

FCC RF Test Report

APPLICANT : Motorola Mobility, Inc.
EQUIPMENT : GSM / EGPRS Mobile Phone
BRAND NAME : Motorola
MODEL NAME : EX440
MARKETING NAME : MOTOGO!™ TV
GPPD NUMBER : 3347
FCC ID : IHDT56NE5
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Apr. 10, 2012 and completely tested on Apr. 30, 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
FR241001B	Rev. 01	Initial issue of report	May 07, 2012
FR241001B	Rev. 02	Update the report for revising HW Version	May 15, 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 14.98 dB at 0.380 MHz
3.7	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 10.01 dB at 55.220 MHz
3.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Motorola Mobility, Inc.

8F., No. 9, Songgao Rd., Taipei 110, Taiwan

1.2 Manufacturer

Arima Communications Corp.

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

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	GSM / EGPRS Mobile Phone
Brand Name	Motorola
Model Name / Marketing Name	EX440
Marketing Name	MOTOGO!™ TV
FCC ID	IHDT56NE5
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 : 18.89 dBm (0.077 W) 802.11g : 21.89 dBm (0.155 W)
Antenna Type	IFA Antenna with gain 1.37 dBi
Type of Antenna Connector	cutkey
HW Version	PCR
SW Version	SILVTV_G_07.13.00RDD
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Identical Prototype

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 (KUNSHAN) INC.		
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958		
Test Site No.	Sporton Site No. :		FCC/IC Registration No.
	03CH01-KS	CO01-KS	149928/4086E-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.	Router	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
3.	DC Power Supply	GW	GPC-60300	N/A	N/A	Unshielded, 1.8 m
4.	Notebook	Dell	P08S	QDS-BRCM1030	N/A	AC I/P: Unshielded, 1.84m DC O/P: Shielded, 0.9m
5.	Bluetooth Earphone	Nokia	BH-106	QTLBH-106	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	17.91	17.89	16.98	17.61
CH 06	2437 MHz	18.77	18.74	17.79	18.48
CH 11	2462 MHz	18.89	18.87	18.15	18.79

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	20.66	20.49	20.62	20.51	21.19	21.06	21.02	20.73
CH 06	2437 MHz	21.71	21.34	21.65	21.17	21.67	21.47	21.59	21.53
CH 11	2462 MHz	21.89	21.13	21.85	21.47	21.87	21.88	21.69	21.85

Remark: The EUT is programmed to transmit signals continuously for all testing.

2.2 Maximum Peak Conducted Output Power:

Band	2.4GHz 802.11b RF Power (dBm)			2.4GHz 802.11g RF Power (dBm)		
Channel	1	6	11	1	6	11
Frequency (MHz)	2412	2437	2462	2412	2437	2462
Peak Power	17.91	18.77	18.89	20.66	21.71	21.89

Remark: The data rates of WLAN 802.11b/g were set in 1Mbps for 802.11b and 6Mbps for 802.11g for all the test cases due to the highest RF output power.

2.3 Maximum Average Conducted Output Power:

Band	2.4GHz 802.11b RF Power (dBm)			2.4GHz 802.11g RF Power (dBm)		
Channel	1	6	11	1	6	11
Frequency (MHz)	2412	2437	2462	2412	2437	2462
Average Power	14.53	15.41	15.63	11.65	12.53	12.75

Remark:

1. The average power, which is used by the test method, AVG2, in DTS Meas. Guidance v01, is reporting only.
2. The EUT is programmed to transmit signals continuously.

2.4 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).

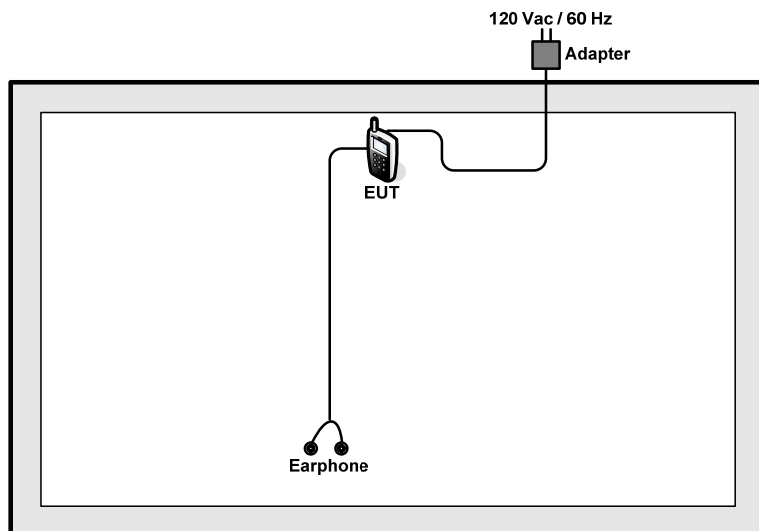
Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations.

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

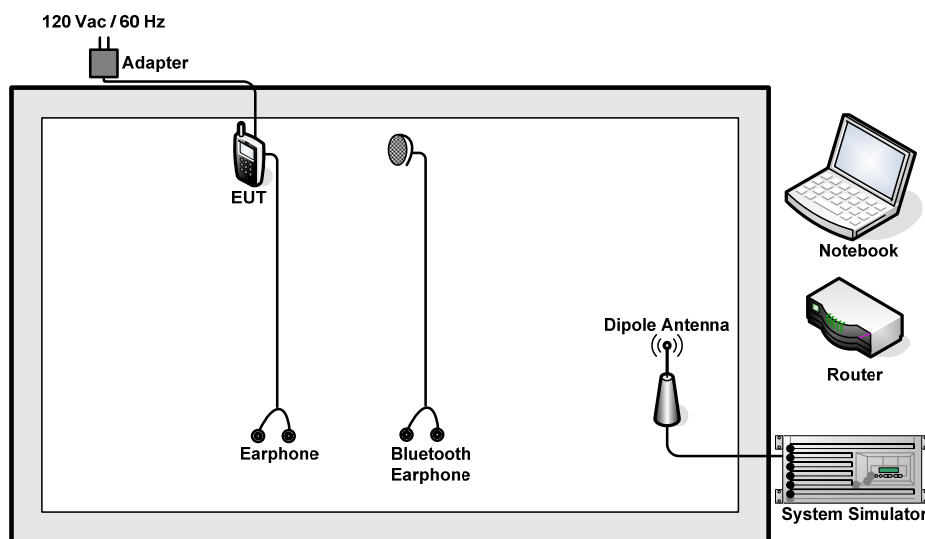
Test Cases		
Test Item	802.11b (Modulation : DSSS)	802.11g (Modulation : OFDM)
Conducted TCs	Mode 1 : 802.11b CH01_2412 MHz Mode 2 : 802.11b CH06_2437 MHz Mode 3 : 802.11b CH11_2462 MHz	Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz
Radiated TCs	Mode 1 : 802.11b 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 + Camera + Adapter Mode 2 : GSM1900 Idle + Bluetooth Link + WLAN Link + Earphone + MP3 + Adapter	
Remark: The worst case of conducted emission is mode 2; only the test data of it was reported.		

2.5 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.6 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.

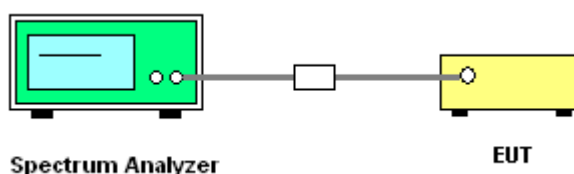
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 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

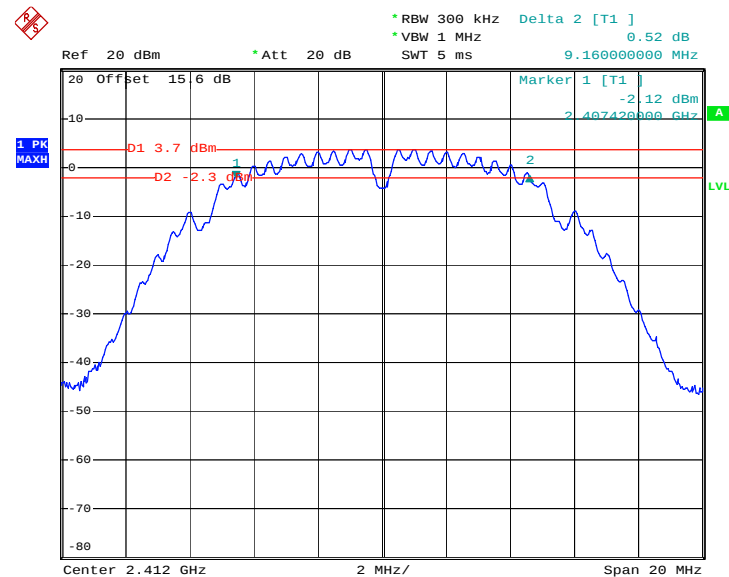


3.1.5 Test Result of 6dB Bandwidth

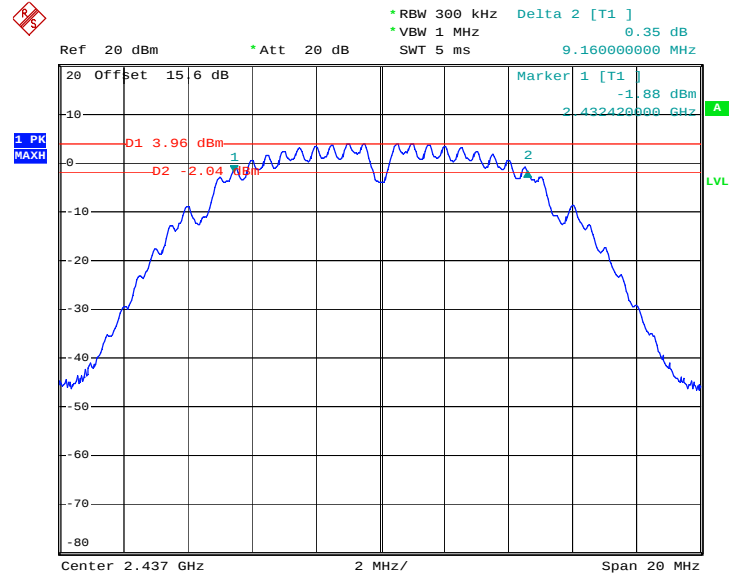
Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Li Zi	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	9.16	0.5	Pass
06	2437	9.16	0.5	Pass
11	2462	9.16	0.5	Pass

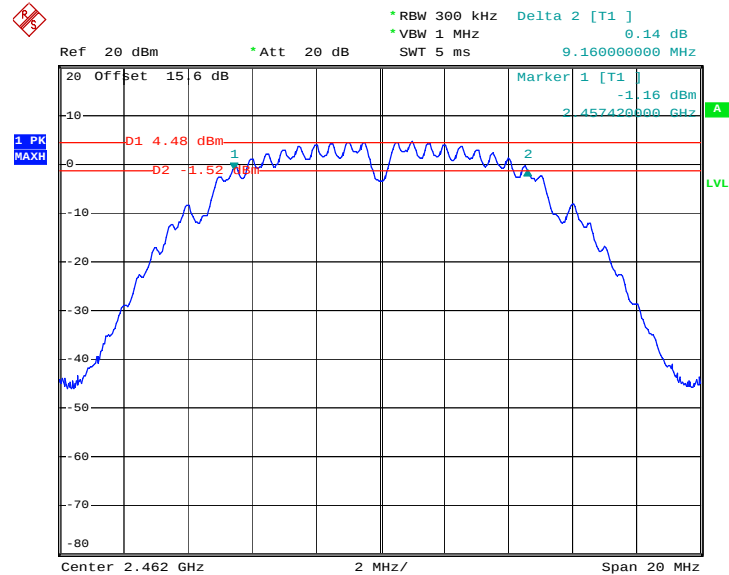
Mode 1 : 6 dB Bandwidth Plot on 802.11b Channel 01



