

FCC RF Test Report

APPLICANT : Inventec Corporation
EQUIPMENT : PDA Phone
BRAND NAME : Opticon
MODEL NAME : H-19A/H-19B
FCC ID : DGIORCHID1
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Transmission System (DTS)

The product was received on Apr. 10, 2010 and completely tested on May 07, 2010. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:



Roy Wu / Manager



SPORTON INTERNATIONAL INC.

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FCC ID : DGIORCHID1

Page Number : 1 of 61

Report Issued Date : Jun. 04, 2010

Report Version : Rev. 01



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR041004B	Rev. 01	Initial issue of report	Jun. 04, 2010

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	A8.2(a)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.2	15.247(b)	A8.4	Power Output	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(d)	A8.5	Frequency Band Edges	$\leq 20\text{dBc}$	Pass	-
3.4	15.247(d)	A8.5	Spurious Emission	$< 20\text{ dBc}$	Pass	-
3.5	15.247(e)	A8.2(b)	Power Spectral Density	$\leq 8\text{dBm}$	Pass	-
3.6	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 21.9 dB at 0.422 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.08 dB at 2483.50 MHz
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Inventec Corporation

Inventec Building, No. 66, Hou-Kang Street, Shihlin District, Taipei 11170, Taiwan

1.2 Manufacturer

Inventec Corporation

Inventec Building, No. 66, Hou-Kang Street, Shihlin District, Taipei 11170, Taiwan

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	PDA Phone
Brand Name	Opticon
Model Name	H-19A/H-19B
FCC ID	DGIORCHID1
Sample A	H-19A with Scanner 1
Sample B	H-19B with Scanner 2
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Number of Channels	11
Carrier Frequency of Each Channel	2412+(n-1)*5 MHz; n=1~11
Channel Spacing	5 MHz
Maximum Output Power to Antenna	802.11b : 17.72 dBm (59.16 mW) 802.11g : 20.72 dBm (118.03 mW)
Antenna Type	PIFA Antenna with gain -7 dBi
HW Version	ORCHID0223_6050A2351001_MB_X01 ORCHID0223_6050A2351501_SUB_X01
SW Version	0.2.8.2
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Production Unit

Remark:

1. For other wireless features of this EUT, test report will be issued separately.
2. This test report recorded only product characteristics and test results of Digital Transmission System (DTS).
3. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	CO05-HY	03CH07-HY	TW1022/4086B-1

1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 (Measurement Guidelines of DTS)
- ♦ ANSI C63.4-2003
- ♦ IC RSS-210 Issue 7

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC), recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	GPS Station	T&E	GS-50	N/A	N/A	Unshielded, 1.8 m
3.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
4.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A

2 Test Configuration of Equipment Under Test

2.1 RF Power

Preliminary tests were performed in different data rate and recorded the RF power output in the following table:

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)				
		At DSSS Data Rate				
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps	22 Mbps
CH 01	2412 MHz	17.20	17.03	16.56	17.02	17.13
CH 06	2437 MHz	17.21	16.52	16.51	16.98	17.02
CH 11	2462 MHz	17.72	17.05	16.79	16.84	16.84

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)								
		At OFDM Data Rate								
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps	72 Mbps
CH 01	2412 MHz	15.48	20.54	20.50	20.57	20.61	20.61	20.53	20.58	20.72
CH 06	2437 MHz	16.45	20.34	20.32	20.25	20.36	20.34	20.18	20.17	20.36
CH 11	2462 MHz	17.67	19.82	19.58	19.56	19.70	19.73	19.58	19.41	19.56

Remark:

1. The data rates of WLAN 802.11b/g were set in 1Mbps for 802.11b and 72Mbps for 802.11g, for all the test cases due to the highest RF output power.
2. The EUT is programmed to transmit signals continuously for all testing.

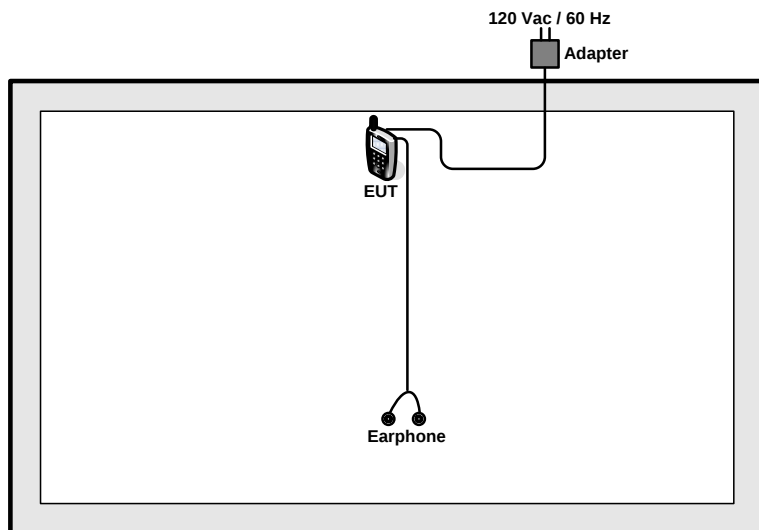
2.2 Test Mode

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. Frequency range investigated: conducted emission (150 kHz to 30 MHz), radiated emission (30 MHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). Pre-scanned tests were conducted to determine the final configuration from all possible combinations. The following tables are showing the test modes as the worst cases and recorded in this report.

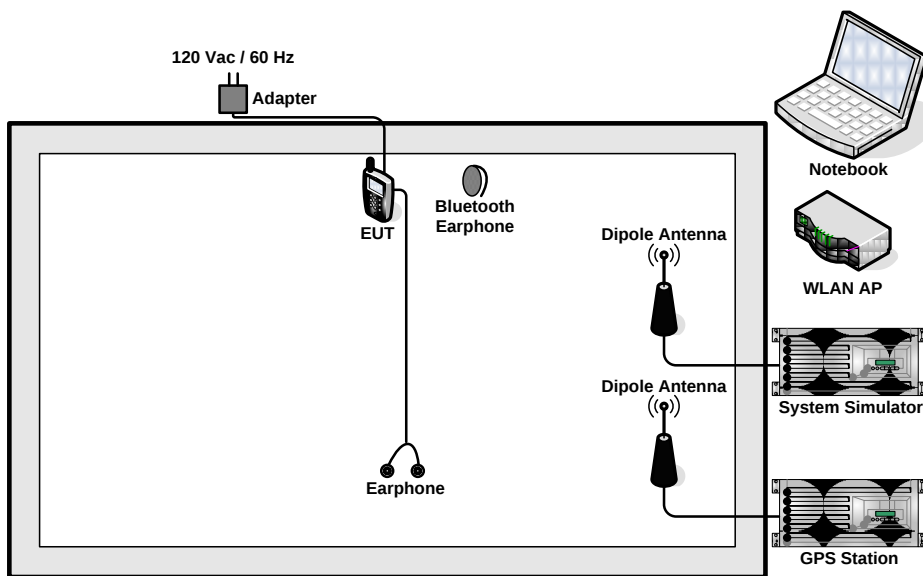
Test Cases		
Test Item	802.11b	802.11g
Conducted TCs	Mode 1 : 802.11b CH01_2412 MHz	Mode 4 : 802.11g CH01_2412 MHz
	Mode 2 : 802.11b CH06_2437 MHz	Mode 5 : 802.11g CH06_2437 MHz
	Mode 3 : 802.11b CH11_2462 MHz	Mode 6 : 802.11g CH11_2462 MHz
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz for Sample B	Mode 4 : 802.11g CH01_2412 MHz for Sample B
	Mode 2 : 802.11b CH06_2437 MHz for Sample B	Mode 5 : 802.11g CH06_2437 MHz for Sample B
	Mode 3 : 802.11b CH11_2462 MHz for Sample B	Mode 6 : 802.11g CH11_2462 MHz for Sample B
		Mode 7 : 802.11g CH11_2462 MHz for Sample A
AC Conducted Emission	Mode 1 : Sample B + GSM850 Idle + Bluetooth Link + WLAN Link + GPS Rx + Earphone + Adapter	
	Mode 2 :Sample A + GSM1900 Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone + Adapter	
Remark: The worst case of conducted emission is mode 2; only the test data of it was reported.		

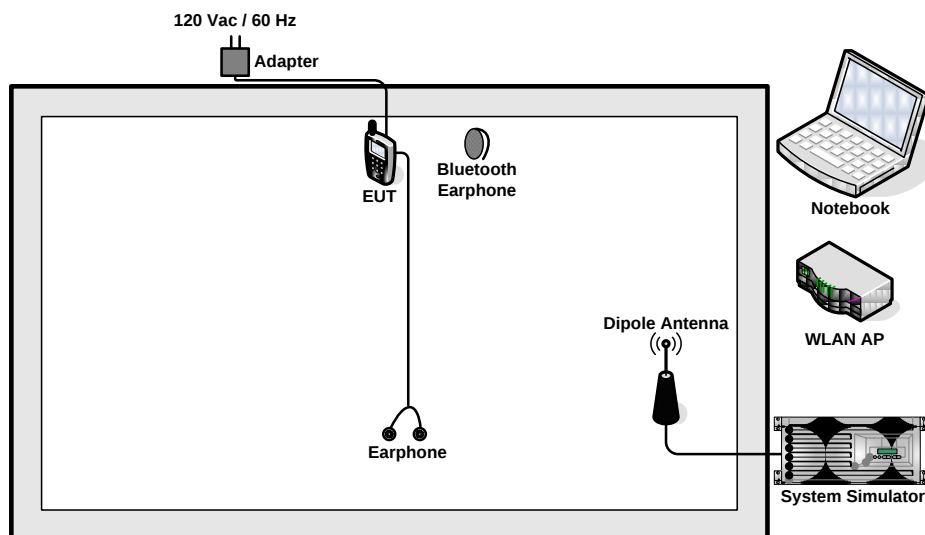
2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<EUT with Adapter for GPS Rx Mode>



<EUT with Adapter Mode>


2.4 RF Utility

The programmed RF utility, "RF Test(24XXC)" is installed in EUT to provide channel selection, power level, data rate and the application type. RF Utility can send transmitting signal for all testing. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

3 Test Result

3.1 6dB Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

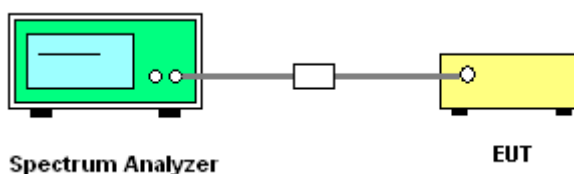
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz.
In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 kHz.
4. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

3.1.4 Test Setup



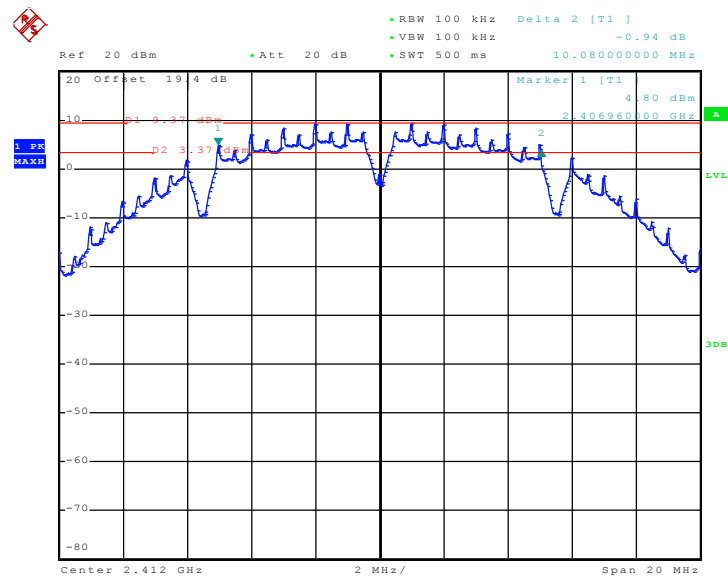


3.1.5 Test Result of 6dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	25~27°C
Test Engineer :	Lancelot Chen	Relative Humidity :	47~50%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	10.08	0.5	Pass
06	2437	10.12	0.5	Pass
11	2462	10.12	0.5	Pass

