

FCC TEST REPORT

for

47 CFR Part 15 Subpart C

Equipment : Wireless USB Adapter
Model No. : SpeedTouch 121g
FCC ID : RSE-ST121GA
Filing Type : Certification
Applicant : Thomson Telecom Belgium
Prins Boudewijnlaan 47,
B-2650 Edegem,
Belgium

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- The data shown in this test report were carried out on May 10, 2005 at Sporton International Inc. LAB.
- Report No.: FR551807-04, Report Version: Rev. 01.



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Report Version: Rev. 01



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History of this test report

Report Issue Date: Sep. 22, 2005

Original Report Issue Date	Description



1. General Description of Equipment under Test

1.1. Applicant

Thomson Telecom Belgium
Prins Boudewijnlaan 47,
B-2650 Edegem,
Belgium

1.2 Manufacturer

Same as 1.1

1.3 Basic Description of Equipment Under Test

Equipment : Wireless USB Adapter
Model Number : SpeedTouch 121g
Trade Name : THOMSON
Power Supply : Powered by USB Interface

1.4 Feature of Equipment under Test

Product Feature & Specification	
1. Modulation Type / Data Rate	DSSS(CCK/DQPSK/DBPSK) / 11, 5.5, 2, 1 Mbps OFDM(64QAM/16QAM/DQPSK/DBPSK) / 54, 48, 36, 24, 18, 12, 9, 6 Mbps
2. Frequency Range	2400 MHz ~ 2483.5 MHz
3. Number of Channels	11 Channels
4. Carrier Frequency of each channel	2412 + (n-1) x 5 MHz; n = 1~11
5. Channel Bandwidth	DSSS: 22MHz OFDM: 20MHz
6. Maximum Output Power to Antenna (Normal condition)	DSSS: 18.68 dBm OFDM: 20.9 dBm
7. Type of Antenna Connector	N/A
8. Antenna Type and Gain	PCB antenna
9. Antenna Gain	2.28 dBi
10. Function Type	Transmitter <input type="checkbox"/> Transceiver <input checked="" type="checkbox"/>
11. Power Rating (DC/AC , Voltage)	DC 5V
12. Duty Cycle	100%
13. Temperature / Humidity Range	0°C to 45°C



2 Test Configuration of Equipment under Test

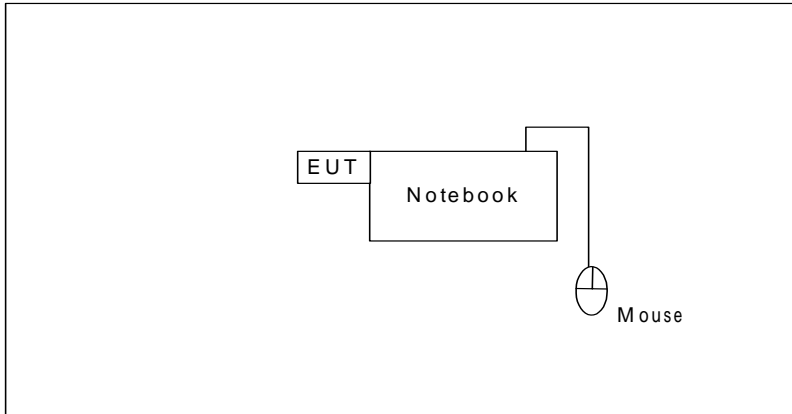
2.1 Test Manner

- 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. DSSS with 11 Mbps data rate and OFDM with 6 Mbps were used for all testings because these data rates will induce worst cases.
- e. Frequency range investigated: conduction 150 kHz to 30 MHz, radiation 30 MHz to 25000MHz.

2.2 Test Mode

Application	DSSS	OFDM
6 dB Bandwidth/ Power Density/ Output Power	Mode 1: Tx Ch01(2412MHz)	Mode 4: Tx Ch01(2412MHz)
	Mode 2: Tx Ch06(2437MHz)	Mode 5: Tx Ch06(2437MHz)
	Mode 3: Tx Ch11(2462MHz)	Mode 6: Tx Ch11(2462MHz)
Bandedge	Model 1: Tx Ch01(2412MHz)	Model 3: Tx Ch01(2412MHz)
	Model 2: Tx Ch11(2462MHz)	Model 4: Tx Ch11(2462MHz)
Conducted Emission	Mode 1: RF Link Mode	

2.3 Connection Diagram of Test System



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. RF Utility

The programmed RF Utility is either installed in EUT or Notebook 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 : 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.

4.6 Test Date

Received Date : May 10, 2005
Tested Date : May 24, 2005



5. Test Data and Test Result

5.1 List of Measurements and Examinations

FCC Rule	Description of Test	Result	Section
15.247(a)(2)	6dB Bandwidth	Pass	5.2
15.247(d)	Power Spectral Density	Pass	5.3
15.247 (c)	100kHz Bandwidth of Frequency Band Edges	Pass	5.4
15.247(b)	Maximum Peak Output Power	Pass	5.5
15.207	Conducted Emission	Pass	5.6
15.209(a)	Radiated Emission	Pass	5.7
15.203 15.247(b)(4)	Antenna Requirement	Pass	5.8

5.2 6dB Bandwidth Measurement

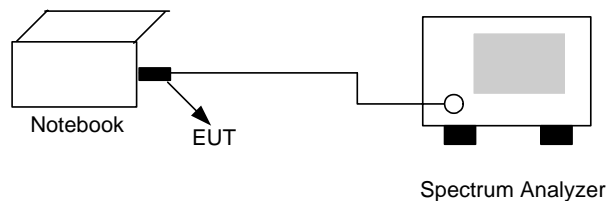
5.2.1 Measuring Instruments :

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 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.

5.2.3 Test Setup Layout :



5.2.4 Test Result :

- Application Type : DSSS
- Temperature : 24°C
- Relative Humidity : 53%
- Test Enginner : Jay

Channel	Frequency (MHz)	6dB Emission bandwidth (MHz)	Limits (MHz)	Plot Ref. No.
01	2412	11.52	0.5	Mode 1
06	2437	11.48	0.5	Mode 2
11	2462	11.12	0.5	Mode 3

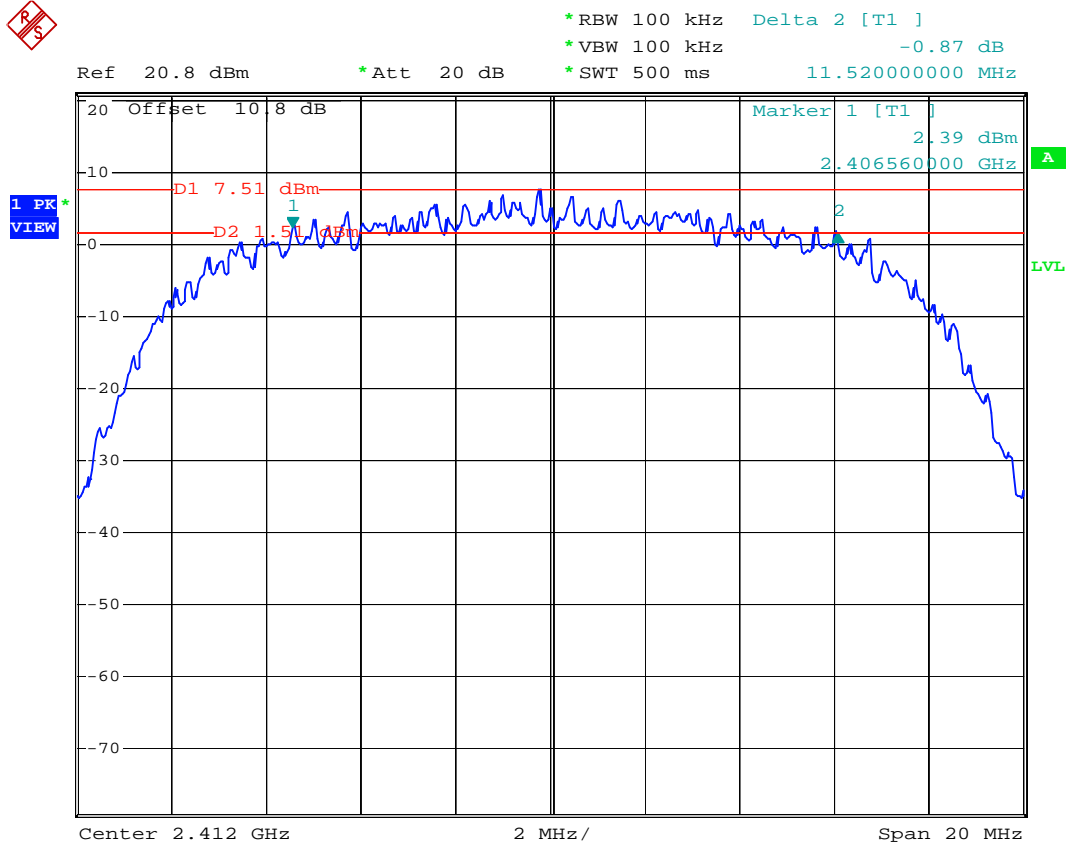
- Application Type : OFDM
- Temperature : 24°C
- Relative Humidity : 53%
- Test Enginner : Jay

Channel	Frequency (MHz)	6dB Emission bandwidth (MHz)	Limits (MHz)	Plot Ref. No.
01	2412	16.40	0.5	Mode 4
06	2437	16.40	0.5	Mode 5
11	2462	16.40	0.5	Mode 6



