

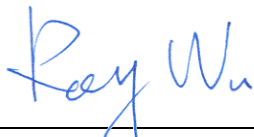
FCC RF Test Report

APPLICANT : Universal Scientific Industrial CO., LTD.
EQUIPMENT : NAS
BRAND NAME : Universal Scientific Industrial
MODEL NAME : UGNASXXXXXXXXXX (X can be 0~9, a(A)~z(Z) or blank)
FCC ID : IXMUGNAS-P3
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Transmission System (DTS)

The product was received on Jan. 18, 2011 and completely tested on Jan. 24, 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:



Roy Wu / 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
FR111809	Rev. 01	Initial issue of report	Mar. 03, 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	-
0	15.247(d)	A8.5	Spurious Emission	$< 20\text{ dBc}$	Pass	-
0	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 13.0 dB at 0.61 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 5.8 dB at 2483.66 MHz
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Universal Scientific Industrial CO., LTD.

No. 141, Lane 351, Taiping Road, Sec. 1, Tsao Tuen, Nan-Tou, Taiwan

1.2 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	NAS
Brand Name	Universal Scientific Industrial
Model Name	UGNASXXXXXXXXXX (X can be 0~9, a(A)~z(Z) or blank)
FCC ID	IXMUGNAS-P3
Sample 1	EUT with CPU (2GHz) and memory (256MB)
Sample 2	EUT with CPU (1.6GHz) and memory (512MB)
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 : 19.09 dBm (0.08 W) 802.11g : 23.80 dBm (0.24 W) 802.11n (BW 20MHz) : 22.53 dBm (0.18 W) 802.11n (BW 40MHz) : 23.37 dBm (0.22 W)
Antenna Type	PIFA Antenna with gain -3.62 dBi
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Production Unit

Remark:

1. This test report recorded only product characteristics and test results of Digital Transmission System (DTS).
2. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
3. Only sample 2 was performed for this test.

1.3 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

1.4 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.

1.5 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
2.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	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:

<Peak Power>

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	18.84	-	-	18.94
CH 06	2437 MHz	18.98	19.07	18.48	19.09
CH 11	2462 MHz	18.94	-	-	19.03

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	23.80	23.58	23.72	23.11	23.57	23.23	23.14	23.61
CH 06	2437 MHz	23.38	-	-	-	-	-	-	-
CH 11	2462 MHz	23.45	-	-	-	-	-	-	-

Channel	Frequency	2.4GHz 802.11n (BW 20MHz) RF Power (dBm)							
		OFDM Data Rate							
		M0	M1	M2	M3	M4	M5	M6	M7
CH 01	2412 MHz	22.40	-	-	-	-	-	-	-
CH 06	2437 MHz	22.53	22.49	22.42	22.51	22.49	22.50	22.47	22.43
CH 11	2462 MHz	22.38	-	-	-	-	-	-	-
Channel	Frequency	M8	M9	M10	M11	M12	M13	M14	M15
CH 01	2412 MHz	-	-	-	-	-	-	-	-
CH 06	2437 MHz	22.52	22.52	22.50	22.40	22.48	22.52	22.49	22.50
CH 11	2462 MHz	-	-	-	-	-	-	-	-

Channel	Frequency	2.4GHz 802.11n (BW 40MHz) RF Power (dBm)							
		OFDM Data Rate							
		M0	M1	M2	M3	M4	M5	M6	M7
CH 03	2422 MHz	22.68	22.53	22.85	23.37	23.11	23.25	22.89	22.83
CH 06	2437 MHz	22.57	-	-	23.22	-	-	-	-
CH 09	2452 MHz	22.45	-	-	23.17	-	-	-	-
Channel	Frequency	M8	M9	M10	M11	M12	M13	M14	M15
CH 03	2422 MHz	22.42	21.11	21.30	21.82	22.44	21.82	21.90	21.92
CH 06	2437 MHz	-	-	-	-	-	-	-	-
CH 09	2452 MHz	-	-	-	-	-	-	-	-

<Average Power>

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	16.23	-	-	16.22
CH 06	2437 MHz	16.36	16.39	16.33	16.34
CH 11	2462 MHz	16.35	-	-	16.35

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	14.11	14.11	14.05	14.06	14.01	13.93	13.97	13.93
CH 06	2437 MHz	14.20	-	-	-	-	-	-	-
CH 11	2462 MHz	14.17	-	-	-	-	-	-	-

Channel	Frequency	2.4GHz 802.11n (BW 20MHz) RF Power (dBm)							
		OFDM Data Rate							
		M0	M1	M2	M3	M4	M5	M6	M7
CH 01	2412 MHz	13.17	-	-	-	-	-	-	-
CH 06	2437 MHz	13.33	13.28	13.26	13.26	13.27	13.28	13.30	13.29
CH 11	2462 MHz	13.28	-	-	-	-	-	-	-
Channel	Frequency	M8	M9	M10	M11	M12	M13	M14	M15
CH 01	2412 MHz	-	-	-	-	-	-	-	-
CH 06	2437 MHz	13.17	13.28	13.27	13.25	13.24	13.30	13.25	13.24
CH 11	2462 MHz	-	-	-	-	-	-	-	-

Channel	Frequency	2.4GHz 802.11n (BW 40MHz) RF Power (dBm)							
		OFDM Data Rate							
		M0	M1	M2	M3	M4	M5	M6	M7
CH 03	2422 MHz	13.23	13.25	13.22	13.20	13.23	13.19	13.27	13.21
CH 06	2437 MHz	13.27	-	-	13.25	-	-	-	-
CH 09	2452 MHz	13.31	-	-	13.26	-	-	-	-
Channel	Frequency	M8	M9	M10	M11	M12	M13	M14	M15
CH 03	2422 MHz	13.17	13.16	13.25	13.04	13.11	12.86	12.88	12.86
CH 06	2437 MHz	-	-	-	-	-	-	-	-
CH 09	2452 MHz	-	-	-	-	-	-	-	-

Remark:

1. The data rates of WLAN 802.11b/g/n were set in 11Mbps for 802.11b, 6Mbps for 802.11g, M0 for 802.11n (BW 20MHz), and M3 for 802.11n (BW 40MHz) 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).

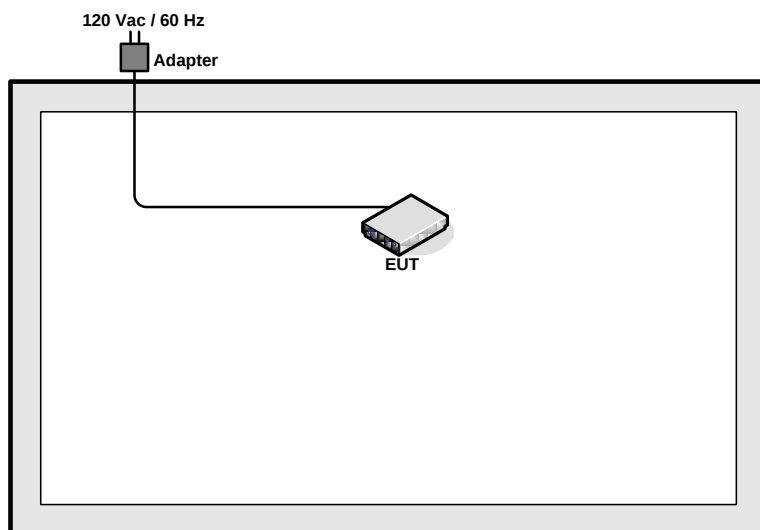
Pre-scanned tests were conducted to determine the final configuration from all possible combinations.

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

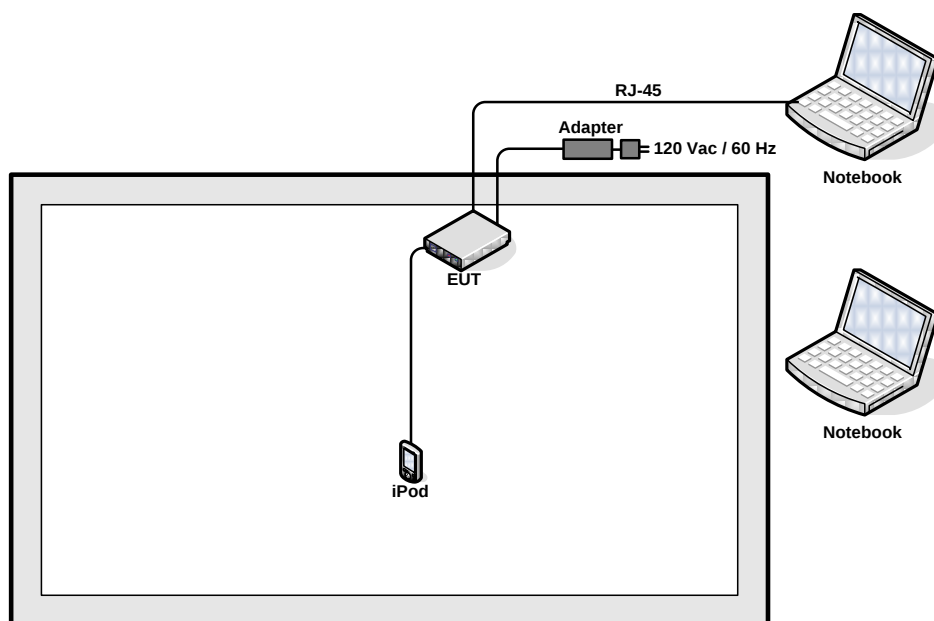
Test Cases		
Test Item	802.11b (Modulation : DSSS)	802.11g/n (Modulation : OFDM)
Conducted TCs	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz Mode 7: 802.11n (BW 20M)_CH01_2412 MHz Mode 8: 802.11n (BW 20M)_CH06_2437 MHz Mode 9: 802.11n (BW 20M)_CH11_2462 MHz Mode 10: 802.11n (BW 40M)_CH03_2422 MHz Mode 11: 802.11n (BW 40M)_CH06_2437 MHz Mode 12: 802.11n (BW 40M)_CH09_2452 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 Mode 10: 802.11n (BW 40M)_CH03_2422 MHz Mode 11: 802.11n (BW 40M)_CH06_2437 MHz Mode 12: 802.11n (BW 40M)_CH09_2452 MHz
AC Conducted Emission	Mode 1 :WLAN Link + iPod + AC Plug	
Remark: Mode 7 ~ 12 of radiation test only performed Band Edges.		

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>





2.4 RF Utility

The programmed RF utility 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.

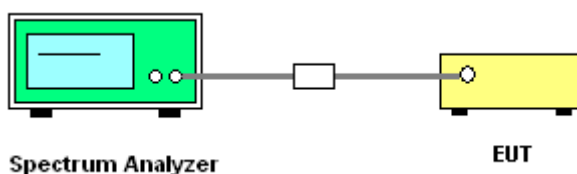
3.1.2 Measuring Instruments

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

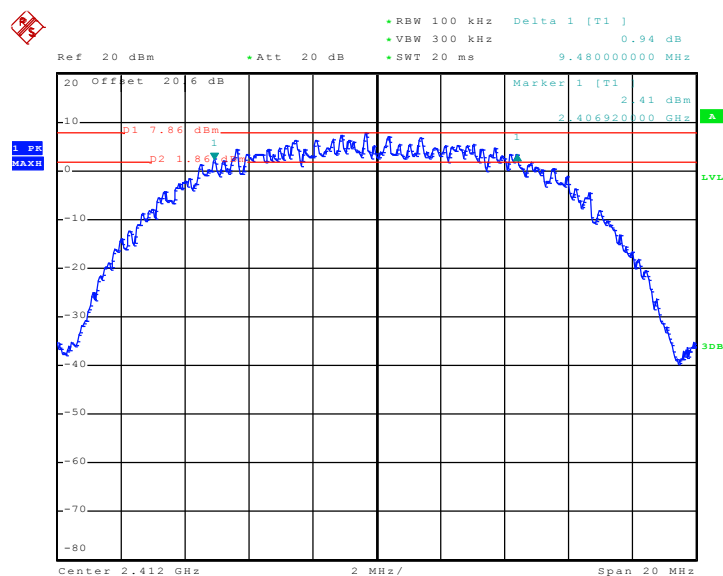


3.1.5 Test Result of 6dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	23~25°C
Test Engineer :	Hank Yu	Relative Humidity :	51~55%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	9.48	0.5	Pass
06	2437	9.52	0.5	Pass
11	2462	9.48	0.5	Pass

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



Date: 21.JAN.2011 15:19:24

[illegible]

Date: 21.JAN.2011 14:58:05

• RBW 100 kHz Delta 1 [T1]
 • VBW 300 kHz 0.90 dB
 • SWT 20 ms 9.480000000 MHz

Ref 20 dBm • Att 20 dB

20 Off et 20 6 dB

Marker 1 [T1] 2.43 dBm A
 2.46200000 GHz

1. PRG
 MAXM

P1 7.79 dBm 1
 P2 1.79 dBm 2

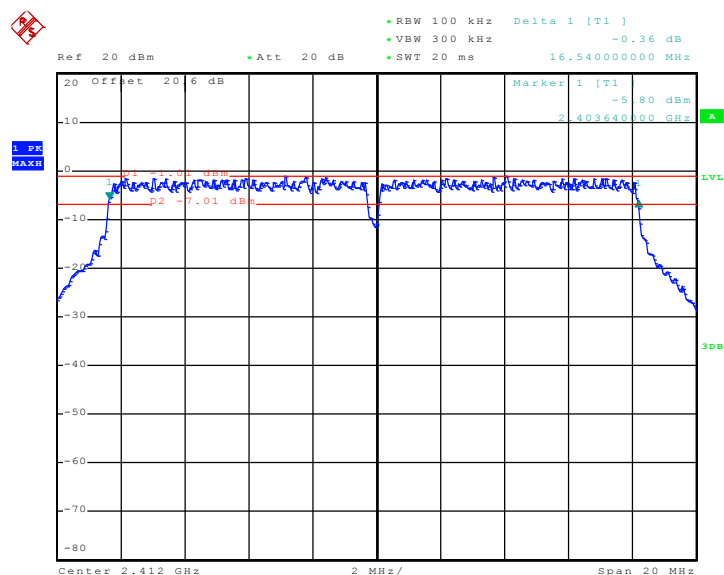
LVL
 3dB

Center 2.462 GHz 2 MHz/ Span 20 MHz

Date: 21.JAN.2011 15:33:36

Test Mode :	Mode 4, 5, 6	Temperature :	23~25°C
Test Engineer :	Hank Yu	Relative Humidity :	51~55%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	16.54	0.5	Pass
06	2437	16.54	0.5	Pass
11	2462	16.54	0.5	Pass

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


Date: 21.JAN.2011 16:25:09



• RBW 100 kHz Delta 1 [T1]
 • VBW 300 kHz -0.23 dB
 • SWT 20 ms 16.54000000 MHz

Ref 20 dBm Att 20 dB

Marker 1 [T1]
 -5.78 dBm
 2.42864000 GHz

LVL
 3dB

1 PR
 MASK

20 Offset 20.6 dB
 -10
 -20
 -30
 -40
 -50
 -60
 -70
 -80

p1 -6.45 dBm
 p2 -6.82 dBm

Center 2.437 GHz 2 MHz/ Span 20 MHz

Date: 21.JAN.2011 16:08:01

Ref 20 dBm • Att 20 dB • RBW 100 kHz Delta 1 [T1] • VBW 300 kHz -0.17 dB 16.54000000 MHz • SWT 20 ms

