FCC RF Test Report

APPLICANT	:	Motorola Mobility LLC
EQUIPMENT	:	Cellular Mobile Phone
BRAND NAME	:	Motorola
MODEL NAME	:	4486
FCC ID	:	IHDT56QE2
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System

The product was received on Oct. 14, 2014 and testing was completed on Nov. 12, 2014. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in 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: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

SPORTON INTERNATIONAL INC.
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APPENDIX A. TEST RESULT OF RADIATED EMISSION

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR4O1411C	Rev. 01	Initial issue of report	Nov. 17, 2014

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.1	-	99% Bandwidth	-	Pass	-
3.2	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.40 dB at 2484.480 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 15.60 dB at 1.502 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Motorola Mobility LLC
222 W. Merchandise Mart Plaza, Suite 1800, Chicago IL. 60654, United States

1.2 Manufacturer

Motorola Mobility LLC
222 W. Merchandise Mart Plaza, Suite 1800, Chicago IL. 60654, United States

1.3 Product Feature of Equipment Under Test

Product Feature		
Equipment	Cellular Mobile Phone	
Brand Name	Motorola	
Model Name	4486	
FCC ID	IHDT56QE2	
IMEI	For Conductin Emission	SIM 1: 355452060024472 SIM 2: 355452060024480
	For Radiation Emission	SIM 1: 355452060023938 SIM 2: 355452060023946
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA WLAN 11b/g/n HT20 Bluetooth v2.1 EDR Bluetooth v4.0 - LE	
HW Version	P2A	
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.

Accessory List	
AC Adapter	Brand Name : Motorola
	Model Name : SPN5810A
Earphone	Brand Name : Motorola
	Model Name : SJYN1181B
Battery	Brand Name : Motorola
	Model Name : FT40

1.4 Product Specification subjective to this standard

Product Specification subjective to this standard	
Tx/Rx Channel Frequency Range	802.11b/g/n : 2412 MHz ~ 2462 MHz
Maximum (Peak) Output Power to Antenna	802.11b : 19.68 dBm (0.0929 W) 802.11g : 21.89 dBm (0.1545 W) 802.11n HT20 : 22.03 dBm (0.1596 W)
99% Occupied Bandwidth	**<2412 MHz ~ 2462 MHz>** 802.11b : 13.35MHz 802.11g : 18.65MHz 802.11n HT20 : 19.55MHz
Antenna Type	Fixed Internal Antenna type with gain 0.12 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	**Sporton Site No.**		
	TH02-HY	CO05-HY	03CH06-HY

Note: The test site complies with ANSI C63.4 2003 requirement.

1.7 Applicable 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 v03r02
- ANSI C63.4-2003

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.

2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals 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) and radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Z plane) were recorded in this report.

The final configuration from all the combinations and the worst-case data rates were investigated by measuring the maximum power across all the data rates and modulation modes under section 2.2.

Based on the worst configuration found above, the RF power setting is set individually to meet FCC compliance limit for the final conducted and radiated tests shown in section 2.3.

2.1 Carrier Frequency Channel

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 and data rate associated with the highest power were chosen for full test shown in the following tables.

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412MHz	19.46	19.45	19.05	19.23
CH 06	2437MHz	19.68	19.65	19.32	19.54
CH 11	2462MHz	19.64	19.62	19.59	19.60

Channel	Frequency	2.4GHz 802.11b Average Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412MHz	16.69	16.56	16.43	16.28
CH 06	2437MHz	16.89	16.72	16.62	16.49
CH 11	2462MHz	17.16	16.95	17.14	17.11

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	2412MHz	21.34	21.10	21.25	21.26	21.16	21.30	21.29	21.04
CH 06	2437MHz	21.89	21.82	21.77	21.81	21.73	21.81	21.74	21.01
CH 11	2462MHz	20.35	20.17	20.22	20.27	20.24	20.21	20.28	20.04

Channel	Frequency	2.4GHz 802.11g Average Power (dBm)							
		OFDM Data Rate							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
CH 01	2412MHz	13.49	13.47	13.38	13.45	13.47	13.32	13.44	13.46
CH 06	2437MHz	15.13	15.07	15.12	14.68	14.41	13.98	13.98	11.94
CH 11	2462MHz	11.67	11.53	11.59	11.61	11.60	11.58	11.63	11.28

Channel	Frequency	2.4GHz 802.11n HT20 RF Power (dBm)							
		OFDM Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412MHz	21.10	21.01	21.08	21.05	21.07	20.87	20.81	20.72
CH 06	2437MHz	**22.03**	21.96	21.94	21.97	21.71	21.55	20.99	19.24
CH 11	2462MHz	19.91	19.87	19.82	19.79	19.61	19.66	19.72	19.81

Channel	Frequency	2.4GHz 802.11n HT20 Average Power (dBm)							
		OFDM Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412MHz	12.78	12.74	12.75	12.69	12.74	12.47	12.49	12.11
CH 06	2437MHz	15.77	15.58	15.74	14.78	13.62	12.98	12.12	9.81
CH 11	2462MHz	10.79	10.71	10.74	10.70	10.42	10.37	10.34	10.40

2.3 Test Mode

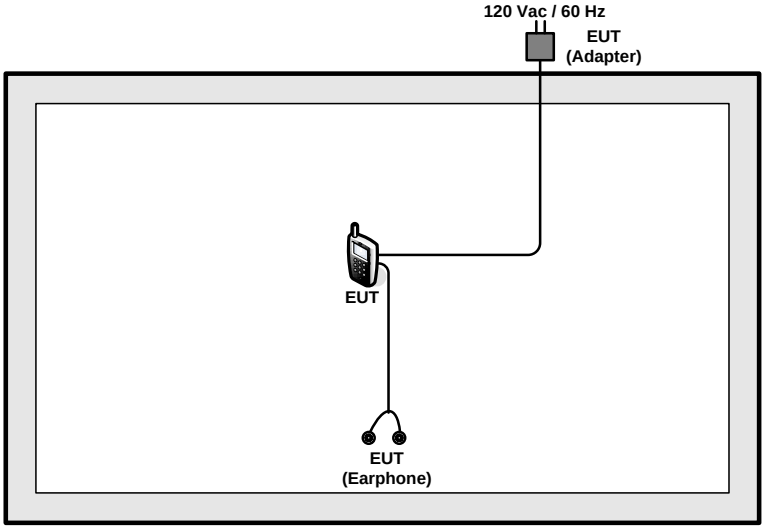
Final results of test modes, data rates and test channels are shown as following table.

Test Cases				
	Test Items	Mode	Data Rate	Test Channel
Conducted TCs	6dB and 99% BW Power Spectral Density	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	MCS0	1/6/11
	Output Power	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	MCS0	1/6/11
	Conducted Band Edge	802.11b	1 Mbps	1/11
		802.11g	6 Mbps	1/11
		802.11n HT20	MCS0	1/11
	Conducted Spurious Emission	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	MCS0	1/6/11
Radiated TCs	Radiated Band Edge	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	MCS0	1/6/11
	Radiated Spurious Emission	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	MCS0	1/6/11

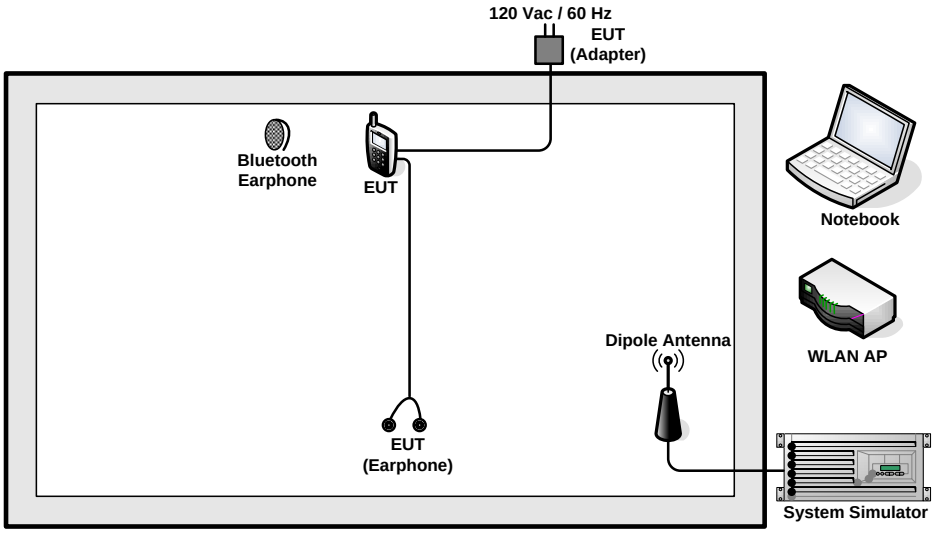
Test Cases	
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN Link + MP3 + Earphone + Battery + Adapter

2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.5 Support Unit used in test configuration and system

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.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
3.	WLAN AP	D-Link	DIR-865L	KA2IR865LA1	N/A	Unshielded, 1.8 m
4.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A

2.6 EUT Operation Test Setup

For WLAN function, programmed RF utility, “CMD” installed in the notebook make the EUT provide functions like channel selection and power level for continuous transmitting and receiving signals.

2.7 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

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

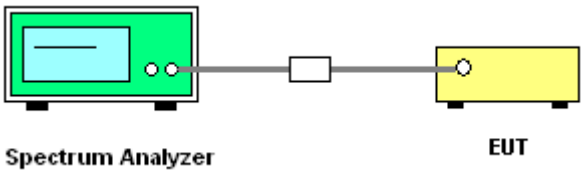
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v03r02.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) = 1MHz and set the Video bandwidth (VBW) = 3MHz.
6. Measure and record the results in the test report.

