

FCC TEST REPORT

for

47 CFR Part 15 Subpart C

Equipment : Smart Phone
Trade Name : BenQ
Model No. : P31 (57P31)
FCC ID. : JVP57P31
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 Oct. 07, 2004 at **Sporton International Inc. LAB.**

Daniel Lee 3/5/2005

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History of this test report

Original Report Issue Date: Mar. 14, 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	: Smart Phone
Trade Name	: BenQ
Model No.	: P31 (57P31)
FCC ID	: JVP57P31
Power Supply Type	: Switching
AC Power Cord	: AC 120V, Weave-shielded, Wall-mount, 1.8meter, 2pin
Earpiece	: 23.42036.001
Data Cable	: 50.G4702.001
Battery	: 23.20113.101, LI 3.7V 1240MA
Holster	: 47.G8225.001
Charger	: MP2X, BenQ

1.4. Feature of Equipment under Test

Product Feature & Specification				
1. Modulation Type/Data Rate	GFSK			
2. Frequency Range.	2400 MHz ~ 2483.5 MHz			
3. Number o f Channels	79			
4. Carrier Frequency of each channel	2402MHz+n*1MHz, n=0~78			
5. Channel Spacing	1 MHz			
6. Maximum Output Power to Antenna (Normal condition)	1.72 dBm			
7. Type of Antenna Connector	N/A			
8. Antenna Type	PIFA			
9. Antenna Gain	0 dBi			
10. Function Type	Transmitter		Transceiver	V



2. Test Configuration of Equipment under Test

2.1. Test Manner

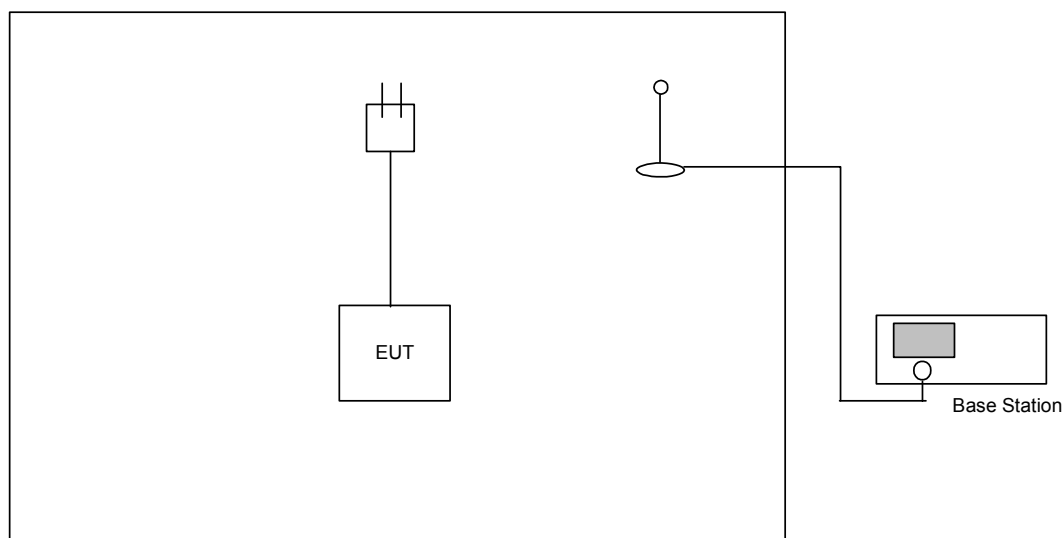
- a. The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.
- b. For spurious emission below 1GHz, only one channel of each application was tested because it is not related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

2.2. Test Mode

Application	Bluetooth
Radiated Emission	Mode 1: Tx_CH00_2402 MHz Mode 2: Tx_CH39_2441 MHz Mode 3: Tx_CH78_2480 MHz
Conducted Emission	Mode 1: PCS Idle + MP3 Play + Bluetooth On Mode 2: PCS Idle + Camera On + Bluetooth On Mode 3: PCS Idle + USB Link

2.3. Connection Diagram of Test System

<Conducted Emission & Radiation Emission>



2.4. Ancillary Equipment List

Item	Equipment	Model No.	Serial No.
1.	Notebook (DELL)	PP05L	N/A
2.	(USB) MOUSE (LOGITECH)	M-BE58	N/A
3.	Base Station	CMU200	N/A



3. RF Utility

The EUT is connected with Base station, CMU200, to send transmitting signal for all testing.



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 : CO01-HY, 03CH06-HY

4.1. Test Voltage

AC 120V

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

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	Section
15.247(a)(1)	Hopping Channel Separation	Pass	5.2
15.247(a)(1)(ii) i)	Number of Hopping Frequency Used	Pass	5.3
15.247(a)(1)	Hopping Channel Bandwidth	Pass	5.4
15.247(a)(1)(ii) i)	Dwell Time of Each Frequency within a 30 Second Period	Pass	5.5
15.247(b)(1)	Output Power	Pass	5.6
15.247(c)	100kHz Bandwidth of Frequency Band Edges	Pass	5.7
15.207	Conducted Emission	Pass	5.8
15.209	Radiated Emission	Pass	5.9
15.203	Antenna Requirement	Pass	5.10

5.2. Hopping Channel Separation

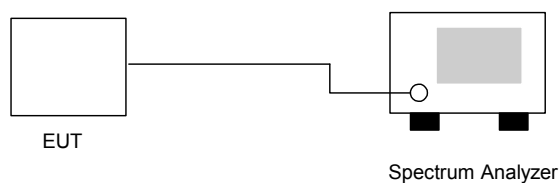
5.2.1. Measuring Instruments :

As described in chapter 6 of this test report.

5.2.2. Test Procedure :

1. The transmitter output was connected to the spectrum analyzer 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

- Temperature: 24°C
- Relative Humidity: 47%
- Test Engineer : Jay

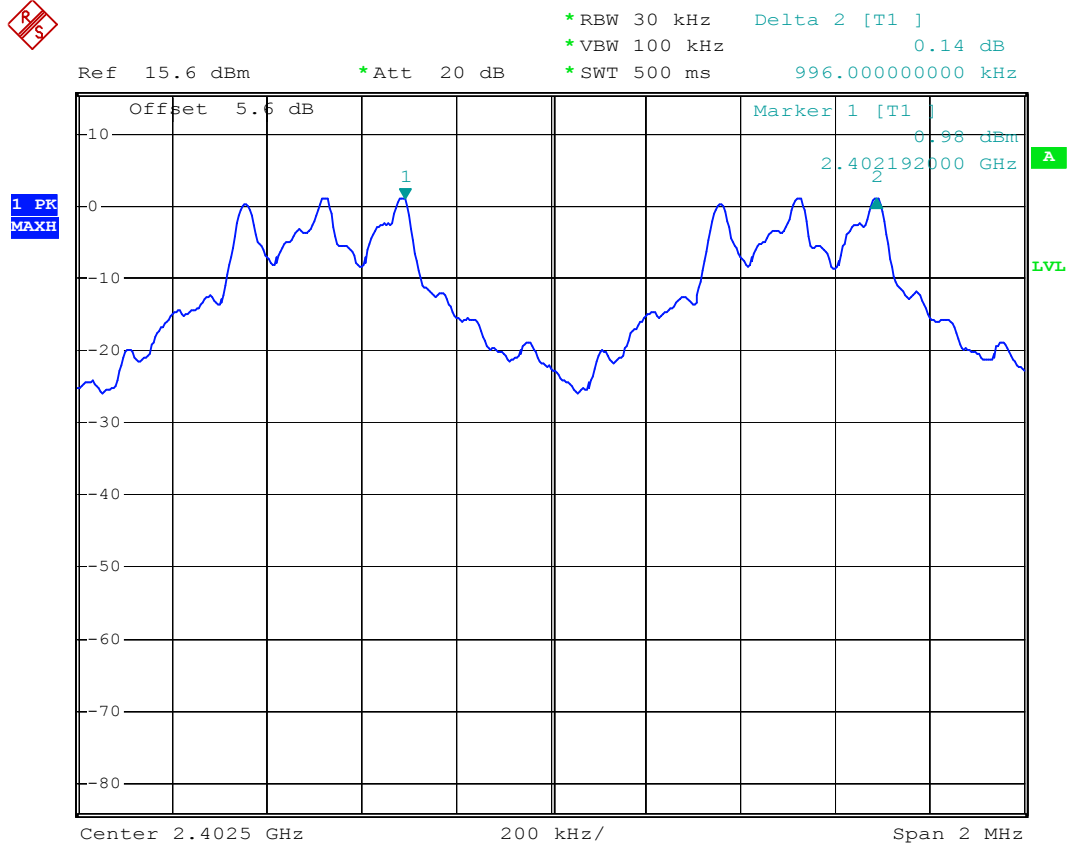
Channel	Frequency (MHz)	Hopping Channel Separation (MHz)	Limits (MHz)	Plot Ref. No.
00	2402	0.996	0.692	Mode 1
39	2441	1.0	0.692	Mode 2
78	2480	1.0	0.694	Mode 3

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



5.2.5 Hopping Channel Separation

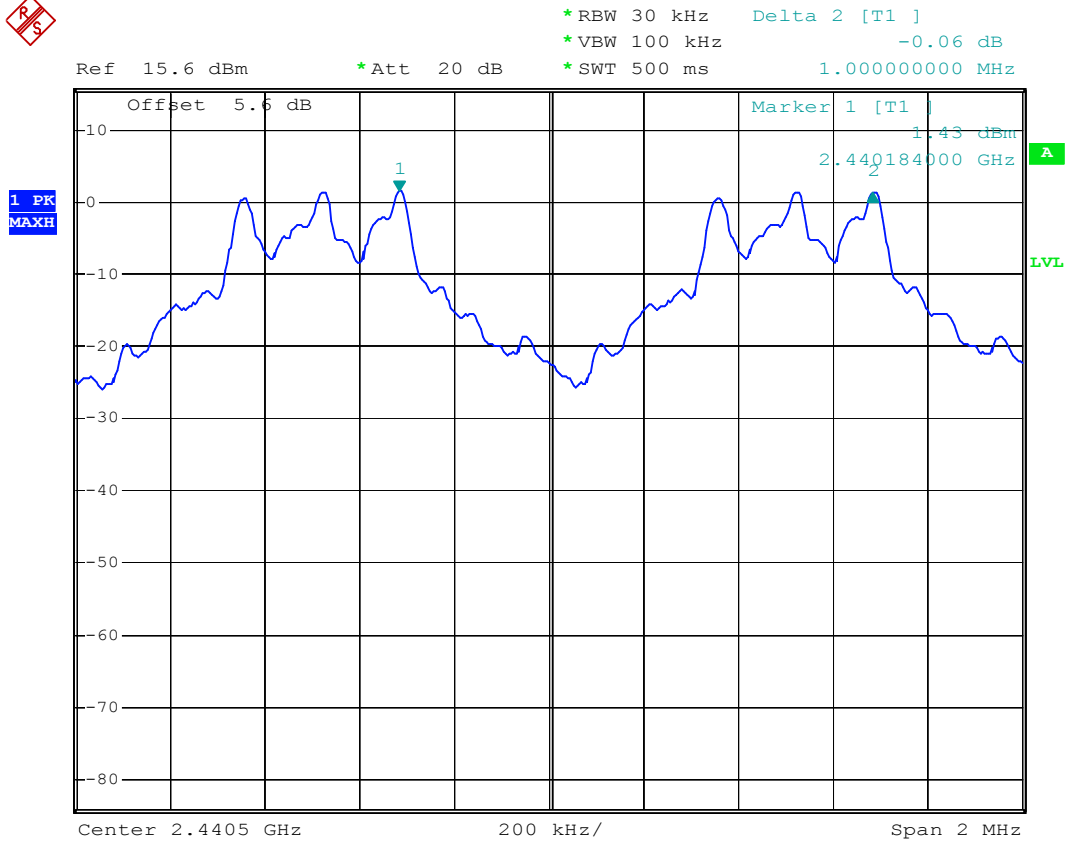
Mode 1: CH00 (2402MHz)



