

FCC TEST REPORT

for

47 CFR Part 15 Subpart C

Equipment : Nokia Image Album

Model No. : PD-1

FCC ID. : LJPPD-1

Filing Type : Certification

Applicant : Nokia Corporation
Keilalahdentie 4, 02150 Espoo, Finland

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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: Sep. 17, 2004

- No additional attachment.
- Additional attachment were issued as following record:

CERTIFICATE OF COMPLIANCE

for

47 CFR Part 15 Subpart C

Equipment : Nokia Image Album**Model No.** : PD-1**FCC ID.** : LJPPD-1**Filing Type** : Certification**Applicant** : Nokia Corporation
Keilalahdentie 4, 02150 Espoo, FinlandI **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 Aug. 11, 2004 at **SPORTON International Inc.** LAB.

Jones Tsai 09/30/2004Jones Tsai
Manager**SPORTON International Inc.**

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

SPORTON International Inc.TEL : 886-2-2696-2468
FAX : 886-2-2696-2255

FCC ID. : LJPPD-1

Page No. : 1 of 60

Issued Date : Sep. 17, 2004

1. General Description of Equipment under Test**1.1. Applicant****Nokia Corporation**

Keilalahdentie 4, 02150 Espoo, Finland

1.2. Manufacturer**Lite-On Technology**

No. 69, Ting-Hu 1st Street, Kwei Shan, Taoyuan Hsin, Taiwan, R.O.C.

1.3. Basic Description of Equipment under Test

Equipment	: Nokia Image Album
Model No.	: PD-1
FCC ID	: LJPPD-1
Trade Name	: Nokia
Power Supply Type	: AC 120V, Wall-mount, 1.8 meter, 2pin

1.4. Feature of Equipment under Test

Product Feature & Specification			
1. Type of Modulation	FHSS		
2. Frequency Band	2400 ~ 2483.5 MHz		
3. Carrier Frequency of each channel	2402+K MHz ; K=0 ~ 78		
4. Bandwidth of each channel	1MHz		
5. Maximum Output Power to Antenna	1 dBm		
6. IF & L.O. frequency	1 MHz		
7. Type of Antenna Connector	N/A		
8. Antenna Type	Chip Antenna		
9. Antenna Gain	-0.4 dBi		
10. Function Type	Transmitter	Transceiver	V
11. HW Version	V1.2		
12. SW Version	V2.00.1		
13. Mechanical Version	T7		
14. Power Adaptor	V1.3		
15. Power Rating (DC/AC , Voltage)	12V		
16. Temperature Range (Operating)	+ 5°C to + 35°C		
17. RCV (Remote Control Unit)	HW: V0.5 / SW: V1.2		

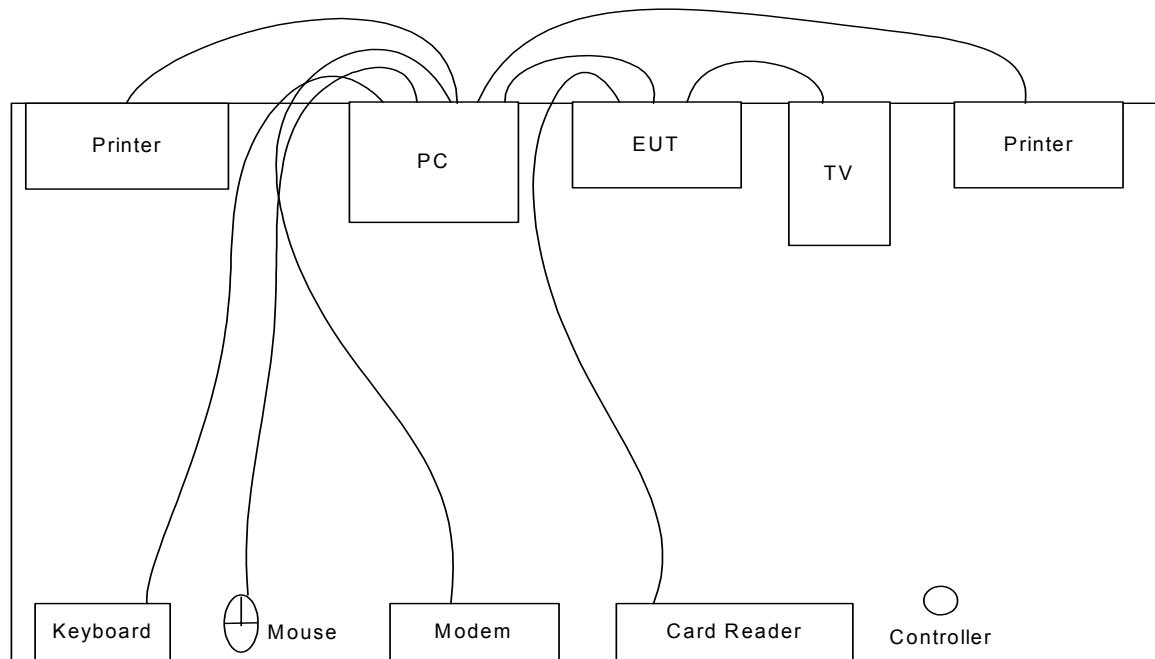
2. Test Configuration of Equipment under Test

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 HP PC, SONY Monitor, COMPAQ (PS2) Keyboard, ACEEX MODEM, JVC TV, Microsoft (USB) Mouse, EPSON Printer and EUT for EMI test.
- c. The following test modes were tested for conduction test:
 - Mode 1: CARD READ+HDD R/W
 - Mode 2: USB+CARD READ+HDD R/W
- d. The following test modes were tested for radiation test:
 - Mode 1: TX CH: 00 2402 MHz
 - Mode 2: TX CH: 39 2441 MHz
 - Mode 3: TX CH: 78 2480 MHz
- 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.	PC (HP)	D380MX	N/A	SP0007
2.	Monitor (SONY)	G520	Shielded, 1.7m	SP0012
3.	(PS2) Keyboard	COMPAQ	Shielded, 1.5m	SP0017
4.	Modem (ACEEX)	DM141	Shielded, 1.15m	SP0020
5.	TV (JVC)	TM-1700PN	N/A	SP0022
6.	(USB) Mouse (Microsoft)	B75-00093	Shielded, 1.8m	SP0033
7.	Printer (EPSON)	LQ-300	N/A	SP0034
8.	Cable 1 (Modem)	N/A	Shielded, 1.8m	N/A
9.	Cable 2 (Monitor)	N/A	Double-shielded, 1.9m	N/A
10.	Cable 3 (Printer)	N/A	Double-shielded, 1.7m	N/A
11.	Cable 4 (TV)	N/A	Non-shielded, 2m	N/A
12.	Cable 5 (Card Reader)	N/A	Shielded, 1.1m	N/A
13.	Cable 6 (Card Reader)	N/A	Shielded, 1.8m	N/A
14.	Power Core (Monitor)	N/A	Non-shielded, 1.8m	N/A
15.	Power Core (Desktop)	N/A	Non-shielded, 1.8m	N/A

2.3. Connection Diagram of Test System

3. Operation of Equipment under Test

An executive program, EMITEST.EXE and Activesync.exe on WIN XP continuously generating a complete line of " 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 modem.
- f. The PC sends " H " messages to the internal hard disk, and the hard disk reads and writes the message.
- g. Repeat the steps from c to f.

At the same time, the following program was executed:

"RnTTE.exe" sends continuous transmitting for radiation test.

"Ping.exe" connect with slaver wireless lan for conduction test.

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

110V/60Hz or DC 3.7V

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	Antenna Requirement	Pass

5.2. Hopping Channel Separation

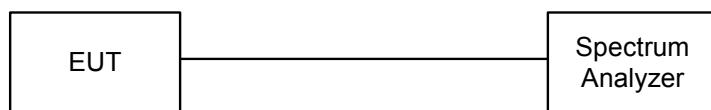
5.2.1. Measuring Instruments :

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

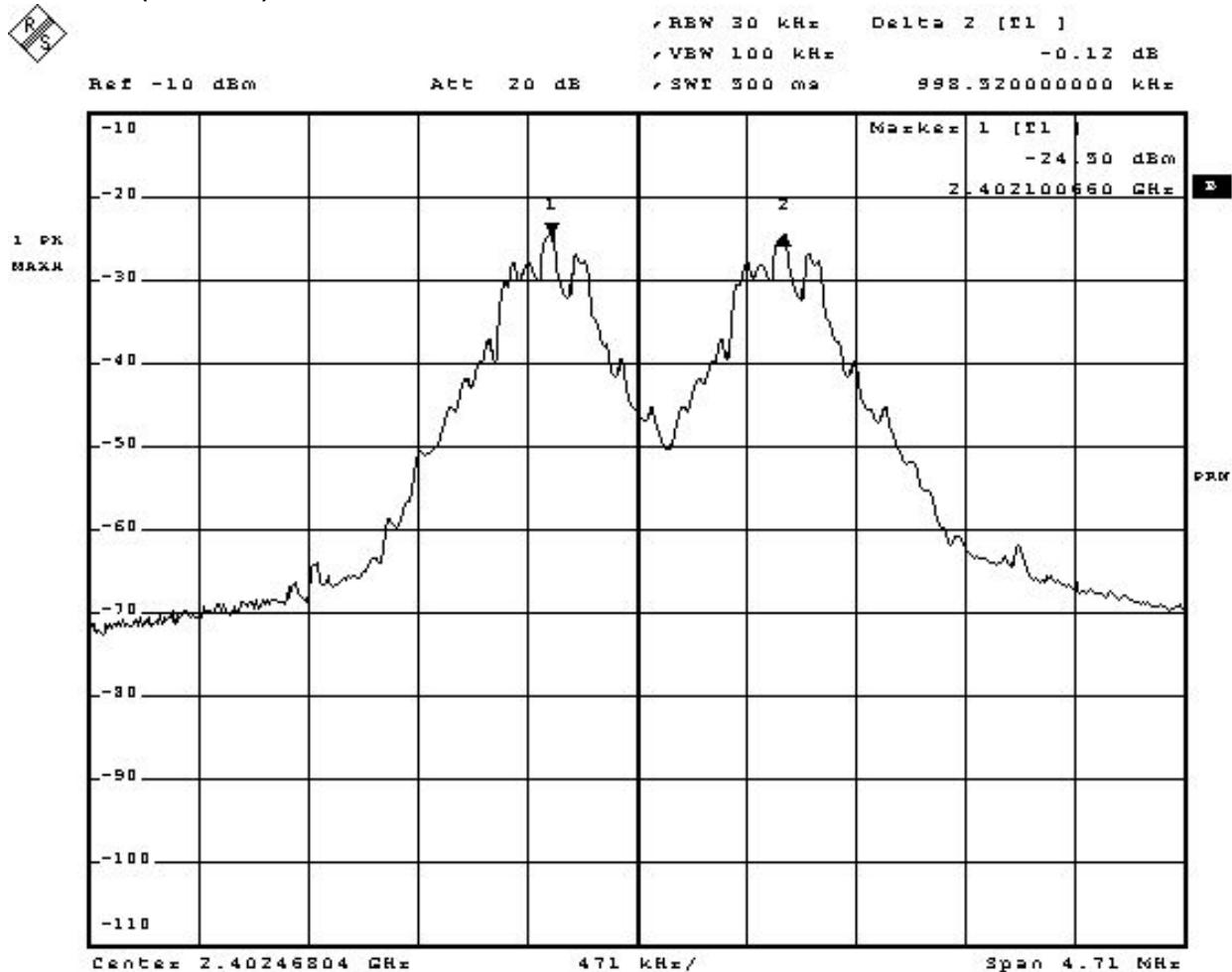
- Test Mode: Mode 1~Mode 3
- Temperature: 26°C
- Relative Humidity: 53 %

Channel	Frequency (MHz)	Hopping Channel Separation	Limits (MHz)	Plot Ref. No.
		(MHz)		
00	2402	0.998 >	0.744	Mode 1
39	2441	0.998 >	0.744	Mode 2
78	2480	0.990 >	0.744	Mode 3

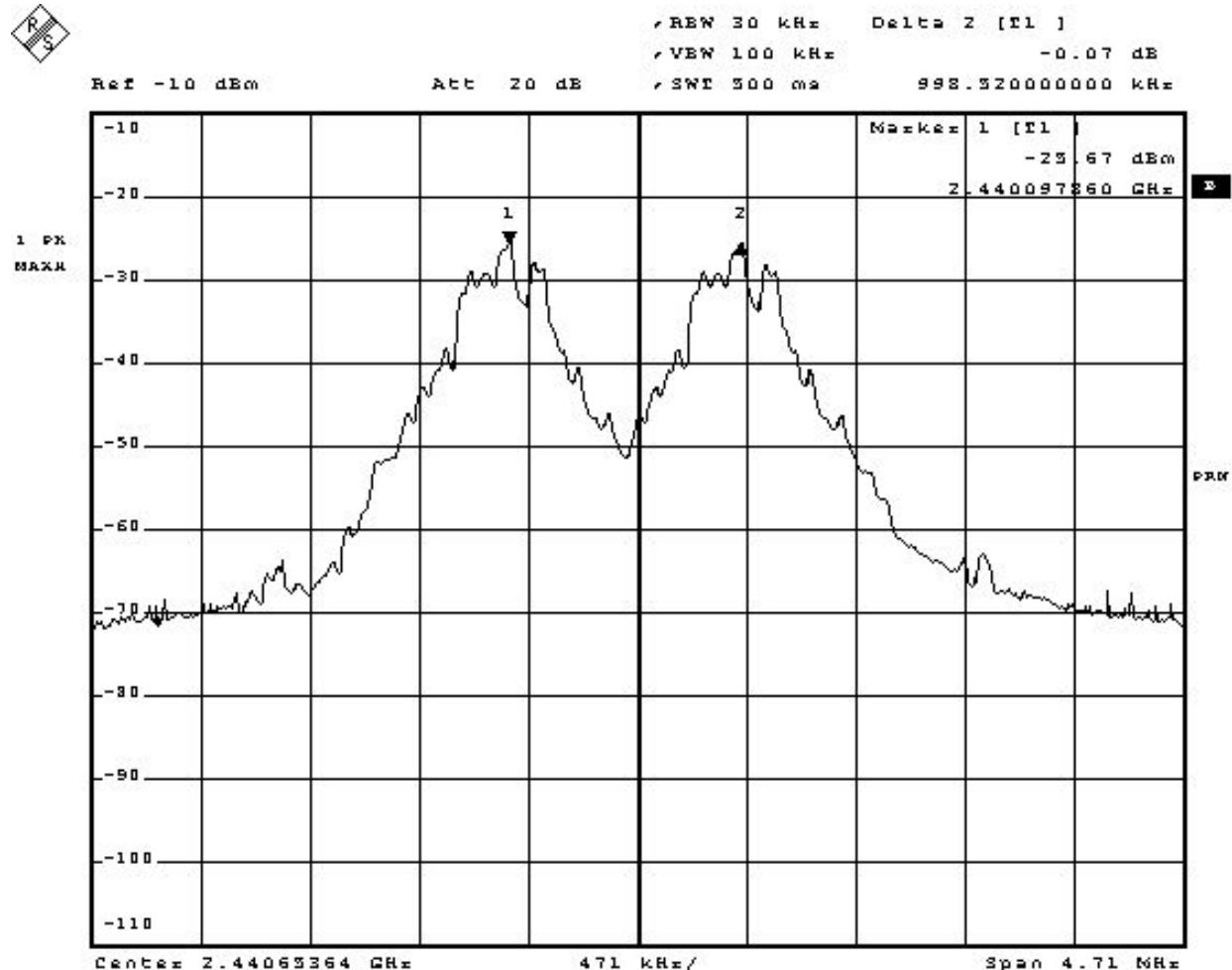
Remark: Limit is the greater one of 25kHz or the 20dB bandwidth of the hopping channel.

