-12.78	56.00	43.09	0.10	0.03	QP
6	0.546	41.90	-4.10	46.00	41.77	0.10	0.03	Average
7	0.728	44.61	-11.39	56.00	44.47	0.10	0.04	QP
8	0.728	43.36	-2.64	46.00	43.22	0.10	0.04	Average
9	1.639	43.30	-12.70	56.00	43.13	0.10	0.07	QP
10	1.639	38.39	-7.61	46.00	38.22	0.10	0.07	Average
11	6.916	44.41	-15.59	60.00	44.15	0.16	0.10	QP
12	6.916	25.47	-24.53	50.00	25.21	0.16	0.10	Average



Site : CO01-HY
Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
EUT : Wireless Terminal

Power : 120Vac/60Hz
Model : CT-10

Memo : LINK MODE

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.182	53.84	-10.55	64.39	53.73	0.10	0.01	QP
2	0.182	41.27	-13.12	54.39	41.16	0.10	0.01	Average
3	0.363	46.72	-11.94	58.66	46.59	0.10	0.03	QP
4	0.363	30.38	-18.28	48.66	30.25	0.10	0.03	Average
5	0.728	45.46	-10.54	56.00	45.32	0.10	0.04	QP
6	0.728	33.68	-12.32	46.00	33.54	0.10	0.04	Average
7	0.910	44.50	-11.50	56.00	44.36	0.10	0.04	QP
8	0.910	40.83	-5.17	46.00	40.69	0.10	0.04	Average
9	1.766	50.46	-5.54	56.00	50.29	0.10	0.07	QP
10	1.766	43.75	-2.25	46.00	43.58	0.10	0.07	Average
11	6.918	54.44	-5.56	60.00	54.14	0.20	0.10	QP
12	6.918	46.36	-3.64	50.00	46.06	0.20	0.10	Average

Test Engineer: Jay

Jay

5.9 Test of Radiated Emission

Radiated emissions from 30 MHz to 26.5 GHz were measured according to the methods defined in ANSI C63.4-2001. The EUT was placed on a nonmetallic stand, 0.8 meter above the ground plane, as shown in section 5.9.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions

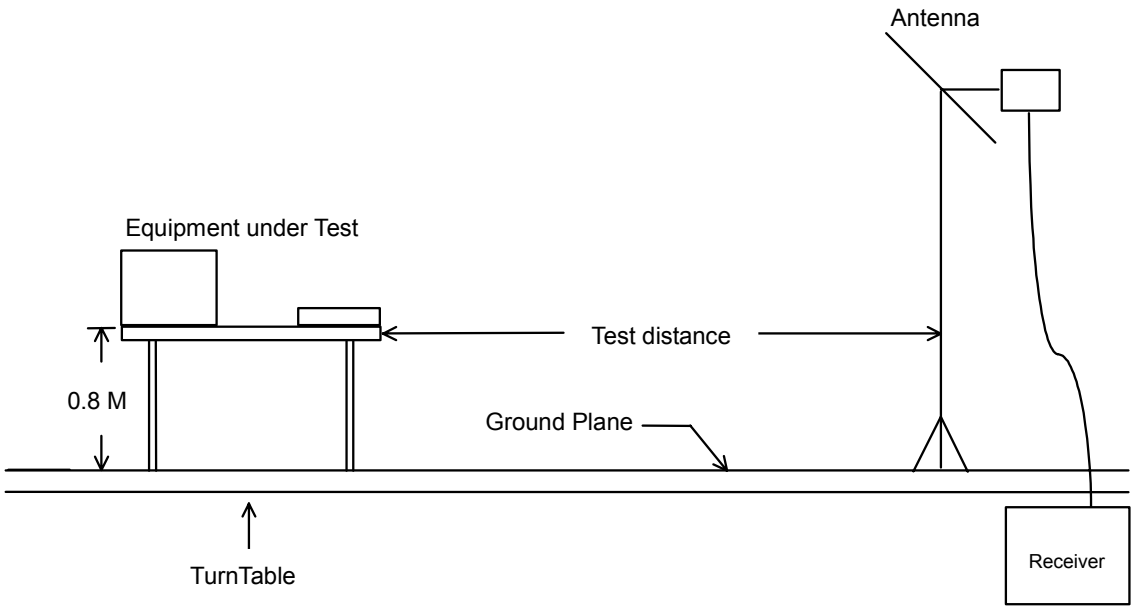
5.9.1 Major Measuring Instruments

● Amplifier	(MITEQ AFS44)
RF Gain	40 dB
Signal Input	100 MHz to 26.5 GHz
● Amplifier	PA-103
RF Gain	30 dB
Signal Input	100 kHz to 1 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

5.9.2 Test Procedures

1. The EUT was placed on a rotatable table top 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
7. 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.

