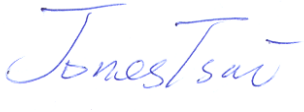
FCC RF Test Report

APPLICANT	:	Corporativo Lanix S.A . de C.V.
EQUIPMENT	:	Mobile Phone
BRAND NAME	:	LANIX
MODEL NAME	:	Ilium X700
FCC ID	:	ZC4X700
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System

The product was received on Jan. 19, 2015 and testing was completed on Feb. 20, 2015. We, SPORTON INTERNATIONAL (KUNSHAN) 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager

Testing Laboratory
2627

SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR511905C	Rev. 01	Initial issue of report	Mar. 12, 2015

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	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 4.81 dB at 31.940 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 12.46 dB at 0.450 MHz
0	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Corporativo Lanix S.A . de C.V.
Carretera Internacional Hermosillo-Nogales Km 8.5 Hermosillo Sonora Mexico

1.2 Manufacturer

Corporativo Lanix S.A . de C.V.
Carretera Internacional Hermosillo-Nogales Km 8.5 Hermosillo Sonora Mexico

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	LANIX
Model Name	Ilium X700
FCC ID	ZC4X700
EUT supports Radios application	GSM/GPRS/WCDMA/HSPA/HSPA+(Downlink Only)/ WLAN2.4GHz 802.11b/g/n HT20/HT40/ Bluetooth v3.0+EDR/Bluetooth v4.0 LE
HW Version	HWLWDM019
SW Version	ILIUM_X700_TELCEL_SW_01
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 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 : 20.48 dBm (0.1117 W) 802.11g : 23.31 dBm (0.2143 W) 802.11n HT20 : 23.01 dBm (0.2000 W) 802.11n HT40 : 23.04 dBm (0.2014 W)
Antenna Type/Gain	802.11b/g/n : PIFA Antenna with gain -4.50 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

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.			
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958			
Test Site No.	**Sporton Site No.**			**FCC Registration No.**
	TH01-KS	CO01-KS	03CH01-KS	149928

Note: The test site complies with ANSI C63.4 2009 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 C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. FCC permits the use of the 1.5 meter table as an alternative in C63.10-2013 through inquiry tracking number 961829.
3. 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 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.

2.4GHz 802.11b RF Output Power (dBm)						
Power vs. Channel			Power vs. Data Rate			
Channel	Frequency (MHz)	Data Rate 1Mbps	Channel	2Mbps	5.5Mbps	11Mbps
CH 01	2412 MHz	20.07	CH 06	20.47	20.46	20.28
CH 06	2437 MHz	**20.48**				
CH 11	2462 MHz	20.38				

2.4GHz 802.11g RF Output Power (dBm)									
Power vs. Channel			Power vs. Data Rate						
Channel	Frequency (MHz)	Data Rate 6Mbps	Channel	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 01	2412 MHz	22.39	CH 06	23.12	23.09	23.26	23.23	23.27	23.16	23.25
CH 06	2437 MHz	**23.31**								
CH 11	2462 MHz	22.84								

2.4GHz 802.11n HT20 RF Output Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412 MHz	22.68	CH 06	22.95	22.71	22.82	22.88	22.72	22.89	22.74
CH 06	2437 MHz	**23.01**								
CH 11	2462 MHz	22.94								

2.4GHz 802.11n HT40 RF Output Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 03	2422 MHz	22.45	CH 06	22.55	22.59	22.56	22.62	22.67	22.55	22.56
CH 06	2437 MHz	**23.04**								
CH 09	2452 MHz	22.61								

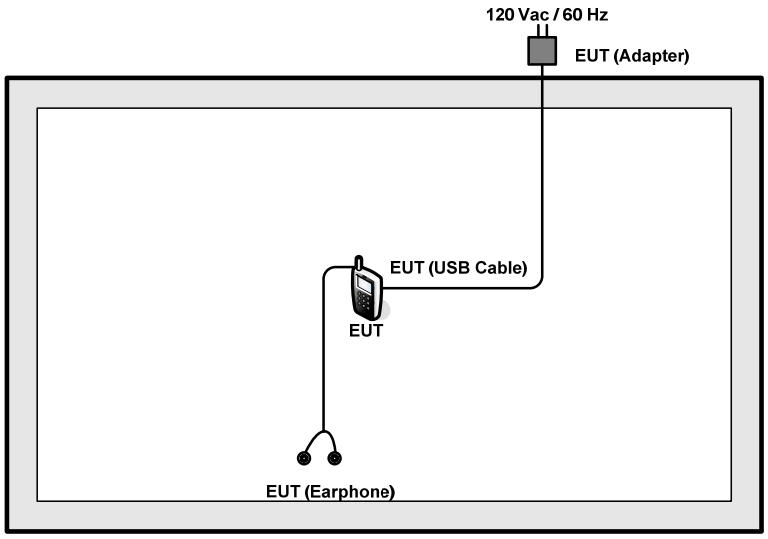
2.3 Test Mode

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

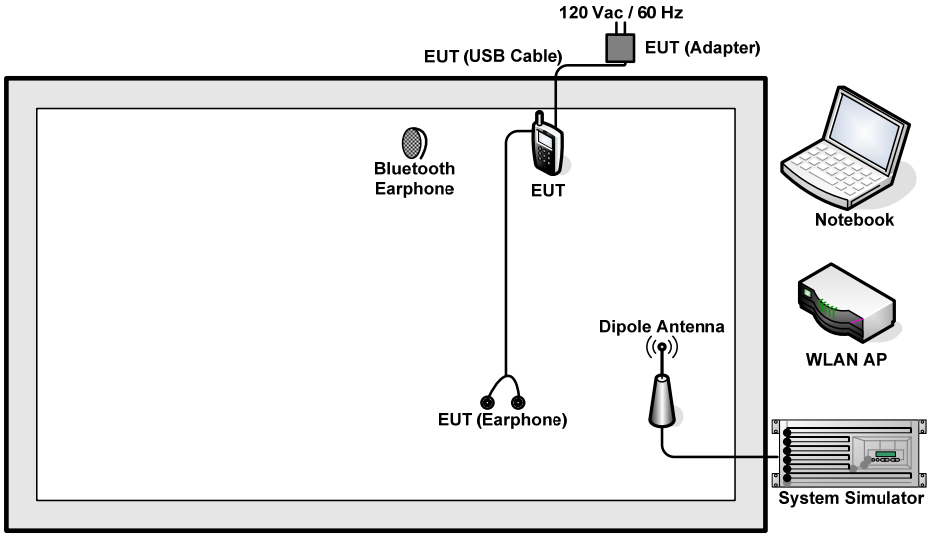
Test Cases				
	Test Items	**Mode**	**Data Rate**	**Test Channel**
Conducted TCs	**6dB BW Power Spectral Density**	**802.11b**	**1 Mbps**	**1/6/11**
		802.11g	**6 Mbps**	**1/6/11**
		802.11n HT20	**MCS0**	**1/6/11**
		802.11n HT40	**MCS0**	**3/6/9**
	Output Power	**802.11b**	**1 Mbps**	**1/6/11**
		802.11g	**6 Mbps**	**1/6/11**
		802.11n HT20	**MCS0**	**1/6/11**
		802.11n HT40	**MCS0**	**3/6/9**
	Conducted Band Edge	**802.11b**	**1 Mbps**	**1/11**
		802.11g	**6 Mbps**	**1/11**
		802.11n HT20	**MCS0**	**1/11**
		802.11n HT40	**MCS0**	**3/9**
	Conducted Spurious Emission	**802.11b**	**1 Mbps**	**1/6/11**
		802.11g	**6 Mbps**	**1/6/11**
		802.11n HT20	**MCS0**	**1/6/11**
		802.11n HT40	**MCS0**	**3/6/9**
Radiated TCs	**Radiated Band Edge**	**802.11b**	**1 Mbps**	**1/11**
		802.11g	**6 Mbps**	**1/11**
		802.11n HT20	**MCS0**	**1/11**
		802.11n HT40	**MCS0**	**3/9**
	Radiated Spurious Emission	**802.11b**	**1 Mbps**	**1/6/11**
		802.11g	**6 Mbps**	**1/6/11**
		802.11n HT20	**MCS0**	**1/6/11**
		802.11n HT40	**MCS0**	**3/6/9**
Test Cases				
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter) + Earphone			
Remark: For radiated test cases, the tests were performance with adapter, earphone and USB cable.				

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.	Notebook	Lenovo	G480	PRC4	N/A	shielded cable DC O/P 1.8 m unshielded AC I/P cable1.8 m
3.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
4.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded,1.8m

2.6 EUT Operation Test Setup

For WLAN function, the engineering test program was provided and enabled to make EUT continuous transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

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 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.
Offset = RF cable loss + attenuator factor.
Following shows an offset computation example with cable loss 5.5 dB.

Offset(dB) = RF cable loss(dB).
= 5.5 (dB)

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.

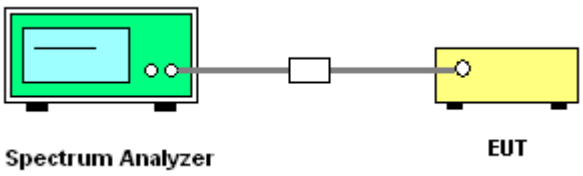
3.1.2 Measuring Instruments

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. Measure and record the results in the test report.

3.1.4 Test Setup

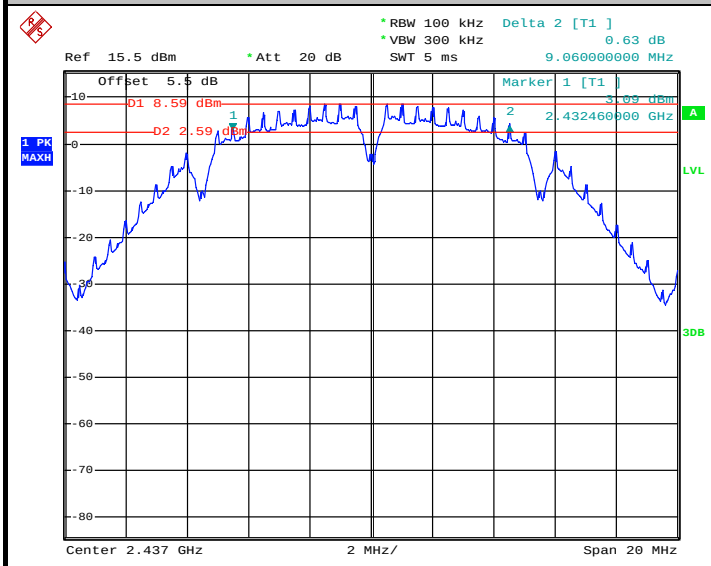


3.1.5 Test Result of 6dB Bandwidth

Test Band :	2.4GHz	Temperature :	24~25℃
Test Engineer :	Issac Song	Relative Humidity :	49~51%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
11b	1Mbps	1	1	2412	10.02	0.5	Pass
11b	1Mbps	1	6	2437	9.06	0.5	Pass
11b	1Mbps	1	11	2462	10.00	0.5	Pass
11g	6Mbps	1	1	2412	15.44	0.5	Pass
11g	6Mbps	1	6	2437	15.78	0.5	Pass
11g	6Mbps	1	11	2462	15.44	0.5	Pass
HT20	MCS0	1	1	2412	15.16	0.5	Pass
HT20	MCS0	1	6	2437	16.90	0.5	Pass
HT20	MCS0	1	11	2462	15.70	0.5	Pass
HT40	MCS0	1	3	2422	35.16	0.5	Pass
HT40	MCS0	1	6	2437	35.20	0.5	Pass
HT40	MCS0	1	9	2452	35.16	0.5	Pass

Minimum 6dB Bandwidth



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.

