

FCC TEST REPORT

for

47 CFR Part 15 Subpart C

Equipment : PDA Phone
Trade Name : BenQ
Model No. : P50(57P50)
FCC ID : JVP57P50
Filing Type : Certification
Applicant : BenQ Corporation
157 Shan-Ying Road, Gueishan, Taoyuan 333,
Taiwan, R.O.C.

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- The data shown in this test report were carried out on Nov. 25, 2004 at Sporton International Inc. LAB.

Dr. Daniel Lee
EMC/SAR Manager

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Table of Contents

History of this test report.....	ii
1. General Description of Equipment under Test.....	1
1.1. Applicant	1
1.2. Manufacturer	1
1.3. Basic Description of Equipment under Test	1
1.4. Feature of Equipment under Test	2
2 Test Configuration of Equipment under Test	3
2.1 Test Manner	3
2.2 Test Mode	3
2.3 Connection Diagram of Test System	4
2.4 Ancillary Equipment List.....	4
3. RF Utility	5
4. General Information of Test.....	6
4.1 Test Voltage	6
4.2 Standard for Methods of Measurement.....	6
4.3 Test in Compliance with	6
4.4 Frequency Range Investigated	6
4.5 Test Distance	6
5. Test Data and Test Result.....	7
5.1 List of Measurements and Examinations	7
5.2 Peak Output Power Measurement.....	9
5.3 Power Spectral Density Measurement.....	10
5.4 6dB Bandwidth Measurement.....	14
5.5 Band Edges Measurement	18
5.6 Hopping Channel Bandwidth	25
5.7 Hopping Channel Separation.....	29
5.8 Number of Hopping Frequency.....	33
5.9 Dwell Time of Each Frequency within a 30 Seconds Period	35
5.10 Conducted Emission Measurement	42
5.11 Radiated Emission Measurement.....	45
5.12 Antenna Requirements	60
6. List of Measuring Equipments Used	61
7. Uncertainty Evaluation.....	62
Appendix A. Photographs of EUT External	
Appendix B. Photographs of EUT Internal	
Appendix C. Photographs of Setup	



History of this test report

Original Report Issue Date: Feb. 22, 2005

☒ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description



1. General Description of Equipment under Test

1.1. Applicant

BenQ Corporation

157 Shan-Ying Road, Gueishan, Taoyuan 333, Taiwan, R.O.C.

1.2 Manufacturer

BenQ Corporation

157 Shan-Ying Road, Gueishan, Taoyuan 333, Taiwan, R.O.C.

1.3 Basic Description of Equipment under Test

Equipment	: PDA Phone
Trade Name	: BenQ
Model No.	: P50(57P50)
FCC ID	: JVP57P50
Power Supply Type	: Switching
AC Power Cord	: AC 120V, Non-shielded, Wall-mount, 1.8meter, 2pin
Earpiece	: EMC147-X043 57P30
Charger	: NAC060240U807-1
Battery	: BAT LI-I 3.7V 1240MA 57P50
Data Cable	: CABLE USB WITH CORE 1500MM P30

**1.4 Feature of Equipment under Test**

Product Feature & Specification			
1. Type of Modulation	802.11b: CCK(11Mbps), DQPSK(5.5Mbps) DQPSK(2Mbps), DBPSK(1Mbps) BT: GFSK		
2. Number of Channels	802.11b: 11 Channels BT: 79 Channels		
3. Frequency Band	2.4GHz~2.4835GHz		
4. Carrier Frequency of each channel	802.11b: $2412\text{MHz} + (n-1) \times 5\text{MHz}$, $n=1\sim 11$ BT: $2402\text{MHz} + n \times 1\text{MHz}$, $n=0\sim 78$		
5. Channel Spacing	802.11b: 5MHz BT: 1MHz		
6. Maximum Output Power to Antenna (Normal Condition)	802.11b: 17.82 dBm BT: 0.58 dBm		
7. Type of Antenna Connector	N/A		
8. Antenna Type	802.11b: FPA (Flexible Printed Antenna) BT: PCB (Printed Circuit Board) Antenna		
9. Antenna Gain	802.11b: -0.63 dBi BT: 0.98 dBi		
10. Function Type	Transmitter		Transceiver V
11. Duty Cycle	N/A		
12. Basic function of product	With Wireless LAN and BT for data networking applications		



2 Test Configuration of Equipment under Test

2.1 Test Manner

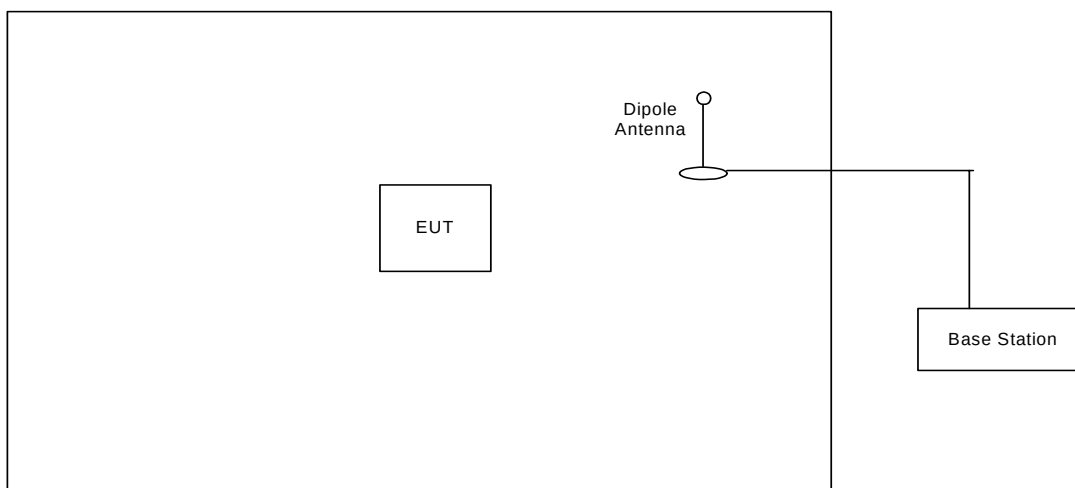
- a. The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.
- b. For spurious emission below 1GHz, only one channel of each application was tested because it is not related to channel selection.
- c. The EUT is programmed to transmit signal continuously for all testings.
- d. Frequency range investigated: conduction 150 kHz to 30 MHz, radiation 30 MHz to 25000MHz.
- e. The co-location for WLAN and BT was checked for Radiated Emission.

2.2 Test Mode

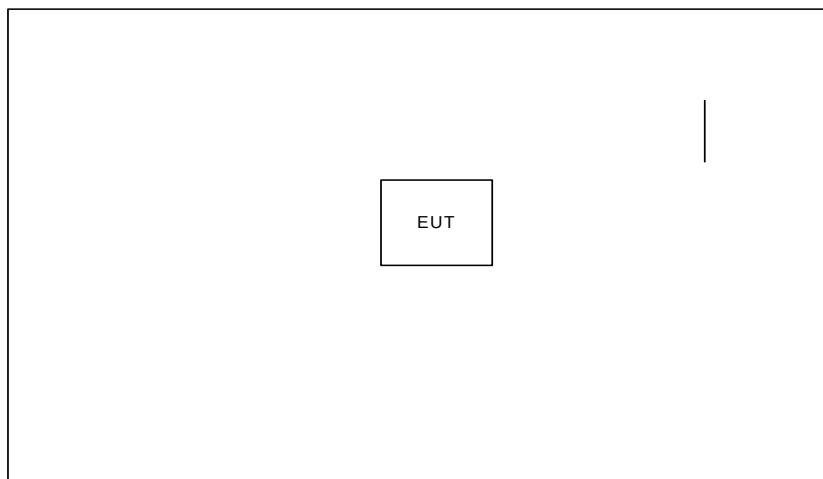
Application	802.11b	BT
Radiated Emission	Mode 1: Tx_CH01_2412 MHz Mode 2: Tx_CH06_2437 MHz Mode 3: Tx_CH11_2462 MHz	Mode 4: Tx_CH00_2402 MHz Mode 5: Tx_CH38_2441 MHz Mode 6: Tx_CH78_2480 MHz
	Mode 7: GSM 850 CH189+WLAN CH06+Bluetooth CH38	
Conducted Emission	Mode 1: PCS1900 Idle Mode + WLAN Link + BT on + MP3 + MP4 + Camera	

2.3 Connection Diagram of Test System

《Conducted Emission》



《Radiation Emission》



2.4 Ancillary Equipment List

Equipment	Trade Name	Model No.
Base Station	Agilent	E5515C



3. RF Utility

The programmed RF Utility for WLAN and BT is either installed in EUT to provide channel selection, power level, data rate and the application type. RF Utility can send transmitting signal for all testings.



4. General Information of Test

Test Site Location : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park,
Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
TEL : 886-3-327-3456
FAX : 886-3-318-0055
Test Site No : CO04-HY, 03CH06-HY

4.1 Test Voltage

120V/ 60Hz

4.2 Standard for Methods of Measurement

ANSI C63.4-2003

4.3 Test in Compliance with

47 CFR Part 15 Subpart C

4.4 Frequency Range Investigated

- a. Conduction: from 150 kHz to 30 MHz
- b. Radiation: from 30 MHz to 25000 MHz

4.5 Test Distance

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



5. Test Data and Test Result

5.1 List of Measurements and Examinations

The Emission Mode: Wireless LAN

FCC Rule	Description of Test	Result	Section
15.247(b)	Maximum Peak Output Power	Pass	5.2
15.247(d)	Power Spectral Density	Pass	5.3
15.247(a)(2)	6dB Bandwidth	Pass	5.4
15.247(c)	100kHz Bandwidth of Frequency Band Edges	Pass	5.5
15.207	Conducted Emission	Pass	5.10
15.209(a)	Radiated Emission	Pass	5.11
15.203 15.247(b)(4)	Antenna Requirement	Pass	5.12

**The Emission Mode: Bluetooth**

FCC Rule	Description of Test	Result	Section
15.247(b)	Maximum Peak Output Power	Pass	5.2
15.247(c)	100kHz Bandwidth of Frequency Band Edges	Pass	5.5
15.247(a)(1)	Hopping Channel Bandwidth	Pass	5.6
15.247(a)(1)	Hopping Channel Separation	Pass	5.7
15.247(a)(1)(iii)	Number of Hopping Frequency Used	Pass	5.8
15.247(a)(1)(iii)	Dwell Time of Each Frequency	Pass	5.9
15.207	Conducted Emission	Pass	5.10
15.209	Radiated Emission	Pass	5.11
15.203 15.247(b)(4)	Antenna Requirement	Pass	5.12

5.2 Peak Output Power Measurement

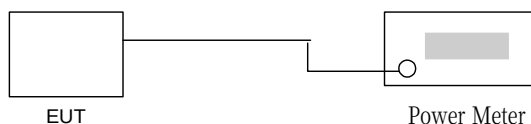
5.2.1 Measuring Instruments :

As described in chapter 6 of this test report.

5.2.2 Test Procedure :

The antenna port (RF output) of the EUT was connected to the input (RF input) of a power meter.
The power is equal to the reading level on power meter plus cable loss at the EUT antenna terminal.

5.2.3 Test Setup Layout :



5.2.4 Test Result :

- Application Type : WLAN 802.11b and BT
- Temperature : 26°C
- Relative Humidity : 53 %
- Test Enginner : Jay

WLAN 802.11b

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (Watt/dBm)
01	2412	17.82	1W/30 dBm
06	2437	17.62	1W/30 dBm
11	2462	17.34	1W/30 dBm

BT

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (Watt/dBm)
00	2402	0.58	1W/30 dBm
38	2441	-0.19	1W/30 dBm
78	2480	-0.35	1W/30 dBm

5.3 Power Spectral Density Measurement

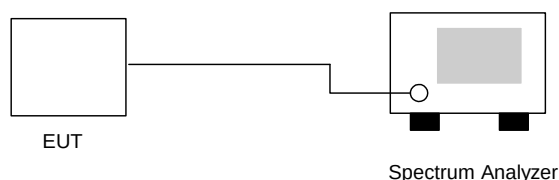
5.3.1 Measuring Instruments :

As described in chapter 6 of this test report.

5.3.2 Test Procedure :

1. The transmitter output was connected to spectrum analyzer directly.
2. The spectrum analyzer's resolution bandwidth was set at 3kHz RBW and 30kHz VBW as that of the fundamental frequency. Set the sweep time=span/3kHz.
3. The power spectral density was measured and recorded.
4. The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

5.3.3 Test Setup Layout :



5.3.4 Test Result :

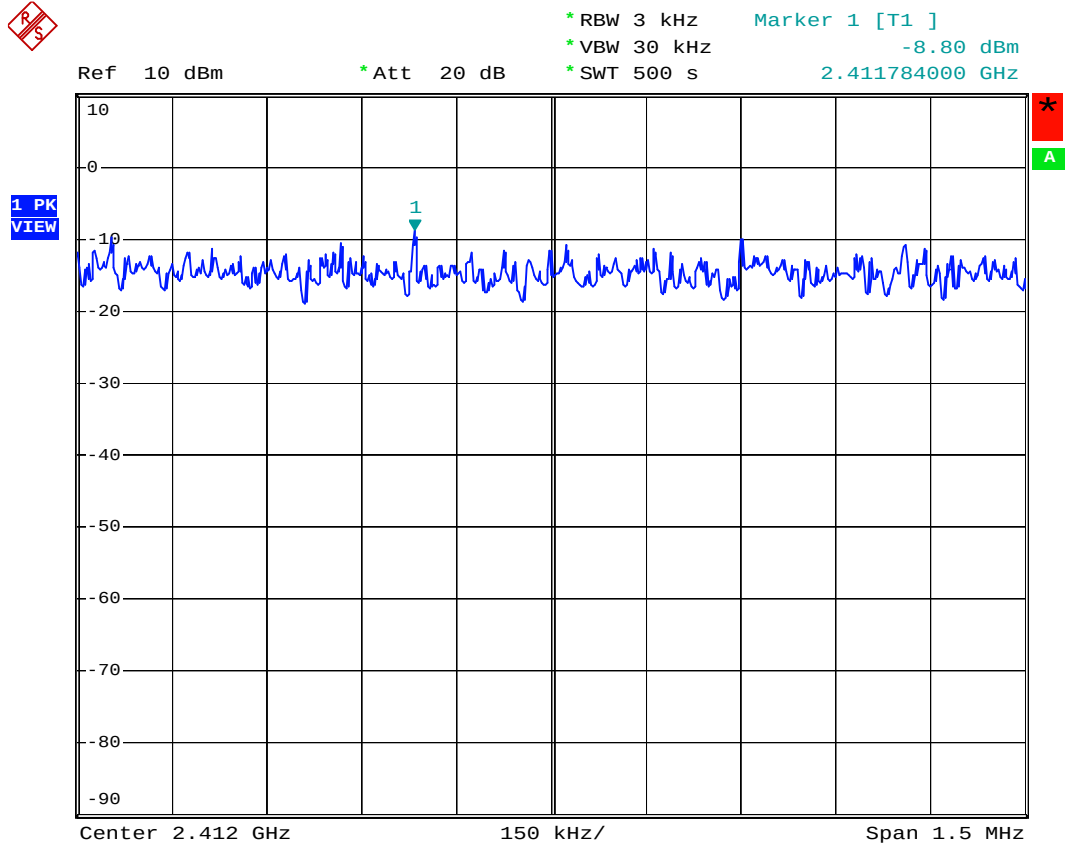
- Application Type : 802.11b
- Temperature : 26°C,
- Relative Humidity : 53%
- Test Enginner : Jay

Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)	Plot Ref. No.
01	2412	-8.80	8	Mode 1
06	2437	-8.80	8	Mode 2
11	2462	-8.84	8	Mode 3



5.3.5 Power Spectral Density

Mode 1





Mode 2

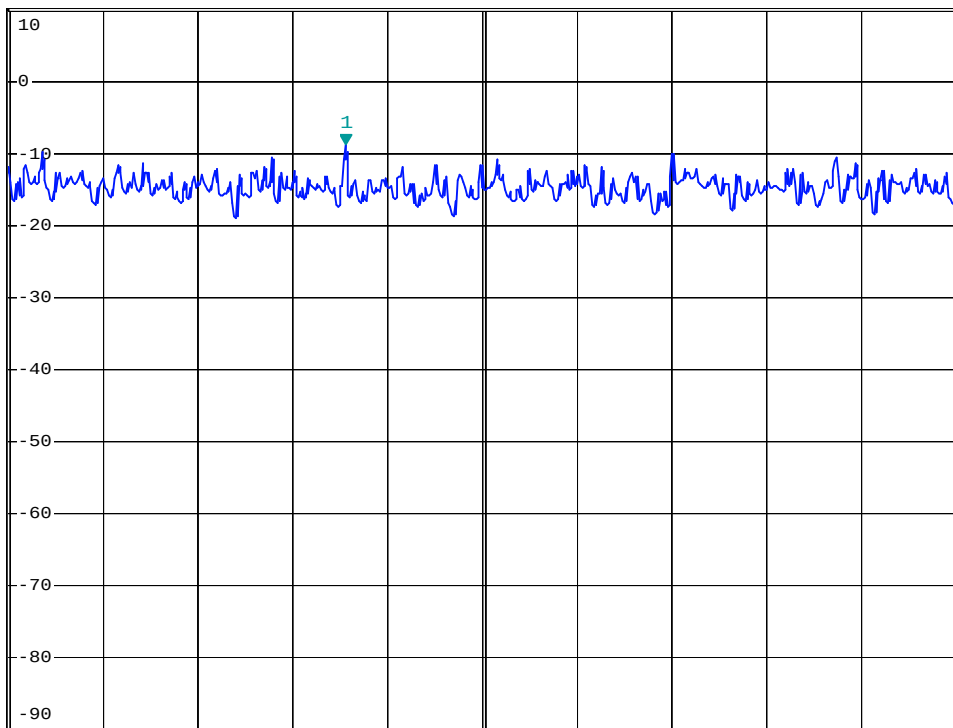


* RBW 3 kHz Marker 1 [T1]
* VBW 30 kHz -8.80 dBm
* SWT 500 s 2.436784000 GHz

Ref 10 dBm

* Att 20 dB

1 PK
VIEW



Center 2.437 GHz

150 kHz/

Span 1.5 MHz



Mode 3

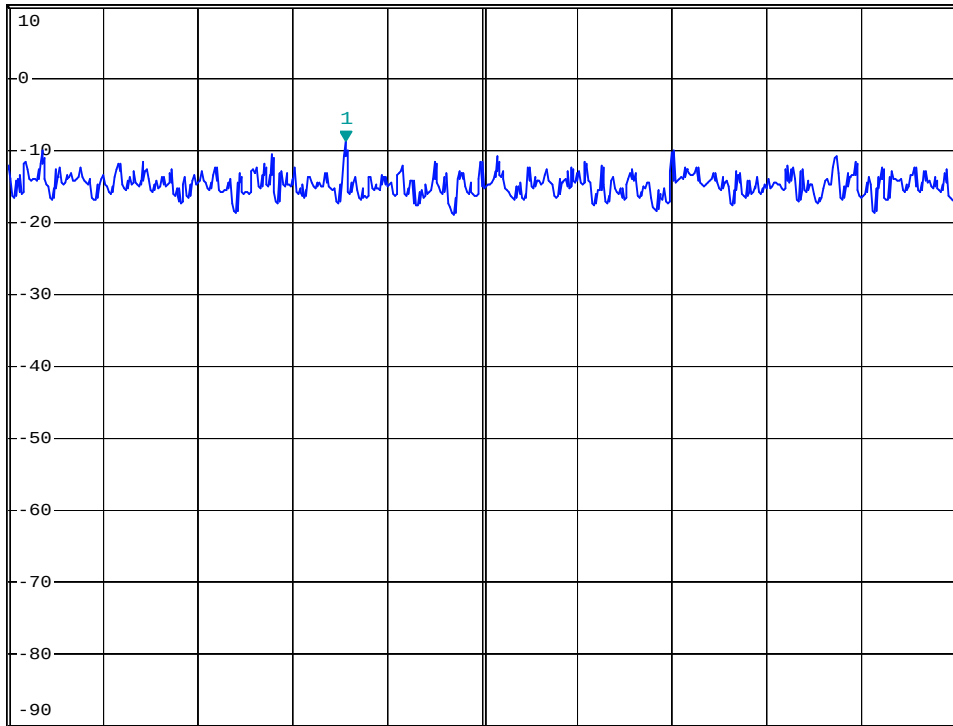


* RBW 3 kHz Marker 1 [T1]
* VBW 30 kHz -8.84 dBm
* SWT 500 s 2.461784000 GHz

Ref 10 dBm

* Att 20 dB

1 PK
VIEW



Center 2.462 GHz

150 kHz/

Span 1.5 MHz

5.4 6dB Bandwidth Measurement

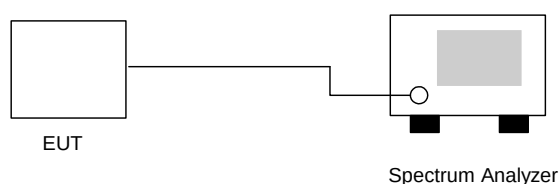
5.4.1 Measuring Instruments :

As described in chapter 6 of this test report.

5.4.2 Test Procedure :

1. The transmitter output was connected to the spectrum analyzer directly.
2. Set RBW of spectrum analyzer to 100kHz and VBW to 100kHz.
3. The 6 dB bandwidth is defined as the frequency range where the power is higher than the peak power minus 6dB.

5.4.3 Test Setup Layout :



5.4.4 Test Result :

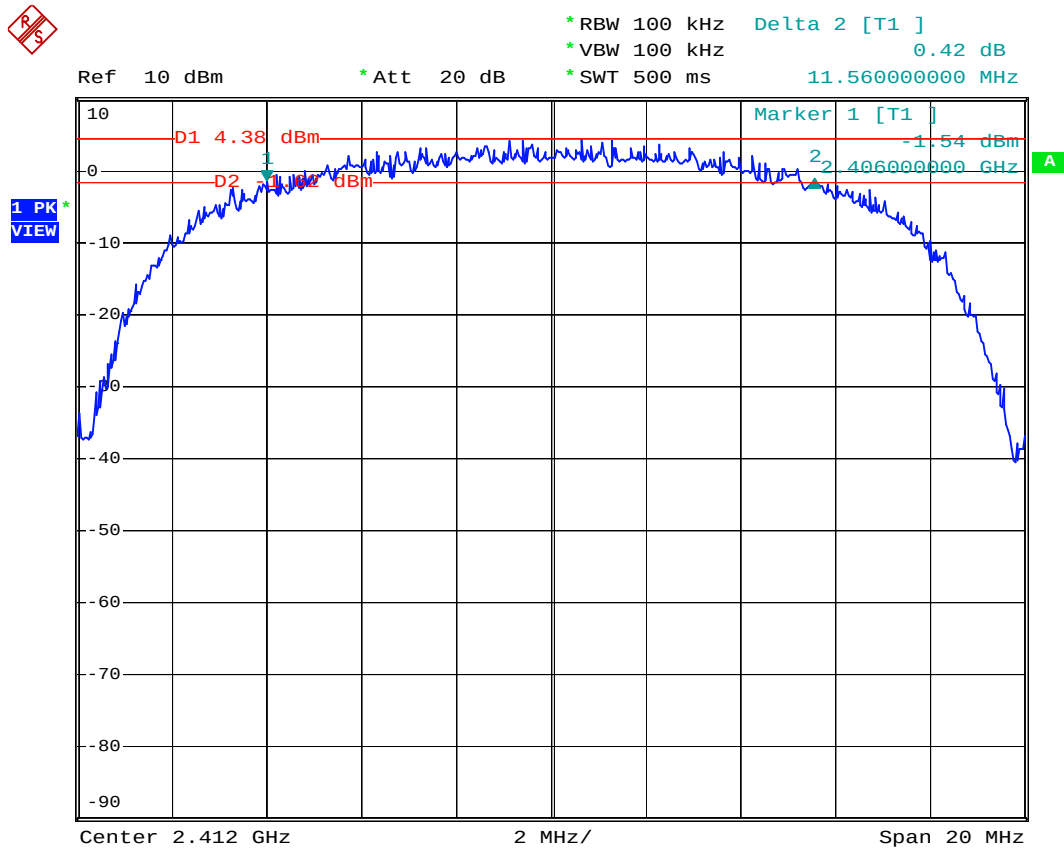
- Application Type : WLAN 802.11b
- Temperature : 26°C
- Relative Humidity : 53%
- Test Enginner : Jay

Channel	Frequency (MHz)	6dB Emission bandwidth (MHz)	Limits (MHz)	Plot Ref. No.
01	2412	11.56	0.5	Mode 1
06	2437	11.60	0.5	Mode 2
11	2462	11.56	0.5	Mode 3



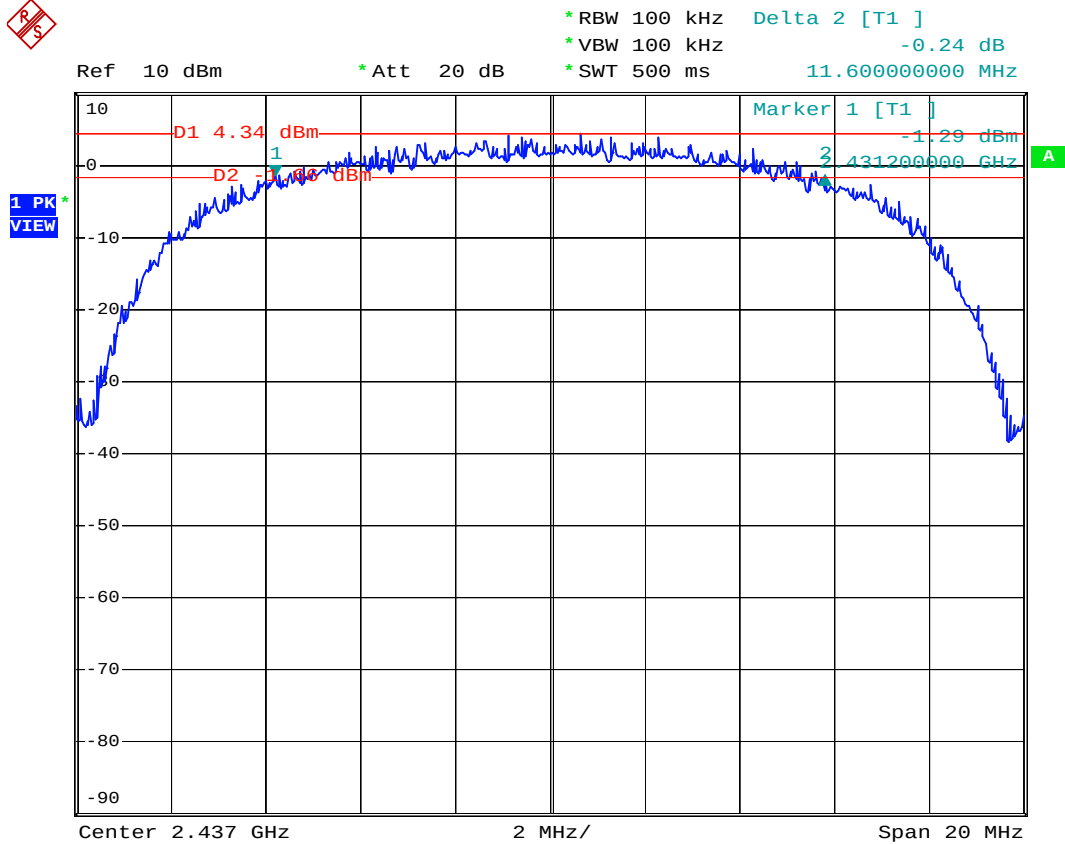
5.4.5 6dB Bandwidth

Mode 1



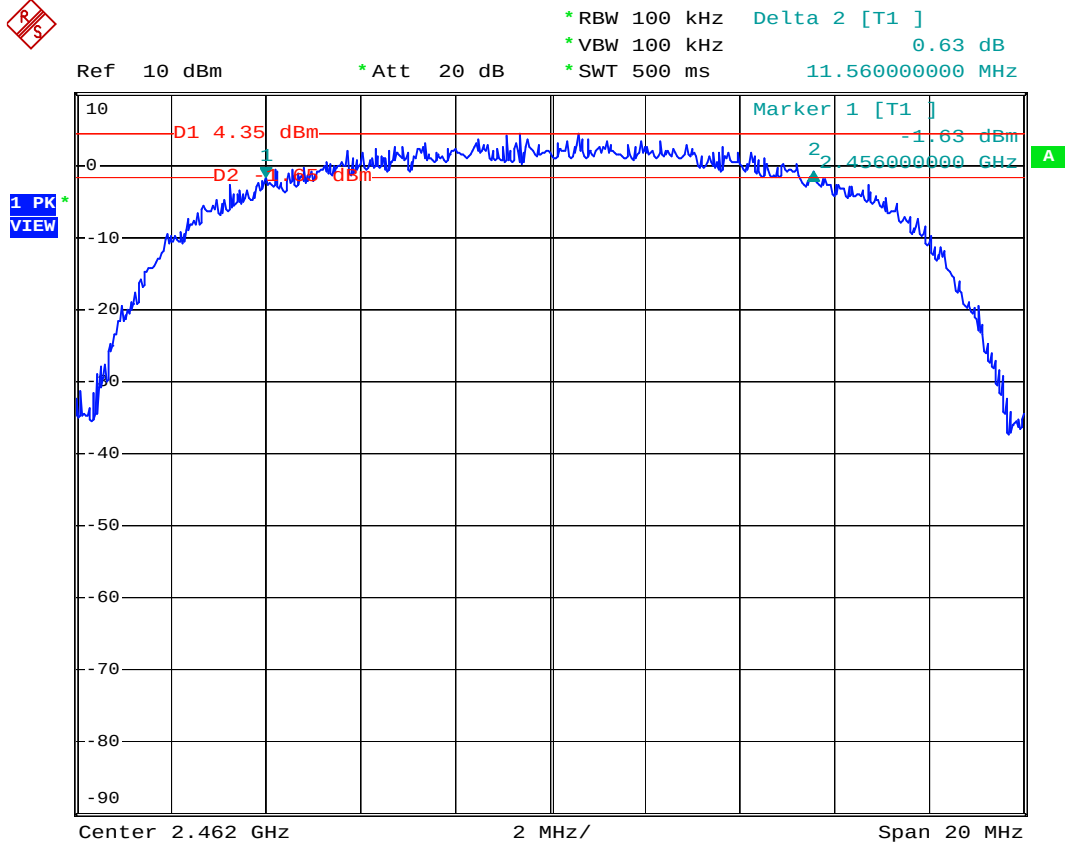


Mode 2





Mode 3





5.5 Band Edges Measurement

5.5.1 Measuring Instruments :

As described in chapter 6 of this test report.

