

FCC RF Test Report

APPLICANT : Motorola Mobility, Inc.
EQUIPMENT : Mobile Phone
BRAND NAME : MOTOROLA
MODEL NAME : EX225
GPPD NUMBER : 3131
FCC ID : IHDT56MK4
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Transmission System (DTS)

The product was received on Aug. 19, 2011 and completely tested on Sep. 08, 2011. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.

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

Reviewed by:



Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

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



TABLE OF CONTENTS

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



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR181924-03B	Rev. 01	Initial issue of report	Sep. 20, 2011

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	A8.2(a)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.2	15.247(b)	A8.4	Power Output	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(d)	A8.5	Frequency Band Edges	$\leq 20\text{dBc}$	Pass	-
3.4	15.247(d)	A8.5	Spurious Emission	$< 20\text{ dBc}$	Pass	-
3.5	15.247(e)	A8.2(b)	Power Spectral Density	$\leq 8\text{dBm}$	Pass	-
3.6	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 26.1 dB at 2.98 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 6.81 dB at 47.82 MHz
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Motorola Mobility, Inc.

No. 1, Wang Jing East Road, Chao Yang District, 100102 Beijing, P. R. China

1.2 Manufacturer

Arima Communications Corp.

6F., No. 866, Jhongjheng Rd., Jhonghe Dist., New Taipei City 23586, Taiwan

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Mobile Phone
Brand Name	MOTOROLA
Model Name	EX225
FCC ID	IHDT56MK4
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 : 18.19 dBm (0.0659 W) 802.11g : 21.77 dBm (0.1503 W)
Antenna Type	IFA Antenna with gain -2.21 dBi
HW Version	P2
SW Version	BREA3G_W_07.0E.00R_S_WIFI
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	03CH07-HY	722060/4086B-1

1.5 Applied Standards

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

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 (Measurement Guidelines of DTS)
- ♦ ANSI C63.4-2003
- ♦ IC RSS-210 Issue 8

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (Certification), 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	P20G	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)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	18.18	18.17	17.98	18.17
CH 06	2437 MHz	18.19	18.07	17.93	18.10
CH 11	2462 MHz	18.08	17.98	17.80	18.02

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	21.74	21.58	21.62	21.61	21.63	21.64	21.67	21.70
CH 06	2437 MHz	21.77	21.68	21.76	21.66	21.75	21.67	21.65	21.66
CH 11	2462 MHz	21.47	21.43	21.54	21.46	21.48	21.52	21.45	21.41

Remark: 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).

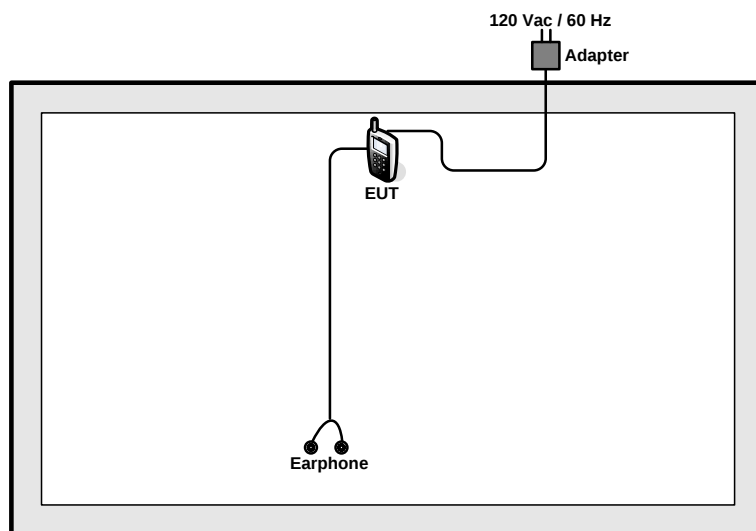
Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations, laptop / tablet modes.

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

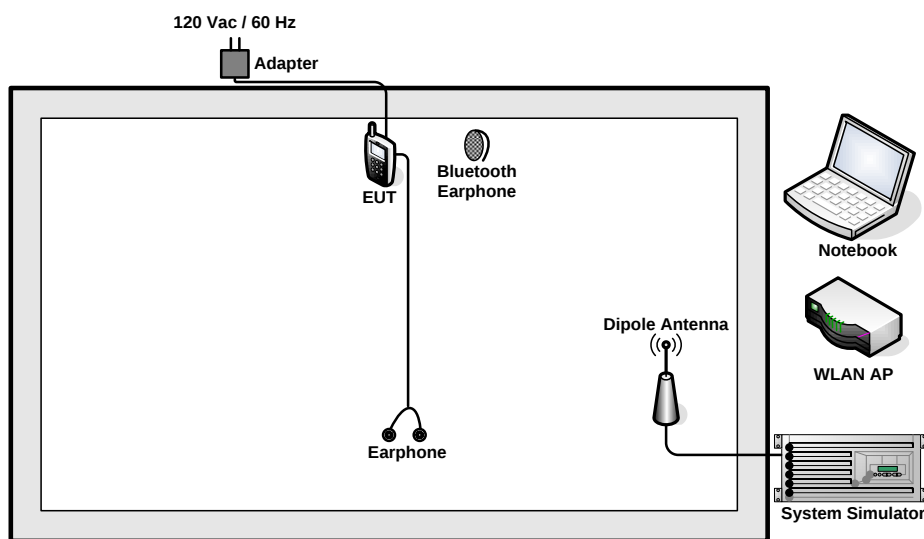
Test Cases		
Test Item	802.11b (Modulation : DSSS)	802.11g (Modulation : OFDM)
Conducted TCs	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz
Radiated TCs	Mode 1 : 802.11b 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
AC Conducted Emission	Mode 1 :GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + USB Cable (Charging from Adapter)	
Remark: For Radiated TCs, the test was performance with adapter, battery and earphone.		

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.4 RF Utility

For WLAN function, key in “* #3646633 #” on the EUT directly. Then, the EUT provides functions like channel selection and power level for continuous transmitting and receiving signals.

3 Test Result

3.1 6dB Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

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

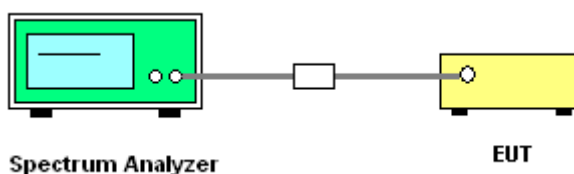
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

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

3.1.4 Test Setup

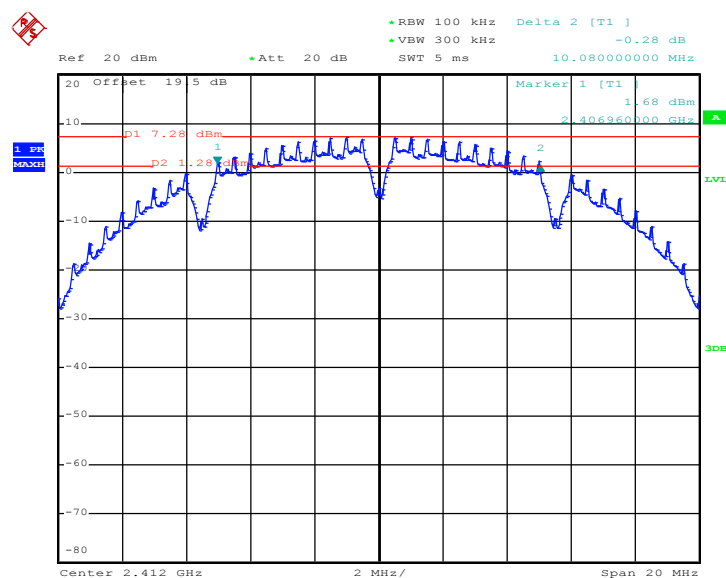


3.1.5 Test Result of 6dB Bandwidth

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

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	10.08	0.5	Pass
06	2437	10.04	0.5	Pass
11	2462	10.04	0.5	Pass

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



Date: 26.AUG.2011 08:19:28

[illegible]

Date: 26.AUG.2011 08:32:39

• RBW 100 kHz Delta 2 [T1] 0.20 dB
 • VSWR 300 kHz
 Ref 20 dBm • Att 20 dB SWT 5 ms 10.04000000 MHz

20 Offset 19 5 dB
 Marker 1 (T1) 1.53 dBm
 2.456960000 GHz

1. 9%
 MAX

p1 7 dBm
 p2 1 dBm
 1
 2

-10
 -20
 -30
 -40
 -50
 -60
 -70
 -80

Center 2.462 GHz 2 MHz/ Span 20 MHz

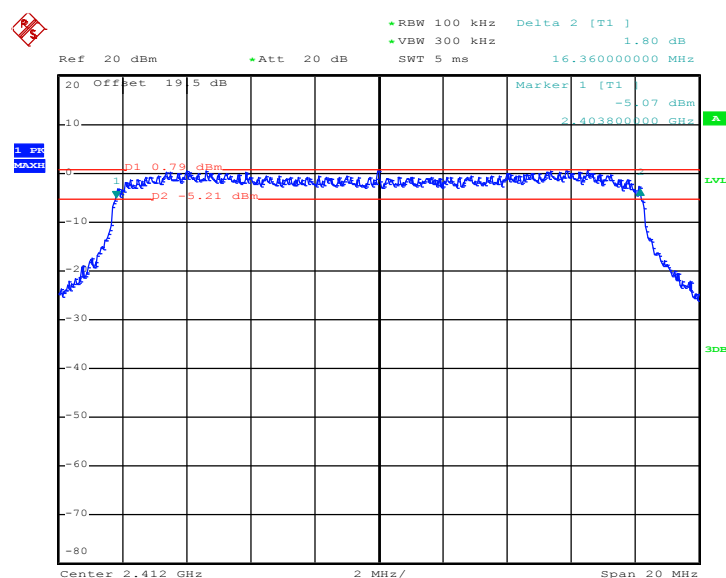
Date: 26.AUG.2011 08:46:24



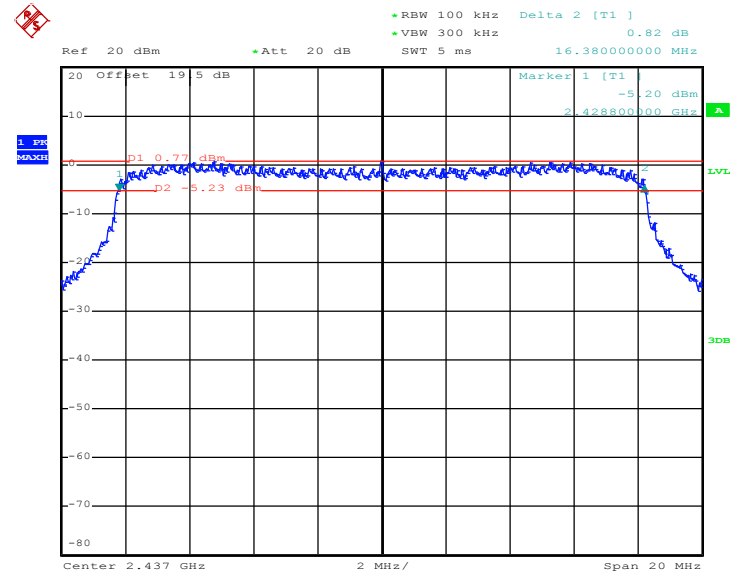
Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	16.36	0.5	Pass
06	2437	16.38	0.5	Pass
11	2462	16.36	0.5	Pass