5.2.5 Test Data

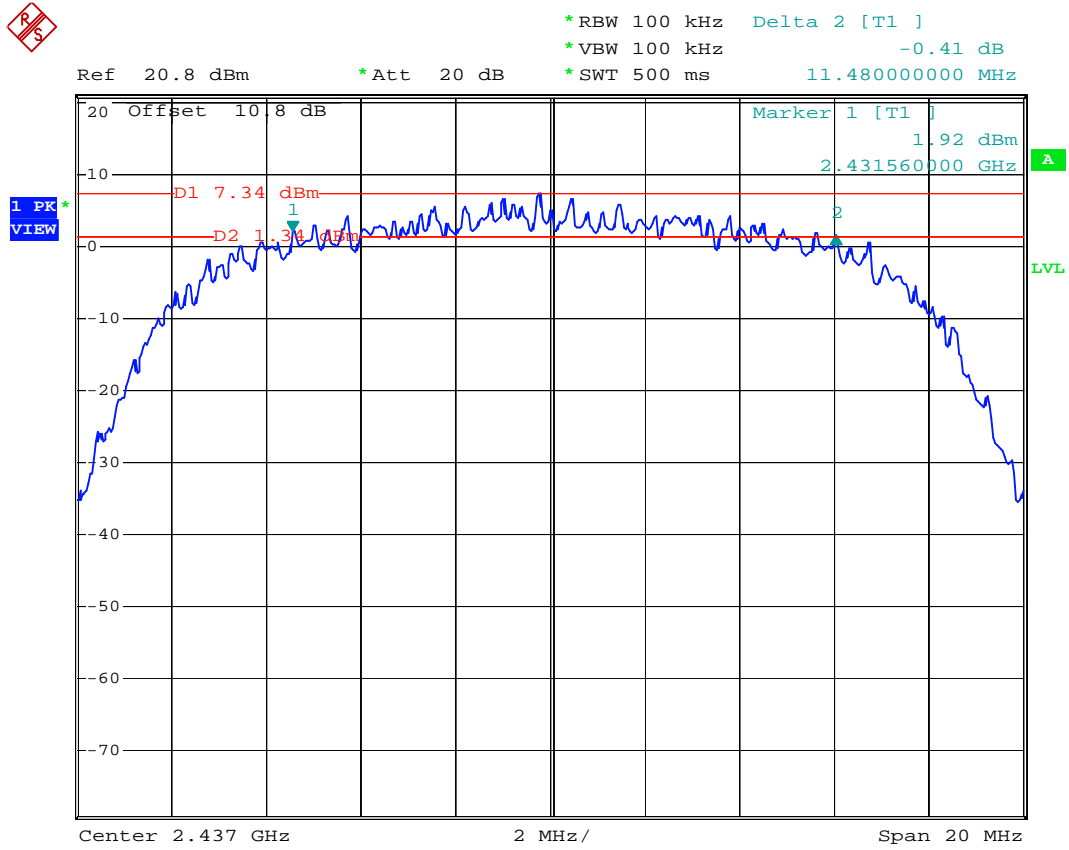
Mode 1 : DSSS Tx CH01 (2412MHz)



Date: 24.MAY.2005 10:16:23



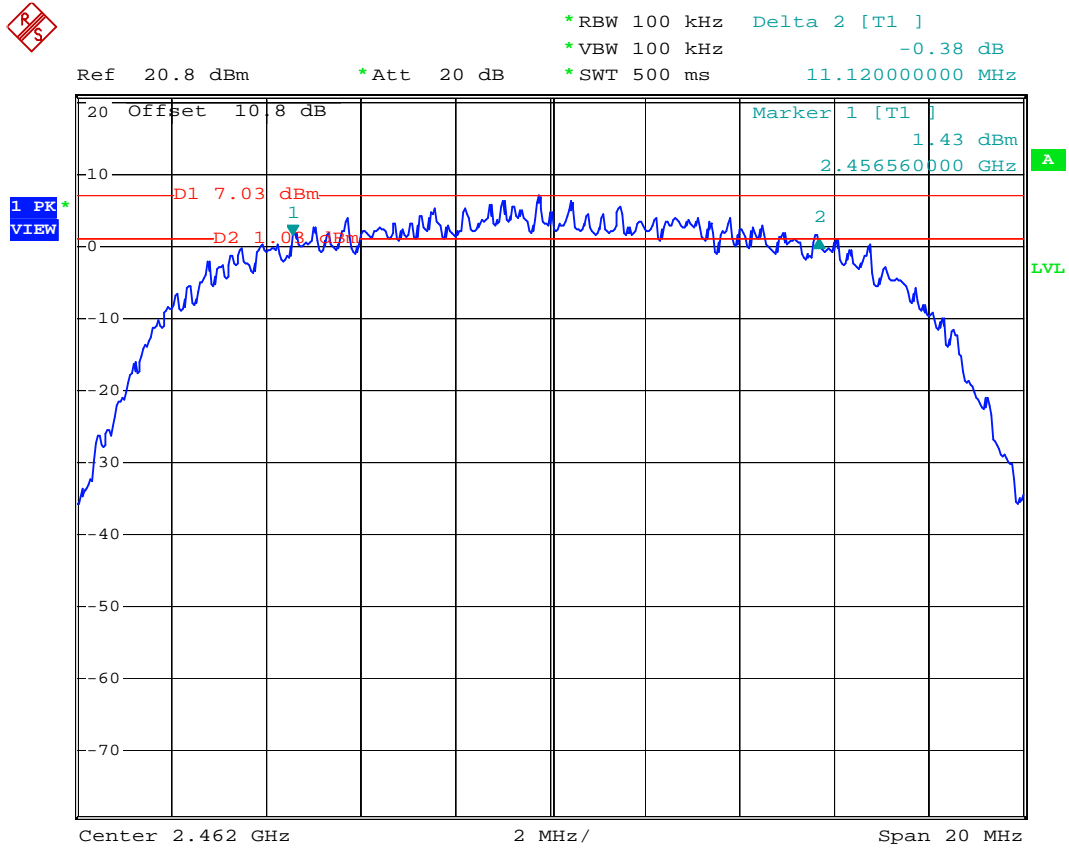
Mode 2 : DSSS Tx CH06 (2437MHz)



Date: 24.MAY.2005 10:20:45



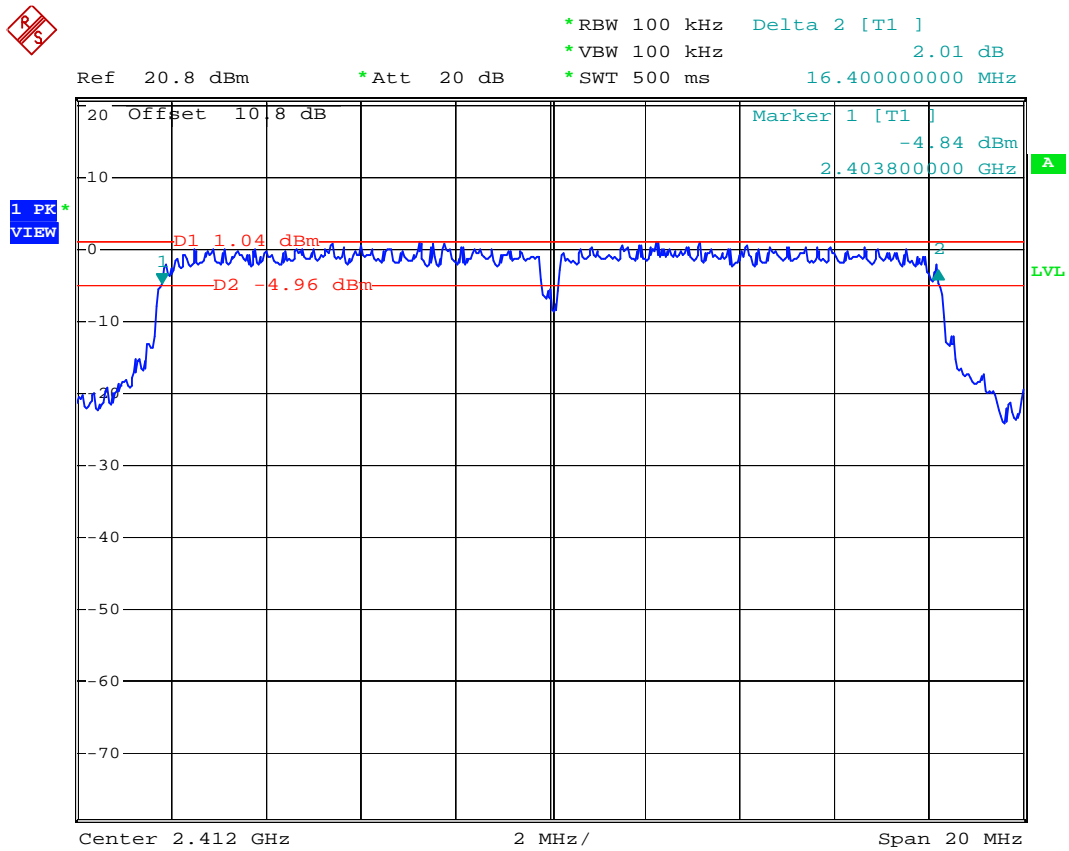
Mode 3 : DSSS Tx CH11(2462MHz)



