

FCC RF Test Report

APPLICANT : Commtiva Technology Ltd.
EQUIPMENT : MID
BRAND NAME : Commtiva
MODEL NAME : N700
FCC ID : X7H-N700
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Transmission System (DTS)

The product was received on Sep. 03, 2010 and completely tested on Sep. 18, 2010. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.

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

Reviewed by:



Anderson Chiu / Deputy Manager



SPORTON INTERNATIONAL INC.

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



TABLE OF CONTENTS

REVISION HISTORY	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant	5
1.2 Manufacturer	5
1.3 Feature of Equipment Under Test	5
1.4 Testing Site	6
1.5 Applied Standards	6
1.6 Ancillary Equipment List	6
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	7
2.1 RF Power	7
2.2 Test Mode	8
2.3 Connection Diagram of Test System	9
2.4 RF Utility	9
3 TEST RESULT	10
3.1 6dB Bandwidth Measurement	10
3.2 Output Power Measurement	15
3.3 Band Edges Measurement	17
3.4 Spurious Emission Measurement	23
3.5 Power Spectral Density Measurement	30
3.6 AC Conducted Emission Measurement	35
3.7 Radiated Emission Measurement	39
3.8 Antenna Requirements	54
4 LIST OF MEASURING EQUIPMENT	55
5 UNCERTAINTY OF EVALUATION	56
APPENDIX A. PHOTOGRAPHS OF EUT	
APPENDIX B. SETUP PHOTOGRAPHS	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR090307-01AB	Rev. 01	Initial issue of report	Nov. 04, 2010

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	A8.2(a)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.2	15.247(b)	A8.4	Power Output	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(d)	A8.5	Frequency Band Edges	$\leq 20\text{dBc}$	Pass	-
3.4	15.247(d)	A8.5	Spurious Emission	$< 20\text{ dBc}$	Pass	-
3.5	15.247(e)	A8.2(b)	Power Spectral Density	$\leq 8\text{dBm}$	Pass	-
3.6	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 9.4 dB at 0.478 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.07 dB at 180.12 MHz
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Commtiva Technology Ltd.

4F., No. 408, Rueiguang Rd., Neihu District, Taipei 114, Taiwan (R.O.C.)

1.2 Manufacturer

Chi Mei Communication Systems, Inc.

No. 4, Mingsheng Street, Tucheng City, Taipei County 23678, Taiwan

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	MID
Brand Name	Commtiva
Model Name	N700
FCC ID	X7H-N700
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 : 15.69 dBm (0.037 W) 802.11g : 22.84 dBm (0.192 W)
Antenna Type	Fixed Internal Antenna with gain -5 dBi
HW Version	PR3.6
SW Version	3.16I
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g : 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	03CH05-HY	TW1022/4086B-1

1.5 Applied Standards

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

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

Remark:

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

1.6 Ancillary Equipment List

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

2 Test Configuration of Equipment Under Test

2.1 RF Power

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

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		At DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	15.35	15.34	15.33	15.37
CH 06	2437 MHz	15.22	15.27	15.21	15.25
CH 11	2462 MHz	15.68	15.67	15.65	15.69

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		At OFDM Data Rate							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
CH 01	2412 MHz	22.57	21.76	22.70	22.79	22.71	22.14	22.21	22.84
CH 06	2437 MHz	22.47	21.67	22.66	21.81	22.59	22.60	22.31	22.80
CH 11	2462 MHz	22.52	21.72	22.68	21.86	22.30	22.10	22.09	22.61

Remark:

1. The data rates of WLAN 802.11b/g were set in 11Mbps for 802.11b and 54Mbps for 802.11g, for all the test cases due to the highest RF output power.
2. The EUT is programmed to transmit signals continuously for all testing.

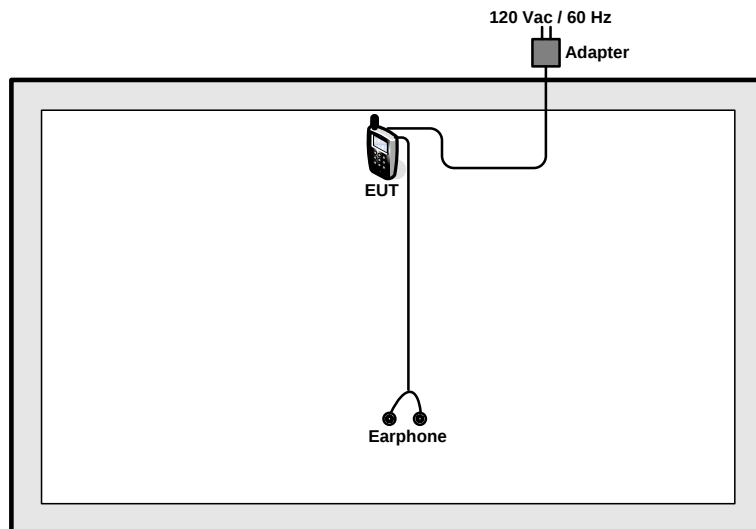
2.2 Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz), radiated emission (30 MHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). Pre-scanned tests were conducted to determine the final configuration from all possible combinations. The following tables are showing the test modes as the worst cases and recorded in this report.

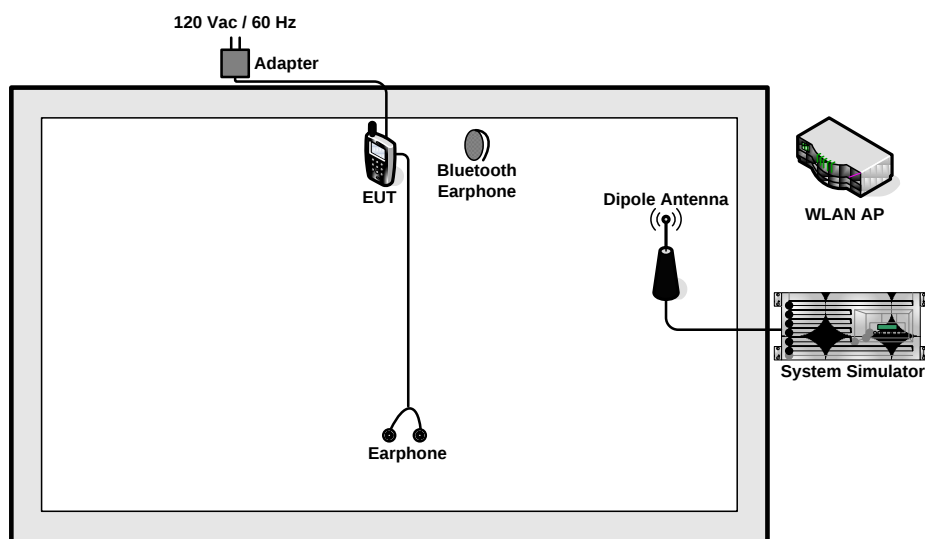
Test Cases		
Test Item	802.11b	802.11g
Conducted TCs	Mode 1 : 802.11b CH01_2412 MHz	Mode 4 : 802.11g CH01_2412 MHz
	Mode 2 : 802.11b CH06_2437 MHz	Mode 5 : 802.11g CH06_2437 MHz
	Mode 3 : 802.11b CH11_2462 MHz	Mode 6 : 802.11g CH11_2462 MHz
Radiated TCs	Mode 1 : 802.11b CH01_2412 MHz	Mode 4 : 802.11g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

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<EUT with Adapter Mode>



2.4 RF Utility

Key in “* # * # 373 # * # *” 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.

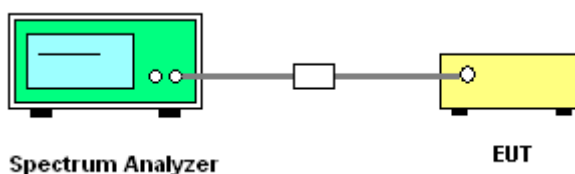
3.1.2 Measuring Instruments

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

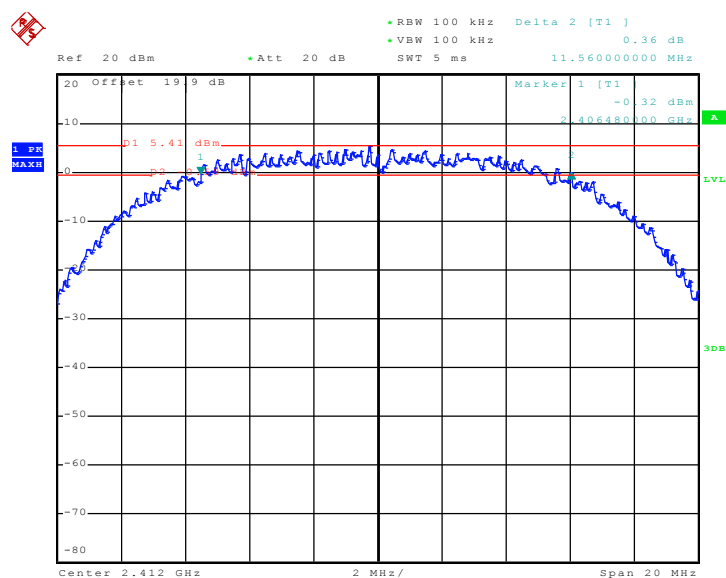


3.1.5 Test Result of 6dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	26~28℃
Test Engineer :	Andy Yeh	Relative Humidity :	52~55%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	11.56	0.5	Pass
06	2437	12.08	0.5	Pass
11	2462	11.52	0.5	Pass

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



Date: 16.SEP.2010 10:05:29



Ref 20 dBm Att 20 dB RBW 100 kHz VBW 100 kHz SWT 5 ms Delta 2 [T1] 0.51 dB 12.080000000 MHz

Marker 1 [T1] -1.16 dBm 2.430960000 GHz

Marker 2 [T2] -16.00 dBm 2.430960000 GHz

Center 2.437 GHz 2 MHz/ Span 20 MHz

Date: 16.SEP.2010 10:15:47

•RBW 100 kHz Delta 2 [T1]
 •VBW 100 kHz -0.84 dB
 •Att 20 dB SWT 5 ms 11.52000000 MHz