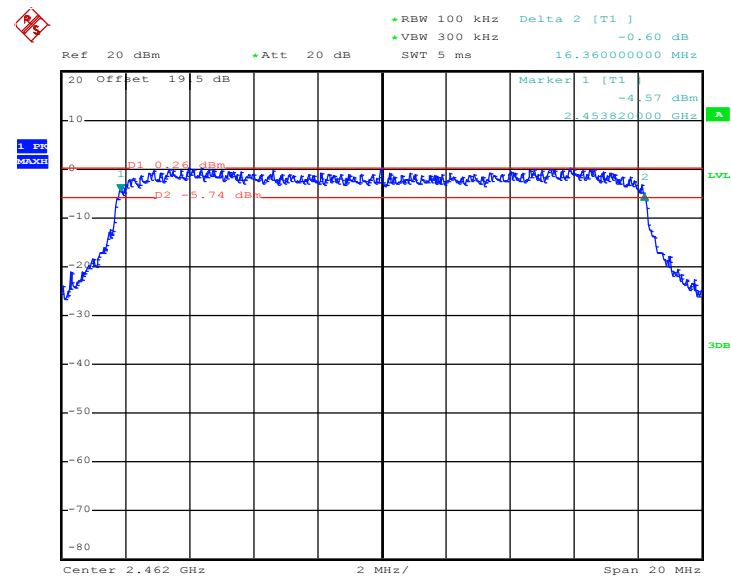
Mode 4 : 6 dB Bandwidth Plot on 802.11g Channel 01



Date: 26.AUG.2011 09:15:34

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


Date: 26.AUG.2011 09:32:12

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


Date: 26.AUG.2011 08:59:42

3.2 Output Power Measurement

3.2.1 Limit of Output Power

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

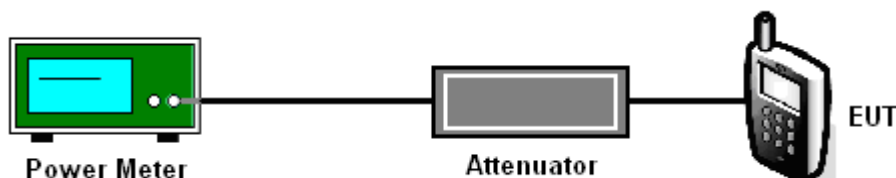
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

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

3.2.4 Test Setup



3.2.5 Test Result of Output Power

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

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	18.18	30	Pass
06	2437	18.19	30	Pass
11	2462	18.08	30	Pass

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

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	21.74	30	Pass
06	2437	21.77	30	Pass
11	2462	21.47	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

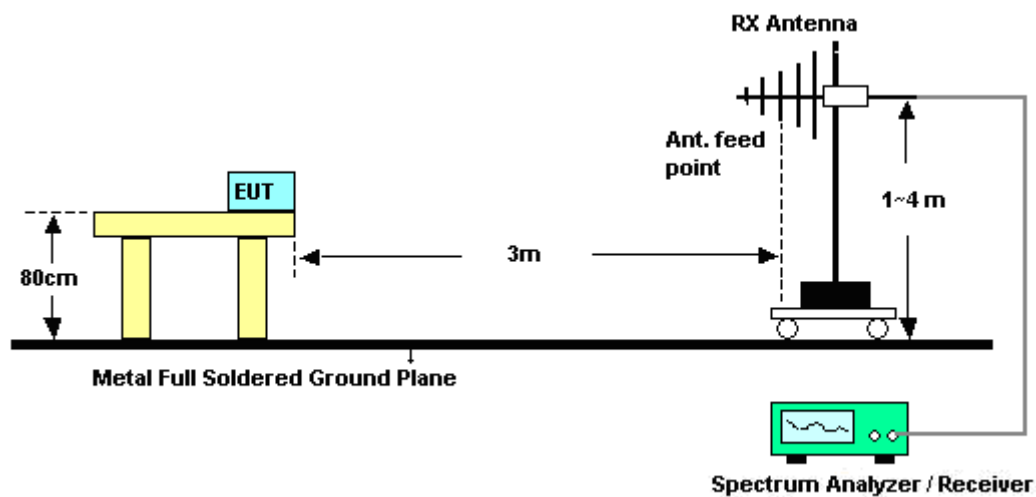
See list of measuring instruments of this test report.

3.3.3 Test Procedures

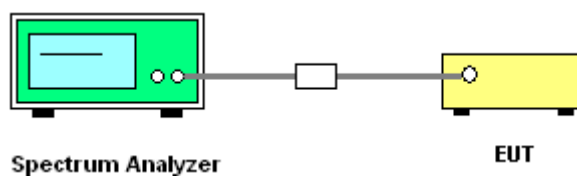
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW) $\geq$ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized 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 :	22~25°C
Test Band :	802.11b	Relative Humidity :	49~51%
Test Channel :	01	Test Engineer :	Ivan Chiang and David Yang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2379.54	47.42	-26.58	74	43.24	32.03	5.99	33.84	138	21	Peak
2379.54	36.26	-17.74	54	32.08	32.03	5.99	33.84	138	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
2388.09	47.48	-26.52	74	43.24	32.06	6.03	33.85	141	360	Peak
2388.09	37.11	-16.89	54	32.87	32.06	6.03	33.85	141	360	Average

Test Mode :	Mode 3	Temperature :	22~25°C
Test Band :	802.11b	Relative Humidity :	49~51%
Test Channel :	11	Test Engineer :	Ivan Chiang and David Yang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2486.7	47.7	-26.3	74	43.24	32.18	6.18	33.9	172	43	Peak
2486.7	37.03	-16.97	54	32.57	32.18	6.18	33.9	172	43	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
2486.7	48.88	-25.12	74	44.42	32.18	6.18	33.9	145	319	Peak
2486.7	39.05	-14.95	54	34.59	32.18	6.18	33.9	145	319	Average



Test Mode :	Mode 4	Temperature :	22~25°C
Test Band :	802.11g	Relative Humidity :	49~51%
Test Channel :	01	Test Engineer :	Ivan Chiang and David Yang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.99	62.41	-11.59	74	58.17	32.06	6.03	33.85	138	24	Peak
2389.99	39.78	-14.22	54	35.54	32.06	6.03	33.85	138	24	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
2389.99	62.35	-11.65	74	58.11	32.06	6.03	33.85	146	331	Peak
2389.99	40.98	-13.02	54	36.74	32.06	6.03	33.85	146	331	Average

Test Mode :	Mode 6	Temperature :	22~25°C
Test Band :	802.11g	Relative Humidity :	49~51%
Test Channel :	11	Test Engineer :	Ivan Chiang and David Yang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	64.78	-9.22	74	60.32	32.18	6.18	33.9	113	32	Peak
2483.5	39.33	-14.67	54	34.87	32.18	6.18	33.9	113	32	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	65.7	-8.3	74	61.24	32.18	6.18	33.9	166	343	Peak
2483.5	41.29	-12.71	54	36.83	32.18	6.18	33.9	166	343	Average



Test Mode :	Mode 1 and 3	Temperature :	24~26℃
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Pinkston Tu

Ref 20 dBm •Att 20 dB RBW 100 kHz VBW 300 kHz Marker 1 [T1] -32.97 dBm
SWT 5 ms 2.397010000 GHz