Date: 24.MAY.2005 10:24:42



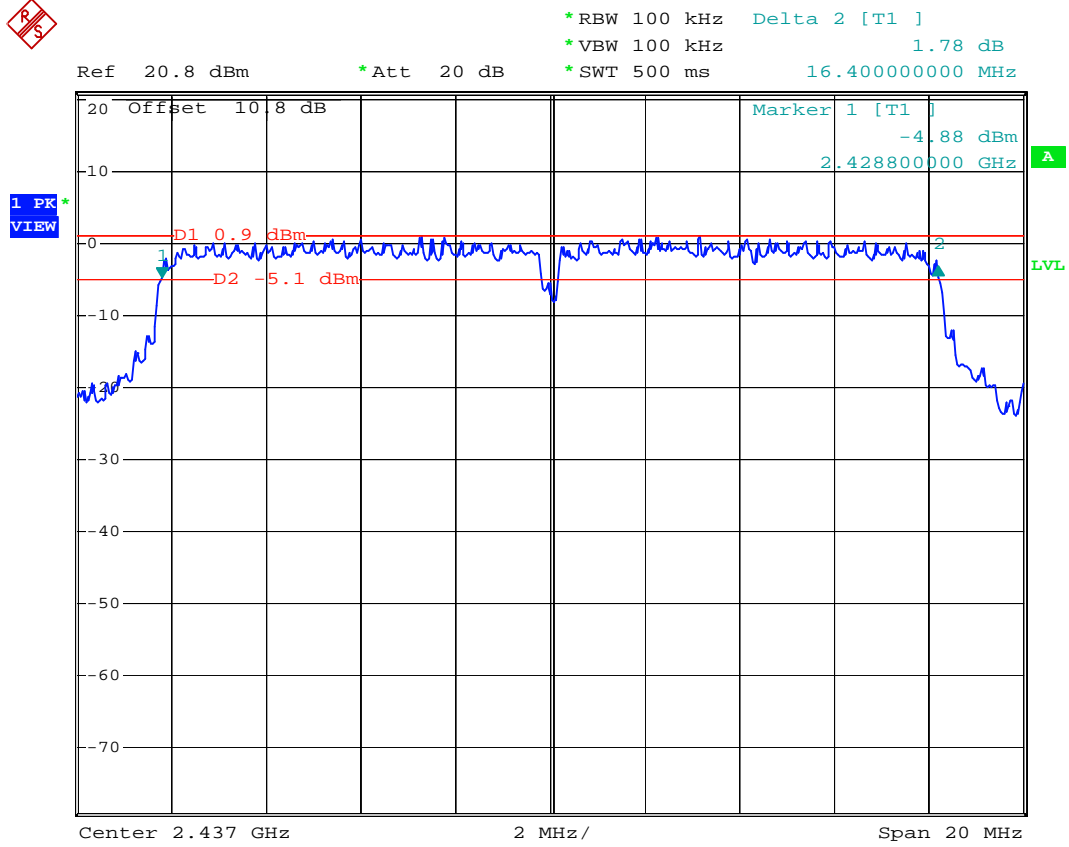
Mode 4 : OFDM Tx CH01 (2412MHz)



Date: 24.MAY.2005 10:29:37



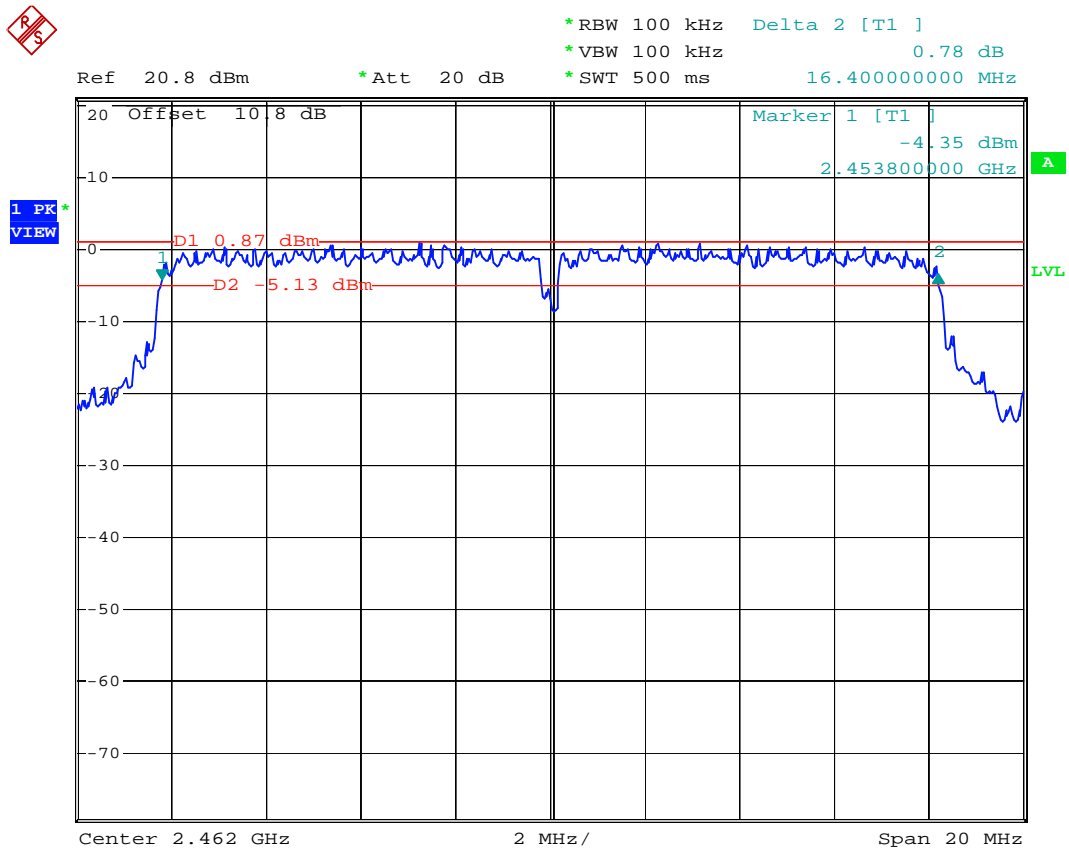
Mode 5 : OFDM Tx CH06 (2437MHz)



Date: 24.MAY.2005 10:31:39



Mode 6 : OFDM Tx CH11 (2462MHz)



Date: 24.MAY.2005 10:34:02

5.3 Power Spectral Density Measurement

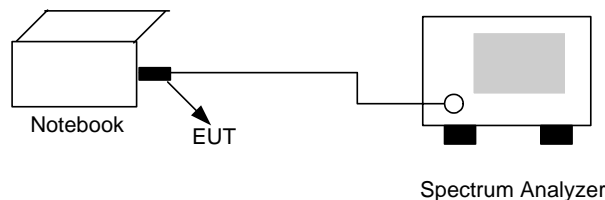
5.3.1 Measuring Instruments :

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 : DSSS
- Temperature : 24°C
- Relative Humidity : 53%
- Test Enginner : Jay

Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)	Plot Ref. No.
01	2412	-6.65	8	Mode 1
06	2437	-6.42	8	Mode 2
11	2462	-6.48	8	Mode 3

- Application Type : OFDM
- Temperature : 24°C
- Relative Humidity : 53%
- Test Enginner : Jay

Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)	Plot Ref. No.
01	2412	-14.13	8	Mode 4
06	2437	-14.20	8	Mode 5
11	2462	-14.21	8	Mode 6



5.3.5 Test Data

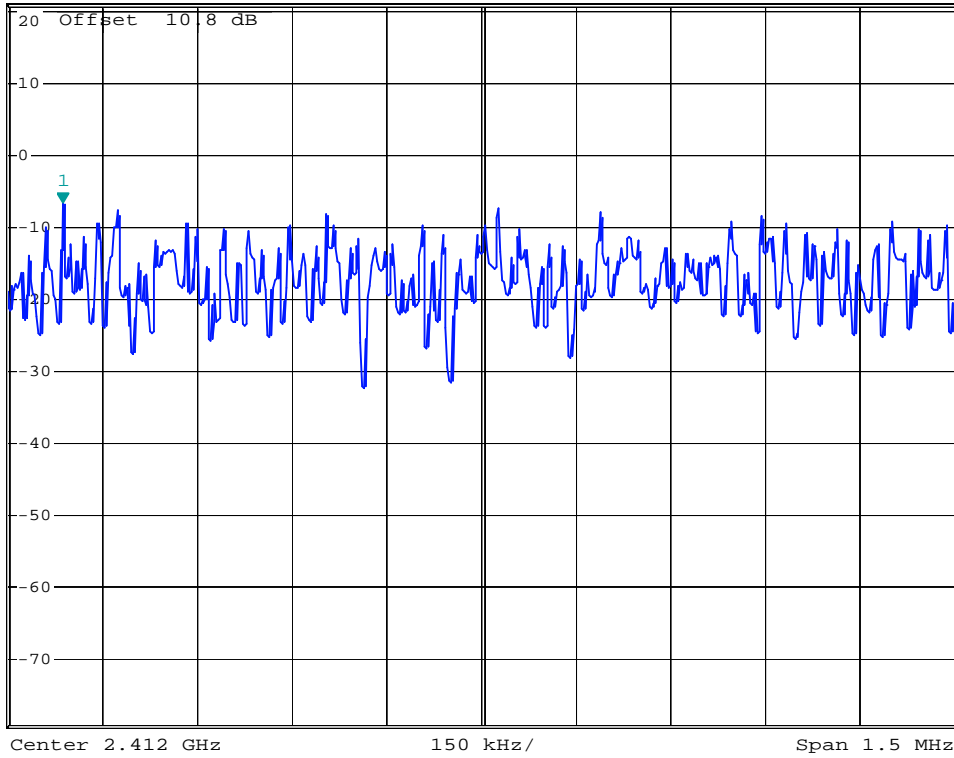
Mode 1 : DSSS Tx CH01(2412MHz)



*RBW 3 kHz Marker 1 [T1]
*VBW 30 kHz -6.65 dBm
*SWT 500 s 2.411337000 GHz

Ref 20.8 dBm

*Att 20 dB



Date: 24.MAY.2005 10:18:50



Mode 2 : DSSS Tx CH06 (2437MHz)