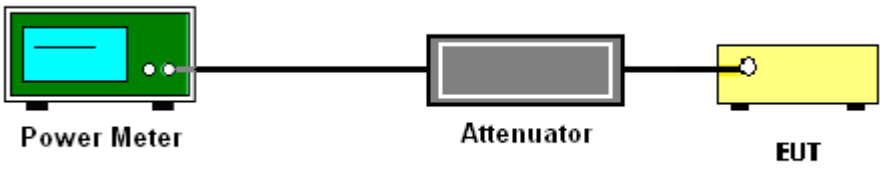
3.2.2 Measuring Instruments

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 :	24~25℃
Test Engineer :	Issac Song	Relative Humidity :	49~51%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	RF Output Power (dBm)	Power Limit (dBm)	DG (dBi)	Pass/Fail
11b	1Mbps	1	1	2412	20.07	30	-4.50	Pass
11b	1Mbps	1	6	2437	20.48	30	-4.50	Pass
11b	1Mbps	1	11	2462	20.38	30	-4.50	Pass
11g	6Mbps	1	1	2412	22.39	30	-4.50	Pass
11g	6Mbps	1	6	2437	23.31	30	-4.50	Pass
11g	6Mbps	1	11	2462	22.84	30	-4.50	Pass
HT20	MCS0	1	1	2412	22.68	30	-4.50	Pass
HT20	MCS0	1	6	2437	23.01	30	-4.50	Pass
HT20	MCS0	1	11	2462	22.94	30	-4.50	Pass
HT40	MCS0	1	3	2422	22.45	30	-4.50	Pass
HT40	MCS0	1	6	2437	23.04	30	-4.50	Pass
HT40	MCS0	1	9	2452	22.61	30	-4.50	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 :	24~25℃
Test Engineer :	Issac Song	Relative Humidity :	49~51%

Mod.	Data Rate	N_{TX}	Channel	Freq. (MHz)	Duty Factor (dB)	Average Output Power (dBm)	Power Limit (dBm)	DG (dBi)	Pass/Fail
11b	1Mbps	1	1	2412	0.08	17.29	30	-4.50	Pass
11b	1Mbps	1	6	2437	0.08	17.76	30	-4.50	Pass
11b	1Mbps	1	11	2462	0.08	17.59	30	-4.50	Pass
11g	6Mbps	1	1	2412	0.50	13.36	30	-4.50	Pass
11g	6Mbps	1	6	2437	0.50	16.08	30	-4.50	Pass
11g	6Mbps	1	11	2462	0.50	13.87	30	-4.50	Pass
HT20	MCS0	1	1	2412	0.54	13.55	30	-4.50	Pass
HT20	MCS0	1	6	2437	0.54	13.99	30	-4.50	Pass
HT20	MCS0	1	11	2462	0.54	13.87	30	-4.50	Pass
HT40	MCS0	1	3	2422	1.02	11.64	30	-4.50	Pass
HT40	MCS0	1	6	2437	1.02	13.80	30	-4.50	Pass
HT40	MCS0	1	9	2452	1.02	11.61	30	-4.50	Pass

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.

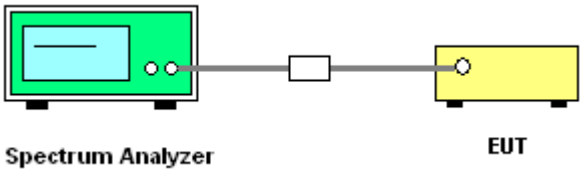
3.3.2 Measuring Instruments

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



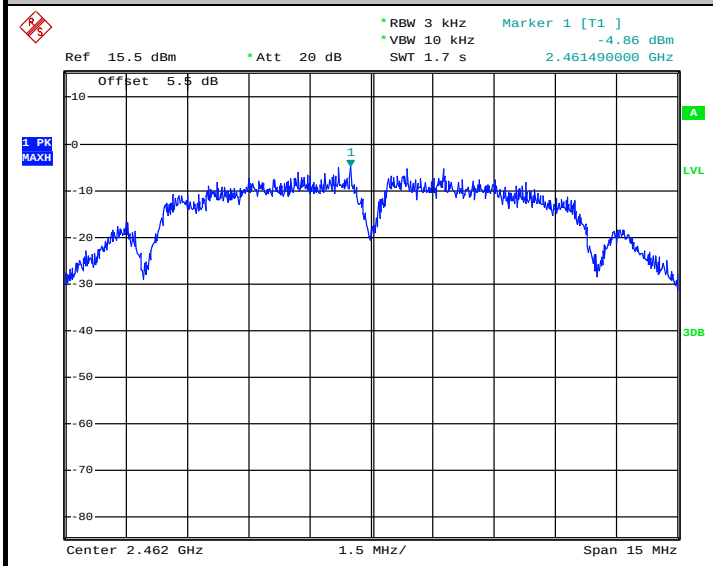
3.3.5 Test Result of Power Spectral Density

Test Mode :	2.4GHz	Temperature :	24~25℃
Test Engineer :	Issac Song	Relative Humidity :	49~51%

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	-5.78	8	-4.50	Pass
11b	1Mbps	1	6	2437	-5.52	8	-4.50	Pass
11b	1Mbps	1	11	2462	-4.86	8	-4.50	Pass
11g	6Mbps	1	1	2412	-11.53	8	-4.50	Pass
11g	6Mbps	1	6	2437	-9.85	8	-4.50	Pass
11g	6Mbps	1	11	2462	-9.90	8	-4.50	Pass
HT20	MCS0	1	1	2412	-10.46	8	-4.50	Pass
HT20	MCS0	1	6	2437	-10.89	8	-4.50	Pass
HT20	MCS0	1	11	2462	-11.10	8	-4.50	Pass
HT40	MCS0	1	3	2422	-17.16	8	-4.50	Pass
HT40	MCS0	1	6	2437	-14.57	8	-4.50	Pass
HT40	MCS0	1	9	2452	-16.58	8	-4.50	Pass

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

Worst Case Power Density (dBm/3kHz)



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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).

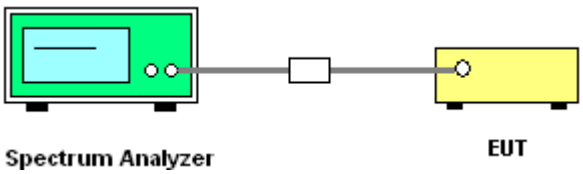
3.4.2 Measuring Instruments

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

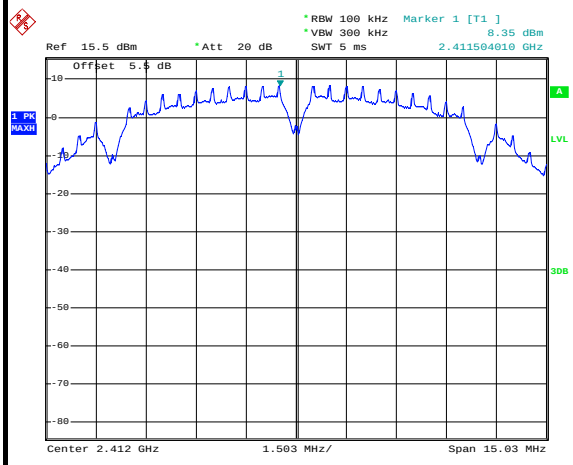


3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Test Mode :	802.11b	Temperature :	24~25℃
Test Band :	2.4GHz Low	Relative Humidity :	49~51%
Test Channel :	01	Test Engineer :	Issac Song

WLAN 802.11b Channel 01

100kHz PSD reference Level



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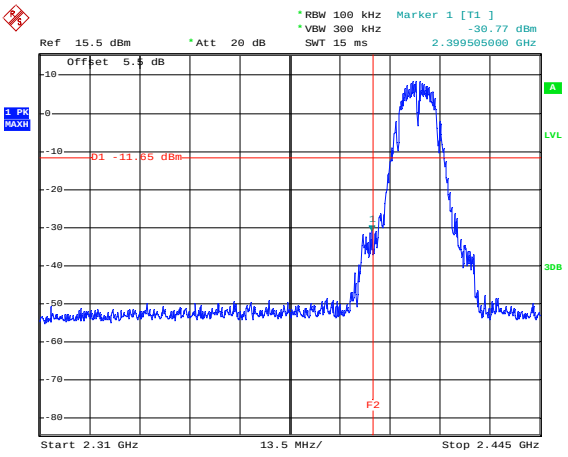
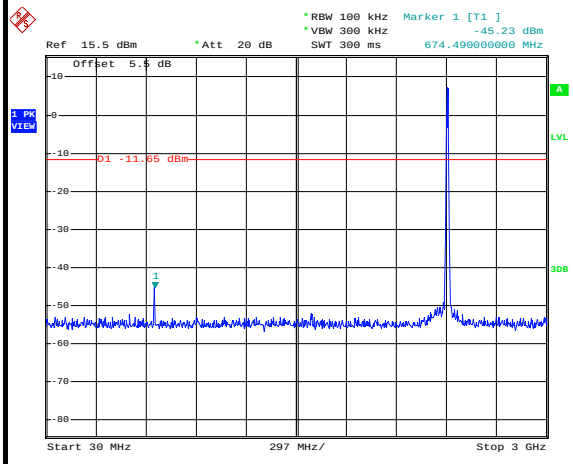
Low Channel Plot



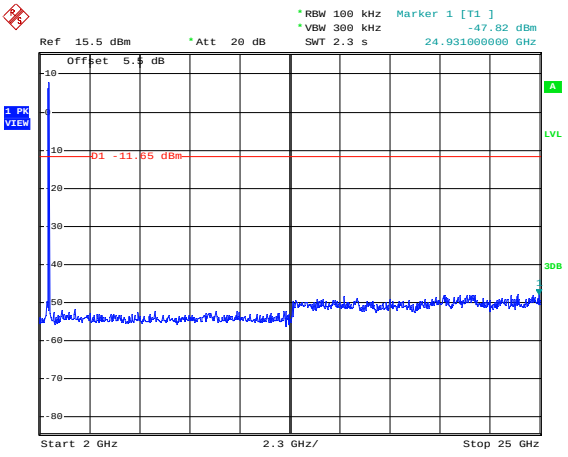
Date: 12.FEB.2015 18:52:19

Spurious Emission 30MHz~3GHz



Date: 12.FEB.2015 18:52:55

Spurious Emission 2GHz~25GHz

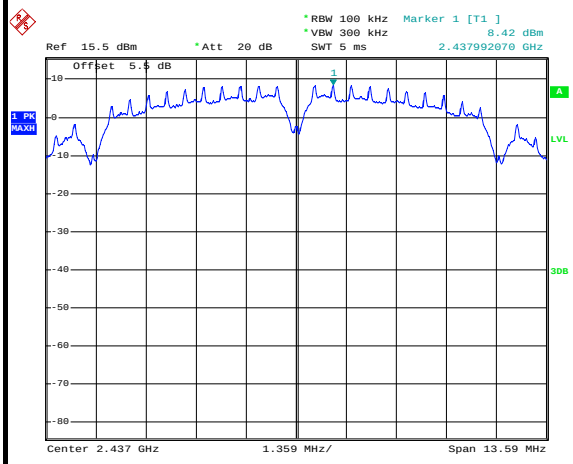


Date: 12.FEB.2015 18:53:13

Test Mode :	802.11b	Temperature :	24~25℃
Test Band :	2.4GHz Mid	Relative Humidity :	49~51%
Test Channel :	06	Test Engineer :	Issac Song

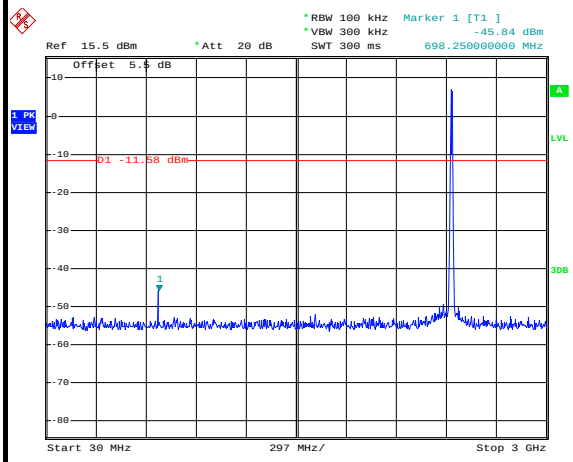
WLAN 802.11b Channel 06

100kHz PSD reference Level



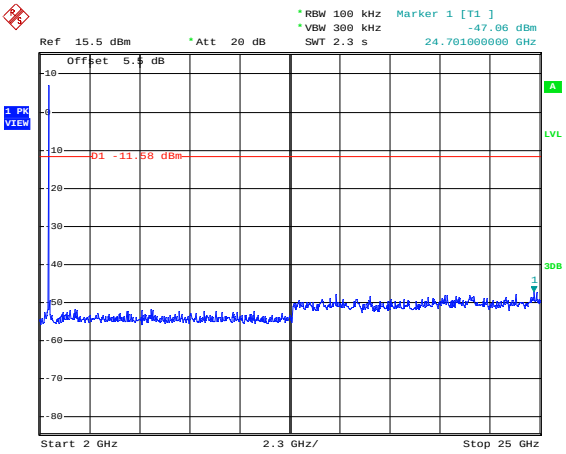
Date: 12.FEB.2015 18:56:02

Spurious Emission 30MHz~3GHz



Date: 12.FEB.2015 18:57:05

Spurious Emission 2GHz~25GHz

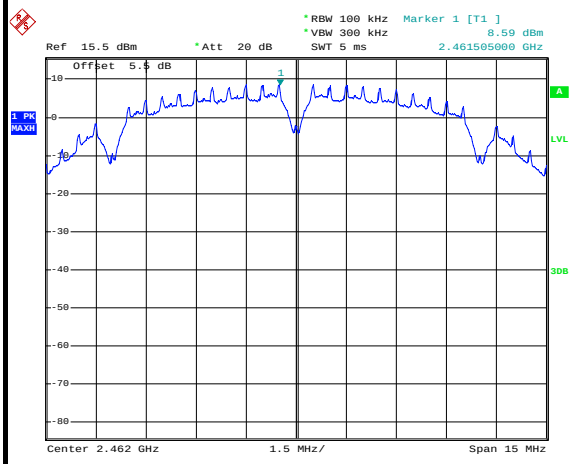


Date: 12.FEB.2015 18:57:23

Test Mode :	802.11b	Temperature :	24~25℃
Test Band :	2.4GHz High	Relative Humidity :	49~51%
Test Channel :	11	Test Engineer :	Issac Song