Date: 29.APR.2012 15:45:46

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


Date: 29.APR.2012 15:49:46

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


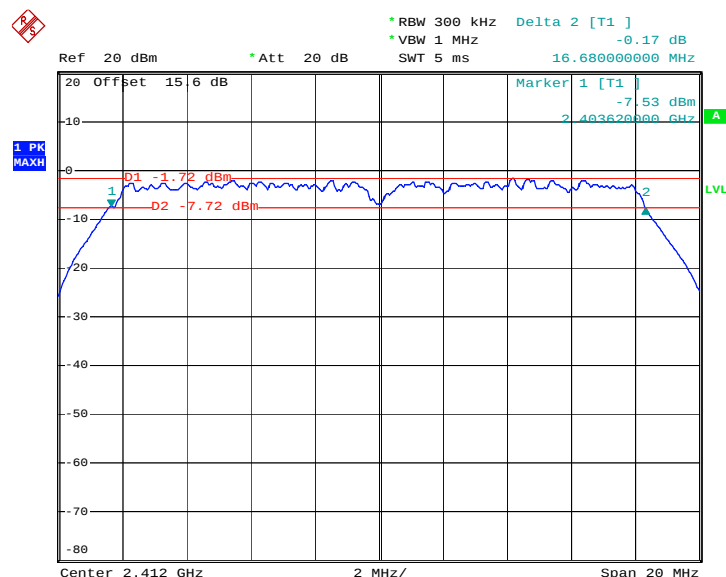
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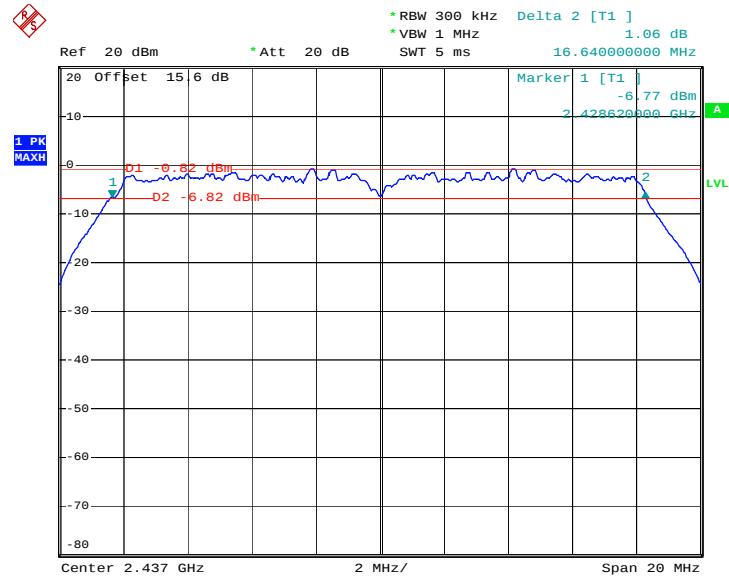
Test Mode :	Mode 4, 5, 6	Temperature :	24~26°C
Test Engineer :	Li Zi	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11g 6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
01	2412	16.68	0.5	Pass
06	2437	16.64	0.5	Pass
11	2462	16.48	0.5	Pass

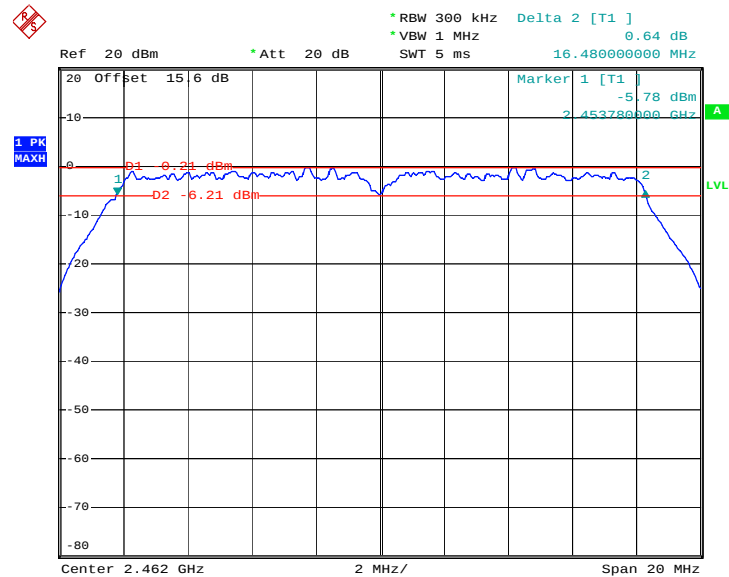
Mode 4 : 6 dB Bandwidth Plot on 802.11g Channel 01



Date: 29.APR.2012 15:59:54

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


Date: 29.APR.2012 16:04:49

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


Date: 29.APR.2012 16:09:27

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.

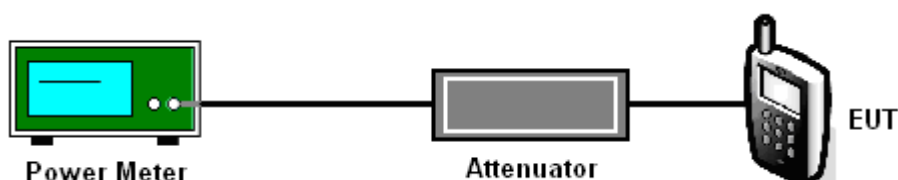
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure PK2 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 :	Li Zi	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	17.91	30	Pass
06	2437	18.77	30	Pass
11	2462	18.89	30	Pass

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

Channel	Frequency (MHz)	802.11g Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
01	2412	20.66	30	Pass
06	2437	21.71	30	Pass
11	2462	21.89	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

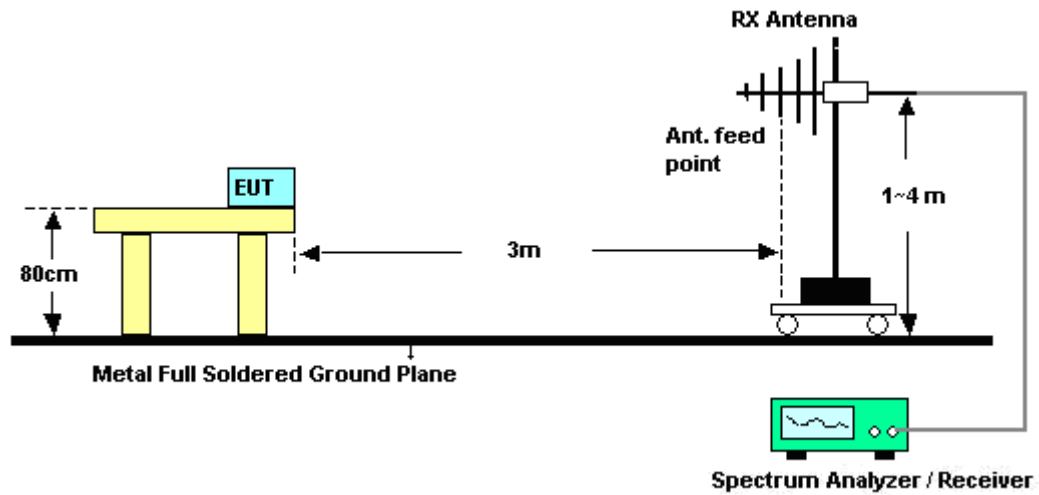
See list of measuring instruments of this test report.

3.3.3 Test Procedures

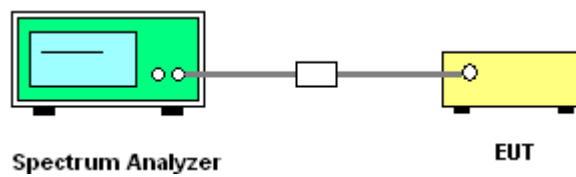
1. The testing follows the guidelines in ANSI C63.4-2003 and the Measurement Procedure of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance DR01.
2. Conducted emission test: Set RBW = 100 KHz, Video bandwidth (VBW) $\geq$ RBW. Out of the authorized frequency band emissions must be at least 20 dB 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).
1. 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 :	21~22℃
Test Band :	802.11b	Relative Humidity :	46~47%
Test Channel :	01	Test Engineer :	Chenmy Cheng

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
2340.02	50.24	-23.76	74	48.07	32.78	3.33	33.94	200	21	Peak
2340.02	36.76	-17.24	54	34.59	32.78	3.33	33.94	200	21	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
2362.63	49.84	-24.16	74	47.63	32.81	3.38	33.98	200	103	Peak
2362.63	36.82	-17.18	54	34.61	32.81	3.38	33.98	200	103	Average

Test Mode :	Mode 3	Temperature :	21~22℃
Test Band :	802.11b	Relative Humidity :	46~47%
Test Channel :	11	Test Engineer :	Chenmy Cheng

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
2484.8	50.33	-23.67	74	47.84	33.01	3.68	34.2	100	120	Peak
2484.8	38.62	-15.38	54	36.13	33.01	3.68	34.2	100	120	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
2483.85	50.11	-23.89	74	47.62	33.01	3.68	34.2	100	26	Peak
2483.85	37.05	-16.95	54	34.56	33.01	3.68	34.2	100	26	Average

Test Mode :	Mode 4	Temperature :	21~22°C
Test Band :	802.11g	Relative Humidity :	46~47%
Test Channel :	01	Test Engineer :	Chenmy Cheng

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
2378.02	50.06	-23.94	74	47.82	32.83	3.42	34.01	100	261	Peak
2378.02	36.9	-17.1	54	34.66	32.83	3.42	34.01	100	261	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
2351.42	50.15	-23.85	74	47.98	32.78	3.33	33.94	100	0	Peak
2351.42	36.85	-17.15	54	34.68	32.78	3.33	33.94	100	0	Average

Test Mode :	Mode 6	Temperature :	21~22°C
Test Band :	802.11g	Relative Humidity :	46~47%
Test Channel :	11	Test Engineer :	Chenmy Cheng