5.9.3 Typical Test Setup Layout of Radiated Emission

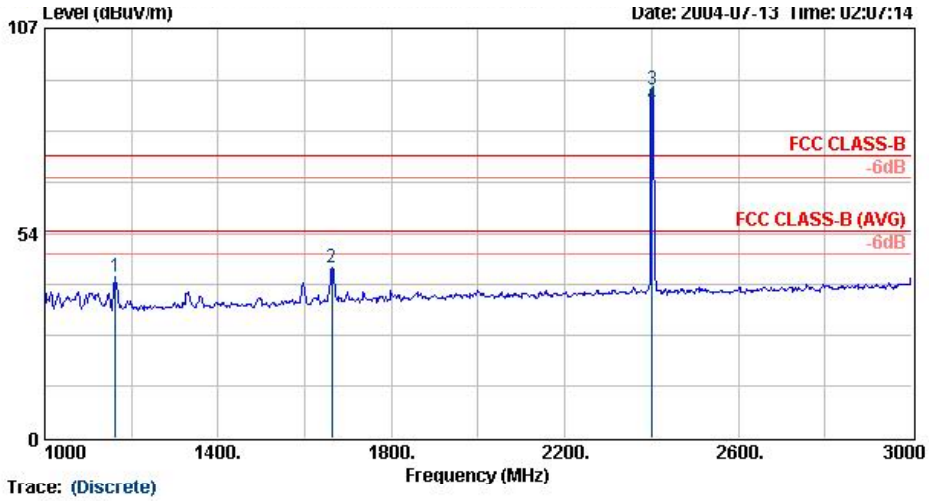


5.9.4 Test Result of Radiated Emission

- Test Mode: Mode 1
- Test Distance: 3 m
- Temperature: 26°C
- Relative Humidity: 53%
- Test Date: July 22, 2004
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

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

Spurious Emission

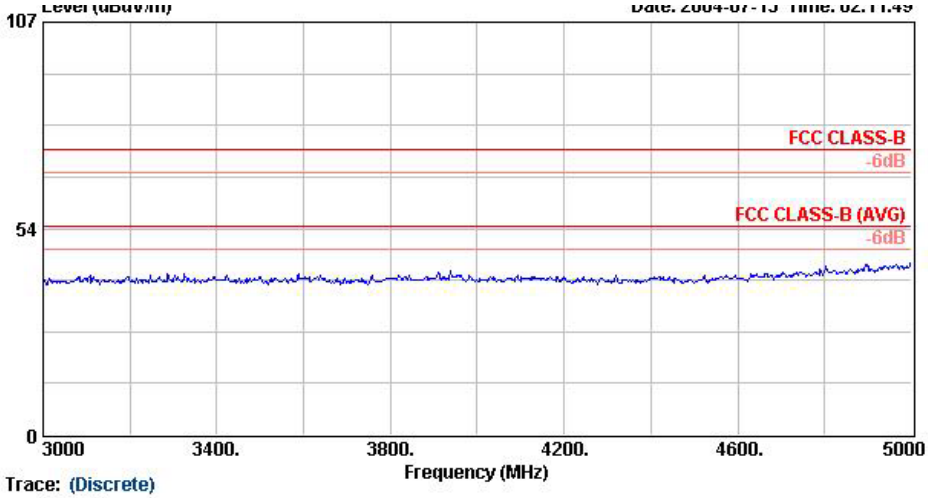


Trace: (Discrete)

Site : 03CH06
Condition : FCC CLASS-B 3m HF-HORN AH-118 HORIZONTAL
eut : GSM/GPRS With Bluetooth
power : AC 120V / 60Hz
model :
memo : Bluetooth CH00 2402MHz

	Freq	Over Limit	Limit Line	Level	ReadAntenna Level	Factor	Preamp Factor	Cable Loss	Remark
	MHz	dB	dBuV/m	dBuV/m	dBuV	dB/m	dB	dB	
1	1164.00	-31.96	74.00	42.04	58.96	24.52	43.71	2.28	
2	1662.00	-29.57	74.00	44.43	59.56	26.33	44.23	2.77	
3 @	2402.00			91.19	103.80	28.40	44.34	3.33	
4 @	2402.00			86.95	99.55	28.40	44.34	3.35	Average

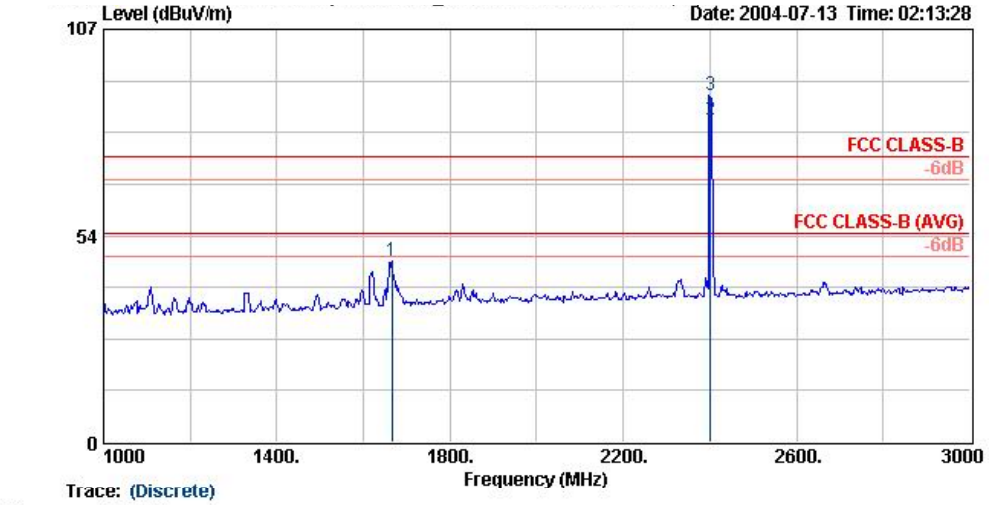
Remark: The “X” represent a fundamental frequency.