3.1.4 Test Setup

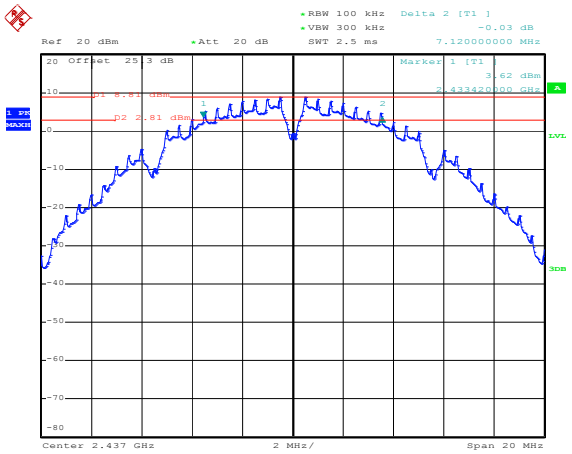


3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Test Band :	2.4GHz	**Temperature :**	21~26℃
Test Engineer :	Luffy Lin	**Relative Humidity :**	45~54%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	99% Bandwidth (MHz)	6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
11b	1Mbps	1	1	2412	12.80	7.60	0.5	Pass
11b	1Mbps	1	6	2437	12.55	7.12	0.5	Pass
11b	1Mbps	1	11	2462	13.35	8.00	0.5	Pass
11g	6Mbps	1	1	2412	18.30	16.40	0.5	Pass
11g	6Mbps	1	6	2437	18.60	16.32	0.5	Pass
11g	6Mbps	1	11	2462	18.65	16.44	0.5	Pass
HT20	MCS0	1	1	2412	19.15	17.64	0.5	Pass
HT20	MCS0	1	6	2437	19.55	17.56	0.5	Pass
HT20	MCS0	1	11	2462	19.15	17.66	0.5	Pass

Minimum 6dB Bandwidth



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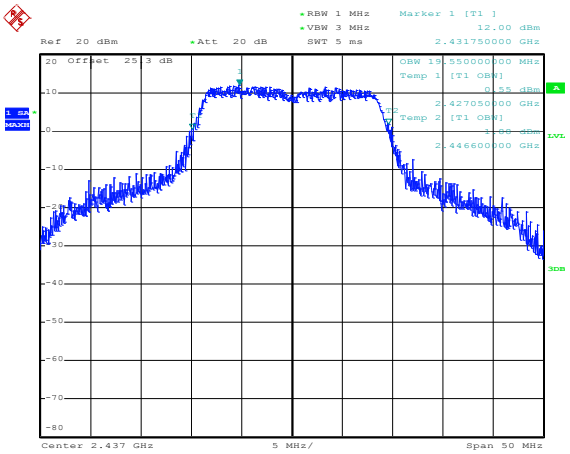
Maximum 99% Occupied Bandwidth



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Note : The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

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.

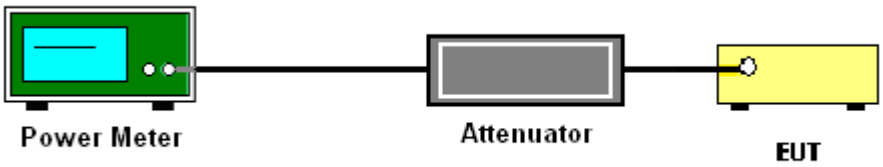
3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v03r02.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

3.2.4 Test Setup



3.2.5 Test Result of Peak Output Power

Test Mode :	2.4GHz	Temperature :	21~26℃
Test Engineer :	Luffy Lin	Relative Humidity :	45~54%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	RF Output Power (dBm)	Power Limit (dBm)	DG (dBi)	Pass/Fail
11b	1Mbps	1	1	2412	19.46	30	0.12	Pass
11b	1Mbps	1	6	2437	19.68	30	0.12	Pass
11b	1Mbps	1	11	2462	19.64	30	0.12	Pass
11g	6Mbps	1	1	2412	21.34	30	0.12	Pass
11g	6Mbps	1	6	2437	21.89	30	0.12	Pass
11g	6Mbps	1	11	2462	20.35	30	0.12	Pass
HT20	MCS0	1	1	2412	21.10	30	0.12	Pass
HT20	MCS0	1	6	2437	22.03	30	0.12	Pass
HT20	MCS0	1	11	2462	19.91	30	0.12	Pass

Note: Measured power (dBm) has offset with cable loss.

3.2.6 Test Result of Average output Power (Reporting Only)

Test Mode :	2.4GHz	Temperature :	21~26℃
Test Engineer :	Luffy Lin	Relative Humidity :	45~54%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	Duty Factor (dB)	Average Output Power (dBm)
11b	1Mbps	1	1	2412	0.08	16.69
11b	1Mbps	1	6	2437	0.08	16.89
11b	1Mbps	1	11	2462	0.08	17.16
11g	6Mbps	1	1	2412	0.66	13.49
11g	6Mbps	1	6	2437	0.66	15.13
11g	6Mbps	1	11	2462	0.66	11.67
HT20	MCS0	1	1	2412	0.65	12.78
HT20	MCS0	1	6	2437	0.65	15.77
HT20	MCS0	1	11	2462	0.65	10.79

Note: Measured power (dBm) has offset with cable loss and duty factor.

3.3 Power Spectral Density Measurement

3.3.1 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.

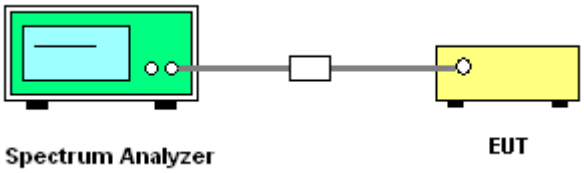
3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

1. The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
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.
6. Measure and record the results in the test report.

3.3.4 Test Setup



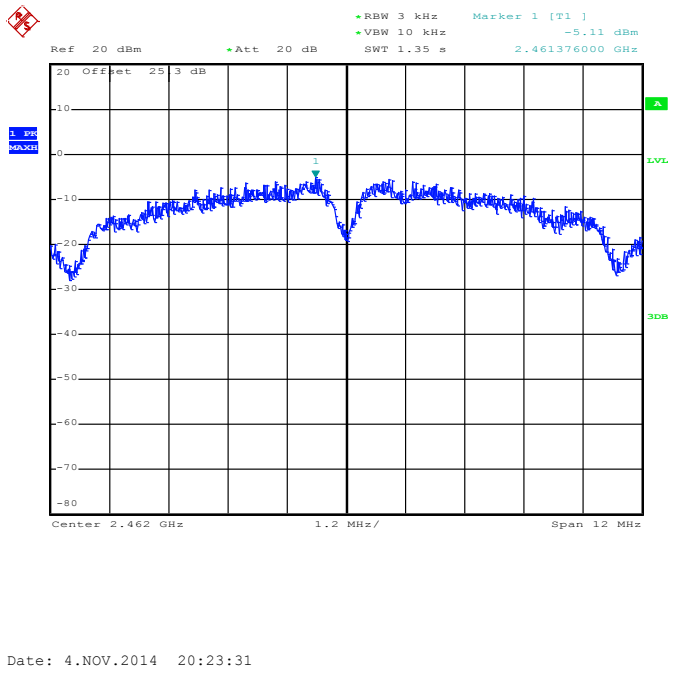
3.3.5 Test Result of Power Spectral Density

Test Mode :	2.4GHz	Temperature :	21~26℃
Test Engineer :	Luffy Lin	Relative Humidity :	45~54%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	Peak Power Density (dBm/3kHz)	Max. Limits (dBm/3kHz)	DG (dBi)	Pass/Fail
11b	1Mbps	1	1	2412	-6.64	8	0.12	Pass
11b	1Mbps	1	6	2437	-5.27	8	0.12	Pass
11b	1Mbps	1	11	2462	-5.11	8	0.12	Pass
11g	6Mbps	1	1	2412	-10.80	8	0.12	Pass
11g	6Mbps	1	6	2437	-10.81	8	0.12	Pass
11g	6Mbps	1	11	2462	-13.55	8	0.12	Pass
HT20	MCS0	1	1	2412	-11.58	8	0.12	Pass
HT20	MCS0	1	6	2437	-10.17	8	0.12	Pass
HT20	MCS0	1	11	2462	-14.35	8	0.12	Pass

Note: Measured power density (dBm) has offset with cable loss.

Worst Case Power Density (dBm/3kHz)



3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement and radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

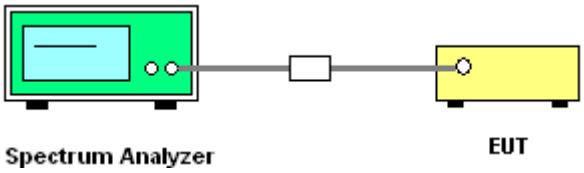
3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. 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).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.4.4 Test Setup

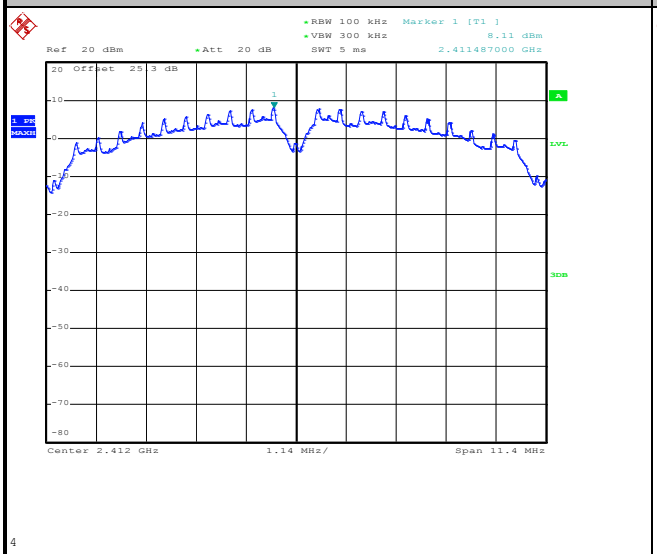


3.4.5 Test Result of Conducted Band Edges and Spurious Emission

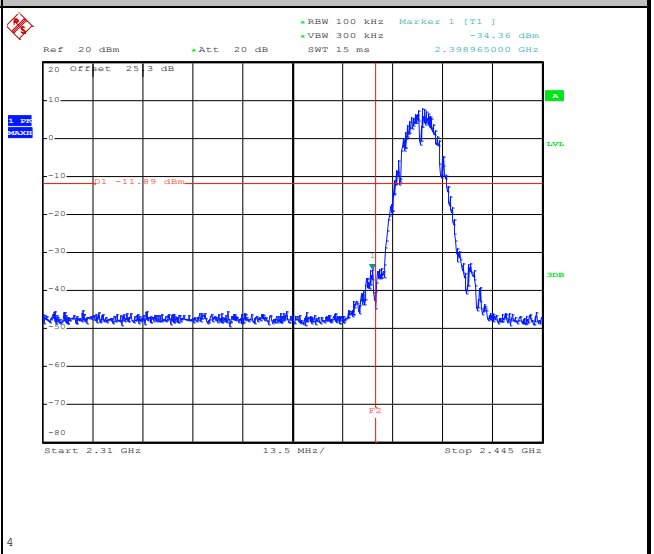
Test Mode :	802.11b	**Temperature :**	21~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	45~54%
Test Channel :	01	**Test Engineer :**	Luffy Lin

