FCC RF Test Report

APPLICANT	:	Motorola Mobility, LLC
EQUIPMENT	:	Mobile Cellular Phone
BRAND NAME	:	Motorola
MODEL NAME	:	4651
FCC ID	:	IHDT56UA2
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System

This is a variant report which is only valid together with the original test report. The product was received on May 21, 2015. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

SPORTON INTERNATIONAL INC.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR552083-02C	Rev. 01	The Bluetooth and WLAN circuitry of this variant model (4651) is identical to that of the parent product (4036), based on the product equality declaration by the manufacturer.	Aug. 04, 2015

1 General Description

1.1 Applicant

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

1.2 Manufacturer

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

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	4651
FCC ID	IHDT56UA2
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA/LTE/NFC 2.4GHz WLAN 11b/g/n HT20 2.4GHz WLAN 11ac VHT20 5GHz WLAN 11a/n HT20/HT40 5GHz WLAN 11ac VHT20/VHT40/VHT80 Bluetooth v3.0 EDR Bluetooth v4.1 - LE
HW Version	P2
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>2412 MHz ~ 2462 MHz</td></tr>
<tr><td>Antenna Type /Gain</td><td>Antenna 1 : IFA Antenna
Antenna 2 : IFA Antenna
(The antenna peak gain of EUT is less than 6 dBi)</td></tr>
<tr><td>Type of Modulation</td><td>802.11b : DSSS (DBPSK / DQPSK / CCK)
802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)</td></tr>
<tr><td>Antenna Function for Transmitter</td><td>
<table>
<tr><td></td><td>Ant. 1</td><td>Ant. 2</td></tr>
<tr><td>802.11 b/g SISO</td><td>V</td><td>V</td></tr>
<tr><td>802.11 b/g MIMO</td><td>V</td><td>V</td></tr>
<tr><td>802.11 n/ac SISO</td><td>V</td><td>V</td></tr>
<tr><td>802.11 n/ac 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.

Appendix A. Original Report

Please refer to Sporton report number FR552083C as below.

FCC RF Test Report

APPLICANT	:	Motorola Mobility, LLC
EQUIPMENT	:	Mobile Cellular Phone
BRAND NAME	:	Motorola
MODEL NAME	:	4036
FCC ID	:	IHDT56UA1
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System

The product was received on May 20, 2015 and testing was completed on Jun. 23, 2015. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory 1190

SPORTON INTERNATIONAL INC.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR552083C	Rev. 01	Initial issue of report	Jul. 13, 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 0.50 dB at 2483.600 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 7.50 dB at 2.006 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

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

1.2 Manufacturer

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

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	4036
FCC ID	IHDT56UA1
IMEI Code	990005740025664 (for AC Conducted Emission) 990005740064614 (for Radiated Spurious Emission)
EUT supports Radios application	CDMA/EV-DO/GSM/EGPRS/WCDMA/HSPA/LTE/NFC 2.4GHz WLAN 11b/g/n HT20 WLAN 11ac VHT20 5GHz WLAN 11a/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth v3.0 EDR Bluetooth v4.1 - LE
HW Version	P2
EUT Stage	Identical Prototype

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

Accessory List		
AC Adapter	Brand Name :	Motorola
	Model Name :	SPN5886A
Battery	Brand Name :	Motorola
	Model Name :	FB55
Earphone	Brand Name :	Motorola
	Model Name :	89719N

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>2412 MHz ~ 2462 MHz</td></tr>
<tr><td>Maximum Output Power to antenna</td><td><SISO Ant. 1>
802.11b : 20.74 dBm (0.1186 W)
802.11g : 22.45 dBm (0.1758 W)
802.11n HT20 : 22.47 dBm (0.1766 W)
802.11ac VHT20 : 22.58 dBm (0.1811 W)
<SISO Ant. 2>
802.11b : 21.00 dBm (0.1259 W)
802.11g : 22.66 dBm (0.1845 W)
802.11n HT20 : 22.77 dBm (0.1892 W)
802.11ac VHT20 : 23.11 dBm (0.2046 W)
<MIMO Ant. 1+2>
802.11b : 23.75 dBm (0.2371 W)
802.11g : 25.44 dBm (0.3499 W)
802.11n HT20 : 25.35 dBm (0.3428 W)
802.11ac VHT20 : 25.27 dBm (0.3365 W)</td></tr>
<tr><td>Antenna Type</td><td><Ant 1>: PIFA Antenna type
<Ant 2>: PIFA Antenna type
(The antenna peak gain of EUT is less than 6 dBi)</td></tr>
<tr><td>Type of Modulation</td><td>802.11b : DSSS (DBPSK / DQPSK / CCK)
802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)</td></tr>
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<tr><td>802.11 n/ac 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

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

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	**Sporton Site No.**		
	TH05-HY	CO05-HY	03CH07-HY

Note: The test site complies with ANSI C63.4 2009 requirement.

1.7 Applicable Standards

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

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r03
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- FCC KDB 644545 D03 Guidance for IEEE 802 11ac New Rules v01
- KDB 648474 D03 Handset Wireless Chargers Battery Covers v01r02
- ANSI C63.10-2009

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. FCC permits the use of the 1.5 meter table as an alternative in C63.10-2013 through inquiry tracking number 961829.
3. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

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

<SISO Ant. 1>

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412MHz	**20.74**	20.65	20.68	20.71
CH 06	2437MHz	20.18	20.11	20.12	20.15
CH 11	2462MHz	20.62	20.57	20.53	20.57

Channel	Frequency	2.4GHz 802.11b Average Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412MHz	18.32	18.26	18.30	18.31
CH 06	2437MHz	17.92	17.88	17.89	17.90
CH 11	2462MHz	18.21	18.18	18.19	18.18

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		OFDM Data Rate							
		6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 01	2412MHz	**22.45**	22.14	22.17	22.36	22.39	22.21	22.42	22.21
CH 06	2437MHz	22.15	21.92	22.01	21.82	22.13	22.03	22.08	21.97
CH 11	2462MHz	21.99	21.97	21.97	21.98	21.98	21.97	21.96	21.95

Channel	Frequency	2.4GHz 802.11g Average Power (dBm)							
		OFDM Data Rate							
		6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 01	2412MHz	16.84	16.76	16.80	16.76	16.81	16.82	16.83	16.78
CH 06	2437MHz	16.59	16.46	16.54	16.56	16.56	16.46	16.54	16.54
CH 11	2462MHz	15.92	15.87	15.86	15.85	16.36	16.33	16.32	15.97

Channel	Frequency	2.4GHz 802.11n HT20 RF Power (dBm)							
		OFDM Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412MHz	**22.47**	22.32	22.23	22.04	21.97	22.24	22.12	22.01
CH 06	2437MHz	22.37	22.25	22.21	22.02	21.84	22.12	22.06	22.07
CH 11	2462MHz	21.94	21.83	21.66	21.93	21.93	21.93	21.92	21.87

Channel	Frequency	2.4GHz 802.11n HT20 Average Power (dBm)							
		OFDM Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412MHz	16.72	16.54	16.69	15.56	15.57	15.45	15.53	15.50
CH 06	2437MHz	16.55	16.44	16.49	15.11	15.12	15.10	15.14	15.13
CH 11	2462MHz	15.39	15.27	15.31	15.29	15.28	15.29	15.36	14.05

Channel	Frequency	2.4GHz 802.11ac VHT20 RF Power (dBm)								
		OFDM Data Rate								
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
CH 01	2412MHz	22.36	22.25	22.33	21.98	22.25	22.20	21.91	22.03	22.14
CH 06	2437MHz	22.24	22.21	22.14	22.18	22.02	21.91	22.11	21.88	21.91
CH 11	2462MHz	**22.58**	22.50	22.48	22.45	22.24	22.19	22.27	22.31	22.03

Channel	Frequency	2.4GHz 802.11ac VHT20 Average Power (dBm)								
		OFDM Data Rate								
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
CH 01	2412MHz	16.80	16.64	16.52	15.66	15.56	15.53	15.59	15.43	13.59
CH 06	2437MHz	16.46	16.37	16.42	15.14	15.16	15.15	15.21	15.03	13.23
CH 11	2462MHz	15.44	15.41	15.40	15.44	15.35	15.33	15.34	13.33	12.78

<SISO Ant. 2>

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412MHz	**21.00**	20.97	20.91	20.98
CH 06	2437MHz	20.89	20.83	20.74	20.81
CH 11	2462MHz	20.68	20.63	20.66	20.62

Channel	Frequency	2.4GHz 802.11b Average Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412MHz	18.29	18.28	18.28	18.26
CH 06	2437MHz	18.28	18.26	18.21	18.21
CH 11	2462MHz	18.05	17.98	18.02	17.99

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		OFDM Data Rate							
		6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 01	2412MHz	22.63	22.61	22.51	22.46	22.24	22.49	22.36	22.46
CH 06	2437MHz	**22.66**	22.62	22.59	22.49	22.35	22.54	22.59	22.51
CH 11	2462MHz	22.57	22.54	22.55	22.55	22.56	22.56	22.55	22.54

Channel	Frequency	2.4GHz 802.11g Average Power (dBm)							
		OFDM Data Rate							
		6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 01	2412MHz	16.95	16.87	16.79	16.89	16.75	16.93	16.88	16.83
CH 06	2437MHz	16.96	16.95	16.88	16.87	16.84	16.95	16.92	16.85
CH 11	2462MHz	16.22	16.17	16.15	16.14	16.13	16.12	16.10	16.08

Channel	Frequency	2.4GHz 802.11n HT20 RF Power (dBm)							
		OFDM Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412MHz	22.74	22.71	22.63	22.70	22.64	22.58	22.46	22.51
CH 06	2437MHz	**22.77**	22.75	22.72	22.65	22.68	22.58	22.49	22.36
CH 11	2462MHz	22.41	22.39	22.30	22.40	22.40	22.40	22.27	22.37

Channel	Frequency	2.4GHz 802.11n HT20 Average Power (dBm)							
		OFDM Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412MHz	16.71	16.67	16.69	15.53	15.52	15.58	15.50	15.50
CH 06	2437MHz	16.75	16.61	16.72	15.41	15.38	15.41	15.36	15.40
CH 11	2462MHz	15.59	15.51	15.49	15.48	15.48	15.52	15.38	13.64

Channel	Frequency	2.4GHz 802.11ac VHT20 RF Power (dBm)								
		OFDM Data Rate								
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
CH 01	2412MHz	22.93	22.90	22.84	22.79	22.75	22.86	22.71	22.68	22.61
CH 06	2437MHz	**23.11**	22.95	22.85	22.94	22.88	22.74	22.82	22.94	22.90
CH 11	2462MHz	22.34	22.31	22.28	22.33	22.33	22.32	22.32	22.31	22.30

Channel	Frequency	2.4GHz 802.11ac VHT20 Average Power (dBm)								
		OFDM Data Rate								
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
CH 01	2412MHz	16.68	16.63	16.65	15.51	15.41	15.43	15.47	15.44	13.52
CH 06	2437MHz	16.84	16.71	16.78	15.43	15.36	15.47	15.38	15.34	13.47
CH 11	2462MHz	15.51	15.46	15.44	15.45	15.44	15.44	15.45	13.65	13.07

<MIMO Ant. 1+2>

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412MHz	**23.75**	23.69	23.69	23.70
CH 06	2437MHz	23.50	23.38	23.44	23.45
CH 11	2462MHz	23.67	23.59	23.58	23.66

Channel	Frequency	2.4GHz 802.11b Average Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412MHz	21.34	21.26	21.32	21.31
CH 06	2437MHz	21.13	21.00	21.07	21.06
CH 11	2462MHz	21.33	21.20	21.23	21.26

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		OFDM Data Rate							
		6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 01	2412MHz	**25.44**	25.41	25.39	25.23	25.34	25.32	25.38	25.30
CH 06	2437MHz	25.28	25.19	25.22	25.21	25.20	25.17	25.09	25.16
CH 11	2462MHz	25.15	25.13	25.12	25.14	25.14	25.13	25.13	25.12

Channel	Frequency	2.4GHz 802.11g Average Power (dBm)							
		OFDM Data Rate							
		6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 01	2412MHz	19.95	19.82	19.84	19.82	19.88	19.93	19.89	19.89
CH 06	2437MHz	19.78	19.74	19.77	19.74	19.74	19.74	19.74	19.71
CH 11	2462MHz	19.15	19.11	19.09	19.09	19.11	19.27	19.25	19.12

Channel	Frequency	2.4GHz 802.11n HT20 RF Power (dBm)							
		OFDM Data Rate							
		MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 01	2412MHz	**25.35**	25.29	25.29	25.29	25.23	25.30	25.18	25.06
CH 06	2437MHz	25.19	25.15	25.06	24.99	24.97	24.86	24.93	24.98
CH 11	2462MHz	24.61	24.53	24.35	24.54	24.44	24.53	24.48	24.55

Channel	Frequency	2.4GHz 802.11n HT20 Average Power (dBm)							
		OFDM Data Rate							
		MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 01	2412MHz	19.82	19.80	19.75	18.68	18.52	18.57	18.47	18.55
CH 06	2437MHz	19.84	19.79	19.67	18.44	18.32	18.31	18.35	18.30
CH 11	2462MHz	18.61	18.47	18.41	18.65	18.54	18.60	18.54	16.87

Channel	Frequency	2.4GHz 802.11ac VHT20 RF Power (dBm)								
		OFDM Data Rate								
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
CH 01	2412MHz	**25.27**	25.23	25.19	25.20	25.10	24.95	25.00	25.08	25.09
CH 06	2437MHz	25.21	25.19	25.13	25.10	25.05	24.94	25.04	24.97	24.89
CH 11	2462MHz	24.64	24.61	24.55	24.56	24.47	24.45	24.54	24.55	24.51

Channel	Frequency	2.4GHz 802.11ac VHT20 Average Power (dBm)								
		OFDM Data Rate								
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
CH 01	2412MHz	19.82	19.59	19.70	18.52	18.54	18.57	18.57	18.51	16.59
CH 06	2437MHz	19.64	19.48	19.50	18.31	18.29	18.28	18.29	18.24	16.36
CH 11	2462MHz	18.38	18.33	18.37	18.37	18.36	18.35	18.28	16.58	16.30

Note: MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.

2.3 Test Mode

Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates from the power table described in section 2.2.

Single Antenna

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0
802.11ac VHT20	MCS0

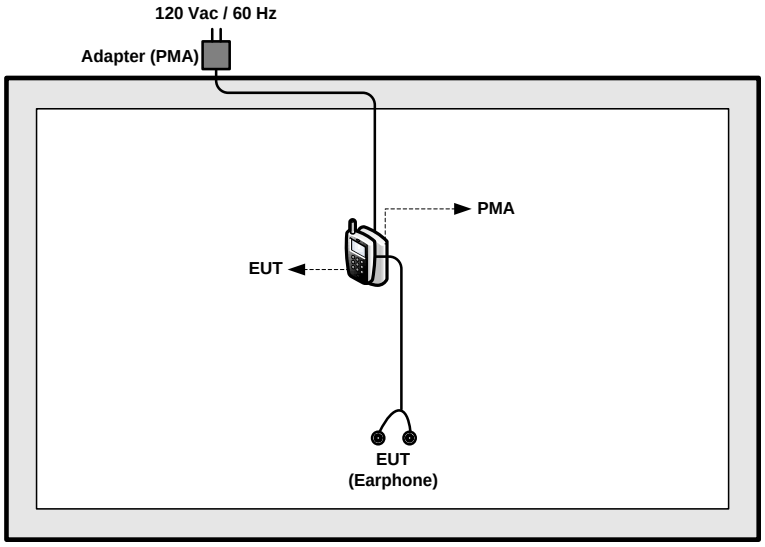
MIMO Antenna

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS8
802.11ac VHT20	MCS0

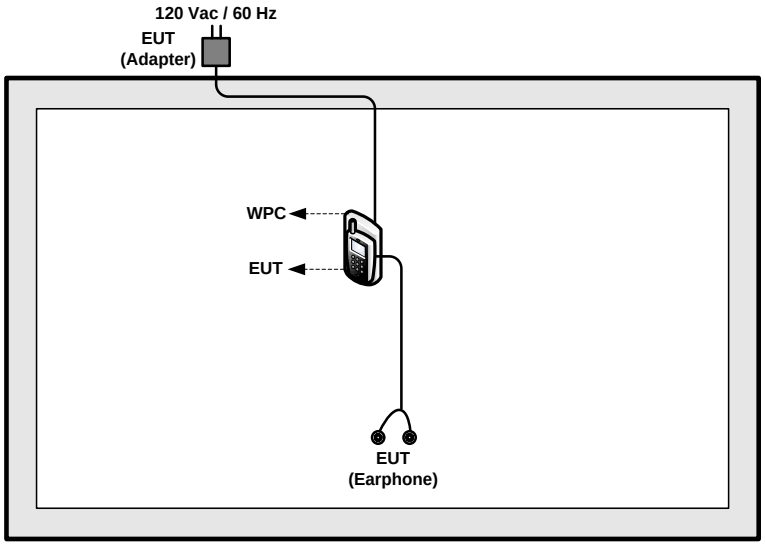
Test Cases	
AC Conducted Emission	Mode 1 ： GSM850 Idle + WLAN (2.4GHz) Link + Bluetooth Link + Adapter + Earphone + MP3

2.4 Connection Diagram of Test System

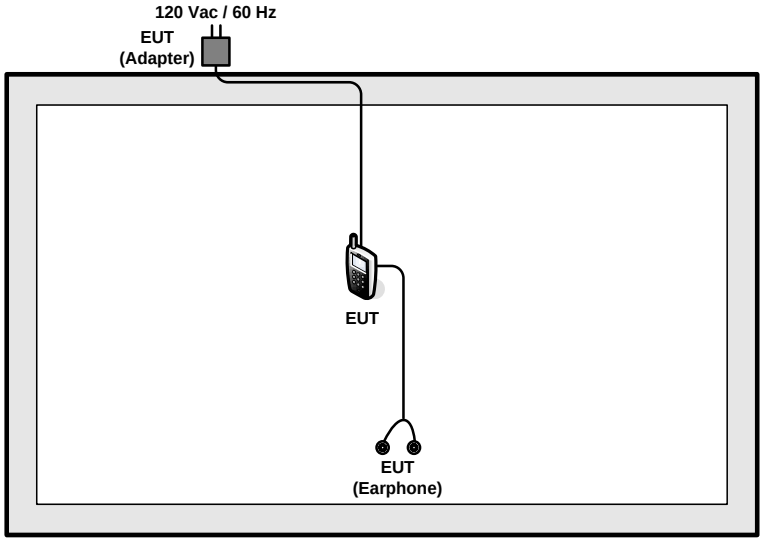
<WLAN Tx Mode with PMA>



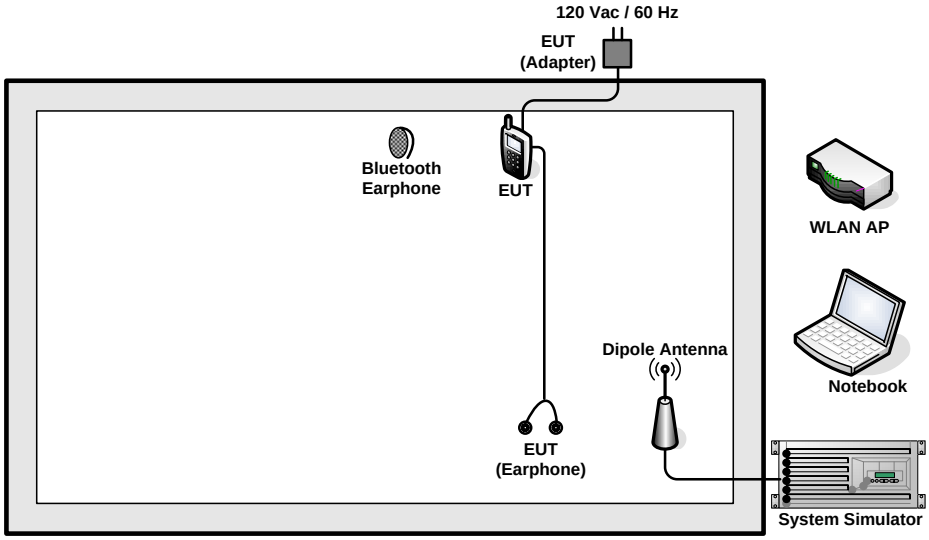
<WLAN Tx Mode with WPC>



<WLAN Tx Mode with Adapter>



<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	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-865L	KA2IR865LA1	N/A	Unshielded, 1.8 m
3.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
5.	WPC	Samsung	EP-P1001EWE	A3LEPP100IJWU	N/A	N/A
6.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A
7.	Adapter(PMA)	POWER MAT	KSAP0151800083D5	N/A	N/A	1.5m
8.	PMA	Duracell Powermat	M-C 18B-518A	N/A	N/A	N/A

2.6 EUT Operation Test Setup

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

2.7 Measurement Results Explanation Example

For all conducted test items:

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

Example:

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

Offset = RF cable loss + attenuator factor.