Date: 21.FEB.2005 10:26:03



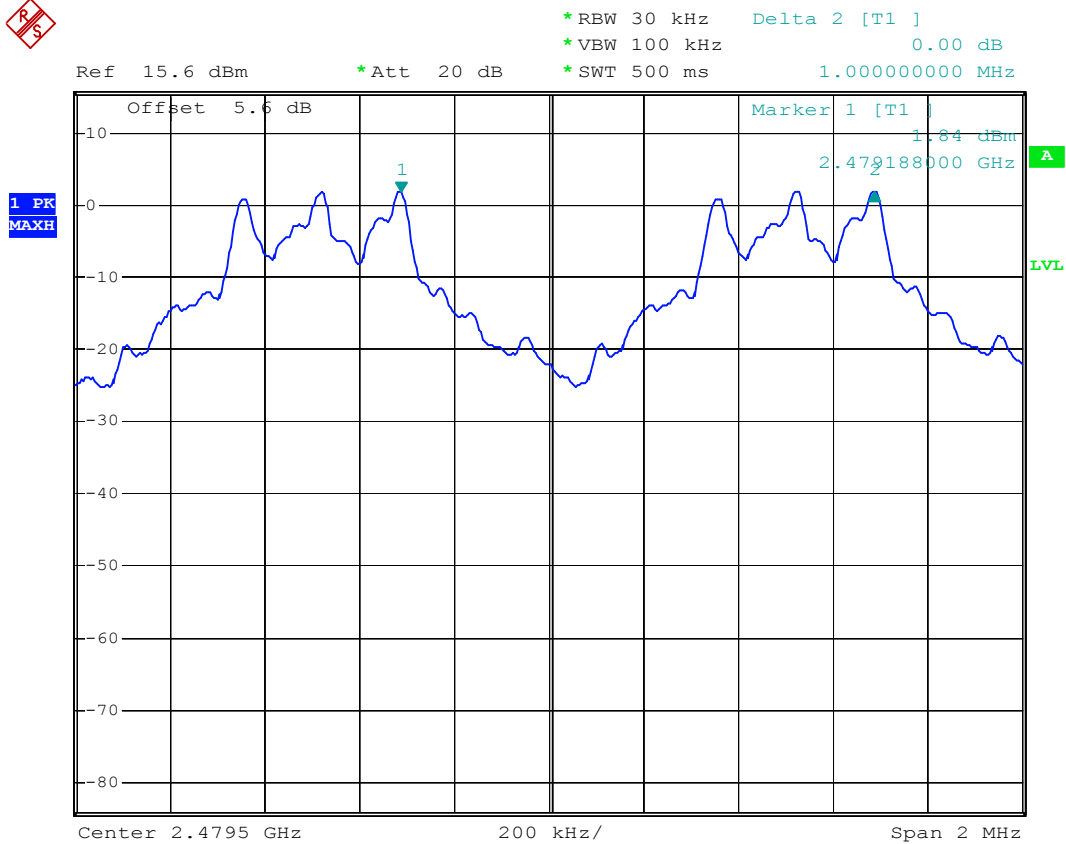
Mode 2: CH39 (2441MHz)



Date: 21.FEB.2005 10:26:55



Mode 3: CH78 (2480MHz)



Date: 21.FEB.2005 10:36:22

5.3. Number of Hopping Frequency

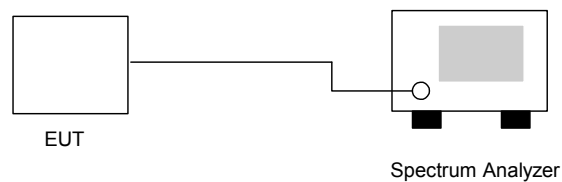
5.3.1. Measuring Instruments :

As described in chapter 6 of this test report.

5.3.2. Test Procedure :

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



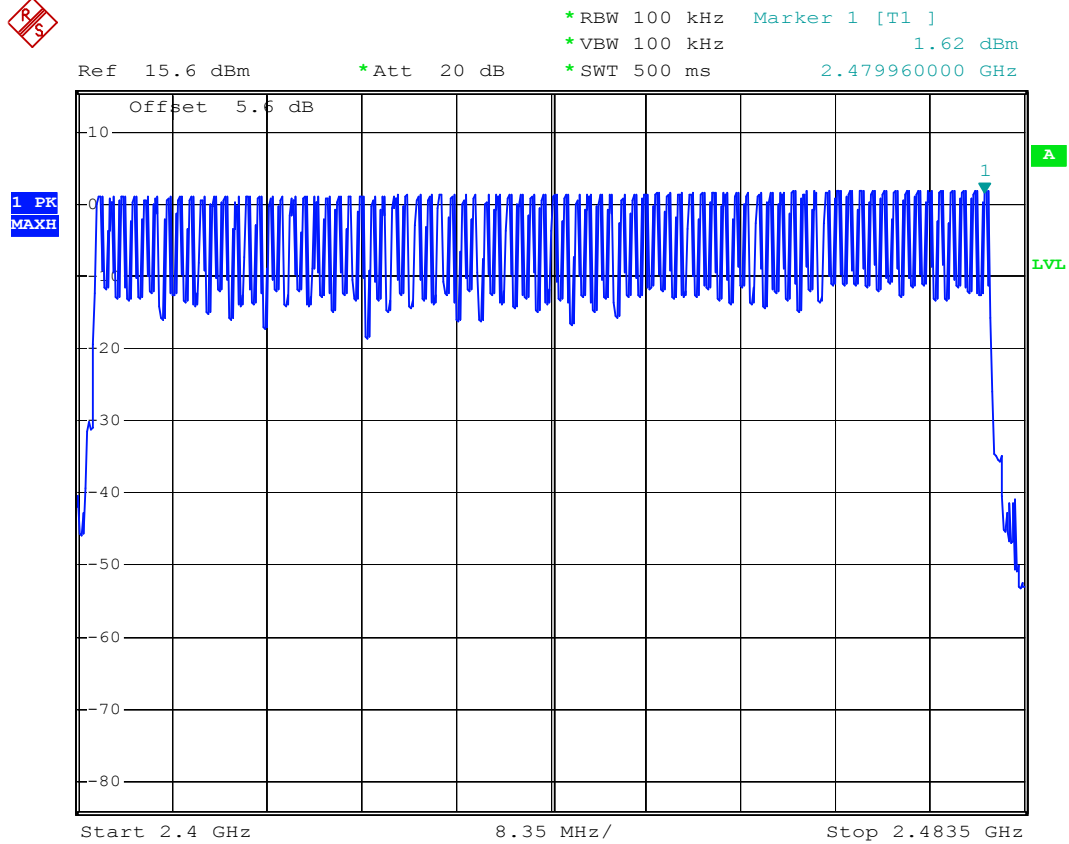
5.3.4. Test Result : See spectrum analyzer plots below

- Temperature: 24°C
- Relative Humidity: 47%
- Test Enginner : Jay

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



5.3.5 Number of Hopping Frequency



Date: 21.FEB.2005 10:48:17

5.4 Hopping Channel Bandwidth

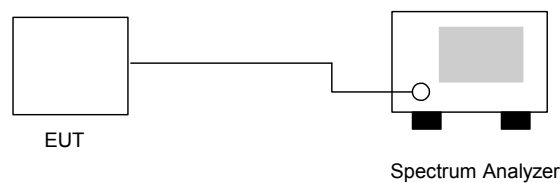
5.4.1 Measuring Instruments :

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 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 :



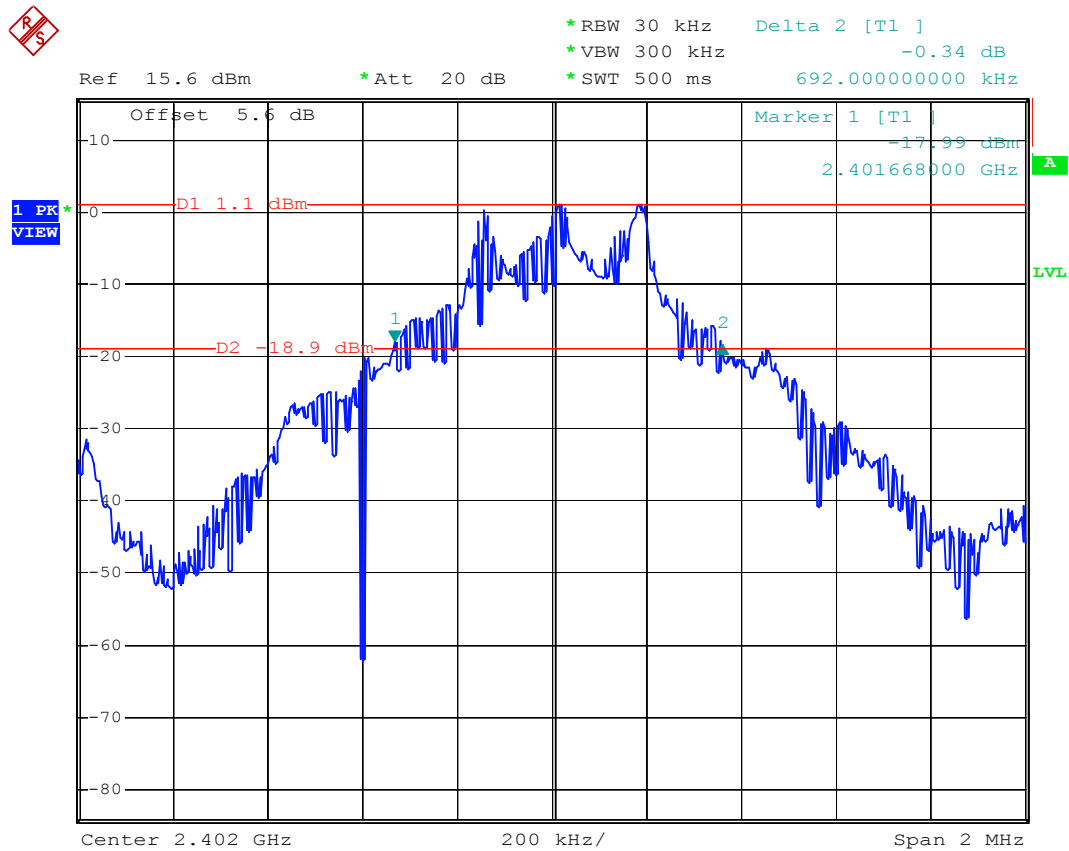
5.4.4 Test Result : See spectrum analyzer plots below

- Temperature: 24°C
- Relative Humidity: 47%
- Test Engineer : Jay

Channel	Frequency (MHz)	Hopping Channel Bandwidth (MHz)	Limits (MHz)	Plot Ref. No.
00	2402	0.692	1.0	Mode 1
39	2441	0.692	1.0	Mode 2
78	2480	0.694	1.0	Mode 3

5.4.5 Hopping Channel Bandwidth

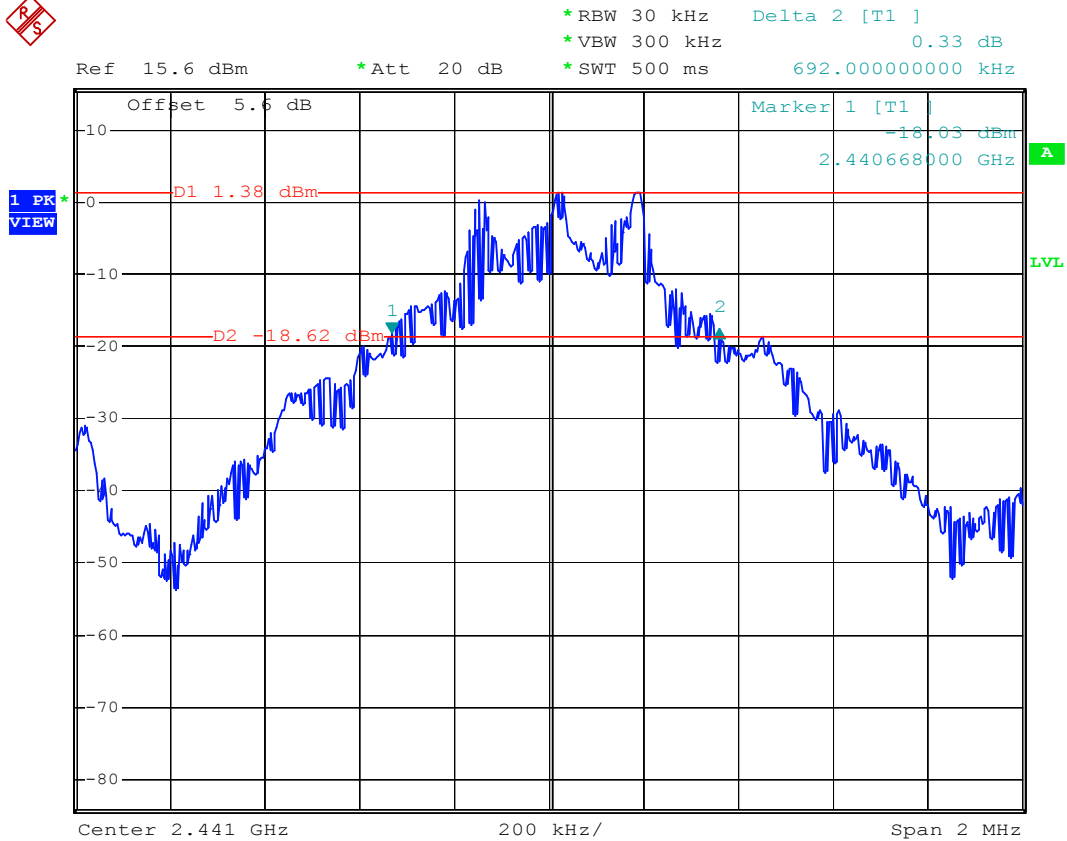
Mode 1: CH00 (2402MHz)



