

FCC RF Test Report

APPLICANT : HTC Corporation
EQUIPMENT : Smartphone
MODEL NAME : PH39100
FCC ID : NM8PH39100
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Transmission System (DTS)

The product was received on May 09, 2011 and completely tested on Jun. 02, 2011. 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:



Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR142244-01B	Rev. 01	Initial issue of report	Jun. 28, 2011

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 5.3 dB at 0.26 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 7.66 dB at 436.5 MHz
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

HTC Corporation

No. 23, Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan

1.2 Manufacturer

HTC Corporation

No. 23, Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Smartphone
Model Name	PH39100
FCC ID	NM8PH39100
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Number of Channels	11
Carrier Frequency of Each Channel	$2412+(n-1)*5$ MHz; $n=1\sim11$
Channel Spacing	5 MHz
Maximum Output Power to Antenna	802.11b : 21.44 dBm (0.139 W) 802.11g : 23.63 dBm (0.231 W) 802.11n (BW 20MHz) : 23.57 dBm (0.228 W)
Antenna Type	PCB Antenna with gain -2.63 dBi
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Identical Prototype

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	722060/4086B-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 8

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.	Bluetooth Base Station	R&S	CBT32	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
6.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m

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)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	-	-	-	21.1
CH 06	2437 MHz	-	-	-	20.99
CH 11	2462 MHz	21.33	21.28	21.27	21.44

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		OFDM Data Rate							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
CH 01	2412 MHz	22.85	-	-	-	-	-	-	-
CH 06	2437 MHz	22.96	-	-	-	-	-	-	-
CH 11	2462 MHz	23.63	23.53	23.1	23.2	23.02	23.29	22.94	23.31

Channel	Frequency	2.4GHz 802.11n (BW 20MHz) RF Power (dBm)							
		OFDM Data Rate							
		MCS=0	MCS=1	MCS=2	MCS=3	MCS=4	MCS=5	MCS=6	MCS=7
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
CH 01	2412 MHz	22.92	-	-	-	-	-	-	-
CH 06	2437 MHz	23.19	-	-	-	-	-	-	-
CH 11	2462 MHz	23.57	23.53	23.14	23.12	23.39	23.22	23.48	23.41

Remark:

1. The data rates of WLAN 802.11b/g/n were set in 11Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n (BW 20MHz) 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).

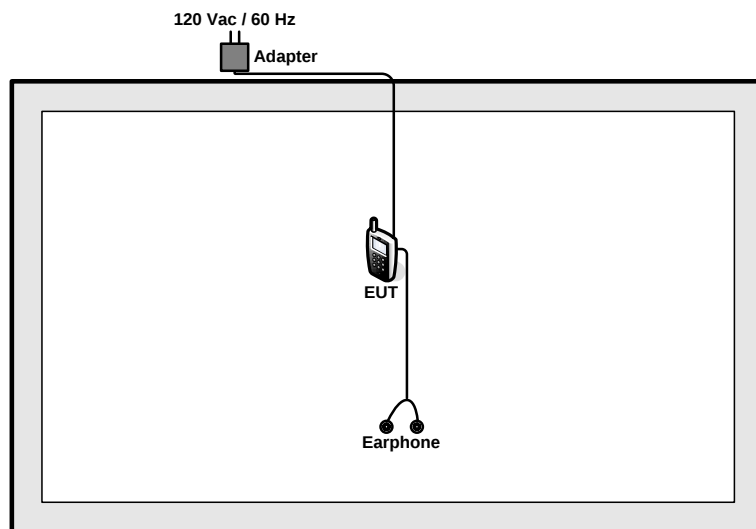
Pre-scanned tests were conducted to determine the final configuration from all possible combinations.

The following tables are showing the test modes as the worst cases and recorded in this report.

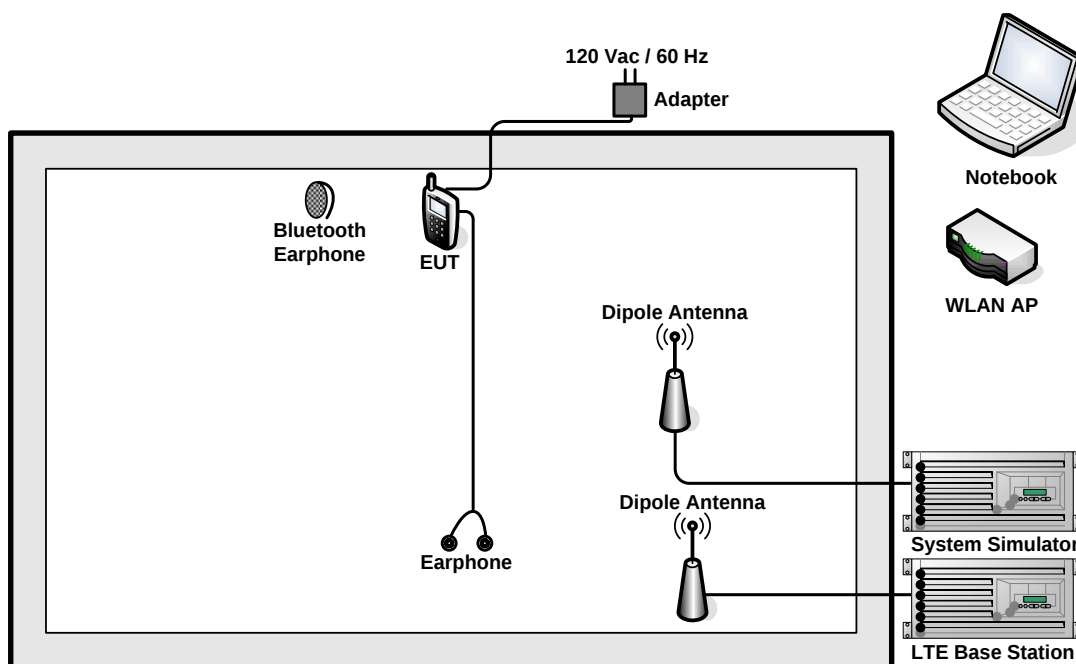
Test Cases		
Test Item	802.11b (Modulation : DSSS)	802.11g/n (Modulation : OFDM)
Conducted TCs	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz Mode 7: 802.11n (BW 20M)_CH01_2412 MHz Mode 8: 802.11n (BW 20M)_CH06_2437 MHz Mode 9: 802.11n (BW 20M)_CH11_2462 MHz
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz Mode 7: 802.11n (BW 20M)_CH01_2412 MHz Mode 8: 802.11n (BW 20M)_CH06_2437 MHz Mode 9: 802.11n (BW 20M)_CH11_2462 MHz
AC Conducted Emission	Mode 1 : GSM1900 Idle + LTE Band4 Idle + Bluetooth Link + WLAN Link + Battery + Camera + Earphone + USB Cable (Charging from Adapter)	

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.4 RF Utility

The programmed RF utility "Remote 432X controller" 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.

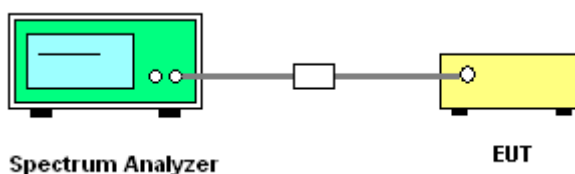
3.1.2 Measuring Instruments

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

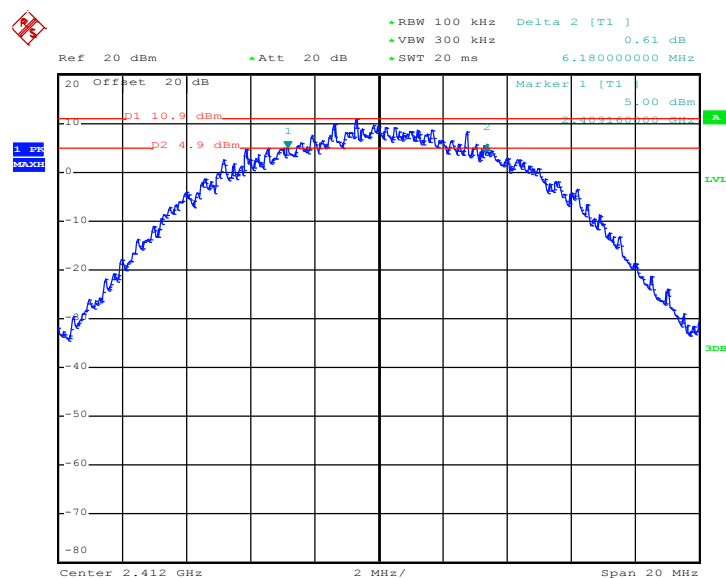


3.1.5 Test Result of 6dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Hank Yu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	6.18	0.5	Pass
06	2437	6.40	0.5	Pass
11	2462	6.24	0.5	Pass

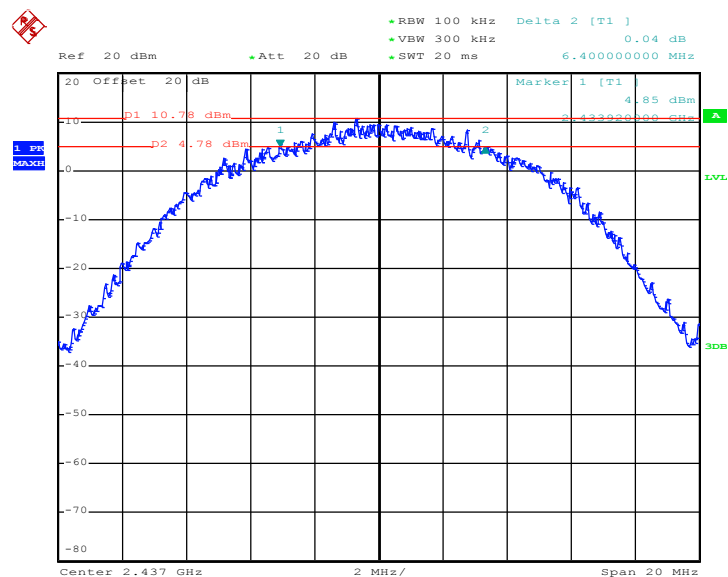
Mode 1 : 6 dB Bandwidth Plot on 802.11b Channel 01



Date: 26.MAY.2011 23:58:28

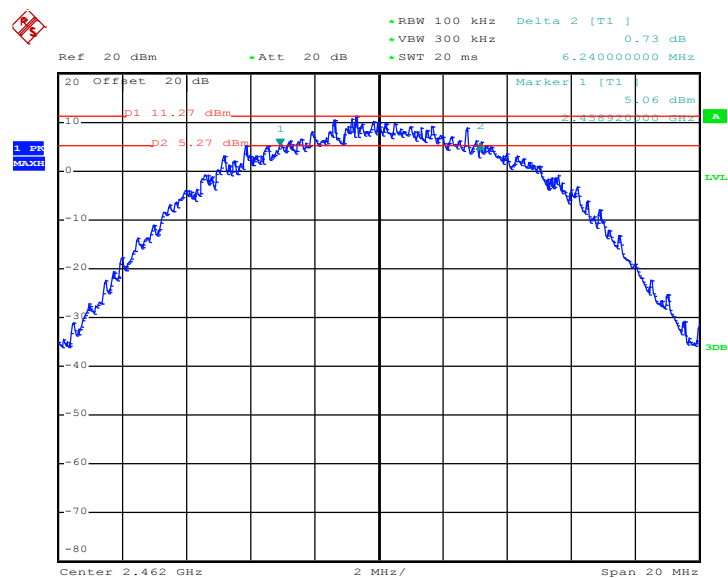


Mode 2 : 6 dB Bandwidth Plot on 802.11b Channel 06



Date: 27.MAY.2011 00:11:03

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



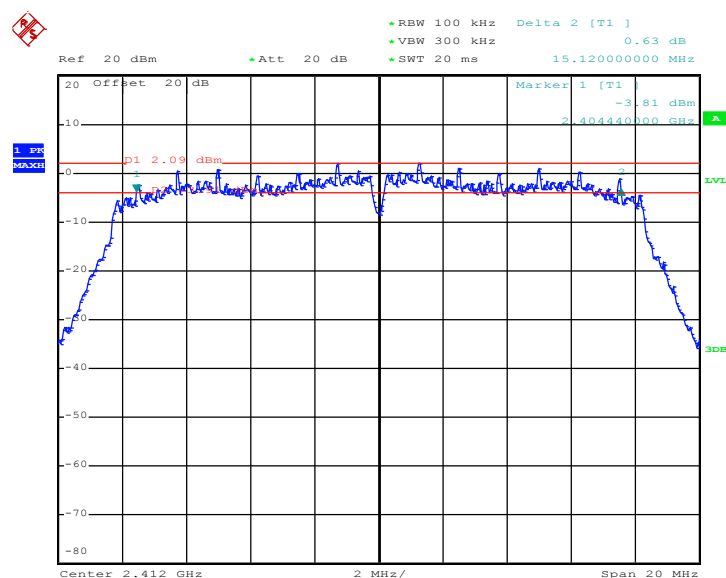
Date: 27.MAY.2011 00:03:01



Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	15.12	0.5	Pass
06	2437	15.12	0.5	Pass
11	2462	15.08	0.5	Pass

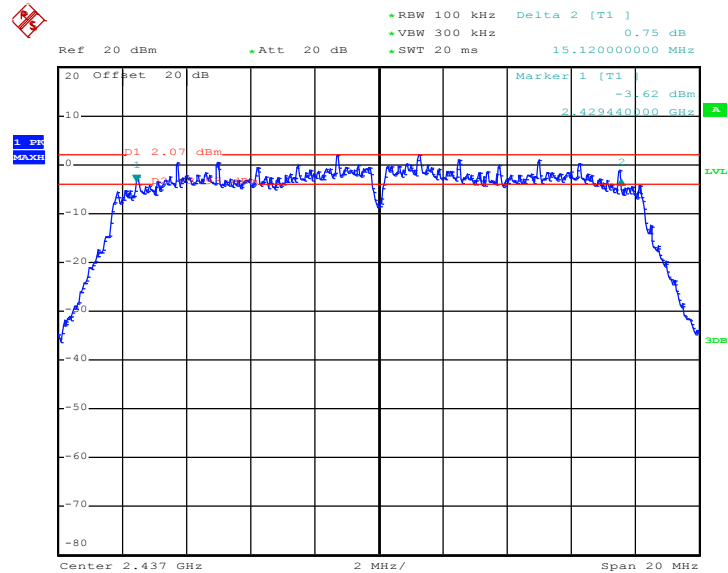
Mode 4 : 6 dB Bandwidth Plot on 802.11g Channel 01