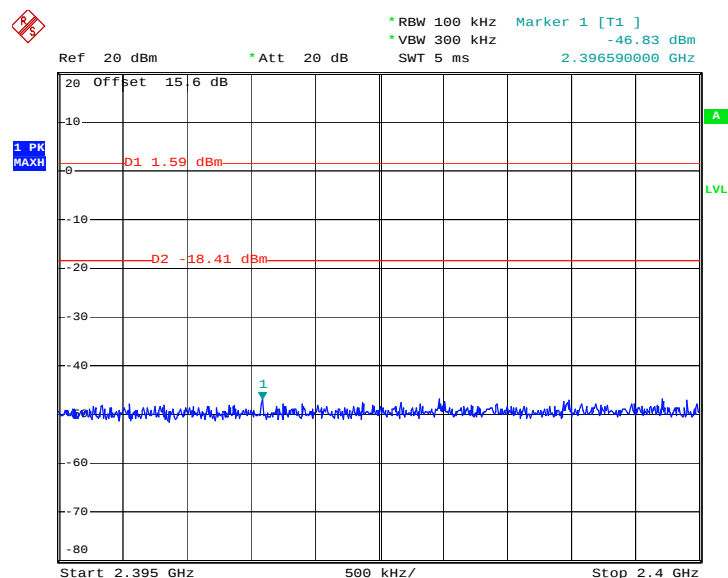
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	57.12	-16.88	74	54.63	33.01	3.68	34.2	100	0	Peak
2483.5	41.34	-12.66	54	38.85	33.01	3.68	34.2	100	0	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
2483.5	54.78	-19.22	74	52.29	33.01	3.68	34.2	100	0	Peak
2483.5	40.08	-13.92	54	37.59	33.01	3.68	34.2	100	0	Average

3.3.6 Test Plots of Conducted Band Edges

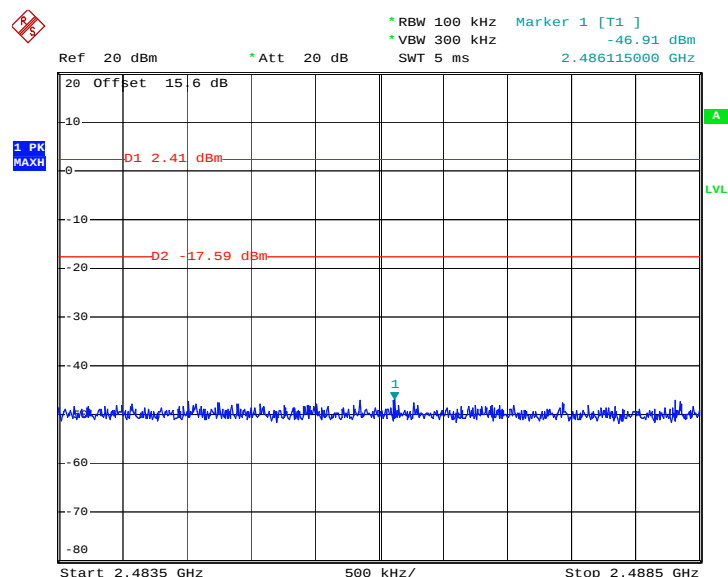
Test Mode :	Mode 1 and 3	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Li Zi

Low Band Edge Plot on 802.11b Channel 01



Date: 29.APR.2012 15:47:05

High Band Edge Plot on 802.11b Channel 11

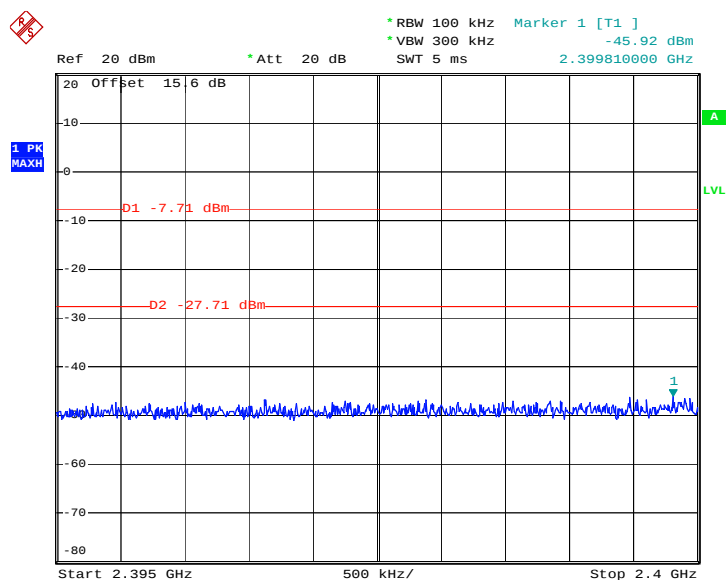


Date: 29.APR.2012 15:55:05



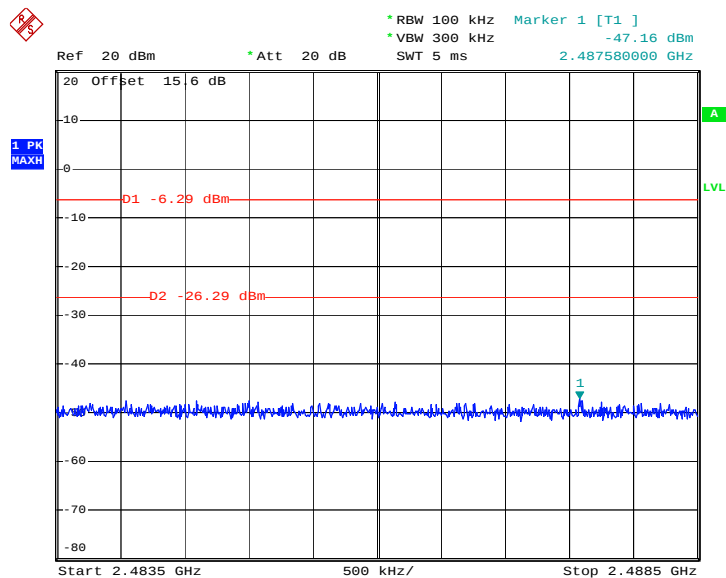
Test Mode :	Mode 4 and 6	Temperature :	24~26℃
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01 and 11	Test Engineer :	Li Zi

Low Band Edge Plot on 802.11g Channel 01



Date: 29.APR.2012 16:01:01

High Band Edge Plot on 802.11g Channel 11



Date: 29.APR.2012 16:12:44

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.

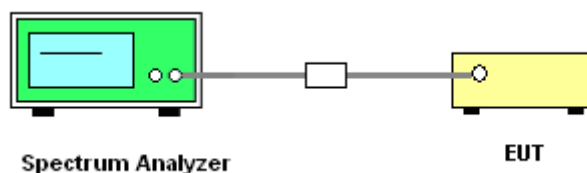
3.4.2 Measuring Instruments

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.

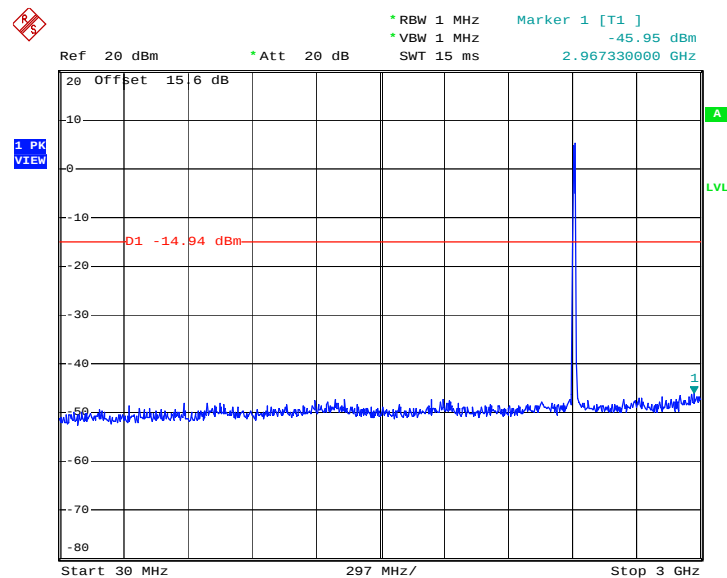
3.4.4 Test Setup



3.4.5 Test Plots of Spurious Emission

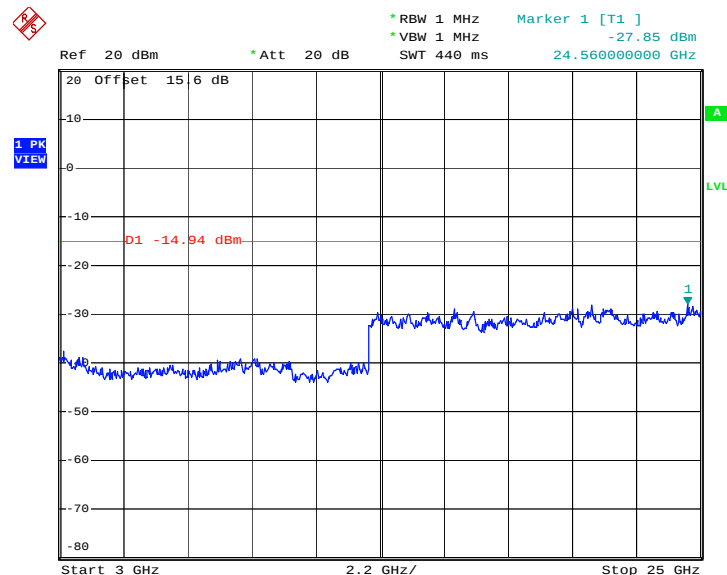
Test Mode :	Mode 1	Temperature :	24~26°C
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Li Zi

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 30.APR.2012 12:38:58

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

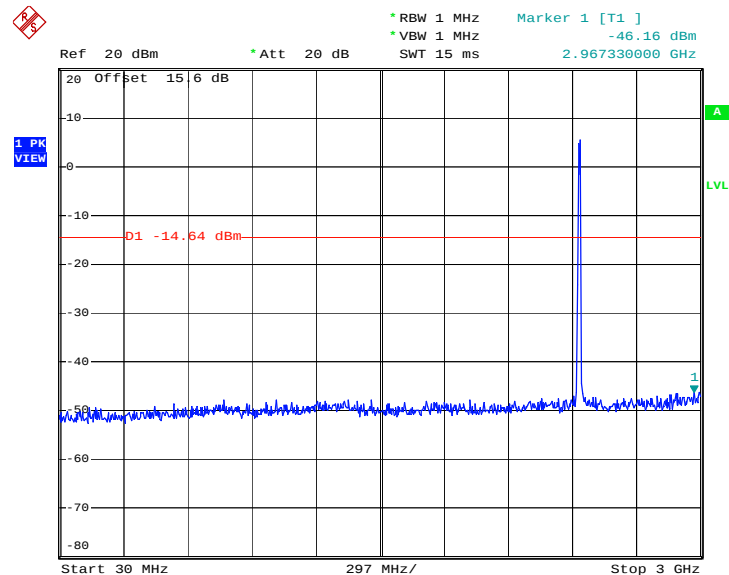


Date: 30.APR.2012 12:39:16



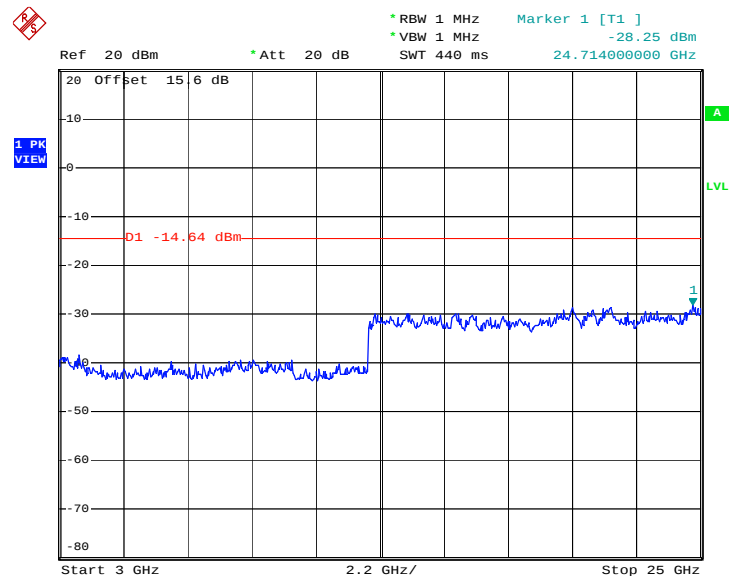
Test Mode :	Mode 2	Temperature :	24~26℃
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Li Zi