20 Offset 19.5 dB

-10

-20

-30

-40

-50

-60

-70

-80

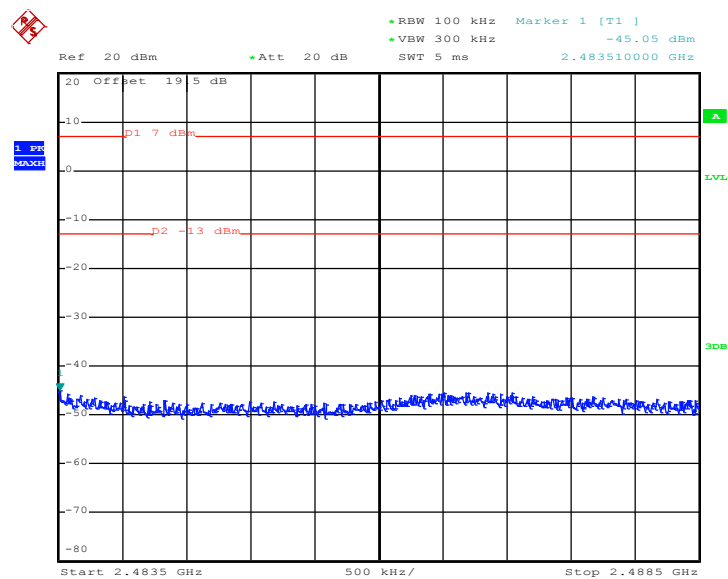
p1 -7.28 dBm

p2 -12.72 dBm

1.5% MAX

Start 2.395 GHz 500 kHz/ Stop 2.4 GHz

High Band Edge Plot on 802.11b Channel 11

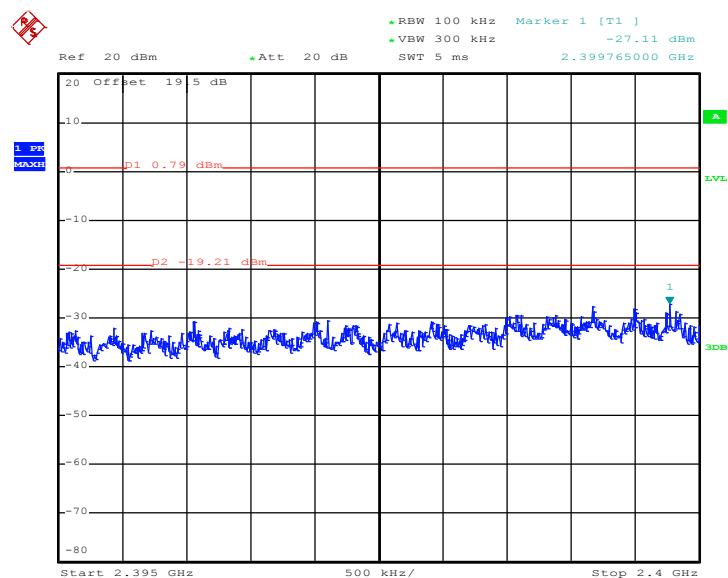


Date: 26.AUG.2011 08:47:11



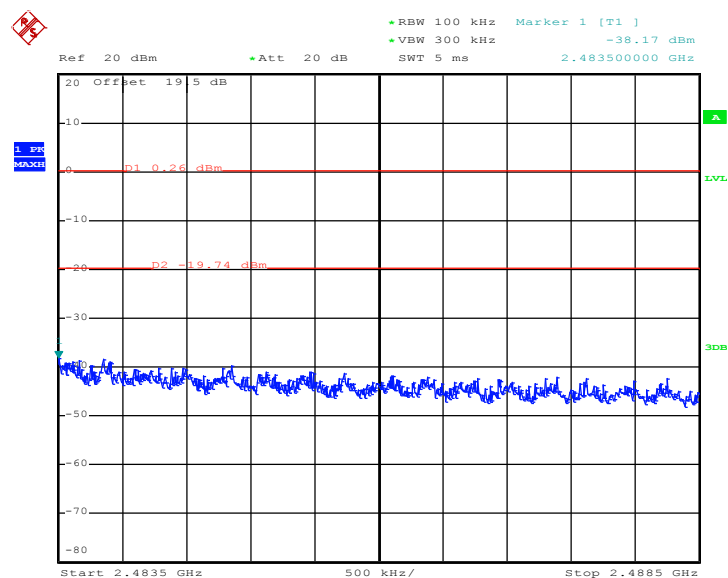
Test Mode :	Mode 4 and 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 802.11g Channel 01



Date: 26.AUG.2011 09:16:42

High Band Edge Plot on 802.11g Channel 11



Date: 26.AUG.2011 09:00:28

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.

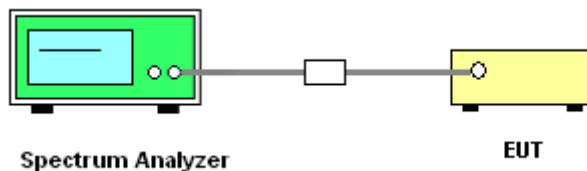
3.4.2 Measuring Instruments

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.

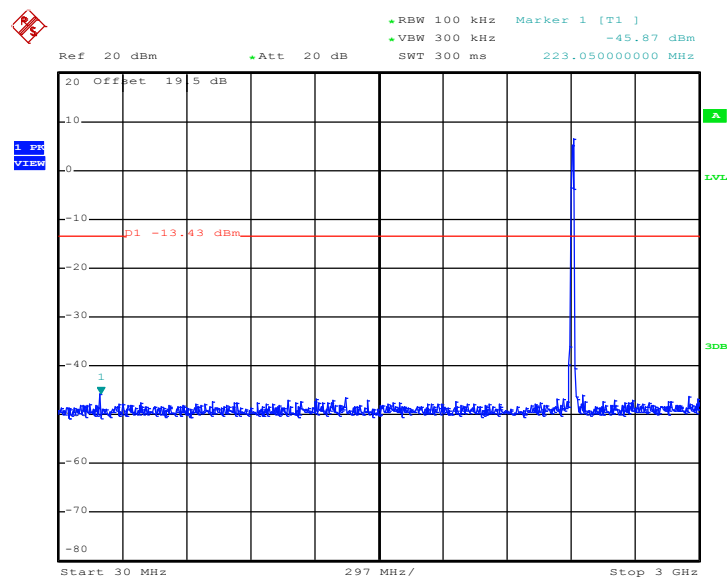
3.4.4 Test Setup



3.4.5 Test Plots of Spurious Emission

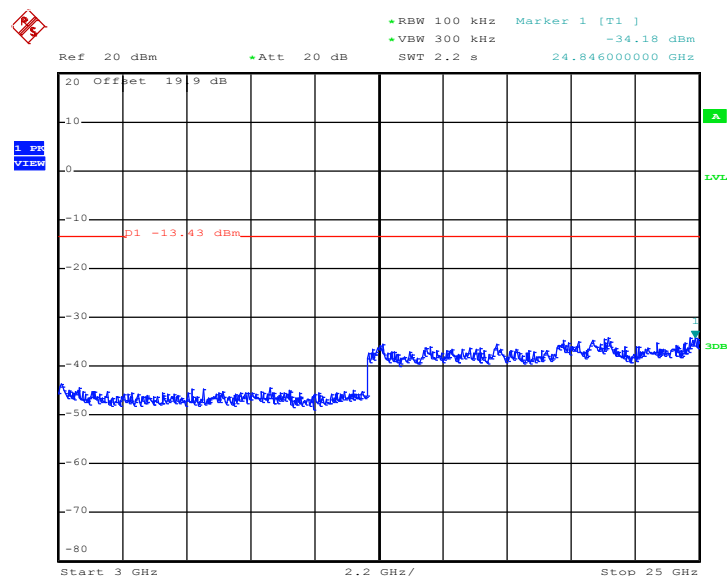
Test Mode :	Mode 1	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 26.AUG.2011 08:30:08

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

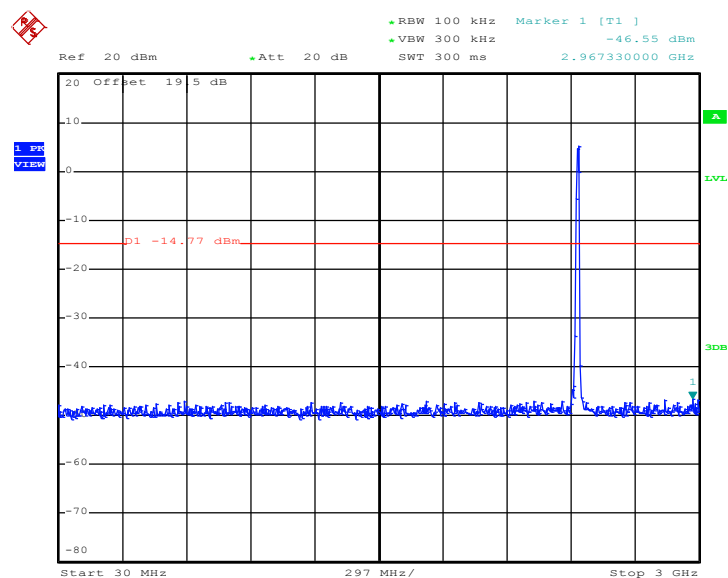


Date: 26.AUG.2011 08:30:25



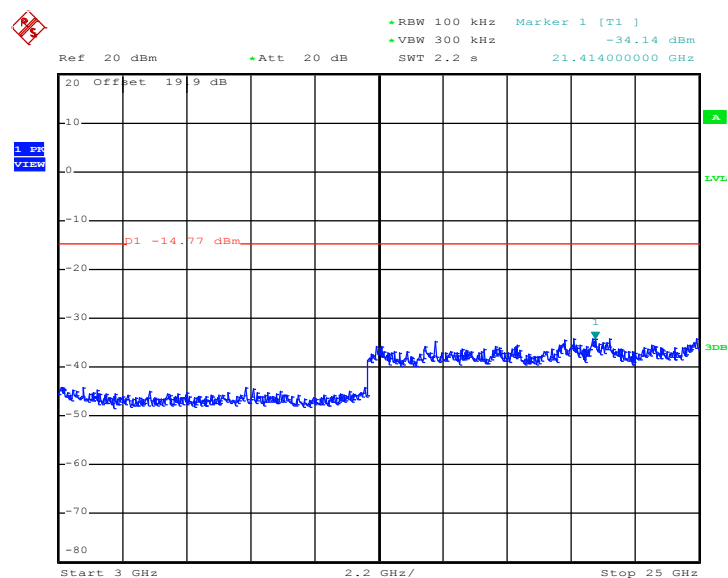
Test Mode :	Mode 2	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 26.AUG.2011 08:43:49