Date: 27.MAY.2011 00:16:24

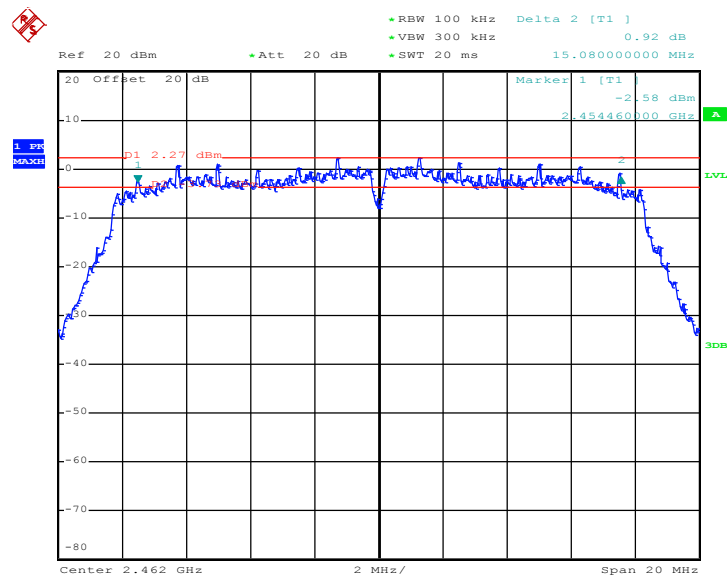


Mode 5 : 6 dB Bandwidth Plot on 802.11g Channel 06



Date: 27.MAY.2011 00:13:05

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



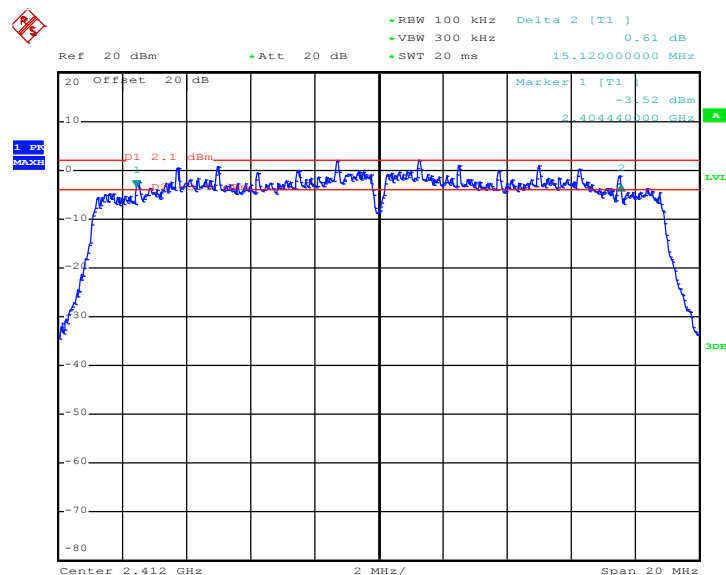
Date: 27.MAY.2011 00:22:45



Test Mode :	Mode 7, 8, 9	Temperature :	24~26°C
Test Engineer :	Hank Yu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11n (BW 20MHz) 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	15.12	0.5	Pass
06	2437	15.92	0.5	Pass
11	2462	15.08	0.5	Pass

Mode 7 : 6 dB Bandwidth Plot on 802.11n(BW 20MHz) Channel 01



Date: 27.MAY.2011 00:29:14



Mode 9 : 6 dB Bandwidth Plot on 802.11n(BW 20MHz) Channel 11



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.

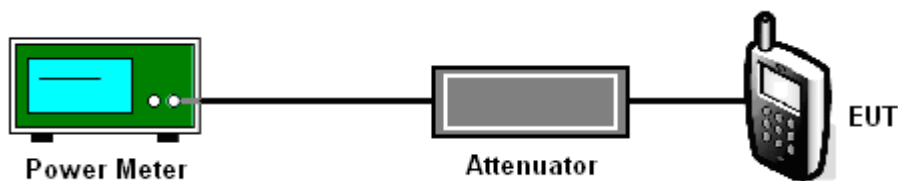
3.2.2 Measuring Instruments

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 :	24~26℃
Test Engineer :	Hank Yu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	21.1	30	Pass
06	2437	20.99	30	Pass
11	2462	21.44	30	Pass

Test Mode :	Mode 4, 5, 6	Temperature :	24~26℃
Test Engineer :	Hank Yu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	22.85	30	Pass
06	2437	22.96	30	Pass
11	2462	23.63	30	Pass

Test Mode :	Mode 7, 8, 9	Temperature :	24~26℃
Test Engineer :	Hank Yu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11n (BW 20MHz) Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	22.92	30	Pass
06	2437	23.19	30	Pass
11	2462	23.57	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

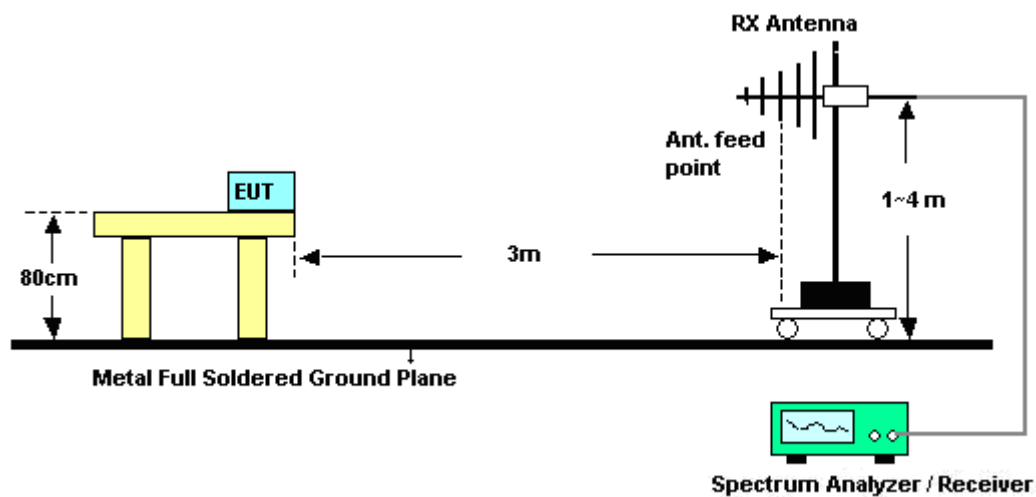
See list of measuring instruments of this test report.

3.3.3 Test Procedures

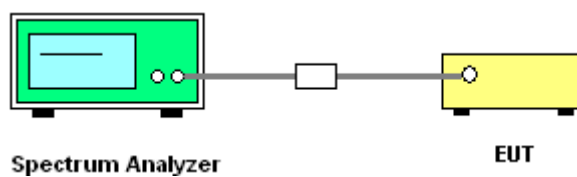
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized 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 :	45~49%
Test Channel :	01	Test Engineer :	David Yang

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
2389.61	49.1	-24.9	74	44.74	32.18	6.03	33.85	100	329	Peak
2389.61	36.4	-17.6	54	32.04	32.18	6.03	33.85	100	329	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
2389.61	48.6	-25.4	74	44.24	32.18	6.03	33.85	130	337	Peak
2389.61	35.26	-18.74	54	30.9	32.18	6.03	33.85	130	337	Average

Test Mode :	Mode 3	Temperature :	22~24℃
Test Band :	802.11b	Relative Humidity :	45~49%
Test Channel :	11	Test Engineer :	David Yang

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
2486.7	47.91	-26.09	74	43.35	32.28	6.18	33.9	127	174	Peak
2486.7	35.34	-18.66	54	30.78	32.28	6.18	33.9	127	174	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	46.71	-27.29	74	42.15	32.28	6.18	33.9	100	247	Peak
2483.5	34.69	-19.31	54	30.13	32.28	6.18	33.9	100	247	Average



Test Mode :	Mode 4	Temperature :	22~24℃
Test Band :	802.11g	Relative Humidity :	45~49%
Test Channel :	01	Test Engineer :	David Yang

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	56.92	-17.08	74	52.56	32.18	6.03	33.85	128	315	Peak
2390	39.4	-14.6	54	35.04	32.18	6.03	33.85	128	315	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	55.16	-18.84	74	50.8	32.18	6.03	33.85	130	335	Peak
2390	38.39	-15.61	54	34.03	32.18	6.03	33.85	130	335	Average

Test Mode :	Mode 6	Temperature :	22~24℃
Test Band :	802.11g	Relative Humidity :	45~49%
Test Channel :	11	Test Engineer :	David Yang

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	57.87	-16.13	74	53.31	32.28	6.18	33.9	102	318	Peak
2483.5	40.08	-13.92	54	35.52	32.28	6.18	33.9	102	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
2483.66	53.07	-20.93	74	48.51	32.28	6.18	33.9	124	244	Peak
2483.66	36.37	-17.63	54	31.81	32.28	6.18	33.9	124	244	Average

Test Mode :	Mode 7	Temperature :	22~24℃
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	45~49%
Test Channel :	01	Test Engineer :	David Yang

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
2389.42	57.46	-16.54	74	53.1	32.18	6.03	33.85	128	318	Peak
2389.42	38.61	-15.39	54	34.25	32.18	6.03	33.85	128	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
2389.61	58.3	-15.7	74	53.94	32.18	6.03	33.85	130	336	Peak
2389.61	40.92	-13.08	54	36.56	32.18	6.03	33.85	130	336	Average

Test Mode :	Mode 9	Temperature :	22~24℃
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	45~49%
Test Channel :	11	Test Engineer :	David Yang

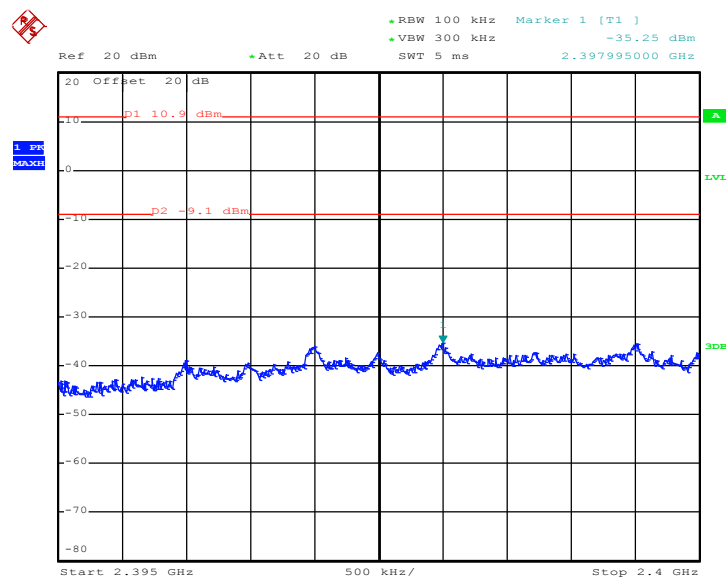
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	55.94	-18.06	74	51.38	32.28	6.18	33.9	100	319	Peak
2483.5	39.25	-14.75	54	34.69	32.28	6.18	33.9	100	319	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
2483.66	54.56	-19.44	74	50	32.28	6.18	33.9	128	337	Peak
2483.66	39.14	-14.86	54	34.58	32.28	6.18	33.9	128	337	Average

3.3.6 Test Plots of Conducted Band Edges

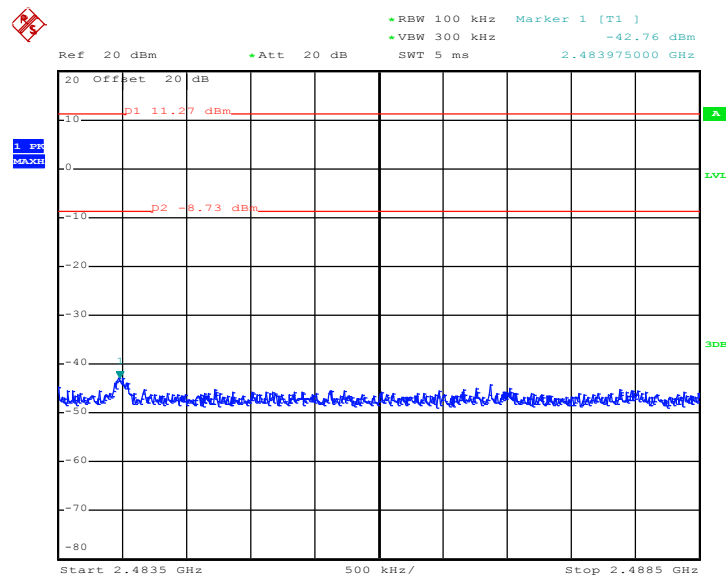
Test Mode :	Mode 1 and 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Hank Yu

