FCC RF Test Report

APPLICANT	:	ZTE CORPORATION
EQUIPMENT	:	LTE uFi
BRAND NAME	:	ZTE
MODEL NAME	:	MF97B
FCC ID	:	SRQ-MF97B
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System

The product was received on Oct. 21, 2014 and testing was completed on Jan. 18, 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

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APPENDIX A. RADIATED SPURIOUS EMISSION

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR4O2101C	Rev. 01	Initial issue of report	Jan. 26, 2015
FR4O2101C	Rev. 02	Update report for revising hardware version	Jan. 30, 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 2.5 dB at 2483.520 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 13.73 dB at 0.160 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

ZTE CORPORATION
ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P. R. China

1.2 Manufacturer

ZTE CORPORATION
ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P. R. China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	LTE uFi
Brand Name	ZTE
Model Name	MF97B
FCC ID	SRQ-MF97B
EUT supports Radios application	WCDMA/HSPA/HSPA+(Downlink Only)/LTE/ WLAN 2.4GHz 802. 11b/g/n HT20/HT40/ WLAN 5GHz 802. 11a/n HT20/HT40/ Bluetooth v2.1 + EDR/Bluetooth v4.0 LE
HW Version	d96C
SW Version	MF97BV1.0.0B01
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

<table>
<tr><th colspan="2">Product Specification subjective to this standard</th></tr>
<tr><td>Tx/Rx Channel Frequency Range</td><td>802.11b/g/n : 2412 MHz ~ 2462 MHz</td></tr>
<tr><td>Maximum (Peak) Output Power to antenna</td><td>802.11b : 18.39 dBm (0.0690 W)
802.11g : 20.89 dBm (0.1227 W)
802.11n HT20 : 22.70 dBm (0.1862 W)
802.11n HT40 : 21.92 dBm (0.1556 W)</td></tr>
<tr><td>Antenna Type / Gain</td><td>WLAN for Chain Port 0: IFA Antenna with gain 1.2 dBi
WLAN for Chain Port 1: IFA Antenna with gain 1.2 dBi</td></tr>
<tr><td>Type of Modulation</td><td>802.11b : DSSS (DBPSK / DQPSK / CCK)
802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)</td></tr>
<tr><td>Antenna Function for Transmitter</td><td><table>
<tr><th></th><th>Chain Port 0</th><th>Chain Port 1</th></tr>
<tr><td>802.11 b</td><td>V</td><td>V</td></tr>
<tr><td>802.11 g</td><td>V</td><td>V</td></tr>
<tr><td>802.11 n SISO</td><td>V</td><td>V</td></tr>
<tr><td>802.11 n MIMO</td><td>V</td><td>V</td></tr>
</table></td></tr>
</table>

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	149928

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.	
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755- 3320-2398	
Test Site No.	**Sporton Site No.**	**FCC Registration No.**
	03CH01-SZ	831040

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
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- 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 above 1 GHz 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 and 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 Peak Power (dBm)							
Power vs. Channel				Power vs. Data Rate			
Channel	Frequency (MHz)	Chain Port	Data Rate 1Mbps	Channel	2Mbps	5.5Mbps	11Mbps
CH 01	2412	0	**18.35**	CH 01	18.30	17.88	18.25
CH 06	2437	0	17.65				
CH 11	2462	0	17.30				
CH 01	2412	1	17.21	CH 06	17.79	18.07	18.23
CH 06	2437	1	**18.39**				
CH 11	2462	1	17.86				

2.4GHz 802.11g Peak Power (dBm)											
Power vs. Channel				Power vs. Data Rate							
Channel	Frequency (MHz)	Chain Port	Data Rate 6Mbps	Channel	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 01	2412	0	**19.72**	CH 01	19.42	19.54	19.36	19.54	19.64	19.68	19.52
CH 06	2437	0	19.24								
CH 11	2462	0	18.65								
CH 01	2412	1	19.24	CH 11	20.68	20.56	20.72	20.80	20.75	20.46	20.63
CH 06	2437	1	20.30								
CH 11	2462	1	**20.89**								

2.4GHz 802.11n HT20 Peak Power (dBm)											
Power vs. Channel				Power vs. MCS Index							
Channel	Frequency (MHz)	Chain Port	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412	0	19.07	CH 06	19.47	19.34	20.25	20.73	20.88	20.76	20.62
CH 06	2437	0	**20.89**								
CH 11	2462	0	18.34								
CH 01	2412	1	19.56	CH 06	20.28	20.52	21.24	20.89	21.12	21.03	21.34
CH 06	2437	1	**21.36**								
CH 11	2462	1	20.36								
CH 01	2412	0+1(0)	17.91	CH 06	17.93	17.43	19.95	19.86	19.67	19.75	19.54
CH 06	2437	0+1(0)	19.89								
CH 11	2462	0+1(0)	16.73								
CH 01	2412	0+1(1)	17.82	CH 06	18.38	18.86	19.02	19.28	19.45	19.24	19.12
CH 06	2437	0+1(1)	19.48								
CH 11	2462	0+1(1)	18.37								
CH 01	2412	0+1	20.88	CH 06	21.17	21.21	22.52	22.59	22.57	22.51	22.35
CH 06	2437	0+1	**22.70**								
CH 11	2462	0+1	20.64								

2.4GHz 802.11n HT40 Peak Power (dBm)											
Power vs. Channel				Power vs. MCS Index							
Channel	Frequency (MHz)	Chain Port	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 03	2422	0	19.07	CH 06	19.72	19.83	20.65	20.50	20.63	20.60	20.58
CH 06	2437	0	**20.78**								
CH 09	2452	0	18.88								
CH 03	2422	1	18.63	CH 06	19.16	19.35	20.40	20.50	20.57	20.62	20.52
CH 06	2437	1	**20.79**								
CH 09	2452	1	19.30								
CH 03	2422	0+1(0)	16.63	CH 06	17.88	18.45	18.81	18.56	18.90	18.92	18.78
CH 06	2437	0+1(0)	18.95								
CH 09	2452	0+1(0)	16.45								
CH 03	2422	0+1(1)	17.06	CH 06	17.29	18.65	18.78	18.69	18.54	18.75	17.91
CH 06	2437	0+1(1)	18.87								
CH 09	2452	0+1(1)	17.57								
CH 03	2422	0+1	19.86	CH 06	20.61	21.56	21.81	21.64	21.73	21.85	21.38
CH 06	2437	0+1	**21.92**								
CH 09	2452	0+1	20.06								

Note: Chain Port 0+1 is a calculated result from sum of the power Chain Port 0+1(0) and Chain Port 0+1(1).

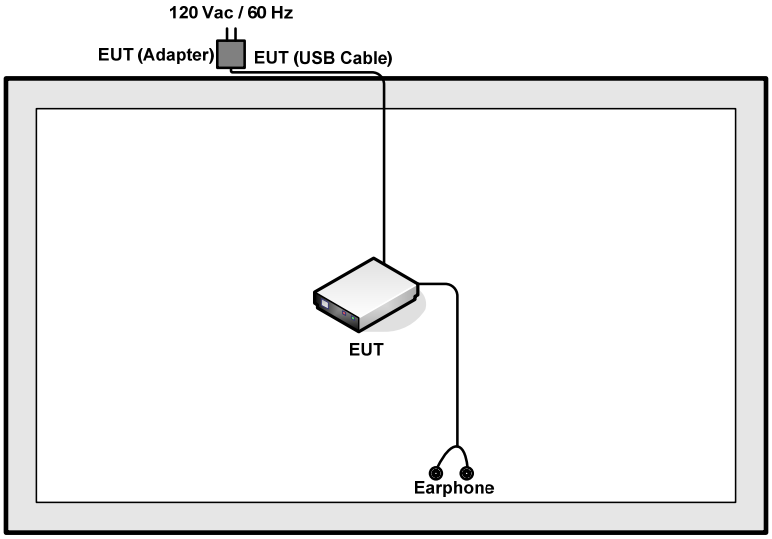
2.3 Test Mode

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

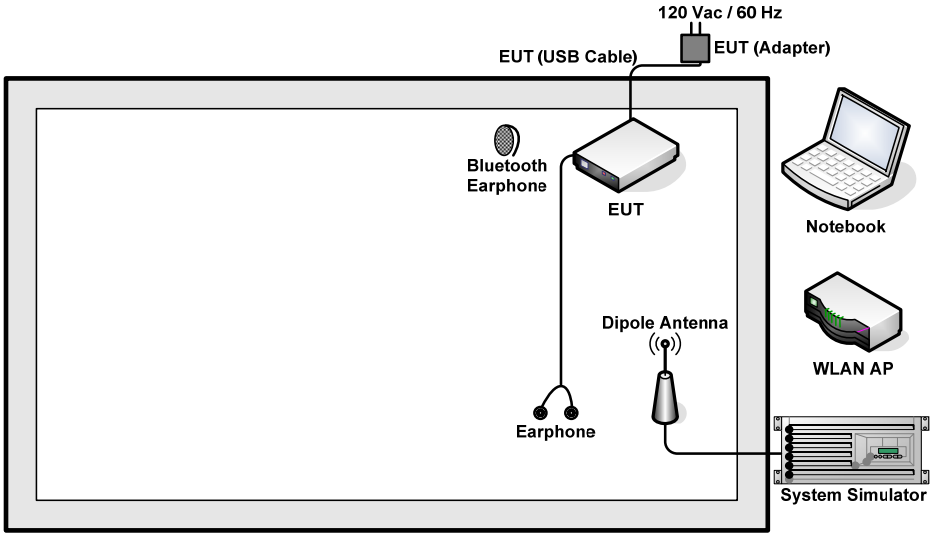
Test Cases				
	Test Items	Mode	Data Rate	Test Channel
Conducted TCs	6dB BW Power Spectral Density	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	MCS0	1/6/11
		802.11n HT40	MCS0	3/6/9
	Output Power	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	MCS0	1/6/11
		802.11n HT40	MCS0	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
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + Earphone + USB Cable (Charging from Adapter)			
Remark: For radiated TCs, the tests were performed 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.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
3.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
4.	Notebook	Lenovo	G480	PRC4	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
5.	Earphone	Lenovo	SH100	N/A	Unshielded, 1.2 m	N/A

2.6 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuously 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

Following shows an offset computation example with cable loss 6 dB.

Offset (dB) = RF cable loss (dB)

=6 (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.

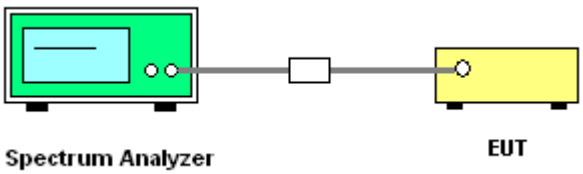
3.1.2 Measuring Instruments

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

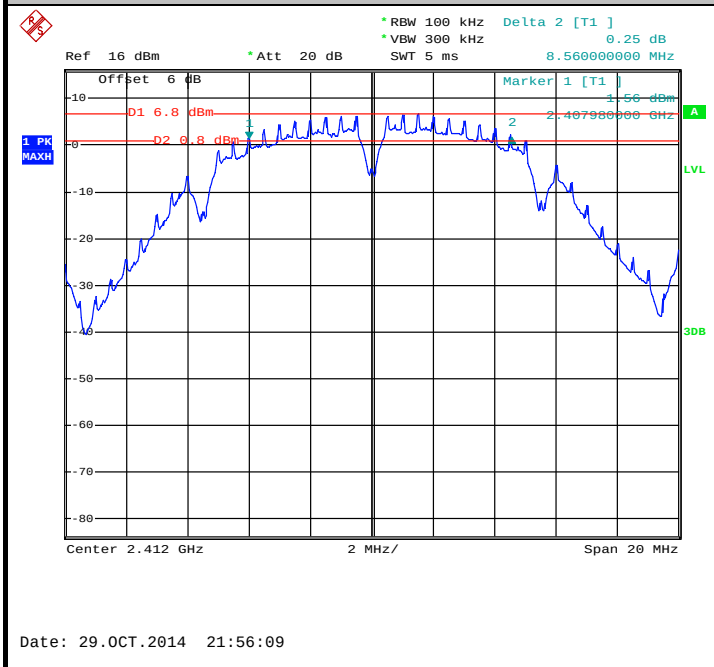


3.1.5 Test Result of 6dB Bandwidth

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
					Chain Port 0	Chain Port 1		
11b	1Mbps	1	1	2412	-	8.56	0.5	Pass
11b	1Mbps	1	6	2437	-	9.08	0.5	Pass
11b	1Mbps	1	11	2462	-	9.04	0.5	Pass
11g	6Mbps	1	1	2412	-	16.04	0.5	Pass
11g	6Mbps	1	6	2437	-	16.36	0.5	Pass
11g	6Mbps	1	11	2462	-	16.28	0.5	Pass
HT20	MCS0	1	1	2412	-	17.20	0.5	Pass
HT20	MCS0	1	6	2437	-	17.56	0.5	Pass
HT20	MCS0	1	11	2462	-	17.56	0.5	Pass
HT40	MCS0	1	3	2422	-	35.68	0.5	Pass
HT40	MCS0	1	6	2437	-	36.32	0.5	Pass
HT40	MCS0	1	9	2452	-	36.36	0.5	Pass
HT20	MCS0	2	1	2412	17.28	17.60	0.5	Pass
HT20	MCS0	2	6	2437	16.32	17.60	0.5	Pass
HT20	MCS0	2	11	2462	17.60	17.60	0.5	Pass
HT40	MCS0	2	3	2422	35.76	35.76	0.5	Pass
HT40	MCS0	2	6	2437	35.16	36.32	0.5	Pass
HT40	MCS0	2	9	2452	35.12	36.32	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 Peak Output Power Measurement

3.2.1 Limit of Peak Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is 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.

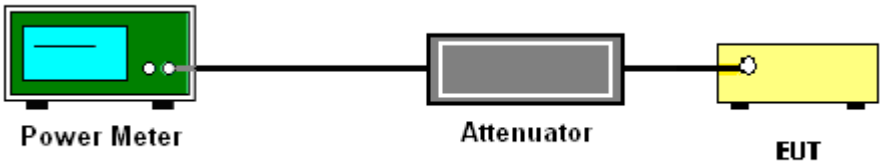
3.2.2 Measuring Instruments

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.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

3.2.4 Test Setup



3.2.5 Test Result of Peak Output Power

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

Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Peak Conducted Power (dBm)			Max. Limit (dBm)		DG (dBi)		Pass/Fail
					Chain Port 0	Chain Port 1	SUM	Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	
11b	1Mbps	1	1	2412	18.35	17.21	-	30.00	30.00	1.20	1.20	Pass
11b	1Mbps	1	6	2437	17.65	18.39		30.00	30.00	1.20	1.20	Pass
11b	1Mbps	1	11	2462	17.30	17.86		30.00	30.00	1.20	1.20	Pass
11g	6Mbps	1	1	2412	19.72	19.24		30.00	30.00	1.20	1.20	Pass
11g	6Mbps	1	6	2437	19.24	20.30		30.00	30.00	1.20	1.20	Pass
11g	6Mbps	1	11	2462	18.65	20.89		30.00	30.00	1.20	1.20	Pass
HT20	MCS0	1	1	2412	19.07	19.56		30.00	30.00	1.20	1.20	Pass
HT20	MCS0	1	6	2437	20.89	21.36		30.00	30.00	1.20	1.20	Pass
HT20	MCS0	1	11	2462	18.34	20.36		30.00	30.00	1.20	1.20	Pass
HT40	MCS0	1	3	2422	19.07	18.63		30.00	30.00	1.20	1.20	Pass
HT40	MCS0	1	6	2437	20.78	20.79		30.00	30.00	1.20	1.20	Pass
HT40	MCS0	1	9	2452	18.88	19.30		30.00	30.00	1.20	1.20	Pass
HT20	MCS0	2	1	2412	17.91	17.82	20.88	30.00		1.20		Pass
HT20	MCS0	2	6	2437	19.89	19.48	22.70	30.00		1.20		Pass
HT20	MCS0	2	11	2462	16.73	18.37	20.64	30.00		1.20		Pass
HT40	MCS0	2	3	2422	16.63	17.06	19.86	30.00		1.20		Pass
HT40	MCS0	2	6	2437	18.95	18.87	21.92	30.00		1.20		Pass
HT40	MCS0	2	9	2452	16.45	17.57	20.06	30.00		1.20		Pass

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

3.2.6 Test Result of Average output Power (Reporting Only)

Test Band :	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 Conducted Power (dBm)		
					Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	Sum Power
11b	1Mbps	1	1	2412	0.04	0.03	15.12	14.32	-
11b	1Mbps	1	6	2437	0.04	0.03	14.46	15.39	
11b	1Mbps	1	11	2462	0.04	0.03	14.14	14.98	
11g	6Mbps	1	1	2412	0.28	0.29	13.96	13.89	
11g	6Mbps	1	6	2437	0.28	0.29	12.92	14.92	
11g	6Mbps	1	11	2462	0.28	0.29	12.51	15.08	
HT20	MCS0	1	1	2412	0.32	0.34	13.08	13.45	
HT20	MCS0	1	6	2437	0.32	0.34	13.58	14.50	
HT20	MCS0	1	11	2462	0.32	0.34	12.57	14.09	
HT40	MCS0	1	3	2422	0.62	0.61	12.15	11.64	
HT40	MCS0	1	6	2437	0.62	0.61	12.97	13.06	
HT40	MCS0	1	9	2452	0.62	0.61	12.35	12.20	
HT20	MCS0	2	1	2412	0.31	0.34	11.05	10.78	13.93
HT20	MCS0	2	6	2437	0.31	0.34	11.30	12.06	14.71
HT20	MCS0	2	11	2462	0.31	0.34	9.89	11.40	13.73
HT40	MCS0	2	3	2422	0.64	1.15	9.10	10.11	12.64
HT40	MCS0	2	6	2437	0.64	1.15	9.43	10.93	13.25
HT40	MCS0	2	9	2452	0.64	1.15	9.07	10.71	12.98

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.
7. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

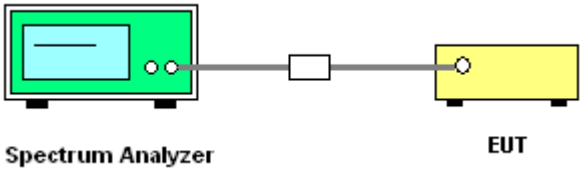
   If measurements performed using method (2) plus 10 log (N) exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

   Method (1): Measure and sum the spectra across the outputs.