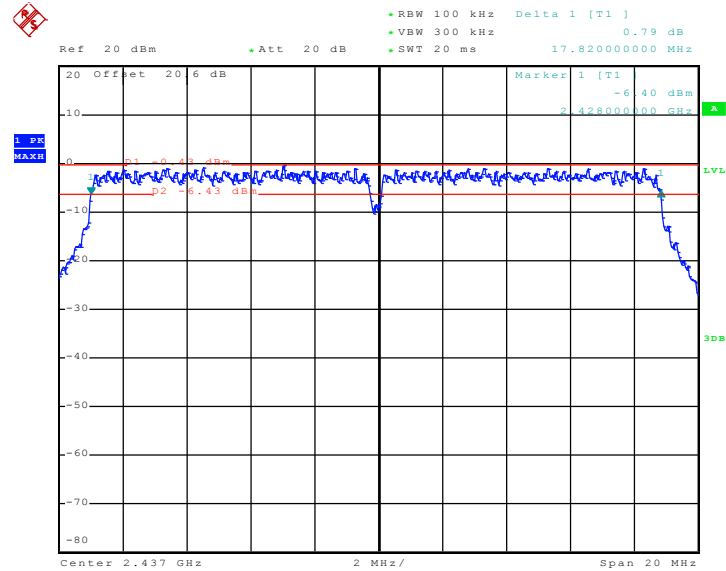
Marker 1 [T1] -5.88 dBm 2.453640000 GHz

1. PRG MAXM

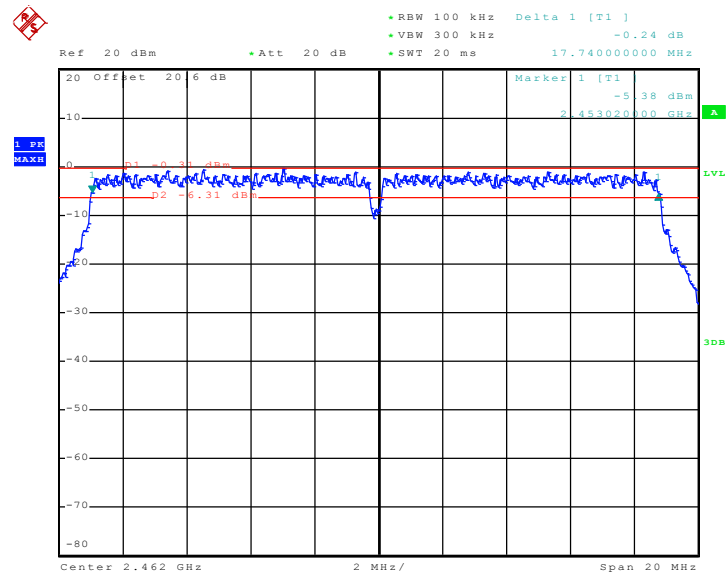
p1 -6.88 dBm p2 -6.96 dBm

Center 2.462 GHz 2 MHz/ Span 20 MHz

Date: 21.JAN.2011 15:52:37

Mode 8 : 6 dB Bandwidth Plot on 802.11n(BW 20MHz) Channel 06


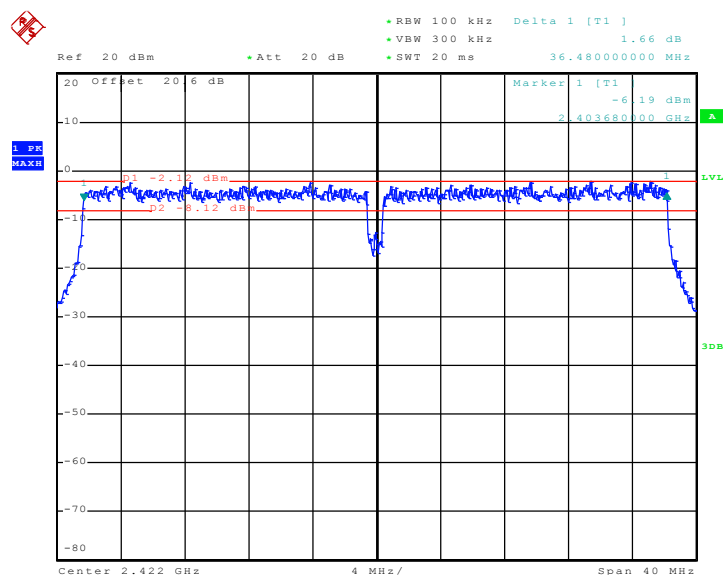
Date: 21.JAN.2011 16:53:41

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


Date: 21.JAN.2011 17:05:15

Test Mode :	Mode 10, 11, 12	Temperature :	23~25°C
Test Engineer :	Hank Yu	Relative Humidity :	51~55%

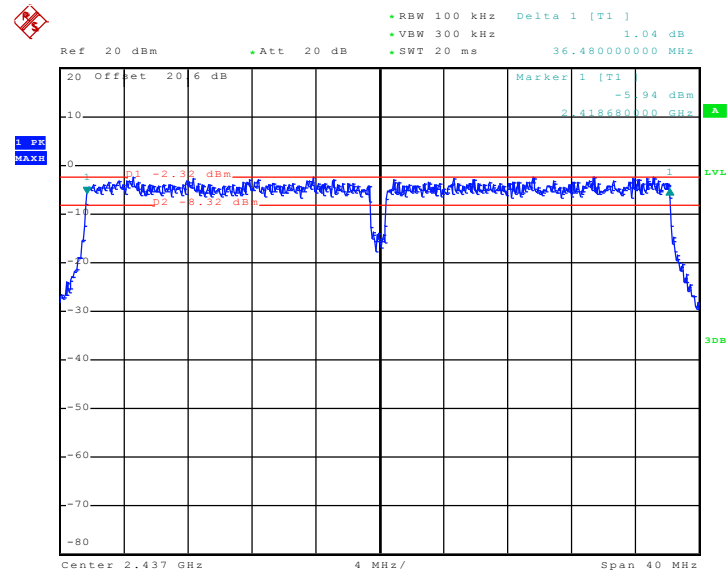
Channel	Frequency (MHz)	802.11n (BW 40MHz) 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
03	2422	36.48	0.5	Pass
06	2437	36.48	0.5	Pass
09	2452	36.56	0.5	Pass

Mode 10 : 6 dB Bandwidth Plot on 802.11n(BW 40MHz) Channel 03


Date: 21.JAN.2011 17:18:24

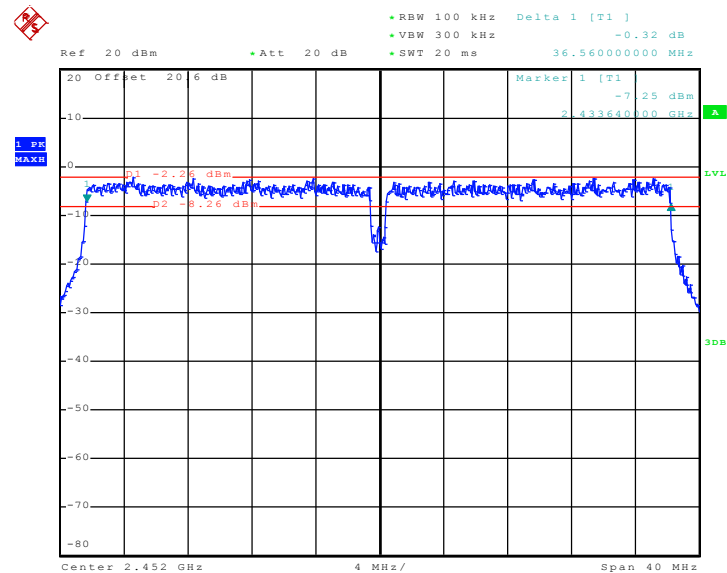


Mode 11 : 6 dB Bandwidth Plot on 802.11n(BW 40MHz) Channel 06



Date: 21.JAN.2011 17:33:33

Mode 12 : 6 dB Bandwidth Plot on 802.11n(BW 40MHz) Channel 09



Date: 21.JAN.2011 17:46:01

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.

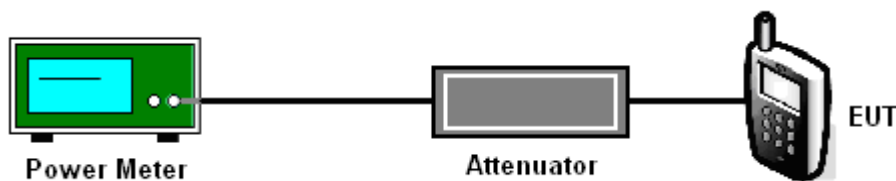
3.2.2 Measuring Instruments

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 :	23~25℃
Test Engineer :	Hank Yu	Relative Humidity :	51~55%

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	18.94	30	Pass
06	2437	19.09	30	Pass
11	2462	19.03	30	Pass

Test Mode :	Mode 4, 5, 6	Temperature :	23~25℃
Test Engineer :	Hank Yu	Relative Humidity :	51~55%

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	23.80	30	Pass
06	2437	23.38	30	Pass
11	2462	23.45	30	Pass

Test Mode :	Mode 7, 8, 9	Temperature :	23~25℃
Test Engineer :	Hank Yu	Relative Humidity :	51~55%

Channel	Frequency (MHz)	802.11n (BW 20MHz) Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	22.40	30	Pass
06	2437	22.53	30	Pass
11	2462	22.38	30	Pass

Test Mode :	Mode 10, 11, 12	Temperature :	23~25℃
Test Engineer :	Hank Yu	Relative Humidity :	51~55%

Channel	Frequency (MHz)	802.11n (BW 40MHz) Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
03	2422	23.37	30	Pass
06	2437	23.22	30	Pass
09	2452	23.17	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

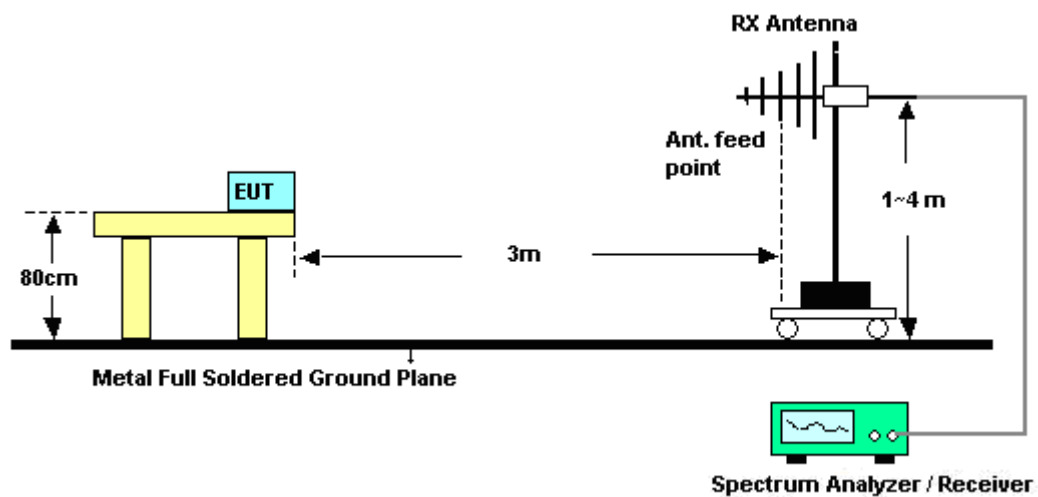
See list of measuring instruments of this test report.

3.3.3 Test Procedures

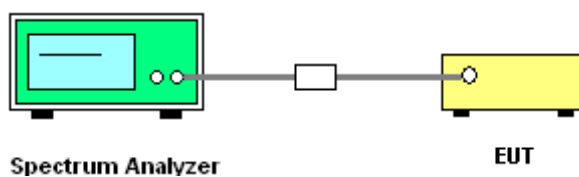
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized 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 :	50~52%
Test Channel :	01	Test Engineer :	Ivan Chiang

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	51.19	-22.81	74	46.83	32.18	6.03	33.85	104	69	Peak
2390	38.32	-15.68	54	33.96	32.18	6.03	33.85	104	69	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
2374.98	50.15	-23.85	74	45.84	32.16	5.99	33.84	102	240	Peak
2374.98	39	-15	54	34.69	32.16	5.99	33.84	102	240	Average

Test Mode :	Mode 3	Temperature :	22~24℃
Test Band :	802.11b	Relative Humidity :	50~52%
Test Channel :	11	Test Engineer :	Ivan Chiang

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	52.61	-21.39	74	48.03	32.3	6.18	33.9	100	76	Peak
2488.22	39.03	-14.97	54	34.45	32.3	6.18	33.9	100	76	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
2483.85	52.32	-21.68	74	47.76	32.28	6.18	33.9	102	7	Peak
2483.85	38.2	-15.8	54	33.64	32.28	6.18	33.9	102	7	Average

Test Mode :	Mode 4	Temperature :	22~24℃
Test Band :	802.11g	Relative Humidity :	50~52%
Test Channel :	01	Test Engineer :	Ivan Chiang

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	65.15	-8.85	74	60.79	32.18	6.03	33.85	103	68	Peak
2390	42.59	-11.41	54	38.23	32.18	6.03	33.85	103	68	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	61.71	-12.29	74	57.35	32.18	6.03	33.85	100	240	Peak
2389.61	39.99	-14.01	54	35.63	32.18	6.03	33.85	100	240	Average

Test Mode :	Mode 6	Temperature :	22~24℃
Test Band :	802.11g	Relative Humidity :	50~52%
Test Channel :	11	Test Engineer :	Ivan Chiang

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	64.58	-9.42	74	60.02	32.28	6.18	33.9	104	70	Peak
2483.5	44.59	-9.41	54	40.03	32.28	6.18	33.9	104	70	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	64.01	-9.99	74	59.45	32.28	6.18	33.9	102	7	Peak
2483.66	43.32	-10.68	54	38.76	32.28	6.18	33.9	102	7	Average

Test Mode :	Mode 7	Temperature :	22~24℃
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50~52%
Test Channel :	01	Test Engineer :	Ivan Chiang

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
2388.85	59.09	-14.91	74	54.73	32.18	6.03	33.85	103	69	Peak
2388.85	40.7	-13.3	54	36.34	32.18	6.03	33.85	103	69	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
2388.85	56.33	-17.67	74	51.97	32.18	6.03	33.85	100	240	Peak
2388.85	39.35	-14.65	54	34.99	32.18	6.03	33.85	100	240	Average

Test Mode :	Mode 9	Temperature :	22~24℃
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	50~52%
Test Channel :	11	Test Engineer :	Ivan Chiang

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	59.06	-14.94	74	54.5	32.28	6.18	33.9	104	70	Peak
2483.5	42.39	-11.61	54	37.83	32.28	6.18	33.9	104	70	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	60.03	-13.97	74	55.47	32.28	6.18	33.9	100	8	Peak
2483.5	43.01	-10.99	54	38.45	32.28	6.18	33.9	100	8	Average

Test Mode :	Mode 10	Temperature :	22~24℃
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	50~52%
Test Channel :	03	Test Engineer :	Ivan Chiang

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
2388.09	65.43	-8.57	74	61.07	32.18	6.03	33.85	106	70	Peak
2388.09	44.08	-9.92	54	39.72	32.18	6.03	33.85	106	70	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
2388.09	60.56	-13.44	74	56.2	32.18	6.03	33.85	100	240	Peak
2388.09	41.14	-12.86	54	36.78	32.18	6.03	33.85	100	240	Average

Test Mode :	Mode 12	Temperature :	22~24℃
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	50~52%
Test Channel :	09	Test Engineer :	Ivan Chiang

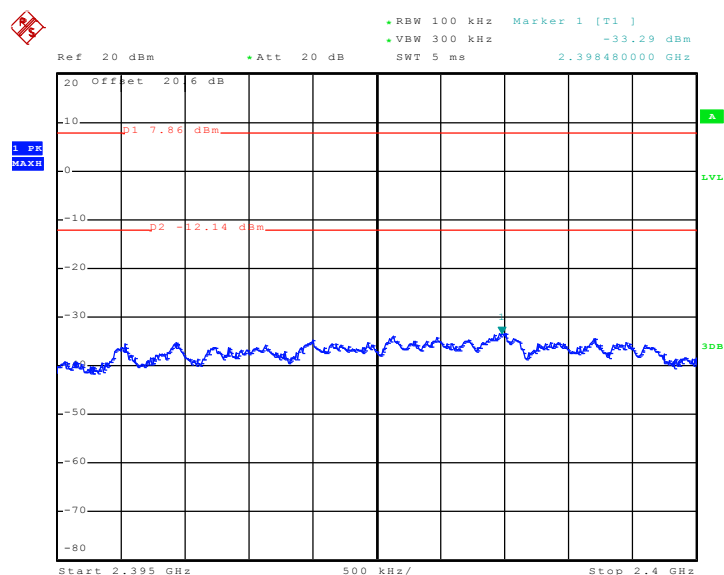
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2493.73	66.23	-7.77	74	61.65	32.3	6.18	33.9	106	70	Peak
2493.73	47.77	-6.23	54	43.19	32.3	6.18	33.9	106	70	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	66.66	-7.34	74	62.1	32.28	6.18	33.9	100	8	Peak
2483.66	48.2	-5.8	54	43.64	32.28	6.18	33.9	100	8	Average