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

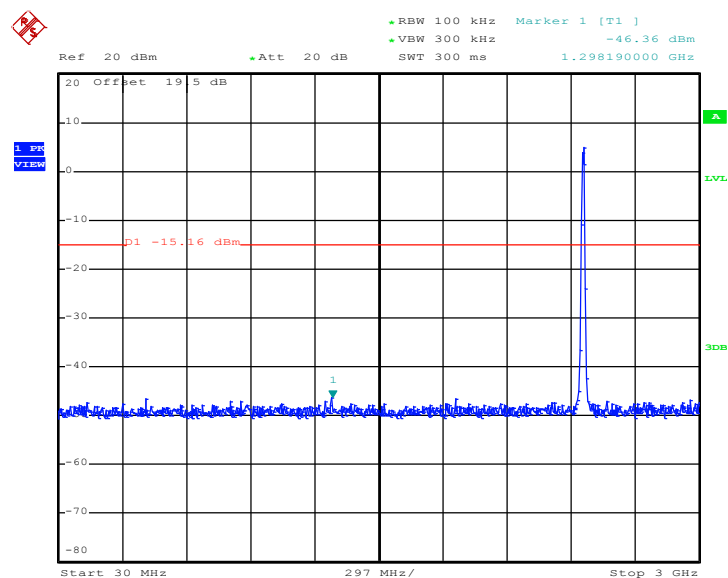


Date: 26.AUG.2011 08:44:06



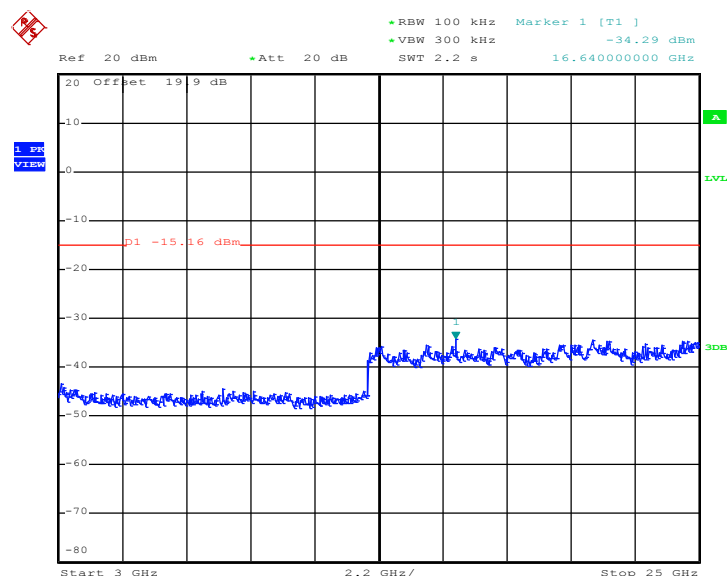
Test Mode :	Mode 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 26.AUG.2011 08:56:40

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

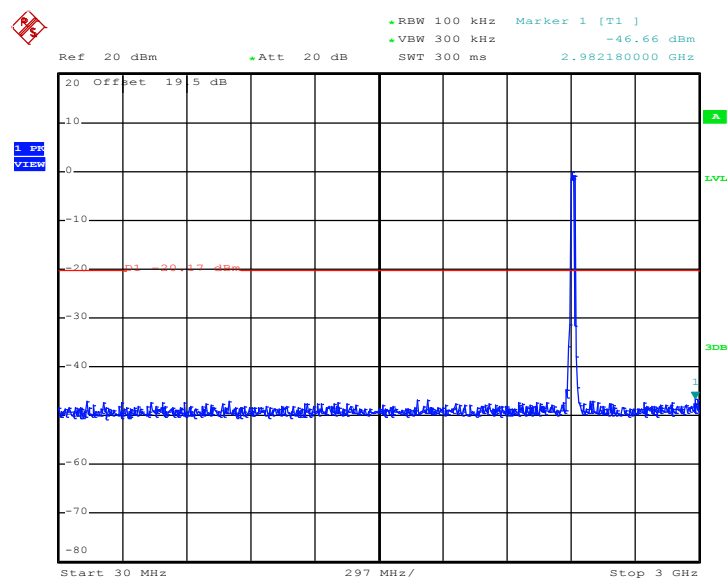


Date: 26.AUG.2011 08:56:57



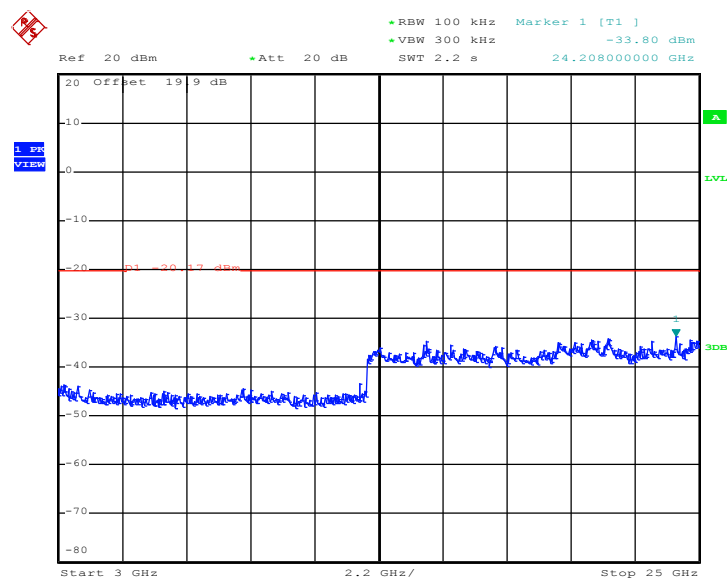
Test Mode :	Mode 4	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 26.AUG.2011 09:26:03

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

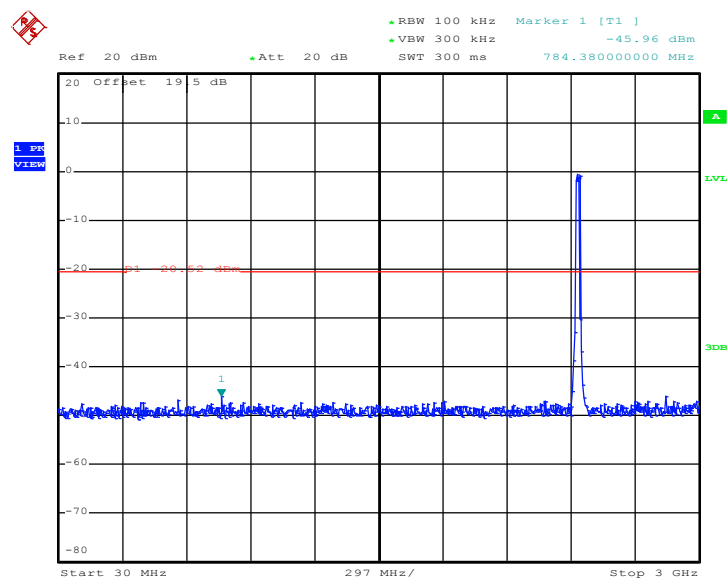


Date: 26.AUG.2011 09:26:20



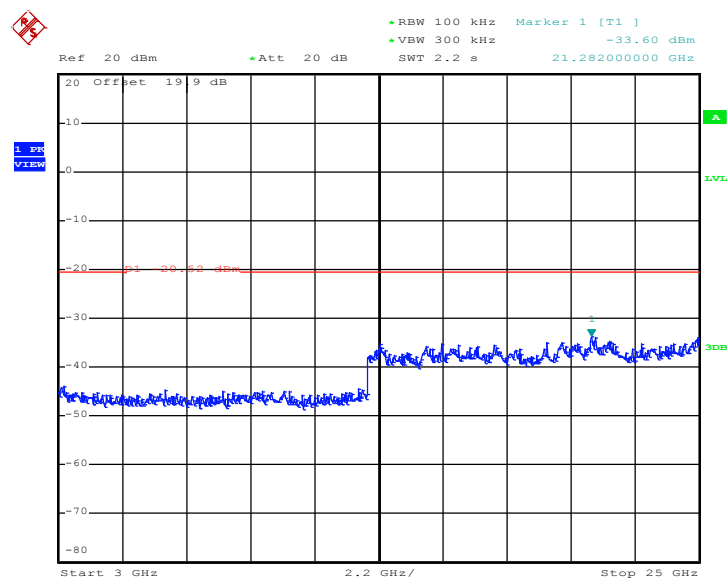
Test Mode :	Mode 5	Temperature :	24~26
Test Band :	802.11g	Relative Humidity :	50~53
Test Channel :	06	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 26.AUG.2011 09:47:20

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

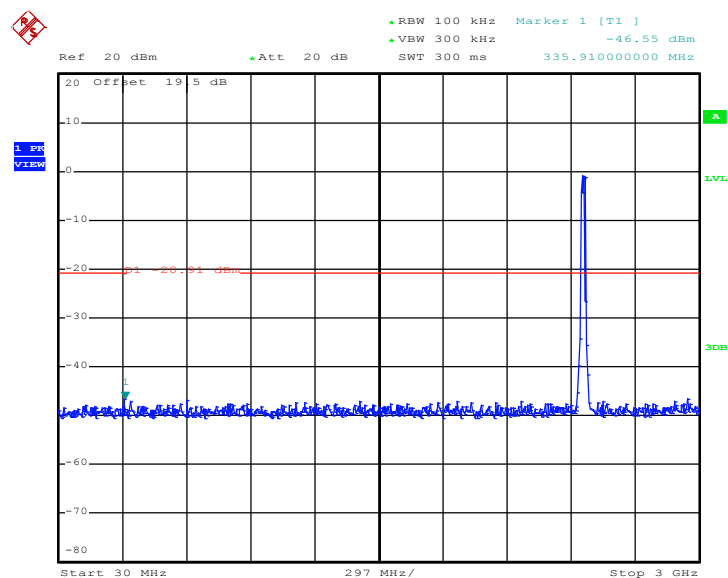


Date: 26.AUG.2011 09:47:37



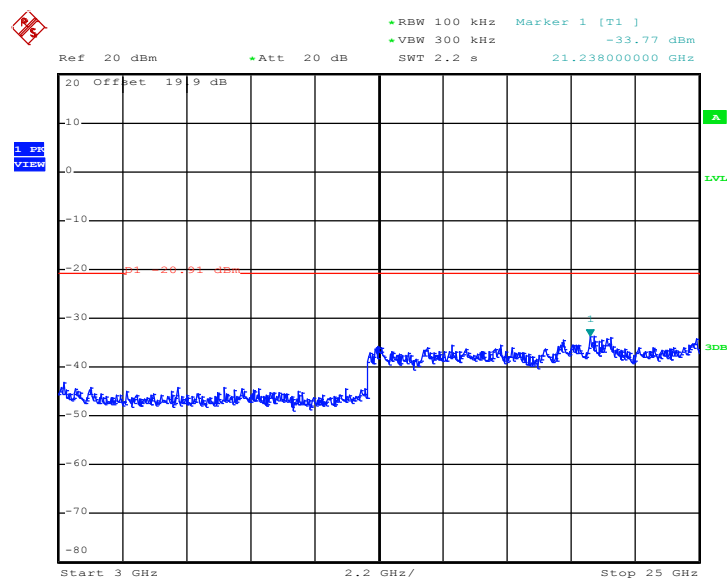
Test Mode :	Mode 6	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 26.AUG.2011 09:10:31