Ref 20 dBm

20 OffSet 19.9 dB

Marker 1 [T1]
 -0.12 dBm
 2.456520000 GHz

1 VPK MARK

-10 dBm

p1 4.42 dBm

LVL

3DB

Center 2.462 GHz Span 20 MHz

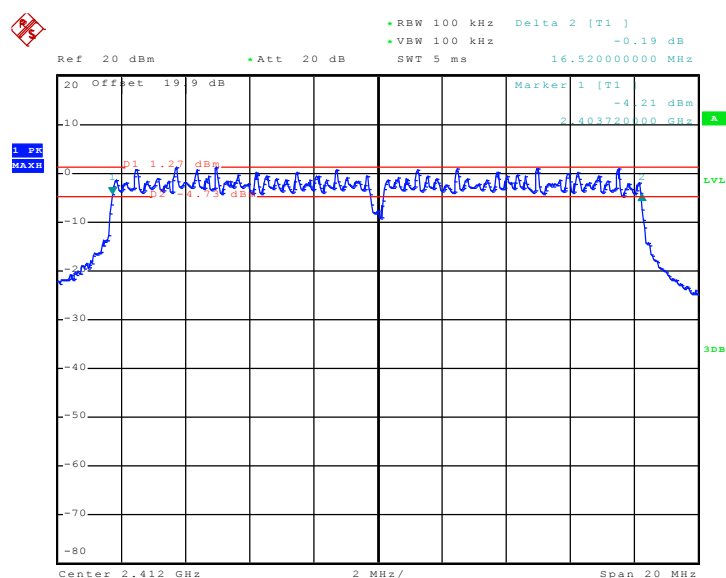
Date: 16.SEP.2010 10:17:35



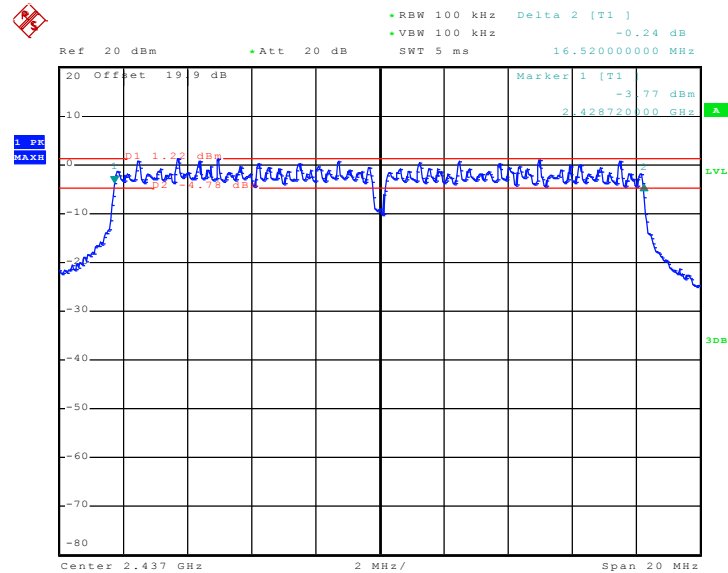
Test Mode :	Mode 4, 5, 6	Temperature :	26~28°C
Test Engineer :	Andy Yeh	Relative Humidity :	52~55%

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

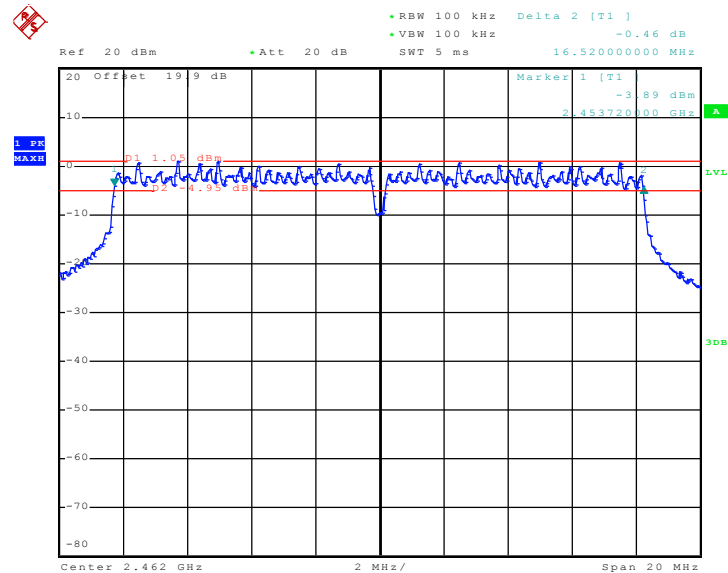
Mode 4 : 6 dB Bandwidth Plot on 802.11g Channel 01



Date: 16.SEP.2010 10:35:13

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


Date: 16.SEP.2010 10:33:31

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


Date: 16.SEP.2010 10:28:28

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.

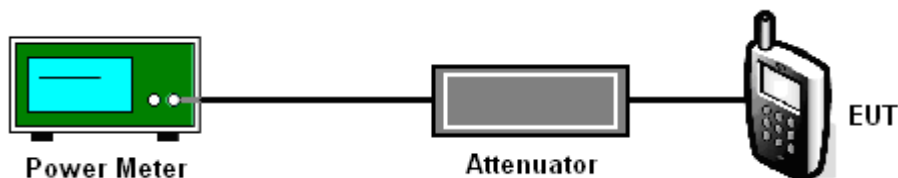
3.2.2 Measuring Instruments

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 :	26~28℃
Test Engineer :	Andy Yeh	Relative Humidity :	52~55%

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	15.37	30	Pass
06	2437	15.25	30	Pass
11	2462	15.69	30	Pass

Test Mode :	Mode 4, 5, 6	Temperature :	26~28℃
Test Engineer :	Andy Yeh	Relative Humidity :	52~55%

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	22.84	30	Pass
06	2437	22.80	30	Pass
11	2462	22.61	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

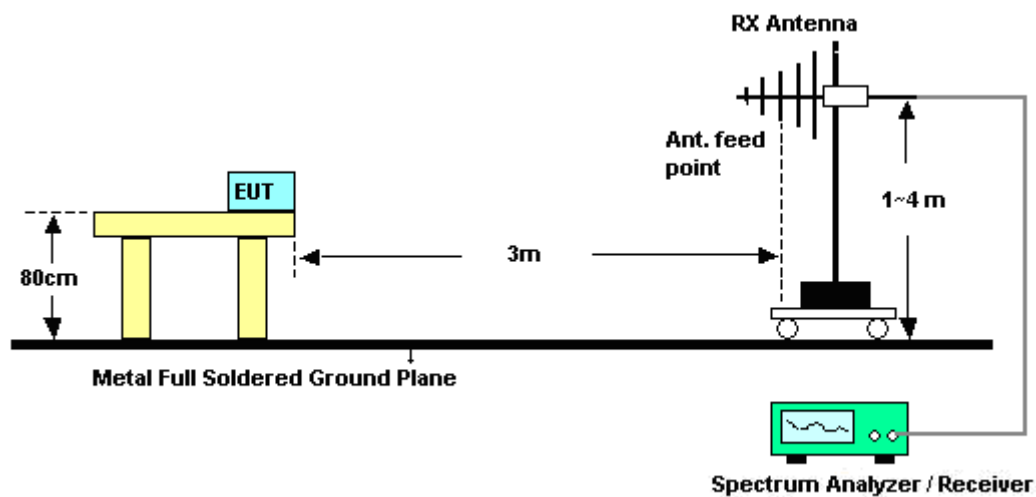
See list of measuring instruments of this test report.

3.3.3 Test Procedures

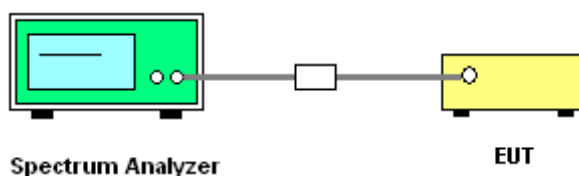
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized 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 :	25.2~26.6℃
Test Band :	802.11b	Relative Humidity :	47~53%
Test Channel :	01	Test Engineer :	Jason Wang

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
2352.94	45.58	-28.42	74	43.57	31.66	4.44	34.09	130	298	Peak
2352.94	33.12	-20.88	54	31.11	31.66	4.44	34.09	130	298	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2386.19	48.7	-25.3	74	46.61	31.7	4.47	34.08	100	295	Peak
2386.19	32.41	-21.59	54	30.32	31.7	4.47	34.08	100	295	Average

Test Mode :	Mode 3	Temperature :	25.2~26.6℃
Test Band :	802.11b	Relative Humidity :	47~53%
Test Channel :	11	Test Engineer :	Jason Wang

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
2488.6	45.56	-28.44	74	43.25	31.8	4.59	34.08	130	12	Peak
2488.6	32.41	-21.59	54	30.1	31.8	4.59	34.08	130	12	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2488.41	48.58	-25.42	74	46.27	31.8	4.59	34.08	100	314	Peak
2488.41	35.93	-18.07	54	33.62	31.8	4.59	34.08	100	314	Average



Test Mode :	Mode 4	Temperature :	25.2~26.6℃
Test Band :	802.11g	Relative Humidity :	47~53%
Test Channel :	01	Test Engineer :	Jason Wang

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	56.49	-17.51	74	54.4	31.7	4.47	34.08	105	10	Peak
2389.42	37.43	-16.57	54	35.34	31.7	4.47	34.08	105	10	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	62.42	-11.58	74	60.33	31.7	4.47	34.08	125	316	Peak
2389.61	41.57	-12.43	54	39.48	31.7	4.47	34.08	125	316	Average

Test Mode :	Mode 6	Temperature :	25.2~26.6℃
Test Band :	802.11g	Relative Humidity :	47~53%
Test Channel :	11	Test Engineer :	Jason Wang

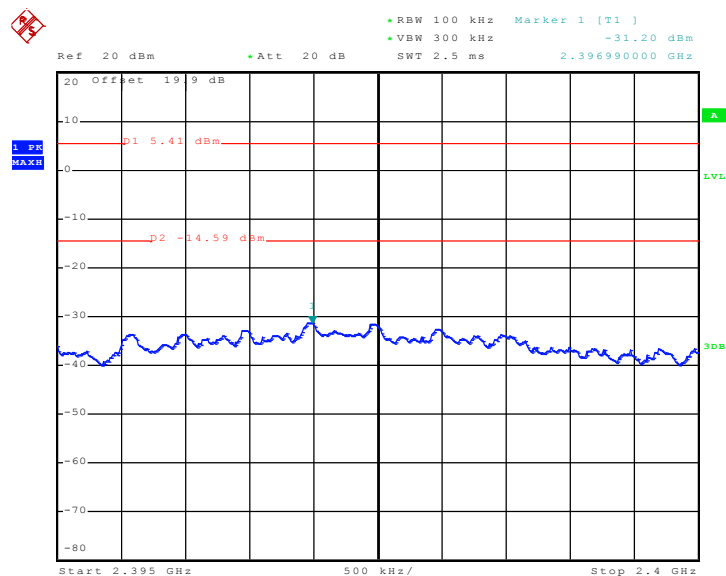
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	53.02	-20.98	74	50.73	31.78	4.59	34.08	160	21	Peak
2483.5	35.57	-18.43	54	33.28	31.78	4.59	34.08	160	21	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	57.05	-16.95	74	54.76	31.78	4.59	34.08	100	321	Peak
2483.66	38.94	-15.06	54	36.65	31.78	4.59	34.08	100	321	Average