3.3.6 Test Plots of Conducted Band Edges

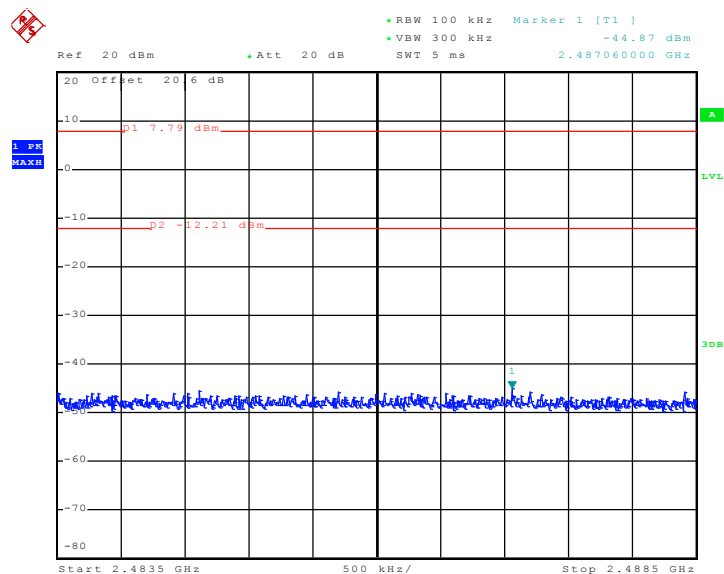
Test Mode :	Mode 1 and 3	Temperature :	23~25°C
Test Band :	802.11b	Relative Humidity :	51~55%
Test Channel :	01 and 11	Test Engineer :	Hank Yu

Low Band Edge Plot on 802.11b Channel 01



Date: 21.JAN.2011 15:20:32

High Band Edge Plot on 802.11b Channel 11



Date: 21.JAN.2011 15:34:23



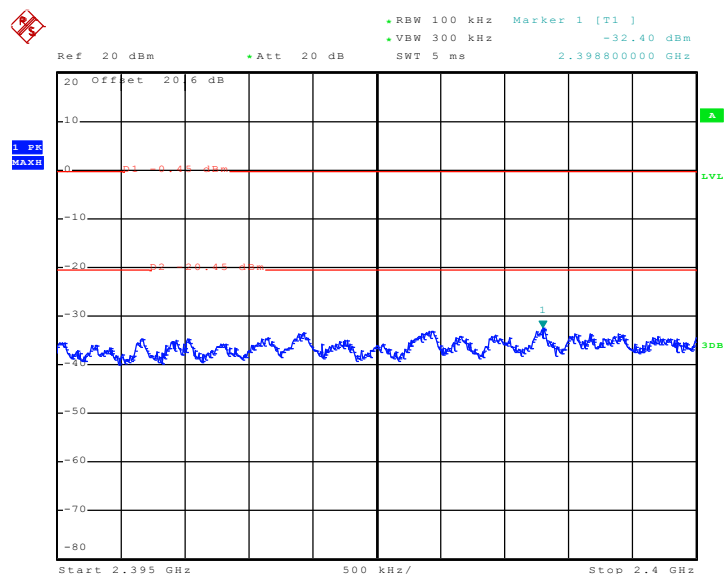
Low Band Edge Plot on 802.11g Channel 01



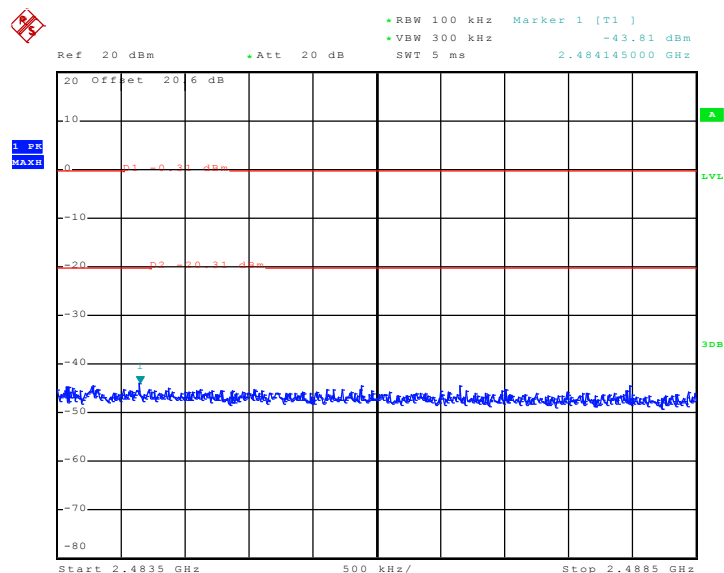
High Band Edge Plot on 802.11g Channel 11



Test Mode :	Mode 7 and 9	Temperature :	23~25°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	51~55%
Test Channel :	01 and 11	Test Engineer :	Hank Yu

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


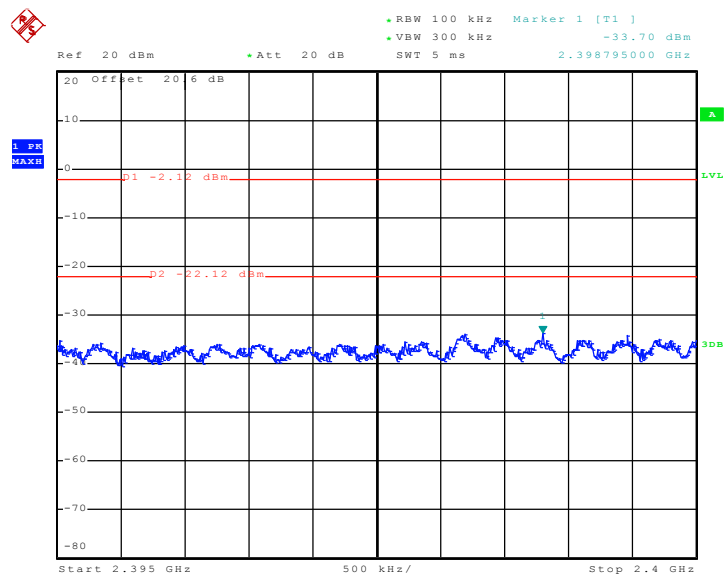
Date: 21.JAN.2011 17:31:58

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


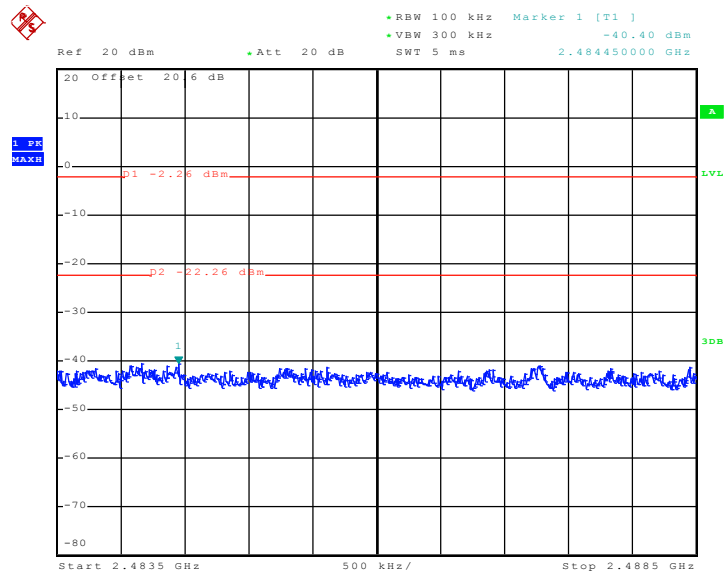
Date: 21.JAN.2011 17:06:02



Test Mode :	Mode 10 and 12	Temperature :	23~25°C
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	51~55%
Test Channel :	03 and 09	Test Engineer :	Hank Yu

Low Band Edge Plot on 802.11n (BW 40MHz) Channel 03

Date: 21.JAN.2011 17:19:39

High Band Edge Plot on 802.11n (BW 40MHz) Channel 09

Date: 21.JAN.2011 17:46:27

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.

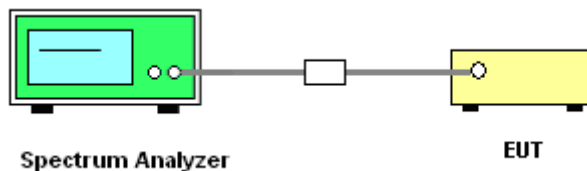
3.4.2 Measuring Instruments

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.

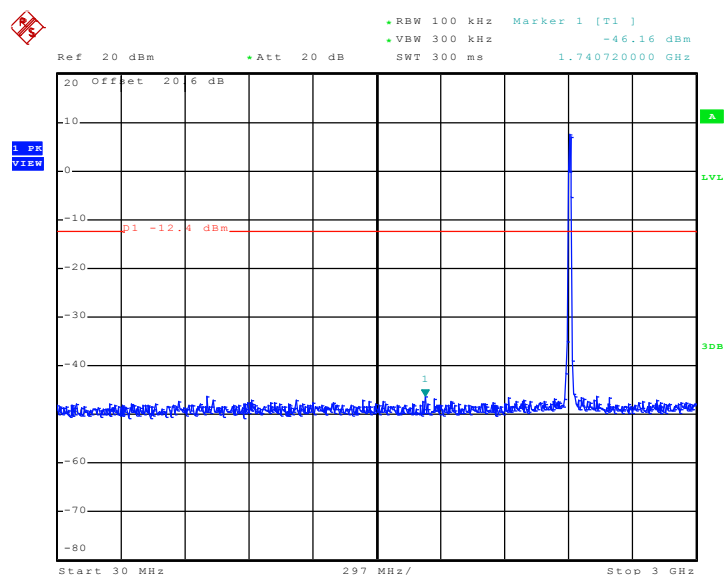
3.4.4 Test Setup



3.4.5 Test Plots of Spurious Emission

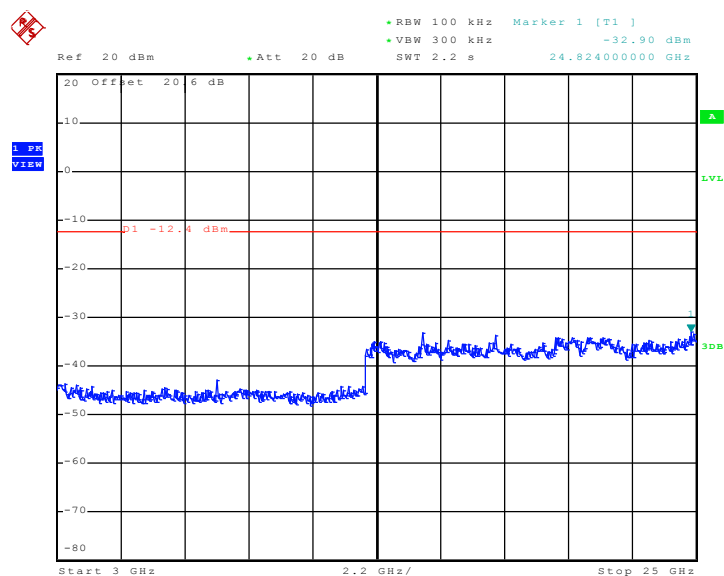
Test Mode :	Mode 1	Temperature :	23~25°C
Test Band :	802.11b	Relative Humidity :	51~55%
Test Channel :	01	Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



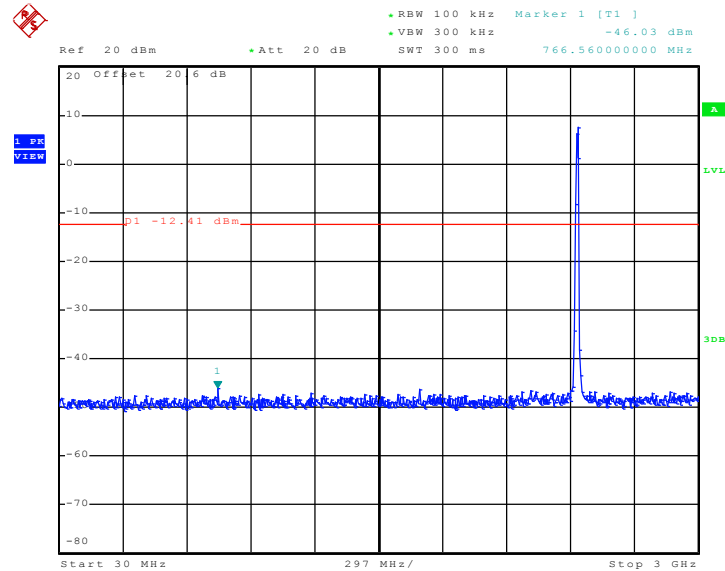
Date: 21.JAN.2011 15:30:56

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

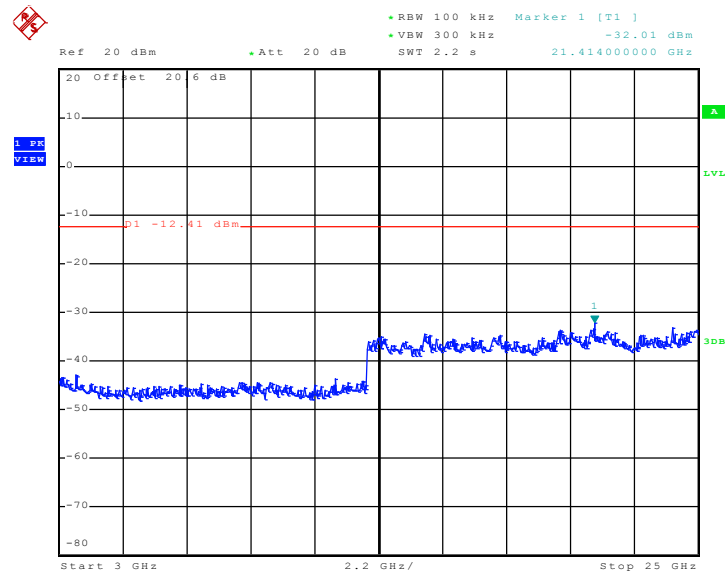


Date: 21.JAN.2011 15:31:13

Test Mode :	Mode 2	Temperature :	23~25°C
Test Band :	802.11b	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


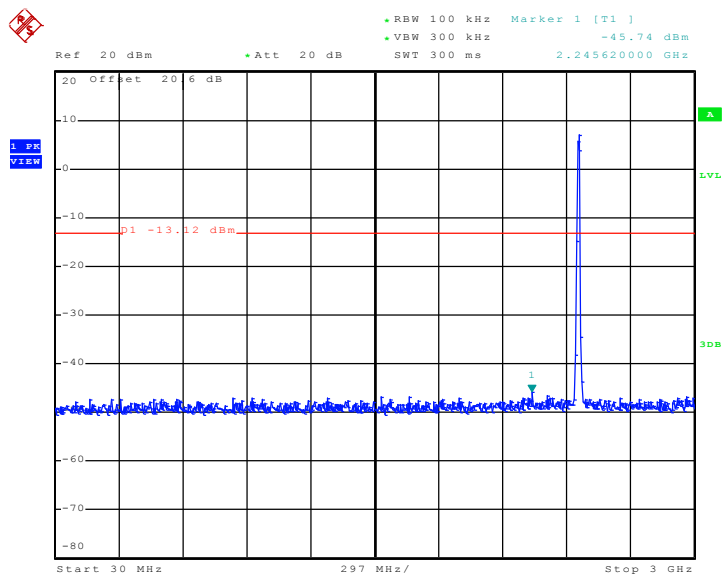
Date: 21.JAN.2011 15:16:19

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


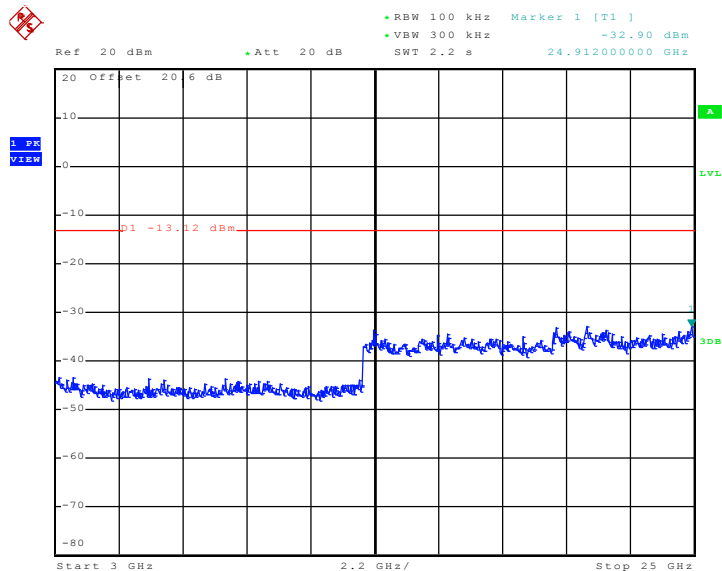
Date: 21.JAN.2011 15:16:36



Test Mode :	Mode 3	Temperature :	23~25°C
Test Band :	802.11b	Relative Humidity :	51~55%
Test Channel :	11	Test Engineer :	Hank Yu