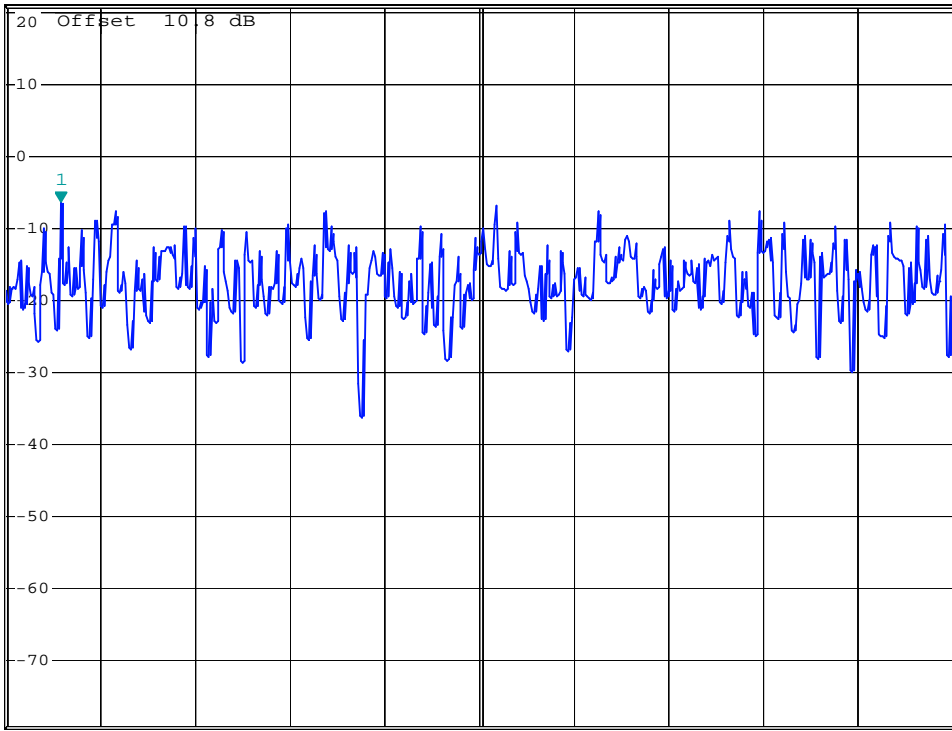


*RBW 3 kHz Marker 1 [T1]
*VBW 30 kHz -6.42 dBm
*SWT 500 s 2.436337000 GHz

Ref 20.8 dBm

*Att 20 dB

1 PK
VIEW



Date: 24.MAY.2005 10:19:52



Mode 3 : DSSS Tx CH11 (2462MHz)

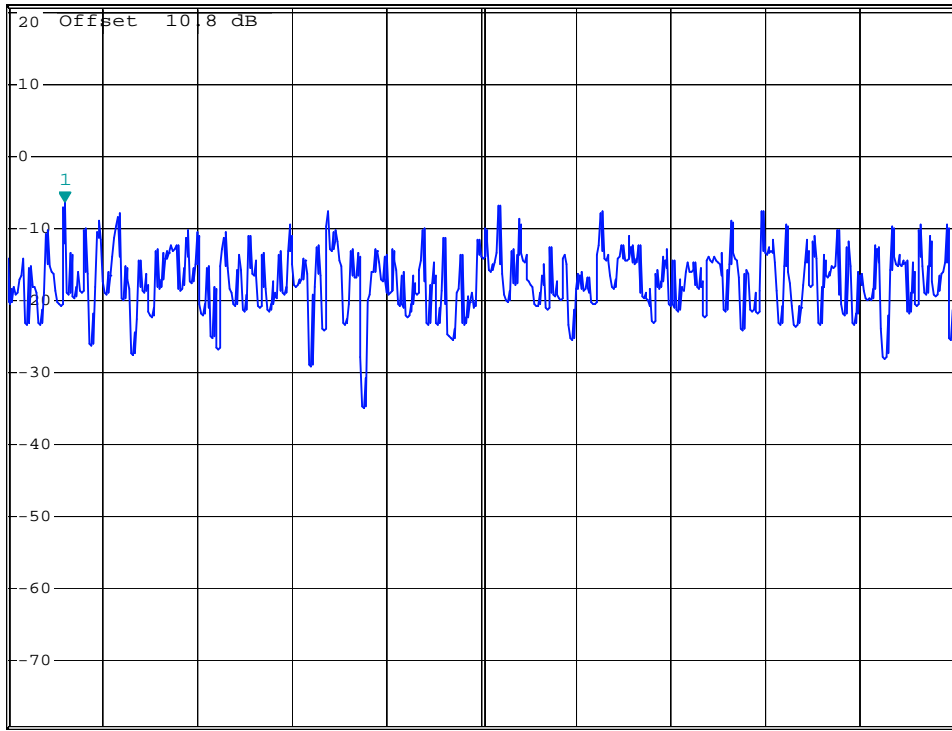


*RBW 3 kHz Marker 1 [T1]
*VBW 30 kHz -6.48 dBm
*SWT 500 s 2.461340000 GHz

Ref 20.8 dBm

*Att 20 dB

1 PK
VIEW



Center 2.462 GHz

150 kHz/

Span 1.5 MHz

Date: 24.MAY.2005 10:26:27



Mode 4 : OFDM Tx CH01(2412MHz)

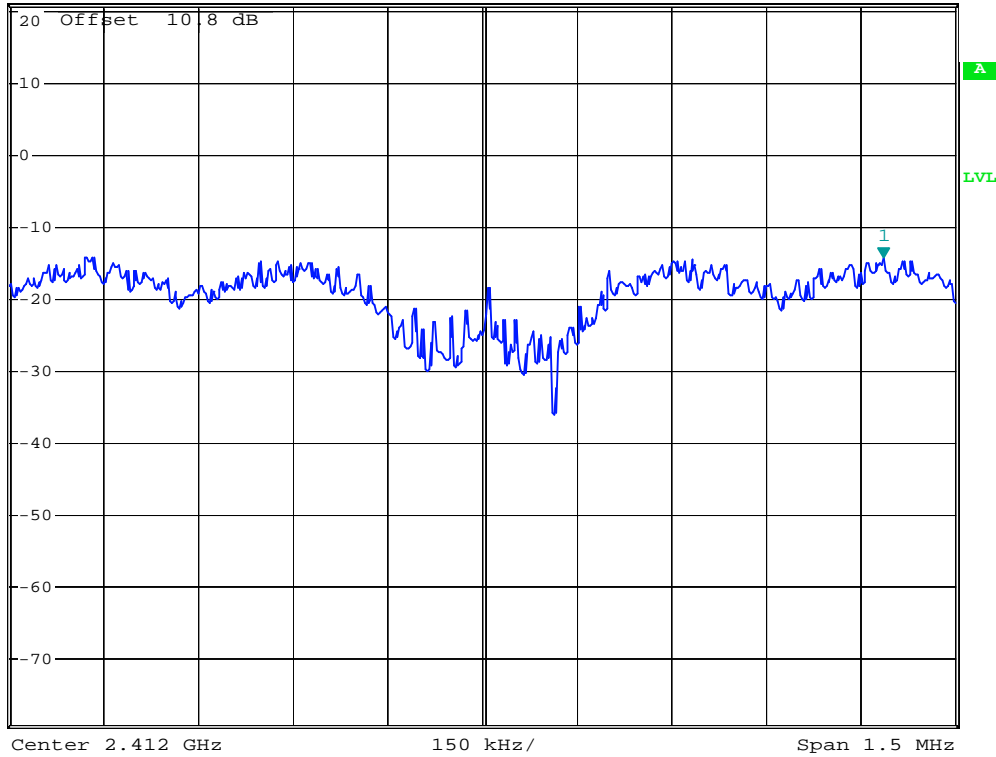


*RBW 3 kHz Marker 1 [T1]
*VBW 30 kHz -14.13 dBm
*SWT 500 s 2.412636000 GHz

Ref 20.8 dBm

*Att 20 dB

1 PK
VIEW



Date: 24.MAY.2005 10:28:13



Mode 5 : OFDM Tx CH06 (2437MHz)

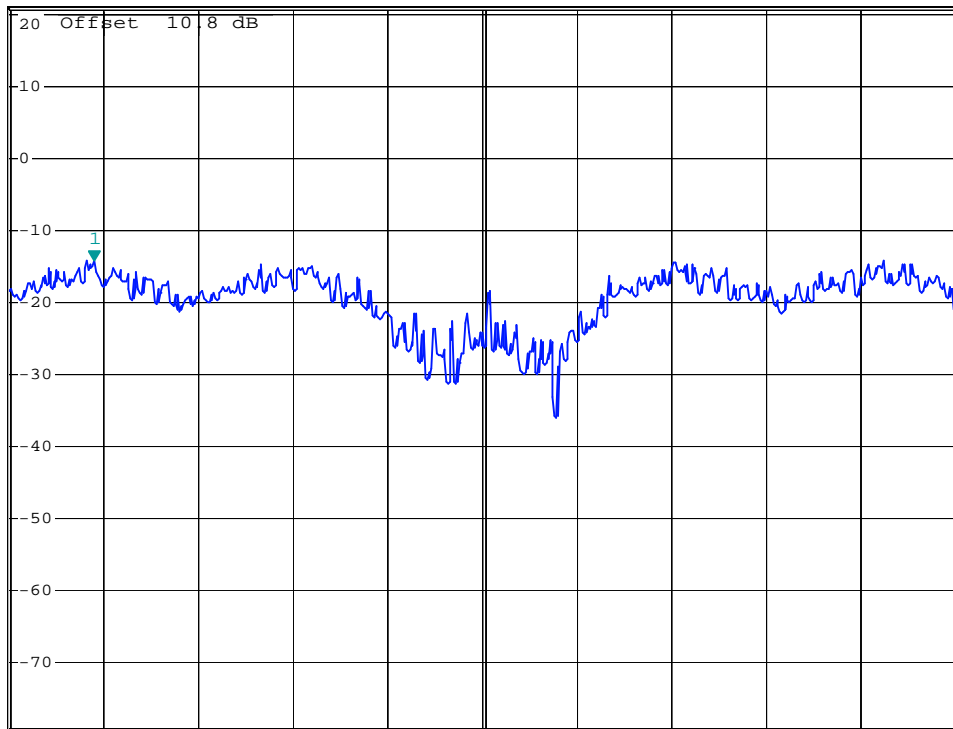


*RBW 3 kHz Marker 1 [T1]
*VBW 30 kHz -14.20 dBm
*SWT 500 s 2.436385000 GHz

Ref 20.8 dBm

*Att 20 dB

1 PK
VIEW



Date: 24.MAY.2005 10:32:20



Mode 6 : OFDM Tx CH11 (2462MHz)

