

FCC RF Test Report

APPLICANT : NEC CASIO Mobile Communications, Ltd.
EQUIPMENT : Smart Phone
BRAND NAME : NEC CASIO Mobile Communications, Ltd.
MODEL NAME : NE-103T
MARKETING NAME : Dragon
FCC ID : A98-JDM2910
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on May 22, 2012 and completely tested on Jun. 02, 2012. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.

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

Reviewed by:



Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

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



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR252201B	Rev. 01	Initial issue of report	Jun. 13, 2012

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 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 16.30 dB at 0.398 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.10 dB at 2390.000 MHz
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

NEC CASIO Mobile Communications, Ltd.

28Fl., Tamagawa Renaissance City Tower N, 1753 Shimonumabe, Nakahara-ku, Kawasaki,
Kanagawa 211-8666 Japan

1.2 Manufacturer

Arima Communications Corp.

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

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Smart Phone
Brand Name	NEC CASIO Mobile Communications, Ltd.
Model Name	NE-103T
Marketing Name	Dragon
FCC ID	A98-JDM2910
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Number of Channels	11
Carrier Frequency of Each Channel	2412+(n-1)*5 MHz; n=1~11
Channel Spacing	5 MHz
Maximum Output Power to Antenna	802.11b : 19.36 dBm (0.0863 W) 802.11g : 22.98 dBm (0.1986 W) 802.11g/n (BW 20MHz) : 21.78 dBm (0.1507 W)
Duty Cycle	802.11b : 100.00% 802.11g : 87.86% 802.11g/n (BW 20MHz) : 88.65%
Antenna Type	PIFA Antenna with gain 1.78 dBi
HW Version	EP1-2
SW Version	001.01.03.0.00.00
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Production Unit

Remark: 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	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 D01 DTS Meas. Guidance DR01
- ♦ ANSI C63.4-2003
- ♦ IC RSS-210 Issue 8
- ♦ IC RSS-Gen Issue 3

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, 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	Latitude E6320	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Sony Ericsson	MW600	PY70DA2029	N/A	N/A

2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency Channel

There are two bandwidth systems for 2.4GHz.

For 20MHz bandwidth systems, use Channel 1~11.

For 40MHz bandwidth systems, use Channel 3~9.

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437		

2.2 Pre-Scanned RF Power

Preliminary tests were performed in different data rate as below table and the highest power data rates (11b, 11g, and 11g/n (BW 20MHz) modes) were chosen for full test in the following sections to demonstrate compliance to the FCC limit line.

2.4GHz 802.11b mode				
Data Rate (MHz)	1M bps	2M bps	5.5M bps	11M bps
Peak Power (dBm)	19.36	19.33	19.34	19.33

2.4GHz 802.11g mode								
Data Rate (MHz)	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
Peak Power (dBm)	21.77	21.58	21.71	21.94	22.44	22.76	22.88	22.98

2.4GHz 802.11g/n (BW 20MHz) mode								
Data Rate (MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Peak Power (dBm)	20.35	19.93	20.04	20.16	20.02	20.21	21.78	20.33

2.3 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).

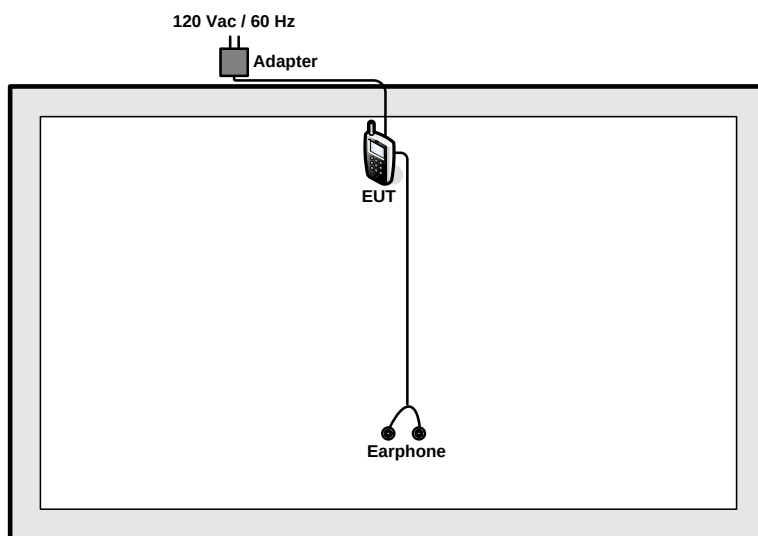
Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations, laptop / tablet modes.

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

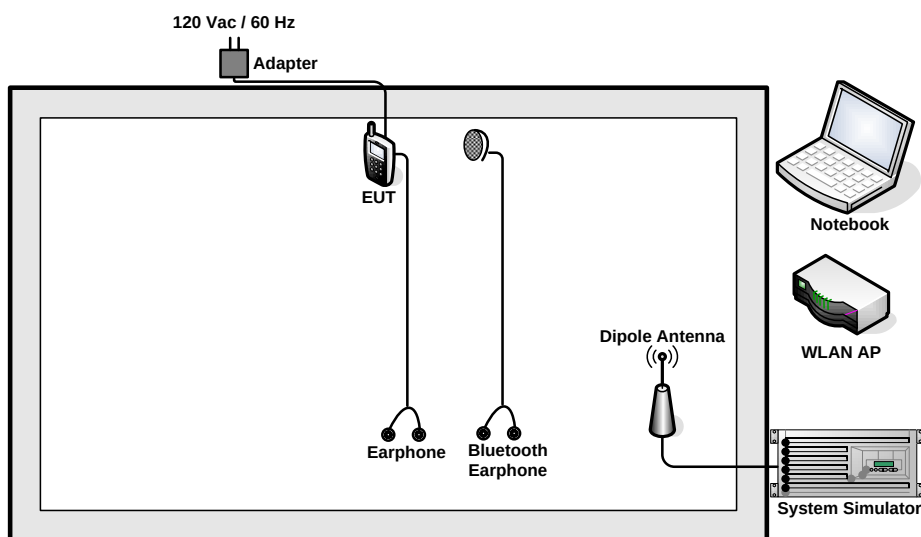
Test Cases				
Test Item	802.11b (Modulation : DSSS) 802.11g/n (Modulation : OFDM)			
Conducted TCs	Test Mode	802.11b	802.11g	802.11g/n (BW 20MHz)
	CH01	1	4	7
	CH06	2	5	8
	CH11	3	6	9
Radiated TCs	Test Mode	802.11b	802.11g	802.11g/n (BW 20MHz)
	CH01	1	4	7
	CH06	2	5	8
	CH11	3	6	9
AC Conducted Emission	Mode 1 : WCDMA Band V Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone + Battery + USB Cable (Charging from Adapter) + SIM2			

2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.5 RF Utility

The programmed RF utility "adb tool" is installed in notebook 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.

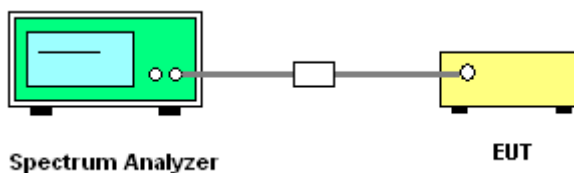
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance DR01.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable. The path loss was compensated to the results for each measurement.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 1-5% of the emission bandwidth (EBW). Set the Video bandwidth (VBW) $\geq 3 * RBW$. In order to make an accurate measurement. 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

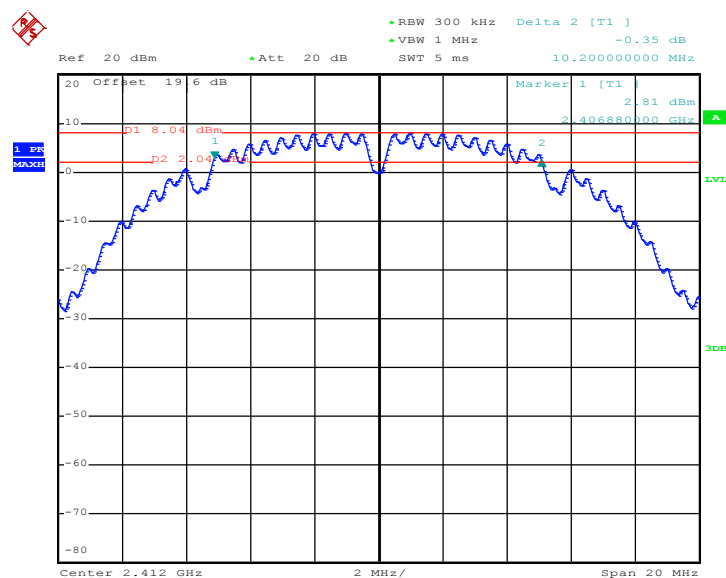


3.1.5 Test Result of 6dB Bandwidth

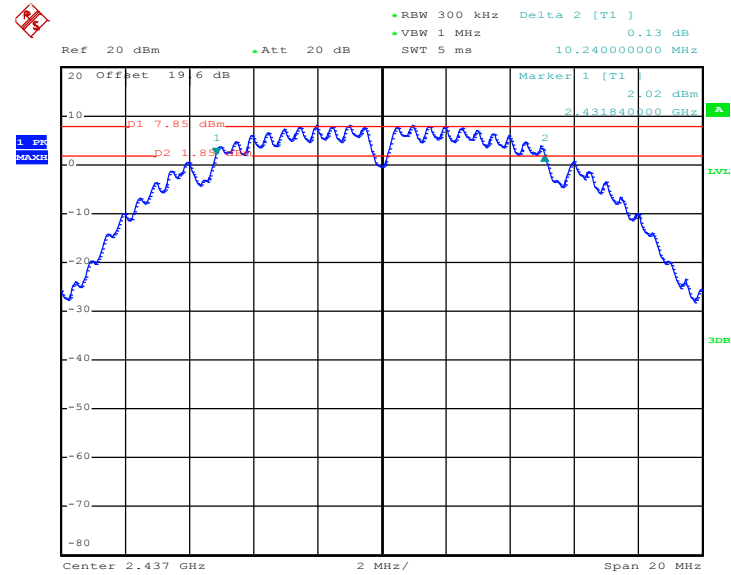
Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	10.20	0.5	Pass
06	2437	10.24	0.5	Pass
11	2462	10.24	0.5	Pass

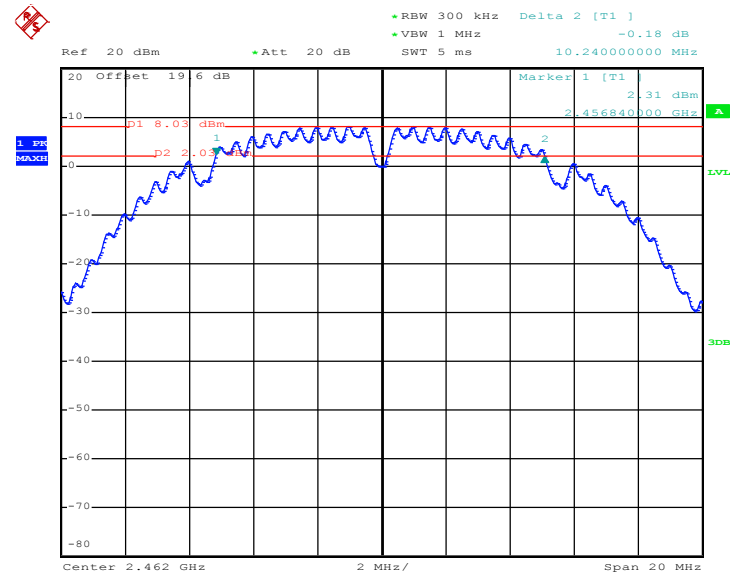
Mode 1 : 6 dB Bandwidth Plot on 802.11b Channel 01



Date: 30.MAY.2012 09:27:02

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


Date: 30.MAY.2012 09:33:52

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


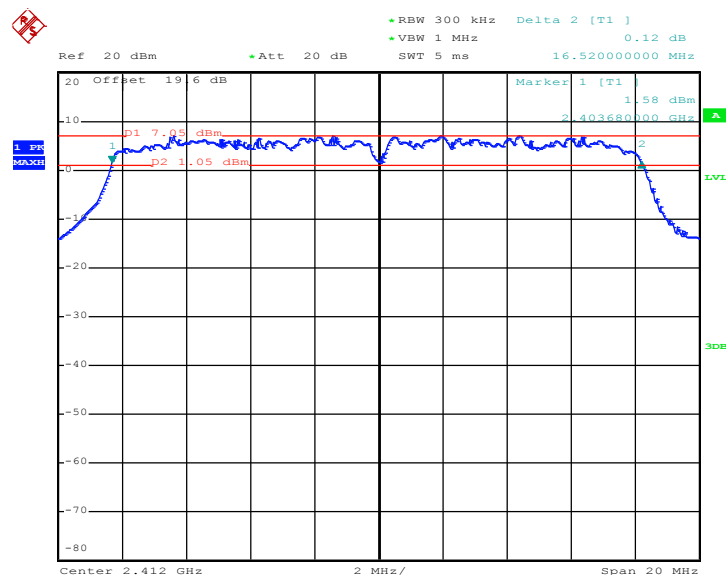
Date: 30.MAY.2012 09:37:00



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	16.52	0.5	Pass
06	2437	16.52	0.5	Pass
11	2462	16.48	0.5	Pass