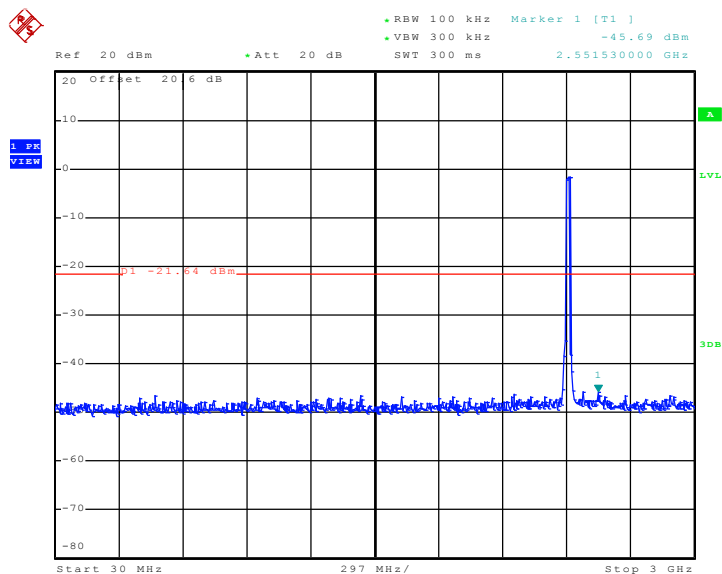
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz

Date: 21.JAN.2011 15:43:59

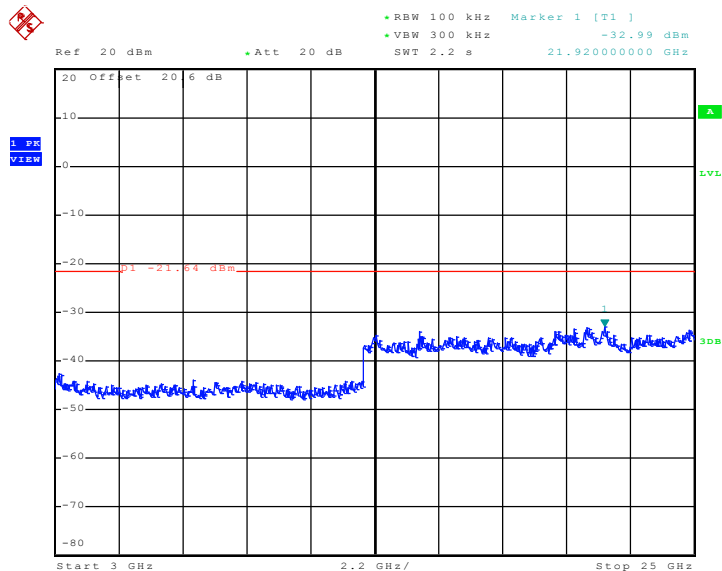
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

Date: 21.JAN.2011 15:44:16

Test Mode :	Mode 4	Temperature :	23~25°C
Test Band :	802.11g	Relative Humidity :	51~55%
Test Channel :	01	Test Engineer :	Hank Yu

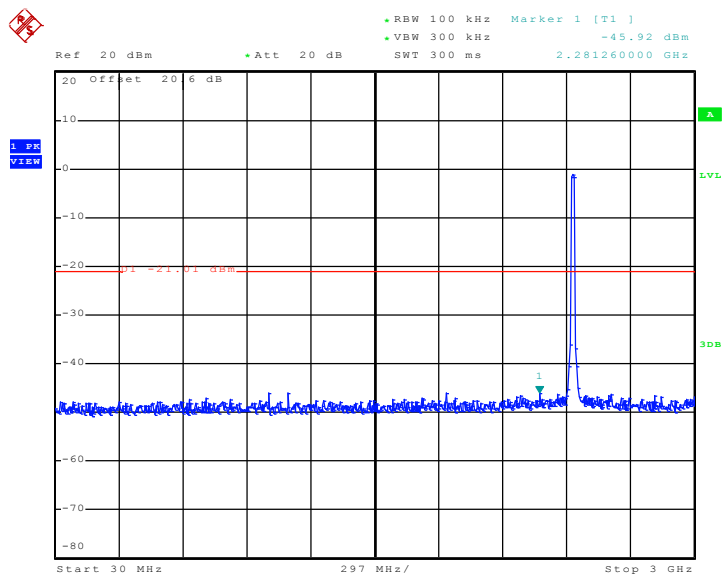
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 21.JAN.2011 16:35:53

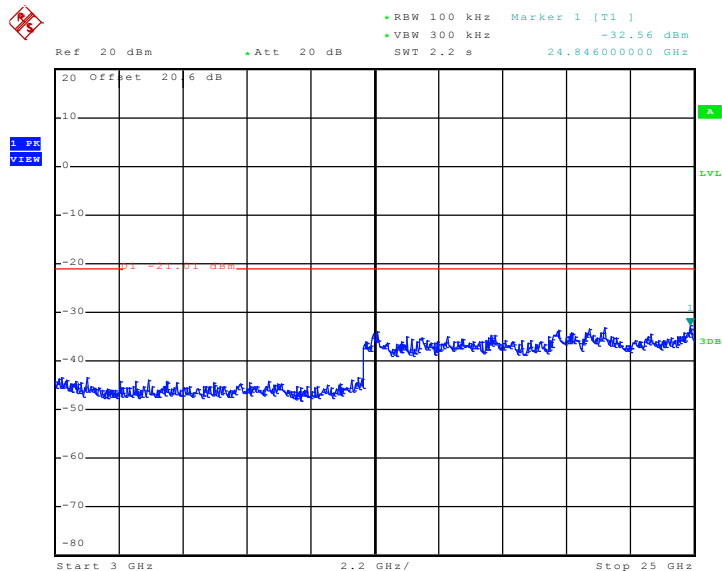
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 21.JAN.2011 16:36:10

Test Mode :	Mode 5	Temperature :	23~25°C
Test Band :	802.11g	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Hank Yu

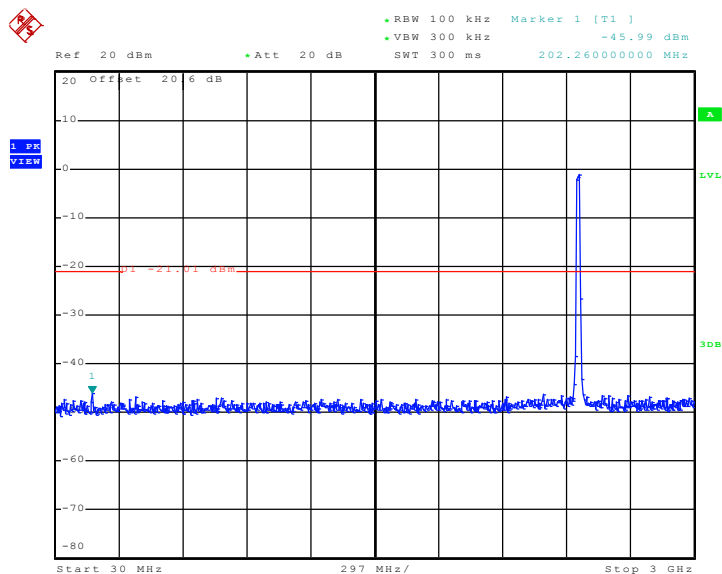
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 21.JAN.2011 16:21:55

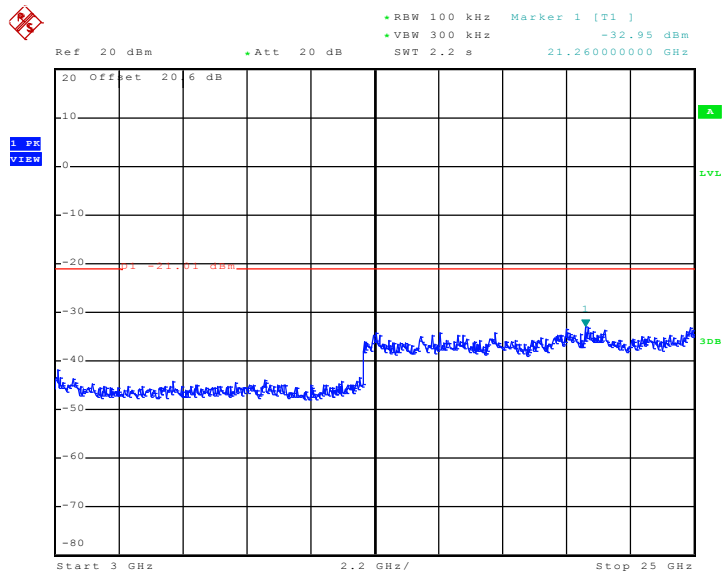
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 21.JAN.2011 16:22:12

Test Mode :	Mode 6	Temperature :	23~25°C
Test Band :	802.11g	Relative Humidity :	51~55%
Test Channel :	11	Test Engineer :	Hank Yu

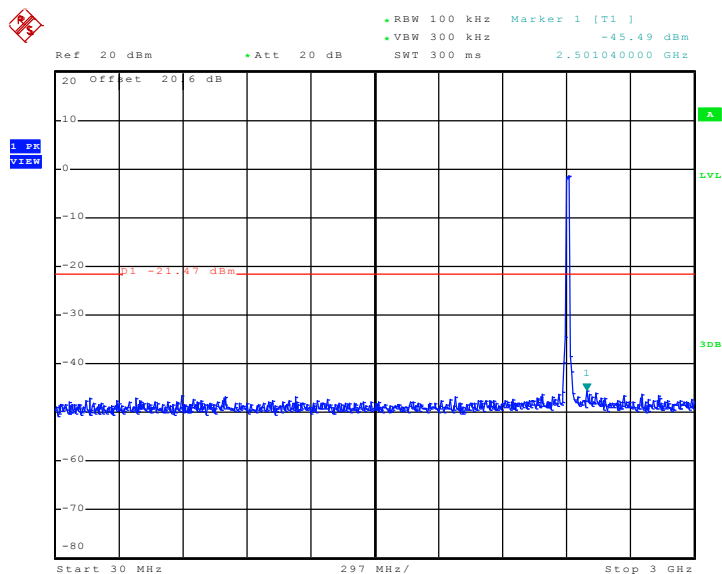
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 21.JAN.2011 16:02:45

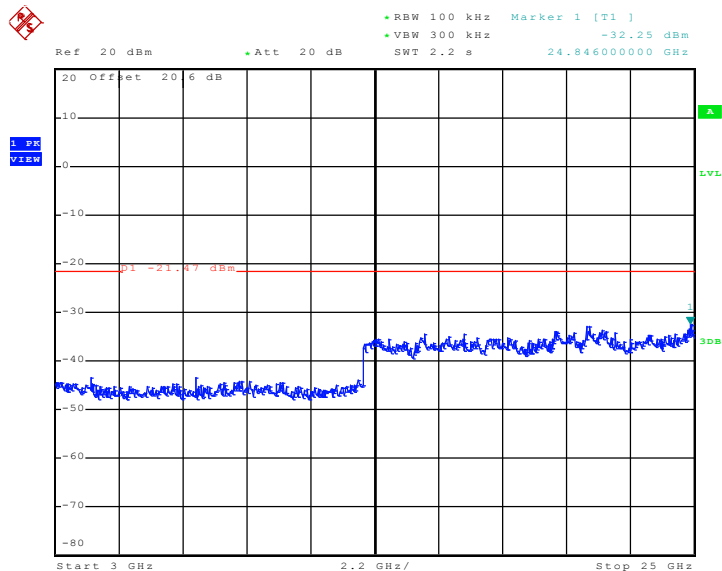
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 21.JAN.2011 16:03:02

Test Mode :	Mode 7	Temperature :	23~25°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	51~55%
Test Channel :	01	Test Engineer :	Hank Yu

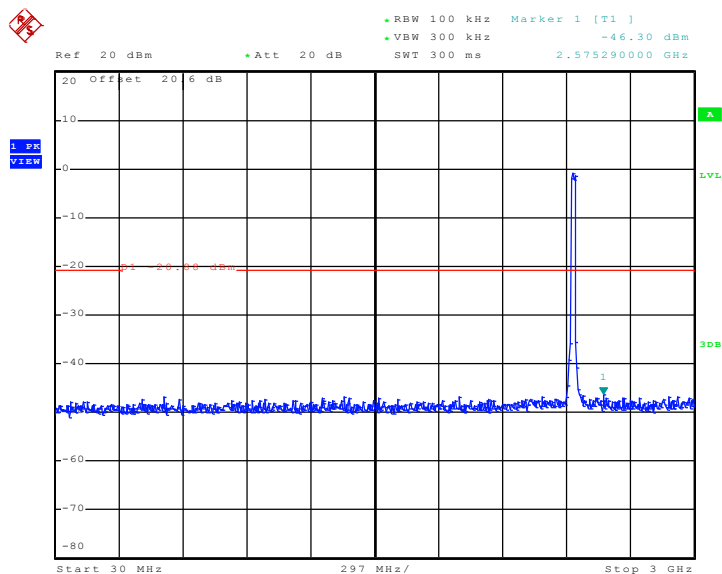
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 21.JAN.2011 16:51:48

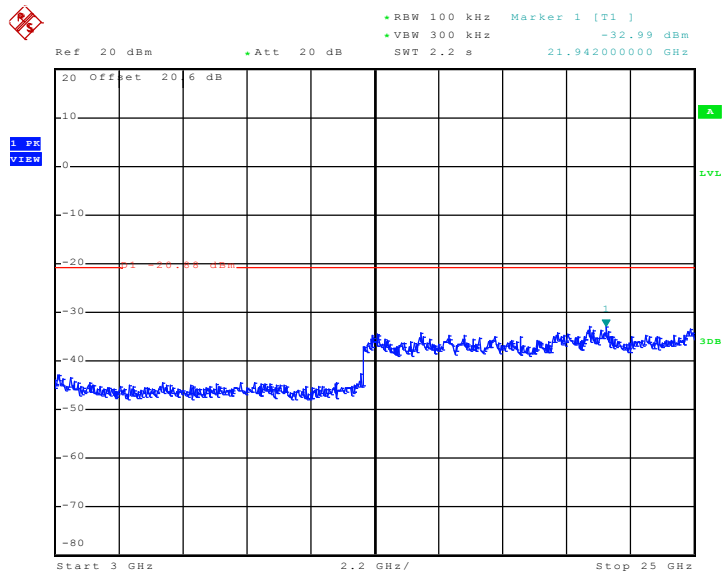
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 21.JAN.2011 16:52:05

Test Mode :	Mode 8	Temperature :	23~25°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Hank Yu

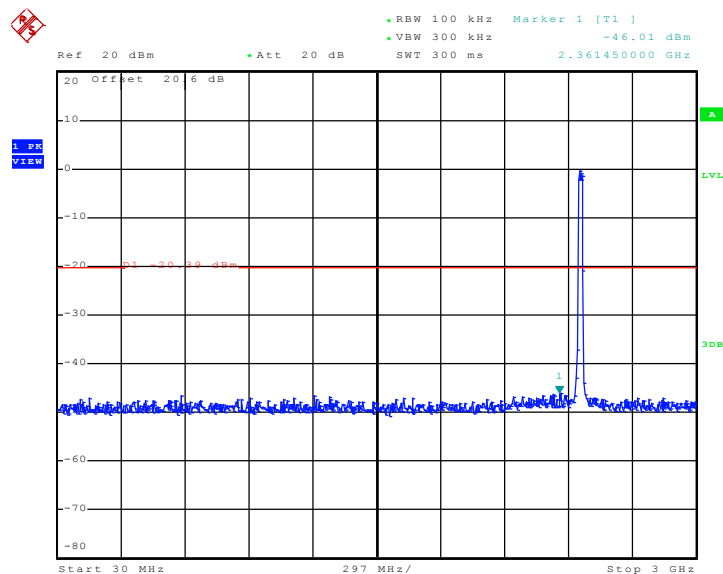
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 21.JAN.2011 17:03:31