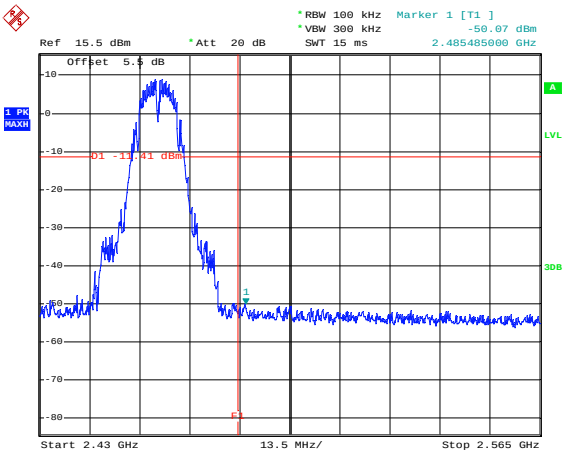
WLAN 802.11b Channel 11

100kHz PSD reference Level



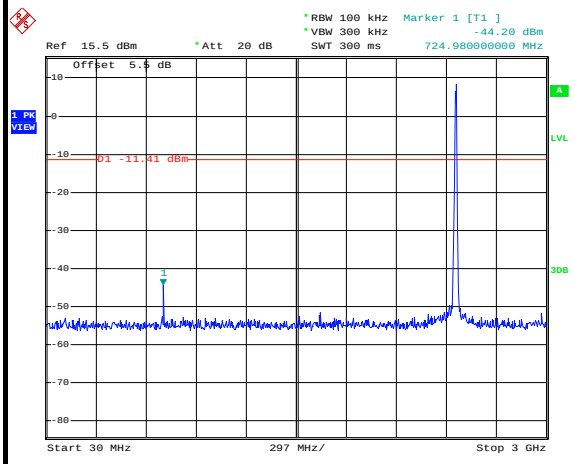
Date: 12.FEB.2015 19:00:20

High Channel Plot



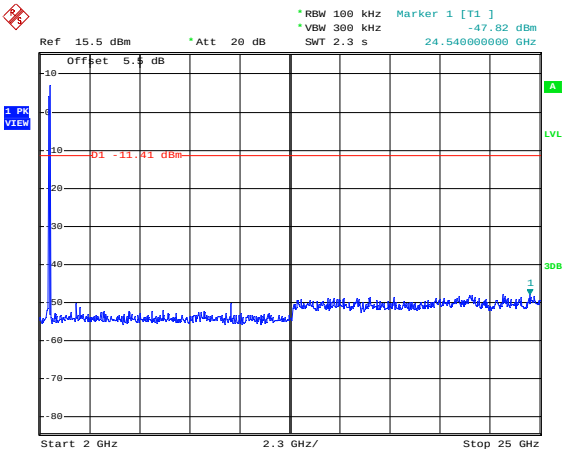
Date: 12.FEB.2015 19:00:36

Spurious Emission 30MHz~3GHz



Date: 12.FEB.2015 19:01:08

Spurious Emission 2GHz~25GHz

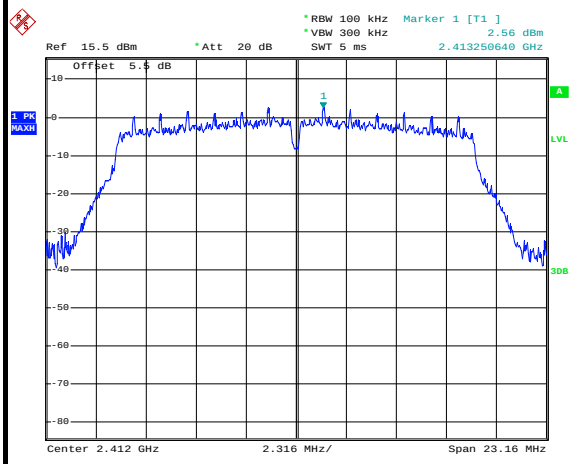


Date: 12.FEB.2015 19:01:26

Test Mode :	802.11g	**Temperature :**	24~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	49~51%
Test Channel :	01	**Test Engineer :**	Issac Song

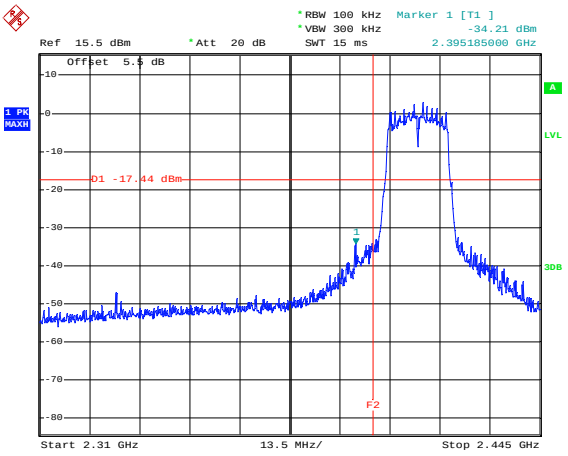
WLAN 802.11g Channel 01

100kHz PSD reference Level



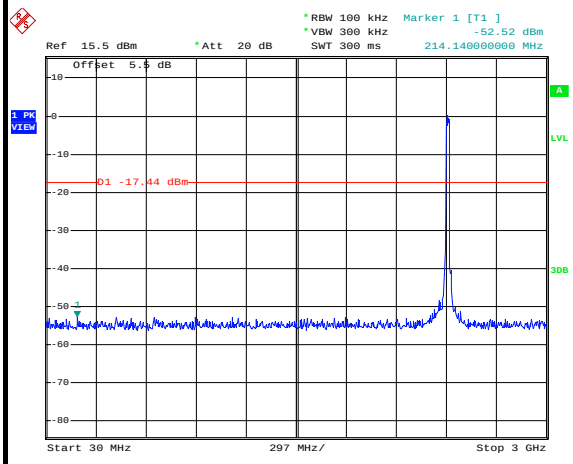
Date: 12.FEB.2015 19:06:51

Low Channel Plot



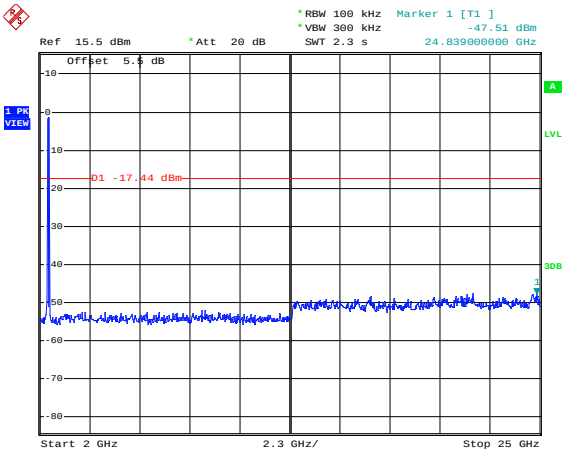
Date: 12.FEB.2015 19:07:08

Spurious Emission 30MHz~3GHz



Date: 12.FEB.2015 19:07:32

Spurious Emission 2GHz~25GHz

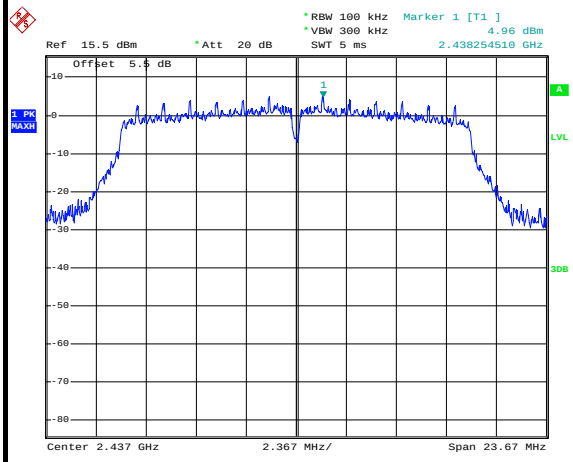


Date: 12.FEB.2015 19:07:50

Test Mode :	802.11g	Temperature :	24~25℃
Test Band :	2.4GHz Mid	Relative Humidity :	49~51%
Test Channel :	06	Test Engineer :	Issac Song

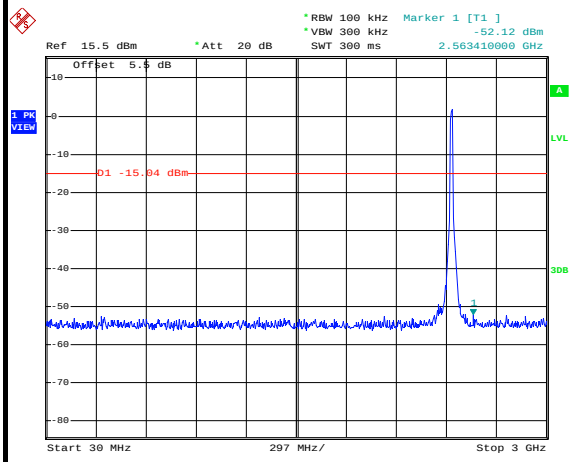
WLAN 802.11g Channel 06

100kHz PSD reference Level



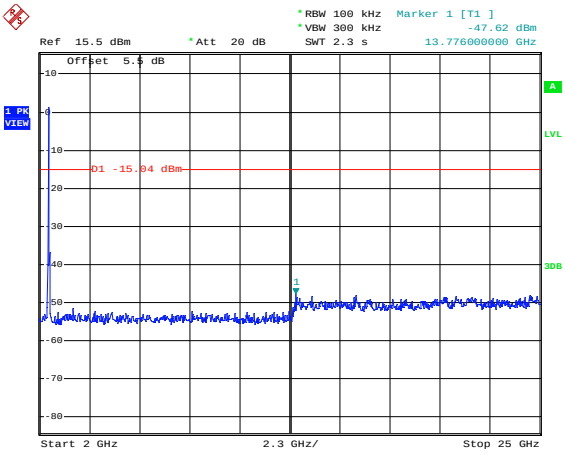
Date: 12.FEB.2015 19:12:24

Spurious Emission 30MHz~3GHz



Date: 12.FEB.2015 19:12:54

Spurious Emission 2GHz~25GHz

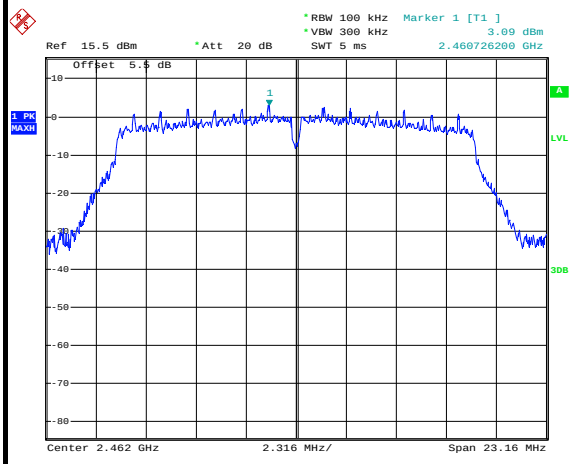


Date: 12.FEB.2015 19:13:12

Test Mode :	802.11g	Temperature :	24~25℃
Test Band :	2.4GHz High	Relative Humidity :	49~51%
Test Channel :	11	Test Engineer :	Issac Song