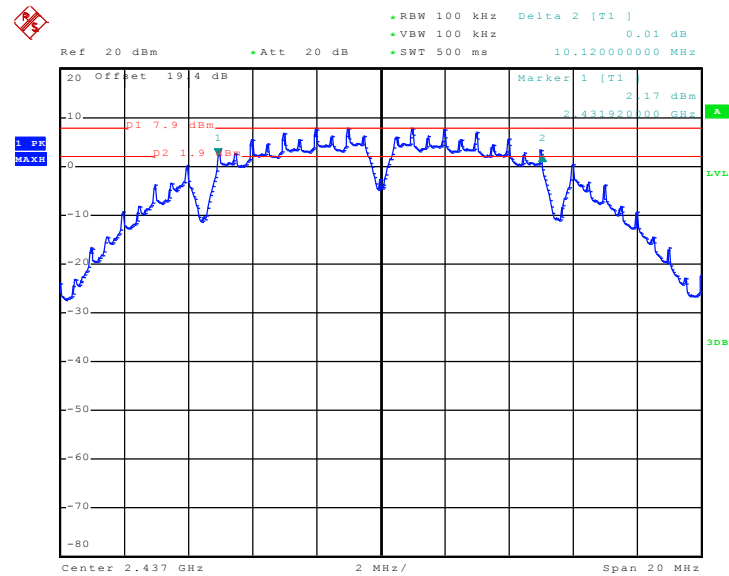
Mode 1 : 6 dB Bandwidth Plot on 802.11b Channel 01



Date: 21.APR.2010 10:00:29

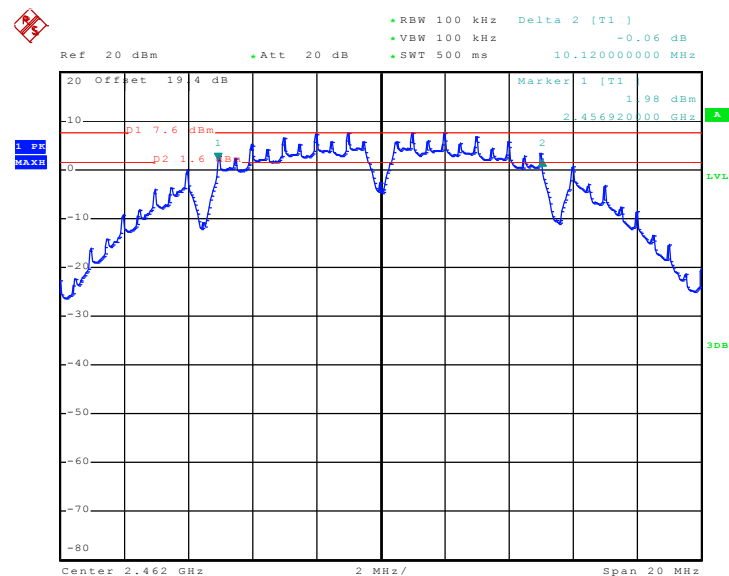


Mode 2 : 6 dB Bandwidth Plot on 802.11b Channel 06



Date: 21.APR.2010 10:05:00

Mode 3 : 6 dB Bandwidth Plot on 802.11b Channel 11

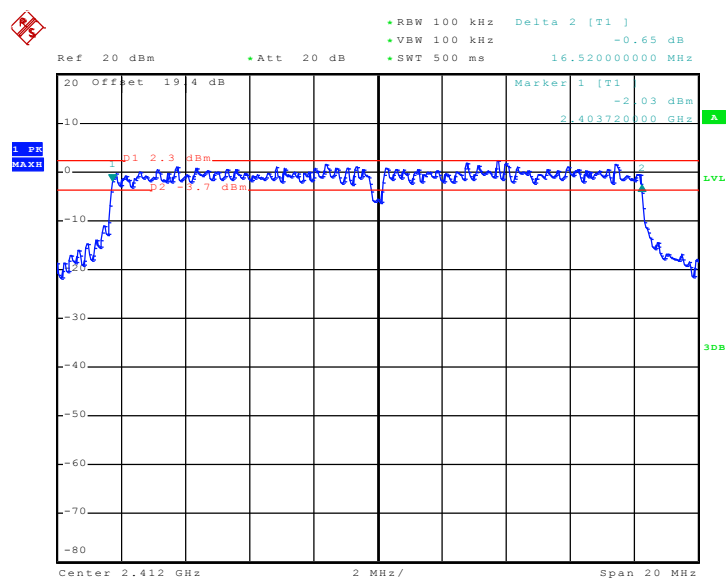


Date: 21.APR.2010 10:06:02



Test Mode :	Mode 4, 5, 6	Temperature :	25~27°C
Test Engineer :	Lancelot Chen	Relative Humidity :	47~50%

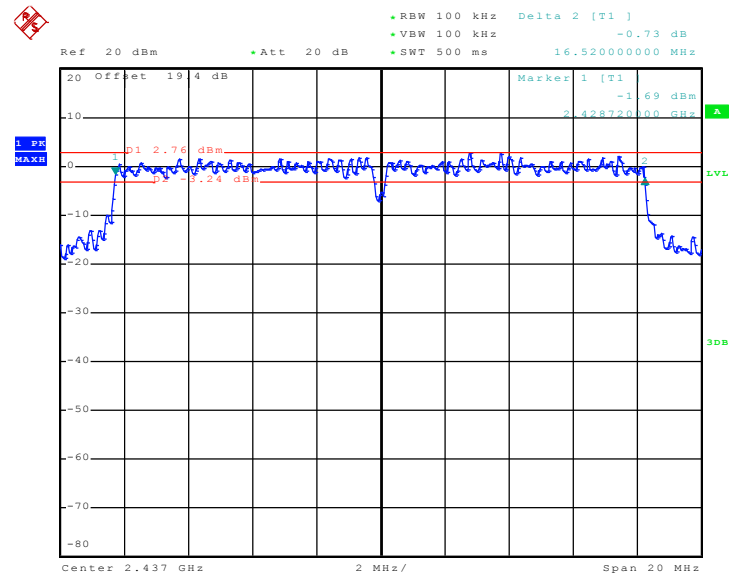
Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	16.52	0.5	Pass
06	2437	16.52	0.5	Pass
11	2462	16.40	0.5	Pass

Mode 4 : 6 dB Bandwidth Plot on 802.11g Channel 01

Date: 21.APR.2010 10:46:32

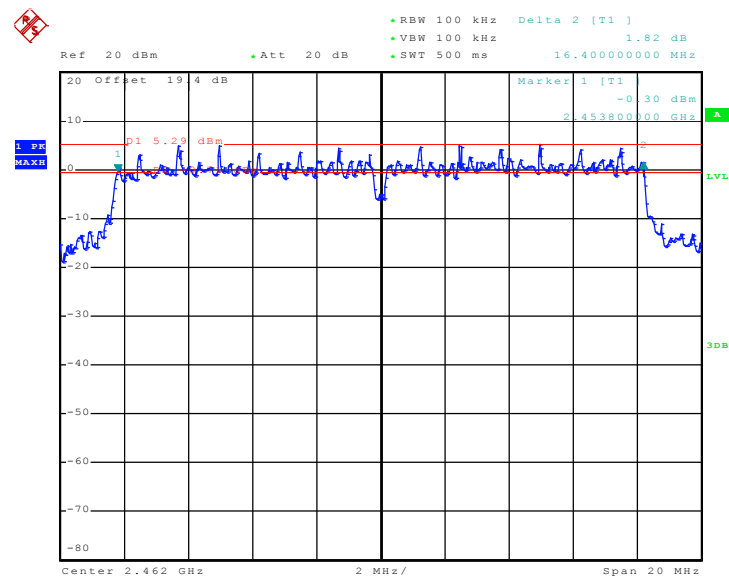


Mode 5 : 6 dB Bandwidth Plot on 802.11g Channel 06



Date: 21.APR.2010 10:59:05

Mode 6 : 6 dB Bandwidth Plot on 802.11g Channel 11



Date: 21.APR.2010 11:00:59

3.2 Output Power Measurement

3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

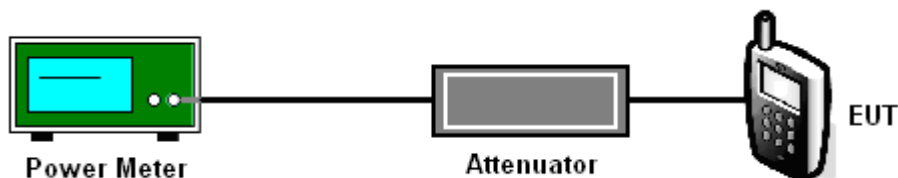
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the power meter by a low loss cable.
3. Measure the power by power meter.

3.2.4 Test Setup



**3.2.5 Test Result of Output Power**

Test Mode :	Mode 1, 2, 3	Temperature :	25~27℃
Test Engineer :	Lancelot Chen	Relative Humidity :	47~50%

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	17.20	30	Pass
06	2437	17.21	30	Pass
11	2462	17.72	30	Pass

Test Mode :	Mode 4, 5, 6	Temperature :	25~27℃
Test Engineer :	Lancelot Chen	Relative Humidity :	47~50%

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	20.72	30	Pass
06	2437	20.36	30	Pass
11	2462	19.56	30	Pass

3.3 Band Edges Measurement

3.3.1 Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB.

3.3.2 Measuring Instruments

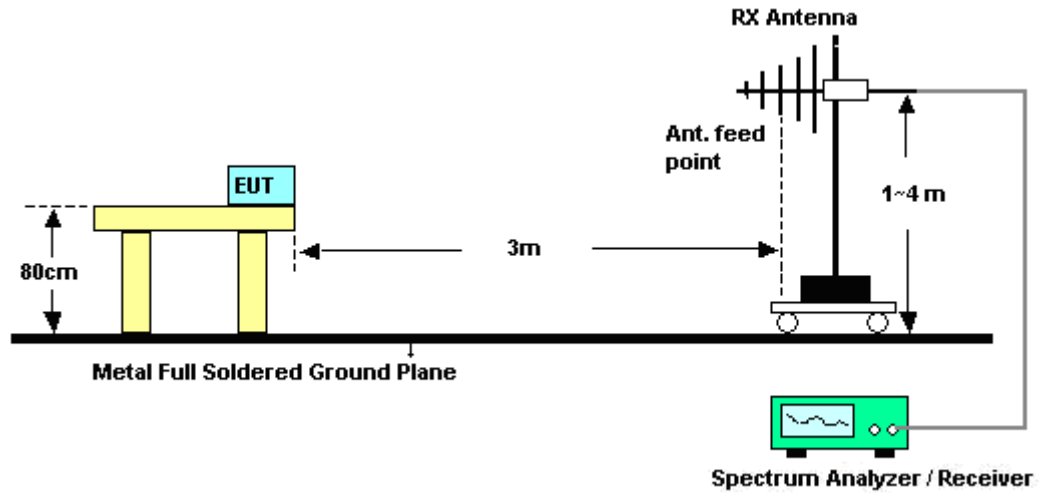
See list of measuring instruments of this test report.

3.3.3 Test Procedures

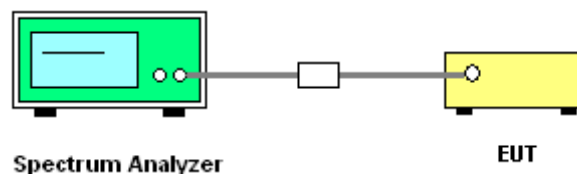
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. Radiated emission test: Apply to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep=Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation as in FCC Section 15.35(b) and (c).