Date: 21.FEB.2005 10:24:14

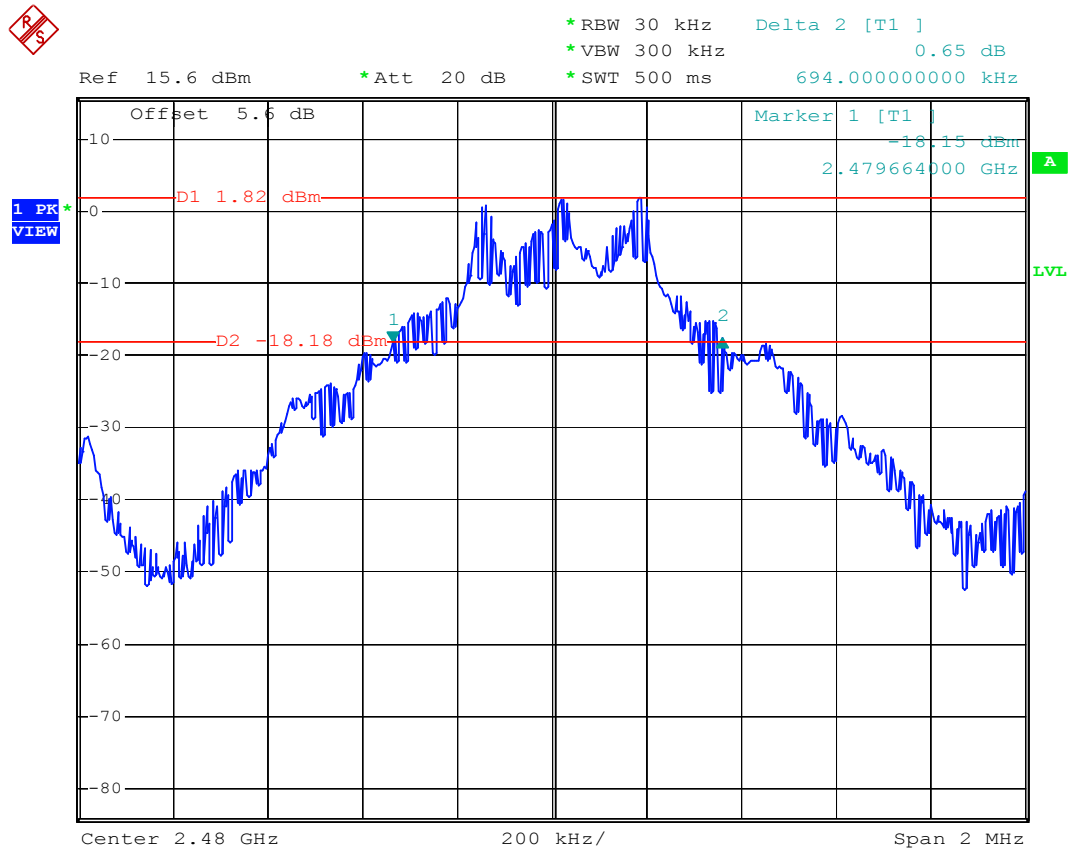


Mode 2: CH39 (2441MHz)



Date: 21.FEB.2005 10:27:39

Mode 3: CH78 (2480MHz)



Date: 21.FEB.2005 10:38:18

5.5 Dwell Time of Each Frequency within a 30 Seconds Period

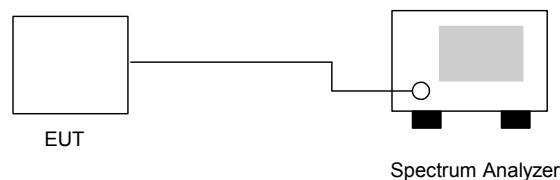
5.5.1 Measuring Instruments :

As described in chapter 6 of this test report.

5.5.2 Test Procedure :

1. The transmitter output was connected to the spectrum analyzer 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 = $30 \times (1600/79) \times t$ (t = the time duration of one single pulse)

5.5.3 Test Setup Layout :



5.5.4 Test Result : See spectrum analyzer plots below

- Temperature: 24°C
- Relative Humidity: 47%
- Test Engineer : Jay

Package Mode	Average Hopping Channel	Package Transfer Time (us)	Dwell Time (s)	Limit (s)
DH1	9.2	452	0.13	0.4
DH3	3	1740	0.16	0.4
DH5	1.9	2960	0.18	0.4

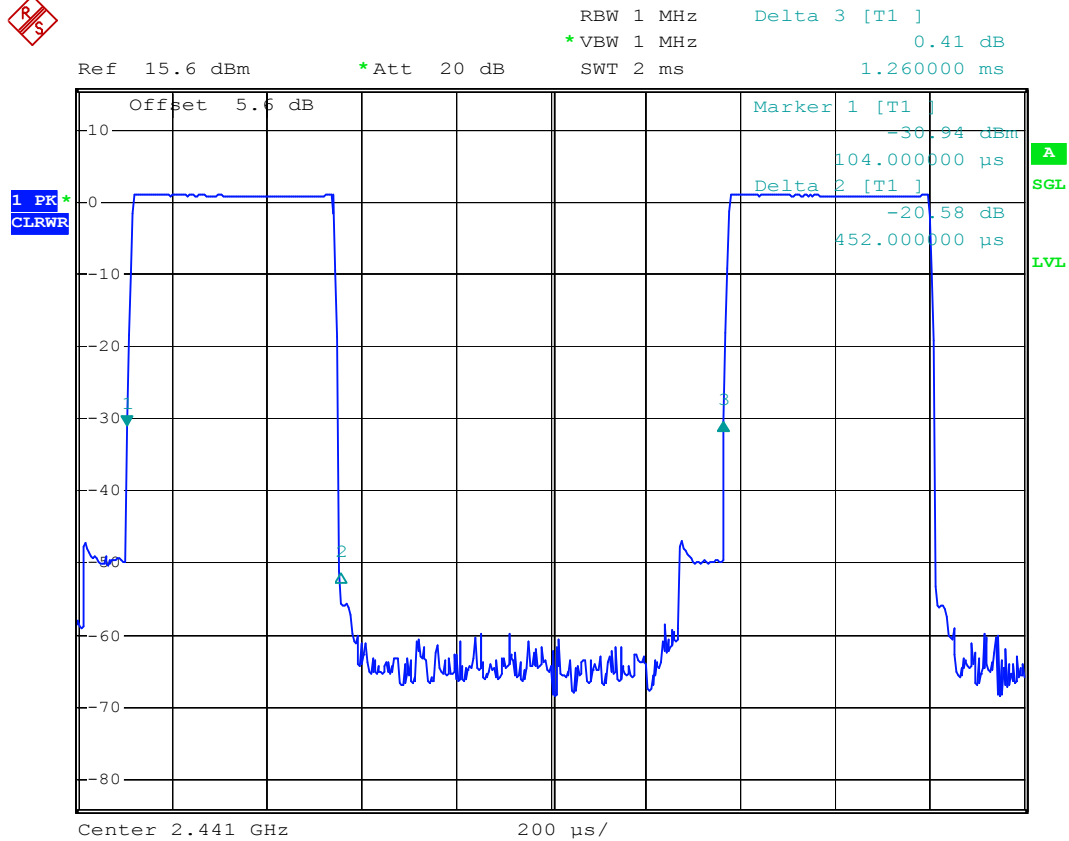
※ Remark:

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

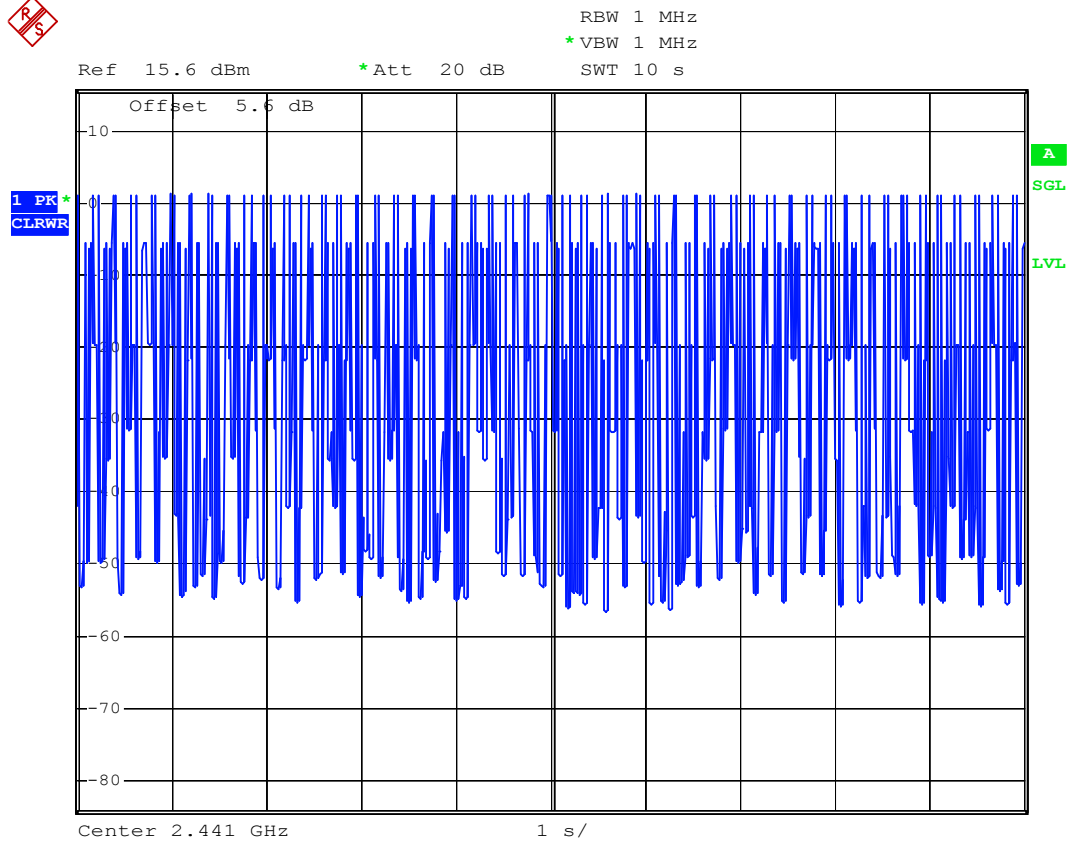


5.5.5 Dwell Time

DH1



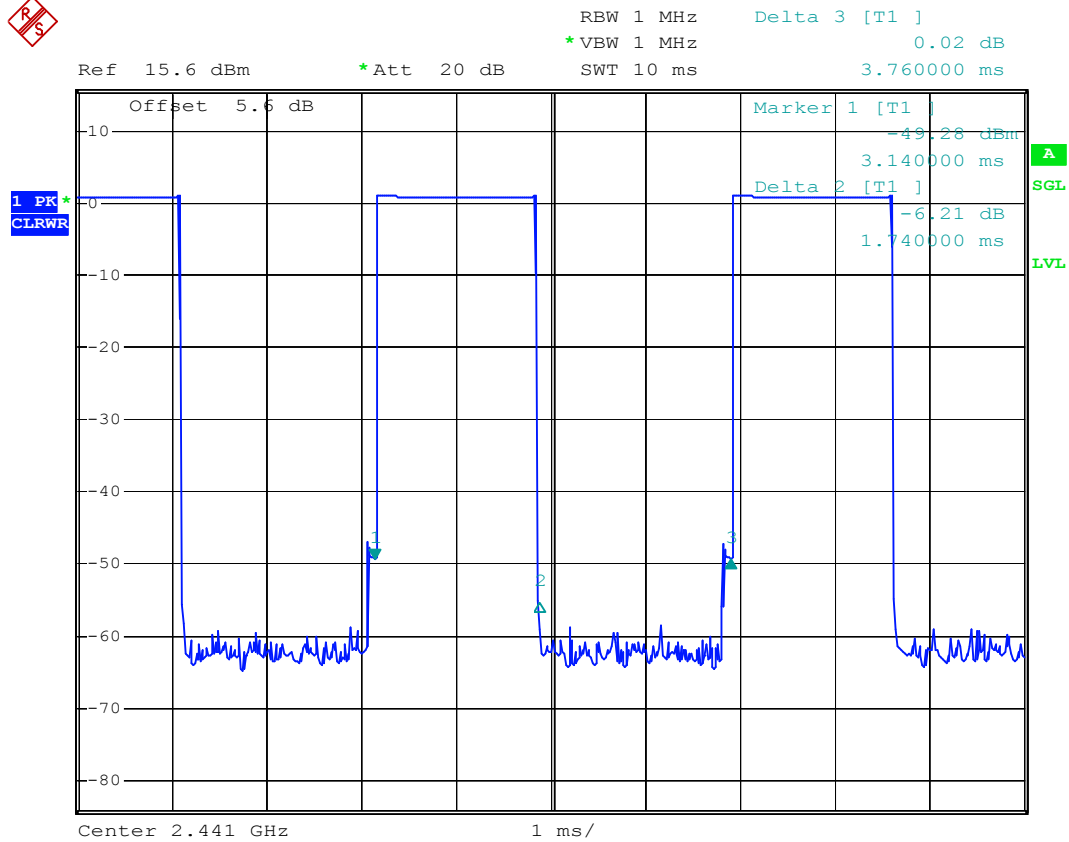
Date: 21.FEB.2005 10:29:42



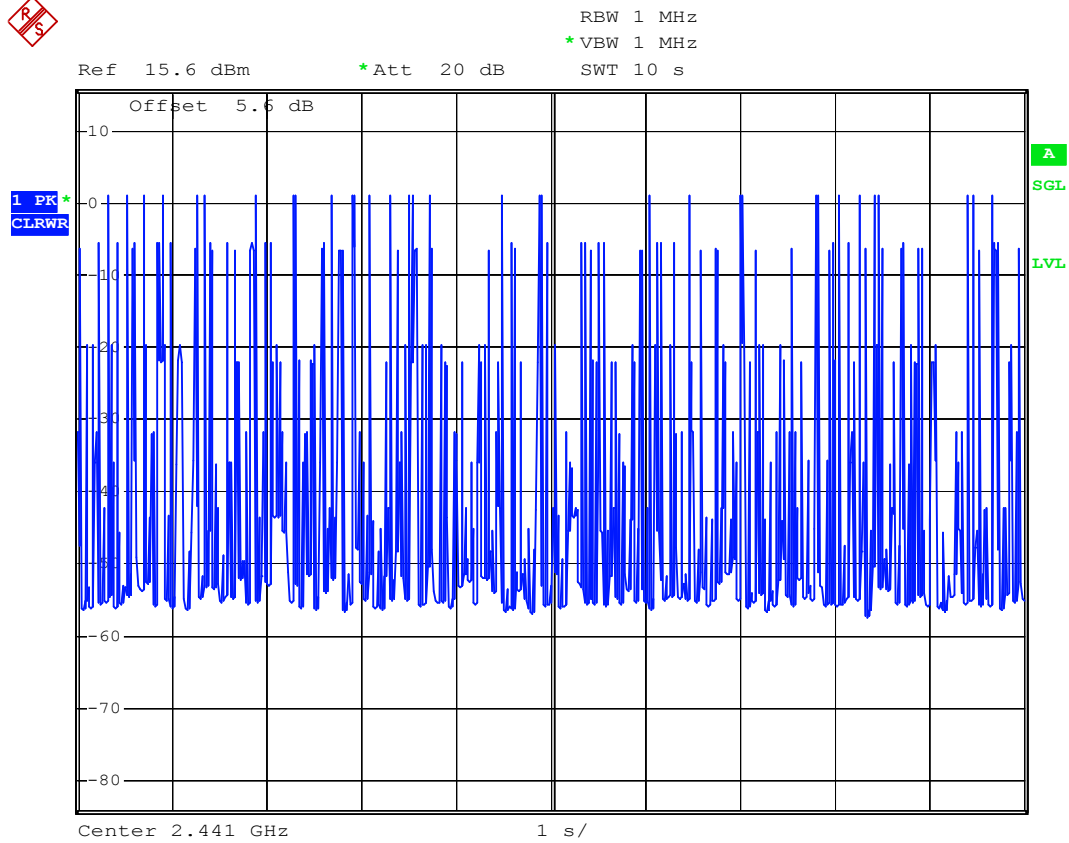
Date: 21.FEB.2005 10:30:27



DH3



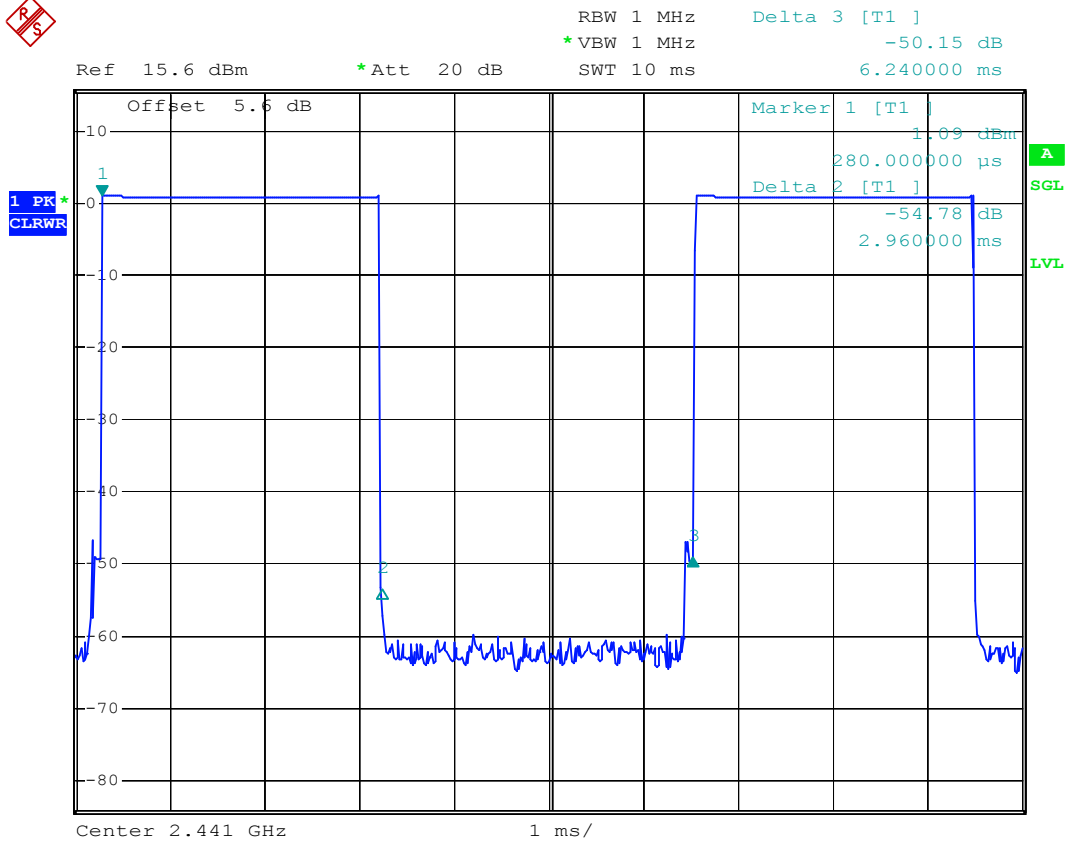
Date: 21.FEB.2005 10:33:44



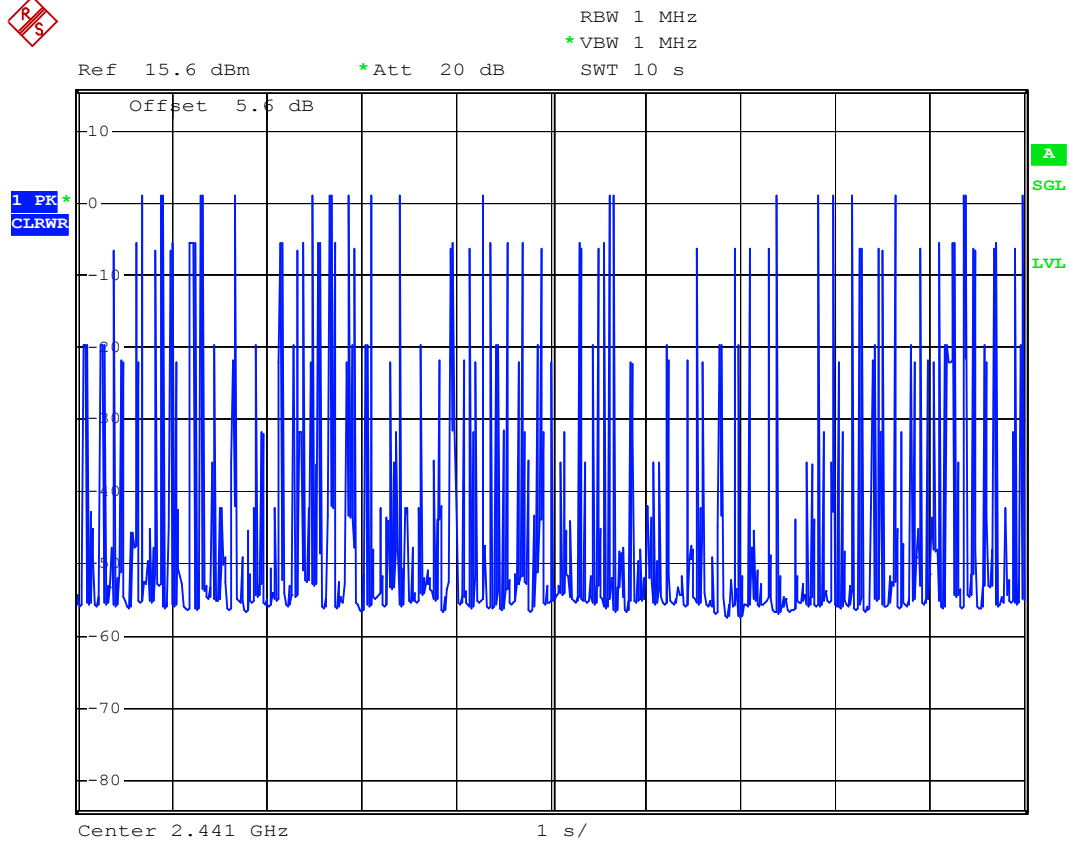
Date: 21.FEB.2005 10:33:04



DH5



Date: 21.FEB.2005 10:34:28



Date: 21.FEB.2005 10:35:08

5.6 Output Power

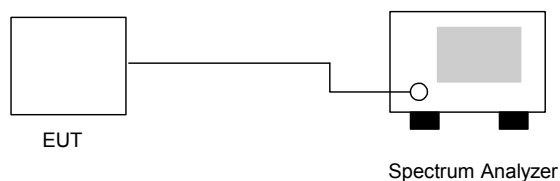
5.6.1 Measuring Instruments :