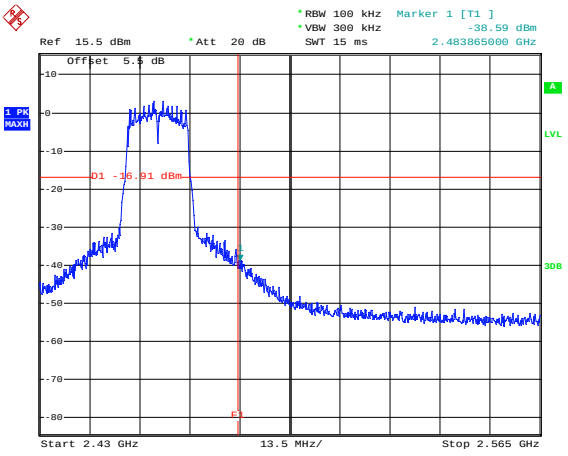
WLAN 802.11g Channel 11

100kHz PSD reference Level



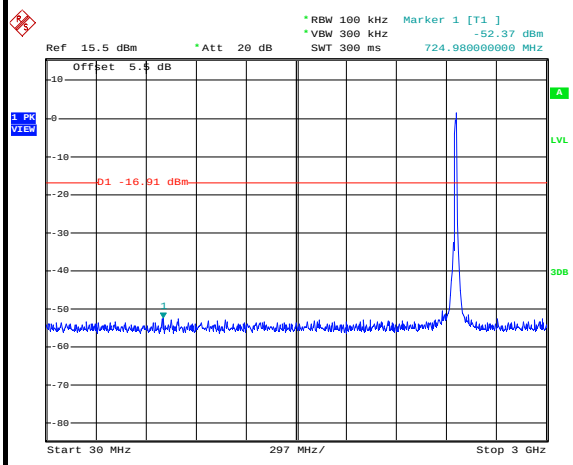
Date: 12.FEB.2015 19:15:55

High Channel Plot



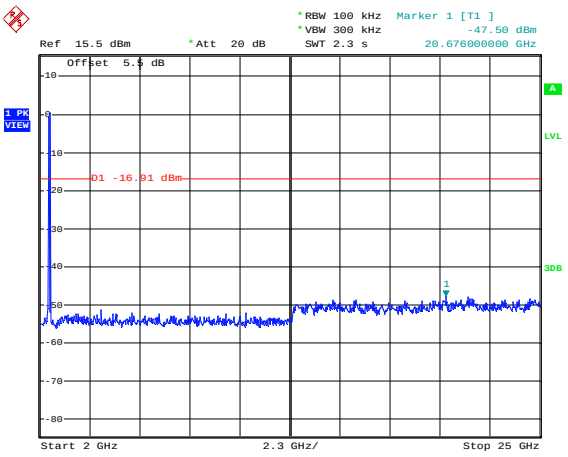
Date: 12.FEB.2015 19:16:37

Spurious Emission 30MHz~3GHz



Date: 12.FEB.2015 19:17:03

Spurious Emission 2GHz~25GHz

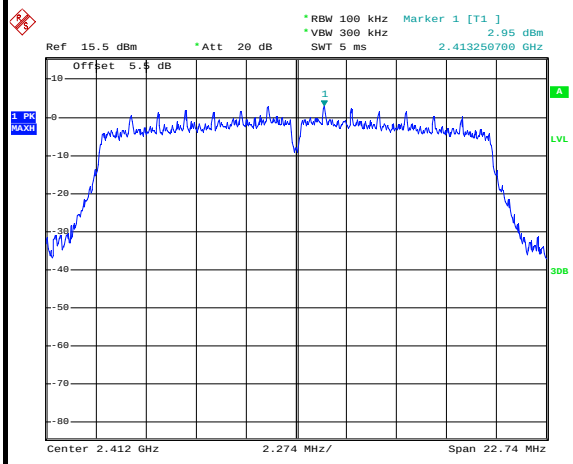


Date: 12.FEB.2015 19:17:21

Test Mode :	802.11n HT20	Temperature :	24~25℃
Test Band :	2.4GHz Low	Relative Humidity :	49~51%
Test Channel :	01	Test Engineer :	Issac Song

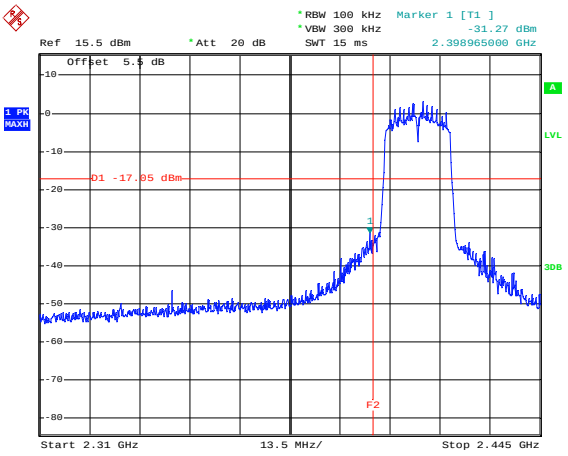
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



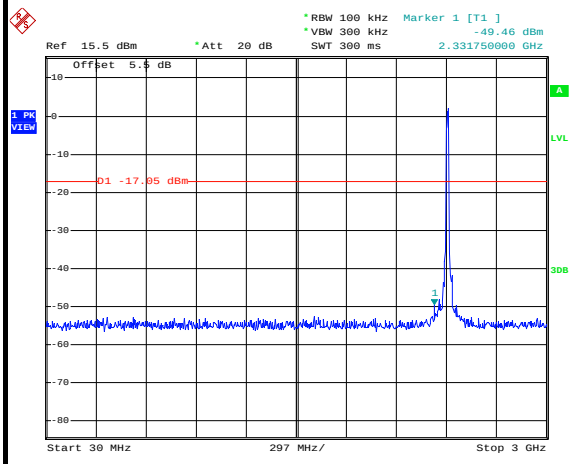
Date: 12.FEB.2015 20:22:55

Low Channel Plot



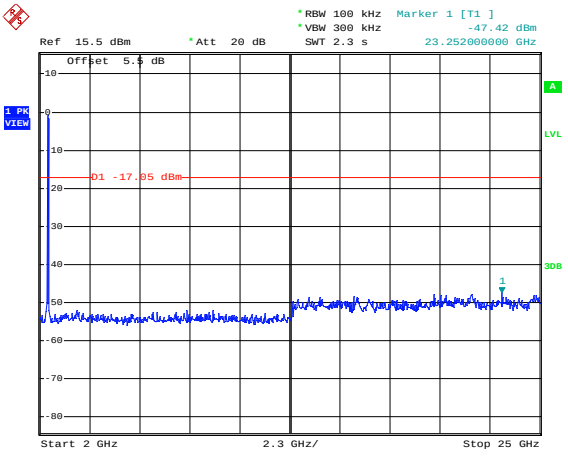
Date: 12.FEB.2015 20:23:14

Spurious Emission 30MHz~3GHz



Date: 12.FEB.2015 20:23:38

Spurious Emission 2GHz~25GHz

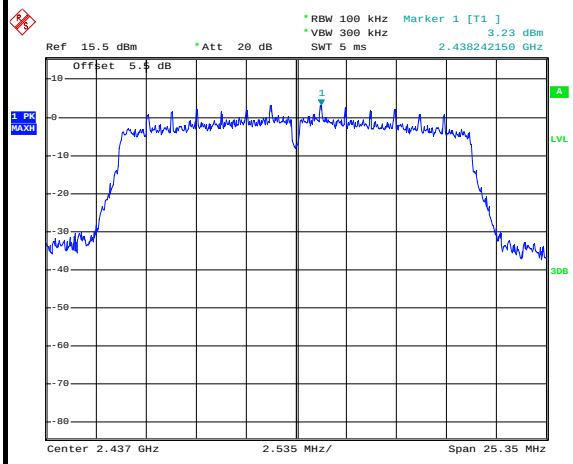


Date: 12.FEB.2015 20:23:56

Test Mode :	802.11n HT20	**Temperature :**	24~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	49~51%
Test Channel :	06	**Test Engineer :**	Issac Song

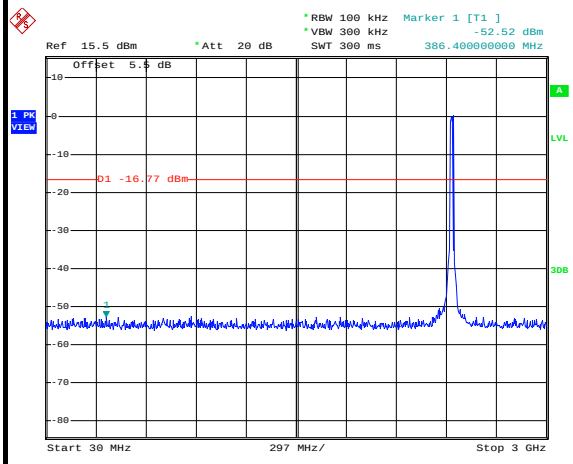
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



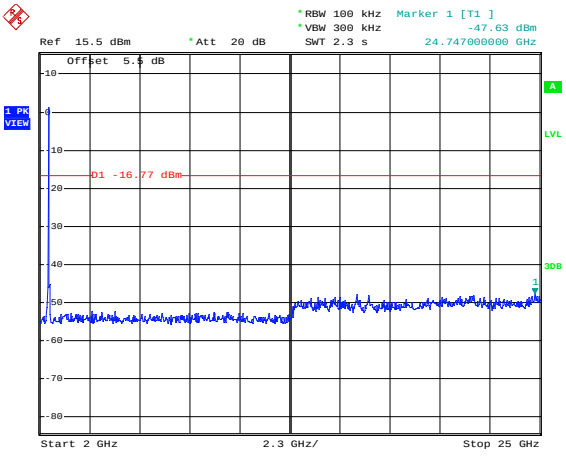
Date: 12.FEB.2015 20:28:32

Spurious Emission 30MHz~3GHz



Date: 12.FEB.2015 20:28:53

Spurious Emission 2GHz~25GHz

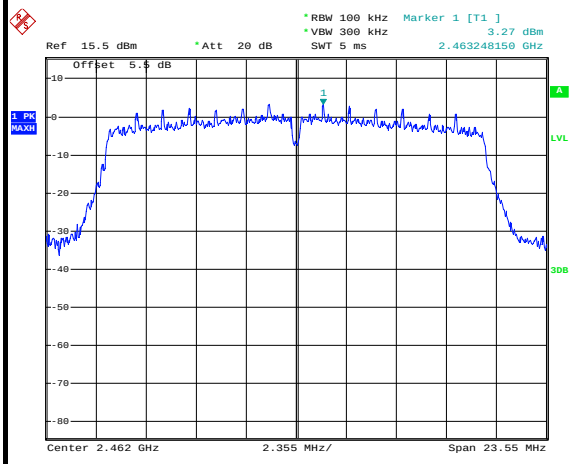


Date: 12.FEB.2015 20:29:11

Test Mode :	802.11n HT20	Temperature :	24~25℃
Test Band :	2.4GHz High	Relative Humidity :	49~51%
Test Channel :	11	Test Engineer :	Issac Song

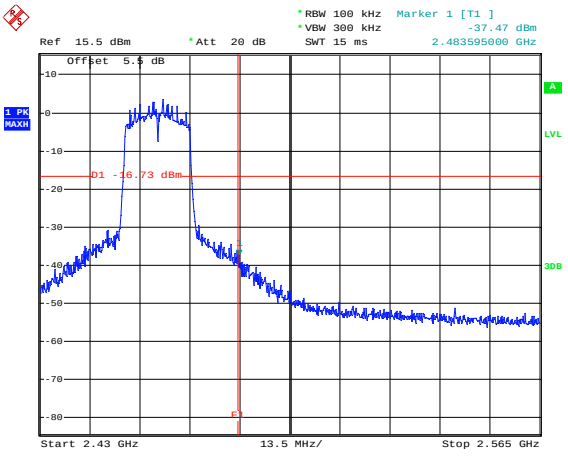
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