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 26.AUG.2011 09:10:48

3.5 Power Spectral Density Measurement

3.5.1 Limit of Power Spectral Density

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

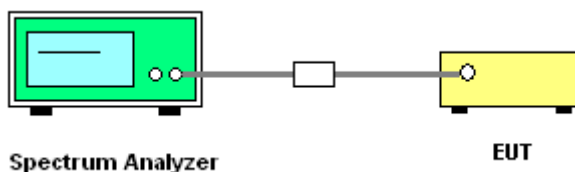
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

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

3.5.4 Test Setup

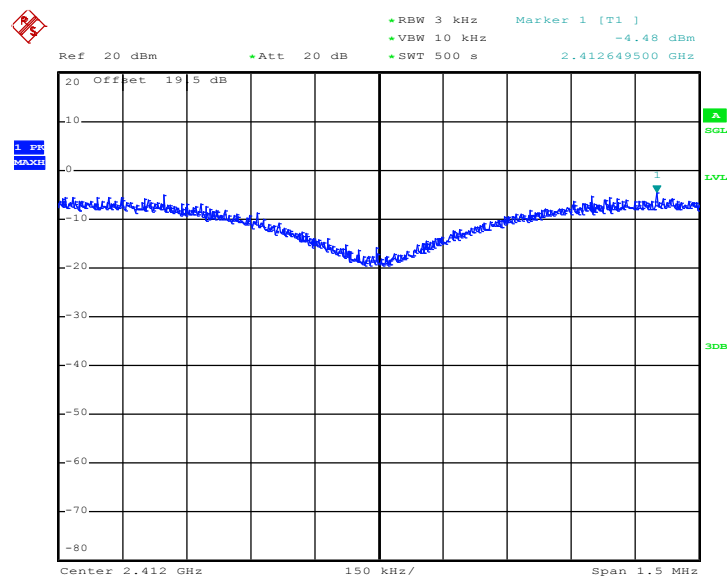


3.5.5 Test Result of Power Spectral Density

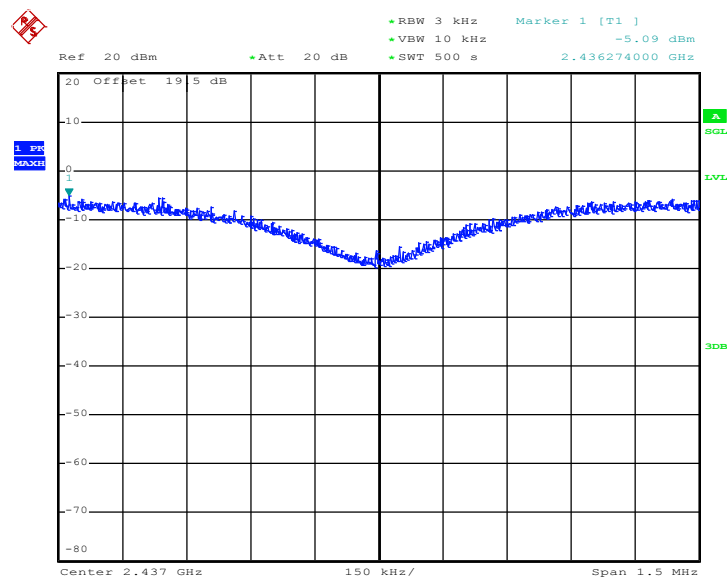
Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-4.48	8	Pass
06	2437	-5.09	8	Pass
11	2462	-5.75	8	Pass

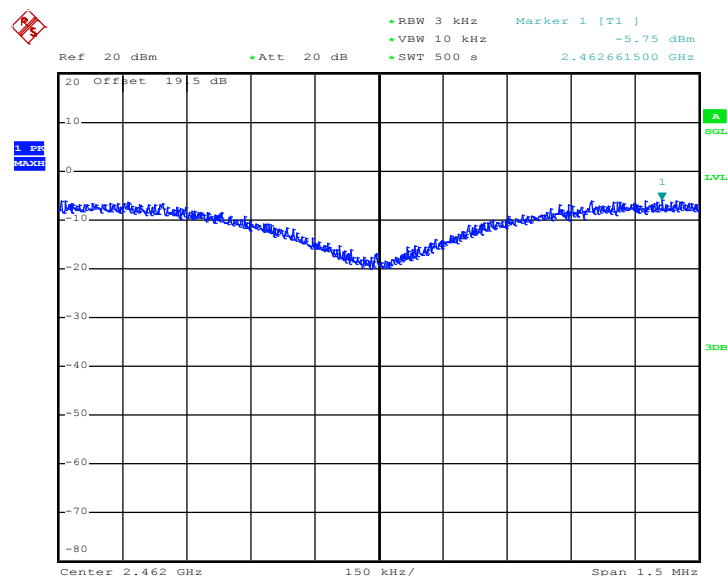
Mode 1 : PSD Plot on 802.11b Channel 01



Date: 26.AUG.2011 08:29:47

Mode 2 : PSD Plot on 802.11b Channel 06


Date: 26.AUG.2011 08:41:43

Mode 3 : PSD Plot on 802.11b Channel 11


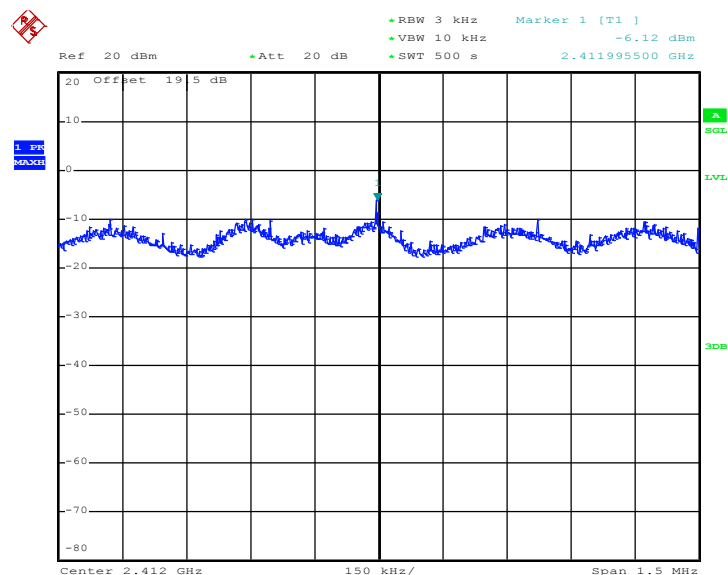
Date: 26.AUG.2011 08:56:19



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

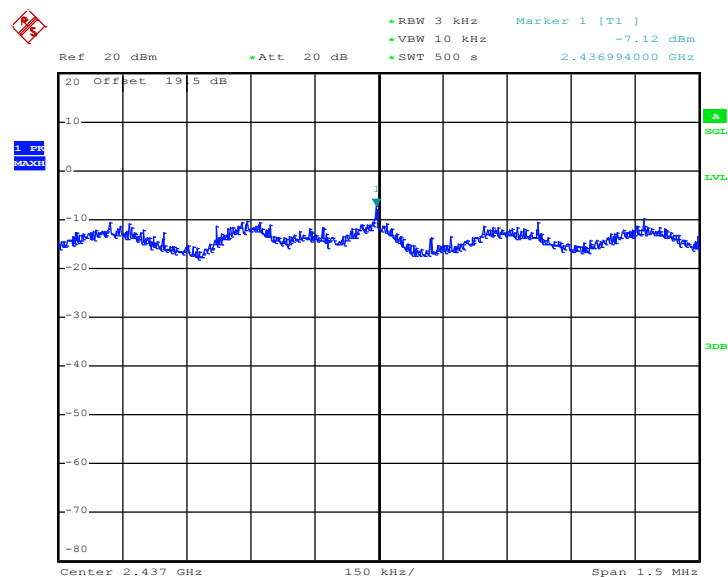
Channel	Frequency (MHz)	802.11g Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	-6.12	8	Pass
06	2437	-7.12	8	Pass
11	2462	-7.69	8	Pass

Mode 4 : PSD Plot on 802.11g Channel 01



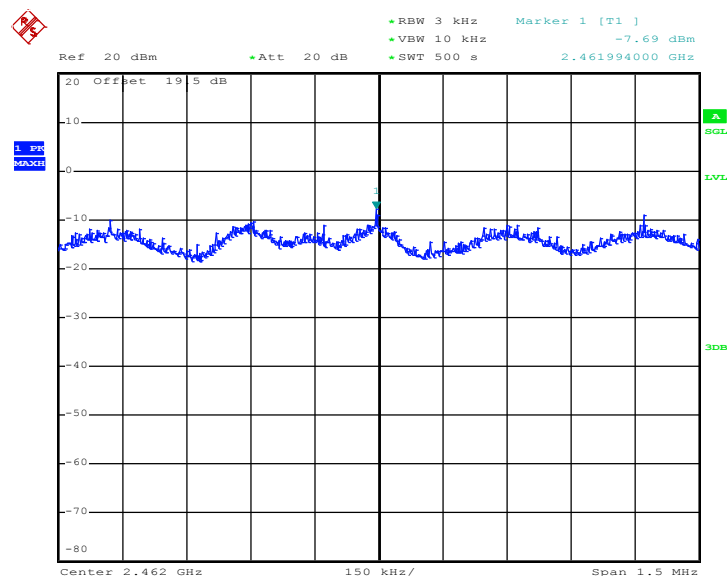
Date: 26.AUG.2011 09:25:42

Mode 5 : PSD Plot on 802.11g Channel 06



Date: 26.AUG.2011 09:41:40

Mode 6 : PSD Plot on 802.11g Channel 11



Date: 26.AUG.2011 09:10:10

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

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

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

*Decreases with the logarithm of the frequency.