   The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

   Method (2): Measure and add 10 log (N) dB, where N is the number of outputs. (N=2)

3.3.4 Test Setup



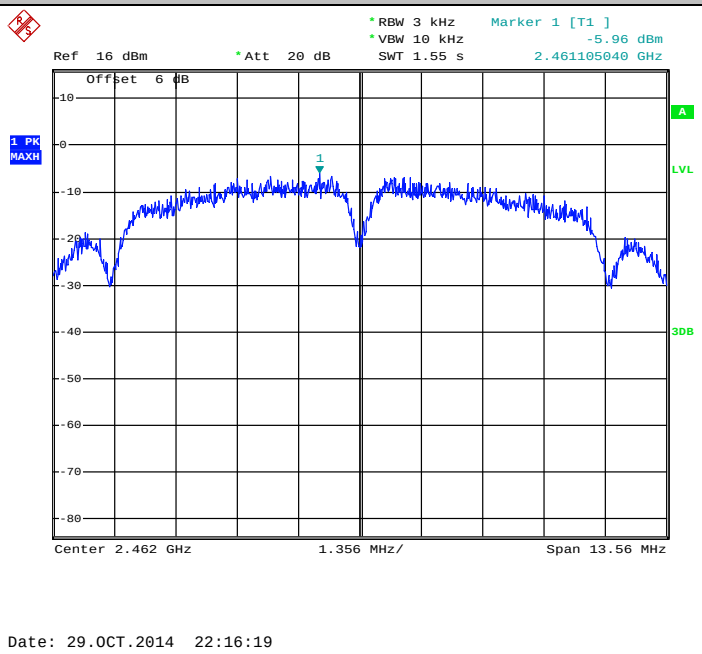
3.3.5 Test Result of Power Spectral Density

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

Mod.	Data Rate	N_{TX}	CH.	Freq. (MHz)	Peak Power Density (dBm/3kHz)			Max. Limit (dBm/3kHz)		DG (dBi)		Pass/Fail
					Chain Port 0	Chain Port 1	Worst +10log(2)	Chain Port 0	Chain Port 1	Chain Port 0	Chain Port 1	
11b	1Mbps	1	1	2412	-	-8.20	-	8.00	8.00	1.20	1.20	Pass
11b	1Mbps	1	6	2437	-	-6.53		8.00	8.00	1.20	1.20	Pass
11b	1Mbps	1	11	2462	-	-5.96		8.00	8.00	1.20	1.20	Pass
11g	6Mbps	1	1	2412	-	-11.66		8.00	8.00	1.20	1.20	Pass
11g	6Mbps	1	6	2437	-	-9.31		8.00	8.00	1.20	1.20	Pass
11g	6Mbps	1	11	2462	-	-9.02		8.00	8.00	1.20	1.20	Pass
HT20	MCS0	1	1	2412	-	-11.32		8.00	8.00	1.20	1.20	Pass
HT20	MCS0	1	6	2437	-	-10.38		8.00	8.00	1.20	1.20	Pass
HT20	MCS0	1	11	2462	-	-10.70		8.00	8.00	1.20	1.20	Pass
HT40	MCS0	1	3	2422	-	-15.50		8.00	8.00	1.20	1.20	Pass
HT40	MCS0	1	6	2437	-	-14.85		8.00	8.00	1.20	1.20	Pass
HT40	MCS0	1	9	2452	-	-16.04		8.00	8.00	1.20	1.20	Pass
HT20	MCS0	2	1	2412	-14.23	-13.15	-10.14	8.00		4.21		Pass
HT20	MCS0	2	6	2437	-13.80	-13.82	-10.79	8.00		4.21		Pass
HT20	MCS0	2	11	2462	-15.44	-13.16	-10.15	8.00		4.21		Pass
HT40	MCS0	2	3	2422	-18.40	-17.70	-14.69	8.00		4.21		Pass
HT40	MCS0	2	6	2437	-18.16	-18.47	-15.15	8.00		4.21		Pass
HT40	MCS0	2	9	2452	-17.94	-16.96	-13.95	8.00		4.21		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).

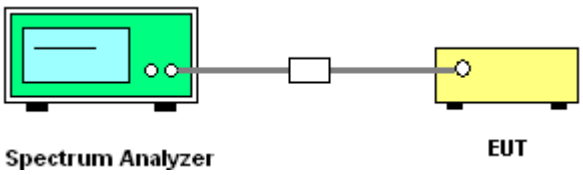
3.4.2 Measuring Instruments

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



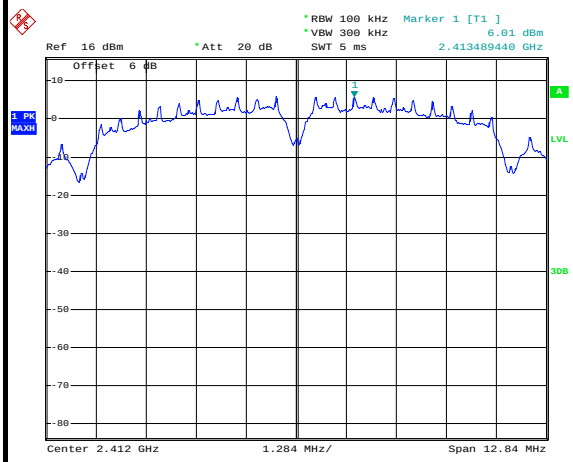
3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Number of TX = 1, Chain Port 1 (Measured)

Number of TX	1	**Chain Port:**	1
Test Mode :	802.11b	**Temperature :**	24~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	49~51%
Test Channel :	01	**Test Engineer :**	Issac Song

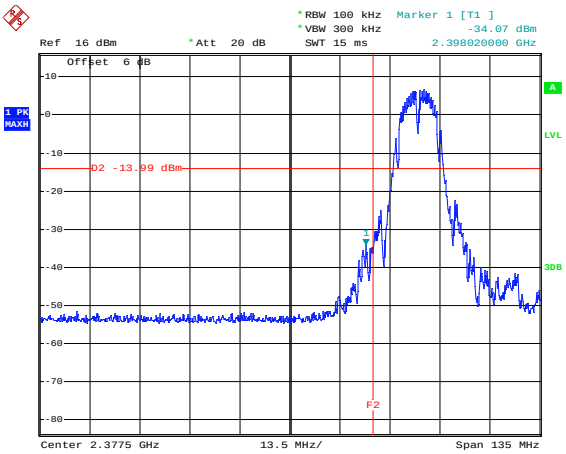
WLAN 802.11b Channel 01

100kHz PSD reference Level



Date: 29.OCT.2014 21:56:39

Low Channel Plot



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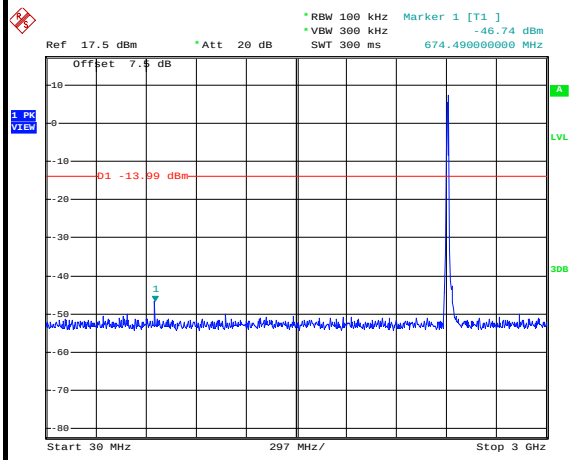
Spurious Emission 30MHz~3GHz



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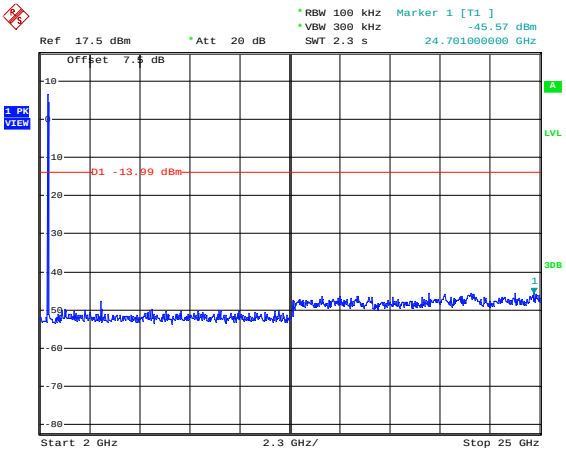
Spurious Emission 2GHz~25GHz

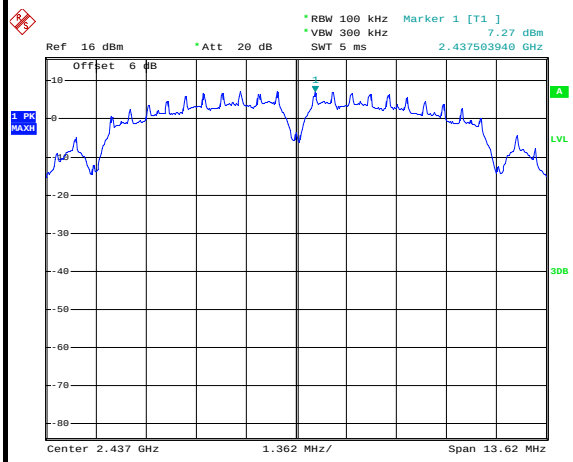


Date: 29.OCT.2014 21:57:31

Number of TX :	1	**Chain Port:**	1
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



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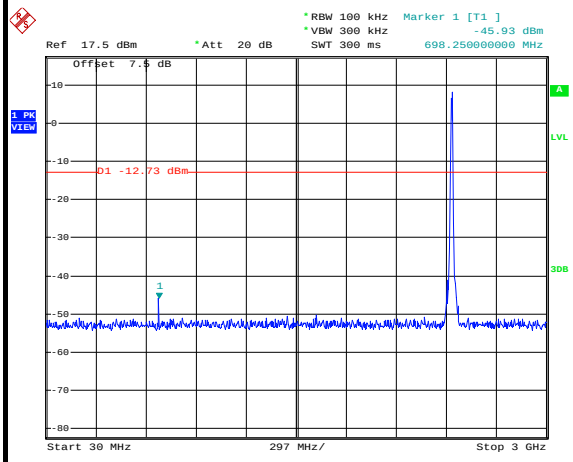
Spurious Emission 30MHz~3GHz



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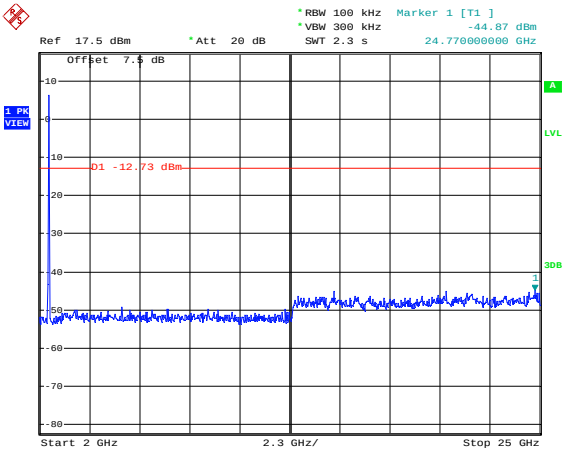
Spurious Emission 2GHz~25GHz

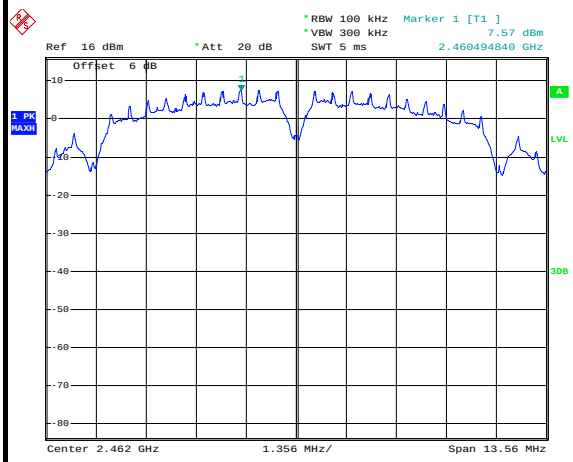


Date: 29.OCT.2014 22:13:29

Number of TX :	1	**Chain Port:**	1
Test Mode :	802.11b	**Temperature :**	24~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	49~51%
Test Channel :	11	**Test Engineer :**	Issac Song

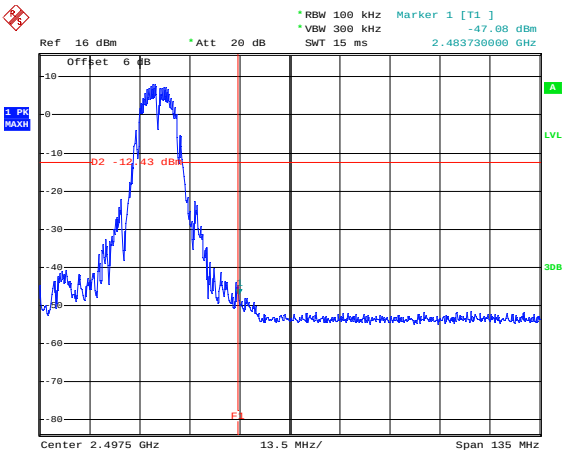
WLAN 802.11b Channel 11

100kHz PSD reference Level



Date: 29.OCT.2014 22:16:28

High Channel Plot



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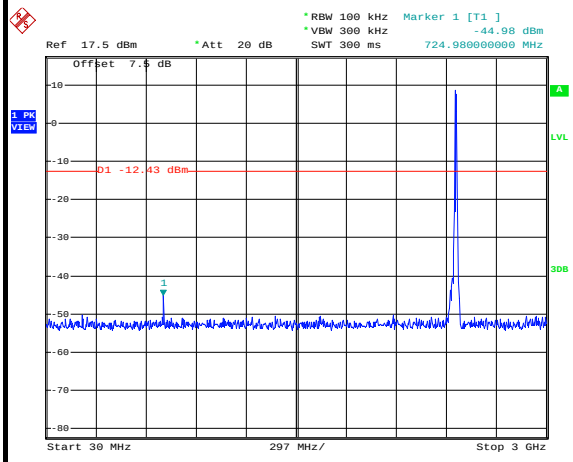
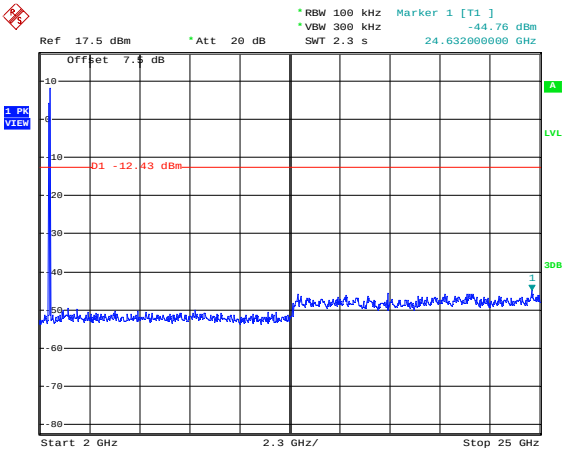
Spurious Emission 30MHz~3GHz



Date: 29.OCT.2014 22:17:01

Spurious Emission 2GHz~25GHz

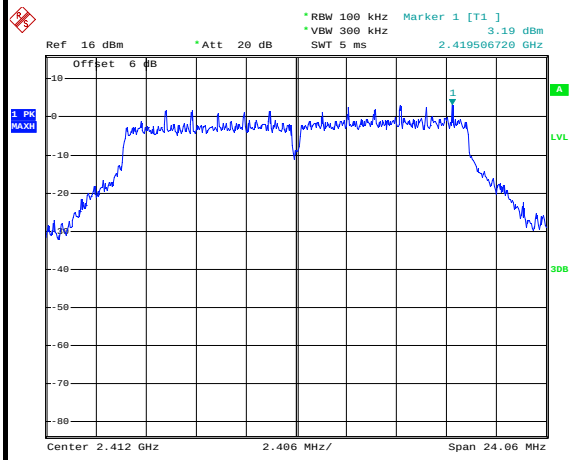


Date: 29.OCT.2014 22:17:19

Number of TX :	1	**Chain Port:**	1
Test Mode :	802.11g	**Temperature :**	24~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	49~51%
Test Channel :	01	**Test Engineer :**	Issac Song

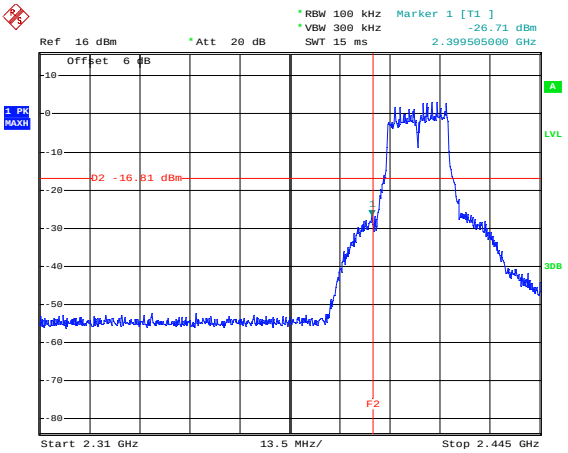
WLAN 802.11g Channel 01

100kHz PSD reference Level



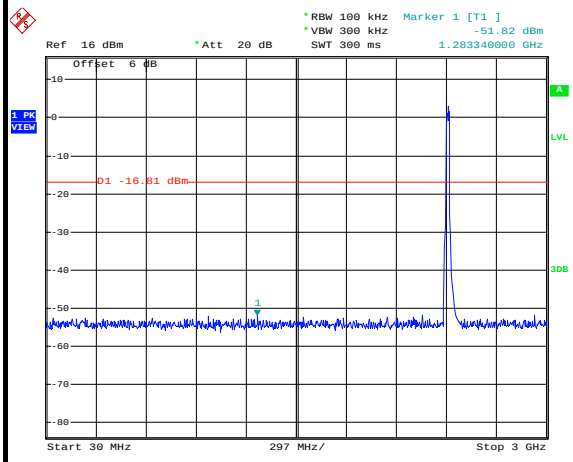
Date: 29.OCT.2014 22:27:04

Low Channel Plot



Date: 29.OCT.2014 22:27:18

Spurious Emission 30MHz~3GHz



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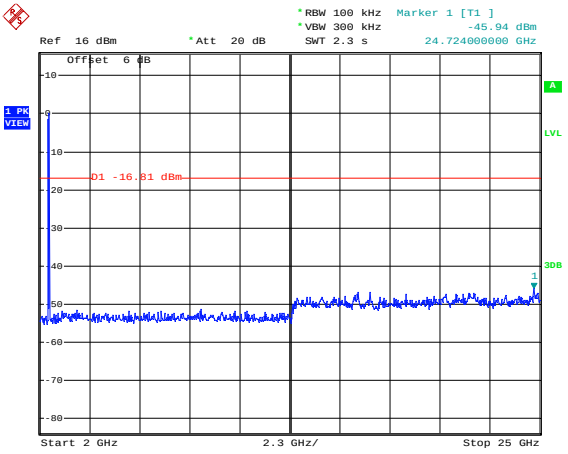
Spurious Emission 2GHz~25GHz

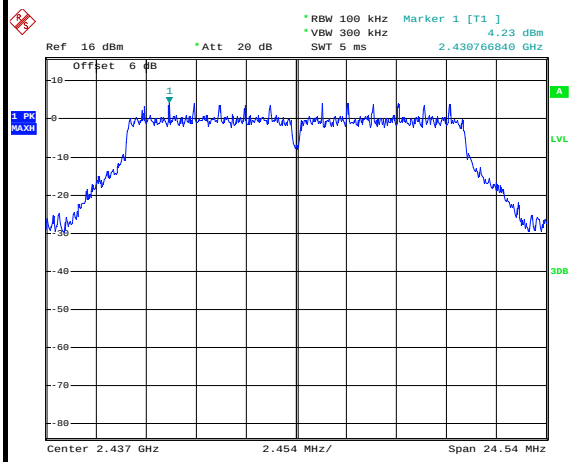


Date: 29.OCT.2014 22:27:56

Number of TX :	1	**Chain Port:**	1
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



