

FCC RF Test Report

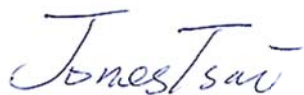
APPLICANT : Opticon Sensors Europe B.V.
EQUIPMENT : Android Industrial Smartphone
BRAND NAME : Opticon
MODEL NAME : H-27
FCC ID : Q2QH-27
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Mar. 21, 2014 and testing was completed on Jun. 11, 2014. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and the testing has shown the tested sample to be 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



SPORTON INTERNATIONAL (KUNSHAN) INC.
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TABLE OF CONTENTS

REVISION HISTORY.....	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant.....	5
1.2 Manufacturer.....	5
1.3 Feature of Equipment Under Test	5
1.4 Product Specification of Equipment Under Test.....	5
1.5 Modification of EUT	6
1.6 Testing Location	6
1.7 Applicable Standards.....	6
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	7
2.1 Carrier Frequency Channel	7
2.2 Pre-Scanned RF Power.....	8
2.3 Test Mode.....	10
2.4 Connection Diagram of Test System.....	12
2.5 Support Unit used in test configuration and system	13
2.6 EUT Operation Test Setup	13
2.7 Measurement Results Explanation Example.....	13
3 TEST RESULT	14
3.1 6dB Bandwidth Measurement	14
3.2 Output Power Measurement.....	17
3.3 Power Spectral Density Measurement	22
3.4 Conducted Band Edges and Spurious Emission Measurement	25
3.5 Radiated Band Edges and Spurious Emission Measurement	46
3.6 AC Conducted Emission Measurement.....	76
3.7 Antenna Requirements.....	80
4 LIST OF MEASURING EQUIPMENT	81
5 UNCERTAINTY OF EVALUATION	82
APPENDIX A. SETUP PHOTOGRAPHS	

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR422837-02C	Rev. 01	Initial issue of report	Jun. 20, 2014

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.2	15.247(b)	Power Output Measurement	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(e)	Power Spectral Density	$\leq 8\text{dBm}/3\text{kHz}$	Pass	-
3.4	15.247(d)	Conducted Band Edges	$\leq 20\text{dBc}$	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 7.13 dB at 237.580 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 13.45 dB at 25.860 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Opticon Sensors Europe B.V.

Opaallaan 35, 2132 XV Hoofddorp, The Netherlands

1.2 Manufacturer

Opticon Sensors Europe B.V.

Opaallaan 35, 2132 XV Hoofddorp, The Netherlands

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Android Industrial Smartphone
Brand Name	Opticon
Model Name	H-27
FCC ID	Q2QH-27
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/NFC/ WLAN 2.4GHz 802.11b/g/n HT20/HT40/ WLAN 5GHz 802.11a/n HT20/HT40/ Bluetooth v3.0 + EDR/Bluetooth v4.0 LE
HW Version	V4.0
SW Version	R06C
EUT Stage	Production Unit

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx/Rx Channel Frequency Range	802.11b/g/n : 2412 MHz ~ 2462 MHz 802.11a/n: 5745~5805MHz.
Maximum (Peak) Output Power to Antenna	<2412 MHz ~ 2462 MHz> 802.11b : 16.94 dBm (0.0494 W) 802.11g : 21.95 dBm (0.1567 W) 802.11n HT20 : 21.37 dBm (0.1371 W) 802.11n HT40 : 20.62 dBm (0.1153 W) <5745 MHz ~ 5805 MHz> 802.11a : 19.06 dBm (0.0805 W) 802.11n HT20 : 18.98 dBm (0.0791 W) 802.11n HT40 : 18.88 dBm (0.0773 W)
Antenna Type	802.11b/g/n : PIFA Antenna with gain 2.64 dBi 802.11a/n : PIFA Antenna with gain 0.31 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11a/g/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.C.			
	TEL: +86-0512-5790-0158			
	FAX: +86-0512-5790-0958			
Test Site No.	Sporton Site No.			FCC Registration No.
	TH01-KS	03CH01-KS	CO01-KS	149928

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

1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02
- ♦ ANSI C63.4-2003

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz) and radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Z plane) were recorded in this report.

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

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

2.1 Carrier Frequency Channel

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

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5725-5850 MHz Band 4	149	5745	159	5795
	151	5755	161	5805
	153	5765	-	-
	157	5785	-	-

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 Power (dBm)						
Power vs. Channel			Power vs. Data Rate			
Channel	Frequency (MHz)	Data Rate	Channel	2Mbps	5.5Mbps	11Mbps
		1Mbps				
CH 01	2412	16.46	CH 06	16.84	16.91	16.81
CH 06	2437	16.94				
CH 11	2462	15.51				

2.4GHz 802.11g RF Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	Data Rate	Channel	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
		6Mbps								
CH 01	2412	21.65	CH 06	21.68	21.59	21.71	21.72	21.88	21.66	21.65
CH 06	2437	21.95								
CH 11	2462	20.63								

2.4GHz 802.11n HT20 RF Power (dBm)										
Power vs. Channel			Power vs. MCS Index							
Channel	Frequency (MHz)	MCS Index	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
		MCS0								
CH 01	2412	21.02	CH 06	21.28	21.34	21.35	21.36	21.33	21.28	21.33
CH 06	2437	21.37								
CH 11	2462	20.07								

2.4GHz 802.11n HT40 RF Power (dBm)										
Power vs. Channel			Power vs. MCS Index							
Channel	Frequency (MHz)	MCS Index	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
		MCS0								
CH 03	2422 MHz	20.62	CH 03	20.14	20.57	20.33	20.16	20.38	20.35	20.41
CH 06	2437 MHz	20.17								
CH 09	2452 MHz	19.89								

5GHz 802.11a RF Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	Data Rate	Channel	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
		6Mbps								
CH 149	5745 MHz	18.65	CH 161	18.94	18.97	18.99	19.02	19.02	18.98	19.03
CH 157	5785 MHz	18.86								
CH 161	5805 MHz	19.06								

5GHz 802.11n HT20 RF Power (dBm)										
Power vs. Channel			Power vs. MCS Index							
Channel	Frequency (MHz)	MCS Index	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
		MCS0								
CH 149	5745 MHz	18.14	CH 161	18.72	18.77	18.81	18.89	18.97	18.89	18.92
CH 157	5785 MHz	18.45								
CH 161	5805 MHz	18.98								

5GHz 802.11n HT40 RF Power (dBm)										
Power vs. Channel			Power vs. MCS Index							
Channel	Frequency (MHz)	MCS Index	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
		MCS0								
CH 151	5755 MHz	18.43	CH 159	18.68	18.78	18.75	18.78	18.86	18.87	18.77
CH 159	5795 MHz	18.88								

2.3 Test Mode

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

<2.4GHz>

Test Cases				
	Test Items	Mode	Data Rate	Test Channel
	6dB BW Power Spectral Density Output Power	802.11b 802.11g 802.11n HT20 802.11n HT40	1 Mbps 6 Mbps MCS0 MCS0	1/6/11 1/6/11 1/6/11 3/6/9
Conducted TCs	Conducted Band Edge	802.11b	1 Mbps	1/11
		802.11g	6 Mbps	1/11
		802.11n HT20	MCS0	1/6/11
		802.11n HT40	MCS0	3/6/9
	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 Band Edge	802.11b	1 Mbps	1/11
		802.11g	6 Mbps	1/11
		802.11n HT20	MCS0	1/6/11
		802.11n HT40	MCS0	3/6/9
Radiated TCs	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

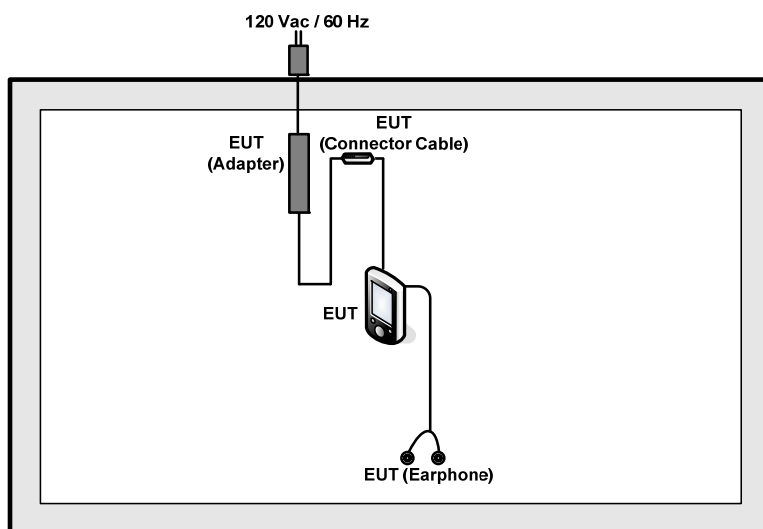
<5GHz>

Test Cases				
Conducted TCs	Test Items	Mode	Data Rate	Test Channel
	6dB BW	802.11a	6 Mbps	149/157/161
	Power Spectral Density	802.11n HT20	MCS0	149/157/161
	Output Power	802.11n HT40	MCS0	151/159
	Conducted Band Edge	802.11a	6 Mbps	149/161
		802.11n HT20	MCS0	149/161
		802.11n HT40	MCS0	151/159
	Conducted Spurious Emission	802.11a	6 Mbps	149/157/161
		802.11n HT20	MCS0	149/157/161
		802.11n HT40	MCS0	151/159
Radiated TCs	Radiated Spurious Emission	802.11a	6 Mbps	149/157/161
		802.11n HT20	MCS0	149/157/161
		802.11n HT40	MCS0	151/159

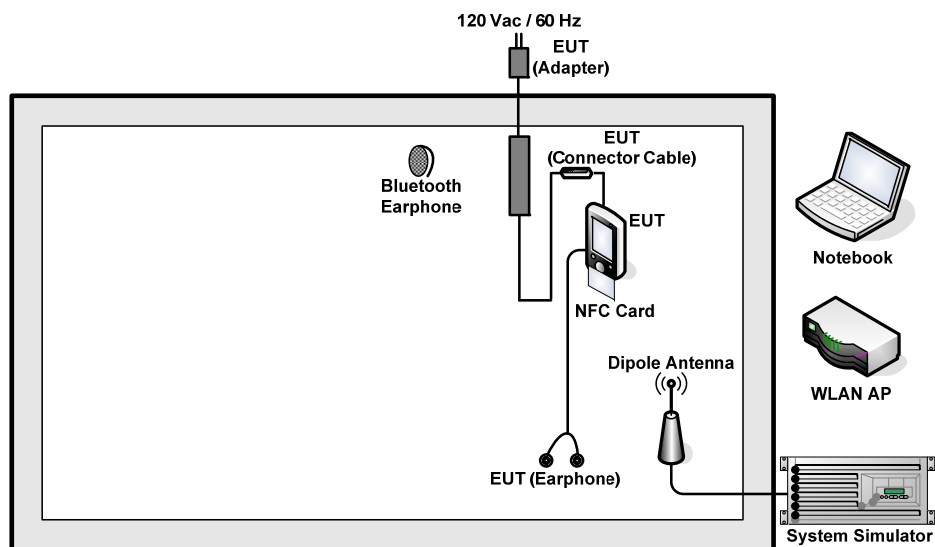
Test Cases	
AC Conducted	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + Function 1 + Earphone + NFC Tx
Emission	Mode 2 : GSM850 Idle + Bluetooth Link + WLAN (5G) Link + Function 1 + Earphone + NFC Tx
Remark: - The worst case of conducted emission is mode 1; only the test data of it was reported. - Function 1 stands for adapter + connector cable + EUT. - For radiated TCs, the tests were performed with adapter, connector cable and earphone.	

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.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
3.	Bluetooth Earphone	Lenovo	LBH505	N/A	N/A	N/A
4.	Notebook	Acer	MS2204	QDS-BRCM1018	N/A	AC I/P: Unshielded, 0.9 m DC O/P: Shielded, 1.8 m

2.6 EUT Operation Test Setup

For WLAN RF test items, an 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 and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

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

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 6.3 dB and 10dB attenuator.

Offset (dB) = RF cable loss (dB) + attenuator factor (dB).
= 6.3 + 10 = 16.3 (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.

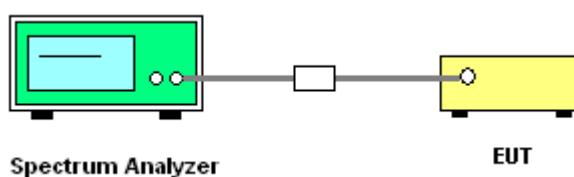
3.1.2 Measuring Instruments

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

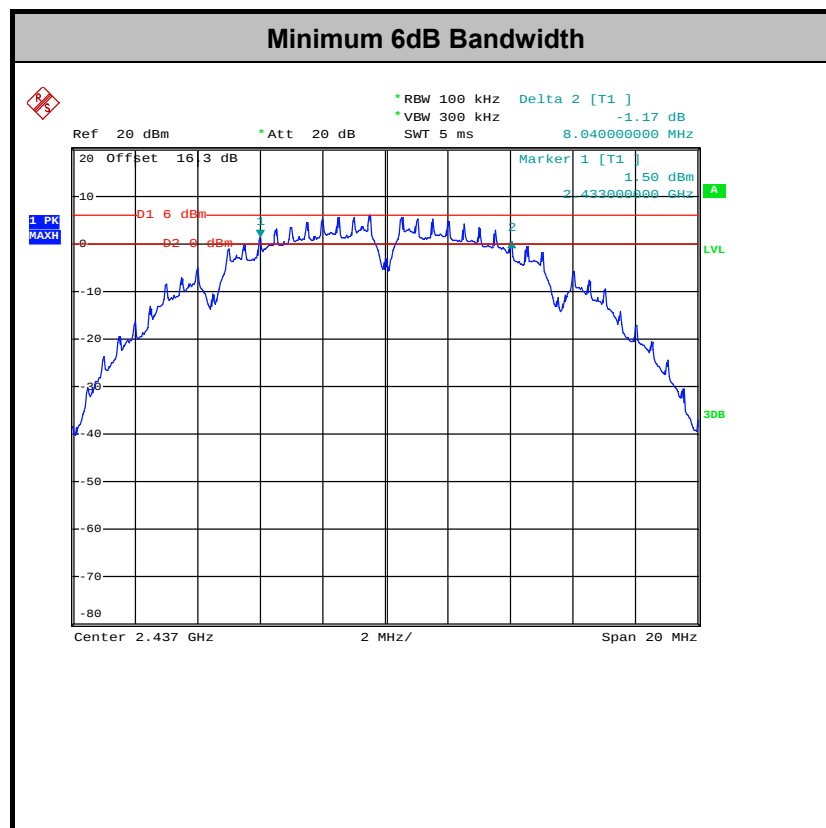


3.1.5 Test Result of 6dB Bandwidth

Test Band :	2.4GHz + 5GHz band 4	Temperature :	24~25°C
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	8.52	0.5	Pass
11b	1Mbps	1	6	2437	8.04	0.5	Pass
11b	1Mbps	1	11	2462	9.00	0.5	Pass
11g	6Mbps	1	1	2412	16.32	0.5	Pass
11g	6Mbps	1	6	2437	16.32	0.5	Pass
11g	6Mbps	1	11	2462	16.32	0.5	Pass
HT20	MCS0	1	1	2412	17.60	0.5	Pass
HT20	MCS0	1	6	2437	17.28	0.5	Pass
HT20	MCS0	1	11	2462	17.56	0.5	Pass
HT40	MCS0	1	3	2422	35.12	0.5	Pass
HT40	MCS0	1	6	2437	35.12	0.5	Pass
HT40	MCS0	1	9	2452	35.12	0.5	Pass

Mod.	Data Rate	N _{TX}	Channel	Freq. (MHz)	6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
11a	6Mbps	1	149	5745	16.36	0.5	Pass
11a	6Mbps	1	157	5785	16.34	0.5	Pass
11a	6Mbps	1	161	5805	16.32	0.5	Pass
HT20	MCS0	1	149	5745	17.58	0.5	Pass
HT20	MCS0	1	157	5785	17.54	0.5	Pass
HT20	MCS0	1	161	5805	17.52	0.5	Pass
HT40	MCS0	1	151	5755	35.16	0.5	Pass
HT40	MCS0	1	159	5795	35.16	0.5	Pass



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 and 5725-5850MHz, 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.