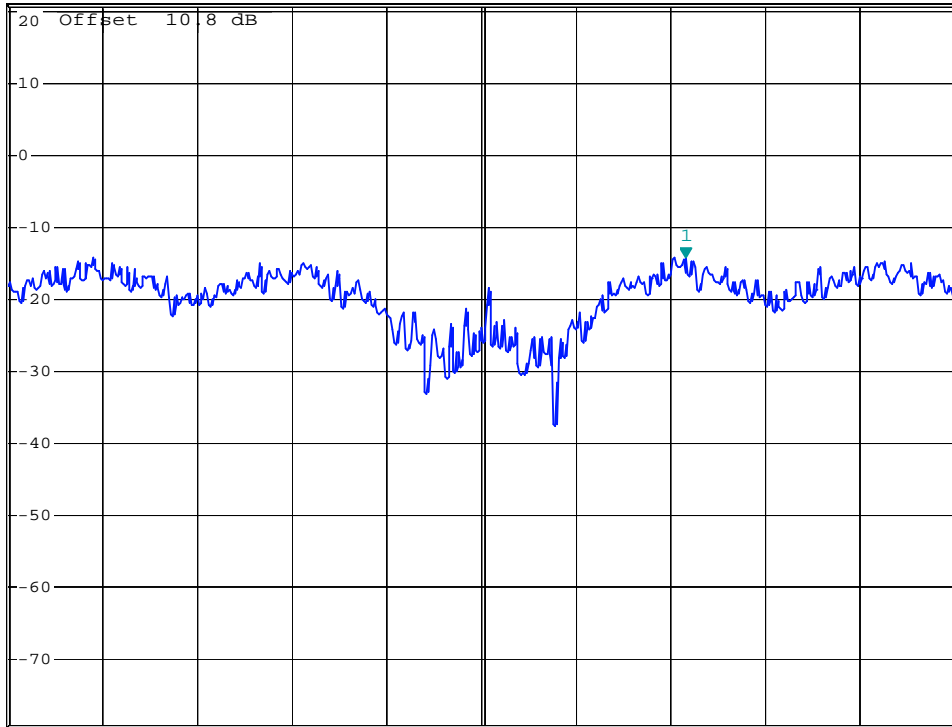


*RBW 3 kHz Marker 1 [T1]
*VBW 30 kHz -14.21 dBm
*SWT 500 s 2.462324000 GHz

Ref 20.8 dBm

*Att 20 dB

1 PK
VIEW



Center 2.462 GHz

150 kHz/

Span 1.5 MHz

Date: 24.MAY.2005 10:33:07



5.4 Band Edges 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 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.

5.4.3 Test Result :

- Application Type : DSSS / OFDM
- Temperature : 24°C
- Relative Humidity : 53%
- Test Enginner : Jay

- Test Result in lower band (Channel 1) : PASS
- Test Result in higher band (Channel 11) : PASS

5.4.4 Note on Band Edge Emission

➤DSSS

CH01 (Horizontal)

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Detect Mode
2390.00	58.17	-15.83	74.00	58.72	30.48	35.46	4.43	Peak
2390.00	45.18	-8.82	54.00	45.72	30.48	35.46	4.43	Average

CH01 (Vertical)

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Detect Mode
2390.00	55.00	-19.00	74.00	55.54	30.48	35.46	4.43	Peak
2390.00	43.02	-10.98	54.00	43.56	30.48	35.46	4.43	Average



CH11 (Horizontal)

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Detect Mode
2498.00	54.17	-19.83	74.00	54.75	30.40	35.53	4.55	Peak
2498.00	43.73	-10.27	54.00	44.31	30.40	35.53	4.55	Average

CH11 (Vertical)

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Detect Mode
2498.00	53.60	-20.40	74.00	54.18	30.40	35.53	4.55	Peak
2498.00	42.34	-11.66	54.00	42.92	30.40	35.53	4.55	Average

➤OFDM

CH01 (Horizontal)

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Detect Mode
2390.00	72.98	-1.02	74.00	73.53	30.48	35.46	4.43	Peak
2390.00	53.74	-0.26	54.00	54.28	30.48	35.46	4.43	Average

CH01 (Vertical)

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Detect Mode
2390.00	71.83	-2.17	74.00	72.37	30.48	35.46	4.43	Peak
2390.00	52.60	-1.430	54.00	53.14	30.48	35.46	4.43	Average

CH11 (Horizontal)

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Detect Mode
2483.50	71.68	-2.32	74.00	72.26	30.41	35.51	4.52	Peak
2483.50	53.79	-0.21	54.00	54.37	30.41	35.51	4.52	Average



CH11 (Vertical)

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Detect Mode
2483.50	65.23	-8.77	74.00	65.81	30.41	35.51	4.52	Peak
2483.50	51.10	-2.90	54.00	51.68	30.41	35.51	4.52	Average

* Remark: The data above can refer to radiated emission in section 5.7.

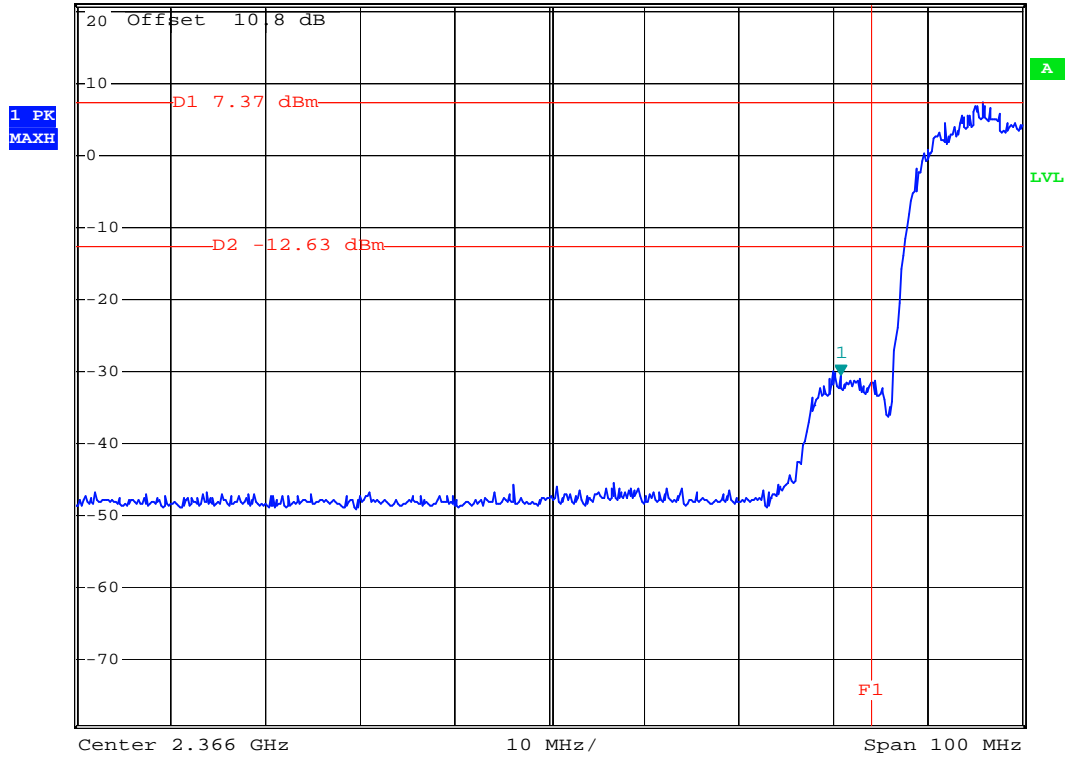


5.4.5 Test Data

DSSS Tx CH01 (2412MHz)



Ref 20.8 dBm *Att 20 dB *RBW 100 kHz Marker 1 [T1] -30.51 dBm
*VBW 100 kHz *SWT 500 ms 2.396800000 GHz