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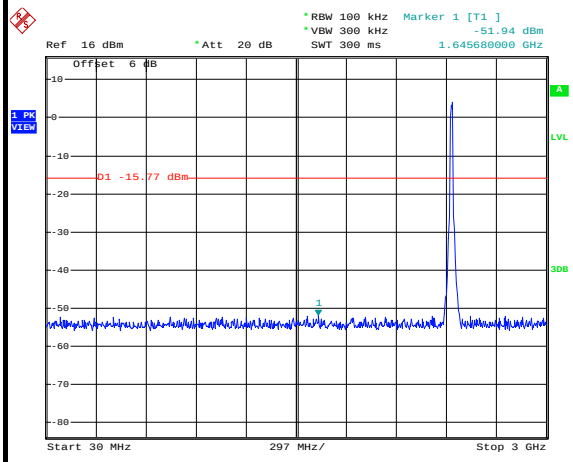
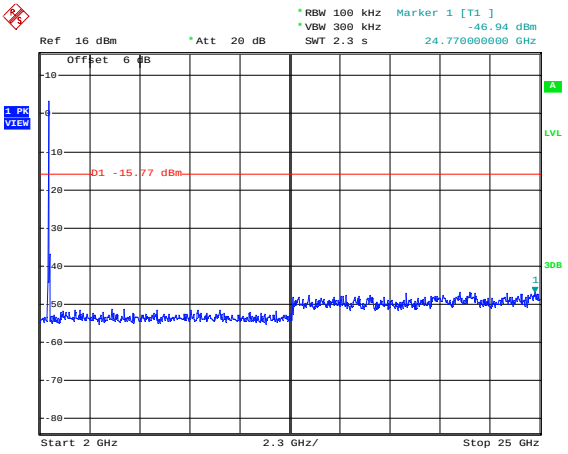
Spurious Emission 30MHz~3GHz



Date: 29.OCT.2014 22:42:04

Spurious Emission 2GHz~25GHz



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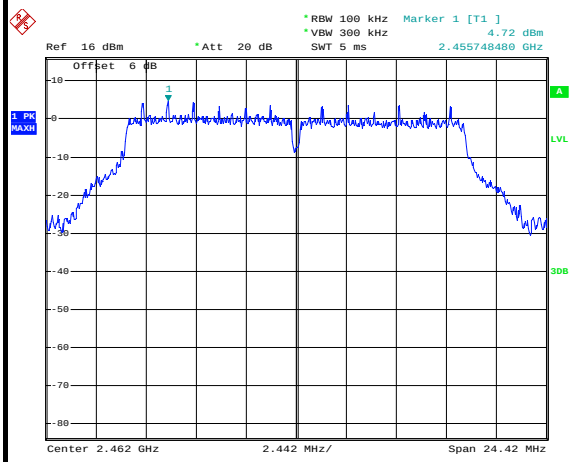
Number of TX :	1	**Chain Port:**	1
Test Mode :	802.11g	**Temperature :**	24~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	49~51%
Test Channel :	11	**Test Engineer :**	Issac Song

WLAN 802.11g Channel 11

100kHz PSD reference Level



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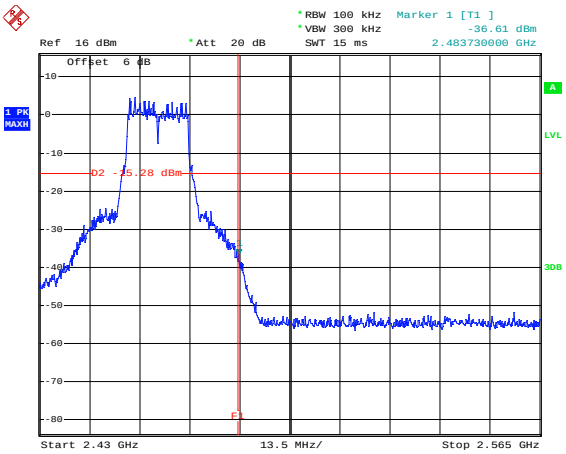
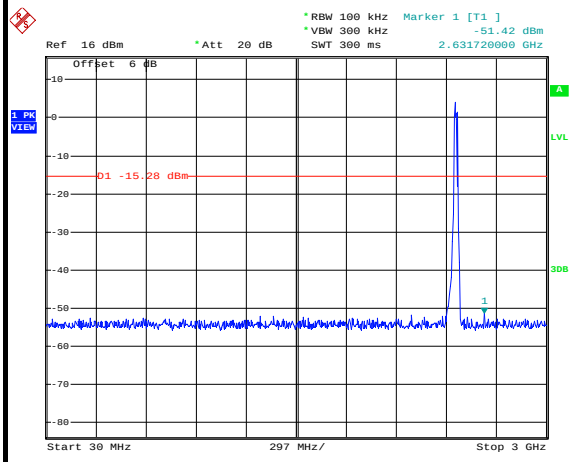
High Channel Plot



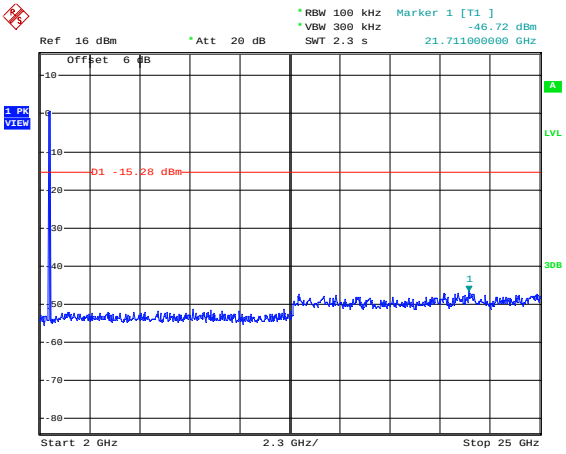
Date: 29.OCT.2014 22:35:05

Spurious Emission 30MHz~3GHz



Date: 29.OCT.2014 22:35:24

Spurious Emission 2GHz~25GHz

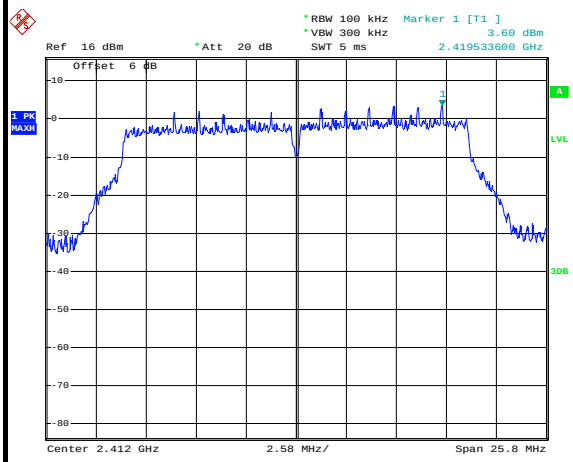


Date: 29.OCT.2014 22:35:43

Number of TX :	1	**Chain Port:**	1
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



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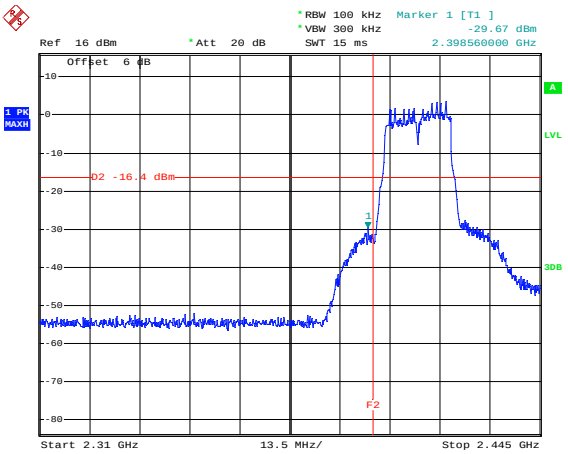
Low Channel Plot



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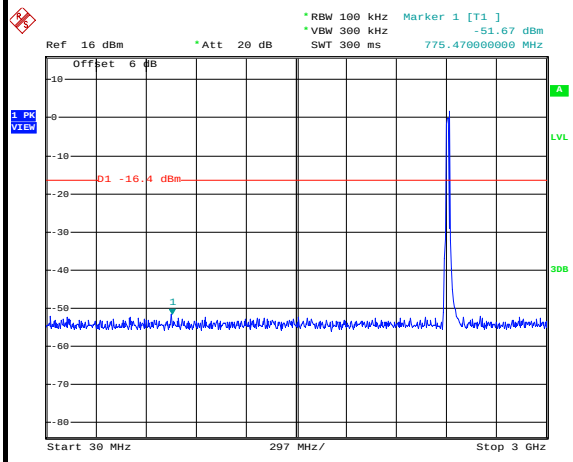
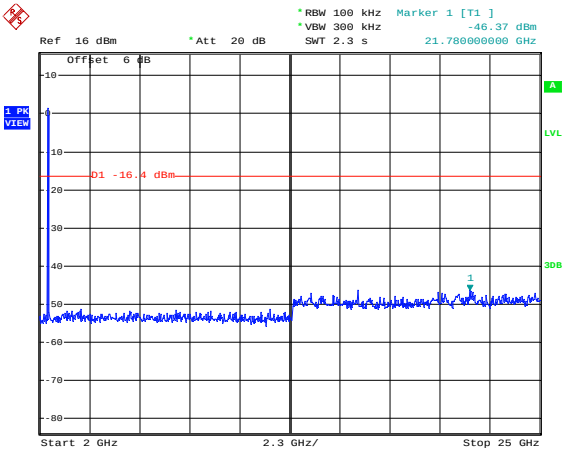
Spurious Emission 30MHz~3GHz



Date: 29.OCT.2014 23:12:53

Spurious Emission 2GHz~25GHz

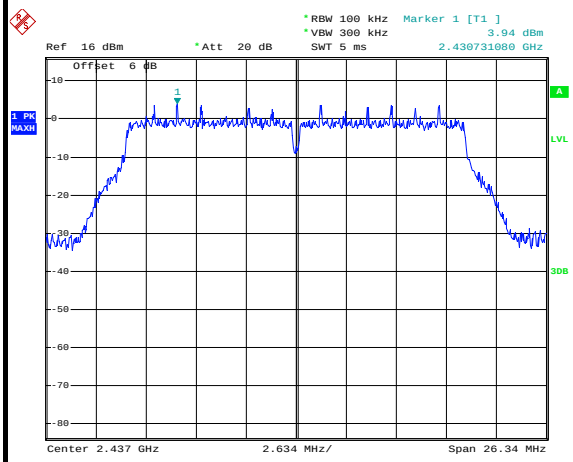


Date: 29.OCT.2014 23:13:11

Number of TX :	1	**Chain Port:**	1
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



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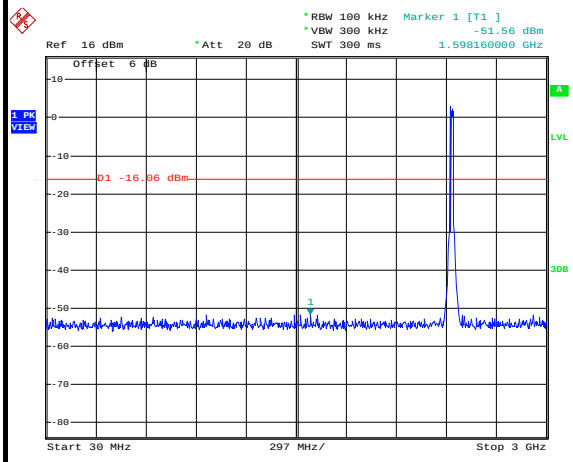
Spurious Emission 30MHz~3GHz



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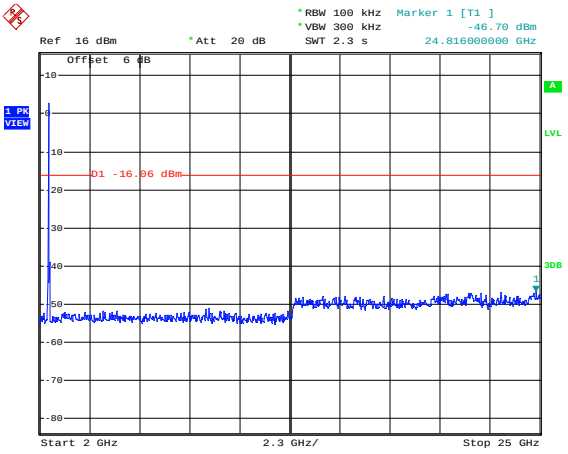
Spurious Emission 2GHz~25GHz

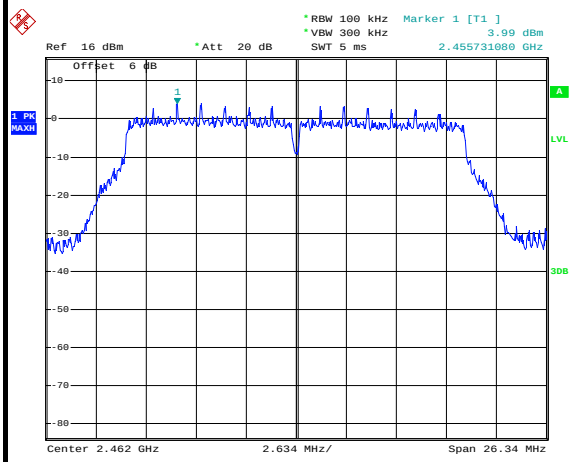


Date: 29.OCT.2014 23:16:10

Number of TX :	1	**Chain Port:**	1
Test Mode :	802.11n HT20	**Temperature :**	24~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	49~51%
Test Channel :	11	**Test Engineer :**	Issac Song

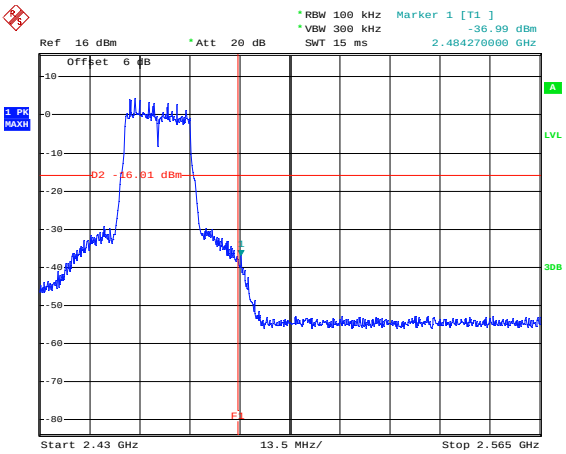
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



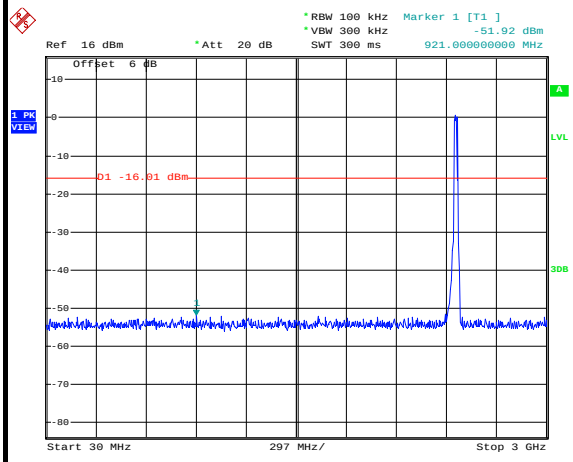
Date: 29.OCT.2014 23:18:31

High Channel Plot



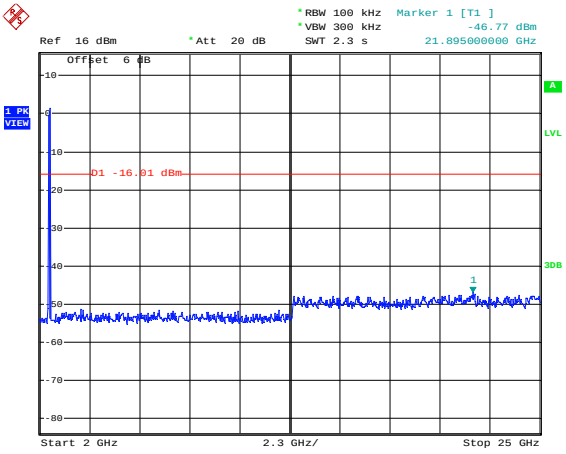
Date: 29.OCT.2014 23:18:45

Spurious Emission 30MHz~3GHz



Date: 29.OCT.2014 23:19:04

Spurious Emission 2GHz~25GHz

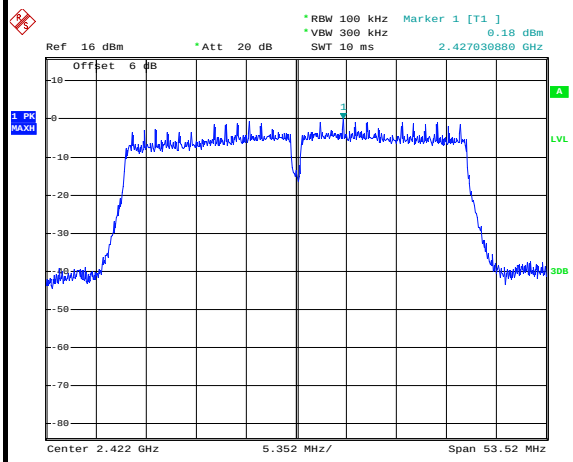


Date: 29.OCT.2014 23:19:23

Number of TX :	1	**Chain Port:**	1
Test Mode :	802.11n HT40	**Temperature :**	24~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	49~51%
Test Channel :	03	**Test Engineer :**	Issac Song