Low Band Edge Plot on 802.11b Channel 01



Date: 26.MAY.2011 23:59:37

High Band Edge Plot on 802.11b Channel 11

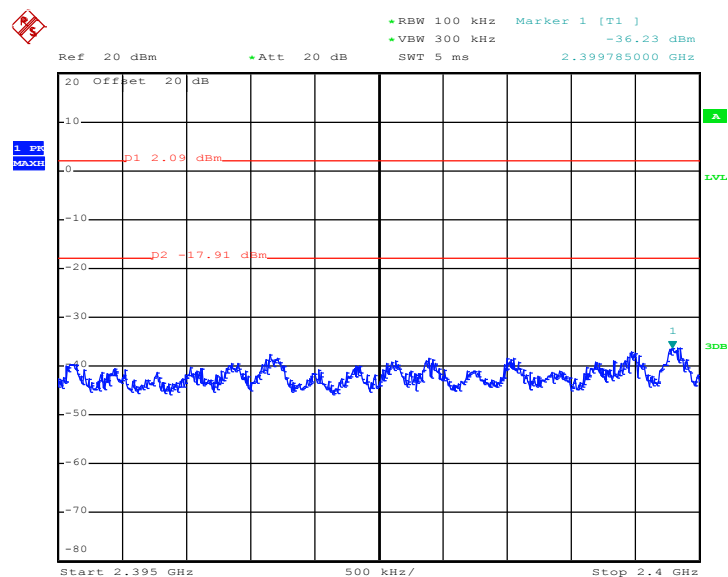


Date: 27.MAY.2011 00:03:47



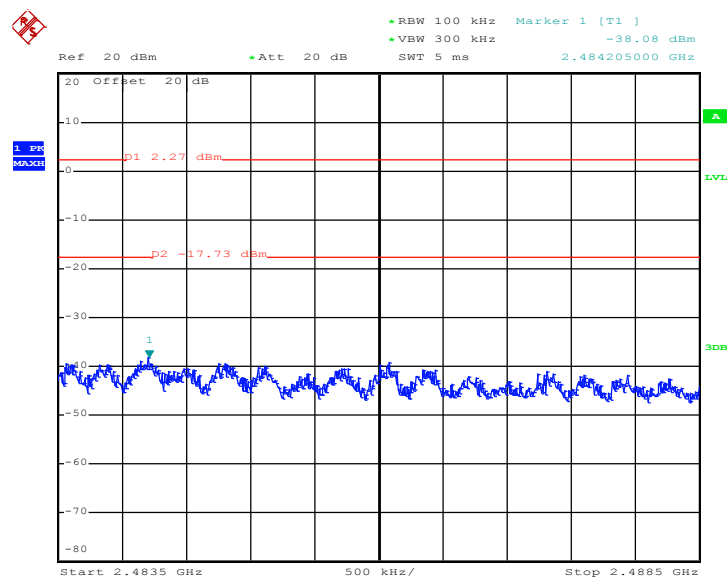
Test Mode :	Mode 4 and 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Hank Yu

Low Band Edge Plot on 802.11g Channel 01



Date: 27.MAY.2011 00:17:32

High Band Edge Plot on 802.11g Channel 11

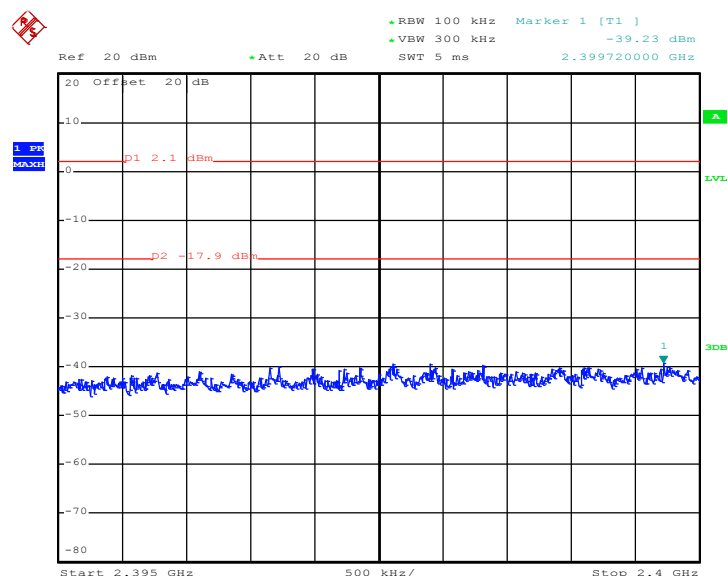


Date: 27.MAY.2011 00:23:31



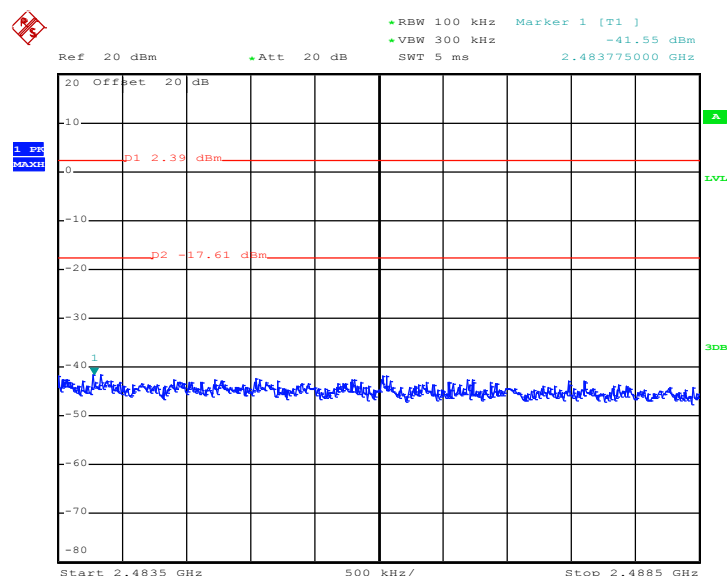
Test Mode :	Mode 7 and 9	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Hank Yu

Low Band Edge Plot on 802.11n (BW 20MHz) Channel 01



Date: 27.MAY.2011 00:30:23

High Band Edge Plot on 802.11n (BW 20MHz) Channel 11



Date: 27.MAY.2011 00:26:47

3.4 Spurious Emission Measurement

3.4.1 Limit of Spurious Emission Measurement

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

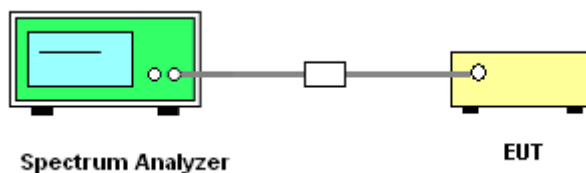
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedure

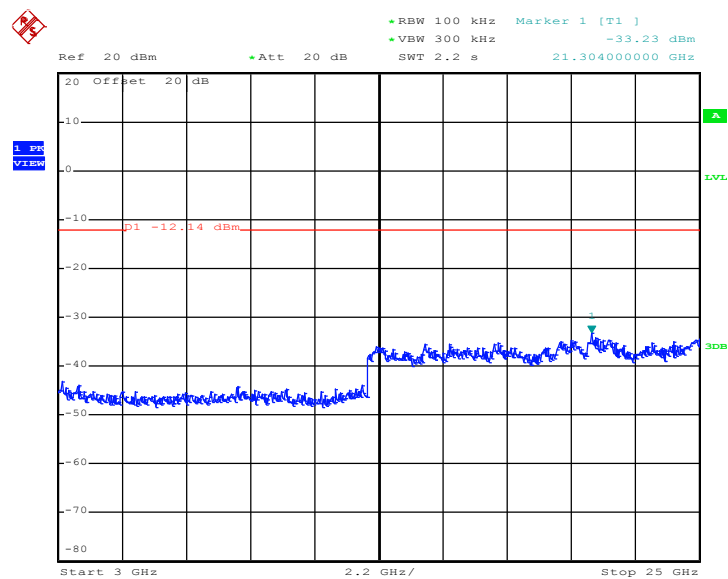
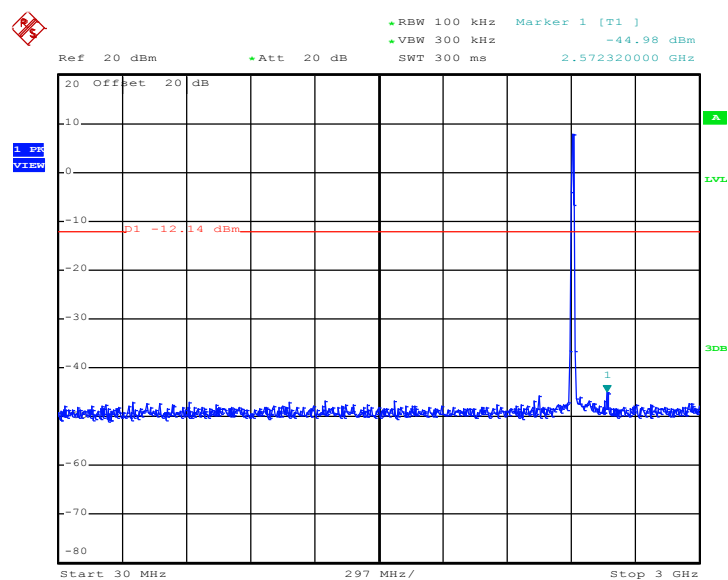
1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set RBW = 100 kHz, Video bandwidth (VBW) $\geq$ RBW, scan up through 10th harmonic. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100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

3.4.4 Test Setup

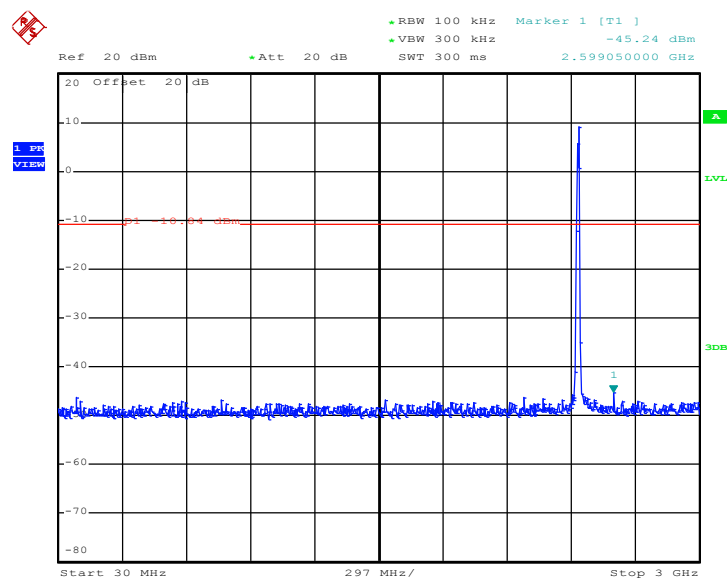




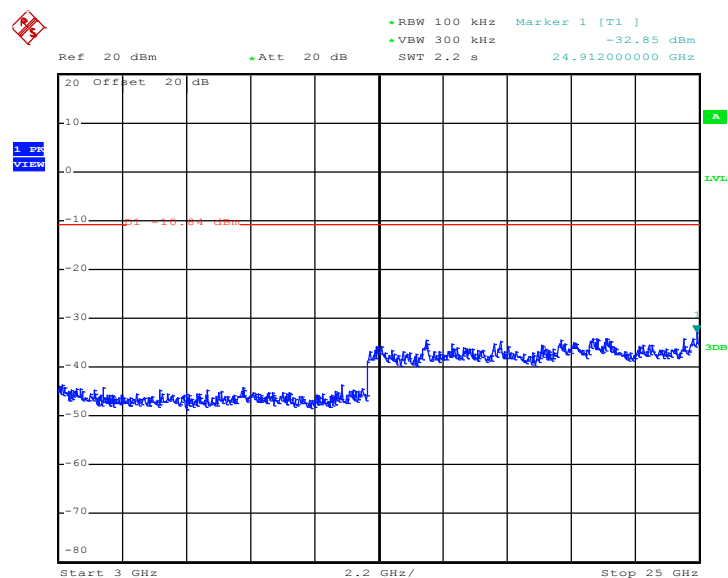
Test Mode :	Mode 1	Temperature :	24~26℃
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Hank Yu



Test Mode :	Mode 2	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 27.MAY.2011 00:11:54

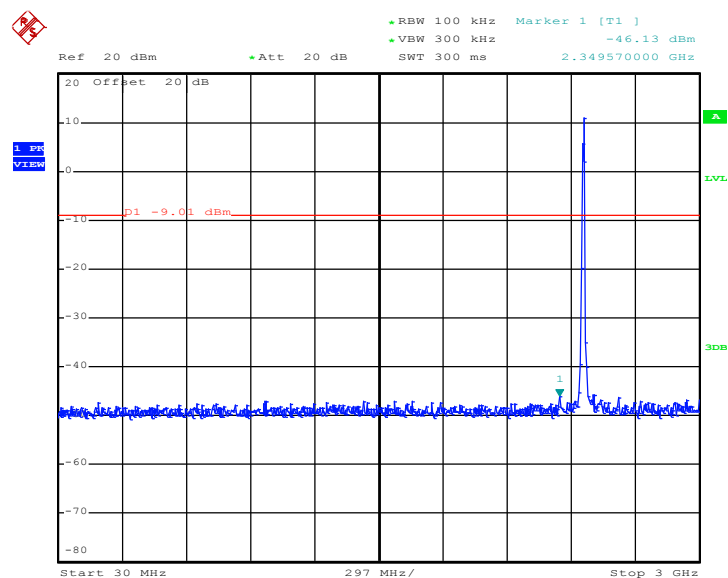
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 27.MAY.2011 00:12:11



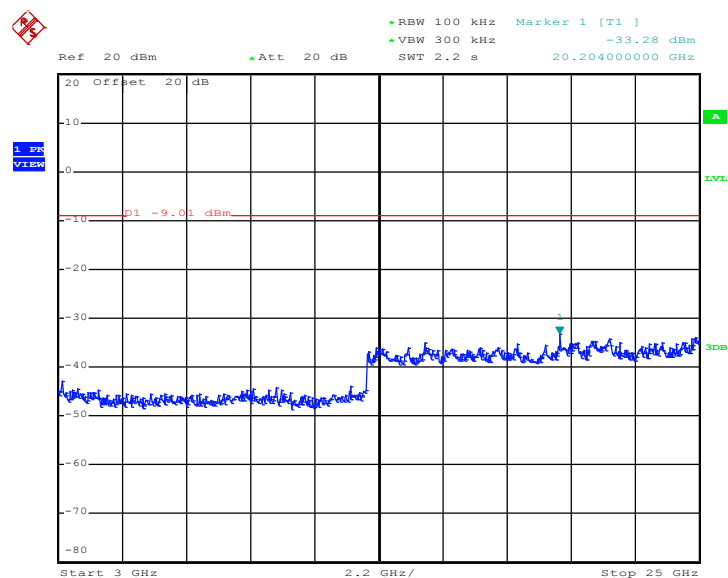
Test Mode :	Mode 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 27.MAY.2011 00:04:34