Trace: (Discrete)

Site : 03CH06
Condition : FCC CLASS-B 3m HF-HORN AH-118 HORIZONTAL
eut : GSM/GPRS With Bluetooth
power : AC 120V / 60Hz
model :
memo : Bluetooth CH00 2402MHz

Remark: Frequency from 5000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured.

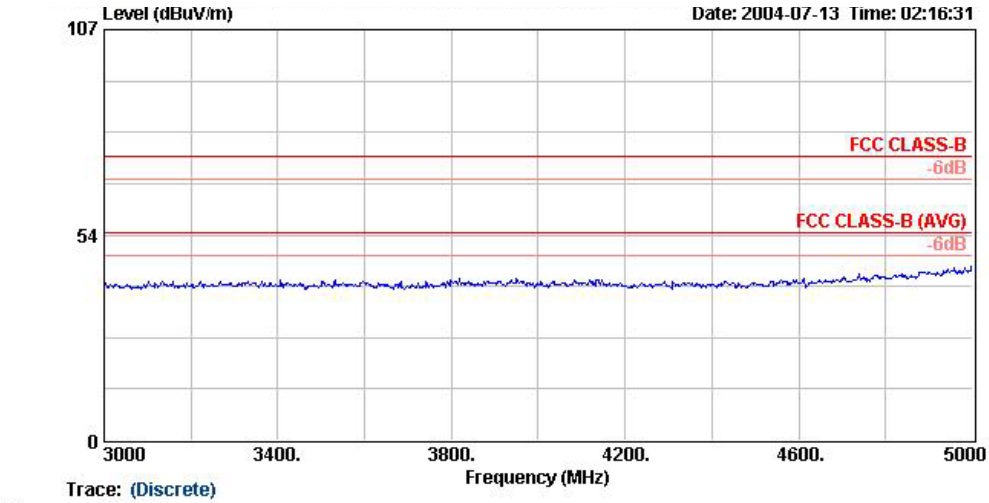


Trace: (Discrete)

Site : 03CH06
Condition : FCC CLASS-B 3m HF-HORN AH-118 VERTICAL
eut : GSM/GPRS With Bluetooth
power : AC 120V / 60Hz
model :
memo : Bluetooth CH00 2402MHz

	Freq	Over Limit	Limit Line	Level	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark
	MHz	dB	dBuV/m	dBuV/m	dBuV	dB/m	dB	dB	
1	1666.00	-27.15	74.00	46.85	61.99	26.33	44.23	2.77	
2 @	2402.00			83.64	96.24	28.40	44.34	3.35	Average
3 @	2402.00			89.70	102.32	28.40	44.34	3.33	

Remark: The “X” represent a fundamental frequency.



Site : 03CH06
Condition : FCC CLASS-B 3m HF-HORN AH-118 VERTICAL
eut : GSM/GPRS With Bluetooth
power : AC 120V / 60Hz
model :
memo : Bluetooth CH00 2402MHz

Remark: Frequency from 5000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured.

■ Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Preamp Factor (dB)	Limits (dBuV/m)	Emission (dBuV/m)	Margin (dB)	Detect Mode
2402.000	H	28.40	3.33	59.46	44.34	-	91.19	-	Peak
2402.000	H	28.40	3.35	55.20	44.34	-	86.95	-	A.V.
2402.000	V	28.40	3.33	57.97	44.34	-	89.70	-	Peak
2402.000	V	28.40	3.35	51.89	44.34	-	83.64	-	A.V.
4804.000	V/H	-	-	-	-	-	-	-	Peak, 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

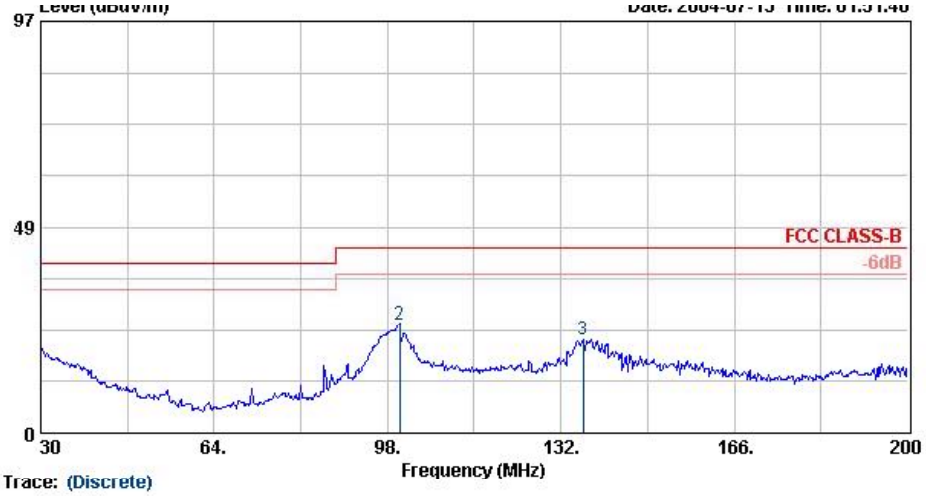
Test Engineer: 

Jay

- Test Mode: Mode 2
- Test Distance: 3m
- Temperature: 26°C
- Relative Humidity: 53%
- Test Date: July 22, 2004
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