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 30.APR.2012 12:43:36

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

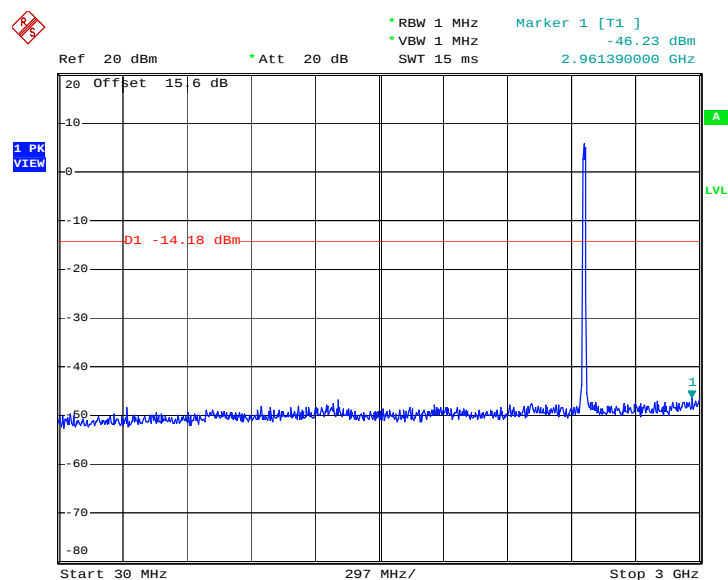


Date: 30.APR.2012 12:43:55



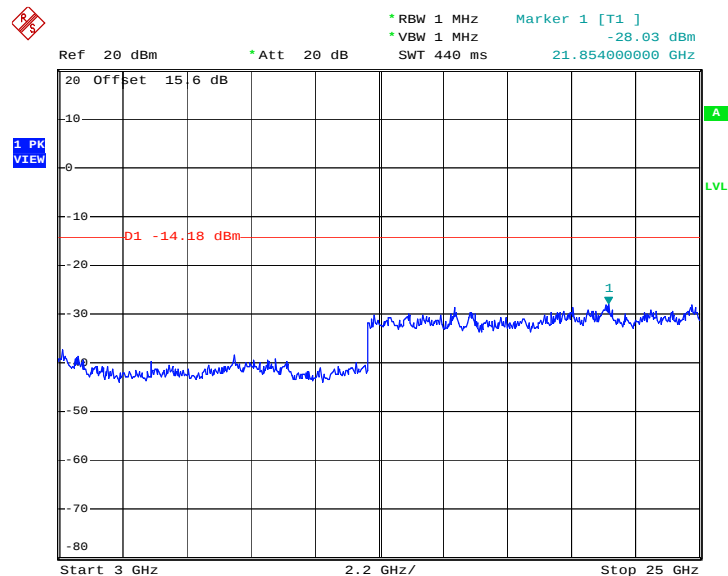
Test Mode :	Mode 3	Temperature :	24~26℃
Test Band :	802.11b	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Li Zi

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



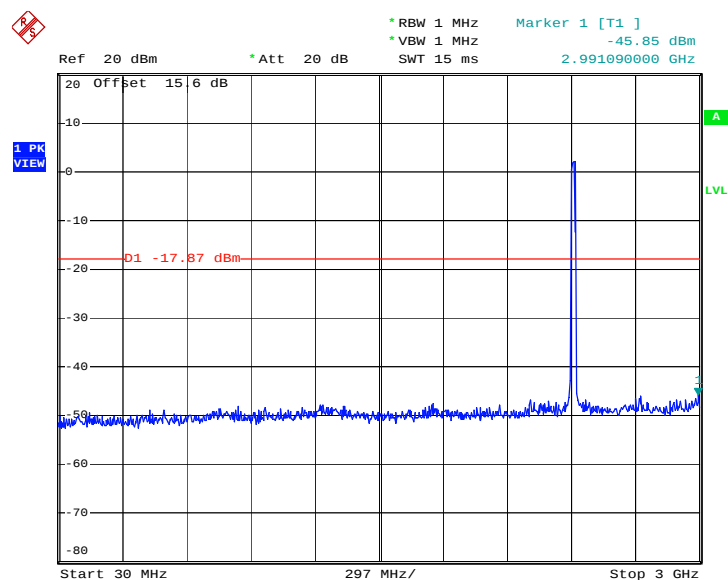
Date: 30.APR.2012 12:46:27

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

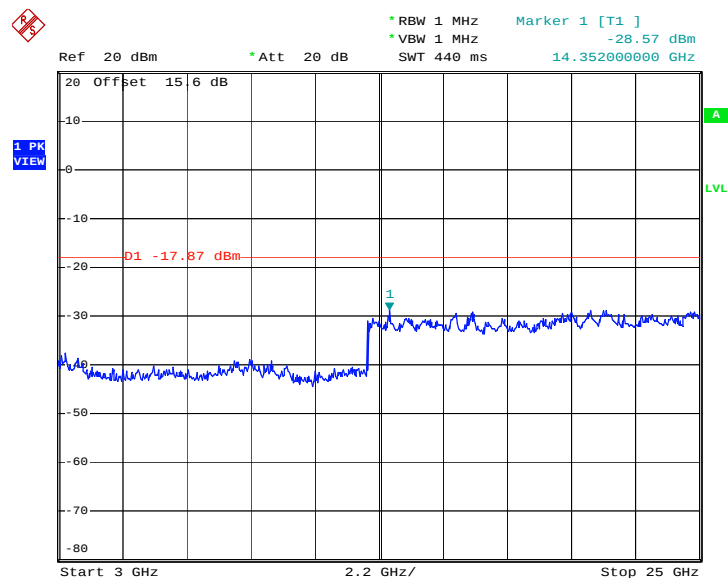


Date: 30.APR.2012 12:46:46

Test Mode :	Mode 4	Temperature :	24~26℃
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	01	Test Engineer :	Li Zi

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 30.APR.2012 12:50:36

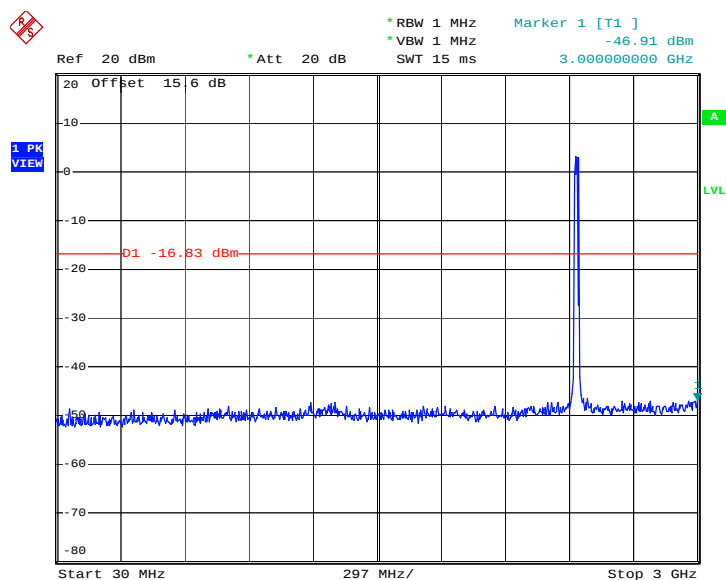
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 30.APR.2012 12:50:54



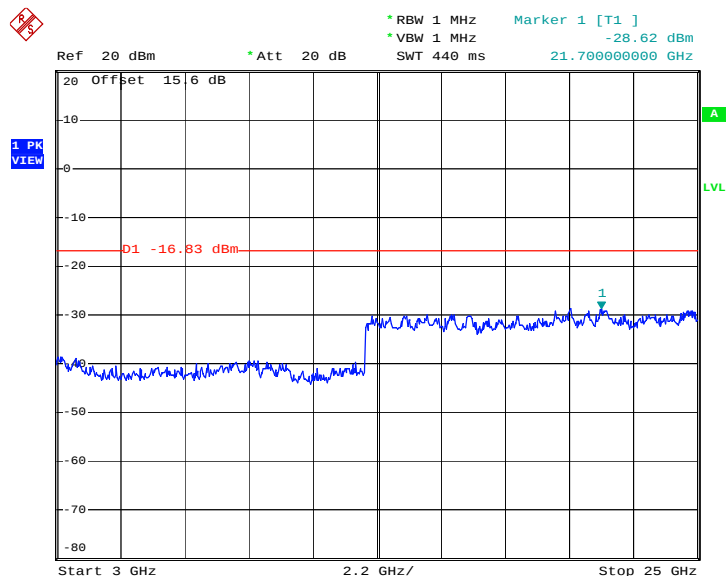
Test Mode :	Mode 5	Temperature :	24~26℃
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	06	Test Engineer :	Li Zi

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



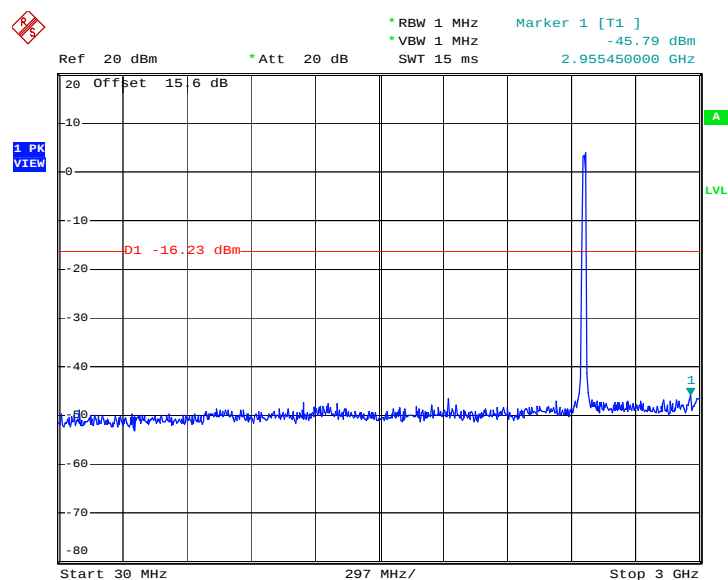
Date: 30.APR.2012 12:53:08

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz

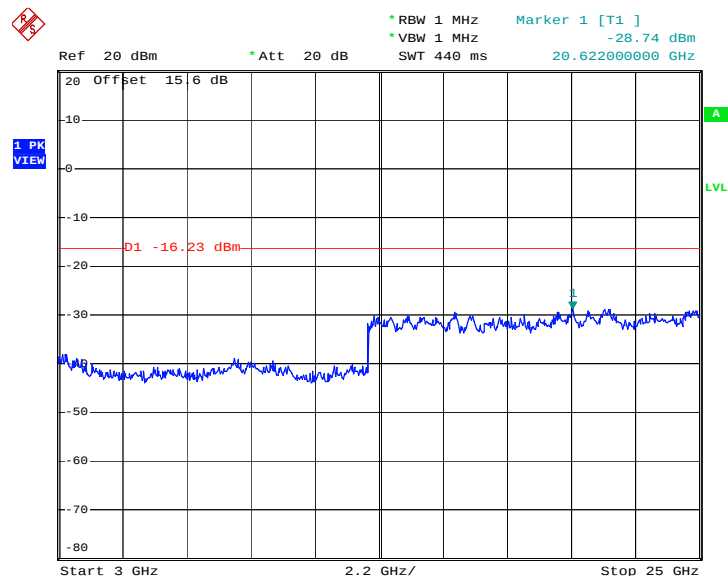


Date: 30.APR.2012 12:53:27

Test Mode :	Mode 6	Temperature :	24~26℃
Test Band :	802.11g	Relative Humidity :	50~53%
Test Channel :	11	Test Engineer :	Li Zi

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz


Date: 30.APR.2012 12:55:50

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz


Date: 30.APR.2012 12:56:08

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.