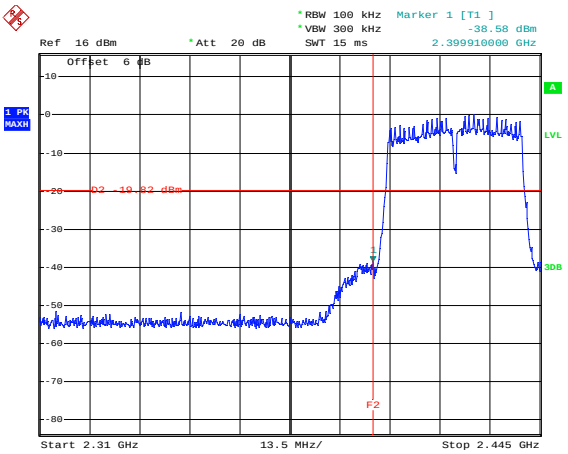
WLAN 802.11n HT40 Channel 03

100kHz PSD reference Level



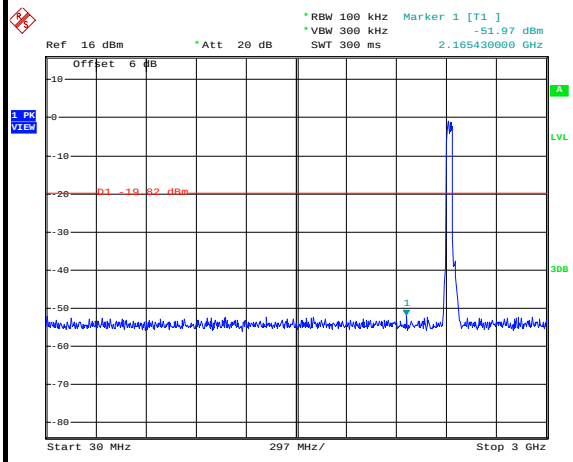
Date: 29.OCT.2014 23:52:26

Low Channel Plot



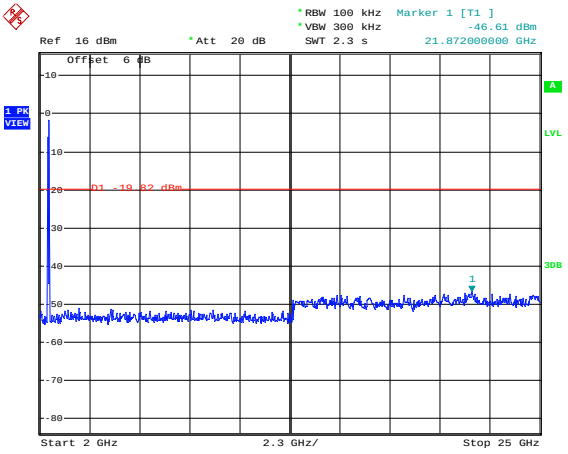
Date: 29.OCT.2014 23:52:40

Spurious Emission 30MHz~3GHz



Date: 29.OCT.2014 23:53:00

Spurious Emission 2GHz~25GHz

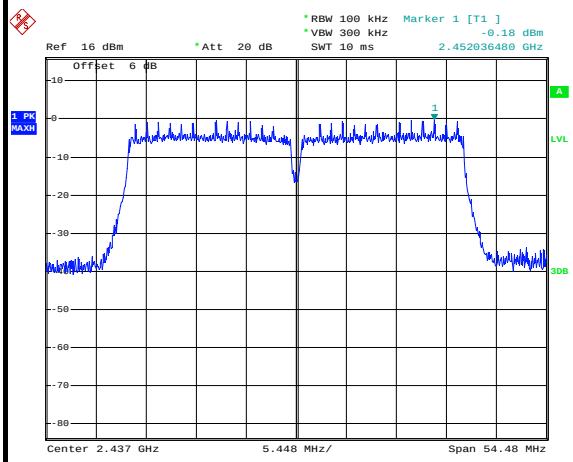


Date: 29.OCT.2014 23:53:18

Number of TX :	1	**Chain Port:**	1
Test Mode :	802.11n HT40	**Temperature :**	24~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	49~51%
Test Channel :	06	**Test Engineer :**	Issac Song

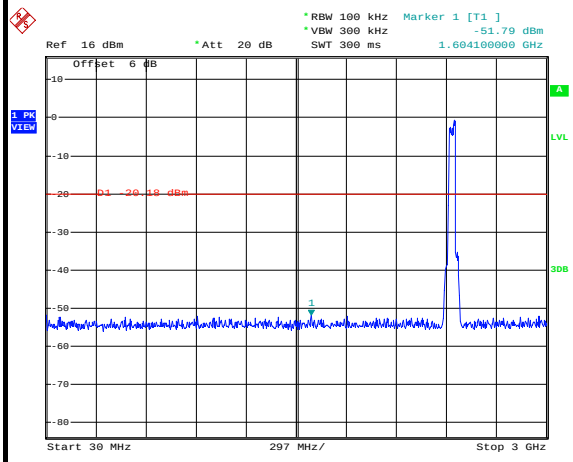
WLAN 802.11n HT40 Channel 06

100kHz PSD reference Level



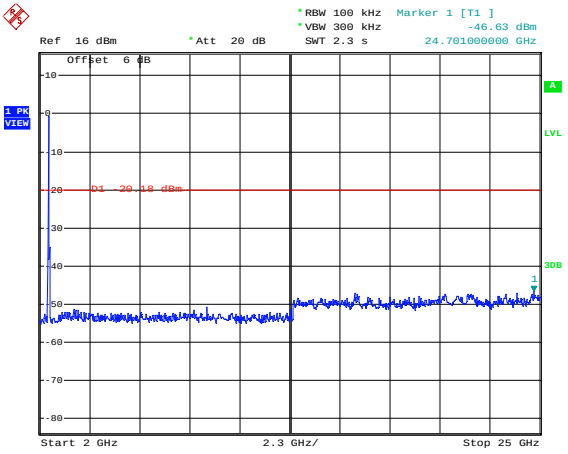
Date: 29.OCT.2014 23:56:35

Spurious Emission 30MHz~3GHz



Date: 29.OCT.2014 23:58:10

Spurious Emission 2GHz~25GHz

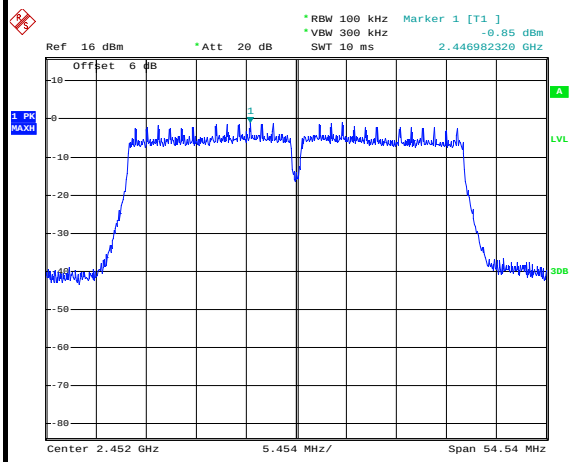


Date: 29.OCT.2014 23:58:29

Number of TX :	1	**Chain Port:**	1
Test Mode :	802.11n HT40	**Temperature :**	24~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	49~51%
Test Channel :	09	**Test Engineer :**	Issac Song

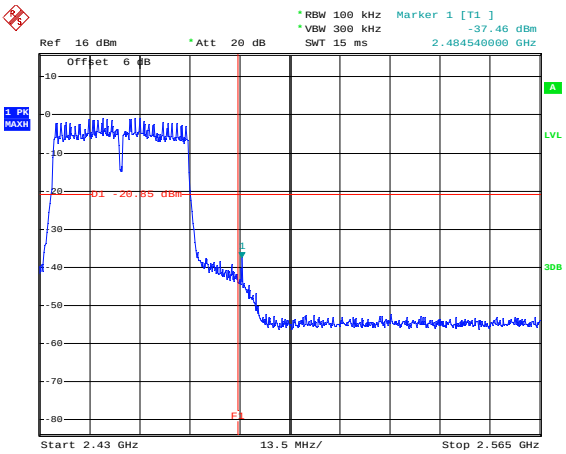
WLAN 802.11n HT40 Channel 09

100kHz PSD reference Level



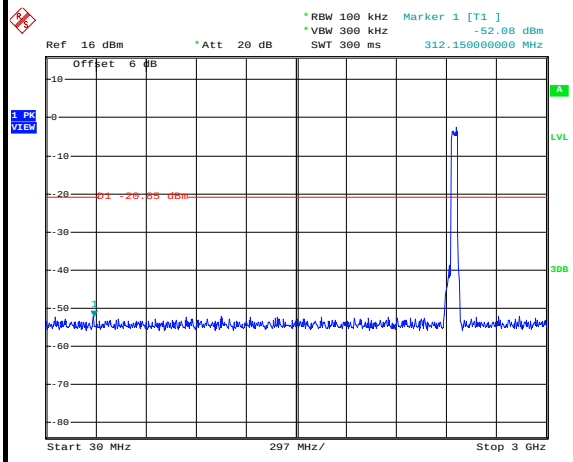
Date: 31.OCT.2014 20:29:19

High Channel Plot



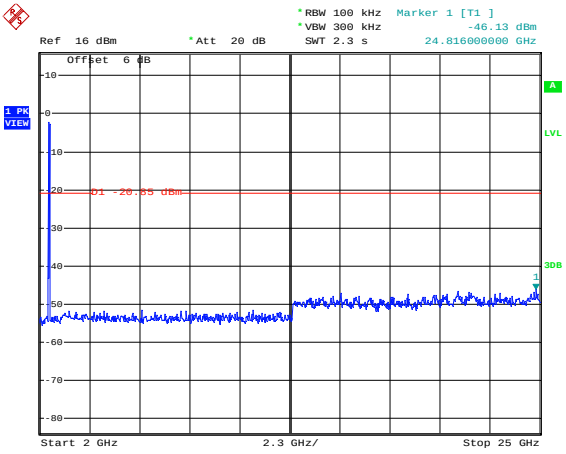
Date: 31.OCT.2014 20:31:03

Spurious Emission 30MHz~3GHz



Date: 31.OCT.2014 20:31:32

Spurious Emission 2GHz~25GHz



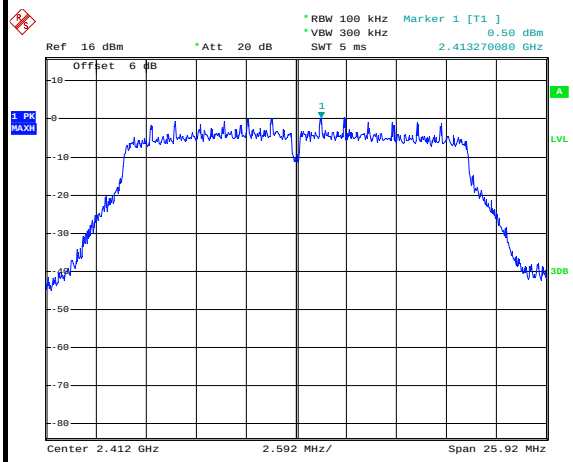
Date: 31.OCT.2014 20:31:50

Number of TX = 2, Chain Port 0+1(0) (Measured)

Number of TX :	2	**Chain Port:**	0+1(0)
Test Mode :	802.11n HT20	**Temperature :**	24~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	49~51%
Test Channel :	01	**Test Engineer :**	Issac Song

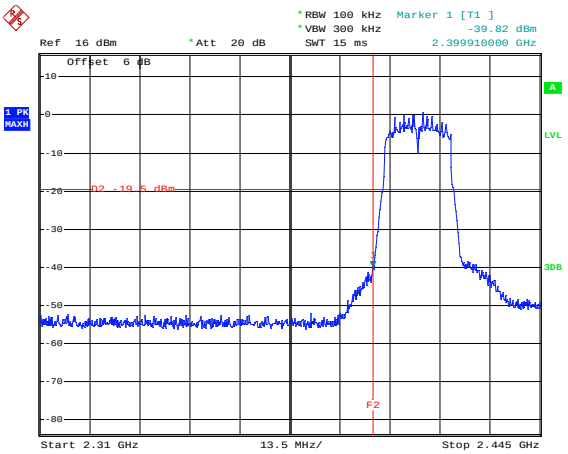
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



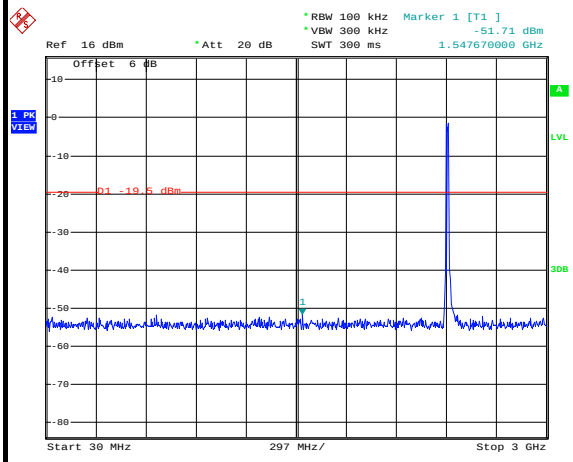
Date: 29.OCT.2014 23:31:30

Low Channel Plot



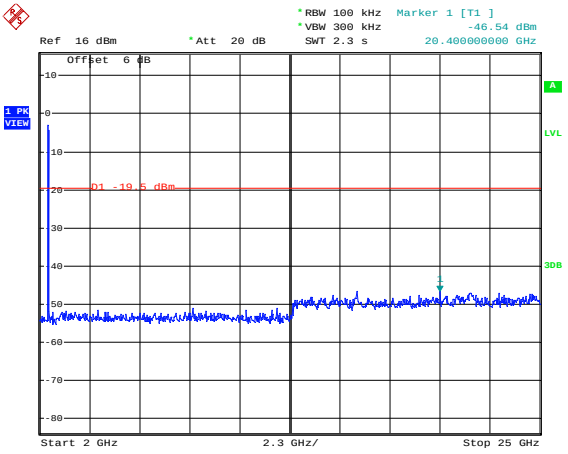
Date: 29.OCT.2014 23:33:50

Spurious Emission 30MHz~3GHz



Date: 29.OCT.2014 23:32:03

Spurious Emission 2GHz~25GHz

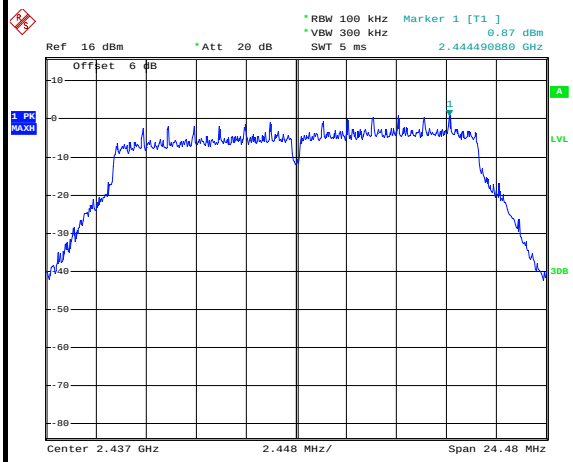


Date: 29.OCT.2014 23:32:22

Number of TX :	2	**Chain Port:**	0+1(0)
Test Mode :	802.11n HT20	**Temperature :**	24~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	49~51%
Test Channel :	06	**Test Engineer :**	Issac Song

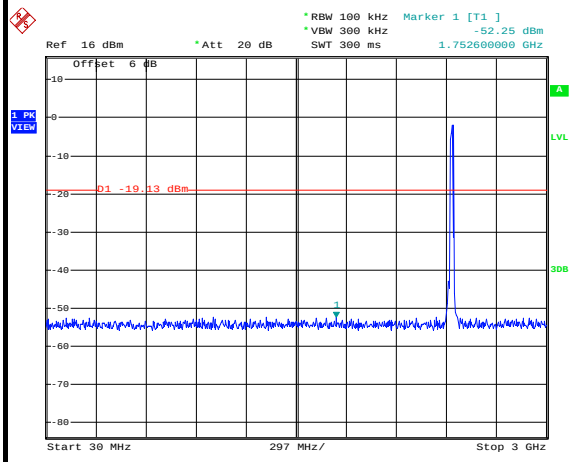
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



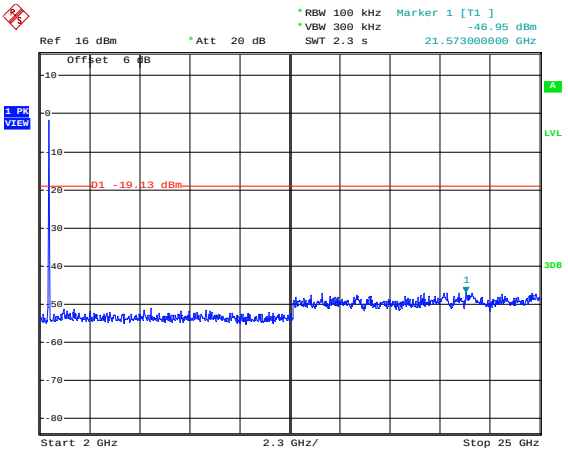
Date: 29.OCT.2014 23:36:49

Spurious Emission 30MHz~3GHz



Date: 29.OCT.2014 23:37:09

Spurious Emission 2GHz~25GHz

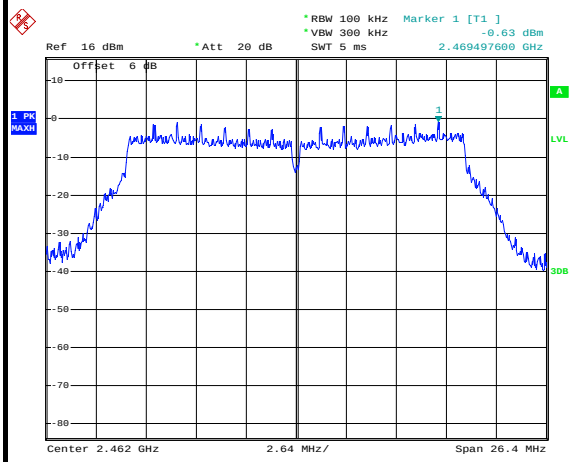


Date: 29.OCT.2014 23:37:28

Number of TX :	2	**Chain Port:**	0+1(0)
Test Mode :	802.11n HT20	**Temperature :**	24~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	49~51%
Test Channel :	11	**Test Engineer :**	Issac Song

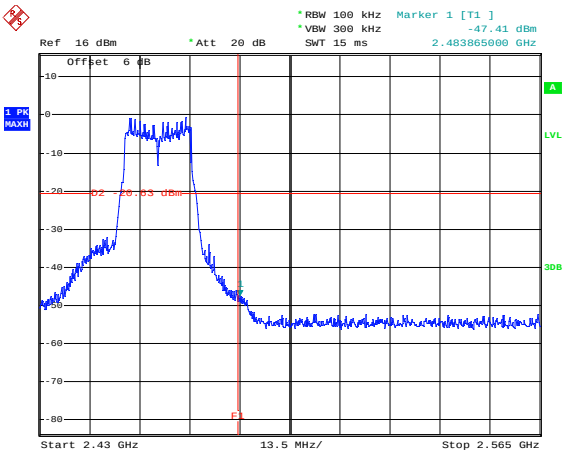
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



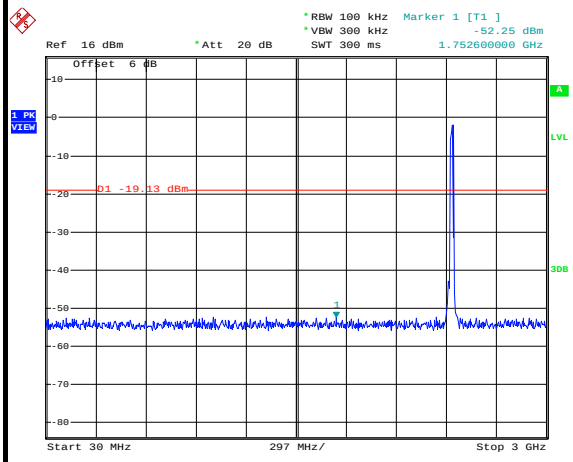
Date: 29.OCT.2014 23:45:09

High Channel Plot



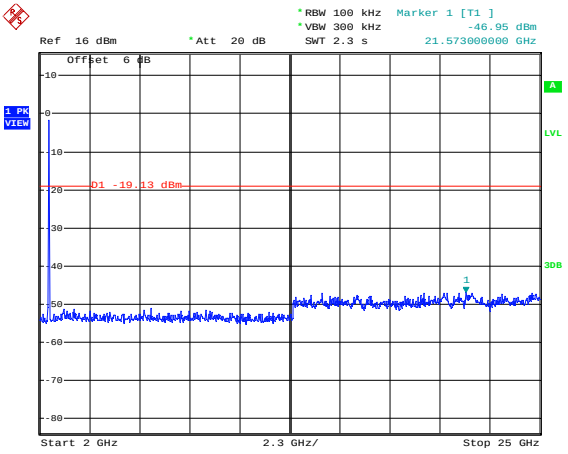
Date: 29.OCT.2014 23:45:23

Spurious Emission 30MHz~3GHz



Date: 29.OCT.2014 23:37:09

Spurious Emission 2GHz~25GHz

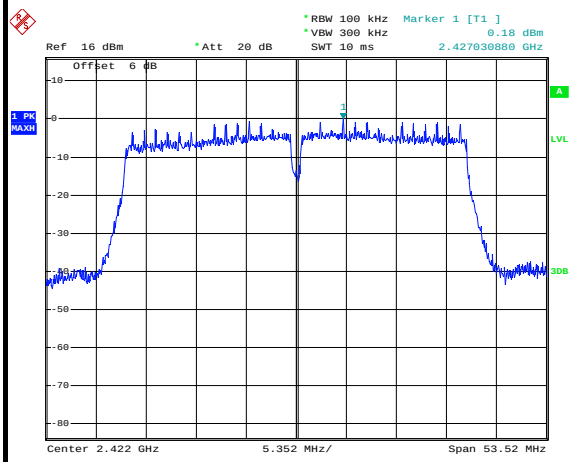


Date: 29.OCT.2014 23:37:28

Number of TX :	2	**Chain Port:**	0+1(0)
Test Mode :	802.11n HT40	**Temperature :**	24~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	49~51%
Test Channel :	03	**Test Engineer :**	Issac Song