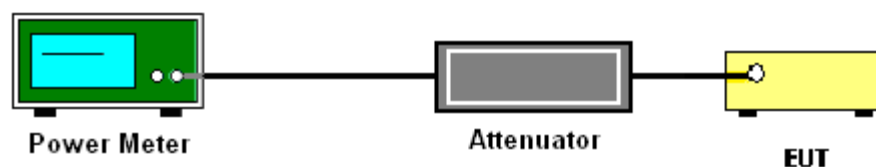
3.2.2 Measuring Instruments

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 + 5GHz band 4	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	16.46	30	2.64	Pass
11b	1Mbps	1	6	2437	16.94	30	2.64	Pass
11b	1Mbps	1	11	2462	15.51	30	2.64	Pass
11g	6Mbps	1	1	2412	21.65	30	2.64	Pass
11g	6Mbps	1	6	2437	21.95	30	2.64	Pass
11g	6Mbps	1	11	2462	20.63	30	2.64	Pass
HT20	MCS0	1	1	2412	21.02	30	2.64	Pass
HT20	MCS0	1	6	2437	21.37	30	2.64	Pass
HT20	MCS0	1	11	2462	20.07	30	2.64	Pass
HT40	MCS0	1	3	2422	20.62	30	2.64	Pass
HT40	MCS0	1	6	2437	20.17	30	2.64	Pass
HT40	MCS0	1	9	2452	19.89	30	2.64	Pass

Mod.	Data Rate	N _{TX}	Channel	Freq. (MHz)	RF Output Power (dBm)	Power Limit (dBm)	DG (dBi)	Pass/Fail
11a	6Mbps	1	149	5745	18.65	30	0.31	Pass
11a	6Mbps	1	157	5785	18.86	30	0.31	Pass
11a	6Mbps	1	161	5805	19.06	30	0.31	Pass
HT20	MCS0	1	149	5745	18.14	30	0.31	Pass
HT20	MCS0	1	157	5785	18.45	30	0.31	Pass
HT20	MCS0	1	161	5805	18.98	30	0.31	Pass
HT40	MCS0	1	151	5755	18.43	30	0.31	Pass
HT40	MCS0	1	159	5795	18.88	30	0.31	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 + 5GHz band 4	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	0.10	14.09	30	2.64	Pass
11b	1Mbps	1	6	2437	0.10	14.39	30	2.64	Pass
11b	1Mbps	1	11	2462	0.10	13.04	30	2.64	Pass
11g	6Mbps	1	1	2412	0.59	13.66	30	2.64	Pass
11g	6Mbps	1	6	2437	0.59	13.91	30	2.64	Pass
11g	6Mbps	1	11	2462	0.59	12.48	30	2.64	Pass
HT20	MCS0	1	1	2412	0.64	12.93	30	2.64	Pass
HT20	MCS0	1	6	2437	0.64	13.16	30	2.64	Pass
HT20	MCS0	1	11	2462	0.64	11.73	30	2.64	Pass
HT40	MCS0	1	3	2422	0.65	12.28	30	2.64	Pass
HT40	MCS0	1	6	2437	0.65	11.88	30	2.64	Pass
HT40	MCS0	1	9	2452	0.65	11.27	30	2.64	Pass

Mod.	Data Rate	N _{TX}	Channel	Freq. (MHz)	Duty Factor (dB)	Average Output Power (dBm)	Power Limit (dBm)	DG (dBi)	Pass/Fail
11a	6Mbps	1	149	5745	0.59	15.08	30	0.31	Pass
11a	6Mbps	1	157	5785	0.59	15.08	30	0.31	Pass
11a	6Mbps	1	161	5805	0.59	15.38	30	0.31	Pass
HT20	MCS0	1	149	5745	0.66	12.50	30	0.31	Pass
HT20	MCS0	1	157	5785	0.66	12.53	30	0.31	Pass
HT20	MCS0	1	161	5805	0.66	13.10	30	0.31	Pass
HT40	MCS0	1	151	5755	0.64	12.07	30	0.31	Pass
HT40	MCS0	1	159	5795	0.64	12.41	30	0.31	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.

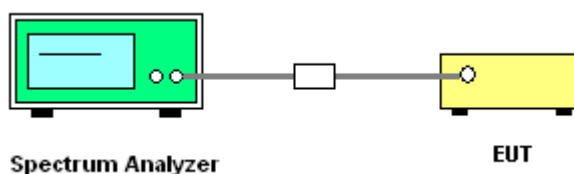
3.3.2 Measuring Instruments

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



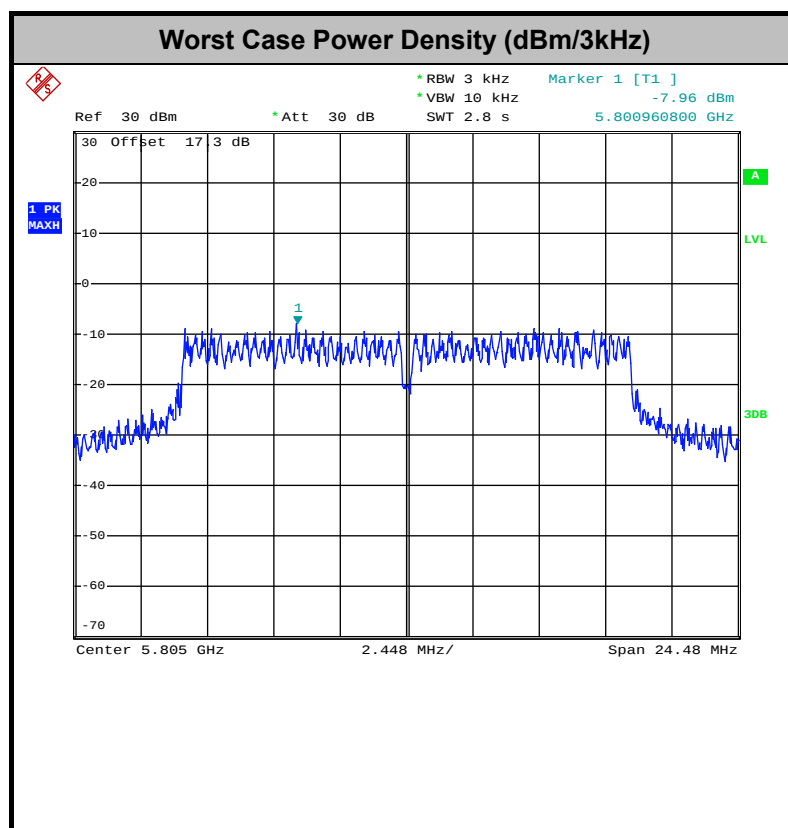
3.3.5 Test Result of Power Spectral Density

Test Mode :	2.4GHz + 5GHz band 4	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	-10.96	8	2.64	Pass
11b	1Mbps	1	6	2437	-8.79	8	2.64	Pass
11b	1Mbps	1	11	2462	-10.89	8	2.64	Pass
11g	6Mbps	1	1	2412	-12.47	8	2.64	Pass
11g	6Mbps	1	6	2437	-10.91	8	2.64	Pass
11g	6Mbps	1	11	2462	-13.29	8	2.64	Pass
HT20	MCS0	1	1	2412	-14.59	8	2.64	Pass
HT20	MCS0	1	6	2437	-13.79	8	2.64	Pass
HT20	MCS0	1	11	2462	-14.44	8	2.64	Pass
HT40	MCS0	1	3	2422	-18.43	8	2.64	Pass
HT40	MCS0	1	6	2437	-17.76	8	2.64	Pass
HT40	MCS0	1	9	2452	-16.89	8	2.64	Pass

Mod.	Data Rate	N _{TX}	Channel	Freq. (MHz)	Peak Power Density (dBm/3kHz)	Max. Limits (dBm/3kHz)	DG (dBi)	Pass/Fail
11a	6Mbps	1	149	5745	-10.82	8	0.31	Pass
11a	6Mbps	1	157	5785	-10.05	8	0.31	Pass
11a	6Mbps	1	161	5805	-7.96	8	0.31	Pass
HT20	MCS0	1	149	5745	-11.19	8	0.31	Pass
HT20	MCS0	1	157	5785	-12.83	8	0.31	Pass
HT20	MCS0	1	161	5805	-8.84	8	0.31	Pass
HT40	MCS0	1	151	5755	-16.41	8	0.31	Pass
HT40	MCS0	1	159	5795	-15.84	8	0.31	Pass

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



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).

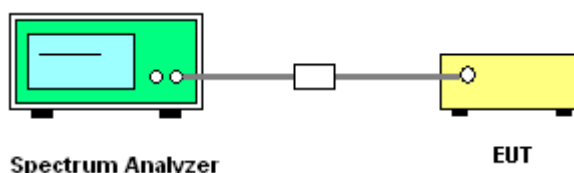
3.4.2 Measuring Instruments

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



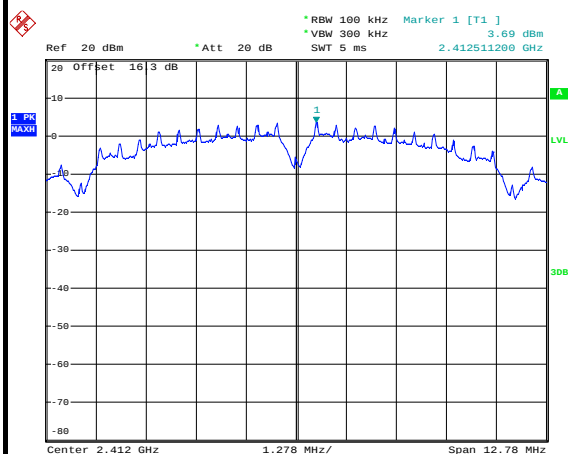


3.4.5 Test Result of Conducted Band Edges and Spurious Emission

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

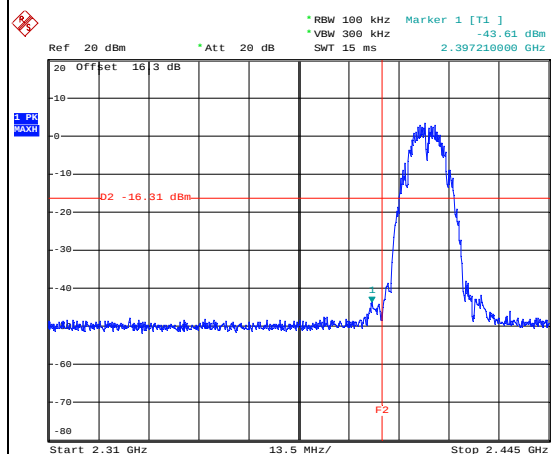
WLAN 802.11b Channel 01

100kHz PSD reference Level



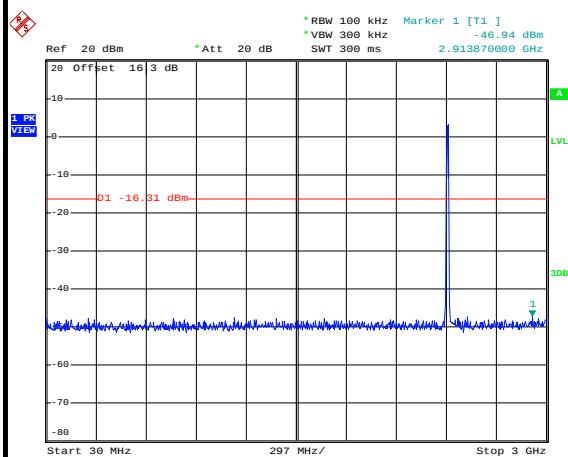
Date: 23.APR.2014 23:47:13

Low Channel Plot



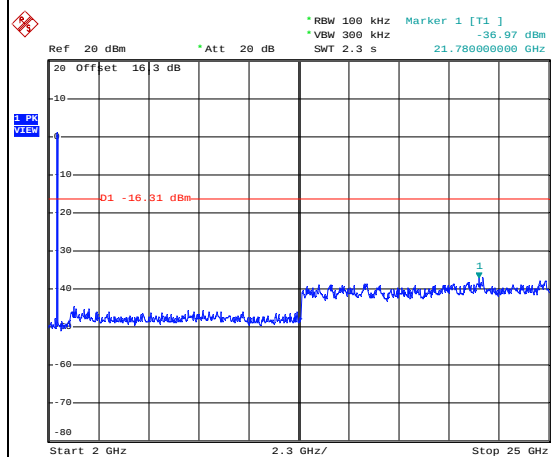
Date: 23.APR.2014 23:47:27

Spurious Emission 30MHz~3GHz



Date: 23.APR.2014 23:47:46

Spurious Emission 2GHz~25GHz



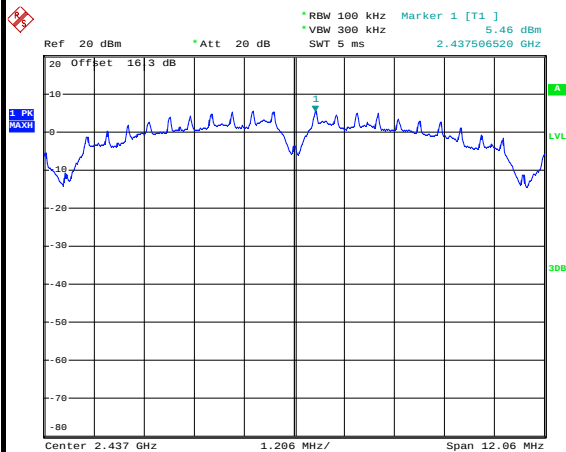
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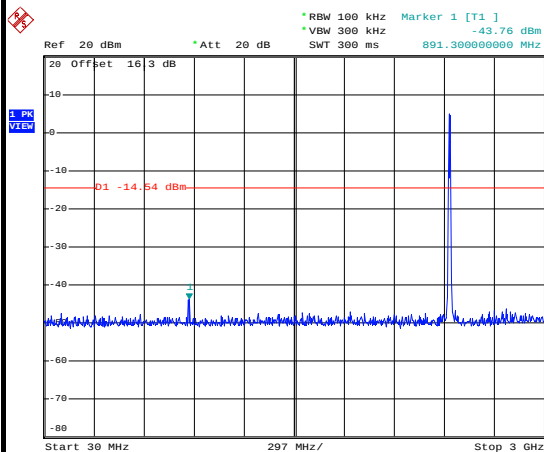
Test Mode :	802.11b	Temperature :	24~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	49~51%
Test Channel :	06	Test Engineer :	Issac Song

WLAN 802.11b Channel 06

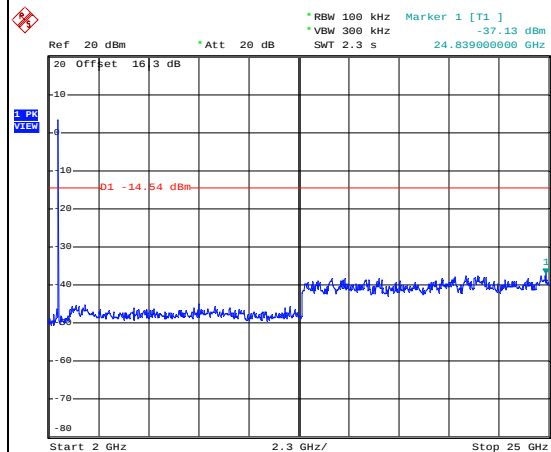
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

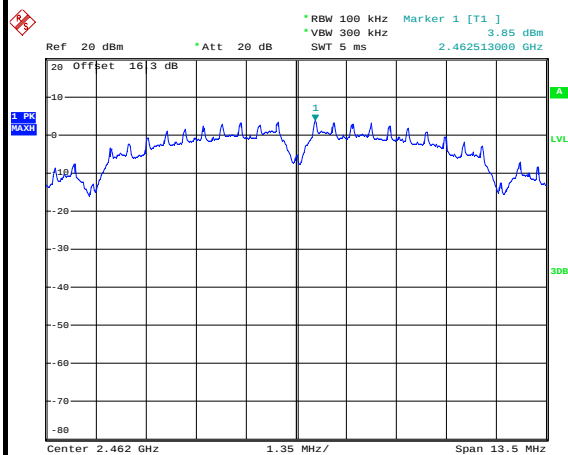




Test Mode :	802.11b	Temperature :	24~25°C
Test Band :	2.4GHz High	Relative Humidity :	49~51%
Test Channel :	11	Test Engineer :	Issac Song

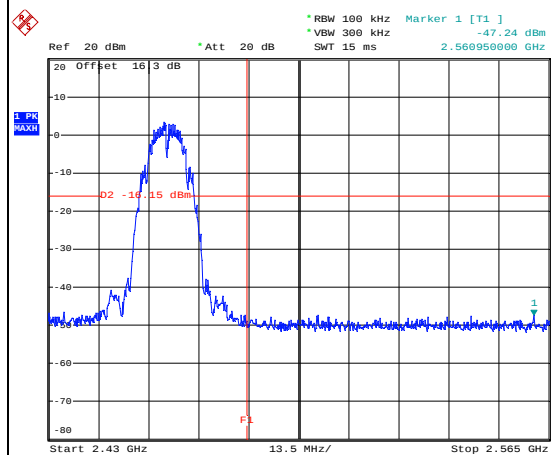
WLAN 802.11b Channel 11

100kHz PSD reference Level



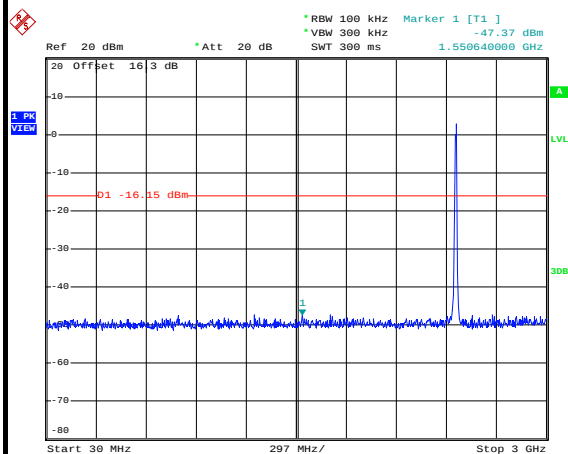
Date: 23.APR.2014 23:53:00

High Channel Plot



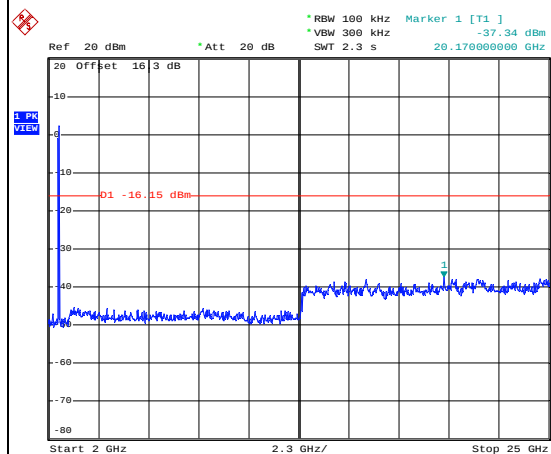
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Spurious Emission 30MHz~3GHz