Date: 24.MAY.2005 10:17:50

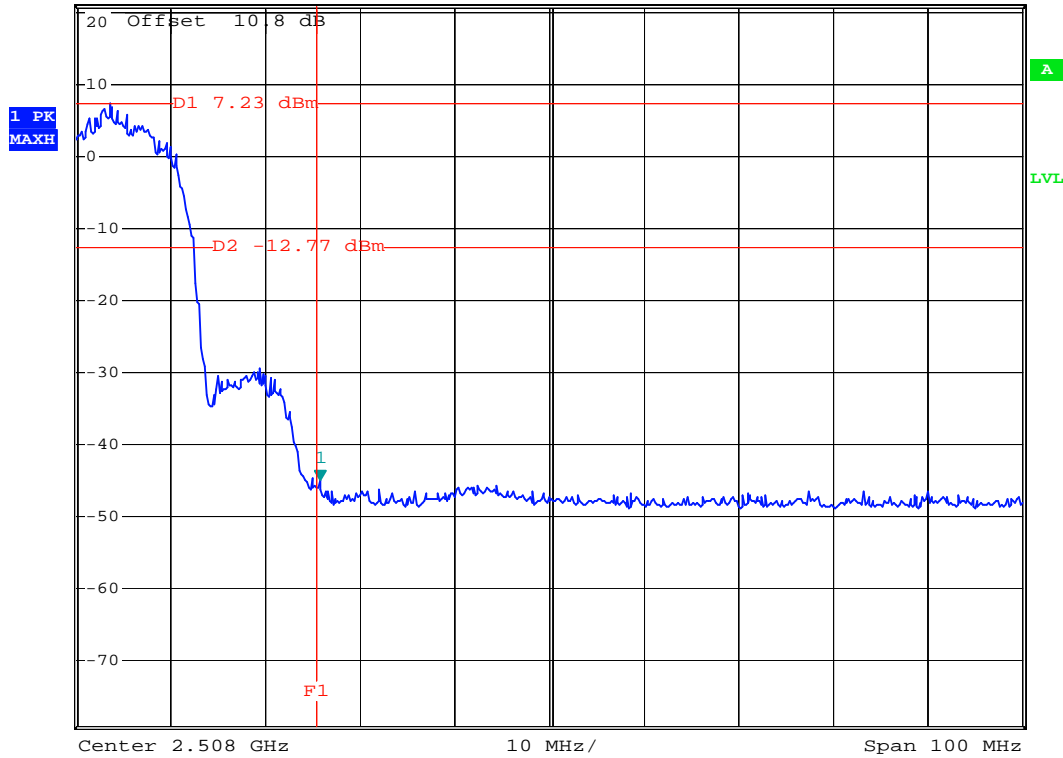


DSSS Tx CH11 (2462MHz)



*RBW 100 kHz Marker 1 [T1]
*VBW 100 kHz -44.86 dBm
*SWT 500 ms 2.483700000 GHz

Ref 20.8 dBm *Att 20 dB



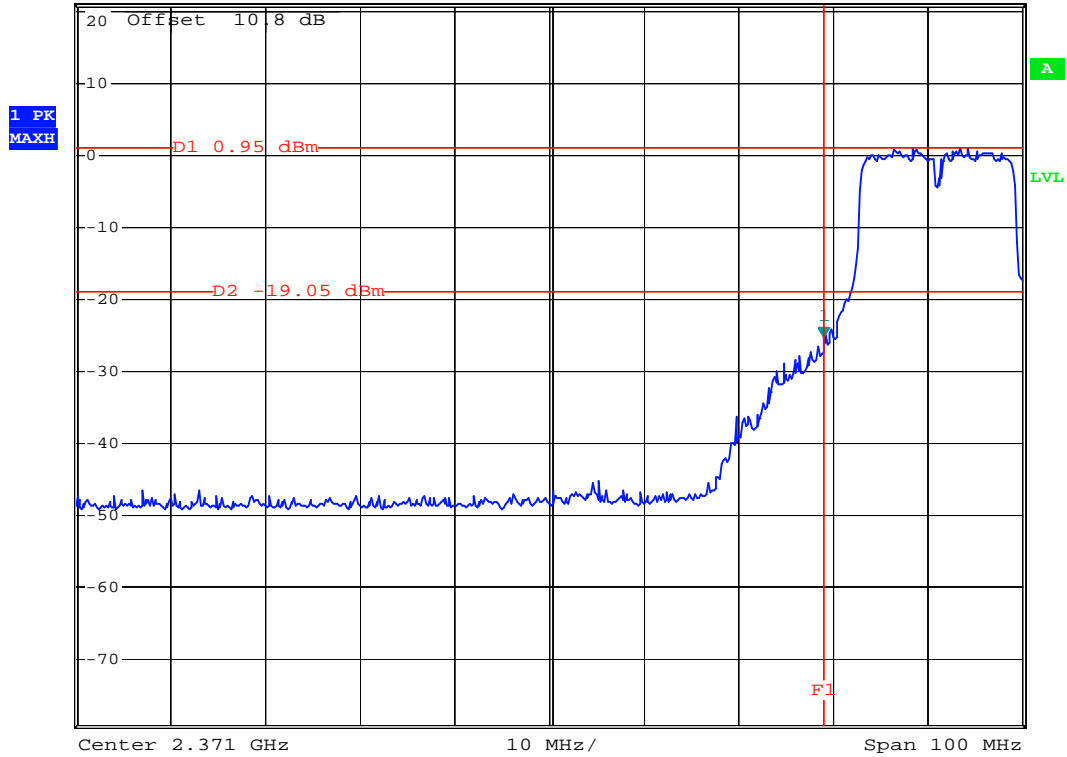
Date: 24.MAY.2005 10:25:56



OFDM Tx CH01 (2412MHz)



Ref 20.8 dBm *Att 20 dB *RBW 100 kHz Marker 1 [T1] -25.37 dBm
*VBW 100 kHz *SWT 500 ms 2.40000000 GHz



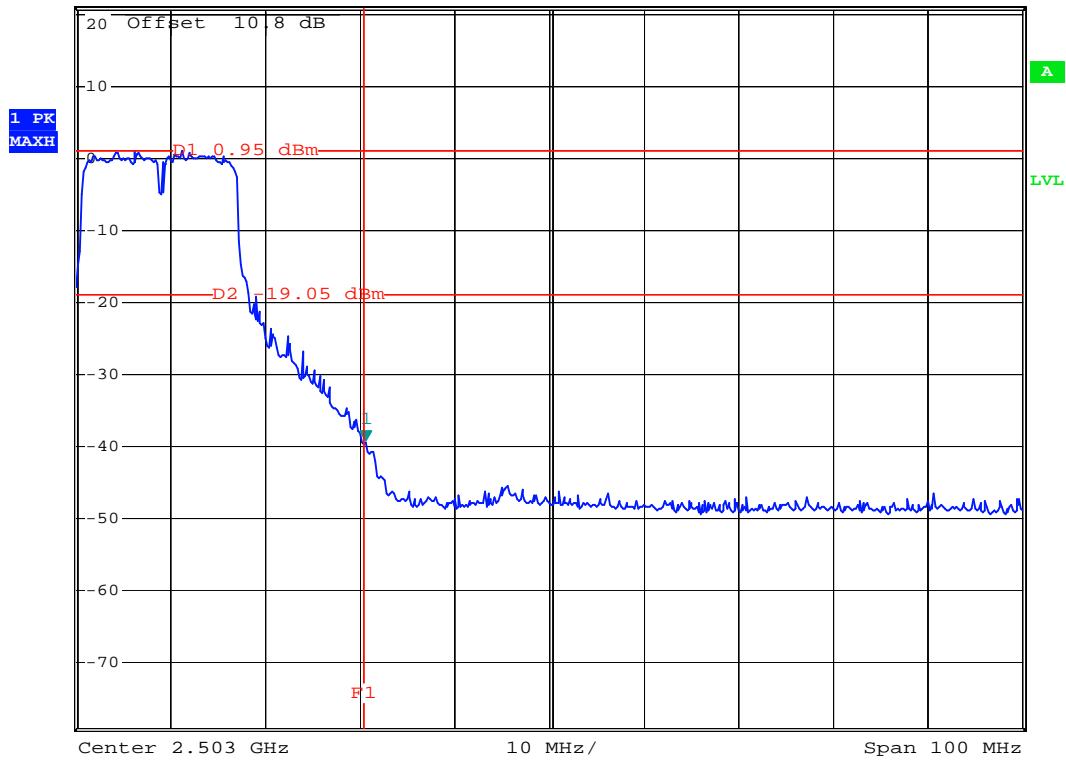
Date: 24.MAY.2005 10:30:29



OFDM Tx CH11 (2462MHz)



Ref 20.8 dBm *Att 20 dB *RBW 100 kHz Marker 1 [T1]
*VBW 100 kHz -39.18 dBm
*SWT 500 ms 2.483500000 GHz



Date: 24.MAY.2005 10:34:44

5.5 Peak Output Power Measurement

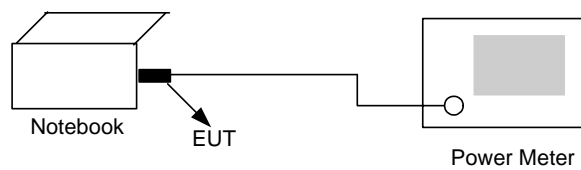
5.5.1 Measuring Instruments :

As described in chapter 6 of this test report.

5.5.2 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.

5.5.3 Test Setup Layout :



5.5.4 Test Result :

- Application Type : DSSS
- Temperature : 24°C
- Relative Humidity : 53%
- Test Enginner : Jay

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (Watt/dBm)
01	2412	18.68	1W/30 dBm
06	2437	18.62	1W/30 dBm
11	2462	18.66	1W/30 dBm

- Application Type : OFDM
- Temperature : 24°C
- Relative Humidity : 53%
- Test Enginner : Jay

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (Watt/dBm)
01	2412	20.67	1W/30 dBm
06	2437	20.9	1W/30 dBm
11	2462	20.89	1W/30 dBm



5.6 Conducted Emission Measurement

5.6.1 Measuring Instruments

As described in chapter 6 of this test Report.

5.6.2 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.