WLAN 802.11b Channel 01

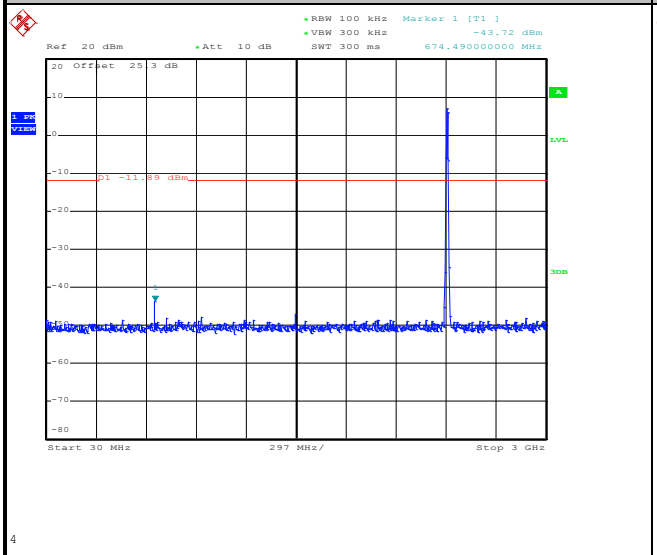
100kHz PSD reference Level



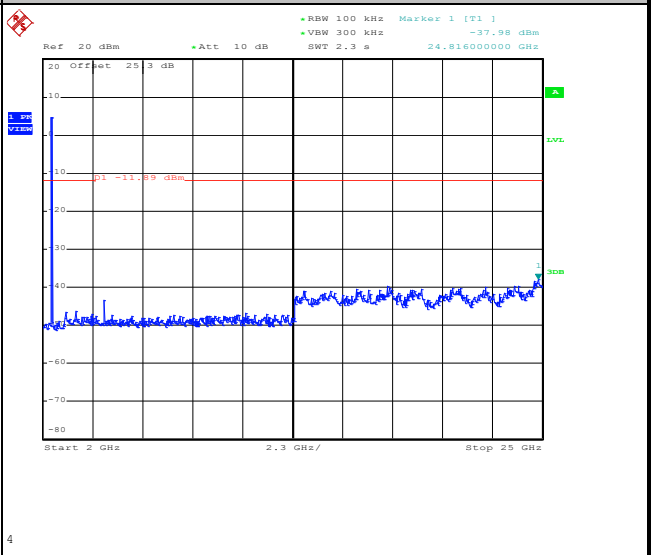
Low Channel Plot



Spurious Emission 30MHz~3GHz



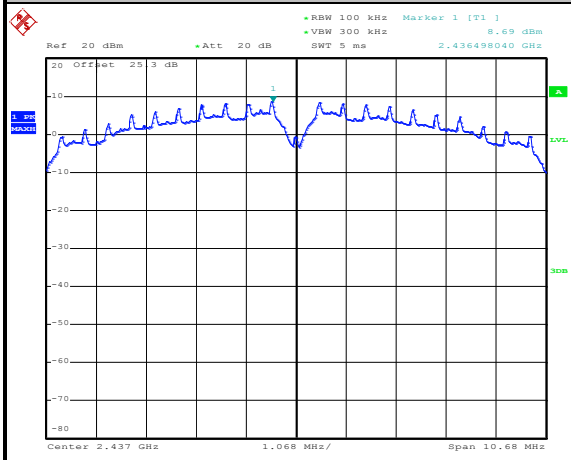
Spurious Emission 2GHz~25GHz



Test Mode :	802.11b	**Temperature :**	21~26℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	45~54%
Test Channel :	06	**Test Engineer :**	Luffy Lin

WLAN 802.11b Channel 06

100kHz PSD reference Level



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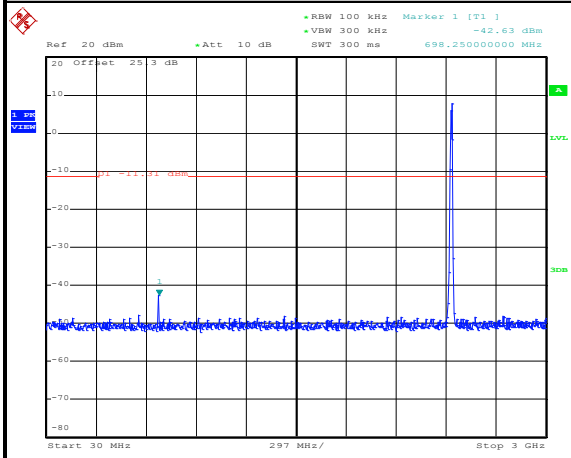
Date: 10.NOV.2014 23:02:21

Spurious Emission 30MHz~3GHz



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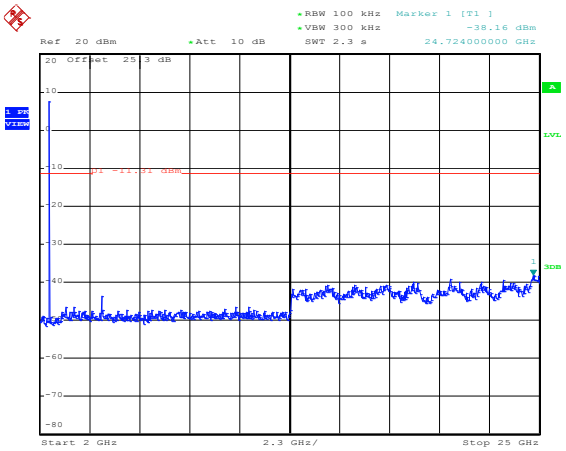
Date: 10.NOV.2014 23:02:44

Spurious Emission 2GHz~25GHz

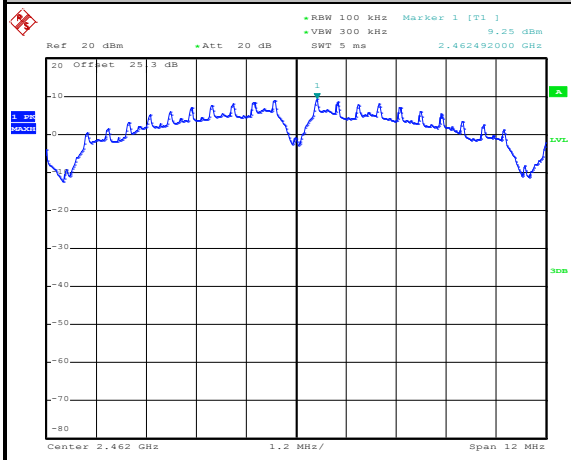


4
Date: 10.NOV.2014 23:03:02

Test Mode :	802.11b	**Temperature :**	21~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	45~54%
Test Channel :	11	**Test Engineer :**	Luffy Lin

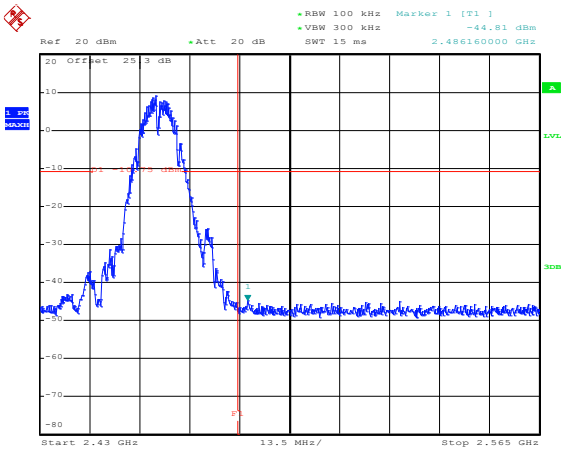
WLAN 802.11b Channel 11

100kHz PSD reference Level



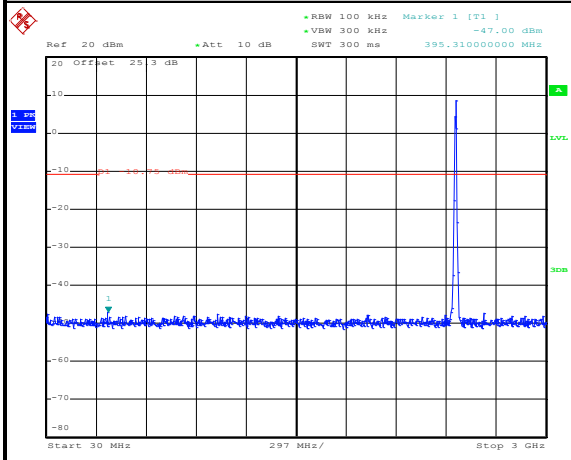
Date: 4.NOV.2014 20:23:54

High Channel Plot



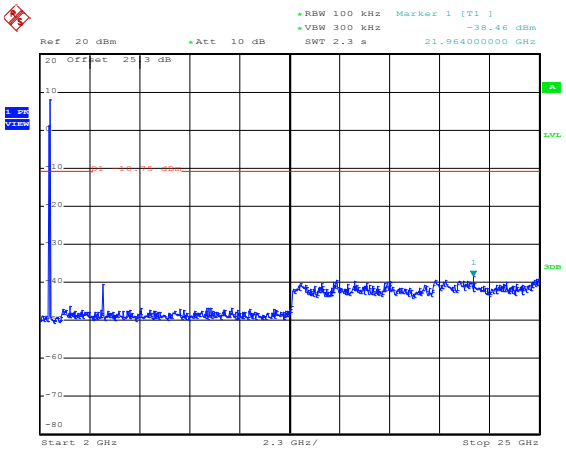
Date: 4.NOV.2014 20:24:13

Spurious Emission 30MHz~3GHz



Date: 4.NOV.2014 20:24:37

Spurious Emission 2GHz~25GHz

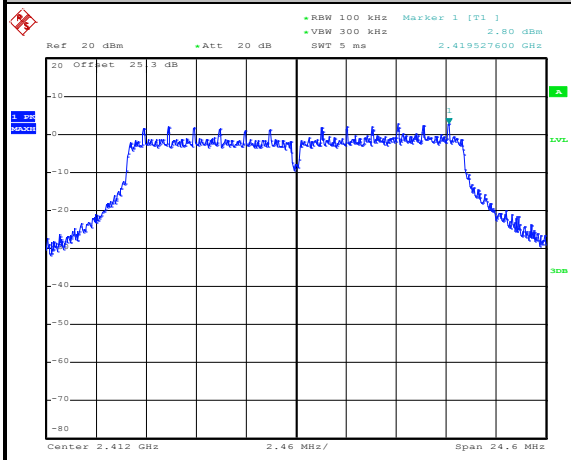


Date: 4.NOV.2014 20:24:55

Test Mode :	802.11g	**Temperature :**	21~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	45~54%
Test Channel :	01	**Test Engineer :**	Luffy Lin