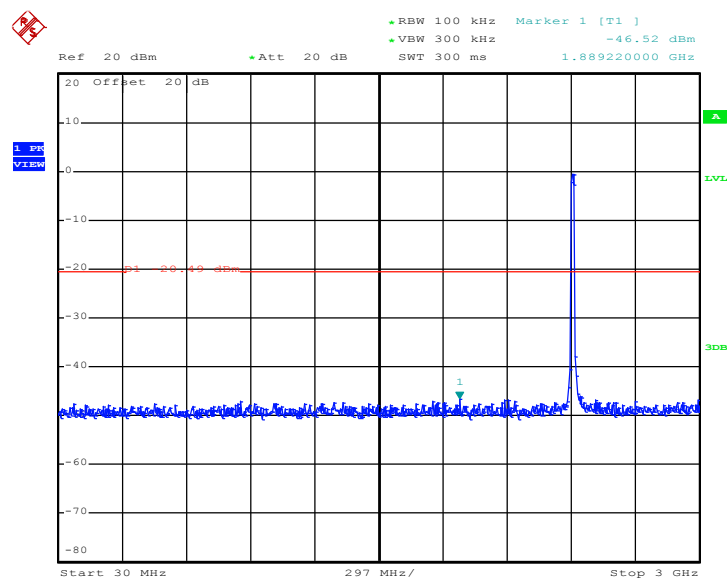
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



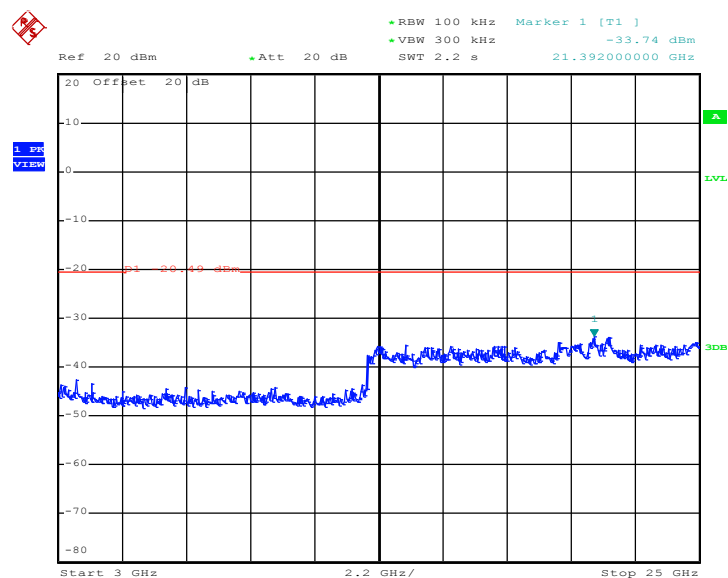
Date: 27.MAY.2011 00:04:50



Test Mode :	Mode 4	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz

Date: 27.MAY.2011 00:18:18

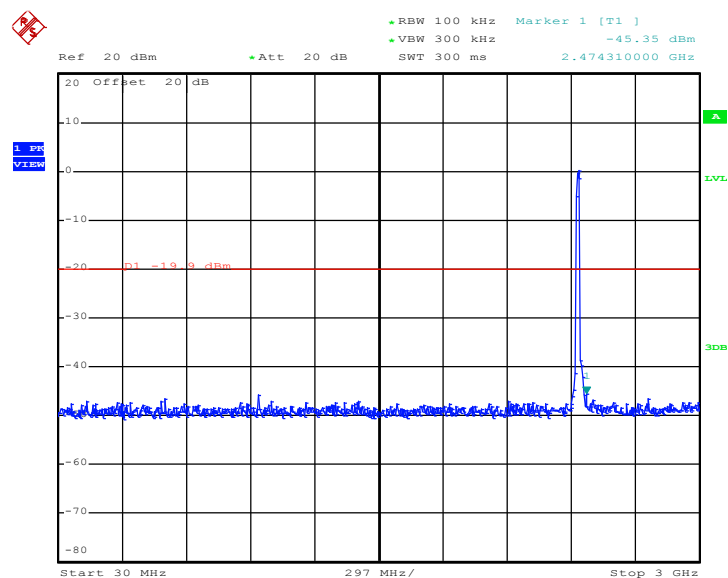
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

Date: 27.MAY.2011 00:18:35



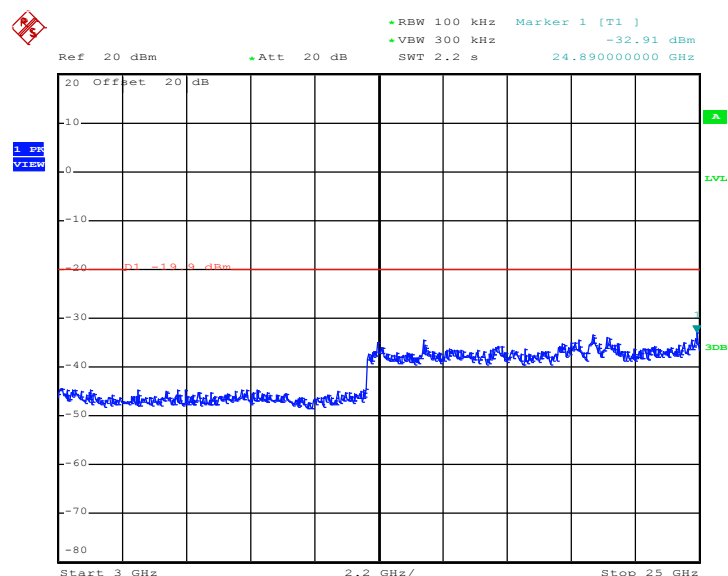
Test Mode :	Mode 5	Temperature :	24~26
Test Band :	802.11g	Relative Humidity :	50~53
Test Channel :	06	Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 27.MAY.2011 00:13:56

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

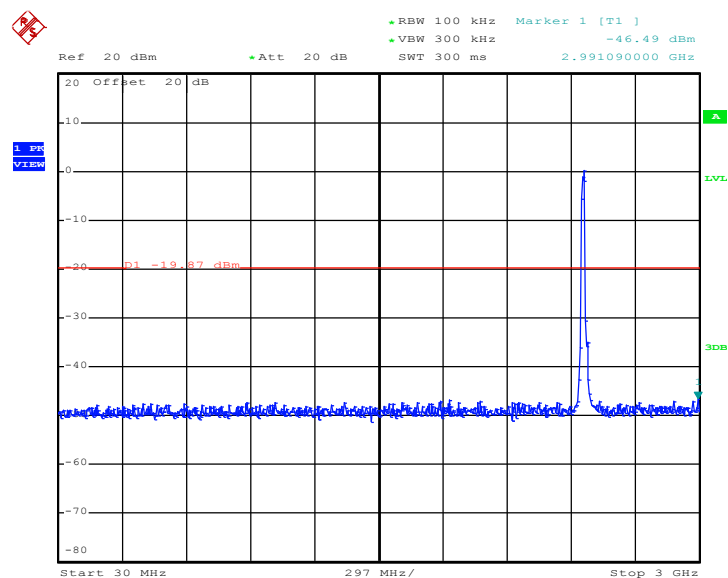


Date: 27.MAY.2011 00:14:12



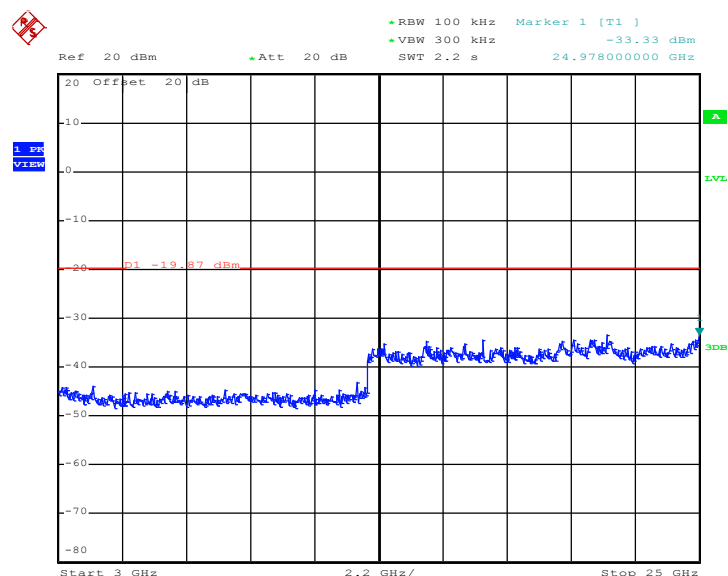
Test Mode :	Mode 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



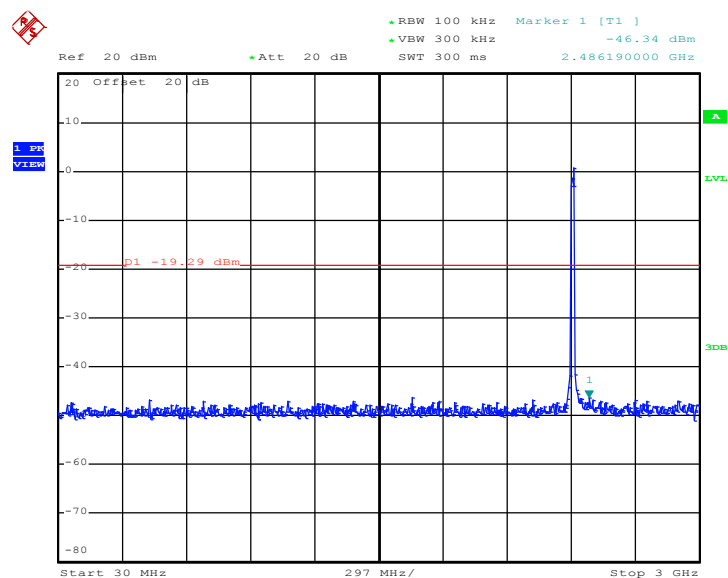
Date: 27.MAY.2011 00:24:23

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

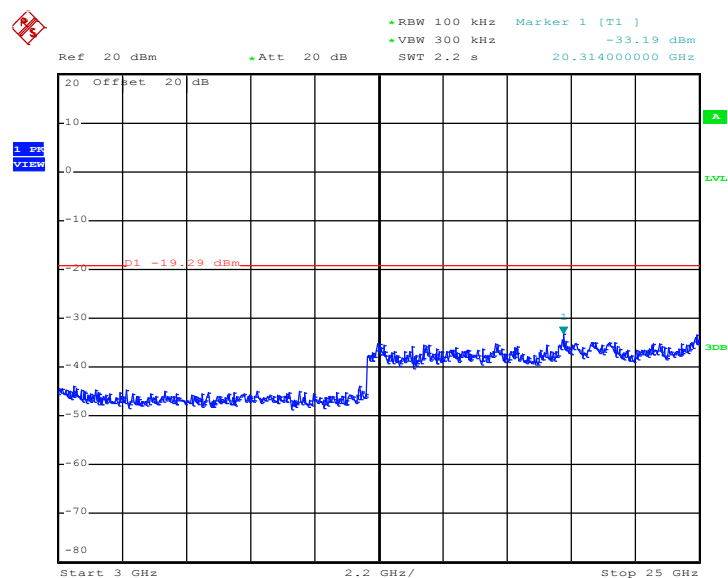


Date: 27.MAY.2011 00:24:47

Test Mode :	Mode 7	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


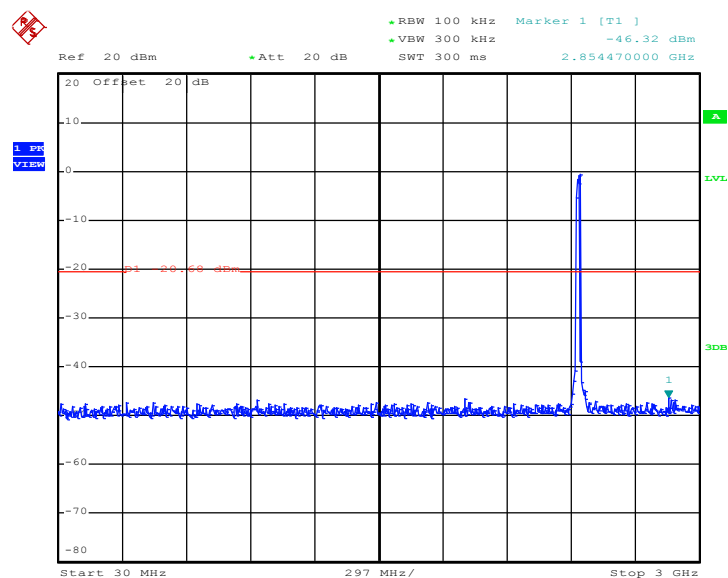
Date: 27.MAY.2011 00:31:10

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


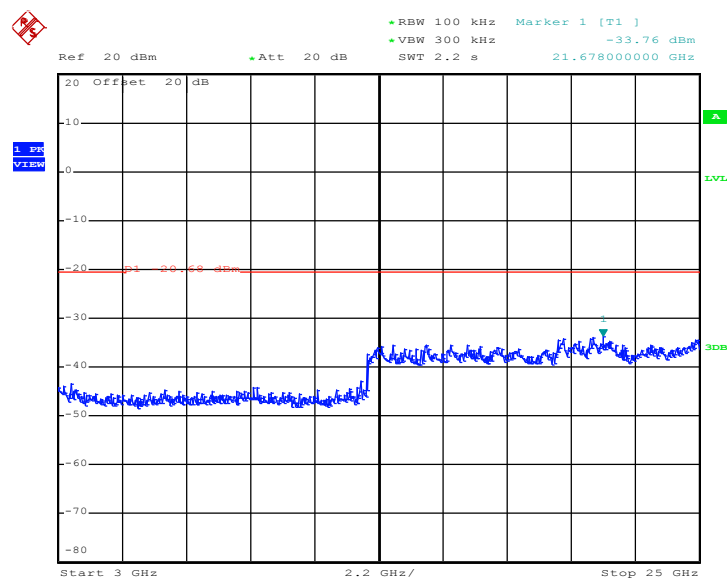
Date: 27.MAY.2011 00:31:27



Test Mode :	Mode 8	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Hank Yu

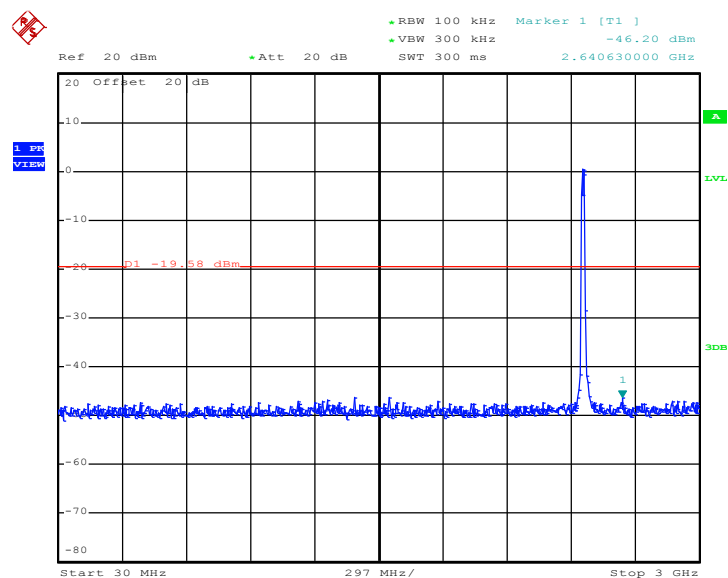
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz

Date: 27.MAY.2011 00:41:45

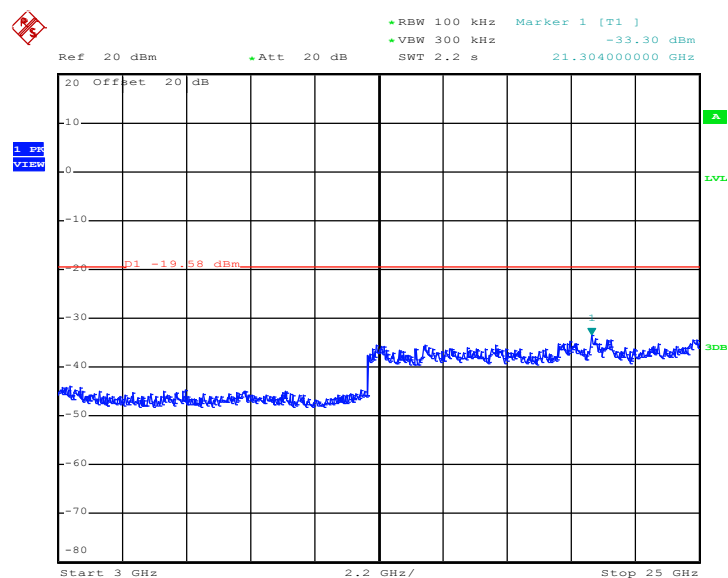
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

Date: 27.MAY.2011 00:42:02

Test Mode :	Mode 9	Temperature :	24~26°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 27.MAY.2011 00:27:33

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 27.MAY.2011 00:27:51

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.

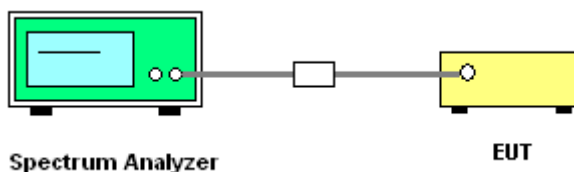
3.5.2 Measuring Instruments

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

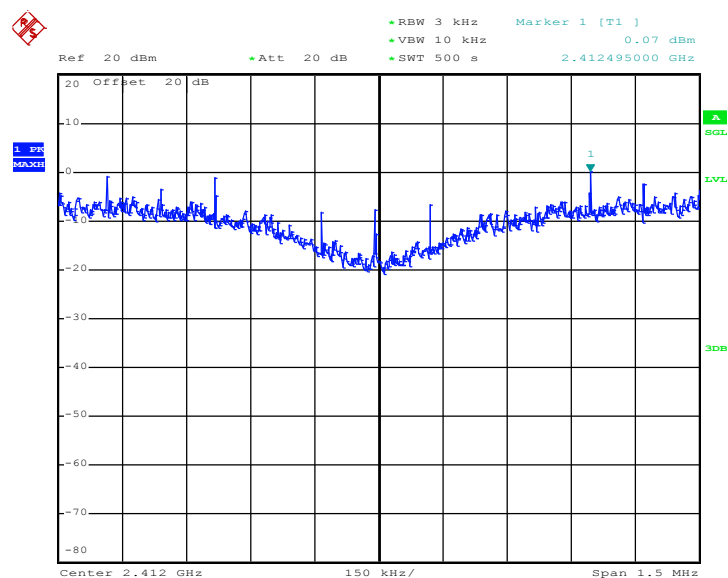


3.5.5 Test Result of Power Spectral Density

Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Hank Yu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	0.07	8	Pass
06	2437	4.38	8	Pass
11	2462	4.99	8	Pass

Mode 1 : PSD Plot on 802.11b Channel 01



Date: 27.MAY.2011 01:54:49



Mode 3 : PSD Plot on 802.11b Channel 11

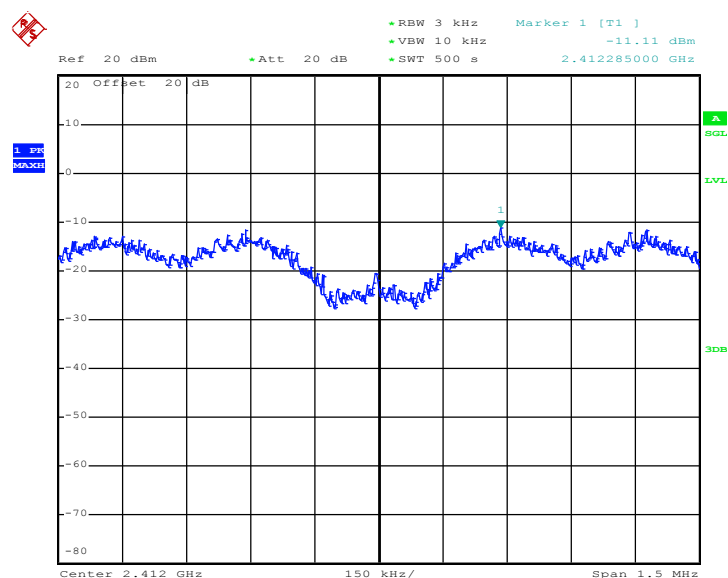




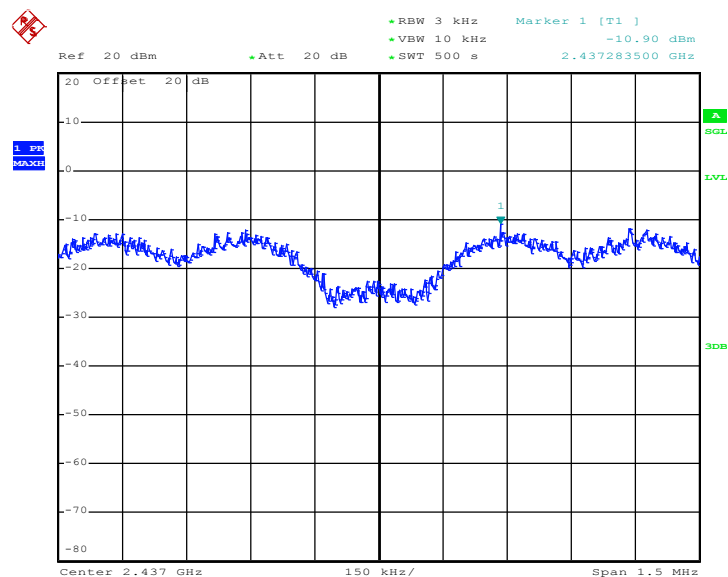
Test Mode :	Mode 4, 5, 6	Temperature :	24~26℃
Test Engineer :	Hank Yu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-11.11	8	Pass
06	2437	-10.90	8	Pass
11	2462	-10.48	8	Pass

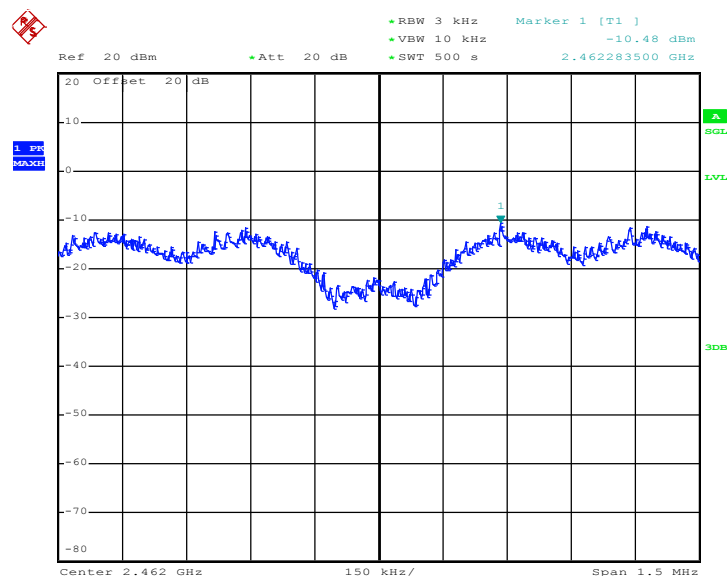
Mode 4 : PSD Plot on 802.11g Channel 01



Date: 27.MAY.2011 01:17:10

Mode 5 : PSD Plot on 802.11g Channel 06


Date: 27.MAY.2011 02:12:23

Mode 6 : PSD Plot on 802.11g Channel 11


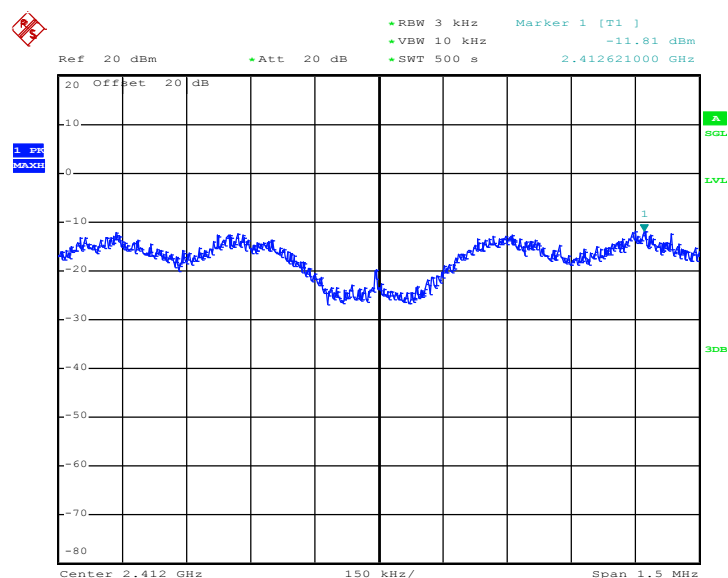
Date: 27.MAY.2011 01:26:41



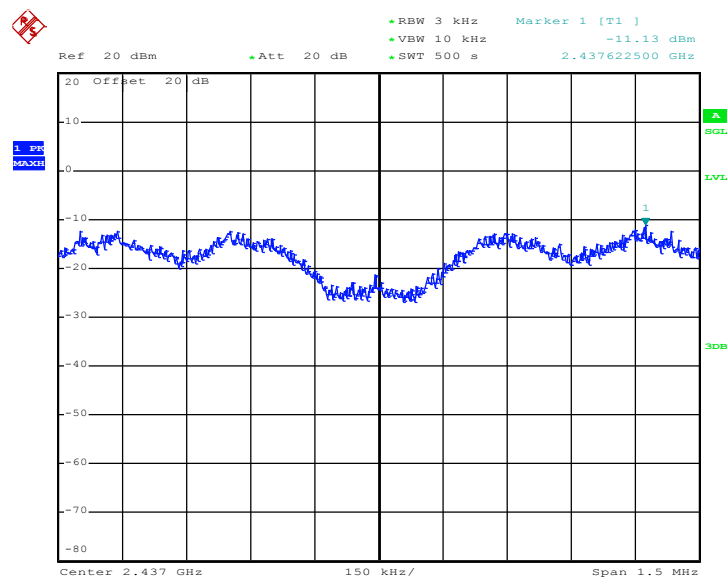
Test Mode :	Mode 7, 8, 9	Temperature :	24~26℃
Test Engineer :	Hank Yu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11n (BW 20MHz) Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-11.81	8	Pass
06	2437	-11.13	8	Pass
11	2462	-11.35	8	Pass

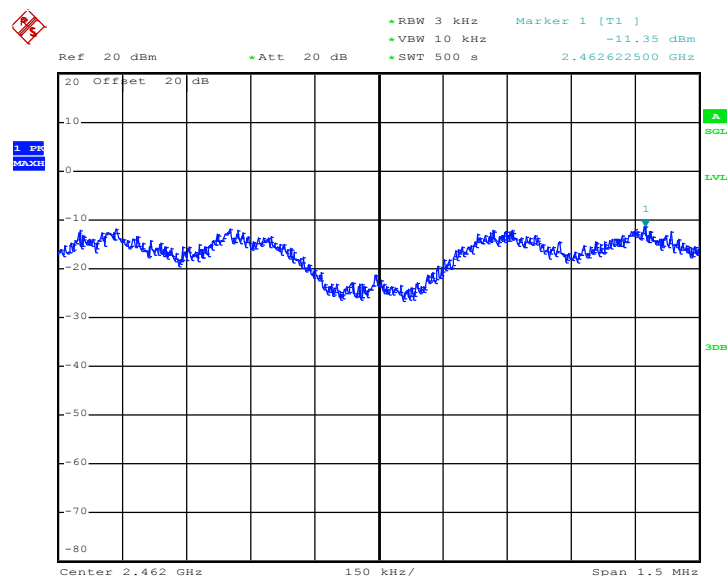
Mode 7 : PSD Plot on 802.11n (BW 20MHz) Channel 01



Date: 27.MAY.2011 00:50:47

Mode 8 : PSD Plot on 802.11n (BW 20MHz) Channel 06


Date: 27.MAY.2011 00:41:24

Mode 9 : PSD Plot on 802.11n (BW 20MHz) Channel 11


Date: 27.MAY.2011 00:59:30

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.