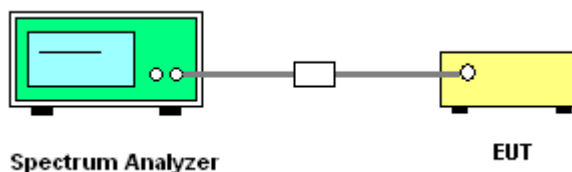
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The testing follows Measurement Procedure PKPSD 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

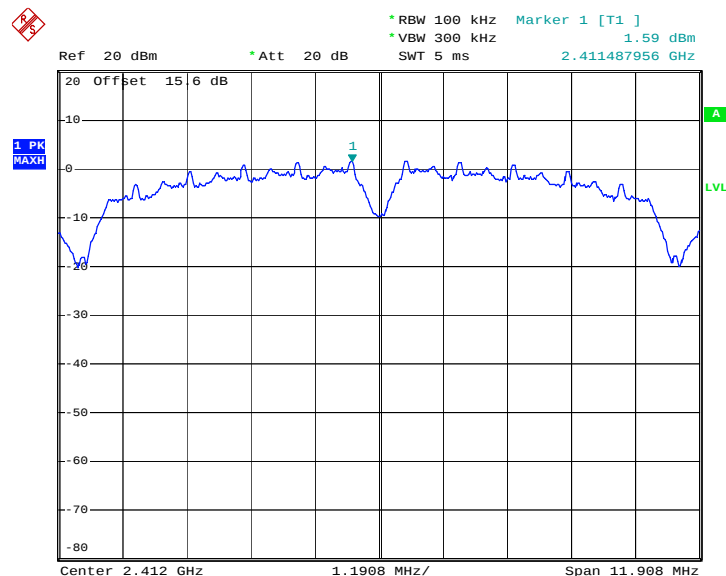
Test Mode :	Mode 1, 2, 3	Temperature :	24~26℃
Test Engineer :	Li Zi	Relative Humidity :	50~53%

Channel	Frequency (MHz)	802.11b Power Density		Max. Limits (dBm)	Pass/Fail
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	1.59	-13.61	8	Pass
06	2437	1.89	-13.31	8	Pass
11	2462	2.41	-12.79	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. $\text{Power Density/ 3kHz (dBm)} = \text{Measured power density/ 100KHz (dBm)} + BWCF (dB)$

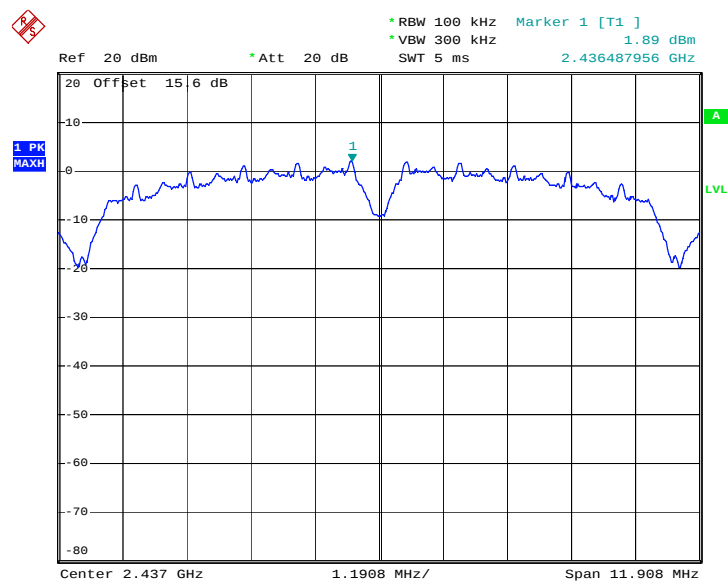
Mode 1 : PSD Plot on 802.11b Channel 01



Date: 29.APR.2012 15:46:18

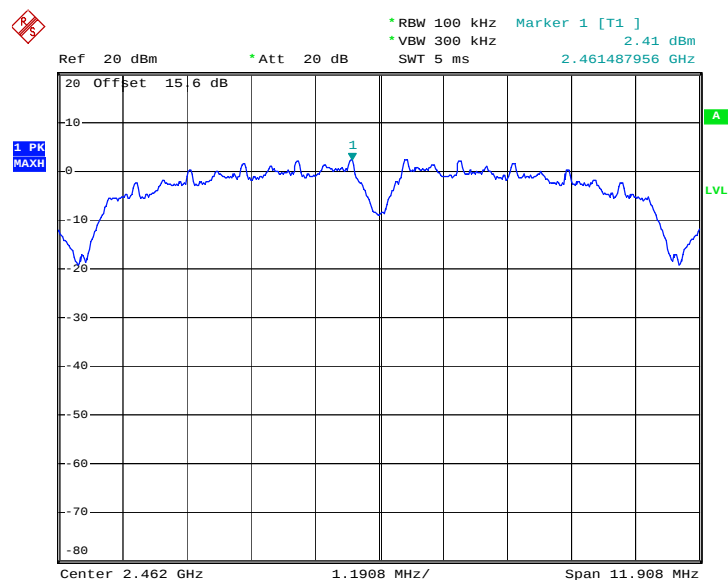


Mode 2 : PSD Plot on 802.11b Channel 06



Date: 29.APR.2012 15:50:10

Mode 3 : PSD Plot on 802.11b Channel 11



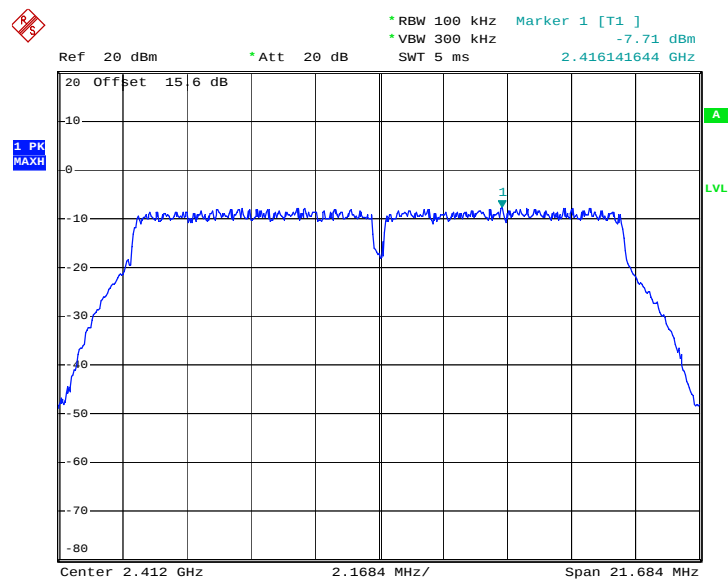
Date: 29.APR.2012 15:54:32

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

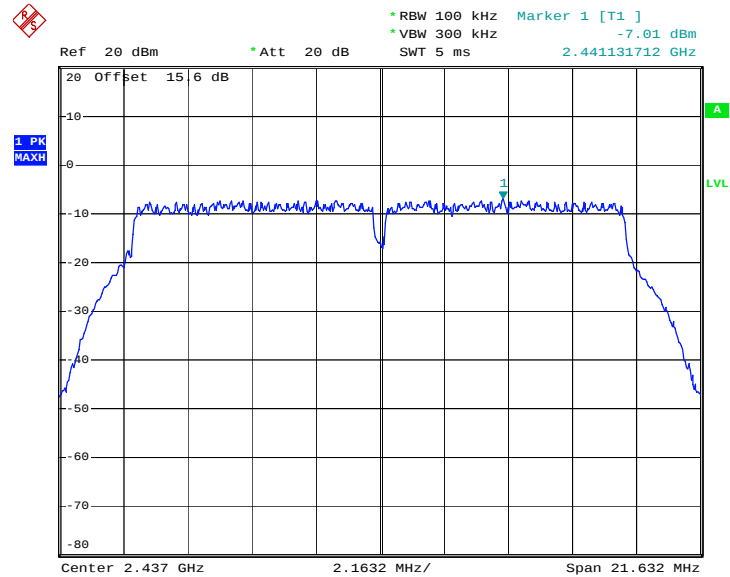
Channel	Frequency (MHz)	802.11g Power Density		Max. Limits (dBm)	Pass/Fail
		Measured PSD/100KHz (dBm)	PSD/3KHz (dBm)		
01	2412	-7.71	-22.91	8	Pass
06	2437	-7.01	-22.21	8	Pass
11	2462	-6.29	-21.49	8	Pass

Note:

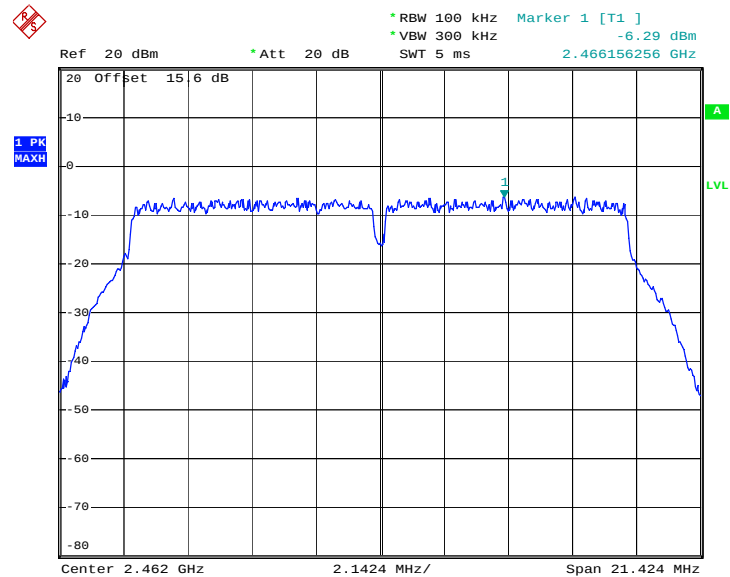
1. Measured power density (dBm) has offset with cable loss.
2. $BWCF (dB) = 10 \log (3k/100k) = -15.2 \text{ dB}$
3. $\text{Power Density/ 3KHz (dBm)} = \text{Measured power density/ 100KHz (dBm)} + BWCF (dB)$

Mode 4 : PSD Plot on 802.11g Channel 01


Date: 29.APR.2012 16:00:20

Mode 5 : PSD Plot on 802.11g Channel 06


Date: 29.APR.2012 16:05:14

Mode 6 : PSD Plot on 802.11g Channel 11


Date: 29.APR.2012 16:09:57

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

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

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

*Decreases with the logarithm of the frequency.