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

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

= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 6dB Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

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

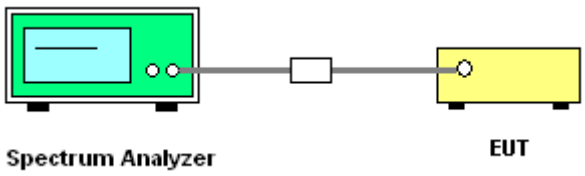
3.1.2 Measuring Instruments

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 v03r03.
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.

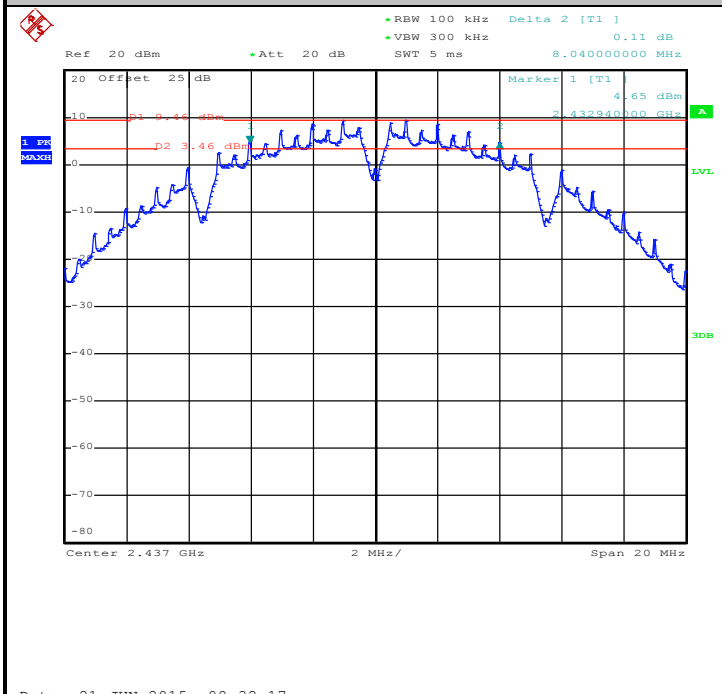
3.1.4 Test Setup



3.1.5 Test Result of 6dB Occupied Bandwidth

Please refer to Appendix A of this report.

Minimum 6dB Bandwidth



Date: 21.JUN.2015 08:32:17

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.

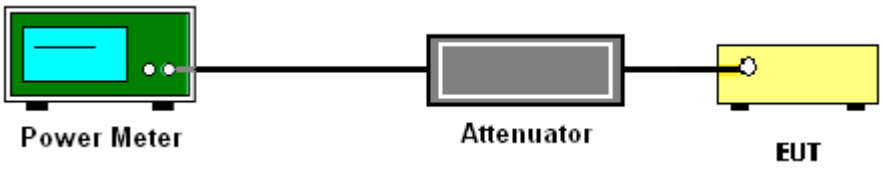
3.2.2 Measuring Instruments

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 v03r03.
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

Please refer to Appendix A of this report.

3.2.6 Test Result of Average output Power (Reporting Only)

Please refer to Appendix A of this report.

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 v03r03
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.

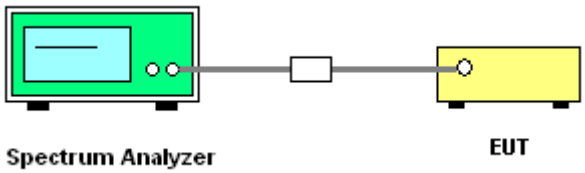
   If measurements performed using method (2) plus 10 log (N) exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

   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)

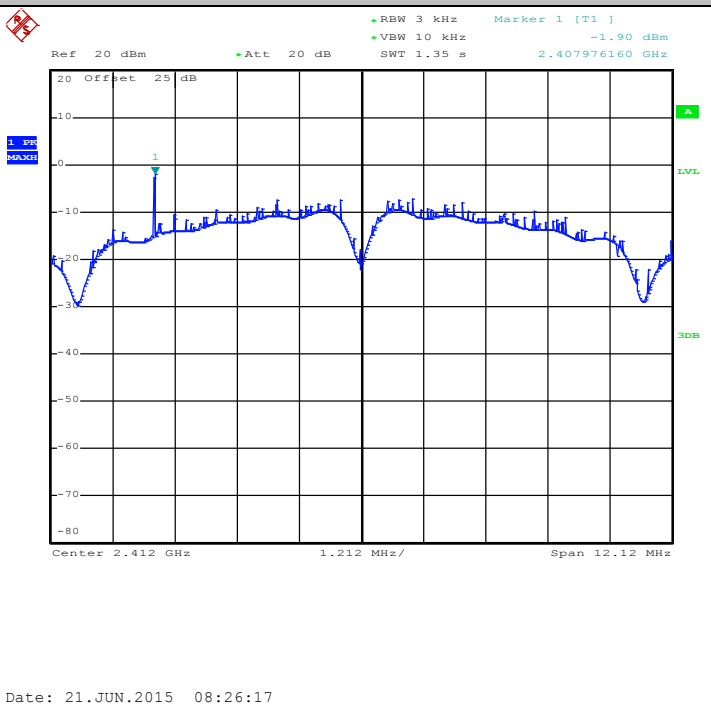
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A of this report.

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).

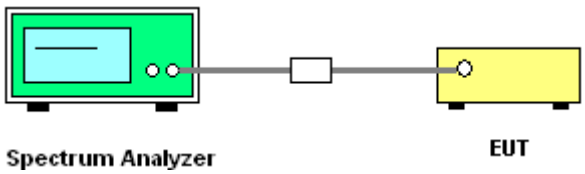
3.4.2 Measuring Instruments

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 v03r03.
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



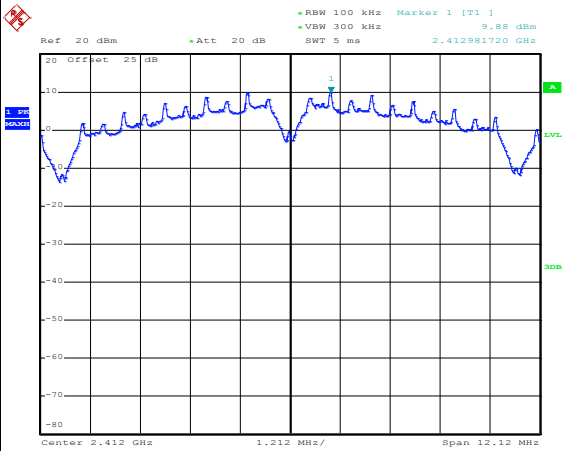
3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Number of TX = 2, Ant. 1 (Measured)

Number of TX	1	**Ant. :**	1
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Tommy Lee