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

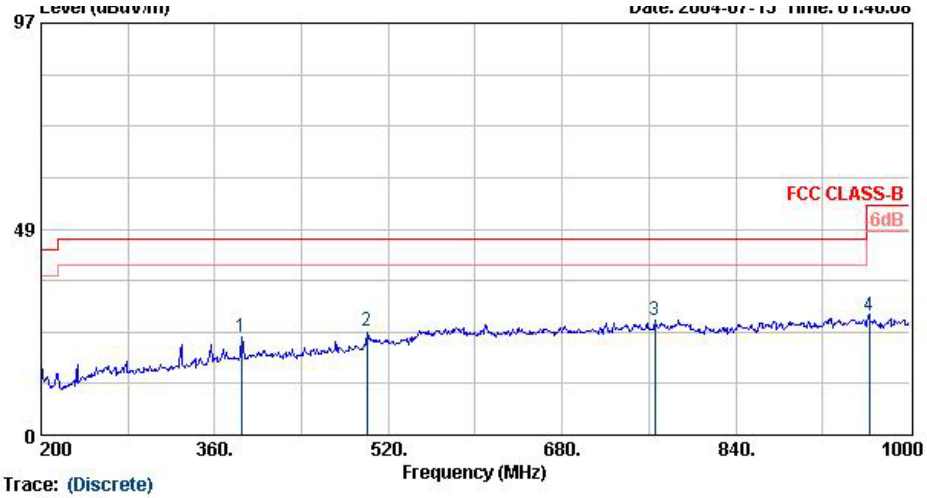
Spurious Emission



Trace: (Discrete)

Site : 03CH06
Condition : FCC CLASS-B 3m BI LOG 2004 0629 HORIZONTAL
eut : GSM/GPRS With Bluetooth
power : AC 120V / 60Hz
model :
memo : Bluetooth CH39 2441MHz

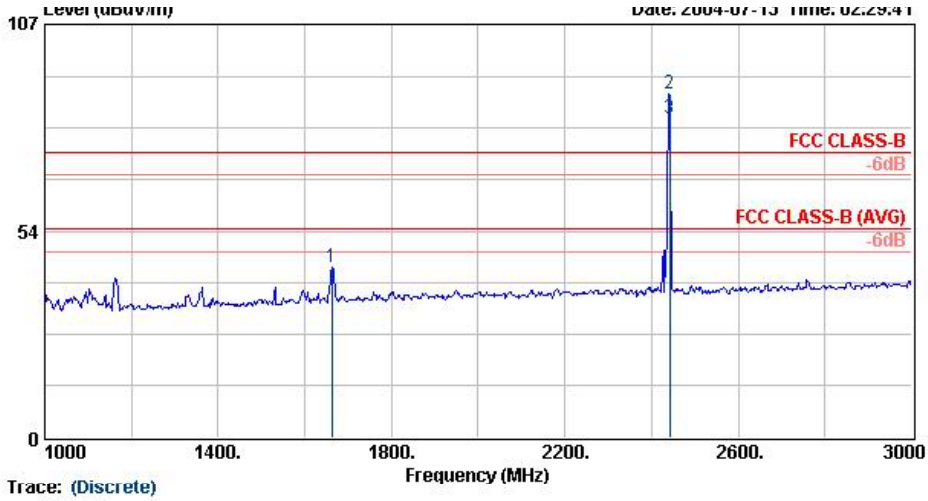
	Freq	Over Limit	Limit Line	Level	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark
	MHz	dB	dBuV/m	dBuV/m	dBuV	dB/m	dB	dB	
1	30.00	-19.85	40.00	20.15	33.87	17.90	32.12	0.50	
2 @	100.38	-17.76	43.50	25.74	46.74	10.40	32.29	0.89	
3	136.42	-21.42	43.50	22.08	42.18	11.17	32.28	1.01	



Trace: (Discrete)

Site : 03CH06
Condition : FCC CLASS-B 3m BI LOG 2004 0629 HORIZONTAL
eut : GSM/GPRS With Bluetooth
power : AC 120V / 60Hz
model :
memo : Bluetooth CH39 2441MHz

	Freq	Over Limit	Limit Line	Level	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark
	MHz	dB	dBuV/m	dBuV/m	dBuV	dB/m	dB	dB	
1	384.80	-22.95	46.00	23.05	37.48	15.24	31.44	1.78	
2	500.00	-21.55	46.00	24.45	36.48	17.30	31.42	2.09	
3	765.60	-18.78	46.00	27.22	36.22	19.96	31.66	2.70	
4	963.20	-25.75	54.00	28.25	35.11	20.90	30.91	3.16	

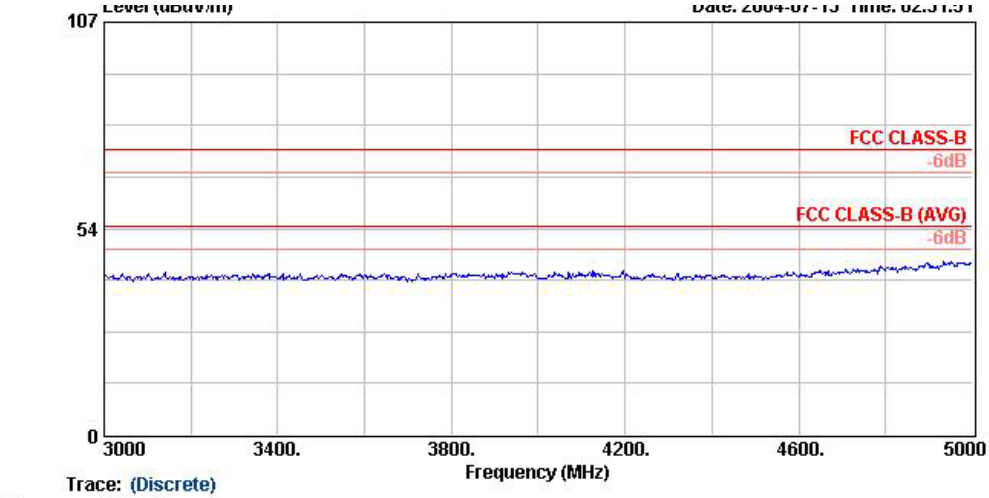


Trace: (Discrete)