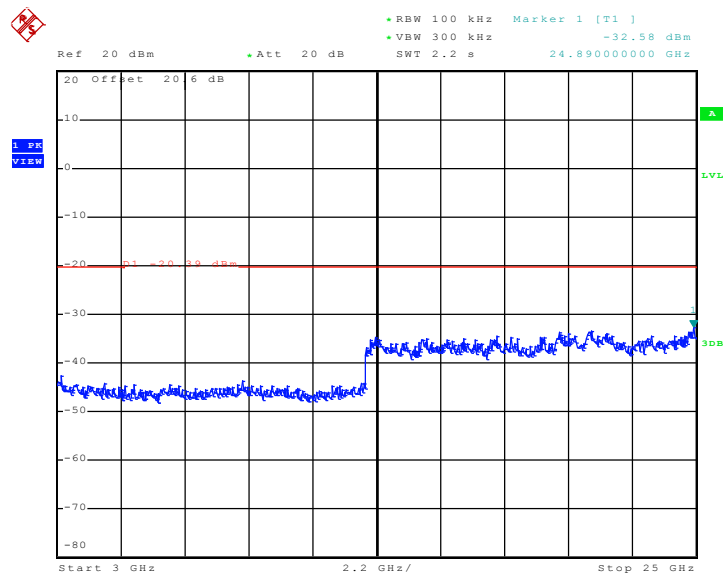
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 21.JAN.2011 17:03:48

Test Mode :	Mode 9	Temperature :	23~25°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	51~55%
Test Channel :	11	Test Engineer :	Hank Yu

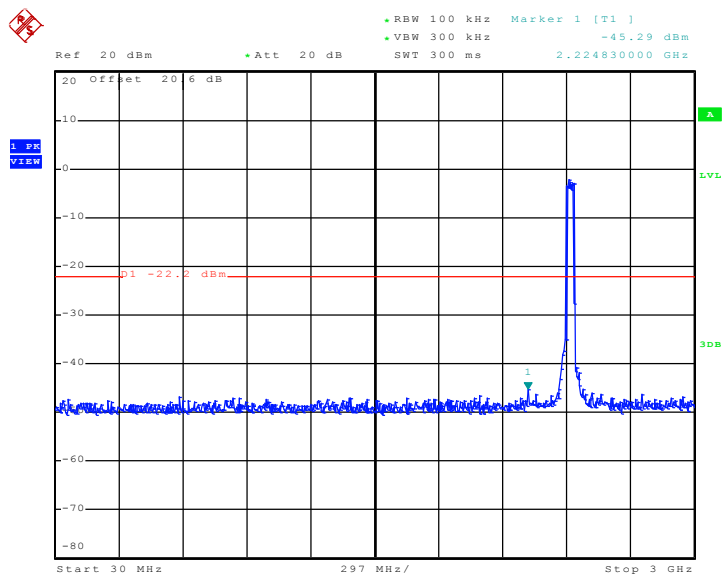
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 21.JAN.2011 17:15:32

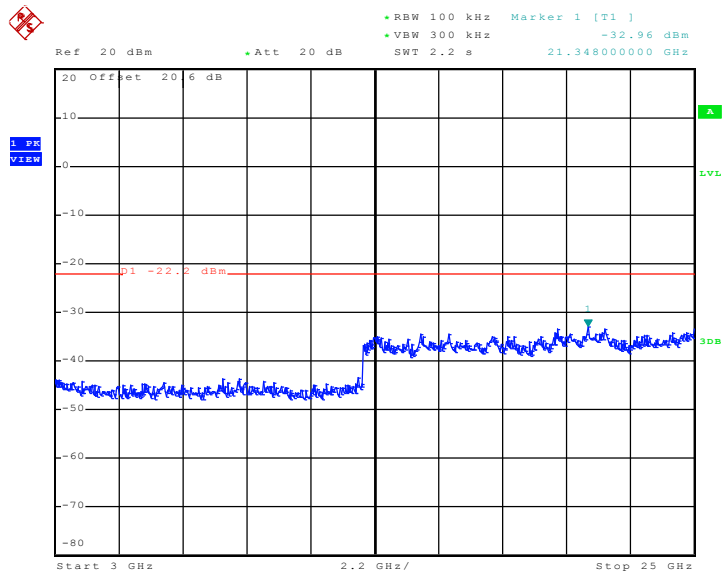
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 21.JAN.2011 17:15:49

Test Mode :	Mode 10	Temperature :	23~25°C
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	51~55%
Test Channel :	03	Test Engineer :	Hank Yu

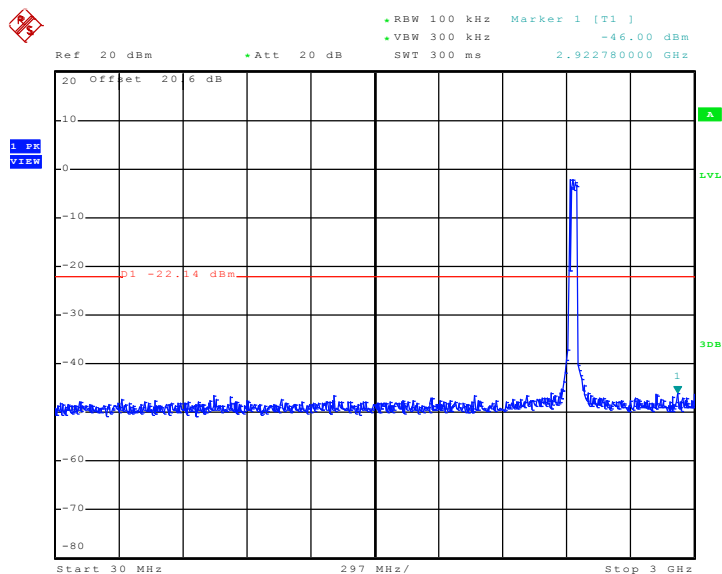
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 21.JAN.2011 17:29:23

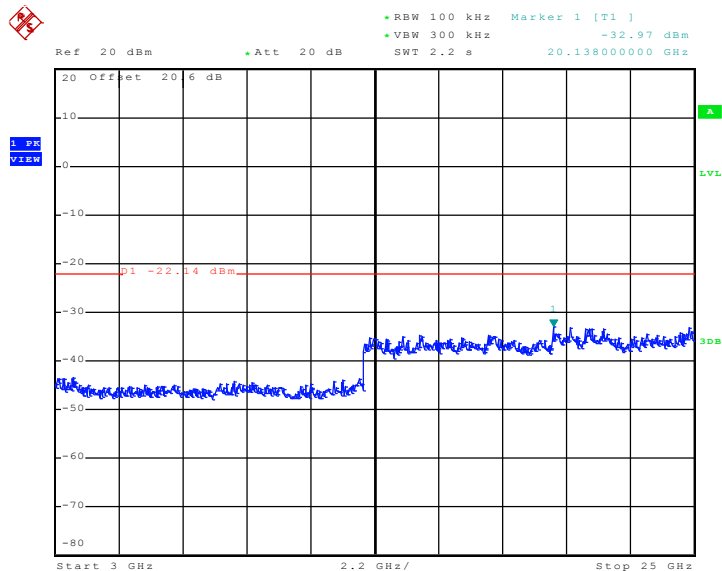
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 21.JAN.2011 17:29:40

Test Mode :	Mode 11	Temperature :	23~25°C
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Hank Yu

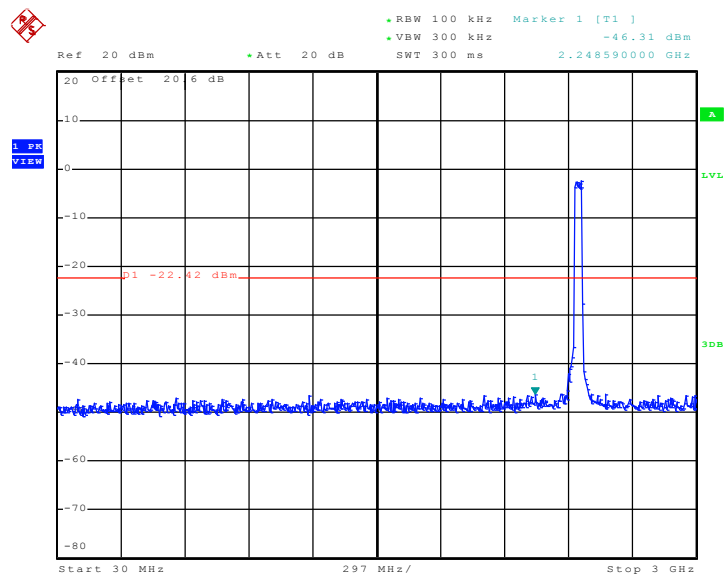
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 21.JAN.2011 17:44:12

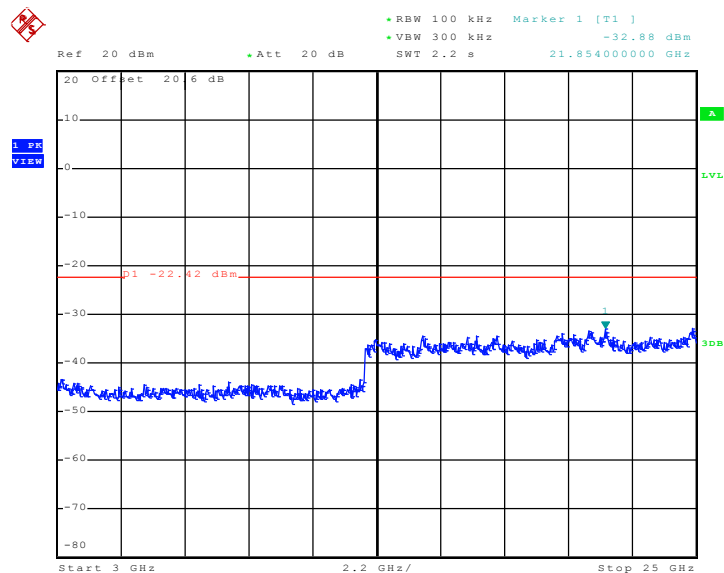
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 21.JAN.2011 17:44:29

Test Mode :	Mode 12	Temperature :	23~25°C
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	51~55%
Test Channel :	09	Test Engineer :	Hank Yu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 21.JAN.2011 17:57:02

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 21.JAN.2011 17:57:19

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.

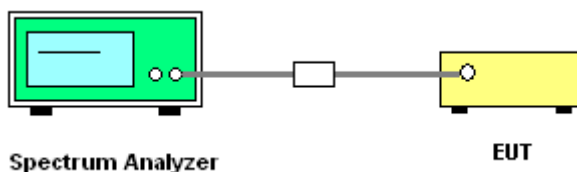
3.5.2 Measuring Instruments

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

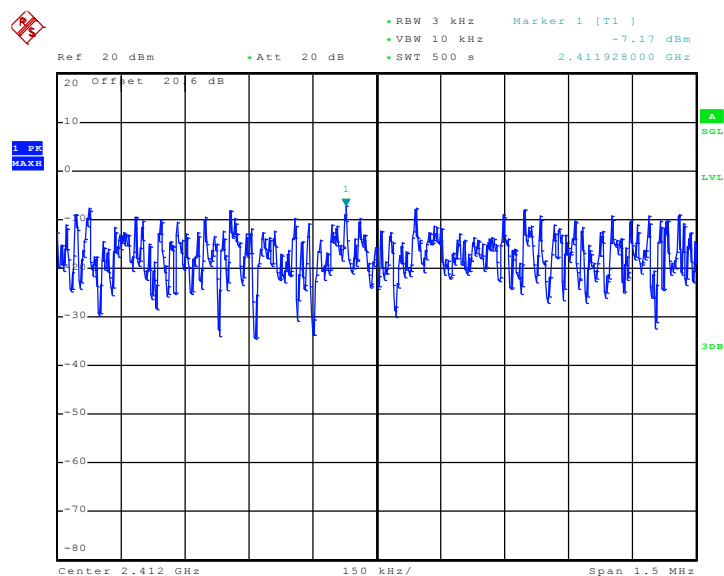


3.5.5 Test Result of Power Spectral Density

Test Mode :	Mode 1, 2, 3	Temperature :	23~25℃
Test Engineer :	Hank Yu	Relative Humidity :	51~55%

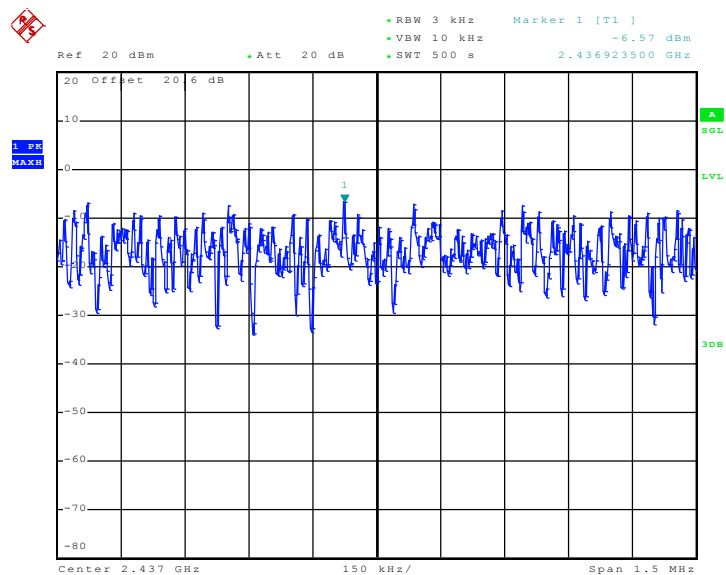
Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-7.17	8	Pass
06	2437	-6.57	8	Pass
11	2462	-7.20	8	Pass

Mode 1 : PSD Plot on 802.11b Channel 01



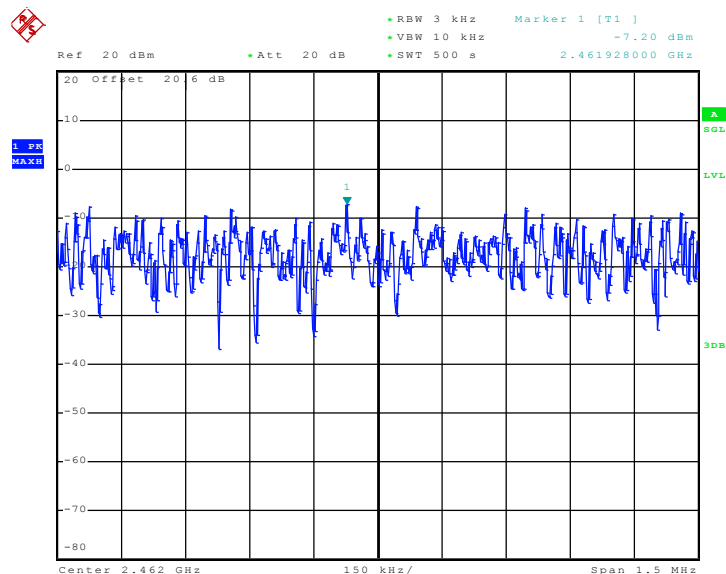
Date: 21.JAN.2011 15:30:35

Mode 2 : PSD Plot on 802.11b Channel 06



Date: 21.JAN.2011 15:15:59

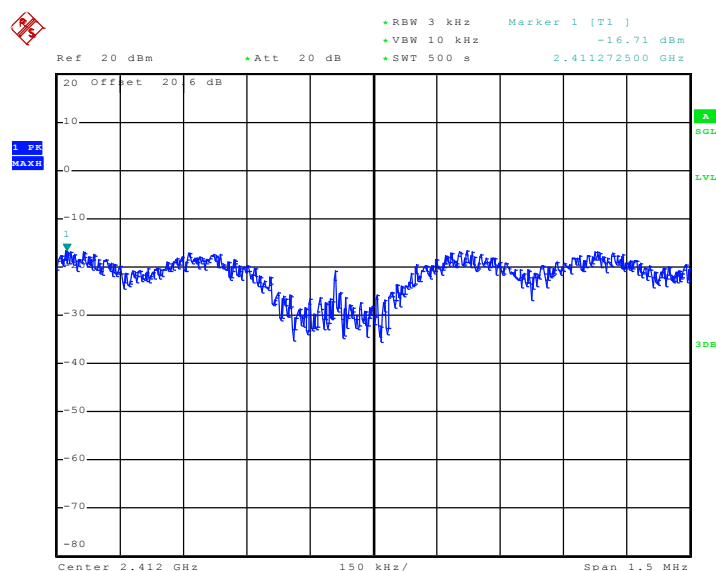
Mode 3 : PSD Plot on 802.11b Channel 11



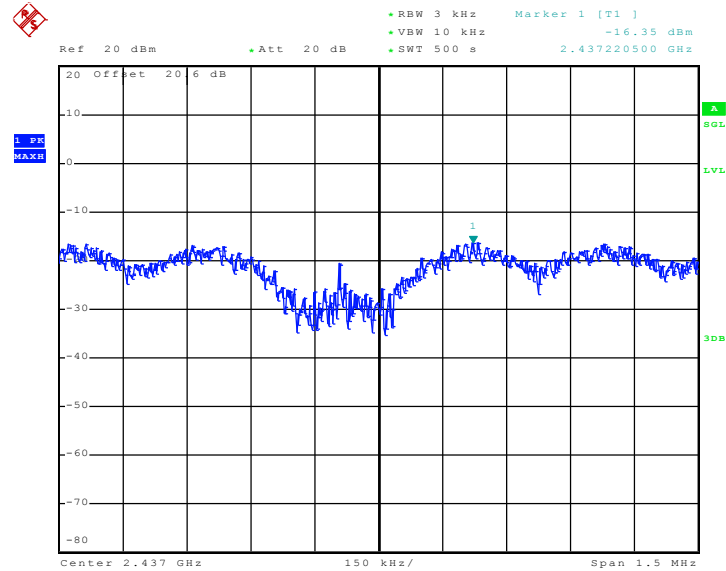
Date: 21.JAN.2011 15:43:38

Test Mode :	Mode 4, 5, 6	Temperature :	23~25°C
Test Engineer :	Hank Yu	Relative Humidity :	51~55%