3.3.4 Test Setup

<Radiated Band Edges>



<Conducted Band Edges>



3.3.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	22~24℃
Test Band :	802.11b	Relative Humidity :	48~49%
Test Channel :	01	Test Engineer :	Ivan Jiang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2386.38	52.24	-21.76	74	48.8	32.13	5.46	34.15	111	327	Peak
2386.38	42.83	-11.17	54	39.39	32.13	5.46	34.15	111	327	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2386.38	51.54	-22.46	74	48.1	32.13	5.46	34.15	104	304	Peak
2386.38	42.08	-11.92	54	38.64	32.13	5.46	34.15	104	304	Average

Test Mode :	Mode 3	Temperature :	22~24℃
Test Band :	802.11b	Relative Humidity :	48~49%
Test Channel :	11	Test Engineer :	Ivan Jiang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2488.22	56.6	-17.4	74	53.12	32.3	5.37	34.19	104	317	Peak
2488.22	50.38	-3.62	54	46.9	32.3	5.37	34.19	104	317	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2488.22	56.88	-17.12	74	53.4	32.3	5.37	34.19	100	303	Peak
2488.22	50.19	-3.81	54	46.71	32.3	5.37	34.19	100	303	Average



Test Mode :	Mode 4	Temperature :	22~24℃
Test Band :	802.11g	Relative Humidity :	48~49%
Test Channel :	01	Test Engineer :	Ivan Jiang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	64.33	-9.67	74	60.9	32.13	5.46	34.16	104	328	Peak
2390	46.67	-7.33	54	43.24	32.13	5.46	34.16	104	328	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	62.44	-11.56	74	59.01	32.13	5.46	34.16	101	305	Peak
2390	46.47	-7.53	54	43.04	32.13	5.46	34.16	101	305	Average

Test Mode :	Mode 6	Temperature :	22~24℃
Test Band :	802.11g	Relative Humidity :	48~49%
Test Channel :	11	Test Engineer :	Ivan Jiang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	68.25	-5.75	74	64.79	32.27	5.38	34.19	103	318	Peak
2483.5	48.23	-5.77	54	44.77	32.27	5.38	34.19	103	318	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	70.87	-3.13	74	67.41	32.27	5.38	34.19	100	296	Peak
2483.5	50.92	-3.08	54	47.46	32.27	5.38	34.19	100	296	Average



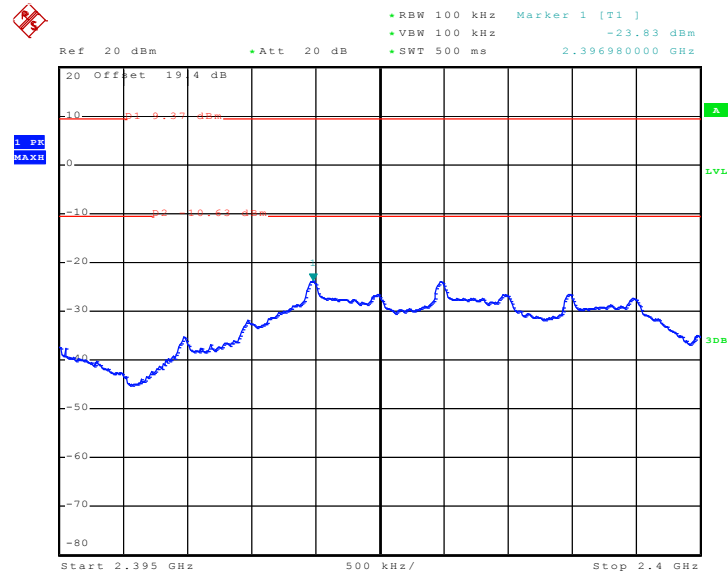
Test Mode :	Mode 7	Temperature :	22~24°C
Test Band :	802.11g	Relative Humidity :	48~49%
Test Channel :	11	Test Engineer :	Ivan Jiang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	60.31	-13.69	74	56.85	32.27	5.38	34.19	109	3	Peak
2483.5	43.47	-10.53	54	40.01	32.27	5.38	34.19	109	3	Average

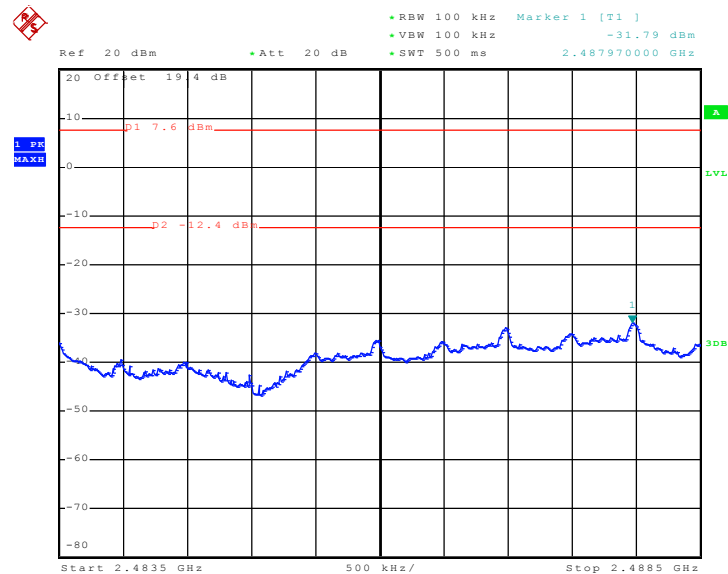
ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	56	-18	74	52.54	32.27	5.38	34.19	100	173	Peak
2483.5	40.2	-13.8	54	36.74	32.27	5.38	34.19	100	173	Average

**3.3.6 Test Plots of Conducted Band Edges**

Test Mode :	Mode 1 and 3	Temperature :	25~27°C
Test Band :	802.11b	Relative Humidity :	47~50%
Test Channel :	01 and 11	Test Engineer :	Lancelot Chen

Low Band Edge Plot on 802.11b Channel 01

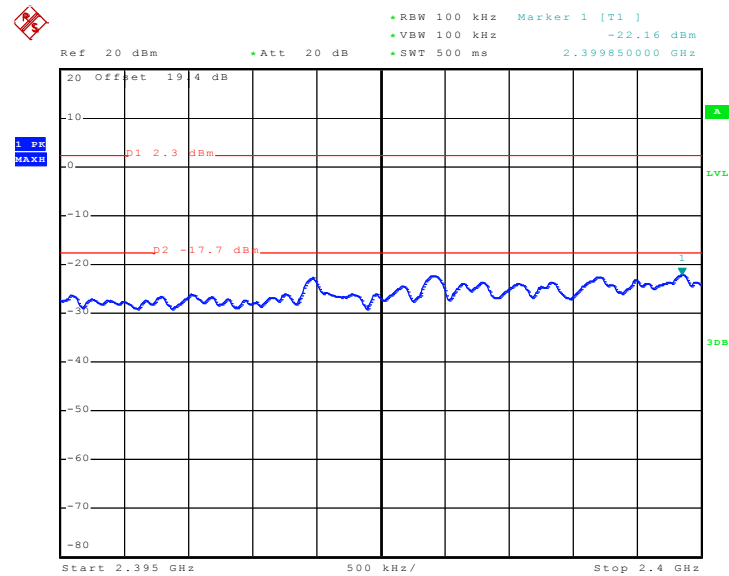
Date: 21.APR.2010 10:02:52

High Band Edge Plot on 802.11b Channel 11

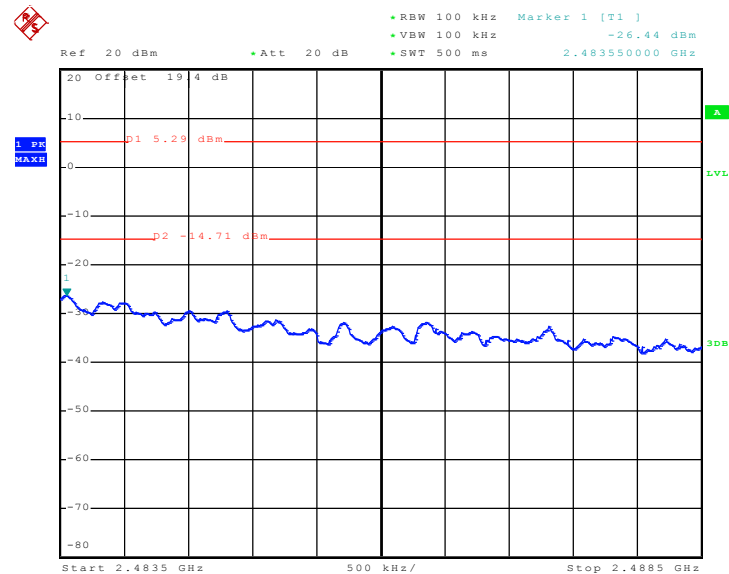
Date: 21.APR.2010 10:07:44



Test Mode :	Mode 4 and 6	Temperature :	25~27°C
Test Band :	802.11g	Relative Humidity :	47~50%
Test Channel :	01 and 11	Test Engineer :	Lancelot Chen

Low Band Edge Plot on 802.11g Channel 01

Date: 21.APR.2010 10:47:27

High Band Edge Plot on 802.11g Channel 11

Date: 21.APR.2010 11:01:42

3.4 Spurious Emission Measurement

3.4.1 Limit of Spurious Emission Measurement

All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band.

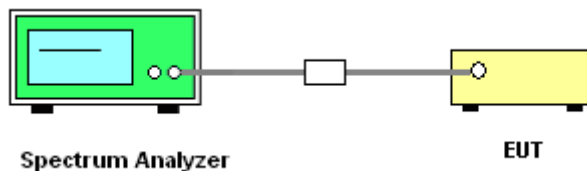
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedure

1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set RBW = 100 kHz, Video bandwidth (VBW) $\geq$ RBW, scan up through 10th harmonic. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

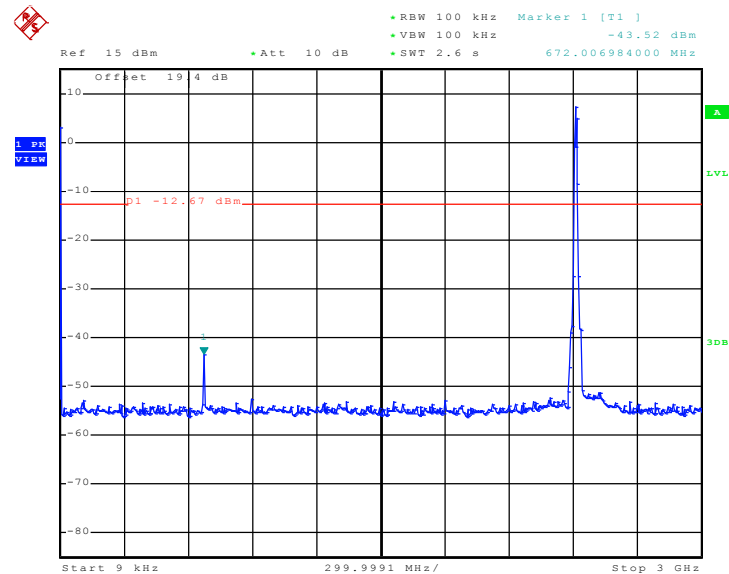
3.4.4 Test Setup



3.4.5 Test Plots of Spurious Emission

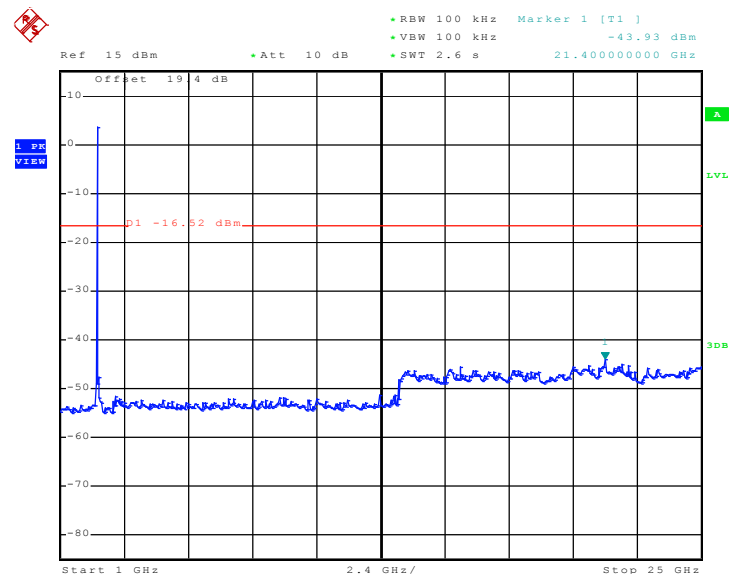
Test Mode :	Mode 1	Temperature :	25~27°C
Test Band :	802.11b	Relative Humidity :	47~50%
Test Channel :	01	Test Engineer :	Lancelot Chen