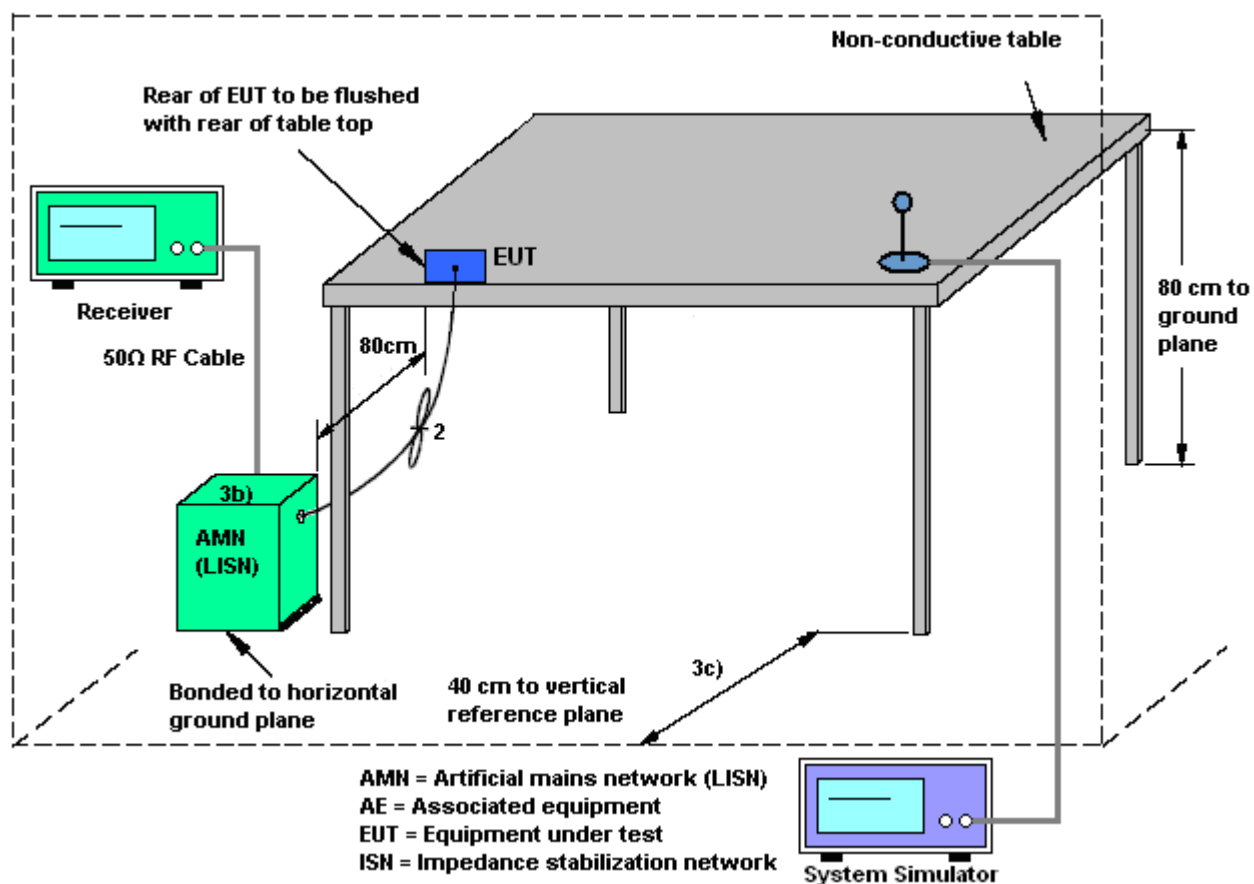
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

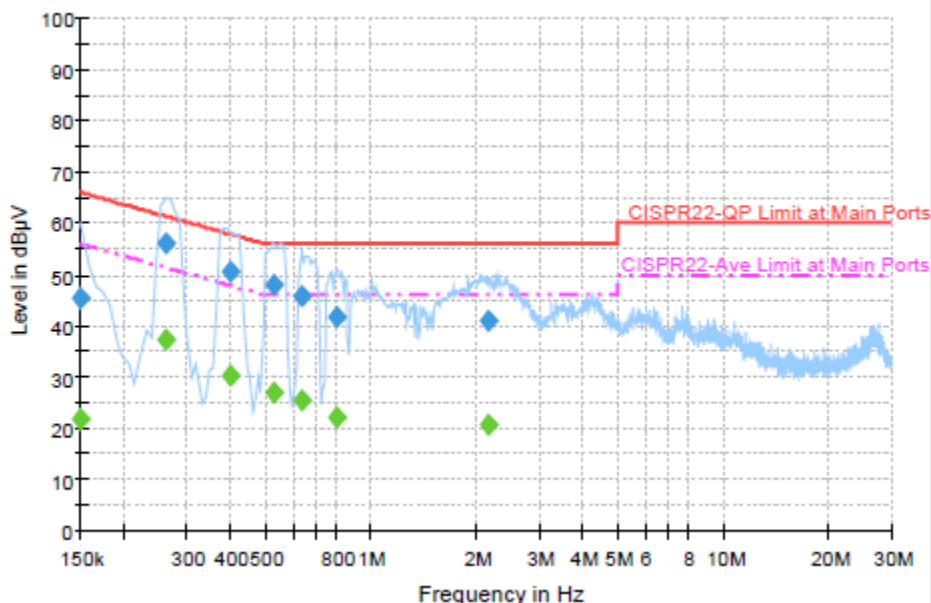
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (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 1	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM1900 Idle + LTE Band4 Idle + Bluetooth Link + WLAN Link + Battery + Camera + Earphone + USB Cable (Charging from Adapter)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



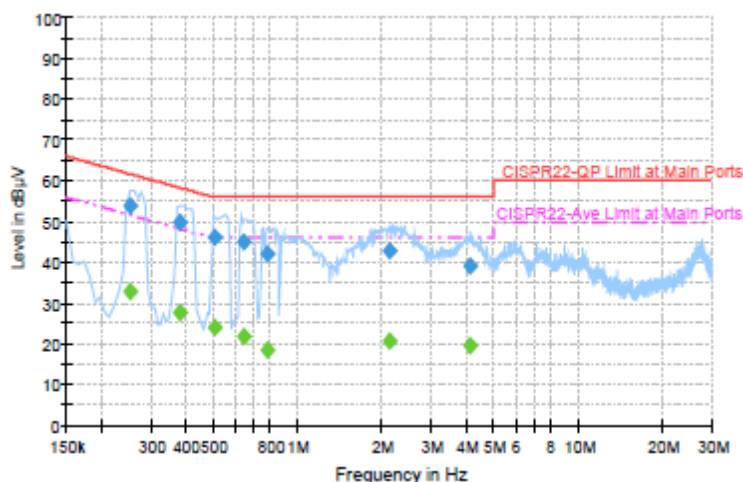
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	45.6	Off	L1	19.4	20.4	66.0
0.262000	56.1	Off	L1	19.4	5.3	61.4
0.398000	50.6	Off	L1	19.4	7.3	57.9
0.534000	48.0	Off	L1	19.4	8.0	56.0
0.638000	45.8	Off	L1	19.4	10.2	56.0
0.798000	41.8	Off	L1	19.4	14.2	56.0
2.158000	40.9	Off	L1	19.4	15.1	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	21.9	Off	L1	19.4	34.1	56.0
0.262000	37.3	Off	L1	19.4	14.1	51.4
0.398000	30.3	Off	L1	19.4	17.6	47.9
0.534000	26.9	Off	L1	19.4	19.1	46.0
0.638000	25.4	Off	L1	19.4	20.6	46.0
0.798000	22.3	Off	L1	19.4	23.7	46.0
2.158000	20.8	Off	L1	19.4	25.2	46.0

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM1900 Idle + LTE Band4 Idle + Bluetooth Link + WLAN Link + Battery + Camera + Earphone + USB Cable (Charging from 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)
0.254000	53.9	Off	N	19.4	7.7	61.6
0.382000	49.8	Off	N	19.4	8.4	58.2
0.510000	46.0	Off	N	19.4	10.0	56.0
0.646000	45.1	Off	N	19.4	10.9	56.0
0.782000	42.0	Off	N	19.4	14.0	56.0
2.126000	42.9	Off	N	19.5	13.1	56.0
4.118000	39.2	Off	N	19.5	16.8	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.254000	33.0	Off	N	19.4	18.6	51.6
0.382000	27.6	Off	N	19.4	20.6	48.2
0.510000	24.0	Off	N	19.4	22.0	46.0
0.646000	21.6	Off	N	19.4	24.4	46.0
0.782000	18.4	Off	N	19.4	27.6	46.0
2.126000	20.6	Off	N	19.5	25.4	46.0
4.118000	19.4	Off	N	19.5	26.6	46.0

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

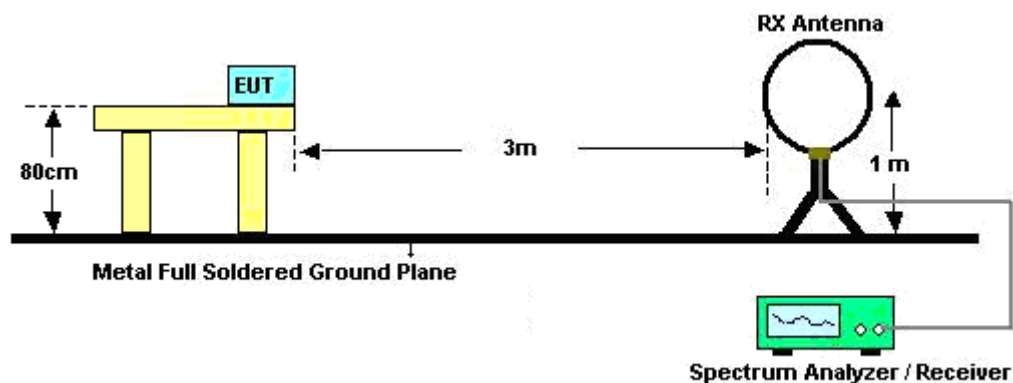
See list of measuring instruments of this test report.

3.7.3 Test Procedures

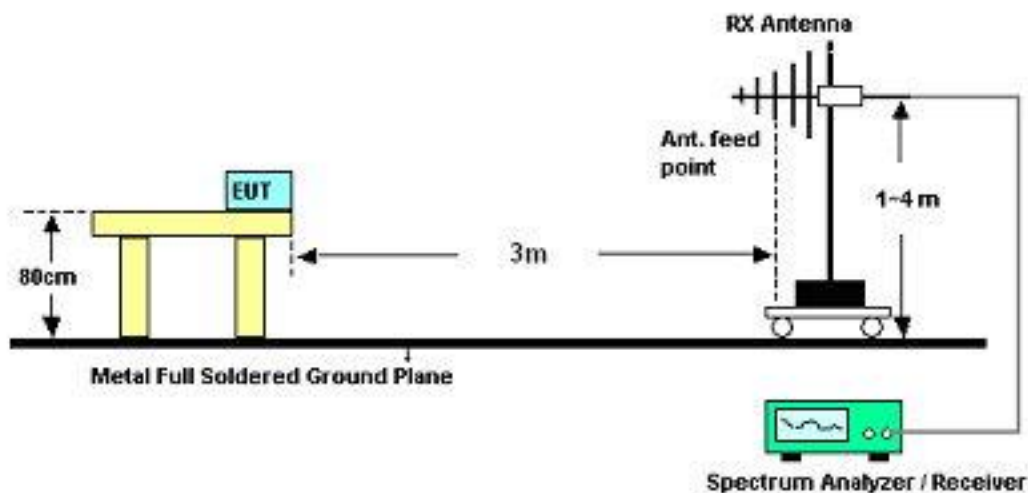
1. The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Use the following spectrum analyzer settings:
 - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = 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

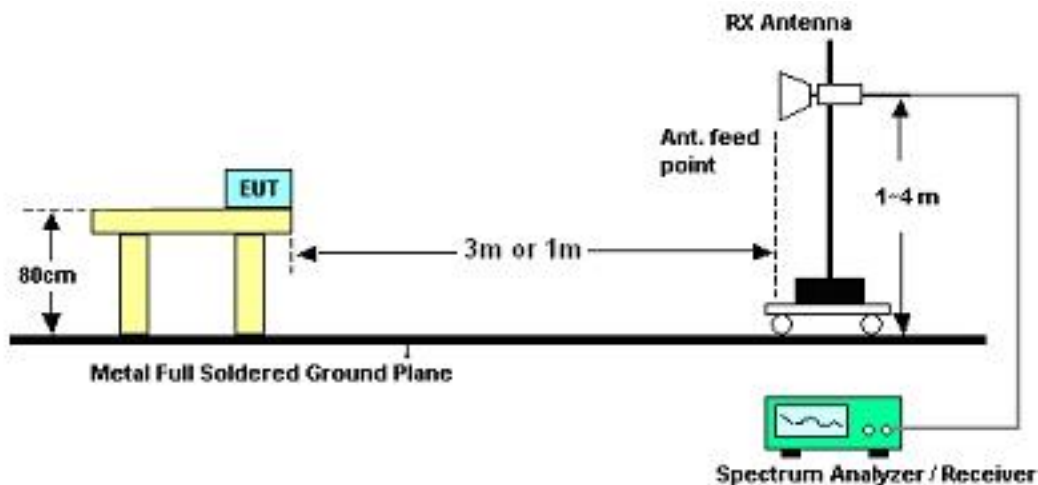
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