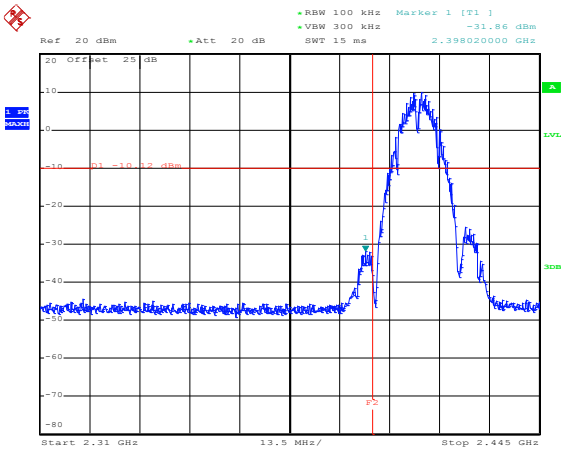
WLAN 802.11b Channel 01

100kHz PSD reference Level



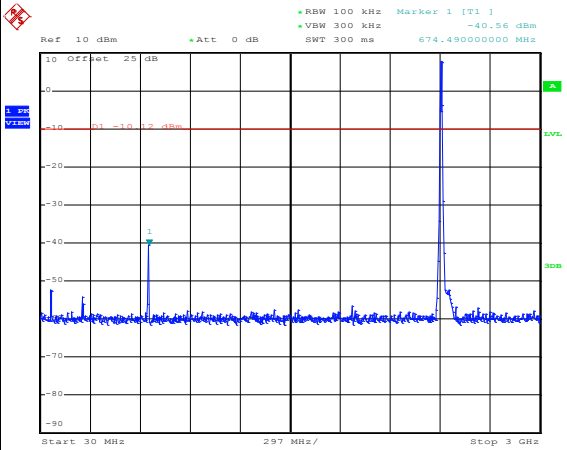
Date: 21.JUN.2015 08:14:48

Low Channel Plot



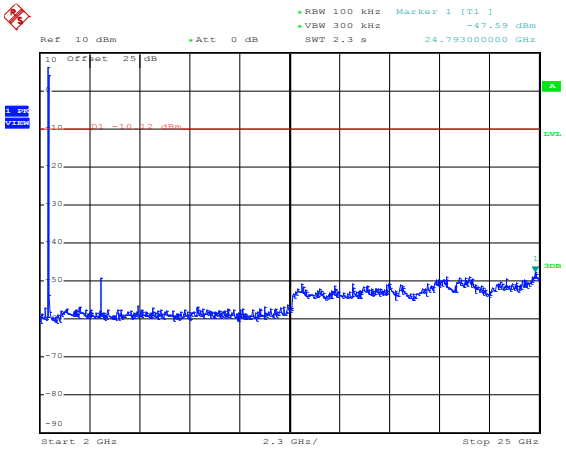
Date: 21.JUN.2015 08:17:16

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 08:20:59

Spurious Emission 2GHz~25GHz

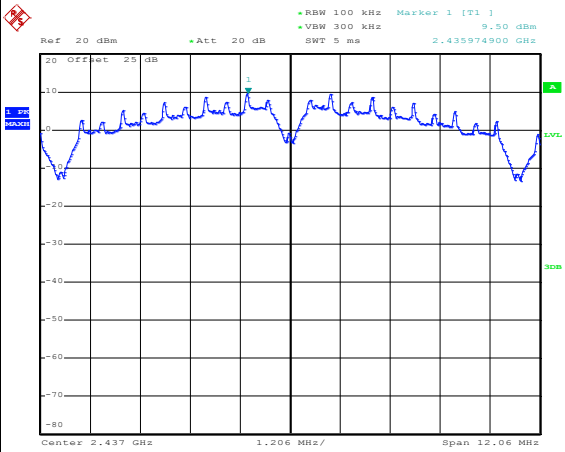


Date: 21.JUN.2015 08:21:16

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Tommy Lee

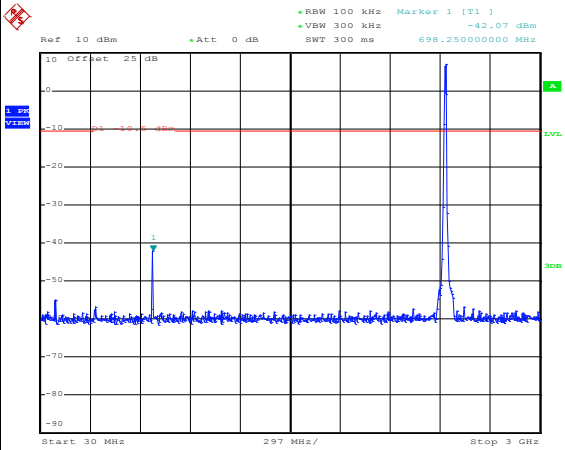
WLAN 802.11b Channel 06

100kHz PSD reference Level



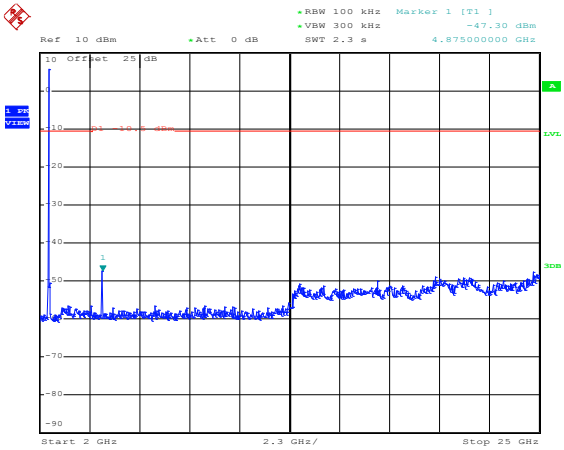
Date: 21.JUN.2015 08:34:03

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 08:34:30

Spurious Emission 2GHz~25GHz

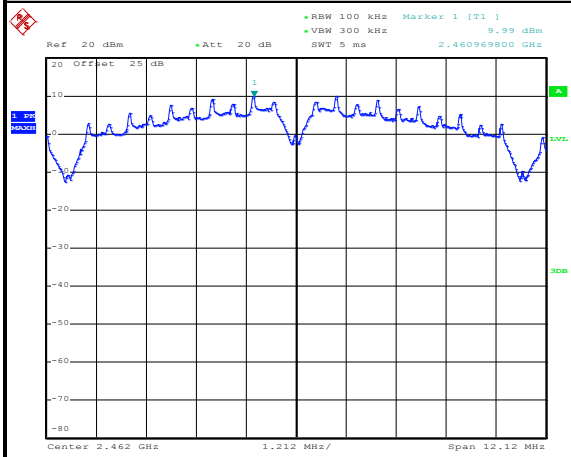


Date: 21.JUN.2015 08:34:48

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Tommy Lee

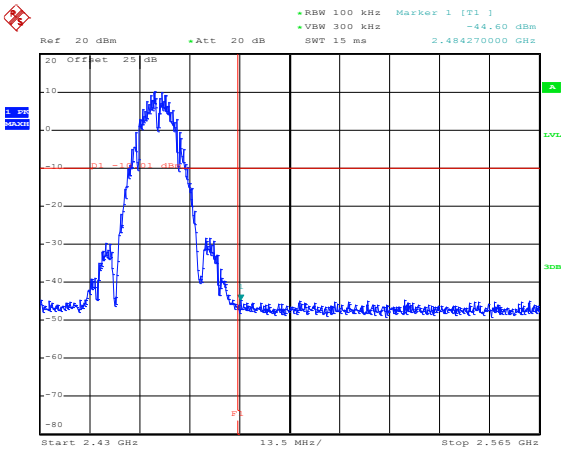
WLAN 802.11b Channel 11

100kHz PSD reference Level



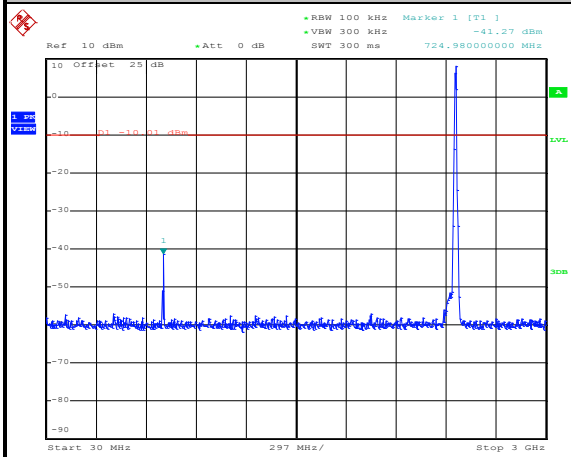
Date: 21.JUN.2015 08:48:55

High Channel Plot



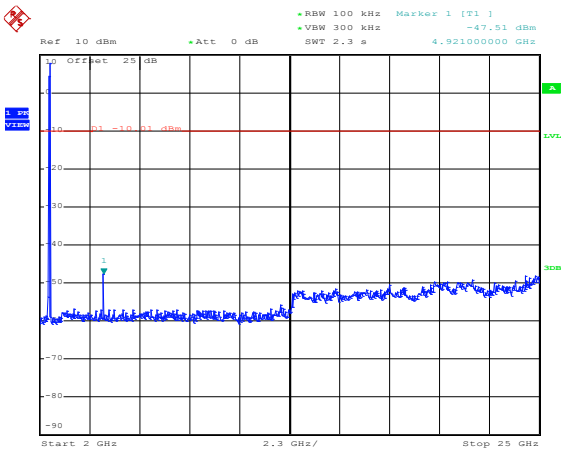
Date: 21.JUN.2015 08:49:13

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 08:50:35

Spurious Emission 2GHz~25GHz

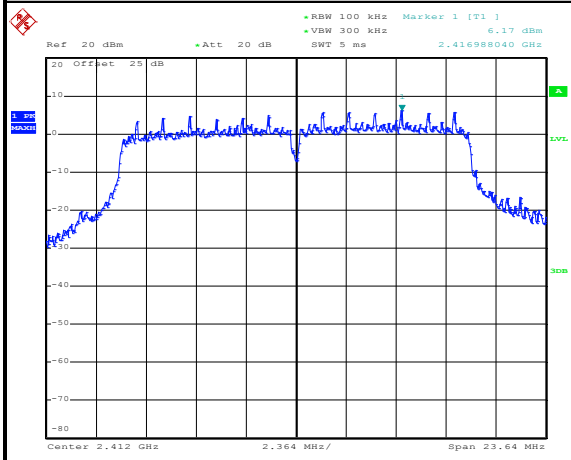


Date: 21.JUN.2015 08:50:52

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Tommy Lee

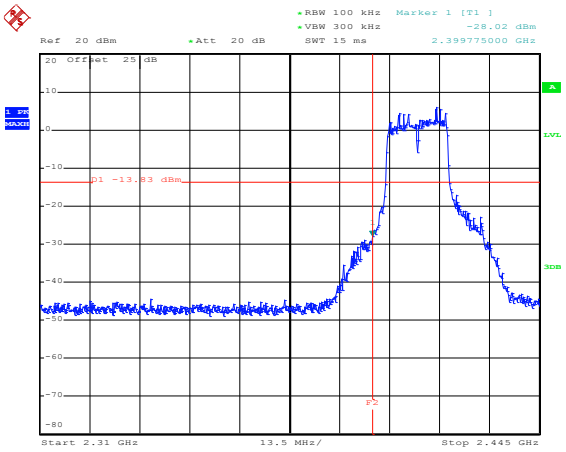
WLAN 802.11g Channel 01

100kHz PSD reference Level



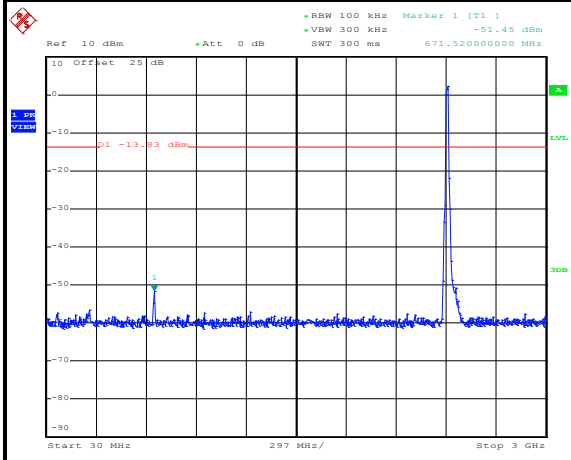
Date: 21.JUN.2015 09:09:36

Low Channel Plot



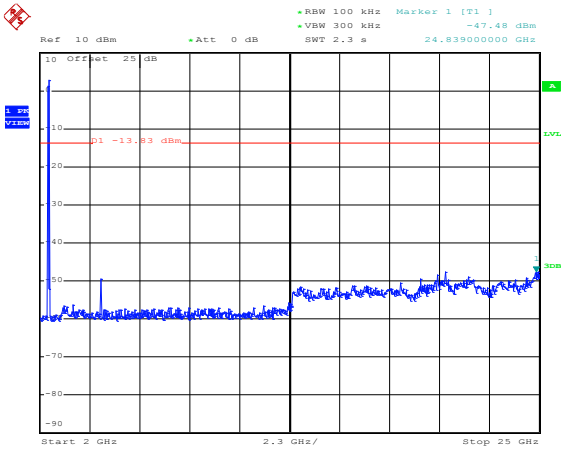
Date: 21.JUN.2015 09:09:54

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 09:10:23

Spurious Emission 2GHz~25GHz

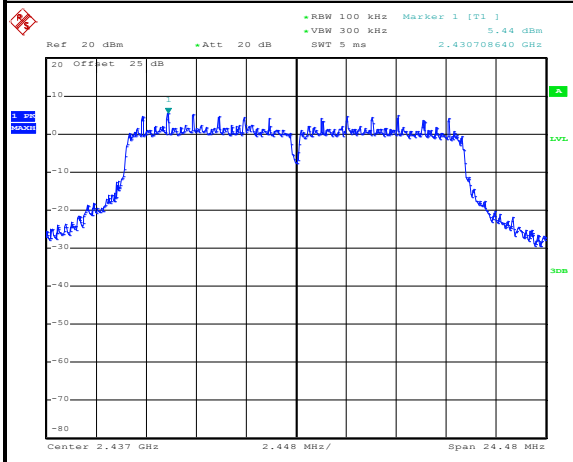


Date: 21.JUN.2015 09:10:41

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Tommy Lee

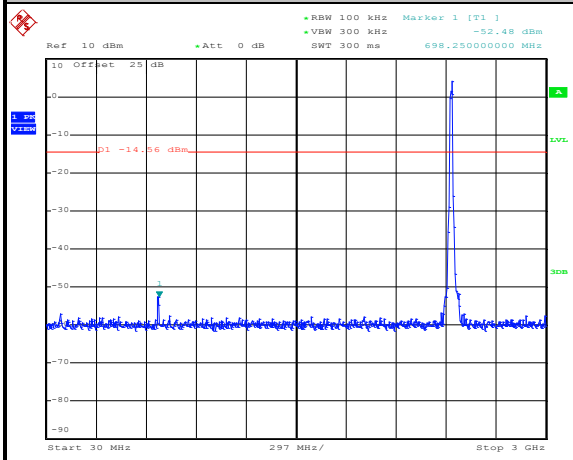
WLAN 802.11g Channel 06

100kHz PSD reference Level



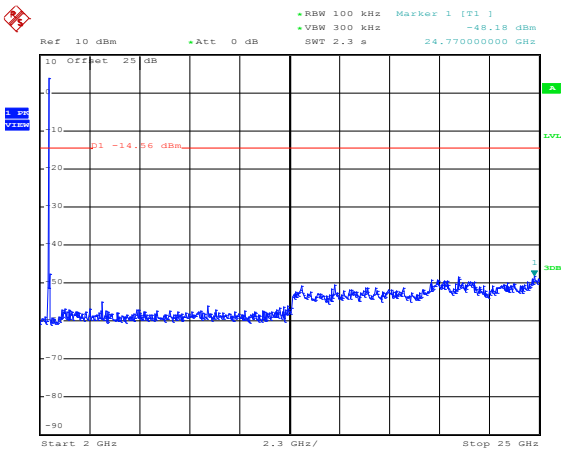
Date: 21.JUN.2015 09:21:49

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 09:22:16

Spurious Emission 2GHz~25GHz

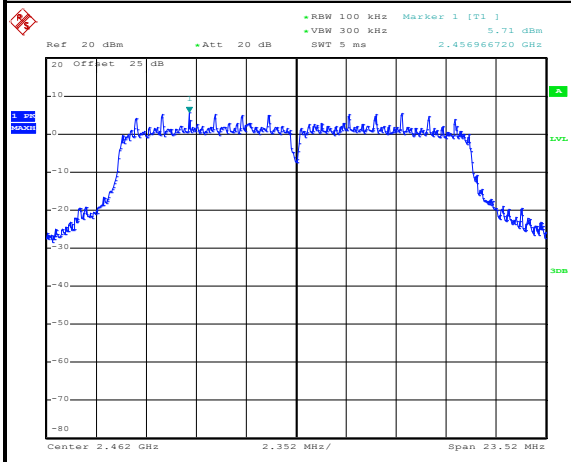


Date: 21.JUN.2015 09:22:34

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Tommy Lee

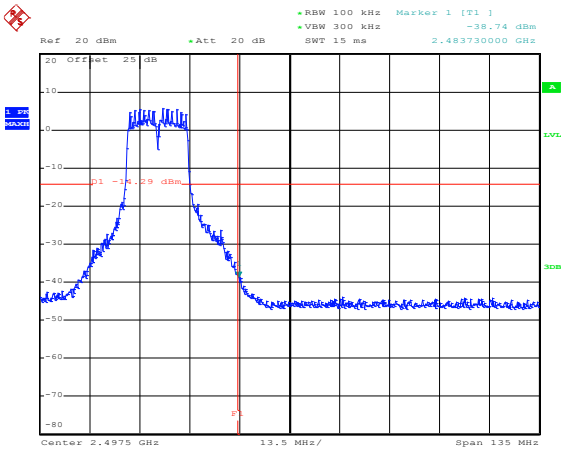
WLAN 802.11g Channel 11

100kHz PSD reference Level



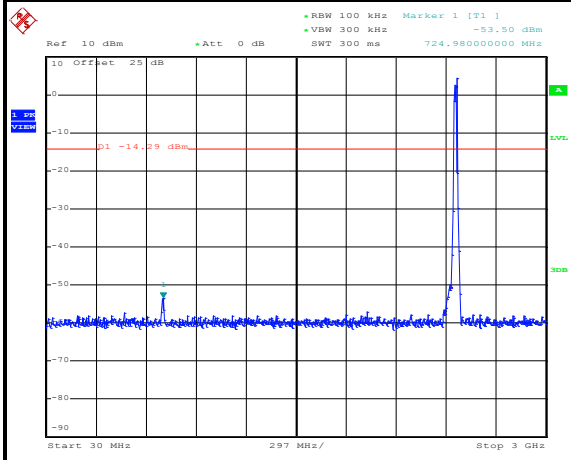
Date: 21.JUN.2015 09:38:21

High Channel Plot



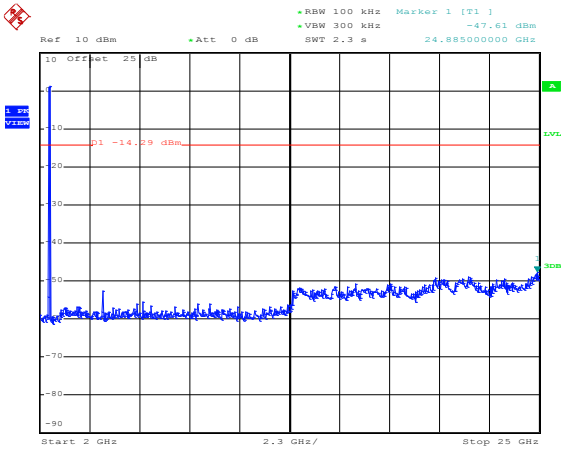
Date: 21.JUN.2015 11:45:43

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 09:39:10

Spurious Emission 2GHz~25GHz

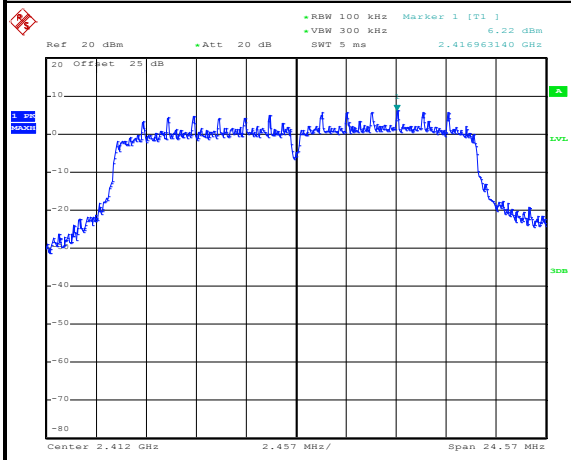


Date: 21.JUN.2015 09:39:28

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Tommy Lee

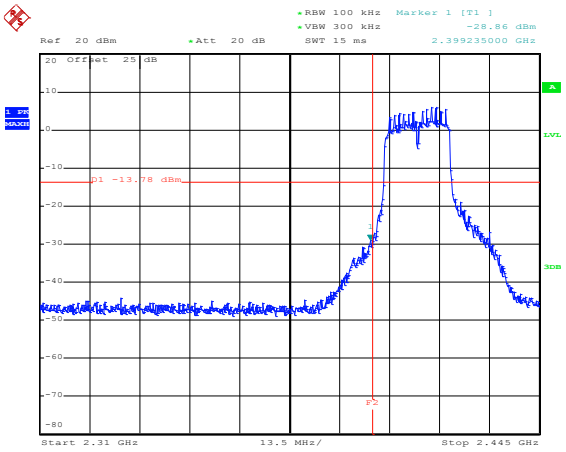
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



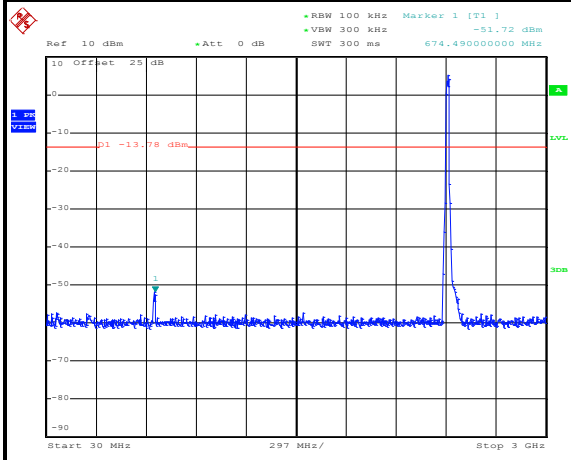
Date: 21.JUN.2015 09:58:39

Low Channel Plot



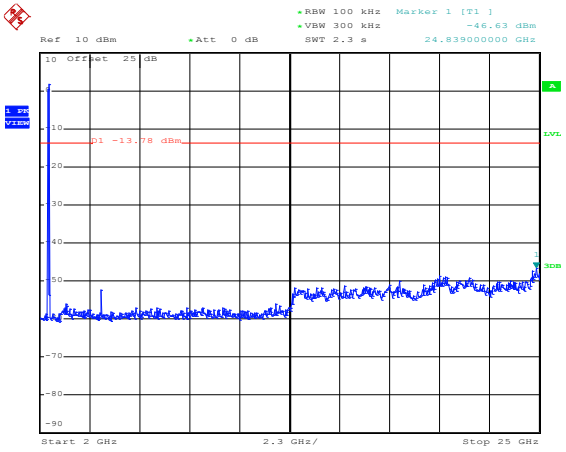
Date: 21.JUN.2015 09:59:14

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 09:59:46

Spurious Emission 2GHz~25GHz

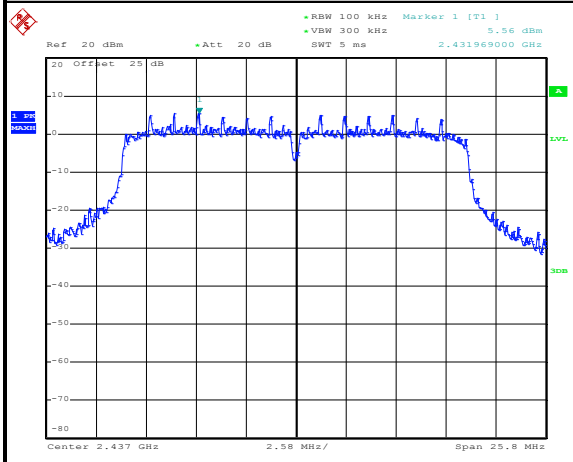


Date: 21.JUN.2015 10:00:04

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Tommy Lee

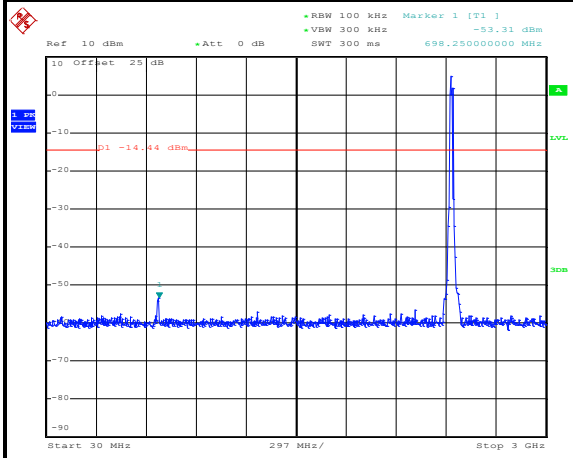
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



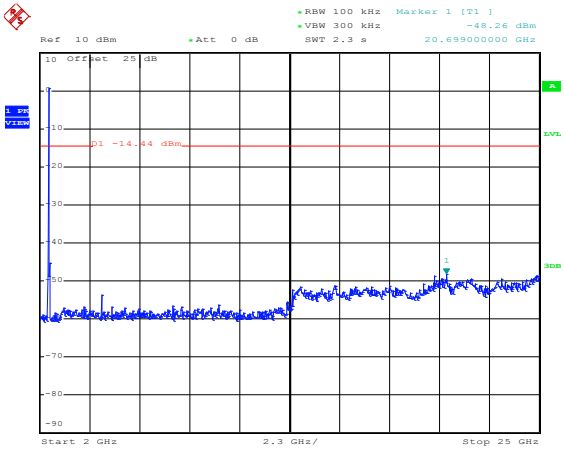
Date: 21.JUN.2015 10:14:37

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 10:21:13

Spurious Emission 2GHz~25GHz

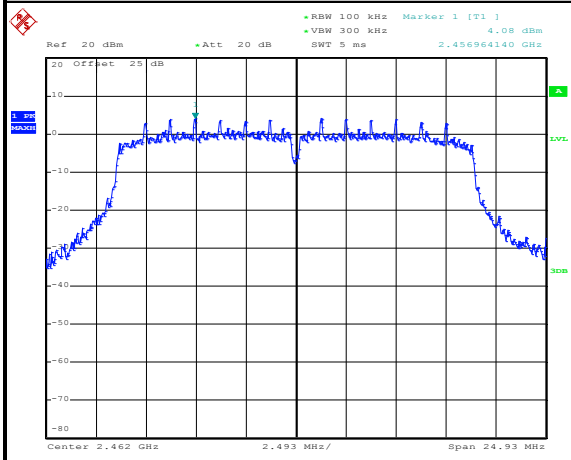


Date: 21.JUN.2015 10:21:31

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Tommy Lee

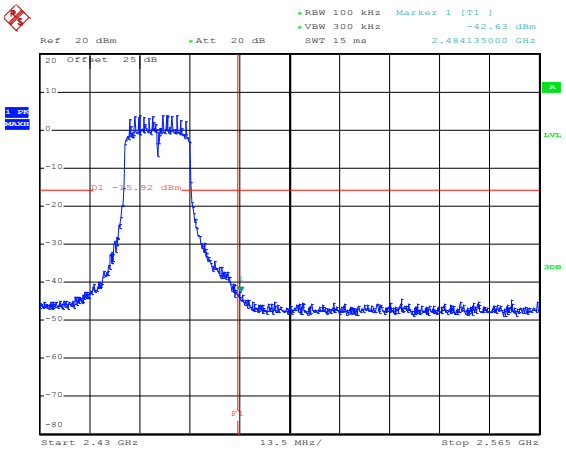
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



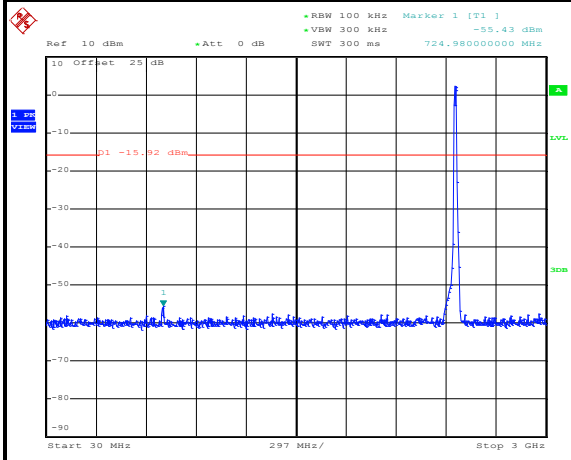
Date: 21.JUN.2015 10:30:23

High Channel Plot



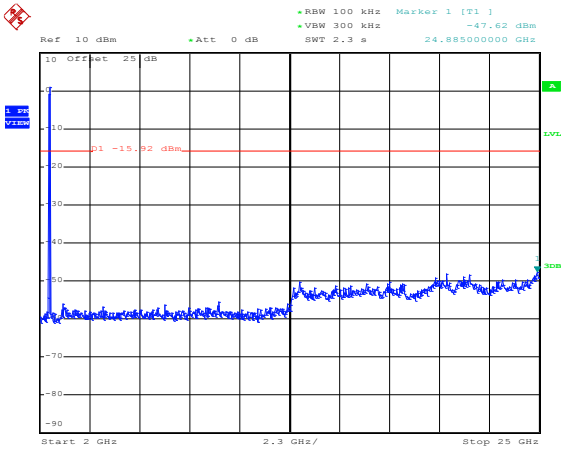
Date: 21.JUN.2015 10:30:46

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 10:31:13

Spurious Emission 2GHz~25GHz

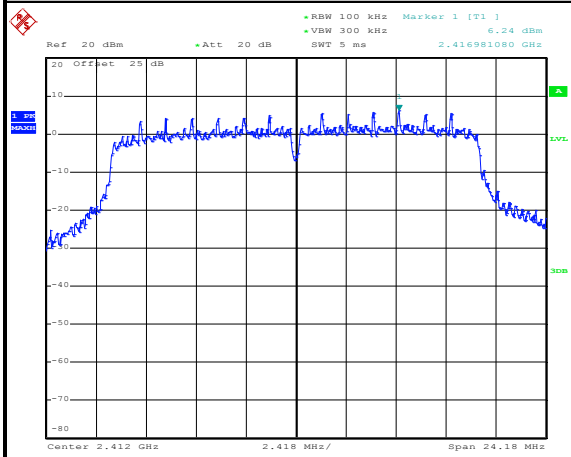


Date: 21.JUN.2015 10:31:31

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11ac VHT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Tommy Lee

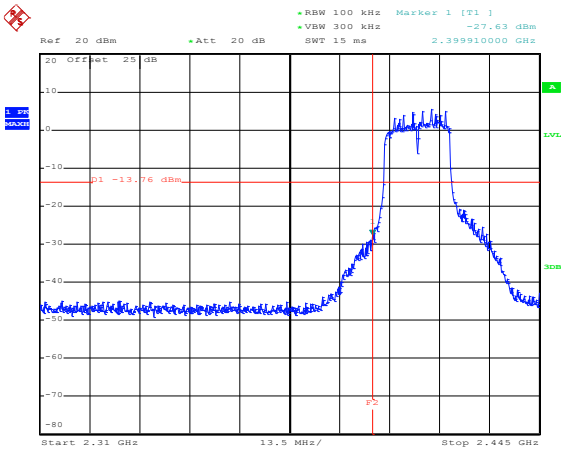
WLAN 802.11ac VHT20 Channel 01

100kHz PSD reference Level



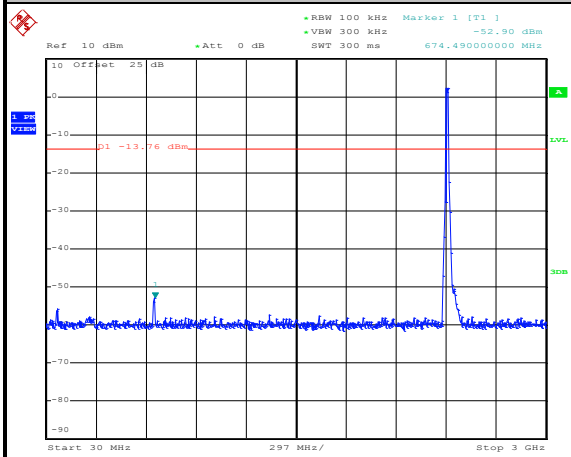
Date: 21.JUN.2015 10:54:04

Low Channel Plot



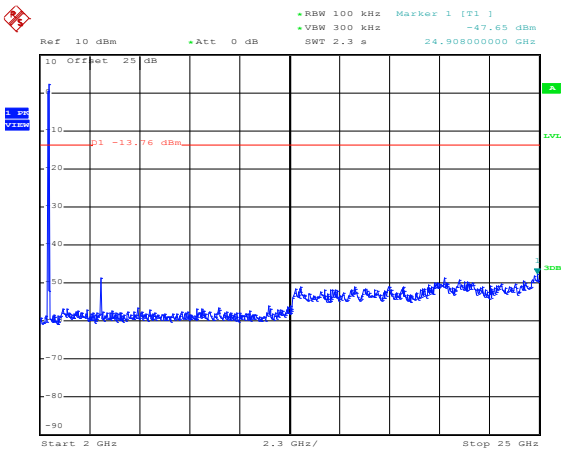
Date: 21.JUN.2015 10:54:24

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 10:54:46

Spurious Emission 2GHz~25GHz

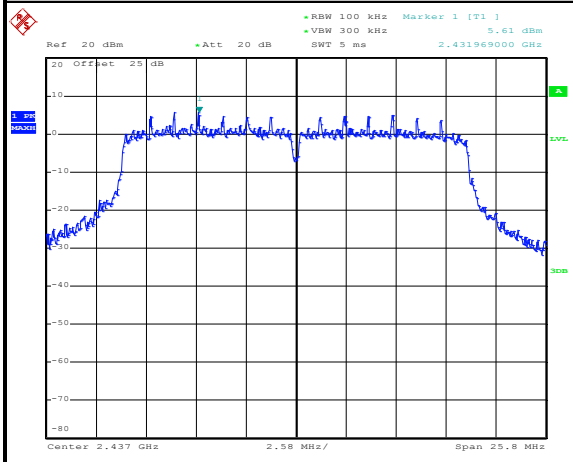


Date: 21.JUN.2015 10:55:03

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11ac VHT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Tommy Lee