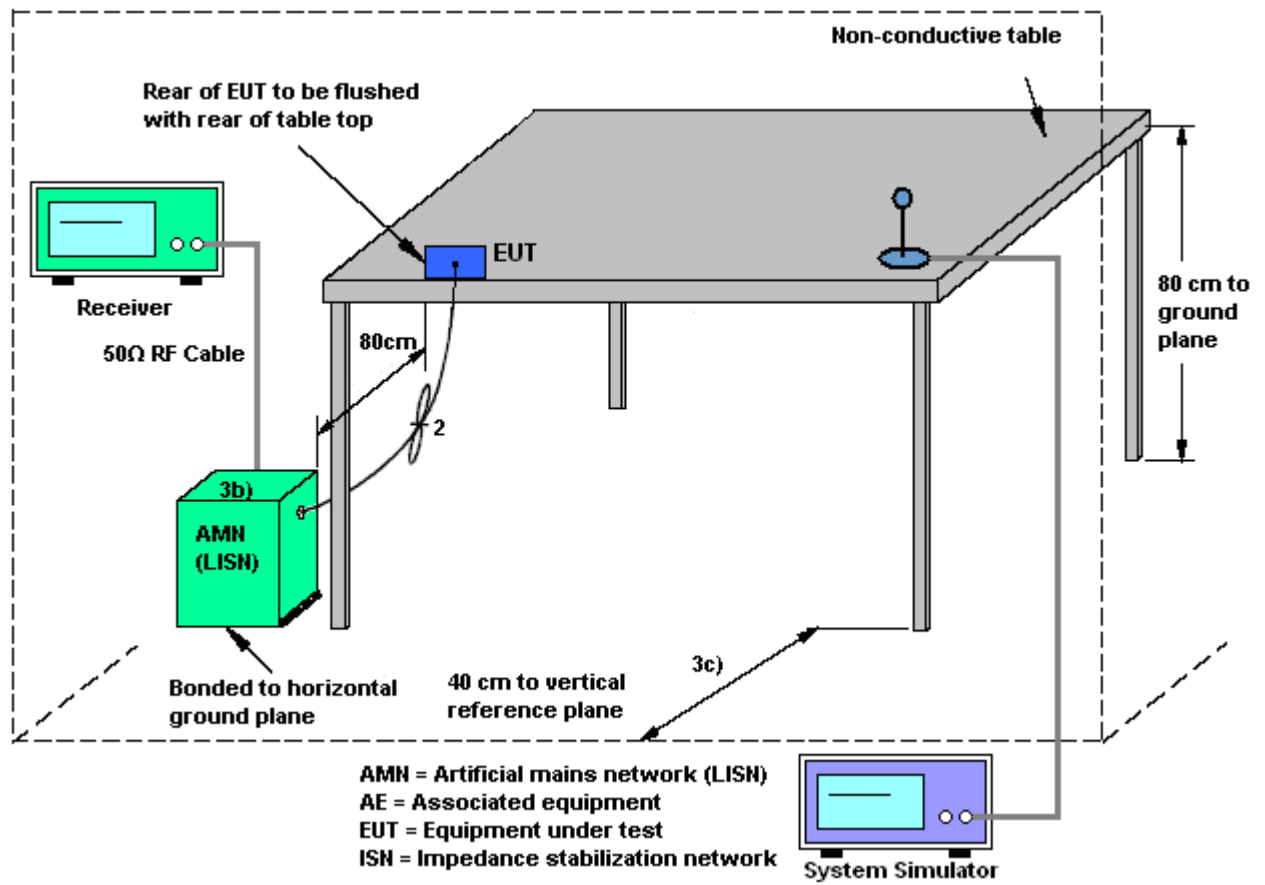
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

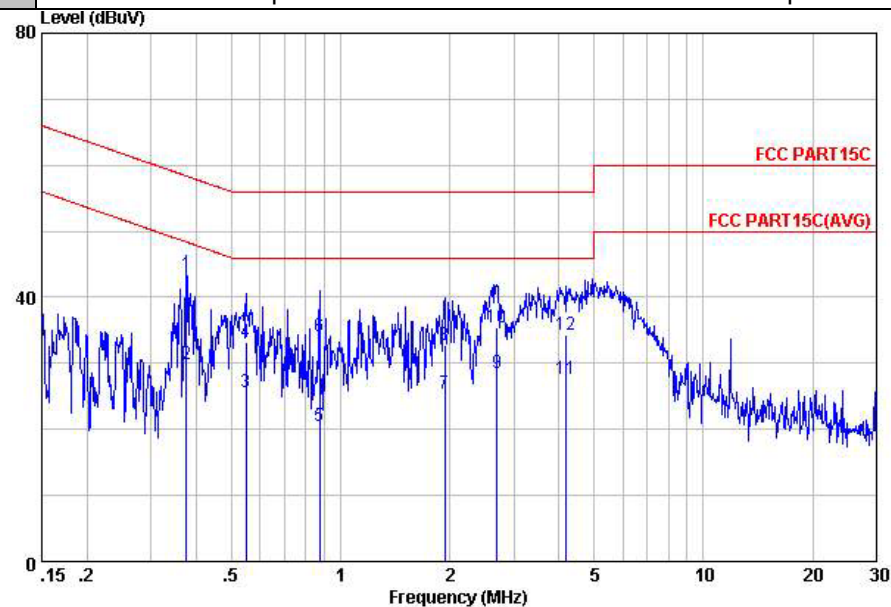
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network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

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

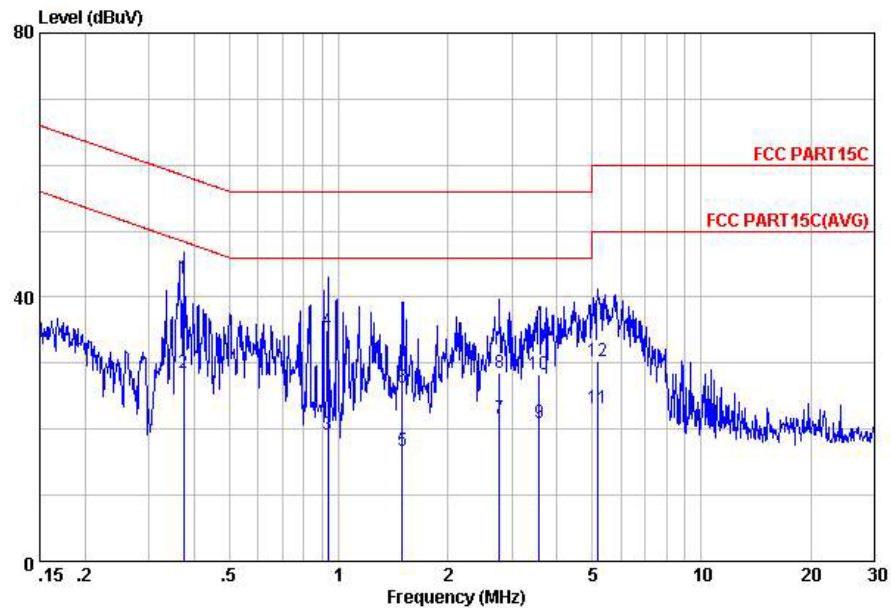
Test Mode :	Mode 2	Temperature :	19~20°C
Test Engineer :	Tom Wang	Relative Humidity :	39~40%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM1900 Idle + Bluetooth Link + WLAN Link + Earphone + MP3 + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : C001-KS
Condition: FCC PART15C LISN-100807 LINE
mode : Mode 2

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.38	43.41	-14.98	58.39	33.30	-0.08	10.19	QP
2	0.38	29.81	-18.58	48.39	19.70	-0.08	10.19	Average
3	0.55	25.73	-20.27	46.00	15.59	-0.08	10.22	Average
4	0.55	33.13	-22.87	56.00	22.99	-0.08	10.22	QP
5	0.88	20.46	-25.54	46.00	10.31	-0.10	10.25	Average
6	0.88	34.16	-21.84	56.00	24.01	-0.10	10.25	QP
7	1.94	25.42	-20.58	46.00	15.20	-0.11	10.33	Average
8	1.94	32.72	-23.28	56.00	22.50	-0.11	10.33	QP
9	2.69	28.45	-17.55	46.00	18.20	-0.11	10.36	Average
10	2.69	35.35	-20.65	56.00	25.10	-0.11	10.36	QP
11	4.18	27.56	-18.44	46.00	17.30	-0.13	10.39	Average
12	4.18	34.26	-21.74	56.00	24.00	-0.13	10.39	QP

Test Mode :	Mode 2	Temperature :	19~20°C
Test Engineer :	Tom Wang	Relative Humidity :	39~40%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM1900 Idle + Bluetooth Link + WLAN Link + Earphone + MP3 + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : C001-KS
 Condition: FCC PART15C LISN-100807 NEUTRAL
 mode : Mode 2

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.37	42.81	-15.62	58.43	32.70	-0.08	10.19	QP
2	0.37	28.61	-19.82	48.43	18.50	-0.08	10.19	Average
3	0.93	19.07	-26.93	46.00	8.90	-0.09	10.26	Average
4	0.93	34.97	-21.03	56.00	24.80	-0.09	10.26	QP
5	1.50	16.80	-29.20	46.00	6.60	-0.10	10.30	Average
6	1.50	26.30	-29.70	56.00	16.10	-0.10	10.30	QP
7	2.78	21.65	-24.35	46.00	11.41	-0.12	10.36	Average
8	2.78	28.45	-27.55	56.00	18.21	-0.12	10.36	QP
9	3.57	21.06	-24.94	46.00	10.80	-0.12	10.38	Average
10	3.57	28.26	-27.74	56.00	18.00	-0.12	10.38	QP
11	5.19	23.27	-26.73	50.00	13.00	-0.13	10.40	Average
12	5.19	30.27	-29.73	60.00	20.00	-0.13	10.40	QP

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

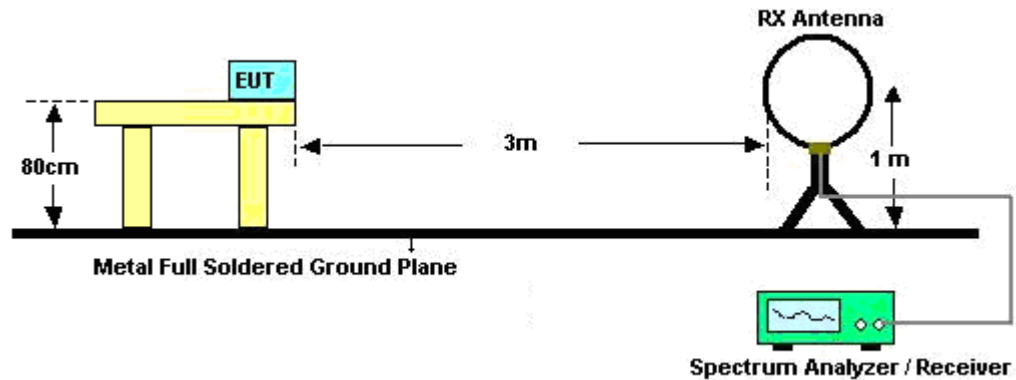
See list of measuring instruments of this test report.