Date: 23.APR.2014 23:53:33

Spurious Emission 2GHz~25GHz



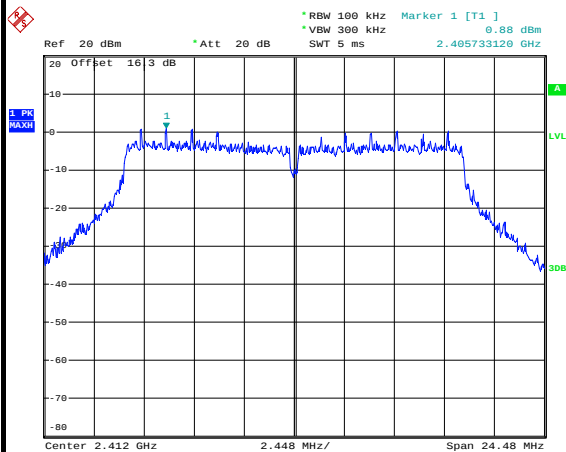
Date: 23.APR.2014 23:53:52



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

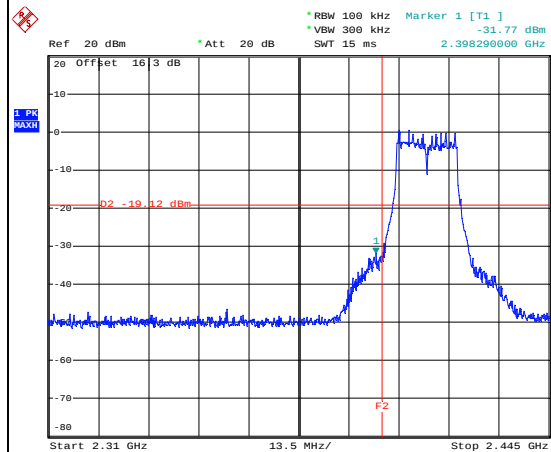
WLAN 802.11g Channel 01

100kHz PSD reference Level



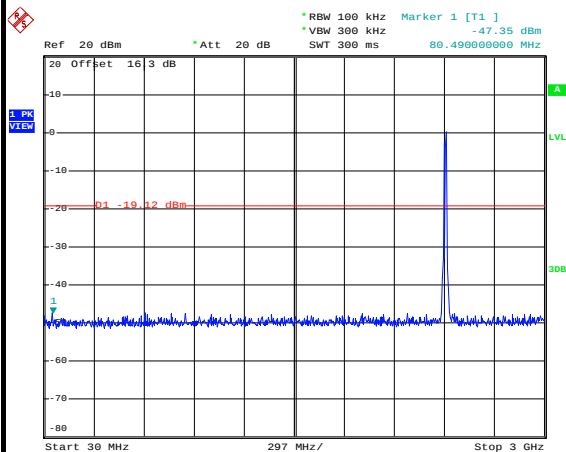
Date: 23.APR.2014 23:58:28

Low Channel Plot



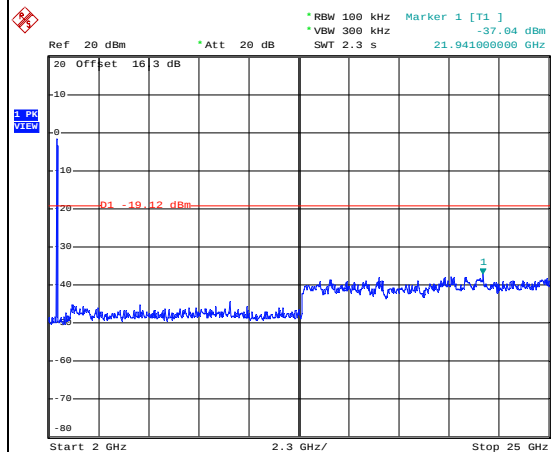
Date: 23.APR.2014 23:58:41

Spurious Emission 30MHz~3GHz



Date: 23.APR.2014 23:59:01

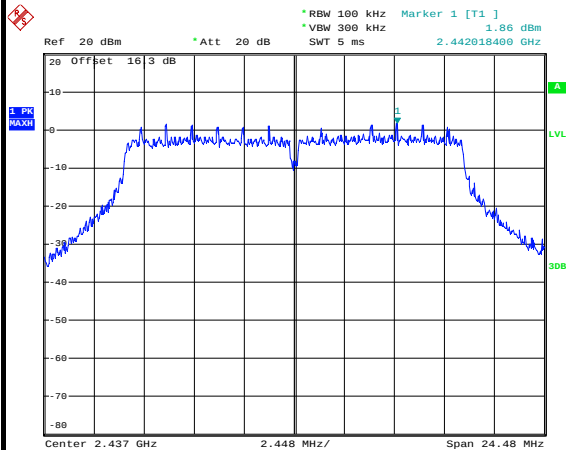
Spurious Emission 2GHz~25GHz



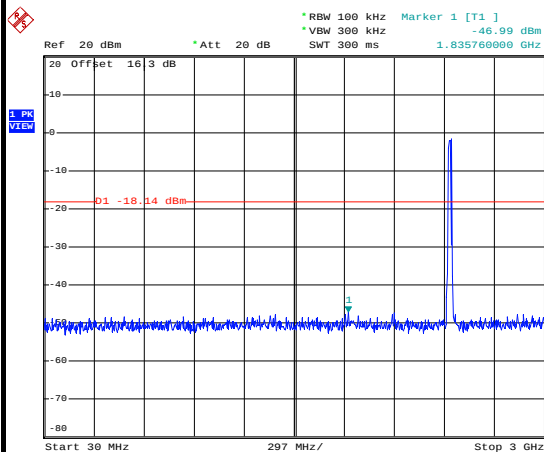
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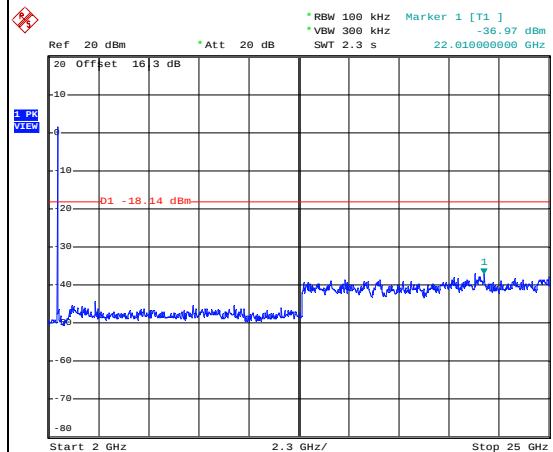
Test Mode :	802.11g	Temperature :	24~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	49~51%
Test Channel :	06	Test Engineer :	Issac Song

WLAN 802.11g Channel 06**100kHz PSD reference Level**

Date: 24.APR.2014 00:02:38

Spurious Emission 30MHz~3GHz

Date: 24.APR.2014 00:15:38

Spurious Emission 2GHz~25GHz

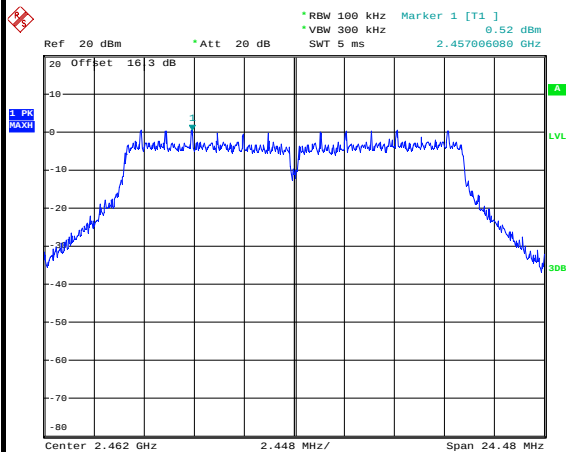
Date: 24.APR.2014 00:03:16



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

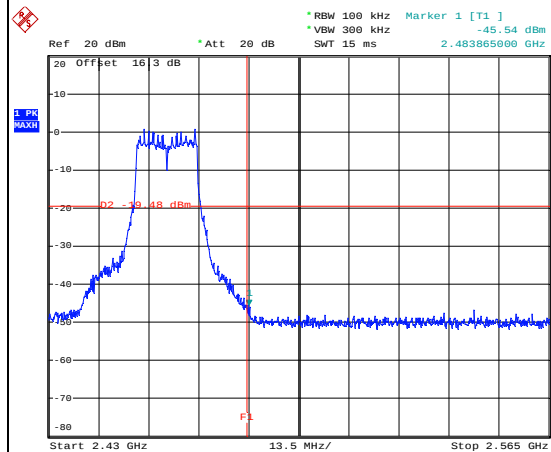
WLAN 802.11g Channel 11

100kHz PSD reference Level



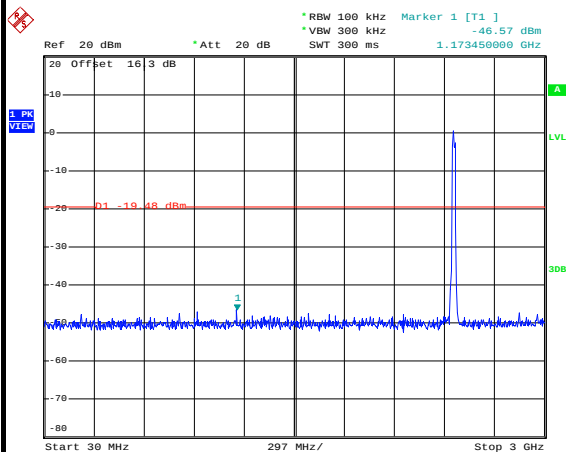
Date: 24.APR.2014 00:05:09

High Channel Plot



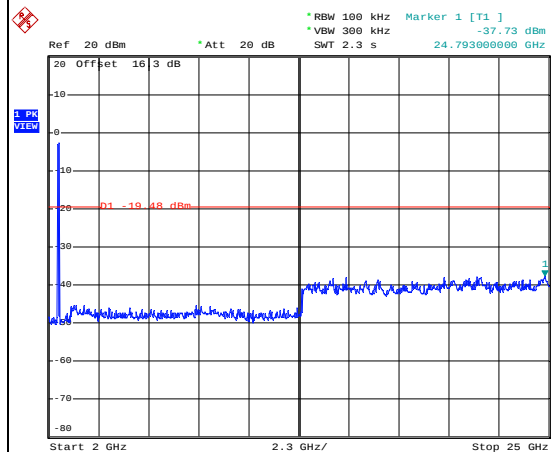
Date: 24.APR.2014 00:05:23

Spurious Emission 30MHz~3GHz



Date: 24.APR.2014 00:12:42

Spurious Emission 2GHz~25GHz



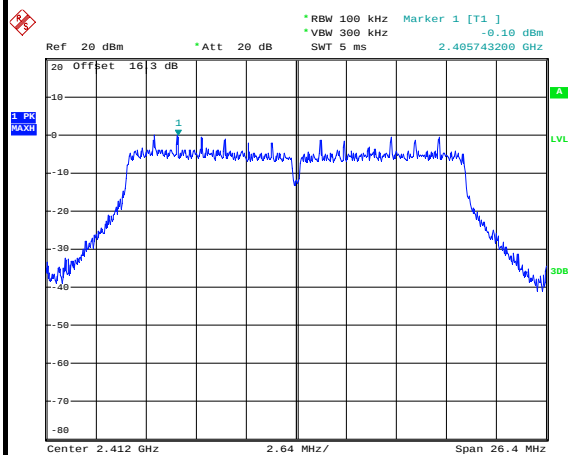
Date: 24.APR.2014 00:09:54



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

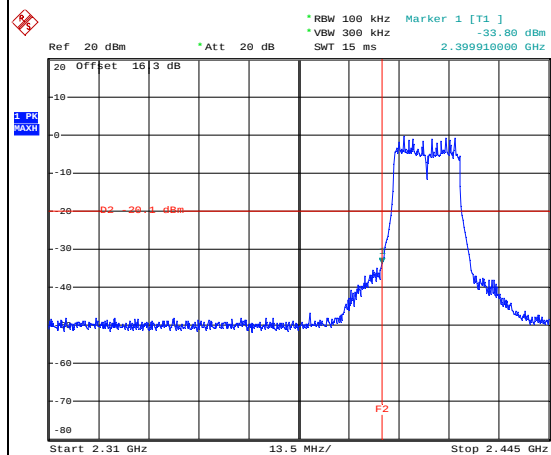
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



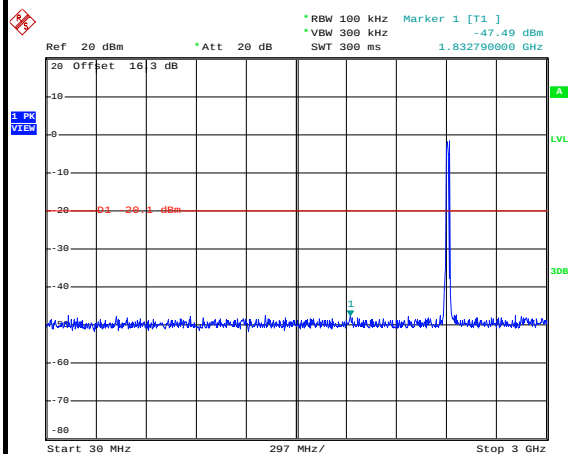
Date: 24.APR.2014 00:18:59

Low Channel Plot



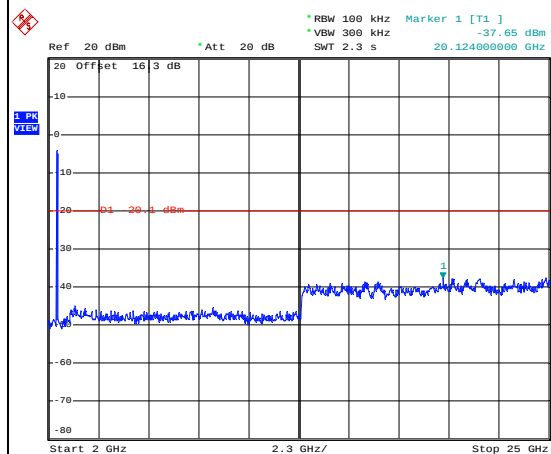
Date: 24.APR.2014 00:19:13

Spurious Emission 30MHz~3GHz



Date: 24.APR.2014 00:19:32

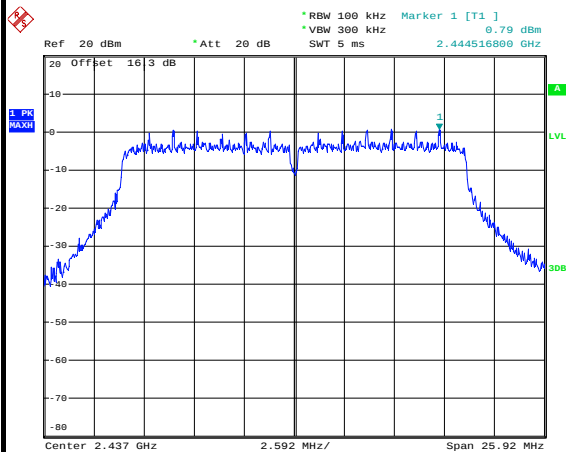
Spurious Emission 2GHz~25GHz



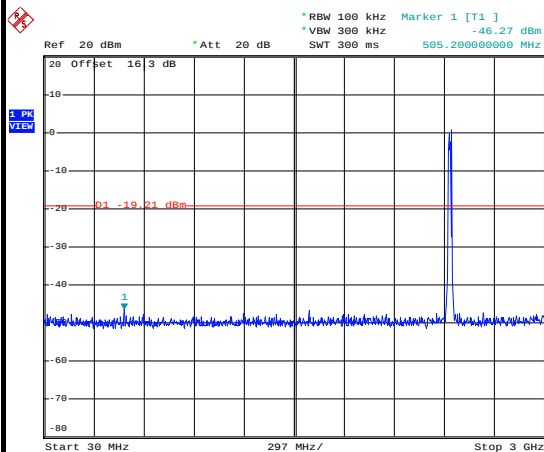
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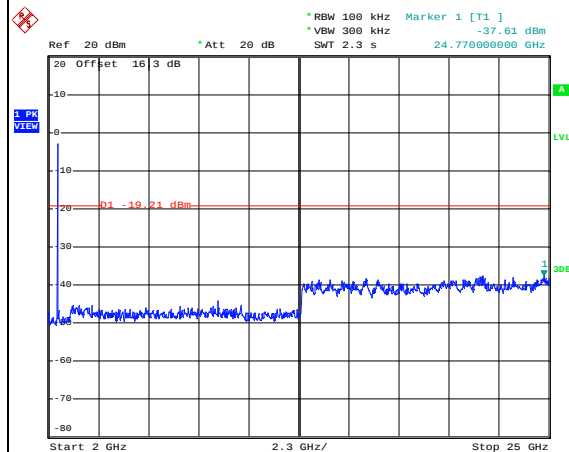
Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	49~51%
Test Channel :	06	Test Engineer :	Issac Song