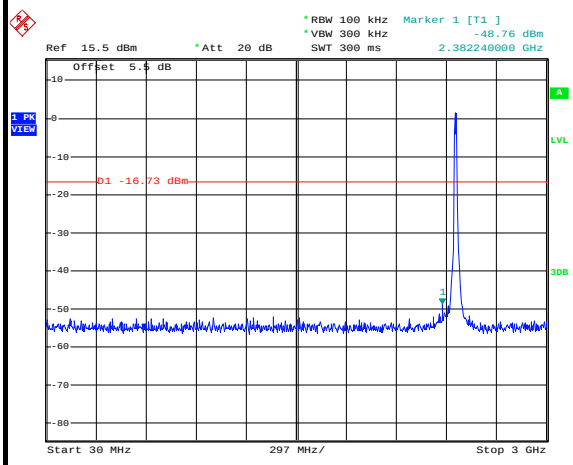
Date: 12.FEB.2015 20:38:13

High Channel Plot



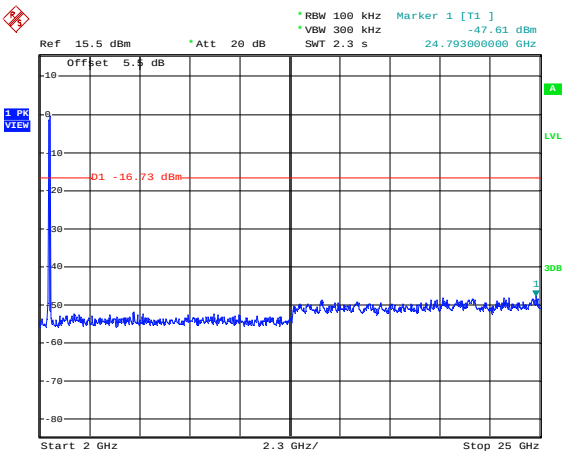
Date: 12.FEB.2015 20:38:33

Spurious Emission 30MHz~3GHz



Date: 12.FEB.2015 20:38:58

Spurious Emission 2GHz~25GHz

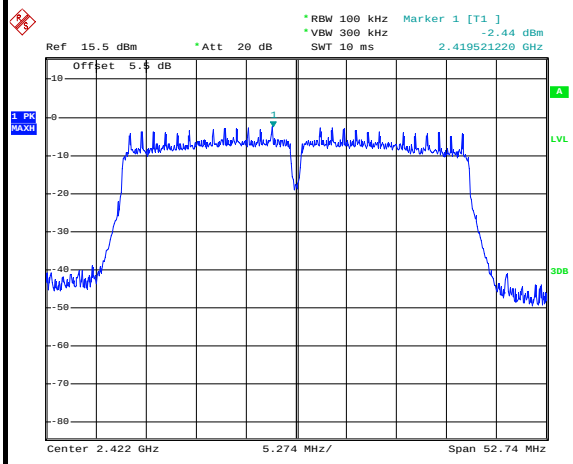


Date: 12.FEB.2015 20:39:16

Test Mode :	802.11n HT40	Temperature :	24~25℃
Test Band :	2.4GHz Low	Relative Humidity :	49~51%
Test Channel :	03	Test Engineer :	Issac Song

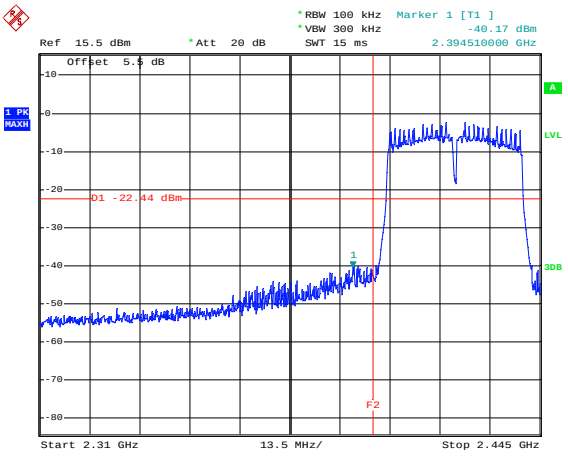
WLAN 802.11n HT40 Channel 03

100kHz PSD reference Level



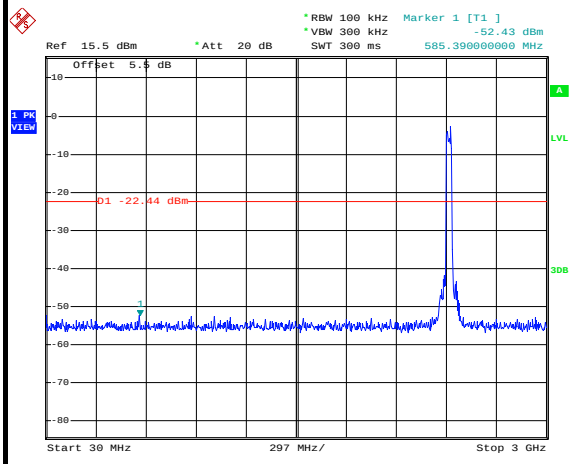
Date: 12.FEB.2015 19:34:27

Low Channel Plot



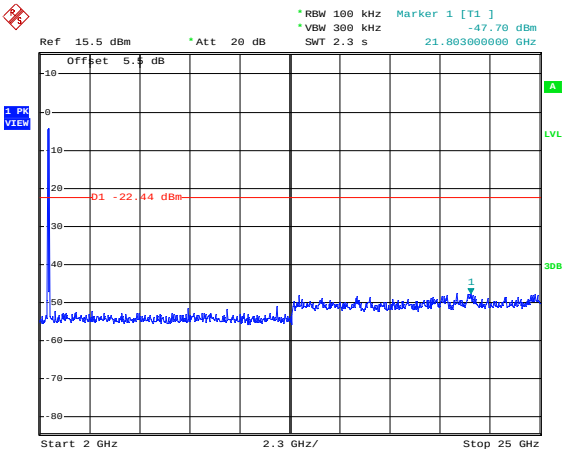
Date: 12.FEB.2015 19:34:54

Spurious Emission 30MHz~3GHz



Date: 12.FEB.2015 20:10:42

Spurious Emission 2GHz~25GHz

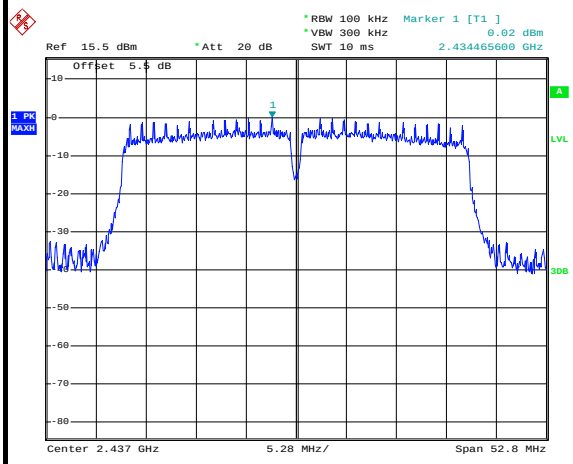


Date: 12.FEB.2015 20:06:50

Test Mode :	802.11n HT40	Temperature :	24~25℃
Test Band :	2.4GHz Mid	Relative Humidity :	49~51%
Test Channel :	06	Test Engineer :	Issac Song

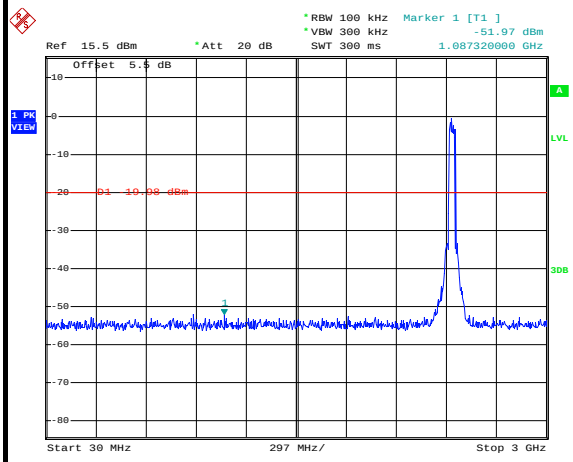
WLAN 802.11n HT40 Channel 06

100kHz PSD reference Level



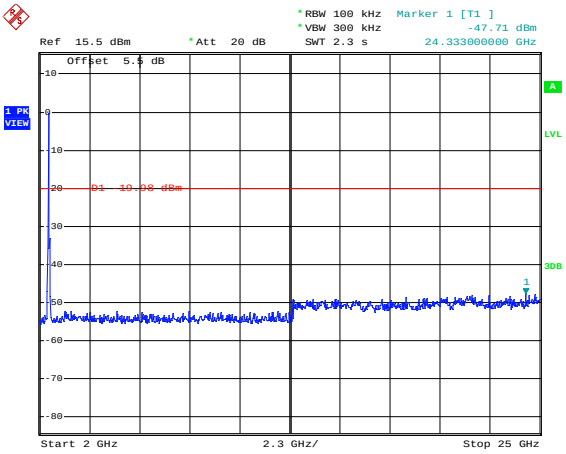
Date: 12.FEB.2015 19:42:07

Spurious Emission 30MHz~3GHz



Date: 12.FEB.2015 19:44:59

Spurious Emission 2GHz~25GHz

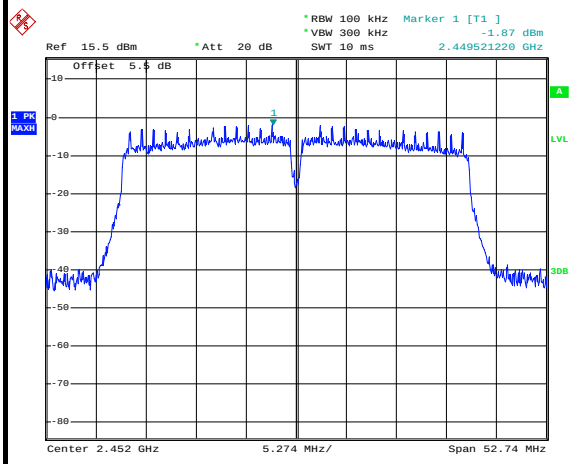


Date: 12.FEB.2015 19:45:16

Test Mode :	802.11n HT40	**Temperature :**	24~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	49~51%
Test Channel :	09	**Test Engineer :**	Issac Song

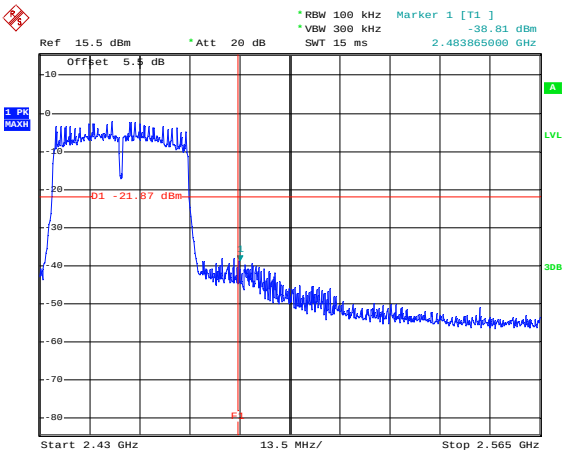
WLAN 802.11n HT40 Channel 09

100kHz PSD reference Level



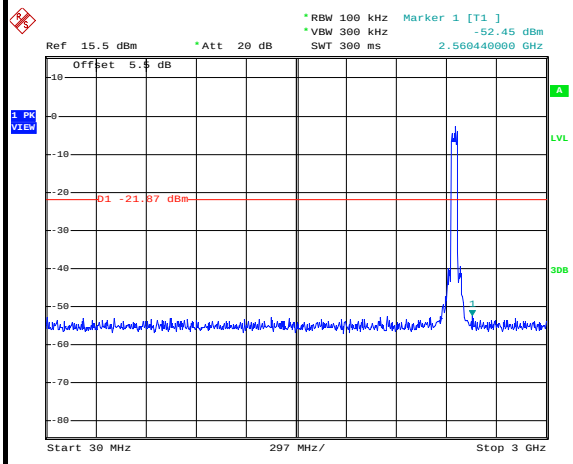
Date: 12.FEB.2015 19:48:33

High Channel Plot



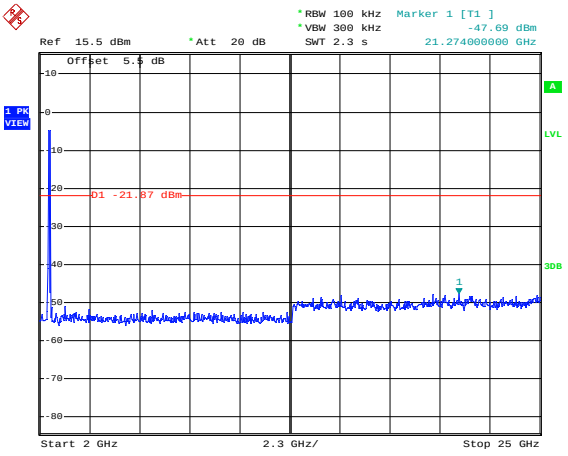
Date: 12.FEB.2015 19:48:56

Spurious Emission 30MHz~3GHz



Date: 12.FEB.2015 19:58:16

Spurious Emission 2GHz~25GHz



Date: 12.FEB.2015 19:54:24

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.