3.7.3 Test Procedures

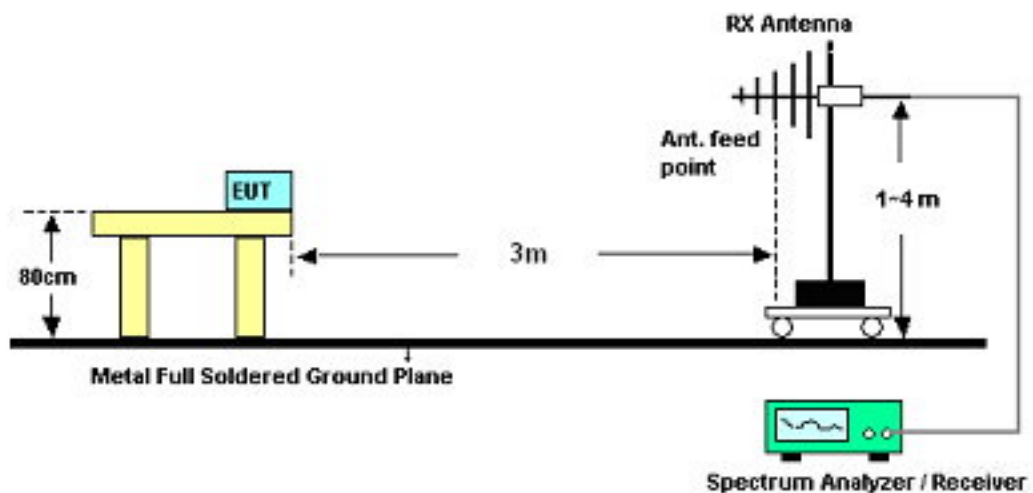
- Use the following spectrum analyzer settings:
 - Span shall wide enough to fully capture the emission being measured;
 - Set RBW = 1 MHz for $f \geq 1$ GHz, 100 KHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - Measurement above 18 GHz shall be extrapolated 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

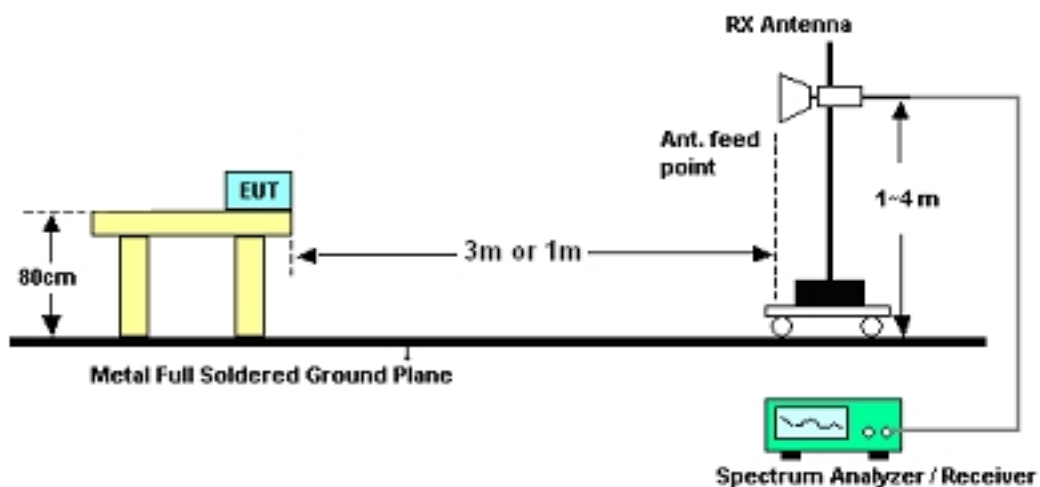
For radiated emissions below 30MHz



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 :	21~22℃
Test Channel :	01	Relative Humidity :	46~47%
Test Engineer :	Chenmy Cheng	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	22.46	-17.54	40	34.28	18	0.26	30.08	-	-	Peak
241.46	19.12	-26.88	46	36.67	11.61	0.66	29.82	-	-	Peak
596.48	22.58	-23.42	46	32.54	18.59	1.07	29.62	-	-	Peak
865.17	27.55	-18.45	46	35.38	20.49	1.29	29.61	-	-	Peak
939.86	29.24	-16.76	46	36.75	20.69	1.33	29.53	100	109	Peak
957.32	28.33	-25.67	54	35.76	20.77	1.34	29.54	-	-	Peak
2340.02	50.24	-23.76	74	48.07	32.78	3.33	33.94	200	21	Peak
2340.02	36.76	-17.24	54	34.59	32.78	3.33	33.94	200	21	Average
2412	100.03	-	-	97.7	32.89	3.52	34.08	200	106	Peak
2412	94.96	-	-	92.63	32.89	3.52	34.08	200	106	Average
2491.83	49.91	-24.09	74	47.37	33.05	3.72	34.23	100	301	Peak
2491.83	36.7	-17.3	54	34.16	33.05	3.72	34.23	100	301	Average

Test Mode :	Mode 1	Temperature :	21~22℃
Test Channel :	01	Relative Humidity :	46~47%
Test Engineer :	Chenmy Cheng	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
36.79	27.2	-12.8	40	42.84	14.19	0.24	30.07	-	-	Peak
55.22	29.47	-10.53	40	53.11	6.2	0.29	30.13	100	263	Peak
567.38	26.07	-19.93	46	36.18	18.53	1.02	29.66	-	-	Peak
914.64	26.89	-19.11	46	34.56	20.52	1.31	29.5	-	-	Peak
939.86	27.75	-18.25	46	35.26	20.69	1.33	29.53	-	-	Peak
960.23	28.57	-25.43	54	35.98	20.79	1.34	29.54	-	-	Peak
2362.63	49.84	-24.16	74	47.63	32.81	3.38	33.98	200	103	Peak
2362.63	36.82	-17.18	54	34.61	32.81	3.38	33.98	200	103	Average
2412	98.38	-	-	96.05	32.89	3.52	34.08	200	201	Peak
2412	93.94	-	-	91.61	32.89	3.52	34.08	200	201	Average
2486.32	49.93	-24.07	74	47.44	33.01	3.68	34.2	200	31	Peak
2486.32	37.32	-16.68	54	34.83	33.01	3.68	34.2	200	31	Average

Test Mode :	Mode 2	Temperature :	21~22℃
Test Channel :	06	Relative Humidity :	46~47%
Test Engineer :	Chenmy Cheng	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
30	26.32	-13.68	40	38.14	18	0.26	30.08	100	199	Peak
811.82	25.53	-20.47	46	33.9	19.97	1.26	29.6	-	-	Peak
862.26	26.01	-19.99	46	33.85	20.5	1.28	29.62	-	-	Peak
914.64	29.69	-16.31	46	37.36	20.52	1.31	29.5	-	-	Peak
939.86	29.85	-16.15	46	37.36	20.69	1.33	29.53	-	-	Peak
960.23	27.97	-26.03	54	35.38	20.79	1.34	29.54	-	-	Peak
2370.42	50.65	-23.35	74	48.41	32.83	3.42	34.01	200	16	Peak
2370.42	36.85	-17.15	54	34.61	32.83	3.42	34.01	200	16	Average
2437	100.45	-	-	98.05	32.95	3.6	34.15	200	102	Peak
2437	96.21	-	-	93.81	32.95	3.6	34.15	200	102	Average
2491.26	50.04	-23.96	74	47.5	33.05	3.72	34.23	200	30	Peak
2491.26	37.07	-16.93	54	34.53	33.05	3.72	34.23	200	30	Average

Test Mode :	Mode 2	Temperature :	21~22℃
Test Channel :	06	Relative Humidity :	46~47%
Test Engineer :	Chenmy Cheng	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
36.79	26.65	-13.35	40	42.29	14.19	0.24	30.07	-	-	Peak
55.22	29.58	-10.42	40	53.22	6.2	0.29	30.13	100	156	Peak
573.2	28.15	-17.85	46	38.23	18.54	1.03	29.65	-	-	Peak
914.64	29.29	-16.71	46	36.96	20.52	1.31	29.5	-	-	Peak
939.86	30.18	-15.82	46	37.69	20.69	1.33	29.53	-	-	Peak
957.32	28.32	-25.68	54	35.75	20.77	1.34	29.54	-	-	Peak
2336.79	50.59	-23.41	74	48.42	32.78	3.33	33.94	100	26	Peak
2336.79	36.82	-17.18	54	34.65	32.78	3.33	33.94	100	26	Average
2437	96.15	-	-	93.75	32.95	3.6	34.15	100	57	Peak
2437	90.66	-	-	88.26	32.95	3.6	34.15	100	57	Average
2485.18	51.34	-22.66	74	48.85	33.01	3.68	34.2	100	162	Peak
2485.18	37.05	-16.95	54	34.56	33.01	3.68	34.2	100	162	Average

Test Mode :	Mode 3	Temperature :	21~22℃
Test Channel :	11	Relative Humidity :	46~47%
Test Engineer :	Chenmy Cheng	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
30	25.44	-14.56	40	37.26	18	0.26	30.08	100	15	Peak
239.52	18.76	-27.24	46	36.41	11.51	0.66	29.82	-	-	Peak
774.96	24.83	-21.17	46	33.3	19.88	1.22	29.57	-	-	Peak
872.93	27.04	-18.96	46	34.85	20.48	1.29	29.58	-	-	Peak
914.64	30.7	-15.3	46	38.37	20.52	1.31	29.5	-	-	Peak
939.86	28.88	-17.12	46	36.39	20.69	1.33	29.53	-	-	Peak
2355.03	49.5	-24.5	74	47.29	32.81	3.38	33.98	100	21	Peak
2355.03	37.12	-16.88	54	34.91	32.81	3.38	33.98	100	21	Average
2462	102.79	-	-	100.34	32.98	3.64	34.17	100	330	Peak
2462	98.08	-	-	95.63	32.98	3.64	34.17	100	330	Average
2484.8	50.33	-23.67	74	47.84	33.01	3.68	34.2	100	120	Peak
2484.8	38.62	-15.38	54	36.13	33.01	3.68	34.2	100	120	Average

Test Mode :	Mode 3	Temperature :	21~22℃
Test Channel :	11	Relative Humidity :	46~47%
Test Engineer :	Chenmy Cheng	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
36.79	27.34	-12.66	40	42.98	14.19	0.24	30.07	-	-	Peak
55.22	29.99	-10.01	40	53.63	6.2	0.29	30.13	100	20	Peak
536.34	26.12	-19.88	46	36.6	18.22	0.99	29.69	-	-	Peak
567.38	27.29	-18.71	46	37.4	18.53	1.02	29.66	-	-	Peak
939.86	28.94	-17.06	46	36.45	20.69	1.33	29.53	-	-	Peak
960.23	28.48	-25.52	54	35.89	20.79	1.34	29.54	-	-	Peak
2383.34	49.72	-24.28	74	47.48	32.83	3.42	34.01	100	12	Peak
2383.34	36.75	-17.25	54	34.51	32.83	3.42	34.01	100	12	Average
2462	98.8	-	-	96.35	32.98	3.64	34.17	100	181	Peak
2462	93.71	-	-	91.26	32.98	3.64	34.17	100	181	Average
2483.85	50.11	-23.89	74	47.62	33.01	3.68	34.2	100	26	Peak
2483.85	37.05	-16.95	54	34.56	33.01	3.68	34.2	100	26	Average