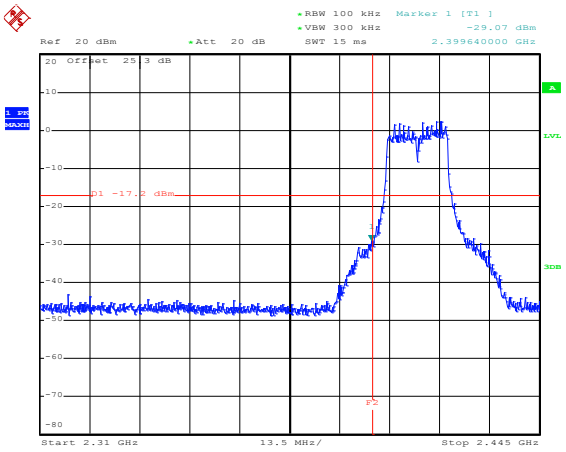
WLAN 802.11g Channel 01

100kHz PSD reference Level



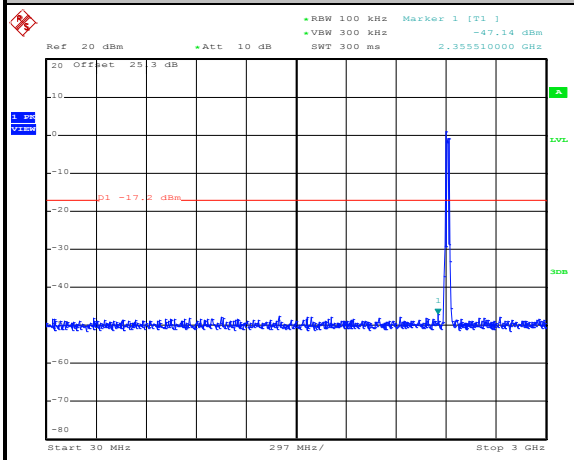
Date: 11.NOV.2014 22:35:43

Low Channel Plot



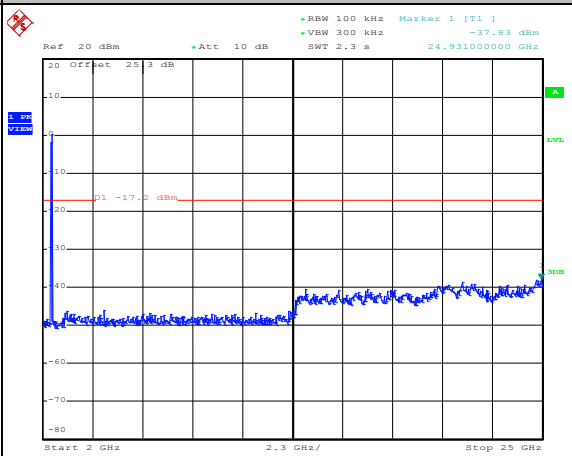
Date: 11.NOV.2014 22:36:04

Spurious Emission 30MHz~3GHz



Date: 11.NOV.2014 22:36:28

Spurious Emission 2GHz~25GHz

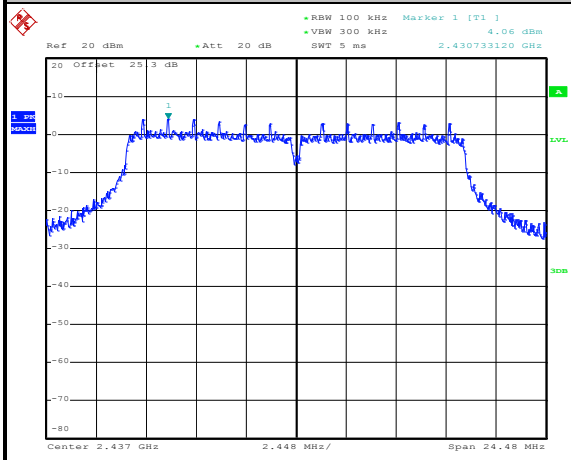


Date: 11.NOV.2014 22:36:46

Test Mode :	802.11g	**Temperature :**	21~26℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	45~54%
Test Channel :	06	**Test Engineer :**	Luffy Lin

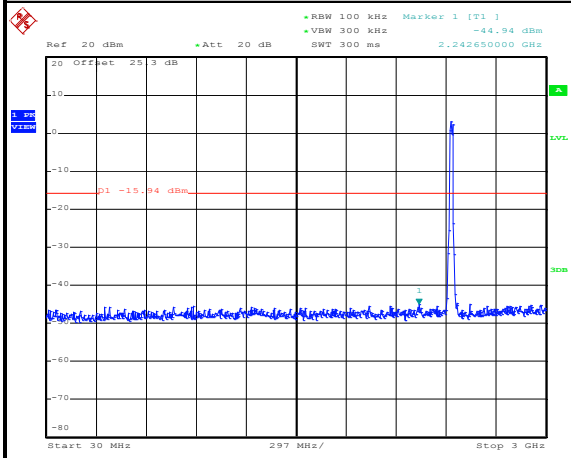
WLAN 802.11g Channel 06

100kHz PSD reference Level



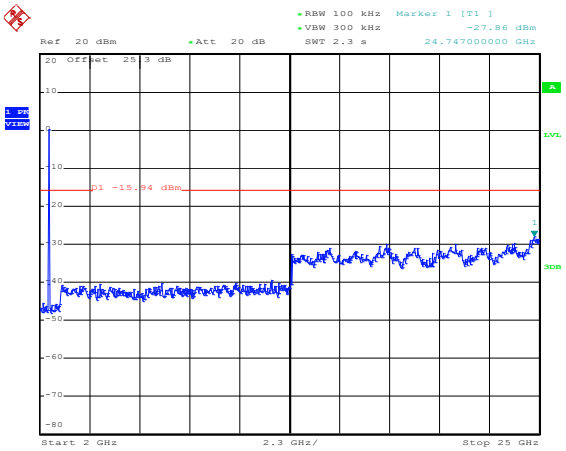
4
Date: 12.NOV.2014 15:11:10

Spurious Emission 30MHz~3GHz



4
Date: 12.NOV.2014 15:12:09

Spurious Emission 2GHz~25GHz

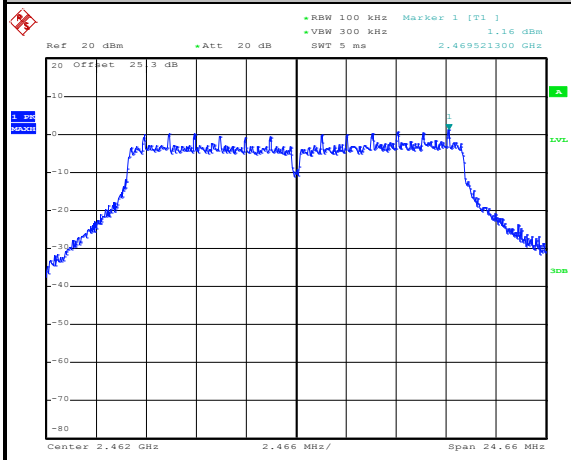


4
Date: 12.NOV.2014 15:12:26

Test Mode :	802.11g	**Temperature :**	21~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	45~54%
Test Channel :	11	**Test Engineer :**	Luffy Lin

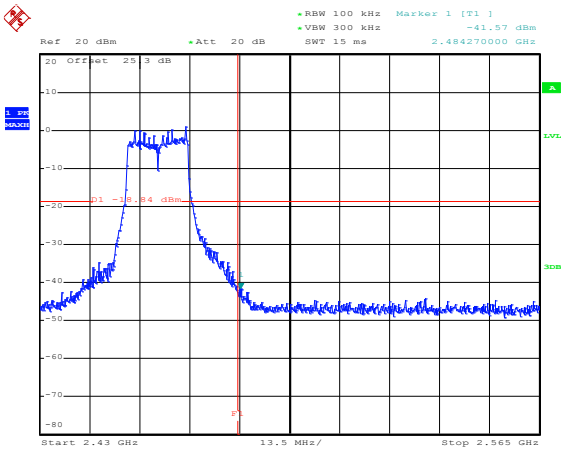
WLAN 802.11g Channel 11

100kHz PSD reference Level



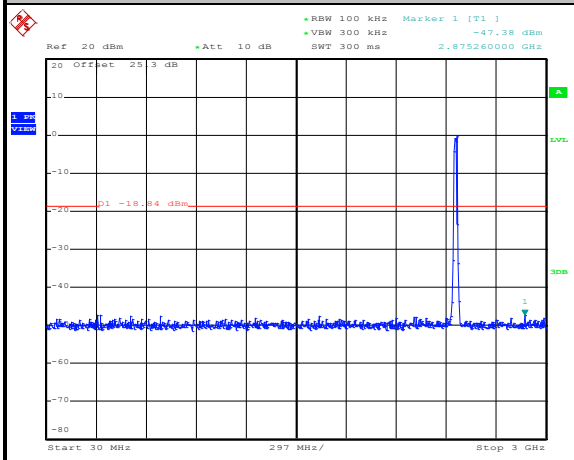
Date: 11.NOV.2014 22:40:30

High Channel Plot



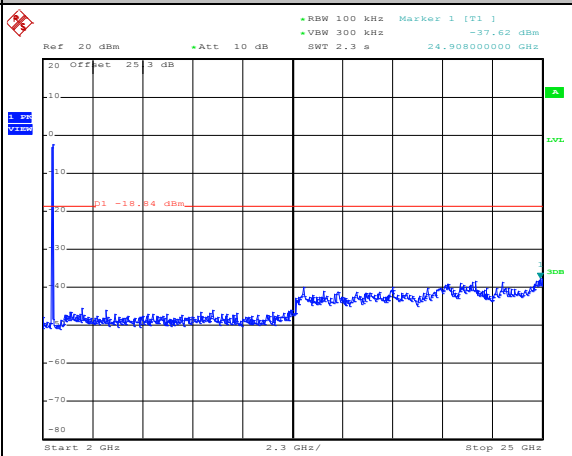
Date: 11.NOV.2014 22:40:47

Spurious Emission 30MHz~3GHz



Date: 11.NOV.2014 22:41:11

Spurious Emission 2GHz~25GHz

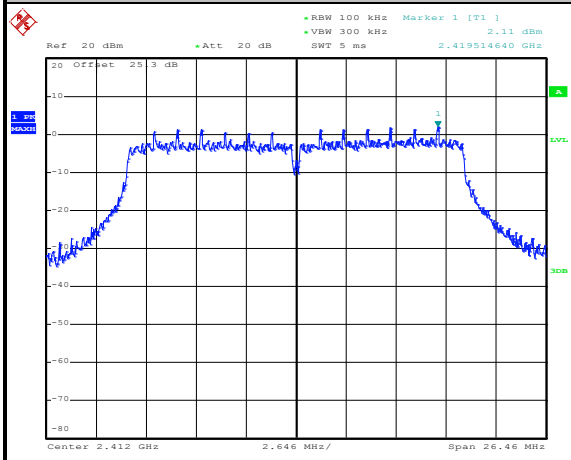


Date: 11.NOV.2014 22:41:29

Test Mode :	802.11n HT20	**Temperature :**	21~26℃
Test Band :	2.4GHz Low	**Relative Humidity :**	45~54%
Test Channel :	01	**Test Engineer :**	Luffy Lin