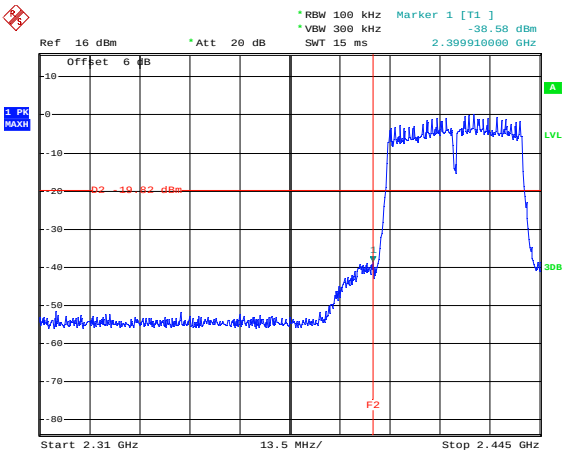
WLAN 802.11n HT40 Channel 03

100kHz PSD reference Level



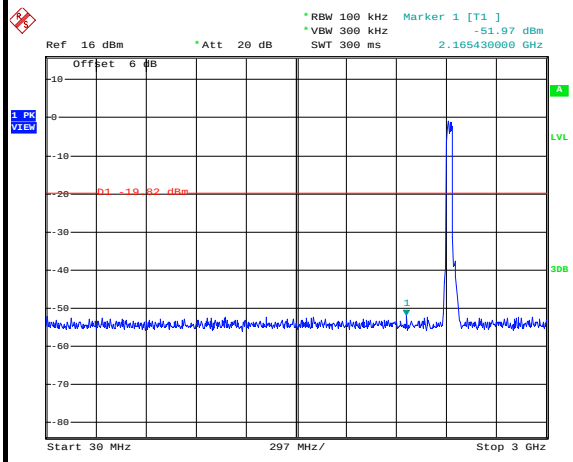
Date: 29.OCT.2014 23:52:26

Low Channel Plot



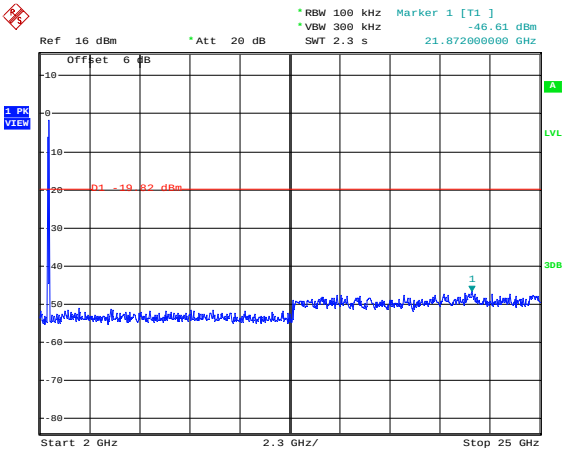
Date: 29.OCT.2014 23:52:40

Spurious Emission 30MHz~3GHz



Date: 29.OCT.2014 23:53:00

Spurious Emission 2GHz~25GHz

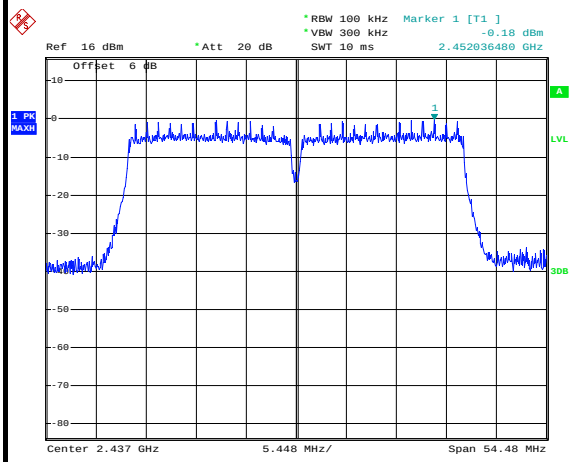


Date: 29.OCT.2014 23:53:18

Number of TX :	2	**Chain Port:**	0+1(0)
Test Mode :	802.11n HT40	**Temperature :**	24~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	49~51%
Test Channel :	06	**Test Engineer :**	Issac Song

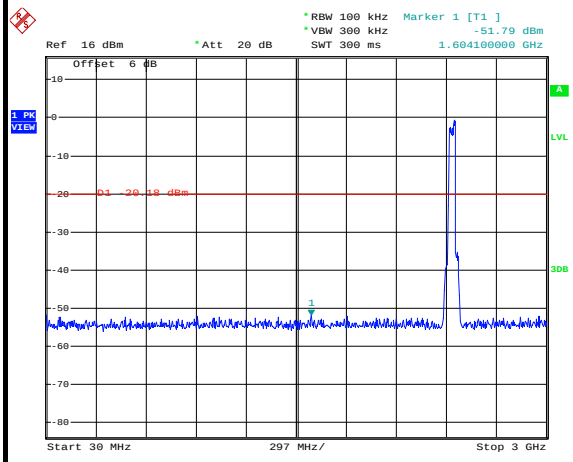
WLAN 802.11n HT40 Channel 06

100kHz PSD reference Level



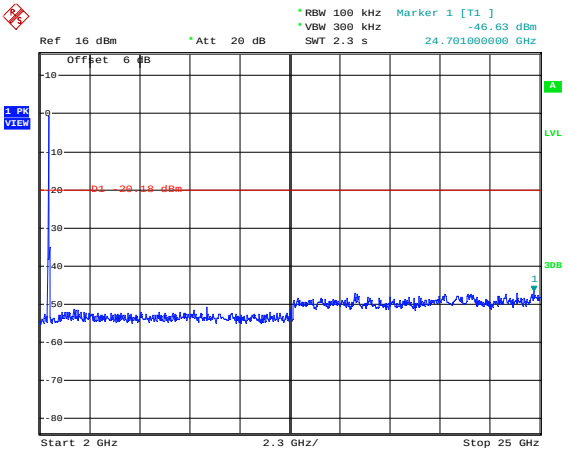
Date: 29.OCT.2014 23:56:35

Spurious Emission 30MHz~3GHz



Date: 29.OCT.2014 23:58:10

Spurious Emission 2GHz~25GHz

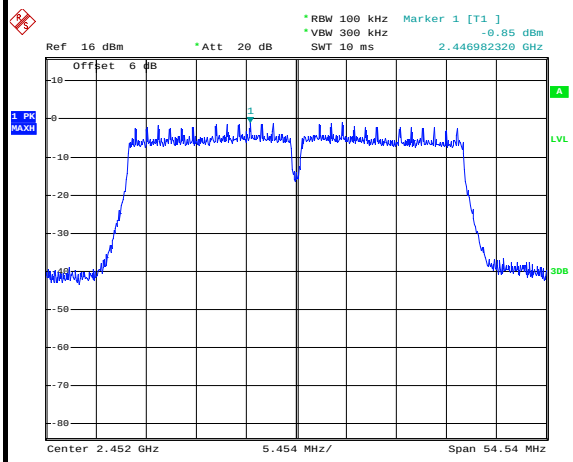


Date: 29.OCT.2014 23:58:29

Number of TX :	2	**Chain Port:**	0+1(0)
Test Mode :	802.11n HT40	**Temperature :**	24~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	49~51%
Test Channel :	09	**Test Engineer :**	Issac Song

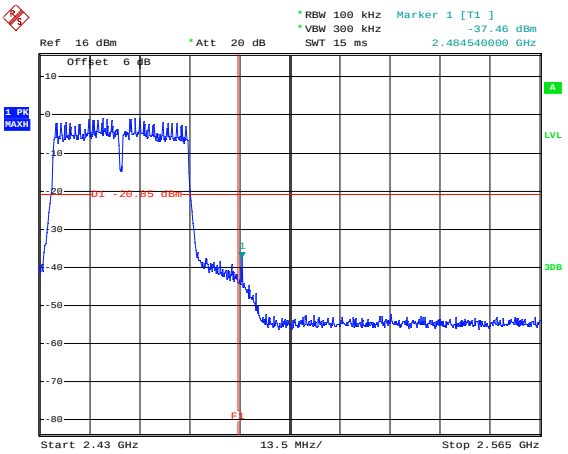
WLAN 802.11n HT40 Channel 09

100kHz PSD reference Level



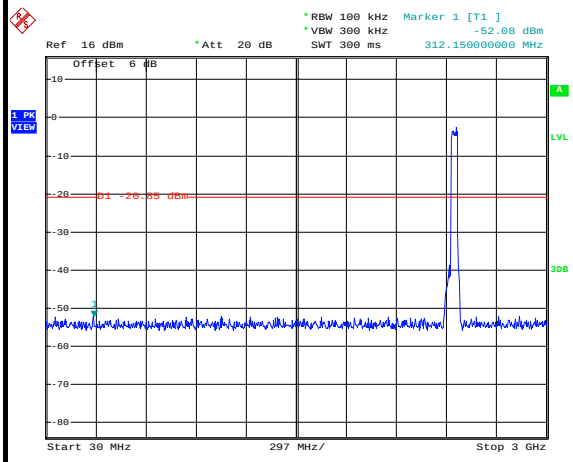
Date: 31.OCT.2014 20:29:19

High Channel Plot



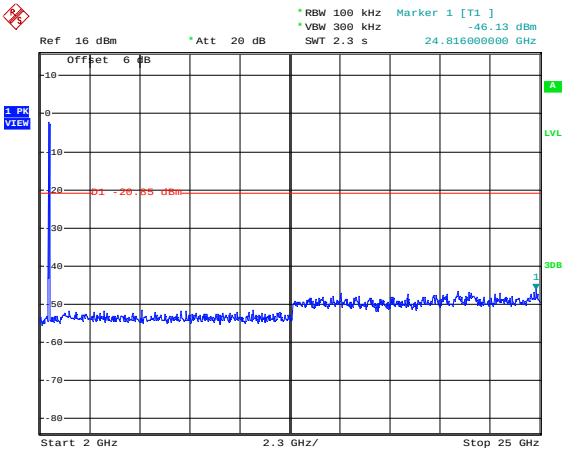
Date: 31.OCT.2014 20:31:03

Spurious Emission 30MHz~3GHz



Date: 31.OCT.2014 20:31:32

Spurious Emission 2GHz~25GHz



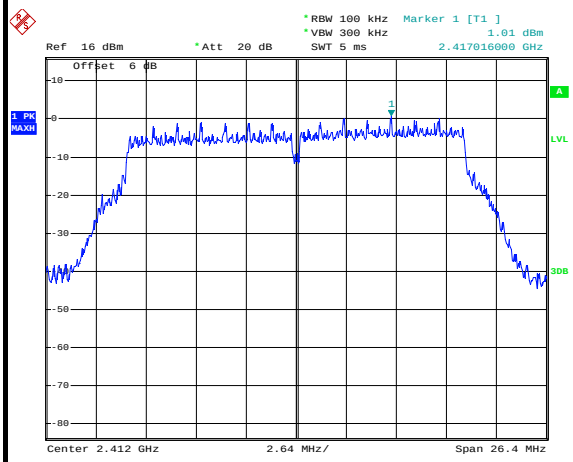
Date: 31.OCT.2014 20:31:50

Number of TX = 2, Chain Port 0+1(1) (Measured)

Number of TX :	2	**Chain Port:**	0+1(1)
Test Mode :	802.11n HT20	**Temperature :**	24~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	49~51%
Test Channel :	01	**Test Engineer :**	Issac Song

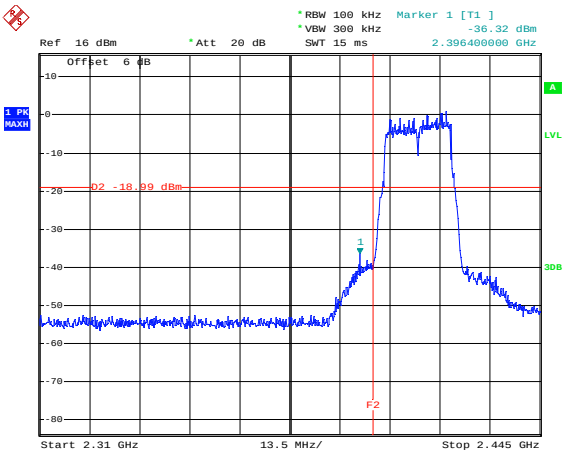
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



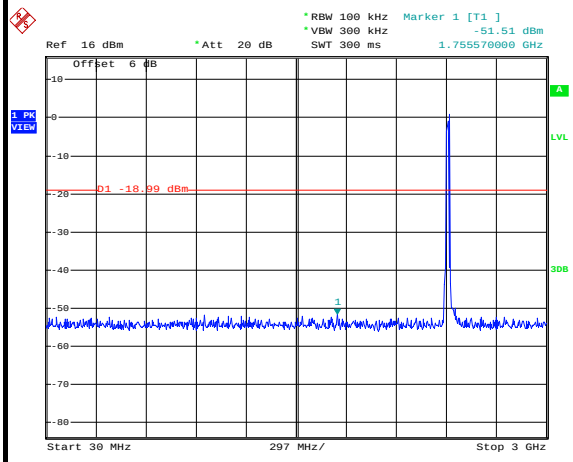
Date: 29.OCT.2014 23:27:43

Low Channel Plot



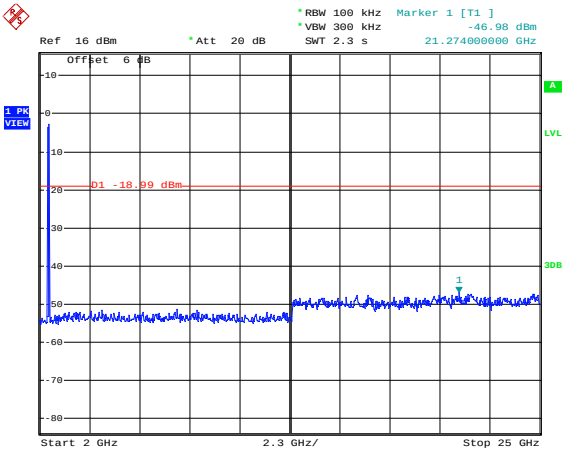
Date: 29.OCT.2014 23:27:57

Spurious Emission 30MHz~3GHz



Date: 29.OCT.2014 23:28:16

Spurious Emission 2GHz~25GHz

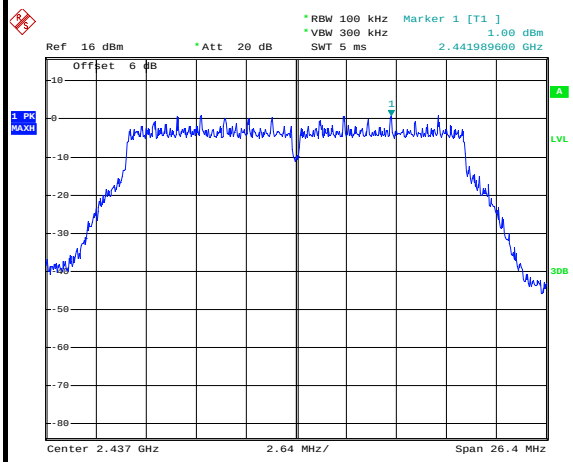


Date: 29.OCT.2014 23:28:35

Number of TX :	2	**Chain Port:**	0+1(1)
Test Mode :	802.11n HT20	**Temperature :**	24~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	49~51%
Test Channel :	06	**Test Engineer :**	Issac Song

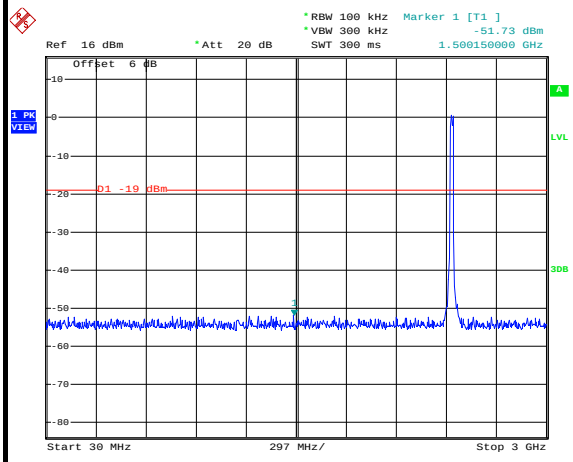
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



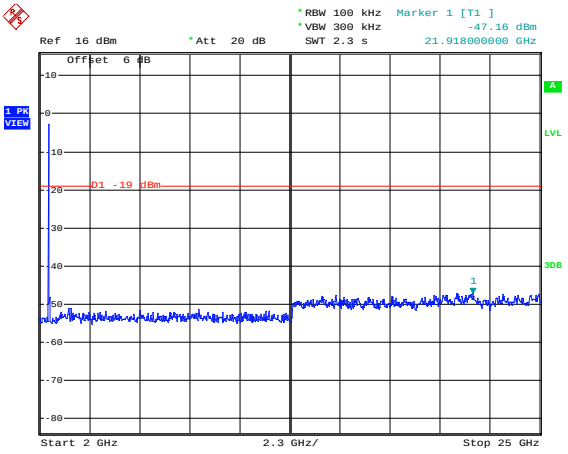
Date: 29.OCT.2014 23:39:22

Spurious Emission 30MHz~3GHz



Date: 29.OCT.2014 23:39:42

Spurious Emission 2GHz~25GHz

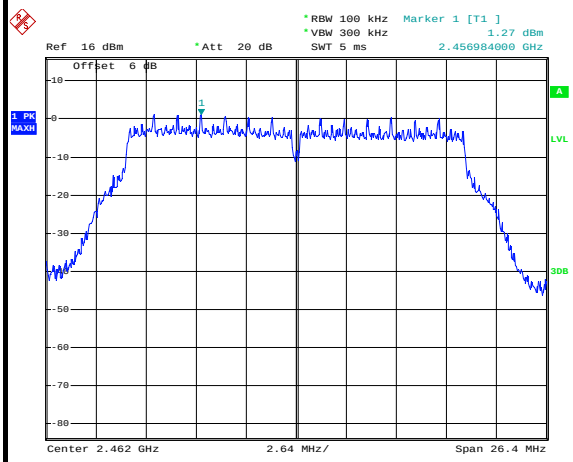


Date: 29.OCT.2014 23:40:00

Number of TX :	2	**Chain Port:**	0+1(1)
Test Mode :	802.11n HT20	**Temperature :**	24~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	49~51%
Test Channel :	11	**Test Engineer :**	Issac Song