5.5.2 Test Procedure :

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

5.5.3 Test Result :

- Application Type : WLAN 802.11b and BT
- Temperature : 26°C,
- Relative Humidity : 53%
- Test Enginner : Jay

- Test Result in WLAN lower band (Channel 1) : PASS
- Test Result in WLAN higher band (Channel 11) : PASS
- Test Result in BT lower band (Channel 00) : PASS
- Test Result in BT higher band (Channel 78) : PASS

5.5.4 Note on Band Edge Emission :

➤WLAN 802.11b

CH01 (Horizontal)

Frequency	Level	Over	Limit	Read	Antenna	Preamp	Cable	Detect
(MHz)	(dBuV/m)	Limit	Line	Level	Factor	Factor	Loss	Mode
(dB)	(dBuV/m)	(dB)	(dBuV/m)	(dB)	(dB)	(dB)	(dB)	
2390.00	63.52	-10.48	74.00	67.04	28.40	35.25	3.32	Peak
2390.00	37.40	-16.60	54.00	40.93	28.40	35.25	3.32	Average

CH01 (Vertical)

Frequency	Level	Over	Limit	Read	Antenna	Preamp	Cable	Detect
(MHz)	(dBuV/m)	Limit	Line	Level	Factor	Factor	Loss	Mode
(dB)	(dBuV/m)	(dB)	(dBuV/m)	(dB)	(dB)	(dB)	(dB)	
2390.00	63.17	-10.83	74.00	66.70	28.40	35.25	3.32	Peak
2390.00	45.05	-8.95	54.00	48.58	28.40	35.25	3.32	Average

**CH11 (Horizontal)**

Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Detect
(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV)	(dB)	(dB)	(dB)	Mode
2484.00	53.20	-20.80	74.00	56.60	28.48	35.26	3.38	Peak
2484.00	42.74	-11.26	54.00	46.14	28.48	35.26	3.38	Average

CH11 (Vertical)

Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Detect
(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV)	(dB)	(dB)	(dB)	Mode
2494.00	54.91	-19.09	74.00	58.27	28.52	35.26	3.39	Peak
2494.00	35.17	-18.83	54.00	38.53	28.50	35.26	3.39	Average

➤BT**CH00 (Horizontal)**

Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Detect
(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV)	(dB)	(dB)	(dB)	Mode
2344.00	41.45	-32.55	74.00	45.06	28.34	35.24	3.29	Peak
2344.00	30.04	-23.96	54.00	33.65	28.34	35.24	3.29	Average

CH00 (Vertical)

Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Detect
(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV)	(dB)	(dB)	(dB)	Mode
2384.00	41.74	-32.26	74.00	45.30	28.38	35.24	3.31	Peak
2384.00	29.92	-24.08	54.00	33.48	28.38	35.24	3.31	Average

**CH78 (Horizontal)**

Frequency	Level	Over	Limit	Read	Antenna	Preamp	Cable	Detect
(MHz)	(dBuV/m)	Limit	Line	Level	Factor	Factor	Loss	Mode
(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV)	(dB)	(dB)	(dB)	Mode
2483.5	62.74	-11.26	74.00	66.14	28.48	35.26	3.38	Peak
2483.5	47.60	-6.40	54.00	51.00	28.48	35.26	3.38	Average

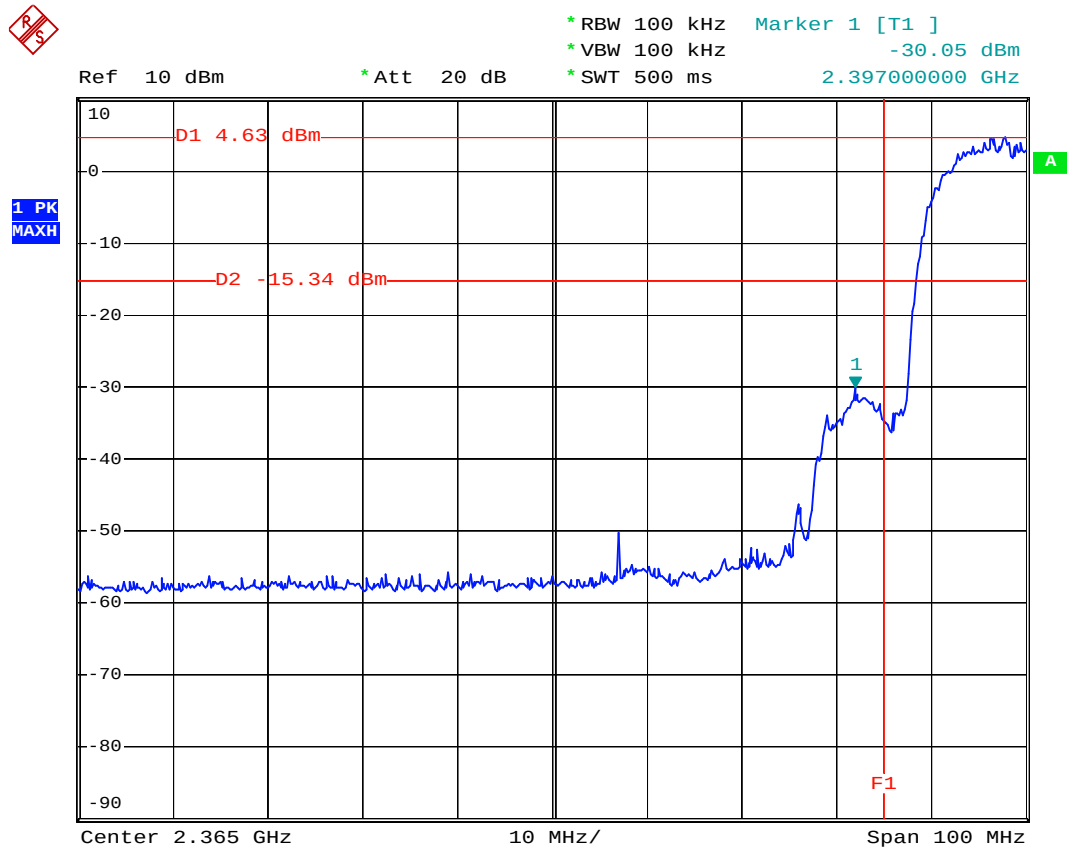
CH78 (Vertical)

Frequency	Level	Over	Limit	Read	Antenna	Preamp	Cable	Detect
(MHz)	(dBuV/m)	Limit	Line	Level	Factor	Factor	Loss	Mode
(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV)	(dB)	(dB)	(dB)	Mode
2483.5	64.51	-9.49	74.00	67.91	28.48	35.26	3.38	Peak
2483.5	49.95	-4.05	54.00	53.35	28.48	35.26	3.38	Average



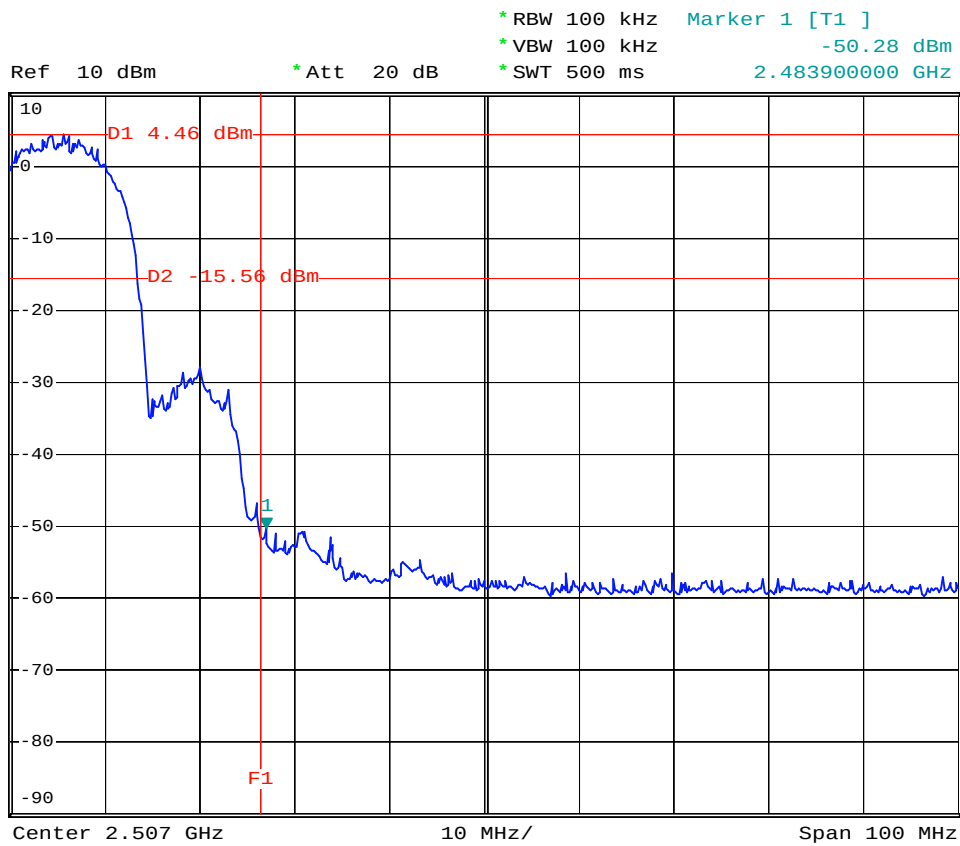
5.5.5 20dB Band Edge

WLAN 802.11b:

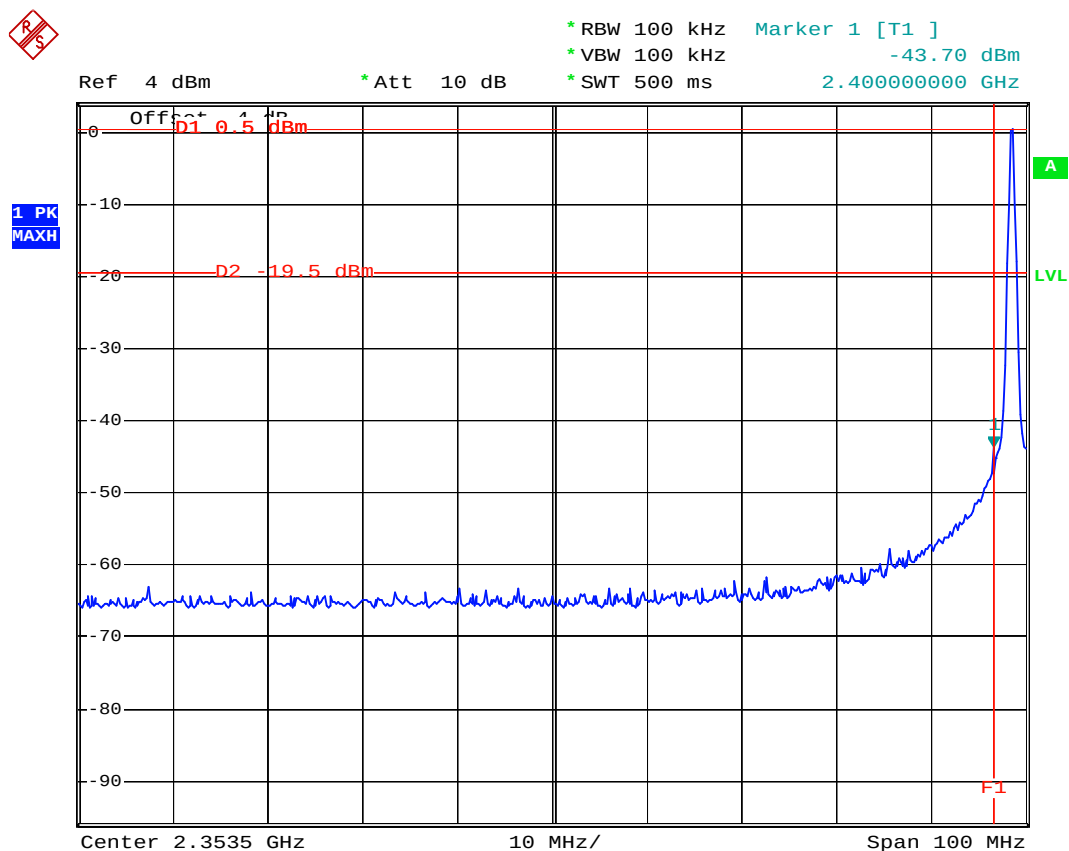




1 PK
MAXH



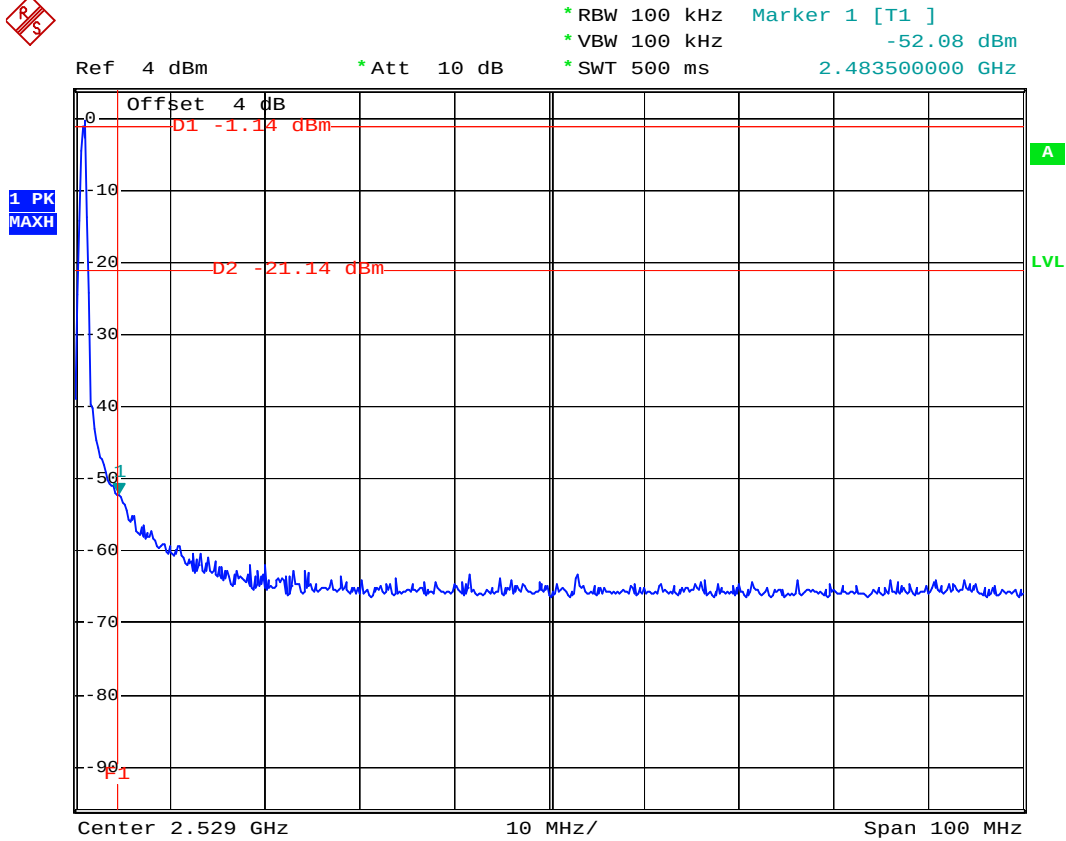
Bluetooth:





FCC TEST REPORT

Report No. : FR401206



5.6 Hopping Channel Bandwidth

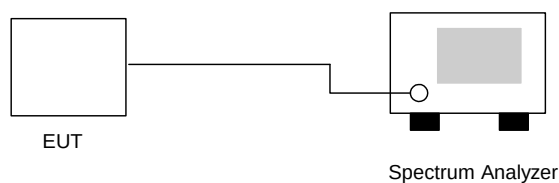
5.6.1 Measuring Instruments :

As described in chapter 9 of this test report.