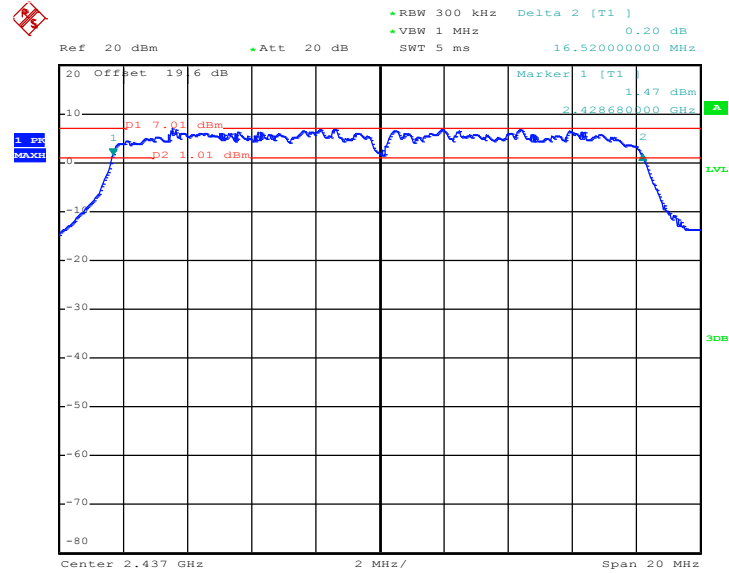
Mode 4 : 6 dB Bandwidth Plot on 802.11g Channel 01



Date: 30.MAY.2012 09:56:33

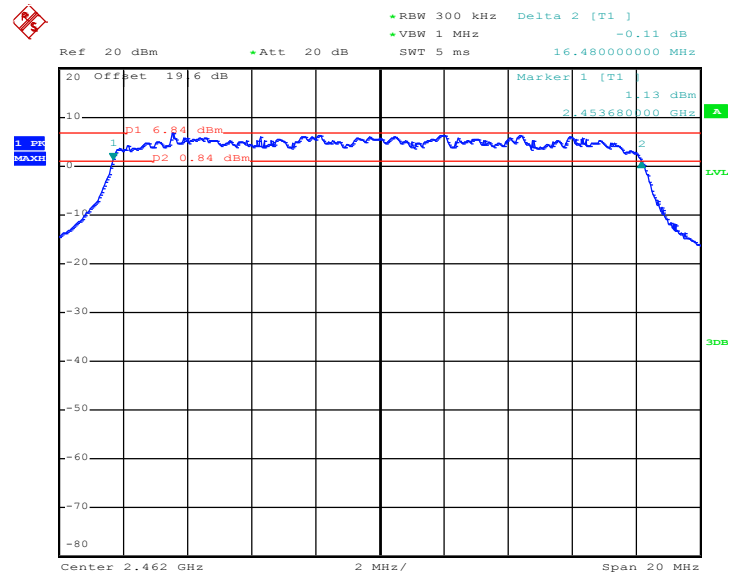


Mode 5 : 6 dB Bandwidth Plot on 802.11g Channel 06



Date: 30.MAY.2012 09:51:05

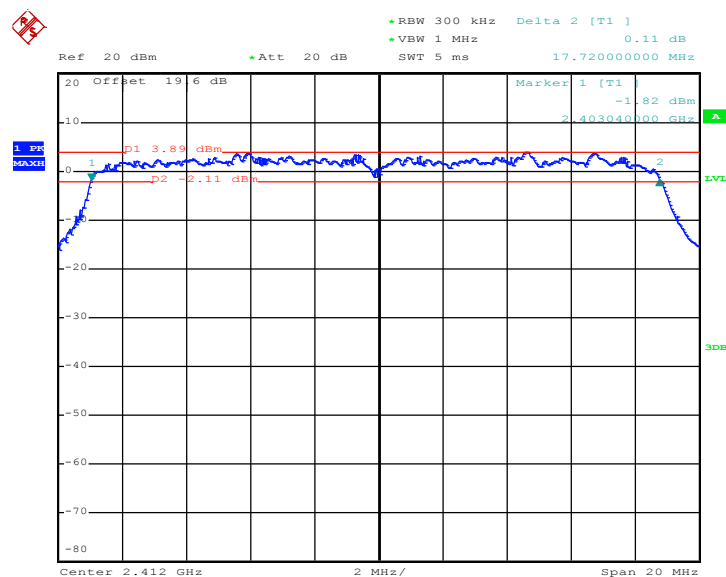
Mode 6 : 6 dB Bandwidth Plot on 802.11g Channel 11



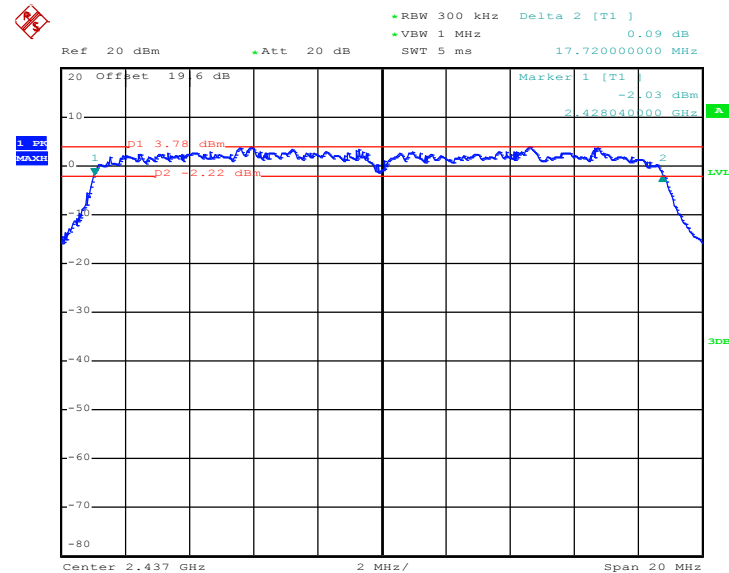
Date: 30.MAY.2012 09:43:02

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

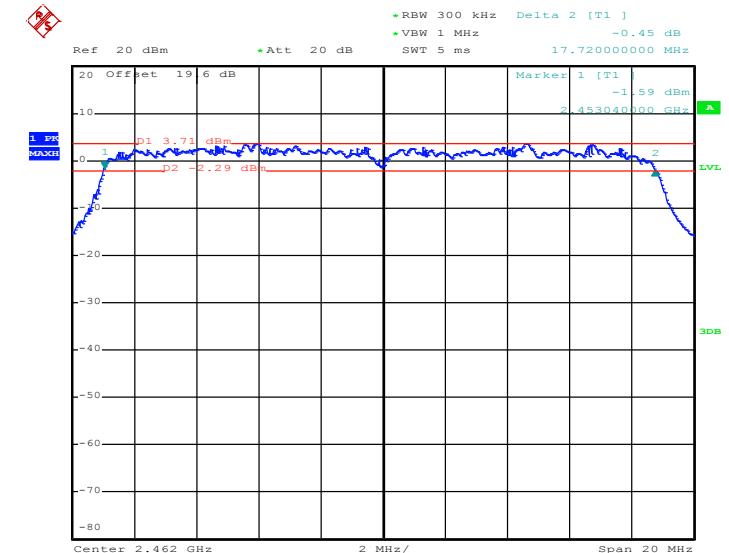
Channel	Frequency (MHz)	802.11g/n (BW 20MHz) 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	17.72	0.5	Pass
06	2437	17.72	0.5	Pass
11	2462	17.72	0.5	Pass

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


Date: 30.MAY.2012 10:08:00

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


Date: 30.MAY.2012 10:17:32

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


Date: 30.MAY.2012 10:20:20

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.

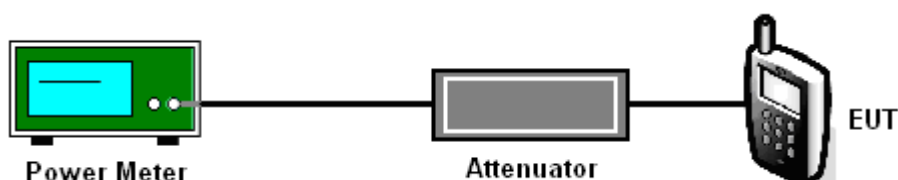
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure 7.2.1.3 Option 3(peak power meter method) of FCC KDB No. 558074 DTS Meas. Guidance DR01.
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 Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	19.36	30	Pass
06	2437	19.34	30	Pass
11	2462	19.27	30	Pass

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

Channel	Frequency (MHz)	802.11g Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	22.28	30	Pass
06	2437	22.69	30	Pass
11	2462	22.98	30	Pass

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

Channel	Frequency (MHz)	802.11g/n (BW 20MHz) Peak Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	21.78	30	Pass
06	2437	21.20	30	Pass
11	2462	21.57	30	Pass

3.3 Band Edges Measurement

3.3.1 Limit of Band Edges

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

3.3.2 Measuring Instruments

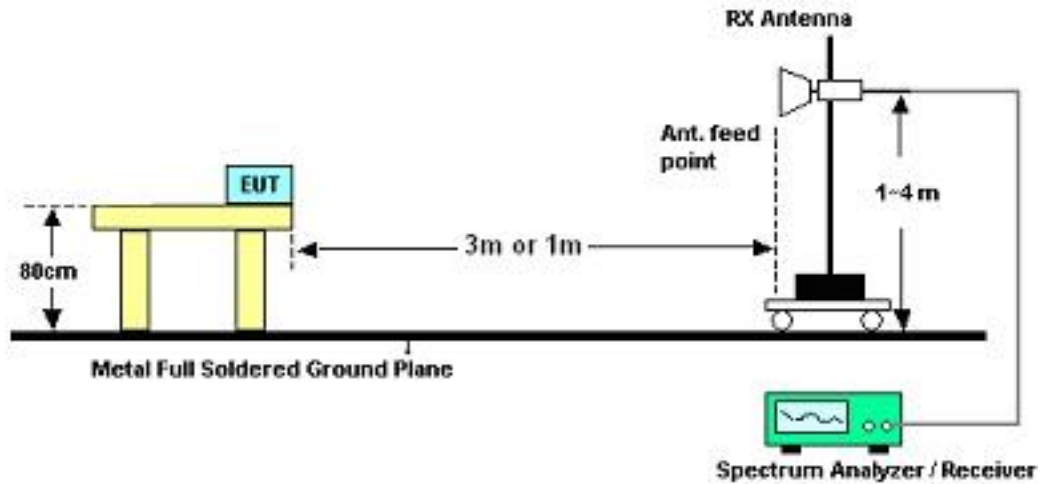
See list of measuring instruments of this test report.

3.3.3 Test Procedures

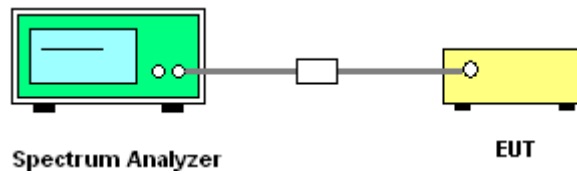
1. The testing follows the guidelines in ANSI C63.4-2003 and the Measurement Procedure of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance DR01.
2. Conducted emission test: Set RBW = 100 KHz, Video bandwidth (VBW) $\geq$ RBW. Out of the authorized frequency band emissions must be at least 20 dB lower than the highest emission level within the authorized band as measured with a 100 KHz RBW. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
3. Radiated emission test: Apply to band edge emissions that falling on 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 measurement above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep=Auto. If the emission is pulsed, then modify the unit for continuous operation. Use the settings in this paragraph to correct the reading level by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation per 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 :	20~22℃
Test Band :	802.11b	Relative Humidity :	40~42%
Test Channel :	01	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2386.14	57.59	-16.41	74	56.87	32.02	4.58	35.88	101	345	Peak
2386.14	50.65	-3.35	54	49.93	32.02	4.58	35.88	101	345	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2386.23	55.45	-18.55	74	54.73	32.02	4.58	35.88	101	358	Peak
2386.23	47.76	-6.24	54	47.04	32.02	4.58	35.88	101	358	Average

Test Mode :	Mode 3	Temperature :	20~22℃
Test Band :	802.11b	Relative Humidity :	40~42%
Test Channel :	11	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.76	55.74	-18.26	74	54.82	32.09	4.64	35.81	100	340	Peak
2483.76	45.59	-8.41	54	44.67	32.09	4.64	35.81	100	340	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2487.54	52.84	-21.16	74	51.91	32.1	4.64	35.81	100	352	Peak
2487.54	42.95	-11.05	54	42.02	32.1	4.64	35.81	100	352	Average



Test Mode :	Mode 4	Temperature :	20~22℃
Test Band :	802.11g	Relative Humidity :	40~42%
Test Channel :	01	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	72.85	-1.15	74	72.11	32.02	4.58	35.86	100	340	Peak
2390	53.9	-0.1	54	53.16	32.02	4.58	35.86	100	340	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	70.66	-3.34	74	69.92	32.02	4.58	35.86	101	349	Peak
2390	52.24	-1.76	54	51.5	32.02	4.58	35.86	101	349	Average

Test Mode :	Mode 6	Temperature :	20~22℃
Test Band :	802.11g	Relative Humidity :	40~42%
Test Channel :	11	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.62	73.42	-0.58	74	72.5	32.09	4.64	35.81	100	335	Peak
2483.62	51.83	-2.17	54	50.91	32.09	4.64	35.81	100	335	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.54	69.45	-4.55	74	68.53	32.09	4.64	35.81	100	344	Peak
2483.54	48.15	-5.85	54	47.23	32.09	4.64	35.81	100	344	Average