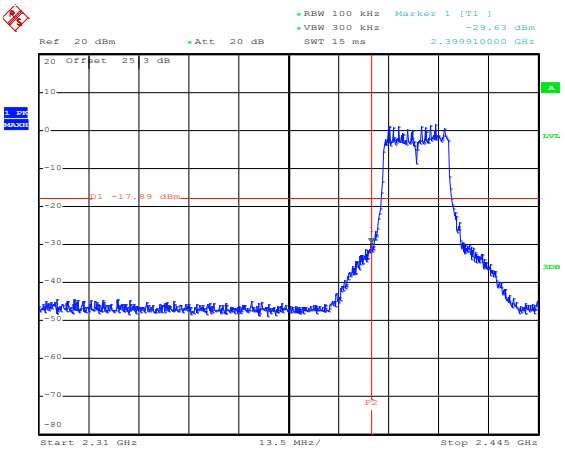
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



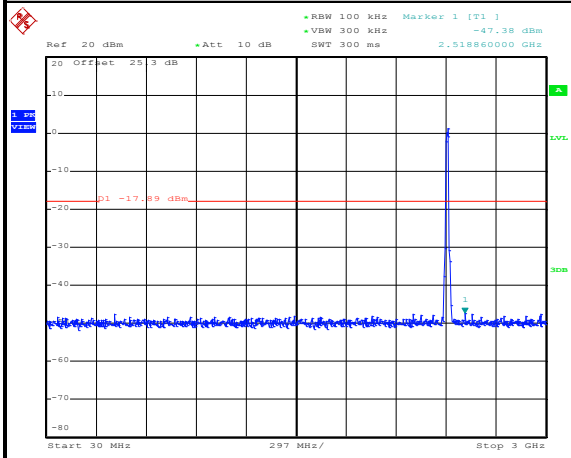
Date: 11.NOV.2014 22:45:45

Low Channel Plot



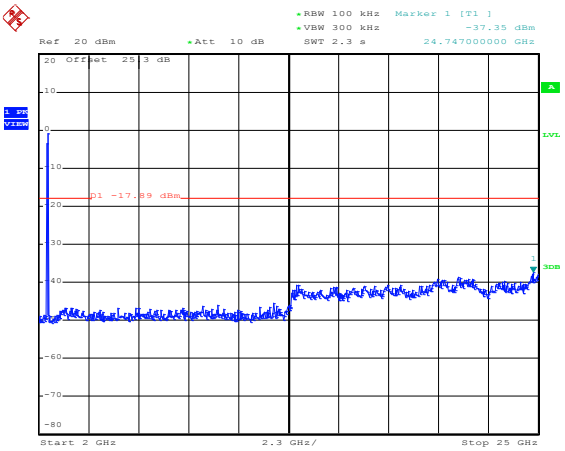
Date: 11.NOV.2014 22:46:04

Spurious Emission 30MHz~3GHz



Date: 11.NOV.2014 22:47:04

Spurious Emission 2GHz~25GHz

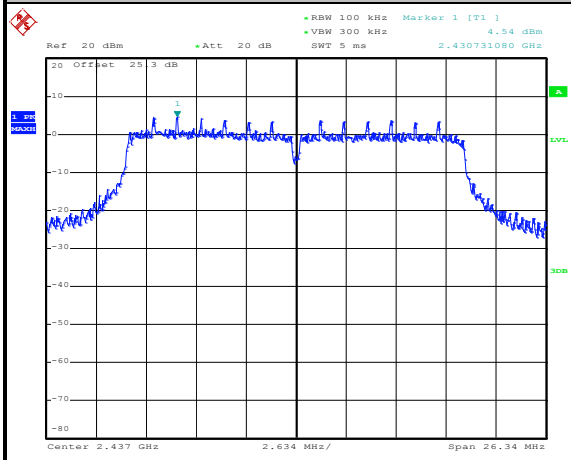


Date: 11.NOV.2014 22:47:22

Test Mode :	802.11n HT20	**Temperature :**	21~26℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	45~54%
Test Channel :	06	**Test Engineer :**	Luffy Lin

WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



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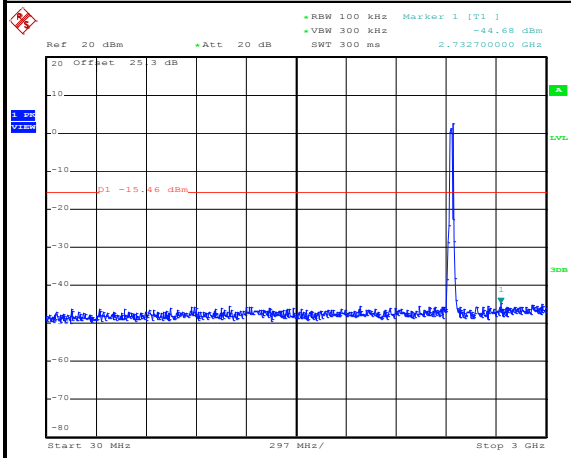
Date: 12.NOV.2014 15:18:20

Spurious Emission 30MHz~3GHz



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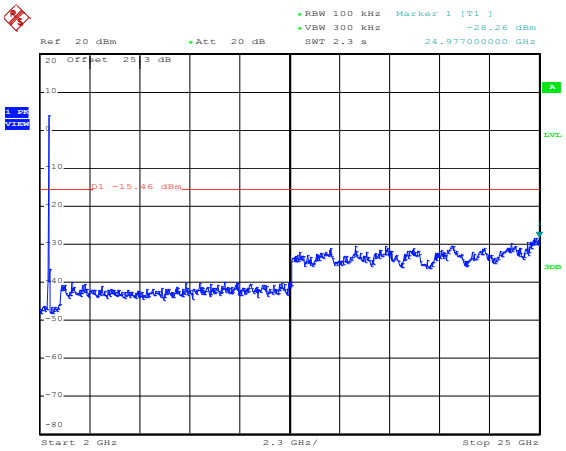
Date: 12.NOV.2014 15:18:47

Spurious Emission 2GHz~25GHz

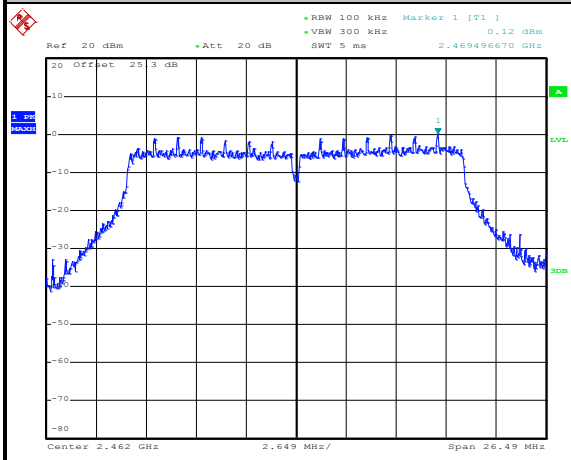


4
Date: 12.NOV.2014 15:19:05

Test Mode :	802.11n HT20	**Temperature :**	21~26℃
Test Band :	2.4GHz High	**Relative Humidity :**	45~54%
Test Channel :	11	**Test Engineer :**	Luffy Lin

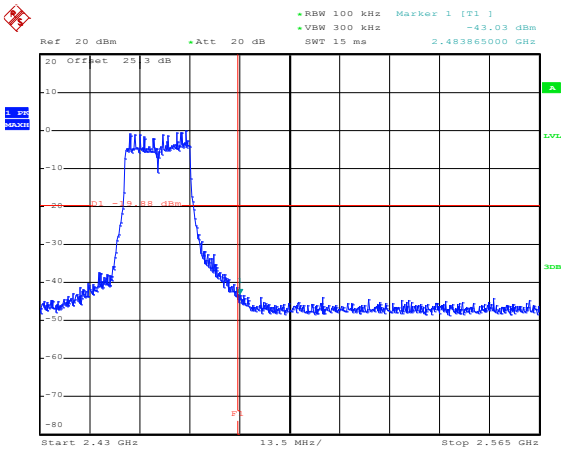
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