3.3.6 Test Plots of Conducted Band Edges

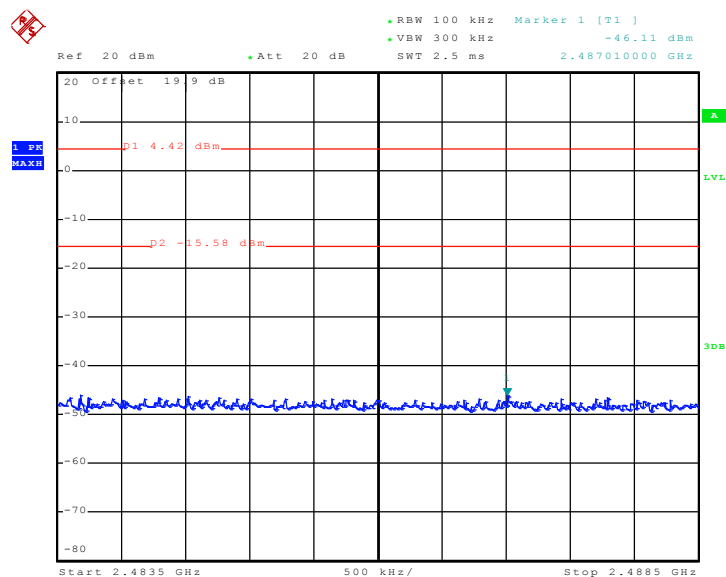
Test Mode :	Mode 1 and 3	Temperature :	26~28°C
Test Band :	802.11b	Relative Humidity :	52~55%
Test Channel :	01 and 11	Test Engineer :	Andy Yeh

Low Band Edge Plot on 802.11b Channel 01



Date: 16.SEP.2010 10:12:01

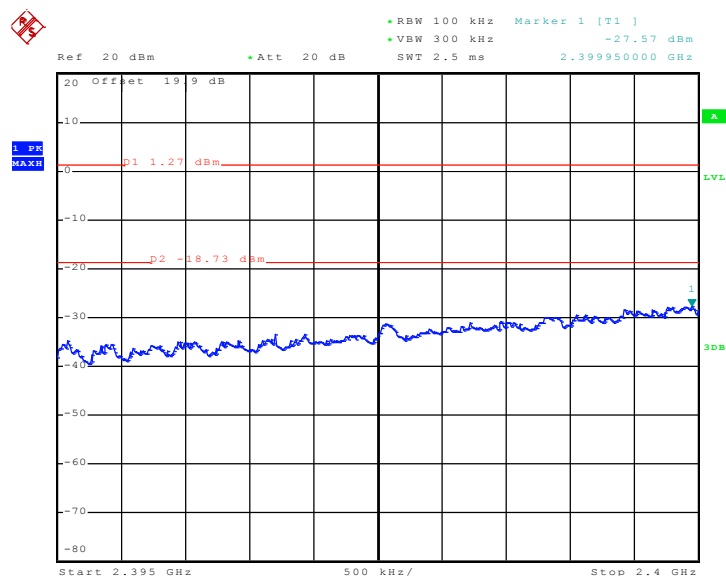
High Band Edge Plot on 802.11b Channel 11



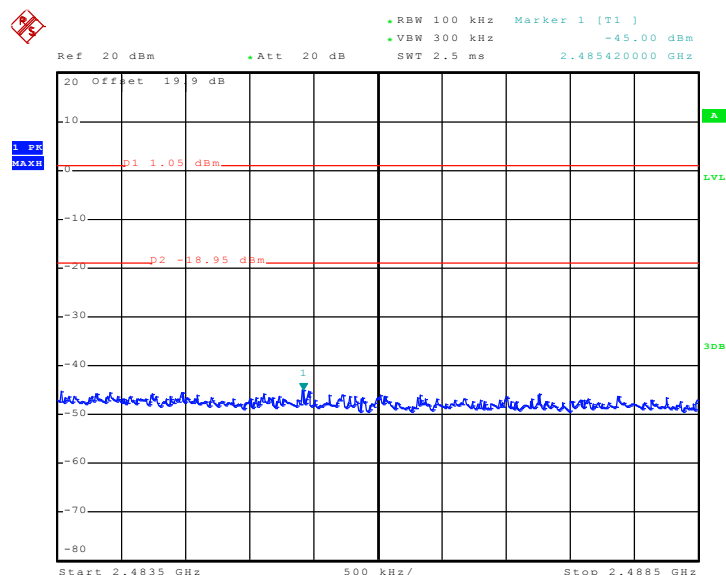
Date: 16.SEP.2010 10:19:13



Test Mode :	Mode 4 and 6	Temperature :	26~28°C
Test Band :	802.11g	Relative Humidity :	52~55%
Test Channel :	01 and 11	Test Engineer :	Andy Yeh

Low Band Edge Plot on 802.11g Channel 01

Date: 16.SEP.2010 10:36:08

High Band Edge Plot on 802.11g Channel 11

Date: 16.SEP.2010 10:30:26

3.4 Spurious Emission Measurement

3.4.1 Limit of Spurious Emission Measurement

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

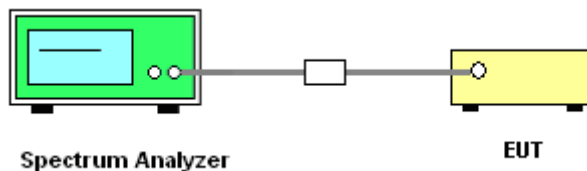
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedure

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

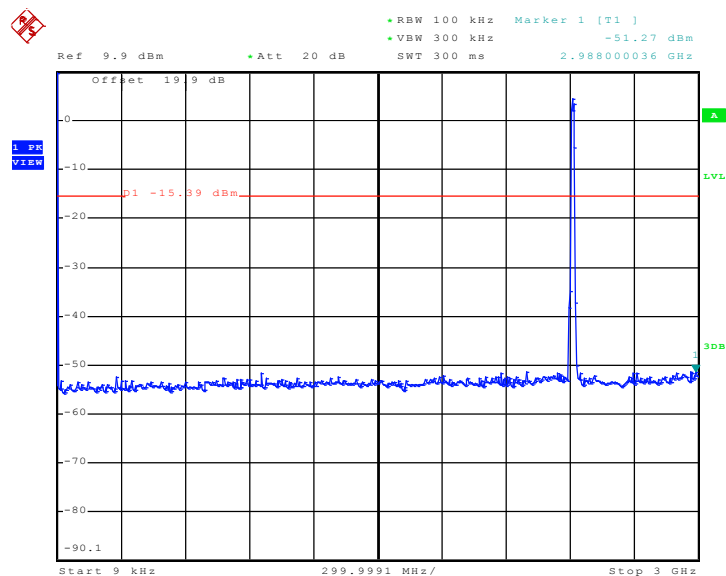
3.4.4 Test Setup



3.4.5 Test Plots of Spurious Emission

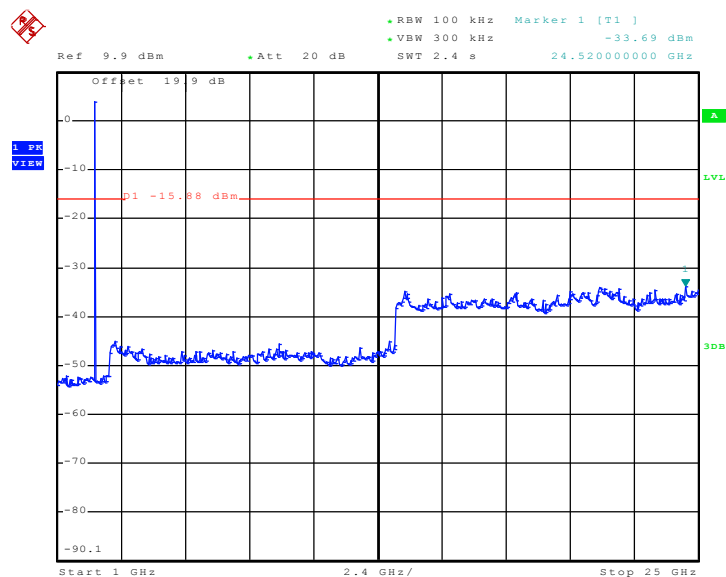
Test Mode :	Mode 1	Temperature :	26~28°C
Test Band :	802.11b	Relative Humidity :	52~55%
Test Channel :	01	Test Engineer :	Andy Yeh

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz



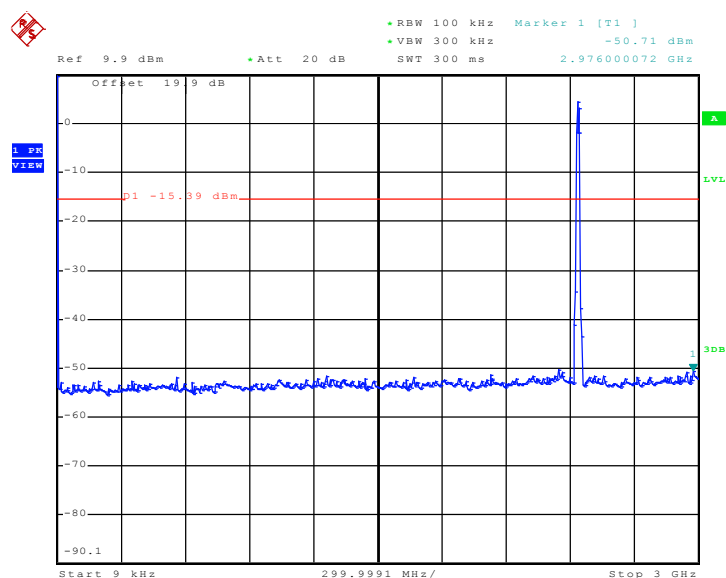
Date: 16.SEP.2010 15:41:42

Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz

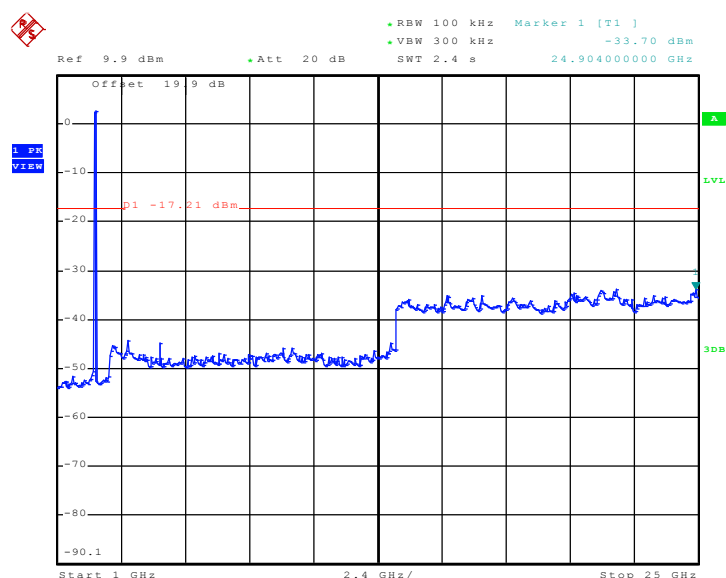


Date: 16.SEP.2010 15:42:07

Test Mode :	Mode 2	Temperature :	26~28°C
Test Band :	802.11b	Relative Humidity :	52~55%
Test Channel :	06	Test Engineer :	Andy Yeh