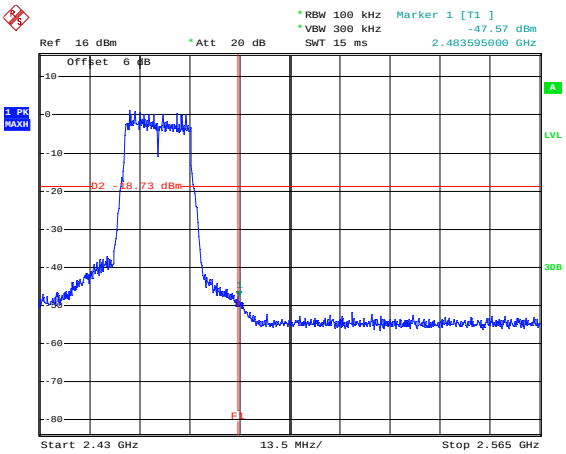
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



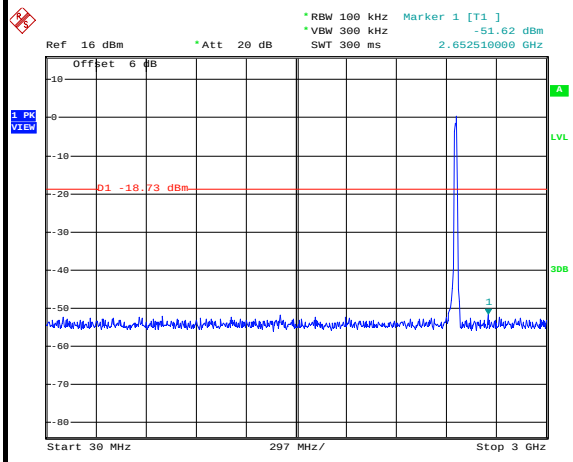
Date: 29.OCT.2014 23:42:08

High Channel Plot



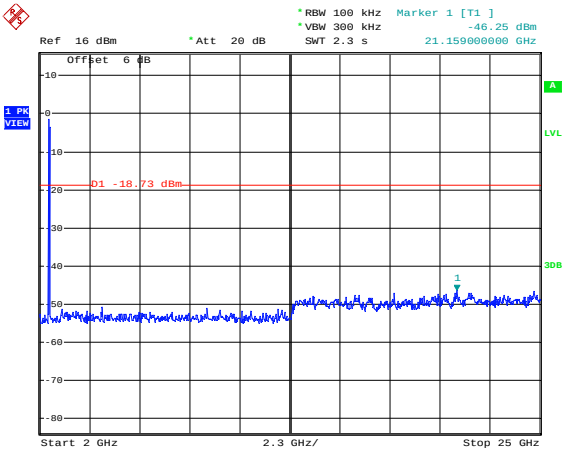
Date: 29.OCT.2014 23:42:22

Spurious Emission 30MHz~3GHz



Date: 29.OCT.2014 23:42:42

Spurious Emission 2GHz~25GHz

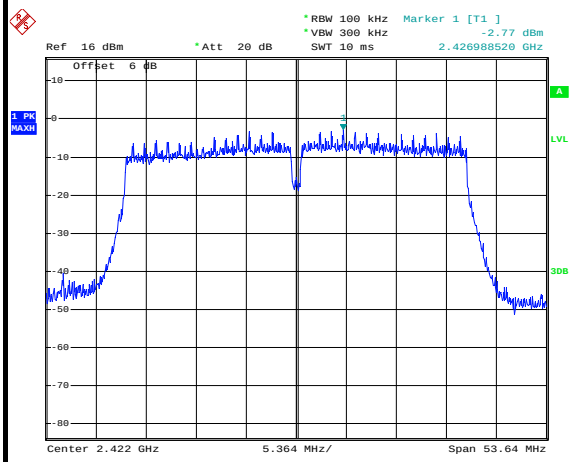


Date: 29.OCT.2014 23:43:00

Number of TX :	2	**Chain Port:**	0+1(1)
Test Mode :	802.11n HT40	**Temperature :**	24~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	49~51%
Test Channel :	03	**Test Engineer :**	Issac Song

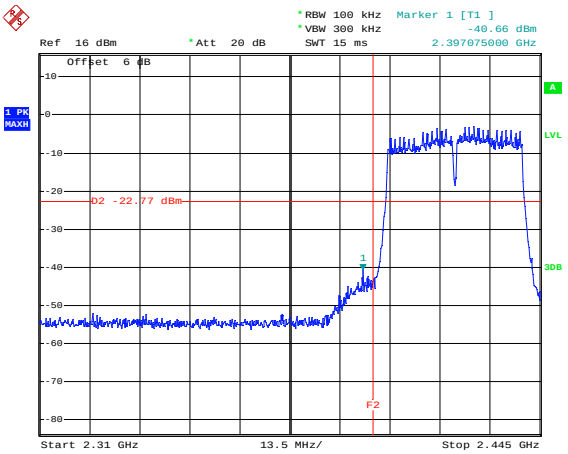
WLAN 802.11n HT40 Channel 03

100kHz PSD reference Level



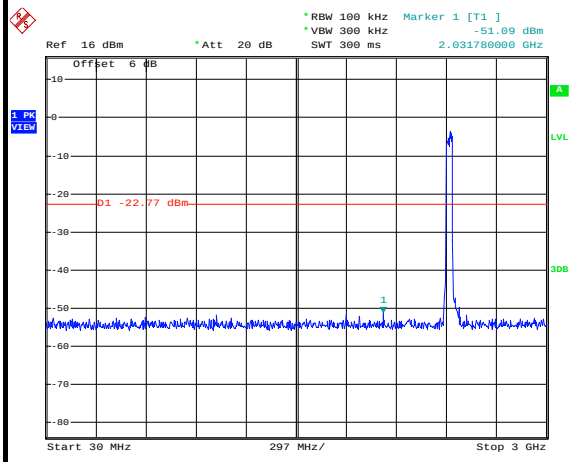
Date: 30.OCT.2014 00:19:17

Low Channel Plot



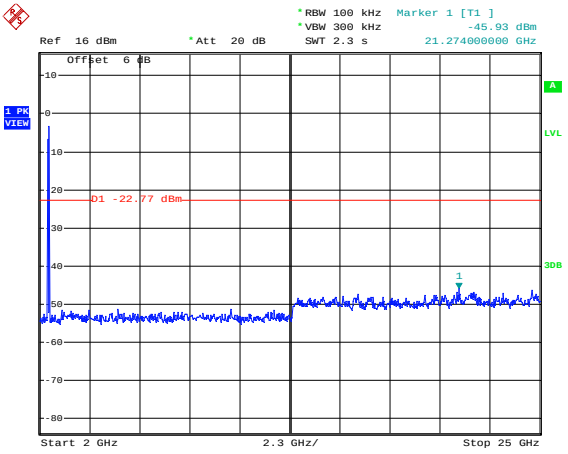
Date: 30.OCT.2014 00:19:31

Spurious Emission 30MHz~3GHz



Date: 30.OCT.2014 00:19:50

Spurious Emission 2GHz~25GHz

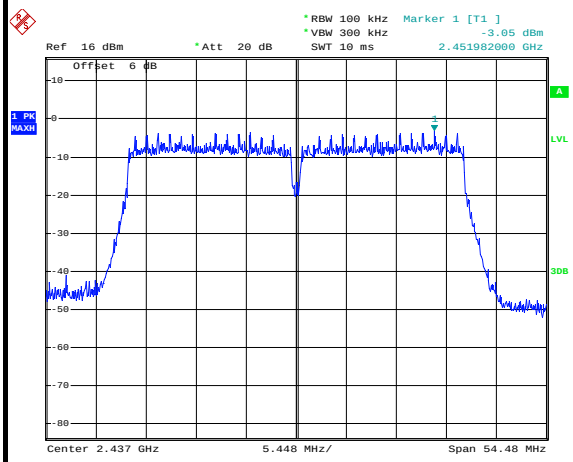


Date: 30.OCT.2014 00:20:09

Number of TX :	2	**Chain Port:**	0+1(1)
Test Mode :	802.11n HT40	**Temperature :**	24~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	49~51%
Test Channel :	06	**Test Engineer :**	Issac Song

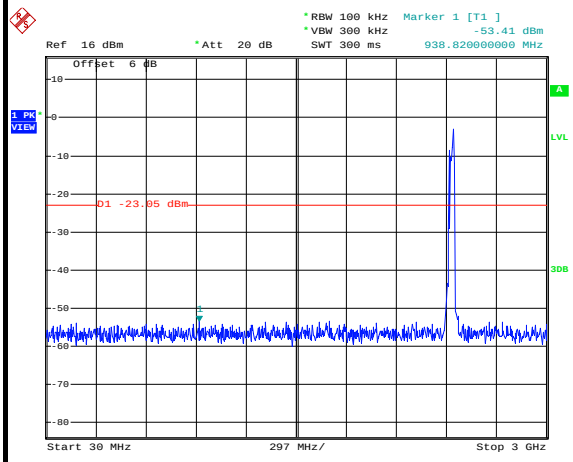
WLAN 802.11n HT40 Channel 06

100kHz PSD reference Level



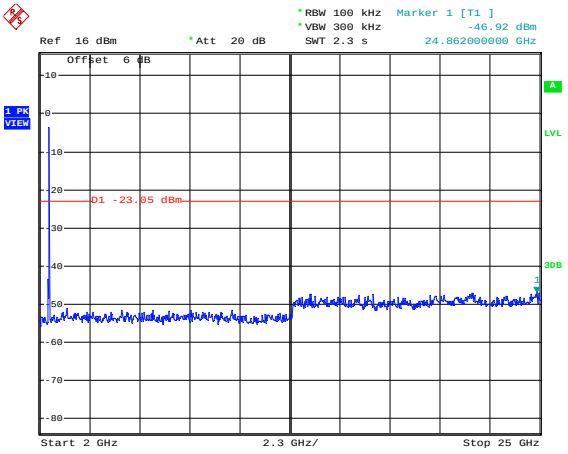
Date: 30.OCT.2014 00:33:34

Spurious Emission 30MHz~3GHz



Date: 30.OCT.2014 01:15:32

Spurious Emission 2GHz~25GHz

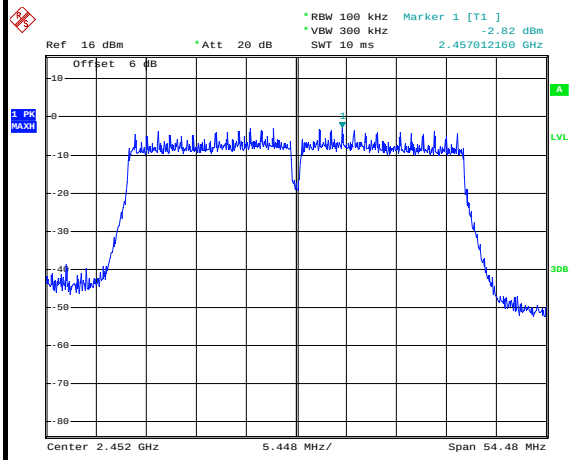


Date: 30.OCT.2014 00:35:28

Number of TX :	2	**Chain Port:**	0+1(1)
Test Mode :	802.11n HT40	**Temperature :**	24~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	49~51%
Test Channel :	09	**Test Engineer :**	Issac Song

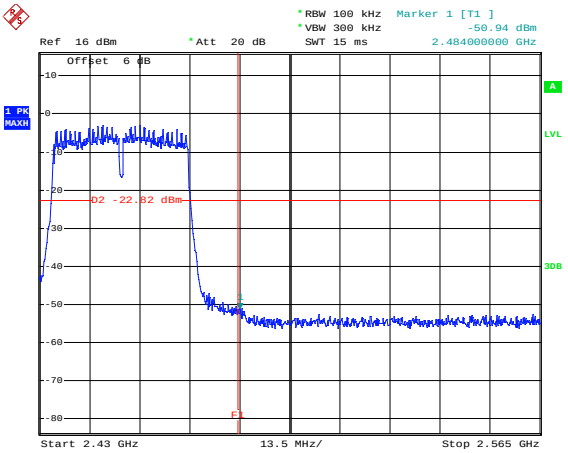
WLAN 802.11n HT40 Channel 09

100kHz PSD reference Level



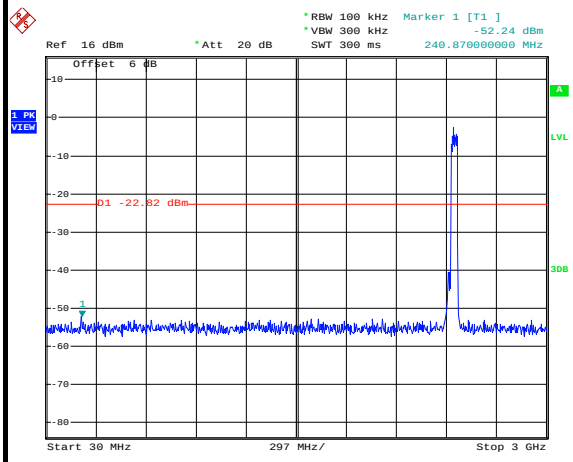
Date: 30.OCT.2014 00:39:29

High Channel Plot



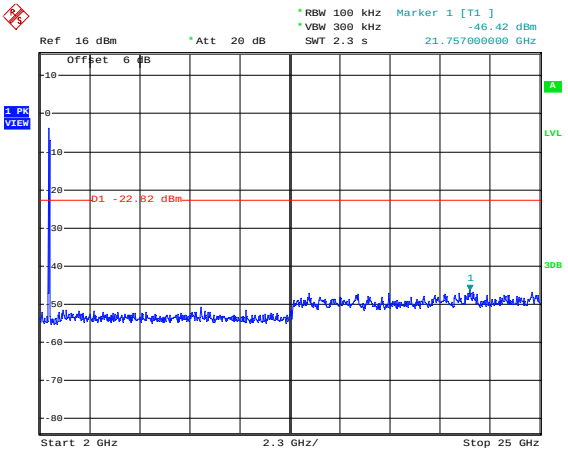
Date: 30.OCT.2014 00:39:43

Spurious Emission 30MHz~3GHz



Date: 30.OCT.2014 00:42:39

Spurious Emission 2GHz~25GHz



Date: 30.OCT.2014 00:41:39

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.

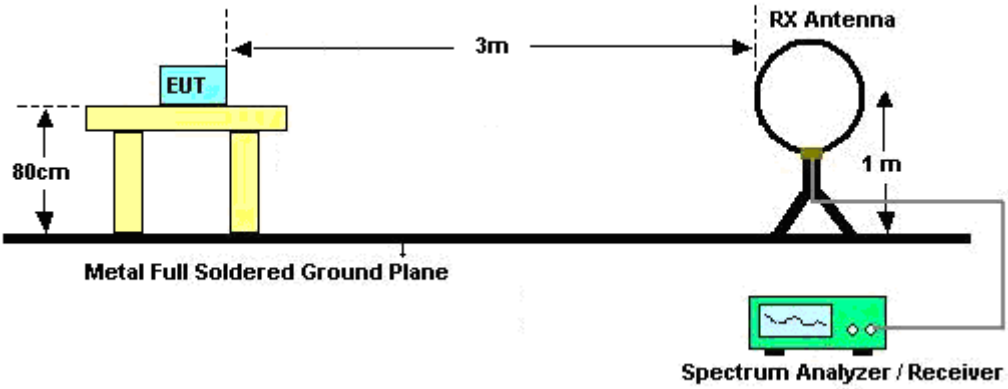
3.5.3 Test Procedure

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.

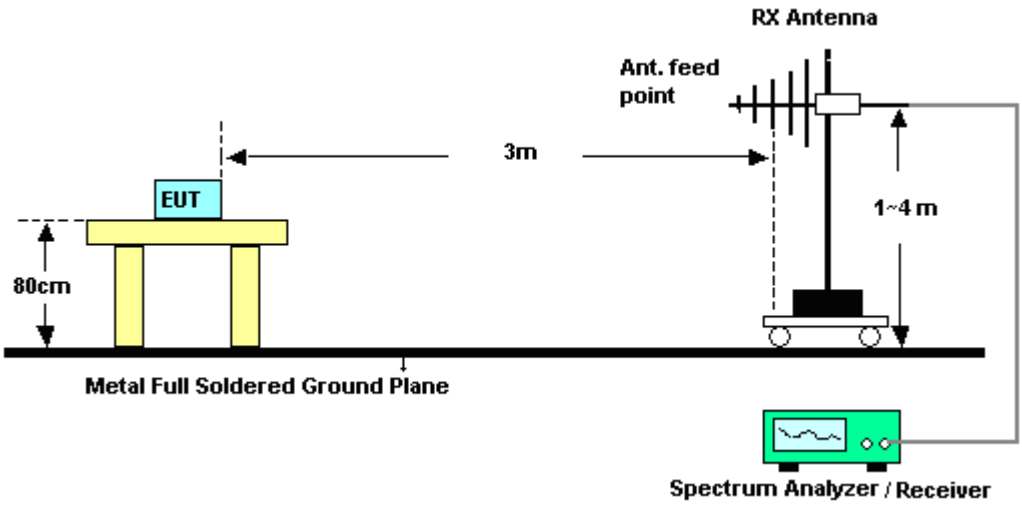
Chain Port	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
0	802.11b	99.08	-	-	10Hz
1	802.11b	99.31	-	-	
0	802.11g	93.83	1.43	0.70	1kHz
1	802.11g	93.46	1.43	0.70	
0+1	2.4GHz 802.11n HT20	93.02	1.33	0.75	1kHz
0+1	2.4GHz 802.11n HT40	86.30	0.67	1.50	3kHz

3.5.4 Test Setup

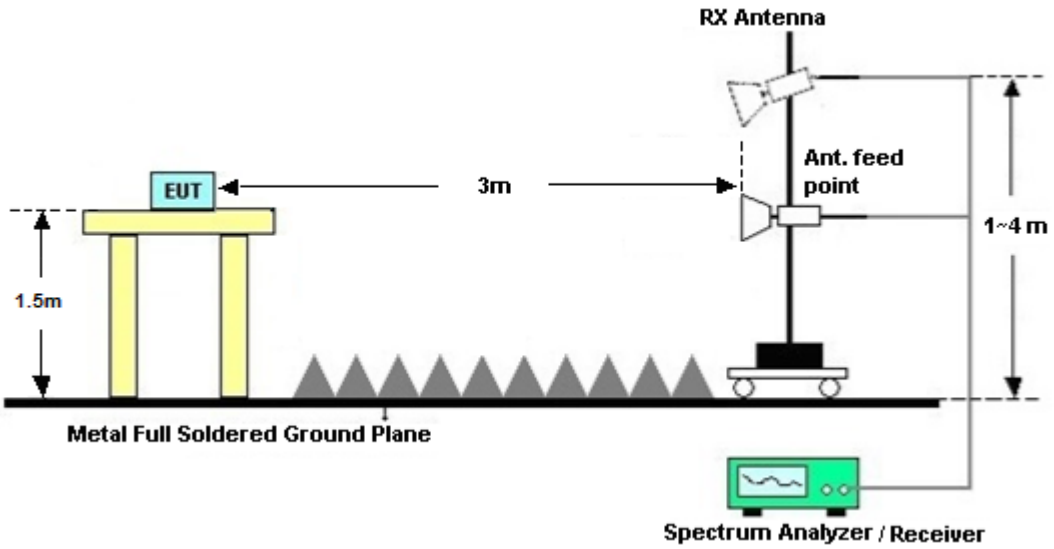
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.5.5 Test Results of Radiated 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.