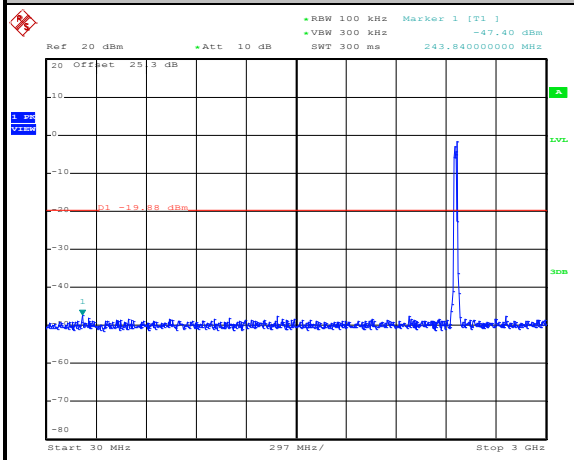
Date: 11.NOV.2014 22:51:45

High Channel Plot



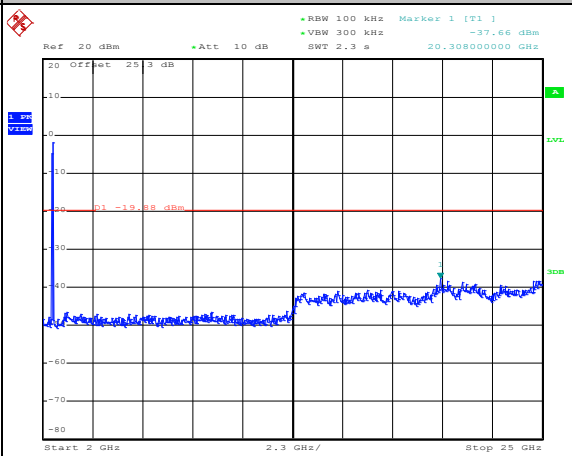
Date: 11.NOV.2014 22:52:04

Spurious Emission 30MHz~3GHz



Date: 11.NOV.2014 22:52:36

Spurious Emission 2GHz~25GHz



Date: 11.NOV.2014 22:52:54

3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

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

3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

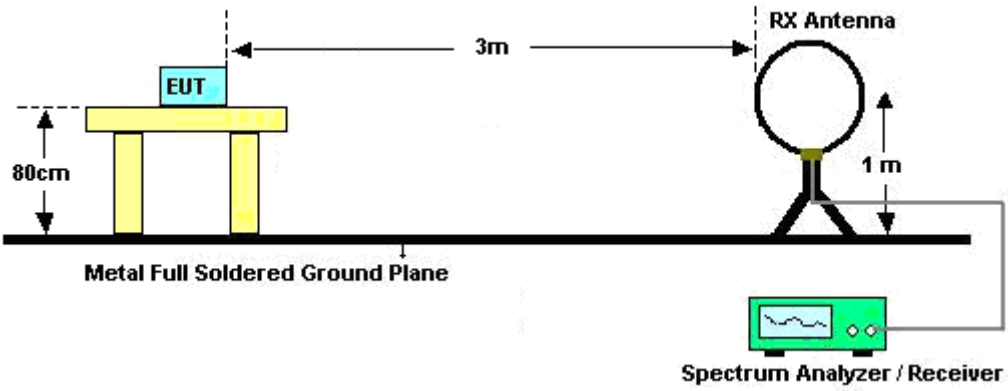
3.5.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

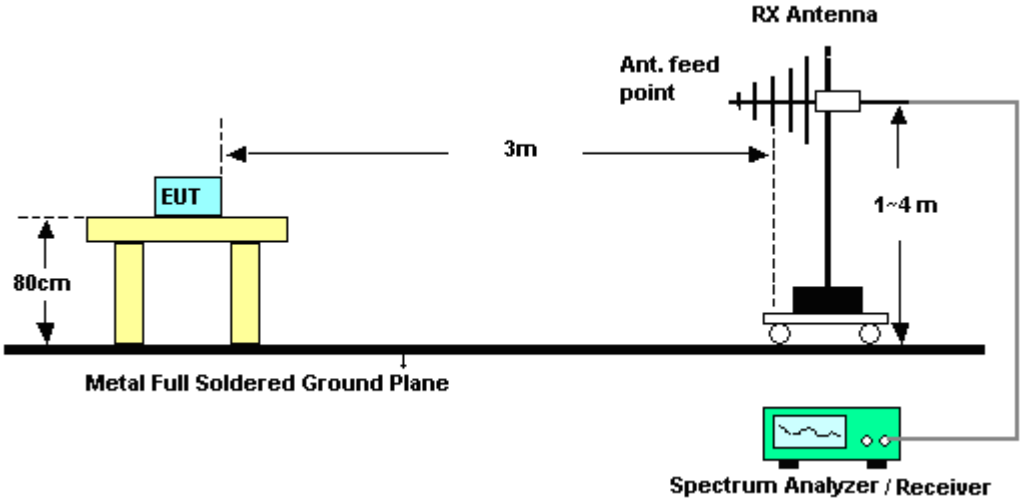
Band	Duty Cycle(%)	T(μs)	1/T(kHz)	VBW Setting
802.11b	98.1	-	-	10Hz
802.11g	85.86	1367.179	0.731	1kHz
2.4GHz 802.11n HT20	86.02	1282.051	0.780	1kHz

3.5.4 Test Setup

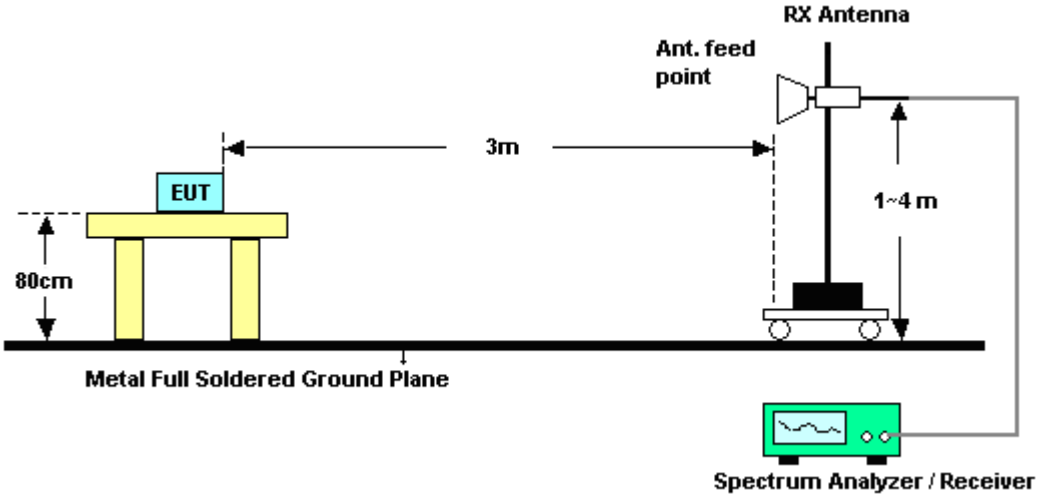
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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.

3.5.6 Test Result

Please refer to appendix A.

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 (dBμV)	
	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.

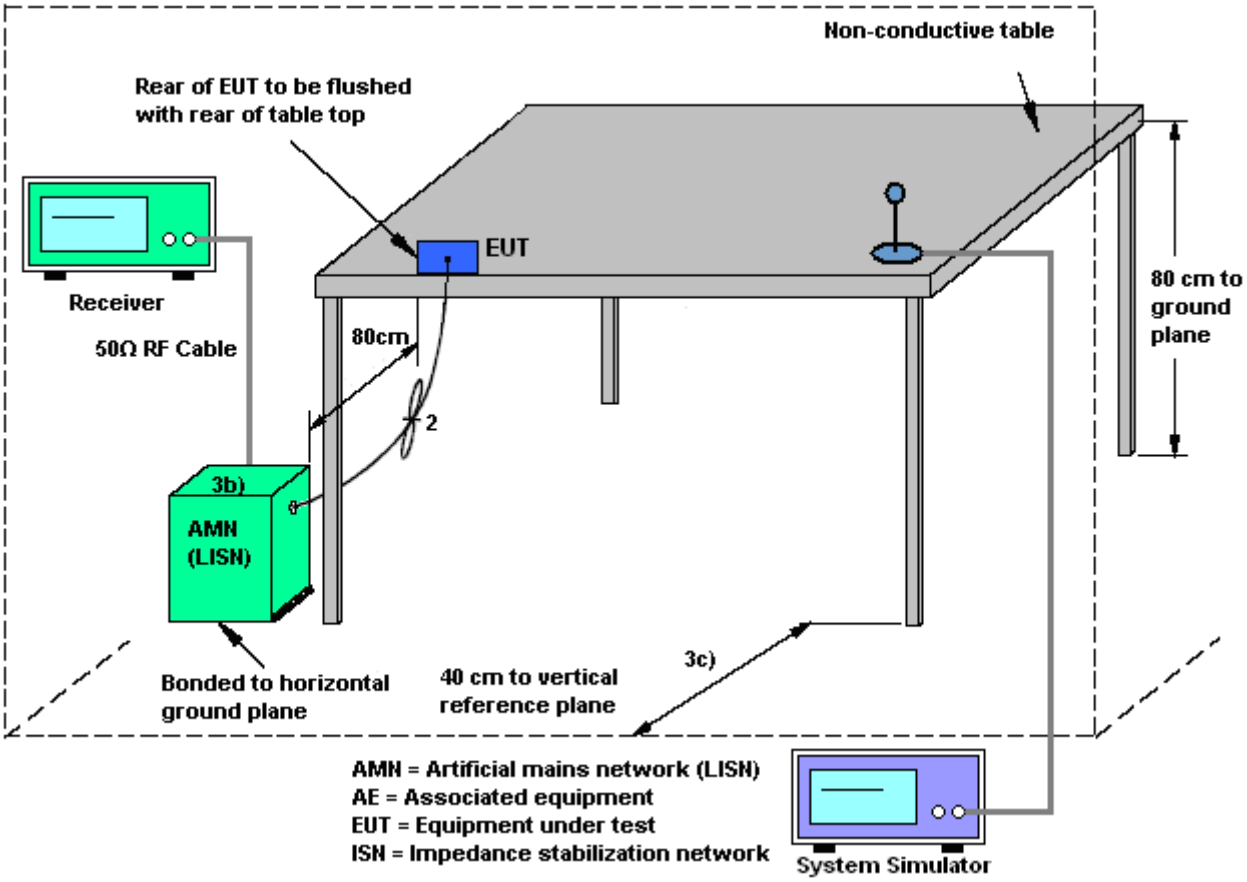
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

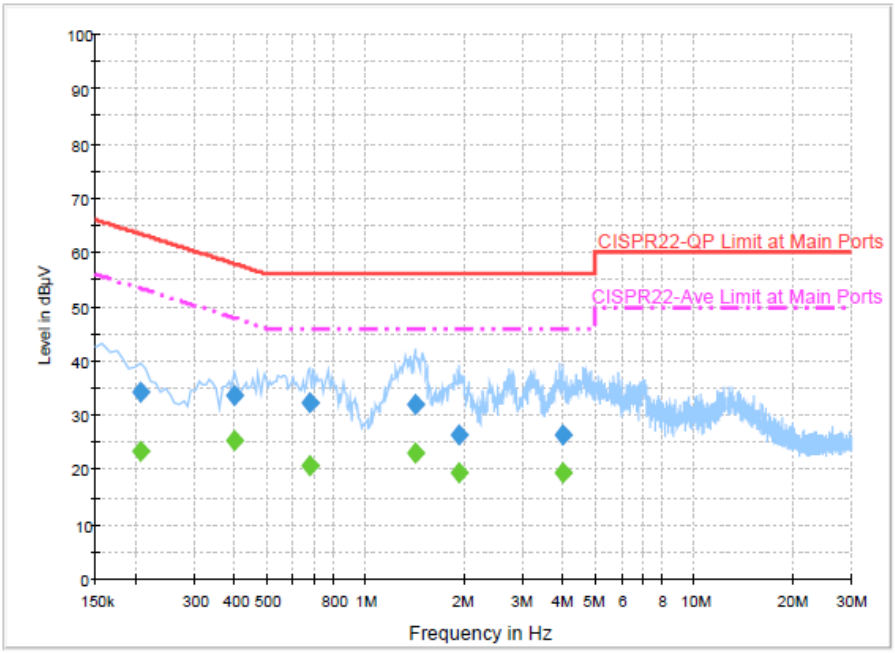
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other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