5.2.5 Hopping Channel Separation

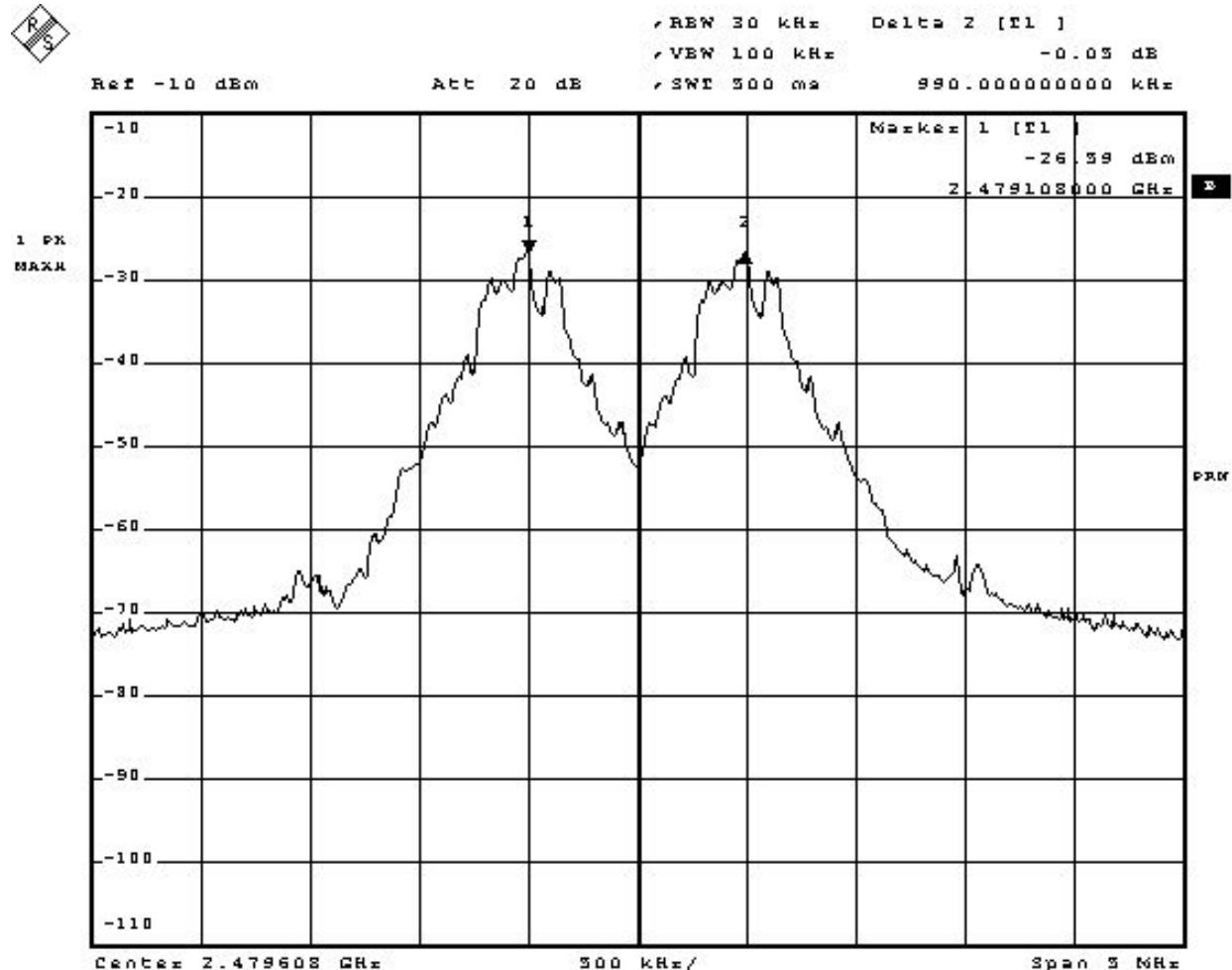
Mode 1: CH00 (2402MHz)



Mode 2: CH39 (2441MHz)



Mode 3: CH78 (2480MHz)



5.3. Number of Hopping Frequency

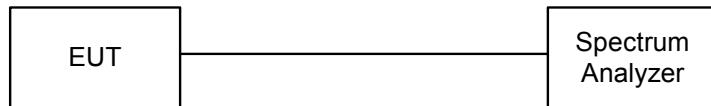
5.3.1. Measuring Instruments :

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 :

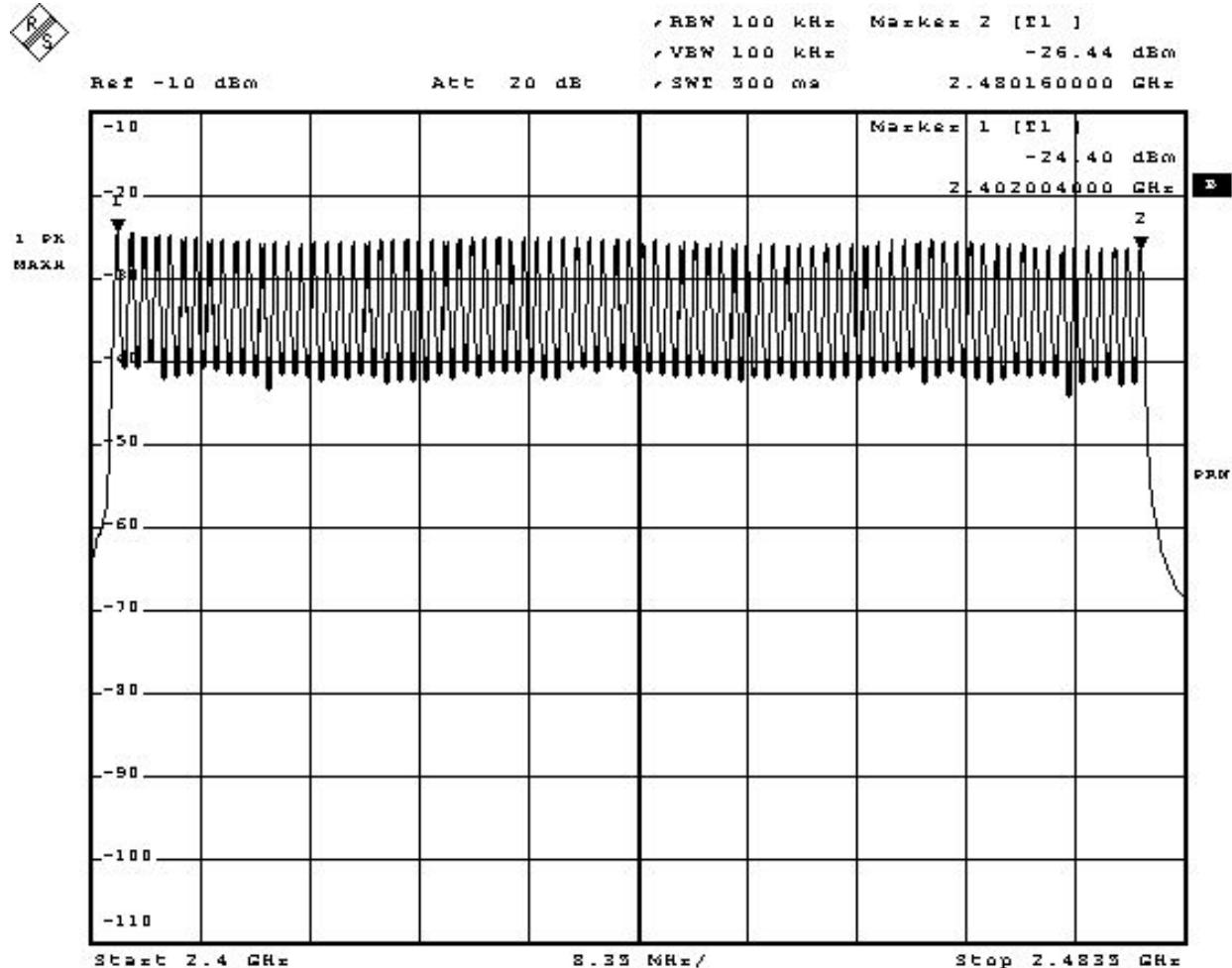


5.3.4. Test Result : See spectrum analyzer plots below

- 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

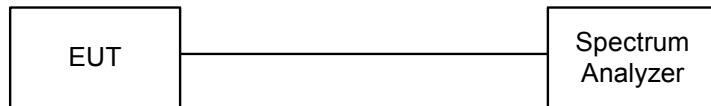
5.4.1 Measuring Instruments :

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 :



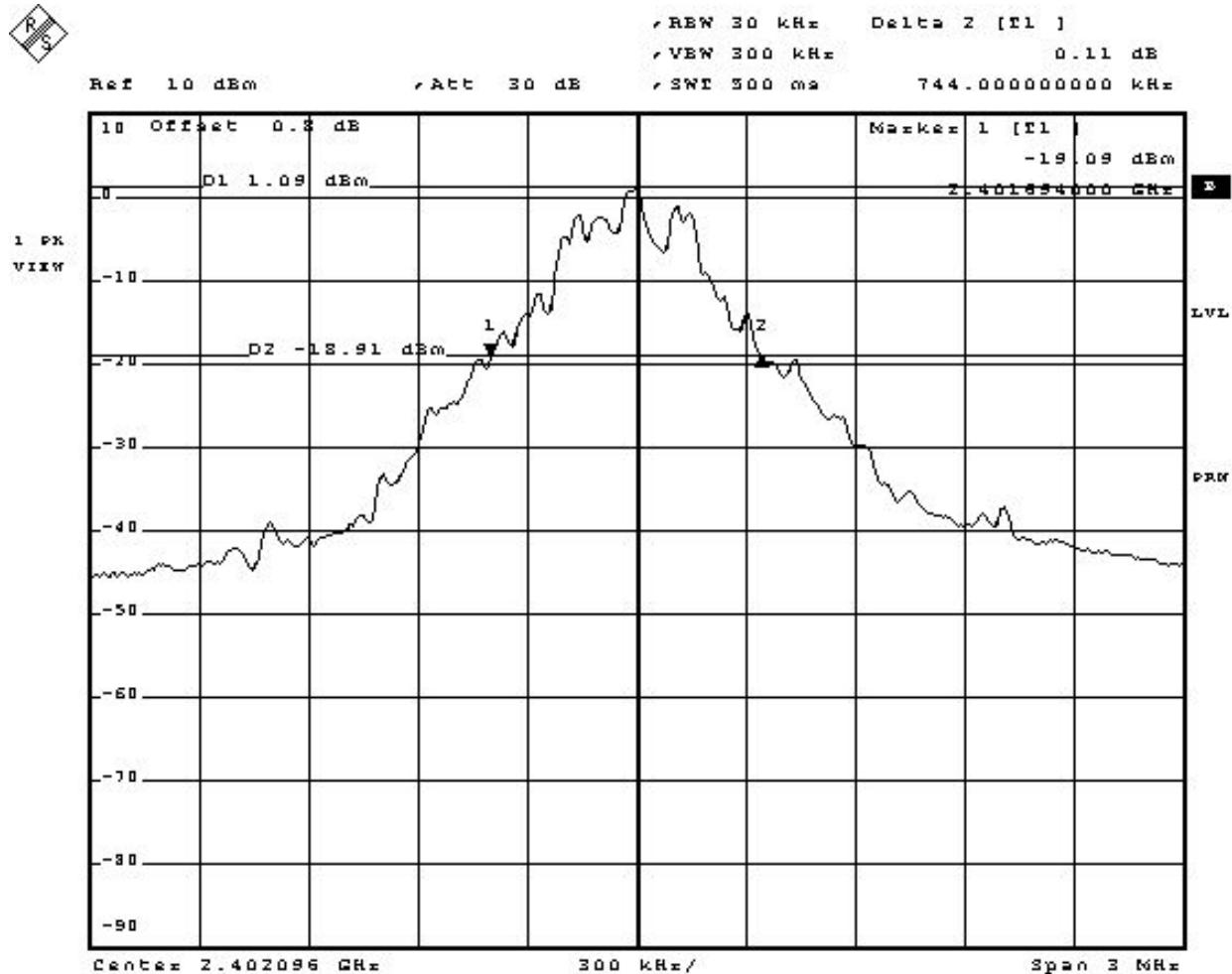
5.4.4 Test Result : See spectrum analyzer plots below

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

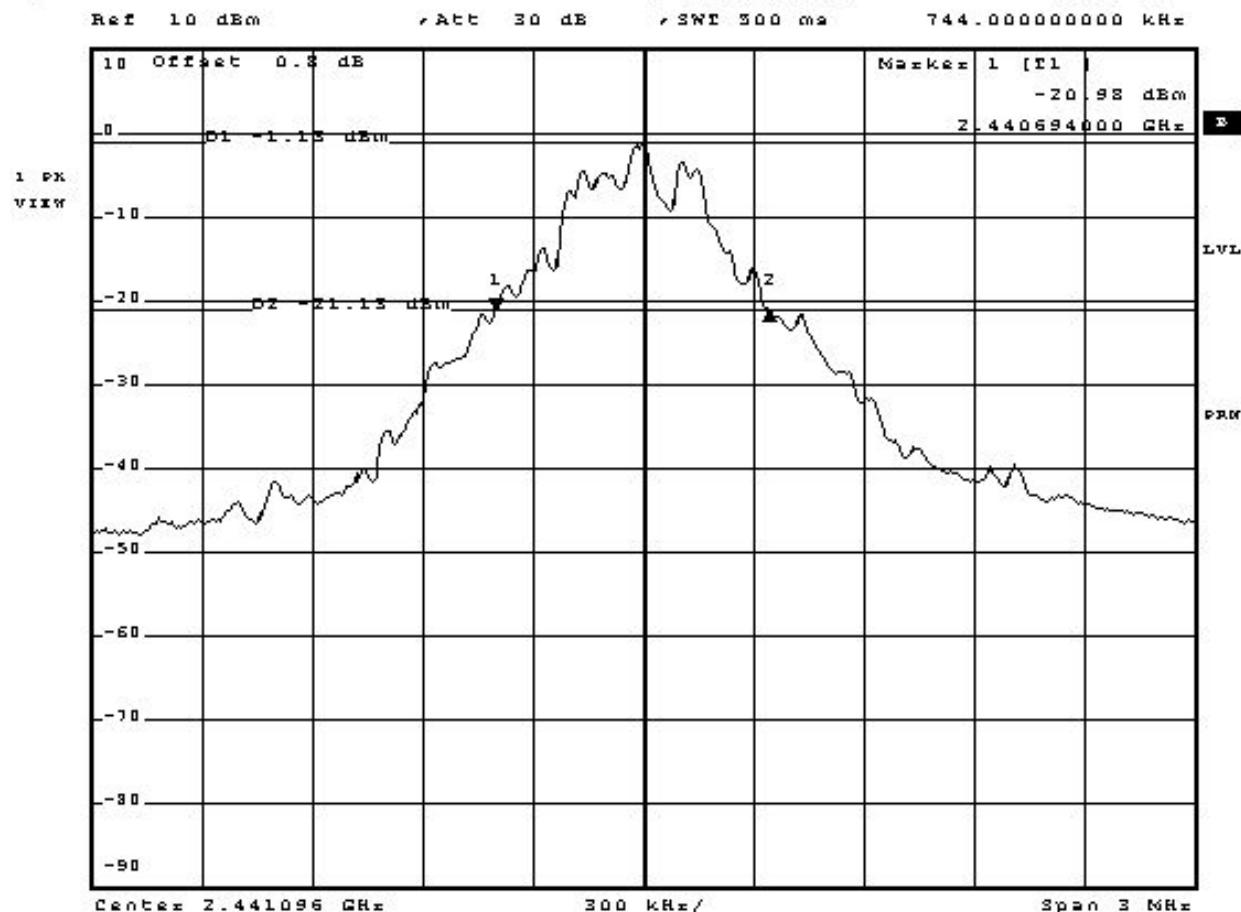
Channel	Frequency (MHz)	Hopping Channel Bandwidth (MHz)	Limits (MHz)	Plot
				Ref. No.
00	2402	0.744	< 1.0	Mode 1
39	2441	0.744	< 1.0	Mode 2
78	2480	0.744	< 1.0	Mode 3

5.4.5 Hopping Channel Bandwidth

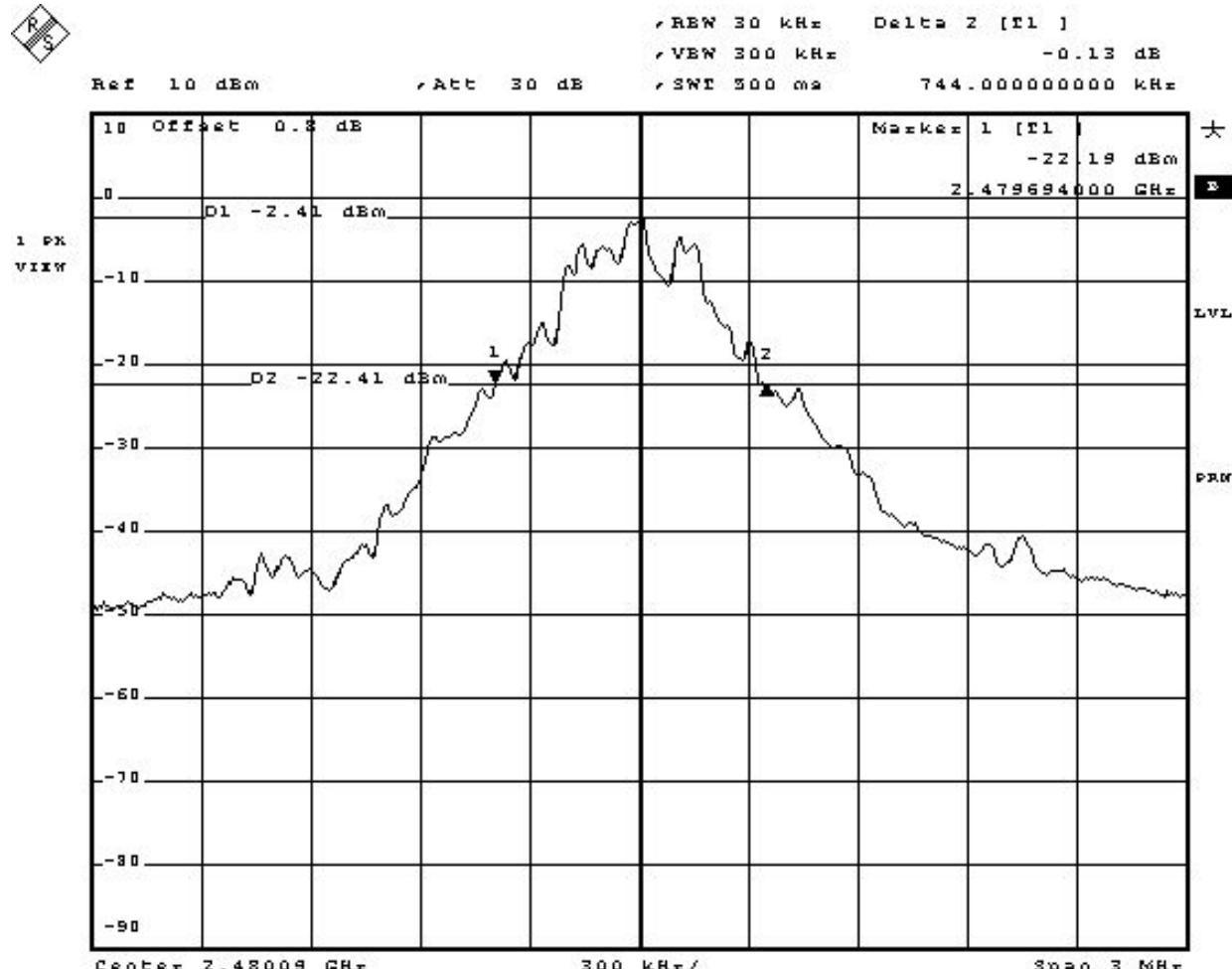
Mode 1: CH00 (2402MHz)