Test Mode :	Mode 4	Temperature :	21~22℃
Test Channel :	01	Relative Humidity :	46~47%
Test Engineer :	Chenmy Cheng	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	25.53	-14.47	40	37.35	18	0.26	30.08	100	201	Peak
127.97	18.21	-25.29	43.5	36	11.72	0.47	29.98	-	-	Peak
241.46	18.98	-27.02	46	36.53	11.61	0.66	29.82	-	-	Peak
870.99	27.63	-18.37	46	35.44	20.49	1.29	29.59	-	-	Peak
914.64	30.79	-15.21	46	38.46	20.52	1.31	29.5	-	-	Peak
939.86	27.66	-18.34	46	35.17	20.69	1.33	29.53	-	-	Peak
2378.02	50.06	-23.94	74	47.82	32.83	3.42	34.01	100	261	Peak
2378.02	36.9	-17.1	54	34.66	32.83	3.42	34.01	100	261	Average
2412	93.85	-	-	91.52	32.89	3.52	34.08	100	205	Peak
2412	84.95	-	-	82.62	32.89	3.52	34.08	100	205	Average
2490.69	49.27	-24.73	74	46.73	33.05	3.72	34.23	100	0	Peak
2490.69	37.07	-16.93	54	34.53	33.05	3.72	34.23	100	0	Average

Test Mode :	Mode 4	Temperature :	21~22℃
Test Channel :	01	Relative Humidity :	46~47%
Test Engineer :	Chenmy Cheng	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
36.79	26.99	-13.01	40	42.63	14.19	0.24	30.07	-	-	Peak
55.22	29.46	-10.54	40	53.1	6.2	0.29	30.13	100	206	Peak
540.22	27.61	-18.39	46	38	18.31	0.99	29.69	-	-	Peak
572.23	26.48	-19.52	46	36.57	18.54	1.03	29.66	-	-	Peak
939.86	28.99	-17.01	46	36.5	20.69	1.33	29.53	-	-	Peak
960.23	28.63	-25.37	54	36.04	20.79	1.34	29.54	-	-	Peak
2351.42	50.15	-23.85	74	47.98	32.78	3.33	33.94	100	0	Peak
2351.42	36.85	-17.15	54	34.68	32.78	3.33	33.94	100	0	Average
2412	90.84	-	-	88.51	32.89	3.52	34.08	100	185	Peak
2412	82.24	-	-	79.91	32.89	3.52	34.08	100	185	Average
2489.74	49.28	-24.72	74	46.74	33.05	3.72	34.23	100	32	Peak
2489.74	36.8	-17.2	54	34.26	33.05	3.72	34.23	100	32	Average

Test Mode :	Mode 5	Temperature :	21~22℃
Test Channel :	06	Relative Humidity :	46~47%
Test Engineer :	Chenmy Cheng	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
30	24.81	-15.19	40	36.63	18	0.26	30.08	100	201	Peak
54.25	19.13	-20.87	40	42.48	6.49	0.29	30.13	-	-	Peak
234.67	19.21	-26.79	46	37.19	11.23	0.65	29.86	-	-	Peak
874.87	26.78	-19.22	46	34.58	20.48	1.29	29.57	-	-	Peak
915.61	28.1	-17.9	46	35.76	20.53	1.31	29.5	-	-	Peak
939.86	29.16	-16.84	46	36.67	20.69	1.33	29.53	-	-	Peak
2353.51	49.29	-24.71	74	47.08	32.81	3.38	33.98	100	10	Peak
2353.51	36.9	-17.1	54	34.69	32.81	3.38	33.98	100	10	Average
2437	93.94	-	-	91.54	32.95	3.6	34.15	100	126	Peak
2437	85.21	-	-	82.81	32.95	3.6	34.15	100	126	Average
2485.94	49.84	-24.16	74	47.35	33.01	3.68	34.2	100	201	Peak
2485.94	37.61	-16.39	54	35.12	33.01	3.68	34.2	100	201	Average

Test Mode :	Mode 5	Temperature :	21~22℃
Test Channel :	06	Relative Humidity :	46~47%
Test Engineer :	Chenmy Cheng	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
36.79	27.5	-12.5	40	43.14	14.19	0.24	30.07	-	-	Peak
55.22	29.65	-10.35	40	53.29	6.2	0.29	30.13	100	0	Peak
548.95	27.15	-18.85	46	37.35	18.48	1	29.68	-	-	Peak
561.56	28.82	-17.18	46	38.96	18.52	1.01	29.67	-	-	Peak
914.64	29.76	-16.24	46	37.43	20.52	1.31	29.5	-	-	Peak
957.32	28.79	-25.21	54	36.22	20.77	1.34	29.54	-	-	Peak
2376.69	50.16	-23.84	74	47.92	32.83	3.42	34.01	100	251	Peak
2376.69	37.05	-16.95	54	34.81	32.83	3.42	34.01	100	251	Average
2437	91.31	-	-	88.91	32.95	3.6	34.15	100	163	Peak
2437	81.31	-	-	78.91	32.95	3.6	34.15	100	163	Average
2491.26	50.24	-23.76	74	47.7	33.05	3.72	34.23	100	26	Peak
2491.26	37.15	-16.85	54	34.61	33.05	3.72	34.23	100	26	Average

Test Mode :	Mode 6	Temperature :	21~22℃
Test Channel :	11	Relative Humidity :	46~47%
Test Engineer :	Chenmy Cheng	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
30	25.43	-14.57	40	37.25	18	0.26	30.08	100	201	Peak
54.25	19.47	-20.53	40	42.82	6.49	0.29	30.13	-	-	Peak
864.2	26.33	-19.67	46	34.17	20.5	1.28	29.62	-	-	Peak
915.61	29.85	-16.15	46	37.51	20.53	1.31	29.5	-	-	Peak
939.86	29.28	-16.72	46	36.79	20.69	1.33	29.53	-	-	Peak
960.23	27.87	-26.13	54	35.28	20.79	1.34	29.54	-	-	Peak
2326.53	49.85	-24.15	74	47.72	32.76	3.27	33.9	100	16	Peak
2326.53	36.81	-17.19	54	34.68	32.76	3.27	33.9	100	16	Average
2462	95.76	-	-	93.31	32.98	3.64	34.17	100	67	Peak
2462	87.03	-	-	84.58	32.98	3.64	34.17	100	67	Average
2483.5	57.12	-16.88	74	54.63	33.01	3.68	34.2	100	0	Peak
2483.5	41.34	-12.66	54	38.85	33.01	3.68	34.2	100	0	Average

Test Mode :	Mode 6	Temperature :	21~22℃
Test Channel :	11	Relative Humidity :	46~47%
Test Engineer :	Chenmy Cheng	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
36.79	27.04	-12.96	40	42.68	14.19	0.24	30.07	-	-	Peak
54.25	29.54	-10.46	40	52.89	6.49	0.29	30.13	100	321	Peak
537.31	27.81	-18.19	46	38.27	18.24	0.99	29.69	-	-	Peak
573.2	26.48	-19.52	46	36.56	18.54	1.03	29.65	-	-	Peak
915.61	35	-11	46	42.66	20.53	1.31	29.5	-	-	Peak
939.86	29.28	-16.72	46	36.79	20.69	1.33	29.53	-	-	Peak
2383.72	50.09	-23.91	74	47.85	32.83	3.42	34.01	100	16	Peak
2383.72	36.51	-17.49	54	34.27	32.83	3.42	34.01	100	16	Average
2462	92.81	-	-	90.36	32.98	3.64	34.17	100	22	Peak
2462	83.82	-	-	81.37	32.98	3.64	34.17	100	22	Average
2483.5	54.78	-19.22	74	52.29	33.01	3.68	34.2	100	0	Peak
2483.5	40.08	-13.92	54	37.59	33.01	3.68	34.2	100	0	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 with cutkey 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	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Dec. 30, 2011	Apr. 25, 2012 ~ Apr. 30, 2012	Dec. 29, 2012	Conducted (TH01-KS)
Power Meter	Agilent	E4416A	MY45101555	N/A	Aug. 23, 2011	Apr. 25, 2012 ~ Apr. 30, 2012	Aug. 22, 2012	Conducted (TH01-KS)
Power Sensor	Agilent	E9327A	MY44421198	N/A	Aug. 23, 2011	Apr. 25, 2012 ~ Apr. 30, 2012	Aug. 22, 2012	Conducted (TH01-KS)
DC Power Supply	TOPWARD	GPS-3030 D	E1884515	N/A	Aug. 23, 2011	Apr. 25, 2012 ~ Apr. 30, 2012	Aug. 22, 2012	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESCI7	100768	9kHz~7GHz	Jun. 02, 2011	Apr. 17, 2012	Jun. 01, 2012	Conduction (CO01-KS)
LISN	MessTec	AN3016	060103	9kHz~30MHz	Dec. 30, 2011	Apr. 17, 2012	Dec. 29, 2012	Conduction (CO01-KS)
LISN	MessTec	AN3016	060105	9kHz~30MHz	Dec. 30, 2011	Apr. 17, 2012	Dec. 29, 2012	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP0000008 11	N/A	Nov. 16, 2011	Apr. 17, 2012	Nov. 15, 2012	Conduction (CO01-KS)
System Simulator	R&S	CMU200	837587/066	GSM/GPRS850/900/1800/1900,	Dec. 30, 2011	Apr. 17, 2012	Dec. 29, 2012	Conduction (CO01-KS)
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Dec. 30, 2011	Apr. 29, 2012	Dec. 29, 2012	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP30	101400	9kHz~30GHz	Jun. 02, 2011	Apr. 29, 2012	Jun. 01, 2012	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Dec. 08, 2011	Apr. 29, 2012	Dec. 07, 2012	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	00075959	1GHz~18GHz	Jan. 06, 2012	Apr. 29, 2012	Jan. 05, 2013	Radiation (03CH01-KS)
Amplifier	Wireless	FPA-6592G	060029	9KHz~2GHz	Jan. 06, 2012	Apr. 29, 2012	Jan. 05, 2013	Radiation (03CH01-KS)
Amplifier	Wireless	FPA-6592G	060004	30MHz~2GHz	Dec. 30, 2011	Apr. 29, 2012	Dec. 29, 2012	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Dec. 30, 2011	Apr. 29, 2012	Dec. 29, 2012	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701023	1G-18GHz	Nov. 07, 2011	Apr. 29, 2012	Nov. 06, 2012	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15-40GHz	Oct. 11, 2011	Apr. 29, 2012	Oct. 10, 2012	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Apr. 29, 2012	Jul. 28, 2012	Radiation (03CH01-KS)

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 = $20\log(1-\Gamma_1*\Gamma_2)$	+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				