5.6.2 Test Procedure :

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

5.6.3 Test Setup Layout :



5.6.4 Test Result : See spectrum analyzer plots below

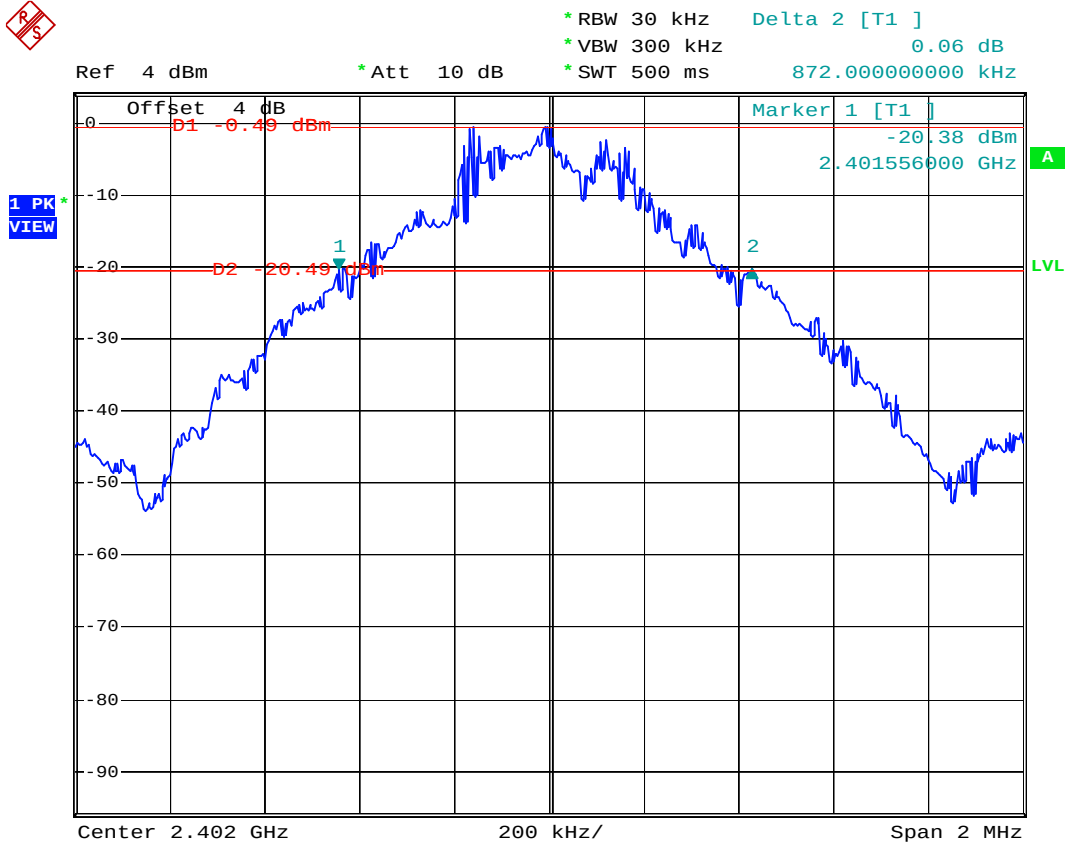
- Application Type : BT
- Temperature : 26°C,
- Relative Humidity : 53%
- Test Engineer : Jay

Channel	Frequency (MHz)	Hopping Channel Bandwidth (MHz)	Limits (MHz)	Plot Ref. No.
00	2402	0.872	1.0	Mode 1
38	2441	0.872	1.0	Mode 2
78	2480	0.876	1.0	Mode 3



5.6.5 Hopping Channel Bandwidth

Mode 1



Mode 2



Ref 4 dBm

* Att 10 dB

* RBW 30 kHz

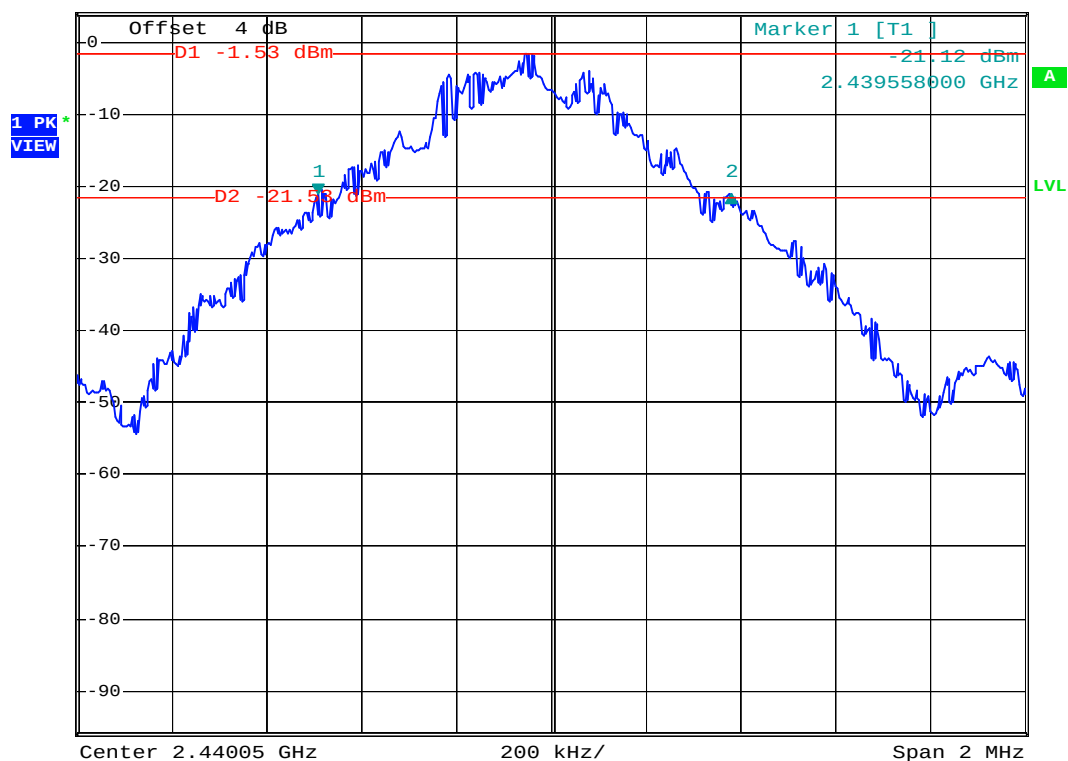
Delta 2 [T1]

* VBW 300 kHz

-0.07 dB

* SWT 500 ms

872.000000000 kHz





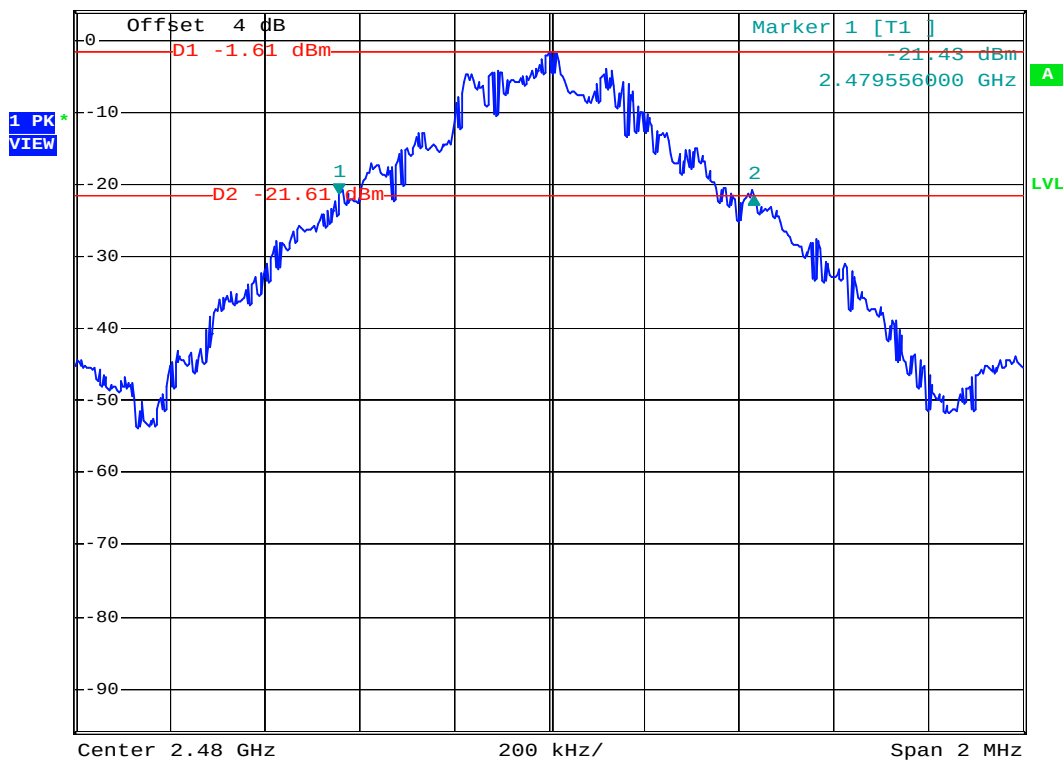
Mode 3



*RBW 30 kHz Delta 2 [T1]
*VBW 300 kHz -0.06 dB
*SWT 500 ms 876.000000000 kHz

Ref 4 dBm

*Att 10 dB



5.7 Hopping Channel Separation

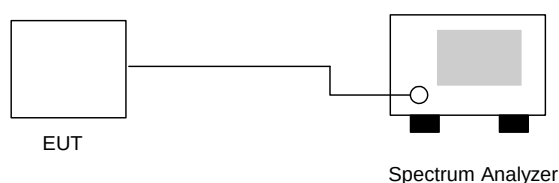
5.7.1 Measuring Instruments :

As described in chapter 9 of this test report.

5.7.2 Test Procedure :

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

5.7.3 Test Setup Layout :



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

- Application Type : BT
- Temperature : 26°C,
- Relative Humidity : 53%
- Test Enginner : Jay

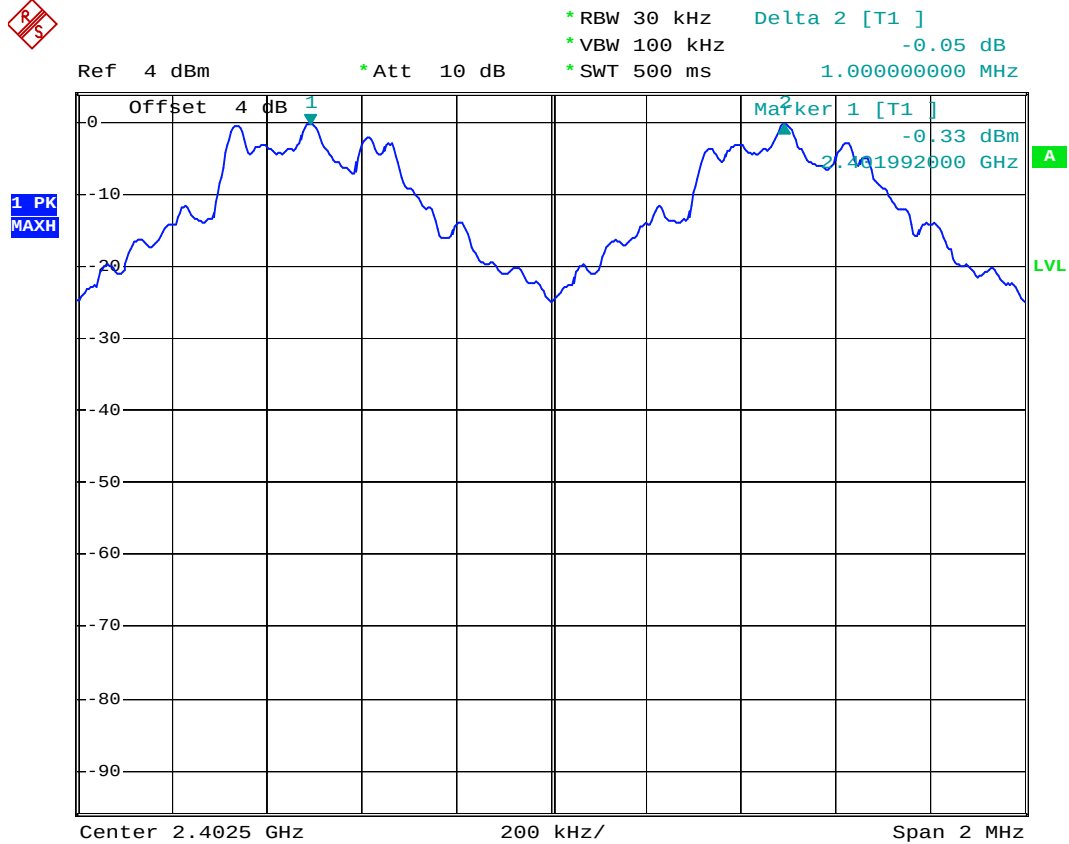
Channel	Carrier Frequency		Limits	Plot
	Frequency (MHz)	Separation (kHz)		
00	2402	1000	1000kHz	Mode 1
38	2441	1000	1000kHz	Mode 2
78	2480	1000	1000kHz	Mode 3