Test Mode :	Mode 7	Temperature :	20~22℃
Test Band :	802.11g/n (BW 20MHz)	Relative Humidity :	40~42%
Test Channel :	01	Test Engineer :	David Ke

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.83	70.04	-3.96	74	69.3	32.02	4.58	35.86	101	342	Peak
2389.83	51.19	-2.81	54	50.45	32.02	4.58	35.86	101	342	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.02	67.6	-6.4	74	66.88	32.02	4.58	35.88	100	351	Peak
2389.02	49.01	-4.99	54	48.29	32.02	4.58	35.88	100	351	Average

Test Mode :	Mode 9	Temperature :	20~22℃
Test Band :	802.11g/n (BW 20MHz)	Relative Humidity :	40~42%
Test Channel :	11	Test Engineer :	David Ke

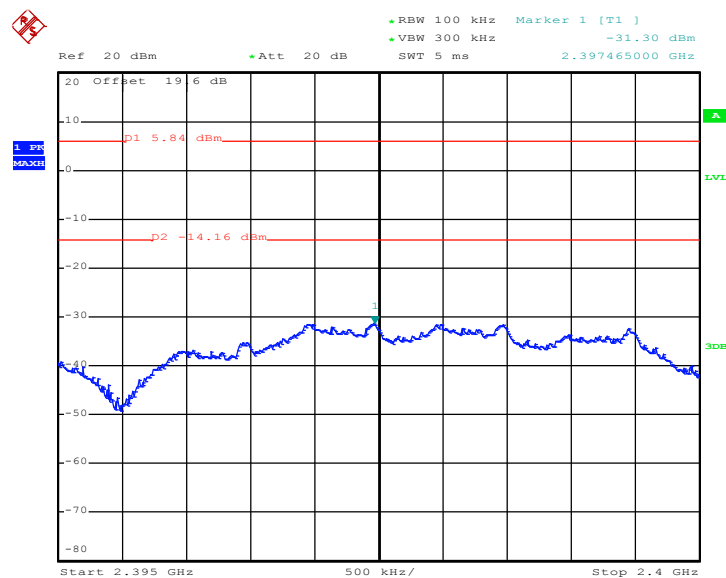
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.2	65.8	-8.2	74	64.88	32.09	4.64	35.81	100	337	Peak
2484.2	46.77	-7.23	54	45.85	32.09	4.64	35.81	100	337	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.48	63.3	-10.7	74	62.38	32.09	4.64	35.81	100	344	Peak
2484.48	43.86	-10.14	54	42.94	32.09	4.64	35.81	100	344	Average

3.3.6 Test Plots of Conducted Band Edges

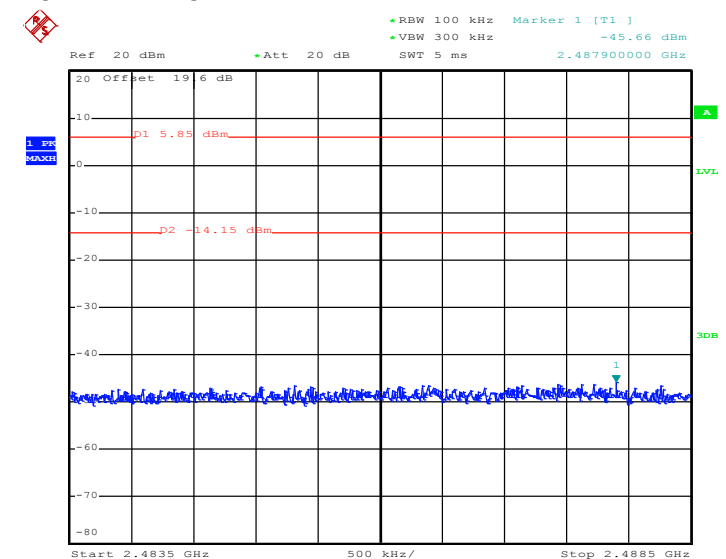
Test Mode :	Mode 1 and 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 802.11b Channel 01



Date: 30.MAY.2012 09:28:11

High Band Edge Plot on 802.11b Channel 11

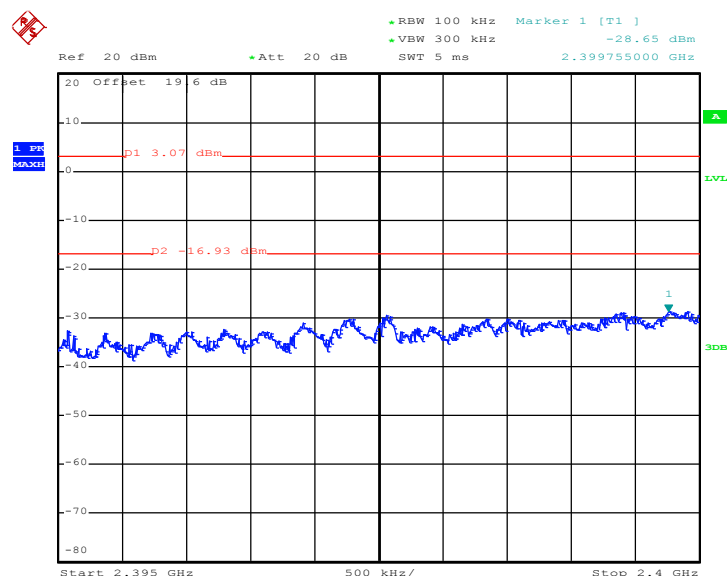


Date: 30.MAY.2012 09:37:50



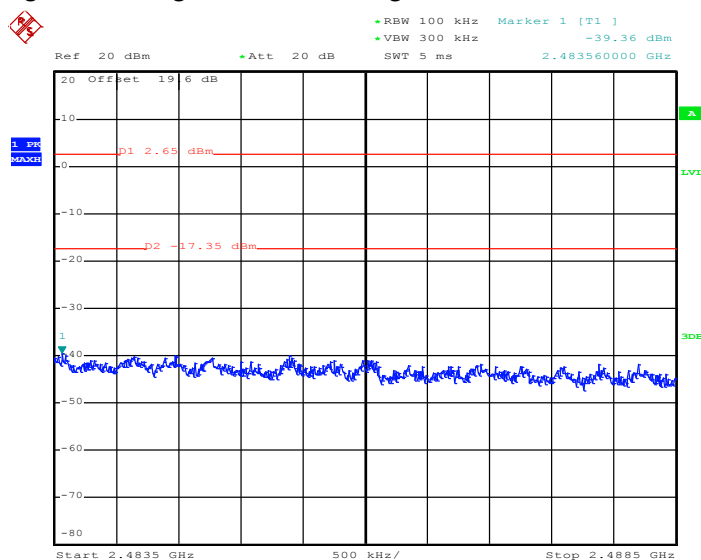
Test Mode :	Mode 4 and 6	Temperature :	24~26℃
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Pinkston Tu

Low Band Edge Plot on 802.11g Channel 01



Date: 30.MAY.2012 09:57:47

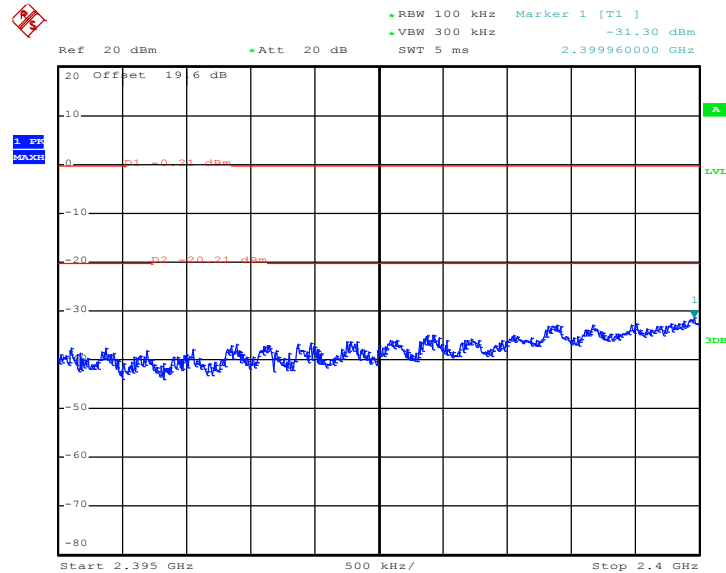
High Band Edge Plot on 802.11g Channel 11



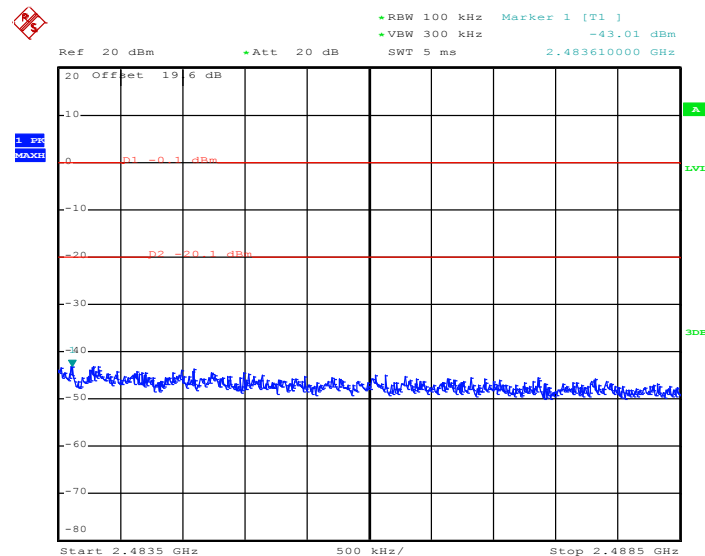
Date: 30.MAY.2012 09:44:20



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

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

Date: 30.MAY.2012 10:08:58

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

Date: 30.MAY.2012 10:21:08

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.

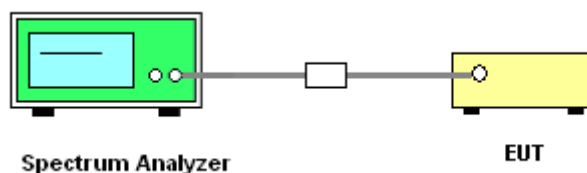
3.4.2 Measuring Instruments

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. The path loss was compensated to the results for each measurement.
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.

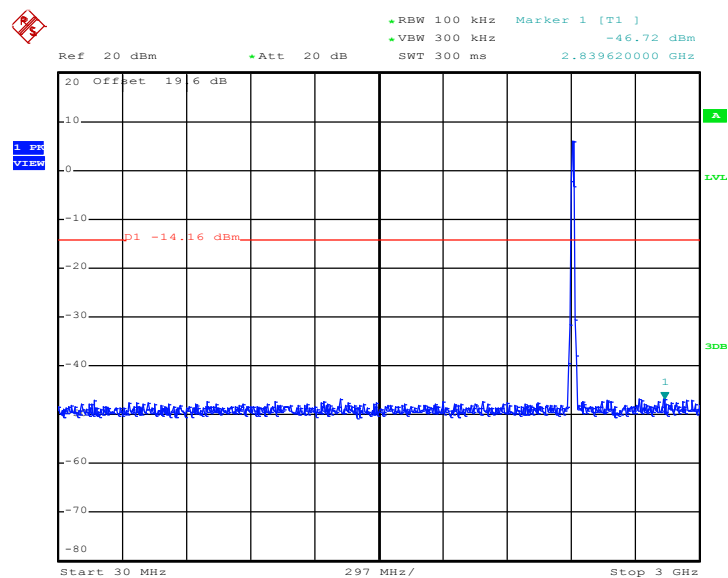
3.4.4 Test Setup



3.4.5 Test Plots of Spurious Emission

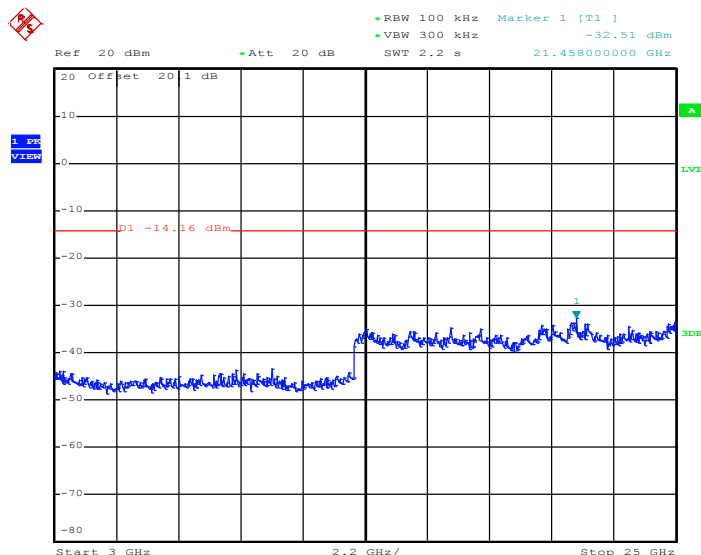
Test Mode :	Mode 1	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 30.MAY.2012 10:44:24