Mode 2: CH39 (2441MHz)



Mode 3: CH78 (2480MHz)



5.5 Dwell Time of Each Frequency within a 30 Seconds Period

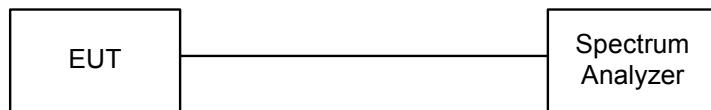
5.5.1 Measuring Instruments :

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.
4. The equation = $30 * (1600/79) * t$ (t = the time duration of one single pulse)

5.5.3 Test Setup Layout :



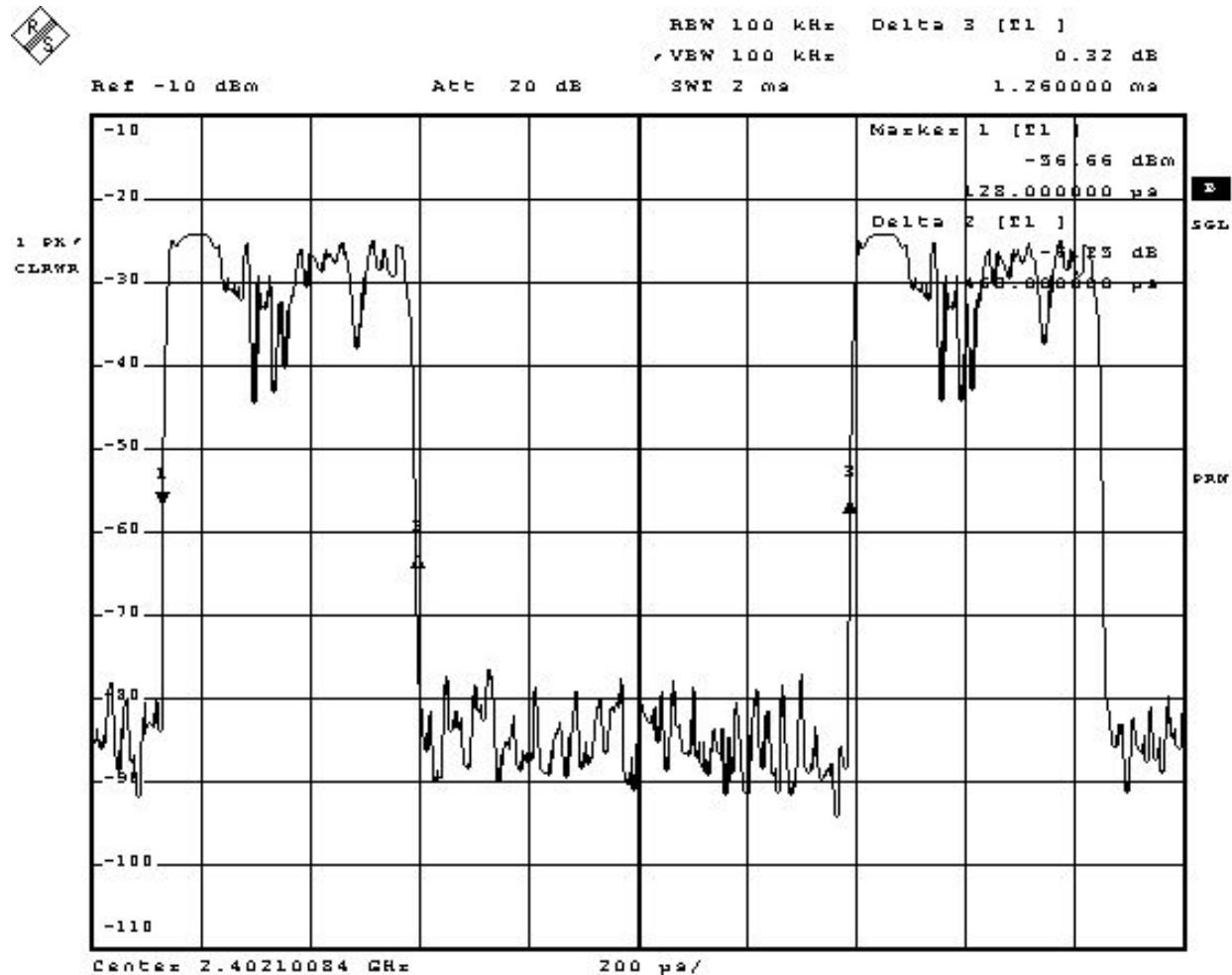
5.5.4 Test Result : See spectrum analyzer plots below

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

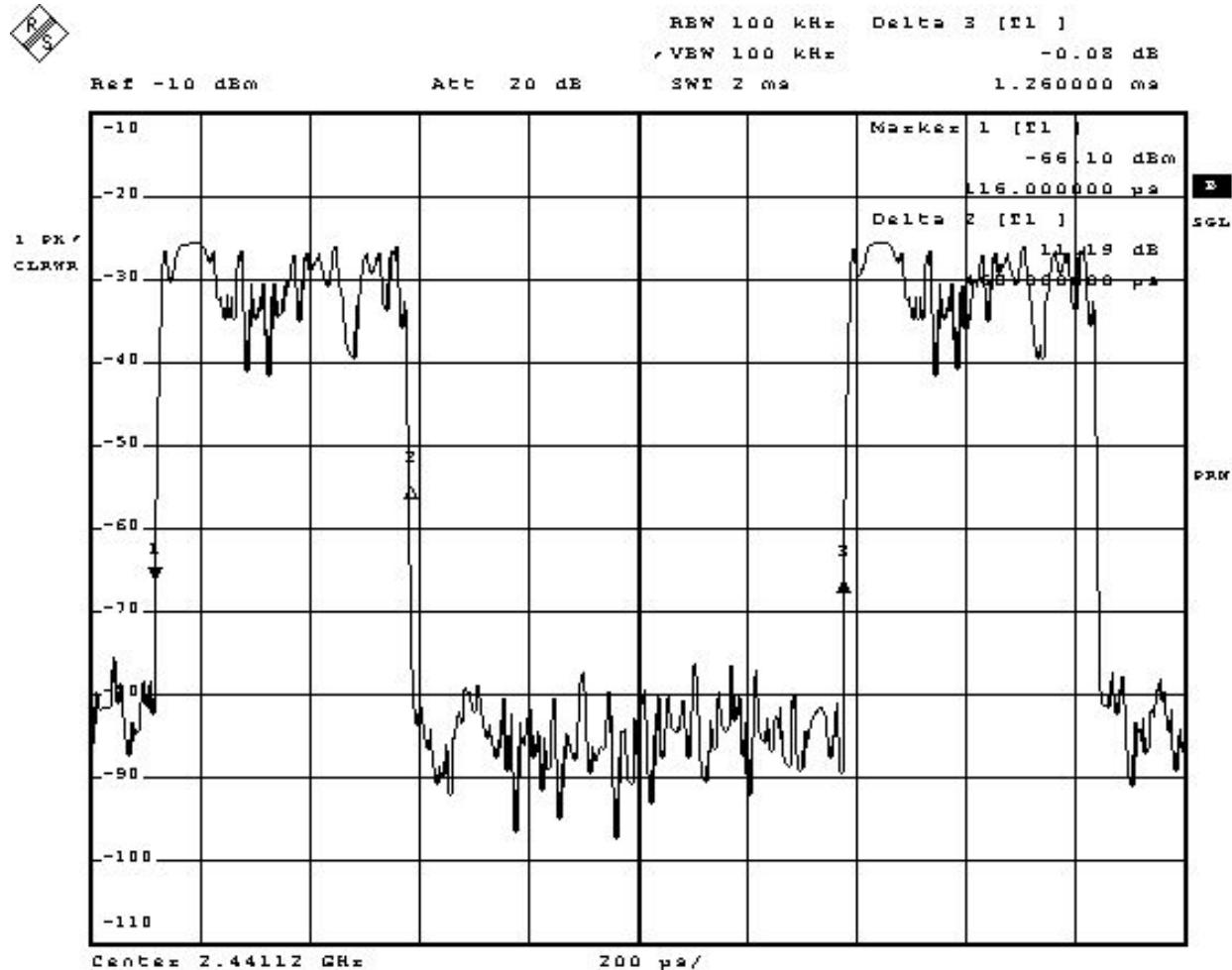
Channel	Frequency	Dwell Time	Limits	Plot
	(MHz)	(s)	(s)	Ref. No.
00	2402	0.28	< 0.4	Mode 1
39	2441	0.28	< 0.4	Mode 2
78	2480	0.28	< 0.4	Mode 3

5.5.5 Dwell Time of Each Frequency

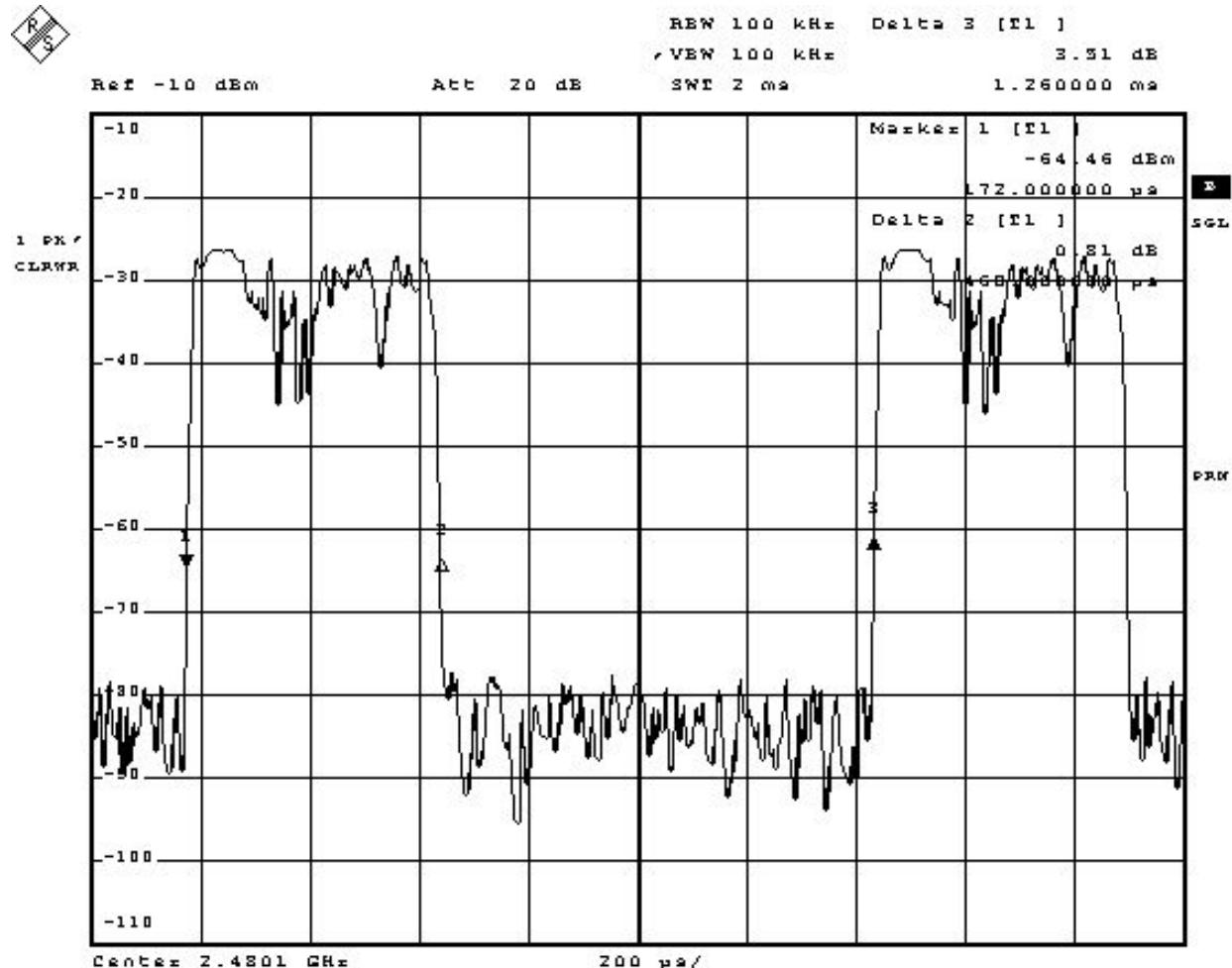
Mode 1: CH00 (2402MHz)



Mode 2: CH39 (2441MHz)



Mode 3: CH78 (2480MHz)



5.6 Output Power

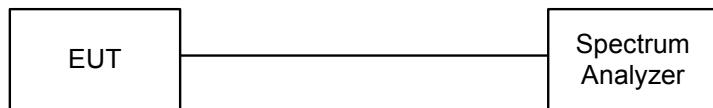
5.6.1 Measuring Instruments :

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 :



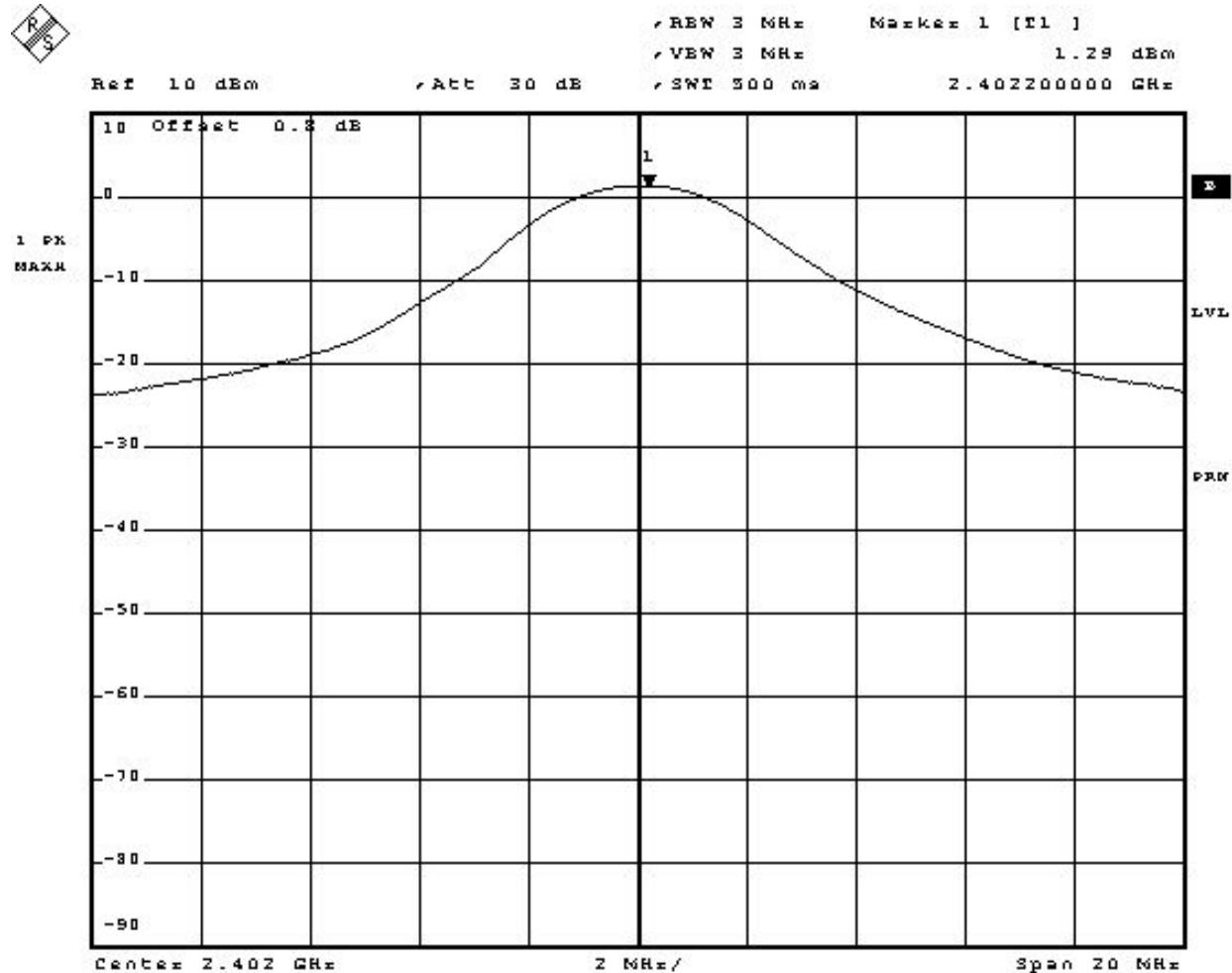
5.6.4 Test Result : See spectrum analyzer plots below