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



5.7.5 Hopping Channel Separation

Mode 1





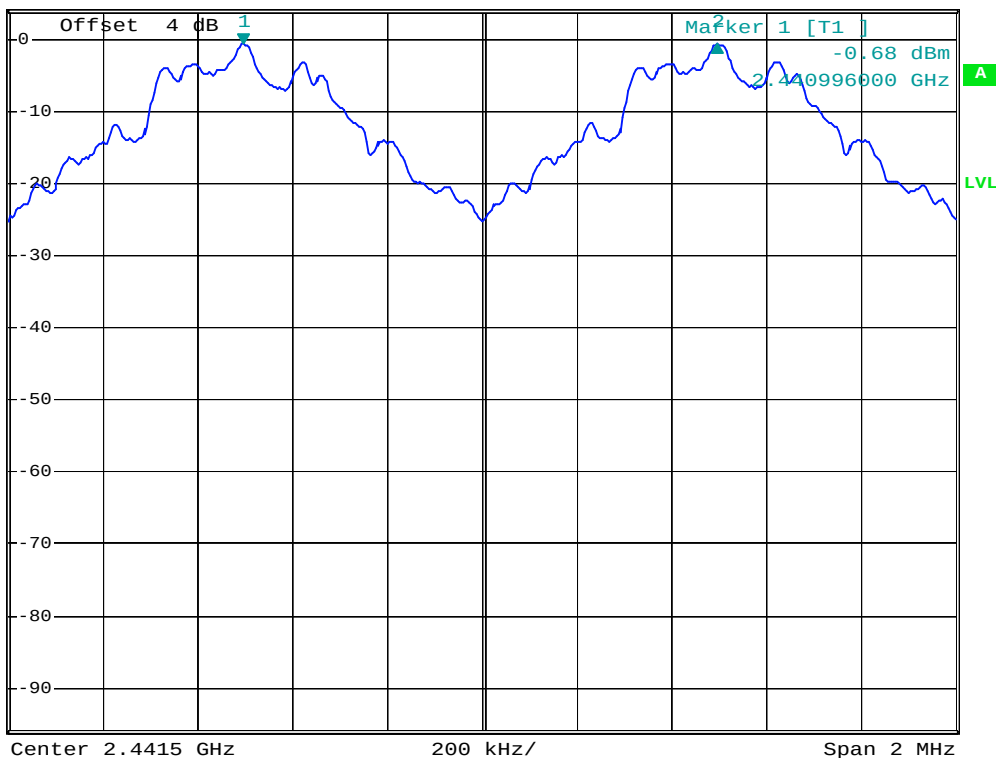
Mode 2



* RBW 30 kHz Delta 2 [T1]
* VBW 100 kHz 0.01 dB
* SWT 500 ms 1.000000000 MHz

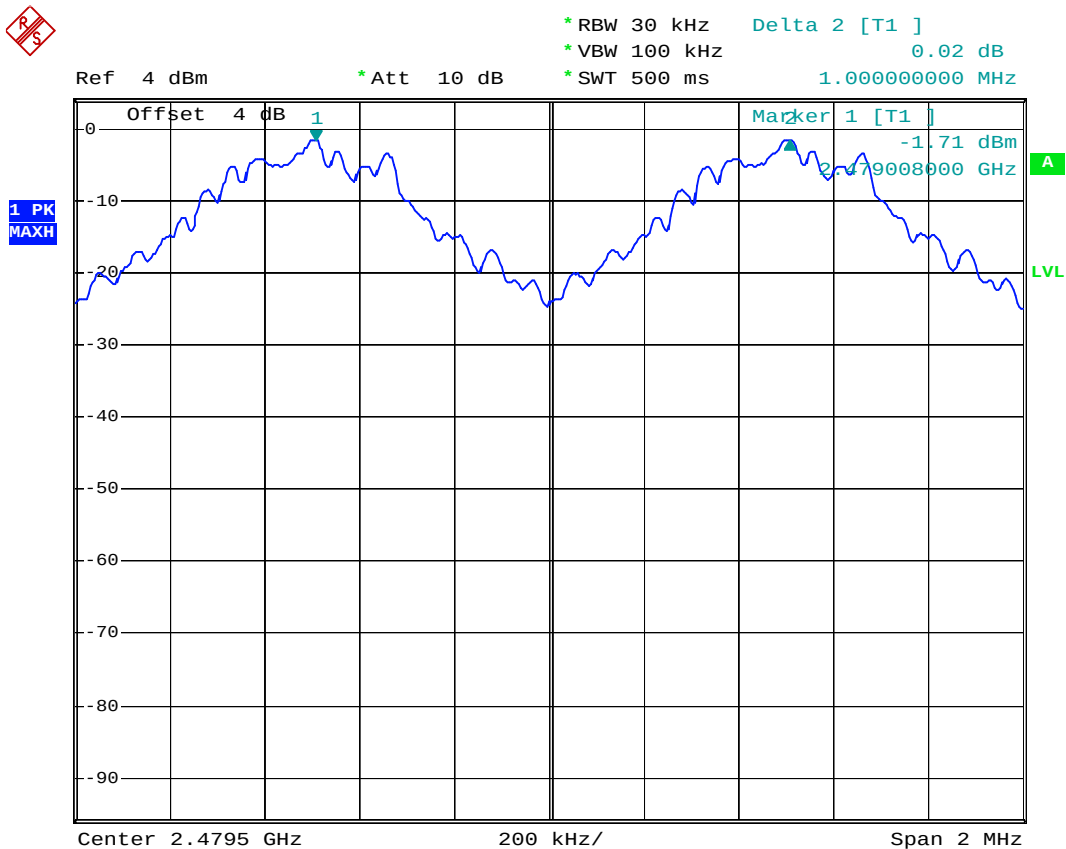
Ref 4 dBm

* Att 10 dB

1 PK
MAXH



Mode 3



5.8 Number of Hopping Frequency

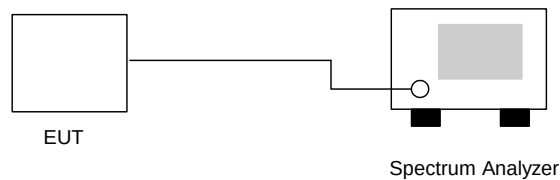
5.8.1 Measuring Instruments :

As described in chapter 9 of this test report.

5.8.2 Test Procedure :

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

5.8.3 Test Setup Layout :



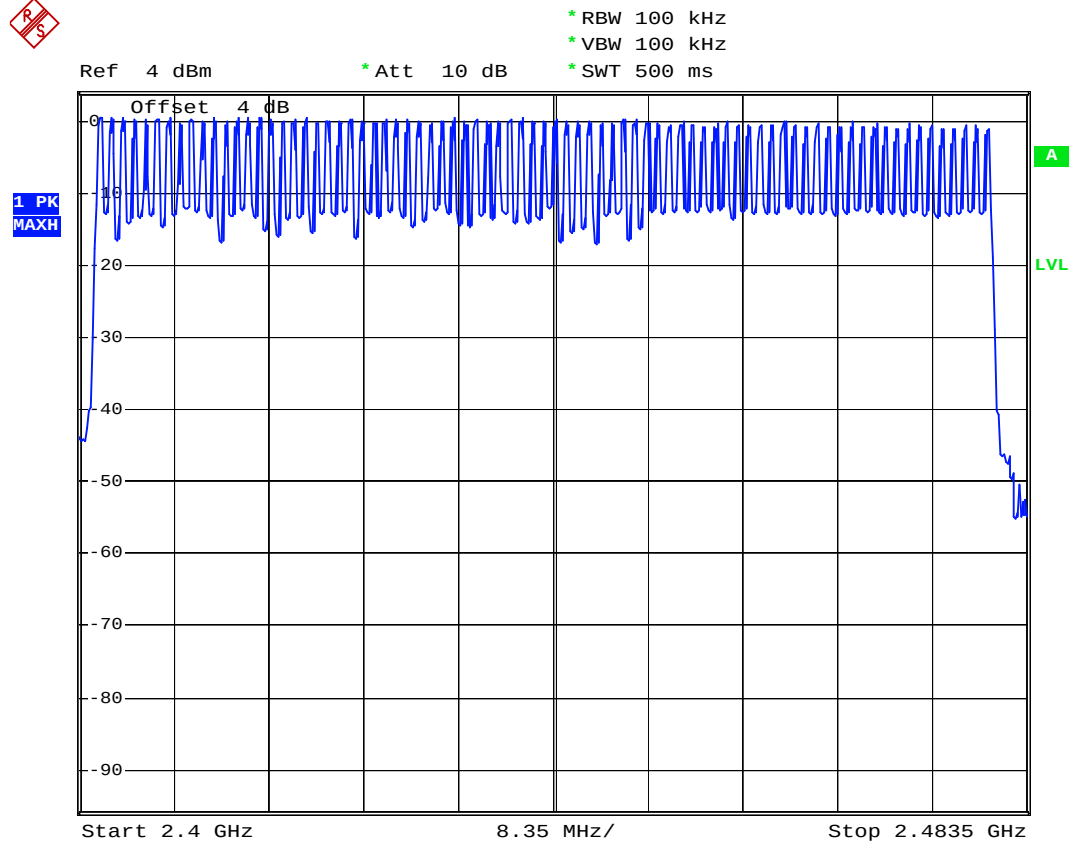
5.8.4 Test Result : See spectrum analyzer plots below

- Application Type : BT
 - Temperature : 26°C,
 - Relative Humidity : 53%
- Test Enginner : Jay

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



5.8.5 Number of Hopping Frequency



5.9 Dwell Time of Each Frequency within a 30 Seconds Period

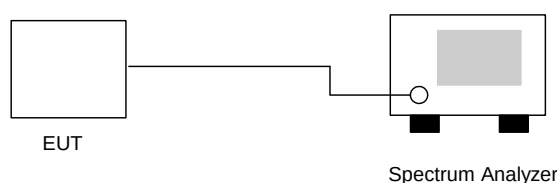
5.9.1 Measuring Instruments :

As described in chapter 9 of this test report.

5.9.2 Test Procedure :

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

5.9.3 Test Setup Layout :



5.9.4 Test Result : See spectrum analyzer plots below

- Application Type : BT
- Temperature : 26°C,
- Relative Humidity : 53%
- Test Enginner : Jay

Package Mode	Average Hopping Channel	Package Transfer Time (us)	Dwell Time (s)	Limit (s)
DH1	9.8	436	0.14	0.4
DH3	5	1700	0.27	0.4
DH5	4	2940	0.37	0.4

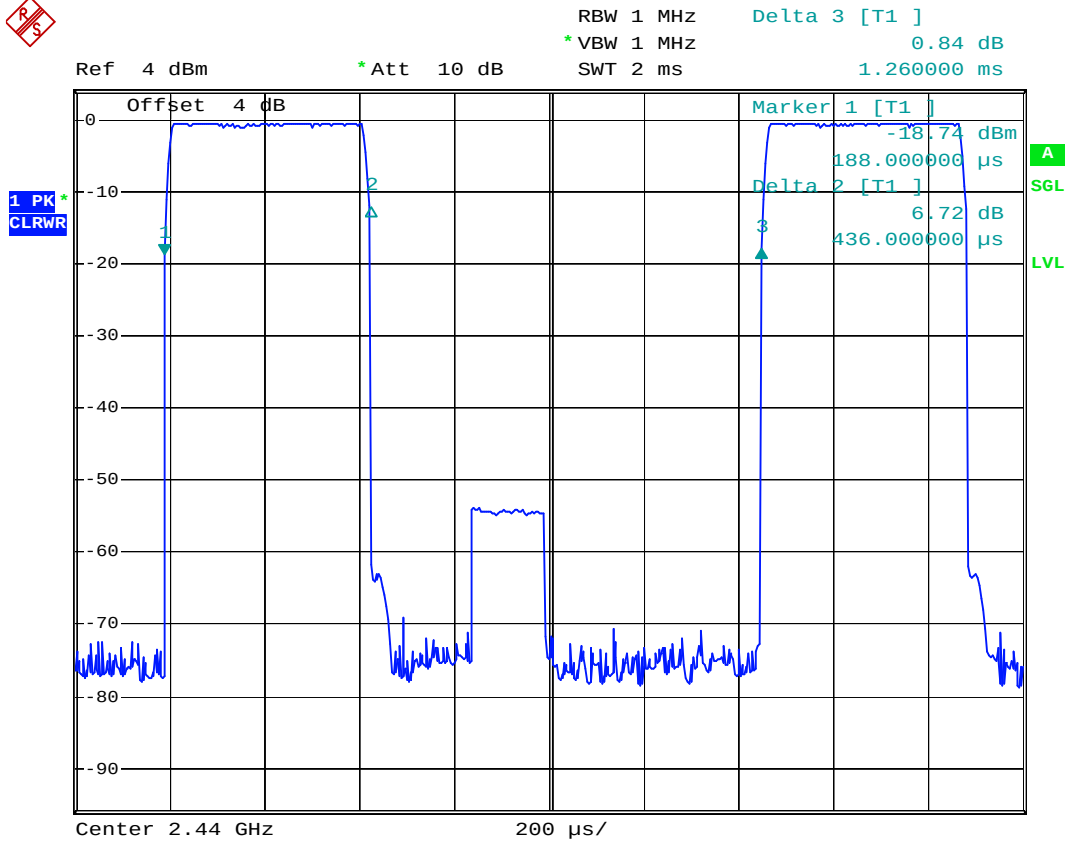
※ Remark:

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



5.9.5 Dell Time

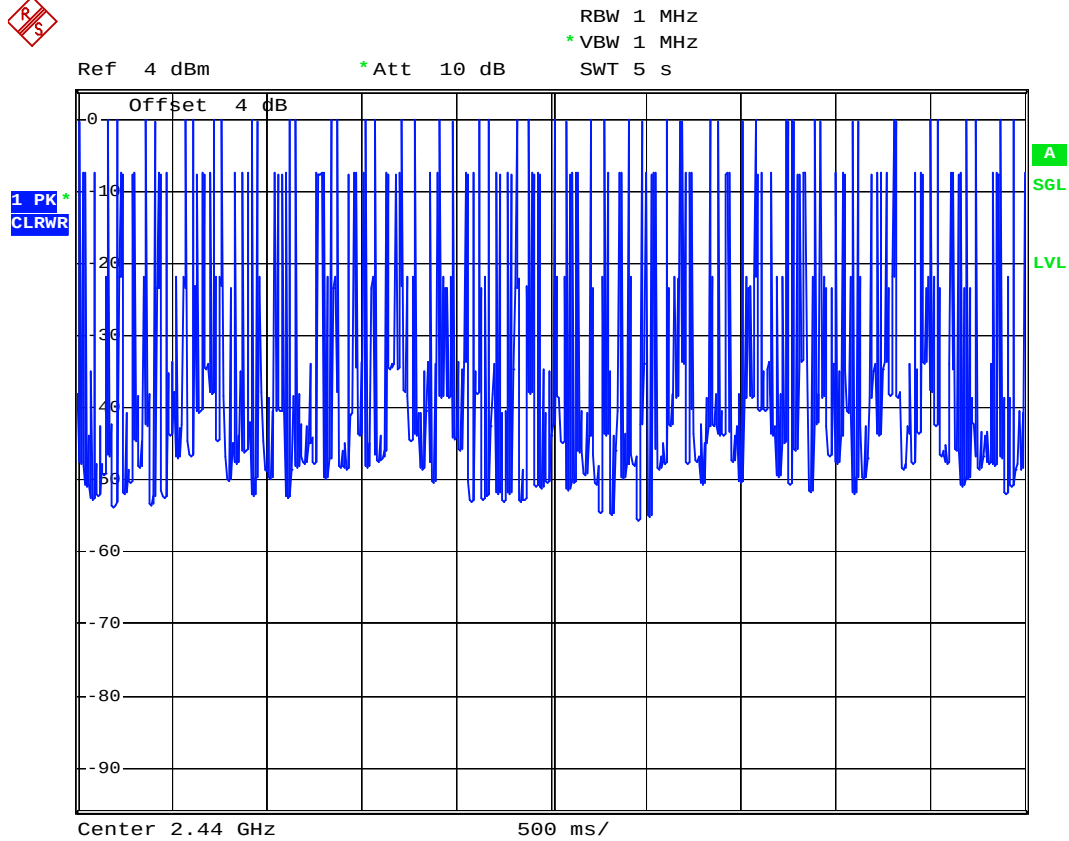
DH1





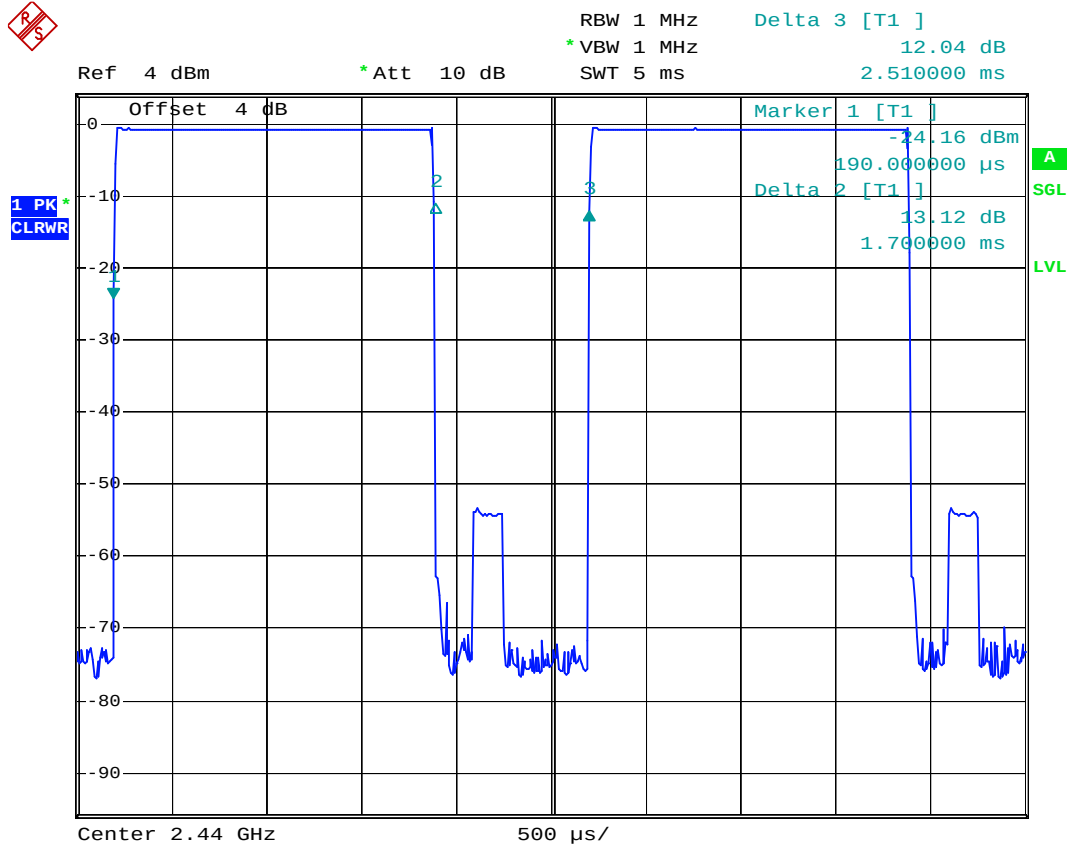
FCC TEST REPORT

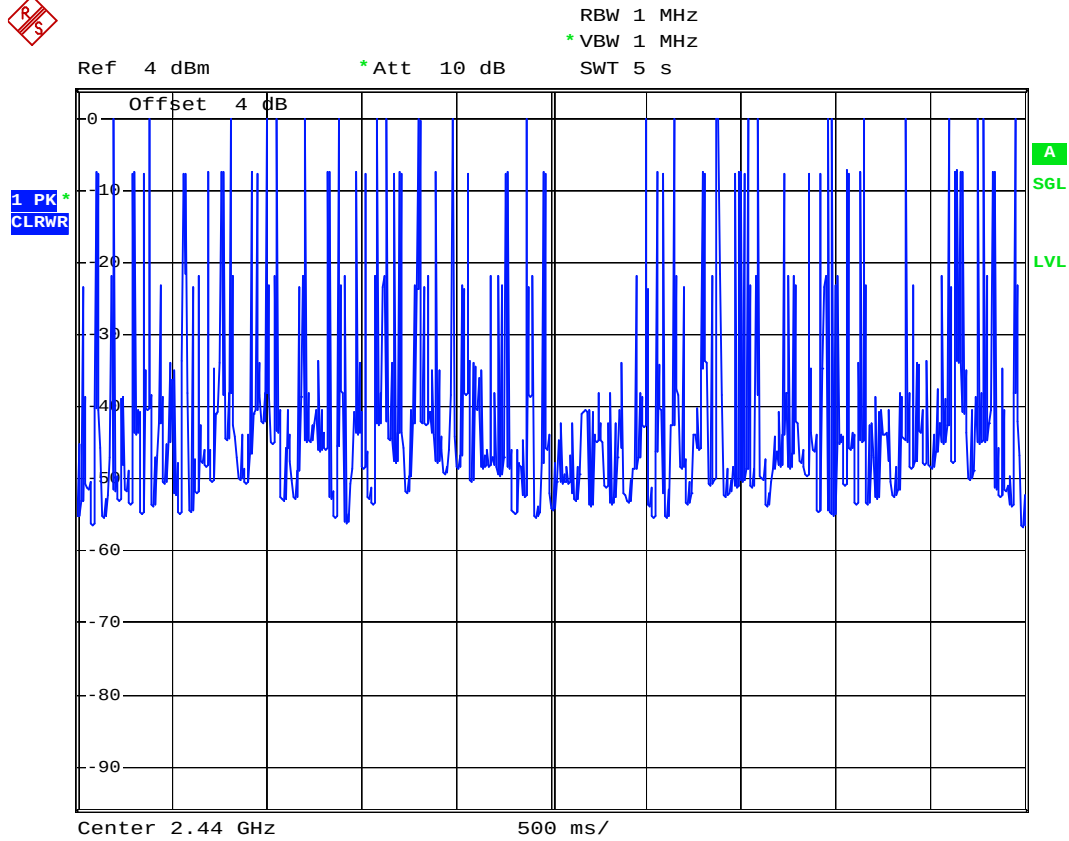
Report No. : FR401206





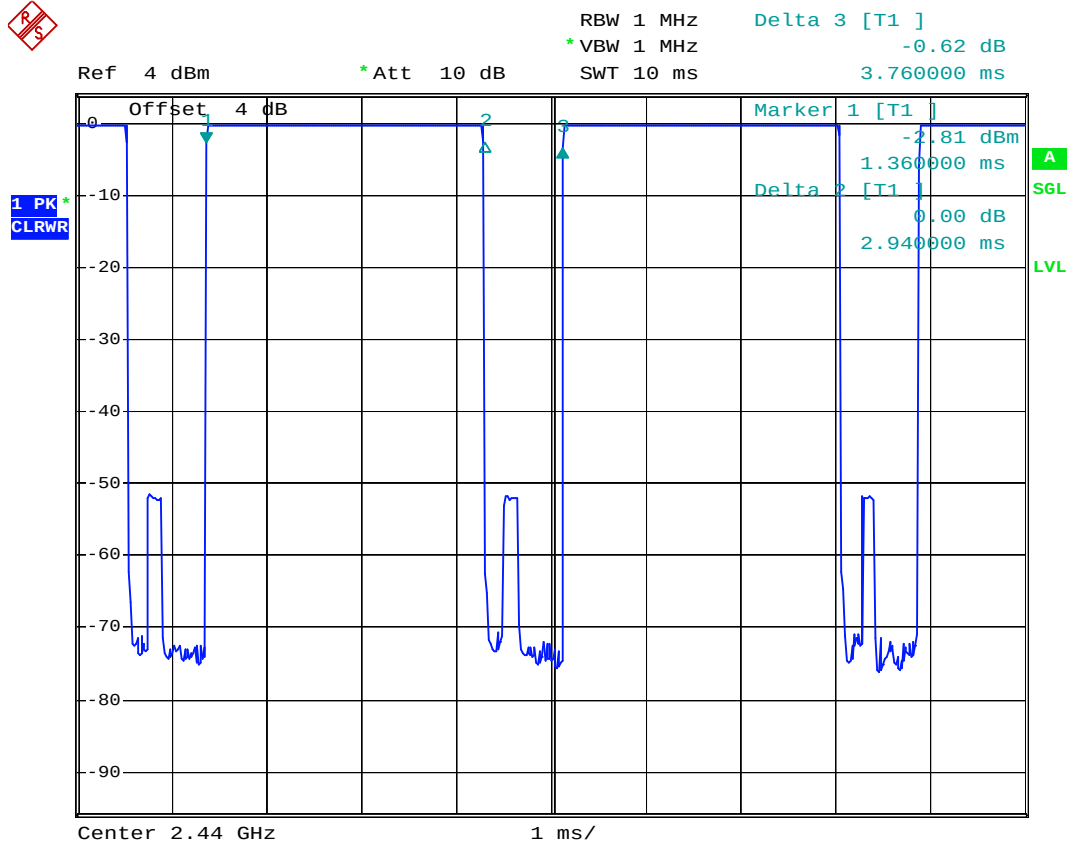
DH3

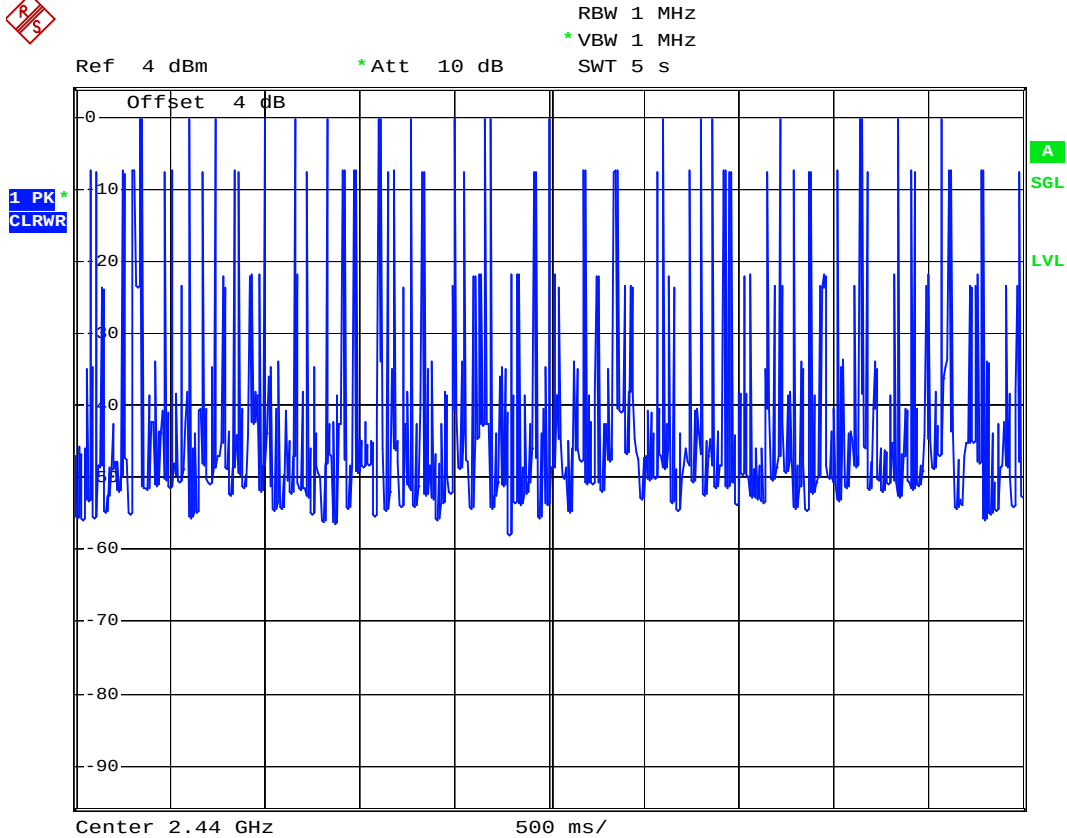






DH5







5.10 Conducted Emission Measurement

5.10.1 Measuring Instruments

As described in chapter 6 of this test Report.

5.10.2 Test Procedures

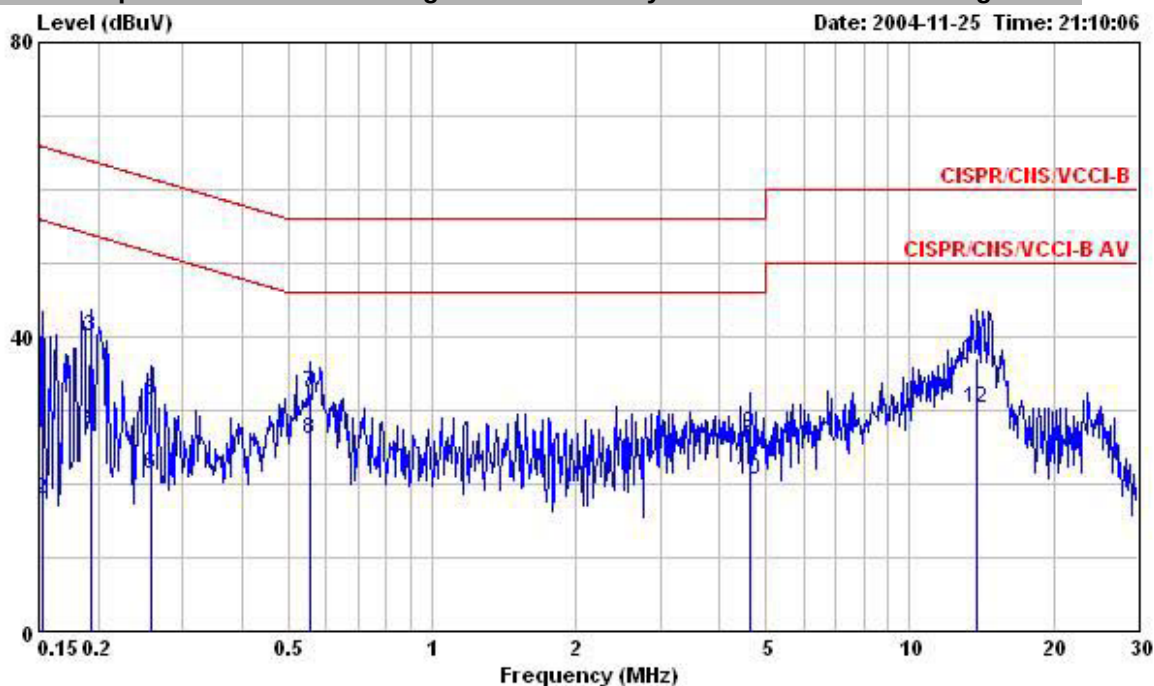
- a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- b. Connect EUT to the power port of the line impedance stabilization network (LISN).
- c. All the support units are connect to the other LISN.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



5.10.3 Test Data

- Temperature : 26 °C
- Relative Humidity : 53 %
- Test Engineer : Jay
- Test Mode : Mode 1