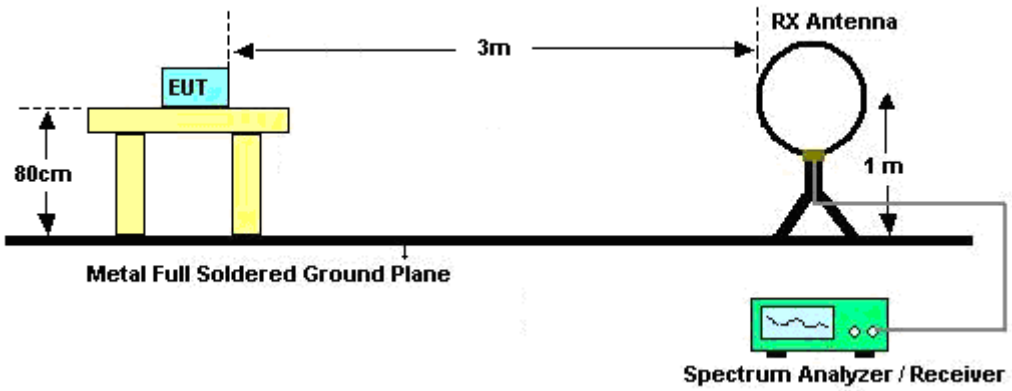
3.5.3 Test Procedures

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 for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively 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.

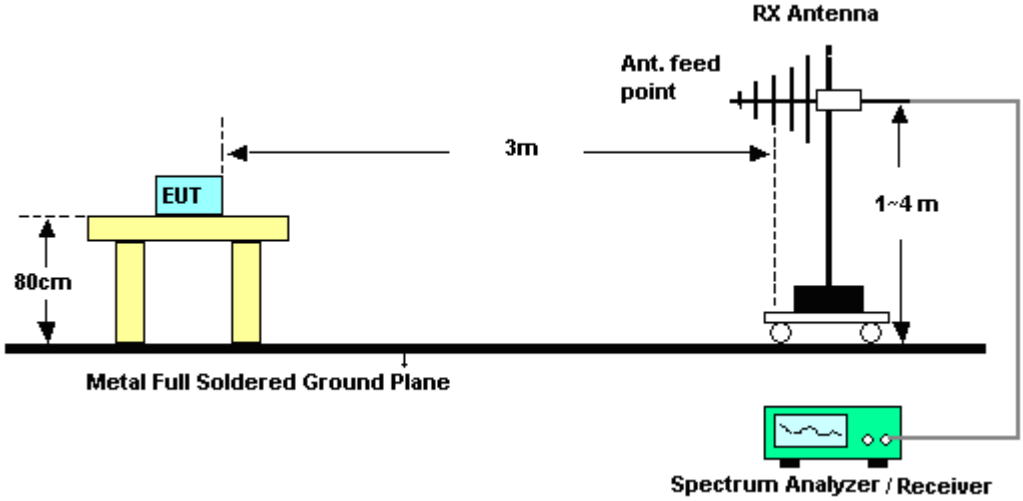
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	98.13	-	-	300Hz
802.11g	89.17	1.40	0.71	1kHz
2.4GHz 802.11n HT20	88.28	1.30	0.77	1kHz
2.4GHz 802.11n HT40	79.13	0.65	1.53	3kHz

3.5.4 Test Setup

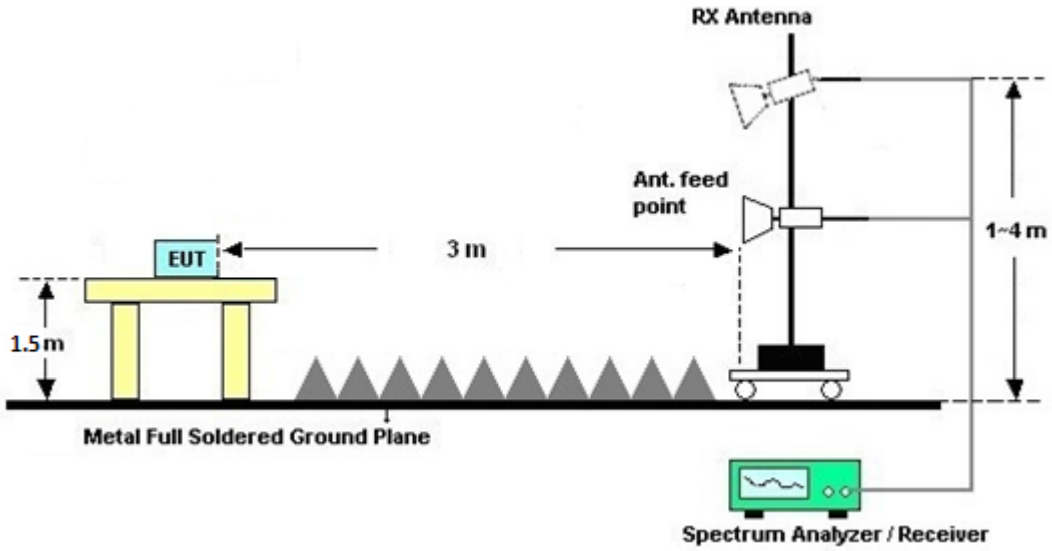
For radiated emissions below 30MHz



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 of Radiated Spurious at Band Edges

Please refer to Appendix A.

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

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.

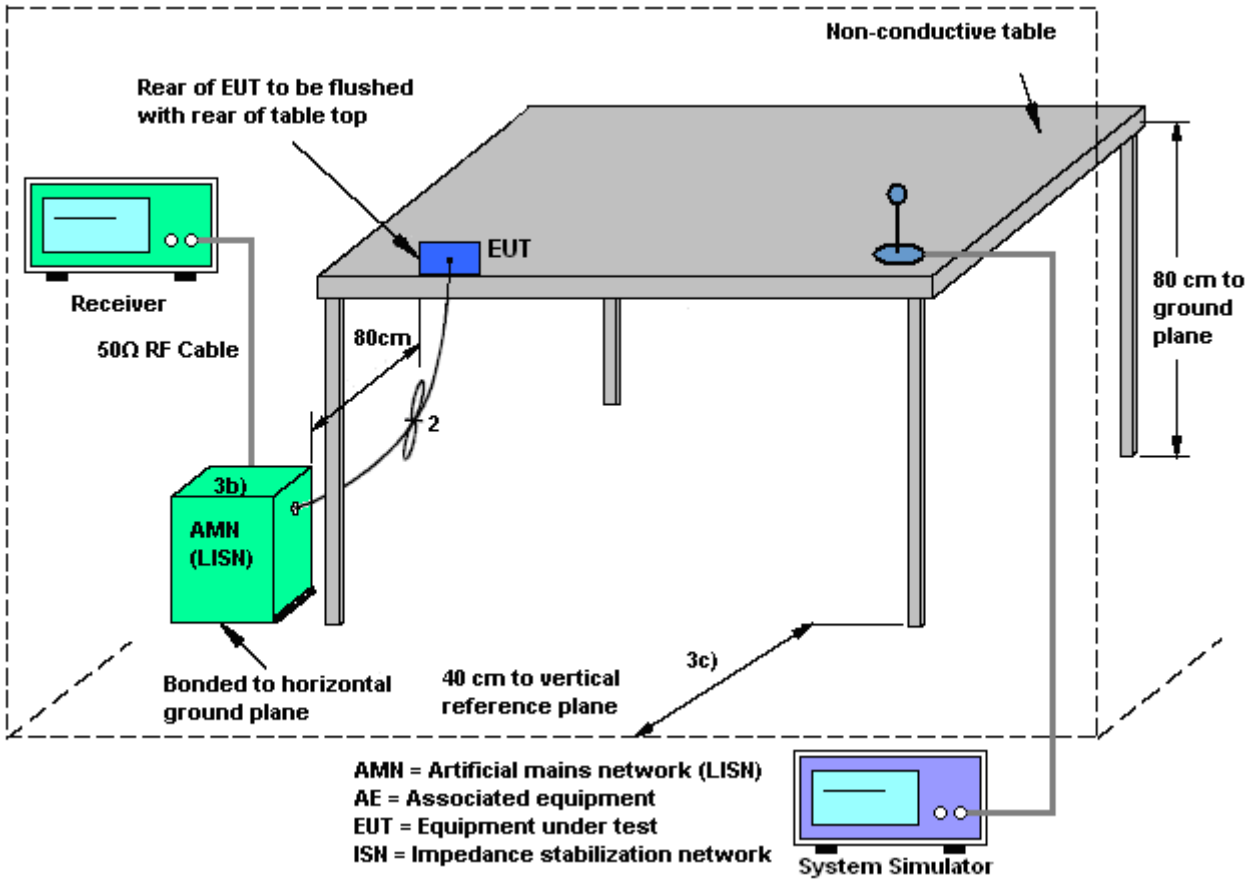
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

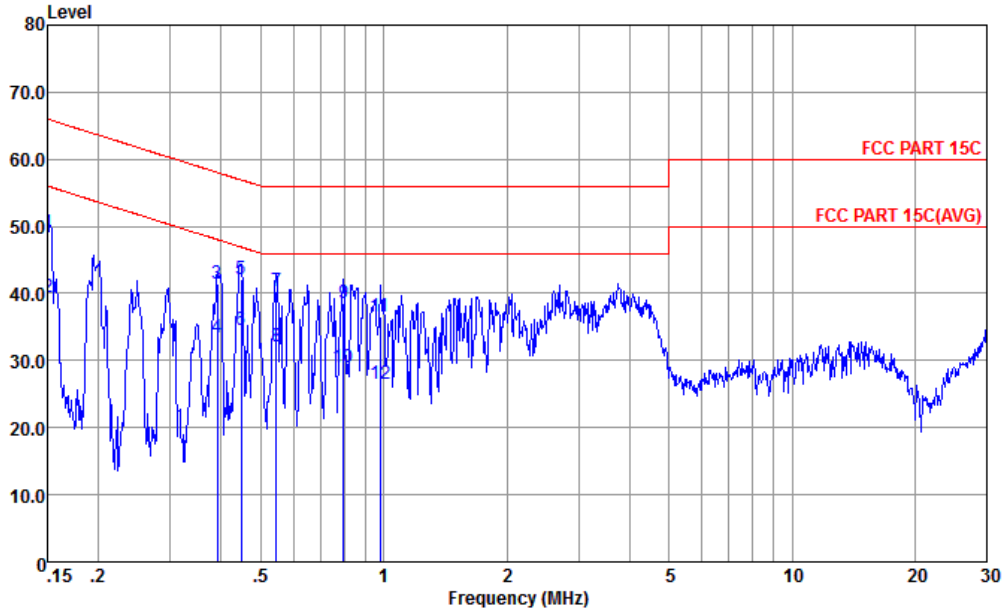
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other 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 :	22~24℃
Test Engineer :	Eko Guan	Relative Humidity :	30~33%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter) + Earphone		