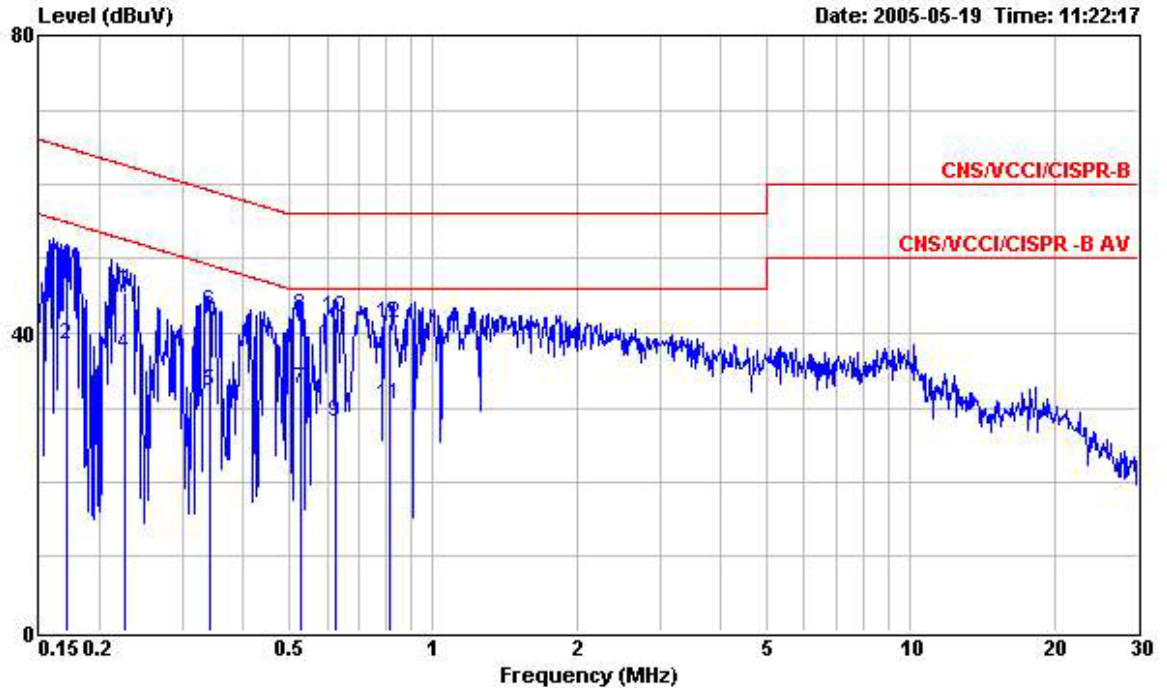


5.6.3 Test Data

5.4.1 Frequency Range of Test : 150kHz to 30 MHz

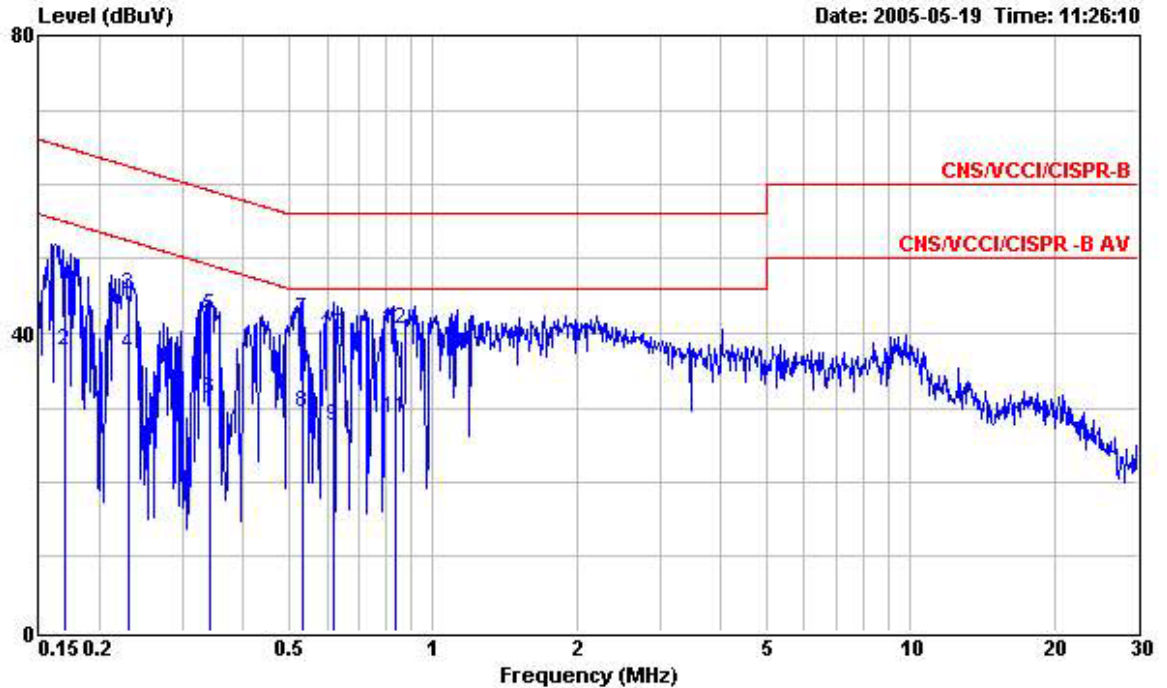
- Test Mode : Mode 1
- Temperature : 24°C
- Relative Humidity : 53%

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 : 11g Wireless USB 2.0 adapter
 Power : 120Vac/50Hz
 Model :
 Memo : RF Link 11g CH06

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.171	48.42	-16.51	64.93	48.31	0.10	0.01	QP
2	0.171	38.57	-16.36	54.93	38.46	0.10	0.01	Average
3	0.226	45.42	-17.18	62.60	45.31	0.10	0.01	QP
4	0.226	37.26	-15.34	52.60	37.15	0.10	0.01	Average
5	0.340	32.28	-16.92	49.20	32.15	0.10	0.03	Average
6	0.340	42.79	-16.41	59.20	42.66	0.10	0.03	QP
7	0.529	32.44	-13.56	46.00	32.31	0.10	0.03	Average
8	0.529	42.41	-13.59	56.00	42.28	0.10	0.03	QP
9	0.626	27.96	-18.04	46.00	27.83	0.10	0.03	Average
10	0.626	42.04	-13.96	56.00	41.91	0.10	0.03	QP
11	0.811	30.35	-15.65	46.00	30.22	0.10	0.03	Average
12	0.811	41.33	-14.67	56.00	41.20	0.10	0.03	QP



Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
 EUT : 11g Wireless USB 2.0 adapter
 Power : 120Vac/60Hz
 Model :
 Memo : RFLink 11g CH06

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.170	47.37	-17.61	64.98	47.26	0.10	0.01	QP
2	0.170	37.56	-17.42	54.98	37.45	0.10	0.01	Average
3	0.230	45.24	-17.21	62.45	45.13	0.10	0.01	QP
4	0.230	37.14	-15.31	52.45	37.03	0.10	0.01	Average
5	0.342	42.47	-16.67	59.14	42.34	0.10	0.03	QP
6	0.342	31.16	-17.98	49.14	31.03	0.10	0.03	Average
7	0.535	41.72	-14.28	56.00	41.59	0.10	0.03	QP
8	0.535	29.32	-16.68	46.00	29.19	0.10	0.03	Average
9	0.619	27.44	-18.56	46.00	27.31	0.10	0.03	Average
10	0.619	39.86	-16.14	56.00	39.73	0.10	0.03	QP
11	0.832	28.57	-17.43	46.00	28.44	0.10	0.03	Average
12	0.832	40.60	-15.40	56.00	40.47	0.10	0.03	QP

Test Engineer : Jay
 Jay

5.7 Radiated Emission Measurement

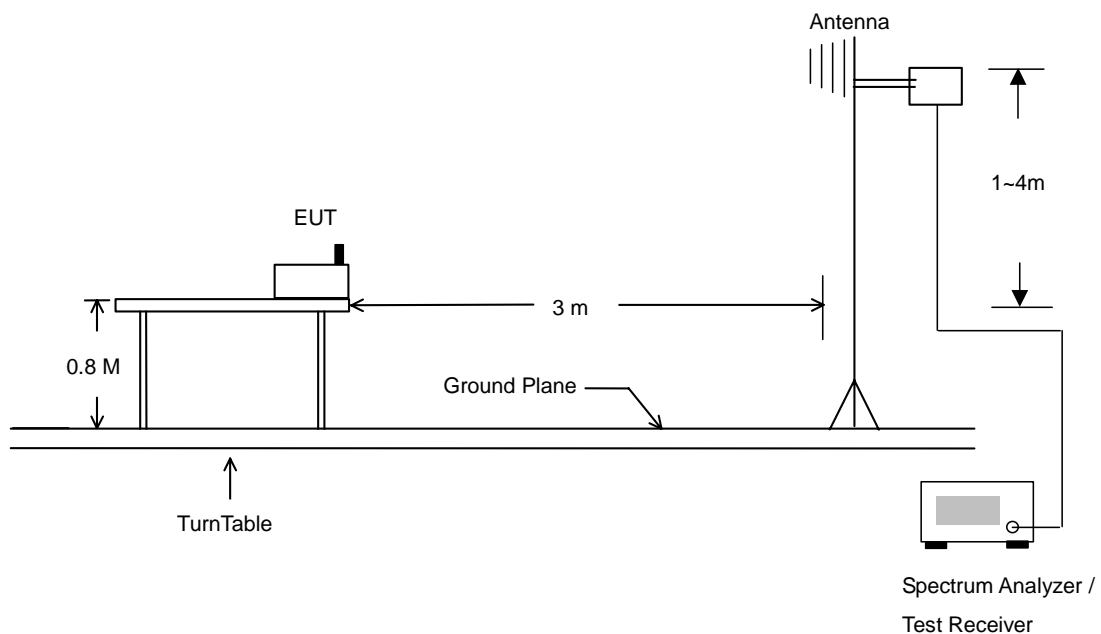
5.7.1 Measuring Instruments

As described in chapter 6 of this Report.

5.7.2 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 at RBW=120KHz and VBW=300KHz.
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.