As described in chapter 6 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

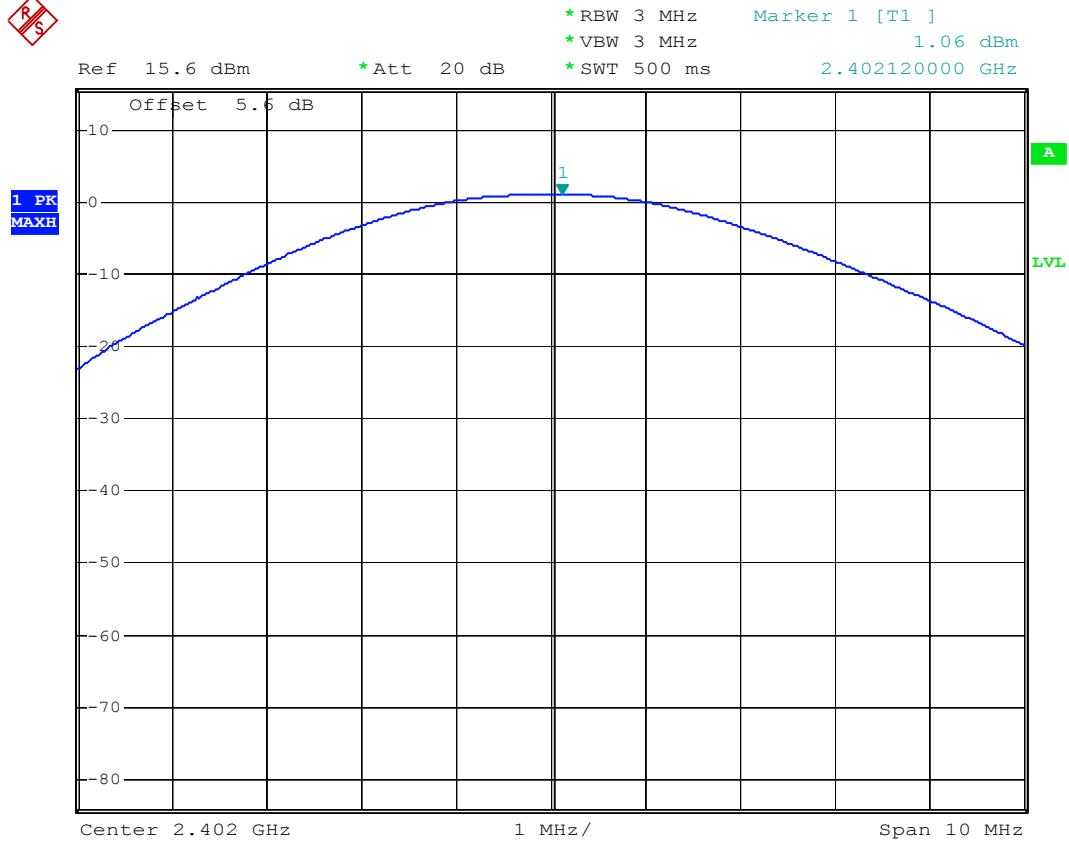
- Temperature: 24°C
- Relative Humidity: 47%
- Test Engineer : Jay

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (Watt/dBm)	Plot Ref. No.
00	2402	1.06	1W/30 dBm	Mode 1
39	2441	1.31	1W/30 dBm	Mode 2
78	2480	1.72	1W/30 dBm	Mode 3



5.6.5 Output Power

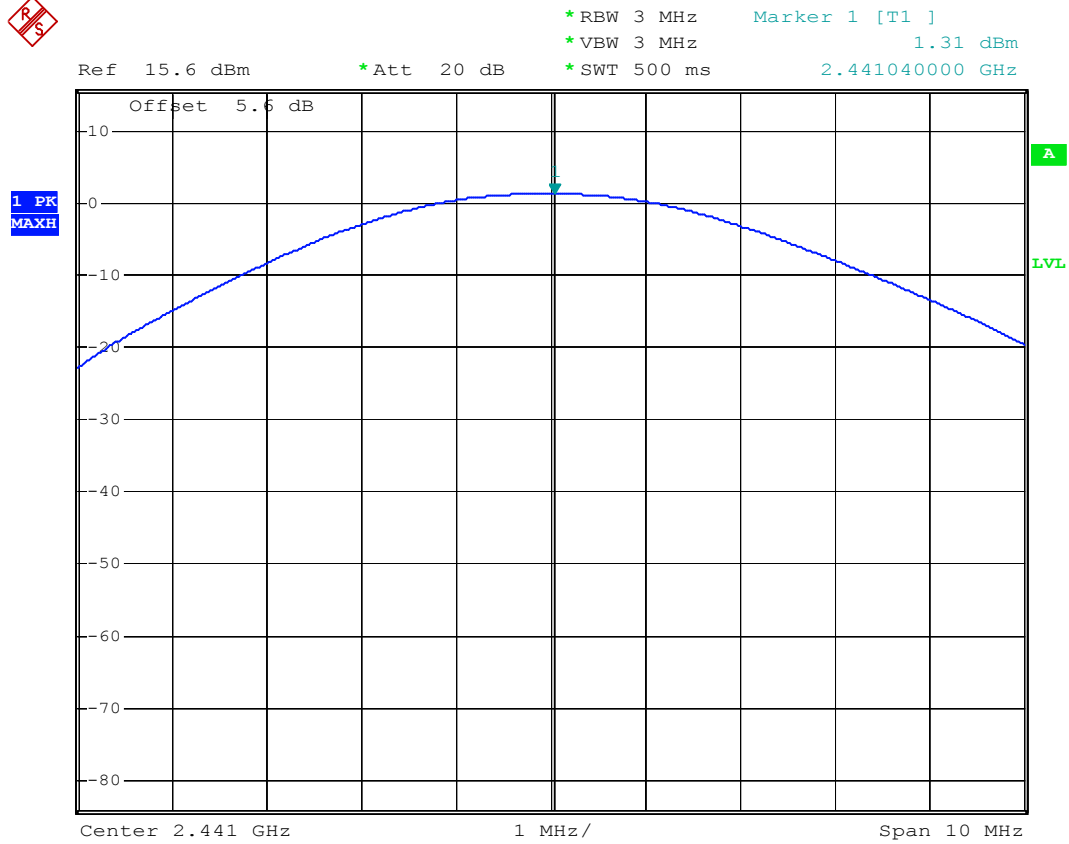
Mode 1: CH00 (2402MHz)



Date: 21.FEB.2005 10:20:49



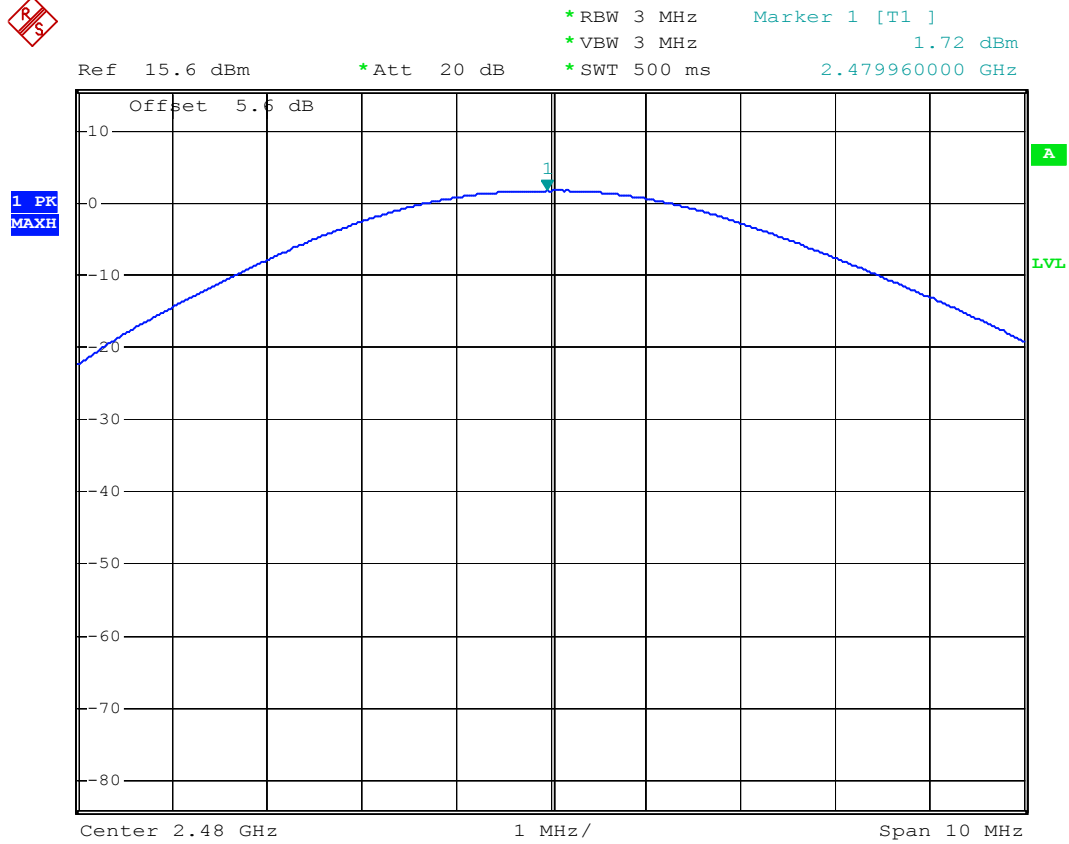
Mode 2: CH39 (2441MHz)



Date: 21.FEB.2005 10:28:56



Mode 3: CH78 (2480MHz)



Date: 21.FEB.2005 10:40:38



5.7 100kHz Bandwidth of Frequency Band Edges

5.7.1 Measuring Instruments :

As described in chapter 6 of this test report.

5.7.2 Test Procedure :

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

5.7.3 Test Result :

- Temperature: 26°C
- Relative Humidity: 57%
- Test Enginner : Jay

Test Result in lower band (Channel 00) : PASS

Test Result in higher band(Channel 78) : PASS

5.7.4 Note on Band edge Emission

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
2348.00	46.26	-27.74	74.00	46.47	30.52	35.12	4.37	Peak
2348.00	34.02	-19.98	54.00	34.24	30.52	35.12	4.37	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
2490.00	46.69	-27.31	74.00	46.92	30.48	35.14	4.43	Peak
2490.00	33.76	-20.24	54.00	33.99	30.48	35.14	4.43	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
2483.50	64.62	-9.38	74.00	64.87	30.41	35.19	4.52	Peak
2483.50	53.00	-1.00	54.00	53.25	30.41	35.19	4.52	Average

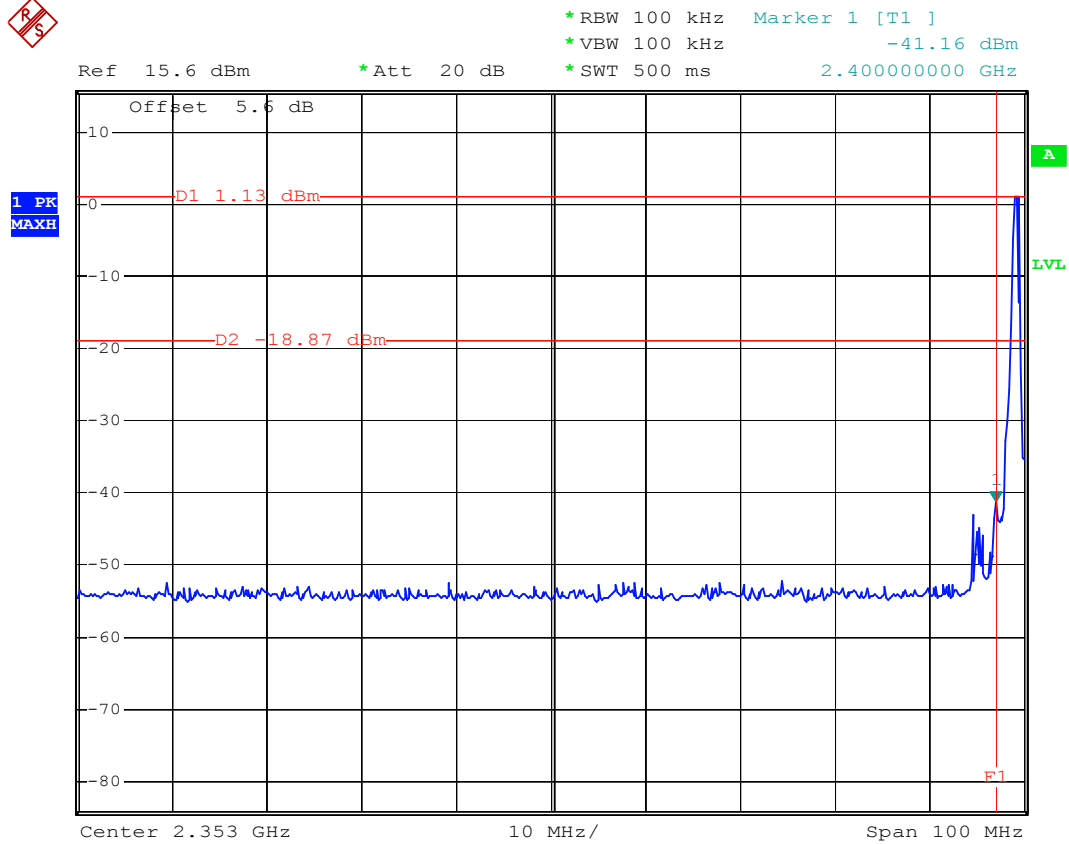
CH78 (Vertical)