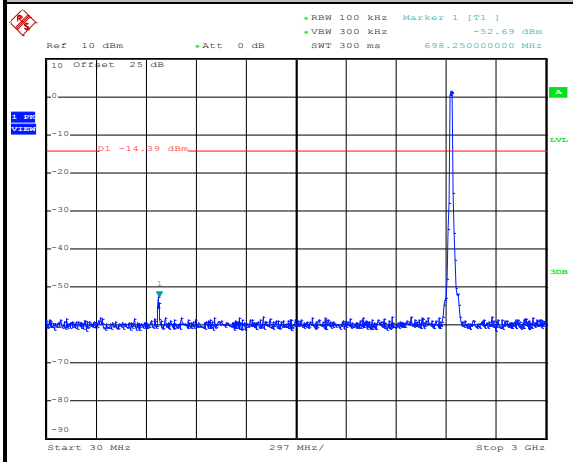
WLAN 802.11ac VHT20 Channel 06

100kHz PSD reference Level



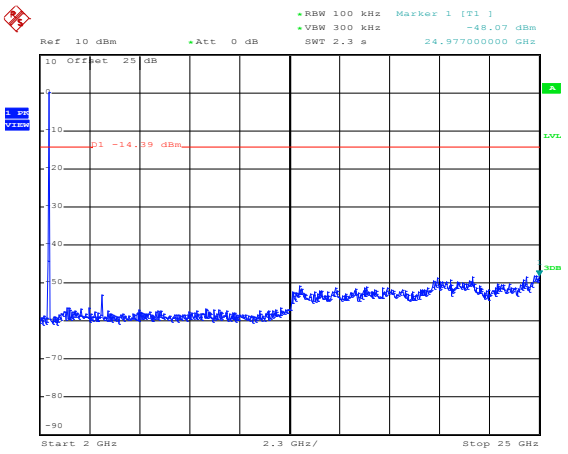
Date: 21.JUN.2015 11:17:21

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 11:17:54

Spurious Emission 2GHz~25GHz

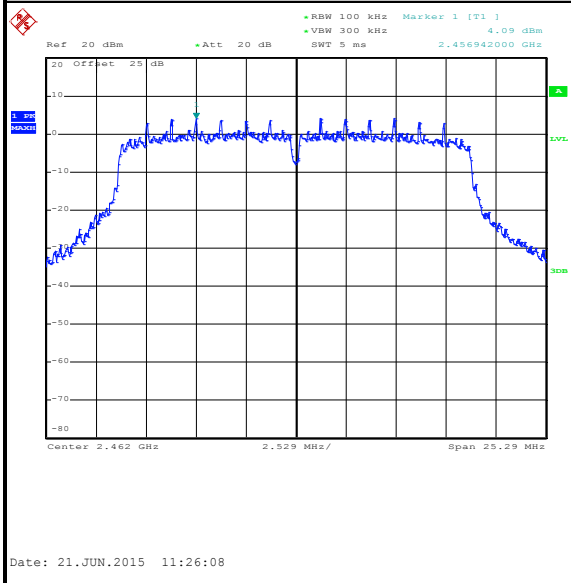


Date: 21.JUN.2015 11:18:12

Number of TX :	2	**Ant. :**	1
Test Mode :	802.11ac VHT20	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Tommy Lee

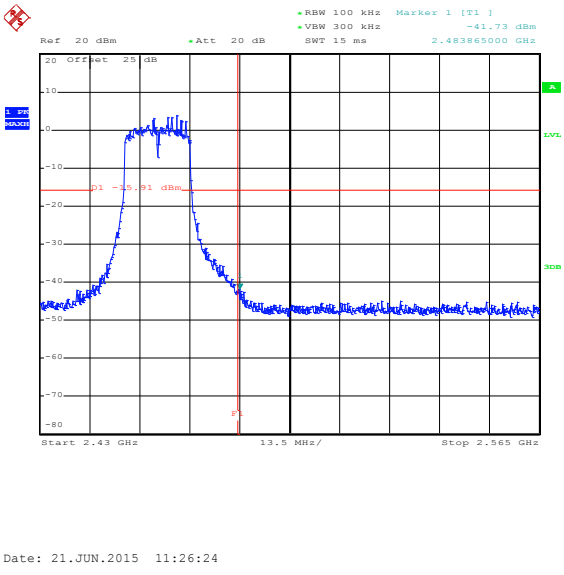
WLAN 802.11ac VHT20 Channel 11

100kHz PSD reference Level



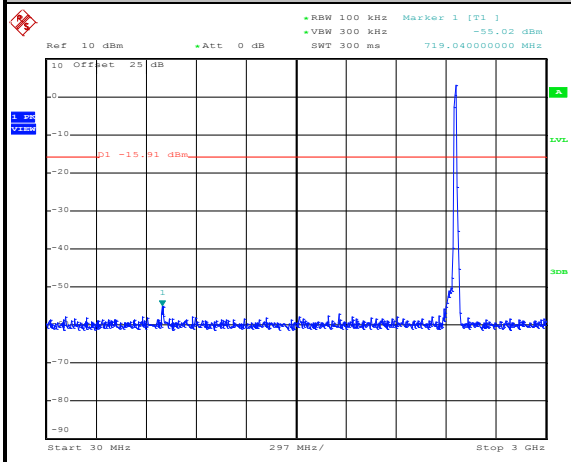
Date: 21.JUN.2015 11:26:08

High Channel Plot



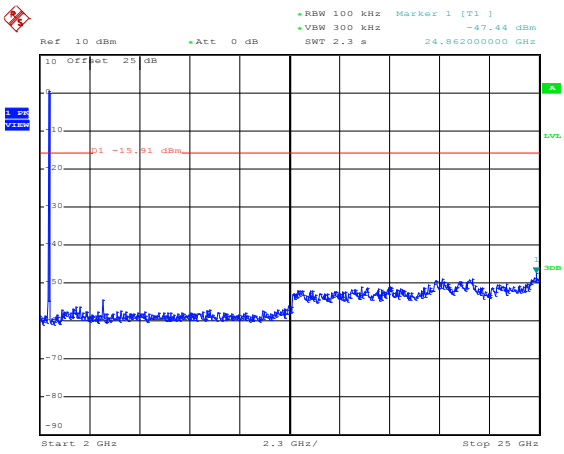
Date: 21.JUN.2015 11:26:24

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 11:26:49

Spurious Emission 2GHz~25GHz



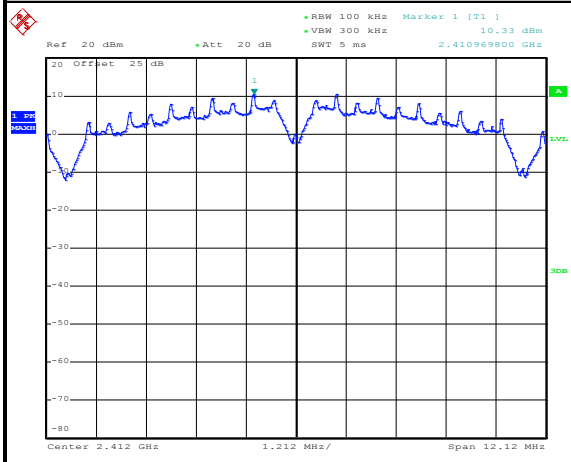
Date: 21.JUN.2015 11:27:07

Number of TX = 2, Ant. 2 (Measured)

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Tommy Lee

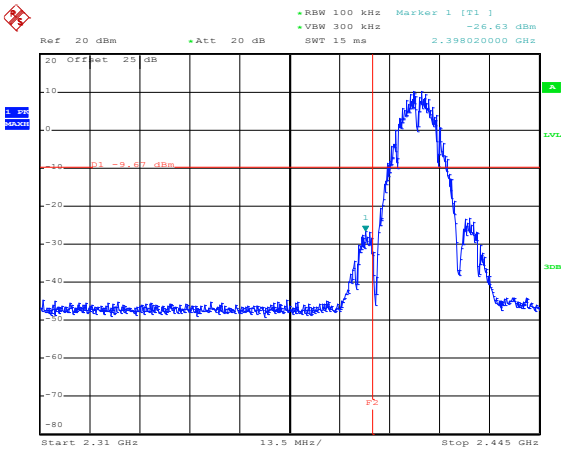
WLAN 802.11b Channel 01

100kHz PSD reference Level



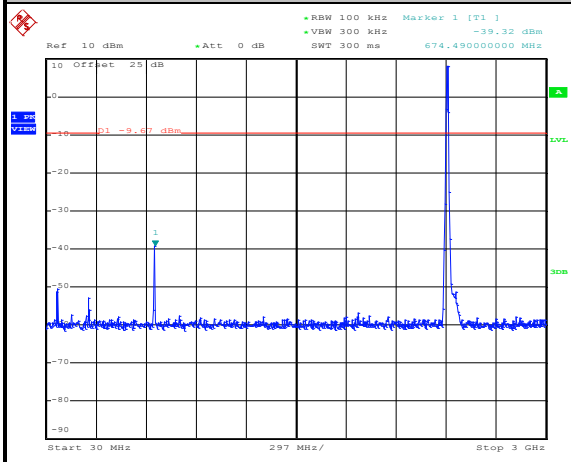
Date: 21.JUN.2015 08:26:51

Low Channel Plot



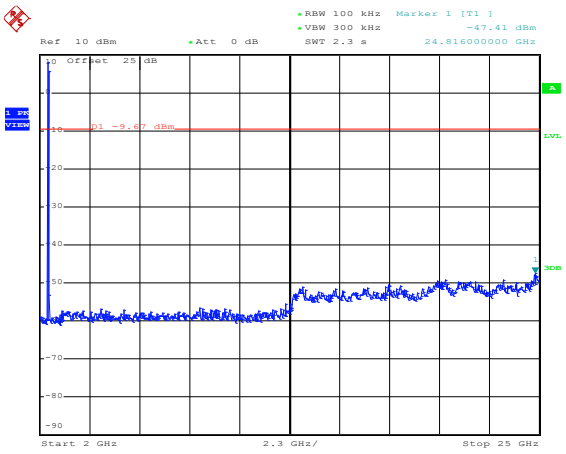
Date: 21.JUN.2015 08:27:31

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 08:28:03

Spurious Emission 2GHz~25GHz

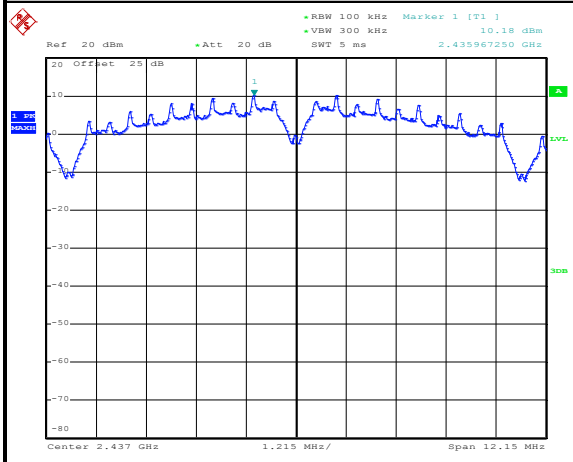


Date: 21.JUN.2015 08:28:20

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Tommy Lee

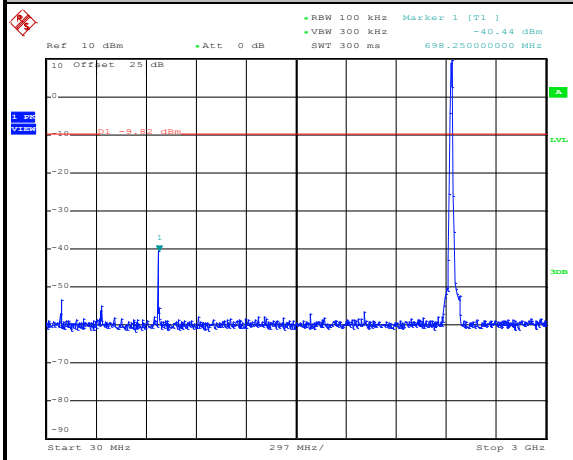
WLAN 802.11b Channel 06

100kHz PSD reference Level



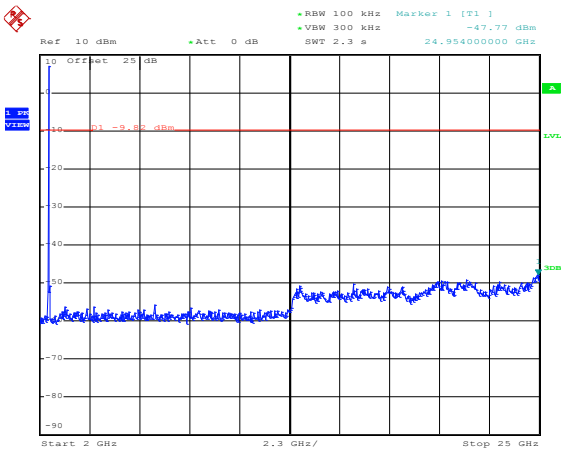
Date: 21.JUN.2015 08:42:19

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 08:42:46

Spurious Emission 2GHz~25GHz

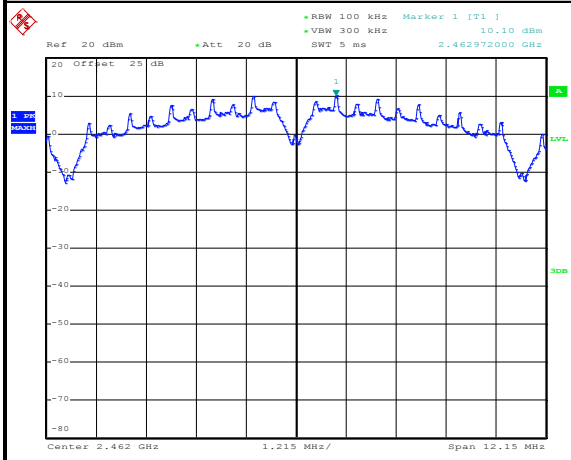


Date: 21.JUN.2015 08:43:04

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11b	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Tommy Lee