WLAN 802.11n HT20 Channel 06**100kHz PSD reference Level**

Date: 24.APR.2014 00:22:11

Spurious Emission 30MHz~3GHz

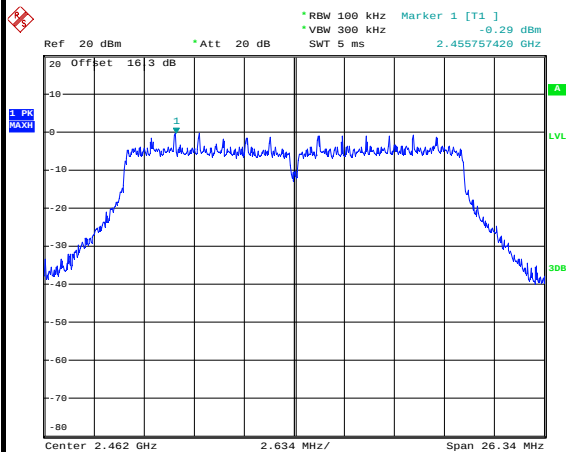
Date: 24.APR.2014 00:22:31

Spurious Emission 2GHz~25GHz

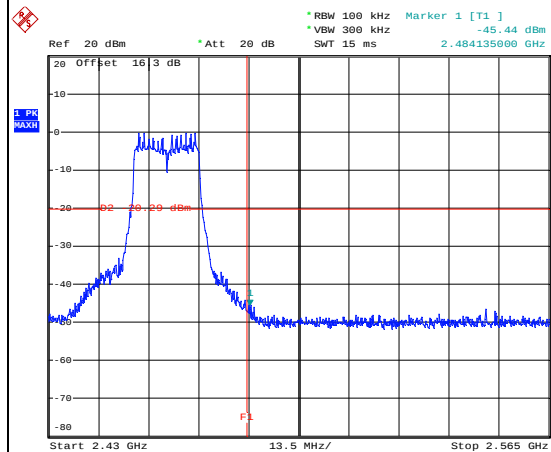
Date: 24.APR.2014 00:22:49



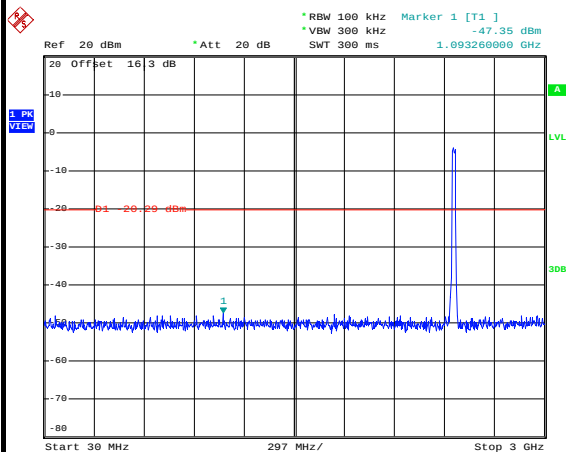
Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Band :	2.4GHz High	Relative Humidity :	49~51%
Test Channel :	11	Test Engineer :	Issac Song

WLAN 802.11n HT20 Channel 11**100kHz PSD reference Level**

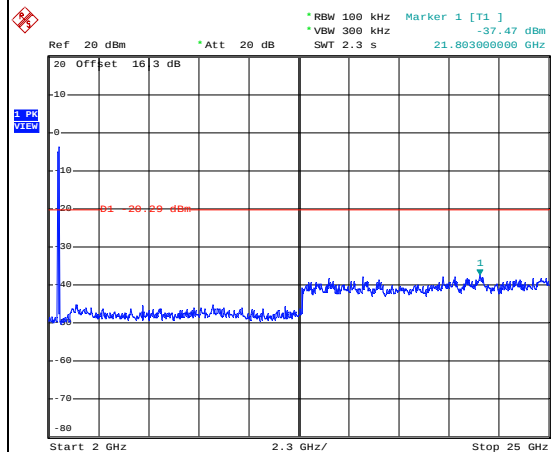
Date: 24.APR.2014 00:25:52

High Channel Plot

Date: 24.APR.2014 00:26:06

Spurious Emission 30MHz~3GHz

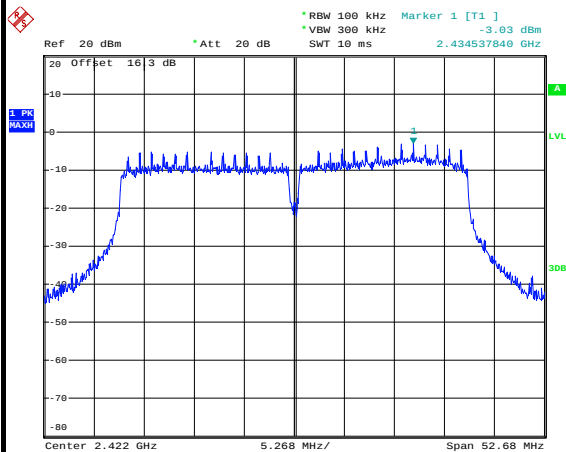
Date: 24.APR.2014 00:30:38

Spurious Emission 2GHz~25GHz

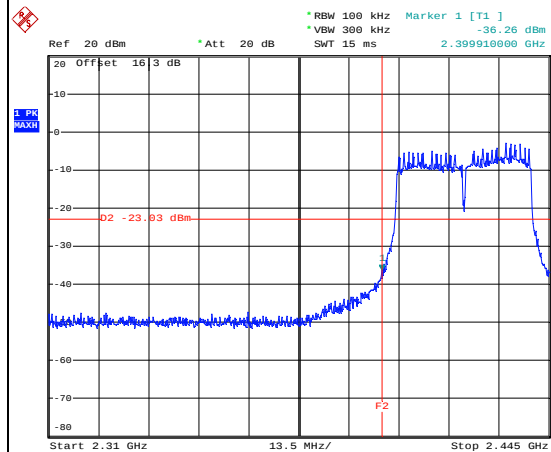
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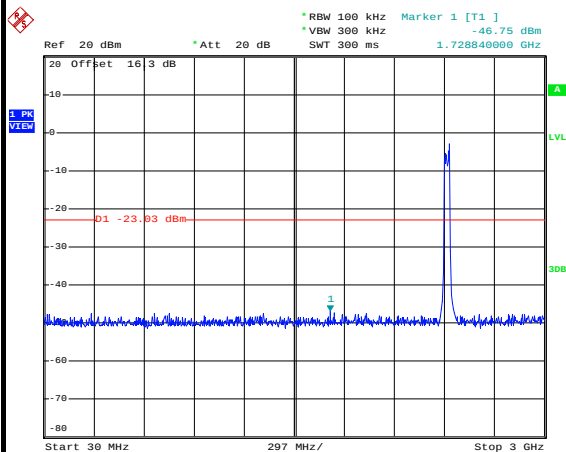
Test Mode :	802.11n HT40	Temperature :	24~25°C
Test Band :	2.4GHz Low	Relative Humidity :	49~51%
Test Channel :	03	Test Engineer :	Issac Song

WLAN 802.11n HT40 Channel 03**100kHz PSD reference Level**

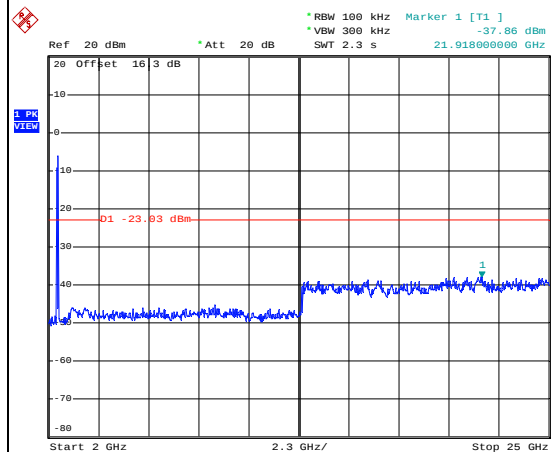
Date: 24.APR.2014 00:33:11

Low Channel Plot

Date: 24.APR.2014 00:36:10

Spurious Emission 30MHz~3GHz

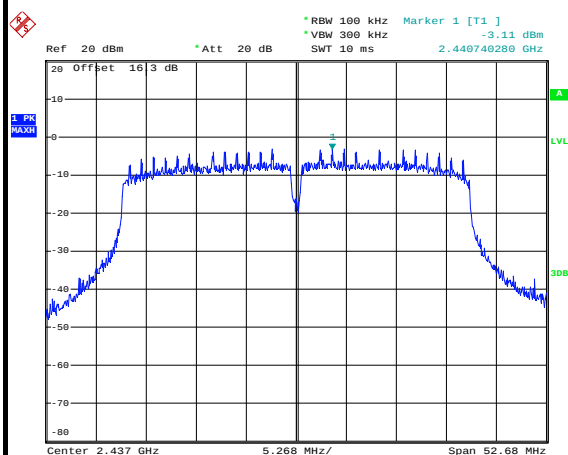
Date: 24.APR.2014 00:35:01

Spurious Emission 2GHz~25GHz

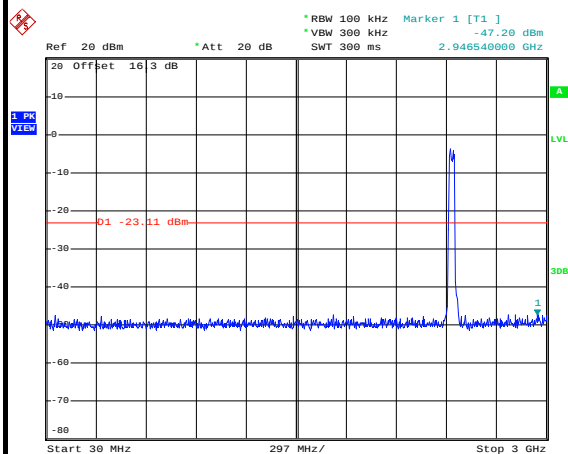
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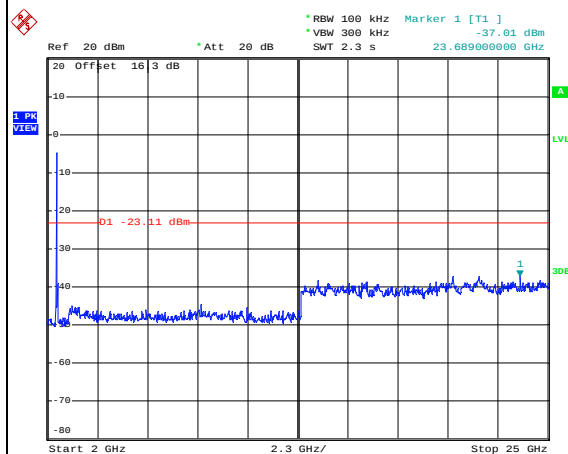
Test Mode :	802.11n HT40	Temperature :	24~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	49~51%
Test Channel :	06	Test Engineer :	Issac Song

WLAN 802.11n HT40 Channel 06**100kHz PSD reference Level**

Date: 24.APR.2014 00:39:02

Spurious Emission 30MHz~3GHz

Date: 24.APR.2014 00:40:46

Spurious Emission 2GHz~25GHz

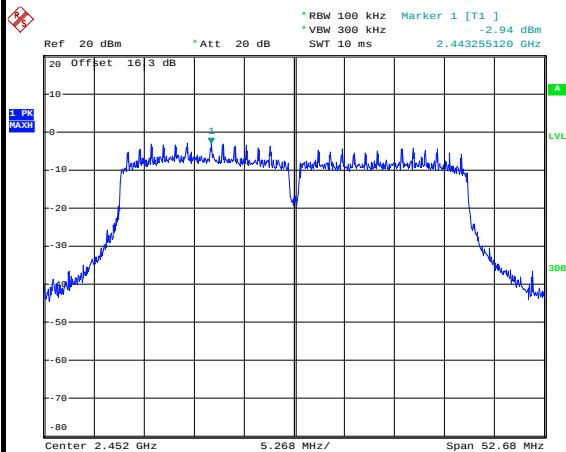
Date: 24.APR.2014 00:41:05



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

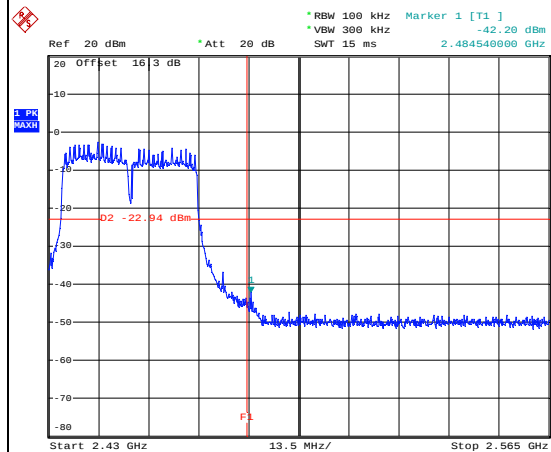
WLAN 802.11n HT40 Channel 09

100kHz PSD reference Level



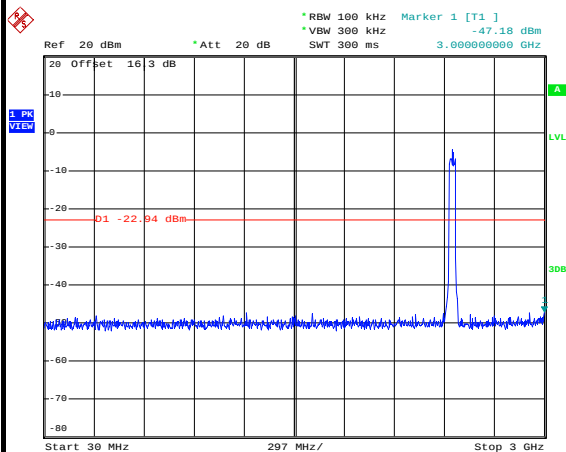
Date: 24.APR.2014 00:44:04

High Channel Plot



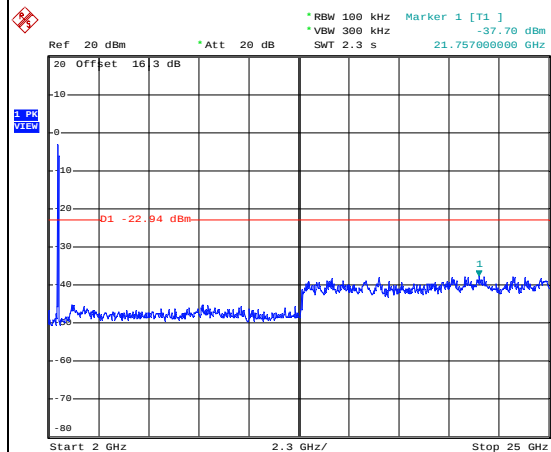
Date: 24.APR.2014 00:44:18

Spurious Emission 30MHz~3GHz



Date: 24.APR.2014 00:49:28

Spurious Emission 2GHz~25GHz



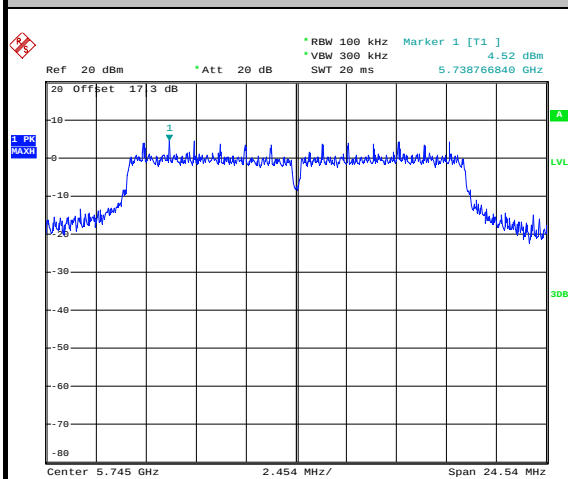
Date: 24.APR.2014 00:47:59



Test Mode :	802.11a	Temperature :	24~25°C
Test Band :	5GHz Low	Relative Humidity :	49~51%
Test Channel :	149	Test Engineer :	Issac Song