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
2483.50	59.33	-14.67	74.00	59.58	30.41	35.19	4.52	Peak
2483.50	50.91	-3.09	54.00	51.16	30.41	35.19	4.52	Average



5.7.5 Frequency Band Edge

Mode 1: CH00 (2402 MHz)



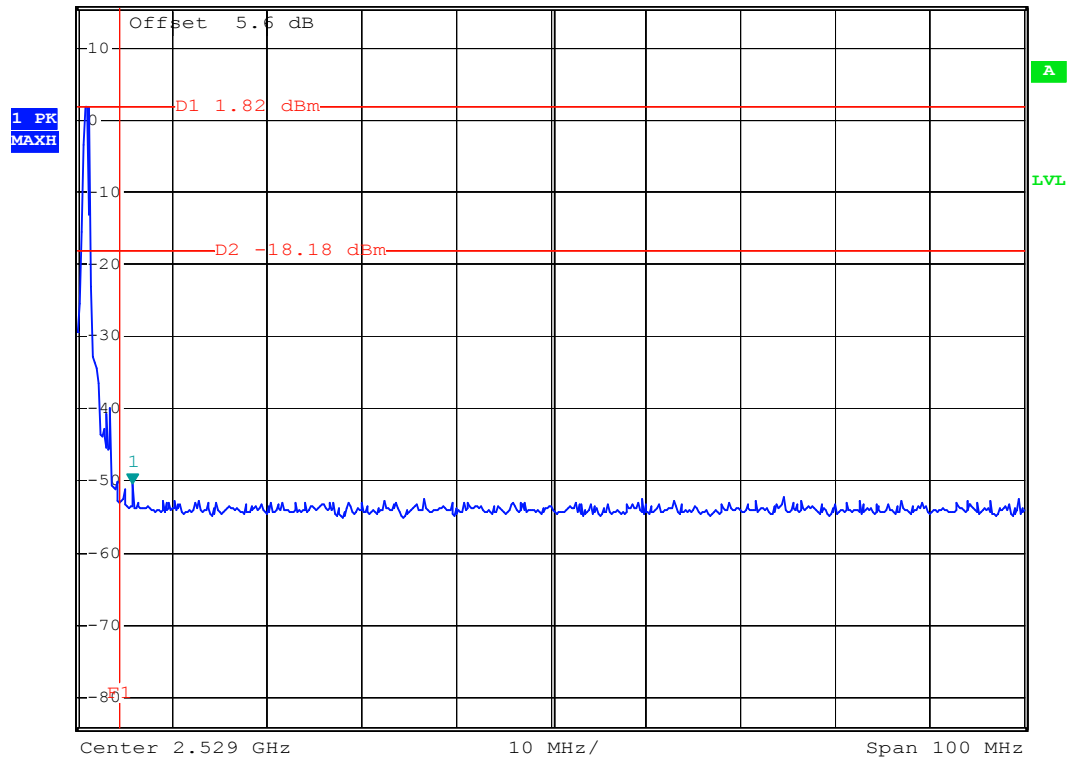
Date: 21.FEB.2005 10:25:00



Mode 3: CH78 (2480 MHz)



Ref 15.6 dBm *Att 20 dB *RBW 100 kHz Marker 1 [T1]
*VBW 100 kHz -50.46 dBm
*SWT 500 ms 2.484700000 GHz



Date: 21.FEB.2005 10:40:10

5.8 Conducted Emission

5.8.1 Measuring Instruments

As described in chapter 6 of this test Report.

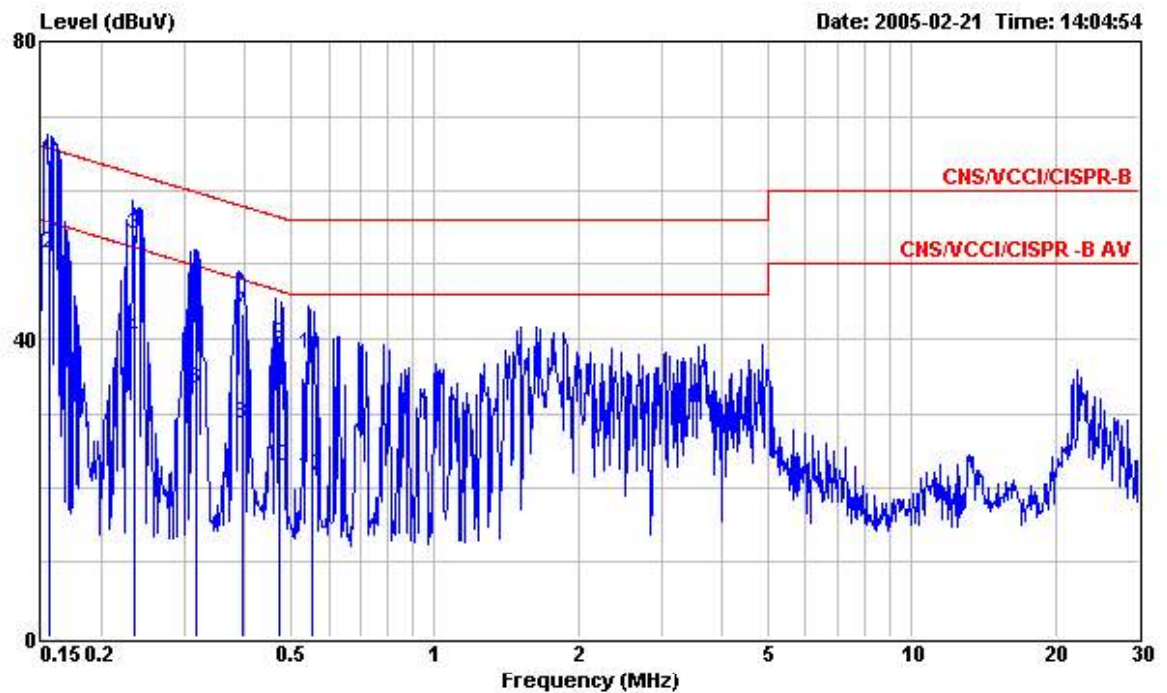
5.8.2 Test Procedures :

- 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 Data

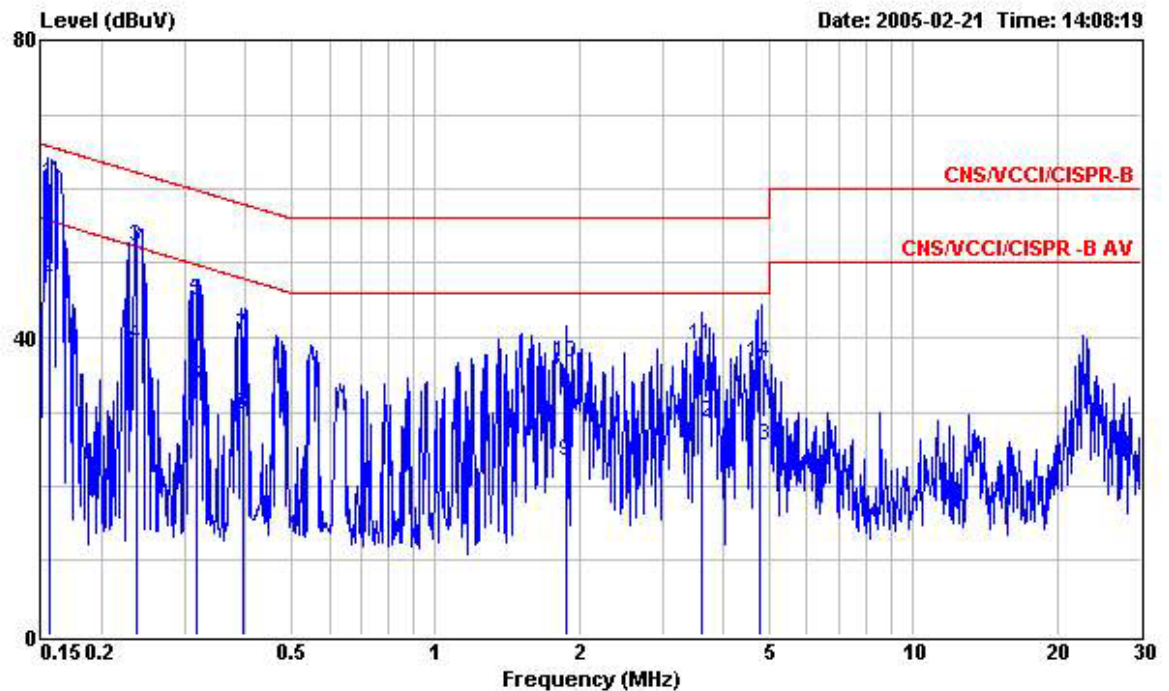
- Temperature : 24 °C
- Relating Humidity : 47 %
- Test Enginner : Jay
- Test Mode : Mode 1

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



Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 LINE
 EUT : GSM Tri Band Smart Phone
 Power : 120V 60Hz
 Model : FD511807
 Memo : PCS Idle+MP3 Play
 Memo : Blooths on

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.155	64.04	-1.69	65.73	63.91	0.10	0.03	QP
2	0.155	51.53	-4.20	55.73	51.40	0.10	0.03	Average
3	0.236	54.07	-8.18	62.25	53.94	0.10	0.03	QP
4	0.236	40.10	-12.15	52.25	39.97	0.10	0.03	Average
5	0.316	47.27	-12.53	59.80	47.15	0.10	0.02	QP
6	0.316	33.14	-16.66	49.80	33.02	0.10	0.02	Average
7	0.397	43.26	-14.66	57.92	43.15	0.10	0.01	QP
8	0.397	28.54	-19.38	47.92	28.43	0.10	0.01	Average
9	0.474	39.30	-17.14	56.44	39.18	0.10	0.02	QP
10	0.474	22.83	-23.61	46.44	22.71	0.10	0.02	Average
11	0.554	38.01	-17.99	56.00	37.89	0.10	0.02	QP
12	0.554	21.45	-24.55	46.00	21.33	0.10	0.02	Average



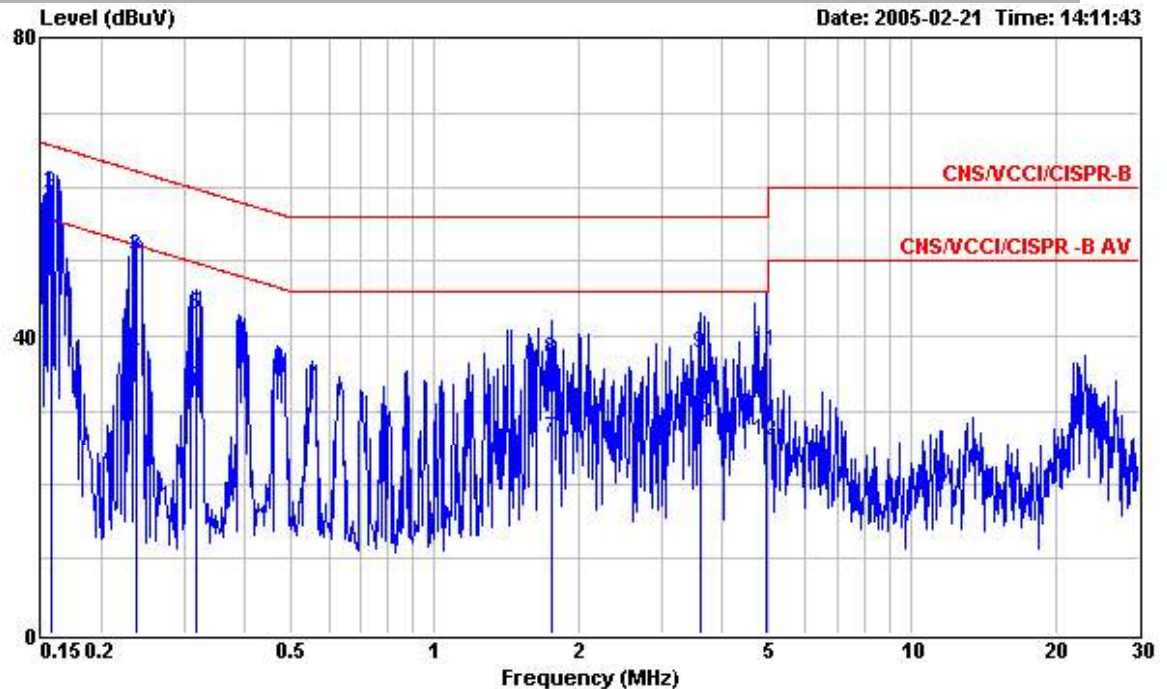
Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
 EUT : GSM Tri Band Smart Phone
 Power : 120W 60Hz
 Model : FD511807
 Memo : PCS Idle+MP3 Play
 Memo : Bluetooth on