Test Engineer :	David Yang	Temperature :	22~24℃	
		Relative Humidity :	45~49%	

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 :	45~49%
Test Engineer :	David Yang	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
31.62	18.49	-21.51	40	33.36	16.04	0.55	31.46	-	-	Peak
228.18	26.11	-19.89	46	44.99	11.09	1.47	31.44	-	-	Peak
299.46	20.14	-25.86	46	36.24	13.46	1.77	31.33	-	-	Peak
377	36.65	-9.35	46	49.93	15.87	2.09	31.24	101	355	Peak
444.2	36.58	-9.42	46	48.1	17.3	2.29	31.11	-	-	Peak
503.7	30.28	-15.72	46	40.61	18.27	2.46	31.06	-	-	Peak
2389.61	49.1	-24.9	74	44.74	32.18	6.03	33.85	100	329	Peak
2389.61	36.4	-17.6	54	32.04	32.18	6.03	33.85	100	329	Average
2412	102.25	-	-	97.85	32.2	6.07	33.87	100	329	Peak
2412	90.48	-	-	86.08	32.2	6.07	33.87	100	329	Average
2492	36.86	-17.14	54	32.28	32.3	6.18	33.9	100	329	Average
2492	48.42	-25.58	74	43.84	32.3	6.18	33.9	100	329	Peak
3618	49.56	-24.44	74	67.86	32.77	8.1	59.17	100	0	Peak
4824	44.55	-29.45	74	60.47	34.07	9.12	59.11	100	0	Peak
7236	50.76	-31.49	82.25	63.33	35.51	10.03	58.11	100	0	Peak

Test Mode :	Mode 1	Temperature :	22~24°C
Test Channel :	01	Relative Humidity :	45~49%
Test Engineer :	David Yang	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	22.15	-17.85	40	36.57	16.51	0.53	31.46	-	-	Peak
227.37	26.49	-19.51	46	45.45	11.02	1.46	31.44	-	-	Peak
298.38	20.62	-25.38	46	36.75	13.44	1.76	31.33	-	-	Peak
377	33.34	-12.66	46	46.62	15.87	2.09	31.24	-	-	Peak
435.8	35.01	-10.99	46	46.73	17.15	2.26	31.13	100	39	Peak
508.6	32.79	-13.21	46	43.02	18.35	2.47	31.05	-	-	Peak
2389.61	35.26	-18.74	54	30.9	32.18	6.03	33.85	130	337	Average
2389.61	48.6	-25.4	74	44.24	32.18	6.03	33.85	130	337	Peak
2412	100.7	-	-	96.3	32.2	6.07	33.87	130	337	Peak
2412	88.76	-	-	84.36	32.2	6.07	33.87	130	337	Average
2492	48.77	-25.23	74	44.19	32.3	6.18	33.9	130	337	Peak
2492	36.27	-17.73	54	31.69	32.3	6.18	33.9	130	337	Average
3618	49.04	-24.96	74	67.34	32.77	8.1	59.17	100	0	Peak
7236	51.57	-29.13	80.7	64.14	35.51	10.03	58.11	100	0	Peak

Test Mode :	Mode 2	Temperature :	22~24℃
Test Channel :	06	Relative Humidity :	45~49%
Test Engineer :	David Yang	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
31.89	18.43	-21.57	40	33.3	16.04	0.55	31.46	-	-	Peak
138.81	14.24	-29.26	43.5	32.99	11.6	1.2	31.55	-	-	Peak
228.18	24.27	-21.73	46	43.15	11.09	1.47	31.44	-	-	Peak
374.9	35.24	-10.76	46	48.59	15.81	2.09	31.25	111	294	Peak
449.8	33.73	-12.27	46	45.13	17.4	2.3	31.1	-	-	Peak
489	28.54	-17.46	46	39.15	18.04	2.41	31.06	-	-	Peak
2364	46.15	-27.85	74	41.87	32.13	5.99	33.84	162	310	Peak
2364	34.58	-19.42	54	30.3	32.13	5.99	33.84	162	310	Average
2437	100.82	-	-	96.35	32.24	6.11	33.88	162	310	Peak
2437	88.13	-	-	83.66	32.24	6.11	33.88	162	310	Average
2492	45.32	-28.68	74	40.74	32.3	6.18	33.9	162	310	Peak
2492	33.13	-20.87	54	28.55	32.3	6.18	33.9	162	310	Average
3654	48.28	-25.72	74	66.44	32.82	8.21	59.19	100	0	Peak
4874	44.32	-29.68	74	60.15	34.08	9.13	59.04	100	0	Peak
7311	49.82	-24.18	74	62.44	35.45	10.06	58.13	100	0	Peak

Test Mode :	Mode 2	Temperature :	22~24℃
Test Channel :	06	Relative Humidity :	45~49%
Test Engineer :	David Yang	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
31.62	22.16	-17.84	40	37.03	16.04	0.55	31.46	-	-	Peak
106.41	19.94	-23.56	43.5	40.09	10.37	1.03	31.55	-	-	Peak
229.53	26.52	-19.48	46	45.25	11.23	1.48	31.44	-	-	Peak
377	33.02	-12.98	46	46.3	15.87	2.09	31.24	109	63	Peak
442.1	32.5	-13.5	46	44.07	17.27	2.28	31.12	-	-	Peak
511.4	30.78	-15.22	46	40.97	18.39	2.47	31.05	-	-	Peak
2356	45.32	-28.68	74	41.07	32.13	5.95	33.83	102	326	Peak
2356	34.6	-19.4	54	30.35	32.13	5.95	33.83	102	326	Average
2437	98.71	-	-	94.24	32.24	6.11	33.88	102	326	Peak
2437	87.73	-	-	83.26	32.24	6.11	33.88	102	326	Average
2492	45.79	-28.21	74	41.21	32.3	6.18	33.9	102	326	Peak
2492	33.87	-20.13	54	29.29	32.3	6.18	33.9	102	326	Average
3654	48.79	-25.21	74	66.95	32.82	8.21	59.19	100	0	Peak
4874	43.9	-30.1	74	59.73	34.08	9.13	59.04	100	0	Peak
7311	50.51	-23.49	74	63.13	35.45	10.06	58.13	100	0	Peak

Test Mode :	Mode 3	Temperature :	22~24℃
Test Channel :	11	Relative Humidity :	45~49%
Test Engineer :	David Yang	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
32.7	18.94	-21.06	40	34.05	15.8	0.56	31.47	-	-	Peak
228.18	25.98	-20.02	46	44.86	11.09	1.47	31.44	-	-	Peak
298.38	19.83	-26.17	46	35.96	13.44	1.76	31.33	-	-	Peak
377	36.07	-9.93	46	49.35	15.87	2.09	31.24	108	315	Peak
436.5	35.95	-10.05	46	47.64	17.17	2.27	31.13	-	-	Peak
458.2	33.17	-12.83	46	44.41	17.52	2.32	31.08	-	-	Peak
2388	46.09	-27.91	74	41.73	32.18	6.03	33.85	127	174	Peak
2388	33.53	-20.47	54	29.17	32.18	6.03	33.85	127	174	Average
2462	102.52	-	-	98.01	32.26	6.14	33.89	127	174	Peak
2462	90.76	-	-	86.25	32.26	6.14	33.89	127	174	Average
2486.7	47.91	-26.09	74	43.35	32.28	6.18	33.9	127	174	Peak
2486.7	35.34	-18.66	54	30.78	32.28	6.18	33.9	127	174	Average
3690	48.03	-25.97	74	66.11	32.87	8.27	59.22	100	0	Peak
4924	47.2	-26.8	74	62.92	34.09	9.15	58.96	100	0	Peak
7386	47.57	-26.43	74	60.26	35.38	10.1	58.17	100	0	Peak

Test Mode :	Mode 3	Temperature :	22~24℃
Test Channel :	11	Relative Humidity :	45~49%
Test Engineer :	David Yang	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	22.76	-17.24	40	37.18	16.51	0.53	31.46	-	-	Peak
89.94	20.42	-23.08	43.5	42.32	8.68	0.94	31.52	-	-	Peak
226.29	26.44	-19.56	46	45.48	10.95	1.46	31.45	-	-	Peak
374.9	31.64	-14.36	46	44.99	15.81	2.09	31.25	-	-	Peak
444.2	36.75	-9.25	46	48.27	17.3	2.29	31.11	100	33	Peak
497.4	32.51	-13.49	46	42.96	18.18	2.44	31.07	-	-	Peak
2388	46.08	-27.92	74	41.72	32.18	6.03	33.85	100	247	Peak
2388	33.88	-20.12	54	29.52	32.18	6.03	33.85	100	247	Average
2462	100.25	-	-	95.74	32.26	6.14	33.89	100	247	Peak
2462	88.66	-	-	84.15	32.26	6.14	33.89	100	247	Average
2483.5	46.71	-27.29	74	42.15	32.28	6.18	33.9	100	247	Peak
2483.5	34.69	-19.31	54	30.13	32.28	6.18	33.9	100	247	Average
3690	49.17	-24.83	74	67.25	32.87	8.27	59.22	100	0	Peak
4924	44.89	-29.11	74	60.61	34.09	9.15	58.96	100	0	Peak
7386	45.49	-28.51	74	58.18	35.38	10.1	58.17	100	0	Peak

Test Mode :	Mode 4	Temperature :	22~24℃
Test Channel :	01	Relative Humidity :	45~49%
Test Engineer :	David Yang	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
31.62	18.77	-21.23	40	33.64	16.04	0.55	31.46	-	-	Peak
223.05	27.17	-18.83	46	46.43	10.75	1.44	31.45	-	-	Peak
296.49	19.39	-26.61	46	35.56	13.41	1.75	31.33	-	-	Peak
377	36.38	-9.62	46	49.66	15.87	2.09	31.24	-	-	Peak
436.5	38.34	-7.66	46	50.03	17.17	2.27	31.13	111	296	Peak
512.1	27.23	-18.77	46	37.4	18.41	2.47	31.05	-	-	Peak
2390	56.92	-17.08	74	52.56	32.18	6.03	33.85	128	315	Peak
2390	39.4	-14.6	54	35.04	32.18	6.03	33.85	128	315	Average
2412	99.55	-	-	95.15	32.2	6.07	33.87	128	315	Peak
2412	87.05	-	-	82.65	32.2	6.07	33.87	128	315	Average
2492	34.94	-19.06	54	30.36	32.3	6.18	33.9	128	315	Average
2492	46.2	-27.8	74	41.62	32.3	6.18	33.9	128	315	Peak
3618	48.68	-25.32	74	66.98	32.77	8.1	59.17	100	0	Peak
7236	45.14	-34.41	79.55	57.69	35.52	10.03	58.1	100	0	Peak

Test Mode :	Mode 4	Temperature :	22~24℃
Test Channel :	01	Relative Humidity :	45~49%
Test Engineer :	David Yang	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
30.54	22.27	-17.73	40	36.92	16.27	0.54	31.46	-	-	Peak
227.37	25.41	-20.59	46	44.37	11.02	1.46	31.44	-	-	Peak
275.97	21.37	-24.63	46	38	13.09	1.64	31.36	-	-	Peak
377.7	31.92	-14.08	46	45.2	15.87	2.09	31.24	-	-	Peak
448.4	35.26	-10.74	46	46.7	17.36	2.3	31.1	103	58	Peak
491.8	32.24	-13.76	46	42.8	18.09	2.42	31.07	-	-	Peak
2390	55.16	-18.84	74	50.8	32.18	6.03	33.85	130	335	Peak
2390	38.39	-15.61	54	34.03	32.18	6.03	33.85	130	335	Average
2412	97.27	-	-	92.87	32.2	6.07	33.87	130	335	Peak
2412	84.77	-	-	80.37	32.2	6.07	33.87	130	335	Average
2486	35.18	-18.82	54	30.62	32.28	6.18	33.9	130	335	Average
2486	46.73	-27.27	74	42.17	32.28	6.18	33.9	130	335	Peak
3618	48.46	-25.54	74	66.76	32.77	8.1	59.17	100	0	Peak
7236	44.4	-32.87	77.27	56.97	35.51	10.03	58.11	100	0	Peak

Test Mode :	Mode 5	Temperature :	22~24℃
Test Channel :	06	Relative Humidity :	45~49%
Test Engineer :	David Yang	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
33.78	18.55	-21.45	40	33.88	15.57	0.57	31.47	-	-	Peak
228.18	25.27	-20.73	46	44.15	11.09	1.47	31.44	-	-	Peak
298.38	19.78	-26.22	46	35.91	13.44	1.76	31.33	-	-	Peak
377	35.54	-10.46	46	48.82	15.87	2.09	31.24	-	-	Peak
435.8	35.67	-10.33	46	47.39	17.15	2.26	31.13	117	146	Peak
520.5	28.68	-17.32	46	38.68	18.54	2.49	31.03	-	-	Peak
2390	47.66	-26.34	74	43.3	32.18	6.03	33.85	100	333	Peak
2390	34.07	-19.93	54	29.71	32.18	6.03	33.85	100	333	Average
2437	97.69	-	-	93.22	32.24	6.11	33.88	100	333	Peak
2437	84.88	-	-	80.41	32.24	6.11	33.88	100	333	Average
2492	46.26	-27.74	74	41.68	32.3	6.18	33.9	100	333	Peak
2492	34.26	-19.74	54	29.68	32.3	6.18	33.9	100	333	Average
3654	48.21	-25.79	74	66.37	32.82	8.21	59.19	100	0	Peak
7311	44.51	-29.49	74	57.13	35.45	10.06	58.13	100	0	Peak