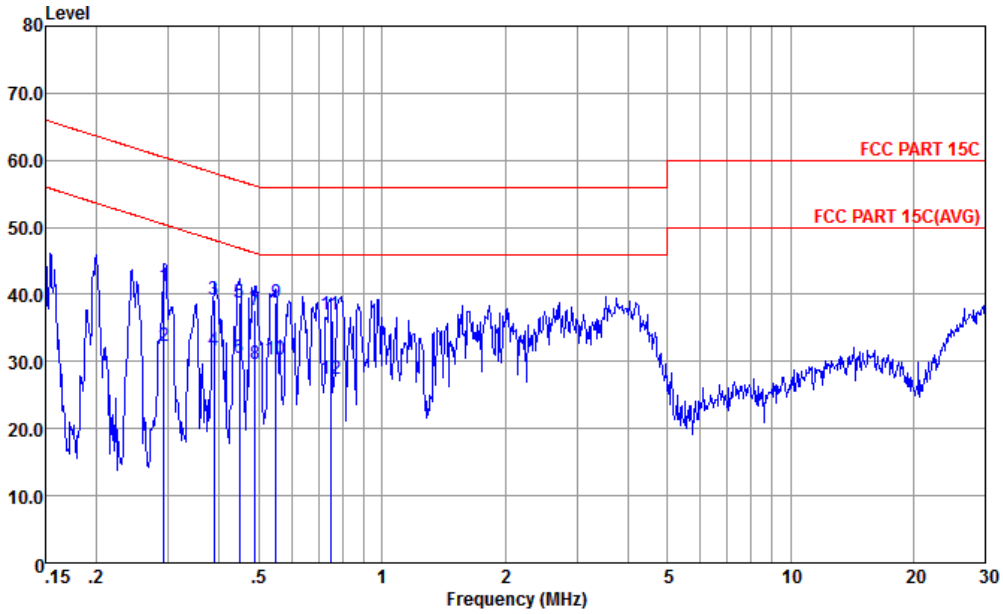


Site : CO01-KS
Condition : FCC PART 15C LISN-L20140306 LINE

mode : Mode 1

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz		dB			dB	dB	
1		0.15	48.92	-17.08	66.00	36.60	1.95	10.37	QP
2		0.15	39.42	-16.58	56.00	27.10	1.95	10.37	Average
3		0.39	41.45	-16.58	58.03	30.50	0.33	10.62	QP
4		0.39	33.45	-14.58	48.03	22.50	0.33	10.62	Average
5		0.45	42.07	-14.86	56.93	31.20	0.25	10.62	QP
6	*	0.45	34.47	-12.46	46.93	23.60	0.25	10.62	Average
7		0.55	40.33	-15.67	56.00	29.50	0.20	10.63	QP
8		0.55	32.13	-13.87	46.00	21.30	0.20	10.63	Average
9		0.80	38.51	-17.49	56.00	27.69	0.17	10.65	QP
10		0.80	28.91	-17.09	46.00	18.09	0.17	10.65	Average
11		0.98	36.55	-19.45	56.00	25.80	0.10	10.65	QP
12		0.98	26.55	-19.45	46.00	15.80	0.10	10.65	Average

Test Mode :	Mode 1	Temperature :	22~24℃
Test Engineer :	Eko Guan	Relative Humidity :	30~33%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter) + Earphone		



Site : CO01-KS
Condition : FCC PART 15C LISN-N20140306 NEUTRAL

mode : Mode 1

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz		dB			dB	dB	
1		0.29	41.13	-19.33	60.46	29.80	0.76	10.57	QP
2		0.29	32.23	-18.23	50.46	20.90	0.76	10.57	Average
3		0.39	39.24	-18.88	58.12	28.20	0.42	10.62	QP
4		0.39	31.74	-16.38	48.12	20.70	0.42	10.62	Average
5		0.45	38.67	-18.26	56.93	27.70	0.35	10.62	QP
6		0.45	30.57	-16.36	46.93	19.60	0.35	10.62	Average
7		0.49	37.73	-18.46	56.19	26.80	0.31	10.62	QP
8		0.49	29.73	-16.46	46.19	18.80	0.31	10.62	Average
9		0.55	38.81	-17.19	56.00	27.90	0.28	10.63	QP
10	*	0.55	30.21	-15.79	46.00	19.30	0.28	10.63	Average
11		0.75	36.93	-19.07	56.00	26.10	0.19	10.64	QP
12		0.75	27.33	-18.67	46.00	16.50	0.19	10.64	Average

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	R&S	FSP40	100319	9kHz~40GHz	Oct. 28, 2014	Feb. 12, 2015	Oct. 27, 2015	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	30MHz~40GHz	Jan. 23, 2015	Feb. 12, 2015	Jan. 22, 2016	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 23, 2015	Feb. 12, 2015	Jan. 22, 2016	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Oct. 25, 2014	Feb. 20, 2015	Oct. 24, 2015	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP30	101399	9kHz~30GHz	May 04, 2014	Feb. 20, 2015	May 03, 2015	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 13, 2014	Feb. 20, 2015	Nov. 12, 2015	Radiation (03CH01-KS)
Bilog Antenna	TeseQ	CBL6112D	23182	25Mhz-2Ghz	Jan. 17, 2015	Feb. 20, 2015	Jan. 16, 2016	Radiation (03CH01-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Jan. 17, 2015	Feb. 20, 2015	Jan. 16, 2016	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 08, 2014	Feb. 20, 2015	Nov. 07, 2015	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Mar. 10, 2014	Feb. 20, 2015	Mar. 09, 2015	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161069	1MHz~1GHz /32dB	May 04, 2014	Feb. 20, 2015	May 03, 2015	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02371	1GHz~26.5GHz	Oct. 28, 2014	Feb. 20, 2015	Oct. 27, 2015	Radiation (03CH01-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Feb. 20, 2015	NCR	Radiation (03CH01-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Feb. 20, 2015	NCR	Radiation (03CH01-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Feb. 20, 2015	NCR	Radiation (03CH01-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	May 04, 2014	Feb. 02, 2015	May 03, 2015	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 25, 2014	Feb. 02, 2015	Oct. 24, 2015	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 25, 2014	Feb. 02, 2015	Oct. 24, 2015	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 25, 2014	Feb. 02, 2015	Oct. 24, 2015	Conduction (CO01-KS)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.3dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.5dB**

Appendix A. Radiated Spurious Emission

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz	*	2413.44	97.65	-	-	96.14	31.31	6.22	36.02	100	43	P	H
	*	2411.61	92.6	-	-	91.09	31.31	6.22	36.02	100	43	A	H
		2388.03	49.7	-24.3	74	48.31	31.3	6.17	36.08	100	43	P	H
		2387.13	38.25	-15.75	54	36.86	31.3	6.17	36.08	100	43	A	H
	*	2410.52	97.5	-	-	95.99	31.31	6.22	36.02	100	345	P	V
	*	2411.19	92.61	-	-	91.1	31.31	6.22	36.02	100	345	A	V
		2389.74	50.42	-23.58	74	49.03	31.3	6.17	36.08	100	345	P	V
		2386.95	38.16	-15.84	54	36.77	31.3	6.17	36.08	100	345	A	V
802.11b CH 06 2437MHz	*	2435.57	98.96	-	-	97.37	31.33	6.22	35.96	100	224	P	H
	*	2436.24	93.93	-	-	92.34	31.33	6.22	35.96	100	224	A	H
	*	2435.57	99.31	-	-	97.72	31.33	6.22	35.96	104	328	P	V
	*	2436.16	94.4	-	-	92.81	31.33	6.22	35.96	104	328	A	V

802.11b CH 11 2462MHz	*	2463.46	101.07	-	-	99.28	31.36	6.28	35.85	172	130	P	H
	*	2461.21	96.22	-	-	94.43	31.36	6.28	35.85	172	130	A	H
		2487.4	51.28	-22.72	74	49.37	31.37	6.33	35.79	172	130	P	H
		2486.96	38.29	-15.71	54	36.38	31.37	6.33	35.79	172	130	A	H
	*	2460.62	97.18	-	-	95.39	31.36	6.28	35.85	100	0	P	V
	*	2461.21	92.33	-	-	90.54	31.36	6.28	35.85	100	0	A	V
		2487.44	49.19	-24.81	74	47.28	31.37	6.33	35.79	100	0	P	V
		2486.2	37.29	-16.71	54	35.38	31.37	6.33	35.79	100	0	A	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	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		4824	48.22	-25.78	74	41.25	34.89	8.73	36.65	150	189	P	H
		4824	49.53	-24.47	74	42.56	34.89	8.73	36.65	150	127	P	V
802.11b CH 06 2437MHz		4874	49.07	-24.93	74	42.23	34.92	8.76	36.84	150	180	P	H
		7311	50.77	-23.23	74	43.23	35.56	10.84	38.86	150	128	P	H
		4874	48.15	-25.85	74	41.31	34.92	8.76	36.84	124	180	P	V
		7311	50.92	-23.08	74	43.38	35.56	10.84	38.86	129	120	P	V
802.11b CH 11 2462MHz		4923	50.86	-23.14	74	44.15	34.95	8.79	37.03	150	180	P	H
		7386	50.4	-23.6	74	43.12	35.58	10.89	39.19	150	360	P	H
		4924	49.43	-24.57	74	42.72	34.95	8.79	37.03	150	197	P	V
		7386	50.93	-23.07	74	43.65	35.58	10.89	39.19	150	158	P	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	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11g CH 01 2412MHz	*	2414.7	97.45	-	-	95.94	31.31	6.22	36.02	200	332	P	H
	*	2412.86	87.1	-	-	85.59	31.31	6.22	36.02	200	332	A	H
		2388.39	59.32	-14.68	74	57.93	31.3	6.17	36.08	200	332	P	H
		2390	40.96	-13.04	54	39.57	31.3	6.17	36.08	200	332	A	H
	*	2410.86	99.37	-	-	97.86	31.31	6.22	36.02	160	250	P	V
	*	2411.11	89.1	-	-	87.59	31.31	6.22	36.02	140	250	A	V
		2386.86	61.04	-12.96	74	59.65	31.3	6.17	36.08	160	250	P	V
		2389.92	42.8	-11.2	54	41.41	31.3	6.17	36.08	160	250	A	V
802.11g CH 06 2437MHz	*	2434.15	102	-	-	100.41	31.33	6.22	35.96	194	336	P	H
	*	2435.82	91.46	-	-	89.87	31.33	6.22	35.96	194	336	A	H
	*	2435.91	102.66	-	-	101.07	31.33	6.22	35.96	178	250	P	V
	*	2435.4	92.17	-	-	90.58	31.33	6.22	35.96	178	250	A	V

802.11g CH 11 2462MHz	*	2462.96	99.38	-	-	97.59	31.36	6.28	35.85	122	331	P	H
	*	2463.04	88.54	-	-	86.75	31.36	6.28	35.85	122	331	A	H
		2484.48	63.93	-10.07	74	62.02	31.37	6.33	35.79	122	331	P	H
		2483.52	40.69	-13.31	54	38.78	31.37	6.33	35.79	122	331	A	H
	*	2463.13	96.53	-	-	94.74	31.36	6.28	35.85	100	208	P	V
	*	2462.96	86.11	-	-	84.32	31.36	6.28	35.85	100	208	A	V
		2483.76	62.25	-11.75	74	60.34	31.37	6.33	35.79	100	208	P	V
		2483.88	39.82	-14.18	54	37.91	31.37	6.33	35.79	100	208	A	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	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11g CH 01 2412MHz		4824	49.46	-24.54	74	42.49	34.89	8.73	36.65	150	180	P	H
		4824	49.44	-24.56	74	42.47	34.89	8.73	36.65	150	120	P	V
802.11g CH 06 2437MHz		4874	48.69	-25.31	74	41.85	34.92	8.76	36.84	150	180	P	H
		7311	50.24	-23.76	74	42.7	35.56	10.84	38.86	164	360	P	H
		4875	50.71	-23.29	74	43.87	34.92	8.76	36.84	150	125	P	V
		7311	50.51	-23.49	74	42.97	35.56	10.84	38.86	150	187	P	V
802.11g CH 11 2462MHz		4923	50.91	-23.09	74	44.2	34.95	8.79	37.03	150	132	P	H
		7386	50.16	-23.84	74	42.88	35.58	10.89	39.19	164	360	P	H
		4924	48.57	-25.43	74	41.86	34.95	8.79	37.03	150	123	P	V
		7386	50.65	-23.35	74	43.37	35.58	10.89	39.19	150	197	P	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	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
	*	2414.45	98.25	-	-	96.74	31.31	6.22	36.02	150	323	P	H
	*	2412.69	87.2	-	-	85.69	31.31	6.22	36.02	150	323	A	H
802.11n		2389.11	65.17	-8.83	74	63.78	31.3	6.17	36.08	150	323	P	H
HT20		2389.92	44.24	-9.76	54	42.85	31.3	6.17	36.08	150	323	A	H
CH 01	*	2411.61	94.27	-	-	92.76	31.31	6.22	36.02	150	226	P	V
2412MHz	*	2410.69	83.69	-	-	82.18	31.31	6.22	36.02	150	226	A	V
		2389.38	61.36	-12.64	74	59.97	31.3	6.17	36.08	150	226	P	V
		2389.92	40.86	-13.14	54	39.47	31.3	6.17	36.08	150	226	A	V
802.11n	*	2436.24	100.64	-	-	99.05	31.33	6.22	35.96	189	329	P	H
HT20	*	2435.66	89.83	-	-	88.24	31.33	6.22	35.96	189	329	A	H
CH 06	*	2438.16	96.45	-	-	94.8	31.34	6.22	35.91	216	331	P	V
2437MHz	*	2437.99	85.9	-	-	84.25	31.34	6.22	35.91	216	331	A	V