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

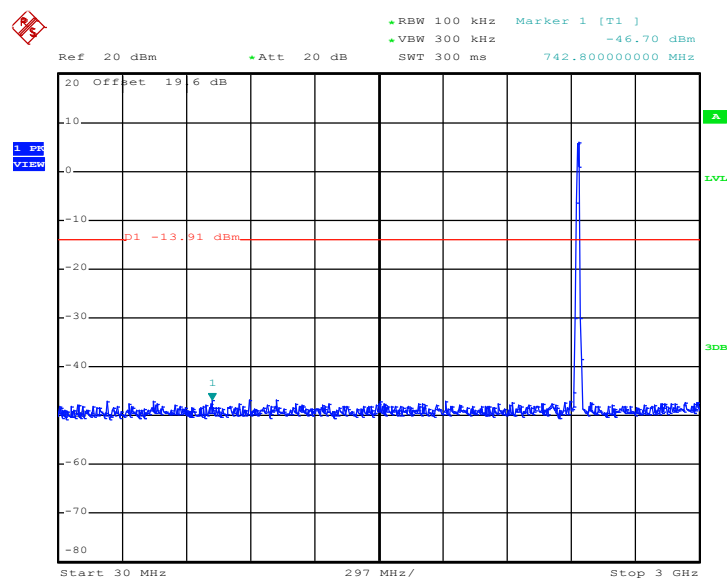


Date: 30.MAY.2012 10:44:42



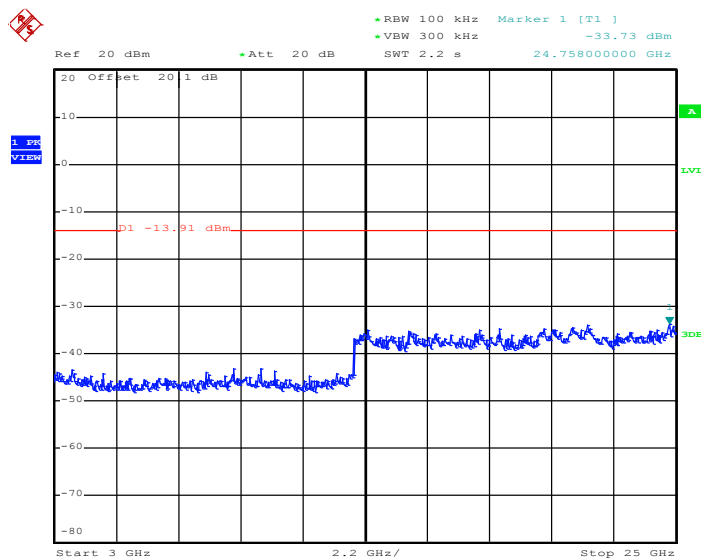
Test Mode :	Mode 2	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 30.MAY.2012 10:45:21

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

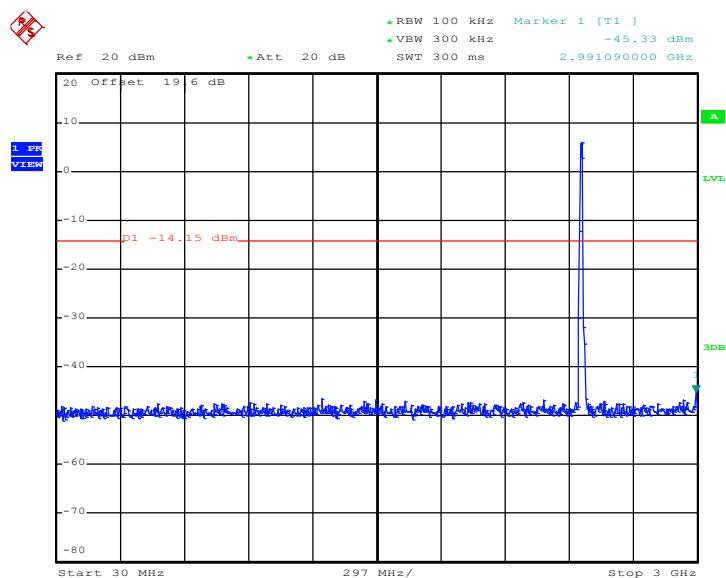


Date: 30.MAY.2012 10:45:38



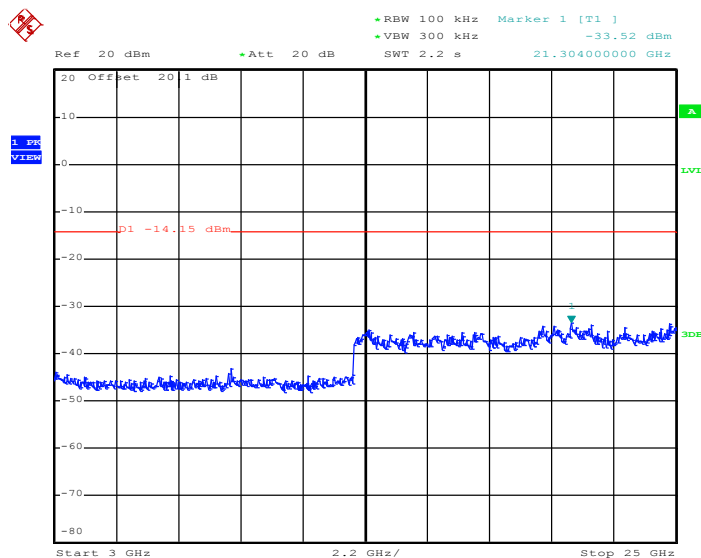
Test Mode :	Mode 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 30.MAY.2012 10:42:22

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

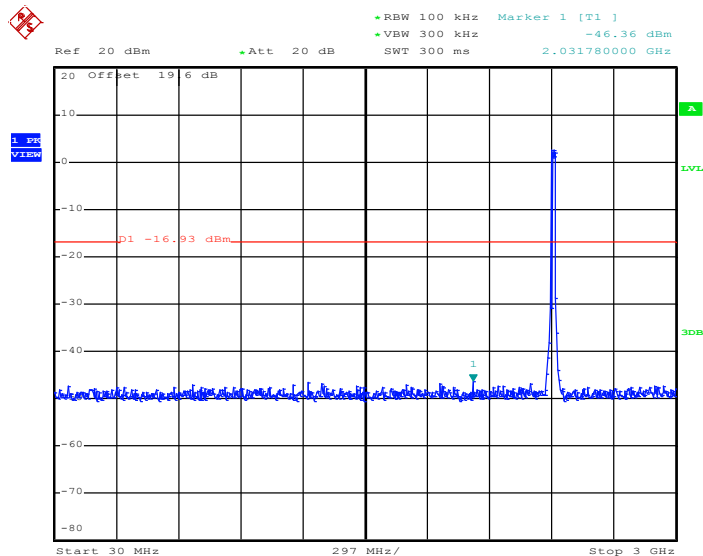


Date: 30.MAY.2012 10:42:40



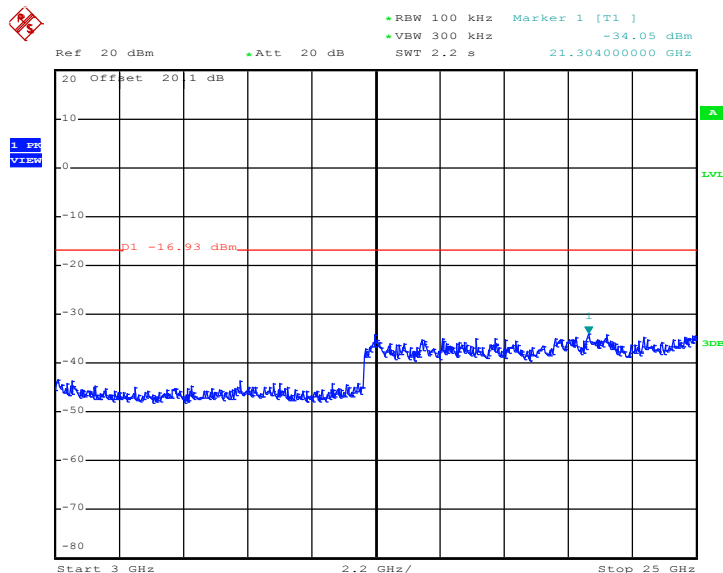
Test Mode :	Mode 4	Temperature :	24~26°C
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



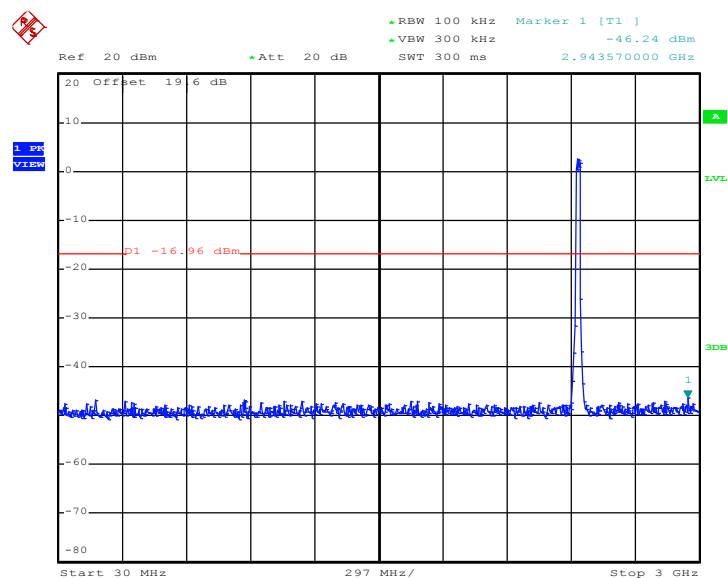
Date: 30.MAY.2012 10:34:50

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

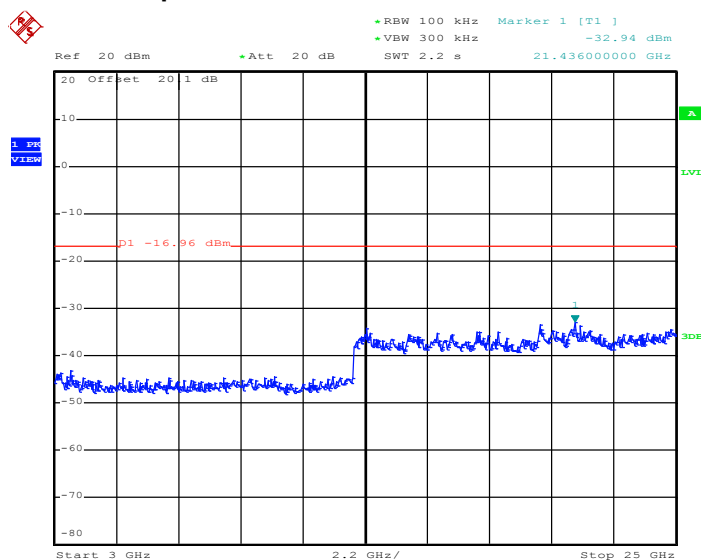


Date: 30.MAY.2012 10:35:08

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

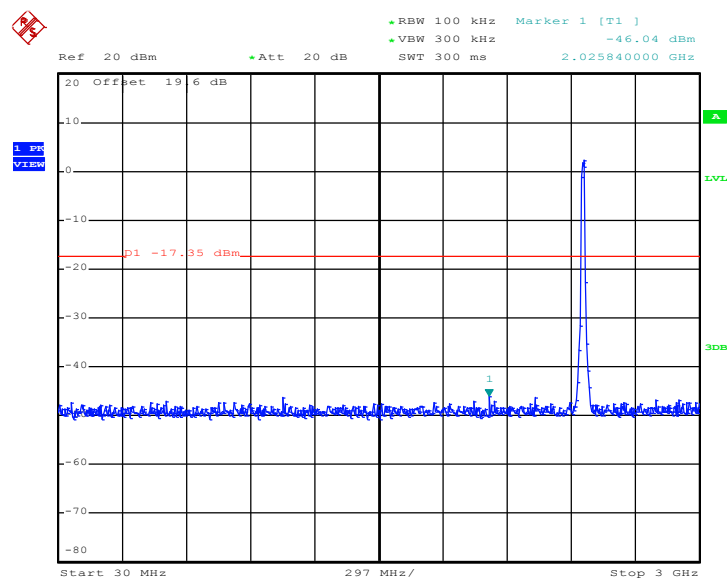
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 30.MAY.2012 10:35:55

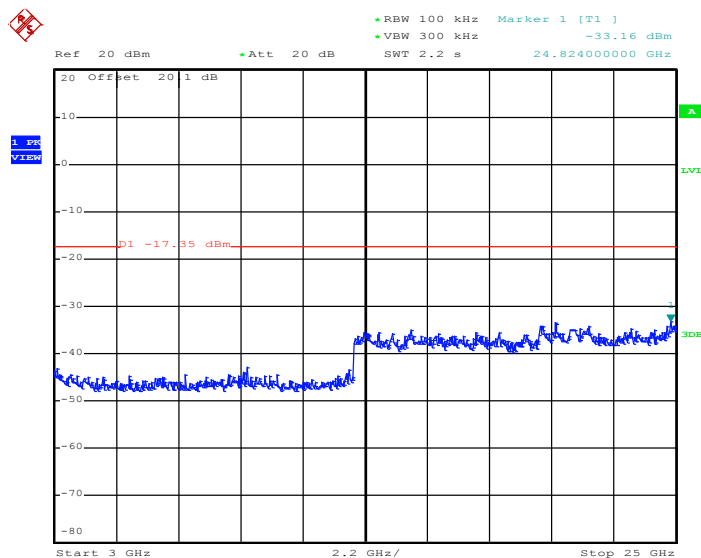
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 30.MAY.2012 10:36:12