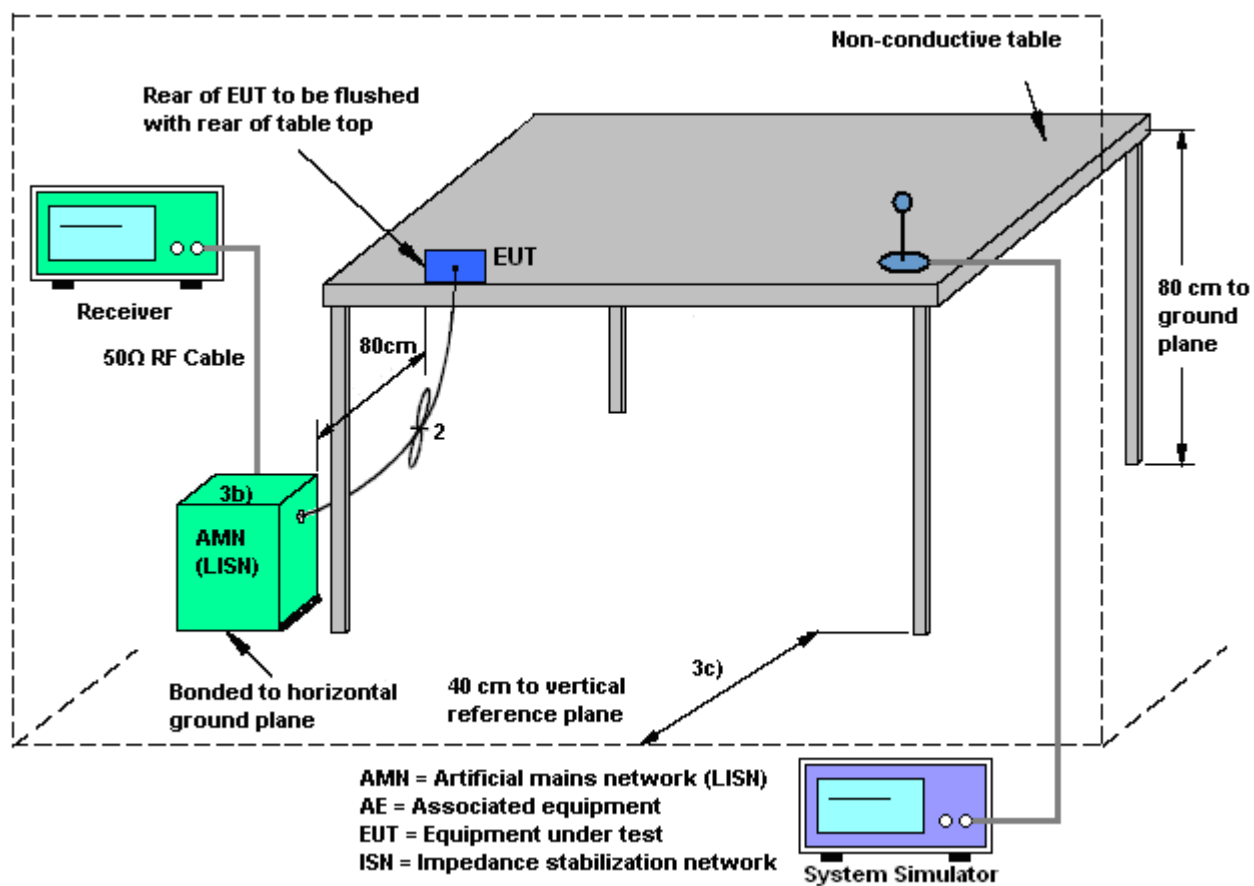
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

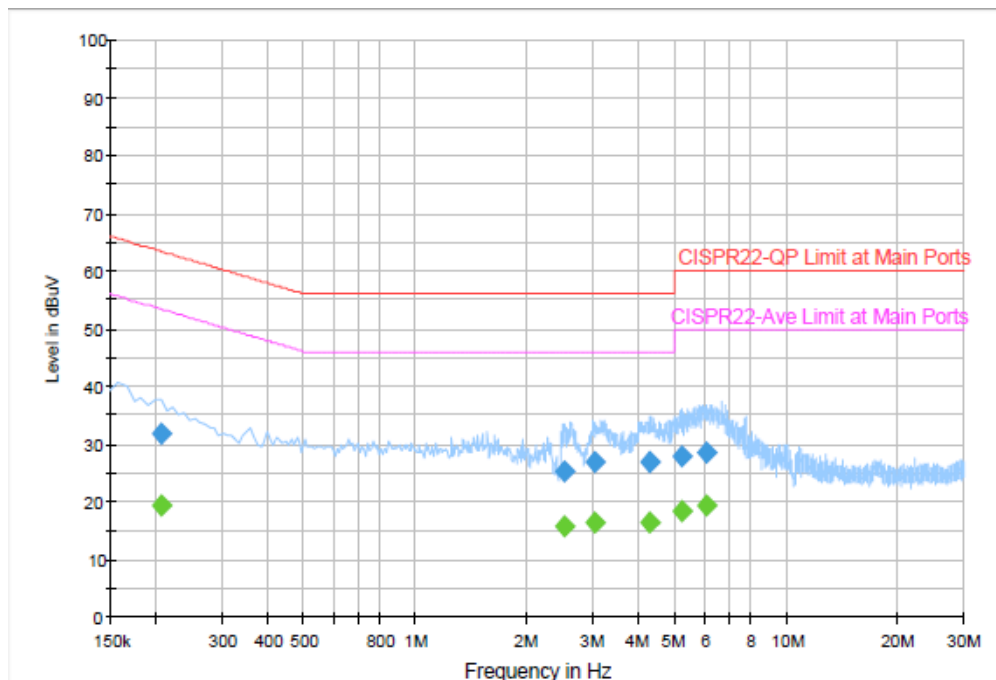
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network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

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + USB Cable (Charging from Adapter)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



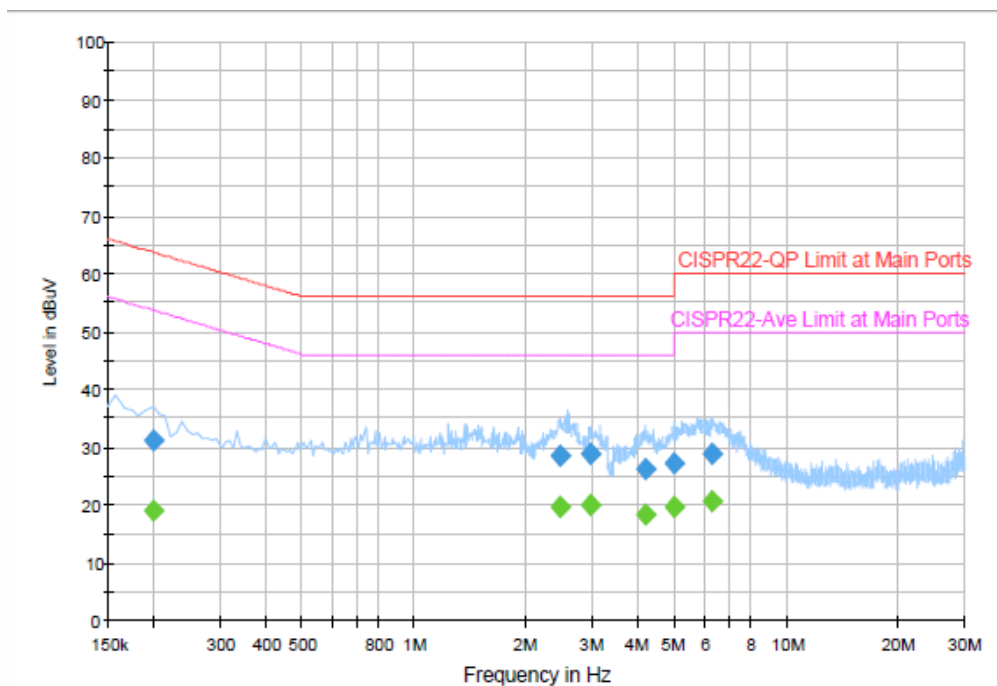
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.206000	32.0	Off	L1	19.4	31.4	63.4
2.526000	25.2	Off	L1	19.4	30.8	56.0
3.046000	27.0	Off	L1	19.5	29.0	56.0
4.270000	26.9	Off	L1	19.5	29.1	56.0
5.182000	27.9	Off	L1	19.5	32.1	60.0
6.086000	28.5	Off	L1	19.5	31.5	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.206000	19.3	Off	L1	19.4	34.1	53.4
2.526000	15.6	Off	L1	19.4	30.4	46.0
3.046000	16.5	Off	L1	19.5	29.5	46.0
4.270000	16.2	Off	L1	19.5	29.8	46.0
5.182000	18.3	Off	L1	19.5	31.7	50.0
6.086000	19.3	Off	L1	19.5	30.7	50.0

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + USB Cable (Charging from Adapter)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		


Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.198000	31.2	Off	N	19.4	32.5	63.7
2.470000	28.6	Off	N	19.5	27.4	56.0
2.982000	28.8	Off	N	19.5	27.2	56.0
4.182000	26.3	Off	N	19.5	29.7	56.0
4.974000	27.2	Off	N	19.5	28.8	56.0
6.318000	28.7	Off	N	19.5	31.3	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.198000	18.9	Off	N	19.4	34.8	53.7
2.470000	19.7	Off	N	19.5	26.3	46.0
2.982000	19.9	Off	N	19.5	26.1	46.0
4.182000	18.3	Off	N	19.5	27.7	46.0
4.974000	19.5	Off	N	19.5	26.5	46.0
6.318000	20.6	Off	N	19.5	29.4	50.0

3.7 Radiated Emission Measurement

3.7.1 Limit of Radiated Emission

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

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

3.7.2 Measuring Instruments

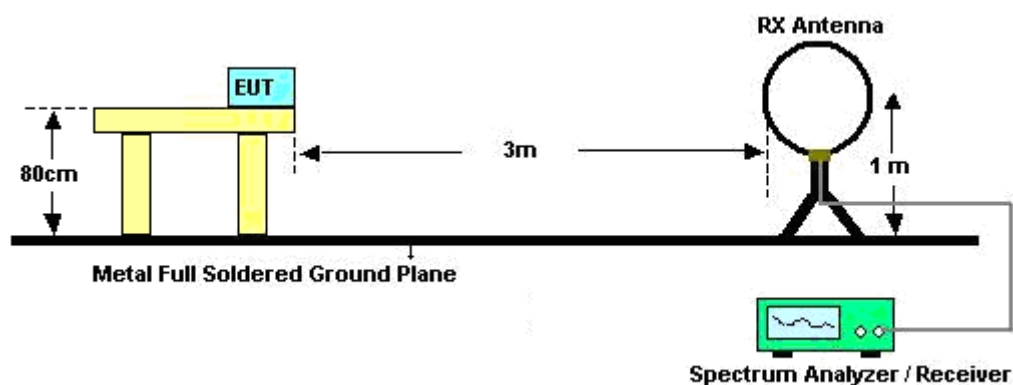
See list of measuring instruments of this test report.