- Test Mode: Mode 1~Mode 3
- Temperature: 26°C
- Relative Humidity: 50 %

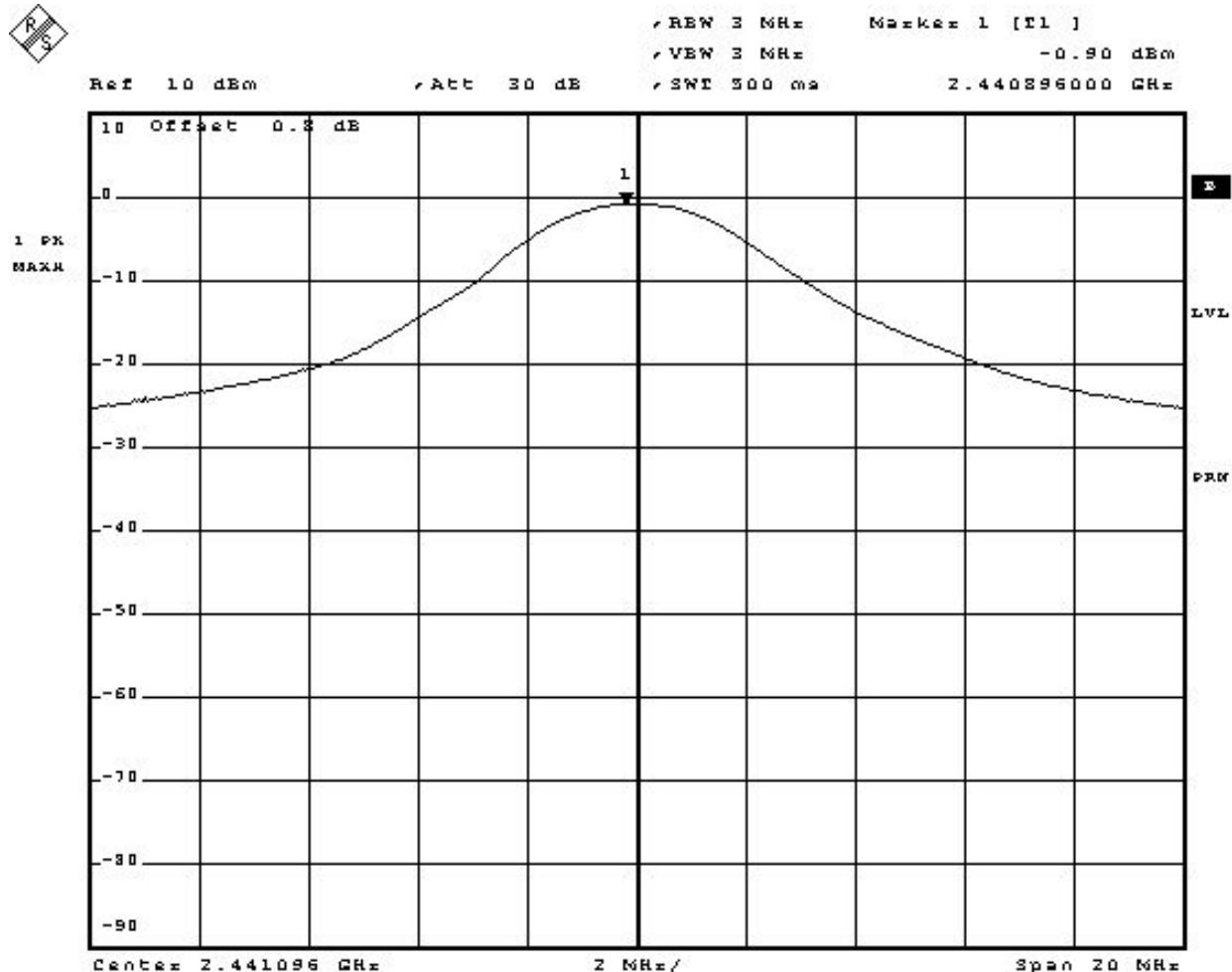
Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (Watt/dBm)	Plot Ref. No.
00	2402	1.29	< 1W/30 dBm	Mode 1
39	2441	-0.9	< 1W/30 dBm	Mode 2
78	2480	-2.14	< 1W/30 dBm	Mode 3

5.6.5 Output Power

Mode 1: CH00 (2402MHz)



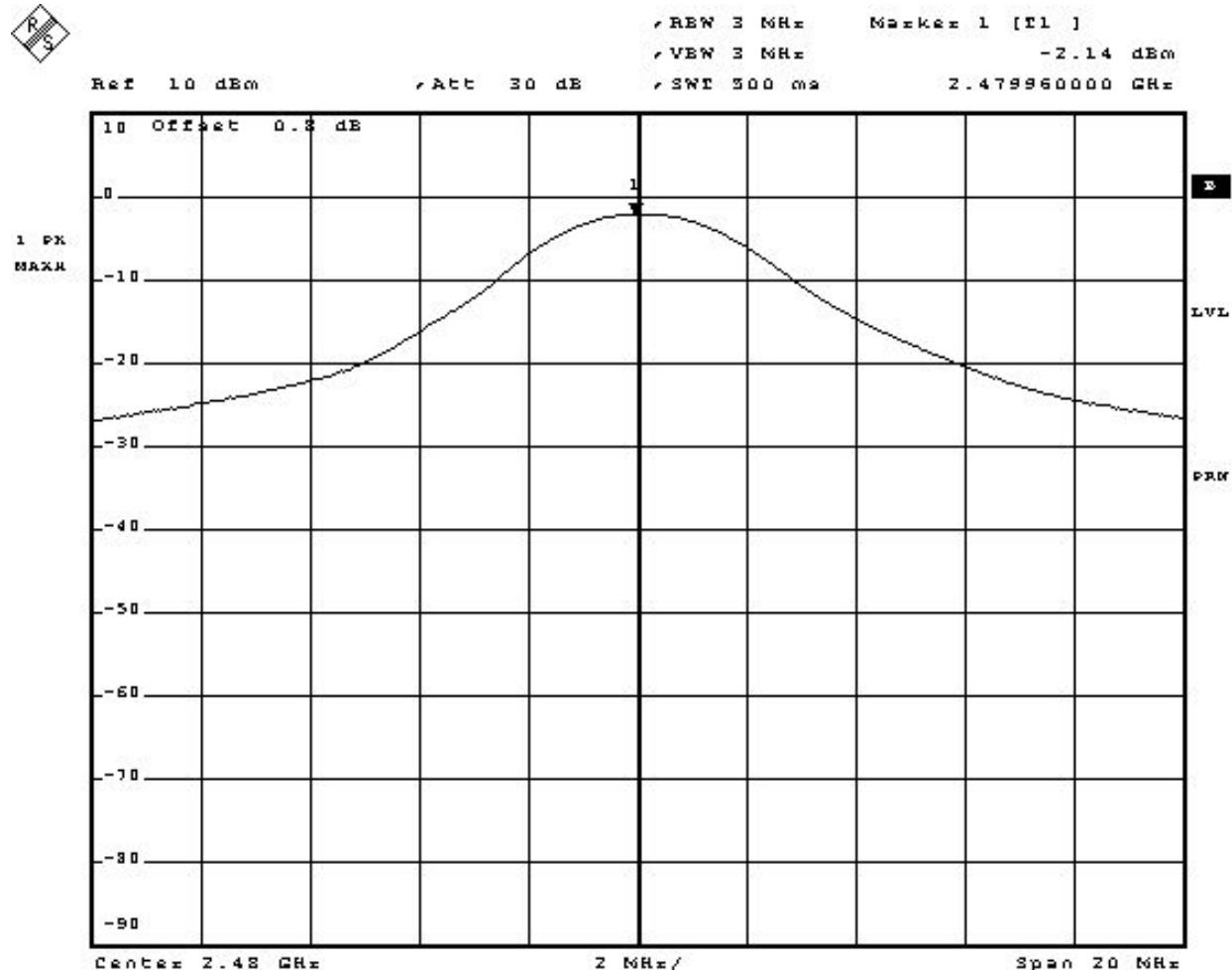
Mode 2: CH39 (2441MHz)



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Mode 3: CH78 (2480MHz)



SPORTON International Inc.

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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 loss 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 delta between fundamental signal (CH00) and peak spurious emission ($f = 2400$ MHz) is 40.34 dB.

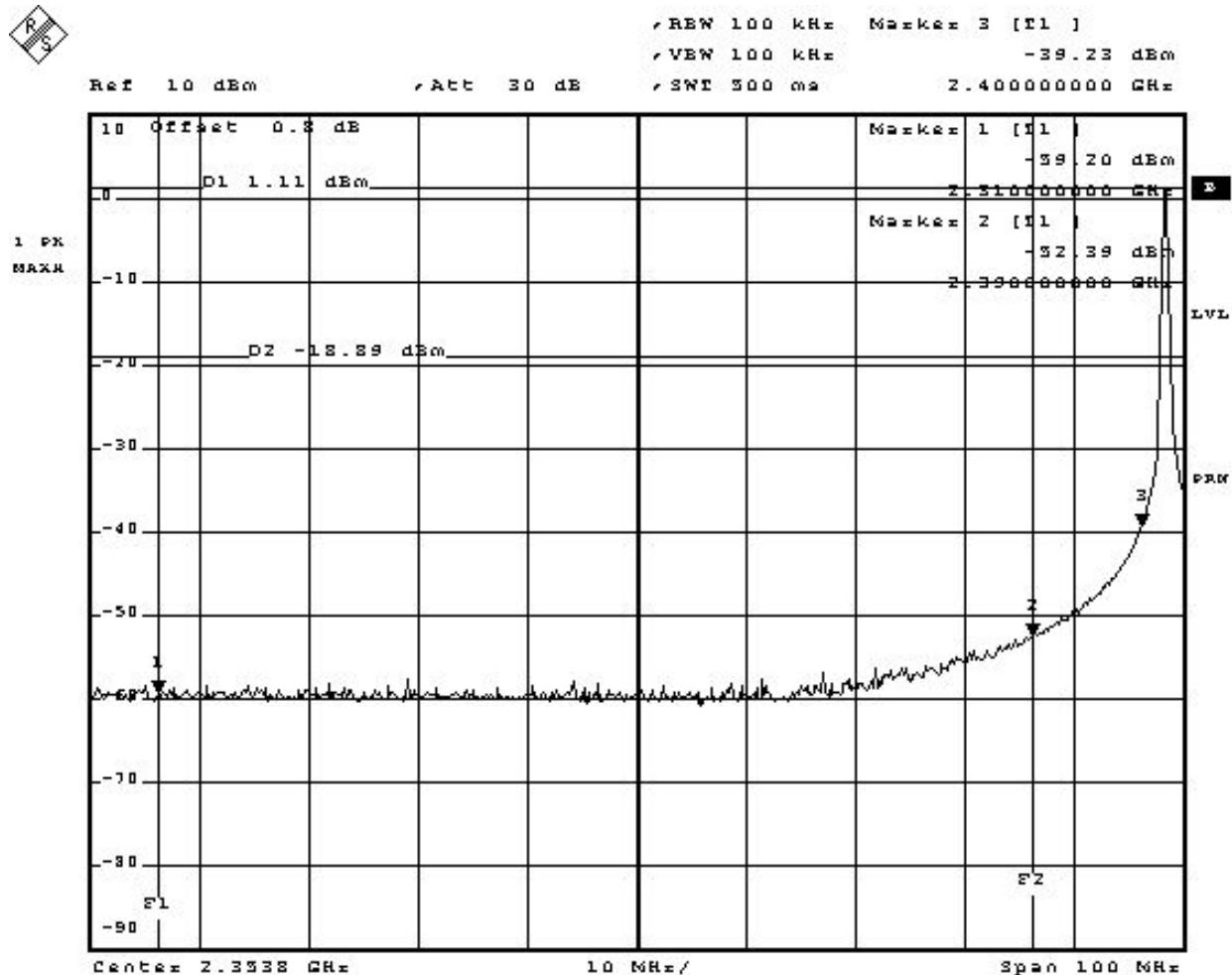
The delta between fundamental signal (CH78) and peak spurious emission ($f = 2483.5$ MHz) is 43.08 dB.

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	89.22	2.400	48.88	74	-25.12	Peak	Pass
	H	88.61	2.400	48.27	54	-5.73	Average	Pass
	V	92.51	2.400	52.17	74	-21.83	Peak	Pass
	V	92.33	2.400	51.99	54	-2.01	Average	Pass
78	H	87.75	2.4835	44.67	74	-29.33	Peak	Pass
	H	88.57	2.4835	45.49	54	-8.51	Average	Pass
	V	88.95	2.4835	45.87	74	-28.13	Peak	Pass
	V	88.84	2.4835	48.76	54	-5.24	Average	Pass

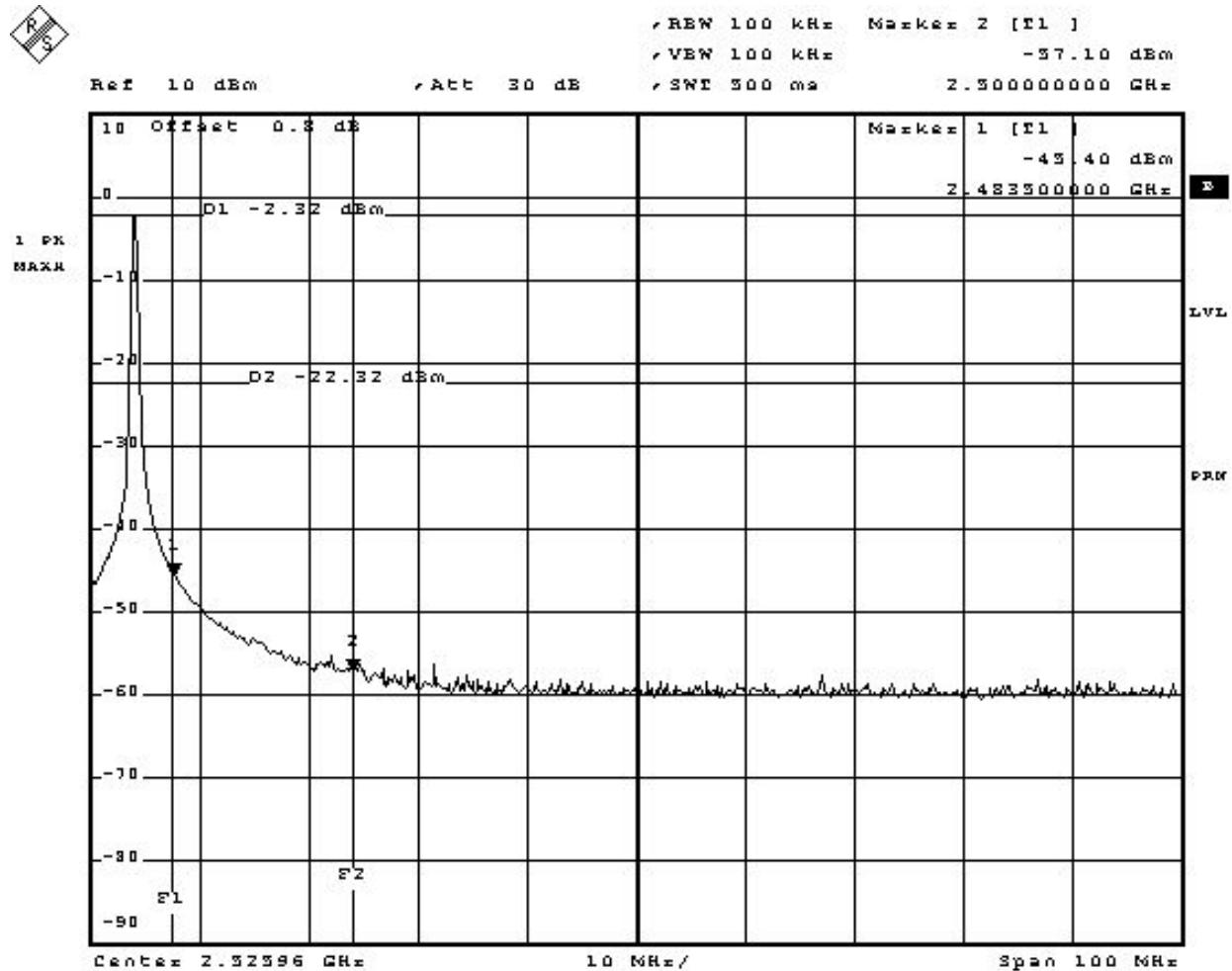
* Remark: The data above can refer to radiated emission in section 5.9.