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: 30.MAY.2012 10:36:41

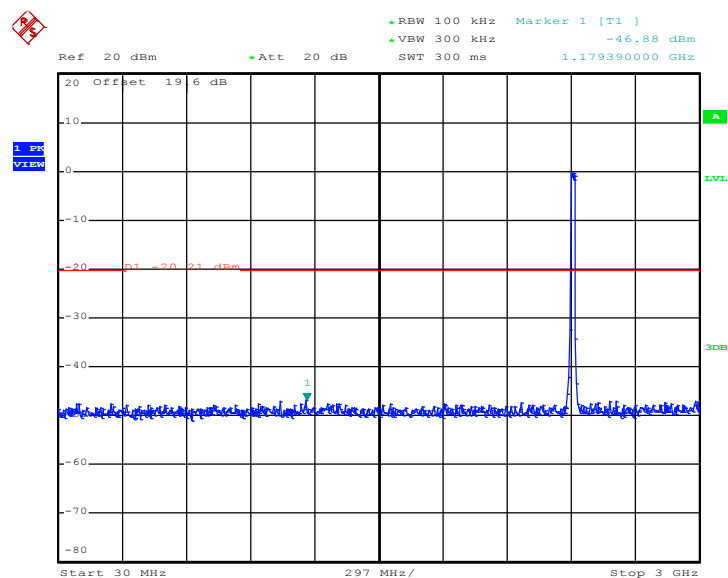
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 30.MAY.2012 10:36:58



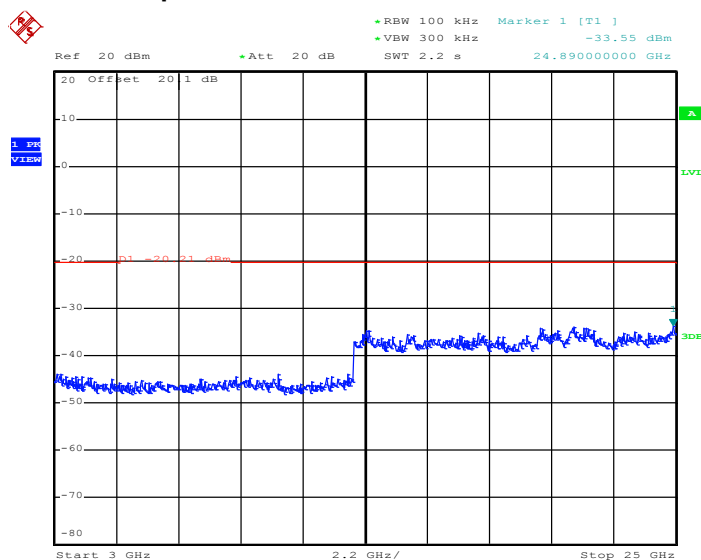
Test Mode :	Mode 7	Temperature :	24~26°C
Test Band :	802.11g/n (BW 20MHz)	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Pinkston Tu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



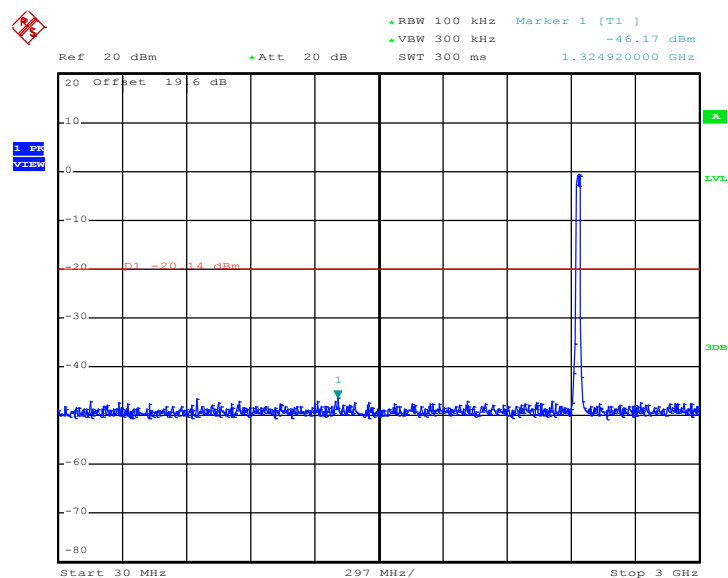
Date: 30.MAY.2012 10:29:49

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

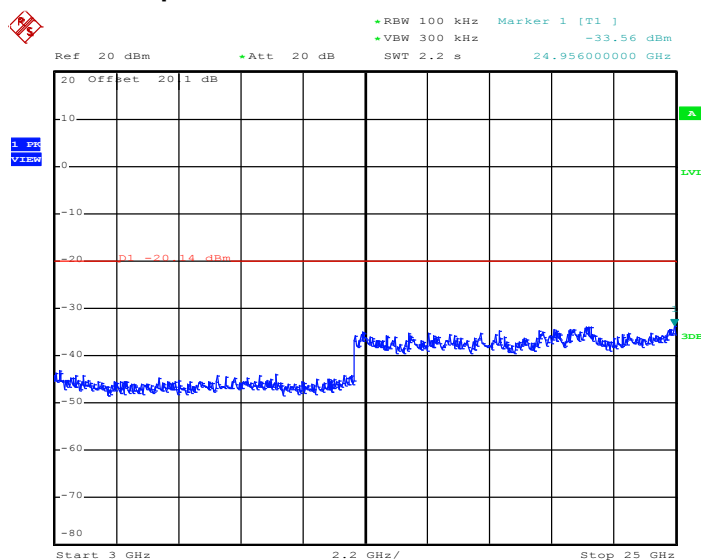


Date: 30.MAY.2012 10:30:06

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

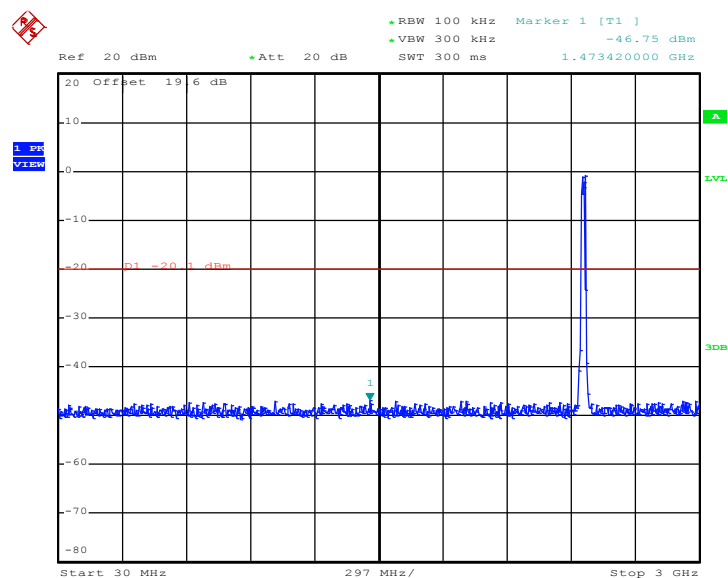
Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 30.MAY.2012 10:28:43

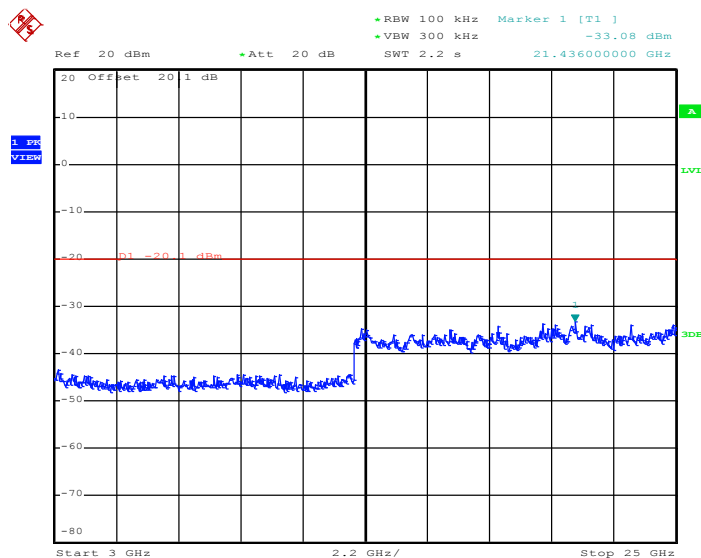
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 30.MAY.2012 10:29:00

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

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 30.MAY.2012 10:37:38

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 30.MAY.2012 10:37:55

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.

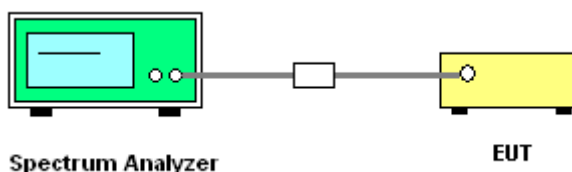
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The testing follows Measurement Procedure Option 1 (Peak PSD) of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance DR01.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable. The path loss was compensated to the results for each measurement.
3. Record the measurement data derived from spectrum analyzer.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 KHz. Video bandwidth (VBW) $\geq$ 300 KHz In order to make an accurate measurement, set the span to 5-30% greater than Emission Bandwidth (EBW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
6. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(3\text{ kHz}/100\text{ kHz} = -15.2\text{ dB})$.

3.5.4 Test Setup



3.5.5 Test Result of Power Spectral Density

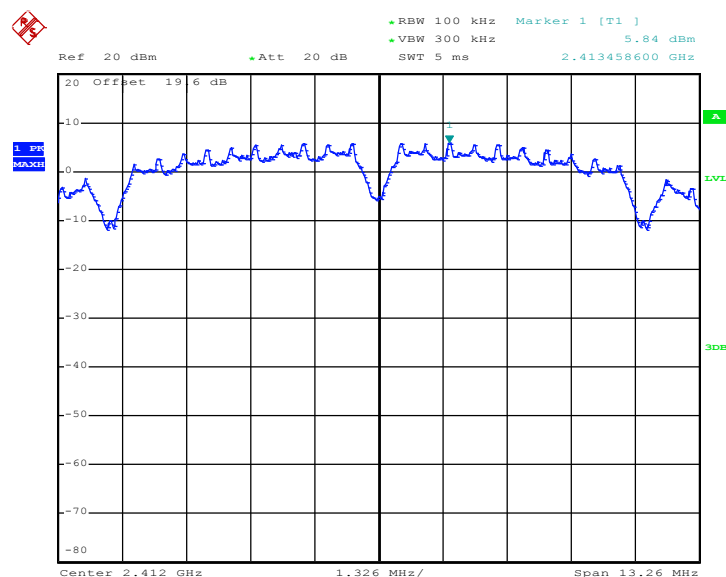
Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Pinkston Tu	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Power Density		Max. Limits (dBm)	Pass/Fail
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	5.84	-9.36	8	Pass
06	2437	6.09	-9.11	8	Pass
11	2462	5.85	-9.35	8	Pass

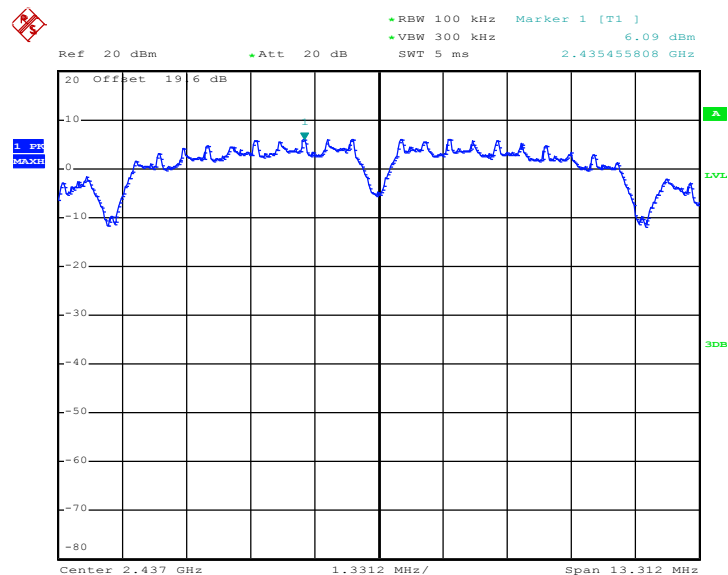
Note:

1. Measured power density (dBm) has offset with cable loss.
2. $BWCF (dB) = 10 \log (3k/100k) = -15.2 \text{ dB}$
3. $\text{Power Density/ 3kHz (dBm)} = \text{Measured power density/ 100KHz (dBm)} + BWCF (dB)$