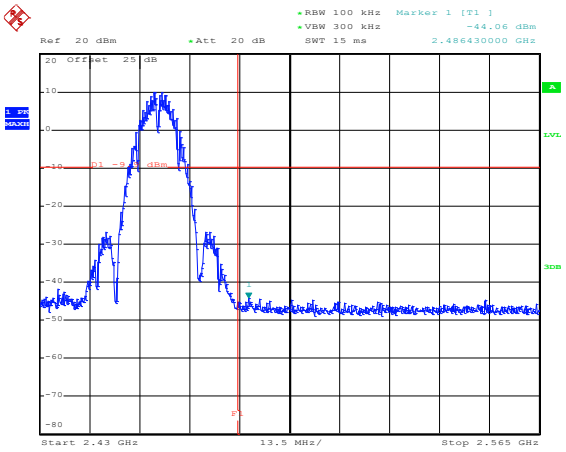
WLAN 802.11b Channel 11

100kHz PSD reference Level



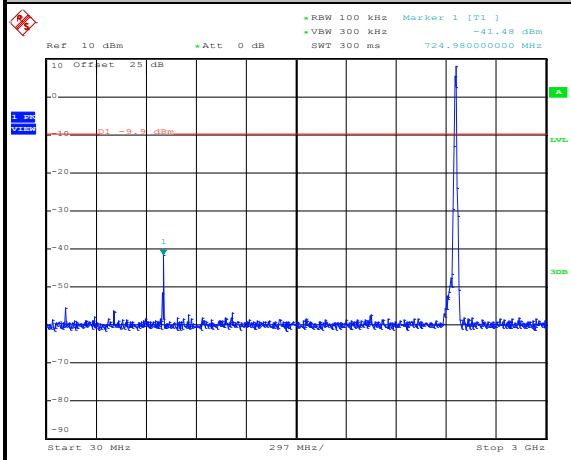
Date: 21.JUN.2015 08:56:42

High Channel Plot



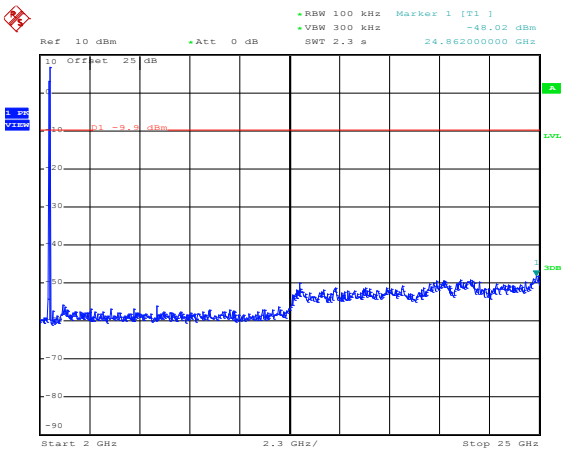
Date: 21.JUN.2015 08:57:22

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 08:58:03

Spurious Emission 2GHz~25GHz

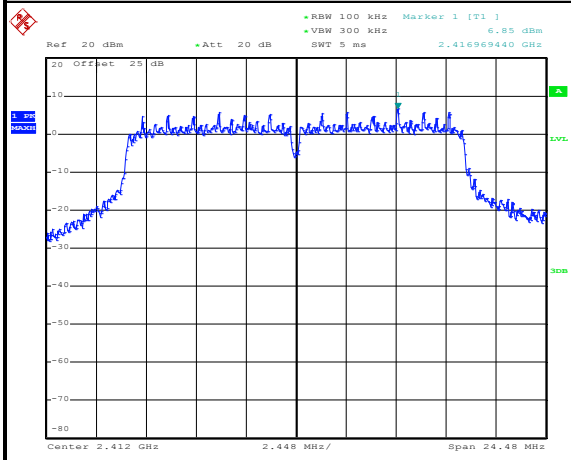


Date: 21.JUN.2015 08:58:21

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Tommy Lee

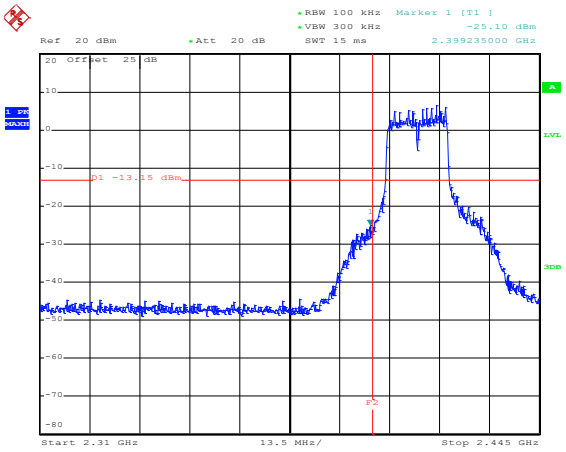
WLAN 802.11g Channel 01

100kHz PSD reference Level



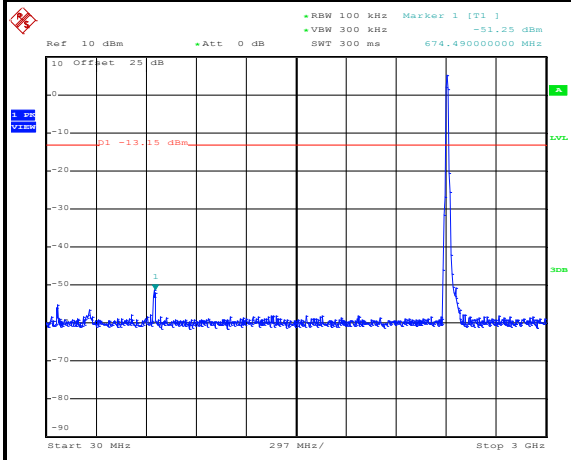
Date: 21.JUN.2015 09:14:57

Low Channel Plot



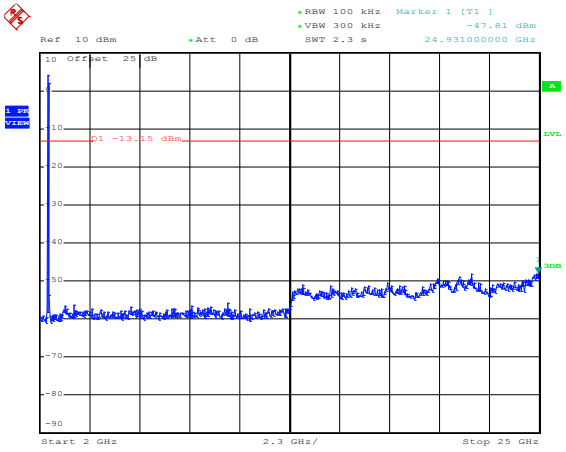
Date: 21.JUN.2015 09:15:19

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 09:15:45

Spurious Emission 2GHz~25GHz

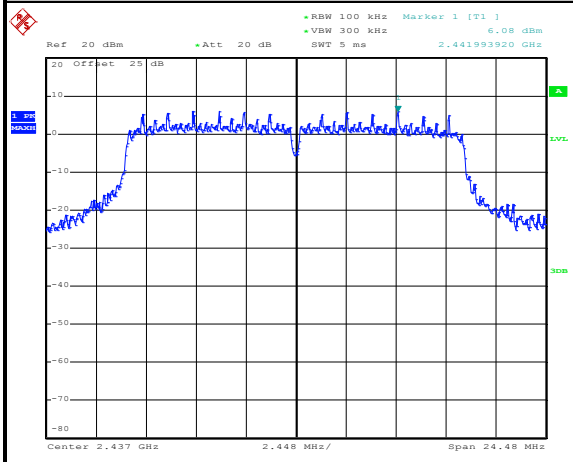


Date: 21.JUN.2015 09:16:03

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Tommy Lee

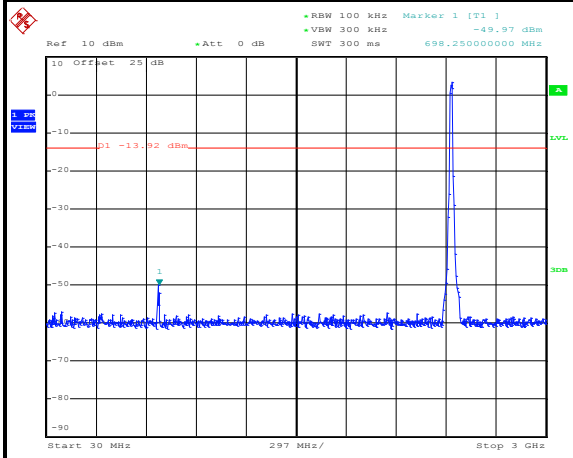
WLAN 802.11g Channel 06

100kHz PSD reference Level



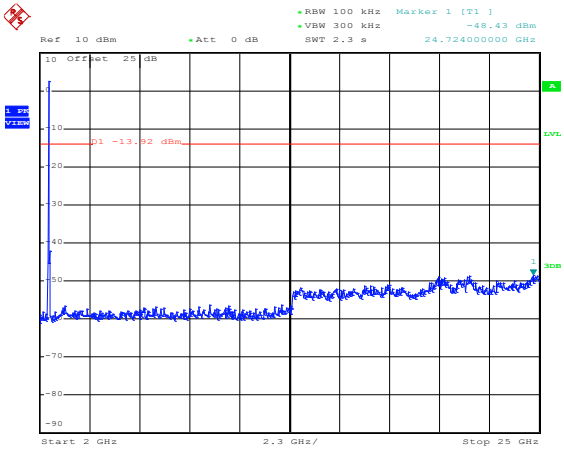
Date: 21.JUN.2015 09:28:32

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 09:28:58

Spurious Emission 2GHz~25GHz

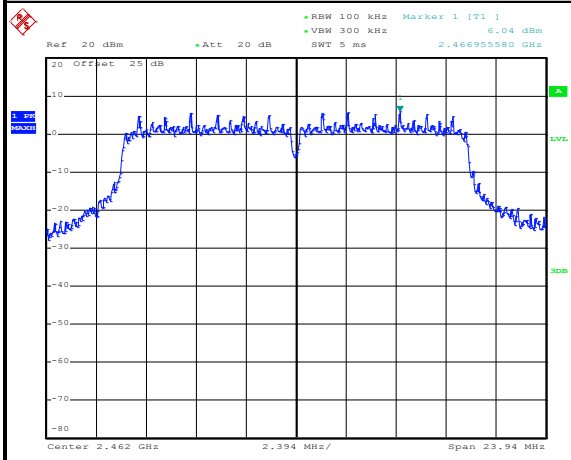


Date: 21.JUN.2015 09:29:16

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11g	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Tommy Lee

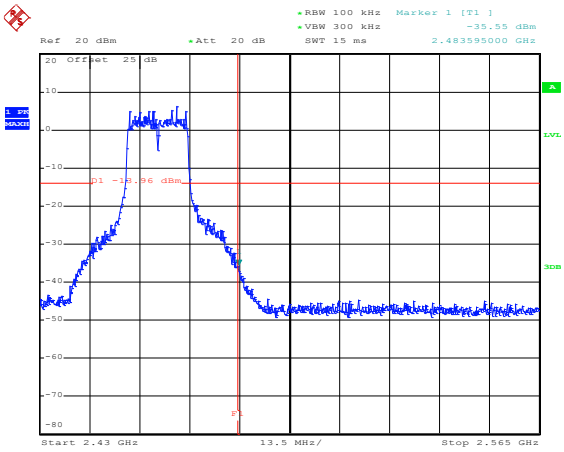
WLAN 802.11g Channel 11

100kHz PSD reference Level



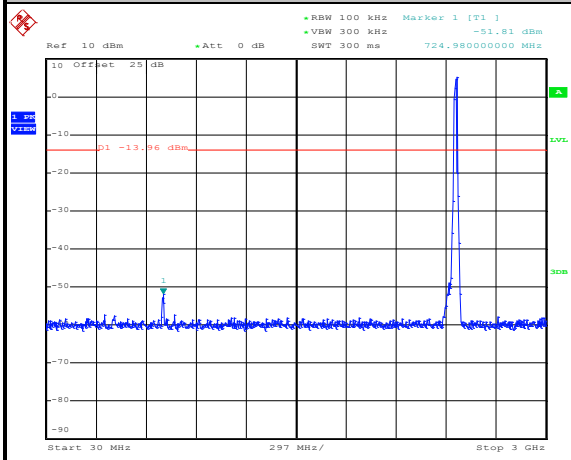
Date: 21.JUN.2015 09:47:41

High Channel Plot



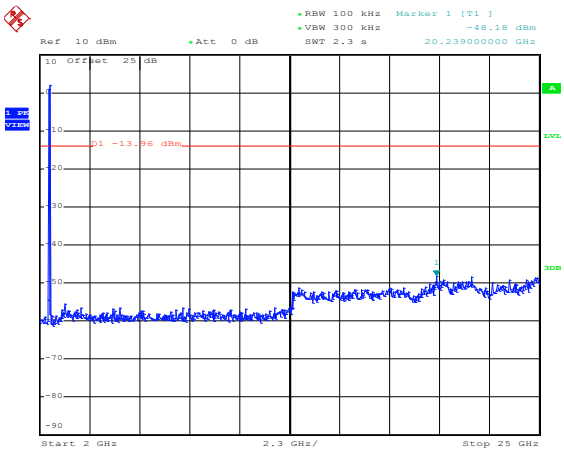
Date: 21.JUN.2015 09:48:20

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 09:48:46

Spurious Emission 2GHz~25GHz

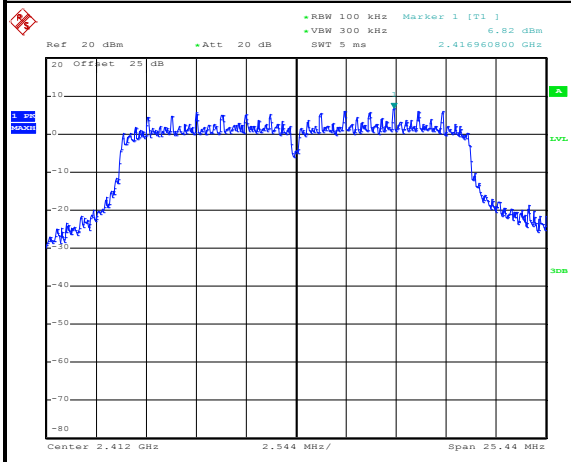


Date: 21.JUN.2015 09:49:04

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Tommy Lee

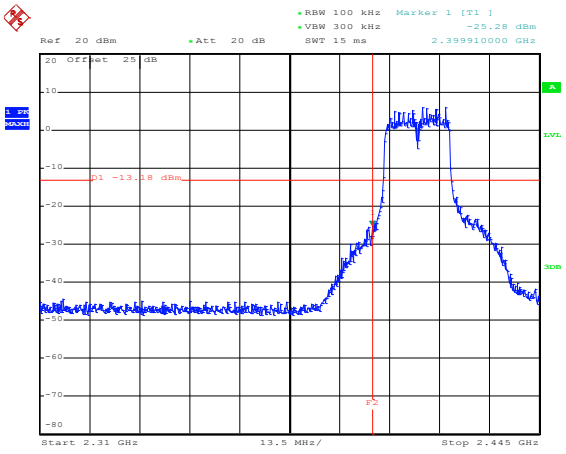
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



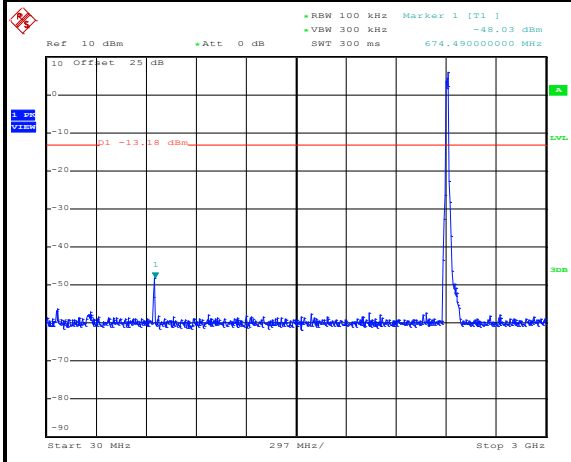
Date: 21.JUN.2015 10:05:18

Low Channel Plot



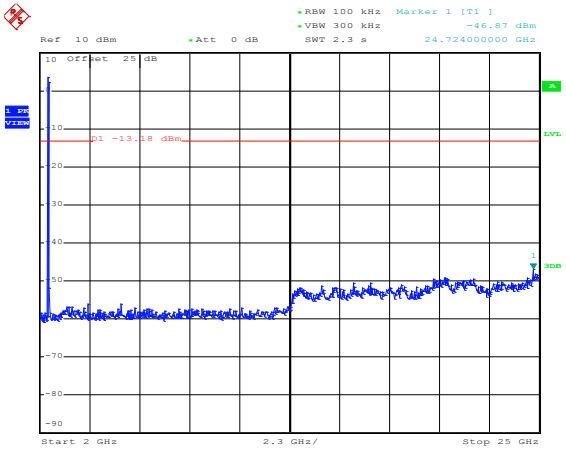
Date: 21.JUN.2015 10:05:38

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 10:06:03

Spurious Emission 2GHz~25GHz

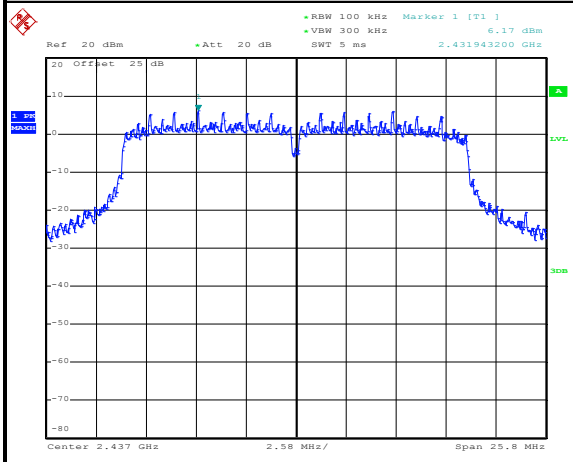


Date: 21.JUN.2015 10:06:21

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Tommy Lee

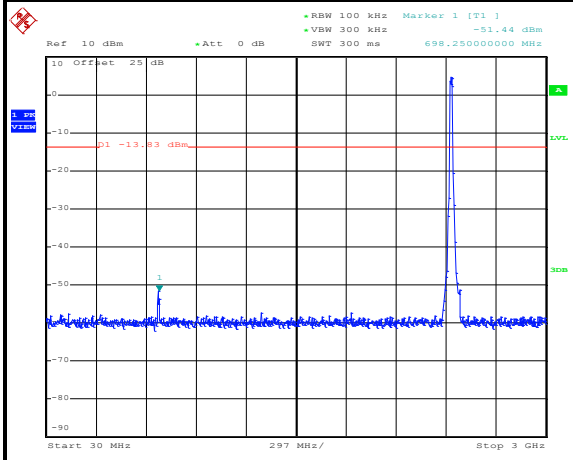
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



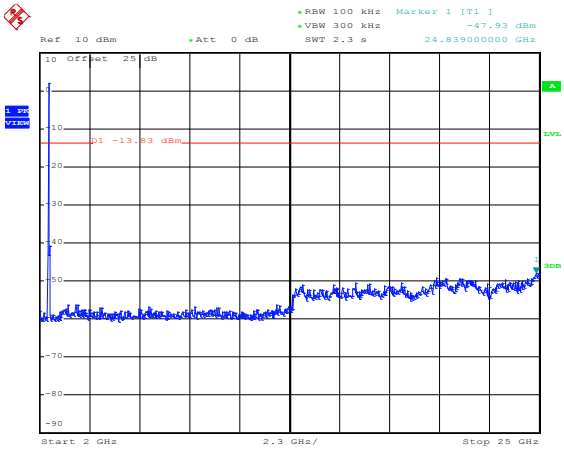
Date: 21.JUN.2015 10:24:41

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 10:25:30

Spurious Emission 2GHz~25GHz

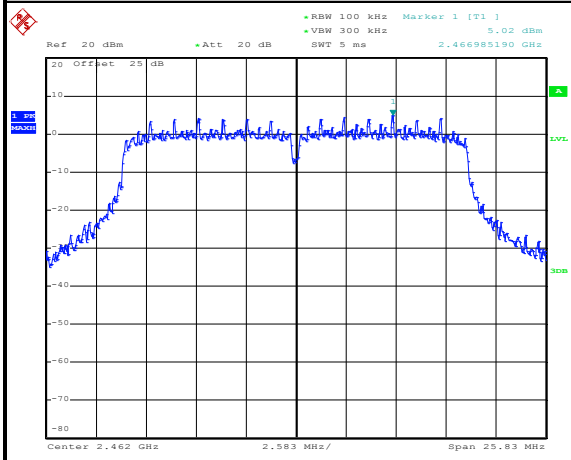


Date: 21.JUN.2015 10:25:48

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11n HT20	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Tommy Lee

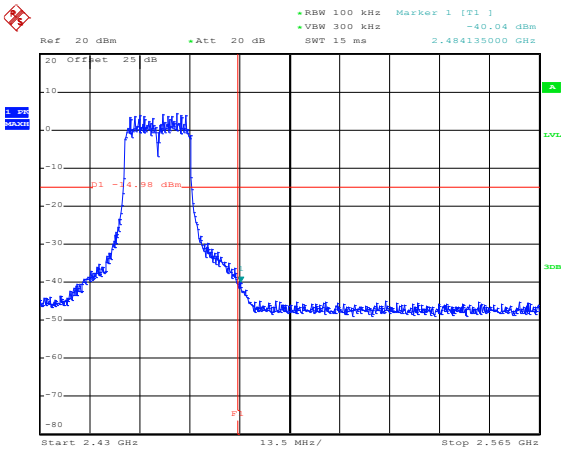
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



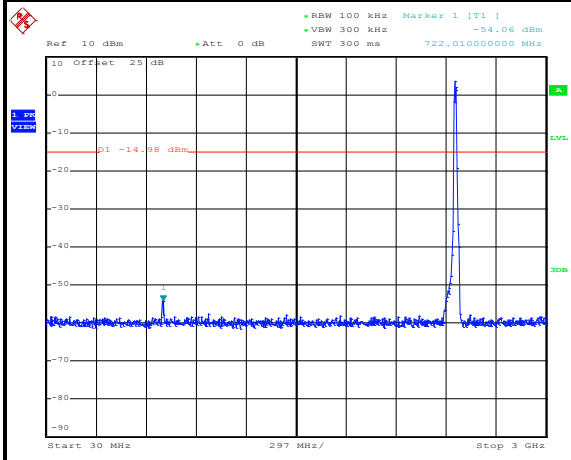
Date: 21.JUN.2015 10:37:00

High Channel Plot



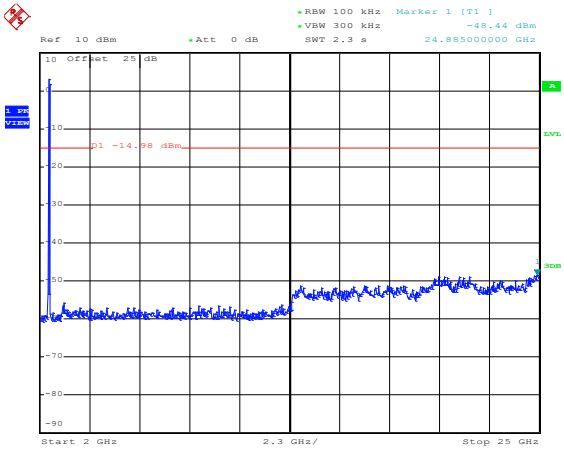
Date: 21.JUN.2015 10:37:39

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 10:38:02

Spurious Emission 2GHz~25GHz

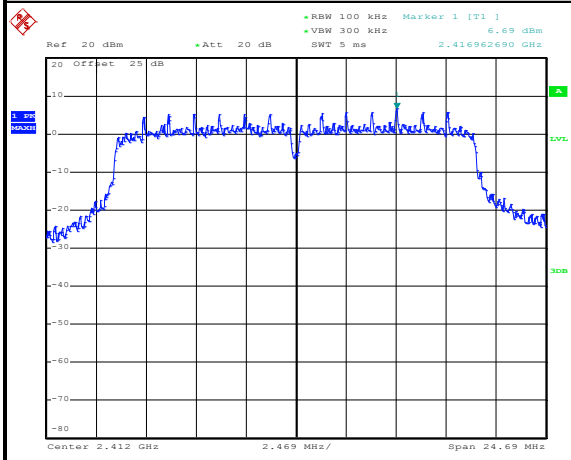


Date: 21.JUN.2015 10:38:20

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11ac VHT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Low	**Relative Humidity :**	51~54%
Test Channel :	01	**Test Engineer :**	Tommy Lee