802.11n HT20 CH 11 2462MHz	*	2460.37	98.46	-	-	96.67	31.36	6.28	35.85	127	324	P	H
	*	2463.38	88.51	-	-	86.72	31.36	6.28	35.85	127	324	A	H
		2484.56	66.67	-7.33	74	64.76	31.37	6.33	35.79	127	324	P	H
		2483.6	40.78	-13.22	54	38.87	31.37	6.33	35.79	127	324	A	H
	*	2465.46	94.19	-	-	92.4	31.36	6.28	35.85	100	318	P	V
	*	2463.46	84.07	-	-	82.28	31.36	6.28	35.85	100	318	A	V
		2484.12	61.02	-12.98	74	59.11	31.37	6.33	35.79	100	318	P	V
		2483.68	38.74	-15.26	54	36.83	31.37	6.33	35.79	100	318	A	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	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
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	50.93	-23.07	74	43.96	34.89	8.73	36.65	150	134	P	H
		4824	50.68	-23.32	74	43.71	34.89	8.73	36.65	150	180	P	V
802.11n HT20 CH 06 2437MHz		4874	49.27	-24.73	74	42.43	34.92	8.76	36.84	150	180	P	H
		7311	49.84	-24.16	74	42.3	35.56	10.84	38.86	150	360	P	H
		4874	48.24	-25.76	74	41.4	34.92	8.76	36.84	164	180	P	V
		7311	49.68	-24.32	74	42.14	35.56	10.84	38.86	150	0	P	V
802.11n HT20 CH 11 2462MHz		4924	49.59	-24.41	74	42.88	34.95	8.79	37.03	150	127	P	H
		7386	50.78	-23.22	74	43.5	35.58	10.89	39.19	157	360	P	H
		4924	49.11	-24.89	74	42.4	34.95	8.79	37.03	179	180	P	V
		7386	50.98	-23.02	74	43.7	35.58	10.89	39.19	150	124	P	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 HT40 (Band Edge @ 3m)

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		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
	*	2416.2	93.99	-	-	92.48	31.31	6.22	36.02	157	334	P	H
	*	2415.62	83.44	-	-	81.93	31.31	6.22	36.02	157	334	A	H
		2389.2	64.44	-9.56	74	63.05	31.3	6.17	36.08	157	334	P	H
		2390	44.77	-9.23	54	43.38	31.3	6.17	36.08	157	334	A	H
802.11n		2491.84	50.16	-23.84	74	48.18	31.39	6.33	35.74	157	334	P	H
HT40		2484.28	37.46	-16.54	54	35.55	31.37	6.33	35.79	157	334	A	H
CH 03	*	2417.87	95.86	-	-	94.35	31.31	6.22	36.02	134	257	P	V
2422MHz	*	2420.04	85.45	-	-	83.86	31.33	6.22	35.96	134	257	A	V
		2388.57	64.95	-9.05	74	63.56	31.3	6.17	36.08	134	257	P	V
		2390	45.19	-8.81	54	43.8	31.3	6.17	36.08	134	257	A	V
		2486.44	51.07	-22.93	74	49.16	31.37	6.33	35.79	134	257	P	V
		2484.36	37.68	-16.32	54	35.77	31.37	6.33	35.79	134	257	A	V
	*	2432.82	96.76	-	-	95.17	31.33	6.22	35.96	100	312	P	H
	*	2431.06	86.44	-	-	84.85	31.33	6.22	35.96	100	312	A	H
		2389.56	63.15	-10.85	74	61.76	31.3	6.17	36.08	100	312	P	H
		2389.74	44.78	-9.22	54	43.39	31.3	6.17	36.08	100	312	A	H
802.11n		2484.64	60.11	-13.89	74	58.2	31.37	6.33	35.79	100	312	P	H
HT40		2483.52	40.38	-13.62	54	38.47	31.37	6.33	35.79	100	312	A	H
CH 06	*	2440	97.35	-	-	95.64	31.34	6.28	35.91	167	273	P	V
2437MHz	*	2435.15	87.08	-	-	85.49	31.33	6.22	35.96	167	273	A	V
		2370.3	58.33	-15.67	74	57.04	31.28	6.17	36.16	167	273	P	V
		2389.38	41.93	-12.07	54	40.54	31.3	6.17	36.08	167	273	A	V
		2484.68	61.72	-12.28	74	59.81	31.37	6.33	35.79	167	273	P	V
		2486.36	41.02	-12.98	54	39.11	31.37	6.33	35.79	167	273	A	V

802.11n HT40 CH 09 2452MHz	*	2446.51	94.74	-	-	93.03	31.34	6.28	35.91	158	326	P	H
	*	2447.34	84.36	-	-	82.65	31.34	6.28	35.91	158	326	A	H
		2384.52	55.18	-18.82	74	53.89	31.28	6.17	36.16	158	326	P	H
		2380.38	38.72	-15.28	54	37.43	31.28	6.17	36.16	158	326	A	H
		2484.76	64	-10	74	62.09	31.37	6.33	35.79	158	326	P	H
		2483.84	39.18	-14.82	54	37.27	31.37	6.33	35.79	158	326	A	H
	*	2458.87	95.01	-	-	93.22	31.36	6.28	35.85	138	263	P	V
	*	2450.52	85.13	-	-	83.42	31.34	6.28	35.91	138	263	A	V
		2384.79	56.55	-17.45	74	55.26	31.28	6.17	36.16	138	263	P	V
		2388.39	39.45	-14.55	54	38.06	31.3	6.17	36.08	138	263	A	V
		2484.92	65.83	-8.17	74	63.92	31.37	6.33	35.79	138	263	P	V
		2484.32	40.33	-13.67	54	38.42	31.37	6.33	35.79	138	263	A	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 HT40 (Harmonic @ 3m)

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		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n		4845	49.75	-24.25	74	42.84	34.9	8.73	36.72	150	126	P	H
HT40		7266	50.59	-23.41	74	42.95	35.56	10.81	38.73	150	124	P	H
CH 03		4845	48.49	-25.51	74	41.58	34.9	8.73	36.72	164	180	P	V
2422MHz		7266	49.33	-24.67	74	41.69	35.56	10.81	38.73	150	124	P	V
802.11n		4875	48	-26	74	41.16	34.92	8.76	36.84	150	126	P	H
HT40		7311	50.38	-23.62	74	42.84	35.56	10.84	38.86	150	127	P	H
CH 06		4875	49.84	-24.16	74	43	34.92	8.76	36.84	197	180	P	V
2437MHz		7311	50.47	-23.53	74	42.93	35.56	10.84	38.86	150	124	P	V
802.11n		4905	49.77	-24.23	74	43	34.94	8.79	36.96	150	180	P	H
HT40		7356	50.31	-23.69	74	42.94	35.57	10.86	39.06	162	360	P	H
CH 09		4905	49.2	-24.8	74	42.43	34.94	8.79	36.96	150	180	P	V
2452MHz		7356	50.01	-23.99	74	42.64	35.57	10.86	39.06	150	12	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C Emission below 1GHz

2.4GHz WIFI 802.11b (LF)

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		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11b LF		30.97	19.48	-20.52	40	32.64	18.71	0.79	32.66	-	-	P	H
		78.5	26.19	-13.81	40	48.86	8.94	1.04	32.65	-	-	P	H
		116.33	30.25	-13.25	43.5	50.23	11.43	1.23	32.64	-	-	P	H
		167.74	27.38	-16.12	43.5	47.43	11.03	1.44	32.52	-	-	P	H
		194.9	22.56	-20.94	43.5	43.43	9.99	1.61	32.47	-	-	P	H
		328.76	34.81	-11.19	46	51.03	14.15	2.02	32.39	120	21	P	H
	!	31.94	35.07	-4.93	40	48.71	18.22	0.79	32.65	100	216	P	V
		79.47	25.33	-14.67	40	47.92	9.02	1.04	32.65	-	-	P	V
		116.33	25.62	-17.88	43.5	45.6	11.43	1.23	32.64	-	-	P	V
		167.74	22.11	-21.39	43.5	42.16	11.03	1.44	32.52	-	-	P	V
		210.42	21.96	-21.54	43.5	42.54	10.29	1.61	32.48	-	-	P	V
		329.73	29.5	-16.5	46	45.67	14.19	2.02	32.38	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

15C Emission below 1GHz

2.4GHz WIFI 802.11g (LF)

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		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11g LF		34.85	19.97	-20.03	40	35.06	16.75	0.79	32.63	-	-	P	H
		77.53	26.76	-13.24	40	49.52	8.85	1.04	32.65	-	-	P	H
		116.33	31.08	-12.42	43.5	51.06	11.43	1.23	32.64	-	-	P	H
		167.74	28.27	-15.23	43.5	48.32	11.03	1.44	32.52	-	-	P	H
		193.93	22.89	-20.61	43.5	43.73	10.02	1.61	32.47	-	-	P	H
		329.73	35.61	-10.39	46	51.78	14.19	2.02	32.38	126	45	P	H
	!	31.94	34.46	-5.54	40	48.1	18.22	0.79	32.65	100	214	P	V
		79.47	21.97	-18.03	40	44.56	9.02	1.04	32.65	-	-	P	V
		116.33	23.02	-20.48	43.5	43	11.43	1.23	32.64	-	-	P	V
		147.37	17.3	-26.2	43.5	36.95	11.68	1.23	32.56	-	-	P	V
		194.9	21.66	-21.84	43.5	42.53	9.99	1.61	32.47	-	-	P	V
		326.82	32.09	-13.91	46	48.38	14.08	2.02	32.39	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

15C Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

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		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11n HT20 LF		33.88	20.37	-19.63	40	34.97	17.24	0.79	32.63	-	-	P	H
		78.5	27.36	-12.64	40	50.03	8.94	1.04	32.65	-	-	P	H
		117.3	31.23	-12.27	43.5	51.2	11.44	1.23	32.64	-	-	P	H
		167.74	27.72	-15.78	43.5	47.77	11.03	1.44	32.52	-	-	P	H
		194.9	22.48	-21.02	43.5	43.35	9.99	1.61	32.47	-	-	P	H
		326.82	35.61	-10.39	46	51.9	14.08	2.02	32.39	100	213	P	H
	!	32.91	34.95	-5.05	40	49.07	17.73	0.79	32.64	100	265	P	V
		79.47	21.43	-18.57	40	44.02	9.02	1.04	32.65	-	-	P	V
		104.69	15.52	-27.98	43.5	35.78	11.34	1.04	32.64	-	-	P	V
		166.77	19.2	-24.3	43.5	39.21	11.07	1.44	32.52	-	-	P	V
		203.63	21.22	-22.28	43.5	42.11	9.98	1.61	32.48	-	-	P	V
		331.67	27.25	-18.75	46	43.34	14.27	2.02	32.38	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

15C Emission below 1GHz

2.4GHz WIFI 802.11n HT40 (LF)

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		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11n HT40 LF		32.91	32.1	-7.9	40	46.22	17.73	0.79	32.64	100	312	P	H
		78.5	27	-13	40	49.67	8.94	1.04	32.65	-	-	P	H
		116.33	30.66	-12.84	43.5	50.64	11.43	1.23	32.64	-	-	P	H
		167.74	27.06	-16.44	43.5	47.11	11.03	1.44	32.52	-	-	P	H
		194.9	22.5	-21	43.5	43.37	9.99	1.61	32.47	-	-	P	H
		326.82	35.13	-10.87	46	51.42	14.08	2.02	32.39	-	-	P	H
	!	31.94	35.19	-4.81	40	48.83	18.22	0.79	32.65	120	124	P	V
		79.47	23.96	-16.04	40	46.55	9.02	1.04	32.65	-	-	P	V
		116.33	26.59	-16.91	43.5	46.57	11.43	1.23	32.64	-	-	P	V
		163.86	20.2	-23.3	43.5	40.12	11.18	1.44	32.54	-	-	P	V
		193.93	22.87	-20.63	43.5	43.71	10.02	1.61	32.47	-	-	P	V
		325.85	33.16	-12.84	46	49.49	14.04	2.02	32.39	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against 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".