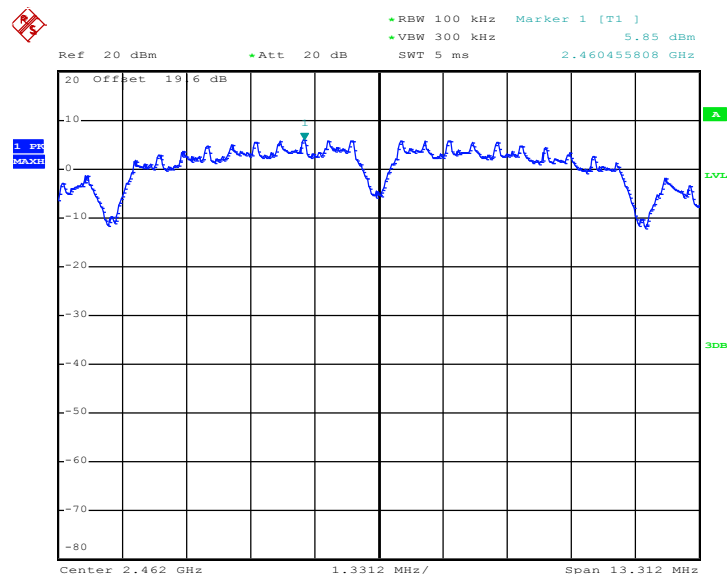
Mode 1 : PSD Plot on 802.11b Channel 01



Date: 30.MAY.2012 09:27:23

Mode 2 : PSD Plot on 802.11b Channel 06


Date: 30.MAY.2012 09:34:11

Mode 3 : PSD Plot on 802.11b Channel 11


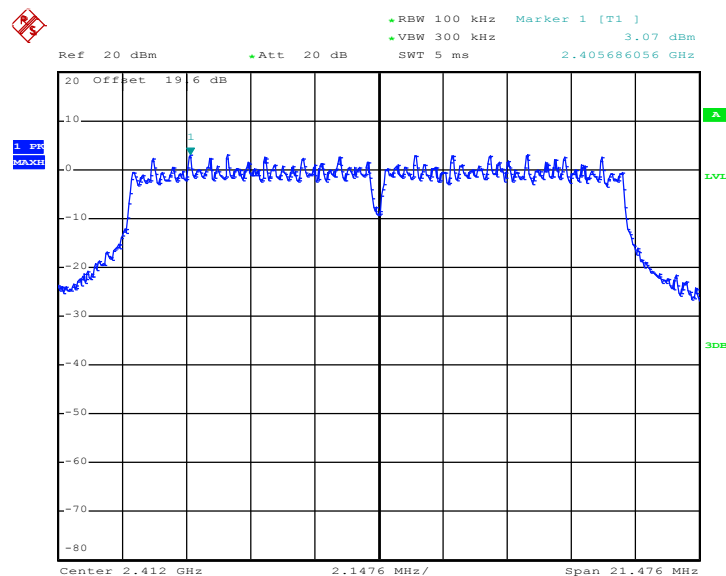
Date: 30.MAY.2012 09:37:19

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

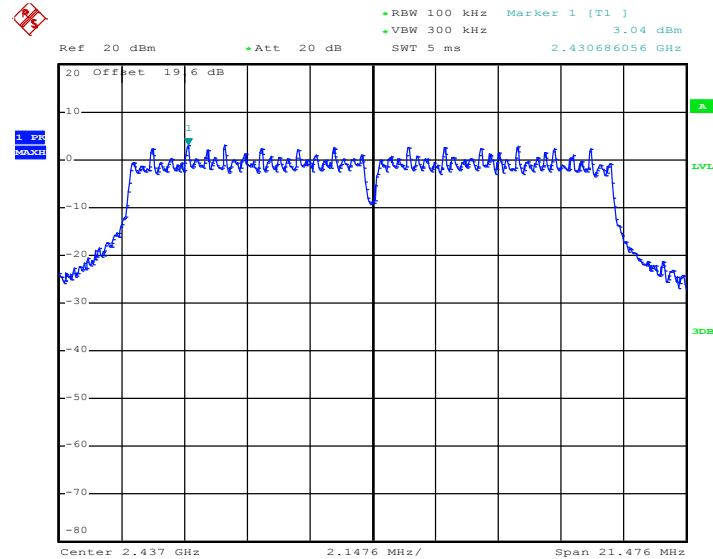
Channel	Frequency (MHz)	802.11g Power Density		Max. Limits (dBm)	Pass/Fail
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	3.07	-12.13	8	Pass
06	2437	3.04	-12.16	8	Pass
11	2462	2.65	-12.55	8	Pass

Note:

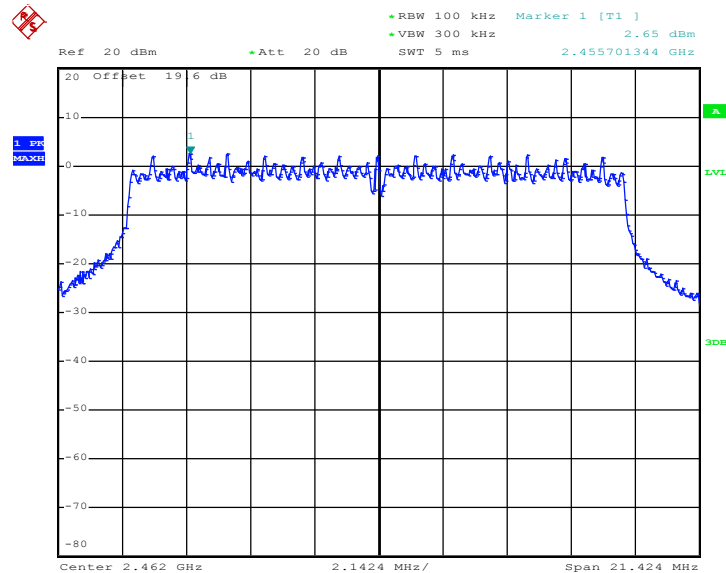
1. Measured power density (dBm) has offset with cable loss.
2. $BWCF (dB) = 10 \log (3k/100k) = -15.2 \text{ dB}$
3. $\text{Power Density/ 3KHz (dBm)} = \text{Measured power density/ 100KHz (dBm)} + BWCF (dB)$

Mode 4 : PSD Plot on 802.11g Channel 01


Date: 30.MAY.2012 09:56:52

Mode 5 : PSD Plot on 802.11g Channel 06


Date: 30.MAY.2012 09:51:32

Mode 6 : PSD Plot on 802.11g Channel 11


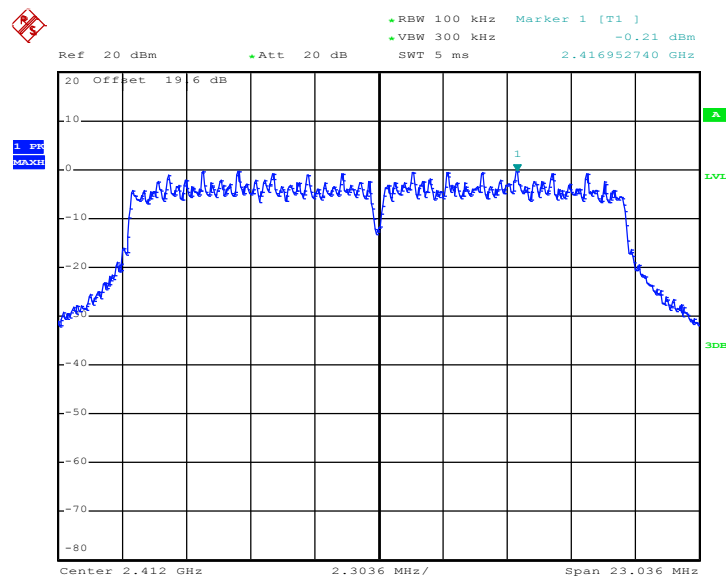
Date: 30.MAY.2012 09:43:22

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

Channel	Frequency (MHz)	802.11g/n (BW 20MHz) Power Density		Max. Limits (dBm)	Pass/Fail
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	-0.21	-15.41	8	Pass
06	2437	-0.14	-15.34	8	Pass
11	2462	-0.10	-15.30	8	Pass

Note:

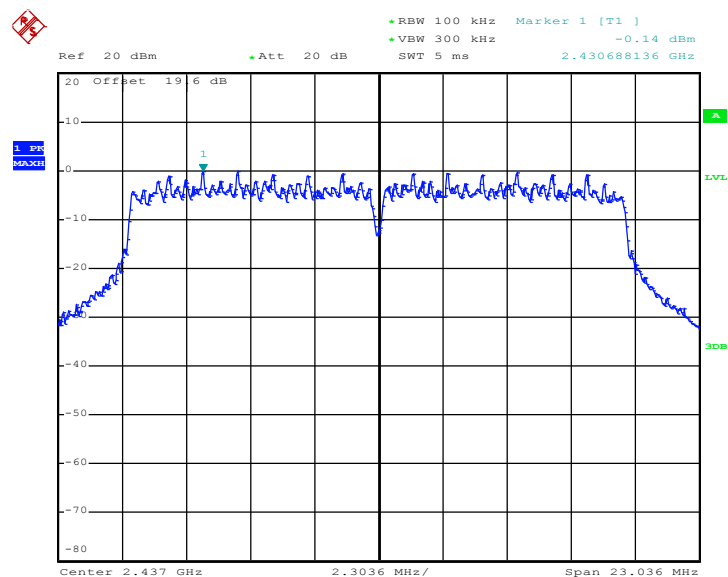
1. Measured power density (dBm) has offset with cable loss.
2. $BWCF (dB) = 10 \log (3k/100k) = -15.2 \text{ dB}$
3. $\text{Power Density/ 3KHz (dBm)} = \text{Measured power density/ 100KHz (dBm)} + BWCF (dB)$

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


Date: 30.MAY.2012 10:08:21

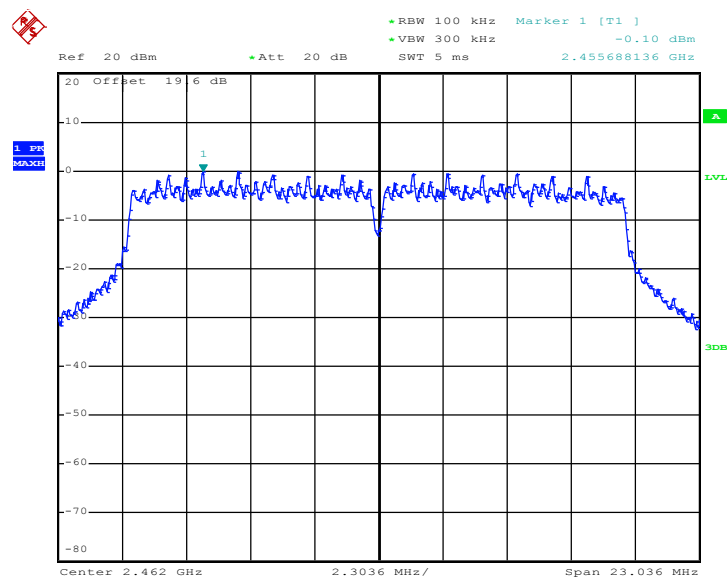


Mode 8 : PSD Plot on 802.11g/n (BW 20MHz) Channel 06



Date: 30.MAY.2012 10:17:52

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



Date: 30.MAY.2012 10:20:38

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.

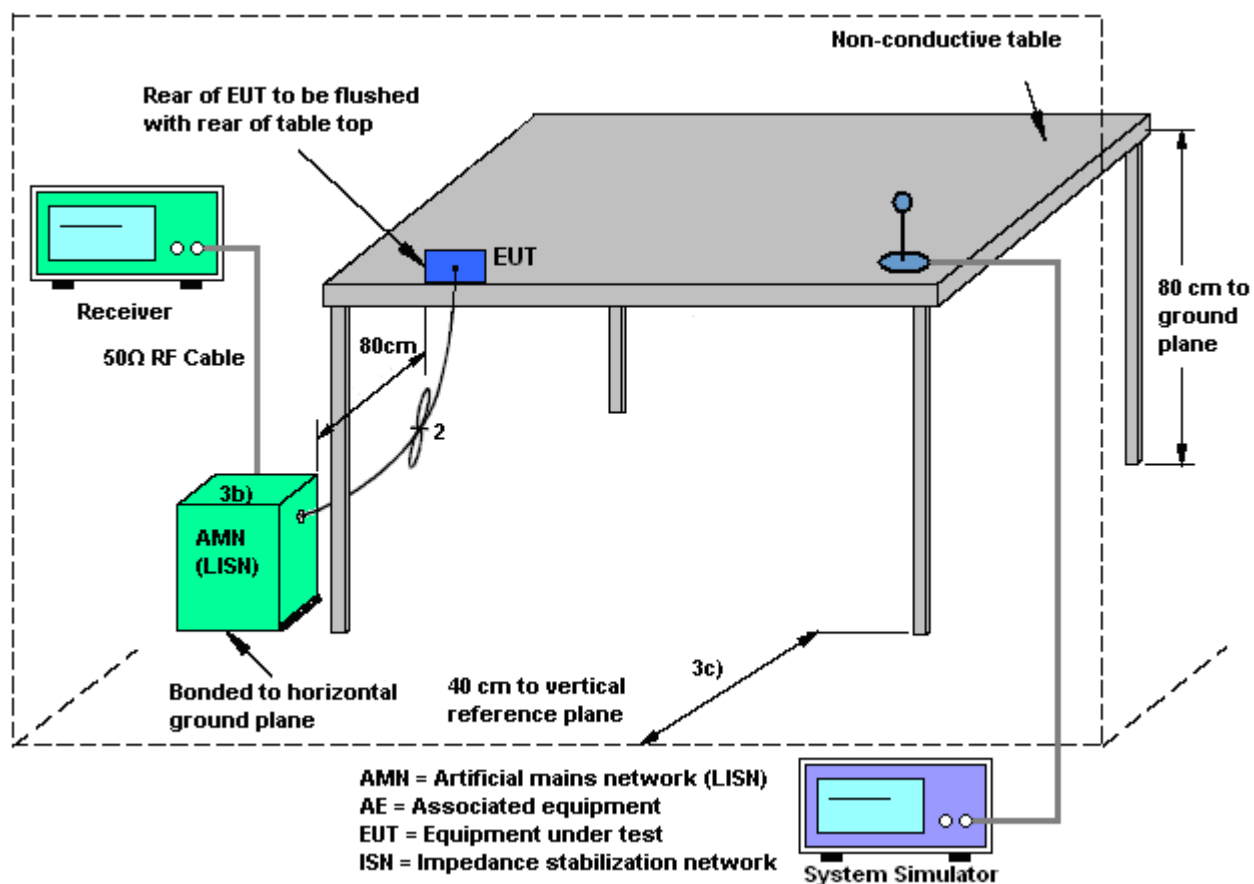
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