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.156	60.89	-4.80	65.69	60.76	0.10	0.03	QP
2	0.156	48.05	-7.64	55.69	47.92	0.10	0.03	Average
3	0.236	52.16	-10.07	62.23	52.03	0.10	0.03	QP
4	0.236	38.89	-13.34	52.23	38.76	0.10	0.03	Average
5	0.315	44.94	-14.90	59.84	44.82	0.10	0.02	QP
6	0.315	33.38	-16.46	49.84	33.26	0.10	0.02	Average
7	0.394	40.30	-17.68	57.98	40.19	0.10	0.01	QP
8	0.394	29.61	-18.37	47.98	29.50	0.10	0.01	Average
9	1.877	23.49	-22.51	46.00	23.36	0.10	0.03	Average
10	1.877	36.62	-19.38	56.00	36.49	0.10	0.03	QP
11	3.600	39.07	-16.93	56.00	38.86	0.18	0.03	QP
12	3.600	28.45	-17.55	46.00	28.24	0.18	0.03	Average
13	4.760	25.36	-20.64	46.00	25.12	0.20	0.04	Average
14	4.760	36.58	-19.42	56.00	36.34	0.20	0.04	QP

5.8.4 Test Data

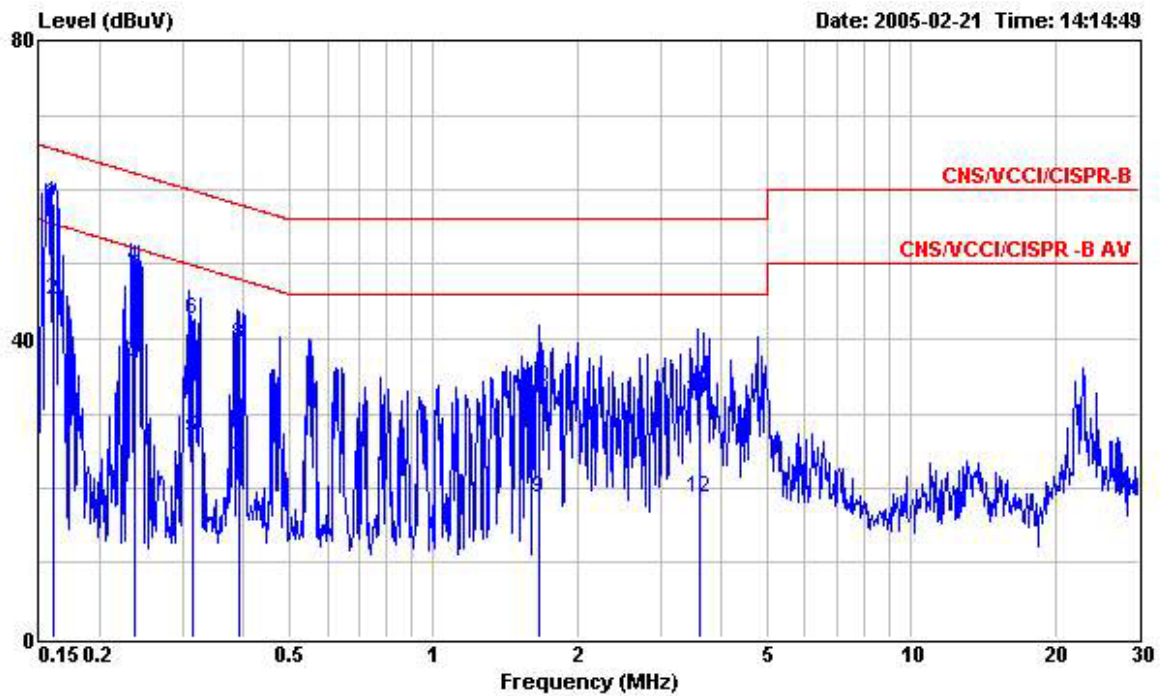
- Temperature : 24 °C
- Relating Humidity : 47 %
- Test Enginner : Jay
- Test Mode : Mode 2

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



Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 LINE
 EUT : GSM Tri Band Smart Phone
 Power : 120V 60Hz
 Model : FD511807
 Memo : PCS Idle+Camera On
 Memo : Blooths on

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.157	47.18	-8.46	55.64	47.05	0.10	0.03	Average
2	0.157	59.32	-6.32	65.64	59.19	0.10	0.03	QP
3	0.236	50.57	-11.67	62.24	50.44	0.10	0.03	QP
4	0.236	37.34	-14.90	52.24	37.21	0.10	0.03	Average
5	0.317	42.97	-16.82	59.79	42.85	0.10	0.02	QP
6	0.317	32.94	-16.85	49.79	32.82	0.10	0.02	Average
7	1.753	26.27	-19.73	46.00	26.14	0.10	0.03	Average
8	1.753	36.92	-19.08	56.00	36.79	0.10	0.03	QP
9	3.620	37.61	-18.39	56.00	37.48	0.10	0.03	QP
10	3.620	28.24	-17.76	46.00	28.11	0.10	0.03	Average
11	4.955	37.94	-18.06	56.00	37.78	0.12	0.04	QP
12	4.955	25.88	-20.12	46.00	25.72	0.12	0.04	Average



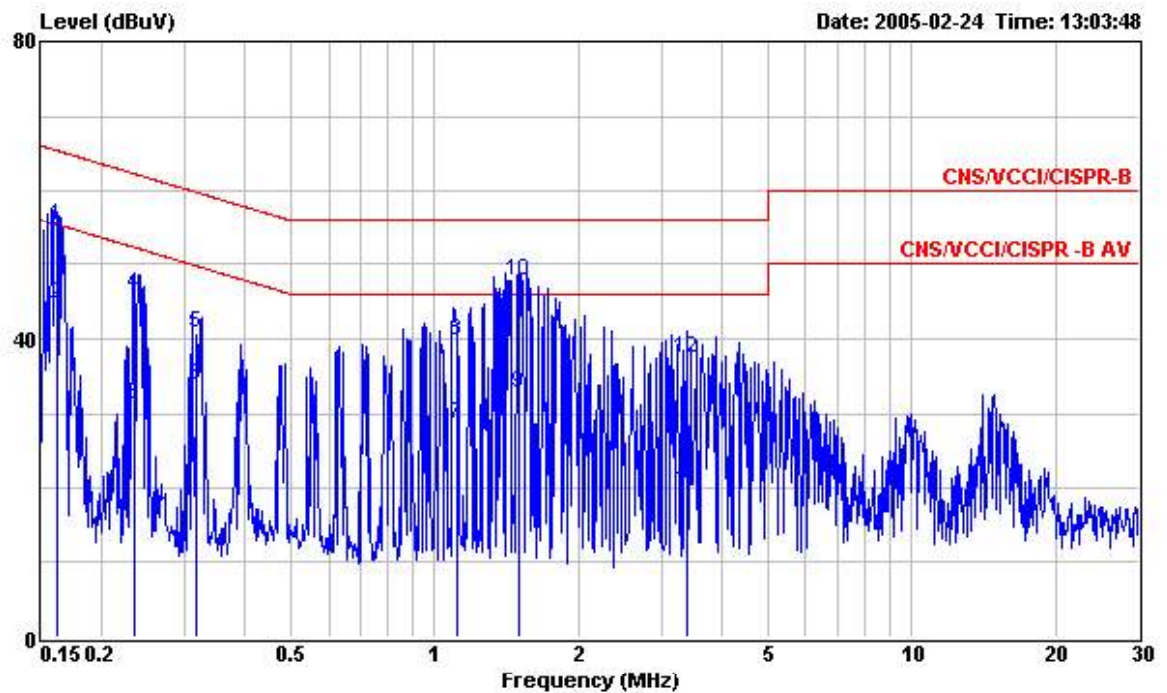
Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
 EUT : GSM Tri Band Smart Phone
 Power : 120V 60Hz
 Model : FD511807
 Memo : PCS Idle+Camera On
 Memo : Blooths on

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.161	58.16	-7.27	65.43	58.03	0.10	0.03	QP
2	0.161	45.30	-10.13	55.43	45.17	0.10	0.03	Average
3	0.238	36.78	-15.40	52.18	36.65	0.10	0.03	Average
4	0.238	49.56	-12.62	62.18	49.43	0.10	0.03	QP
5	0.313	26.87	-23.01	49.88	26.75	0.10	0.02	Average
6	0.313	42.70	-17.18	59.88	42.58	0.10	0.02	QP
7	0.394	22.57	-25.42	47.99	22.46	0.10	0.01	Average
8	0.394	39.27	-18.72	57.99	39.16	0.10	0.01	QP
9	1.670	18.82	-27.18	46.00	18.69	0.10	0.03	Average
10	1.670	33.60	-22.40	56.00	33.47	0.10	0.03	QP
11	3.615	32.07	-23.93	56.00	31.85	0.19	0.03	QP
12	3.615	18.82	-27.18	46.00	18.60	0.19	0.03	Average

5.8.5 Test Data

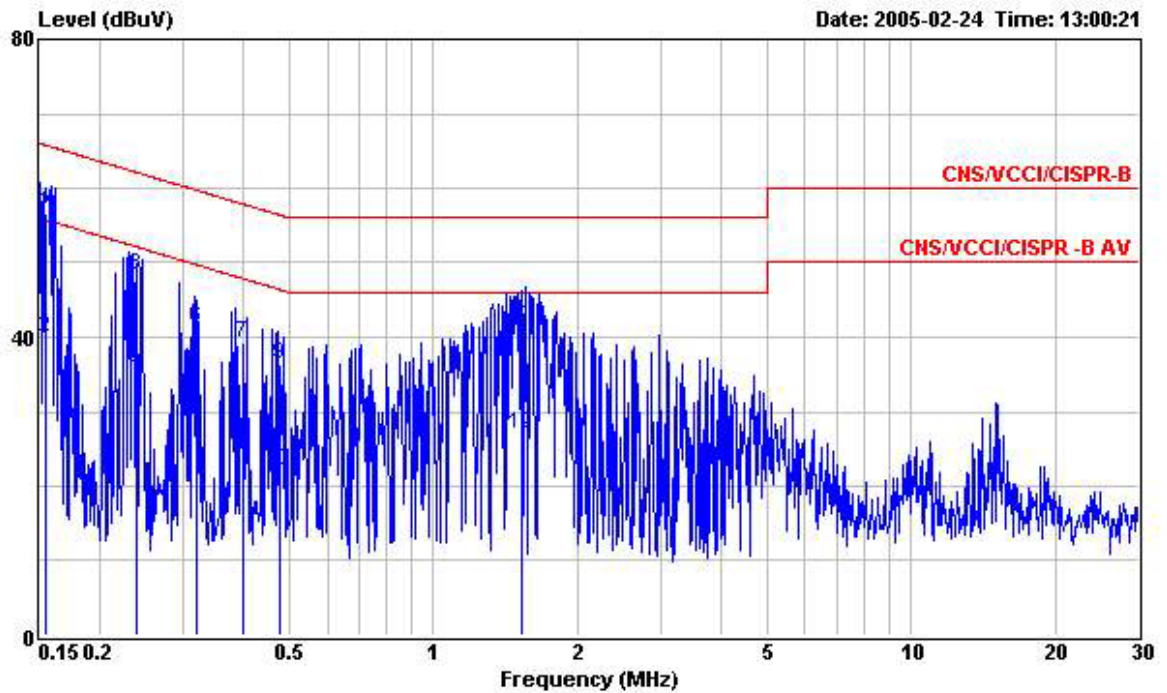
- Temperature : 24 °C
- Relating Humidity : 47 %
- Test Enginner : Jay
- Test Mode : Mode 3