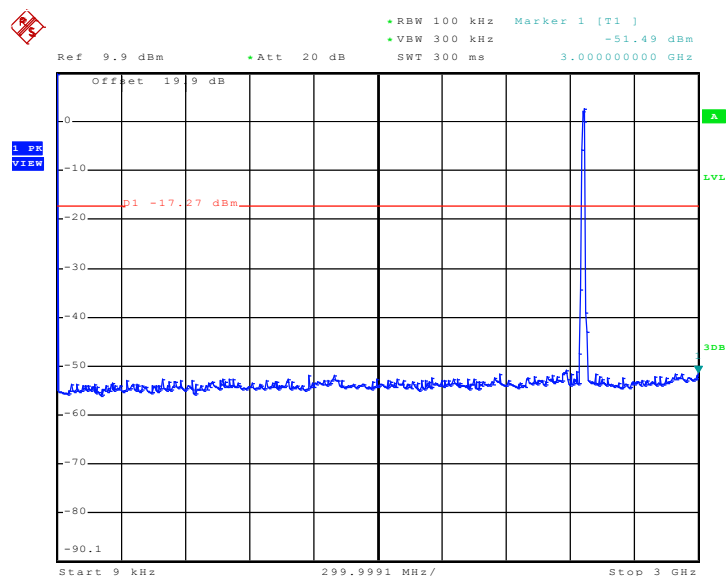
Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz


Date: 16.SEP.2010 15:43:04

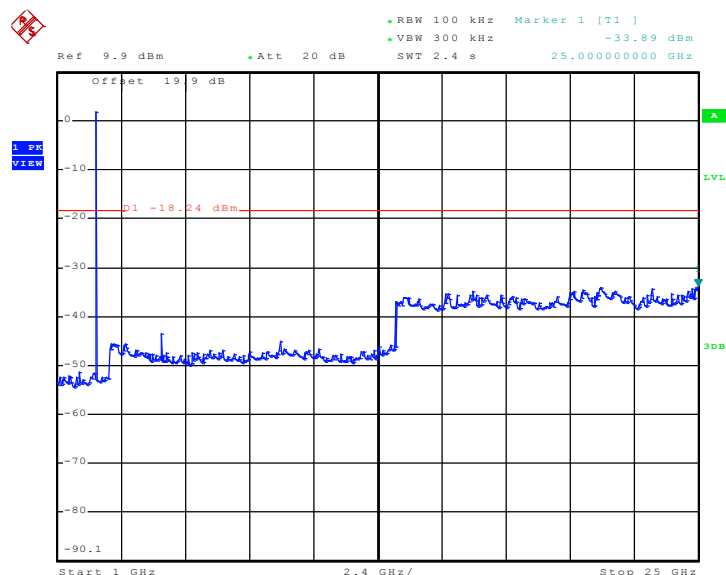
Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz


Date: 16.SEP.2010 15:43:43

Test Mode :	Mode 3	Temperature :	26~28°C
Test Band :	802.11b	Relative Humidity :	52~55%
Test Channel :	11	Test Engineer :	Andy Yeh

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz


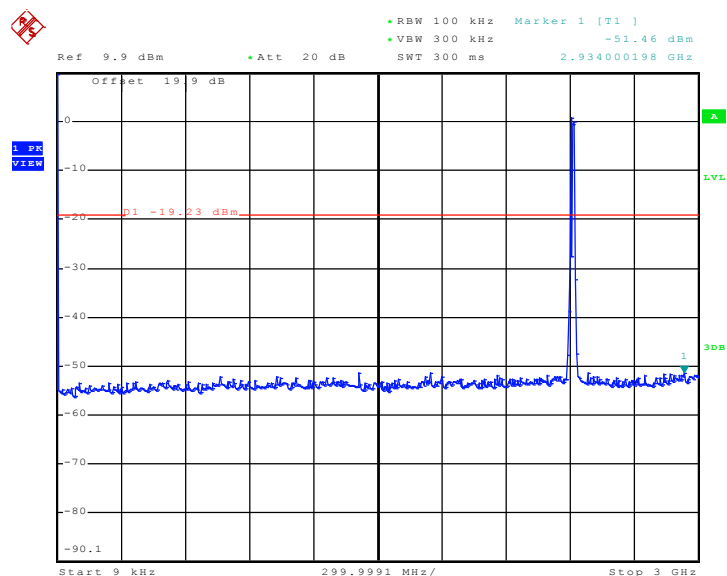
Date: 16.SEP.2010 15:44:16

Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz


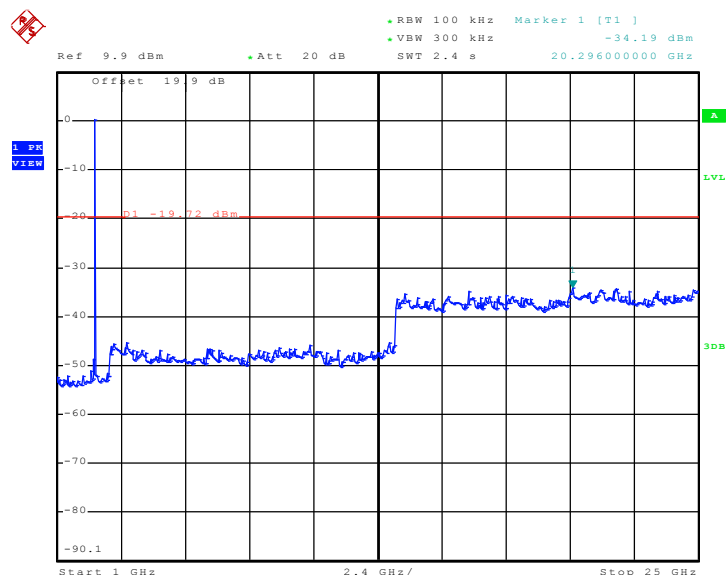
Date: 16.SEP.2010 15:44:49



Test Mode :	Mode 4	Temperature :	26~28°C
Test Band :	802.11g	Relative Humidity :	52~55%
Test Channel :	01	Test Engineer :	Andy Yeh

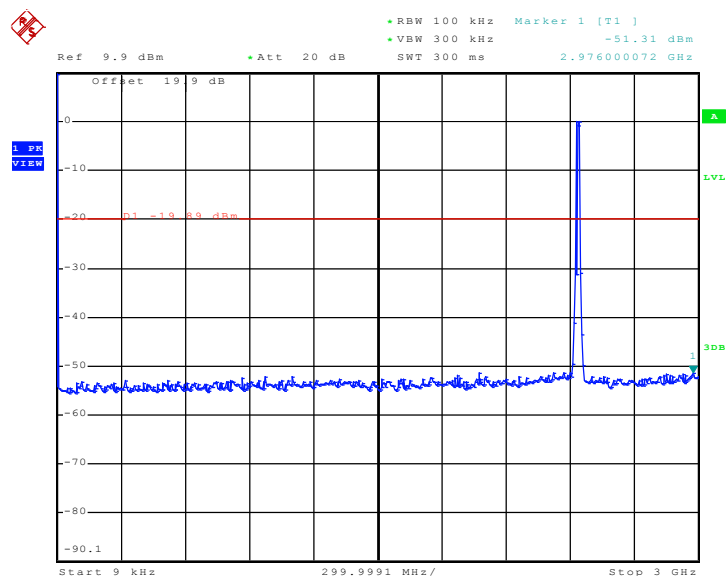
Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz

Date: 16.SEP.2010 15:48:15

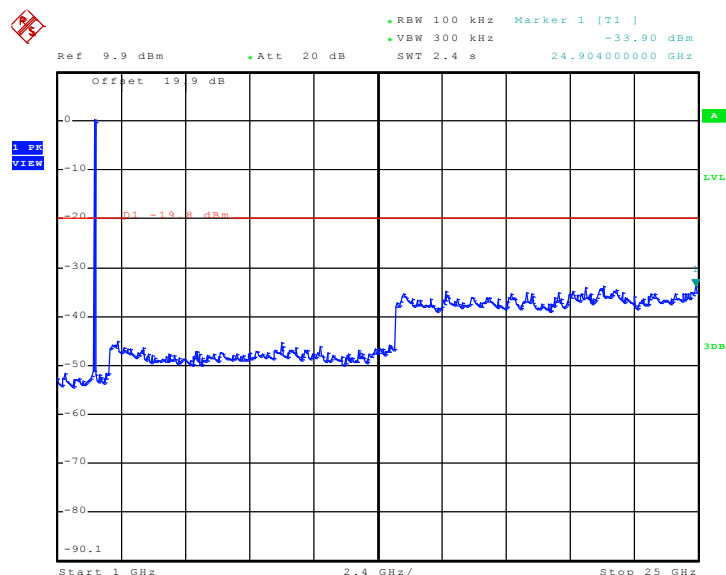
Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz

Date: 16.SEP.2010 15:48:46

Test Mode :	Mode 5	Temperature :	26~28°C
Test Band :	802.11g	Relative Humidity :	52~55%
Test Channel :	06	Test Engineer :	Andy Yeh