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



Site : C004-HY

Condition : CISPR/CIS/VCCI-B 2004 2001/004 LINE

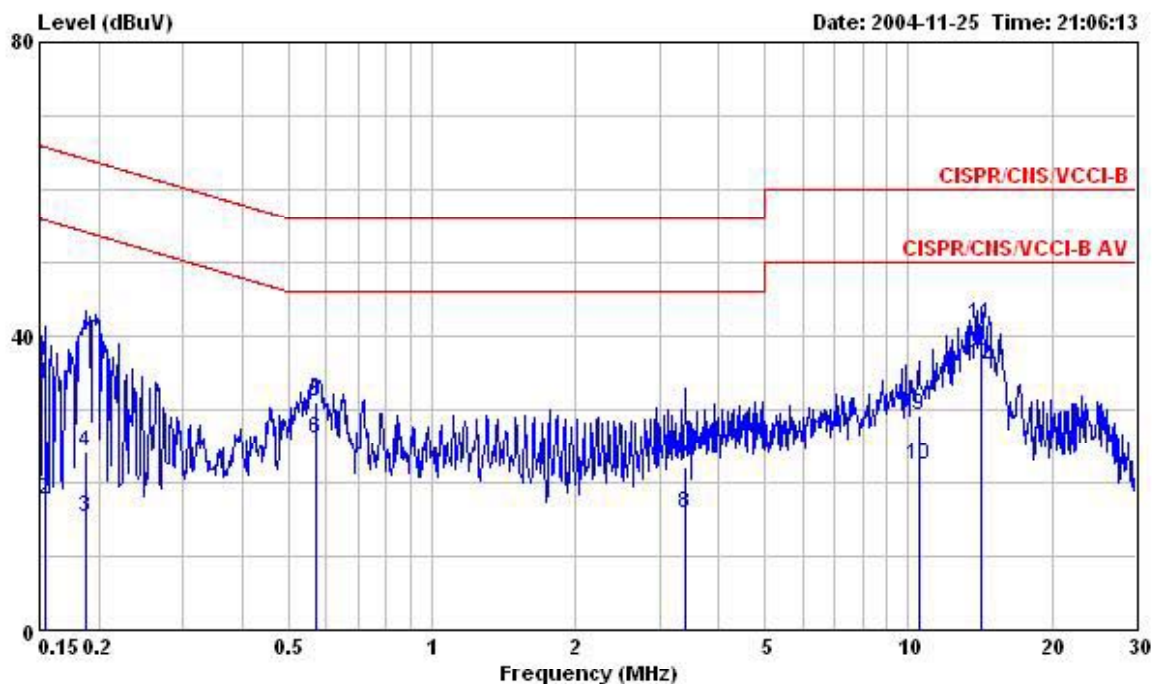
EUT : GSM Smart Phone

POWER: 120Vac/60Hz

MODEL : P50

MEMO : PCS1900 Idle Mode + WLAN Link + BT on + MP3 + MP4 + Camera

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1532130	33.44	-32.38	65.82	33.43	0.00	0.01	QP
2	0.1532130	17.93	-37.89	55.82	17.92	0.00	0.01	Average
3	0.1934380	39.94	-23.95	63.89	39.93	0.00	0.01	QP
4	0.1934380	27.65	-26.24	53.89	27.64	0.00	0.01	Average
5	0.2588790	31.43	-30.04	61.47	31.42	0.00	0.01	QP
6	0.2588790	21.29	-30.18	51.47	21.28	0.00	0.01	Average
7	0.5551950	32.29	-23.71	56.00	32.26	0.00	0.03	QP
8	0.5551950	26.06	-19.94	46.00	26.03	0.00	0.03	Average
9	4.620	26.95	-29.05	56.00	26.87	0.00	0.08	QP
10	4.620	20.49	-25.51	46.00	20.41	0.00	0.08	Average
11	13.840	37.05	-22.95	60.00	36.90	0.00	0.15	QP
12	13.840	30.19	-19.81	50.00	30.04	0.00	0.15	Average



Site : CO04-HY

Condition : CISPR/CIS/VCCI-B 2004 2001/004 NEUTRAL

EUT : GSM Smart Phone

POWER: 120Vac/60Hz

MODEL : P50

MEMO : PCS1900 Idle Mode + WLAN Link + BT on + MP3 + MP4 + Camera

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1540270	33.36	-32.42	65.78	33.35	0.00	0.01	QP
2	0.1540270	17.52	-38.26	55.78	17.51	0.00	0.01	Average
3	0.1873850	15.26	-48.89	64.15	15.25	0.00	0.01	QP
4	0.1873850	24.28	-29.87	54.15	24.27	0.00	0.01	Average
5	0.5701000	30.93	-25.07	56.00	30.90	0.00	0.03	QP
6	0.5701000	26.12	-19.88	46.00	26.09	0.00	0.03	Average
7	3.400	22.09	-33.91	56.00	22.03	0.00	0.06	QP
8	3.400	15.85	-30.15	46.00	15.79	0.00	0.06	Average
9	10.510	29.16	-30.84	60.00	29.04	0.00	0.12	QP
10	10.510	22.41	-27.59	50.00	22.29	0.00	0.12	Average
11	14.210	41.58	-18.42	60.00	41.43	0.00	0.15	QP
12	14.210	36.16	-13.84	50.00	36.01	0.00	0.15	Average

5.11 Radiated Emission Measurement

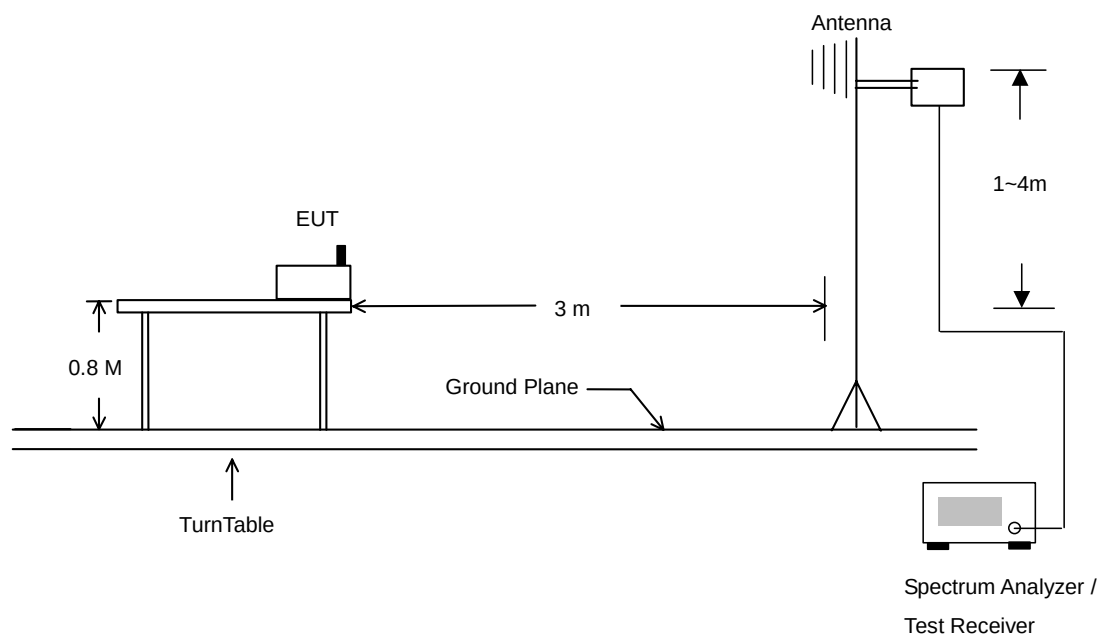
5.11.1 Measuring Instruments

As described in chapter 6 of this Report.

5.11.2 Test Procedures

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

5.11.3 Typical Test Setup Layout of Radiated Emission





5.11.4 Test Data

- Temperature : 26°C
- Relative Humidity : 53%
- Test Engineer : Jay
- Test Mode : Mode 1
- Polarization : Horizontal

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	48.63	23.49	-16.51	40.00	46.66	8.40	32.42	0.86	Peak	---	---
2 @	238.44	31.94	-14.06	46.00	51.03	10.68	31.76	1.99	Peak	---	---
3	287.58	31.03	-14.97	46.00	48.05	12.72	31.97	2.23	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	311.90	35.27	-10.73	46.00	51.61	13.47	32.16	2.35	Peak	---	---
2 @	414.80	36.17	-9.83	46.00	48.91	16.48	32.12	2.91	Peak	124	70
3	498.80	30.92	-15.08	46.00	41.88	17.30	31.41	3.16	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	1504.00	43.76	-30.24	74.00	51.08	25.58	35.53	2.63	Peak	---	---
2 @	2390.00	63.52	-10.48	74.00	67.04	28.40	35.25	3.32	Peak	---	---
3	2390.00	37.40	-16.60	54.00	40.93	28.40	35.25	3.32	Average	---	---
4 @	2414.00	106.70			110.21	28.41	35.25	3.32	Peak	---	---
5 @	2414.00	91.50			95.01	28.41	35.25	3.32	Average	140	320
6	2498.00	44.33	-29.67	74.00	47.70	28.50	35.26	3.39	Peak	---	---
7	2498.00	32.28	-21.72	54.00	35.64	28.50	35.26	3.39	Average	---	---

Remark: #4 and 5 Fundamental Signal



- Polarization : Vertical

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	48.63	35.97	-4.03	40.00	59.14	8.40	32.42	0.86	QP	100	88
2	174.18	27.67	-15.83	43.50	49.20	8.68	31.90	1.69	Peak	---	---
3	238.44	28.65	-17.35	46.00	47.73	10.68	31.76	1.99	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	311.90	33.02	-12.98	46.00	49.36	13.47	32.16	2.35	Peak	---	---
2	357.40	30.40	-15.60	46.00	44.72	14.60	31.49	2.58	Peak	---	---
3 @	414.80	32.21	-13.79	46.00	44.95	16.48	32.12	2.91	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	1504.00	44.34	-29.66	74.00	51.66	25.58	35.53	2.63	Peak	---	---
2 @	2390.00	63.17	-10.83	74.00	66.70	28.40	35.25	3.32	Peak	---	---
3 @	2390.00	45.05	-8.95	54.00	48.58	28.40	35.25	3.32	Average	---	---
4 @	2414.00	106.30			109.81	28.41	35.25	3.32	Peak	---	---
5 @	2414.00	96.05			99.56	28.41	35.25	3.32	Average	153	207
6	2494.00	42.58	-31.42	74.00	45.94	28.50	35.26	3.39	Peak	---	---
7	2494.00	31.55	-22.45	54.00	34.91	28.50	35.26	3.39	Average	---	---

Remark: #4 and 5 Fundamental Signal



- Test Mode : Mode 2
- Polarization : Horizontal

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	220.89	28.39	-17.61	46.00	49.65	8.61	31.82	1.95	Peak	---	---
2 @	238.44	31.82	-14.18	46.00	50.91	10.68	31.76	1.99	Peak	---	---
3 @	287.58	31.10	-14.90	46.00	48.12	12.72	31.97	2.23	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	311.90	35.32	-10.68	46.00	51.66	13.47	32.16	2.35	Peak	---	---
2 @	414.80	36.13	-9.87	46.00	48.87	16.48	32.12	2.91	Peak	125	77
3 @	519.80	28.46	-17.54	46.00	39.81	16.96	31.53	3.22	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	1398.00	45.93	-28.07	74.00	53.97	25.19	35.75	2.52	Peak	---	---
2 @	2358.00	33.60	-20.40	54.00	37.19	28.36	35.24	3.29	Average	---	---
3 @	2358.00	46.28	-27.72	74.00	49.87	28.36	35.24	3.29	Peak	---	---
4 @	2438.00	107.01			110.47	28.45	35.25	3.34	Peak	---	---
5 @	2438.00	96.26			99.72	28.45	35.25	3.34	Average	136	22
6 @	2494.00	44.91	-29.09	74.00	48.27	28.50	35.26	3.39	Peak	---	---
7 @	2494.00	32.41	-21.59	54.00	35.77	28.50	35.26	3.39	Average	---	---

Remark: #4 and 5 Fundamental Signal



- Polarization : Vertical

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	48.63	35.86	-4.14	40.00	59.03	8.40	32.42	0.86	QP	100	73
2 @	69.69	23.76	-16.24	40.00	49.76	5.30	32.33	1.02	Peak	---	---
3 @	287.58	28.69	-17.31	46.00	45.71	12.72	31.97	2.23	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	311.90	33.29	-12.71	46.00	49.63	13.47	32.16	2.35	Peak	---	---
2 @	357.40	30.48	-15.52	46.00	44.80	14.60	31.49	2.58	Peak	---	---
3 @	414.80	31.72	-14.28	46.00	44.46	16.48	32.12	2.91	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	1454.00	43.98	-30.02	74.00	51.63	25.40	35.62	2.57	Peak	---	---
2 @	2348.00	44.83	-29.17	74.00	48.44	28.34	35.24	3.29	Peak	---	---
3 @	2348.00	33.57	-20.43	54.00	37.18	28.34	35.24	3.29	Average	---	---
4 @	2438.00	104.23			107.69	28.45	35.25	3.34	Peak	---	---
5 @	2438.00	94.83			98.29	28.45	35.25	3.34	Average	167	288
6 @	2494.00	43.35	-30.65	74.00	46.72	28.50	35.26	3.39	Peak	---	---
7 @	2494.00	32.61	-21.39	54.00	35.97	28.50	35.26	3.39	Average	---	---

Remark: #4 and 5 Fundamental Signal



Test Mode : Mode 3

- Polarization : Horizontal

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	119.64	33.73	-9.77	43.50	52.56	11.70	31.95	1.43	Peak	---	---
2 @	285.69	40.88	-5.12	46.00	57.96	12.66	31.97	2.23	Peak	---	---
3 @	296.49	39.86	-6.14	46.00	56.54	12.92	31.93	2.33	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	311.90	42.68	-3.32	46.00	59.02	13.47	32.16	2.35	Peak	147	96
2 @	414.80	35.62	-10.38	46.00	48.36	16.48	32.12	2.91	Peak	---	---
3 @	467.30	35.43	-10.57	46.00	47.06	16.81	31.61	3.16	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	1164.00	46.97	-27.03	74.00	56.61	24.52	36.41	2.25	Peak	---	---
2 @	2378.00	46.42	-27.58	74.00	49.97	28.38	35.24	3.31	Peak	---	---
3 @	2378.00	34.02	-19.98	54.00	37.58	28.38	35.24	3.31	Average	---	---
4 @	2464.00	105.60			109.03	28.47	35.25	3.36	Peak	---	---
5 @	2464.00	95.73			99.16	28.47	35.25	3.36	Average	171	276
6 @	2484.00	53.20	-20.80	74.00	56.60	28.48	35.26	3.38	Peak	---	---
7 @	2484.00	42.74	-11.26	54.00	46.14	28.48	35.26	3.38	Average	---	---

Remark: #4 and 5 Fundamental Signal



- Polarization : Vertical

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	48.63	35.93	-4.07	40.00	59.10	8.40	32.42	0.86	QP	100	74
2 @	69.69	25.01	-14.99	40.00	51.01	5.30	32.33	1.02	Peak	---	---
3 @	238.44	28.30	-17.70	46.00	47.39	10.68	31.76	1.99	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	311.90	33.33	-12.67	46.00	49.67	13.47	32.16	2.35	Peak	---	---
2 @	357.40	30.43	-15.57	46.00	44.75	14.60	31.49	2.58	Peak	---	---
3 @	414.80	32.39	-13.61	46.00	45.13	16.48	32.12	2.91	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	1658.00	48.89	-25.11	74.00	55.23	26.33	35.43	2.76	Peak	---	---
2 @	2334.00	47.02	-26.98	74.00	50.66	28.33	35.24	3.27	Peak	---	---
3 @	2334.00	34.64	-19.36	54.00	38.28	28.33	35.24	3.27	Average	---	---
4 @	2458.00	104.63			108.06	28.47	35.25	3.36	Peak	---	---
5 @	2458.00	95.25			98.68	28.47	35.25	3.36	Average	142	150
6 @	2494.00	54.91	-19.09	74.00	58.27	28.50	35.26	3.39	Peak	---	---
7 @	2494.00	35.17	-18.83	54.00	38.53	28.50	35.26	3.39	Average	---	---