Site : 03CH06
Condition : FCC CLASS-B 3m HF-HORN AH-118 HORIZONTAL
eut : GSM/GPRS With Bluetooth
power : AC 120V / 60Hz
model :
memo : Bluetooth CH39 2441MHz

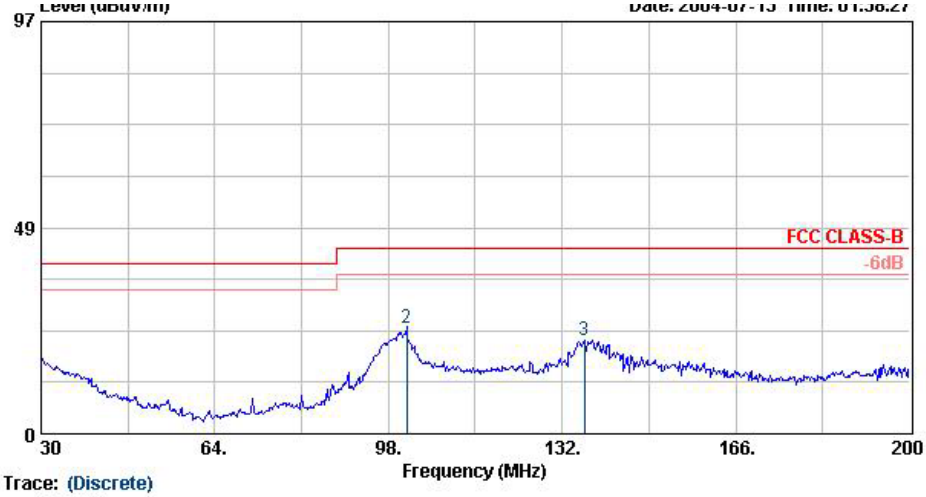
	Freq	Over Limit	Limit Line	Level	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark
	MHz	dB	dBuV/m	dBuV/m	dBuV	dB/m	dB	dB	
1	1662.00	-29.75	74.00	44.25	59.39	26.33	44.23	2.77	
2 @	2441.00			88.97	101.47	28.45	44.32	3.37	
3 @	2441.00			82.67	95.18	28.45	44.32	3.37	Average

Remark: The “X” represent a fundamental frequency.



Site : 03CH06
Condition : FCC CLASS-B 3m HF-HORN AH-118 HORIZONTAL
eut : GSM/GPRS With Bluetooth
power : AC 120V / 60Hz
model :
memo : Bluetooth CH39 2441MHz

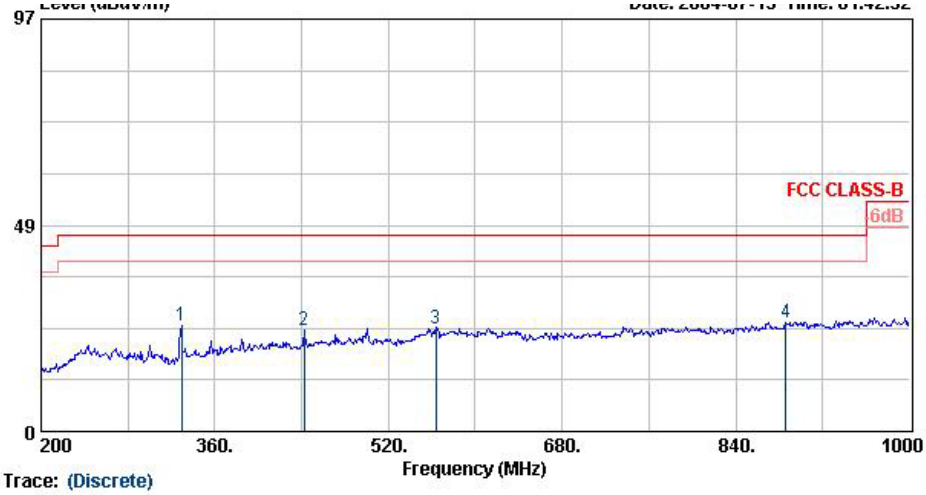
Remark: Frequency from 5000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured.