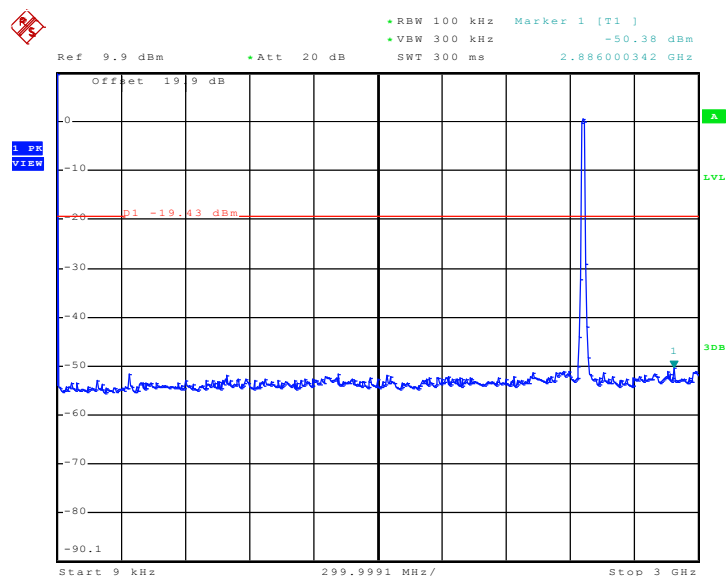
Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz


Date: 16.SEP.2010 15:47:08

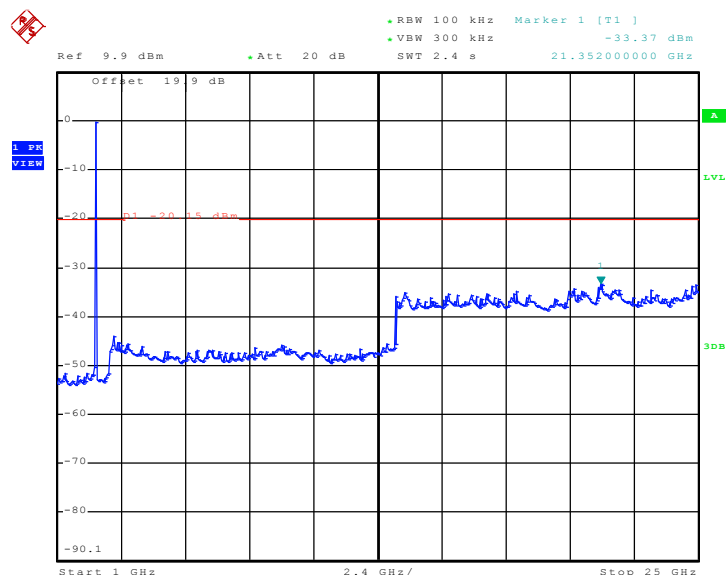
Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz


Date: 16.SEP.2010 15:47:43

Test Mode :	Mode 6	Temperature :	26~28°C
Test Band :	802.11g	Relative Humidity :	52~55%
Test Channel :	11	Test Engineer :	Andy Yeh

Conducted Spurious Emission Plot between 9 kHz ~ 3 GHz


Date: 16.SEP.2010 15:45:32

Conducted Spurious Emission Plot between 1 GHz ~ 25 GHz


Date: 16.SEP.2010 15:46:17

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.

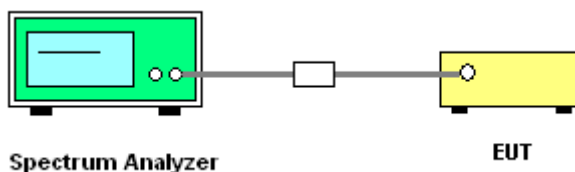
3.5.2 Measuring Instruments

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

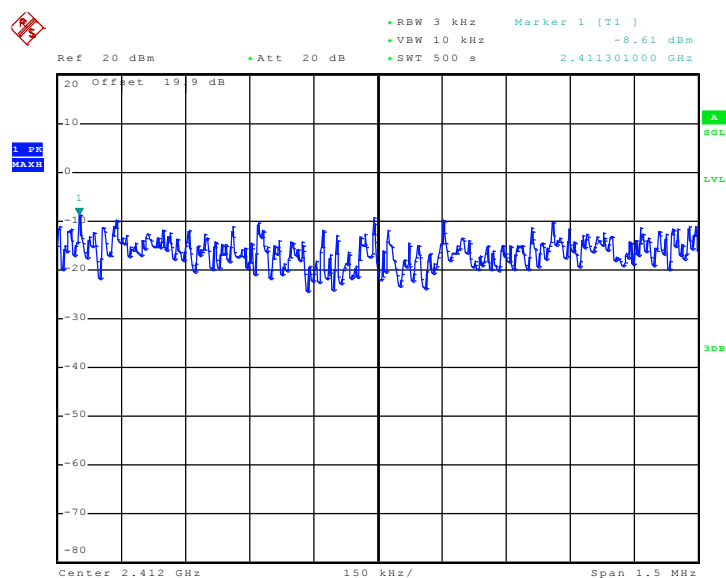


3.5.5 Test Result of Power Spectral Density

Test Mode :	Mode 1, 2, 3	Temperature :	26~28℃
Test Engineer :	Andy Yeh	Relative Humidity :	52~55%

Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-8.61	8	Pass
06	2437	-9.11	8	Pass
11	2462	-9.19	8	Pass

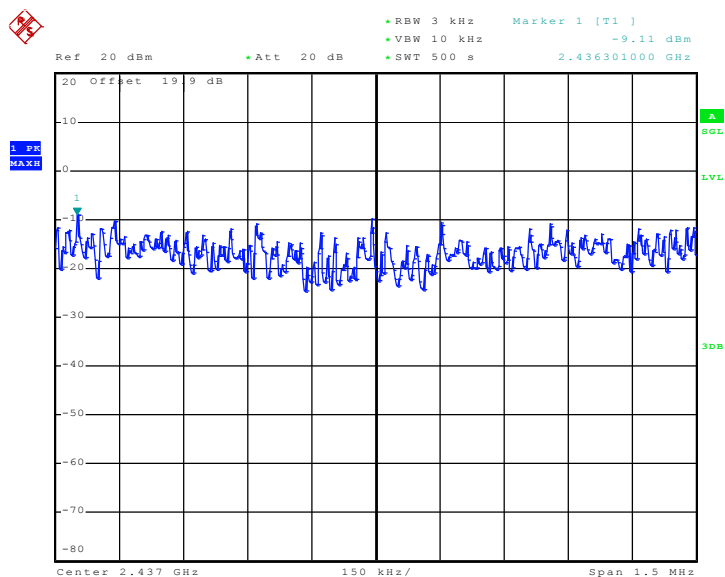
Mode 1 : PSD Plot on 802.11b Channel 01



Date: 16.SEP.2010 11:53:00

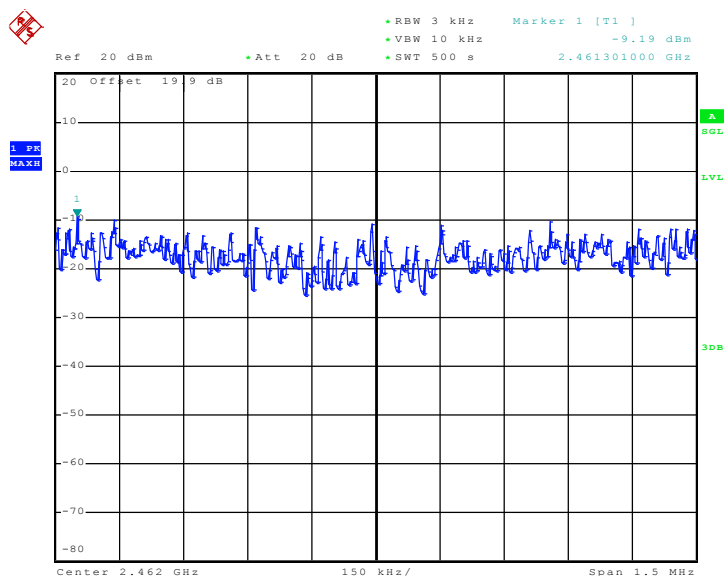


Mode 2 : PSD Plot on 802.11b Channel 06



Date: 16.SEP.2010 11:39:47

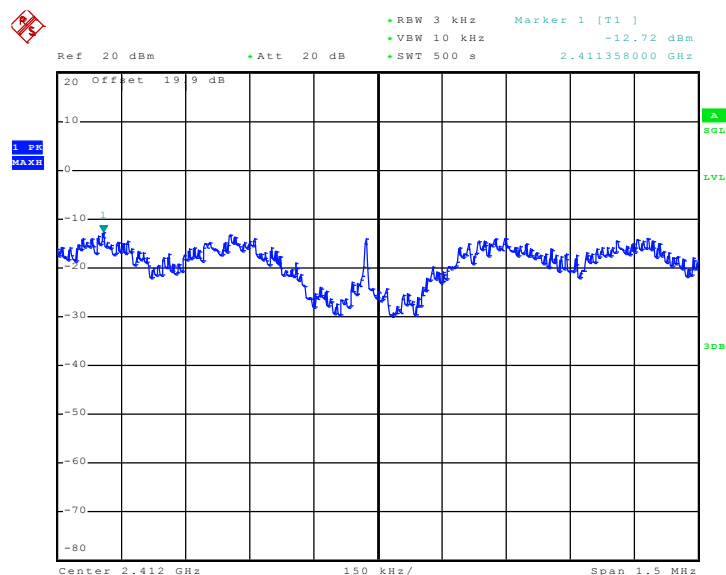
Mode 3 : PSD Plot on 802.11b Channel 11



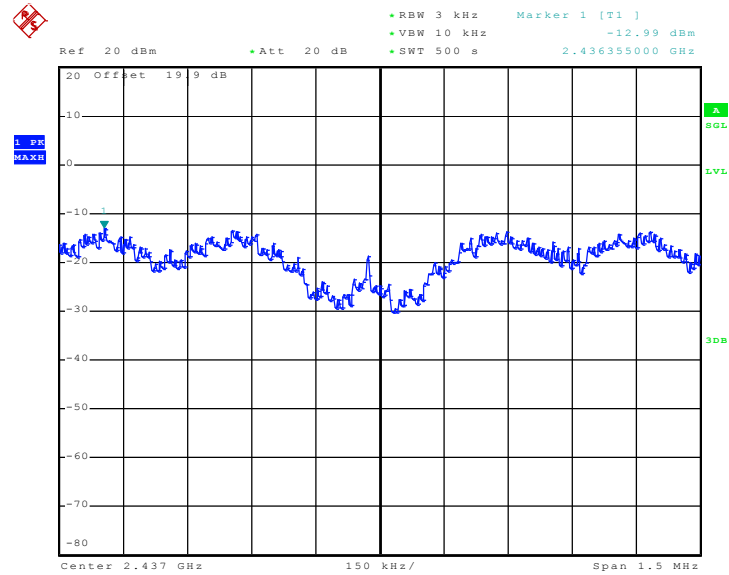
Date: 16.SEP.2010 11:28:40

Test Mode :	Mode 4, 5, 6	Temperature :	26~28℃
Test Engineer :	Andy Yeh	Relative Humidity :	52~55%