3.7.3 Test Procedures

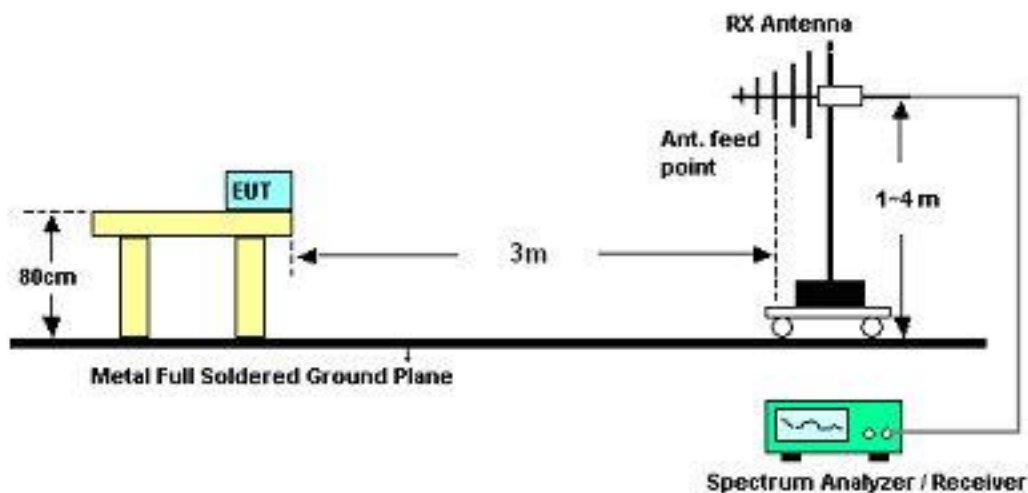
- The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
- Use the following spectrum analyzer settings:
 - Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep =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

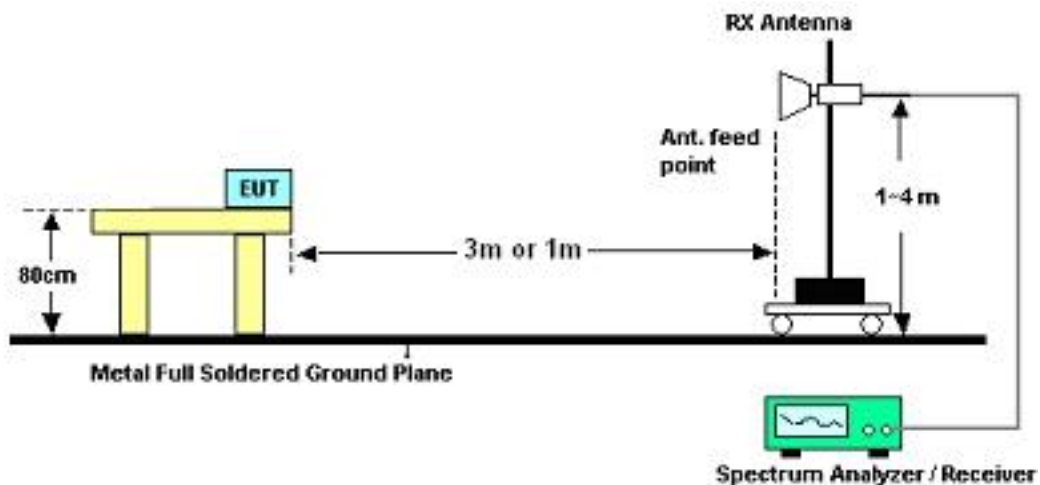
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

Test Engineer :	Ivan Chiang and David Yang	Temperature :	22~25℃	
		Relative Humidity :	49~51%	

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 :	22~25°C
Test Channel :	01	Relative Humidity :	49~51%
Test Engineer :	Ivan Chiang and David Yang	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
34.05	21.68	-18.32	40	37.01	15.57	0.57	31.47	126	174	Peak
67.53	19.26	-20.74	40	43.82	6.17	0.82	31.55	-	-	Peak
92.37	23.67	-19.83	43.5	45.33	8.9	0.96	31.52	-	-	Peak
425.3	18.26	-27.74	46	30.18	16.99	2.23	31.14	-	-	Peak
640.2	22.11	-23.89	46	29.96	20.22	2.81	30.88	-	-	Peak
805.4	25.32	-20.68	46	30.32	22.53	3.15	30.68	-	-	Peak
2379.54	47.42	-26.58	74	43.24	32.03	5.99	33.84	138	21	Peak
2379.54	36.26	-17.74	54	32.08	32.03	5.99	33.84	138	21	Average
2412	101.71	-	-	97.43	32.08	6.07	33.87	138	21	Peak
2412	97.94	-	-	93.66	32.08	6.07	33.87	138	21	Average
2492	32.47	-21.53	54	27.99	32.2	6.18	33.9	138	21	Average
2492	44.46	-29.54	74	39.98	32.2	6.18	33.9	138	21	Peak

Test Mode :	Mode 1	Temperature :	22~25°C
Test Channel :	01	Relative Humidity :	49~51%
Test Engineer :	Ivan Chiang and David Yang	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
47.82	33.19	-6.81	40	54.56	9.48	0.67	31.52	100	344	Peak
106.41	31.34	-12.16	43.5	51.49	10.37	1.03	31.55	-	-	Peak
256.53	22.35	-23.65	46	39.42	12.78	1.57	31.42	-	-	Peak
416.2	18.33	-27.67	46	30.46	16.83	2.2	31.16	-	-	Peak
607.3	22.15	-23.85	46	30.5	19.85	2.71	30.91	-	-	Peak
777.4	24.2	-21.8	46	29.67	22.12	3.1	30.69	-	-	Peak
2388.09	47.48	-26.52	74	43.24	32.06	6.03	33.85	141	360	Peak
2388.09	37.11	-16.89	54	32.87	32.06	6.03	33.85	141	360	Average
2412	104.2	-	-	99.92	32.08	6.07	33.87	141	360	Peak
2412	100.38	-	-	96.1	32.08	6.07	33.87	141	360	Average
2486	32.69	-21.31	54	28.23	32.18	6.18	33.9	141	360	Average
2486	44.96	-29.04	74	40.5	32.18	6.18	33.9	141	360	Peak

Test Mode :	Mode 2	Temperature :	22~25°C
Test Channel :	06	Relative Humidity :	49~51%
Test Engineer :	Ivan Chiang and David Yang	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.62	20.69	-19.31	40	35.56	16.04	0.55	31.46	155	247	Peak
154.74	14.66	-28.84	43.5	34.24	10.74	1.22	31.54	-	-	Peak
277.05	20.5	-25.5	46	37.12	13.1	1.64	31.36	-	-	Peak
388.9	16.64	-29.36	46	29.5	16.23	2.12	31.21	-	-	Peak
551.3	20.38	-25.62	46	29.8	19.01	2.55	30.98	-	-	Peak
792.1	24.09	-21.91	46	29.29	22.35	3.13	30.68	-	-	Peak
2358	46.69	-27.31	74	42.53	32.01	5.99	33.84	171	36	Peak
2358	33.83	-20.17	54	29.67	32.01	5.99	33.84	171	36	Average
2437	101.88	-	-	97.55	32.1	6.11	33.88	171	36	Peak
2437	98.2	-	-	93.84	32.13	6.11	33.88	171	36	Average
2484	45.12	-28.88	74	40.66	32.18	6.18	33.9	171	36	Peak
2484	33.32	-20.68	54	28.86	32.18	6.18	33.9	171	36	Average

Test Mode :	Mode 2	Temperature :	22~25°C
Test Channel :	06	Relative Humidity :	49~51%
Test Engineer :	Ivan Chiang and David Yang	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
66.45	31.16	-8.84	40	55.79	6.1	0.82	31.55	112	107	Peak
86.97	26.66	-13.34	40	49.03	8.24	0.92	31.53	-	-	Peak
137.73	21.02	-22.48	43.5	39.79	11.59	1.19	31.55	-	-	Peak
321.7	25.58	-20.42	46	40.93	14.15	1.82	31.32	-	-	Peak
540.1	20.2	-25.8	46	29.83	18.84	2.53	31	-	-	Peak
780.2	23.94	-22.06	46	29.37	22.15	3.11	30.69	-	-	Peak
2390	47.46	-26.54	74	43.22	32.06	6.03	33.85	117	325	Peak
2390	34.87	-19.13	54	30.63	32.06	6.03	33.85	117	325	Average
2437	104.45	-	-	100.12	32.1	6.11	33.88	117	325	Peak
2437	100.82	-	-	96.46	32.13	6.11	33.88	117	325	Average
2484	46.28	-27.72	74	41.82	32.18	6.18	33.9	117	325	Peak
2484	33.61	-20.39	54	29.15	32.18	6.18	33.9	117	325	Average

Test Mode :	Mode 3	Temperature :	22~25°C
Test Channel :	11	Relative Humidity :	49~51%
Test Engineer :	Ivan Chiang and David Yang	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.89	19.33	-20.67	40	34.2	16.04	0.55	31.46	154	254	Peak
139.89	19.35	-24.15	43.5	38.1	11.6	1.2	31.55	-	-	Peak
254.1	22.32	-23.68	46	39.45	12.73	1.55	31.41	-	-	Peak
352.5	19.85	-26.15	46	34.05	15.09	1.99	31.28	-	-	Peak
565.3	20.38	-25.62	46	29.52	19.23	2.59	30.96	-	-	Peak
780.2	24.4	-21.6	46	29.83	22.15	3.11	30.69	-	-	Peak
2390	45.74	-28.26	74	41.5	32.06	6.03	33.85	172	43	Peak
2390	33.74	-20.26	54	29.5	32.06	6.03	33.85	172	43	Average
2462	97.24	-	-	92.84	32.15	6.14	33.89	172	43	Average
2462	100.86	-	-	96.46	32.15	6.14	33.89	172	43	Peak
2486.7	47.7	-26.3	74	43.24	32.18	6.18	33.9	172	43	Peak
2486.7	37.03	-16.97	54	32.57	32.18	6.18	33.9	172	43	Average