Test Mode :	Mode 5	Temperature :	22~24℃
Test Channel :	06	Relative Humidity :	45~49%
Test Engineer :	David Yang	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	21.88	-18.12	40	36.3	16.51	0.53	31.46	-	-	Peak
106.41	19.68	-23.82	43.5	39.83	10.37	1.03	31.55	-	-	Peak
229.26	24.99	-21.01	46	43.8	11.16	1.47	31.44	-	-	Peak
377.7	32.55	-13.45	46	45.83	15.87	2.09	31.24	-	-	Peak
447	34.5	-11.5	46	45.97	17.35	2.29	31.11	100	77	Peak
491.8	33.48	-12.52	46	44.04	18.09	2.42	31.07	-	-	Peak
2388	47.13	-26.87	74	42.77	32.18	6.03	33.85	147	268	Peak
2388	33.83	-20.17	54	29.47	32.18	6.03	33.85	147	268	Average
2437	95.57	-	-	91.1	32.24	6.11	33.88	147	268	Peak
2437	83.32	-	-	78.85	32.24	6.11	33.88	147	268	Average
2484	46.13	-27.87	74	41.57	32.28	6.18	33.9	147	268	Peak
2484	34.06	-19.94	54	29.5	32.28	6.18	33.9	147	268	Average
3654	46.87	-27.13	74	65.03	32.82	8.21	59.19	100	0	Peak
7311	45.02	-28.98	74	57.64	35.45	10.06	58.13	100	0	Peak

Test Mode :	Mode 6	Temperature :	22~24℃
Test Channel :	11	Relative Humidity :	45~49%
Test Engineer :	David Yang	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
30.81	18.7	-21.3	40	33.35	16.27	0.54	31.46	-	-	Peak
164.46	16.75	-26.75	43.5	36.96	10.08	1.23	31.52	-	-	Peak
228.18	26.01	-19.99	46	44.89	11.09	1.47	31.44	-	-	Peak
372.1	32.82	-13.18	46	46.27	15.72	2.08	31.25	-	-	Peak
447.7	34.25	-11.75	46	45.69	17.36	2.3	31.1	116	323	Peak
531.7	27.44	-18.56	46	37.23	18.71	2.51	31.01	-	-	Peak
2390	46.21	-27.79	74	41.85	32.18	6.03	33.85	102	318	Peak
2390	33.49	-20.51	54	29.13	32.18	6.03	33.85	102	318	Average
2462	98.53	-	-	94.02	32.26	6.14	33.89	102	318	Peak
2462	85.95	-	-	81.44	32.26	6.14	33.89	102	318	Average
2483.5	57.87	-16.13	74	53.31	32.28	6.18	33.9	102	318	Peak
2483.5	40.08	-13.92	54	35.52	32.28	6.18	33.9	102	318	Average
3690	47.12	-26.88	74	65.2	32.87	8.27	59.22	100	0	Peak

Test Mode :	Mode 6	Temperature :	22~24℃
Test Channel :	11	Relative Humidity :	45~49%
Test Engineer :	David Yang	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	22.83	-17.17	40	37.25	16.51	0.53	31.46	-	-	Peak
106.41	21.21	-22.29	43.5	41.36	10.37	1.03	31.55	-	-	Peak
228.18	25.97	-20.03	46	44.85	11.09	1.47	31.44	-	-	Peak
377	32.51	-13.49	46	45.79	15.87	2.09	31.24	-	-	Peak
441.4	34.54	-11.46	46	46.13	17.25	2.28	31.12	100	47	Peak
500.2	32.21	-13.79	46	42.6	18.23	2.45	31.07	-	-	Peak
2388	45.14	-28.86	74	40.78	32.18	6.03	33.85	124	244	Peak
2388	33.12	-20.88	54	28.76	32.18	6.03	33.85	124	244	Average
2462	95.15	-	-	90.64	32.26	6.14	33.89	124	244	Peak
2462	82.9	-	-	78.39	32.26	6.14	33.89	124	244	Average
2483.66	53.07	-20.93	74	48.51	32.28	6.18	33.9	124	244	Peak
2483.66	36.37	-17.63	54	31.81	32.28	6.18	33.9	124	244	Average
3690	48.18	-25.82	74	66.26	32.87	8.27	59.22	100	0	Peak

Test Mode :	Mode 7	Temperature :	22~24°C
Test Channel :	01	Relative Humidity :	45~49%
Test Engineer :	David Yang	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
31.62	18.46	-21.54	40	33.33	16.04	0.55	31.46	-	-	Peak
229.26	27.37	-18.63	46	46.18	11.16	1.47	31.44	-	-	Peak
299.73	19.68	-26.32	46	35.78	13.46	1.77	31.33	-	-	Peak
377	28.53	-17.47	46	41.81	15.87	2.09	31.24	-	-	Peak
438.6	32.5	-13.5	46	44.15	17.2	2.27	31.12	-	-	Peak
458.9	36.18	-9.82	46	47.4	17.54	2.32	31.08	106	22	Peak
2389.42	57.46	-16.54	74	53.1	32.18	6.03	33.85	128	318	Peak
2389.42	38.61	-15.39	54	34.25	32.18	6.03	33.85	128	318	Average
2412	98.26	-	-	93.86	32.2	6.07	33.87	128	318	Peak
2412	85.7	-	-	81.3	32.2	6.07	33.87	128	318	Average
2492	34.09	-19.91	54	29.51	32.3	6.18	33.9	128	318	Average
2492	46.54	-27.46	74	41.96	32.3	6.18	33.9	128	318	Peak
3618	49.11	-24.89	74	67.41	32.77	8.1	59.17	100	0	Peak
7236	45.17	-33.09	78.26	57.72	35.52	10.03	58.1	100	0	Peak

Test Mode :	Mode 7	Temperature :	22~24°C
Test Channel :	01	Relative Humidity :	45~49%
Test Engineer :	David Yang	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	23.81	-16.19	40	38.23	16.51	0.53	31.46	-	-	Peak
106.41	27.71	-15.79	43.5	47.86	10.37	1.03	31.55	-	-	Peak
228.18	27.03	-18.97	46	45.91	11.09	1.47	31.44	-	-	Peak
377	33.14	-12.86	46	46.42	15.87	2.09	31.24	-	-	Peak
441.4	36.34	-9.66	46	47.93	17.25	2.28	31.12	109	45	Peak
489	34.14	-11.86	46	44.75	18.04	2.41	31.06	-	-	Peak
2389.61	58.3	-15.7	74	53.94	32.18	6.03	33.85	130	336	Peak
2389.61	40.92	-13.08	54	36.56	32.18	6.03	33.85	130	336	Average
2412	96.73	-	-	92.33	32.2	6.07	33.87	130	336	Peak
2412	84.23	-	-	79.83	32.2	6.07	33.87	130	336	Average
2486	34.28	-19.72	54	29.72	32.28	6.18	33.9	130	336	Average
2486	47.16	-26.84	74	42.6	32.28	6.18	33.9	130	336	Peak
3618	47.94	-26.06	74	66.24	32.77	8.1	59.17	100	0	Peak
7236	46.84	-29.89	76.73	59.39	35.52	10.03	58.1	100	0	Peak

Test Mode :	Mode 8	Temperature :	22~24℃
Test Channel :	06	Relative Humidity :	45~49%
Test Engineer :	David Yang	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	18.97	-21.03	40	33.39	16.51	0.53	31.46	-	-	Peak
228.18	26.27	-19.73	46	45.15	11.09	1.47	31.44	-	-	Peak
298.38	20.02	-25.98	46	36.15	13.44	1.76	31.33	-	-	Peak
379.8	35.09	-10.91	46	48.27	15.96	2.1	31.24	114	327	Peak
438.6	34.69	-11.31	46	46.34	17.2	2.27	31.12	-	-	Peak
492.5	30.26	-15.74	46	40.81	18.1	2.42	31.07	-	-	Peak
2382	47.15	-26.85	74	42.81	32.16	6.03	33.85	100	314	Peak
2382	34.46	-19.54	54	30.12	32.16	6.03	33.85	100	314	Average
2437	97.22	-	-	92.75	32.24	6.11	33.88	100	314	Peak
2437	84.76	-	-	80.29	32.24	6.11	33.88	100	314	Average
2484	48.45	-25.55	74	43.89	32.28	6.18	33.9	100	314	Peak
2484	34.95	-19.05	54	30.39	32.28	6.18	33.9	100	314	Average
3654	48.52	-25.48	74	66.68	32.82	8.21	59.19	100	0	Peak
7311	44.96	-29.04	74	57.58	35.45	10.06	58.13	100	0	Peak

Test Mode :	Mode 8	Temperature :	22~24℃
Test Channel :	06	Relative Humidity :	45~49%
Test Engineer :	David Yang	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	21.35	-18.65	40	35.77	16.51	0.53	31.46	-	-	Peak
229.26	24.79	-21.21	46	43.6	11.16	1.47	31.44	-	-	Peak
299.46	19.53	-26.47	46	35.63	13.46	1.77	31.33	-	-	Peak
377	33.02	-12.98	46	46.3	15.87	2.09	31.24	-	-	Peak
453.3	37.71	-8.29	46	49.05	17.44	2.31	31.09	100	23	Peak
517	35.85	-10.15	46	45.93	18.48	2.48	31.04	-	-	Peak
2390	48.21	-25.79	74	43.85	32.18	6.03	33.85	160	334	Peak
2390	33.63	-20.37	54	29.27	32.18	6.03	33.85	160	334	Average
2437	83.54	-	-	79.07	32.24	6.11	33.88	160	334	Average
2437	95.74	-	-	91.29	32.22	6.11	33.88	160	334	Peak
2484	46.93	-27.07	74	42.37	32.28	6.18	33.9	160	334	Peak
2484	34.26	-19.74	54	29.7	32.28	6.18	33.9	160	334	Average
3654	48.22	-25.78	74	66.38	32.82	8.21	59.19	100	0	Peak
7311	44.62	-29.38	74	57.24	35.45	10.06	58.13	100	0	Peak



Test Mode :	Mode 9	Temperature :	22~24℃
Test Channel :	11	Relative Humidity :	45~49%
Test Engineer :	David Yang	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
31.89	19.2	-20.8	40	34.07	16.04	0.55	31.46	-	-	Peak
227.1	25.42	-20.58	46	44.39	11.02	1.46	31.45	-	-	Peak
298.38	19.74	-26.26	46	35.87	13.44	1.76	31.33	-	-	Peak
374.9	35.25	-10.75	46	48.6	15.81	2.09	31.25	112	281	Peak
428.1	34.55	-11.45	46	46.42	17.03	2.24	31.14	-	-	Peak
508.6	26.94	-19.06	46	37.17	18.35	2.47	31.05	-	-	Peak
2388	46.32	-27.68	74	41.96	32.18	6.03	33.85	100	319	Peak
2388	33.54	-20.46	54	29.18	32.18	6.03	33.85	100	319	Average
2462	97.41	-	-	92.9	32.26	6.14	33.89	100	319	Peak
2462	84.06	-	-	79.55	32.26	6.14	33.89	100	319	Average
2483.5	55.94	-18.06	74	51.38	32.28	6.18	33.9	100	319	Peak
2483.5	39.25	-14.75	54	34.69	32.28	6.18	33.9	100	319	Average
3690	48.08	-25.92	74	66.16	32.87	8.27	59.22	100	0	Peak

Test Mode :	Mode 9	Temperature :	22~24℃
Test Channel :	11	Relative Humidity :	45~49%
Test Engineer :	David Yang	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
30.81	21.36	-18.64	40	36.01	16.27	0.54	31.46	-	-	Peak
106.41	19.97	-23.53	43.5	40.12	10.37	1.03	31.55	-	-	Peak
228.18	25.65	-20.35	46	44.53	11.09	1.47	31.44	-	-	Peak
379.8	32.65	-13.35	46	45.83	15.96	2.1	31.24	-	-	Peak
452.6	33.6	-12.4	46	44.94	17.44	2.31	31.09	100	36	Peak
489	30.92	-15.08	46	41.53	18.04	2.41	31.06	-	-	Peak
2388	45.57	-28.43	74	41.21	32.18	6.03	33.85	128	337	Peak
2388	33.77	-20.23	54	29.41	32.18	6.03	33.85	128	337	Average
2462	96.53	-	-	92.02	32.26	6.14	33.89	128	337	Peak
2462	84.22	-	-	79.71	32.26	6.14	33.89	128	337	Average
2483.66	54.56	-19.44	74	50	32.28	6.18	33.9	128	337	Peak
2483.66	39.14	-14.86	54	34.58	32.28	6.18	33.9	128	337	Average
3690	48.85	-25.15	74	66.93	32.87	8.27	59.22	100	0	Peak

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 PCB 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
System Simulator	R&S	CMU200	117995	N/A	Aug. 11, 2010	Aug.10, 2011	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP30	101329	9kHz~30GHz	May. 03, 2011	May. 02, 2012	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 13, 2010	Sep. 12, 2011	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 14, 2010	Sep. 13, 2011	Conducted (TH02-HY)
Power Meter	Agilent	E4416A	GB41292344	N/A	Feb. 18, 2011	Feb. 17, 2012	Conducted (TH02-HY)
Power Sensor	Agilent	E9327A	US40441548	N/A	Feb. 18, 2011	Feb. 17, 2012	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D35P	TBN-930701	N/A	Jul. 30, 2010	Jul. 29, 2011	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz – 2.75GHz	Aug. 16, 2010	Aug. 15, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz – 30MHz	Dec. 03, 2010	Dec. 02, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz – 30MHz	Dec. 01, 2010	Nov. 30, 2011	Conduction (CO05-HY)
AC Power Source	APC	APC-1000 W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
System Simulator	R&S	CMU200	117591	N/A	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH07-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 31, 2010	Oct. 30, 2011	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP	101067	9KHz ~ 30GHz	Dec. 03, 2010	Dec. 02, 2011	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 19, 2010	Aug. 18, 2011	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec. 06, 2010	Dec. 05, 2011	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32 dB.GAIN	Mar. 29, 2011	Mar. 28, 2012	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH07-HY)
Bluetooth Base Station	R&S	CBT32	100522	N/A	Jan.13, 2011	Jan.13, 2013	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				