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



Site : CO01-HY
Condition : CNS/VCCI/CISPR-B 2003 2001/008 LINE
EUT : GSM Tri Band Smart Phone
Power : 120V 60Hz
Model : FD511807
Memo : PCS Idle + USB Link
Memo :

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.161	55.23	-10.18	65.41	55.10	0.10	0.03	QP
2	0.161	44.67	-10.74	55.41	44.54	0.10	0.03	Average
3	0.236	31.10	-21.15	52.25	30.97	0.10	0.03	Average
4	0.236	45.93	-16.32	62.25	45.80	0.10	0.03	QP
5	0.318	40.79	-18.98	59.77	40.67	0.10	0.02	QP
6	0.318	33.89	-15.88	49.77	33.77	0.10	0.02	Average
7	1.113	28.55	-17.45	46.00	28.41	0.10	0.04	Average
8	1.113	39.69	-16.31	56.00	39.55	0.10	0.04	QP
9	1.500	32.73	-13.27	46.00	32.60	0.10	0.03	Average
10	1.500	47.66	-8.34	56.00	47.53	0.10	0.03	QP
11	3.380	19.44	-26.56	46.00	19.31	0.10	0.03	Average
12	3.380	37.51	-18.49	56.00	37.38	0.10	0.03	QP



Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
 EUT : GSM Tri Band Smart Phone
 Power : 120V 60Hz
 Model : FD511807
 Memo : PCS Idle + USB Link
 Memo :

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.155	56.52	-9.22	65.74	56.39	0.10	0.03	QP
2	0.155	40.11	-15.63	55.74	39.98	0.10	0.03	Average
3	0.240	48.42	-13.68	62.10	48.29	0.10	0.03	QP
4	0.240	35.26	-16.84	52.10	35.13	0.10	0.03	Average
5	0.319	29.27	-20.47	49.74	29.15	0.10	0.02	Average
6	0.319	41.22	-18.52	59.74	41.10	0.10	0.02	QP
7	0.400	39.25	-18.60	57.85	39.14	0.10	0.01	QP
8	0.400	26.15	-21.70	47.85	26.04	0.10	0.01	Average
9	0.478	36.25	-20.12	56.37	36.13	0.10	0.02	QP
10	0.478	22.01	-24.36	46.37	21.89	0.10	0.02	Average
11	1.523	41.55	-14.45	56.00	41.42	0.10	0.03	QP
12	1.523	27.03	-18.97	46.00	26.90	0.10	0.03	Average



5.9 Radiated Emission Measurement

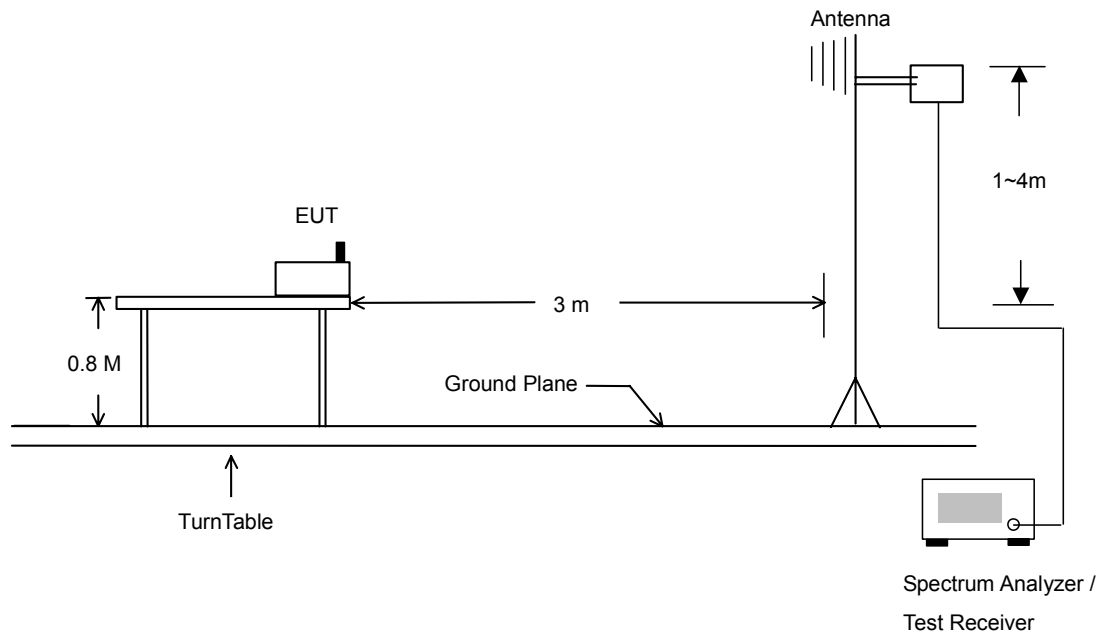
5.9.1 Measuring Instruments

As described in chapter 6 of this Report.

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. 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.

5.9.3 Typical Test Setup Layout of Radiated Emission



5.9.4 Test Data

- Temperature : 20 °C
- Relating Humidity : 54 %
- Test Enginner : Jay
- Test Mode : Mode 1
- Polarization : Horizontal

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

	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	2348.00	46.26	-27.74	74.00	46.47	30.52	35.12	4.37	Peak	---	---
2	2348.00	34.02	-19.98	54.00	34.24	30.52	35.12	4.37	Average	100	97
3 @	2400.00	77.98			78.21	30.48	35.14	4.43	Average	100	97
4 X	2400.00	92.26			92.49	30.48	35.14	4.43	Peak	---	---
5	2498.00	45.73	-28.27	74.00	45.98	30.40	35.20	4.55	Peak	---	---
6	2498.00	33.90	-20.10	54.00	34.15	30.40	35.20	4.55	Average	100	97

Remark: #3 and #4 Fundamental Signal

- Test Mode : Mode 1
- 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	1384.00	47.24	-26.76	74.00	53.34	26.07	35.36	3.20	Peak	---	---
2	2390.00	46.69	-27.31	74.00	46.92	30.48	35.14	4.43	Peak	---	---
3	2390.00	33.76	-20.24	54.00	33.99	30.48	35.14	4.43	Average	220	218
4 X	2400.00	97.27			97.50	30.48	35.14	4.43	Peak	---	---
5 X	2400.00	77.69			77.92	30.48	35.14	4.43	Average	220	218
6	2498.00	45.73	-28.27	74.00	45.98	30.40	35.20	4.55	Peak	---	---
7	2498.00	33.79	-20.21	54.00	34.04	30.40	35.20	4.55	Average	220	218

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	47.28	19.73	-20.27	40.00	40.26	11.02	32.40	0.84	Peak	---	---
2	133.14	22.06	-21.44	43.50	41.29	11.45	32.21	1.53	Peak	---	---
3	198.48	19.65	-23.85	43.50	40.01	9.89	32.07	1.82	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	600.30	29.03	-16.97	46.00	38.67	17.94	31.30	3.72	Peak	---	---
2	959.40	30.49	-15.51	46.00	34.84	21.73	30.89	4.81	Peak	---	---
3	1000.00	31.38	-22.62	54.00	34.48	22.97	31.07	5.00	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	2084.00	49.99	-24.01	74.00	50.16	30.73	34.98	4.08	Peak	---	---
2	2368.00	33.66	-20.34	54.00	33.88	30.51	35.13	4.40	Average	198	202
3	2368.00	45.45	-28.55	74.00	45.66	30.51	35.13	4.40	Peak	---	---
4 X	2440.00	97.58			97.83	30.44	35.16	4.46	Peak	---	---
5 @	2440.00	78.79			79.05	30.44	35.16	4.46	Average	198	202
6	2498.00	46.11	-27.89	74.00	46.36	30.40	35.20	4.55	Peak	---	---
7	2498.00	33.76	-20.24	54.00	34.01	30.40	35.20	4.55	Average	198	202

Remark: #4 and #5 Fundamental Signal



- Test Mode : Mode 2
- 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	41.34	31.52	-8.48	40.00	49.26	13.74	32.22	0.74	Peak	---	---
2	68.34	21.72	-18.28	40.00	46.75	6.29	32.34	1.02	Peak	---	---
3	193.89	20.41	-23.09	43.50	40.95	9.68	32.01	1.79	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	593.30	31.01	-14.99	46.00	40.88	18.04	31.24	3.33	Peak	---	---
2	600.30	34.58	-11.42	46.00	44.21	17.94	31.30	3.72	Peak	---	---
3	799.80	31.27	-14.73	46.00	36.35	21.90	31.46	4.48	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	1498.00	46.31	-27.69	74.00	51.58	26.50	35.11	3.34	Peak	---	---
2	2362.00	33.39	-20.61	54.00	33.62	30.51	35.12	4.37	Average	100	230
3	2362.00	46.05	-27.95	74.00	46.28	30.51	35.12	4.37	Peak	---	---
4 X	2440.00	95.12			95.38	30.44	35.16	4.46	Peak	---	---
5 @	2440.00	76.04			76.30	30.44	35.16	4.46	Average	100	230
6	2484.00	45.57	-28.43	74.00	45.83	30.41	35.19	4.52	Peak	---	---
7	2484.00	33.55	-20.45	54.00	33.80	30.41	35.19	4.52	Average	100	230

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	Preamplifier Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	1384.00	47.38	-26.62	74.00	53.48	26.07	35.36	3.20	Peak	---	---
2	2368.00	45.51	-28.49	74.00	45.72	30.51	35.13	4.40	Peak	---	---
3	2368.00	33.38	-20.62	54.00	33.60	30.51	35.13	4.40	Average	200	208
4 X	2478.00	97.93			98.18	30.41	35.19	4.52	Peak	---	---
5 @	2478.00	78.43			78.68	30.41	35.19	4.52	Average	200	208
6 !	2483.50	53.00	-1.00	54.00	53.25	30.41	35.19	4.52	Average	200	208
7	2483.50	64.62	-9.38	74.00	64.87	30.41	35.19	4.52	Peak	---	---

Remark: #4 and #5 Fundamental Signal.

- Test Mode : Mode 3
- 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	1498.00	46.01	-27.99	74.00	51.28	26.50	35.11	3.34	Peak	---	---
2	2364.00	45.60	-28.40	74.00	45.83	30.51	35.12	4.37	Peak	---	---
3	2364.00	33.31	-20.69	54.00	33.54	30.51	35.12	4.37	Average	100	257
4 X	2478.00	91.99			92.24	30.41	35.19	4.52	Peak	---	---
5 @	2478.00	77.06			77.31	30.41	35.19	4.52	Average	100	257
6 !	2483.50	50.91	-3.09	54.00	51.16	30.41	35.19	4.52	Average	100	257
7	2483.50	59.33	-14.67	74.00	59.58	30.41	35.19	4.52	Peak	---	---

Remark: #4 and #5 Fundamental Signal



5.10 Antenna Requirements

5.10.1 Standard Applicable

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

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

5.10.2 Antenna Connected Construction

The antenna used in this product is a PIFA Antenna 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	100132	9 KHz – 2.75 GHz	Jun. 23, 2004	Jun. 23, 2005	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16 Z	2001/008	9 KHz – 30 MHz	May 03, 2004	May 03, 2005	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16 Z	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. 23, 2004	Dec. 23, 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. 22, 2005	Feb. 22, 2006	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	Qual-band	Jan. 12, 2004	Jan. 12, 2006	Base Station
Radio Communication Tester	R&S	CMU200	105934	Qual-band	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 Radiated Emission Evaluation (30MHz ~ 1000MHz)

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.41	Normal(k=2)	0.21
Antenna factor calibration	0.83	Normal(k=2)	0.42
Cable loss calibration	0.25	Normal(k=2)	0.13
Pre Amplifier Gain calibration	0.27	Normal(k=2)	0.14
RCV/SPA specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site imperfection	1.43	Rectangular	0.83
Mismatch Receiver VSWR $\Gamma_1 = 0.20$ Antenna VSWR $\Gamma_2 = 0.23$ Uncertainty = $20\log(1 - \Gamma_1 \Gamma_2)$	+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 Evaluation (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 Uc(y)	2.36				
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	4.72				