5.7.5 Frequency Band Edge

Mode 1: CH00 (2402 MHz)



Mode 3: CH78 (2480 MHz)



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

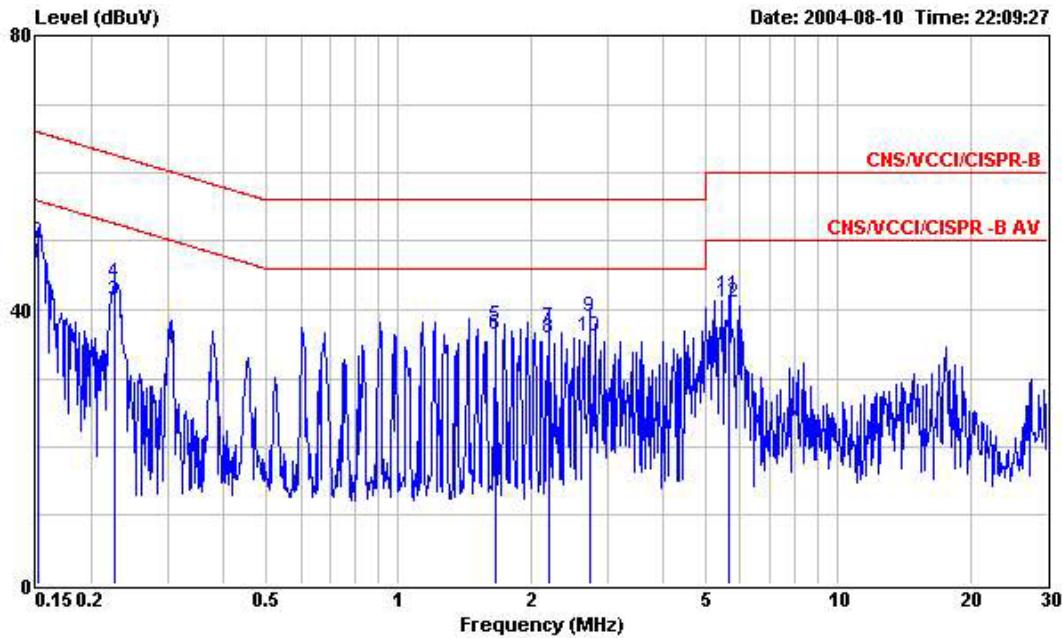
5.8.2 Test Procedures :

- 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 :

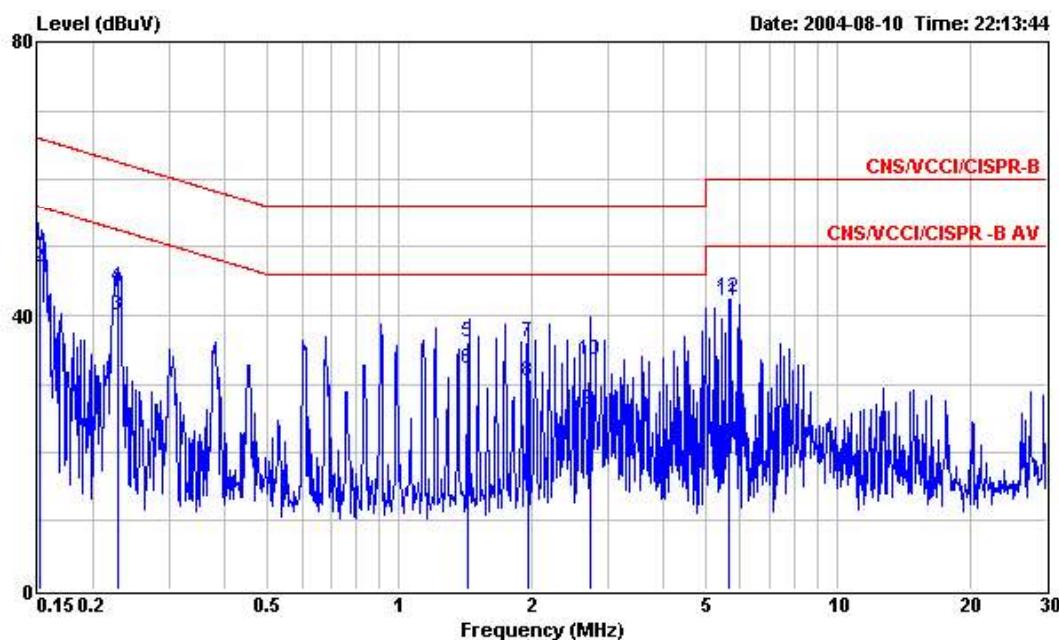
- Test Mode: Mode 1
- Frequency Range of Test: from 150KHz to 30 MHz
- Temperature: 26°C
- Relative Humidity: 53 %

■ 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 NEUTRAL
 EUT : Lite-on Bluetooth Digital
 Power : 110V 60Hz
 Memo : Photo Album
 Memo : CARD READ, HDD R/W

Freq	Level	Over	Limit	Read	Probe	Cable
		Line	dBuV	Level	Factor	Loss
MHz	dBuV	dB	dBuV	dBuV	dB	dB
1	0.152	46.70	-9.19	55.89	46.57	0.10
2	0.152	49.83	-16.06	65.89	49.70	0.10
3	0.226	41.38	-11.22	52.60	41.25	0.10
4	0.226	43.88	-18.72	62.60	43.75	0.10
5	1.665	37.57	-18.43	56.00	37.40	0.10
6	1.665	36.31	-9.69	46.00	36.14	0.10
7	2.195	37.43	-18.57	56.00	37.25	0.11
8	2.195	35.80	-10.20	46.00	35.62	0.11
9	2.723	38.94	-17.06	56.00	38.72	0.14
10	2.723	35.98	-10.02	46.00	35.76	0.14
11	5.672	42.00	-18.00	60.00	41.69	0.20
12	5.672	41.09	-8.91	50.00	40.78	0.20



Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 LINE
 EUT : Lite-on Bluetooth Digital
 Power : 110V 60Hz
 Memo : Photo Album
 Memo : CARD READ, HDD R/W

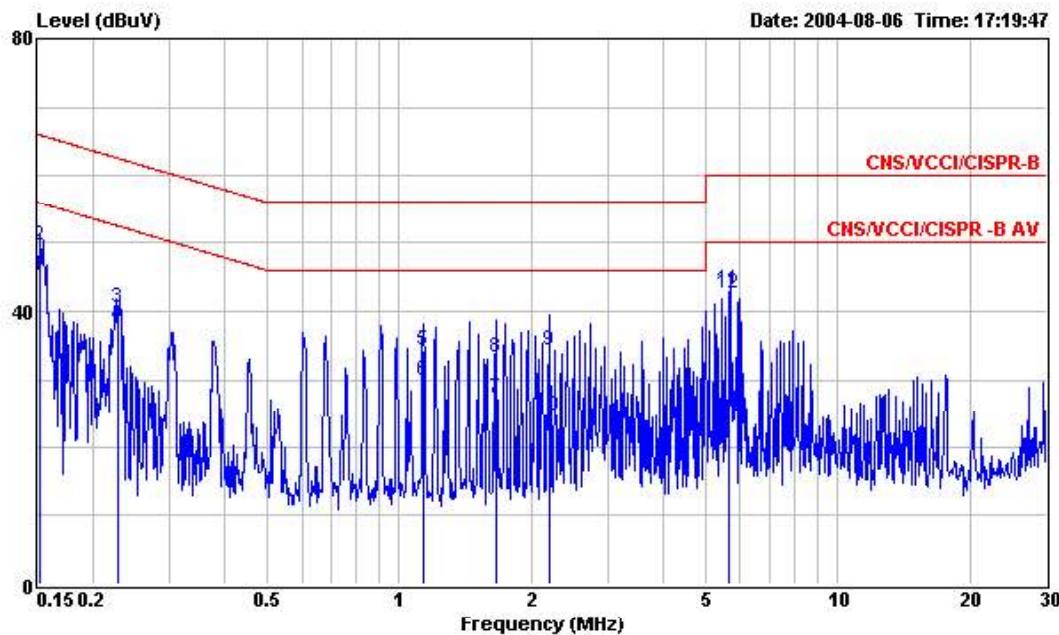
Freq	Level	Over Limit	Limit	Read		Probe	Cable
				Line	Level		
1	0.152	50.58	-15.33	65.91	50.45	0.10	0.03 QP
2	0.152	46.95	-8.96	55.91	46.82	0.10	0.03 Average
3	0.229	39.96	-12.54	52.50	39.83	0.10	0.03 Average
4	0.229	44.04	-18.46	62.50	43.91	0.10	0.03 QP
5	1.436	36.22	-19.78	56.00	36.05	0.10	0.07 QP
6	1.436	32.32	-13.68	46.00	32.15	0.10	0.07 Average
7	1.967	36.13	-19.87	56.00	35.96	0.10	0.07 QP
8	1.967	30.49	-15.51	46.00	30.32	0.10	0.07 Average
9	2.723	26.26	-19.74	46.00	26.08	0.10	0.08 Average
10	2.723	33.59	-22.41	56.00	33.41	0.10	0.08 QP
11	5.672	42.18	-7.82	50.00	41.93	0.14	0.11 Average
12	5.672	42.64	-17.36	60.00	42.39	0.14	0.11 QP

Test Engineer: Jay

Jay

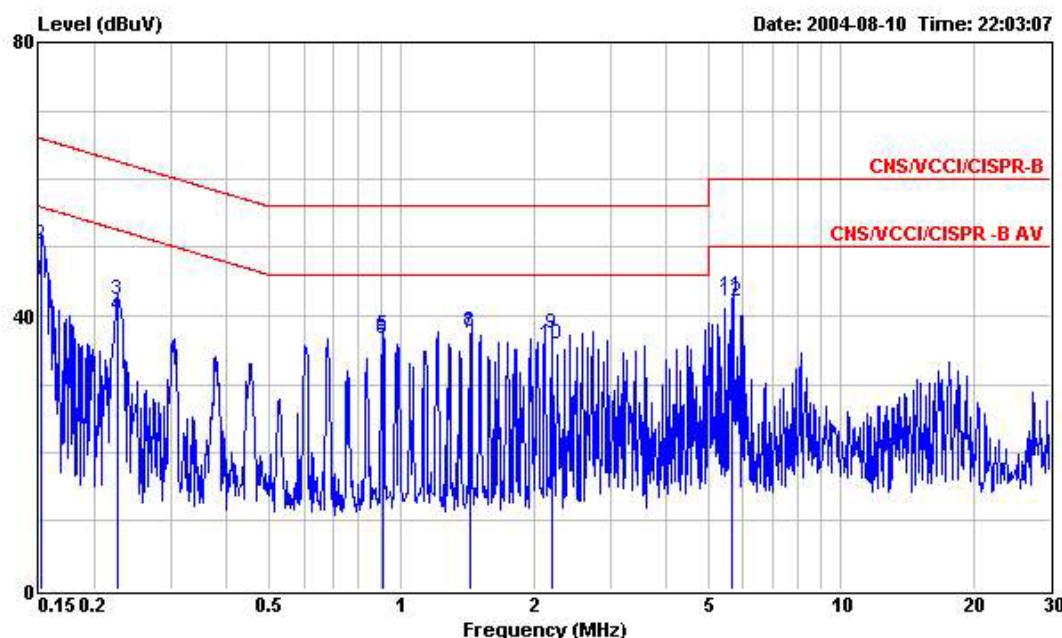
- Test Mode: Mode 2
- Frequency Range of Test: from 150KHz to 30 MHz
- Temperature: 26°C
- Relative Humidity: 53 %

■ 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 : Lite-on Bluetooth Digital
 Power : 110V 60Hz
 Memo : Photo Album
 Memo : USB CARD READ, HDD R/W

Freq	Over Limit		Read Line	Probe Level	Cable Factor	Loss	Remark
	MHz	dBuV	dB				
1	0.152	45.31	-10.58	55.89	45.18	0.10	0.03 Average
2	0.152	49.67	-16.22	65.89	49.54	0.10	0.03 QP
3	0.227	40.57	-21.97	62.54	40.44	0.10	0.03 QP
4	0.227	37.90	-14.64	52.54	37.77	0.10	0.03 Average
5	1.135	34.19	-21.81	56.00	34.03	0.10	0.06 QP
6	1.135	29.76	-16.24	46.00	29.60	0.10	0.06 Average
7	1.666	27.21	-18.79	46.00	27.04	0.10	0.07 Average
8	1.666	33.14	-22.86	56.00	32.97	0.10	0.07 QP
9	2.194	34.22	-21.78	56.00	34.05	0.10	0.07 QP
10	2.194	24.67	-21.33	46.00	24.50	0.10	0.07 Average
11	5.674	43.21	-16.79	60.00	42.96	0.14	0.11 QP
12	5.674	42.58	-7.42	50.00	42.33	0.14	0.11 Average



Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
 EUT : Lite-on Bluetooth Digital
 Power : 110V 60Hz
 Memo : Photo Album
 Memo : USB CARD READ, HDD R/W

Freq	Over Limit		Read Line	Probe Level	Cable Factor	Loss	Remark
	MHz	dBuV	dB				
1	0.151	45.18	-10.76	55.94	45.05	0.10	0.03 Average
2	0.151	50.29	-15.65	65.94	50.16	0.10	0.03 QP
3	0.226	42.32	-20.28	62.60	42.19	0.10	0.03 QP
4	0.226	40.09	-12.51	52.60	39.96	0.10	0.03 Average
5	0.908	37.08	-18.92	56.00	36.92	0.10	0.06 QP
6	0.908	36.64	-9.36	46.00	36.48	0.10	0.06 Average
7	1.436	37.32	-8.68	46.00	37.15	0.10	0.07 Average
8	1.436	37.66	-18.34	56.00	37.49	0.10	0.07 QP
9	2.195	37.47	-18.53	56.00	37.29	0.11	0.07 QP
10	2.195	35.80	-10.20	46.00	35.62	0.11	0.07 Average
11	5.674	42.85	-17.15	60.00	42.54	0.20	0.11 QP
12	5.674	42.03	-7.97	50.00	41.72	0.20	0.11 Average

Test Engineer: Jay

Jay

5.9 Test of Radiated Emission

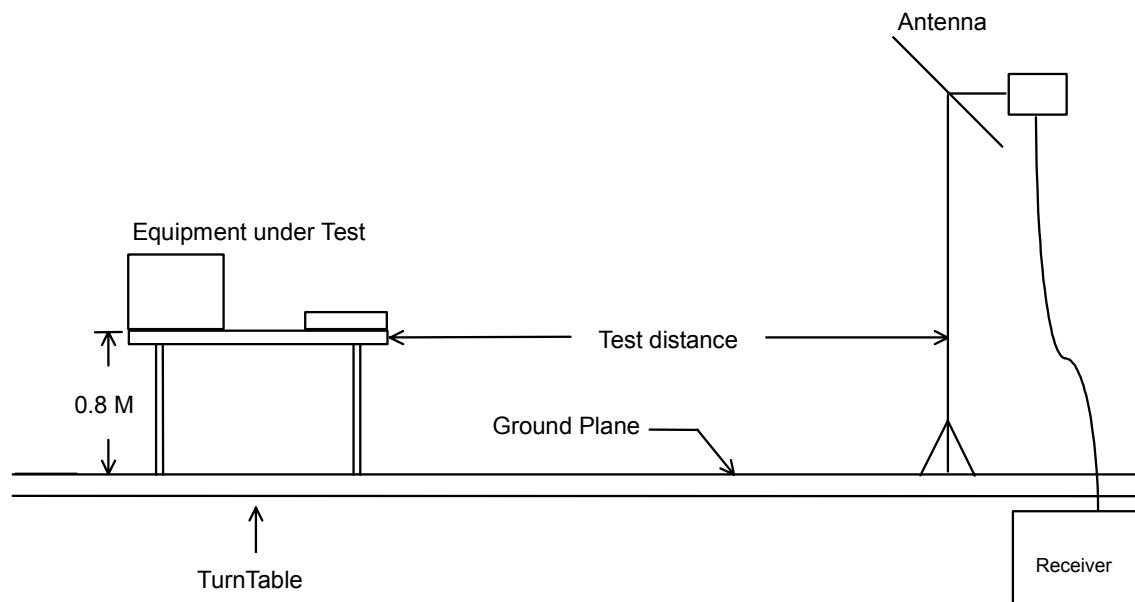
Radiated emissions from 30 MHz to 26.5 GHz were measured according to the methods defined in ANSI C63.4-2001. The EUT was placed on a nonmetallic stand, 0.8 meter above the ground plane, as shown in section 5.9.3. The interface cables and equipment positions were varied within limits of reasonable applications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

5.9.2 Test Procedures

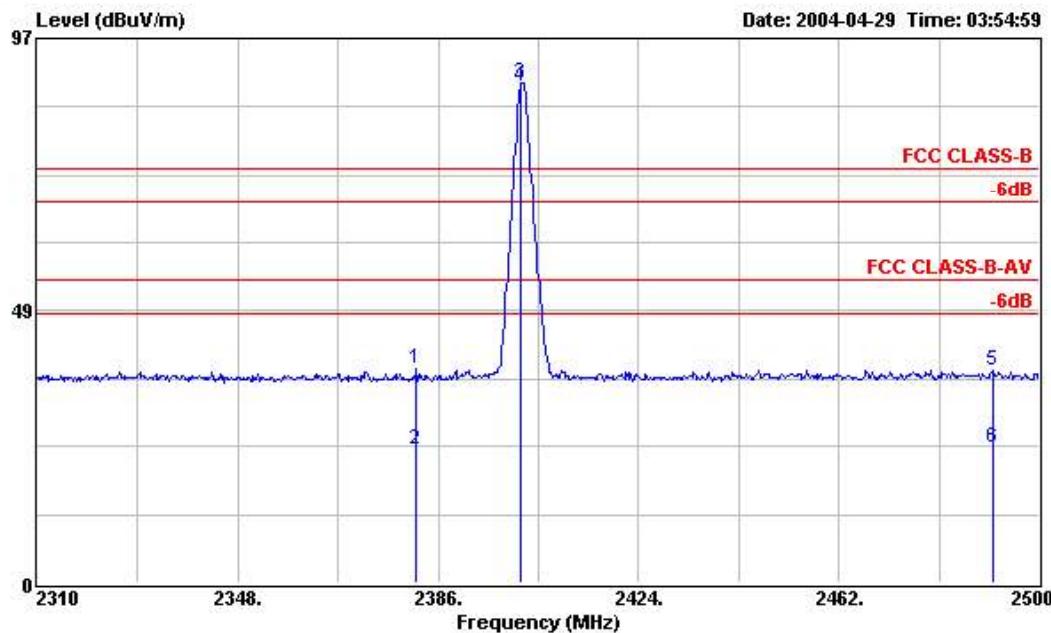
1. The EUT was placed on a rotatable table top 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna 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 %
- Emission level (dBuV/m) = $20 \log_{10}$ Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