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



Date: 21.APR.2010 12:18:05

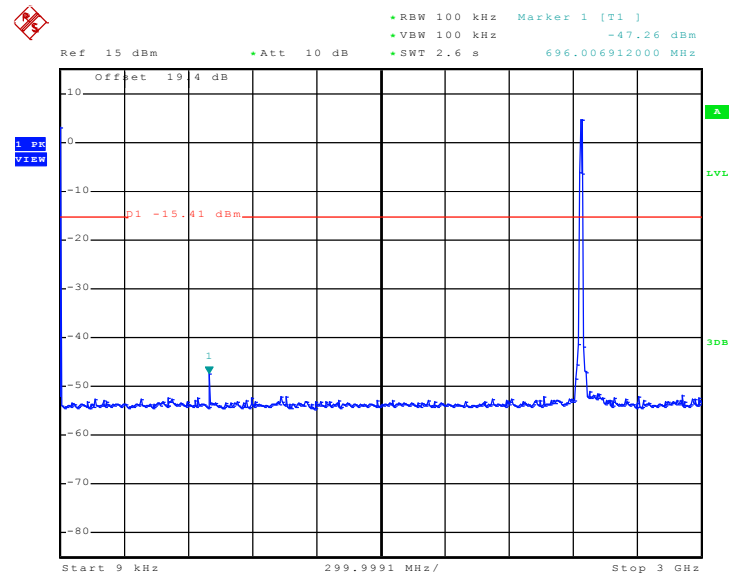
Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz



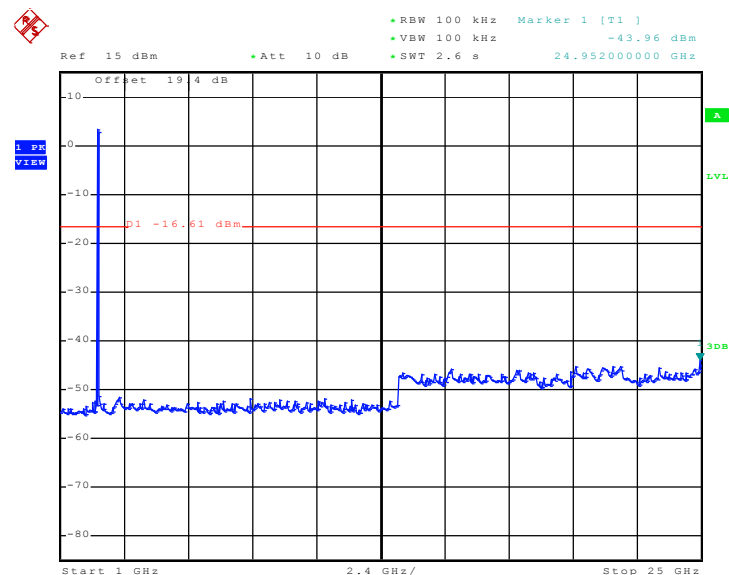
Date: 21.APR.2010 11:44:07



Test Mode :	Mode 2	Temperature :	25~27°C
Test Band :	802.11b	Relative Humidity :	47~50%
Test Channel :	06	Test Engineer :	Lancelot Chen

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz

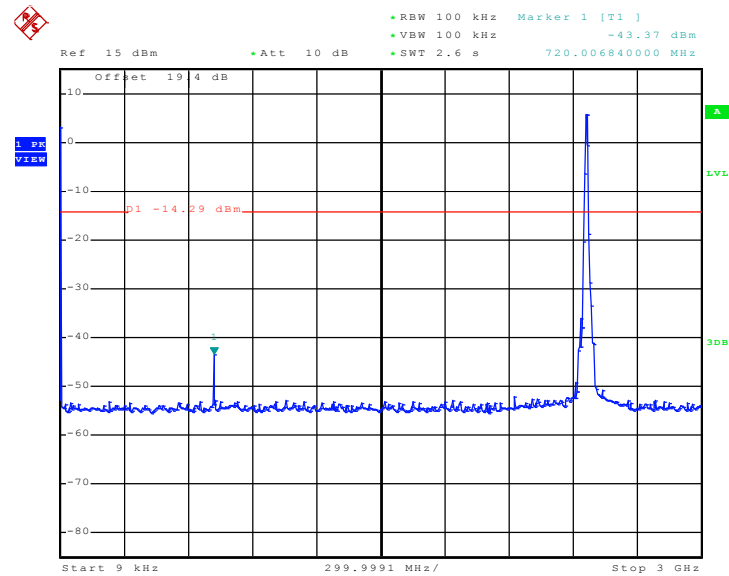
Date: 21.APR.2010 12:22:09

Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz

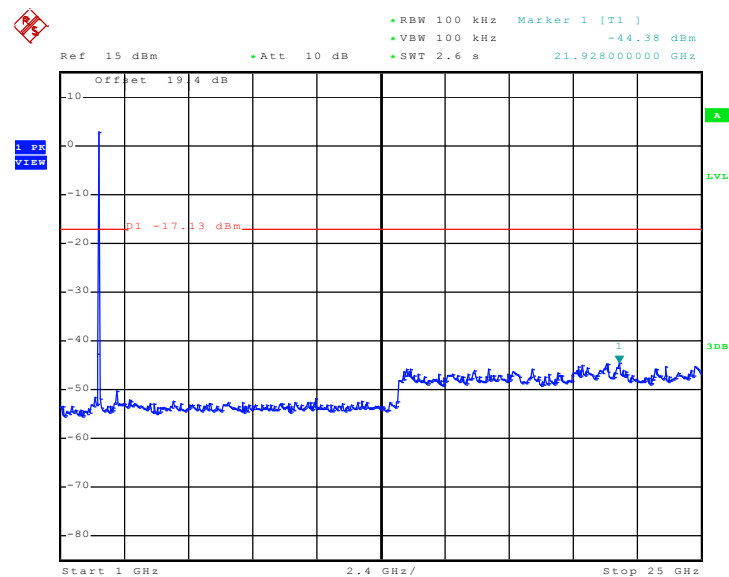
Date: 21.APR.2010 11:45:29



Test Mode :	Mode 3	Temperature :	25~27°C
Test Band :	802.11b	Relative Humidity :	47~50%
Test Channel :	11	Test Engineer :	Lancelot Chen

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz

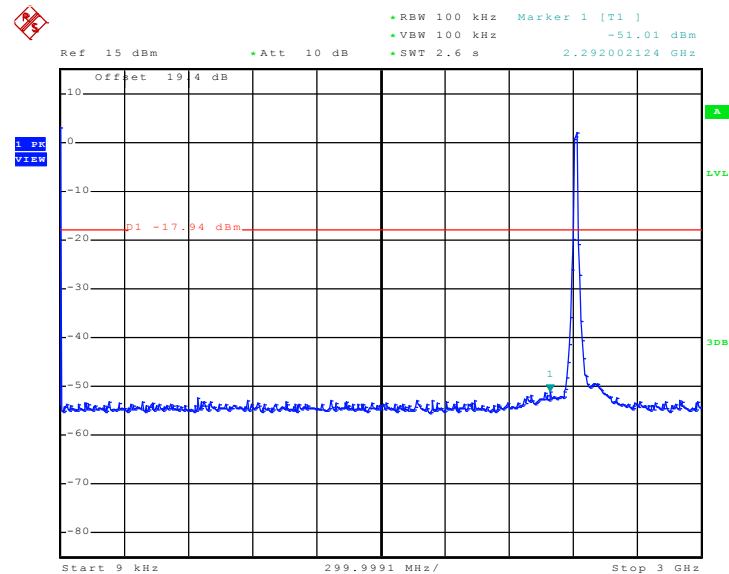
Date: 21.APR.2010 12:15:40

Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz

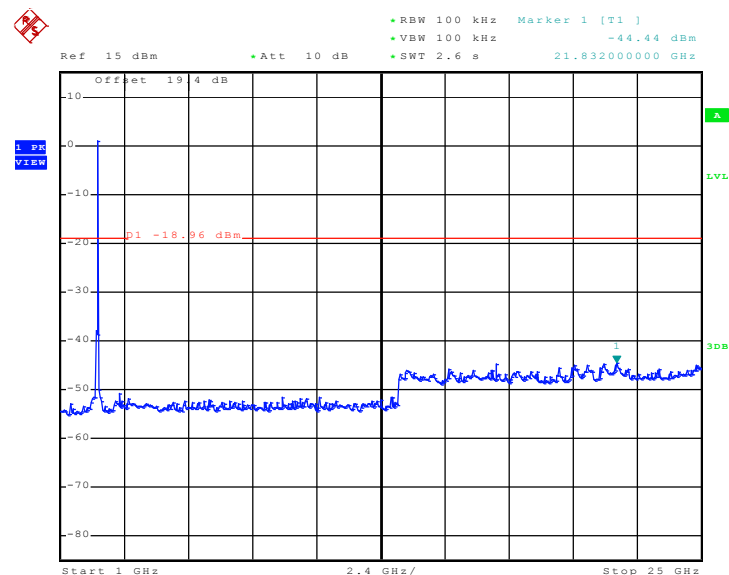
Date: 21.APR.2010 11:46:36



Test Mode :	Mode 4	Temperature :	25~27°C
Test Band :	802.11g	Relative Humidity :	47~50%
Test Channel :	01	Test Engineer :	Lancelot Chen

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz

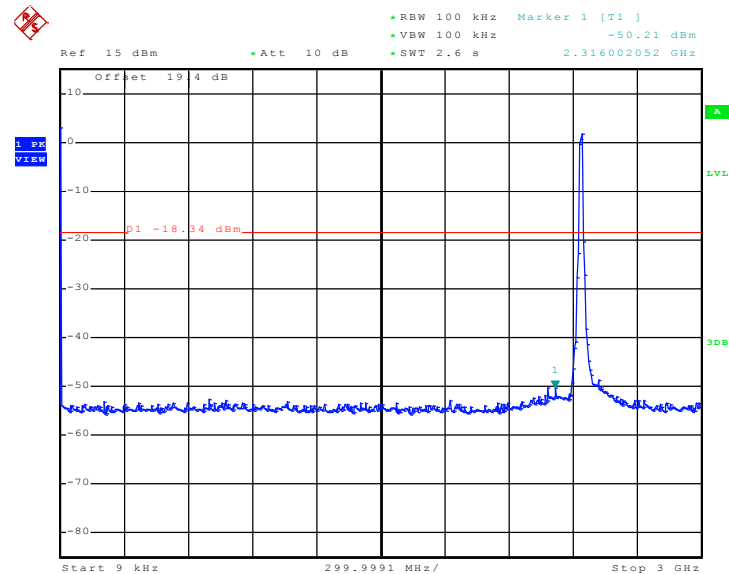
Date: 21.APR.2010 12:23:16

Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz

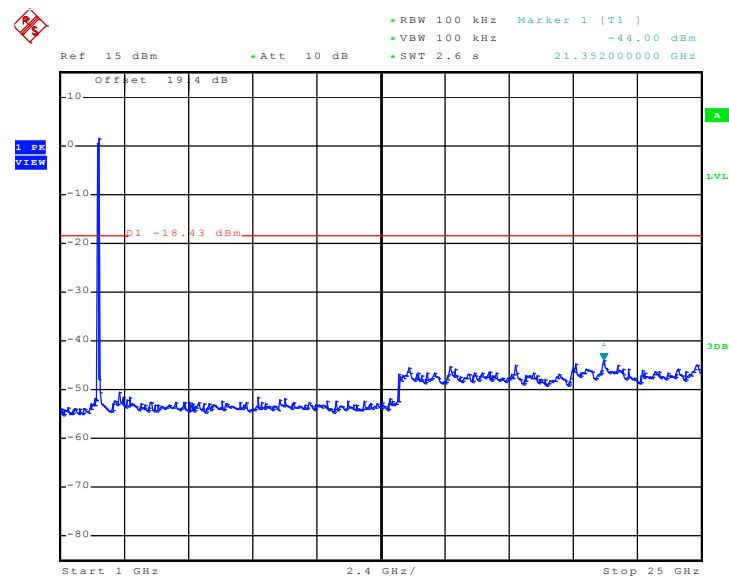
Date: 21.APR.2010 11:51:55



Test Mode :	Mode 5	Temperature :	25~27°C
Test Band :	802.11g	Relative Humidity :	47~50%
Test Channel :	06	Test Engineer :	Lancelot Chen