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	**Temperature :**	20~22℃
Test Engineer :	Cosmo Xu	**Relative Humidity :**	46~48%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + MP3 + Earphone + Battery + Adapter		



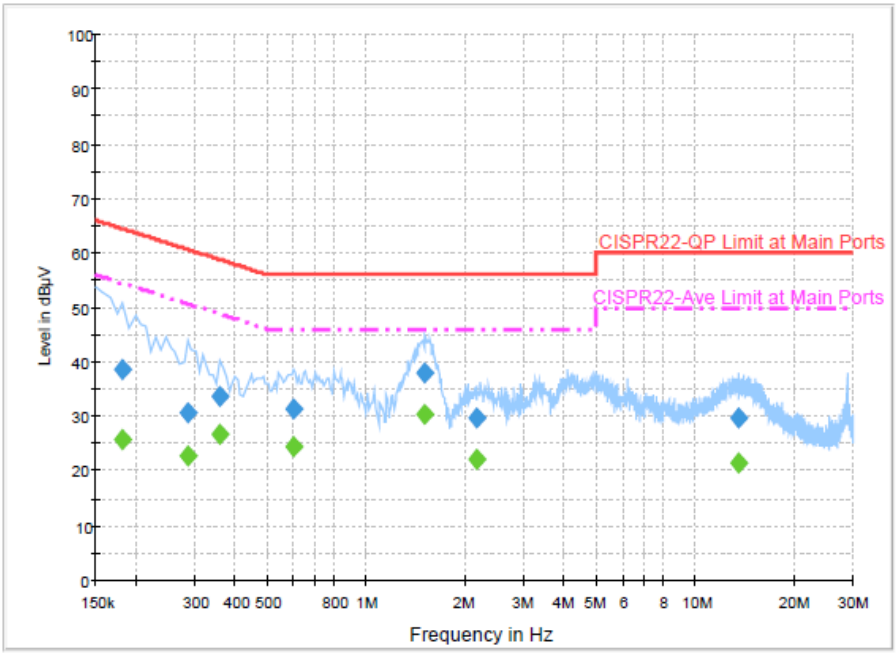
Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.206000	34.4	Off	L1	19.5	29.0	63.4
0.398000	33.8	Off	L1	19.5	24.1	57.9
0.678000	32.4	Off	L1	19.5	23.6	56.0
1.414000	32.2	Off	L1	19.5	23.8	56.0
1.918000	26.3	Off	L1	19.5	29.7	56.0
3.958000	26.3	Off	L1	19.6	29.7	56.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.206000	23.4	Off	L1	19.5	30.0	53.4
0.398000	25.3	Off	L1	19.5	22.6	47.9
0.678000	20.7	Off	L1	19.5	25.3	46.0
1.414000	23.0	Off	L1	19.5	23.0	46.0
1.918000	19.5	Off	L1	19.5	26.5	46.0
3.958000	19.3	Off	L1	19.6	26.7	46.0

Test Mode :	Mode 1	**Temperature :**	20~22℃
Test Engineer :	Cosmo Xu	**Relative Humidity :**	46~48%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + MP3 + Earphone + Battery + Adapter		



Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.182000	38.6	Off	N	19.5	25.8	64.4
0.286000	30.6	Off	N	19.5	30.0	60.6
0.358000	33.8	Off	N	19.5	25.0	58.8
0.598000	31.4	Off	N	19.5	24.6	56.0
1.502000	38.1	Off	N	19.5	17.9	56.0
2.158000	29.6	Off	N	19.3	26.4	56.0
13.446000	29.7	Off	N	19.8	30.3	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.182000	25.8	Off	N	19.5	28.6	54.4
0.286000	22.9	Off	N	19.5	27.7	50.6
0.358000	26.6	Off	N	19.5	22.2	48.8
0.598000	24.3	Off	N	19.5	21.7	46.0
1.502000	30.4	Off	N	19.5	15.6	46.0
2.158000	22.2	Off	N	19.3	23.8	46.0
13.446000	21.3	Off	N	19.8	28.7	50.0

3.7 Antenna Requirements

3.7.1 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.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 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	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Jun. 09, 2014	Oct. 21, 2014 ~ Nov. 12, 2014	Jun. 08, 2015	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	1036004	300MHz~40GHz	Aug. 09, 2014	Oct. 21, 2014 ~ Nov. 12, 2014	Aug. 08, 2015	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Aug. 09, 2014	Oct. 21, 2014 ~ Nov. 12, 2014	Aug. 08, 2015	Conducted (TH02-HY)
EMI Test Receiver	Rohde & Schwarz	ESCS 30	100356	9kHz ~ 2.75GHz	Nov. 15, 2013	Oct. 17, 2014	Nov. 14, 2014	Conduction (CO05-HY)
LISN (for auxiliary equipment)	Rohde & Schwarz	ENV216	100081	9kHz ~ 30MHz	Dec. 12, 2013	Oct. 17, 2014	Dec. 11, 2014	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz ~ 30MHz	Dec. 04, 2013	Oct. 17, 2014	Dec. 03, 2014	Conduction (CO05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Oct. 17, 2014	N/A	Conduction (CO05-HY)
Spectrum Analyzer	R&S	FSP30	101067	9kHz ~ 30GHz	Nov. 20, 2013	Nov. 09, 2014	Nov. 19, 2014	Radiation (03CH06-HY)
Spectrum Analyzer	Agilent	E4408B	MY44211030	9kHz ~ 26.5GHz	Dec. 02, 2013	Nov. 09, 2014	Dec. 01, 2014	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESVS10	834468/0003	20MHz ~ 1000MHz	May 06, 2014	Nov. 09, 2014	May 05, 2015	Radiation (03CH06-HY)
Bilog Antenna	Schaffner	CBL6112B	2885	30MHz ~ 2GHz	Sep. 27, 2014	Nov. 09, 2014	Sep. 26, 2015	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz ~ 18GHz	Jul. 24, 2014	Nov. 09, 2014	Jul. 23, 2015	Radiation (03CH06-HY)
Amplifier	SONOMA	310N	186713	9kHz ~ 1GHz	Apr. 16, 2014	Nov. 09, 2014	Apr. 15, 2015	Radiation (03CH06-HY)
Preamplifier	EMCI	EMC051845	SN980048	1GHz ~ 18GHz	Jul. 17, 2014	Nov. 09, 2014	Jul. 16, 2015	Radiation (03CH06-HY)
Turn Table	INN-CO	DS2000	420/650/00	0 ~ 360 degree	N/A	Nov. 09, 2014	N/A	Radiation (03CH06-HY)
Antenna Mast	MF	MF-7802	MF780208212	1 m ~ 4 m	N/A	Nov. 09, 2014	N/A	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	18GHz- 40GHz	Oct. 02, 2014	Nov. 09, 2014	Oct. 01, 2015	Radiation (03CH06-HY)
Preamplifier	Agilent	8449B	3008A01917	1GHz ~ 26.5GHz	Apr. 10, 2014	Nov. 09, 2014	Apr. 09, 2015	Radiation (03CH06-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Jul. 28, 2014	Nov. 09, 2014	Jul. 27, 2015	Radiation (03CH06-HY)

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.26**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.50**

Appendix A. Radiated Spurious Emission

Test Engineer :	Donny Tang	Temperature :	22~25℃
		Relative Humidity :	42~45%

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		2390	50.78	-23.22	74	47.27	31.94	6.21	34.64	102	316	P	H
		2389.47	40.04	-13.96	54	36.58	31.94	6.17	34.65	102	316	A	H
	*	2410	111.63	-	-	108.11	31.95	6.21	34.64	102	316	P	H
	*	2410	107.02	-	-	103.5	31.95	6.21	34.64	102	316	A	H
													H
													H
		2389.47	48.55	-25.45	74	45.09	31.94	6.17	34.65	129	299	P	V
		2389.11	36.91	-17.09	54	33.45	31.94	6.17	34.65	129	299	A	V
	*	2414	100.1	-	-	96.58	31.95	6.21	34.64	129	299	P	V
	*	2414	95.84	-	-	92.32	31.95	6.21	34.64	129	299	A	V
													V
													V
802.11b CH 06 2437MHz		2311.62	48.27	-25.73	74	44.96	31.89	6.07	34.65	128	302	P	H
		2389.83	36.99	-17.01	54	33.48	31.94	6.21	34.64	128	302	A	H
	*	2438	111.26	-	-	107.7	31.96	6.24	34.64	128	302	P	H
	*	2438	107.04	-	-	103.48	31.96	6.24	34.64	128	302	A	H
		2492.32	49.83	-24.17	74	46.12	32	6.34	34.63	128	302	P	H
		2492.52	37.93	-16.07	54	34.22	32	6.34	34.63	128	302	A	H
		2342.31	49.31	-24.69	74	45.91	31.91	6.14	34.65	112	112	P	V
		2389.29	36.88	-17.12	54	33.42	31.94	6.17	34.65	112	112	A	V
	*	2436	107.03	-	-	103.47	31.96	6.24	34.64	112	112	P	V
	*	2436	103.35	-	-	99.79	31.96	6.24	34.64	112	112	A	V
		2491.4	48.72	-25.28	74	45.05	32	6.3	34.63	112	112	P	V
		2483.76	37.17	-16.83	54	33.51	31.99	6.3	34.63	112	112	A	V