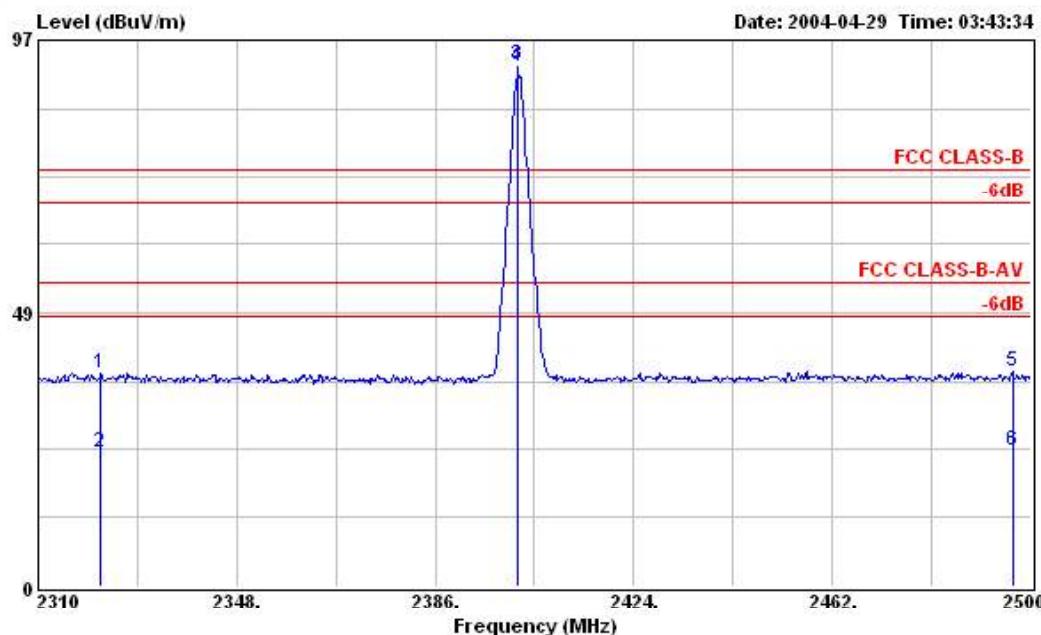
■ The test that passed at the minimum margin was marked by the frame in the following test record



Site : 03CH03-HY
Condition : FCC CLASS-B 3m HORN-ANT-6821 HORIZONTAL
EUT : Lite-on Bluetooth Digital
Model : Photo Album
Power : 110V/60Hz
Memo : TX CH:00 2402MHz

Freq	Level	Over	Limit	Read	Probe	Cable Preamp			Ant Pos	Table Pos
		Limit	Line	Level	Factor	Loss	Factor	Remark		
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB	cm	deg	
1 2381.820	38.08	-35.92	74.00	49.39	28.12	1.71	41.14	Peak	100	67
2 2381.820	23.83	-30.17	54.00	35.14	28.12	1.71	41.14	Average	100	67
3 X 2401.770	89.22			100.47	28.17	1.73	41.15	Peak	100	40
4 X 2401.770	88.61			100.99	28.17	1.73	42.28	Average	100	40
5 2491.260	37.92	-36.08	74.00	48.93	28.40	1.79	41.20	Peak	100	236
6 2491.260	24.03	-29.97	54.00	35.04	28.40	1.79	41.20	Average	100	236

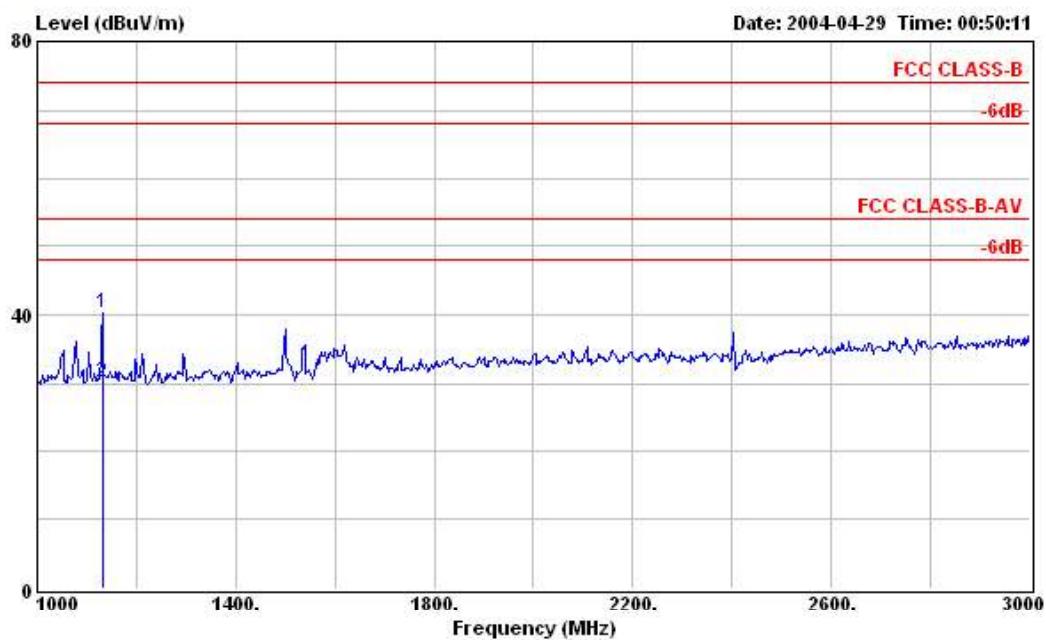
Remark: The “X” represent a fundamental frequency.



Site : 03CH03-HY
 Condition : FCC CLASS-B 3m HORN-ANT-6821 VERTICAL
 EUT : Lite-on Bluetooth Digital
 Model : Photo Album
 Power : 110V/60Hz
 Memo : TX CH.00 2402MHz

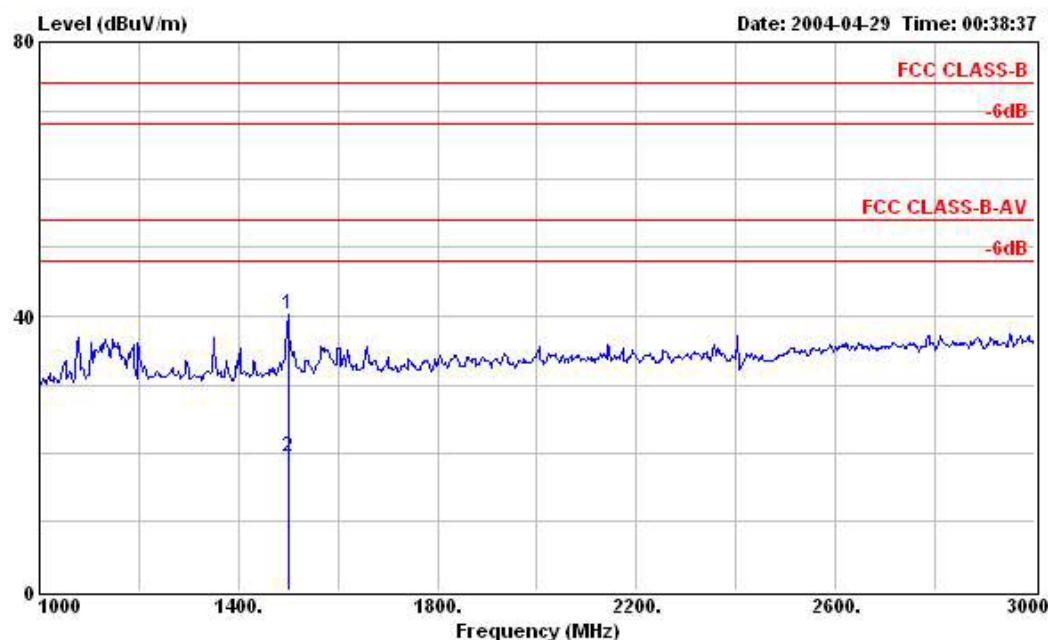
Freq	Over Limit		Read Line	Probe Level	Cable Factor	Preamplifier Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dB	dB	dB		
1	2321.970	37.80	-36.20	74.00	49.21	27.96	1.73	41.10	Peak 100 241
2	2321.970	23.77	-30.23	54.00	35.18	27.96	1.73	41.10	Average 100 241
3 X	2401.770	92.51		103.76	28.17	1.73	41.15	Peak 111 129	
4 X	2401.770	92.33		103.58	28.17	1.73	41.15	Average 111 129	
5	2496.580	38.04	-35.96	74.00	49.05	28.40	1.79	41.20	Peak 100 215
6	2496.580	24.04	-29.96	54.00	35.05	28.40	1.79	41.20	Average 100 215

Remark: The "X" represent a fundamental frequency.



Site : 03CH03-HY
 Condition : FCC CLASS-B 3m HORN-ANT-6821 HORIZONTAL
 EUT : Lite-on Bluetooth Digital
 Model : Photo Album
 Power : 110V/60Hz
 Memo : TX CH:00 2402MHz

Freq	Over Limit	Read Line	Probe Level	Cable Preamp		Ant Pos	Table Pos	
				dB	dBuV/m			
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg
1 1132.000	40.17	-33.83	74.00	54.98	24.20	1.23	40.24	Peak
2 1132.000	30.08	-23.92	54.00	44.89	24.20	1.23	40.24	Average
							100	49



Site : 03CH03-HY
 Condition : FCC CLASS-B 3m HORN-ANT-6821 VERTICAL
 EUT : Lite-on Bluetooth Digital
 Model : Photo Album
 Power : 110V/60Hz
 Memo : TX CH:00 2402MHz

Freq	Over Limit		Read Line	Probe Level	Cable Preamp		Remark	Ant Pos	Table Pos
	Level	Limit			dB	dBuV/m			
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg	
1	1500.000	40.25	-33.75	74.00	54.14	25.26	1.46	40.61	Peak
2	1500.000	19.50	-34.50	54.00	33.39	25.26	1.46	40.61	Average

Remark: Frequency from 3000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency	Antenna	Cable	Reading	Preamp	Limits	Emission	Margin	Detect	
	Polarity	Factor	Loss		Factor				
(MHz)		(dB/m)	(dB)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Mode
2401.770	H	28.17	1.73	59.32	28.17	-	89.22	-	Peak
2401.770	H	28.17	1.73	58.71	28.17	-	88.61	-	A.V.
2401.770	V	28.17	1.73	62.61	28.17	-	92.51	-	Peak
2401.770	V	28.17	1.73	62.43	28.17	-	92.33	-	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



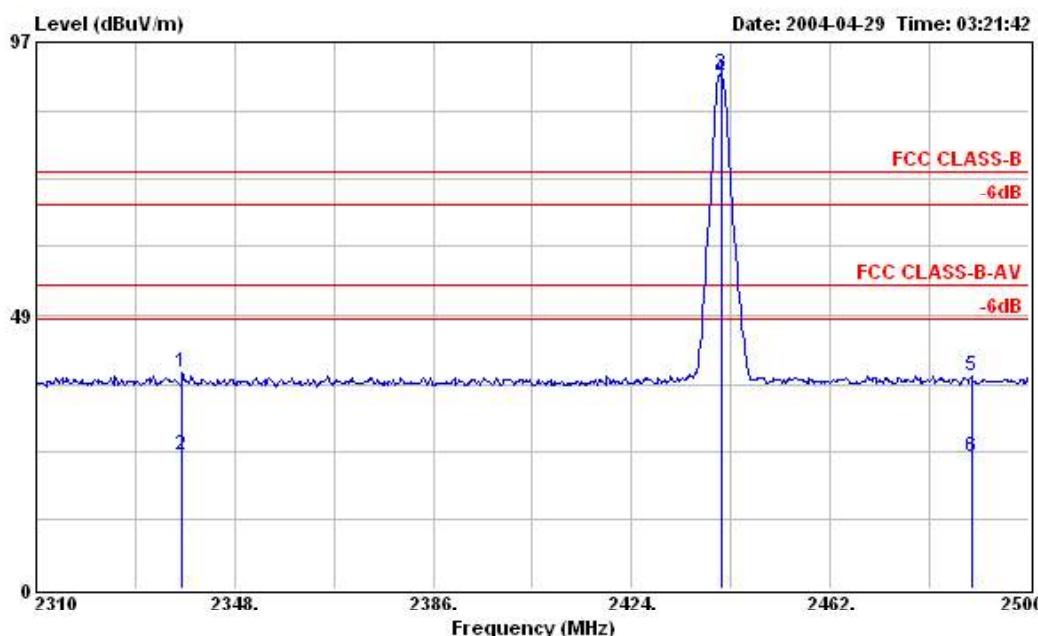
Test Engineer: _____

Jay

- Test Mode: Mode 2
- Test Distance: 3 M
- Temperature: 26 °C
- Relative Humidity: 53 %
- 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

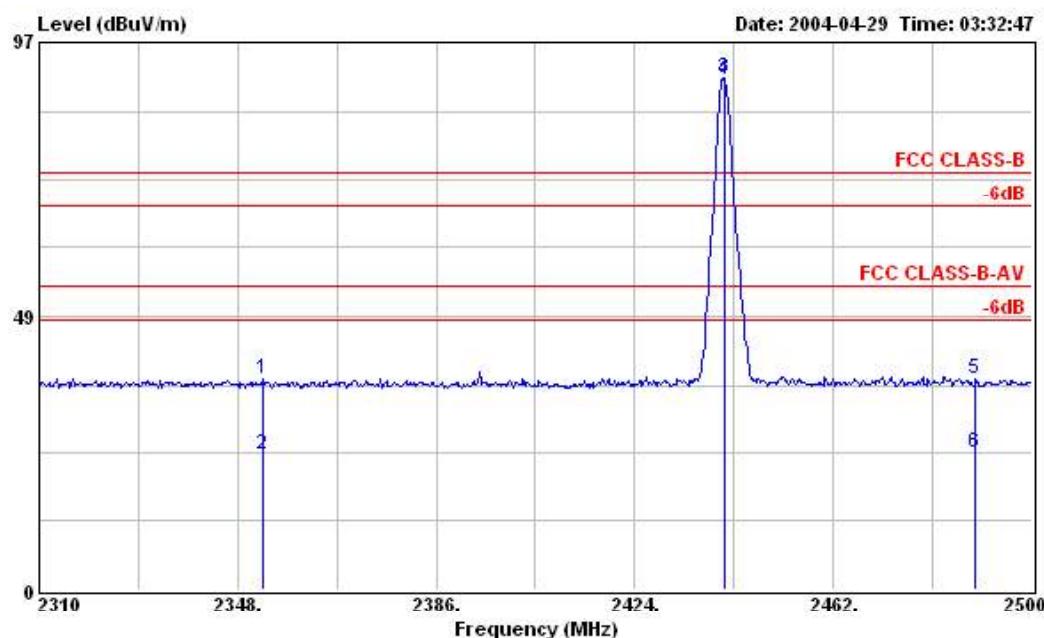
- Spurious Emission



Site : 03CH03-HY
 Condition : FCC CLASS-B 3m HORN-ANT-6821 HORIZONTAL
 EUT : Lite-on Bluetooth Digital
 Model : Photo Album
 Power : 110V/60Hz
 Memo : TX CH:39 2441MHz

Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant	Table	
									Pos	Pos	
MHz	dBuV/m		dB	dBuV/m		dB		dB	cm	deg	
1	2337.930	38.32	-35.68	74.00	49.72	28.01	1.70	41.11	Peak	247	100
2	2337.930	23.70	-30.30	54.00	35.10	28.01	1.70	41.11	Average	247	100
3 X	2441.100	91.22			102.34	28.28	1.77	41.17	Peak	100	311
4 X	2441.100	90.30			101.42	28.28	1.77	41.17	Average	100	311
5	2488.980	37.86	-36.14	74.00	48.87	28.40	1.79	41.20	Peak	100	240
6	2488.980	23.19	-30.81	54.00	34.20	28.40	1.79	41.20	Average	100	240

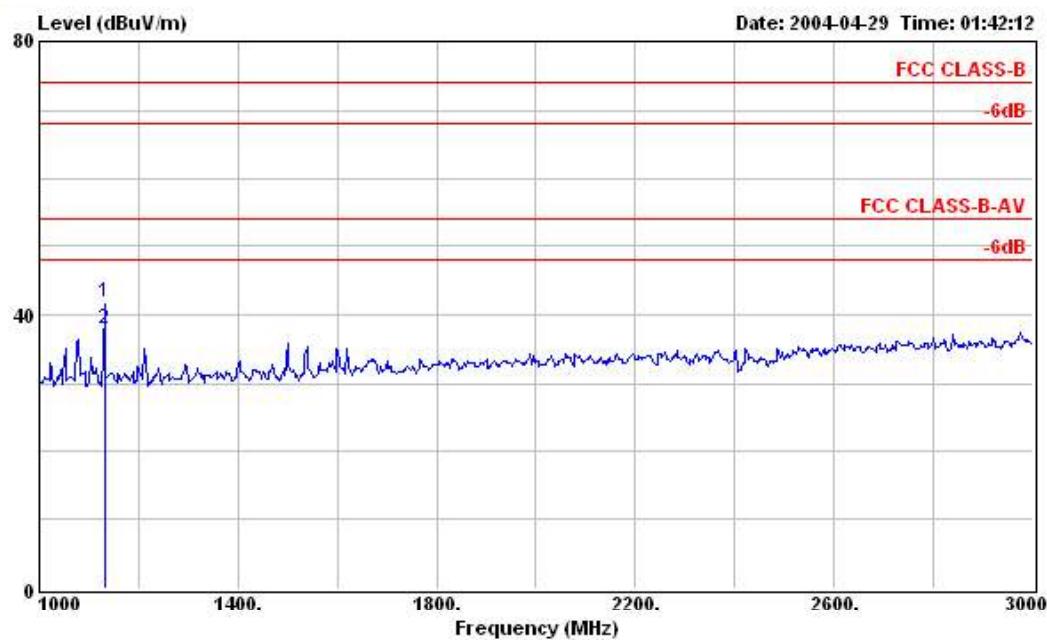
Remark: The "X" represent a fundamental frequency.