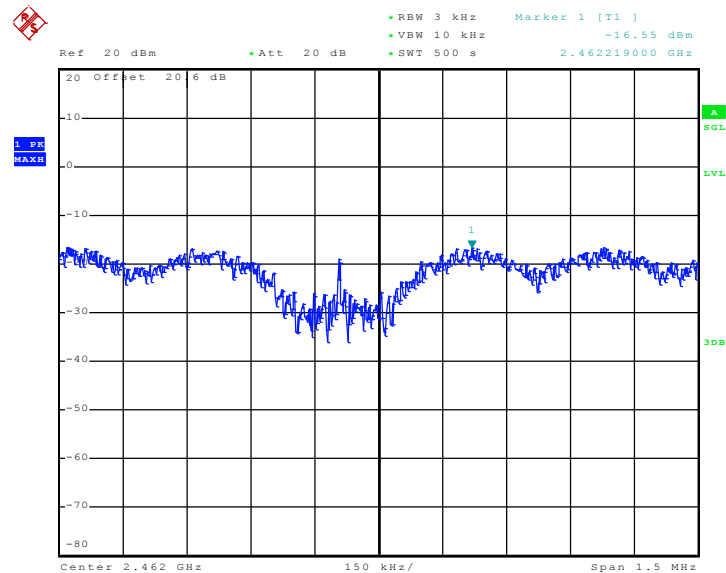
Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-16.71	8	Pass
06	2437	-16.35	8	Pass
11	2462	-16.55	8	Pass

Mode 4 : PSD Plot on 802.11g Channel 01


Date: 21.JAN.2011 16:35:33

Mode 5 : PSD Plot on 802.11g Channel 06


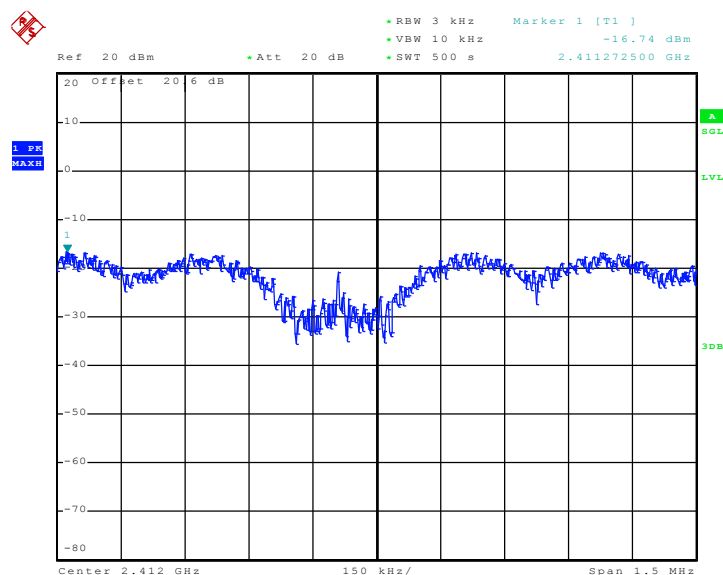
Date: 21.JAN.2011 16:21:35

Mode 6 : PSD Plot on 802.11g Channel 11


Date: 21.JAN.2011 16:02:24

Test Mode :	Mode 7, 8, 9	Temperature :	23~25℃
Test Engineer :	Hank Yu	Relative Humidity :	51~55%

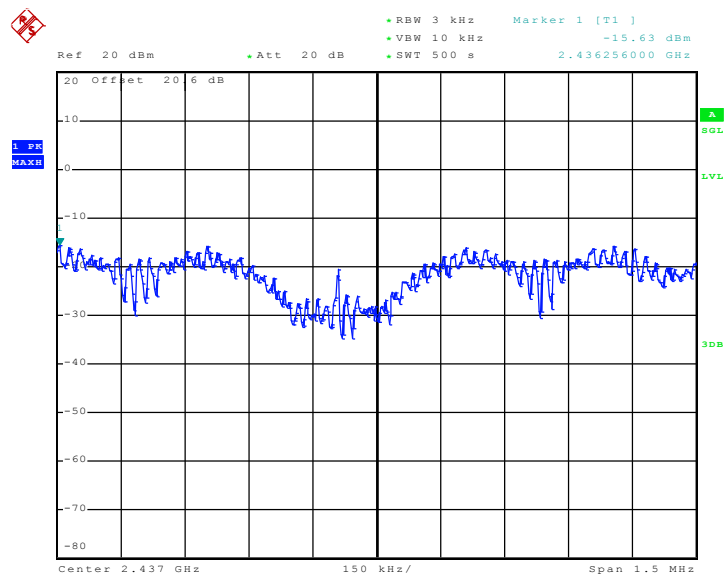
Channel	Frequency (MHz)	802.11n (BW 20MHz) Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-16.74	8	Pass
06	2437	-15.63	8	Pass
11	2462	-15.70	8	Pass

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


Date: 21.JAN.2011 16:51:27

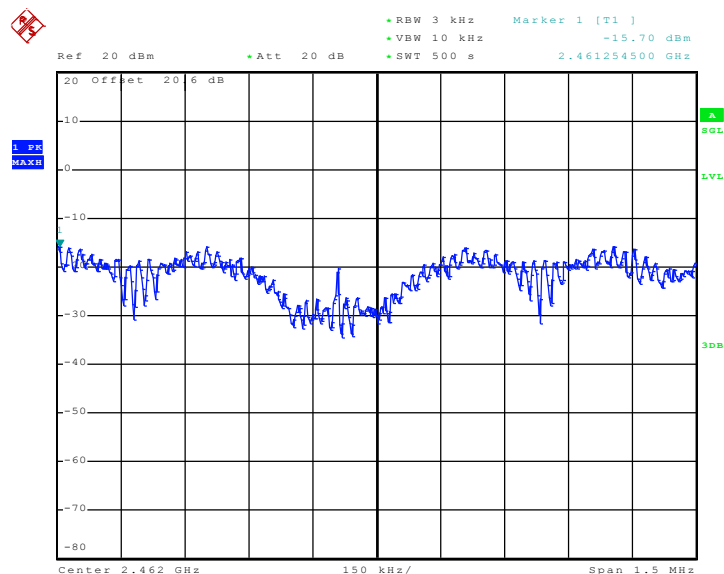


Mode 8 : PSD Plot on 802.11n (BW 20MHz) Channel 06



Date: 21.JAN.2011 17:03:10

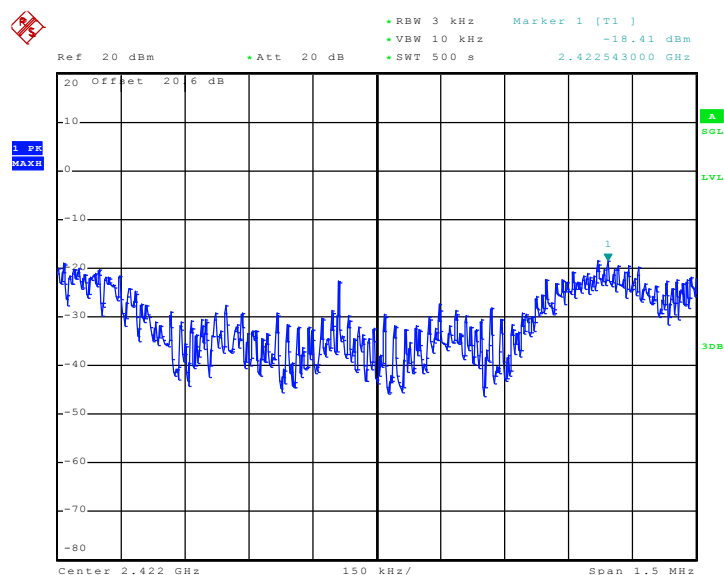
Mode 9 : PSD Plot on 802.11n (BW 20MHz) Channel 11



Date: 21.JAN.2011 17:15:11

Test Mode :	Mode 10, 11, 12	Temperature :	23~25
Test Engineer :	Hank Yu	Relative Humidity :	51~55

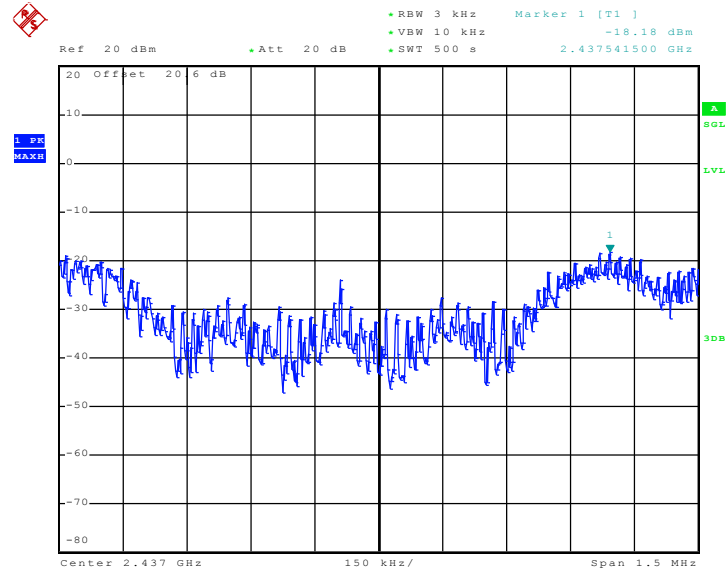
Channel	Frequency (MHz)	802.11n (BW 40MHz) Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
03	2422	-18.41	8	Pass
06	2437	-18.18	8	Pass
09	2452	-18.27	8	Pass

Mode 10 : PSD Plot on 802.11n (BW 40MHz) Channel 03


Date: 21.JAN.2011 17:29:02

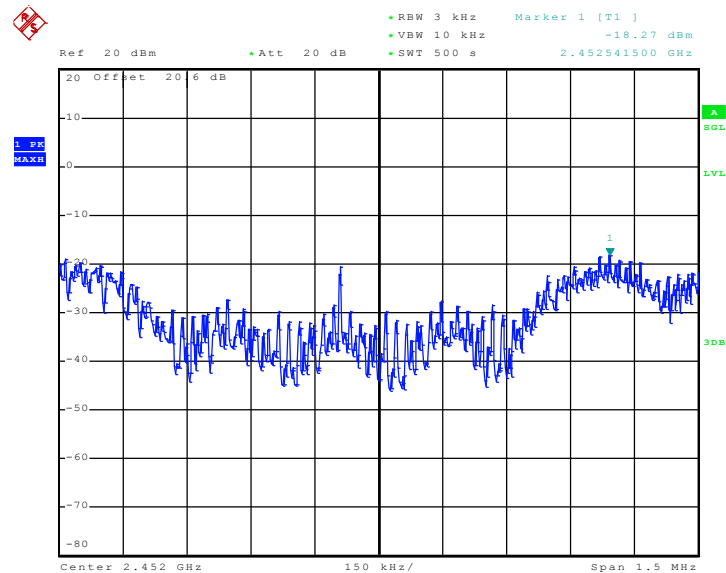


Mode 11 : PSD Plot on 802.11n (BW 40MHz) Channel 06



Date: 21.JAN.2011 17:43:51

Mode 12 : PSD Plot on 802.11n (BW 40MHz) Channel 09



Date: 21.JAN.2011 17:56:40

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.

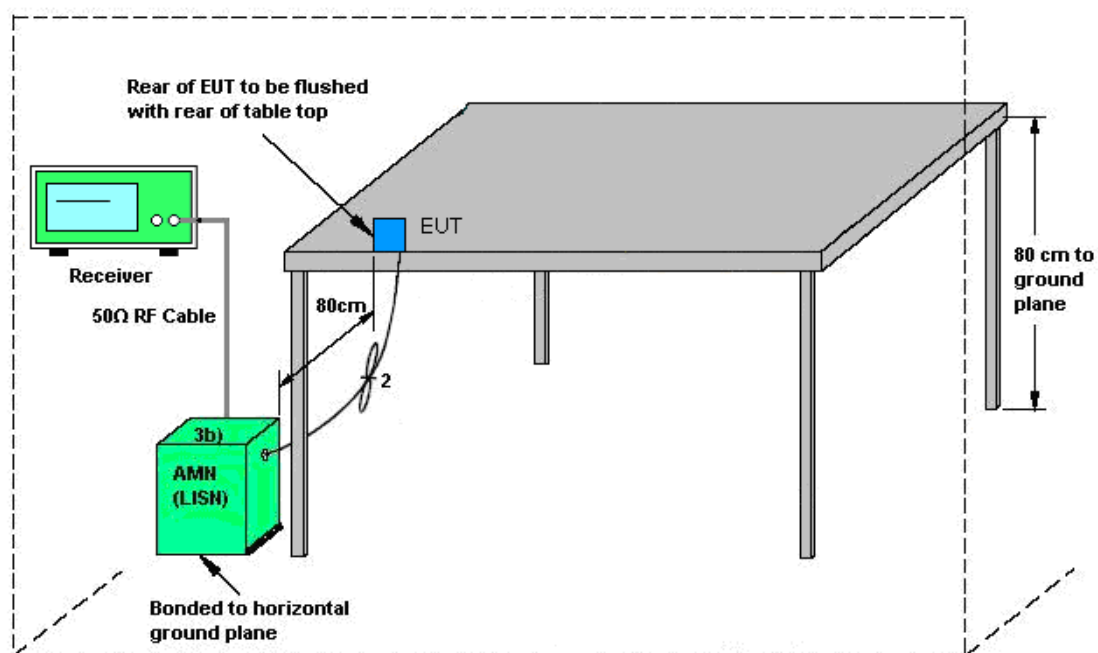
3.6.2 Measuring Instruments

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.