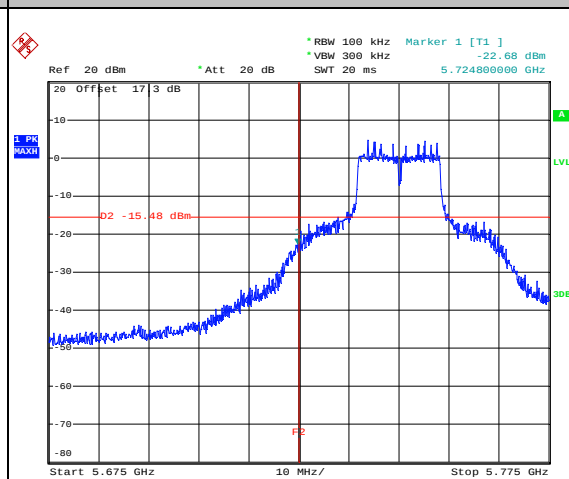
WLAN 802.11a Channel 149

100kHz PSD reference Level



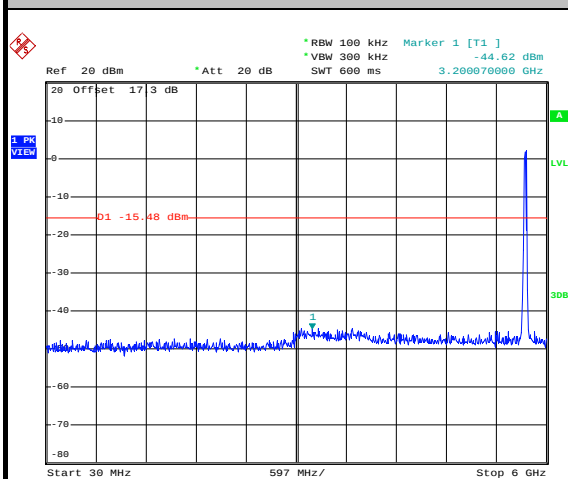
Date: 26.APR.2014 11:03:19

Low Channel Plot

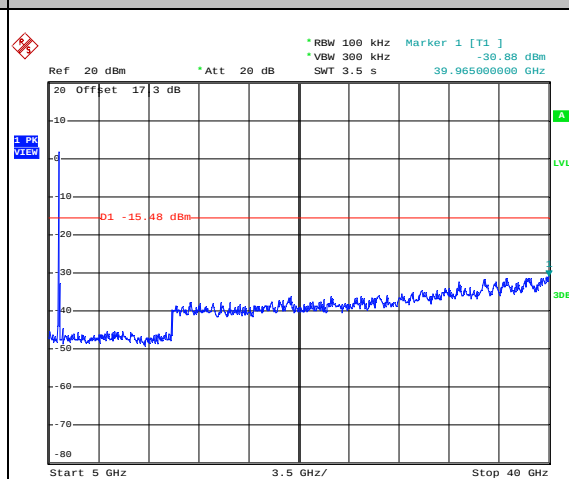


Date: 26.APR.2014 11:04:55

Spurious Emission 30MHz~6GHz



Spurious Emission 5GHz~40GHz

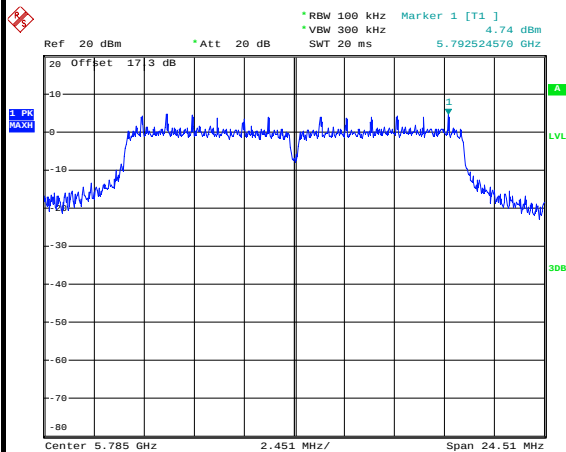




Test Mode :	802.11a	Temperature :	24~25°C
Test Band :	5GHz Mid	Relative Humidity :	49~51%
Test Channel :	157	Test Engineer :	Issac Song

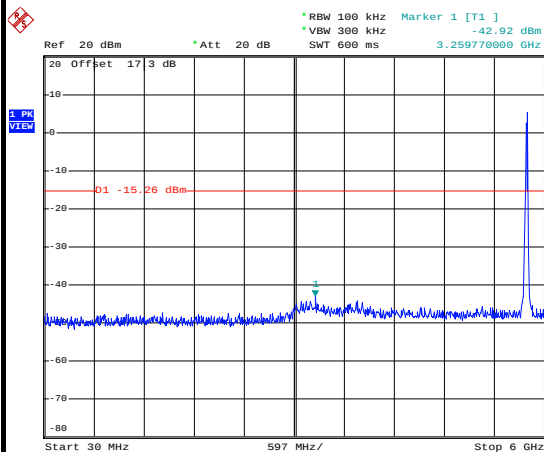
WLAN 802.11a Channel 157

100kHz PSD reference Level

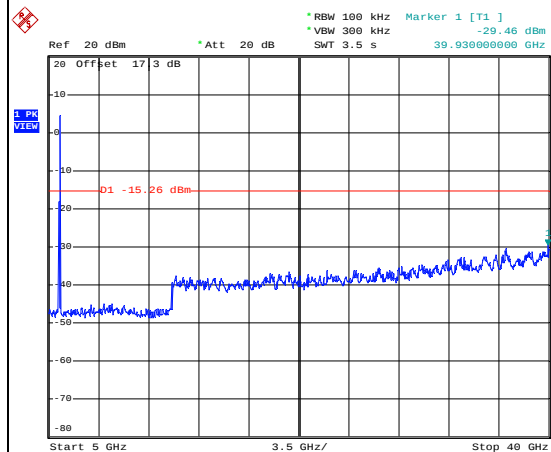


Date: 26.APR.2014 11:07:52

Spurious Emission 30MHz~6GHz



Spurious Emission 5GHz~40GHz

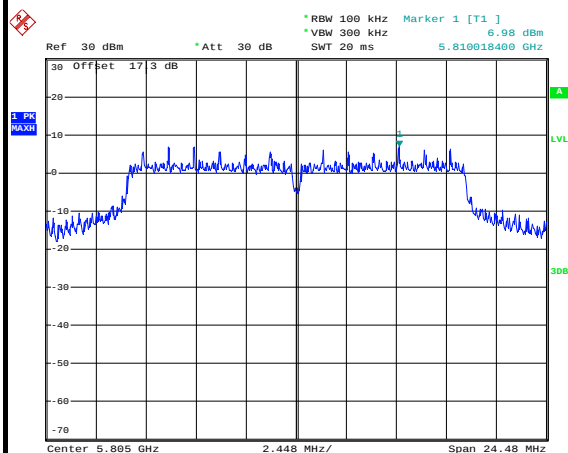




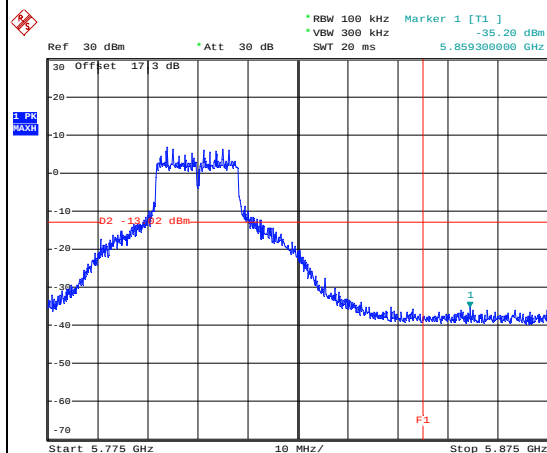
Test Mode :	802.11a	Temperature :	24~25°C
Test Band :	5GHz High	Relative Humidity :	49~51%
Test Channel :	161	Test Engineer :	Issac Song

WLAN 802.11a Channel 161

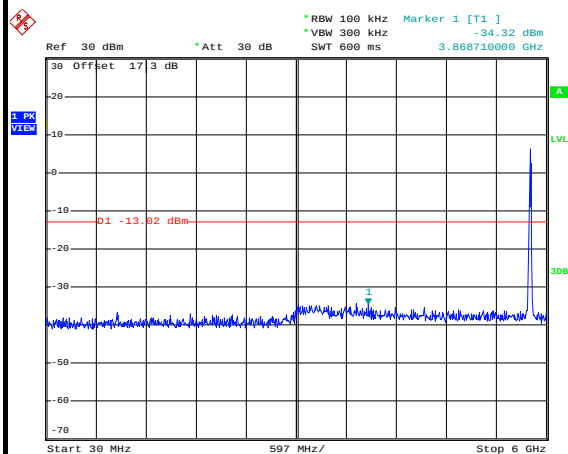
100kHz PSD reference Level



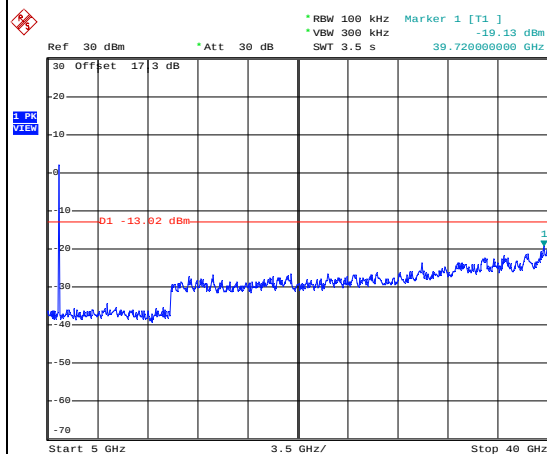
High Channel Plot



Spurious Emission 30MHz~6GHz



Spurious Emission 5GHz~40GHz

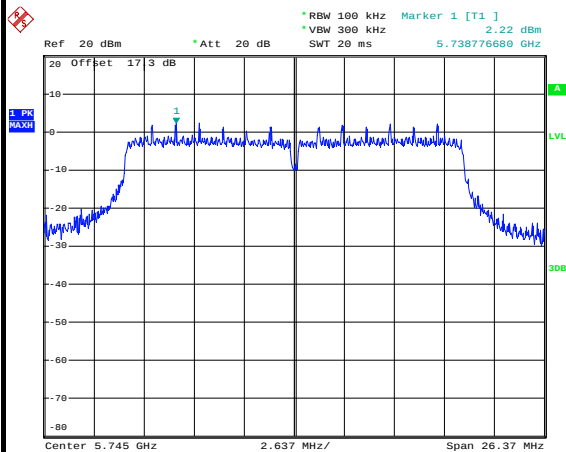




Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Band :	5GHz Low	Relative Humidity :	49~51%
Test Channel :	149	Test Engineer :	Issac Song

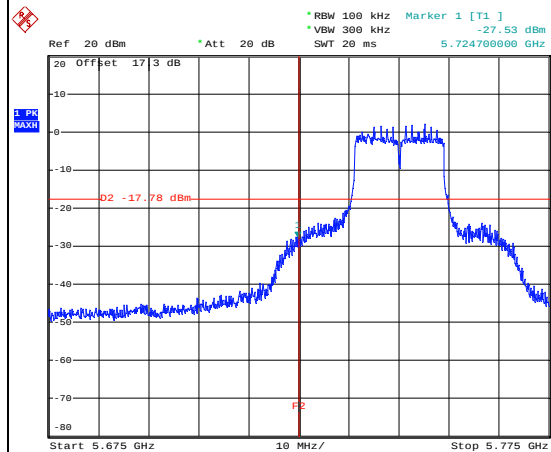
WLAN 802.11n HT20 Channel 149

100kHz PSD reference Level



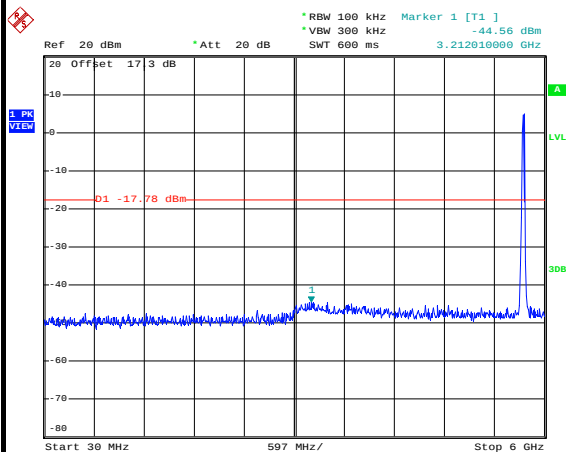
Date: 26.APR.2014 11:19:31

Low Channel Plot

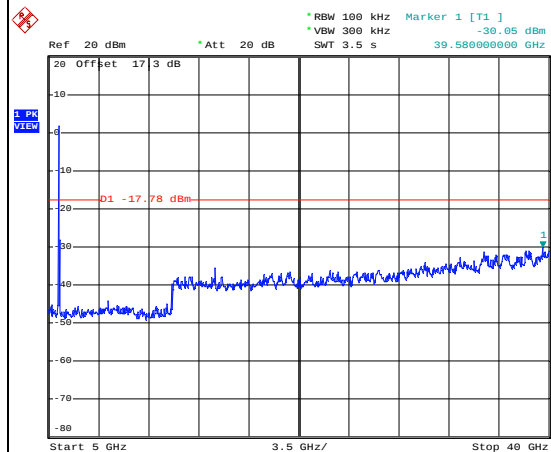


Date: 26.APR.2014 11:19:45

Spurious Emission 30MHz~6GHz



Spurious Emission 5GHz~40GHz

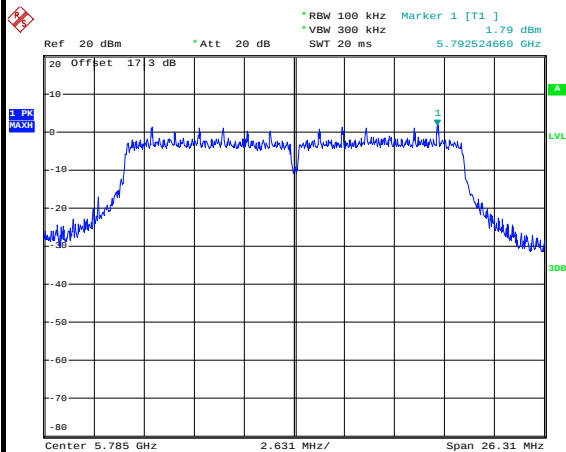




Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Band :	5GHz Mid	Relative Humidity :	49~51%
Test Channel :	157	Test Engineer :	Issac Song

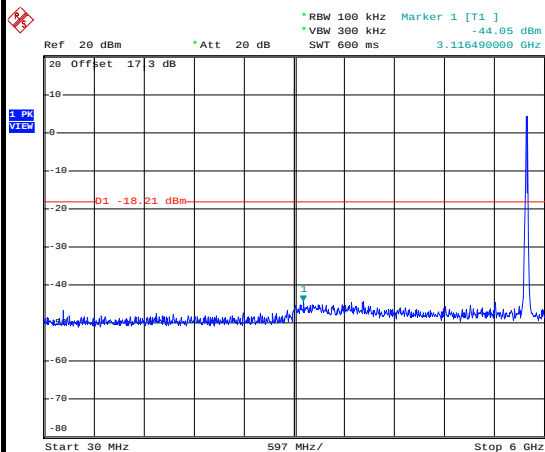
WLAN 802.11n HT20 Channel 157

100kHz PSD reference Level

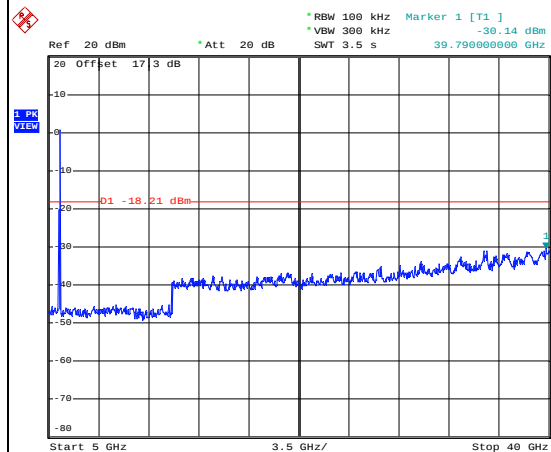


Date: 26.APR.2014 11:26:09

Spurious Emission 30MHz~6GHz



Spurious Emission 5GHz~40GHz

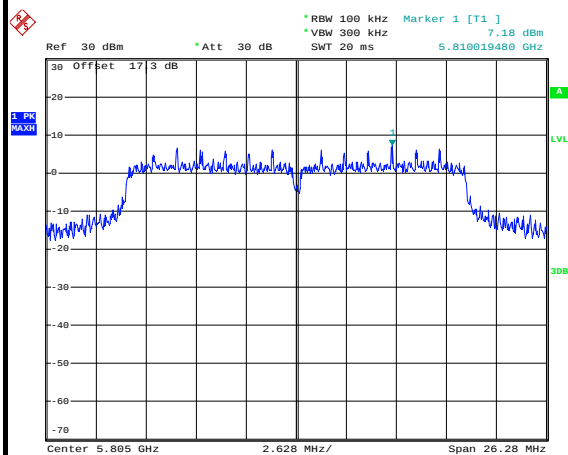




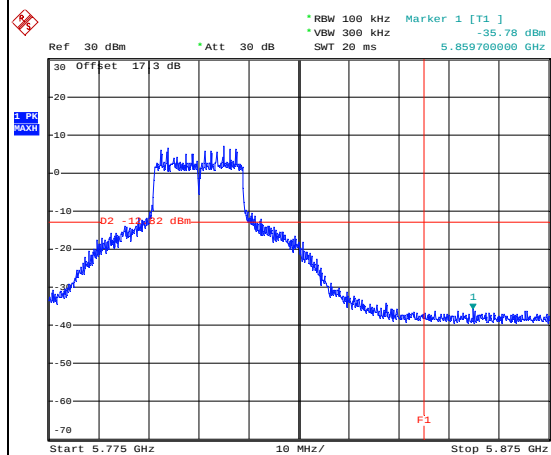
Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Band :	5GHz High	Relative Humidity :	49~51%
Test Channel :	161	Test Engineer :	Issac Song