802.11b CH 11 2462MHz	*	2460.621	112.55	-	-	108.94	31.98	6.27	34.64	101	302	P	H
	*	2461.206	108.07	-	-	104.46	31.98	6.27	34.64	101	302	A	H
		2484.16	53.94	-20.06	74	50.28	31.99	6.3	34.63	101	302	P	H
		2484.96	43.75	-10.25	54	40.09	31.99	6.3	34.63	101	302	A	H
													H
													H
	*	2460.705	109.88	-	-	106.27	31.98	6.27	34.64	142	92	P	V
	*	2461.206	105.34	-	-	101.73	31.98	6.27	34.64	142	92	A	V
		2484.28	52.13	-21.87	74	48.47	31.99	6.3	34.63	142	92	P	V
		2483.52	41.49	-12.51	54	37.83	31.99	6.3	34.63	142	92	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		4824	55.15	-18.85	74	73	34.36	8.6	60.81	154	358	P	H
		4824	53.19	-0.81	54	71.04	34.36	8.6	60.81	154	358	A	H
													H
													H
		4824	47.59	-26.41	74	65.44	34.36	8.6	60.81	100	0	P	V
													V
													V
													V
802.11b CH 06 2437MHz		4874	56.01	-17.99	74	73.53	34.4	8.77	60.69	152	352	P	H
		4874	53.2	-0.8	54	70.72	34.4	8.77	60.69	152	352	A	H
		7311	44.79	-29.21	74	57.63	35.74	11.94	60.52	100	0	P	H
													H
		4874	47.93	-26.07	74	65.45	34.4	8.77	60.69	100	0	P	V
		7311	44.72	-29.28	74	57.56	35.74	11.94	60.52	100	0	P	V
													V
													V
802.11b CH 11 2462MHz		4924	53.89	-20.11	74	71.08	34.44	8.94	60.57	108	352	P	H
		4924	52.12	-1.88	54	69.31	34.44	8.94	60.57	108	352	A	H
		7386	44.19	-29.81	74	57.05	35.72	11.98	60.56	100	0	P	H
													H
		4924	45.61	-28.39	74	62.8	34.44	8.94	60.57	100	0	P	V
		7386	43.72	-30.28	74	56.58	35.72	11.98	60.56	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI Ant.	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz (1)		2389.74	72.32	-1.68	74	68.86	31.94	6.17	34.65	103	301	P	H
		2390	51.38	-2.62	54	47.87	31.94	6.21	34.64	103	301	A	H
	*	2410	111.05	-	-	107.5	31.95	6.24	34.64	103	301	P	H
	*	2410	99.79	-	-	96.24	31.95	6.24	34.64	103	301	A	H
													H
													H
		2390	71.01	-2.99	74	67.5	31.94	6.21	34.64	115	114	P	V
		2390	47.47	-6.53	54	43.96	31.94	6.21	34.64	115	114	A	V
	*	2414	106.53	-	-	102.98	31.95	6.24	34.64	115	114	P	V
	*	2414	96.08	-	-	92.53	31.95	6.24	34.64	115	114	A	V
													V
													V
802.11g CH 06 2437MHz (1)		2385.51	48.66	-25.34	74	45.2	31.94	6.17	34.65	104	310	P	H
		2390	37.92	-16.08	54	34.41	31.94	6.21	34.64	104	310	A	H
	*	2436	111.71	-	-	108.15	31.96	6.24	34.64	104	310	P	H
	*	2436	101.49	-	-	97.93	31.96	6.24	34.64	104	310	A	H
		2484.04	53.69	-20.31	74	50.03	31.99	6.3	34.63	104	310	P	H
		2488.88	41.26	-12.74	54	37.59	32	6.3	34.63	104	310	A	H
		2355	48.46	-25.54	74	45.05	31.92	6.14	34.65	115	113	P	V
		2389.38	37.27	-16.73	54	33.81	31.94	6.17	34.65	115	113	A	V
	*	2438	106.94	-	-	103.34	31.97	6.27	34.64	115	113	P	V
	*	2438	96.63	-	-	93.07	31.96	6.24	34.64	115	113	A	V
		2486.28	51.56	-22.44	74	47.9	31.99	6.3	34.63	115	113	P	V
		2489.44	39.89	-14.11	54	36.22	32	6.3	34.63	115	113	A	V

802.11g CH 11 2462MHz	*	2460	108.76	-	-	105.15	31.98	6.27	34.64	156	305	P	H
	*	2460	97.6	-	-	93.95	31.98	6.3	34.63	156	305	A	H
		2483.72	73.24	-0.76	74	69.58	31.99	6.3	34.63	156	305	P	H
		2483.56	48.2	-5.8	54	44.54	31.99	6.3	34.63	156	305	A	H
													H
													H
	*	2464	105.01	-	-	101.36	31.98	6.3	34.63	144	91	P	V
	*	2464	94.46	-	-	90.81	31.98	6.3	34.63	144	91	A	V
		2483.88	66.08	-7.92	74	62.42	31.99	6.3	34.63	144	91	P	V
		2483.52	44.79	-9.21	54	41.13	31.99	6.3	34.63	144	91	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		4824	58.06	-15.94	74	75.91	34.36	8.6	60.81	111	352	P	H
		4824	46.93	-7.07	54	64.78	34.36	8.6	60.81	111	352	A	H
													H
													H
		4824	49.47	-24.53	74	67.32	34.36	8.6	60.81	100	0	P	V
													V
													V
													V
802.11g CH 06 2437MHz		4874	55.57	-18.43	74	73.14	34.39	8.77	60.73	151	352	P	H
		4874	45.55	-8.45	54	63.12	34.39	8.77	60.73	151	352	A	H
		7311	43.07	-30.93	74	55.91	35.74	11.94	60.52	100	0	P	H
													H
		4874	47.37	-26.63	74	64.89	34.4	8.77	60.69	100	0	P	V
		7311	43.14	-30.86	74	55.98	35.74	11.94	60.52	100	0	P	V
													V
													V
802.11g CH 11 2462MHz		4924	51.61	-22.39	74	68.8	34.44	8.94	60.57	150	348	P	H
		4924	41.72	-12.28	54	58.91	34.44	8.94	60.57	150	348	A	H
		7386	42.66	-31.34	74	55.52	35.72	11.98	60.56	100	0	P	H
													H
		4924	46.38	-27.62	74	63.57	34.44	8.94	60.57	100	0	P	V
		7386	42.42	-31.58	74	55.28	35.72	11.98	60.56	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant.	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		2389.65	73.59	-0.41	74	70.13	31.94	6.17	34.65	108	311	P	H
		2390	52.38	-1.62	54	48.87	31.94	6.21	34.64	108	311	A	H
	*	2410	109.29	-	-	105.77	31.95	6.21	34.64	108	311	P	H
	*	2410	98.81	-	-	95.29	31.95	6.21	34.64	108	311	A	H
													H
													H
		2389.47	69.44	-4.56	74	65.98	31.94	6.17	34.65	116	115	P	V
		2390	48.86	-5.14	54	45.35	31.94	6.21	34.64	116	115	A	V
	*	2414	105.85	-	-	102.3	31.95	6.24	34.64	116	115	P	V
	*	2414	94.8	-	-	91.25	31.95	6.24	34.64	116	115	A	V
													V
													V
802.11n HT20 CH 06 2437MHz		2389.56	49.94	-24.06	74	46.48	31.94	6.17	34.65	104	298	P	H
		2390	38.14	-15.86	54	34.63	31.94	6.21	34.64	104	298	A	H
	*	2438	111.39	-	-	107.83	31.96	6.24	34.64	104	298	P	H
	*	2438	101.1	-	-	97.54	31.96	6.24	34.64	104	298	A	H
		2483.84	55.96	-18.04	74	52.3	31.99	6.3	34.63	104	298	P	H
		2488.68	42.88	-11.12	54	39.21	32	6.3	34.63	104	298	A	H
		2345.55	48.47	-25.53	74	45.07	31.91	6.14	34.65	112	112	P	V
		2385.33	37.24	-16.76	54	33.79	31.93	6.17	34.65	112	112	A	V
	*	2436	107.42	-	-	103.86	31.96	6.24	34.64	112	112	P	V
	*	2436	96.76	-	-	93.2	31.96	6.24	34.64	112	112	A	V
		2485.72	54.48	-19.52	74	50.82	31.99	6.3	34.63	112	112	P	V
		2488.6	41.03	-12.97	54	37.36	32	6.3	34.63	112	112	A	V

802.11n HT20 CH 11 2462MHz	*	2460	107.53	-	-	103.88	31.98	6.3	34.63	101	299	P	H
	*	2460	96.83	-	-	93.18	31.98	6.3	34.63	101	299	A	H
		2484.48	73.6	-0.4	74	69.94	31.99	6.3	34.63	101	299	P	H
		2483.52	48.71	-5.29	54	45.05	31.99	6.3	34.63	101	299	A	H
													H
													H
	*	2464	103.82	-	-	100.17	31.98	6.3	34.63	140	110	P	V
	*	2464	93.32	-	-	89.67	31.98	6.3	34.63	140	110	A	V
		2483.72	71.82	-2.18	74	68.16	31.99	6.3	34.63	140	110	P	V
		2483.56	46.38	-7.62	54	42.72	31.99	6.3	34.63	140	110	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 01 2412MHz		4824	57.42	-16.58	74	75.27	34.36	8.6	60.81	154	357	P	H
		4824	46.57	-7.43	54	64.42	34.36	8.6	60.81	154	357	A	H
													H
													H
		4824	48.07	-25.93	74	65.92	34.36	8.6	60.81	100	0	P	V
													V
													V
													V
802.11n HT20 CH 06 2437MHz		4874	55.58	-18.42	74	73.1	34.4	8.77	60.69	138	355	P	H
		4874	46.16	-7.84	54	63.68	34.4	8.77	60.69	138	355	A	H
		7311	43.54	-30.46	74	56.38	35.74	11.94	60.52	100	0	P	H
													H
		4874	47.18	-26.82	74	64.75	34.39	8.77	60.73	100	0	P	V
		7311	43.56	-30.44	74	56.4	35.74	11.94	60.52	100	0	P	V
													V
													V
802.11n HT20 CH 11 2462MHz		4924	50.26	-23.74	74	67.45	34.44	8.94	60.57	100	0	P	H
		7386	43.56	-30.44	74	56.42	35.72	11.98	60.56	100	0	P	H
													H
													H
		4924	48.54	-25.46	74	65.73	34.44	8.94	60.57	100	0	P	V
		7386	43.33	-30.67	74	56.19	35.72	11.98	60.56	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Note symbol

*	**Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency per 15.209(c).
!	Test result is **over limit** line.
P/A	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is "PASS".