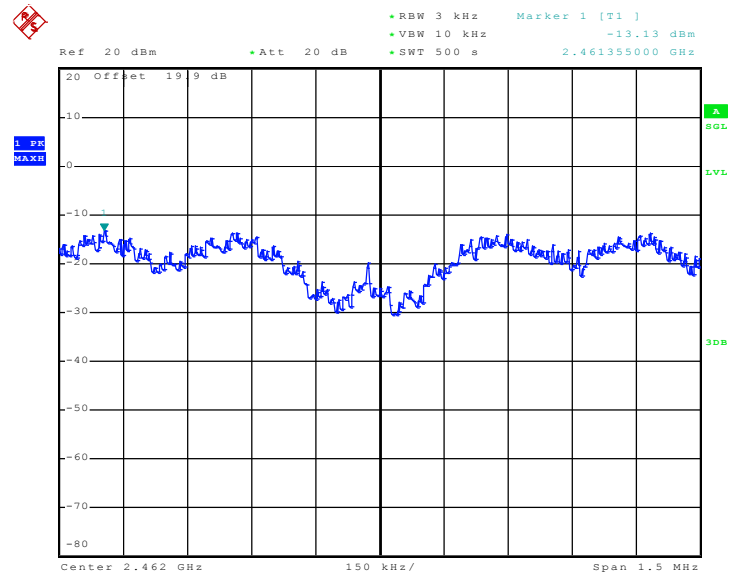
Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-12.72	8	Pass
06	2437	-12.99	8	Pass
11	2462	-13.13	8	Pass

Mode 4 : PSD Plot on 802.11g Channel 01


Date: 16.SEP.2010 10:58:14

Mode 5 : PSD Plot on 802.11g Channel 06


Date: 16.SEP.2010 11:08:20

Mode 6 : PSD Plot on 802.11g Channel 11


Date: 16.SEP.2010 11:18:23

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

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

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

*Decreases with the logarithm of the frequency.

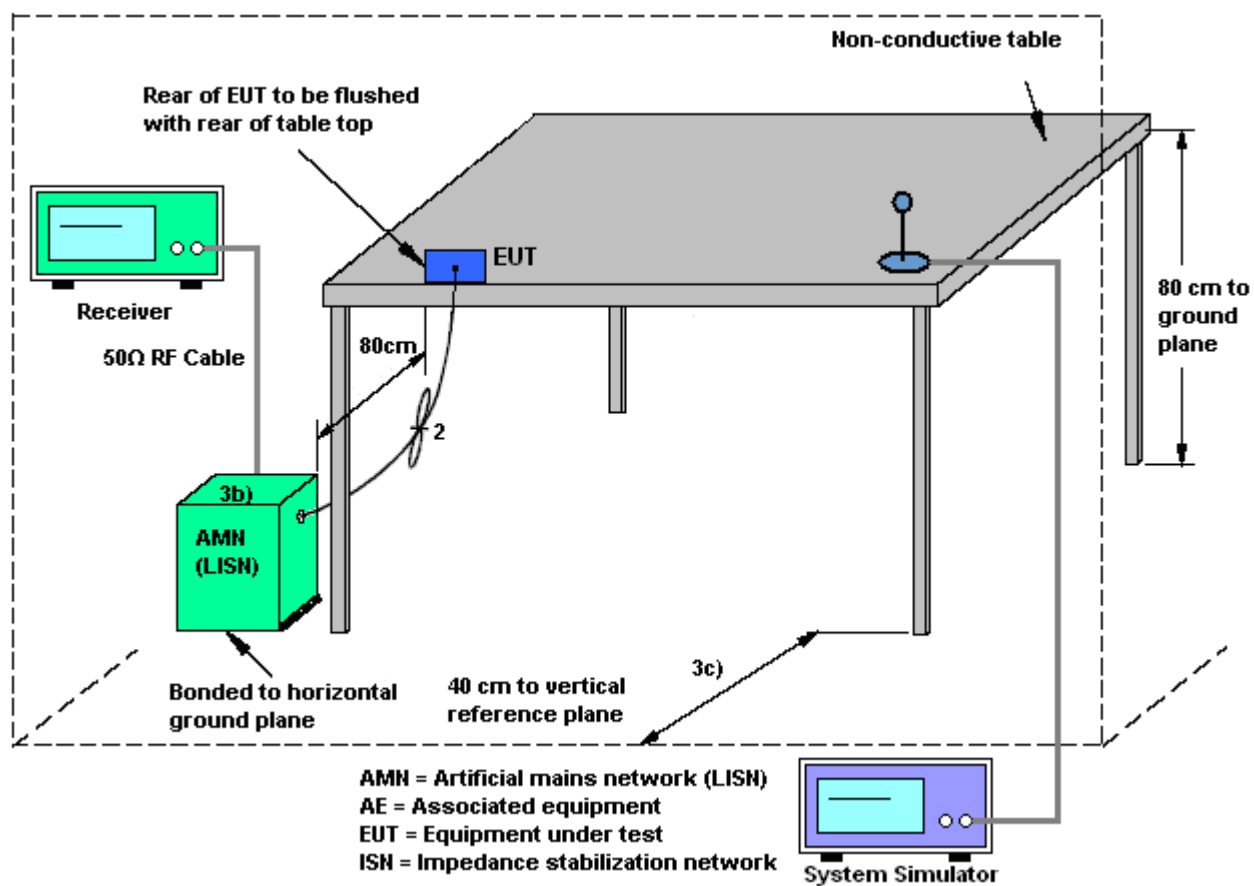
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

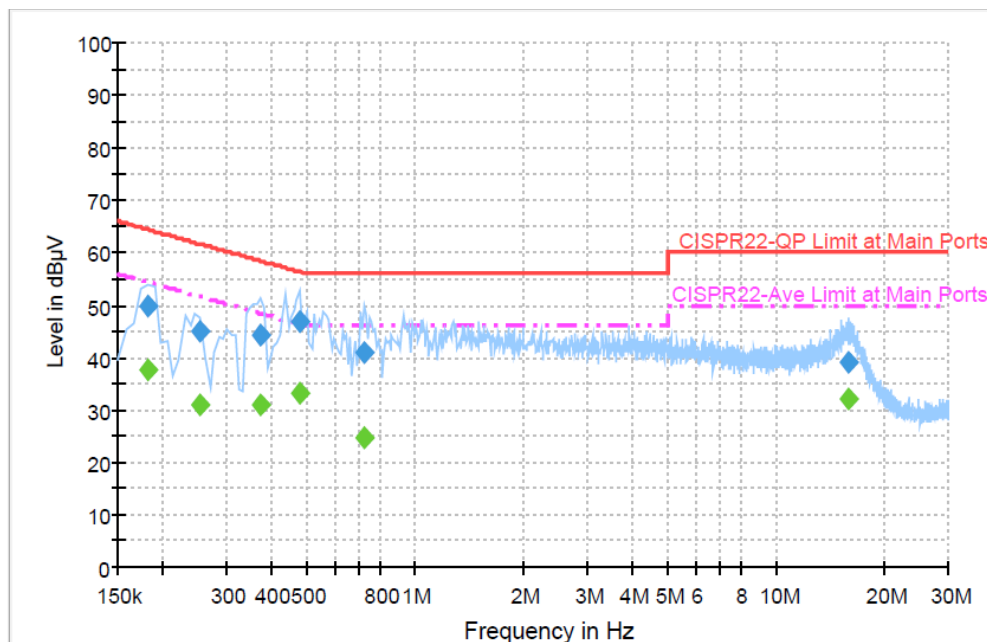
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network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

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 2	Temperature :	20~22℃
Test Engineer :	Novic Jiang	Relative Humidity :	35~37%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WCDMA Band IV Idle + Bluetooth Link + WLAN Link + Earphone + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



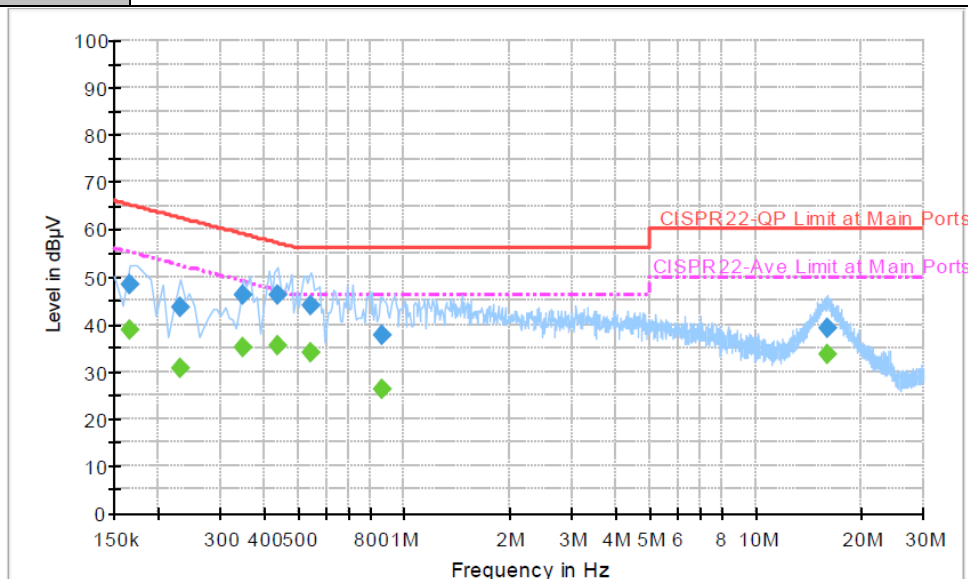
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	49.7	Off	L1	19.4	14.7	64.4
0.254000	44.9	Off	L1	19.3	16.7	61.6
0.374000	44.4	Off	L1	19.4	14.0	58.4
0.478000	47.0	Off	L1	19.4	9.4	56.4
0.726000	40.9	Off	L1	19.4	15.1	56.0
15.886000	39.2	Off	L1	19.7	20.8	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	37.5	Off	L1	19.4	16.9	54.4
0.254000	31.0	Off	L1	19.3	20.6	51.6
0.374000	30.9	Off	L1	19.4	17.5	48.4
0.478000	33.1	Off	L1	19.4	13.3	46.4
0.726000	24.6	Off	L1	19.4	21.4	46.0
15.886000	31.9	Off	L1	19.7	18.1	50.0