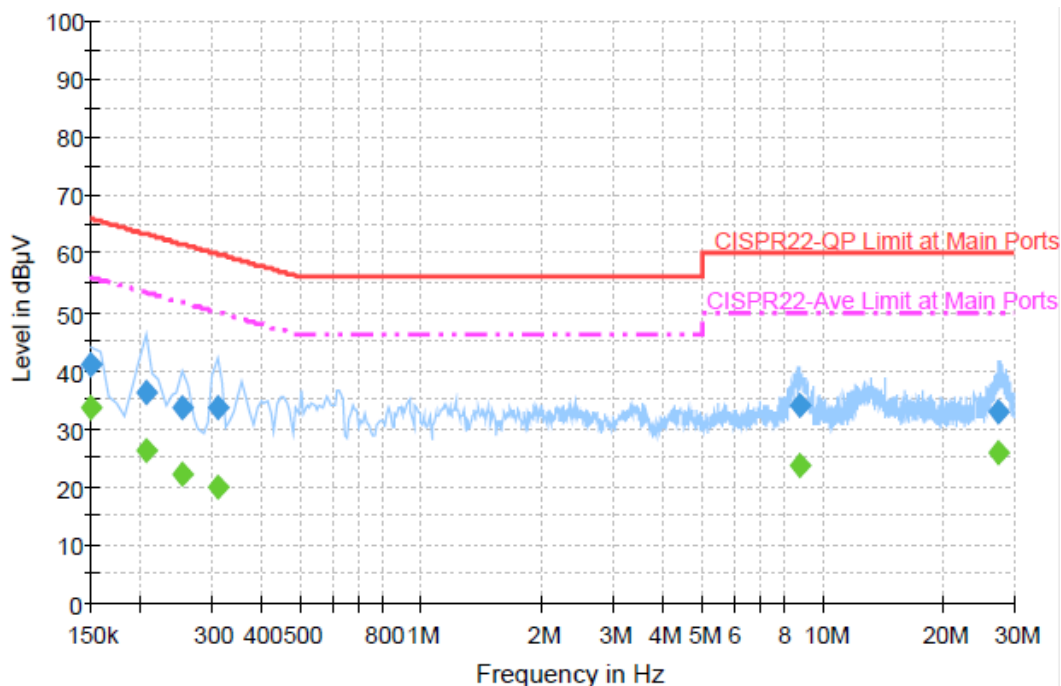
3.6.4 Test Setup



AMN = Artificial mains network (LISN)
 AE = Associated equipment
 EUT = Equipment under test
 ISN = Impedance stabilization network

3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Hayden Wu	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN Link + iPod + AC Plug		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



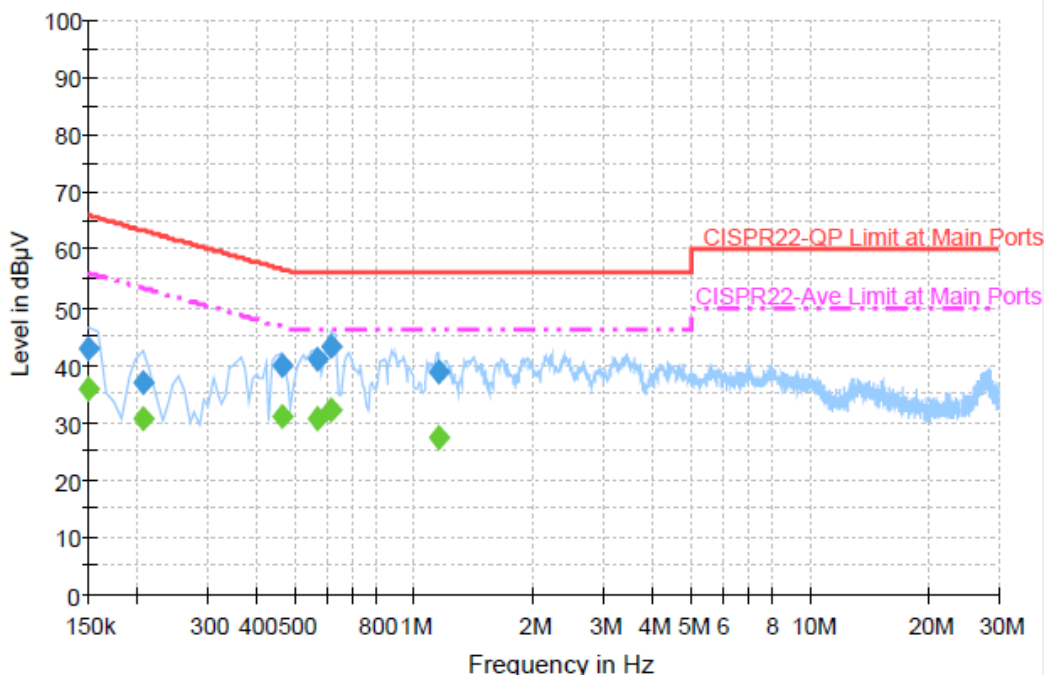
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	41.1	Off	L1	19.4	24.9	66.0
0.206000	36.1	Off	L1	19.3	27.3	63.4
0.254000	33.7	Off	L1	19.3	27.9	61.6
0.310000	33.5	Off	L1	19.3	26.5	60.0
8.718000	34.1	Off	L1	19.6	25.9	60.0
27.286000	32.8	Off	L1	19.8	27.2	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	33.5	Off	L1	19.4	22.5	56.0
0.206000	26.3	Off	L1	19.3	27.1	53.4
0.254000	22.0	Off	L1	19.3	29.6	51.6
0.310000	20.0	Off	L1	19.3	30.0	50.0
8.718000	23.5	Off	L1	19.6	26.5	50.0
27.286000	25.8	Off	L1	19.8	24.2	50.0

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Hayden Wu	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN Link + iPod + AC Plug		
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	43.0	Off	N	19.4	23.0	66.0
0.206000	37.0	Off	N	19.3	26.4	63.4
0.462000	39.7	Off	N	19.3	17.0	56.7
0.566000	40.8	Off	N	19.3	15.2	56.0
0.614000	43.0	Off	N	19.4	13.0	56.0
1.150000	38.9	Off	N	19.5	17.1	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	35.9	Off	N	19.4	20.1	56.0
0.206000	30.5	Off	N	19.3	22.9	53.4
0.462000	30.9	Off	N	19.3	15.8	46.7
0.566000	30.7	Off	N	19.3	15.3	46.0
0.614000	32.1	Off	N	19.4	13.9	46.0
1.150000	27.2	Off	N	19.5	18.8	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

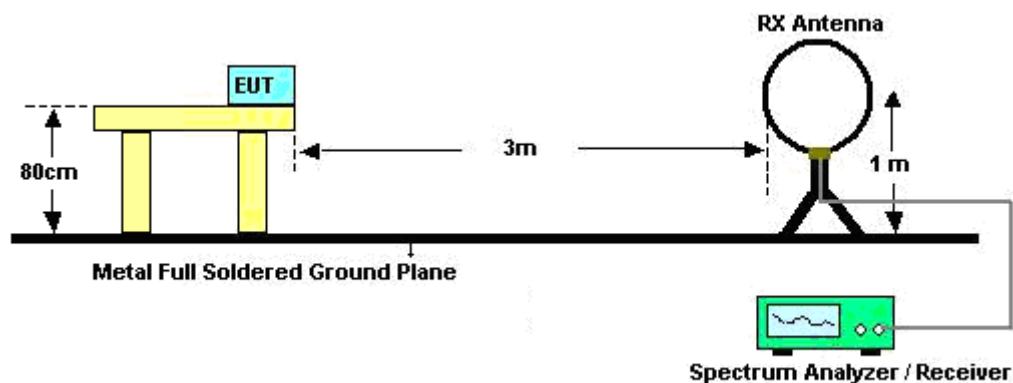
See list of measuring instruments of this test report.

3.7.3 Test Procedures

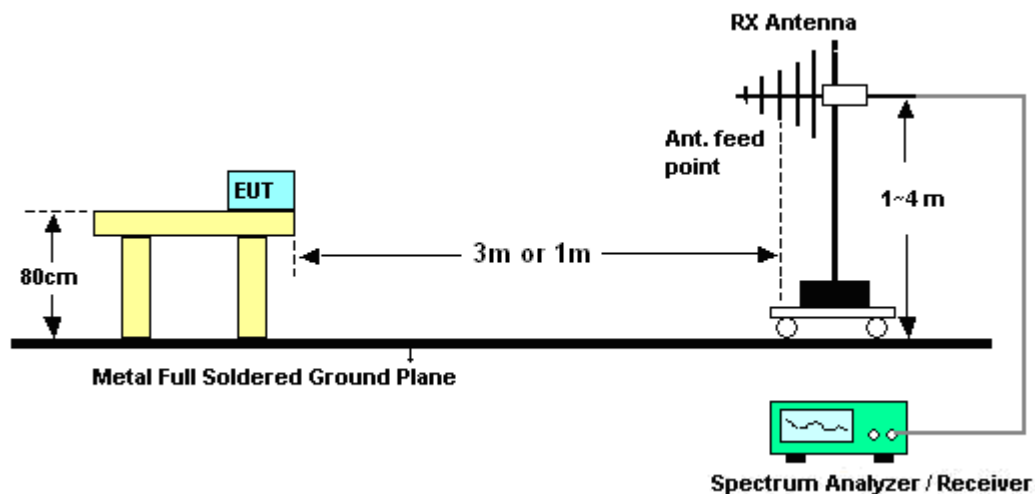
- The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
 - 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)
- 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 Chiang	Temperature :	22~24℃	
		Relative Humidity :	50~52%	

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 :	50~52%
Test Engineer :	Ivan Chiang	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
32.97	18.5	-21.5	40	33.61	15.8	0.56	31.47	-	-	Peak
161.49	15.18	-28.32	43.5	35.22	10.26	1.22	31.52	-	-	Peak
250.86	23.57	-22.43	46	40.75	12.69	1.54	31.41	-	-	Peak
374.2	31.57	-14.43	46	44.95	15.78	2.09	31.25	-	-	Peak
399.4	28.84	-17.16	46	41.32	16.56	2.14	31.18	-	-	Peak
850.2	33.93	-12.07	46	38.33	23.06	3.27	30.73	119	133	Peak
2390	51.19	-22.81	74	46.83	32.18	6.03	33.85	104	69	Peak
2390	38.32	-15.68	54	33.96	32.18	6.03	33.85	104	69	Average
2412	107.78	-	-	103.38	32.2	6.07	33.87	104	69	Peak
2412	99.91	-	-	95.51	32.2	6.07	33.87	104	69	Average
2494	37.47	-16.53	54	32.89	32.3	6.18	33.9	104	69	Average
2494	49.37	-24.63	74	44.79	32.3	6.18	33.9	104	69	Peak

Test Mode :	Mode 1	Temperature :	22~24°C
Test Channel :	01	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	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
32.7	20.07	-19.93	40	35.18	15.8	0.56	31.47	-	-	Peak
46.74	24.38	-15.62	40	45.35	9.87	0.67	31.51	-	-	Peak
207.66	23.19	-20.31	43.5	43.66	9.65	1.35	31.47	-	-	Peak
374.2	29.87	-16.13	46	43.25	15.78	2.09	31.25	-	-	Peak
478.5	29.77	-16.23	46	40.6	17.86	2.37	31.06	-	-	Peak
799.8	30.76	-15.24	46	35.83	22.47	3.14	30.68	110	36	Peak
2374.98	50.15	-23.85	74	45.84	32.16	5.99	33.84	102	240	Peak
2374.98	39	-15	54	34.69	32.16	5.99	33.84	102	240	Average
2412	106.65	-	-	102.25	32.2	6.07	33.87	102	240	Peak
2412	98.5	-	-	94.1	32.2	6.07	33.87	102	240	Average
2500	41.13	-12.87	54	36.55	32.3	6.18	33.9	102	240	Average
2500	48.95	-25.05	74	44.37	32.3	6.18	33.9	102	240	Peak

Test Mode :	Mode 2	Temperature :	22~24℃
Test Channel :	06	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	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
31.62	18.92	-21.08	40	33.79	16.04	0.55	31.46	-	-	Peak
162.3	14.89	-28.61	43.5	34.93	10.26	1.22	31.52	-	-	Peak
251.94	21	-25	46	38.17	12.7	1.54	31.41	-	-	Peak
399.4	28.12	-17.88	46	40.6	16.56	2.14	31.18	-	-	Peak
449.8	27.8	-18.2	46	39.2	17.4	2.3	31.1	-	-	Peak
900.6	30.67	-15.33	46	34.39	23.64	3.34	30.7	111	263	Peak
2358	48.21	-25.79	74	43.93	32.13	5.99	33.84	100	75	Peak
2358	35.58	-18.42	54	31.3	32.13	5.99	33.84	100	75	Average
2437	106.63	-	-	102.16	32.24	6.11	33.88	100	75	Peak
2437	98.47	-	-	94	32.24	6.11	33.88	100	75	Average
2486	48.75	-25.25	74	44.19	32.28	6.18	33.9	100	75	Peak
2486	37.22	-16.78	54	32.66	32.28	6.18	33.9	100	75	Average
4874	51.19	-22.81	74	64.47	34.08	9.13	56.49	116	47	Peak
4874	40	-14	54	53.28	34.08	9.13	56.49	116	47	Average

Test Mode :	Mode 2	Temperature :	22~24°C
Test Channel :	06	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	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
34.86	20.77	-19.23	40	36.33	15.33	0.58	31.47	-	-	Peak
46.74	24.34	-15.66	40	45.31	9.87	0.67	31.51	-	-	Peak
161.49	23.88	-19.62	43.5	43.92	10.26	1.22	31.52	-	-	Peak
374.2	29.82	-16.18	46	43.2	15.78	2.09	31.25	-	-	Peak
424.6	28.85	-17.15	46	40.78	16.98	2.23	31.14	-	-	Peak
799.8	30.68	-15.32	46	35.75	22.47	3.14	30.68	151	202	Peak
2388	46.97	-27.03	74	42.61	32.18	6.03	33.85	102	358	Peak
2388	34.91	-19.09	54	30.55	32.18	6.03	33.85	102	358	Average
2437	106.04	-	-	101.57	32.24	6.11	33.88	102	358	Peak
2437	98.25	-	-	93.78	32.24	6.11	33.88	102	358	Average
2500	48.83	-25.17	74	44.25	32.3	6.18	33.9	102	358	Peak
2500	37.14	-16.86	54	32.56	32.3	6.18	33.9	102	358	Average
4874	49.52	-24.48	74	62.8	34.08	9.13	56.49	100	0	Peak

Test Mode :	Mode 3	Temperature :	22~24°C
Test Channel :	11	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	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	18.04	-21.96	40	32.91	16.04	0.55	31.46	-	-	Peak
162.3	14.34	-29.16	43.5	34.38	10.26	1.22	31.52	-	-	Peak
275.7	22.23	-23.77	46	38.88	13.07	1.64	31.36	-	-	Peak
374.2	31.83	-14.17	46	45.21	15.78	2.09	31.25	156	82	Peak
449.8	27.76	-18.24	46	39.16	17.4	2.3	31.1	-	-	Peak
799.8	30.94	-15.06	46	36.01	22.47	3.14	30.68	-	-	Peak
2358	47.04	-26.96	74	42.76	32.13	5.99	33.84	100	76	Peak
2358	35.68	-18.32	54	31.4	32.13	5.99	33.84	100	76	Average
2462	106.7	-	-	102.19	32.26	6.14	33.89	100	76	Peak
2462	98.8	-	-	94.29	32.26	6.14	33.89	100	76	Average
2488.22	52.61	-21.39	74	48.03	32.3	6.18	33.9	100	76	Peak
2488.22	39.03	-14.97	54	34.45	32.3	6.18	33.9	100	76	Average
4924	53.76	-20.24	74	67.04	34.09	9.15	56.52	100	51	Peak
4924	42.95	-11.05	54	56.23	34.09	9.15	56.52	100	51	Average

Test Mode :	Mode 3	Temperature :	22~24°C
Test Channel :	11	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	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
40.26	24.78	-15.22	40	43.16	12.5	0.63	31.51	-	-	Peak
48.9	22.72	-17.28	40	44.49	9.08	0.68	31.53	-	-	Peak
213.33	29.41	-14.09	43.5	49.44	10.06	1.38	31.47	112	346	Peak
374.2	30.19	-15.81	46	43.57	15.78	2.09	31.25	-	-	Peak
449.8	29.16	-16.84	46	40.56	17.4	2.3	31.1	-	-	Peak
699.7	28.37	-17.63	46	35.37	20.88	2.94	30.82	-	-	Peak
2374	46.37	-27.63	74	42.06	32.16	5.99	33.84	102	7	Peak
2374	34.42	-19.58	54	30.11	32.16	5.99	33.84	102	7	Average
2462	106.85	-	-	102.34	32.26	6.14	33.89	102	7	Peak
2462	98.38	-	-	93.87	32.26	6.14	33.89	102	7	Average
2483.85	52.32	-21.68	74	47.76	32.28	6.18	33.9	102	7	Peak
2483.85	38.2	-15.8	54	33.64	32.28	6.18	33.9	102	7	Average
4924	50.61	-23.39	74	63.89	34.09	9.15	56.52	100	0	Peak