5.7.3 Typical Test Setup Layout of Radiated Emission





5.7.4 Test Data

- Temperature : 28C
- Relating Humidity : 59
- Test Enginner : 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	Read 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 @	2390.00	58.17	-15.83	74.00	58.72	30.48	35.46	4.43	Peak	---	---
2 @	2390.00	45.18	-8.82	54.00	45.72	30.48	35.46	4.43	Average	100	125
3 @	2412.00	107.61			108.17	30.47	35.46	4.43	Peak	---	---
4 @	2412.00	100.14			100.70	30.47	35.46	4.43	Average	100	125
5 @	2488.00	53.75	-20.25	74.00	54.34	30.40	35.51	4.52	Peak	---	---
6 @	2488.00	42.10	-11.90	54.00	42.69	30.40	35.51	4.52	Average	100	125

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	Read 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 @	2390.00	55.00	-19.00	74.00	55.54	30.48	35.46	4.43	Peak	---	---
2 @	2390.00	43.02	-10.98	54.00	43.56	30.48	35.46	4.43	Average	100	235
3 @	2412.00	103.20			103.76	30.47	35.46	4.43	Peak	---	---
4 @	2412.00	96.13			96.69	30.47	35.46	4.43	Average	100	235
5 @	2488.00	53.22	-20.78	74.00	53.81	30.40	35.51	4.52	Peak	---	---
6 @	2488.00	41.66	-12.34	54.00	42.25	30.40	35.51	4.52	Average	100	235

Remark: # 3 and #4 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	Read 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 @	2334.00	55.23	-18.77	74.00	55.75	30.54	35.40	4.34	Peak	---	---
2 @	2334.00	44.42	-9.58	54.00	44.94	30.54	35.40	4.34	Average	100	125
3 @	2437.00	99.53			100.10	30.44	35.47	4.46	Average	100	125
4 @	2437.00	106.35			106.92	30.44	35.47	4.46	Peak	---	---
5 @	2494.00	53.43	-20.57	74.00	54.01	30.40	35.53	4.55	Peak	---	---
6 @	2494.00	42.57	-11.43	54.00	43.15	30.40	35.53	4.55	Average	100	125

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	Read 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 @	2388.00	54.69	-19.31	74.00	55.24	30.48	35.44	4.40	Peak	---	---
2 @	2388.00	42.62	-11.38	54.00	43.18	30.48	35.44	4.40	Average	100	233
3 @	2437.00	102.72			103.29	30.44	35.47	4.46	Peak	---	---
4 @	2437.00	95.37			95.94	30.44	35.47	4.46	Average	100	233
5 @	2488.00	53.86	-20.14	74.00	54.45	30.40	35.51	4.52	Peak	---	---
6 @	2488.00	41.87	-12.13	54.00	42.46	30.40	35.51	4.52	Average	100	233

Remark: #3 and #4 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 @	2344.00	55.00	-19.00	74.00	55.52	30.52	35.42	4.37	Peak	---	---
2 @	2344.00	44.05	-9.95	54.00	44.58	30.52	35.42	4.37	Average	100	128
3 @	2462.00	105.18			105.75	30.43	35.49	4.49	Peak	---	---
4 @	2462.00	98.52			99.10	30.43	35.49	4.49	Average	100	128
5 @	2498.00	54.17	-19.83	74.00	54.75	30.40	35.53	4.55	Peak	---	---
6 @	2498.00	43.73	-10.27	54.00	44.31	30.40	35.53	4.55	Average	100	128

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 @	2344.00	54.20	-19.80	74.00	54.72	30.52	35.42	4.37	Peak	---	---
2 @	2344.00	42.61	-11.39	54.00	43.14	30.52	35.42	4.37	Average	130	228
3 @	2462.00	100.37			100.95	30.43	35.49	4.49	Peak	---	---
4 @	2462.00	94.63			95.21	30.43	35.49	4.49	Average	130	228
5 @	2498.00	53.60	-20.40	74.00	54.18	30.40	35.53	4.55	Peak	---	---
6 @	2498.00	42.34	-11.66	54.00	42.92	30.40	35.53	4.55	Average	130	228

Remark: #3 and #4 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	Read 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 @	2390.00	72.98	-1.02	74.00	73.53	30.48	35.46	4.43	Peak	---	---
2 @	2390.00	53.74	-0.26	54.00	54.28	30.48	35.46	4.43	Average	100	127
3 @	2412.00	100.74			101.30	30.47	35.46	4.43	Average	100	127
4 @	2412.00	109.64			110.20	30.47	35.46	4.43	Peak	---	---
5 @	2488.00	42.35	-11.65	54.00	42.94	30.40	35.51	4.52	Average	100	127
6 @	2488.00	53.99	-20.01	74.00	54.58	30.40	35.51	4.52	Peak	---	---

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	Read 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 @	2390.00	71.83	-2.17	74.00	72.37	30.48	35.46	4.43	Peak	---	---
2 @	2390.00	52.60	-1.40	54.00	53.14	30.48	35.46	4.43	Average	100	234
3 @	2412.00	105.21			105.77	30.47	35.46	4.43	Peak	---	---
4 @	2412.00	97.45			98.01	30.47	35.46	4.43	Average	100	234
5 @	2494.00	53.86	-20.14	74.00	54.44	30.40	35.53	4.55	Peak	---	---
6 @	2494.00	42.01	-11.99	54.00	42.59	30.40	35.53	4.55	Average	100	234

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	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	193.89	25.96	-17.54	43.50	45.53	9.68	31.21	1.96	Peak	---	---
2 @	233.04	27.85	-18.15	46.00	46.58	10.44	31.24	2.08	Peak	---	---
3 @	257.88	31.13	-14.87	46.00	47.29	12.67	31.02	2.19	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 @	479.90	34.17	-11.83	46.00	44.76	16.93	30.78	3.27	Peak	---	---
2 @	799.80	33.98	-12.02	46.00	37.18	21.90	30.12	5.02	Peak	---	---
3 @	833.40	36.35	-9.65	46.00	40.70	21.25	30.38	4.77	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 @	2390.00	56.06	-17.94	74.00	56.60	30.48	35.46	4.43	Peak	---	---
2 @	2390.00	45.01	-8.99	54.00	45.55	30.48	35.46	4.43	Average	100	128
3 @	2437.00	107.94			108.52	30.44	35.47	4.46	Peak	---	---
4 @	2437.00	99.83			100.40	30.44	35.47	4.46	Average	100	128
5 @	2494.00	54.07	-19.93	74.00	54.65	30.40	35.53	4.55	Peak	---	---
6 @	2494.00	42.59	-11.41	54.00	43.17	30.40	35.53	4.55	Average	100	128

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	Read 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 @	54.03	28.85	-11.15	40.00	50.72	8.53	31.44	1.04	QP	297	100
2 @	59.43	34.55	-5.45	40.00	58.02	6.89	31.43	1.07	Peak	---	---
3 @	257.88	29.18	-16.82	46.00	45.34	12.67	31.02	2.19	Peak	---	---

	Freq	Level	Over Limit	Limit Line	Read 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 @	451.90	37.25	-8.75	46.00	48.43	16.43	30.84	3.23	Peak	---	---
2 @	563.90	36.65	-9.35	46.00	44.72	18.49	30.67	4.11	Peak	---	---
3 @	799.80	34.48	-11.52	46.00	37.69	21.90	30.12	5.02	Peak	---	---

	Freq	Level	Over Limit	Limit Line	Read 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 @	2344.00	54.48	-19.52	74.00	55.01	30.52	35.42	4.37	Peak	---	---
2 @	2344.00	42.63	-11.37	54.00	43.16	30.52	35.42	4.37	Average	100	231
3 @	2437.00	103.48			104.05	30.44	35.47	4.46	Peak	---	---
4 @	2437.00	96.05			96.62	30.44	35.47	4.46	Average	100	231
5 @	2488.00	53.36	-20.64	74.00	53.95	30.40	35.51	4.52	Peak	---	---
6 @	2488.00	42.11	-11.89	54.00	42.70	30.40	35.51	4.52	Average	100	231

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	Read 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 @	2358.00	56.96	-17.04	74.00	57.50	30.51	35.42	4.37	Peak	100	127
2 @	2358.00	44.77	-9.23	54.00	45.31	30.51	35.42	4.37	Average	---	---
3 @	2462.00	99.34			99.92	30.43	35.49	4.49	Average	---	---
4 @	2462.00	107.52			108.09	30.43	35.49	4.49	Peak	100	127
5 @	2483.50	71.68	-2.32	74.00	72.26	30.41	35.51	4.52	Peak	100	127
6 @	2483.50	53.79	-0.21	54.00	54.37	30.41	35.51	4.52	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	Read 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	54.23	-19.77	74.00	54.77	30.50	35.44	4.40	Peak	---	---
2 @	2384.00	42.32	-11.68	54.00	42.86	30.50	35.44	4.40	Average	128	230
3 @	2462.00	96.01			96.59	30.43	35.49	4.49	Average	128	230
4 @	2462.00	102.14			102.72	30.43	35.49	4.49	Peak	---	---
5 @	2483.50	65.23	-8.77	74.00	65.81	30.41	35.51	4.52	Peak	---	---
6 @	2483.50	51.10	-2.90	54.00	51.68	30.41	35.51	4.52	Average	128	230

Remark: #3 and #4 Fundamental Signal

Remark: The spurious emission except listed above is too low to be taken.



5.8 Antenna Requirements

5.8.1 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.

5.8.2 Antenna Connected Construction

The antenna used in this product is PCB antenna without connector and it is considered to meet antenna requirement of FCC.

5.8.3 Antenna Gain

The antenna gain of EUT is less than 6dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



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	9kHz – 2.75GHz	Jun. 23, 2004	Jun. 23, 2005	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001/009	9kHz – 30MHz	Apr. 26, 2005	Apr. 26, 2006	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	99081	9kHz – 30MHz	Dec. 17, 2004	Dec. 17, 2005	Conduction (CO01-HY)
EMI Filter	LINDGREN	LRE-2060	1004	< 450Hz	N/A	N/A	Conduction (CO01-HY)
EMI Filter	LINDGREN	N6006	201052	0 – 60Hz	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)
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



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% $U = 2U_e(y)$	4.72				