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz

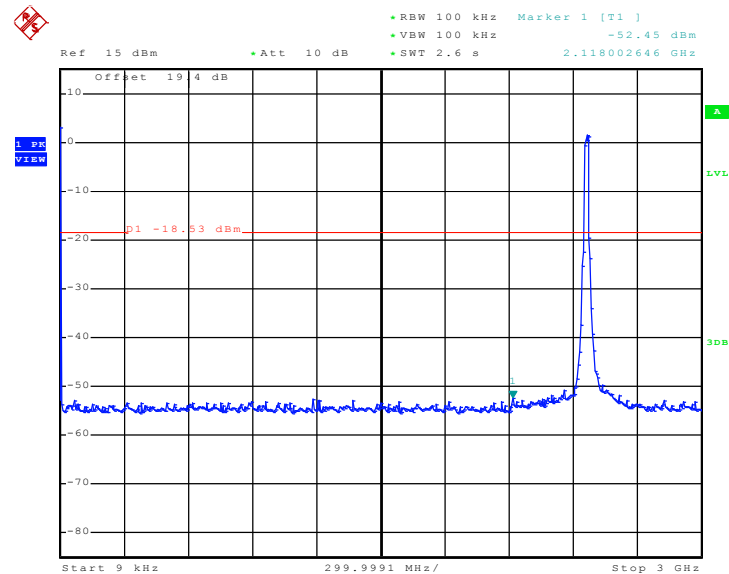
Date: 21.APR.2010 12:08:14

Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz

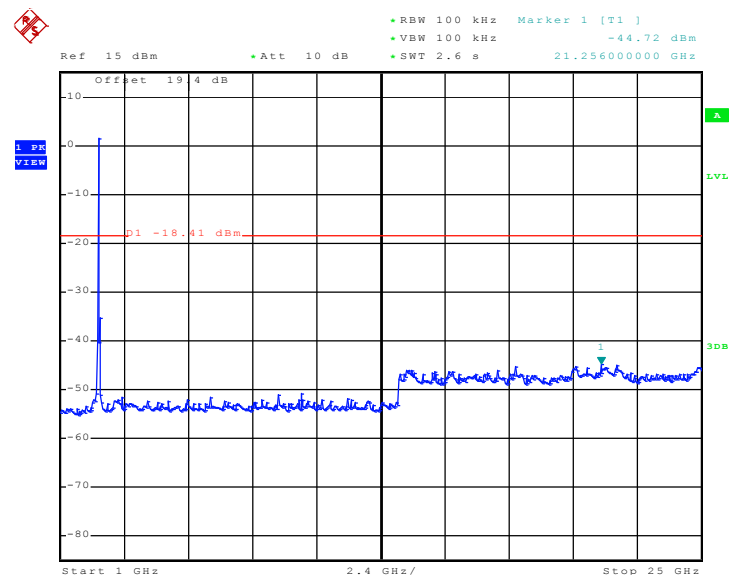
Date: 21.APR.2010 11:55:21



Test Mode :	Mode 6	Temperature :	25~27°C
Test Band :	802.11g	Relative Humidity :	47~50%
Test Channel :	11	Test Engineer :	Lancelot Chen

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz

Date: 21.APR.2010 12:07:09

Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz

Date: 21.APR.2010 11:57:12

3.5 Power Spectral Density Measurement

3.5.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

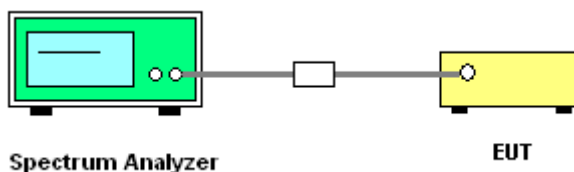
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The test follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Take the measured data from spectrum analyzer.

3.5.4 Test Setup



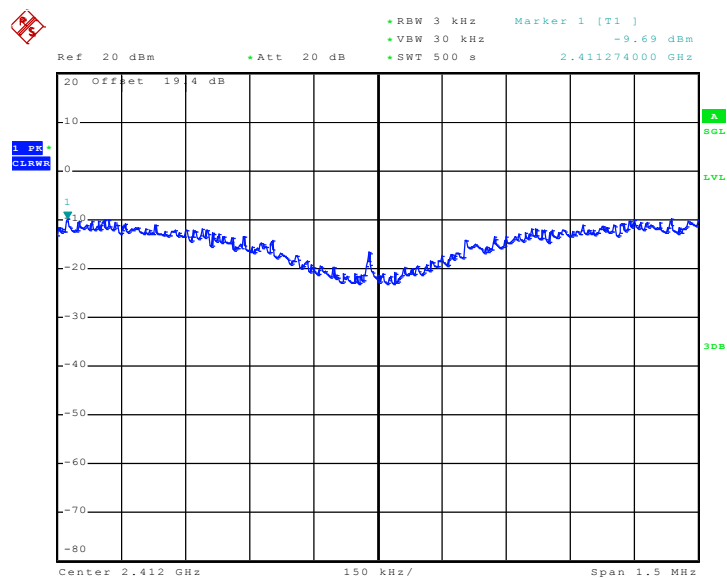


3.5.5 Test Result of Power Spectral Density

Test Mode :	Mode 1, 2, 3	Temperature :	25~27℃
Test Engineer :	Lancelot Chen	Relative Humidity :	47~50%

Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-9.69	8	Pass
06	2437	-9.87	8	Pass
11	2462	-9.29	8	Pass

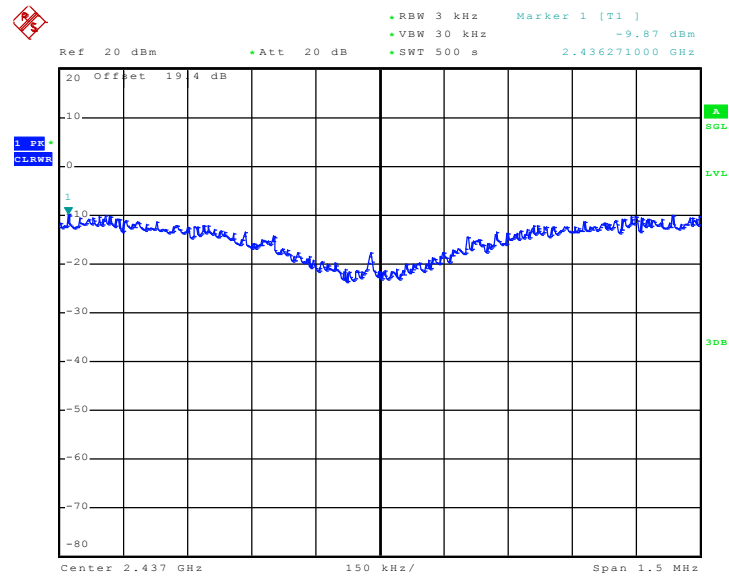
Mode 1 : PSD Plot on 802.11b Channel 01



Date: 22.APR.2010 12:35:51

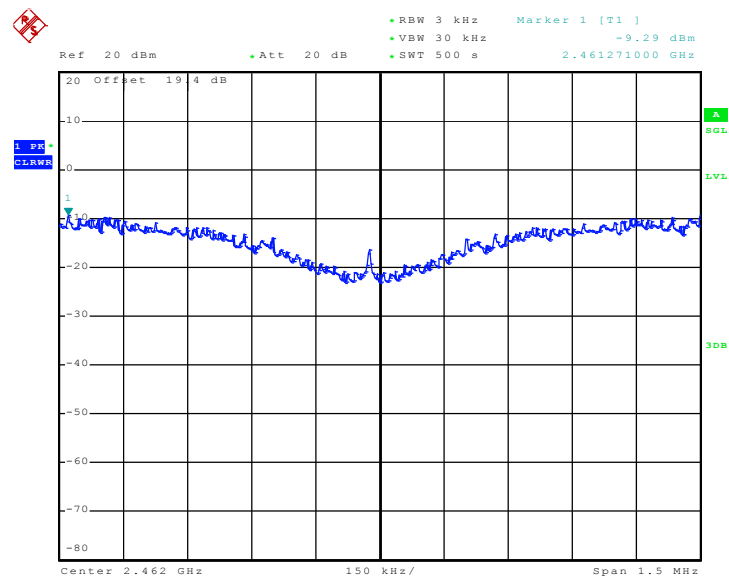


Mode 2 : PSD Plot on 802.11b Channel 06



Date: 22.APR.2010 13:38:13

Mode 3 : PSD Plot on 802.11b Channel 11



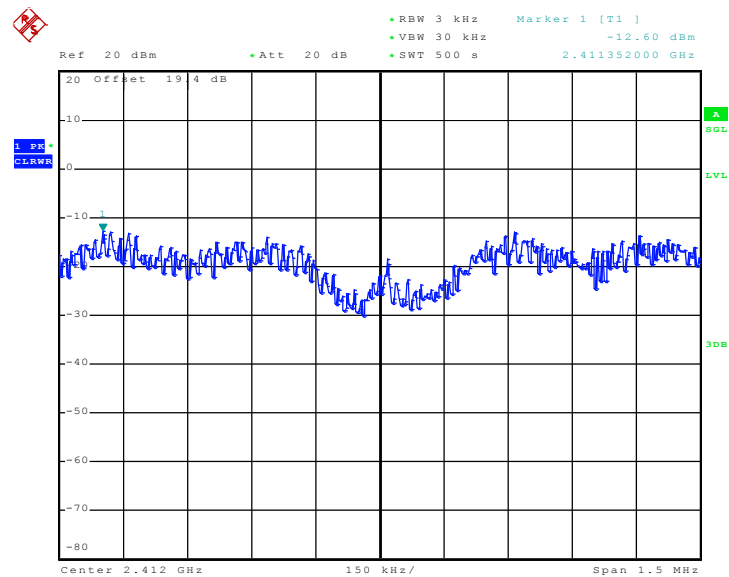
Date: 22.APR.2010 14:41:16



Test Mode :	Mode 4, 5, 6	Temperature :	25~27°C
Test Engineer :	Lancelot Chen	Relative Humidity :	47~50%

Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-12.60	8	Pass
06	2437	-13.16	8	Pass
11	2462	-13.08	8	Pass