Test Mode :	Mode 4	Temperature :	22~24°C
Test Channel :	01	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	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
32.97	18.37	-21.63	40	33.48	15.8	0.56	31.47	-	-	Peak
55.38	15.77	-24.23	40	39.62	6.97	0.73	31.55	-	-	Peak
161.49	15.39	-28.11	43.5	35.43	10.26	1.22	31.52	-	-	Peak
374.2	31.31	-14.69	46	44.69	15.78	2.09	31.25	122	189	Peak
424.6	27.52	-18.48	46	39.45	16.98	2.23	31.14	-	-	Peak
799.8	29.79	-16.21	46	34.86	22.47	3.14	30.68	-	-	Peak
2390	65.15	-8.85	74	60.79	32.18	6.03	33.85	103	68	Peak
2390	42.59	-11.41	54	38.23	32.18	6.03	33.85	103	68	Average
2412	103.95	-	-	99.55	32.2	6.07	33.87	103	68	Peak
2412	94.73	-	-	90.33	32.2	6.07	33.87	103	68	Average
2494	39.55	-14.45	54	34.97	32.3	6.18	33.9	103	68	Average
2494	51.57	-22.43	74	46.99	32.3	6.18	33.9	103	68	Peak
4824	47.14	-26.86	74	60.4	34.07	9.12	56.45	100	0	Peak

Test Mode :	Mode 4	Temperature :	22~24°C
Test Channel :	01	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	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
42.69	24.22	-15.78	40	43.49	11.59	0.64	31.5	-	-	Peak
48.9	22.52	-17.48	40	44.29	9.08	0.68	31.53	-	-	Peak
215.22	26.92	-16.58	43.5	46.8	10.2	1.39	31.47	-	-	Peak
424.6	29.27	-16.73	46	41.2	16.98	2.23	31.14	-	-	Peak
699.7	28.68	-17.32	46	35.68	20.88	2.94	30.82	-	-	Peak
850.2	33.41	-12.59	46	37.81	23.06	3.27	30.73	124	107	Peak
2389.61	61.71	-12.29	74	57.35	32.18	6.03	33.85	100	240	Peak
2389.61	39.99	-14.01	54	35.63	32.18	6.03	33.85	100	240	Average
2412	102.68	-	-	98.28	32.2	6.07	33.87	100	240	Peak
2412	93.41	-	-	89.01	32.2	6.07	33.87	100	240	Average
2500	41.61	-12.39	54	37.03	32.3	6.18	33.9	100	240	Average
2500	50.08	-23.92	74	45.5	32.3	6.18	33.9	100	240	Peak
4824	47.67	-26.33	74	60.93	34.07	9.12	56.45	100	0	Peak

Test Mode :	Mode 5	Temperature :	22~24°C
Test Channel :	06	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	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
31.62	18.97	-21.03	40	33.84	16.04	0.55	31.46	-	-	Peak
133.41	13.72	-29.78	43.5	32.53	11.58	1.17	31.56	-	-	Peak
273.81	26.16	-19.84	46	42.84	13.04	1.64	31.36	-	-	Peak
399.4	29.18	-16.82	46	41.66	16.56	2.14	31.18	-	-	Peak
449.8	27.72	-18.28	46	39.12	17.4	2.3	31.1	-	-	Peak
850.2	33.88	-12.12	46	38.28	23.06	3.27	30.73	141	308	Peak
2382	50.24	-23.76	74	45.9	32.16	6.03	33.85	101	70	Peak
2382	37.77	-16.23	54	33.43	32.16	6.03	33.85	101	70	Average
2437	103.88	-	-	99.41	32.24	6.11	33.88	101	70	Peak
2437	94.51	-	-	90.04	32.24	6.11	33.88	101	70	Average
2484	52.58	-21.42	74	48.02	32.28	6.18	33.9	101	70	Peak
2484	39.17	-14.83	54	34.61	32.28	6.18	33.9	101	70	Average
4874	49.43	-24.57	74	62.7	34.08	9.14	56.49	100	0	Peak

Test Mode :	Mode 5	Temperature :	22~24°C
Test Channel :	06	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	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
31.89	23.56	-16.44	40	38.43	16.04	0.55	31.46	-	-	Peak
48.9	22.28	-17.72	40	44.05	9.08	0.68	31.53	-	-	Peak
212.25	25.09	-18.41	43.5	45.2	9.99	1.37	31.47	-	-	Peak
374.2	29.72	-16.28	46	43.1	15.78	2.09	31.25	-	-	Peak
449.8	28.59	-17.41	46	39.99	17.4	2.3	31.1	-	-	Peak
799.8	30.88	-15.12	46	35.95	22.47	3.14	30.68	134	269	Peak
2356	48.65	-25.35	74	44.4	32.13	5.95	33.83	103	357	Peak
2356	35.9	-18.1	54	31.65	32.13	5.95	33.83	103	357	Average
2437	103.57	-	-	99.1	32.24	6.11	33.88	103	357	Peak
2437	93.85	-	-	89.38	32.24	6.11	33.88	103	357	Average
2500	50.19	-23.81	74	45.61	32.3	6.18	33.9	103	357	Peak
2500	38.82	-15.18	54	34.24	32.3	6.18	33.9	103	357	Average
4874	50.98	-23.02	74	64.26	34.08	9.13	56.49	100	0	Peak

Test Mode :	Mode 6	Temperature :	22~24℃
Test Channel :	11	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	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
31.62	18.63	-21.37	40	33.5	16.04	0.55	31.46	-	-	Peak
136.38	15.56	-27.94	43.5	34.34	11.59	1.19	31.56	-	-	Peak
163.38	15.91	-27.59	43.5	36.07	10.14	1.22	31.52	-	-	Peak
374.2	31.4	-14.6	46	44.78	15.78	2.09	31.25	152	144	Peak
449.8	28.32	-17.68	46	39.72	17.4	2.3	31.1	-	-	Peak
799.8	30.03	-15.97	46	35.1	22.47	3.14	30.68	-	-	Peak
2366	50.59	-23.41	74	46.31	32.13	5.99	33.84	104	70	Peak
2366	37.21	-16.79	54	32.93	32.13	5.99	33.84	104	70	Average
2462	104.53	-	-	100.02	32.26	6.14	33.89	104	70	Peak
2462	95.28	-	-	90.77	32.26	6.14	33.89	104	70	Average
2483.5	64.58	-9.42	74	60.02	32.28	6.18	33.9	104	70	Peak
2483.5	44.59	-9.41	54	40.03	32.28	6.18	33.9	104	70	Average
4924	51.24	-22.76	74	64.53	34.08	9.14	56.51	100	52	Peak
4924	38.7	-15.3	54	51.98	34.09	9.15	56.52	100	52	Average

Test Mode :	Mode 6	Temperature :	22~24°C
Test Channel :	11	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	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
39.45	21.78	-18.22	40	39.71	12.96	0.62	31.51	-	-	Peak
51.33	23.69	-16.31	40	46.5	8.02	0.71	31.54	-	-	Peak
257.34	26.09	-19.91	46	43.16	12.78	1.57	31.42	-	-	Peak
424.6	31.34	-14.66	46	43.27	16.98	2.23	31.14	-	-	Peak
449.8	31.14	-14.86	46	42.54	17.4	2.3	31.1	-	-	Peak
951	34.41	-11.59	46	37.25	24.27	3.46	30.57	126	49	Peak
2374	48.12	-25.88	74	43.81	32.16	5.99	33.84	102	7	Peak
2374	35.54	-18.46	54	31.23	32.16	5.99	33.84	102	7	Average
2462	104.24	-	-	99.73	32.26	6.14	33.89	102	7	Peak
2462	94.39	-	-	89.88	32.26	6.14	33.89	102	7	Average
2483.66	64.01	-9.99	74	59.45	32.28	6.18	33.9	102	7	Peak
2483.66	43.32	-10.68	54	38.76	32.28	6.18	33.9	102	7	Average
4924	50.87	-23.13	74	64.16	34.08	9.14	56.51	100	0	Peak

Test Mode :	Mode 7	Temperature :	22~24℃
Test Channel :	01	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	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
2388.85	59.09	-14.91	74	54.73	32.18	6.03	33.85	103	69	Peak
2388.85	40.7	-13.3	54	36.34	32.18	6.03	33.85	103	69	Average
2412	103.02	-	-	98.62	32.2	6.07	33.87	103	69	Peak
2412	93.24	-	-	88.84	32.2	6.07	33.87	103	69	Average
2492	39.1	-14.9	54	34.52	32.3	6.18	33.9	103	69	Average
2492	51.19	-22.81	74	46.61	32.3	6.18	33.9	103	69	Peak

Test Mode :	Mode 7	Temperature :	22~24℃
Test Channel :	01	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	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
2388.85	56.33	-17.67	74	51.97	32.18	6.03	33.85	100	240	Peak
2388.85	39.35	-14.65	54	34.99	32.18	6.03	33.85	100	240	Average
2412	101.38	-	-	96.98	32.2	6.07	33.87	100	240	Peak
2412	91.7	-	-	87.3	32.2	6.07	33.87	100	240	Average
2500	41.45	-12.55	54	36.87	32.3	6.18	33.9	100	240	Average
2500	50.32	-23.68	74	45.74	32.3	6.18	33.9	100	240	Peak

Test Mode :	Mode 8	Temperature :	22~24°C
Test Channel :	06	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	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
2380	50.18	-23.82	74	45.84	32.16	6.03	33.85	100	70	Peak
2380	37.25	-16.75	54	32.91	32.16	6.03	33.85	100	70	Average
2437	102.21	-	-	97.74	32.24	6.11	33.88	100	70	Peak
2437	92.79	-	-	88.32	32.24	6.11	33.88	100	70	Average
2500	50.97	-23.03	74	46.39	32.3	6.18	33.9	100	70	Peak
2500	39.73	-14.27	54	35.15	32.3	6.18	33.9	100	70	Average

Test Mode :	Mode 8	Temperature :	22~24°C
Test Channel :	06	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	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
2382	48.02	-25.98	74	43.68	32.16	6.03	33.85	103	358	Peak
2382	35.67	-18.33	54	31.33	32.16	6.03	33.85	103	358	Average
2437	101.93	-	-	97.46	32.24	6.11	33.88	103	358	Peak
2437	91.66	-	-	87.19	32.24	6.11	33.88	103	358	Average
2486	49.22	-24.78	74	44.66	32.28	6.18	33.9	103	358	Peak
2486	37.52	-16.48	54	32.96	32.28	6.18	33.9	103	358	Average

Test Mode :	Mode 9	Temperature :	22~24°C
Test Channel :	11	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	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
2374	50.73	-23.27	74	46.42	32.16	5.99	33.84	104	70	Peak
2374	38.09	-15.91	54	33.78	32.16	5.99	33.84	104	70	Average
2462	102.58	-	-	98.07	32.26	6.14	33.89	104	70	Peak
2462	93.19	-	-	88.68	32.26	6.14	33.89	104	70	Average
2483.5	59.06	-14.94	74	54.5	32.28	6.18	33.9	104	70	Peak
2483.5	42.39	-11.61	54	37.83	32.28	6.18	33.9	104	70	Average

Test Mode :	Mode 9	Temperature :	22~24°C
Test Channel :	11	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	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
2372	45.86	-28.14	74	41.55	32.16	5.99	33.84	100	8	Peak
2372	34.61	-19.39	54	30.3	32.16	5.99	33.84	100	8	Average
2462	102.57	-	-	98.06	32.26	6.14	33.89	100	8	Peak
2462	92.49	-	-	87.98	32.26	6.14	33.89	100	8	Average
2483.5	60.03	-13.97	74	55.47	32.28	6.18	33.9	100	8	Peak
2483.5	43.01	-10.99	54	38.45	32.28	6.18	33.9	100	8	Average

Test Mode :	Mode 10	Temperature :	22~24°C
Test Channel :	03	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	Polarization :	Horizontal
Remark :	2422 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
2388.09	65.43	-8.57	74	61.07	32.18	6.03	33.85	106	70	Peak
2388.09	44.08	-9.92	54	39.72	32.18	6.03	33.85	106	70	Average
2422	100.78	-	-	96.36	32.22	6.07	33.87	106	70	Peak
2422	90.59	-	-	86.17	32.22	6.07	33.87	106	70	Average
2492	39.6	-14.4	54	35.02	32.3	6.18	33.9	106	70	Average
2492	54.54	-19.46	74	49.96	32.3	6.18	33.9	106	70	Peak

Test Mode :	Mode 10	Temperature :	22~24°C
Test Channel :	03	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2422 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
2388.09	60.56	-13.44	74	56.2	32.18	6.03	33.85	100	240	Peak
2388.09	41.14	-12.86	54	36.78	32.18	6.03	33.85	100	240	Average
2422	99.46	-	-	95.04	32.22	6.07	33.87	100	240	Peak
2422	88.98	-	-	84.56	32.22	6.07	33.87	100	240	Average
2486	37.37	-16.63	54	32.81	32.28	6.18	33.9	100	240	Average
2486	53.33	-20.67	74	48.77	32.28	6.18	33.9	100	240	Peak

Test Mode :	Mode 11	Temperature :	22~24℃
Test Channel :	06	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	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
2390	58.2	-15.8	74	53.84	32.18	6.03	33.85	100	70	Peak
2390	41.18	-12.82	54	36.82	32.18	6.03	33.85	100	70	Average
2437	99.77	-	-	95.3	32.24	6.11	33.88	100	70	Peak
2437	89.87	-	-	85.4	32.24	6.11	33.88	100	70	Average
2484	61.7	-12.3	74	57.14	32.28	6.18	33.9	100	70	Peak
2484	43.84	-10.16	54	39.28	32.28	6.18	33.9	100	70	Average

Test Mode :	Mode 11	Temperature :	22~24℃
Test Channel :	06	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	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
2390	56.85	-17.15	74	52.49	32.18	6.03	33.85	131	358	Peak
2390	39.2	-14.8	54	34.84	32.18	6.03	33.85	131	358	Average
2437	99.96	-	-	95.49	32.24	6.11	33.88	131	358	Peak
2437	89.67	-	-	85.2	32.24	6.11	33.88	131	358	Average
2484	61.66	-12.34	74	57.1	32.28	6.18	33.9	131	358	Peak
2484	43.39	-10.61	54	38.83	32.28	6.18	33.9	131	358	Average

Test Mode :	Mode 12	Temperature :	22~24°C
Test Channel :	09	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	Polarization :	Horizontal
Remark :	2452 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
2388	53.35	-20.65	74	48.99	32.18	6.03	33.85	106	70	Peak
2388	38.56	-15.44	54	34.2	32.18	6.03	33.85	106	70	Average
2452	100.68	-	-	96.21	32.24	6.11	33.88	106	70	Peak
2452	90.25	-	-	85.78	32.24	6.11	33.88	106	70	Average
2493.73	66.23	-7.77	74	61.65	32.3	6.18	33.9	106	70	Peak
2493.73	47.77	-6.23	54	43.19	32.3	6.18	33.9	106	70	Average

Test Mode :	Mode 12	Temperature :	22~24°C
Test Channel :	09	Relative Humidity :	50~52%
Test Engineer :	Ivan Chiang	Polarization :	Vertical
Remark :	2452 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
2390	50.15	-23.85	74	45.79	32.18	6.03	33.85	100	8	Peak
2390	35.33	-18.67	54	30.97	32.18	6.03	33.85	100	8	Average
2452	99.85	-	-	95.38	32.24	6.11	33.88	100	8	Peak
2452	89.66	-	-	85.19	32.24	6.11	33.88	100	8	Average
2483.66	66.66	-7.34	74	62.1	32.28	6.18	33.9	100	8	Peak
2483.66	48.2	-5.8	54	43.64	32.28	6.18	33.9	100	8	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
System Simulator	R&S	CMU200	117995	N/A	Mar. 19, 2009	Mar. 18, 2011	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP30	101329	9kHz~30GHz	Apr. 26, 2010	Apr. 25, 2011	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. 25, 2010	Feb. 24, 2011	Conducted (TH02-HY)
Power Sensor	Agilent	E9327A	US40441548	N/A	Feb. 25, 2010	Feb. 24, 2011	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)
ISN	Teseq GmbH	ISN T400A	25696	N/A	Jun. 19, 2010	Jun. 18, 2011	Conduction (CO05-HY)
ISN	Teseq GmbH	ISN T800	27134	N/A	Jun. 19, 2010	Jun. 18, 2011	Conduction (CO05-HY)
DC- LISN	R&S	ESH3-26	1000485	0.1MHz~200MHz	Jun. 17, 2010	Jun. 16, 2011	Conduction (CO05-HY)
DC- LISN	R&S	ESH3-26	1000484	0.1MHz~200MHz	Jun. 17, 2010	Jun. 16, 2011	Conduction (CO05-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. 27, 2010	Mar. 26, 2011	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	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 EP111809 as below.