WLAN 802.11n HT20 Channel 161

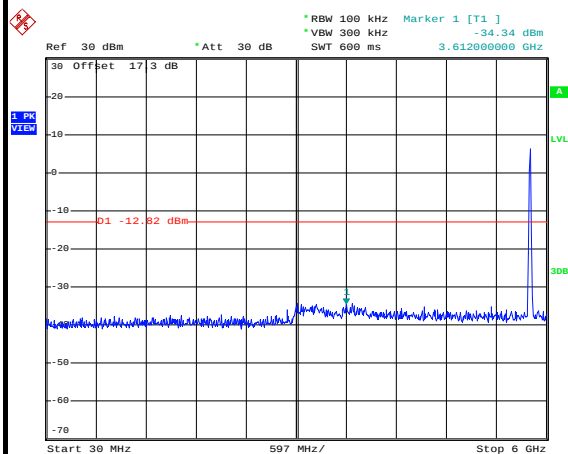
100kHz PSD reference Level



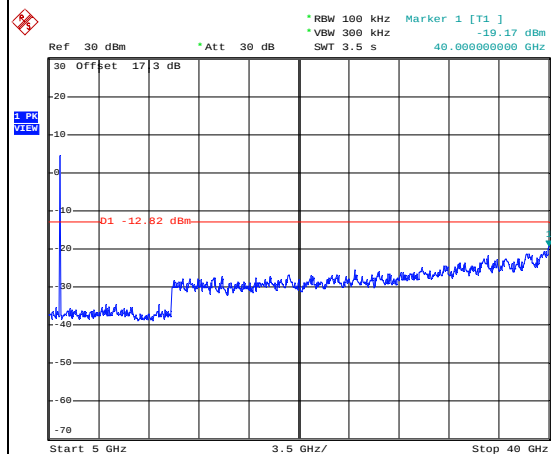
High Channel Plot



Spurious Emission 30MHz~6GHz



Spurious Emission 5GHz~40GHz

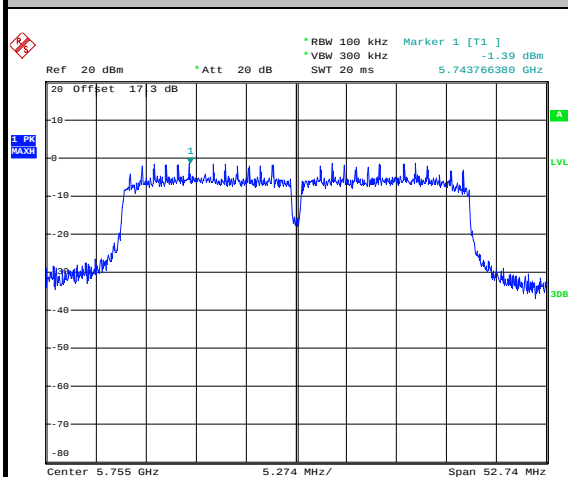




Test Mode :	802.11n HT40	Temperature :	24~25°C
Test Band :	5GHz Low	Relative Humidity :	49~51%
Test Channel :	151	Test Engineer :	Issac Song

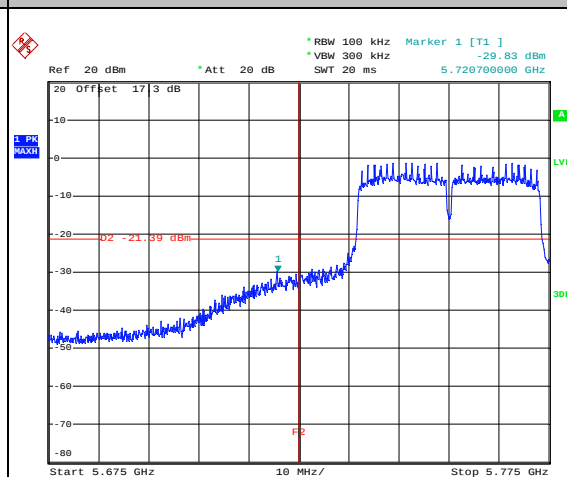
WLAN 802.11n HT40 Channel 151

100kHz PSD reference Level



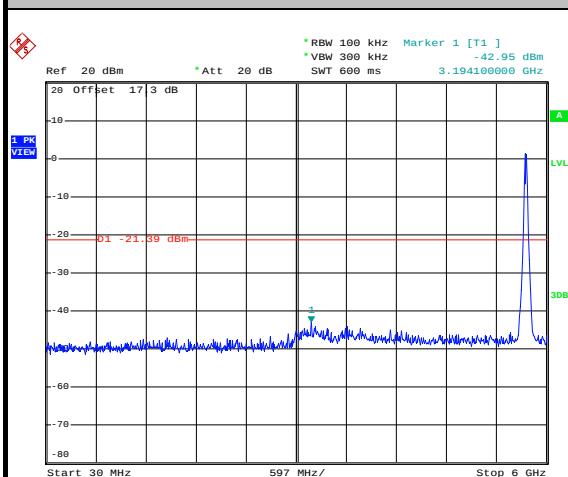
Date: 26.APR.2014 11:35:24

Low Channel Plot

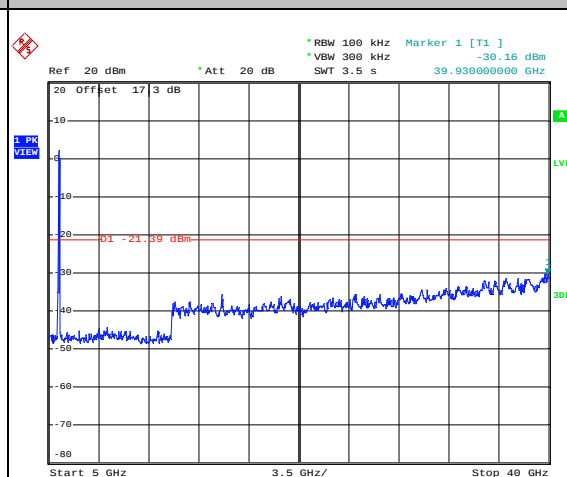


Date: 26.APR.2014 11:35:38

Spurious Emission 30MHz~6GHz



Spurious Emission 5GHz~40GHz

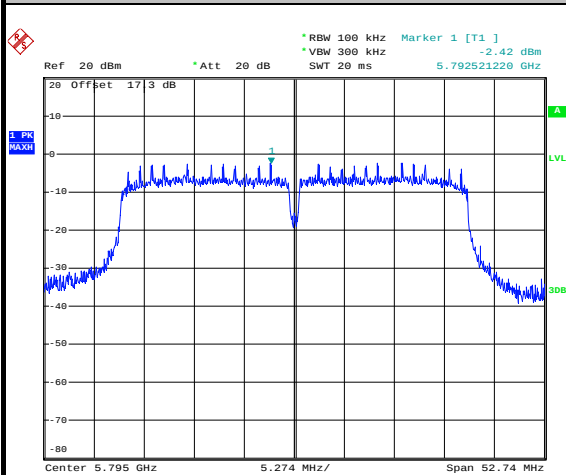




Test Mode :	802.11n HT40	Temperature :	24~25°C
Test Band :	5GHz High	Relative Humidity :	49~51%
Test Channel :	159	Test Engineer :	Issac Song

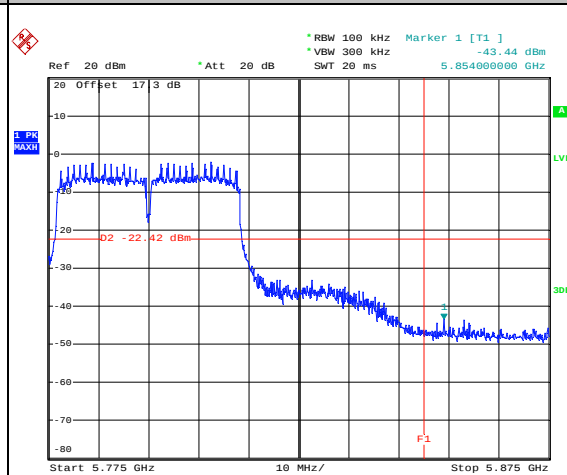
WLAN 802.11n HT40 Channel 159

100kHz PSD reference Level



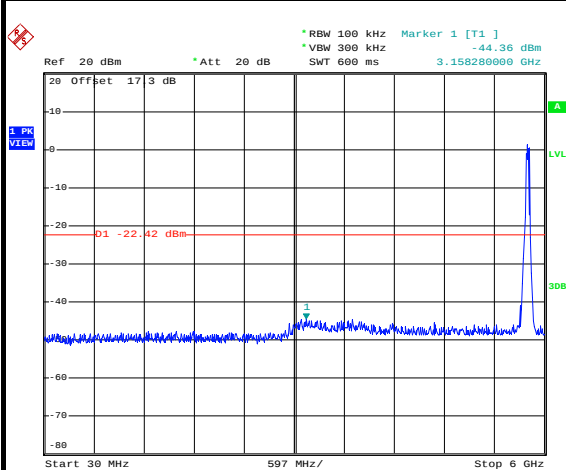
Date: 26.APR.2014 11:40:36

High Channel Plot

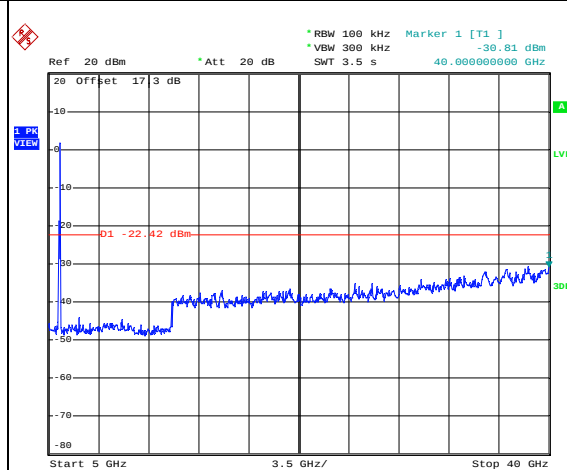


Date: 26.APR.2014 11:40:50

Spurious Emission 30MHz~6GHz



Spurious Emission 5GHz~40GHz



3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

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

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

3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

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

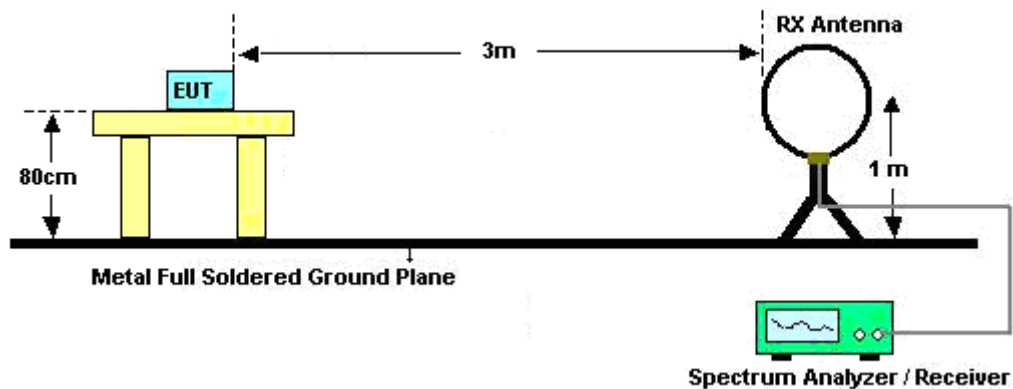
For average measurement:

 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, 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.

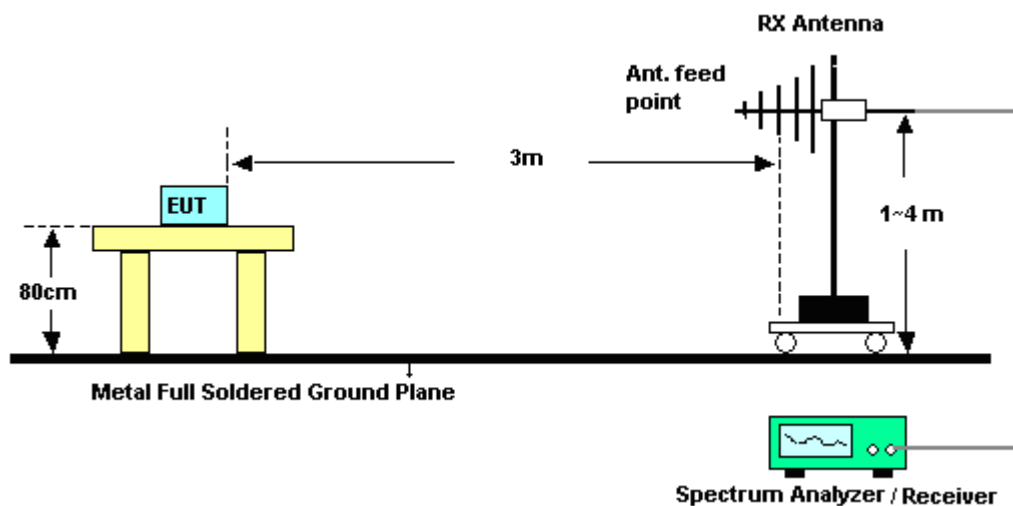
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	97.630	8.240	0.121	300Hz
802.11g	87.261	1.370	0.730	1kHz
2.4GHz 802.11n HT20	86.272	1.282	0.780	1kHz
2.4GHz 802.11n HT40	86.059	0.642	1.558	3kHz
802.11a	87.261	1.370	0.730	1kHz
5GHz 802.11n HT20	85.811	1.270	0.787	1kHz
5GHz 802.11n HT40	86.290	0.642	1.558	3kHz

3.5.4 Test Setup

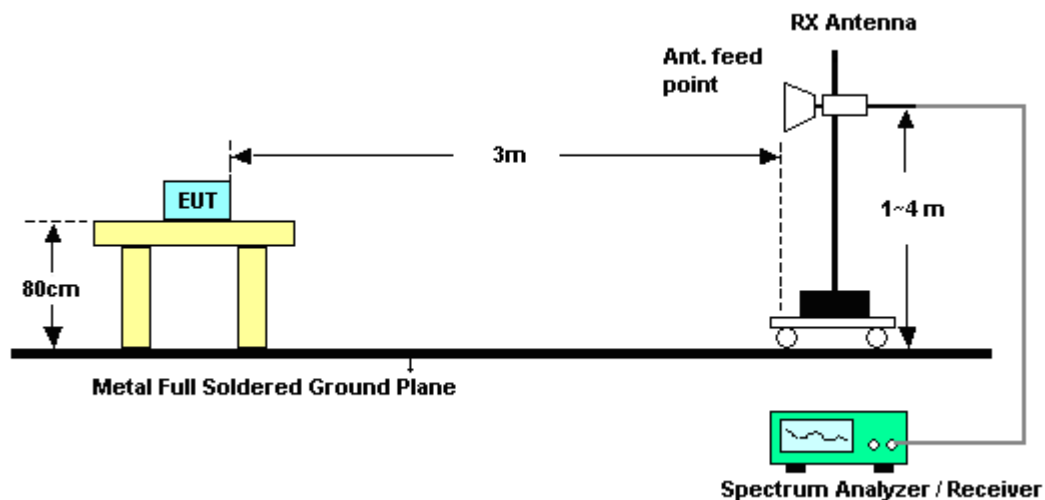
For radiated emissions below 30MHz



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

Test Mode :	802.11b	Temperature :	22~23°C
Test Band :	Low	Relative Humidity :	40~41%
Test Channel :	01	Test Engineer :	Jun Liu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2363.1	47.4	-26.6	74	44.27	32.81	3.57	33.25	155	215	Peak
2389.83	34.69	-19.31	54	31.5	32.86	3.59	33.26	155	215	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2372.46	48.58	-25.42	74	45.43	32.83	3.58	33.26	120	168	Peak
2389.74	34.3	-19.7	54	31.11	32.86	3.59	33.26	120	168	Average