Trace: (Discrete)

Site : 03CH06
Condition : FCC CLASS-B 3m BI LOG 2004 0629 VERTICAL
eut : GSM/GPRS With Bluetooth
power : AC 120V / 60Hz
model :
memo : Bluetooth CH39 2441MHz

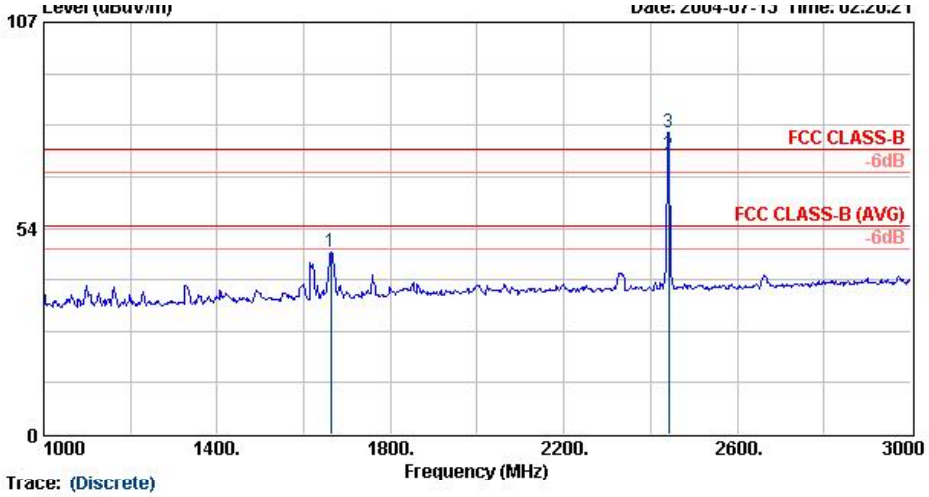
	Freq	Over Limit	Limit Line	Level	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark
	MHz	dB	dBuV/m	dBuV/m	dBuV	dB/m	dB	dB	
1	30.00	-22.25	40.00	17.75	31.47	17.90	32.12	0.50	
2 @	101.57	-18.49	43.50	25.01	45.87	10.51	32.27	0.89	
3	136.42	-21.42	43.50	22.08	42.18	11.17	32.28	1.01	



Trace: (Discrete)

Site : 03CH06
Condition : FCC CLASS-B 3m BI LOG 2004 0629 VERTICAL
eut : GSM/GPRS With Bluetooth
power : AC 120V / 60Hz
model :
memo : Bluetooth CH39 2441MHz

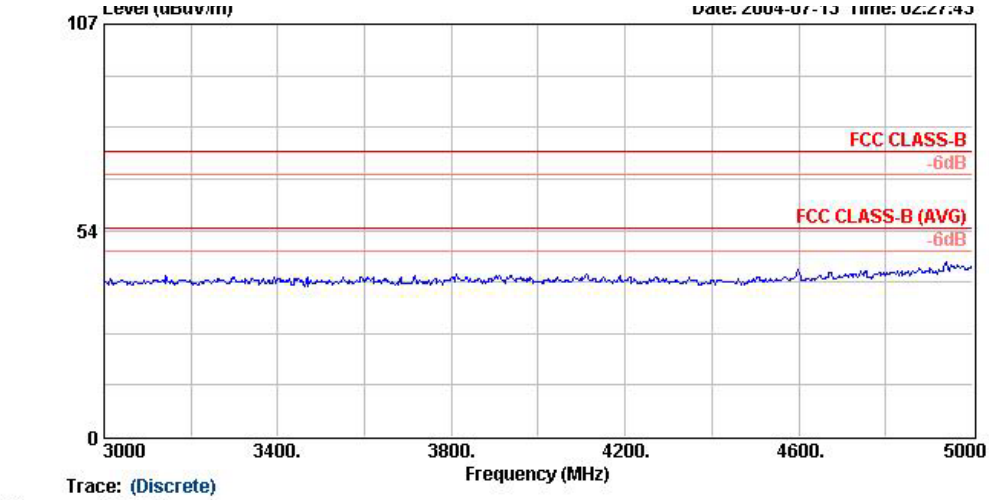
	Freq	Over Limit	Limit Line	Level	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark
	MHz	dB	dBuV/m	dBuV/m	dBuV	dB/m	dB	dB	
1	329.60	-21.02	46.00	24.98	41.58	13.85	32.04	1.59	
2	442.40	-22.06	46.00	23.94	37.57	16.32	31.86	1.91	
3	564.00	-21.66	46.00	24.34	34.87	18.69	31.45	2.22	
4	886.40	-20.35	46.00	25.65	33.07	20.55	30.94	2.97	



Site : 03CH06
Condition : FCC CLASS-B 3m HF-HORN AH-118 VERTICAL
eut : GSM/GPRS With Bluetooth
power : AC 120V / 60Hz
model :
memo : Bluetooth CH39 2441MHz

	Freq	Over Limit	Limit Line	Level	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark
	MHz	dB	dBuV/m	dBuV/m	dBuV	dB/m	dB	dB	
1	1662.00	-26.75	74.00	47.25	62.38	26.33	44.23	2.77	
2 @	2441.00			72.36	84.87	28.45	44.32	3.37	Average
3 @	2441.00			78.20	90.71	28.45	44.32	3.37	

Remark: The “X” represent a fundamental frequency.



Remark: Frequency from 5000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured.

■ Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Preamp Factor (dB)	Limits (dBuV/m)	Emission (dBuV/m)	Margin (dB)	Detect Mode
2441.000	H	28.45	3.37	57.15	44.32	-	88.97	-	Peak
2441.000	H	28.45	3.37	50.85	44.32	-	82.67	-	A.V.
2441.000	V	28.45	3.37	46.38	44.32	-	78.20	-	Peak
2441.000	V	28.45	3.37	40.54	44.32	-	72.36	-	A.V.
4882.000	V/H	-	-	-	-	-	-	-	Peak, 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

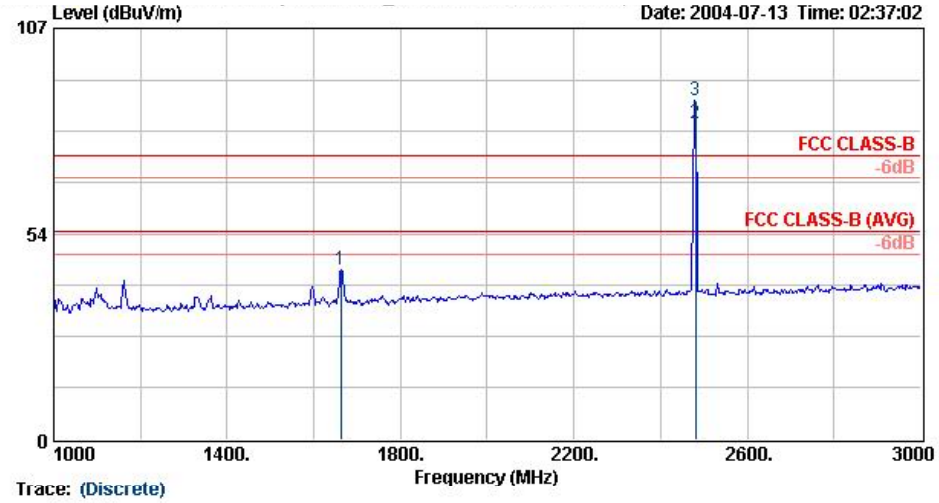
Test Engineer: 

Jay

- Test Mode: Mode 3
- Test Distance: 3m
- Temperature: 26°C
- Relative Humidity: 53%
- Test Date: July 22, 2004
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

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

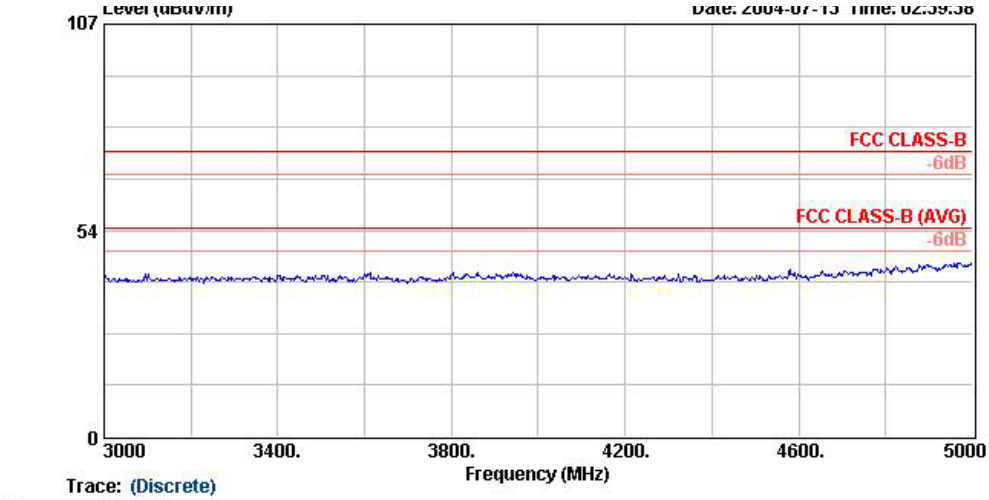
Spurious Emission



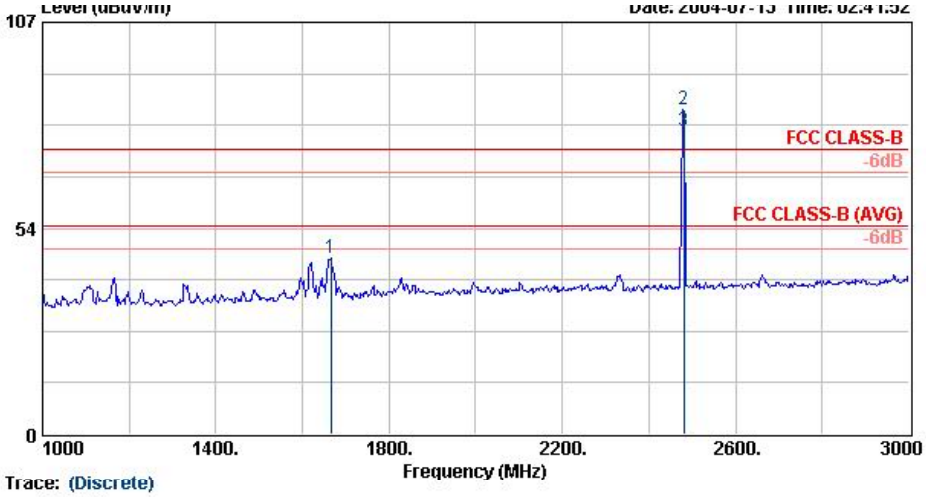
Site : 03CH06
Condition : FCC CLASS-B 3m HF-HORN AH-118 HORIZONTAL
eut : GSM/GPRS With Bluetooth
power : AC 120V / 60Hz
model :
memo : Bluetooth CH78 2480MHz

	Freq	Over Limit	Limit Line	Level	ReadAntenna Level	Factor	Preamp Factor	Cable Loss	Remark
	MHz	dB	dBuV/m	dBuV/m	dBuV	dB/m	dB	dB	
1	1662.00	-29.94	74.00	44.06	59.20	26.33	44.23	2.77	
2 @	2480.00			82.41	94.84	28.48	44.31	3.40	Average
3 @	2480.00			88.50	100.93	28.48	44.31	3.40	

Remark: The “X” represent a fundamental frequency.