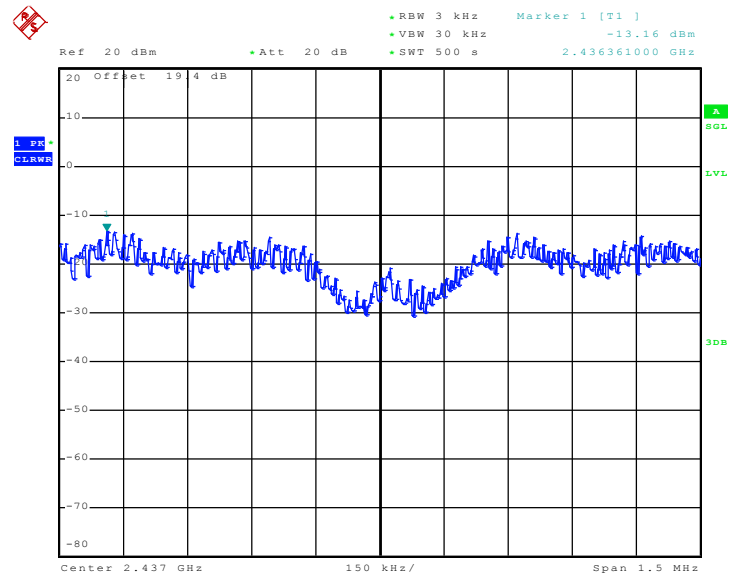
Mode 4 : PSD Plot on 802.11g Channel 01



Date: 22.APR.2010 15:25:07

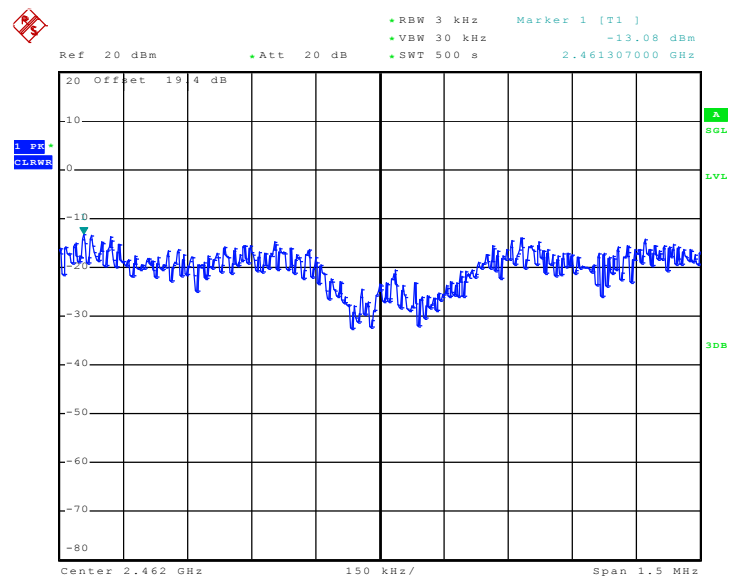


Mode 5 : PSD Plot on 802.11g Channel 06



Date: 22.APR.2010 15:02:36

Mode 6 : PSD Plot on 802.11g Channel 11



Date: 22.APR.2010 14:52:34

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

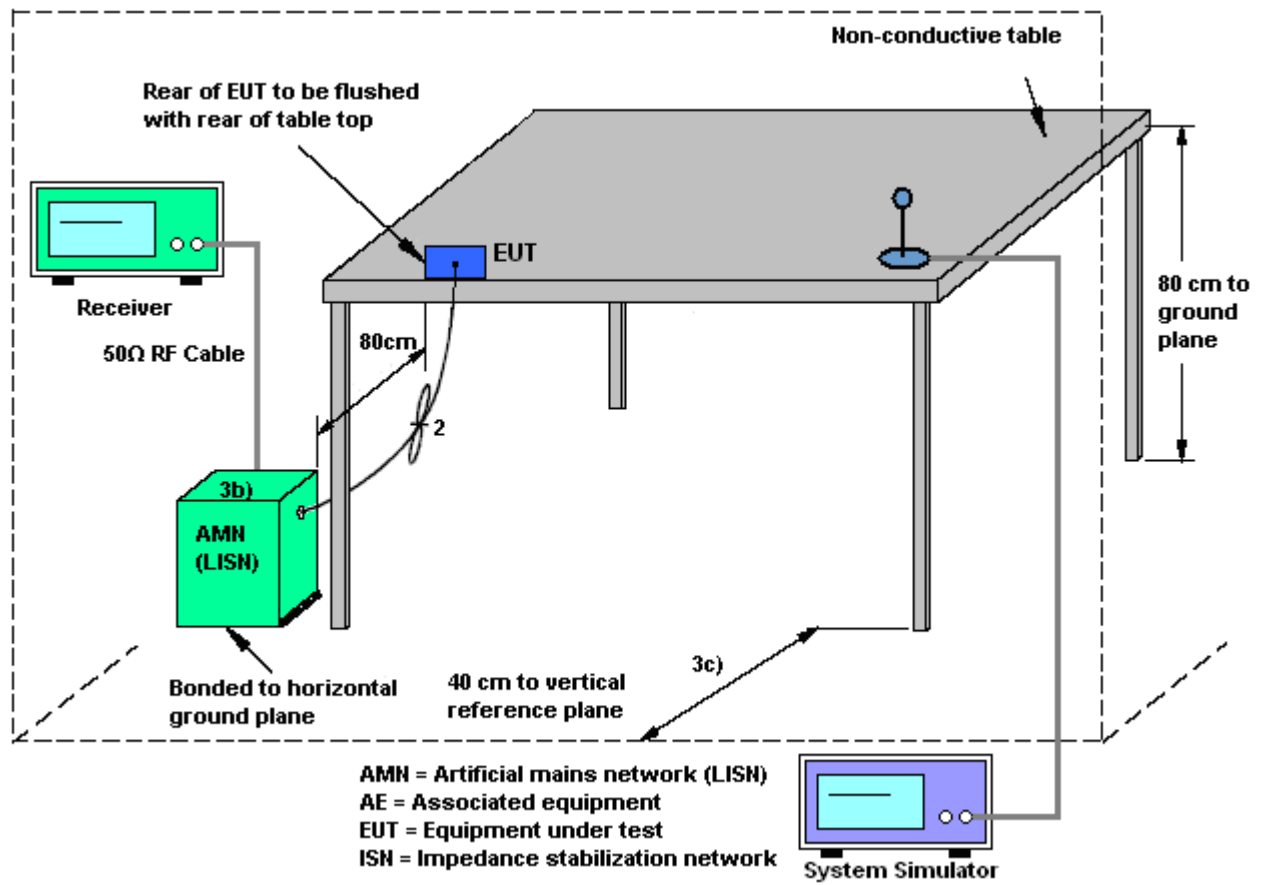
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

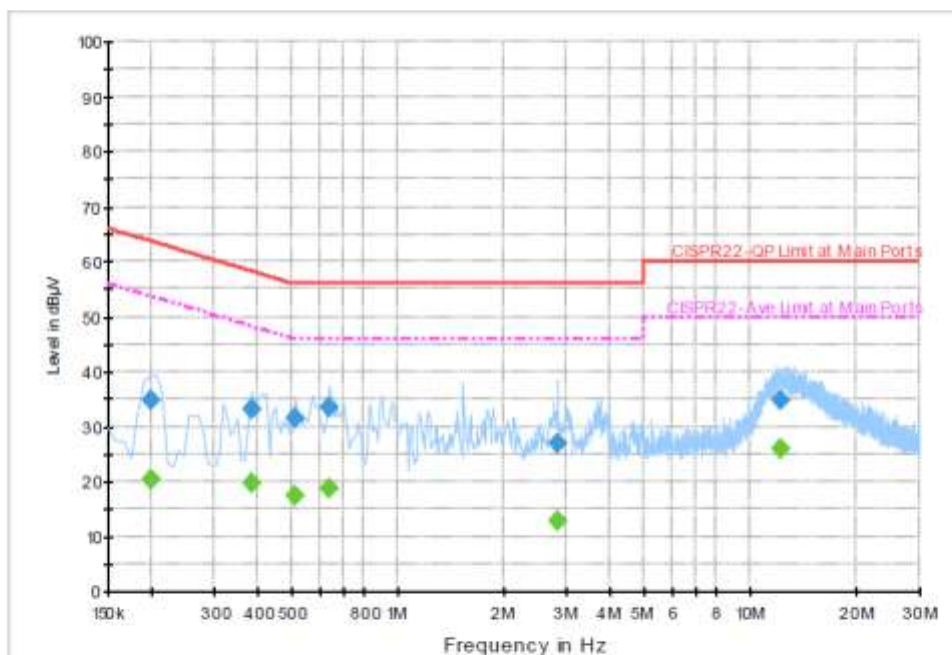
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 2	Temperature :	20~22°C
Test Engineer :	Novic Jiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Sample A + GSM1900 Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



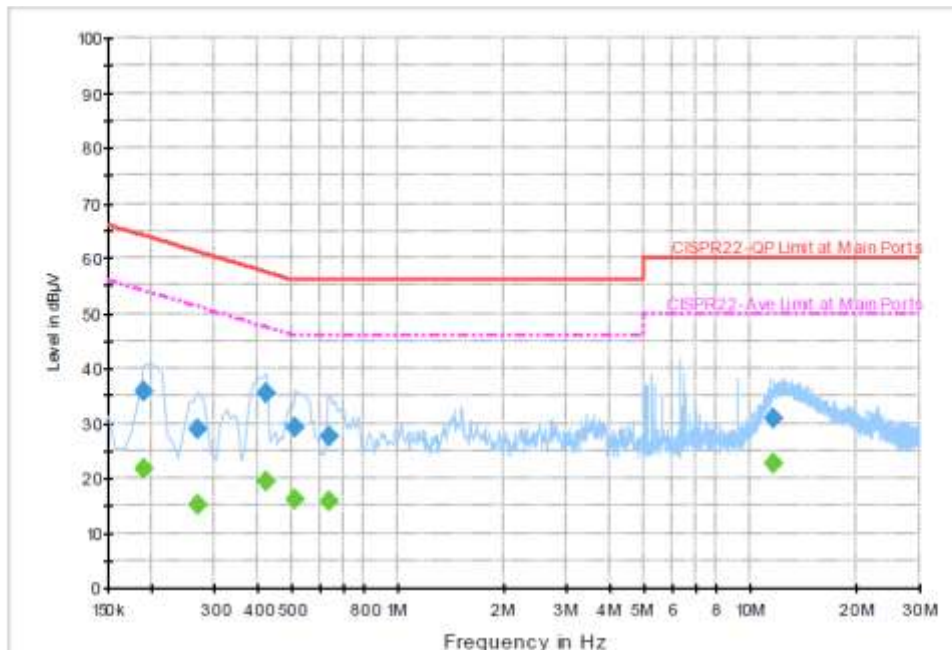
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.198000	34.7	Off	L1	19.6	29.0	63.7
0.382000	33.2	Off	L1	19.5	25.0	58.2
0.510000	31.4	Off	L1	19.4	24.6	56.0
0.638000	33.6	Off	L1	19.5	22.4	56.0
2.822000	26.9	Off	L1	19.5	29.1	56.0
12.126000	34.8	Off	L1	19.6	25.2	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.198000	20.4	Off	L1	19.6	33.3	53.7
0.382000	19.8	Off	L1	19.5	28.4	48.2
0.510000	17.3	Off	L1	19.4	28.7	46.0
0.638000	18.8	Off	L1	19.5	27.2	46.0
2.822000	12.6	Off	L1	19.5	33.4	46.0
12.126000	25.8	Off	L1	19.6	24.2	50.0

Test Mode :	Mode 2	Temperature :	20~22°C
Test Engineer :	Novic Jiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Sample A + GSM1900 Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		


Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.190000	35.8	Off	N	19.5	28.2	64.0
0.270000	28.9	Off	N	19.4	32.2	61.1
0.422000	35.5	Off	N	19.4	21.9	57.4
0.510000	29.0	Off	N	19.4	27.0	56.0
0.638000	27.4	Off	N	19.5	28.6	56.0
11.558000	31.0	Off	N	19.6	29.0	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.190000	21.7	Off	N	19.5	32.3	54.0
0.270000	15.0	Off	N	19.4	36.1	51.1
0.422000	19.4	Off	N	19.4	28.0	47.4
0.510000	15.9	Off	N	19.4	30.1	46.0
0.638000	15.7	Off	N	19.5	30.3	46.0
11.558000	22.6	Off	N	19.6	27.4	50.0

3.7 Radiated Emission Measurement

3.7.1 Limit of Radiated Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.7.2 Measuring Instruments

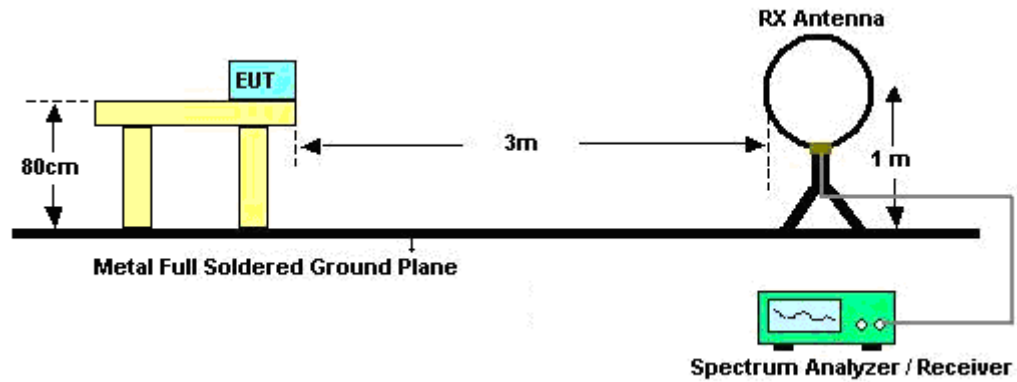
See list of measuring instruments of this test report.