Site : 03CH03-HY
 Condition : FCC CLASS-B 3m HORN-ANT-6821 VERTICAL
 EUT : Lite-on Bluetooth Digital
 Model : Photo Album
 Power : 110V/60Hz
 Memo : TX CH:39 2441MHz

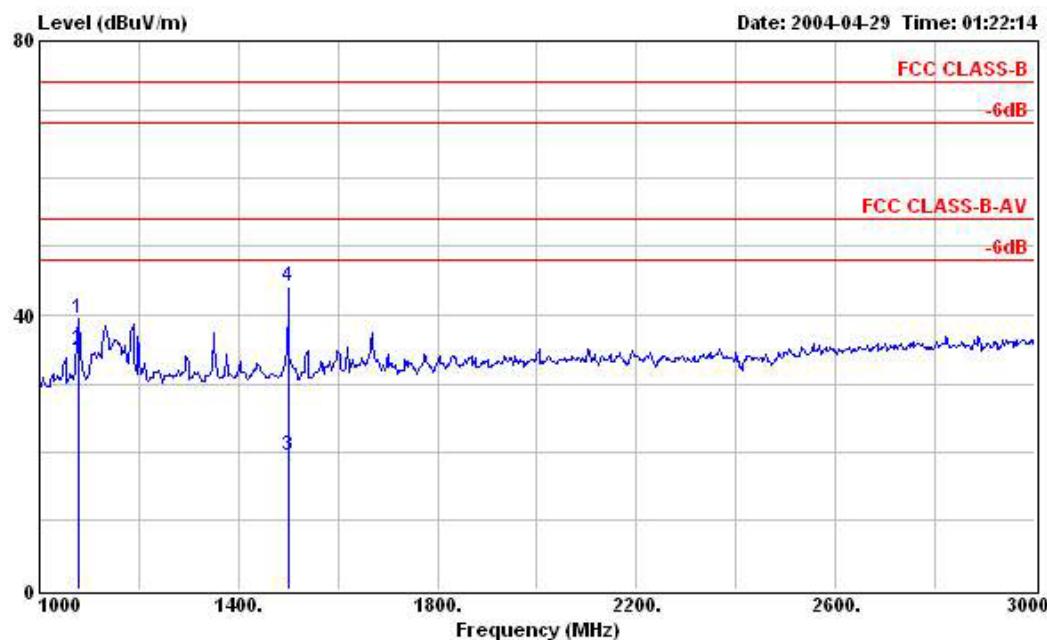
Freq	Over Limit	Read Line	Probe Level	Cable Preamp			Ant Pos	Table Pos
				dB	dBuV/m	dB		
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg
1 2352.940	37.46	-36.54	74.00	48.85	28.04	1.69	41.12	Peak 100 135
2 2352.940	24.00	-30.00	54.00	35.39	28.04	1.69	41.12	Average 100 135
3 X 2441.100	90.74			101.86	28.28	1.77	41.17	Peak 110 72
4 X 2441.100	90.45			101.57	28.28	1.77	41.17	Average 110 72
5 2489.170	37.44	-36.56	74.00	48.45	28.40	1.79	41.20	Peak 100 56
6 2489.170	24.36	-29.64	54.00	35.37	28.40	1.79	41.20	Average 100 56

Remark: The "X" represent a fundamental frequency.



Site : 03CH03-HY
 Condition : FCC CLASS-B 3m HORN-ANT-6821 HORIZONTAL
 EUT : Lite-on Bluetooth Digital
 Model : Photo Album
 Power : 110V/60Hz
 Memo : TX CH:39 2441MHz

Freq	Level	Over Limit	Read Line	Probe Level	Cable Preamp		Ant Pos	Table Pos	
					dB	dBuV/m			
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB	cm	deg
1 1132.000	41.82	-32.18	74.00	56.63	24.20	1.23	40.24	Peak	100 298
2 1132.000	38.04	-15.96	54.00	52.85	24.20	1.23	40.24	Average	100 298



Site : 03CH03-HY
 Condition : FCC CLASS-B 3m HORN-ANT-6821 VERTICAL
 EUT : Lite-on Bluetooth Digital
 Model : Photo Album
 Power : 110V/60Hz
 Memo : TX CH:39 2441MHz

Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Preamp		Ant Pos	Table Pos
						dB	dBuV/m		
1	1078.000	39.40	-34.60	74.00	54.34	24.04	1.21	40.19 Peak	100 211
2	1078.000	34.93	-19.07	54.00	49.87	24.04	1.21	40.19 Average	100 211
3	1500.000	19.58	-34.42	54.00	33.47	25.26	1.46	40.61 Average	113 204
4	1500.000	44.26	-29.74	74.00	58.15	25.26	1.46	40.61 Peak	113 204

Remark: Frequency from 3000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency (MHz)	Antenna Polarity	Cable Factor	Reading Loss	Preamp Factor	Limits (dB)	Emission (dBuV/m)	Margin (dB)	Detect	
								Mode	
2441.100	H	28.28	1.77	61.17	41.17	-	91.22	-	Peak
2441.100	H	28.28	1.77	60.25	41.17	-	90.30	-	A.V.
2441.100	V	28.28	1.77	60.69	41.17	-	90.74	-	Peak
2441.100	V	28.28	1.77	60.40	41.17	-	90.45	-	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.
21959.000	V/H	-	-	-	-	-	-	-	Peak, A.V.
24410.000	V/H	-	-	-	-	-	-	-	Peak, A.V.

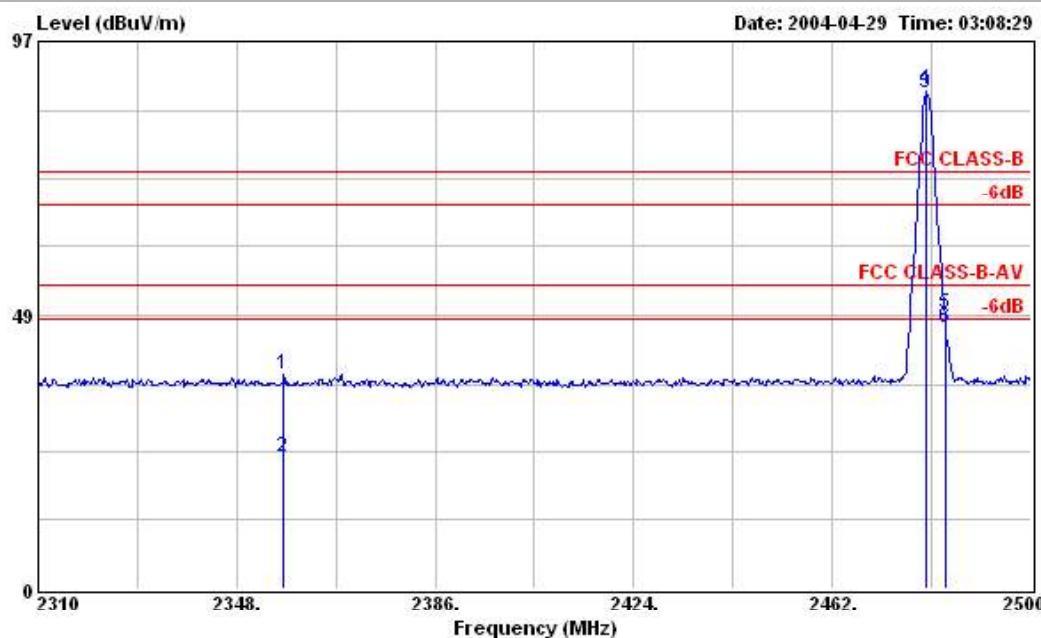
Remark: The emission emitted by the EUT is too low to be measured except the emission listed above

Test Engineer: Jay

Jay

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

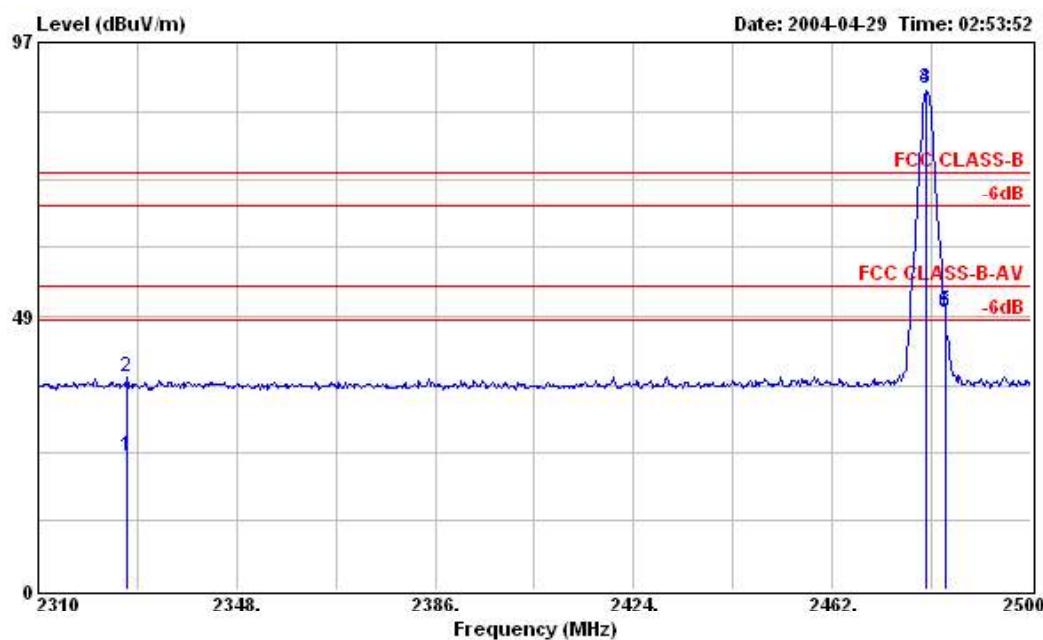
■ The test that passed at the minimum margin was marked by the frame in the following test record



Site : 03CH03-HY
 Condition : FCC CLASS-B 3m HORN-ANT-6821 HORIZONTAL
 EUT : Lite-on Bluetooth Digital
 Model : Photo Album
 Power : 110V/60Hz
 Memo : TX CH.78 2480MHz

Freq	Level	Over Limit	Limit Line	Read Probe			Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
				dBuV/m	dB	dBuV/m					
MHz	dBuV/m									cm	deg
1 2356.930	38.04	-35.96	74.00	49.41	28.06	1.69	41.12	Peak	100	25	
2 2356.930	23.29	-30.71	54.00	34.66	28.06	1.69	41.12	Average	100	25	
3 X 2480.050	87.75			99.88	28.38	1.79	42.30	Average	129	83	
4 X 2480.050	88.57			100.70	28.38	1.79	42.30	Peak	129	83	
5 2483.660	48.69	-25.31	74.00	59.71	28.39	1.79	41.20	Peak	129	83	
6 2483.660	46.26	-7.74	54.00	57.28	28.39	1.79	41.20	Average	129	83	

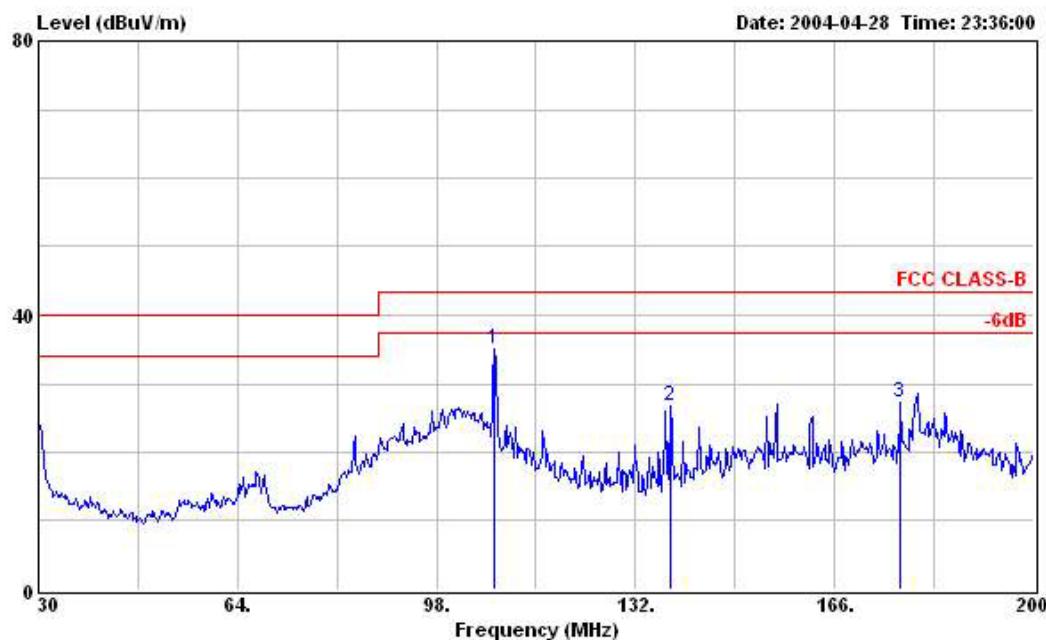
Remark: The "X" represent a fundamental frequency.



Site : 03CH03-HY
 Condition : FCC CLASS-B 3m HORN-ANT-6821 VERTICAL
 EUT : Lite-on Bluetooth Digital
 Model : Photo Album
 Power : 110V/60Hz
 Memo : TX CH:78 2480MHz

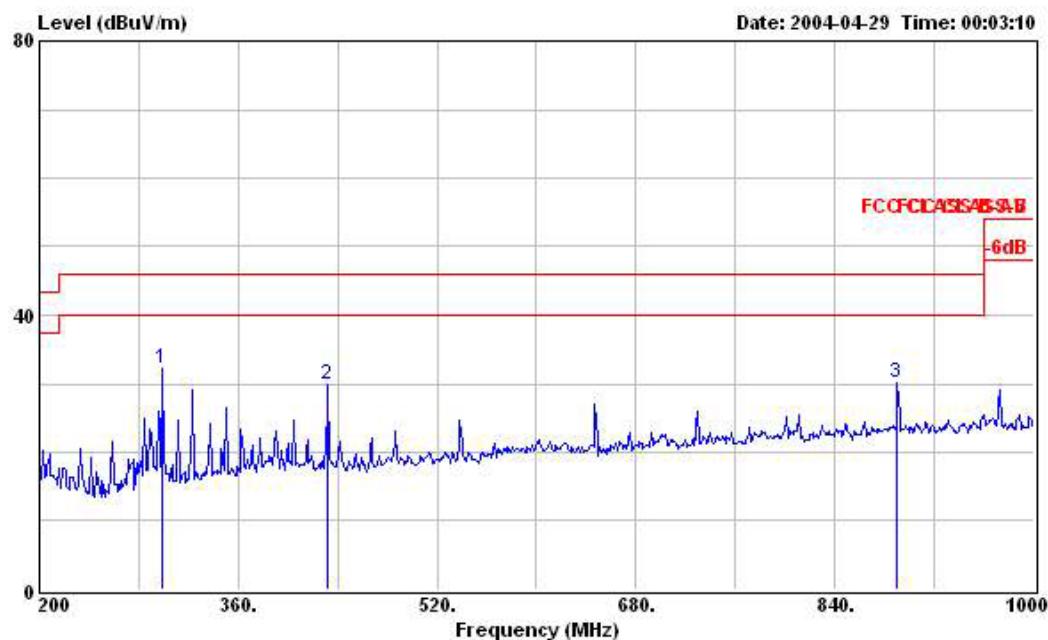
Freq	Over	Limit	Read	Probe	Cable	Preampl	Ant	Table		
	Level	Limit	Line	Level	Factor	Loss			Pos	Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1 2327.100	23.49	-30.51	54.00	34.89	27.98	1.72	41.10	Average	100	207
2 2327.100	37.82	-36.18	74.00	49.22	27.98	1.72	41.10	Peak	100	209
3 X 2480.050	88.95			99.98	28.38	1.79	41.20	Peak	108	158
4 X 2480.050	88.84			99.87	28.38	1.79	41.20	Average	108	158
5 2483.660	49.38	-24.62	74.00	60.40	28.39	1.79	41.20	Peak	108	158
6 ! 2483.660	49.08	-4.92	54.00	60.10	28.39	1.79	41.20	Average	108	158

Remark: The "X" represent a fundamental frequency.