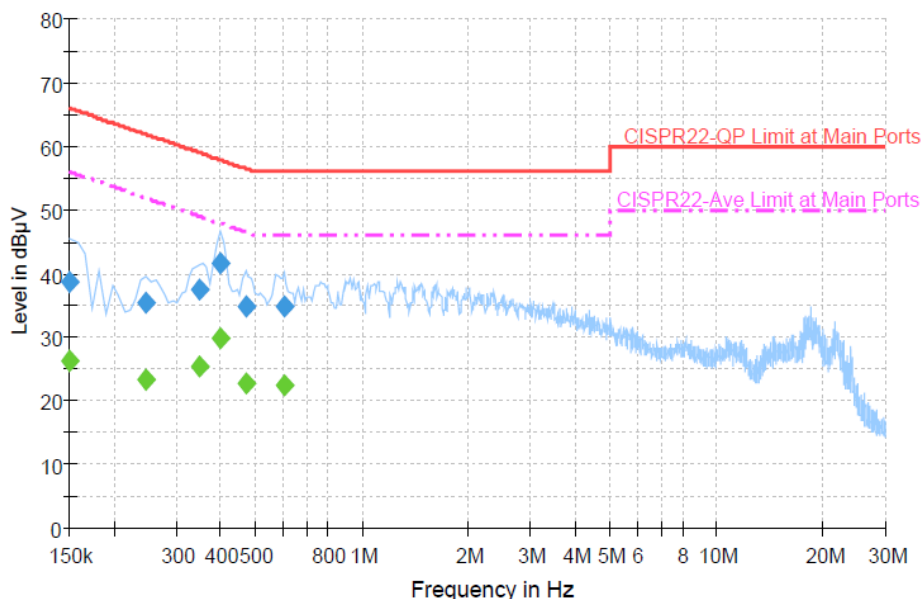
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (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 :	20~21°C
Test Engineer :	Kai-Chun Chu	Relative Humidity :	50~51%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WCDMA Band V Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone + Battery + USB Cable (Charging from Adapter) + SIM2		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



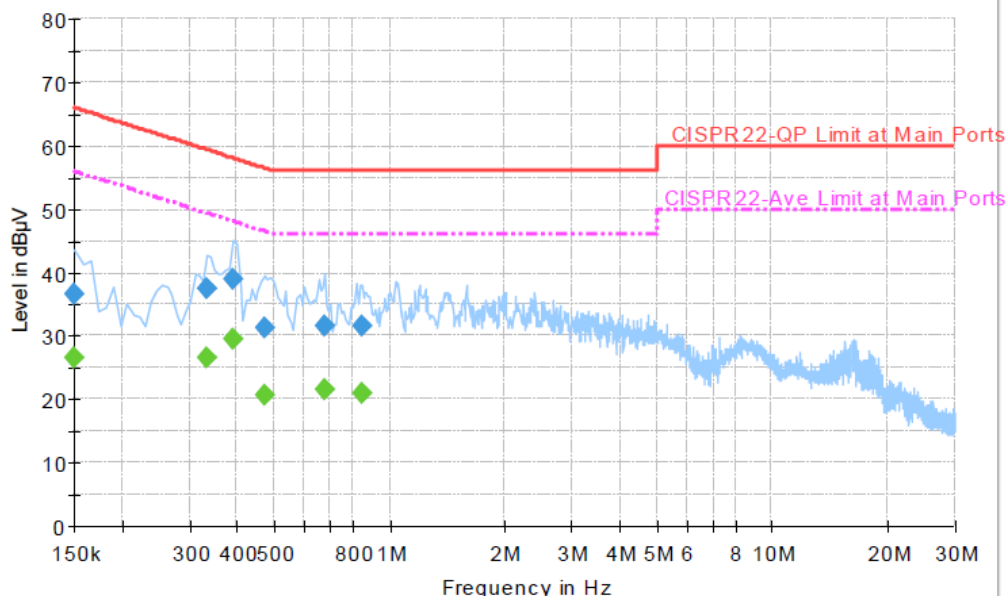
Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	38.8	Off	L1	19.4	27.2	66.0
0.246000	35.3	Off	L1	19.4	26.6	61.9
0.350000	37.4	Off	L1	19.4	21.6	59.0
0.398000	41.6	Off	L1	19.4	16.3	57.9
0.470000	34.8	Off	L1	19.4	21.7	56.5
0.606000	34.8	Off	L1	19.4	21.2	56.0

Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	26.3	Off	L1	19.4	29.7	56.0
0.246000	23.4	Off	L1	19.4	28.5	51.9
0.350000	25.5	Off	L1	19.4	23.5	49.0
0.398000	29.7	Off	L1	19.4	18.2	47.9
0.470000	22.6	Off	L1	19.4	23.9	46.5
0.606000	22.5	Off	L1	19.4	23.5	46.0

Test Mode :	Mode 1	Temperature :	20~21°C
Test Engineer :	Kai-Chun Chu	Relative Humidity :	50~51%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WCDMA Band V Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone + Battery + USB Cable (Charging from Adapter) + SIM2		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		


Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	36.5	Off	N	19.4	29.5	66.0
0.334000	37.4	Off	N	19.4	22.0	59.4
0.390000	39.1	Off	N	19.4	19.0	58.1
0.470000	31.3	Off	N	19.4	25.2	56.5
0.678000	31.6	Off	N	19.5	24.4	56.0
0.846000	31.7	Off	N	19.5	24.3	56.0

Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	26.7	Off	N	19.4	29.3	56.0
0.334000	26.5	Off	N	19.4	22.9	49.4
0.390000	29.4	Off	N	19.4	18.7	48.1
0.470000	20.8	Off	N	19.4	25.7	46.5
0.678000	21.4	Off	N	19.5	24.6	46.0
0.846000	21.1	Off	N	19.5	24.9	46.0

3.7 Radiated Emission Measurement

3.7.1 Limit of Radiated Emission

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

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

3.7.2 Measuring Instruments

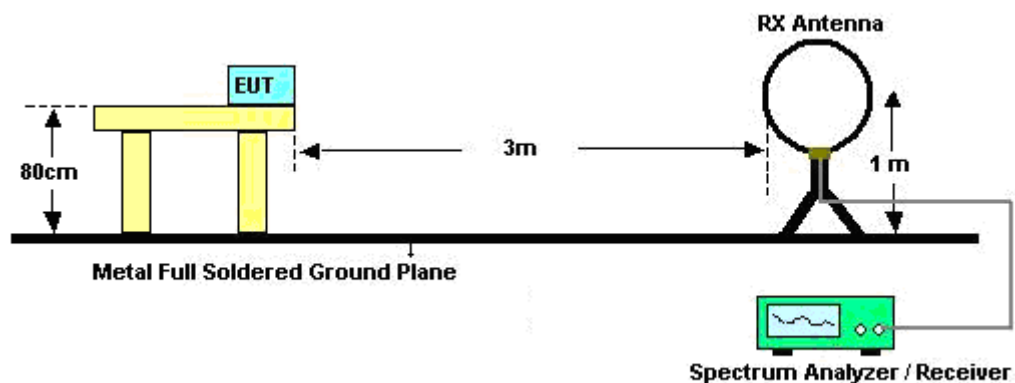
See list of measuring instruments of this test report.

3.7.3 Test Procedures

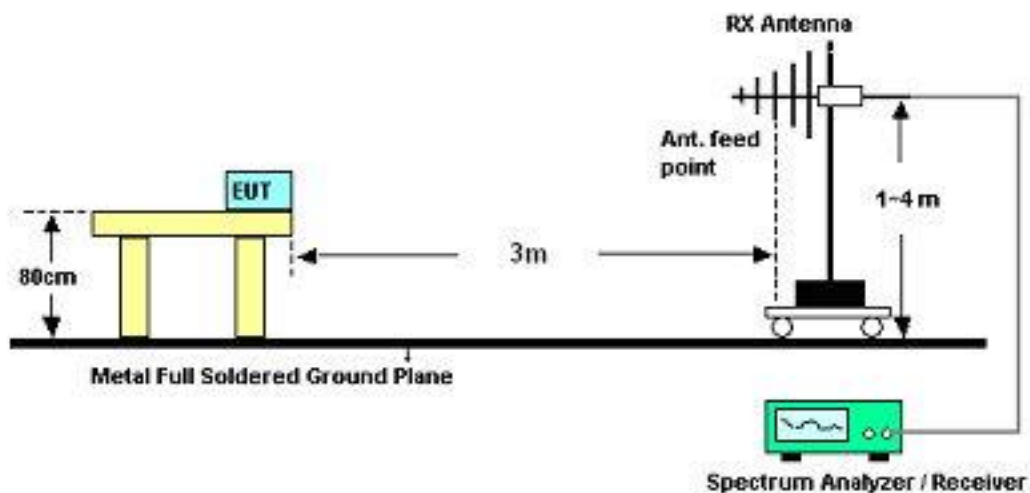
- Use the following spectrum analyzer settings:
 - Span shall wide enough to fully capture the emission being measured;
 - Set RBW = 1 MHz for $f \geq 1$ GHz, 100 KHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - Measurement above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB per decade from 3m to 1m.
Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB)
- Maximize the emission by rotating the EUT for three orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines in ANSI C63.4-2003.

3.7.4 Test Setup

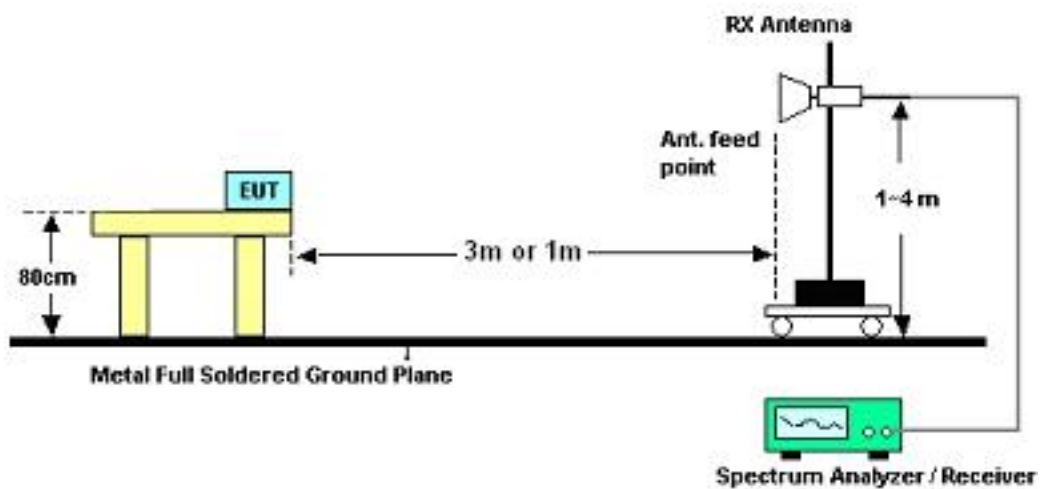
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

The low frequency, which started from 9 KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

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

Test Mode :	Mode 1	Temperature :	20~22℃
Test Channel :	01	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2412 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2386.14	50.65	-3.35	54	49.93	32.02	4.58	35.88	101	345	Average
2386.14	57.59	-16.41	74	56.87	32.02	4.58	35.88	101	345	Peak
2412	105.91	-	-	105.15	32.03	4.59	35.86	101	345	Average
2412	110.81	-	-	110.05	32.03	4.59	35.86	101	345	Peak
2484.8	35.74	-18.26	54	34.82	32.09	4.64	35.81	101	345	Average
2484.8	48.49	-25.51	74	47.57	32.09	4.64	35.81	101	345	Peak

Test Mode :	Mode 1	Temperature :	20~22℃
Test Channel :	01	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2412 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2386.23	47.76	-6.24	54	47.04	32.02	4.58	35.88	101	358	Average
2386.23	55.45	-18.55	74	54.73	32.02	4.58	35.88	101	358	Peak
2412	103.3	-	-	102.54	32.03	4.59	35.86	101	358	Average
2412	108.17	-	-	107.41	32.03	4.59	35.86	101	358	Peak
2486.88	35.17	-18.83	54	34.25	32.09	4.64	35.81	101	358	Average
2486.88	48	-26	74	47.08	32.09	4.64	35.81	101	358	Peak



Test Mode :	Mode 2	Temperature :	20~22℃
Test Channel :	06	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2437 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2380	36.33	-17.67	54	35.63	32	4.58	35.88	101	338	Average
2380	48.9	-25.1	74	48.2	32	4.58	35.88	101	338	Peak
2437	106.82	-	-	105.99	32.06	4.61	35.84	101	338	Average
2437	111.69	-	-	110.86	32.06	4.61	35.84	101	338	Peak
2492	36.24	-17.76	54	35.3	32.1	4.64	35.8	101	338	Average
2492	48.66	-25.34	74	47.72	32.1	4.64	35.8	101	338	Peak