Remark: #4 and 5 Fundamental Signal



Test Mode : Mode 4

- Polarization : Horizontal

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	111.54	33.92	-9.58	43.50	53.12	11.52	32.07	1.35	Peak	---	---
2 @	194.43	35.57	-7.93	43.50	57.32	8.48	32.02	1.79	Peak	141	87
3 @	287.58	29.74	-16.26	46.00	46.76	12.72	31.97	2.23	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	336.40	21.80	-24.20	46.00	37.28	13.95	31.87	2.45	Peak	---	---
2 @	357.40	24.42	-21.58	46.00	38.74	14.60	31.49	2.58	Peak	---	---
3 @	652.80	24.91	-21.09	46.00	34.05	18.86	31.57	3.56	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	2344.00	41.45	-32.55	74.00	45.06	28.34	35.24	3.29	Peak	---	---
2 @	2344.00	30.04	-23.96	54.00	33.65	28.34	35.24	3.29	Average	---	---
3 @	2404.00	81.07			84.58	28.41	35.25	3.32	Peak	---	---
4 @	2404.00	80.82			84.33	28.41	35.25	3.32	Average	300	354
5 @	2494.00	41.47	-32.53	74.00	44.84	28.50	35.26	3.39	Peak	---	---
6 @	2494.00	30.26	-23.74	54.00	33.62	28.50	35.26	3.39	Average	---	---

Remark: #3 and 4 Fundamental Signal



- Polarization : Vertical

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	117.48	28.96	-14.54	43.50	47.87	11.64	31.95	1.40	Peak	---	---
2 @	184.98	34.04	-9.46	43.50	55.97	8.25	31.89	1.71	Peak	---	---
3 @	189.03	34.46	-9.04	43.50	56.36	8.29	31.94	1.75	Peak	161	96

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	329.40	20.91	-25.09	46.00	36.70	13.85	32.05	2.41	Peak	---	---
2 @	357.40	25.19	-20.81	46.00	39.51	14.60	31.49	2.58	Peak	---	---
3 @	472.90	24.14	-21.86	46.00	35.94	16.96	31.72	2.96	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	2384.00	41.74	-32.26	74.00	45.30	28.38	35.24	3.31	Peak	---	---
2 @	2384.00	29.92	-24.08	54.00	33.48	28.38	35.24	3.31	Average	---	---
3 @	2398.00	83.82			87.35	28.40	35.25	3.32	Peak	---	---
4 @	2398.00	83.70			87.23	28.40	35.25	3.32	Average	210	270
5 @	2494.00	41.58	-32.42	74.00	44.94	28.50	35.26	3.39	Peak	---	---
6 @	2494.00	30.07	-23.93	54.00	33.43	28.50	35.26	3.39	Average	---	---

Remark: #3 and 4 Fundamental Signal



Test Mode : Mode 5

- Polarization : Horizontal

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	112.08	35.39	-8.11	43.50	54.57	11.54	32.07	1.36	Peak	137	93
2 @	122.34	33.96	-9.54	43.50	52.80	11.72	32.01	1.45	Peak	---	---
3 @	189.84	35.10	-8.40	43.50	57.00	8.30	31.95	1.75	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	311.90	20.30	-25.70	46.00	36.64	13.47	32.16	2.35	Peak	---	---
2 @	357.40	24.70	-21.30	46.00	39.01	14.60	31.49	2.58	Peak	---	---
3 @	386.80	21.77	-24.23	46.00	35.28	15.29	31.45	2.64	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	2384.00	42.14	-31.86	74.00	45.70	28.38	35.24	3.31	Peak	---	---
2 @	2384.00	29.96	-24.04	54.00	33.52	28.38	35.24	3.31	Average	---	---
3 @	2438.00	85.44			88.91	28.45	35.25	3.34	Peak	---	---
4 @	2438.00	85.21			88.67	28.45	35.25	3.34	Average	290	170
5 @	2498.00	41.49	-32.51	74.00	44.86	28.50	35.26	3.39	Peak	---	---
6 @	2498.00	30.25	-23.75	54.00	33.61	28.50	35.26	3.39	Average	---	---

Remark: #3 and 4 Fundamental Signal



- Polarization : Vertical

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	117.48	27.29	-16.21	43.50	46.20	11.64	31.95	1.40	Peak	---	---
2 @	189.03	32.51	-10.99	43.50	54.42	8.29	31.94	1.75	Peak	---	---
3 @	199.83	32.52	-10.98	43.50	54.04	8.70	32.06	1.84	Peak	162	88

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	329.40	21.53	-24.47	46.00	37.32	13.85	32.05	2.41	Peak	---	---
2 @	357.40	24.89	-21.11	46.00	39.20	14.60	31.49	2.58	Peak	---	---
3 @	500.90	23.79	-22.21	46.00	34.76	17.28	31.42	3.18	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	2364.00	41.73	-32.27	74.00	45.32	28.36	35.24	3.29	Peak	---	---
2 @	2364.00	30.09	-23.91	54.00	33.68	28.36	35.24	3.29	Average	---	---
3 @	2438.00	86.67			90.13	28.45	35.25	3.34	Peak	---	---
4 @	2438.00	86.38			89.84	28.45	35.25	3.34	Average	271	345
5 @	2494.00	41.54	-32.46	74.00	44.90	28.50	35.26	3.39	Peak	---	---
6 @	2494.00	30.14	-23.86	54.00	33.50	28.50	35.26	3.39	Average	---	---

Remark: #3 and 4 Fundamental Signal



Test Mode : Mode 6

- Polarization : Horizontal

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	116.94	34.92	-8.58	43.50	53.85	11.64	31.97	1.40	Peak	---	---
2 @	189.03	35.84	-7.66	43.50	57.75	8.29	31.94	1.75	Peak	150	79
3 @	195.24	35.79	-7.71	43.50	57.50	8.52	32.03	1.80	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	325.90	21.25	-24.75	46.00	37.20	13.79	32.13	2.39	Peak	---	---
2 @	336.40	21.31	-24.69	46.00	36.78	13.95	31.87	2.45	Peak	---	---
3 @	357.40	23.85	-22.15	46.00	38.17	14.60	31.49	2.58	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	2364.00	42.33	-31.67	74.00	45.92	28.36	35.24	3.29	Peak	---	---
2 @	2364.00	30.05	-23.95	54.00	33.64	28.36	35.24	3.29	Average	---	---
3 @	2478.00	84.44			87.83	28.48	35.26	3.38	Peak	---	---
4 @	2478.00	84.15			87.55	28.48	35.26	3.38	Average	240	100
5 @	2483.50	62.74	-11.26	74.00	66.14	28.48	35.26	3.38	Peak	---	---
6 @	2483.50	47.60	-6.40	54.00	51.00	28.48	35.26	3.38	Average	---	---

Remark: #3 and 4 Fundamental Signal



- Polarization : Vertical

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	122.34	28.37	-15.13	43.50	47.21	11.72	32.01	1.45	Peak	---	---
2 @	179.58	32.29	-11.21	43.50	54.24	8.20	31.83	1.68	Peak	---	---
3 @	189.84	35.11	-8.39	43.50	57.01	8.30	31.95	1.75	Peak	137	172

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	329.40	20.81	-25.19	46.00	36.60	13.85	32.05	2.41	Peak	---	---
2 @	357.40	25.46	-20.54	46.00	39.78	14.60	31.49	2.58	Peak	---	---
3 @	472.90	23.53	-22.47	46.00	35.33	16.96	31.72	2.96	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	2328.00	42.05	-31.95	74.00	45.69	28.33	35.24	3.27	Peak	---	---
2 @	2328.00	30.05	-23.95	54.00	33.69	28.33	35.24	3.27	Average	---	---
3 @	2478.00	86.40			89.80	28.48	35.26	3.38	Peak	---	---
4 @	2478.00	86.03			89.43	28.48	35.26	3.38	Average	300	120
5 @	2483.50	64.51	-9.49	74.00	67.91	28.48	35.26	3.38	Peak	---	---
6 @	2483.50	49.95	-4.05	54.00	53.35	28.48	35.26	3.38	Average	---	---

Remark: #3 and 4 Fundamental Signal



Test Mode : Mode 7

Polarization : Horizontal

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	1064.00	43.01	-30.99	74.00	53.24	24.21	36.60	2.17	Peak	---	---
2 @	1674.00	59.23	-14.77	74.00	65.48	26.42	35.43	2.76	Peak	---	---
3 @	1674.00	51.40	-2.60	54.00	57.65	26.42	35.43	2.76	Average	---	---
4 @	2358.00	34.48	-19.52	54.00	38.07	28.36	35.24	3.29	Average	---	---
5 @	2358.00	45.91	-28.09	74.00	49.50	28.36	35.24	3.29	Peak	---	---
6 @	2438.00	75.31			78.77	28.45	35.25	3.34	Average	---	---
7 @	2438.00	93.48			96.94	28.45	35.25	3.34	Peak	---	---
8 @	2488.00	43.74	-30.26	74.00	47.12	28.50	35.26	3.38	Peak	---	---
9 @	2488.00	32.34	-21.66	54.00	35.72	28.50	35.26	3.38	Average	---	---
10 @	2508.00	45.23	-8.77	54.00	48.54	28.55	35.26	3.39	Average	---	---
11 @	2508.00	52.13	-21.87	74.00	55.44	28.55	35.26	3.39	Peak	---	---

Remark: #6 and 7 Fundamental Signal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	3344.00	48.43	-25.57	74.00	49.93	30.00	35.42	3.92	Peak	---	---
2 @	4184.00	47.52	-26.48	74.00	47.98	30.39	35.22	4.37	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	5018.00	51.49	-22.51	74.00	48.25	33.52	35.21	4.93	Peak	---	---
2 @	5018.00	40.94	-13.06	54.00	37.70	33.52	35.21	4.93	Average	---	---
3 @	5854.00	53.50	-20.50	74.00	49.52	33.69	35.20	5.49	Peak	---	---
4 @	5854.00	42.25	-11.75	54.00	38.27	33.69	35.20	5.49	Average	---	---



- Polarization : Vertical

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

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	1674.00	60.44	-13.56	74.00	66.69	26.42	35.43	2.76	Peak	---	---
2 @	1674.00	48.28	-5.72	54.00	54.53	26.42	35.43	2.76	Average	---	---
3 @	2324.00	43.62	-30.38	74.00	47.26	28.33	35.24	3.27	Peak	---	---
4 @	2324.00	32.24	-21.76	54.00	35.88	28.33	35.24	3.27	Average	---	---
5 @	2434.00	93.80			97.28	28.43	35.25	3.34	Peak	---	---
6 @	2434.00	73.71			77.19	28.43	35.25	3.34	QP	---	---
7 @	2488.00	43.00	-31.00	74.00	46.38	28.50	35.26	3.38	Peak	---	---
8 @	2488.00	32.80	-21.20	54.00	36.18	28.50	35.26	3.38	Average	---	---
9 @	2508.00	48.86	-25.14	74.00	52.17	28.55	35.26	3.39	Peak	---	---

Remark: #5 and 6 Fundamental Signal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	3344.00	53.57	-20.43	74.00	55.07	30.00	35.42	3.92	Peak	---	---
2 @	3344.00	41.61	-12.39	54.00	43.11	30.00	35.42	3.92	Average	---	---
3 @	4184.00	48.63	-25.37	74.00	49.09	30.39	35.22	4.37	Peak	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	5018.00	52.02	-21.98	74.00	48.78	33.52	35.21	4.93	Peak	---	---
2 @	5018.00	42.81	-11.19	54.00	39.57	33.52	35.21	4.93	Average	---	---
3 @	5854.00	52.85	-21.15	74.00	48.86	33.69	35.20	5.49	Peak	---	---
4 @	5854.00	44.52	-9.48	54.00	40.54	33.69	35.20	5.49	Average	---	---

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	7528.00	57.66	-16.34	74.00	50.95	36.07	35.54	6.19	Peak	---	---
2 @	7528.00	48.11	-5.89	54.00	41.40	36.07	35.54	6.19	Average	---	---



5.12 Antenna Requirements

5.12.1 Standard Applicable

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

And according to FCC 47 CFR Section 15.247 (b), if directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

5.12.2 Antenna Connected Construction

The antenna used in this product are FPA(Flexibe printed Antenna) for WLAN and PCB(Printed Circuit Board) Antenna for BT without connector and it is considered to meet antenna requirement of FCC.

**6. List of Measuring Equipments Used**

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9 KHz – 2.75 GHz	Feb. 16, 2004	Feb. 16, 2005	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001/004	9 KHz – 30 MHz	Jun. 09, 2004	Jun. 09, 2005	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	99041	9 KHz – 30 MHz	Apr. 27, 2004	Apr. 27, 2005	Conduction (CO01-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	N/A	Conduction (CO01-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB044	9KHz~30MHz	Apr. 21, 2004	Apr. 21, 2005	Conduction (CO01-HY)
Spectrum analyzer	Agilent	E4408B	MY44211030	9KHz-26.5GHz	Jul. 27, 2004	Jul. 26, 2005	Radiation (03CH06-HY)
Receiver	R&S	ESCS30	100356	9KHz-2.75GHz	Jul,09,2004	Jul, 10,2005	Radiation (03CH06-HY)
Controller	CT	SC100	N/A	N/A	N/A	N/A	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Nov. 22, 2004	Nov. 21, 2005	Radiation (03CH06-HY)
Horn Antenna	Com-Power	AH118	071025	1G-18G	Feb. 11, 2004	Feb. 11, 2005	Radiation (03CH06-HY)
SHF-EHF Horn	SCHWARZBECK	BBHA 9170	9170-249	14G - 40G	Jun. 22, 2004	Jun. 22, 2005	Radiation (03CH06-HY)
PreAmplifier	Com-Power	PA-103	161055	1MHz - 1000MHz	Apr. 26, 2004	Apr. 26, 2005	Radiation (03CH06-HY)
HF Amplifier	MITEQ	AFS44	973248	0.1G - 26.5G	May. 20, 2004	May. 20, 2005	Radiation (03CH06-HY)
Amplifier	MITEQ	AMF-6F	997165	26G - 40G	Jun. 24, 2004	Jun. 24, 2005	Radiation (03CH06-HY)
Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	N/A	Radiation (03CH06-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	N/A	Radiation (03CH06-HY)
Base Station Emulator	Agilent	E5515C	GB43460754	N/A	Jan. 12, 2004	Jan. 12, 2006	Base Station
Radio Communication Tester	R&S	CMU200	105934	N/A	Aug. 24, 2004	Aug. 24, 2005	Base Station
Thermal Chamber	Ten Billion	TTH-D35P	N/A	N/A	NCR	NCR	EMS Chamber

7. Uncertainty Evaluation

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

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

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

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.41	Normal(k=2)	0.21
Antenna factor calibration	0.83	Normal(k=2)	0.42
Cable loss calibration	0.25	Normal(k=2)	0.13
Pre Amplifier Gain calibration	0.27	Normal(k=2)	0.14
RCV/SPA specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site imperfection	1.43	Rectangular	0.83
Mismatch	+0.39/-0.41	U-shaped	0.28
combined standard uncertainty Uc(y)	1.27		
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)	2.54		



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

Contribution	Uncertainty of x_i		$u(x_i)$	C_i	$C_i * u(x_i)$
	dB	Probability Distribution			
Receiver reading	± 0.10	Normal(k=1)	0.10	1	0.10
Antenna factor calibration	± 1.70	Normal(k=2)	0.85	1	0.85
Cable loss calibration	± 0.50	Normal(k=2)	0.25	1	0.25
Receiver Correction	± 2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	± 1.50	Rectangular	0.87	1	0.87
Site imperfection	± 2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20 \log(1 - \Gamma_1 * \Gamma_2 * \Gamma_3)$	+0.34/-0.35	U-shaped	0.244	1	0.244
Combined standard uncertainty $U_c(y)$	2.36				
Measuring uncertainty for a level of confidence of 95% $U = 2U_c(y)$	4.72				