Remark: Frequency from 5000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured.

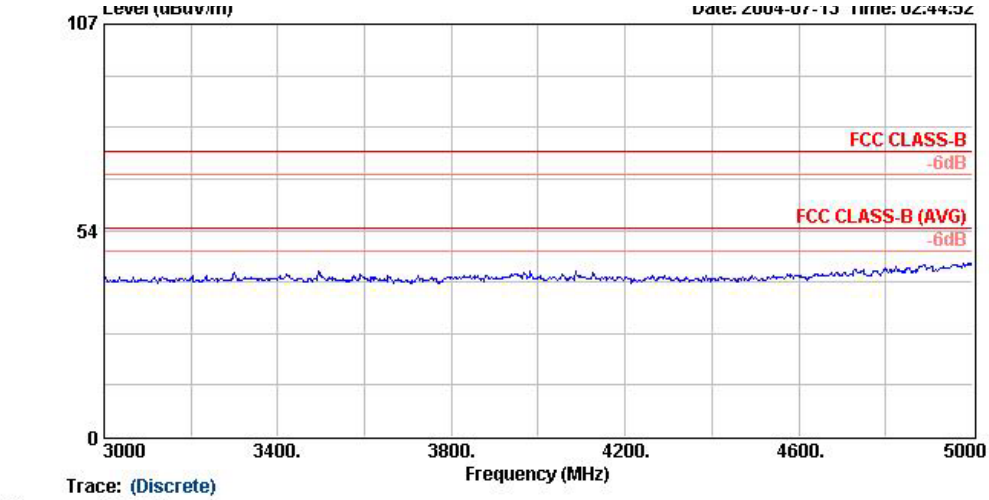


Trace: (Discrete)

Site : 03CH06
Condition : FCC CLASS-B 3m HF-HORN AH-118 VERTICAL
eut : GSM/GPRS With Bluetooth
power : AC 120V / 60Hz
model :
memo : Bluetooth CH78 2480MHz

	Freq	Over Limit	Limit Line	Level	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark
	MHz	dB	dBuV/m	dBuV/m	dBuV	dB/m	dB	dB	
1	1666.00	-28.29	74.00	45.71	60.85	26.33	44.23	2.77	
2 @	2480.00			84.25	96.68	28.48	44.31	3.40	
3 @	2480.00			78.62	91.05	28.48	44.31	3.40	Average

Remark: The “X” represent a fundamental frequency.



Remark: Frequency from 5000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured.

■ Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Preamp Factor (dB)	Limits (dBuV/m)	Emission (dBuV/m)	Margin (dB)	Detect Mode
2480.000	H	28.48	3.40	56.62	44.31	-	88.50	-	Peak
2480.000	H	28.48	3.40	50.53	44.31	-	82.41	-	A.V.
2480.000	V	28.48	3.40	52.37	44.31	-	84.25	-	Peak
2480.000	V	28.48	3.40	46.74	44.31	-	78.62	-	A.V.
4960.000	V/H	-	-	-	-	-	-	-	Peak, 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

6. Antenna Requirements

The EUT use a on board antenna. It is considered to meet antenna requirement of FCC.

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 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 greater than 6dBi are used, the power shall be reduced by the same amount in unit dB comparing to the directional gain of the antenna minus 6dBi.

Antenna Connected Construction

The antenna used in this product is printed antenna without connector.

7. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	10032	9 KHz – 2.75 GHz	Jun. 23, 2004	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001/008	9 KHz – 30 MHz	May 03, 2004	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	2001/009	9 KHz – 30 MHz	Apr. 19, 2004	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	Dec. 24, 2003	Conduction (CO01-HY)
Spectrum analyzer	R&S	FSP40	100057	9KHz-40GHz	Feb. 26, 2004	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Dec. 18, 2003	Radiation (03CH06-HY)
Horn Antenna	Com-Power	AH118	071025	1G-18G	Feb. 11, 2004	Radiation (03CH06-HY)
PreAmplifier	Com-Power	PA-103	161055	1MHz - 1000MHz	Apr. 26, 2004	Radiation (03CH06-HY)
HF Amplifier	MITEQ	AFS44	973248	0.1G - 26.5G	May. 20, 2004	Radiation (03CH06-HY)

※ Calibration Interval of instruments listed above is one year.

※ Calibration Interval of instruments listed above is one year, except for Horn Antenna, BBHA9170.

※ Calibration Interval of Horn Antenna, BBHA9170, is three years.

8. Uncertainty of Test Site

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 **Receiver VSWR Γ1=** **LISN VSWR Γ2=** **Uncertainty=20log(1-Γ1*Γ2)**	+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 Receiver VSWR Γ1= 0.20 Antenna VSWR Γ2= 0.23 Uncertainty=20log(1-Γ1*Γ2)	+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**		

U=$\sqrt{}${(1/2)²+(0.3/2)²+(2²+0.5²+2²+0.25²+2²)/3+(0.54)²/2}=2.2 for 10m test distance

U=$\sqrt{}${(1/2)²+(0.3/2)²+(2²+3²+2²+0.25²+2²)/3+(0.54)²/2}=2.7 for 3m test distance

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**				

U=√{(0.3/2)² +(2²+1.5²+0.2²)/3+(0.2)²/2}=1.66