Test Mode :	Mode 3	Temperature :	22~25°C
Test Channel :	11	Relative Humidity :	49~51%
Test Engineer :	Ivan Chiang and David Yang	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.89	24.62	-15.38	40	39.49	16.04	0.55	31.46	122	100	Peak
69.42	22.06	-17.94	40	46.49	6.29	0.84	31.56	-	-	Peak
241.14	25.66	-20.34	46	43.5	12.05	1.53	31.42	-	-	Peak
315.4	19.85	-26.15	46	35.43	13.94	1.8	31.32	-	-	Peak
528.9	21.15	-24.85	46	31	18.66	2.51	31.02	-	-	Peak
780.2	23.46	-22.54	46	28.89	22.15	3.11	30.69	-	-	Peak
2380	46.34	-27.66	74	42.13	32.03	6.03	33.85	145	319	Peak
2380	33.72	-20.28	54	29.51	32.03	6.03	33.85	145	319	Average
2462	99.76	-	-	95.36	32.15	6.14	33.89	145	319	Average
2462	103.51	-	-	99.11	32.15	6.14	33.89	145	319	Peak
2486.7	48.88	-25.12	74	44.42	32.18	6.18	33.9	145	319	Peak
2486.7	39.05	-14.95	54	34.59	32.18	6.18	33.9	145	319	Average



Test Mode :	Mode 4	Temperature :	22~25°C
Test Channel :	01	Relative Humidity :	49~51%
Test Engineer :	Ivan Chiang and David Yang	Polarization :	Horizontal
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
32.7	20.29	-19.71	40	35.4	15.8	0.56	31.47	142	195	Peak
132.33	14.52	-28.98	43.5	33.35	11.58	1.16	31.57	-	-	Peak
236.82	20.46	-25.54	46	38.67	11.71	1.51	31.43	-	-	Peak
316.1	19.29	-26.71	46	34.84	13.97	1.8	31.32	-	-	Peak
547.8	19.84	-26.16	46	29.31	18.96	2.55	30.98	-	-	Peak
780.2	24.31	-21.69	46	29.74	22.15	3.11	30.69	-	-	Peak
2389.99	62.41	-11.59	74	58.17	32.06	6.03	33.85	138	24	Peak
2389.99	39.78	-14.22	54	35.54	32.06	6.03	33.85	138	24	Average
2412	102.89	-	-	98.59	32.1	6.07	33.87	138	24	Peak
2412	92.43	-	-	88.15	32.08	6.07	33.87	138	24	Average
2500	32.93	-21.07	54	28.45	32.2	6.18	33.9	138	24	Average
2500	44.78	-29.22	74	40.3	32.2	6.18	33.9	138	24	Peak

Test Mode :	Mode 4	Temperature :	22~25°C
Test Channel :	01	Relative Humidity :	49~51%
Test Engineer :	Ivan Chiang and David Yang	Polarization :	Vertical
Remark :	2412 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.62	23.3	-16.7	40	38.17	16.04	0.55	31.46	-	-	Peak
67.53	23.74	-16.26	40	48.3	6.17	0.82	31.55	-	-	Peak
223.05	31.92	-14.08	46	51.18	10.75	1.44	31.45	122	103	Peak
337.8	20.65	-25.35	46	35.44	14.63	1.88	31.3	-	-	Peak
520.5	20.4	-25.6	46	30.4	18.54	2.49	31.03	-	-	Peak
778.1	24.24	-21.76	46	29.71	22.12	3.1	30.69	-	-	Peak
2389.99	62.35	-11.65	74	58.11	32.06	6.03	33.85	146	331	Peak
2389.99	40.98	-13.02	54	36.74	32.06	6.03	33.85	146	331	Average
2412	106.66	-	-	102.38	32.08	6.07	33.87	146	331	Peak
2412	96.06	-	-	91.78	32.08	6.07	33.87	146	331	Average
2484	33.02	-20.98	54	28.56	32.18	6.18	33.9	146	331	Average
2484	45.18	-28.82	74	40.72	32.18	6.18	33.9	146	331	Peak

Test Mode :	Mode 5	Temperature :	22~25°C
Test Channel :	06	Relative Humidity :	49~51%
Test Engineer :	Ivan Chiang and David Yang	Polarization :	Horizontal
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.89	19.21	-20.79	40	34.08	16.04	0.55	31.46	124	182	Peak
232.5	23.2	-22.8	46	41.7	11.43	1.5	31.43	-	-	Peak
285.69	21.82	-24.18	46	38.24	13.24	1.67	31.33	-	-	Peak
300	17.81	-28.19	46	33.91	13.46	1.77	31.33	-	-	Peak
545.7	20.05	-25.95	46	29.57	18.93	2.54	30.99	-	-	Peak
803.3	24.74	-21.26	46	29.77	22.5	3.15	30.68	-	-	Peak
2388	46.08	-27.92	74	41.84	32.06	6.03	33.85	114	29	Peak
2388	34.07	-19.93	54	29.83	32.06	6.03	33.85	114	29	Average
2437	102.9	-	-	98.57	32.1	6.11	33.88	114	29	Peak
2437	92.41	-	-	88.05	32.13	6.11	33.88	114	29	Average
2492	44.81	-29.19	74	40.33	32.2	6.18	33.9	114	29	Peak
2492	33.08	-20.92	54	28.6	32.2	6.18	33.9	114	29	Average

Test Mode :	Mode 5	Temperature :	22~25°C
Test Channel :	06	Relative Humidity :	49~51%
Test Engineer :	Ivan Chiang and David Yang	Polarization :	Vertical
Remark :	2437 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
48.09	33.06	-6.94	40	54.82	9.08	0.68	31.52	100	332	Peak
68.34	24.64	-15.36	40	49.13	6.23	0.83	31.55	-	-	Peak
128.01	19.78	-23.72	43.5	38.64	11.57	1.14	31.57	-	-	Peak
304.2	22.77	-23.23	46	38.71	13.61	1.78	31.33	-	-	Peak
450.5	19.59	-26.41	46	30.98	17.41	2.3	31.1	-	-	Peak
785.8	23.74	-22.26	46	29.07	22.24	3.12	30.69	-	-	Peak
2390	48.8	-25.2	74	44.56	32.06	6.03	33.85	121	309	Peak
2390	35.06	-18.94	54	30.82	32.06	6.03	33.85	121	309	Average
2437	105.23	-	-	100.9	32.1	6.11	33.88	121	309	Peak
2437	94.55	-	-	90.19	32.13	6.11	33.88	121	309	Average
2484	45.75	-28.25	74	41.29	32.18	6.18	33.9	121	309	Peak
2484	33.5	-20.5	54	29.04	32.18	6.18	33.9	121	309	Average



Test Mode :	Mode 6	Temperature :	22~25°C
Test Channel :	11	Relative Humidity :	49~51%
Test Engineer :	Ivan Chiang and David Yang	Polarization :	Horizontal
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.89	31.56	-8.44	40	46.43	16.04	0.55	31.46	152	164	Peak
101.82	28.75	-14.75	43.5	49.33	9.96	1	31.54	-	-	Peak
126.66	34.88	-8.62	43.5	53.75	11.57	1.13	31.57	-	-	Peak
377	19.3	-26.7	46	32.58	15.87	2.09	31.24	-	-	Peak
572.3	20.85	-25.15	46	29.85	19.34	2.61	30.95	-	-	Peak
797.7	25.89	-20.11	46	31.01	22.42	3.14	30.68	-	-	Peak
2374	45.36	-28.64	74	41.18	32.03	5.99	33.84	113	32	Peak
2374	33.33	-20.67	54	29.15	32.03	5.99	33.84	113	32	Average
2462	91.72	-	-	87.32	32.15	6.14	33.89	113	32	Average
2462	102.22	-	-	97.82	32.15	6.14	33.89	113	32	Peak
2483.5	64.78	-9.22	74	60.32	32.18	6.18	33.9	113	32	Peak
2483.5	39.33	-14.67	54	34.87	32.18	6.18	33.9	113	32	Average

Test Mode :	Mode 6	Temperature :	22~25°C
Test Channel :	11	Relative Humidity :	49~51%
Test Engineer :	Ivan Chiang and David Yang	Polarization :	Vertical
Remark :	2462 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.54	22.34	-17.66	40	36.99	16.27	0.54	31.46	112	78	Peak
47.01	21.31	-18.69	40	42.68	9.48	0.67	31.52	-	-	Peak
92.37	23.49	-20.01	43.5	45.15	8.9	0.96	31.52	-	-	Peak
422.5	18.4	-27.6	46	30.38	16.95	2.22	31.15	-	-	Peak
638.1	21.93	-24.07	46	29.82	20.19	2.8	30.88	-	-	Peak
794.2	24.95	-21.05	46	30.12	22.38	3.13	30.68	-	-	Peak
2350	45.47	-28.53	74	41.37	31.98	5.95	33.83	166	343	Peak
2350	32.9	-21.1	54	28.8	31.98	5.95	33.83	166	343	Average
2462	94.31	-	-	89.91	32.15	6.14	33.89	166	343	Average
2462	104.65	-	-	100.25	32.15	6.14	33.89	166	343	Peak
2483.5	65.7	-8.3	74	61.24	32.18	6.18	33.9	166	343	Peak
2483.5	41.29	-12.71	54	36.83	32.18	6.18	33.9	166	343	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 IFA Antenna without connector and it is considered to meet antenna requirement.

3.8.3 Antenna Gain

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

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 13, 2011	Jun. 12, 2012	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 13, 2010	Sep. 12, 2011	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 14, 2010	Sep. 13, 2011	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCI 7	100724	9kHz~7GHz	Aug. 22, 2011	Aug. 21, 2012	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-1000W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
System Simulator	R&S	CMU200	117591	N/A	Oct. 18, 2010	Oct. 17, 2011	Conduction (CO05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 30, 2010	Oct. 29, 2011	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP30	101067	9KHz ~ 30GHz	Dec. 03, 2010	Dec. 02, 2011	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 10, 2011	Aug. 09, 2012	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec. 06, 2010	Dec. 05, 2011	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32 dB.GAIN	Mar. 29, 2011	Mar. 28, 2012	Radiation (03CH07-HY)
EMI TEST RECEIVER	R&S	ESCI 7	100724	9kHz~7GHz	Aug. 22, 2011	Aug. 21, 2012	Radiation (03CH07-HY)
Pre Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	159088	1GHz ~ 18GHz	Feb. 21, 2011	Feb. 20, 2012	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				