3.7.3 Test Procedures

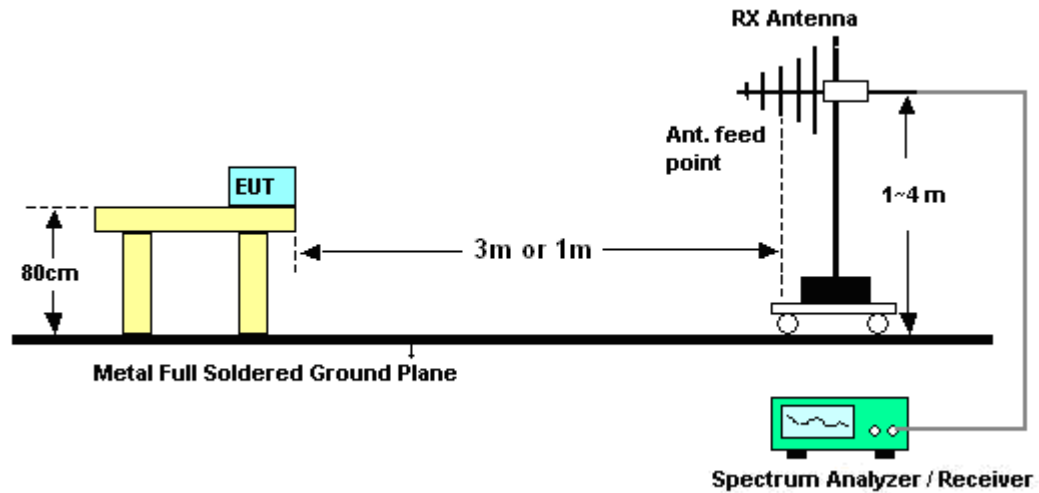
1. The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Use the following spectrum analyzer settings:
 - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
 - (2) Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.
Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB)
3. Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.

3.7.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



**3.7.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)**

Test Engineer :	Ivan Jiang	Temperature :	22~24℃	
		Relative Humidity :	48~49%	
Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.



3.7.6 Test Result of Radiated Emission (30 MHz ~ 10th Harmonic)

Test Mode :	Mode 1	Temperature :	22~24℃
Test Channel :	01	Relative Humidity :	48~49%
Test Engineer :	Ivan Jiang	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	24.01	-15.99	40	35.43	19.51	0.53	31.46	-	-	Peak
153.66	28.5	-15	43.5	47.89	10.95	1.21	31.55	-	-	Peak
208.74	28.15	-15.35	43.5	49.32	8.95	1.35	31.47	-	-	Peak
307	30.31	-15.69	46	46.18	13.67	1.79	31.33	-	-	Peak
405	31.44	-14.56	46	44.22	16.23	2.16	31.17	100	96	Peak
478.5	29.2	-16.8	46	40.17	17.72	2.37	31.06	-	-	Peak
2386.38	42.83	-11.17	54	39.39	32.13	5.46	34.15	111	327	Average
2386.38	52.24	-21.76	74	48.8	32.13	5.46	34.15	111	327	Peak
2412	99.32	-	-	95.88	32.16	5.44	34.16	111	327	Average
2412	103.02	-	-	99.58	32.16	5.44	34.16	111	327	Peak
2492	47.34	-26.66	74	43.87	32.3	5.37	34.2	111	327	Peak
2492	36.21	-17.79	54	32.74	32.3	5.37	34.2	111	327	Average
8214	54.04	-19.96	74	43.16	36	9.98	35.1	114	100	Peak
8214	42.9	-11.1	54	32.02	36	9.98	35.1	114	100	Average



Test Mode :	Mode 1	Temperature :	22~24℃
Test Channel :	01	Relative Humidity :	48~49%
Test Engineer :	Ivan Jiang	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	27.39	-12.61	40	38.81	19.51	0.53	31.46	-	-	Peak
91.02	25.46	-18.04	43.5	47	9.03	0.95	31.52	-	-	Peak
153.66	24.68	-18.82	43.5	44.07	10.95	1.21	31.55	-	-	Peak
307	25.28	-20.72	46	41.15	13.67	1.79	31.33	-	-	Peak
576.5	36.39	-9.61	46	45.11	19.61	2.62	30.95	148	105	Peak
626.2	35.35	-10.65	46	43.2	20.27	2.77	30.89	-	-	Peak
2386.38	42.08	-11.92	54	38.64	32.13	5.46	34.15	104	304	Average
2386.38	51.54	-22.46	74	48.1	32.13	5.46	34.15	104	304	Peak
2412	99.13	-	-	95.69	32.16	5.44	34.16	104	304	Average
2412	102.9	-	-	99.46	32.16	5.44	34.16	104	304	Peak
2494	49.95	-24.05	74	46.48	32.3	5.37	34.2	104	304	Peak
2494	39.42	-14.58	54	35.95	32.3	5.37	34.2	104	304	Average
8346	55.09	-18.91	74	44.12	36	10.07	35.1	145	78	Peak
8346	44.25	-9.75	54	33.28	36	10.07	35.1	145	78	Average



Test Mode :	Mode 2	Temperature :	22~24℃
Test Channel :	06	Relative Humidity :	48~49%
Test Engineer :	Ivan Jiang	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.54	23.51	-16.49	40	35.48	18.95	0.54	31.46	-	-	Peak
149.61	26.68	-16.82	43.5	45.78	11.25	1.21	31.56	-	-	Peak
209.01	28.29	-15.21	43.5	49.43	8.97	1.36	31.47	-	-	Peak
307	30.61	-15.39	46	46.48	13.67	1.79	31.33	-	-	Peak
405	31.46	-14.54	46	44.24	16.23	2.16	31.17	100	214	Peak
478.5	28.81	-17.19	46	39.78	17.72	2.37	31.06	-	-	Peak
2372	48.27	-25.73	74	44.84	32.11	5.47	34.15	106	319	Peak
2372	36.23	-17.77	54	32.8	32.11	5.47	34.15	106	319	Average
2437	104.11	-	-	100.66	32.19	5.43	34.17	106	319	Peak
2437	100.49	-	-	97.03	32.22	5.41	34.17	106	319	Average
2484	49.51	-24.49	74	46.05	32.27	5.38	34.19	106	319	Peak
2484	37.54	-16.46	54	34.08	32.27	5.38	34.19	106	319	Average
8289	54.54	-19.46	74	43.6	36	10.04	35.1	100	124	Peak
8289	43.6	-10.4	54	32.66	36	10.04	35.1	100	124	Average



Test Mode :	Mode 2	Temperature :	22~24℃
Test Channel :	06	Relative Humidity :	48~49%
Test Engineer :	Ivan Jiang	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	27.61	-12.39	40	39.03	19.51	0.53	31.46	-	-	Peak
91.02	24.22	-19.28	43.5	45.76	9.03	0.95	31.52	-	-	Peak
153.66	25.42	-18.08	43.5	44.81	10.95	1.21	31.55	-	-	Peak
307	25.33	-20.67	46	41.2	13.67	1.79	31.33	-	-	Peak
576.5	36.72	-9.28	46	45.44	19.61	2.62	30.95	126	151	Peak
626.2	35.6	-10.4	46	43.45	20.27	2.77	30.89	-	-	Peak
2372	46.18	-27.82	74	42.75	32.11	5.47	34.15	100	304	Peak
2372	34.28	-19.72	54	30.85	32.11	5.47	34.15	100	304	Average
2437	103.09	-	-	99.63	32.22	5.41	34.17	100	304	Peak
2437	99.37	-	-	95.91	32.22	5.41	34.17	100	304	Average
2492	51.31	-22.69	74	47.84	32.3	5.37	34.2	100	304	Peak
2492	39.21	-14.79	54	35.74	32.3	5.37	34.2	100	304	Average
8490	53.82	-20.18	74	42.74	36	10.18	35.1	161	100	Peak
8490	42.59	-11.41	54	31.51	36	10.18	35.1	161	100	Average



Test Mode :	Mode 3	Temperature :	22~24℃
Test Channel :	11	Relative Humidity :	48~49%
Test Engineer :	Ivan Jiang	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	23.6	-16.4	40	35.02	19.51	0.53	31.46	-	-	Peak
149.61	27.02	-16.48	43.5	46.12	11.25	1.21	31.56	-	-	Peak
295.14	26.67	-19.33	46	42.88	13.39	1.73	31.33	-	-	Peak
307	30.4	-15.6	46	46.27	13.67	1.79	31.33	-	-	Peak
405	31.25	-14.75	46	44.03	16.23	2.16	31.17	100	196	Peak
478.5	29.24	-16.76	46	40.21	17.72	2.37	31.06	-	-	Peak
2388	47.54	-26.46	74	44.1	32.13	5.46	34.15	104	317	Peak
2388	35.46	-18.54	54	32.02	32.13	5.46	34.15	104	317	Average
2462	105.52	-	-	102.06	32.24	5.4	34.18	104	317	Peak
2462	101.93	-	-	98.47	32.24	5.4	34.18	104	317	Average
2488.22	50.38	-3.62	54	46.9	32.3	5.37	34.19	104	317	Average
2488.22	56.6	-17.4	74	53.12	32.3	5.37	34.19	104	317	Peak
8454	54.72	-19.28	74	43.68	36	10.14	35.1	133	67	Peak
8454	44.02	-9.98	54	32.98	36	10.14	35.1	133	67	Average



Test Mode :	Mode 3	Temperature :	22~24℃
Test Channel :	11	Relative Humidity :	48~49%
Test Engineer :	Ivan Jiang	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	27.01	-12.99	40	38.43	19.51	0.53	31.46	-	-	Peak
91.02	24.43	-19.07	43.5	45.97	9.03	0.95	31.52	-	-	Peak
151.5	25.18	-18.32	43.5	44.41	11.12	1.21	31.56	-	-	Peak
307	25.8	-20.2	46	41.67	13.67	1.79	31.33	-	-	Peak
576.5	36.47	-9.53	46	45.19	19.61	2.62	30.95	127	164	Peak
626.2	35.3	-10.7	46	43.15	20.27	2.77	30.89	-	-	Peak
2340	46.12	-27.88	74	42.71	32.05	5.5	34.14	100	303	Peak
2340	33.62	-20.38	54	30.21	32.05	5.5	34.14	100	303	Average
2462	104.31	-	-	100.85	32.24	5.4	34.18	100	303	Peak
2462	100.71	-	-	97.25	32.24	5.4	34.18	100	303	Average
2488.22	50.19	-3.81	54	46.71	32.3	5.37	34.19	100	303	Average
2488.22	56.88	-17.12	74	53.4	32.3	5.37	34.19	100	303	Peak
8382	54.6	-19.4	74	43.6	36	10.1	35.1	142	112	Peak
8382	43.33	-10.67	54	32.33	36	10.1	35.1	142	112	Average



Test Mode :	Mode 4	Temperature :	22~24℃
Test Channel :	01	Relative Humidity :	48~49%
Test Engineer :	Ivan Jiang	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	23.27	-16.73	40	34.69	19.51	0.53	31.46	-	-	Peak
153.66	26.66	-16.84	43.5	46.05	10.95	1.21	31.55	-	-	Peak
209.01	27.81	-15.69	43.5	48.95	8.97	1.36	31.47	-	-	Peak
307	30.37	-15.63	46	46.24	13.67	1.79	31.33	-	-	Peak
405	31.38	-14.62	46	44.16	16.23	2.16	31.17	117	46	Peak
478.5	28.89	-17.11	46	39.86	17.72	2.37	31.06	-	-	Peak
2390	46.67	-7.33	54	43.24	32.13	5.46	34.16	104	328	Average
2390	64.33	-9.67	74	60.9	32.13	5.46	34.16	104	328	Peak
2412	92.81	-	-	89.37	32.16	5.44	34.16	104	328	Average
2412	103.37	-	-	99.93	32.16	5.44	34.16	104	328	Peak
2484	49.43	-24.57	74	45.97	32.27	5.38	34.19	104	328	Peak
2484	37.46	-16.54	54	34	32.27	5.38	34.19	104	328	Average
8346	54.37	-19.63	74	43.4	36	10.07	35.1	100	128	Peak
8346	43.75	-10.25	54	32.78	36	10.07	35.1	100	128	Average