Test Mode :	Mode 2	Temperature :	20~22℃
Test Engineer :	Novic Jiang	Relative Humidity :	35~37%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WCDMA Band IV Idle + Bluetooth Link + WLAN Link + Earphone + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		


Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	48.4	Off	N	19.3	16.8	65.2
0.230000	43.5	Off	N	19.4	18.9	62.4
0.350000	46.0	Off	N	19.3	13.0	59.0
0.438000	46.0	Off	N	19.4	11.1	57.1
0.542000	43.8	Off	N	19.3	12.2	56.0
0.870000	37.6	Off	N	19.4	18.4	56.0
15.998000	39.1	Off	N	19.8	20.9	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	38.7	Off	N	19.3	26.5	55.2
0.230000	30.8	Off	N	19.4	21.6	52.4
0.350000	35.0	Off	N	19.3	14.0	49.0
0.438000	35.4	Off	N	19.4	11.7	47.1
0.542000	33.9	Off	N	19.3	12.1	46.0
0.870000	26.1	Off	N	19.4	19.9	46.0
15.998000	33.4	Off	N	19.8	16.6	50.0

3.7 Radiated Emission Measurement

3.7.1 Limit of Radiated Emission

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

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

3.7.2 Measuring Instruments

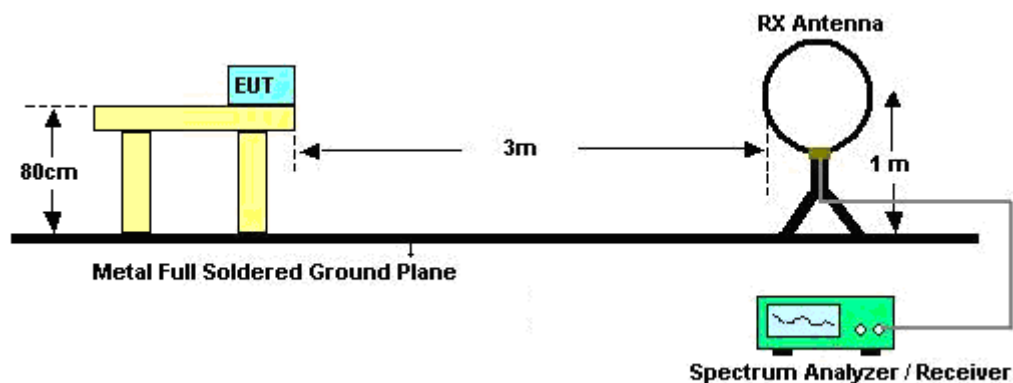
See list of measuring instruments of this test report.

3.7.3 Test Procedures

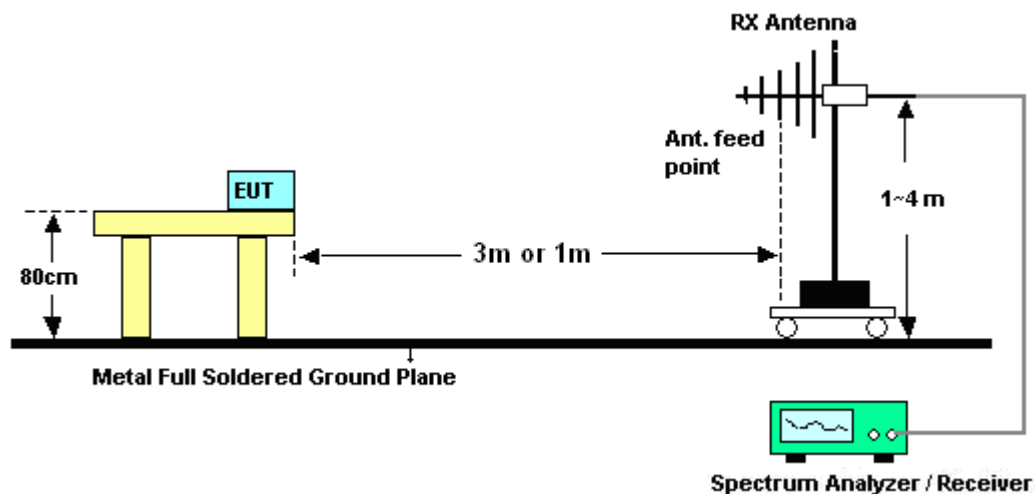
1. The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Use the following spectrum analyzer settings:
 - (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep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

3.7.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



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

Test Engineer :	Jason Wang	Temperature :	25.2~26.6℃	
		Relative Humidity :	47~53%	
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 :	25.2~26.6℃
Test Channel :	01	Relative Humidity :	47~53%
Test Engineer :	Jason Wang	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
119.91	39.77	-3.73	43.5	57.59	12.63	1.07	31.52	114	244	Peak
140.16	39.47	-4.03	43.5	58.46	11.45	1.07	31.51	-	-	Peak
180.12	39.23	-4.27	43.5	60.48	9.03	1.23	31.51	-	-	Peak
319.6	37.36	-8.64	46	52.71	14.31	1.63	31.29	-	-	Peak
339.9	32.93	-13.07	46	47.85	14.75	1.63	31.3	-	-	Peak
400.1	35.56	-10.44	46	48.44	16.48	1.82	31.18	-	-	Peak
2352.94	33.12	-20.88	54	31.11	31.66	4.44	34.09	130	298	Average
2352.94	45.58	-28.42	74	43.57	31.66	4.44	34.09	130	298	Peak
2412	91.05	-	-	88.92	31.71	4.5	34.08	130	298	Average
2412	98.72	-	-	96.59	31.71	4.5	34.08	130	298	Peak
2494	31.94	-22.06	54	29.6	31.8	4.62	34.08	130	298	Average
2494	43.91	-30.09	74	41.57	31.8	4.62	34.08	130	298	Peak



Test Mode :	Mode 1	Temperature :	25.2~26.6℃
Test Channel :	01	Relative Humidity :	47~53%
Test Engineer :	Jason Wang	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
179.85	39.03	-4.47	43.5	60.28	9.03	1.23	31.51	128	257	Peak
200.1	38.73	-4.77	43.5	59.29	9.63	1.26	31.45	-	-	Peak
260.04	38.92	-7.08	46	55.3	13.68	1.42	31.48	-	-	Peak
359.5	33.24	-12.76	46	47.58	15.23	1.71	31.28	-	-	Peak
379.8	33.22	-12.78	46	46.9	15.78	1.77	31.23	-	-	Peak
440	30.34	-15.66	46	42.68	16.95	1.87	31.16	-	-	Peak
2386.19	32.41	-21.59	54	30.32	31.7	4.47	34.08	100	295	Average
2386.19	48.7	-25.3	74	46.61	31.7	4.47	34.08	100	295	Peak
2412	97.86	-	-	95.73	31.71	4.5	34.08	100	295	Average
2412	105.98	-	-	103.85	31.71	4.5	34.08	100	295	Peak
2492	32.66	-21.34	54	30.32	31.8	4.62	34.08	100	295	Average
2492	45.84	-28.16	74	43.5	31.8	4.62	34.08	100	295	Peak



Test Mode :	Mode 2	Temperature :	25.2~26.6℃
Test Channel :	06	Relative Humidity :	47~53%
Test Engineer :	Jason Wang	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
119.91	39.54	-3.96	43.5	57.36	12.63	1.07	31.52	144	105	Peak
179.85	39.32	-4.18	43.5	60.57	9.03	1.23	31.51	-	-	Peak
200.1	38.95	-4.55	43.5	59.51	9.63	1.26	31.45	-	-	Peak
319.6	37.44	-8.56	46	52.79	14.31	1.63	31.29	-	-	Peak
339.9	39.11	-6.89	46	54.03	14.75	1.63	31.3	-	-	Peak
400.1	35.48	-10.52	46	48.36	16.48	1.82	31.18	-	-	Peak
2340	33.91	-20.09	54	31.92	31.64	4.44	34.09	100	300	Average
2340	44.88	-29.12	74	42.89	31.64	4.44	34.09	100	300	Peak
2437	89.88	-	-	87.68	31.75	4.53	34.08	100	300	Average
2437	98.18	-	-	95.98	31.75	4.53	34.08	100	300	Peak
2492	31.77	-22.23	54	29.43	31.8	4.62	34.08	100	300	Average
2492	43.89	-30.11	74	41.55	31.8	4.62	34.08	100	300	Peak



Test Mode :	Mode 2	Temperature :	25.2~26.6℃
Test Channel :	06	Relative Humidity :	47~53%
Test Engineer :	Jason Wang	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
179.85	39.29	-4.21	43.5	60.54	9.03	1.23	31.51	162	250	Peak
190.11	38.66	-4.84	43.5	59.71	9.2	1.23	31.48	-	-	Peak
260.04	38.88	-7.12	46	55.26	13.68	1.42	31.48	-	-	Peak
359.5	33.11	-12.89	46	47.45	15.23	1.71	31.28	-	-	Peak
379.8	33.19	-12.81	46	46.87	15.78	1.77	31.23	-	-	Peak
470.8	31.24	-14.76	46	42.76	17.62	1.98	31.12	-	-	Peak
2356	38.63	-15.37	54	36.62	31.66	4.44	34.09	100	309	Average
2356	49.28	-24.72	74	47.27	31.66	4.44	34.09	100	309	Peak
2437	96.02	-	-	93.82	31.75	4.53	34.08	100	309	Average
2437	104.81	-	-	102.63	31.73	4.53	34.08	100	309	Peak
2494	32.38	-21.62	54	30.04	31.8	4.62	34.08	100	309	Average
2494	44.84	-29.16	74	42.5	31.8	4.62	34.08	100	309	Peak



Test Mode :	Mode 3	Temperature :	25.2~26.6℃
Test Channel :	11	Relative Humidity :	47~53%
Test Engineer :	Jason Wang	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
119.91	39.49	-4.01	43.5	57.31	12.63	1.07	31.52	-	-	Peak
139.89	39.88	-3.62	43.5	58.87	11.45	1.07	31.51	-	-	Peak
180.12	40.43	-3.07	43.5	61.68	9.03	1.23	31.51	140	227	Peak
319.6	36.94	-9.06	46	52.29	14.31	1.63	31.29	-	-	Peak
339.9	37.38	-8.62	46	52.3	14.75	1.63	31.3	-	-	Peak
400.1	34.21	-11.79	46	47.09	16.48	1.82	31.18	-	-	Peak
2370	35.6	-18.4	54	33.53	31.68	4.47	34.08	130	12	Average
2370	46.68	-27.32	74	44.61	31.68	4.47	34.08	130	12	Peak
2462	90.8	-	-	88.55	31.77	4.56	34.08	130	12	Average
2462	99.48	-	-	97.23	31.77	4.56	34.08	130	12	Peak
2488.6	32.41	-21.59	54	30.1	31.8	4.59	34.08	130	12	Average
2488.6	45.56	-28.44	74	43.25	31.8	4.59	34.08	130	12	Peak