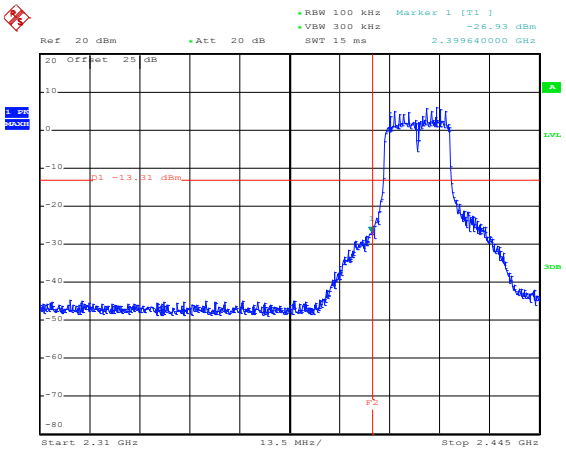
WLAN 802.11ac VHT20 Channel 01

100kHz PSD reference Level



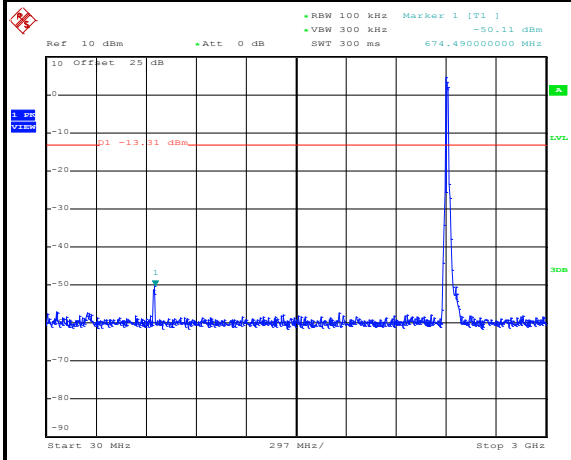
Date: 21.JUN.2015 11:02:47

Low Channel Plot



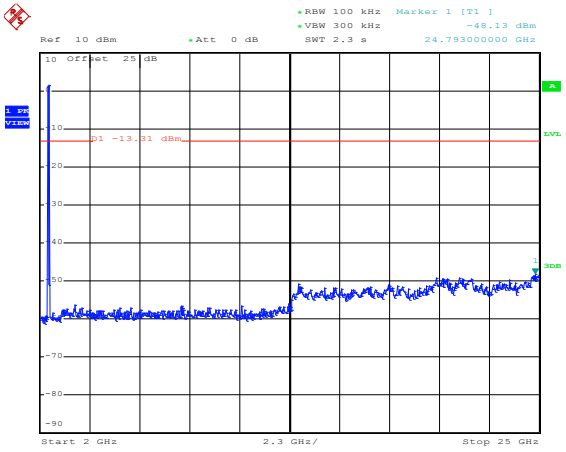
Date: 21.JUN.2015 11:03:04

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 11:03:25

Spurious Emission 2GHz~25GHz

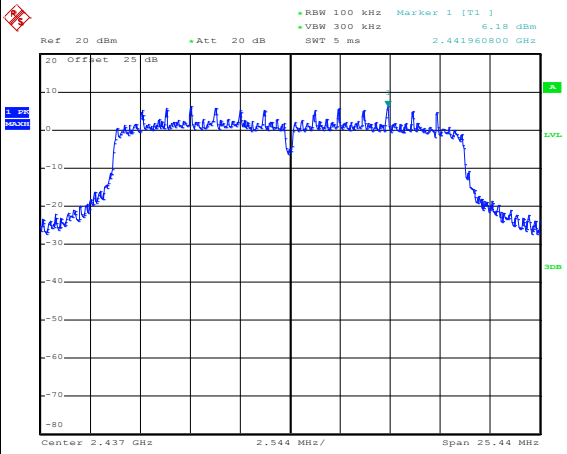


Date: 21.JUN.2015 11:03:43

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11ac VHT20	**Temperature :**	21~25℃
Test Band :	2.4GHz Mid	**Relative Humidity :**	51~54%
Test Channel :	06	**Test Engineer :**	Tommy Lee

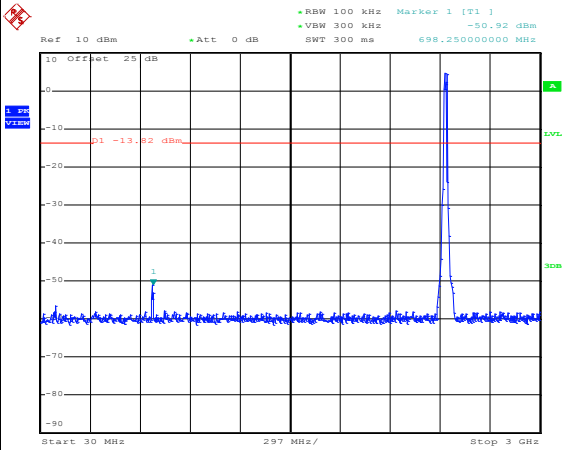
WLAN 802.11ac VHT20 Channel 06

100kHz PSD reference Level



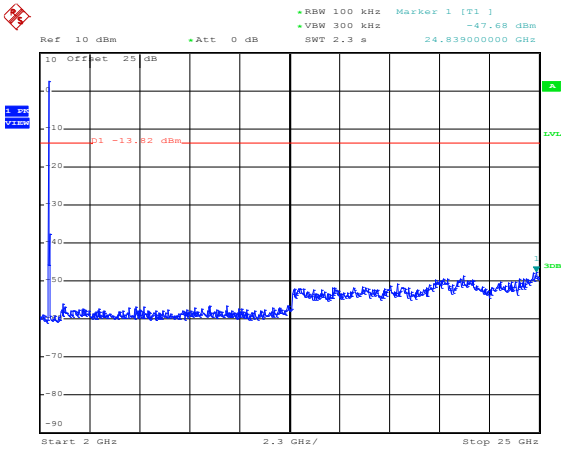
Date: 21.JUN.2015 11:09:27

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 11:09:57

Spurious Emission 2GHz~25GHz

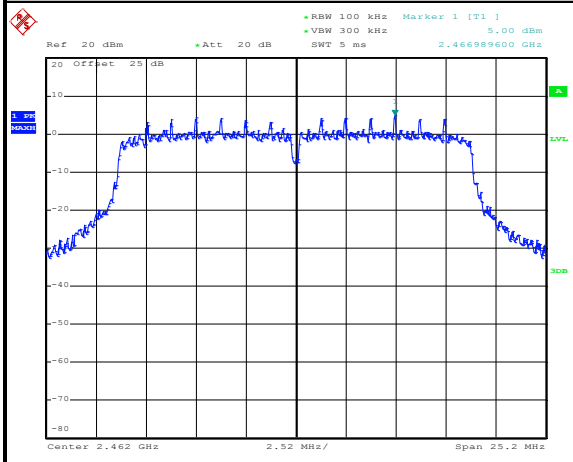


Date: 21.JUN.2015 11:10:15

Number of TX :	2	**Ant. :**	2
Test Mode :	802.11ac VHT20	**Temperature :**	21~25℃
Test Band :	2.4GHz High	**Relative Humidity :**	51~54%
Test Channel :	11	**Test Engineer :**	Tommy Lee

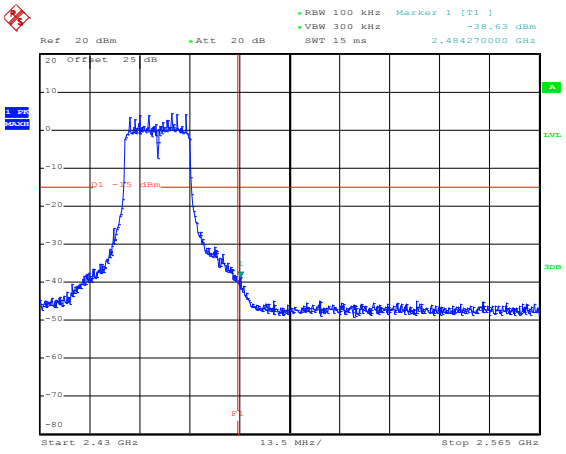
WLAN 802.11ac VHT20 Channel 11

100kHz PSD reference Level



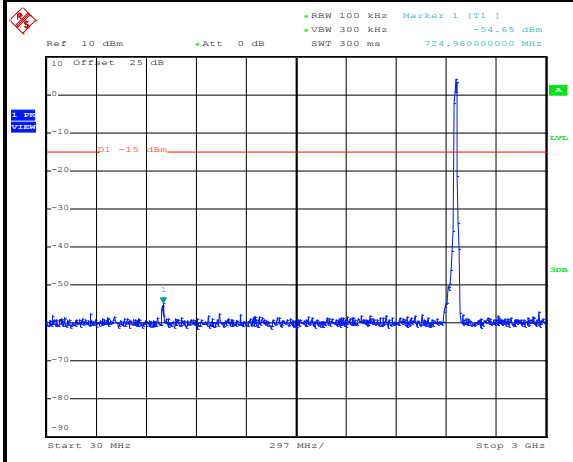
Date: 21.JUN.2015 11:30:47

High Channel Plot



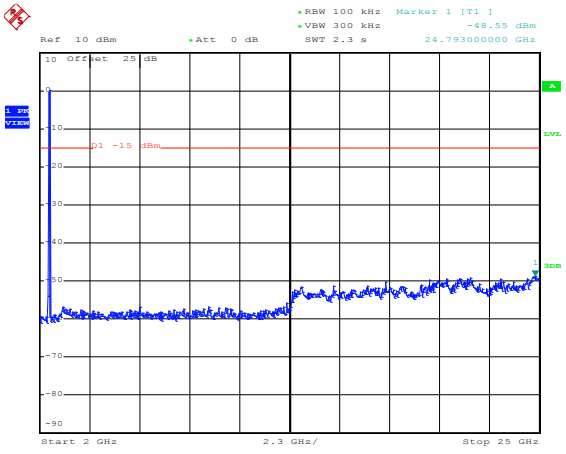
Date: 21.JUN.2015 11:31:23

Spurious Emission 30MHz~3GHz



Date: 21.JUN.2015 11:32:04

Spurious Emission 2GHz~25GHz



Date: 21.JUN.2015 11:32:22

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.

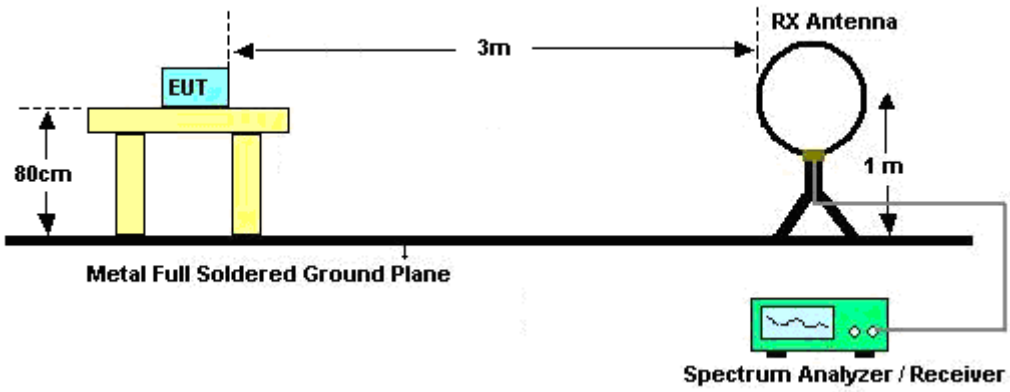
3.5.3 Test Procedure

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r03.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

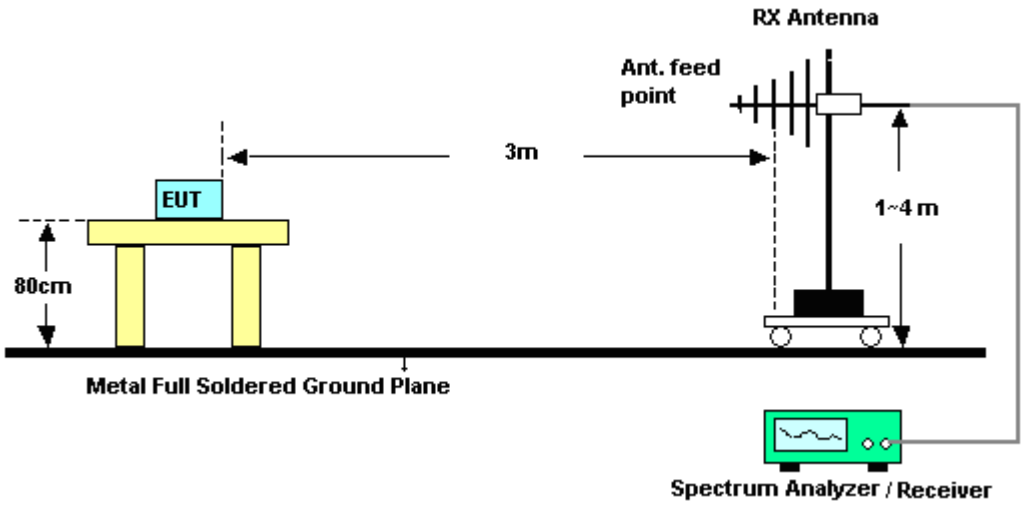
Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1+2	802.11b for Ant. 1	99.04	-	-	10Hz
1+2	802.11b for Ant. 2	99.04	-	-	10Hz
1+2	802.11g for Ant. 1	94.85	2064.00	0.48	1kHz
1+2	802.11g for Ant. 2	95.59	2080.00	0.48	1kHz
1+2	2.4GHz 802.11n HT20 for Ant. 1	91.18	993.59	1.01	3kHz
1+2	2.4GHz 802.11n HT20 for Ant. 2	91.18	993.59	1.01	3kHz
1+2	2.4GHz 802.11ac VHT20 for Ant. 1	94.49	1923.08	0.52	1kHz
1+2	2.4GHz 802.11ac VHT20 for Ant. 2	95.28	1939.10	0.52	1kHz

3.5.4 Test Setup

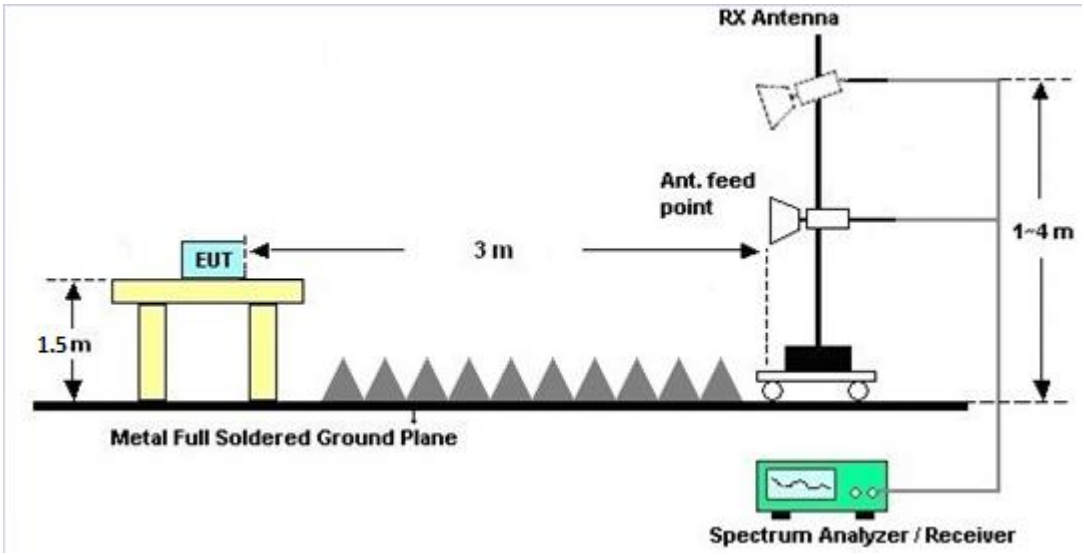
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.5.5 Test Results of Radiated 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 B of this report.

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

Please refer to Appendix B of this report.

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.

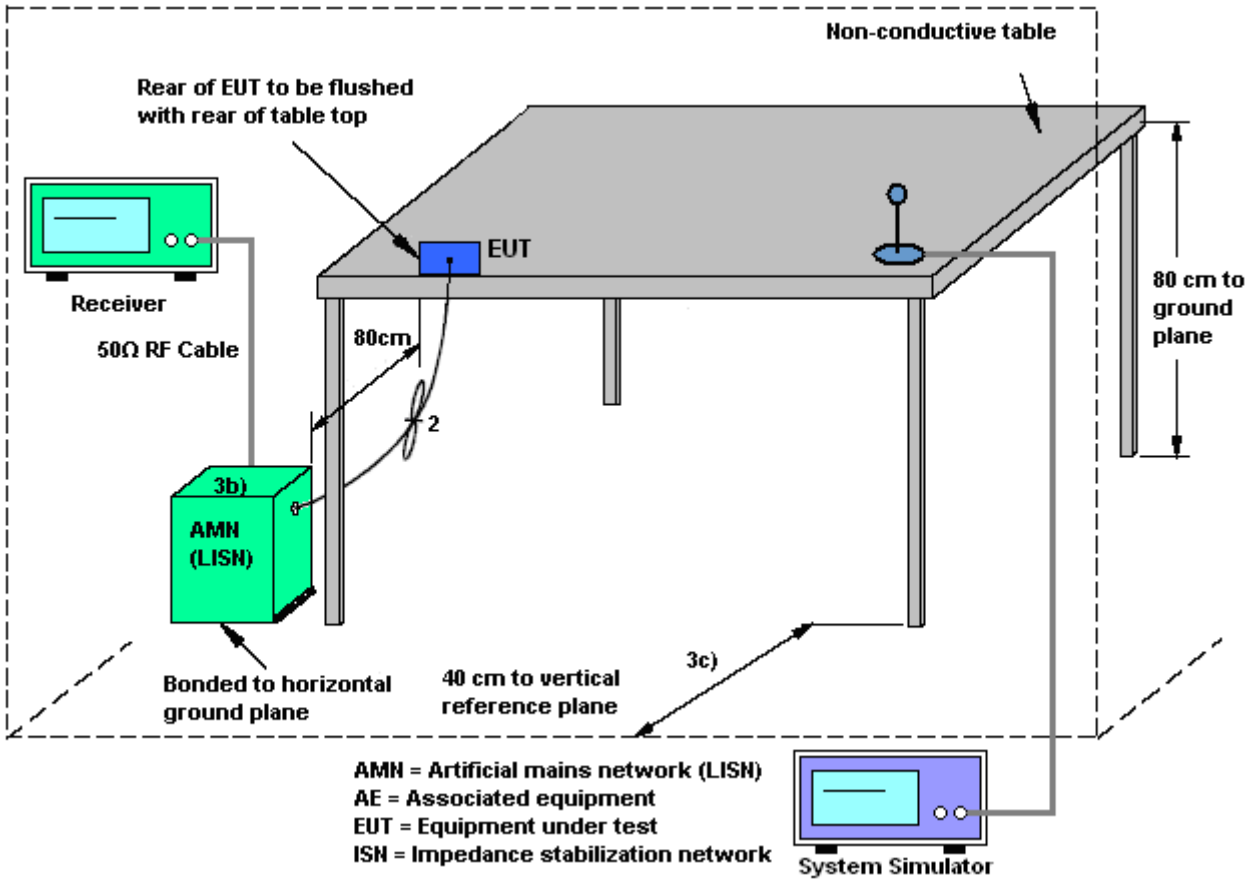
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

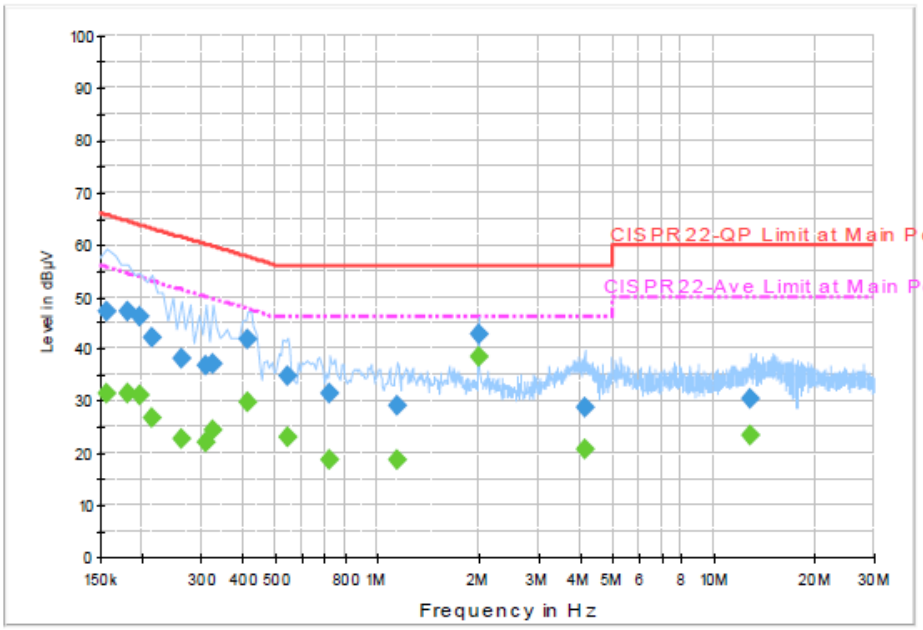
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other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