Test Mode :	Mode 4	Temperature :	22~24℃
Test Channel :	01	Relative Humidity :	48~49%
Test Engineer :	Ivan Jiang	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	27.31	-12.69	40	38.73	19.51	0.53	31.46	-	-	Peak
91.02	24.44	-19.06	43.5	45.98	9.03	0.95	31.52	-	-	Peak
153.66	24.82	-18.68	43.5	44.21	10.95	1.21	31.55	-	-	Peak
307	25.56	-20.44	46	41.43	13.67	1.79	31.33	-	-	Peak
576.5	36.24	-9.76	46	44.96	19.61	2.62	30.95	120	101	Peak
626.2	35.57	-10.43	46	43.42	20.27	2.77	30.89	-	-	Peak
2390	46.47	-7.53	54	43.04	32.13	5.46	34.16	101	305	Average
2390	62.44	-11.56	74	59.01	32.13	5.46	34.16	101	305	Peak
2412	93.49	-	-	90.05	32.16	5.44	34.16	101	305	Average
2412	103.69	-	-	100.25	32.16	5.44	34.16	101	305	Peak
2486	53.2	-20.8	74	49.74	32.27	5.38	34.19	101	305	Peak
2486	41.52	-12.48	54	38.06	32.27	5.38	34.19	101	305	Average
8406	54.28	-19.72	74	43.26	36	10.12	35.1	128	81	Peak
8406	43.06	-10.94	54	32.04	36	10.12	35.1	128	81	Average



Test Mode :	Mode 5	Temperature :	22~24℃
Test Channel :	06	Relative Humidity :	48~49%
Test Engineer :	Ivan Jiang	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.54	22.87	-17.13	40	34.84	18.95	0.54	31.46	-	-	Peak
149.61	28.32	-15.18	43.5	47.42	11.25	1.21	31.56	-	-	Peak
153.66	26.82	-16.68	43.5	46.21	10.95	1.21	31.55	-	-	Peak
307	30.24	-15.76	46	46.11	13.67	1.79	31.33	-	-	Peak
379.8	29.57	-16.43	46	43.11	15.6	2.1	31.24	-	-	Peak
405	31.4	-14.6	46	44.18	16.23	2.16	31.17	110	147	Peak
2380	48.84	-25.16	74	45.41	32.11	5.47	34.15	105	318	Peak
2380	36.17	-17.83	54	32.74	32.11	5.47	34.15	105	318	Average
2437	103.97	-	-	100.52	32.19	5.43	34.17	105	318	Peak
2437	93.69	-	-	90.23	32.22	5.41	34.17	105	318	Average
2486	51.08	-22.92	74	47.62	32.27	5.38	34.19	105	318	Peak
2486	38.48	-15.52	54	35.02	32.27	5.38	34.19	105	318	Average
8466	54.26	-19.74	74	43.2	36	10.16	35.1	106	58	Peak
8466	44.08	-9.92	54	33.02	36	10.16	35.1	106	58	Average



Test Mode :	Mode 5	Temperature :	22~24℃
Test Channel :	06	Relative Humidity :	48~49%
Test Engineer :	Ivan Jiang	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	27.43	-12.57	40	38.85	19.51	0.53	31.46	-	-	Peak
91.02	25.56	-17.94	43.5	47.1	9.03	0.95	31.52	-	-	Peak
149.61	25.61	-17.89	43.5	44.71	11.25	1.21	31.56	-	-	Peak
307	25.85	-20.15	46	41.72	13.67	1.79	31.33	-	-	Peak
576.5	36.63	-9.37	46	45.35	19.61	2.62	30.95	100	241	Peak
626.2	35.74	-10.26	46	43.59	20.27	2.77	30.89	-	-	Peak
2372	47.14	-26.86	74	43.71	32.11	5.47	34.15	100	304	Peak
2372	34.65	-19.35	54	31.22	32.11	5.47	34.15	100	304	Average
2437	103.07	-	-	99.62	32.22	5.41	34.18	100	304	Peak
2437	92.85	-	-	89.39	32.22	5.41	34.17	100	304	Average
2492	51.55	-22.45	74	48.08	32.3	5.37	34.2	100	304	Peak
2492	39.92	-14.08	54	36.45	32.3	5.37	34.2	100	304	Average
8334	54.01	-19.99	74	43.05	36	10.06	35.1	100	162	Peak
8334	43.65	-10.35	54	32.69	36	10.06	35.1	100	162	Average



Test Mode :	Mode 6	Temperature :	22~24℃
Test Channel :	11	Relative Humidity :	48~49%
Test Engineer :	Ivan Jiang	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	23.12	-16.88	40	34.54	19.51	0.53	31.46	-	-	Peak
149.61	29.03	-14.47	43.5	48.13	11.25	1.21	31.56	-	-	Peak
295.14	26.95	-19.05	46	43.16	13.39	1.73	31.33	-	-	Peak
307	30.28	-15.72	46	46.15	13.67	1.79	31.33	-	-	Peak
405	31.66	-14.34	46	44.44	16.23	2.16	31.17	137	121	Peak
478.5	28.86	-17.14	46	39.83	17.72	2.37	31.06	-	-	Peak
2388	46.85	-27.15	74	43.41	32.13	5.46	34.15	103	318	Peak
2388	35.24	-18.76	54	31.8	32.13	5.46	34.15	103	318	Average
2462	103.82	-	-	100.36	32.24	5.4	34.18	103	318	Peak
2462	94.04	-	-	90.58	32.24	5.4	34.18	103	318	Average
2483.5	48.23	-5.77	54	44.77	32.27	5.38	34.19	103	318	Average
2483.5	68.25	-5.75	74	64.79	32.27	5.38	34.19	103	318	Peak
8298	54.68	-19.32	74	43.74	36	10.04	35.1	107	148	Peak
8298	44.43	-9.57	54	33.49	36	10.04	35.1	107	148	Average



Test Mode :	Mode 6	Temperature :	22~24℃
Test Channel :	11	Relative Humidity :	48~49%
Test Engineer :	Ivan Jiang	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
91.02	23.74	-19.76	43.5	45.28	9.03	0.95	31.52	-	-	Peak
91.02	23.74	-19.76	43.5	45.28	9.03	0.95	31.52	-	-	Peak
149.61	24.42	-19.08	43.5	43.52	11.25	1.21	31.56	-	-	Peak
307	25.72	-20.28	46	41.59	13.67	1.79	31.33	-	-	Peak
576.5	36.55	-9.45	46	45.27	19.61	2.62	30.95	100	144	Peak
626.2	36.47	-9.53	46	44.32	20.27	2.77	30.89	-	-	Peak
2380	46.44	-27.56	74	43.01	32.11	5.47	34.15	100	296	Peak
2380	34.99	-19.01	54	31.56	32.11	5.47	34.15	100	296	Average
2462	103.95	-	-	100.5	32.24	5.4	34.19	100	296	Peak
2462	93.89	-	-	90.43	32.24	5.4	34.18	100	296	Average
2483.5	50.92	-3.08	54	47.46	32.27	5.38	34.19	100	296	Average
2483.5	70.87	-3.13	74	67.41	32.27	5.38	34.19	100	296	Peak
8325	54.19	-19.81	74	43.23	36	10.06	35.1	130	201	Peak
8325	43.63	-10.37	54	32.67	36	10.06	35.1	130	201	Average



Test Mode :	Mode 7	Temperature :	22~24℃
Test Channel :	11	Relative Humidity :	48~49%
Test Engineer :	Ivan Jiang	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	22.12	-17.88	40	33.54	19.51	0.53	31.46	-	-	Peak
149.61	28.03	-15.47	43.5	47.13	11.25	1.21	31.56	-	-	Peak
208.74	24.49	-19.01	43.5	45.66	8.95	1.35	31.47	-	-	Peak
307	30.35	-15.65	46	46.22	13.67	1.79	31.33	-	-	Peak
405	31.34	-14.66	46	44.12	16.23	2.16	31.17	116	301	Peak
478.5	28.51	-17.49	46	39.48	17.72	2.37	31.06	-	-	Peak
2366	47.81	-26.19	74	44.39	32.08	5.49	34.15	109	3	Peak
2366	35.53	-18.47	54	32.11	32.08	5.49	34.15	109	3	Average
2462	103.93	-	-	100.47	32.24	5.4	34.18	109	3	Peak
2462	94.2	-	-	90.74	32.24	5.4	34.18	109	3	Average
2483.5	60.31	-13.69	74	56.85	32.27	5.38	34.19	109	3	Peak
2483.5	43.47	-10.53	54	40.01	32.27	5.38	34.19	109	3	Average
8325	54.68	-19.32	74	43.72	36	10.06	35.1	100	236	Peak
8325	43.43	-10.57	54	32.47	36	10.06	35.1	100	236	Average



Test Mode :	Mode 7	Temperature :	22~24℃
Test Channel :	11	Relative Humidity :	48~49%
Test Engineer :	Ivan Jiang	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	26.69	-13.31	40	38.11	19.51	0.53	31.46	-	-	Peak
91.02	24.47	-19.03	43.5	46.01	9.03	0.95	31.52	-	-	Peak
147.45	25.16	-18.34	43.5	44.17	11.34	1.21	31.56	-	-	Peak
576.5	36.52	-9.48	46	45.24	19.61	2.62	30.95	139	110	Peak
601.7	34.98	-11.02	46	43.13	20.08	2.69	30.92	-	-	Peak
626.2	35.38	-10.62	46	43.23	20.27	2.77	30.89	-	-	Peak
2350	47.65	-26.35	74	44.24	32.05	5.5	34.14	100	173	Peak
2350	34.11	-19.89	54	30.7	32.05	5.5	34.14	100	173	Average
2462	100.29	-	-	96.83	32.24	5.4	34.18	100	173	Peak
2462	90.37	-	-	86.91	32.24	5.4	34.18	100	173	Average
2483.5	56	-18	74	52.54	32.27	5.38	34.19	100	173	Peak
2483.5	40.2	-13.8	54	36.74	32.27	5.38	34.19	100	173	Average
8445	55.33	-18.67	74	44.29	36	10.14	35.1	100	211	Peak
8445	44.81	-9.19	54	33.77	36	10.14	35.1	100	211	Average

3.8 Antenna Requirements

3.8.1 Standard Applicable

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. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

3.8.2 Antenna Connected Construction

The antennas type used in this product is PIFA Antenna without connector and it is considered to meet antenna requirement.

3.8.3 Antenna Gain

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

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 23, 2009	Jun. 22, 2010	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 17, 2009	Sep. 16, 2010	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 10, 2009	Sep. 09, 2010	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz ~ 2.75GHz	Aug. 05, 2009	Aug. 04, 2010	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9kHz~30MHz	Nov. 30, 2009	Nov. 29, 2010	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9kHz~30MHz	Nov. 23, 2009	Nov. 22, 2010	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
System Simulator	R&S	CMU200	105934	N/A	Nov. 11, 2008	Nov. 10, 2010	Conduction (CO05-HY)
GPS Station	T&E	GS-50	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 31, 2009	Oct. 30, 2010	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP	101067	9KHz ~ 30GHz	Dec. 04, 2009	Dec. 03, 2010	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 20, 2009	Aug. 19, 2010	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 14, 2009	Oct. 13, 2010	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec.09,2009	Dec. 08, 2010	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32 dB.GAIN	Mar. 27, 2010	Mar. 26, 2011	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 KHz~30 MHz	May 22, 2008	May 21, 2010	Radiation (03CH07-HY)

5 Uncertainty of Evaluation

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

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 Specification	1.50	Rectangular	0.43
Site Imperfection	1.39	Rectangular	0.80
Mismatch	+0.34 / -0.35	U-Shape	0.24
Combined Standard Uncertainty $U_c(y)$	1.13		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.26		

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

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-Shape	0.28
Combined Standard Uncertainty $U_c(y)$	1.27		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.54		

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

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	± 0.10	Normal (k=2)	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 = $20\text{Log}(1-\Gamma_1*\Gamma_2)$	+0.34 / -0.35	U-Shape	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				



Appendix A. Photographs of EUT

Please refer to Sporton report number EP041004 as below.