Test Mode :	Mode 3	Temperature :	25.2~26.6℃
Test Channel :	11	Relative Humidity :	47~53%
Test Engineer :	Jason Wang	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
180.12	39.74	-3.76	43.5	60.99	9.03	1.23	31.51	137	226	Peak
190.11	39.35	-4.15	43.5	60.4	9.2	1.23	31.48	-	-	Peak
200.1	38.59	-4.91	43.5	59.15	9.63	1.26	31.45	-	-	Peak
359.5	33.05	-12.95	46	47.39	15.23	1.71	31.28	-	-	Peak
379.8	34.07	-11.93	46	47.75	15.78	1.77	31.23	-	-	Peak
419.7	29.88	-16.12	46	41.9	17.28	1.87	31.17	-	-	Peak
2368	38.92	-15.08	54	36.87	31.66	4.47	34.08	100	314	Average
2368	50.48	-23.52	74	48.43	31.66	4.47	34.08	100	314	Peak
2462	95.62	-	-	93.37	31.77	4.56	34.08	100	314	Average
2462	103.87	-	-	101.62	31.77	4.56	34.08	100	314	Peak
2488.41	35.93	-18.07	54	33.62	31.8	4.59	34.08	100	314	Average
2488.41	48.58	-25.42	74	46.27	31.8	4.59	34.08	100	314	Peak



Test Mode :	Mode 4	Temperature :	25.2~26.6℃
Test Channel :	01	Relative Humidity :	47~53%
Test Engineer :	Jason Wang	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
119.91	39.87	-3.63	43.5	57.69	12.63	1.07	31.52	177	103	Peak
139.89	39.66	-3.84	43.5	58.65	11.45	1.07	31.51	-	-	Peak
180.12	39.5	-4	43.5	60.75	9.03	1.23	31.51	-	-	Peak
319.6	37.02	-8.98	46	52.37	14.31	1.63	31.29	-	-	Peak
339.9	37.16	-8.84	46	52.08	14.75	1.63	31.3	-	-	Peak
400.1	35.95	-10.05	46	48.83	16.48	1.82	31.18	-	-	Peak
2389.42	37.43	-16.57	54	35.34	31.7	4.47	34.08	105	10	Average
2389.42	56.49	-17.51	74	54.4	31.7	4.47	34.08	105	10	Peak
2412	84.62	-	-	82.49	31.71	4.5	34.08	105	10	Average
2412	98.94	-	-	96.81	31.71	4.5	34.08	105	10	Peak
2484	31.79	-22.21	54	29.5	31.78	4.59	34.08	105	10	Average
2484	43.68	-30.32	74	41.39	31.78	4.59	34.08	105	10	Peak



Test Mode :	Mode 4	Temperature :	25.2~26.6℃
Test Channel :	01	Relative Humidity :	47~53%
Test Engineer :	Jason Wang	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
180.12	39.77	-3.73	43.5	61.02	9.03	1.23	31.51	113	247	Peak
190.11	38.37	-5.13	43.5	59.42	9.2	1.23	31.48	-	-	Peak
260.04	38.27	-7.73	46	54.65	13.68	1.42	31.48	-	-	Peak
359.5	34.93	-11.07	46	49.27	15.23	1.71	31.28	-	-	Peak
379.8	33.43	-12.57	46	47.11	15.78	1.77	31.23	-	-	Peak
440	29.94	-16.06	46	42.28	16.95	1.87	31.16	-	-	Peak
2389.61	41.57	-12.43	54	39.48	31.7	4.47	34.08	125	316	Average
2389.61	62.42	-11.58	74	60.33	31.7	4.47	34.08	125	316	Peak
2412	90.82	-	-	88.69	31.71	4.5	34.08	125	316	Average
2412	104.13	-	-	102	31.71	4.5	34.08	125	316	Peak
2490	32.53	-21.47	54	30.19	31.8	4.62	34.08	125	316	Average
2490	44.3	-29.7	74	41.96	31.8	4.62	34.08	125	316	Peak



Test Mode :	Mode 5	Temperature :	25.2~26.6℃
Test Channel :	06	Relative Humidity :	47~53%
Test Engineer :	Jason Wang	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
139.89	39.29	-4.21	43.5	58.28	11.45	1.07	31.51	-	-	Peak
179.85	40.14	-3.36	43.5	61.39	9.03	1.23	31.51	146	286	Peak
200.1	38.45	-5.05	43.5	59.01	9.63	1.26	31.45	-	-	Peak
319.6	36.32	-9.68	46	51.67	14.31	1.63	31.29	-	-	Peak
339.9	36.28	-9.72	46	51.2	14.75	1.63	31.3	-	-	Peak
379.8	36.55	-9.45	46	50.23	15.78	1.77	31.23	-	-	Peak
2356	34.51	-19.49	54	32.5	31.66	4.44	34.09	132	14	Average
2356	46.7	-27.3	74	44.69	31.66	4.44	34.09	132	14	Peak
2437	83.68	-	-	81.48	31.75	4.53	34.08	132	14	Average
2437	97.23	-	-	95.05	31.73	4.53	34.08	132	14	Peak
2488	31.98	-22.02	54	29.67	31.8	4.59	34.08	132	14	Average
2488	44.14	-29.86	74	41.83	31.8	4.59	34.08	132	14	Peak



Test Mode :	Mode 5	Temperature :	25.2~26.6℃
Test Channel :	06	Relative Humidity :	47~53%
Test Engineer :	Jason Wang	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
180.12	39.67	-3.83	43.5	60.92	9.03	1.23	31.51	138	76	Peak
200.1	39.07	-4.43	43.5	59.63	9.63	1.26	31.45	-	-	Peak
260.04	38.77	-7.23	46	55.15	13.68	1.42	31.48	-	-	Peak
359.5	32.89	-13.11	46	47.23	15.23	1.71	31.28	-	-	Peak
379.8	30.7	-15.3	46	44.38	15.78	1.77	31.23	-	-	Peak
483.4	29.7	-16.3	46	40.86	17.96	1.98	31.1	-	-	Peak
2370	37.91	-16.09	54	35.84	31.68	4.47	34.08	100	315	Average
2370	50.48	-23.52	74	48.41	31.68	4.47	34.08	100	315	Peak
2437	89.69	-	-	87.49	31.75	4.53	34.08	100	315	Average
2437	103.03	-	-	100.85	31.73	4.53	34.08	100	315	Peak
2484	32.81	-21.19	54	30.52	31.78	4.59	34.08	100	315	Average
2484	44.71	-29.29	74	42.42	31.78	4.59	34.08	100	315	Peak



Test Mode :	Mode 6	Temperature :	25.2~26.6℃
Test Channel :	11	Relative Humidity :	47~53%
Test Engineer :	Jason Wang	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
140.16	39.77	-3.73	43.5	58.76	11.45	1.07	31.51	106	27	Peak
180.12	39.39	-4.11	43.5	60.64	9.03	1.23	31.51	-	-	Peak
200.1	39.65	-3.85	43.5	60.21	9.63	1.26	31.45	-	-	Peak
319.6	38.36	-7.64	46	53.71	14.31	1.63	31.29	-	-	Peak
339.9	36.76	-9.24	46	51.68	14.75	1.63	31.3	-	-	Peak
400.1	35.07	-10.93	46	47.95	16.48	1.82	31.18	-	-	Peak
2380	36.04	-17.96	54	33.97	31.68	4.47	34.08	160	21	Average
2380	47.64	-26.36	74	45.57	31.68	4.47	34.08	160	21	Peak
2462	84.22	-	-	81.97	31.77	4.56	34.08	160	21	Average
2462	97.69	-	-	95.44	31.77	4.56	34.08	160	21	Peak
2483.5	35.57	-18.43	54	33.28	31.78	4.59	34.08	160	21	Average
2483.5	53.02	-20.98	74	50.73	31.78	4.59	34.08	160	21	Peak

Test Mode :	Mode 6	Temperature :	25.2~26.6℃
Test Channel :	11	Relative Humidity :	47~53%
Test Engineer :	Jason Wang	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
180.12	40.11	-3.39	43.5	61.36	9.03	1.23	31.51	117	18	Peak
200.1	38.79	-4.71	43.5	59.35	9.63	1.26	31.45	-	-	Peak
260.04	38.24	-7.76	46	54.62	13.68	1.42	31.48	-	-	Peak
359.5	33.59	-12.41	46	47.93	15.23	1.71	31.28	-	-	Peak
379.8	32.95	-13.05	46	46.63	15.78	1.77	31.23	-	-	Peak
400.1	30.82	-15.18	46	43.7	16.48	1.82	31.18	-	-	Peak
2360	39.47	-14.53	54	37.45	31.66	4.44	34.08	100	321	Average
2360	52.62	-21.38	74	50.6	31.66	4.44	34.08	100	321	Peak
2462	89.38	-	-	87.13	31.77	4.56	34.08	100	321	Average
2462	102.52	-	-	100.27	31.77	4.56	34.08	100	321	Peak
2483.66	38.94	-15.06	54	36.65	31.78	4.59	34.08	100	321	Average
2483.66	57.05	-16.95	74	54.76	31.78	4.59	34.08	100	321	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 Fixed Internal Antenna without connector and it is considered to meet antenna requirement.

3.8.3 Antenna Gain

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

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	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)
Spectrum Analyzer	R&S	FSP40	100057	9KHz-40GHz	Oct. 20, 2009	Oct. 19, 2010	Radiation (03CH05-HY)
Amplifier	COM-POWER	PA-103	161069	1KHz - 1GHz	Mar. 29, 2010	Mar. 28, 2011	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 31, 2009	Oct. 30, 2010	Radiation (03CH05-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 14, 2009	Oct. 13, 2010	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz- 26.5GHz	Nov. 11, 2009	Nov. 10, 2010	Radiation (03CH05-HY)
Turn Table	HD	Deis HD 2000	420/611	0 - 360 degree	N/A	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	MA 240	240/666	1 m - 4 m	N/A	N/A	Radiation (03CH05-HY)
Horn Antenna	ESCO	3117	00066584	1GHz ~ 18GHz	Aug. 05, 2010	Aug. 04, 2011	Radiation (03CH05-HY)
Horn Antenna	Training Research	AH-0801	95119	8GHz~18GHz	Nov. 02, 2009	Nov. 01, 2010	Radiation (03CH05-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH05-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 EP090307-01A as below.