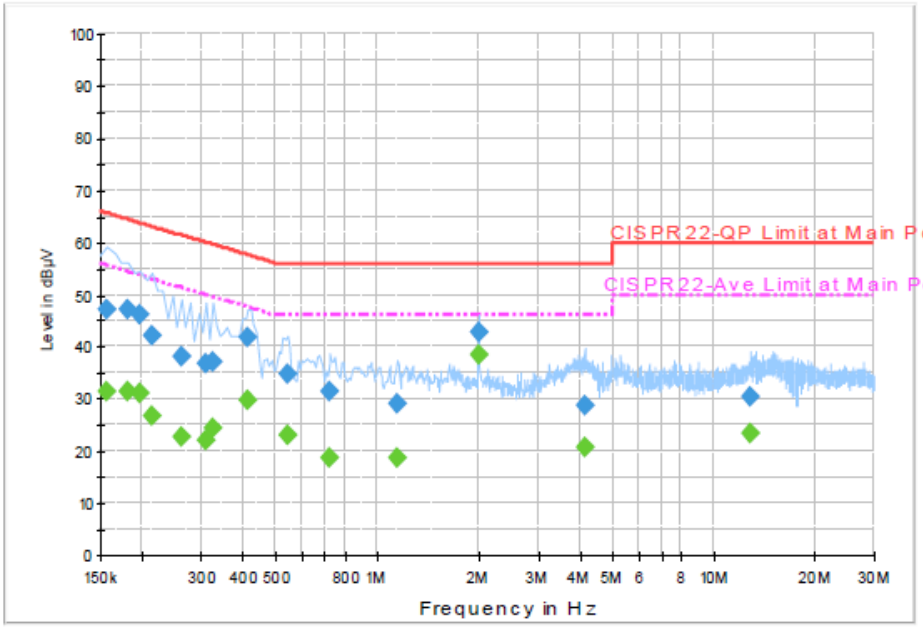
Test Mode :	Mode 1	**Temperature :**	23~25℃
Test Engineer :	Eric Jeng	**Relative Humidity :**	58~59%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	GSM850 Idle + WLAN (2.4GHz) Link + Bluetooth Link + Adapter + Earphone + MP3		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	47.1	Off	L1	19.5	18.5	65.6
0.182000	47.2	Off	L1	19.5	17.2	64.4
0.198000	46.1	Off	L1	19.4	17.6	63.7
0.214000	42.2	Off	L1	19.4	20.8	63.0
0.262000	38.1	Off	L1	19.5	23.3	61.4
0.310000	36.7	Off	L1	19.5	23.3	60.0
0.326000	37.1	Off	L1	19.5	22.5	59.6
0.414000	41.8	Off	L1	19.5	15.8	57.6
0.542000	34.8	Off	L1	19.4	21.2	56.0
0.726000	31.4	Off	L1	19.6	24.6	56.0
1.150000	29.0	Off	L1	19.6	27.0	56.0
2.006000	42.9	Off	L1	19.7	13.1	56.0
4.134000	28.8	Off	L1	19.7	27.2	56.0
12.950000	30.5	Off	L1	19.9	29.5	60.0

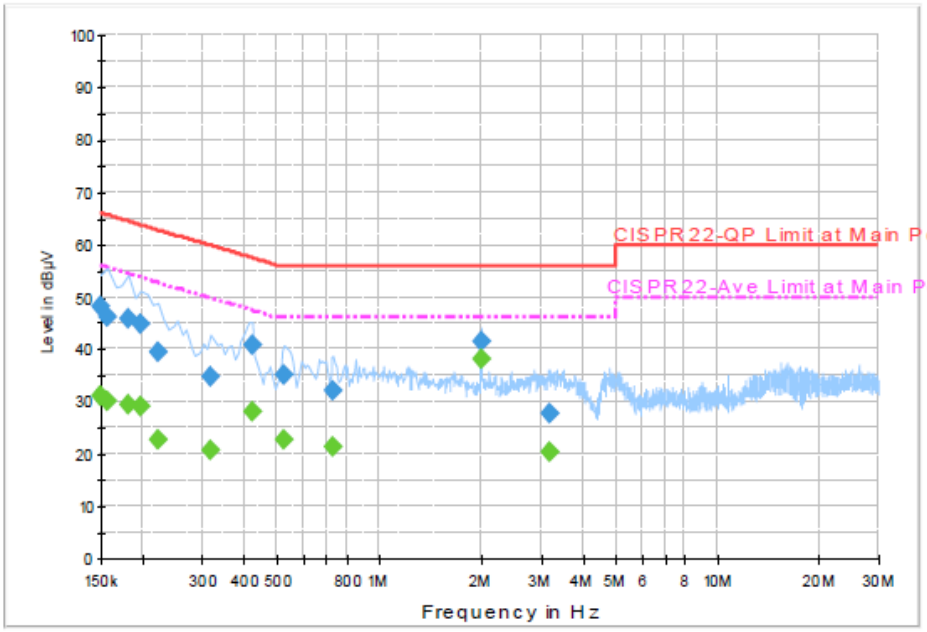
Test Mode :	Mode 1	Temperature :	23~25℃
Test Engineer :	Eric Jeng	Relative Humidity :	58~59%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + WLAN (2.4GHz) Link + Bluetooth Link + Adapter + Earphone + MP3		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	31.6	Off	L1	19.5	24.0	55.6
0.182000	31.3	Off	L1	19.5	23.1	54.4
0.198000	31.1	Off	L1	19.4	22.6	53.7
0.214000	26.9	Off	L1	19.4	26.1	53.0
0.262000	22.9	Off	L1	19.5	28.5	51.4
0.310000	22.2	Off	L1	19.5	27.8	50.0
0.326000	24.3	Off	L1	19.5	25.3	49.6
0.414000	29.6	Off	L1	19.5	18.0	47.6
0.542000	23.0	Off	L1	19.4	23.0	46.0
0.726000	18.6	Off	L1	19.6	27.4	46.0
1.150000	18.6	Off	L1	19.6	27.4	46.0
2.006000	38.5	Off	L1	19.7	7.5	46.0
4.134000	20.7	Off	L1	19.7	25.3	46.0
12.950000	23.5	Off	L1	19.9	26.5	50.0

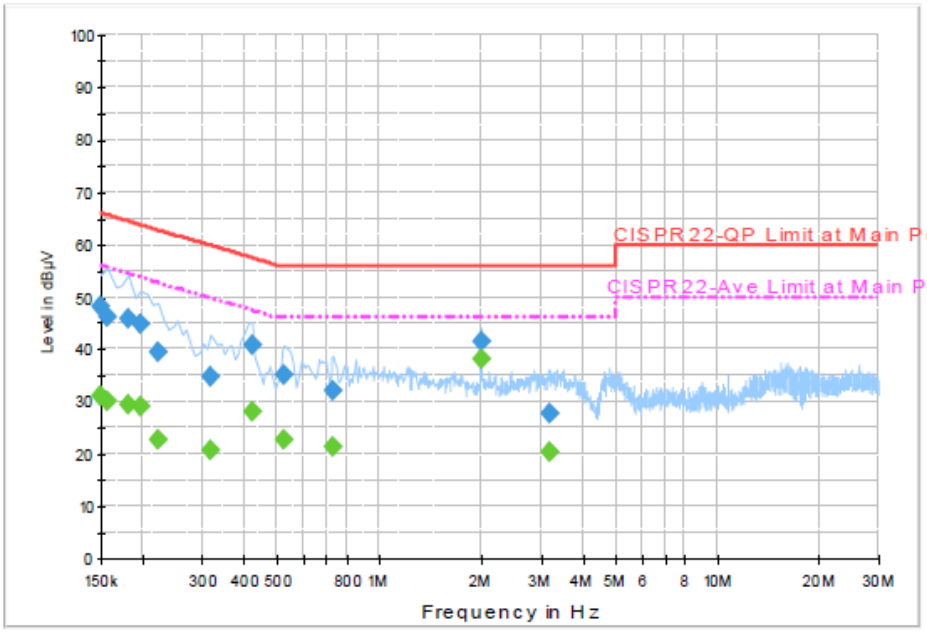
Test Mode :	Mode 1	Temperature :	23~25℃
Test Engineer :	Eric Jeng	Relative Humidity :	58~59%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + WLAN (2.4GHz) Link + Bluetooth Link + Adapter + Earphone + MP3		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	48.3	Off	N	19.5	17.7	66.0
0.158000	46.1	Off	N	19.5	19.5	65.6
0.182000	45.8	Off	N	19.5	18.6	64.4
0.198000	44.7	Off	N	19.4	19.0	63.7
0.222000	39.5	Off	N	19.4	23.2	62.7
0.318000	34.9	Off	N	19.5	24.9	59.8
0.422000	40.7	Off	N	19.5	16.7	57.4
0.526000	35.0	Off	N	19.4	21.0	56.0
0.734000	32.2	Off	N	19.6	23.8	56.0
2.006000	41.5	Off	N	19.7	14.5	56.0
3.206000	27.7	Off	N	19.7	28.3	56.0

Test Mode :	Mode 1	Temperature :	23~25℃
Test Engineer :	Eric Jeng	Relative Humidity :	58~59%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + WLAN (2.4GHz) Link + Bluetooth Link + Adapter + Earphone + MP3		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	31.0	Off	N	19.5	25.0	56.0
0.158000	30.0	Off	N	19.5	25.6	55.6
0.182000	29.6	Off	N	19.5	24.8	54.4
0.198000	29.0	Off	N	19.4	24.7	53.7
0.222000	22.7	Off	N	19.4	30.0	52.7
0.318000	20.8	Off	N	19.5	29.0	49.8
0.422000	28.0	Off	N	19.5	19.4	47.4
0.526000	22.7	Off	N	19.4	23.3	46.0
0.734000	21.4	Off	N	19.6	24.6	46.0
2.006000	38.0	Off	N	19.7	8.0	46.0
3.206000	20.4	Off	N	19.7	25.6	46.0

3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting Antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the Antenna exceeds 6 dBi. The use of a permanently attached Antenna or of an Antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

For CDD and beamforming transmissions, directional gain is calculated as

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

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 and beamforming.

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.

	Ant. 1 (dBi)	Ant. 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
2.4 GHz	-3.90	-4.30	-1.09	-1.09	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
Power Meter	Anritsu	ML2495A	1218006	300MHz~40GHz	Oct. 18, 2014	Jun. 09, 2015 ~ Jun. 21, 2015	Oct. 17, 2015	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	1126017	300MHz~40GHz	Oct. 18, 2014	Jun. 09, 2015 ~ Jun. 21, 2015	Oct. 17, 2015	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100057	9kHz-40GHz	Oct. 17, 2014	Jun. 09, 2015 ~ Jun. 21, 2015	Oct. 16, 2015	Conducted (TH05-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890089	1V~20V 0.5A~5A	Jan. 14, 2015	Jun. 09, 2015 ~ Jun. 21, 2015	Jan. 13, 2016	Conducted (TH05-HY)
Bilog Antenna	Schaffner	CBL6111C	2726	30MHz ~ 1GHz	Sep. 27, 2014	Jun. 14, 2015 ~ Jun. 23, 2015	Sep. 26, 2015	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 19, 2014	Jun. 14, 2015 ~ Jun. 23, 2015	Aug. 18, 2015	Radiation (03CH07-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Aug. 30, 2014	Jun. 14, 2015 ~ Jun. 23, 2015	Aug. 29, 2015	Radiation (03CH07-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1328	1GHz ~ 18GHz	Nov. 05, 2014	Jun. 14, 2015 ~ Jun. 23, 2015	Nov. 04, 2015	Radiation (03CH07-HY)
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 03, 2014	Jun. 14, 2015 ~ Jun. 23, 2015	Nov. 02, 2015	Radiation (03CH07-HY)
Hygrometer	Testo	608-H1	34897197	N/A	May. 04, 2015	Jun. 14, 2015 ~ Jun. 23, 2015	May. 03, 2016	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Jul. 28, 2014	Jun. 14, 2015 ~ Jun. 23, 2015	Jul. 27, 2015	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1590075	1GHz ~ 18GHz	Apr. 20, 2015	Jun. 14, 2015 ~ Jun. 23, 2015	Apr. 19, 2016	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz-1000MHz	Mar. 12, 2015	Jun. 14, 2015 ~ Jun. 23, 2015	Mar. 11, 2016	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Oct. 21, 2014	Jun. 14, 2015 ~ Jun. 23, 2015	Oct. 20, 2015	Radiation (03CH07-HY)
Signal Analyzer	Rohde & Schwarz	FSV 30	101749	10Hz~30GHz	Mar. 10, 2015	Jun. 14, 2015 ~ Jun. 23, 2015	Mar. 09, 2016	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Jun. 14, 2015 ~ Jun. 23, 2015	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 degree	N/A	Jun. 14, 2015 ~ Jun. 23, 2015	N/A	Radiation (03CH07-HY)
Preamplifier	MITEQ	JS44-18004000-33-8P	1840917	18GHz ~ 40GHz	Jun. 02, 2015	Jun. 14, 2015 ~ Jun. 23, 2015	Jun. 01, 2016	Radiation (03CH07-HY)
EMI Test Receiver	Rohde & Schwarz	ESCS 30	100356	9kHz – 2.75GHz	Dec. 01, 2014	Jun. 20, 2015	Nov. 30, 2015	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 02, 2014	Jun. 20, 2015	Dec. 01, 2015	Conduction (CO05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jun. 20, 2015	N/A	Conduction (CO05-HY)

5 Uncertainty of Evaluation

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.2**

Appendix A. Conducted Test Results

Test Engineer:	Tommy Lee, Luffy Lin, and Kenny Chen	Temperature:	21~25	°C
Test Date:	2015/6/9~2015/6/21	Relative Humidity:	51~54	%

TEST RESULTS DATA
6dB Bandwidth

2.4GHz Band								
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant 1	Ant 2		
11b	1Mbps	2	1	2412	8.08	8.08	0.50	Pass
11b	1Mbps	2	6	2437	8.04	8.10	0.50	Pass
11b	1Mbps	2	11	2462	8.08	8.10	0.50	Pass
11g	6Mbps	2	1	2412	15.76	16.32	0.50	Pass
11g	6Mbps	2	6	2437	16.32	16.32	0.50	Pass
11g	6Mbps	2	11	2462	15.68	15.96	0.50	Pass
HT20	MCS8	2	1	2412	16.38	16.96	0.50	Pass
HT20	MCS8	2	6	2437	17.20	17.20	0.50	Pass
HT20	MCS8	2	11	2462	16.62	17.22	0.50	Pass
VHT20	MCS0	2	1	2412	16.12	16.46	0.50	Pass
VHT20	MCS0	2	6	2437	17.20	16.96	0.50	Pass
VHT20	MCS0	2	11	2462	16.86	16.80	0.50	Pass

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TEST RESULTS DATA
Peak Output Power

2.4GHz Band																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	2	1	2412	20.53	20.94	23.75	30.00		-1.09		22.66		36.00		Pass
11b	1Mbps	2	6	2437	20.12	20.83	23.50	30.00		-1.09		22.41		36.00		Pass
11b	1Mbps	2	11	2462	20.62	20.69	23.67	30.00		-1.09		22.58		36.00		Pass
11g	6Mbps	2	1	2412	22.24	22.62	25.44	30.00		-1.09		24.36		36.00		Pass
11g	6Mbps	2	6	2437	22.08	22.46	25.28	30.00		-1.09		24.20		36.00		Pass
11g	6Mbps	2	11	2462	21.86	22.40	25.15	30.00		-1.09		24.06		36.00		Pass
HT20	MCS8	2	1	2412	22.30	22.38	25.35	30.00		-1.09		24.26		36.00		Pass
HT20	MCS8	2	6	2437	22.18	22.18	25.19	30.00		-1.09		24.10		36.00		Pass
HT20	MCS8	2	11	2462	21.48	21.72	24.61	30.00		-1.09		23.52		36.00		Pass
VHT20	MCS0	2	1	2412	22.23	22.29	25.27	30.00		-1.09		24.18		36.00		Pass
VHT20	MCS0	2	6	2437	22.22	22.18	25.21	30.00		-1.09		24.12		36.00		Pass
VHT20	MCS0	2	11	2462	21.69	21.57	24.64	30.00		-1.09		23.55		36.00		Pass

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

TEST RESULTS DATA
Average Output Power

2.4GHz Band									
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)		
					Ant 1	Ant 2	Ant 1	Ant 2	SUM
11b	1Mbps	2	1	2412	0.04	0.04	18.16	18.48	21.34
11b	1Mbps	2	6	2437	0.04	0.04	17.89	18.33	21.13
11b	1Mbps	2	11	2462	0.04	0.04	18.45	18.18	21.33
11g	6Mbps	2	1	2412	0.23	0.20	16.89	16.99	19.95
11g	6Mbps	2	6	2437	0.23	0.20	16.60	16.94	19.78
11g	6Mbps	2	11	2462	0.23	0.20	16.06	16.22	19.15
HT20	MCS8	2	1	2412	0.40	0.40	16.73	16.88	19.82
HT20	MCS8	2	6	2437	0.40	0.40	16.63	17.02	19.84
HT20	MCS8	2	11	2462	0.40	0.40	15.46	15.73	18.61
VHT20	MCS0	2	1	2412	0.25	0.21	16.83	16.80	19.82
VHT20	MCS0	2	6	2437	0.25	0.21	16.38	16.87	19.64
VHT20	MCS0	2	11	2462	0.25	0.21	15.34	15.40	18.38

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

Report Number : FR552083C

TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant 1	Ant 2	Worse + 3.01	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	2	1	2412	-6.83	-1.90	1.11	-1.09		8.00		Pass
11b	1Mbps	2	6	2437	-7.22	-6.04	-3.03	-1.09		8.00		Pass
11b	1Mbps	2	11	2462	-6.71	-7.54	-3.70	-1.09		8.00		Pass
11g	6Mbps	2	1	2412	-10.51	-10.17	-7.16	-1.09		8.00		Pass
11g	6Mbps	2	6	2437	-10.81	-10.65	-7.64	-1.09		8.00		Pass
11g	6Mbps	2	11	2462	-10.35	-10.38	-7.34	-1.09		8.00		Pass
HT20	MCS8	2	1	2412	-10.45	-10.27	-7.26	-1.09		8.00		Pass
HT20	MCS8	2	6	2437	-11.25	-10.09	-7.08	-1.09		8.00		Pass
HT20	MCS8	2	11	2462	-12.46	-10.57	-7.56	-1.09		8.00		Pass
VHT20	MCS0	2	1	2412	-10.75	-9.28	-6.27	-1.09		8.00		Pass
VHT20	MCS0	2	6	2437	-11.78	-10.22	-7.21	-1.09		8.00		Pass
VHT20	MCS0	2	11	2462	-12.45	-11.28	-8.27	-1.09		8.00		Pass

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

Appendix B. Radiated Spurious Emission

Test Engineer :	Nick Yu, Ken Wu, and James Chiu	Temperature :	23~24°C
		Relative Humidity :	55~61%

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m) (with PMA wireless charger)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2341.23	58.28	-15.72	74	52.74	32.11	7.68	34.25	116	318	P	H
		2387.13	44.74	-9.26	54	39.08	32.18	7.75	34.27	116	318	A	H
	*	2412	109.16	-	-	103.51	32.2	7.75	34.3	116	318	P	H
	*	2412	104.82	-	-	99.17	32.2	7.75	34.3	116	318	A	H
													H
													H
		2359.05	57.87	-16.13	74	52.31	32.13	7.68	34.25	103	304	P	V
		2386.59	44.23	-9.77	54	38.57	32.18	7.75	34.27	103	304	A	V
	*	2412	101.48	-	-	95.83	32.2	7.75	34.3	103	304	P	V
	*	2412	96.73	-	-	91.08	32.2	7.75	34.3	103	304	A	V
													V
													V
802.11b CH 06 2437MHz		2326.47	58.19	-15.81	74	52.72	32.09	7.6	34.22	262	278	P	H
		2390	44.3	-9.7	54	38.67	32.18	7.75	34.3	262	278	A	H
	*	2437	109.28	-	-	103.56	32.24	7.83	34.35	262	278	P	H
	*	2437	104.12	-	-	98.4	32.24	7.83	34.35	262	278	A	H
		2484	58.23	-15.77	74	52.47	32.28	7.91	34.43	262	278	P	H
		2483.56	44.65	-9.35	54	38.89	32.28	7.91	34.43	262	278	A	H
		2374.26	58.58	-15.42	74	53.01	32.16	7.68	34.27	100	311	P	V
		2334.66	44.08	-9.92	54	38.59	32.11	7.6	34.22	100	311	A	V
	*	2437	101.69	-	-	95.97	32.24	7.83	34.35	100	311	P	V
	*	2437	97.14	-	-	91.42	32.24	7.83	34.35	100	311	A	V
		2486.28	58.66	-15.34	74	52.9	32.28	7.91	34.43	100	311	P	V
		2484.84	44.3	-9.7	54	38.54	32.28	7.91	34.43	100	311	A	V