Test Mode :	Mode 2	Temperature :	20~22℃
Test Channel :	06	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2437 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	36.06	-17.94	54	35.32	32.02	4.58	35.86	101	352	Average
2390	48.17	-25.83	74	47.43	32.02	4.58	35.86	101	352	Peak
2437	104.23	-	-	103.4	32.06	4.61	35.84	101	352	Average
2437	109.07	-	-	108.24	32.06	4.61	35.84	101	352	Peak
2492	35.47	-18.53	54	34.53	32.1	4.64	35.8	101	352	Average
2492	48.18	-25.82	74	47.24	32.1	4.64	35.8	101	352	Peak

Test Mode :	Mode 3	Temperature :	20~22℃
Test Channel :	11	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2462 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2379.75	36.03	-17.97	54	35.34	32	4.57	35.88	100	340	Average
2379.75	48.71	-25.29	74	48.02	32	4.57	35.88	100	340	Peak
2462	107.51	-	-	106.65	32.07	4.62	35.83	100	340	Average
2462	113.03	-	-	112.17	32.07	4.62	35.83	100	340	Peak
2483.76	45.59	-8.41	54	44.67	32.09	4.64	35.81	100	340	Average
2483.76	55.74	-18.26	74	54.82	32.09	4.64	35.81	100	340	Peak

Test Mode :	Mode 3	Temperature :	20~22℃
Test Channel :	11	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2462 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2361.03	35.54	-18.46	54	34.87	31.99	4.57	35.89	100	352	Average
2361.03	47.94	-26.06	74	47.27	31.99	4.57	35.89	100	352	Peak
2462	103.1	-	-	102.24	32.07	4.62	35.83	100	352	Average
2462	108.24	-	-	107.38	32.07	4.62	35.83	100	352	Peak
2487.54	42.95	-11.05	54	42.02	32.1	4.64	35.81	100	352	Average
2487.54	52.84	-21.16	74	51.91	32.1	4.64	35.81	100	352	Peak
4924	43.35	-30.65	74	61.72	33.81	6.56	58.74	100	0	Peak



Test Mode :	Mode 4	Temperature :	20~22℃
Test Channel :	01	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2412 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	21.47	-18.53	40	32.61	19.8	0.7	31.64	-	-	Peak
99.39	25.44	-18.06	43.5	45.89	9.9	1.09	31.44	-	-	Peak
174.72	27.11	-16.39	43.5	47.66	9.1	1.38	31.03	100	45	Peak
597.5	21.76	-24.24	46	29.92	19.87	2.41	30.44	-	-	Peak
674.5	22.26	-23.74	46	29.46	20.34	2.62	30.16	-	-	Peak
773.9	24.66	-21.34	46	29.72	22.16	2.79	30.01	-	-	Peak
2390	53.9	-0.1	54	53.16	32.02	4.58	35.86	100	340	Average
2390	72.85	-1.15	74	72.11	32.02	4.58	35.86	100	340	Peak
2412	91.96	-	-	91.2	32.03	4.59	35.86	100	340	Average
2412	110.75	-	-	109.99	32.03	4.59	35.86	100	340	Peak
2484.44	35.55	-18.45	54	34.63	32.09	4.64	35.81	100	340	Average
2484.44	48.77	-25.23	74	47.85	32.09	4.64	35.81	100	340	Peak



Test Mode :	Mode 4	Temperature :	20~22℃
Test Channel :	01	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2412 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
57.54	26.38	-13.62	40	50.79	6.3	0.85	31.56	100	184	Peak
99.66	27.12	-16.38	43.5	47.57	9.9	1.09	31.44	-	-	Peak
174.72	23.79	-19.71	43.5	44.34	9.1	1.38	31.03	-	-	Peak
572.3	21.35	-24.65	46	29.87	19.88	2.37	30.77	-	-	Peak
691.3	23.33	-22.67	46	30.26	20.62	2.64	30.19	-	-	Peak
793.5	24.5	-21.5	46	29.58	21.96	2.82	29.86	-	-	Peak
2390	52.24	-1.76	54	51.5	32.02	4.58	35.86	101	349	Average
2390	70.66	-3.34	74	69.92	32.02	4.58	35.86	101	349	Peak
2412	89.46	-	-	88.7	32.03	4.59	35.86	101	349	Average
2412	108.06	-	-	107.3	32.03	4.59	35.86	101	349	Peak
2491.8	35.18	-18.82	54	34.24	32.1	4.64	35.8	101	349	Average
2491.8	47.96	-26.04	74	47.02	32.1	4.64	35.8	101	349	Peak

Test Mode :	Mode 5	Temperature :	20~22℃
Test Channel :	06	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2437 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	37.59	-16.41	54	36.85	32.02	4.58	35.86	100	337	Average
2390	56.78	-17.22	74	56.04	32.02	4.58	35.86	100	337	Peak
2437	93.36	-	-	92.53	32.06	4.61	35.84	100	337	Average
2437	112.05	-	-	111.22	32.06	4.61	35.84	100	337	Peak
2484	36.85	-17.15	54	35.93	32.09	4.64	35.81	100	337	Average
2484	52.71	-21.29	74	51.79	32.09	4.64	35.81	100	337	Peak

Test Mode :	Mode 5	Temperature :	20~22℃
Test Channel :	06	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2437 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	36.54	-17.46	54	35.8	32.02	4.58	35.86	100	346	Average
2390	53.92	-20.08	74	53.18	32.02	4.58	35.86	100	346	Peak
2437	89.91	-	-	89.08	32.06	4.61	35.84	100	346	Average
2437	108.53	-	-	107.7	32.06	4.61	35.84	100	346	Peak
2484	35.57	-18.43	54	34.65	32.09	4.64	35.81	100	346	Average
2484	49.58	-24.42	74	48.66	32.09	4.64	35.81	100	346	Peak

Test Mode :	Mode 6	Temperature :	20~22℃
Test Channel :	11	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2462 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2379.12	35.79	-18.21	54	35.1	32	4.57	35.88	100	335	Average
2379.12	49.2	-24.8	74	48.51	32	4.57	35.88	100	335	Peak
2462	93.25	-	-	92.39	32.07	4.62	35.83	100	335	Average
2462	112.07	-	-	111.21	32.07	4.62	35.83	100	335	Peak
2483.62	51.83	-2.17	54	50.91	32.09	4.64	35.81	100	335	Average
2483.62	73.42	-0.58	74	72.5	32.09	4.64	35.81	100	335	Peak

Test Mode :	Mode 6	Temperature :	20~22℃
Test Channel :	11	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2462 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.84	35.36	-18.64	54	34.64	32.02	4.58	35.88	100	344	Average
2388.84	48.19	-25.81	74	47.47	32.02	4.58	35.88	100	344	Peak
2462	89.83	-	-	88.97	32.07	4.62	35.83	100	344	Average
2462	108.49	-	-	107.63	32.07	4.62	35.83	100	344	Peak
2483.54	48.15	-5.85	54	47.23	32.09	4.64	35.81	100	344	Average
2483.54	69.45	-4.55	74	68.53	32.09	4.64	35.81	100	344	Peak

Test Mode :	Mode 7	Temperature :	20~22℃
Test Channel :	01	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2412 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.83	51.19	-2.81	54	50.45	32.02	4.58	35.86	101	342	Average
2389.83	70.04	-3.96	74	69.3	32.02	4.58	35.86	101	342	Peak
2412	89.64	-	-	88.88	32.03	4.59	35.86	101	342	Average
2412	107.39	-	-	106.63	32.03	4.59	35.86	101	342	Peak
2496.06	35.31	-18.69	54	34.37	32.1	4.64	35.8	101	342	Average
2496.06	48.62	-25.38	74	47.68	32.1	4.64	35.8	101	342	Peak

Test Mode :	Mode 7	Temperature :	20~22℃
Test Channel :	01	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2412 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.02	49.01	-4.99	54	48.29	32.02	4.58	35.88	100	351	Average
2389.02	67.6	-6.4	74	66.88	32.02	4.58	35.88	100	351	Peak
2412	87.06	-	-	86.3	32.03	4.59	35.86	100	351	Average
2412	104.8	-	-	104.04	32.03	4.59	35.86	100	351	Peak
2483.9	35.03	-18.97	54	34.11	32.09	4.64	35.81	100	351	Average
2483.9	47.88	-26.12	74	46.96	32.09	4.64	35.81	100	351	Peak

Test Mode :	Mode 8	Temperature :	20~22℃
Test Channel :	06	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2437 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388	36.06	-17.94	54	35.34	32.02	4.58	35.88	100	338	Average
2388	48.53	-25.47	74	47.81	32.02	4.58	35.88	100	338	Peak
2437	89.69	-	-	88.86	32.06	4.61	35.84	100	338	Average
2437	107.55	-	-	106.72	32.06	4.61	35.84	100	338	Peak
2484	35.65	-18.35	54	34.73	32.09	4.64	35.81	100	338	Average
2484	48.87	-25.13	74	47.95	32.09	4.64	35.81	100	338	Peak

Test Mode :	Mode 8	Temperature :	20~22℃
Test Channel :	06	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2437 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	35.56	-18.44	54	34.82	32.02	4.58	35.86	101	346	Average
2390	48.55	-25.45	74	47.81	32.02	4.58	35.86	101	346	Peak
2437	87.18	-	-	86.35	32.06	4.61	35.84	101	346	Average
2437	105.62	-	-	104.79	32.06	4.61	35.84	101	346	Peak
2484	35.25	-18.75	54	34.33	32.09	4.64	35.81	101	346	Average
2484	48.75	-25.25	74	47.83	32.09	4.64	35.81	101	346	Peak

Test Mode :	Mode 9	Temperature :	20~22℃
Test Channel :	11	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	2462 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2376.24	35.71	-18.29	54	35.02	32	4.57	35.88	100	337	Average
2376.24	48.38	-25.62	74	47.69	32	4.57	35.88	100	337	Peak
2462	90.48	-	-	89.62	32.07	4.62	35.83	100	337	Average
2462	109.33	-	-	108.47	32.07	4.62	35.83	100	337	Peak
2484.2	46.77	-7.23	54	45.85	32.09	4.64	35.81	100	337	Average
2484.2	65.8	-8.2	74	64.88	32.09	4.64	35.81	100	337	Peak

Test Mode :	Mode 9	Temperature :	20~22℃
Test Channel :	11	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	2462 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2385.96	35.31	-18.69	54	34.59	32.02	4.58	35.88	100	344	Average
2385.96	48.01	-25.99	74	47.29	32.02	4.58	35.88	100	344	Peak
2462	87.31	-	-	86.45	32.07	4.62	35.83	100	344	Average
2462	104.79	-	-	103.93	32.07	4.62	35.83	100	344	Peak
2484.48	43.86	-10.14	54	42.94	32.09	4.64	35.81	100	344	Average
2484.48	63.3	-10.7	74	62.38	32.09	4.64	35.81	100	344	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

Non-standard connector used.

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	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 13, 2011	May 23, 2012~ May 30, 2012	Jun. 12, 2012	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 18, 2011	May 23, 2012~ May 30, 2012	Sep. 17, 2012	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 18, 2011	May 23, 2012~ May 30, 2012	Sep. 17, 2012	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz ~ 2.75GHz	Oct. 27, 2011	May 28, 2012	Oct. 26, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz ~ 30MHz	Dec. 09, 2011	May 28, 2012	Dec. 08, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz ~ 30MHz	Dec. 06, 2011	May 28, 2012	Dec. 05, 2012	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	May 28, 2012	N/A	Conduction (CO05-HY)
System Simulator	R&S	CMU200	117995	N/A	Jul. 28, 2011	May 28, 2012	Jul. 27, 2013	Conduction (CO05-HY)
Spectrum Analyzer	R&S	ESU26	100390	20Hz ~ 26.5GHz	Dec. 22, 2011	May 31, 2012~ Jun. 02, 2012	Dec. 21, 2012	Radiation (03CH05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2725	30MHz ~ 2GHz	Oct. 22, 2011	May 31, 2012~ Jun. 02, 2012	Oct. 21, 2012	Radiation (03CH05-HY)
Turn Table	HD	Deis HD 2000	420/611	0 ~ 360 degree	N/A	May 31, 2012~ Jun. 02, 2012	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	MA 240	240/666	1 m ~ 4 m	N/A	May 31, 2012~ Jun. 02, 2012	N/A	Radiation (03CH05-HY)
Horn Antenna	ESCO	3117	66584	1GHz ~ 18GHz	Aug. 04, 2011	May 31, 2012~ Jun. 02, 2012	Aug. 03, 2012	Radiation (03CH05-HY)
Pre Amplifier	COM-POWER	PA-103A	161075	10Hz ~ 1000MHz Gain:32dB	Feb. 27, 2012	May 31, 2012~ Jun. 02, 2012	Feb. 26, 2013	Radiation (03CH05-HY)
Pre Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	159087	1GHz~18GHz	Feb. 27, 2012	May 31, 2012~ Jun. 02, 2012	Feb. 26, 2013	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz~26.5GHz	Aug. 30, 2011	May 31, 2012~ Jun. 02, 2012	Aug. 29, 2012	Radiation (03CH05-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	May 31, 2012~ Jun. 02, 2012	Jul. 28, 2012	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 EP252201 as below.