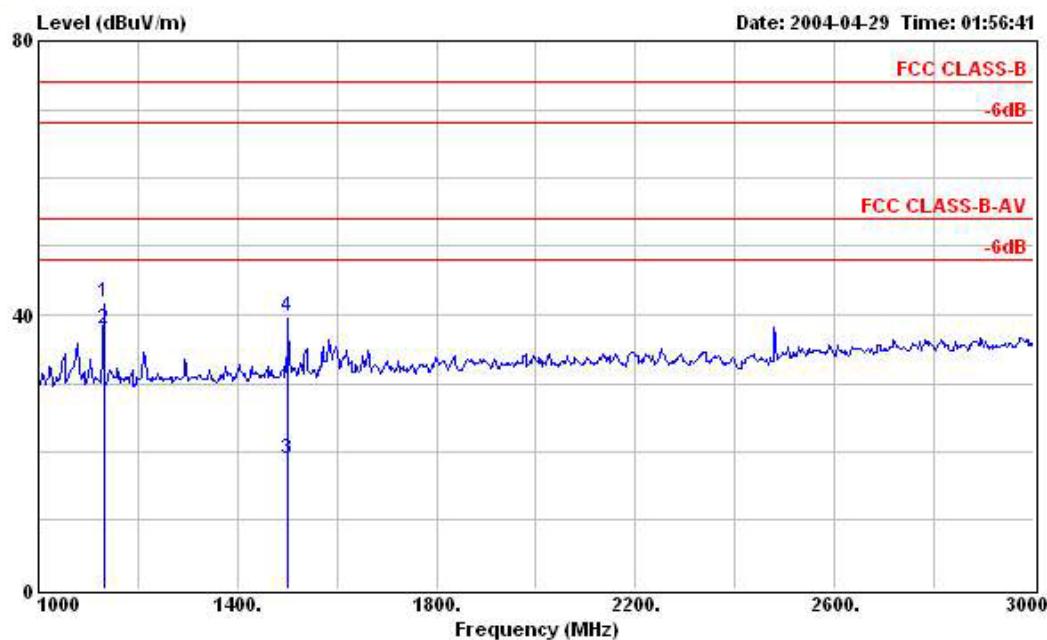
Site : 03CH03-HY
 Condition : FCC CLASS-B 3m BIC-9124--301 HORIZONTAL
 EUT : Lite-on Bluetooth Digital
 Model : Photo Album
 Power : 110V/60Hz
 Memo : TX CH:78 2480MHz

Freq	Level	Over Limit	Limit	Read Line	Probe Level	Cable Factor	Preamp Factor	Remark	Ant	Table
									Pos	Pos
	MHz	dBuV/m		dB	dBuV/m		dB		cm	deg
1	107.860	34.98	-8.52	43.50	50.71	10.30	1.85	27.88 Peak	---	---
2	137.950	26.86	-16.64	43.50	41.00	11.66	2.02	27.82 Peak	---	---
3	177.220	27.20	-16.30	43.50	39.06	13.48	2.40	27.74 Peak	---	---



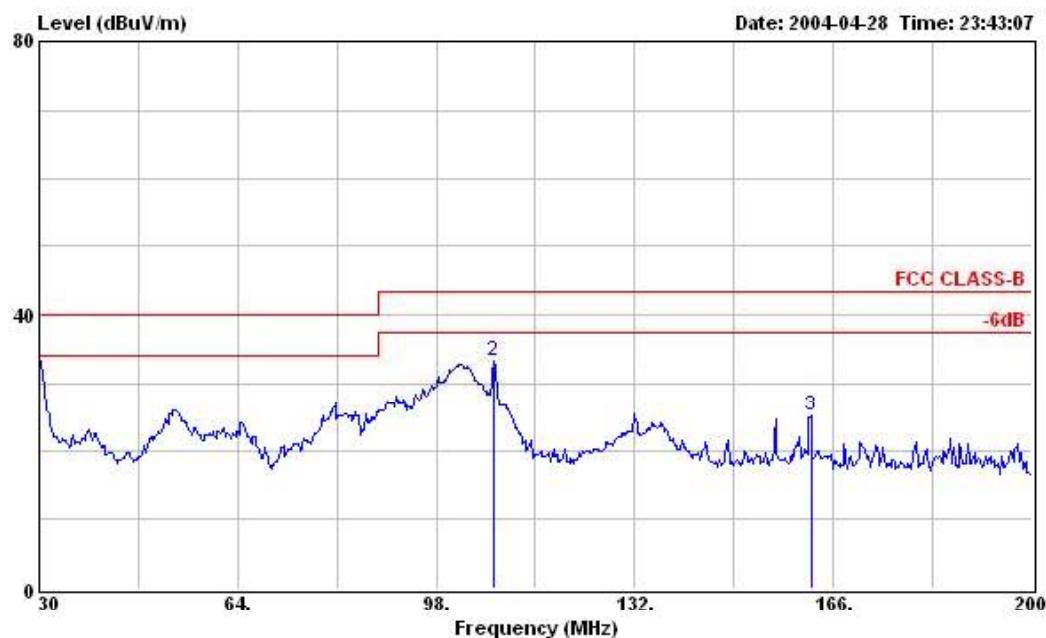
Site : 03CH03-HY
 Condition : FCC CLASS-B 3m LOG-9111-221 HORIZONTAL
 EUT : Lite-on Bluetooth Digital
 Model : Photo Album
 Power : 110V/60Hz
 Memo : TX CH:78 2480MHz

Freq	Level	Limit	Over	Limit	Read	Probe	Cable	Preampl	Ant	Table
			Freq	Line	Level	Factor	Loss	Factor		
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB	cm	deg	
1 298.400	32.22	-13.78	46.00	43.29	13.16	3.08	27.31	Peak	---	---
2 432.000	29.92	-16.08	46.00	38.15	16.24	3.62	28.09	Peak	---	---
3 890.400	30.13	-15.87	46.00	32.13	21.04	5.31	28.35	Peak	---	---



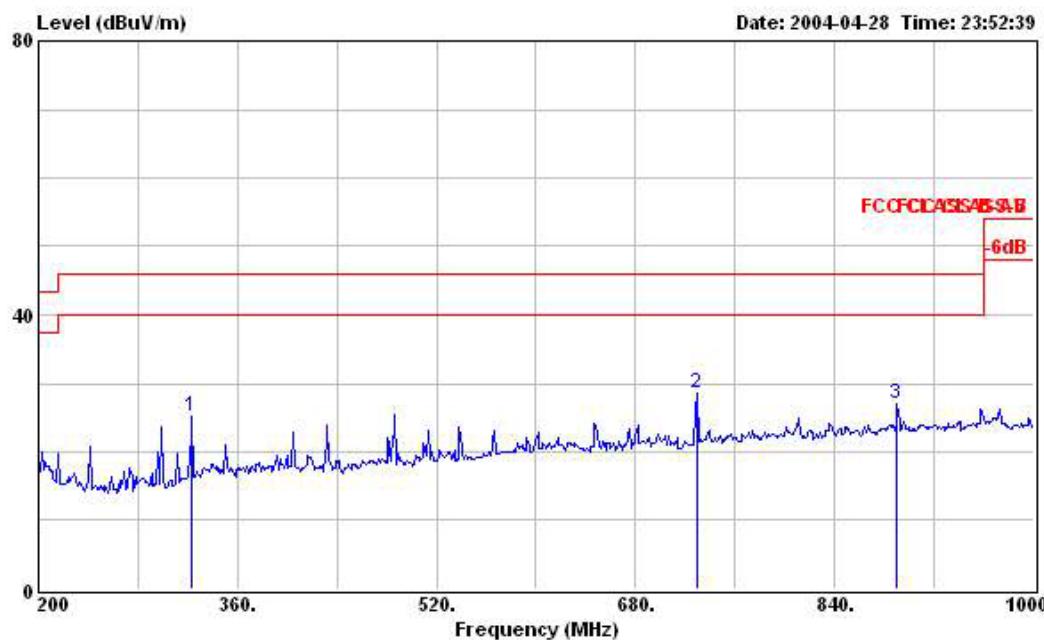
Site : 03CH03-HY
 Condition : FCC CLASS-B 3m HORN-ANT-6821 HORIZONTAL
 EUT : Lite-on Bluetooth Digital
 Model : Photo Album
 Power : 110V/60Hz
 Memo : TX CH:78 2480MHz

Freq	Level	Over	Limit	Read	Probe	Cable	Preamp	Remark	Ant	Table
		Limit	Line	Level	Factor	Loss	Factor		Pos	Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1 1132.000	41.88	-32.12	74.00	56.69	24.20	1.23	40.24	Peak	100	294
2 1132.000	37.88	-16.12	54.00	52.69	24.20	1.23	40.24	Average	100	294
3 1502.000	19.06	-34.94	54.00	32.95	25.26	1.46	40.61	Average	100	195
4 1502.000	39.68	-34.32	74.00	53.57	25.26	1.46	40.61	Peak	100	195



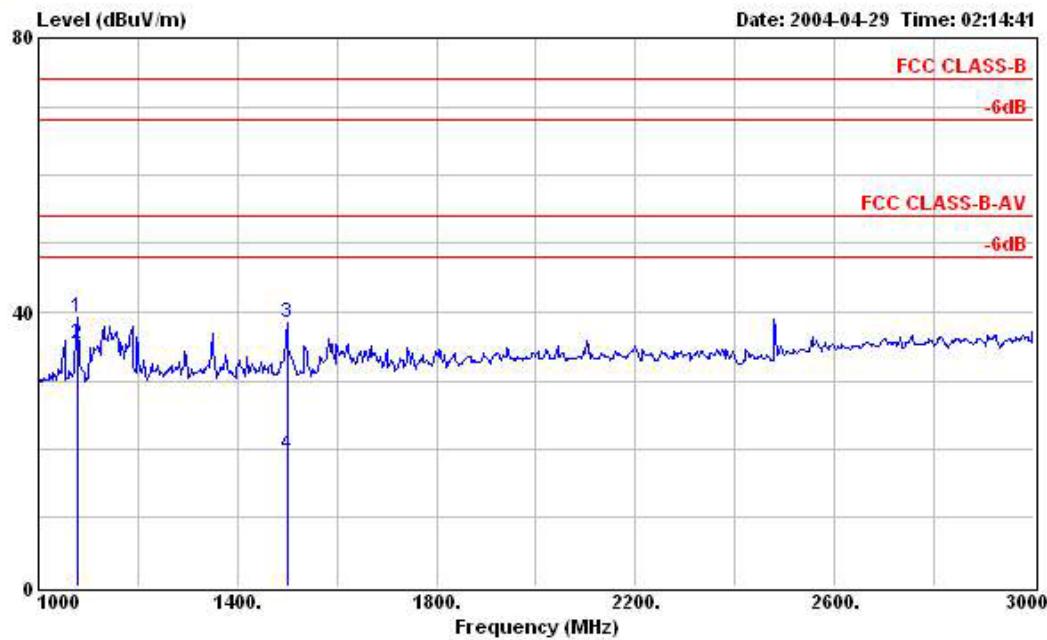
Site : 03CH03-HY
 Condition : FCC CLASS-B 3m BIC-9124--301 VERTICAL
 EUT : Lite-on Bluetooth Digital
 Model : Photo Album
 Power : 110V/60Hz
 Memo : TX CH:78 2480MHz

Freq	Over Level	Limit Line	Read Level	Probe Factor	Cable Preamp		Ant Loss	Table Remark	Ant Pos	Table Pos
					dB	dBuV/m				
MHz	dBuV/m	dB	dBuV/m	dB	dB	dBuV/m	dB	dB	cm	deg
1 30.000	33.47	-6.53	40.00	46.11	14.47	0.94	28.05	Peak	---	---
2 107.860	33.36	-10.14	43.50	49.09	10.30	1.85	27.88	Peak	---	---
3 162.260	25.17	-18.33	43.50	37.81	12.81	2.32	27.77	Peak	---	---



Site : 03CH03-HY
 Condition : FCC CLASS-B 3m LOG-9111-221 VERTICAL
 EUT : Lite-on Bluetooth Digital
 Model : Photo Album
 Power : 110V/60Hz
 Memo : TX CH:78 2480MHz

Freq	Level	Over	Limit	Read	Probe	Cable	Preamp	Ant Pos	Table Pos
		Limit	Line	Level	Factor	Loss	Factor		
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB	cm	deg
1	323.200	25.31	-20.69	46.00	35.03	14.52	3.18	27.42	Peak
2	729.600	28.58	-17.42	46.00	32.59	19.92	4.80	28.73	Peak
3	890.400	26.94	-19.06	46.00	28.94	21.04	5.31	28.35	Peak



Site : 03CH03-HY
 Condition : FCC CLASS-B 3m HORN-ANT-6821 VERTICAL
 EUT : Lite-on Bluetooth Digital
 Model : Photo Album
 Power : 110V/60Hz
 Memo : TX CH:78 2480MHz

Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant	Table	
									Pos	Pos	
	MHz	dBuV/m	dB	dBuV/m		dB	dB	dB	cm	deg	
1	1078.000	39.18	-34.82	74.00	54.12	24.04	1.21	40.19	Peak	100	211
2	1078.000	35.22	-18.78	54.00	50.16	24.04	1.21	40.19	Average	100	211
3	1500.000	38.47	-35.53	74.00	52.36	25.26	1.46	40.61	Peak	100	206
4	1500.000	19.21	-34.79	54.00	33.10	25.26	1.46	40.61	Average	100	206

Remark: Frequency from 3000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured.

■ Field strength of fundamental and harmonics

Frequency	Antenna	Cable	Reading	Preamp	Limits	Emission	Margin	Detect	
	Polarity	Factor	Loss		Factor				
(MHz)		(dB/m)	(dB)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Mode
2480.000	H	28.38	1.79	58.40	42.30	-	88.57	-	Peak
2480.000	H	28.38	1.79	57.58	42.30	-	87.75	-	A.V.
2480.050	V	28.38	1.79	58.78	41.20	-	88.95	-	Peak
2480.050	V	28.38	1.79	58.67	41.20	-	88.84	-	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

Jay

6. Antenna Requirements

The EUT use a chip antenna without connector 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 chip antenna without connector.

7. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
EMC Receiver	R&S	ESCS 30	100132	9 KHz – 2.75 GHz	Jun. 23, 2004	Jun. 23, 2005	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001/008	9 KHz – 30 MHz	May 03, 2004	May 03, 2005	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001/009	9 KHz – 30 MHz	Apr. 19, 2004	Apr. 19, 2005	Conduction (CO01-HY)
EMI Filter	LINDGREN	LRE-2060	1004	< 450 Hz	N/A	N/A	Conduction (CO01-HY)
EMI Filter	LINDGREN	N6006	201052	0 ~ 60 Hz	N/A	N/A	Conduction (CO01-HY)
RF Cable-CON	Suhner Switzerland	RG223/U	CB029	9KHz~30MHz	Dec. 24, 2003	Dec. 24, 2004	Conduction (CO01-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	Jun. 21, 2004	Jun. 21, 2005	Radiation (03CH03-HY)
Spectrum analyzer	R&S	FSP40	100004	9KHZ~40GHz	Aug. 23, 2003	Aug. 23, 2004	Radiation (03CH03-HY)
Amplifier	HP	8447D	2944A09072	100KHz – 1.3GHz	Nov. 05, 2003	Nov. 05, 2004	Radiation (03CH03-HY)
Biconical Antenna	SCHWARZBECK	VHBB 9124	301	30MHz –200MHz	Jul. 28, 2004	Jul. 28, 2005	Radiation (03CH03-HY)
Log Antenna	SCHWARZBECK	VUSLP 9111	221	200MHz -1GHz	Jul. 28, 2004	Jul. 28, 2005	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Dec. 03, 2003	Dec. 03, 2004	Radiation (03CH03-HY)
Amplifier	MITEQ	AFS44	849984	100MHz~26.5GHz	Mar. 26, 2004	Mar. 26, 2005	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6821	1GHz – 18GHz	Sep. 12, 2003	Sep. 12, 2004	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	N/A	Radiation (03CH03-HY)
Horn Antenna	Schwarzbeck	BBHA9170	154	15GHz~40GHz	Jun. 09, 2004	Jun. 09, 2005	Radiation (03CH03-HY)
RF Cable-HIGH	Jye Bao	RG142	CB030-HIGH	1GHz~29.5GHz	Dec. 05, 2003	Dec. 05, 2004	Radiation (03CH03-HY)

8. Uncertainty of Test Site

Uncertainty of Conducted Emission Measurement (30MHz ~ 1000MHz)

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 $\Gamma_1=$ LISN VSWR $\Gamma_2=$ Uncertainty=20log(1- $\Gamma_1 \cdot \Gamma_2$)	+0.34/-0.35	U-shape	0.24
combined standard uncertainty $U_c(y)$	1.13		
Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$	2.26		

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

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 $\Gamma_1= 0.20$ Antenna VSWR $\Gamma_2= 0.23$ Uncertainty=20log(1- $\Gamma_1 \cdot \Gamma_2$)	+0.39/-0.41	U-shaped	0.28
combined standard uncertainty $U_c(y)$	1.27		
Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$	2.54		

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

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

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

Contribution	Uncertainty of \bar{x}_i		$u(x_i)$	Ci	$Ci * u$
	dB	Probability Distribution			
Receiver reading	±0.10	Normal(k=1)	0.10	1	0.10
Antenna factor calibration	±1.70	Normal(k=2)	0.85	1	0.85
Cable loss calibration	±0.50	Normal(k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma 1 = 0.197$ Antenna VSWR $\Gamma 2 = 0.194$ Uncertainty=20log(1- $\Gamma 1 * \Gamma 2 * \Gamma 3$)	+0.34/-0.35	U-shaped	0.244	1	0.244
Combined standard uncertainty $U_c(y)$	2.36				
Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$	4.72				

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