802.11b CH 11 2462MHz	*	2462	110	-	-	104.22	32.26	7.91	34.39	284	270	P	H
	*	2462	105.42	-	-	99.64	32.26	7.91	34.39	284	270	A	H
		2483.64	59.97	-14.03	74	54.21	32.28	7.91	34.43	284	270	P	H
		2483.6	46.6	-7.4	54	40.84	32.28	7.91	34.43	284	270	A	H
													H
													H
	*	2462	101.54	-	-	95.76	32.26	7.91	34.39	100	305	P	V
	*	2462	96.5	-	-	90.72	32.26	7.91	34.39	100	305	A	V
		2485.32	57.91	-16.09	74	52.15	32.28	7.91	34.43	100	305	P	V
		2483.56	44.62	-9.38	54	38.86	32.28	7.91	34.43	100	305	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m) (with PMA wireless charger)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		4824	46.4	-27.6	74	60.62	34.26	11.16	59.64	100	0	P	H
													H
													H
													H
		4824	48.05	-25.95	74	62.27	34.26	11.16	59.64	100	0	P	V
													V
													V
													V
802.11b CH 06 2437MHz		4875	47.41	-26.59	74	61.47	34.3	11.21	59.57	100	0	P	H
		7311	46.85	-27.15	74	54.64	35.6	15.08	58.47	100	0	P	H
													H
													H
		4875	49.56	-24.44	74	63.62	34.3	11.21	59.57	100	0	P	V
		7308	47.3	-26.7	74	55.09	35.6	15.08	58.47	100	0	P	V
													V
													V
802.11b CH 11 2462MHz		4926	48.84	-25.16	74	62.73	34.34	11.27	59.5	100	0	P	H
		7386	43.98	-30.02	74	51.82	35.6	15.14	58.58	100	0	P	H
													H
													H
		4926	49.55	-24.45	74	63.44	34.34	11.27	59.5	100	0	P	V
		7386	45.21	-28.79	74	53.05	35.6	15.14	58.58	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m) (with PMA wireless charger)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11g CH 01 2412MHz		2389.74	66.79	-7.21	74	61.13	32.18	7.75	34.27	265	276	P	H
		2389.92	51.76	-2.24	54	46.13	32.18	7.75	34.3	265	276	A	H
	*	2412	110.25	-	-	104.6	32.2	7.75	34.3	265	276	P	H
	*	2412	99.93	-	-	94.28	32.2	7.75	34.3	265	276	A	H
													H
													H
		2390	61.4	-12.6	74	55.77	32.18	7.75	34.3	100	313	P	V
		2390	47.61	-6.39	54	41.98	32.18	7.75	34.3	100	313	A	V
	*	2408.601	103.74	-	-	98.09	32.2	7.75	34.3	100	313	P	V
	*	2408.183	92.98	-	-	87.33	32.2	7.75	34.3	100	313	A	V
													V
													V
802.11g CH 06 2437MHz		2324.31	58.3	-15.7	74	52.83	32.09	7.6	34.22	260	270	P	H
		2389.83	45.07	-8.93	54	39.44	32.18	7.75	34.3	260	270	A	H
	*	2437	110.39	-	-	104.67	32.24	7.83	34.35	260	270	P	H
	*	2437	100.27	-	-	94.55	32.24	7.83	34.35	260	270	A	H
		2488.32	58.6	-15.4	74	52.82	32.3	7.91	34.43	260	270	P	H
		2484.88	45.46	-8.54	54	39.7	32.28	7.91	34.43	260	270	A	H
		2335.56	57.99	-16.01	74	52.5	32.11	7.6	34.22	100	310	P	V
		2314.5	44.94	-9.06	54	39.49	32.07	7.6	34.22	100	310	A	V
	*	2437	102.08	-	-	96.36	32.24	7.83	34.35	100	310	P	V
	*	2437	92.08	-	-	86.36	32.24	7.83	34.35	100	310	A	V
		2499	58.81	-15.19	74	53.08	32.3	7.91	34.48	100	310	P	V
		2483.96	45.12	-8.88	54	39.36	32.28	7.91	34.43	100	310	A	V

802.11g CH 11 2462MHz	*	2462	109.75	-	-	103.97	32.26	7.91	34.39	285	266	P	H
	*	2462	99.71	-	-	93.93	32.26	7.91	34.39	285	266	A	H
		2483.72	68.65	-5.35	74	62.89	32.28	7.91	34.43	285	266	P	H
		2483.76	52.36	-1.64	54	46.6	32.28	7.91	34.43	285	266	A	H
													H
													H
	*	2462	102.88	-	-	97.1	32.26	7.91	34.39	100	305	P	V
	*	2462	92.51	-	-	86.73	32.26	7.91	34.39	100	305	A	V
		2483.92	60.91	-13.09	74	55.15	32.28	7.91	34.43	100	305	P	V
		2483.52	47.91	-6.09	54	42.15	32.28	7.91	34.43	100	305	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m) (with PMA wireless charger)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11g CH 01 2412MHz		4824	47.93	-26.07	74	62.15	34.26	11.16	59.64	100	0	P	H
													H
													H
													H
		4824	52.34	-21.66	74	66.56	34.26	11.16	59.64	100	168	P	V
		4824	34.56	-19.44	54	48.78	34.26	11.16	59.64	100	168	A	V
													V
													V
802.11g CH 06 2437MHz		4878	45.7	-28.3	74	59.76	34.3	11.21	59.57	100	0	P	H
		7308	43.56	-30.44	74	51.35	35.6	15.08	58.47	100	0	P	H
													H
													H
		4866	47.78	-26.22	74	61.87	34.29	11.21	59.59	100	0	P	V
		7308	44.55	-29.45	74	52.34	35.6	15.08	58.47	100	0	P	V
													V
													V
802.11g CH 11 2462MHz		4924	46.89	-27.11	74	60.78	34.34	11.27	59.5	100	0	P	H
		7386	42.66	-31.34	74	50.5	35.6	15.14	58.58	100	0	P	H
													H
													H
		4924	50	-24	74	63.89	34.34	11.27	59.5	100	0	P	V
		7386	42.97	-31.03	74	50.81	35.6	15.14	58.58	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m) (with PMA wireless charger)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		2389.83	66.6	-7.4	74	60.97	32.18	7.75	34.3	100	263	P	H
		2390	52.35	-1.65	54	46.72	32.18	7.75	34.3	100	263	A	H
	*	2412	109.75	-	-	104.1	32.2	7.75	34.3	100	263	P	H
	*	2412	99.65	-	-	94	32.2	7.75	34.3	100	263	A	H
802.11n													H
HT20													H
CH 01		2389.56	67.84	-6.16	74	62.18	32.18	7.75	34.27	317	213	P	V
2412MHz		2390	52.32	-1.68	54	46.69	32.18	7.75	34.3	317	213	A	V
	*	2412	108.6	-	-	102.95	32.2	7.75	34.3	317	213	P	V
	*	2412	98.83	-	-	93.18	32.2	7.75	34.3	317	213	A	V
													V
													V
		2340.15	58.04	-15.96	74	52.5	32.11	7.68	34.25	100	265	P	H
		2336.64	44.95	-9.05	54	39.46	32.11	7.6	34.22	100	265	A	H
	*	2437	110.1	-	-	104.38	32.24	7.83	34.35	100	265	P	H
	*	2437	100	-	-	94.28	32.24	7.83	34.35	100	265	A	H
802.11n		2484.68	58.57	-15.43	74	52.81	32.28	7.91	34.43	100	265	P	H
HT20		2484.16	45.65	-8.35	54	39.89	32.28	7.91	34.43	100	265	A	H
CH 06		2388.48	58.13	-15.87	74	52.47	32.18	7.75	34.27	320	215	P	V
2437MHz		2389.74	45	-9	54	39.34	32.18	7.75	34.27	320	215	A	V
	*	2437	108.72	-	-	103	32.24	7.83	34.35	320	215	P	V
	*	2437	98.42	-	-	92.7	32.24	7.83	34.35	320	215	A	V
		2485.68	58.42	-15.58	74	52.66	32.28	7.91	34.43	320	215	P	V
		2485	45.48	-8.52	54	39.72	32.28	7.91	34.43	320	215	A	V

	*	2462	108.84	-	-	103.06	32.26	7.91	34.39	126	262	P	H
	*	2462	98.83	-	-	93.05	32.26	7.91	34.39	126	262	A	H
		2483.52	67.09	-6.91	74	61.33	32.28	7.91	34.43	126	262	P	H
		2483.56	52.38	-1.62	54	46.62	32.28	7.91	34.43	126	262	A	H
802.11n													H
HT20													H
CH 11	*	2462	106.7	-	-	100.92	32.26	7.91	34.39	300	212	P	V
2462MHz	*	2462	96.65	-	-	90.87	32.26	7.91	34.39	300	212	A	V
		2484.16	67.2	-6.8	74	61.44	32.28	7.91	34.43	300	212	P	V
		2483.52	51.82	-2.18	54	46.06	32.28	7.91	34.43	300	212	A	V
													V
													V

Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m) (with PMA wireless charger)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		4824	45.46	-28.54	74	59.68	34.26	11.16	59.64	100	0	P	H
													H
802.11n													H
HT20													H
CH 01		4824	45.6	-28.4	74	59.82	34.26	11.16	59.64	100	0	P	V
2412MHz													V
													V
													V
		4875	45.12	-28.88	74	59.18	34.3	11.21	59.57	100	0	P	H
		7311	42.77	-31.23	74	50.56	35.6	15.08	58.47	100	0	P	H
802.11n													H
HT20													H
CH 06		4875	45.61	-28.39	74	59.67	34.3	11.21	59.57	100	0	P	V
2437MHz		7311	42.34	-31.66	74	50.13	35.6	15.08	58.47	100	0	P	V
													V
													V
		4923	39.75	-34.25	74	53.64	34.34	11.27	59.5	100	0	P	H
		7386	43.09	-30.91	74	50.93	35.6	15.14	58.58	100	0	P	H
802.11n													H
HT20													H
CH 11		4923	39.69	-34.31	74	53.58	34.34	11.27	59.5	100	0	P	V
2462MHz		7386	43.8	-30.2	74	51.64	35.6	15.14	58.58	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT20 (Band Edge @ 3m) (with PMA wireless charger)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		2389.92	67.1	-6.9	74	61.47	32.18	7.75	34.3	100	264	P	H
		2390	52.3	-1.7	54	46.67	32.18	7.75	34.3	100	264	A	H
	*	2412	110.4	-	-	104.75	32.2	7.75	34.3	100	264	P	H
	*	2412	100.35	-	-	94.7	32.2	7.75	34.3	100	264	A	H
802.11ac													H
VHT20													H
CH 01		2389.65	67.03	-6.97	74	61.37	32.18	7.75	34.27	315	212	P	V
2412MHz		2390	52.37	-1.63	54	46.74	32.18	7.75	34.3	315	212	A	V
	*	2412	108.76	-	-	103.11	32.2	7.75	34.3	315	212	P	V
	*	2412	98.98	-	-	93.33	32.2	7.75	34.3	315	212	A	V
													V
													V
		2329.26	59.18	-14.82	74	53.71	32.09	7.6	34.22	100	264	P	H
		2362.29	44.83	-9.17	54	39.27	32.13	7.68	34.25	100	264	A	H
	*	2437	110.35	-	-	104.63	32.24	7.83	34.35	100	264	P	H
	*	2437	100.37	-	-	94.65	32.24	7.83	34.35	100	264	A	H
802.11ac		2484.88	58.72	-15.28	74	52.96	32.28	7.91	34.43	100	264	P	H
VHT20		2483.8	45.77	-8.23	54	40.01	32.28	7.91	34.43	100	264	A	H
CH 06		2346.81	58.04	-15.96	74	52.5	32.11	7.68	34.25	321	214	P	V
2437MHz		2389.2	45.02	-8.98	54	39.36	32.18	7.75	34.27	321	214	A	V
	*	2437	108.66	-	-	102.94	32.24	7.83	34.35	321	214	P	V
	*	2437	98.54	-	-	92.82	32.24	7.83	34.35	321	214	A	V
		2485	58.9	-15.1	74	53.14	32.28	7.91	34.43	321	214	P	V
		2484.68	45.33	-8.67	54	39.57	32.28	7.91	34.43	321	214	A	V

	*	2462	109	-	-	103.22	32.26	7.91	34.39	125	261	P	H
	*	2462	98.77	-	-	92.99	32.26	7.91	34.39	125	261	A	H
		2483.64	65.67	-8.33	74	59.91	32.28	7.91	34.43	125	261	P	H
		2483.52	52.18	-1.82	54	46.42	32.28	7.91	34.43	125	261	A	H
802.11ac													H
VHT20													H
CH 11	*	2462	107.18	-	-	101.4	32.26	7.91	34.39	305	214	P	V
2462MHz	*	2462	97.31	-	-	91.53	32.26	7.91	34.39	305	214	A	V
		2484	67.06	-6.94	74	61.3	32.28	7.91	34.43	305	214	P	V
		2483.56	52.3	-1.7	54	46.54	32.28	7.91	34.43	305	214	A	V
													V
													V

Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11ac VHT20 (Harmonic @ 3m) (with PMA wireless charger)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		4824	44.56	-29.44	74	58.78	34.26	11.16	59.64	100	0	P	H
													H
802.11ac													H
VHT20													H
CH 01		4824	41.28	-32.72	74	55.5	34.26	11.16	59.64	100	0	P	V
2412MHz													V
													V
													V
		4875	46.23	-27.77	74	60.29	34.3	11.21	59.57	100	0	P	H
		7311	42.79	-31.21	74	50.58	35.6	15.08	58.47	100	0	P	H
802.11ac													H
VHT20													H
CH 06		4872	47.67	-26.33	74	61.73	34.3	11.21	59.57	100	0	P	V
2437MHz		7311	43.08	-30.92	74	50.87	35.6	15.08	58.47	100	0	P	V
													V
													V
		4929	46.76	-27.24	74	60.65	34.34	11.27	59.5	100	0	P	H
		7386	42.54	-31.46	74	50.38	35.6	15.14	58.58	100	0	P	H
802.11ac													H
VHT20													H
CH 11		4926	47.28	-26.72	74	61.17	34.34	11.27	59.5	100	0	P	V
2462MHz		7386	42.08	-31.92	74	49.92	35.6	15.14	58.58	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF) (with PMA wireless charger)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		48.09	19.43	-20.57	40	39.76	9.1	1.77	31.2	201	77	P	H
		102.09	15.67	-27.83	43.5	33.97	10.44	2.38	31.12	-	-	P	H
		259.5	16.33	-29.67	46	30.37	14	2.96	31	-	-	P	H
		493.9	20.32	-25.68	46	29.27	17.94	3.77	30.66	-	-	P	H
		703.2	25	-21	46	30.27	20.72	4.41	30.4	-	-	P	H
		976.9	29.74	-24.26	54	30.15	24.94	4.94	30.29	-	-	P	H
													H
													H
													H
													H
2.4GHz													H
802.11n													H
HT20		45.66	26.08	-13.92	40	45.36	10.15	1.77	31.2	193	244	P	V
LF		76.98	21.31	-18.69	40	43.58	6.87	2.06	31.2	-	-	P	V
		98.04	20.77	-22.73	43.5	39.89	9.92	2.06	31.1	-	-	P	V
		490.4	21.26	-24.74	46	30.28	17.91	3.77	30.7	-	-	P	V
		736.8	25.66	-20.34	46	29.51	22.14	4.41	30.4	-	-	P	V
		942.6	29.54	-16.46	46	30.65	24.33	4.94	30.38	-	-	P	V
													V
													V
													V
													V
													V
													V

Remark	1. No other spurious found. 2. All results are PASS against limit line.

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m) (with WPC wireless charger)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
	*	2462	109.89	-	-	104.11	32.26	7.91	34.39	289	267	P	H
	*	2462	98.53	-	-	92.75	32.26	7.91	34.39	289	267	A	H
		2483.52	66.97	-7.03	74	61.21	32.28	7.91	34.43	289	267	P	H
		2483.64	51.88	-2.12	54	46.12	32.28	7.91	34.43	289	267	A	H
802.11n													H
HT20													H
CH 11	*	2462	105.29	-	-	99.51	32.26	7.91	34.39	373	146	P	V
2462MHz	*	2462	94.1	-	-	88.32	32.26	7.91	34.39	373	146	A	V
		2483.56	64.31	-9.69	74	58.55	32.28	7.91	34.43	373	146	P	V
		2483.52	50.31	-3.69	54	44.55	32.28	7.91	34.43	373	146	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m) (with WPC wireless charger)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		4924	40.19	-33.81	74	54.08	34.34	11.27	59.5	100	0	P	H
		7386	41.37	-32.63	74	49.21	35.6	15.14	58.58	100	0	P	H
802.11n													H
HT20													H
CH 11		4926	40.11	-33.89	74	54	34.34	11.27	59.5	100	0	P	V
2462MHz		7386	41.66	-32.34	74	49.5	35.6	15.14	58.58	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF) (with WPC wireless charger)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		45.12	28.09	-11.91	40	47.37	10.15	1.77	31.2	200	72	P	H
		59.97	26.77	-13.23	40	50.3	6	1.77	31.3	-	-	P	H
		138.54	27.58	-15.92	43.5	44.8	11.5	2.38	31.1	-	-	P	H
		385.4	24.2	-21.8	46	36.35	15.3	3.52	30.97	-	-	P	H
		461	22.73	-23.27	46	32.35	17.41	3.77	30.8	-	-	P	H
		918.1	28.12	-17.88	46	29.75	23.91	4.8	30.34	-	-	P	H
													H
													H
													H
													H
2.4GHz													H
802.11n													H
HT20		42.42	36.46	-3.54	40	53.99	11.9	1.77	31.2	165	291	P	V
LF		136.92	22.48	-21.02	43.5	39.7	11.5	2.38	31.1	-	-	P	V
		210.63	21.5	-22	43.5	40.71	9.2	2.69	31.1	-	-	P	V
		385.4	20.88	-25.12	46	33.03	15.3	3.52	30.97	-	-	P	V
		738.9	25.96	-20.04	46	29.77	22.18	4.41	30.4	-	-	P	V
		977.6	28.35	-25.65	54	28.74	24.96	4.94	30.29	-	-	P	V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m) (with adapter)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
	*	2462	110.69	-	-	104.91	32.26	7.91	34.39	290	267	P	H
	*	2462	99.52	-	-	93.74	32.26	7.91	34.39	290	267	A	H
		2483.64	68.06	-5.94	74	62.3	32.28	7.91	34.43	290	267	P	H
		2483.6	53.5	-0.5	54	47.74	32.28	7.91	34.43	290	267	A	H
802.11n													H
HT20													H
CH 11	*	2462	105.36	-	-	99.58	32.26	7.91	34.39	382	146	P	V
2462MHz	*	2462	94.16	-	-	88.38	32.26	7.91	34.39	382	146	A	V
		2484	63.37	-10.63	74	57.61	32.28	7.91	34.43	382	146	P	V
		2483.52	49.22	-4.78	54	43.46	32.28	7.91	34.43	382	146	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m) (with adapter)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		4924	40.48	-33.52	74	54.37	34.34	11.27	59.5	100	0	P	H
		7386	40.76	-33.24	74	48.6	35.6	15.14	58.58	100	0	P	H
802.11n													H
HT20													H
CH 11		4924	41.13	-32.87	74	55.02	34.34	11.27	59.5	100	0	P	V
2462MHz		7386	41.9	-32.1	74	49.74	35.6	15.14	58.58	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF) (with adapter)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		30.81	24.66	-15.34	40	36.07	18.28	1.77	31.46	145	331	P	H
		139.08	28.13	-15.37	43.5	45.35	11.5	2.38	31.1	-	-	P	H
		219	24.88	-21.12	46	43.91	9.29	2.69	31.01	-	-	P	H
		336.4	24.69	-21.31	46	38.42	13.99	3.28	31	-	-	P	H
		730.5	25.4	-20.6	46	29.39	22	4.41	30.4	-	-	P	H
		969.9	29.01	-24.99	54	29.59	24.8	4.94	30.32	-	-	P	H
													H
													H
													H
													H
2.4GHz													H
802.11n													H
HT20		44.85	25.2	-14.8	40	44.13	10.5	1.77	31.2	100	262	P	V
LF		99.66	24.65	-18.85	43.5	43.29	10.4	2.06	31.1	-	-	P	V
		220.08	22.13	-23.87	46	40.87	9.3	2.96	31	-	-	P	V
		548.5	23.25	-22.75	46	30.36	19.68	4.01	30.8	-	-	P	V
		867.7	27.21	-18.79	46	29.87	23.04	4.66	30.36	-	-	P	V
		935.6	29.85	-16.15	46	31.12	24.3	4.8	30.37	-	-	P	V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Note symbol

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

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

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

1. Level(dBμV/m) =

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

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