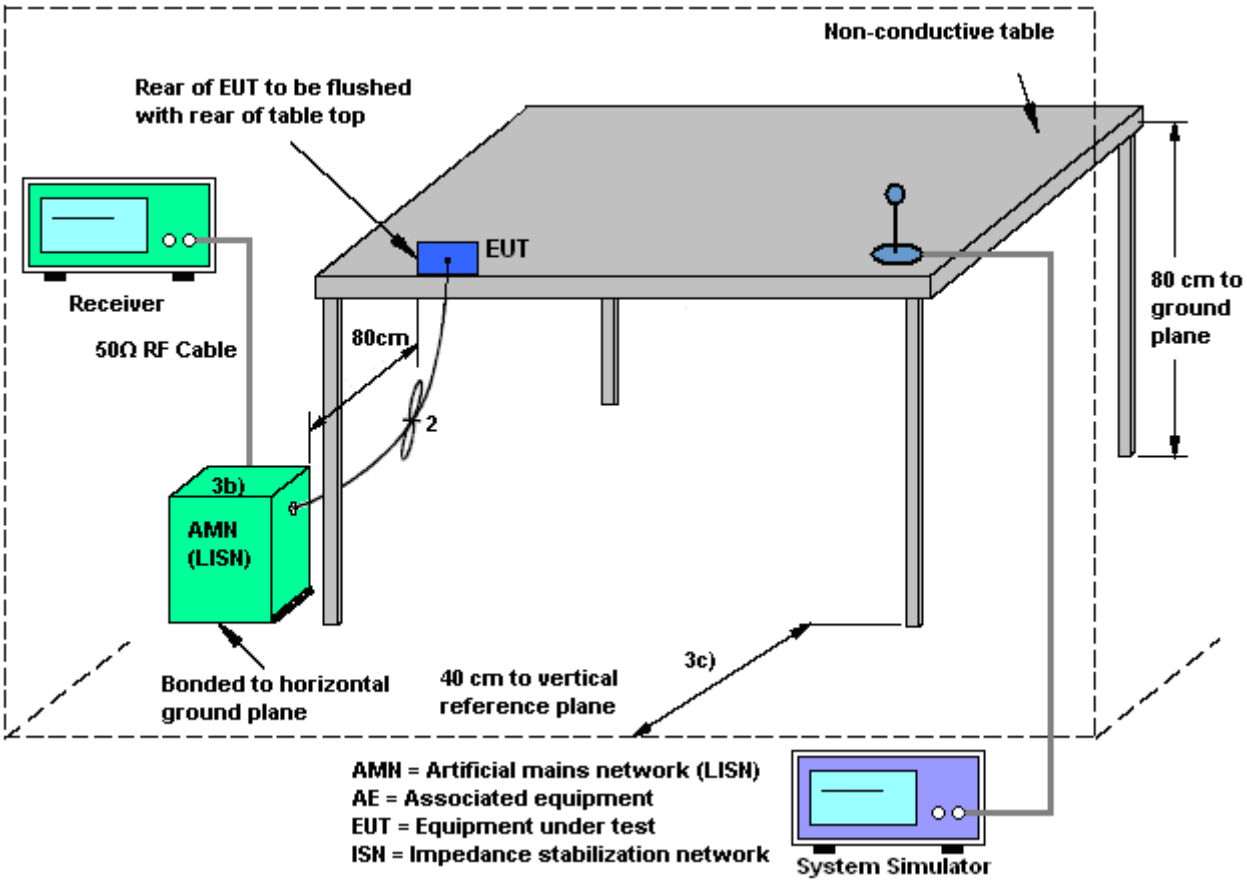
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

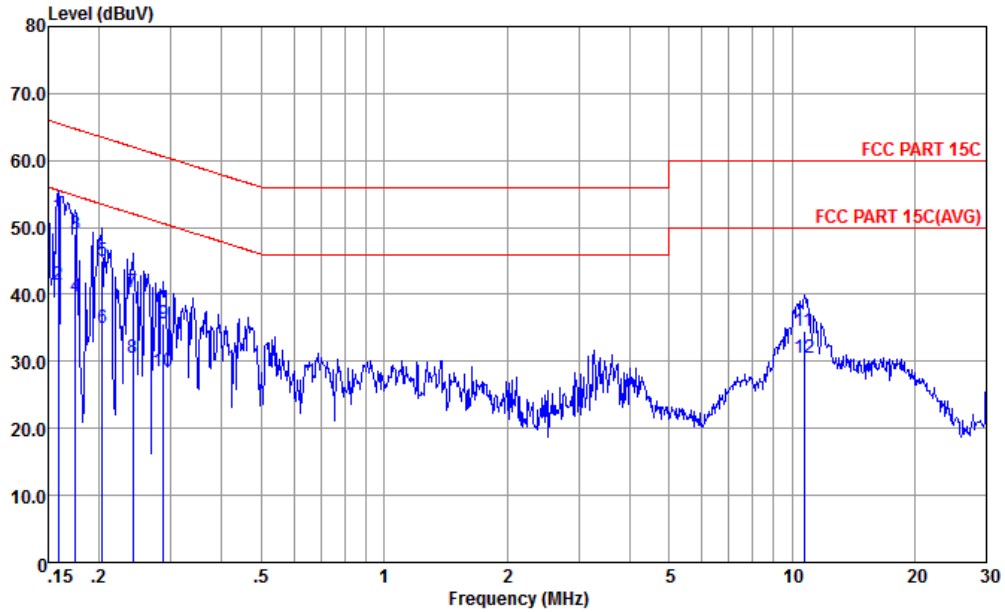
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other 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

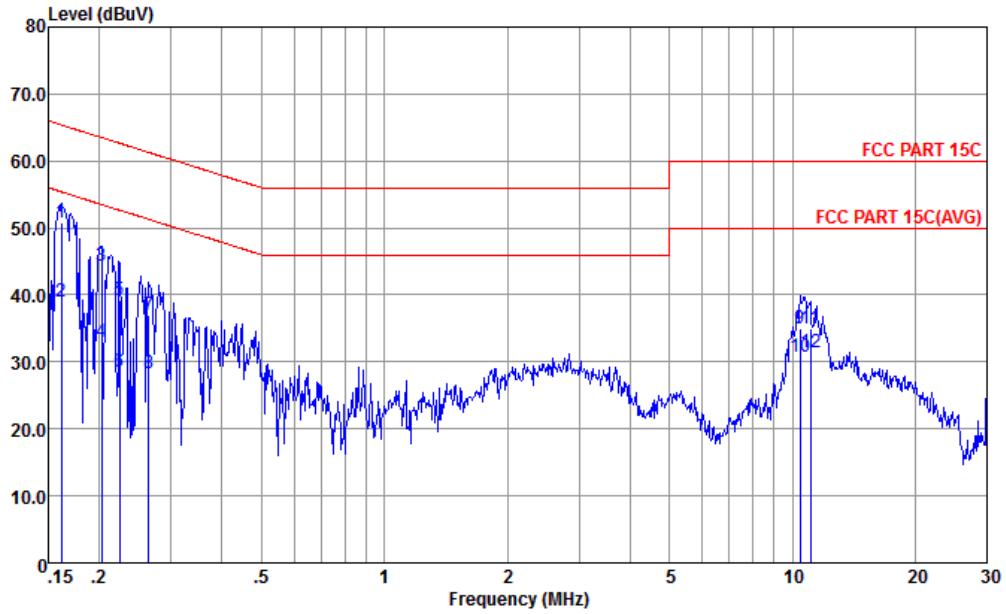
Test Mode :	Mode 1	**Temperature :**	22~24℃
Test Engineer :	Eligah Wamg	**Relative Humidity :**	25~28%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + Earphone + USB Cable (Charging from Adapter)		



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

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 *	0.16	51.79	-13.73	65.52	39.60	1.80	10.39	QP
2	0.16	41.49	-14.03	55.52	29.30	1.80	10.39	Average
3	0.17	49.06	-15.66	64.72	37.20	1.42	10.44	QP
4	0.17	39.76	-14.96	54.72	27.90	1.42	10.44	Average
5	0.20	44.99	-18.46	63.45	33.50	0.99	10.50	QP
6	0.20	35.09	-18.36	53.45	23.60	0.99	10.50	Average
7	0.24	40.32	-21.72	62.04	28.90	0.90	10.52	QP
8	0.24	30.52	-21.52	52.04	19.10	0.90	10.52	Average
9	0.29	35.71	-24.88	60.59	24.39	0.75	10.57	QP
10	0.29	28.41	-22.18	50.59	17.09	0.75	10.57	Average
11	10.73	34.56	-25.44	60.00	23.40	0.20	10.96	QP
12	10.73	30.46	-19.54	50.00	19.30	0.20	10.96	Average

Test Mode :	Mode 1	**Temperature :**	22~24℃
Test Engineer :	Eligah Wamg	**Relative Humidity :**	25~28%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + Earphone + USB Cable (Charging from Adapter)		



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

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	*	0.16	50.81	-14.57	65.38	38.70	1.71	10.40	QP
2		0.16	39.01	-16.37	55.38	26.90	1.71	10.40	Average
3		0.20	44.30	-19.19	63.49	32.81	0.99	10.50	QP
4		0.20	32.90	-20.59	53.49	21.41	0.99	10.50	Average
5		0.22	39.26	-23.40	62.66	27.80	0.95	10.51	QP
6		0.22	28.56	-24.10	52.66	17.10	0.95	10.51	Average
7		0.26	37.09	-24.20	61.29	25.70	0.85	10.54	QP
8		0.26	28.29	-23.00	51.29	16.90	0.85	10.54	Average
9		10.45	35.07	-24.93	60.00	23.90	0.21	10.96	QP
10		10.45	30.67	-19.33	50.00	19.50	0.21	10.96	Average
11		11.08	35.08	-24.92	60.00	23.89	0.22	10.97	QP
12		11.08	31.38	-18.62	50.00	20.19	0.22	10.97	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

FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

For CDD transmissions, directional gain is calculated as

$$DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k/20}$ if the kth antenna is being fed by spatial stream j, or zero if it is not;

G_k is the gain in dBi of the kth antenna.

The EUT supports CDD mode

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain “DG” is calculated as following table.

	Chain Port 0 (dBi)	Chain Port 1 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
2.4 GHz	1.20	1.20	1.20	4.21	0.00	0.00

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 6dBi, (min = 0)

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	Oct. 29, 2014~ Oct. 31, 2014	Oct. 27, 2015	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	30MHz~40GHz	Feb. 27, 2014	Oct. 29, 2014~ Oct. 31, 2014	Feb. 26, 2015	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Feb. 27, 2014	Oct. 29, 2014~ Oct. 31, 2014	Feb. 26, 2015	Conducted (TH01-KS)
ESCIO TEST Receiver	R&S	ESCI	100724	9kHz~3GHz	Feb. 21, 2014	Jan. 18, 2015	Feb. 20, 2015	Radiation (03CH01-SZ)
Spectrum Analyzer	Agilent Technologies	N9038A	MY52260185	20Hz~26.5GHz	May 26, 2014	Jan. 18, 2015	May 25, 2015	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 09, 2014	Jan. 18, 2015	May 08, 2015	Radiation (03CH01-SZ)
Bilog Antenna	TESEQ	CBL 6112D	37877	30MHz~2GHz	Oct. 15, 2014	Jan. 18, 2015	Oct. 14, 2015	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	00119436	1GHz~18GHz	Oct. 15, 2014	Jan. 18, 2015	Oct. 14, 2015	Radiation (03CH01-SZ)
Double Ridged Horn Antenna	COM-POWER	AH-840	101073	18GHz~40GHz	Jun. 09, 2014	Jan. 18, 2015	Jun. 08, 2015	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz~3000MHz	Feb. 21, 2014	Jan. 18, 2015	Feb. 20, 2015	Radiation (03CH01-SZ)
Amplifier	Yiai	AV3860B	04030	2GHz~26.5GHz	May 08, 2014	Jan. 18, 2015	May 07, 2015	Radiation (03CH01-SZ)
AC Source(AVR)	Chroma	61601	616010001985	100Vac~250Vac	Mar. 25, 2014	Jan. 18, 2015	Mar. 24, 2015	Radiation (03CH01-SZ)
Turn Table	EM Electronics	EM 1000	N/A	0~360 degree	NCR	Jan. 18, 2015	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM Electronics	EM 1000	N/A	1 m~4 m	NCR	Jan. 18, 2015	NCR	Radiation (03CH01-SZ)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	May 04, 2014	Jan. 06, 2015	May 03, 2015	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 25, 2014	Jan. 06, 2015	Oct. 24, 2015	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 25, 2014	Jan. 06, 2015	Oct. 24, 2015	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 25, 2014	Jan. 06, 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))	2.3 dB

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

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

Appendix A. Radiated Spurious Emission

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Chain Port 0	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		2389.74	49.62	-24.38	74	47.64	27.25	11.19	36.46	222	360	P	H
		2389.92	40.55	-13.45	54	38.57	27.25	11.19	36.46	222	360	A	H
	*	2412	106.76	-	-	104.72	27.31	11.19	36.46	222	360	P	H
	*	2412	101.61	-	-	99.57	27.31	11.19	36.46	222	360	A	H
		2389.92	49.28	-24.72	74	47.3	27.25	11.19	36.46	150	10	P	V
		2389.92	37.15	-16.85	54	35.17	27.25	11.19	36.46	150	10	A	V
	*	2412	103.44	-	-	101.4	27.31	11.19	36.46	150	10	P	V
	*	2412	98.38	-	-	96.34	27.31	11.19	36.46	150	10	A	V
802.11b CH 06 2437MHz		2389.56	44.43	-29.57	74	42.45	27.25	11.19	36.46	172	360	P	H
		2389.92	32.04	-21.96	54	30.06	27.25	11.19	36.46	172	360	A	H
	*	2437	109.09	-	-	106.81	27.42	11.31	36.45	172	360	P	H
	*	2437	103.88	-	-	101.6	27.42	11.31	36.45	172	360	A	H
		2484.2	48.79	-25.21	74	46.27	27.54	11.43	36.45	172	360	P	H
		2483.52	34.65	-19.35	54	32.13	27.54	11.43	36.45	172	360	A	H
		2357.07	46.64	-27.36	74	44.9	27.13	11.07	36.46	156	0	P	V
		2389.92	31.51	-22.49	54	29.53	27.25	11.19	36.46	156	0	A	V
	*	2437	103.48	-	-	101.2	27.42	11.31	36.45	156	0	P	V
	*	2437	98.47	-	-	96.19	27.42	11.31	36.45	156	0	A	V
		2494.48	46.76	-27.24	74	44.17	27.6	11.43	36.44	156	0	P	V
		2483.56	32.98	-21.02	54	30.46	27.54	11.43	36.45	156	0	A	V

802.11b CH 11 2462MHz	*	2462	106.62	-	-	104.28	27.48	11.31	36.45	185	0	P	H
	*	2462	101.47	-	-	99.13	27.48	11.31	36.45	185	0	A	H
		2484.96	59.45	-14.55	74	56.93	27.54	11.43	36.45	185	0	P	H
		2483.52	44.81	-9.19	54	42.29	27.54	11.43	36.45	185	0	A	H
	*	2462	100.62	-	-	98.28	27.48	11.31	36.45	156	15	P	V
	*	2462	95.54	-	-	93.2	27.48	11.31	36.45	156	15	A	V
		2484.08	54.31	-19.69	74	51.79	27.54	11.43	36.45	156	15	P	V
		2483.52	38.52	-15.48	54	36	27.54	11.43	36.45	156	15	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 Chain Port 0	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	47.91	-26.09	74	36.42	31.26	16.17	35.94	105	198	P	H
		4824	47.75	-26.25	74	36.26	31.26	16.17	35.94	105	198	P	V
802.11b CH 06 2437MHz		4874	45.65	-28.35	74	33.95	31.36	16.26	35.92	145	265	P	H
		7311	49.2	-24.8	74	28.76	35.96	21.01	36.53	174	321	P	H
		4874	47.3	-26.7	74	35.6	31.36	16.26	35.92	145	265	P	V
		7311	48.35	-25.65	74	27.91	35.96	21.01	36.53	174	321	P	V
802.11b CH 11 2462MHz		4924	46.3	-27.7	74	34.31	31.46	16.43	35.9	146	347	P	H
		7386	46.96	-27.04	74	26.51	36.08	20.96	36.59	145	274	P	H
		4924	46.75	-27.25	74	34.76	31.46	16.43	35.9	146	347	P	V
		7386	48.63	-25.37	74	28.18	36.08	20.96	36.59	145	274	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.
Chain Port				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
0		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11g CH 01 2412MHz		2389.92	56.8	-17.2	74	54.82	27.25	11.19	36.46	150	6	P	H
		2389.92	42.84	-11.16	54	40.86	27.25	11.19	36.46	150	6	A	H
	*	2412	105.59	-	-	103.55	27.31	11.19	36.46	150	6	P	H
	*	2412	95.39	-	-	93.35	27.31	11.19	36.46	150	6	A	H
		2389.74	53.3	-20.7	74	51.32	27.25	11.19	36.46	150	6	P	V
		2389.92	40.12	-13.88	54	38.14	27.25	11.19	36.46	150	6	A	V
	*	2412	101.93	-	-	99.89	27.31	11.19	36.46	150	6	P	V
	*	2412	91.9	-	-	89.86	27.31	11.19	36.46	150	6	A	V
802.11g CH 06 2437MHz		2389.83	45.08	-28.92	74	43.1	27.25	11.19	36.46	173	360	P	H
		2389.92	32.79	-21.21	54	30.81	27.25	11.19	36.46	173	360	A	H
	*	2437	108.15	-	-	105.87	27.42	11.31	36.45	173	360	P	H
	*	2437	97.84	-	-	95.56	27.42	11.31	36.45	173	360	A	H
		2484.6	49.09	-24.91	74	46.57	27.54	11.43	36.45	173	360	P	H
		2483.72	37.7	-16.3	54	35.18	27.54	11.43	36.45	173	360	A	H
		2368.59	44.73	-29.27	74	42.93	27.19	11.07	36.46	150	46	P	V
		2359.5	32.17	-21.83	54	30.43	27.13	11.07	36.46	150	46	A	V
	*	2437	102.41	-	-	100.13	27.42	11.31	36.45	150	46	P	V
	*	2437	92.25	-	-	89.97	27.42	11.31	36.45	150	46	A	V
		2483.52	47.83	-26.17	74	45.31	27.54	11.43	36.45	150	46	P	V
		2483.52	35.32	-18.68	54	32.8	27.54	11.43	36.45	150	46	A	V