Test Mode :	802.11b	Temperature :	22~23°C
Test Band :	High	Relative Humidity :	40~41%
Test Channel :	11	Test Engineer :	Jun Liu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.8	47.94	-26.06	74	44.57	33.01	3.65	33.29	182	58	Peak
2484.73	34.1	-19.9	54	30.73	33.01	3.65	33.29	182	58	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.71	48.51	-25.49	74	45.14	33.01	3.65	33.29	100	323	Peak
2486.2	33.69	-20.31	54	30.32	33.01	3.65	33.29	100	323	Average



Test Mode :	802.11g	Temperature :	22~23°C
Test Band :	Low	Relative Humidity :	40~41%
Test Channel :	01	Test Engineer :	Jun Liu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.74	55.09	-18.91	74	51.9	32.86	3.59	33.26	200	213	Peak
2389.83	38.89	-15.11	54	35.7	32.86	3.59	33.26	200	213	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.38	51.9	-22.1	74	48.71	32.86	3.59	33.26	170	185	Peak
2389.83	36.34	-17.66	54	33.15	32.86	3.59	33.26	170	185	Average

Test Mode :	802.11g	Temperature :	22~23°C
Test Band :	High	Relative Humidity :	40~41%
Test Channel :	11	Test Engineer :	Jun Liu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.04	60.56	-13.44	74	57.19	33.01	3.65	33.29	153	232	Peak
2483.5	40.92	-13.08	54	37.55	33.01	3.65	33.29	153	232	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.71	55.3	-18.7	74	51.93	33.01	3.65	33.29	104	133	Peak
2483.5	38.51	-15.49	54	35.14	33.01	3.65	33.29	104	133	Average



Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Band :	Low	Relative Humidity :	40~41%
Test Channel :	01	Test Engineer :	Jun Liu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.92	57.95	-16.05	74	54.76	32.86	3.59	33.26	145	221	Peak
2389.92	38.59	-15.41	54	35.4	32.86	3.59	33.26	142	221	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.65	52.54	-21.46	74	49.35	32.86	3.59	33.26	149	202	Peak
2389.83	36.2	-17.8	54	33.01	32.86	3.59	33.26	149	202	Average

Test Mode :	802.11n HT20	Temperature :	22~23°C
Test Band :	High	Relative Humidity :	40~41%
Test Channel :	11	Test Engineer :	Jun Liu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.89	57.43	-16.57	74	54.06	33.01	3.65	33.29	100	298	Peak
2483.77	38.87	-15.13	54	35.5	33.01	3.65	33.29	100	298	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	53.94	-20.06	74	50.57	33.01	3.65	33.29	130	134	Peak
2483.5	36.45	-17.55	54	33.08	33.01	3.65	33.29	130	134	Average



Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Band :	Low	Relative Humidity :	40~41%
Test Channel :	03	Test Engineer :	Jun Liu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.03	57.42	-16.58	74	54.23	32.86	3.59	33.26	100	216	Peak
2388.84	40.19	-13.81	54	37	32.86	3.59	33.26	100	216	Average
2492.14	47.31	-26.69	74	43.9	33.05	3.66	33.3	100	155	Peak
2497.24	34.52	-19.48	54	31.11	33.05	3.66	33.3	100	155	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.02	53.81	-20.19	74	50.62	32.86	3.59	33.26	100	194	Peak
2389.47	38.28	-15.72	54	35.09	32.86	3.59	33.26	100	194	Average
2483.74	47.06	-26.94	74	43.69	33.01	3.65	33.29	100	0	Peak
2497.45	34.55	-19.45	54	31.14	33.05	3.66	33.3	100	0	Average



Test Mode :	802.11n HT40	Temperature :	22~23°C
Test Band :	High	Relative Humidity :	40~41%
Test Channel :	09	Test Engineer :	Jun Liu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2375.61	48.09	-25.91	74	44.94	32.83	3.58	33.26	100	212	Peak
2386.68	35.14	-18.86	54	31.95	32.86	3.59	33.26	100	212	Average
2484.34	57.29	-16.71	74	53.92	33.01	3.65	33.29	100	231	Peak
2483.5	41.28	-12.72	54	37.91	33.01	3.65	33.29	100	231	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.11	47.73	-26.27	74	44.54	32.86	3.59	33.26	200	187	Peak
2388.84	35	-19	54	31.81	32.86	3.59	33.26	200	187	Average
2483.53	51.8	-22.2	74	48.43	33.01	3.65	33.29	132	139	Peak
2483.56	37.1	-16.9	54	33.73	33.01	3.65	33.29	132	139	Average

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

Note: Pre-scanned all test modes and only choose the worst case mode recorded in the test report for radiated spurious emission below 1GHz.

Test Mode :	802.11b	Temperature :	22~23°C
Test Channel :	01	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2412	94.2	-	-	90.97	32.89	3.61	33.27	104	325	Peak
2412	89.89	-	-	86.66	32.89	3.61	33.27	104	325	Average
4824	47.08	-26.92	74	40.46	35.17	5.25	33.8	162	221	Peak

Test Mode :	802.11b	Temperature :	22~23°C
Test Channel :	01	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2412	91.51	-	-	88.28	32.89	3.61	33.27	118	197	Peak
2412	86.91	-	-	83.68	32.89	3.61	33.27	118	197	Average
4824	47.8	-26.2	74	41.18	35.17	5.25	33.8	165	284	Peak

Test Mode :	802.11b	Temperature :	22~23°C
Test Channel :	06	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2437	92.08	-	-	88.78	32.95	3.63	33.28	158	303	Peak
2437	87.46	-	-	84.16	32.95	3.63	33.28	158	303	Average
4874	46.77	-27.23	74	40.11	35.18	5.28	33.8	100	162	Peak
7312	48.09	-25.91	74	39.41	36.2	6.61	34.13	162	85	Peak

Test Mode :	802.11b	Temperature :	22~23°C
Test Channel :	06	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2437	87.98	-	-	84.68	32.95	3.63	33.28	117	178	Peak
2437	83.7	-	-	80.4	32.95	3.63	33.28	117	178	Average
4874	47.68	-26.32	74	41.02	35.18	5.28	33.8	185	226	Peak
7312	48.6	-25.4	74	39.92	36.2	6.61	34.13	144	120	Peak

Test Mode :	802.11b	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	95.47	-	-	92.14	32.98	3.64	33.29	100	229	Peak
2462	90.92	-	-	87.59	32.98	3.64	33.29	100	229	Average
4924	48.28	-25.72	74	41.58	35.19	5.31	33.8	100	20	Peak
7386	49.78	-24.22	74	41	36.24	6.7	34.16	110	174	Peak

Test Mode :	802.11b	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	90.67	-	-	87.34	32.98	3.64	33.29	132	131	Peak
2462	86.11	-	-	82.78	32.98	3.64	33.29	132	131	Average
4924	48.48	-25.52	74	41.78	35.19	5.31	33.8	119	203	Peak
7386	49.61	-24.39	74	40.83	36.24	6.7	34.16	100	184	Peak

Test Mode :	802.11g	Temperature :	22~23°C
Test Channel :	01	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2412	97.83	-	-	94.6	32.89	3.61	33.27	164	222	Peak
2412	87.05	-	-	83.82	32.89	3.61	33.27	164	222	Average
4824	47.38	-26.62	74	40.76	35.17	5.25	33.8	100	122	Peak

Test Mode :	802.11g	Temperature :	22~23°C
Test Channel :	01	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2412	93.27	-	-	90.04	32.89	3.61	33.27	116	182	Peak
2412	81.83	-	-	78.6	32.89	3.61	33.27	116	182	Average
4824	47.14	-26.86	74	40.52	35.17	5.25	33.8	132	221	Peak

Test Mode :	802.11g	Temperature :	22~23°C
Test Channel :	06	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2437	93.27	-	-	89.97	32.95	3.63	33.28	102	58	Peak
2437	82.28	-	-	78.98	32.95	3.63	33.28	102	58	Average
4874	47.54	-26.46	74	40.88	35.18	5.28	33.8	100	10	Peak
7312	48.62	-25.38	74	39.94	36.2	6.61	34.13	162	228	Peak

Test Mode :	802.11g	Temperature :	22~23°C
Test Channel :	06	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2437	90.78	-	-	87.48	32.95	3.63	33.28	100	195	Peak
2437	79.64	-	-	76.34	32.95	3.63	33.28	100	195	Average
4874	46.9	-27.1	74	40.24	35.18	5.28	33.8	166	228	Peak
7312	48.31	-25.69	74	39.63	36.2	6.61	34.13	163	295	Peak

Test Mode :	802.11g	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	97.14	-	-	93.81	32.98	3.64	33.29	100	229	Peak
2462	86.08	-	-	82.75	32.98	3.64	33.29	100	229	Average
4924	48.36	-25.64	74	41.66	35.19	5.31	33.8	100	184	Peak
7386	49.01	-24.99	74	40.23	36.24	6.7	34.16	162	51	Peak

Test Mode :	802.11g	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	90.08	-	-	86.75	32.98	3.64	33.29	100	321	Peak
2462	78.12	-	-	74.79	32.98	3.64	33.29	100	321	Average
4924	47.56	-26.44	74	40.86	35.19	5.31	33.8	100	95	Peak
7386	49.49	-24.51	74	40.71	36.24	6.7	34.16	122	185	Peak

Test Mode :	2.4GHz 802.11n HT20	Temperature :	22~23°C
Test Channel :	01	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2412	93.77	-	-	90.54	32.89	3.61	33.27	100	326	Peak
2412	83.1	-	-	79.87	32.89	3.61	33.27	100	326	Average
4824	48.19	-25.81	74	41.57	35.17	5.25	33.8	100	210	Peak

Test Mode :	2.4GHz 802.11n HT20	Temperature :	22~23°C
Test Channel :	01	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 2412 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2412	92.01	-	-	88.78	32.89	3.61	33.27	121	202	Peak
2412	81.09	-	-	77.86	32.89	3.61	33.27	121	202	Average
4824	47.14	-26.86	74	40.52	35.17	5.25	33.8	100	102	Peak

Test Mode :	2.4GHz 802.11n HT20	Temperature :	22~23°C
Test Channel :	06	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2437	94.1	-	-	90.8	32.95	3.63	33.28	105	224	Peak
2437	82.77	-	-	79.47	32.95	3.63	33.28	105	224	Average
4874	47.53	-26.47	74	40.87	35.18	5.28	33.8	100	155	Peak
7312	49.15	-24.85	74	40.47	36.2	6.61	34.13	132	226	Peak

Test Mode :	2.4GHz 802.11n HT20	Temperature :	22~23°C
Test Channel :	06	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2437	88.71	-	-	85.41	32.95	3.63	33.28	117	177	Peak
2437	77.41	-	-	74.11	32.95	3.63	33.28	117	177	Average
4874	47.4	-26.6	74	40.74	35.18	5.28	33.8	162	321	Peak
7311	49.65	-24.35	74	40.97	36.2	6.61	34.13	184	221	Peak

Test Mode :	2.4GHz 802.11n HT20	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	95.63	-	-	92.3	32.98	3.64	33.29	100	228	Peak
2462	84.17	-	-	80.84	32.98	3.64	33.29	100	228	Average
4924	47.29	-26.71	74	40.59	35.19	5.31	33.8	165	221	Peak
7386	49.83	-24.17	74	41.05	36.24	6.7	34.16	187	221	Peak

Test Mode :	2.4GHz 802.11n HT20	Temperature :	22~23°C
Test Channel :	11	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 2462 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2462	87.98	-	-	84.65	32.98	3.64	33.29	100	322	Peak
2462	76.7	-	-	73.37	32.98	3.64	33.29	100	322	Average
4924	47.7	-26.3	74	41	35.19	5.31	33.8	122	112	Peak
7386	49.7	-24.3	74	40.92	36.24	6.7	34.16	174	41	Peak

Test Mode :	2.4GHz 802.11n HT40	Temperature :	22~23°C
Test Channel :	03	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 2422 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2422	89.98	-	-	86.72	32.92	3.62	33.28	100	315	Peak
2422	78.75	-	-	75.49	32.92	3.62	33.28	100	315	Average
4844	47.44	-26.56	74	40.8	35.18	5.26	33.8	100	145	Peak
7266	50.1	-23.9	74	41.46	36.19	6.56	34.11	100	154	Peak

Test Mode :	2.4GHz 802.11n HT40	Temperature :	22~23°C
Test Channel :	03	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 2422 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2422	88.37	-	-	85.11	32.92	3.62	33.28	116	191	Peak
2422	77.37	-	-	74.11	32.92	3.62	33.28	116	191	Average
4844	47.08	-26.92	74	40.44	35.18	5.26	33.8	165	44	Peak
7266	49.64	-24.36	74	41	36.19	6.56	34.11	154	221	Peak

Test Mode :	2.4GHz 802.11n HT40	Temperature :	22~23°C
Test Channel :	06	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2437	91.58	-	-	88.28	32.95	3.63	33.28	120	213	Peak
2437	79.75	-	-	76.45	32.95	3.63	33.28	120	213	Average
4874	47.45	-26.55	74	40.79	35.18	5.28	33.8	100	200	Peak
7312	49.68	-24.32	74	41	36.2	6.61	34.13	200	154	Peak

Test Mode :	2.4GHz 802.11n HT40	Temperature :	22~23°C
Test Channel :	06	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 2437 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2437	85.91	-	-	82.61	32.95	3.63	33.28	112	180	Peak
2437	76.1	-	-	72.8	32.95	3.63	33.28	112	180	Average
4874	49.04	-24.96	74	42.38	35.18	5.28	33.8	120	148	Peak
7312	48.66	-25.34	74	39.98	36.2	6.61	34.13	200	165	Peak

Test Mode :	2.4GHz 802.11n HT40	Temperature :	22~23°C
Test Channel :	09	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 2452 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
182.29	27.82	-15.68	43.5	51.74	8.42	1.23	33.57	-	-	Peak
219.15	36.32	-9.68	46	58.45	10.03	1.36	33.52	-	-	Peak
237.58	38.87	-7.13	46	59.5	11.4	1.43	33.46	120	0	Peak
336.52	32.66	-13.34	46	50.16	14.17	1.69	33.36	-	-	Peak
396.66	31.07	-14.93	46	46.6	15.94	1.84	33.31	-	-	Peak
935.98	34.95	-11.05	46	43.92	20.67	2.8	32.44	-	-	Peak
2452	91.19	-	-	87.89	32.95	3.63	33.28	100	226	Peak
2452	80.84	-	-	77.54	32.95	3.63	33.28	100	226	Average
4904	46.47	-27.53	74	39.78	35.19	5.3	33.8	115	21	Peak
7356	49.94	-24.06	74	41.21	36.22	6.66	34.15	102	332	Peak

Test Mode :	2.4GHz 802.11n HT40	Temperature :	22~23°C
Test Channel :	09	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 2452 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
40.67	29.85	-10.15	40	51.24	11.64	0.61	33.64	120	115	Peak
237.58	29.22	-16.78	46	49.85	11.4	1.43	33.46	-	-	Peak
352.04	27.82	-18.18	46	44.94	14.54	1.7	33.36	-	-	Peak
548.95	27.2	-18.8	46	39.65	18.48	2.09	33.02	-	-	Peak
603.27	22.71	-23.29	46	34.8	18.61	2.25	32.95	-	-	Peak
957.32	29.7	-16.3	46	38.55	20.77	2.82	32.44	-	-	Peak
2452	83.3	-	-	80	32.95	3.63	33.28	100	324	Peak
2452	73.15	-	-	69.85	32.95	3.63	33.28	100	324	Average
4904	46.46	-27.54	74	39.77	35.19	5.3	33.8	100	154	Peak
7356	49.87	-24.13	74	41.14	36.22	6.66	34.15	154	112	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	149	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 5745 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5745	105.43	-	-	97.94	35.52	5.67	33.7	120	280	Peak
5745	94.79	-	-	87.3	35.52	5.67	33.7	120	280	Average
11490	35.69	-38.31	74	56.38	4.47	8.84	34	200	0	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	149	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 5745 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5745	106.87	-	-	99.38	35.52	5.67	33.7	103	20	Peak
5745	96.94	-	-	89.45	35.52	5.67	33.7	103	20	Average
11490	36.54	-37.46	74	57.23	4.47	8.84	34	100	0	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	103.02	-	-	95.49	35.53	5.7	33.7	102	28	Peak
5785	91.21	-	-	83.68	35.53	5.7	33.7	102	28	Average
11571	36.12	-37.88	74	56.96	4.38	8.8	34.02	140	210	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	106.6	-	-	99.07	35.53	5.7	33.7	102	21	Peak
5785	95.36	-	-	87.83	35.53	5.7	33.7	102	21	Average
11571	35.61	-38.39	74	56.45	4.38	8.8	34.02	200	0	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	161	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 5805 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5805	103.8	-	-	96.21	35.55	5.74	33.7	108	276	Peak
5805	92.22	-	-	84.63	35.55	5.74	33.7	108	276	Average
11610	36.98	-37.02	74	57.97	4.29	8.76	34.04	200	65	Peak

Test Mode :	802.11a	Temperature :	22~23°C
Test Channel :	161	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 5805 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5805	106.53	-	-	98.94	35.55	5.74	33.7	102	21	Peak
5805	95.59	-	-	88	35.55	5.74	33.7	102	21	Average
11610	36.45	-37.55	74	57.44	4.29	8.76	34.04	130	0	Peak

Test Mode :	5GHz 802.11n HT20	Temperature :	22~23°C
Test Channel :	149	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 5745 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5745	102.41	-	-	94.92	35.52	5.67	33.7	129	275	Peak
5745	91.17	-	-	83.68	35.52	5.67	33.7	129	275	Average
11490	35.63	-38.37	74	56.32	4.47	8.84	34	120	100	Peak

Test Mode :	5GHz 802.11n HT20	Temperature :	22~23°C
Test Channel :	149	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 5745 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5745	101.76	-	-	94.27	35.52	5.67	33.7	100	229	Peak
5745	89.85	-	-	82.36	35.52	5.67	33.7	100	229	Average
11490	36.2	-37.8	74	56.89	4.47	8.84	34	200	301	Peak

Test Mode :	5GHz 802.11n HT20	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	101.38	-	-	93.85	35.53	5.7	33.7	148	263	Peak
5785	89.46	-	-	81.93	35.53	5.7	33.7	148	263	Average
11571	36.06	-37.94	74	56.9	4.38	8.8	34.02	100	302	Peak

Test Mode :	5GHz 802.11n HT20	Temperature :	22~23°C
Test Channel :	157	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 5785 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	102.76	-	-	95.23	35.53	5.7	33.7	101	323	Peak
5785	91.8	-	-	84.27	35.53	5.7	33.7	101	323	Average
11571	35.61	-38.39	74	56.45	4.38	8.8	34.02	100	230	Peak



Test Mode :	5GHz 802.11n HT20	Temperature :	22~23°C
Test Channel :	161	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 5805 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5805	100.84	-	-	93.25	35.55	5.74	33.7	106	30	Peak
5805	89.72	-	-	82.13	35.55	5.74	33.7	106	30	Average
11610	36.35	-37.65	74	57.34	4.29	8.76	34.04	100	0	Peak

Test Mode :	5GHz 802.11n HT20	Temperature :	22~23°C
Test Channel :	161	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 5805 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5805	104.03	-	-	96.44	35.55	5.74	33.7	100	20	Peak
5805	92.27	-	-	84.68	35.55	5.74	33.7	100	20	Average
11610	36.41	-37.59	74	57.4	4.29	8.76	34.04	200	0	Peak

Test Mode :	5GHz 802.11n HT40	Temperature :	22~23°C
Test Channel :	151	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 5755 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5755	98.54	-	-	91.03	35.53	5.68	33.7	155	253	Peak
5755	87.92	-	-	80.41	35.53	5.68	33.7	155	253	Average
11511	34.8	-39.2	74	55.41	4.53	8.86	34	100	201	Peak

Test Mode :	5GHz 802.11n HT40	Temperature :	22~23°C
Test Channel :	151	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 5755 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5755	101.36	-	-	93.85	35.53	5.68	33.7	102	19	Peak
5755	90.32	-	-	82.81	35.53	5.68	33.7	102	19	Average
11511	34.97	-39.03	74	55.58	4.53	8.86	34	100	201	Peak

Test Mode :	5GHz 802.11n HT40	Temperature :	22~23°C
Test Channel :	159	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	1. 5795 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5795	98.29	-	-	90.73	35.54	5.72	33.7	118	279	Peak
5795	87.78	-	-	80.22	35.54	5.72	33.7	118	279	Average
11589	36.16	-37.84	74	57.07	4.34	8.78	34.03	100	300	Peak

Test Mode :	5GHz 802.11n HT40	Temperature :	22~23°C
Test Channel :	159	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	1. 5795 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5795	100.72	-	-	93.16	35.54	5.72	33.7	103	27	Peak
5795	89.45	-	-	81.89	35.54	5.72	33.7	103	27	Average
11589	35.88	-38.12	74	56.79	4.34	8.78	34.03	200	102	Peak

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 (dB μ V)	
	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.

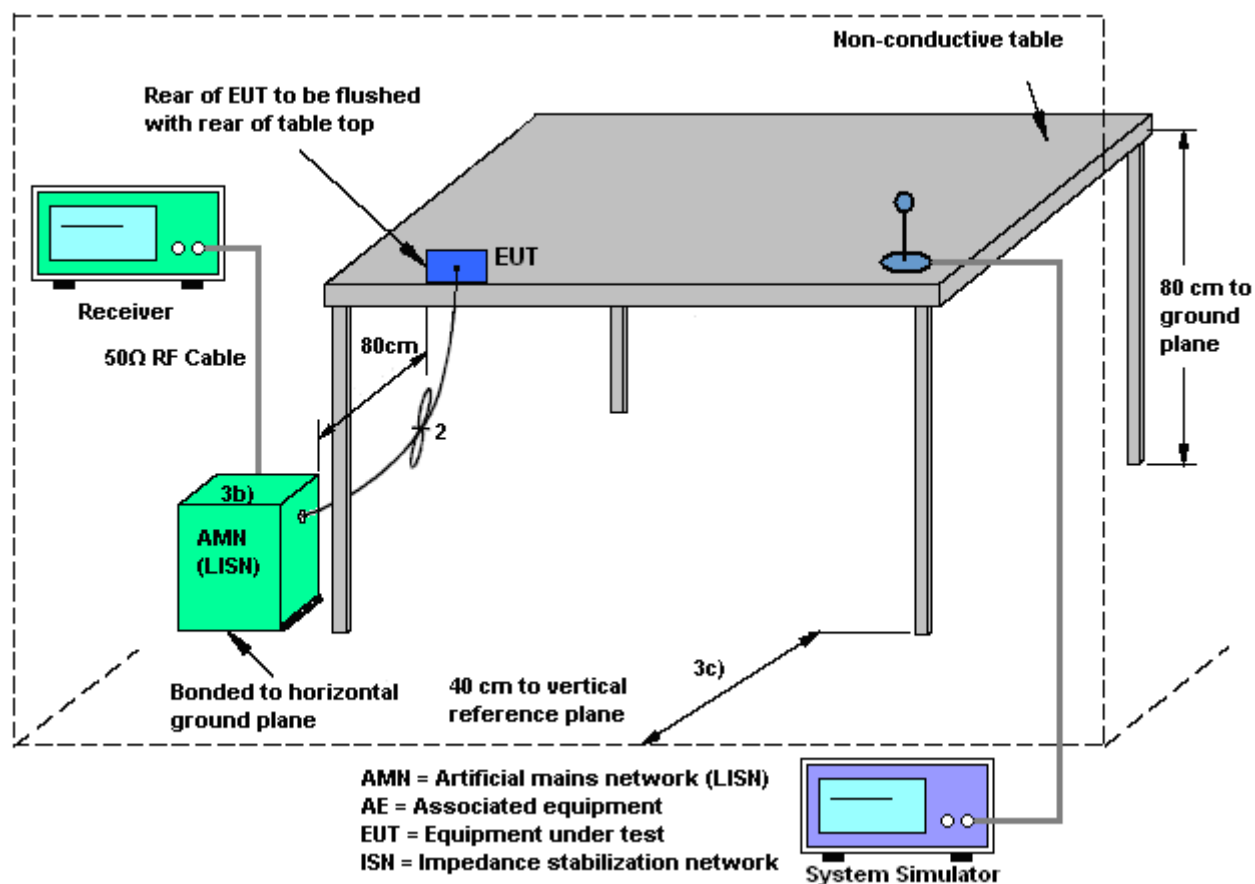
3.6.2 Measuring Instruments

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

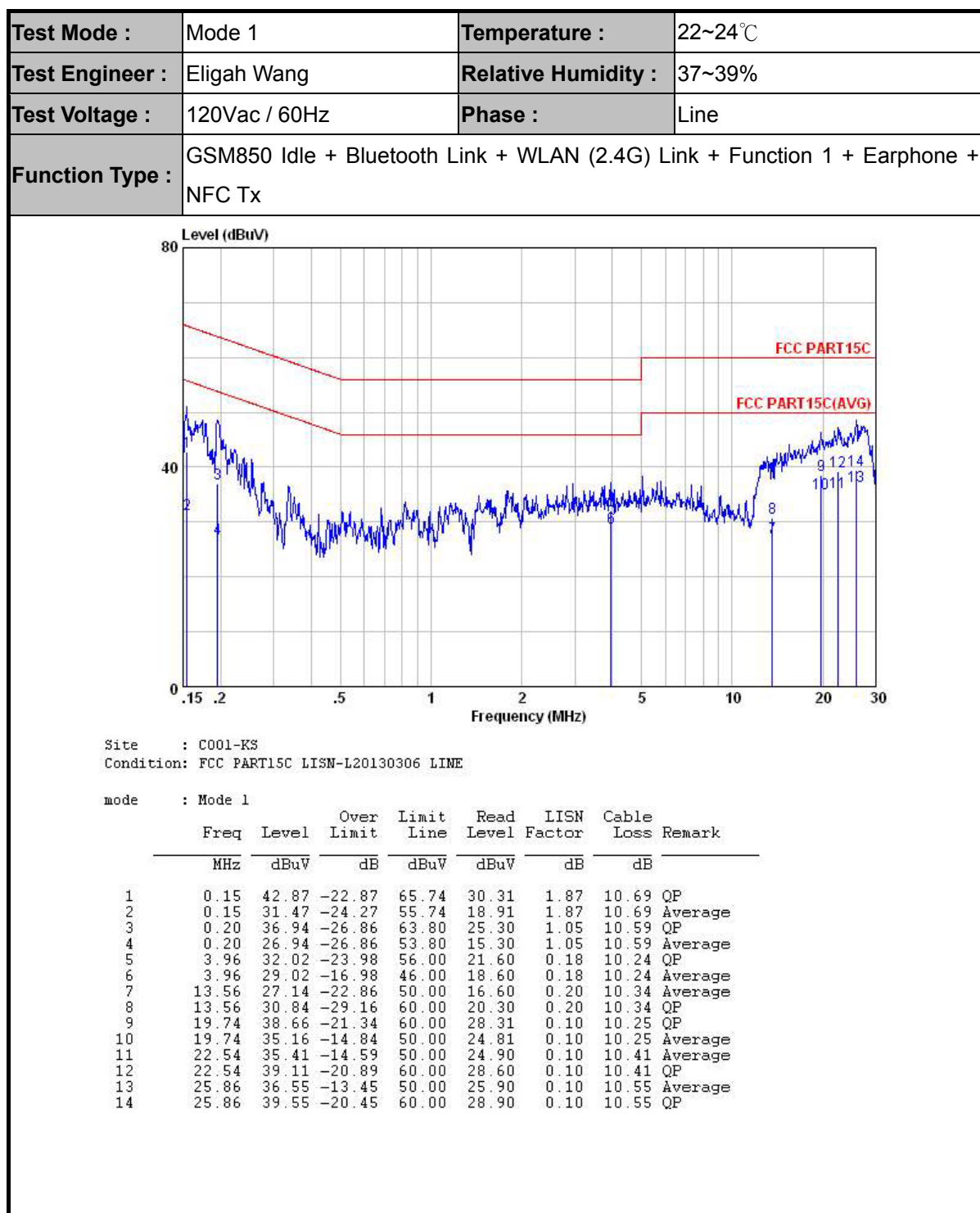
3.6.3 Test Procedures

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 with Maximum Hold Mode.

3.6.4 Test Setup

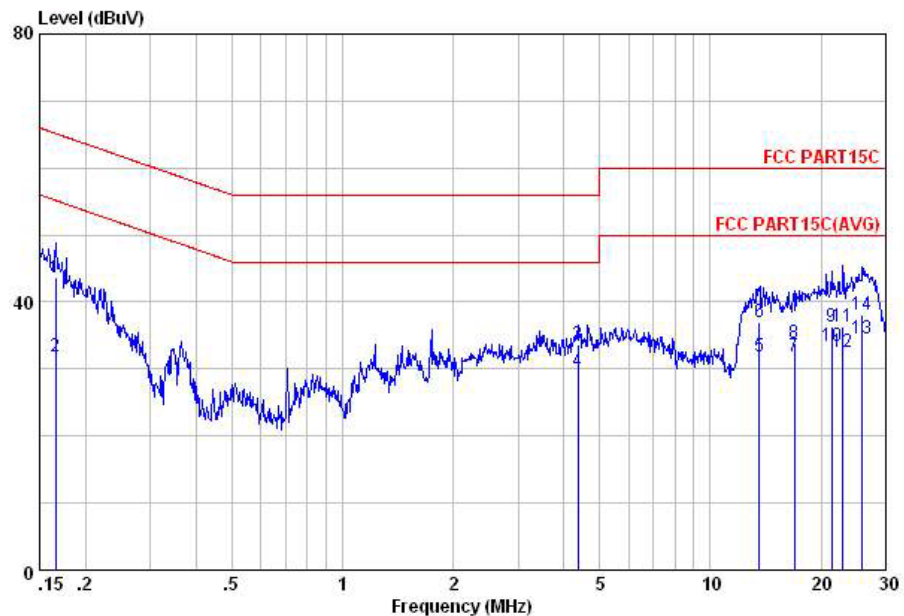


3.6.5 Test Result of AC Conducted Emission





Test Mode :	Mode 1	Temperature :	22~24℃
Test Engineer :	Eligah Wang	Relative Humidity :	37~39%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (2.4G) Link + Function 1 + Earphone + NFC Tx		



Site : C001-KS
Condition: FCC PART15C LISN-N20130306 NEUTRAL

mode : Mode 1

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.17	43.58	-21.58	65.16	31.29	1.63	10.66	QP
2	0.17	31.88	-23.28	55.16	19.59	1.63	10.66	Average
3	4.36	33.54	-22.46	56.00	23.10	0.19	10.25	QP
4	4.36	29.74	-16.26	46.00	19.30	0.19	10.25	Average
5	13.56	31.93	-18.07	50.00	21.31	0.28	10.34	Average
6	13.56	36.93	-23.07	60.00	26.31	0.28	10.34	QP
7	16.93	31.87	-18.13	50.00	21.30	0.26	10.31	Average
8	16.93	33.87	-26.13	60.00	23.30	0.26	10.31	QP
9	21.37	36.43	-23.57	60.00	25.90	0.20	10.33	QP
10	21.37	33.43	-16.57	50.00	22.90	0.20	10.33	Average
11	22.90	36.24	-23.76	60.00	25.60	0.20	10.44	QP
12	22.90	32.54	-17.46	50.00	21.90	0.20	10.44	Average
13	25.86	34.63	-15.37	50.00	23.89	0.19	10.55	Average
14	25.86	38.13	-21.87	60.00	27.39	0.19	10.55	QP

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	Dec. 28, 2013	Apr. 23, 2014~ Apr. 26, 2014	Dec. 27, 2014	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	30MHz~40GHz	Feb. 27, 2014	Apr. 23, 2014~ Apr. 26, 2014	Feb. 26, 2015	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Feb. 27, 2014	Apr. 23, 2014~ Apr. 26, 2014	Feb. 26, 2015	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 05, 2013	May 30, 2014	Nov. 04, 2014	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP30	101399	9kHz~30GHz	May 04, 2014	May 30, 2014	May 03, 2015	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 09, 2013	May 30, 2014	Oct. 08, 2014	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Jan. 08, 2014	May 30, 2014	Jan. 07, 2015	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	00075959	1GHz~18GHz	Jan. 08, 2014	May 30, 2014	Jan. 07, 2015	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA1702 49	15GHz~40GHz	Mar. 10, 2014	May 30, 2014	Mar. 09, 2015	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 18, 2013	May 30, 2014	Nov. 17, 2014	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161073	1MHz~1GHz	May 04, 2014	May 30, 2014	May 03, 2015	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A023 71	1GHz~26.5GHz	Dec.10, 2013	May 30, 2014	Dec. 09, 2014	Radiation (03CH01-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	May 30, 2014	NCR	Radiation (03CH01-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	May 30, 2014	NCR	Radiation (03CH01-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	May 04, 2014	Jun. 11, 2014	May 03, 2015	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Dec. 10, 2013	Jun. 11, 2014	Dec. 09, 2014	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Dec. 10, 2013	Jun. 11, 2014	Dec. 09, 2014	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000 0811	AC 0V~300V, 45Hz~1000Hz	Dec. 10, 2013	Jun. 11, 2014	Dec. 09, 2014	Conduction (CO01-KS)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.26
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.54
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