802.11g CH 11 2462MHz	*	2462	106.56	-	-	104.22	27.48	11.31	36.45	185	0	P	H
	*	2462	96.48	-	-	94.14	27.48	11.31	36.45	185	0	A	H
		2483.68	66.89	-7.11	74	64.37	27.54	11.43	36.45	185	0	P	H
		2483.52	51.12	-2.88	54	48.6	27.54	11.43	36.45	185	0	A	H
	*	2462	102.67	-	-	100.33	27.48	11.31	36.45	156	15	P	V
	*	2462	92.55	-	-	90.21	27.48	11.31	36.45	156	15	A	V
		2483.76	64.43	-9.57	74	61.91	27.54	11.43	36.45	156	15	P	V
		2483.52	48.94	-5.06	54	46.42	27.54	11.43	36.45	156	15	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 Chain Port 0	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	46.91	-27.09	74	35.42	31.26	16.17	35.94	105	198	P	H
		4824	46.55	-27.45	74	35.06	31.26	16.17	35.94	105	198	P	V
802.11g CH 06 2437MHz		4874	47.18	-26.82	74	35.48	31.36	16.26	35.92	145	265	P	H
		7311	49.17	-24.83	74	28.73	35.96	21.01	36.53	174	321	P	H
		4874	48.22	-25.78	74	36.52	31.36	16.26	35.92	145	265	P	V
		7311	48.67	-25.33	74	28.23	35.96	21.01	36.53	174	321	P	V
802.11g CH 11 2462MHz		4924	46.43	-27.57	74	34.44	31.46	16.43	35.9	146	347	P	H
		7386	48.99	-25.01	74	28.54	36.08	20.96	36.59	145	274	P	H
		4924	46.6	-27.4	74	34.61	31.46	16.43	35.9	146	347	P	V
		7386	48.11	-25.89	74	27.66	36.08	20.96	36.59	145	274	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 802.11b (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Chain Port				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		2389.65	47.5	-26.5	74	45.52	27.25	11.19	36.46	150	23	P	H
		2389.92	37.5	-16.5	54	35.52	27.25	11.19	36.46	150	23	A	H
	*	2412	104.72	-	-	102.68	27.31	11.19	36.46	150	23	P	H
	*	2412	99.41	-	-	97.37	27.31	11.19	36.46	150	23	A	H
		2389.74	51.15	-22.85	74	49.17	27.25	11.19	36.46	150	9	P	V
		2389.92	38.2	-15.8	54	36.22	27.25	11.19	36.46	150	9	A	V
	*	2412	103.79	-	-	101.75	27.31	11.19	36.46	150	9	P	V
	*	2412	98.79	-	-	96.75	27.31	11.19	36.46	150	9	A	V
802.11b CH 06 2437MHz		2357.7	44.18	-29.82	74	42.44	27.13	11.07	36.46	160	20	P	H
		2389.92	31.78	-22.22	54	29.8	27.25	11.19	36.46	160	20	A	H
	*	2437	106.13	-	-	103.85	27.42	11.31	36.45	160	20	P	H
	*	2437	100.99	-	-	98.71	27.42	11.31	36.45	160	20	A	H
		2483.6	47.04	-26.96	74	44.52	27.54	11.43	36.45	160	20	P	H
		2483.68	34.4	-19.6	54	31.88	27.54	11.43	36.45	160	20	A	H
		2389.29	46.96	-27.04	74	44.98	27.25	11.19	36.46	150	7	P	V
		2389.92	31.86	-22.14	54	29.88	27.25	11.19	36.46	150	7	A	V
	*	2437	102.89	-	-	100.61	27.42	11.31	36.45	150	7	P	V
	*	2437	97.92	-	-	95.64	27.42	11.31	36.45	150	7	A	V
		2490.64	47.48	-26.52	74	44.9	27.6	11.43	36.45	150	7	P	V
		2483.52	33.09	-20.91	54	30.57	27.54	11.43	36.45	150	7	A	V

802.11b CH 11 2462MHz	*	2462	104.69	-	-	102.35	27.48	11.31	36.45	362	27	P	H
	*	2462	99.61	-	-	97.27	27.48	11.31	36.45	362	27	A	H
		2484.76	54.6	-19.4	74	52.08	27.54	11.43	36.45	362	27	P	H
		2483.52	47.3	-6.7	54	44.78	27.54	11.43	36.45	362	27	A	H
	*	2462	106.9	-	-	104.56	27.48	11.31	36.45	235	32	P	V
	*	2462	101.62	-	-	99.28	27.48	11.31	36.45	235	32	A	V
		2484.48	57.58	-16.42	74	55.06	27.54	11.43	36.45	235	32	P	V
		2483.52	49.17	-4.83	54	46.65	27.54	11.43	36.45	235	32	A	V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

WIFI Chain Port 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	49.05	-24.95	74	37.56	31.26	16.17	35.94	105	198	P	H
		4824	48.38	-25.62	74	36.89	31.26	16.17	35.94	105	198	P	V
802.11b CH 06 2437MHz		4874	45.92	-28.08	74	34.22	31.36	16.26	35.92	145	265	P	H
		7311	49.88	-24.12	74	29.44	35.96	21.01	36.53	174	321	P	H
		4874	46.76	-27.24	74	35.06	31.36	16.26	35.92	145	265	P	V
		7311	49.85	-24.15	74	29.41	35.96	21.01	36.53	174	321	P	V
802.11b CH 11 2462MHz		4924	47.97	-26.03	74	35.98	31.46	16.43	35.9	146	347	P	H
		7386	46.3	-27.7	74	25.85	36.08	20.96	36.59	145	274	P	H
		4924	46.55	-27.45	74	34.56	31.46	16.43	35.9	146	347	P	V
		7386	48.97	-25.03	74	28.52	36.08	20.96	36.59	145	274	P	V
Remark	3. No other spurious found. 4. 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.
Chain Port				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		2389.83	53.74	-20.26	74	51.76	27.25	11.19	36.46	199	19	P	H
		2389.92	40.57	-13.43	54	38.59	27.25	11.19	36.46	199	19	A	H
	*	2412	104.31	-	-	102.27	27.31	11.19	36.46	199	19	P	H
	*	2412	93.54	-	-	91.5	27.31	11.19	36.46	199	19	A	H
		2389.92	55.72	-18.28	74	53.74	27.25	11.19	36.46	150	7	P	V
		2389.92	41.27	-12.73	54	39.29	27.25	11.19	36.46	150	7	A	V
	*	2412	102.96	-	-	100.92	27.31	11.19	36.46	150	7	P	V
	*	2412	92.7	-	-	90.66	27.31	11.19	36.46	150	7	A	V
802.11g CH 06 2437MHz		2389.74	44.56	-29.44	74	42.58	27.25	11.19	36.46	193	21	P	H
		2389.83	32.99	-21.01	54	31.01	27.25	11.19	36.46	193	21	A	H
	*	2437	105.4	-	-	103.12	27.42	11.31	36.45	193	21	P	H
	*	2437	95.48	-	-	93.2	27.42	11.31	36.45	193	21	A	H
		2484.04	51.42	-22.58	74	48.9	27.54	11.43	36.45	193	21	P	H
		2483.52	38.2	-15.8	54	35.68	27.54	11.43	36.45	193	21	A	H
		2359.95	46.66	-27.34	74	44.92	27.13	11.07	36.46	150	12	P	V
		2389.92	33.26	-20.74	54	31.28	27.25	11.19	36.46	150	12	A	V
	*	2437	102.46	-	-	100.18	27.42	11.31	36.45	150	12	P	V
	*	2437	92.42	-	-	90.14	27.42	11.31	36.45	150	12	A	V
		2483.52	49.47	-24.53	74	46.95	27.54	11.43	36.45	150	12	P	V
		2483.76	36.47	-17.53	54	33.95	27.54	11.43	36.45	150	12	A	V

802.11g CH 11 2462MHz	*	2462	103.77	-	-	101.43	27.48	11.31	36.45	150	306	P	H
	*	2462	93.37	-	-	91.03	27.48	11.31	36.45	150	306	A	H
		2483.76	64.2	-9.8	74	61.68	27.54	11.43	36.45	150	306	P	H
		2483.52	49.05	-4.95	54	46.53	27.54	11.43	36.45	150	306	A	H
	*	2462	105.37	-	-	103.03	27.48	11.31	36.45	326	158	P	V
	*	2462	94.98	-	-	92.64	27.48	11.31	36.45	326	158	A	V
		2483.76	67.36	-6.64	74	64.84	27.54	11.43	36.45	326	158	P	V
		2483.52	51.5	-2.5	54	48.98	27.54	11.43	36.45	326	158	A	V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

WIFI Chain Port 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	45.52	-28.48	74	34.03	31.26	16.17	35.94	105	198	P	H
		4824	47.25	-26.75	74	35.76	31.26	16.17	35.94	105	198	P	V
802.11g CH 06 2437MHz		4874	45.76	-28.24	74	34.06	31.36	16.26	35.92	145	265	P	H
		7311	49.57	-24.43	74	29.13	35.96	21.01	36.53	174	321	P	H
		4874	46.21	-27.79	74	34.51	31.36	16.26	35.92	145	265	P	V
		7311	49.2	-24.8	74	28.76	35.96	21.01	36.53	174	321	P	V
802.11g CH 11 2462MHz		4924	46.13	-27.87	74	34.14	31.46	16.43	35.9	146	347	P	H
		7386	47.26	-26.74	74	26.81	36.08	20.96	36.59	145	274	P	H
		4924	45.96	-28.04	74	33.97	31.46	16.43	35.9	146	347	P	V
		7386	49.49	-24.51	74	29.04	36.08	20.96	36.59	145	274	P	V
Remark	3. No other spurious found. 4. 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.
Chain Port				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
0+1		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 01 2412MHz		2389.74	52.12	-21.88	74	50.14	27.25	11.19	36.46	150	19	P	H
		2389.92	39.39	-14.61	54	37.41	27.25	11.19	36.46	150	19	A	H
	*	2412	103.72	-	-	101.68	27.31	11.19	36.46	150	19	P	H
	*	2412	94.24	-	-	92.2	27.31	11.19	36.46	150	19	A	H
		2389.29	53.75	-20.25	74	51.77	27.25	11.19	36.46	322	158	P	V
		2389.83	39.47	-14.53	54	37.49	27.25	11.19	36.46	322	158	A	V
	*	2412	104.03	-	-	101.99	27.31	11.19	36.46	322	158	P	V
	*	2412	93.87	-	-	91.83	27.31	11.19	36.46	322	158	A	V
802.11n HT20 CH 06 2437MHz		2364.09	44.5	-29.5	74	42.76	27.13	11.07	36.46	150	20	P	H
		2389.92	32.24	-21.76	54	30.26	27.25	11.19	36.46	150	20	A	H
	*	2437	105.35	-	-	103.07	27.42	11.31	36.45	150	20	P	H
	*	2437	95.74	-	-	93.46	27.42	11.31	36.45	150	20	A	H
		2484.08	48.18	-25.82	74	45.66	27.54	11.43	36.45	150	20	P	H
		2483.52	36.57	-17.43	54	34.05	27.54	11.43	36.45	150	20	A	H
		2377.5	46.42	-27.58	74	44.62	27.19	11.07	36.46	332	158	P	V
		2389.92	32.43	-21.57	54	30.45	27.25	11.19	36.46	332	158	A	V
	*	2437	105.55	-	-	103.27	27.42	11.31	36.45	332	158	P	V
	*	2437	95.38	-	-	93.1	27.42	11.31	36.45	332	158	A	V
		2483.72	48.5	-25.5	74	45.98	27.54	11.43	36.45	332	158	P	V
		2483.68	36.49	-17.51	54	33.97	27.54	11.43	36.45	332	158	A	V

802.11n HT20 CH 11 2462MHz	*	2462	104.67	-	-	102.33	27.48	11.31	36.45	150	19	P	H
	*	2462	94.05	-	-	91.71	27.48	11.31	36.45	150	19	A	H
		2483.64	56.11	-17.89	74	53.59	27.54	11.43	36.45	150	19	P	H
		2483.52	43.74	-10.26	54	41.22	27.54	11.43	36.45	150	19	A	H
	*	2462	104.55	-	-	102.21	27.48	11.31	36.45	322	158	P	V
	*	2462	94.81	-	-	92.47	27.48	11.31	36.45	322	158	A	V
		2483.64	58.42	-15.58	74	55.9	27.54	11.43	36.45	322	158	P	V
		2484.2	43.68	-10.32	54	41.16	27.54	11.43	36.45	322	158	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 Chain Port 0+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)
802.11n HT20 CH 01 2412MHz		4824	46.52	-27.48	74	35.03	31.26	16.17	35.94	105	198	P	H
		4824	46.25	-27.75	74	34.76	31.26	16.17	35.94	105	198	P	V
802.11n HT20 CH 06 2437MHz		4874	47.01	-26.99	74	35.31	31.36	16.26	35.92	145	265	P	H
		7311	49.39	-24.61	74	28.95	35.96	21.01	36.53	174	321	P	H
		4874	47.29	-26.71	74	35.59	31.36	16.26	35.92	145	265	P	V
		7311	48.16	-25.84	74	27.72	35.96	21.01	36.53	174	321	P	V
802.11n HT20 CH 11 2462MHz		4924	45.79	-28.21	74	33.8	31.46	16.43	35.9	146	347	P	H
		7386	47.61	-26.39	74	27.16	36.08	20.96	36.59	145	274	P	H
		4924	46.43	-27.57	74	34.44	31.46	16.43	35.9	146	347	P	V
		7386	49.17	-24.83	74	28.72	36.08	20.96	36.59	145	274	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.
Chain Port				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
0+1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 CH 03 2422MHz		2388.75	49.26	-24.74	74	47.28	27.25	11.19	36.46	150	19	P	H
		2389.92	37.45	-16.55	54	35.47	27.25	11.19	36.46	150	19	A	H
	*	2422	101.03	-	-	98.92	27.37	11.19	36.45	150	19	P	H
	*	2422	91.81	-	-	89.7	27.37	11.19	36.45	150	19	A	H
		2483.72	46.76	-27.24	74	44.24	27.54	11.43	36.45	150	19	P	H
		2483.76	35.96	-18.04	54	33.44	27.54	11.43	36.45	150	19	A	H
		2389.74	50.07	-23.93	74	48.09	27.25	11.19	36.46	332	158	P	V
		2389.92	39.25	-14.75	54	37.27	27.25	11.19	36.46	332	158	A	V
	*	2422	102	-	-	99.89	27.37	11.19	36.45	332	158	P	V
	*	2422	92.32	-	-	90.21	27.37	11.19	36.45	332	158	A	V
		2483.88	46.33	-27.67	74	43.81	27.54	11.43	36.45	332	158	P	V
		2484.56	35.9	-18.1	54	33.38	27.54	11.43	36.45	332	158	A	V
802.11n HT40 CH 06 2437MHz		2389.83	45.55	-28.45	74	43.57	27.25	11.19	36.46	150	19	P	H
		2389.92	34.75	-19.25	54	32.77	27.25	11.19	36.46	150	19	A	H
	*	2437	101.1	-	-	98.82	27.42	11.31	36.45	150	19	P	H
	*	2437	92	-	-	89.72	27.42	11.31	36.45	150	19	A	H
		2483.68	49.87	-24.13	74	47.35	27.54	11.43	36.45	150	19	P	H
		2483.52	38.75	-15.25	54	36.23	27.54	11.43	36.45	150	19	A	H
		2389.83	46.94	-27.06	74	44.96	27.25	11.19	36.46	332	158	P	V
		2389.83	35.74	-18.26	54	33.76	27.25	11.19	36.46	332	158	A	V
	*	2437	101.68	-	-	99.4	27.42	11.31	36.45	332	158	P	V
	*	2437	92.15	-	-	89.87	27.42	11.31	36.45	332	158	A	V
		2484.32	49.82	-24.18	74	47.3	27.54	11.43	36.45	332	158	P	V
		2484.44	38.24	-15.76	54	35.72	27.54	11.43	36.45	332	158	A	V

802.11n HT40 CH 09 2452MHz		2382.36	44.35	-29.65	74	42.55	27.19	11.07	36.46	150	19	P	H
		2370.84	32.81	-21.19	54	31.01	27.19	11.07	36.46	150	19	A	H
	*	2452	101	-	-	98.72	27.42	11.31	36.45	150	19	P	H
	*	2452	91.26	-	-	88.98	27.42	11.31	36.45	150	19	A	H
		2483.84	54.37	-19.63	74	51.85	27.54	11.43	36.45	150	19	P	H
		2483.52	43.62	-10.38	54	41.1	27.54	11.43	36.45	150	19	A	H
		2388.84	45.16	-28.84	74	43.18	27.25	11.19	36.46	332	158	P	V
		2389.65	33.55	-20.45	54	31.57	27.25	11.19	36.46	332	158	A	V
	*	2452	101.47	-	-	99.19	27.42	11.31	36.45	332	158	P	V
	*	2452	91.55	-	-	89.27	27.42	11.31	36.45	332	158	A	V
		2483.52	55.29	-18.71	74	52.77	27.54	11.43	36.45	332	158	P	V
		2484.72	41.8	-12.2	54	39.28	27.54	11.43	36.45	332	158	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 Chain Port	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
0+1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 CH 03 2422MHz		4844	48.3	-25.7	74	36.68	31.29	16.26	35.93	126	248	P	H
		7266	49.91	-24.09	74	29.48	35.91	21.03	36.51	185	252	P	H
		4844	46.77	-27.23	74	35.15	31.29	16.26	35.93	126	248	P	V
		7266	49.7	-24.3	74	29.27	35.91	21.03	36.51	185	252	P	V
802.11n HT40 CH 06 2437MHz		4874	48.82	-25.18	74	37.12	31.36	16.26	35.92	132	224	P	H
		7311	49.11	-24.89	74	28.67	35.96	21.01	36.53	119	347	P	H
		4874	47.47	-26.53	74	35.77	31.36	16.26	35.92	132	224	P	V
		7311	47.38	-26.62	74	26.94	35.96	21.01	36.53	119	347	P	V
802.11n HT40 CH 09 2452MHz		4904	47.46	-26.54	74	35.59	31.43	16.35	35.91	125	214	P	H
		7356	49.65	-24.35	74	29.21	36.03	20.98	36.57	127	315	P	H
		4904	48.8	-25.2	74	36.93	31.43	16.35	35.91	125	214	P	V
		7356	50.17	-23.83	74	29.73	36.03	20.98	36.57	127	315	P	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.
Chain Port				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
0		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2389.74	49.62	-24.38	74	47.64	27.25	11.19	36.46	222	360	P	H
		2389.92	40.55	-13.45	54	38.57	27.25	11.19	36.46	222	360	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 @ 2389.74MHz:

1. Level(dBμV/m)

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

= 27.25 (dB/m) + 11.19 (dB) + 47.64 (dBμV) –36.46 (dB)

= 49.62 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 49.62 (dBμV/m) – 74(dBμV/m)

= -24.38 (dB)

For Average Limit @ 2389.92MHz:

1. Level(dBμV/m)

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

= 27.25 (dB/m) + 11.19 (dB) + 38.57 (dBμV) –36.46 (dB)

= 40.55 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 40.55 (dBμV/m) – 54(dBμV/m)

= -13.45 (dB)

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