FCC RF Test Report

APPLICANT	:	Motorola Mobility, LLC
EQUIPMENT	:	Mobile Cellular Phone
BRAND NAME	:	Motorola
MODEL NAME	:	6574
FCC ID	:	IHDT56VB2
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 17, 2016 and testing was completed on May 23, 2016. 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.
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APPENDIX A. RADIATED TEST RESULTS

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR640145-15C	Rev. 01	This is a variant report. All the test cases were performed base on the worst case identified in the original report. The test purpose is to verify the influence caused by additional accessory applied, hence only RSE and AC conducted emission need to be considered. Please referred to appendix D for the original report.(Sporton Report Number FR640145C)	Jun. 01, 2016

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.58 dB at 2483.520 MHz
3.2	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 4.10 dB at 0.238 MHz

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	6574
FCC ID	IHDT56VB2
IMEI Code	354108070054138 (for Radiation) 354108070054146 (for Conduction)
EUT supports Radios application	CDMA/EV-DO/GSM/EGPRS/WCDMA/HSPA/LTE/NFC WLAN 11b/g/n HT20/VHT20 WLAN 11a/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth v3.0 EDR Bluetooth v4.2 LE
HW Version	DVT2
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	
WPC Cover	Brand Name : INCIPIO
	Model Name : MT-043-CASE

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz
Antenna Type	Fixed Internal Antenna (The antenna peak gain of EUT is less than 6 dBi)
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Antenna Function for Transmitter	

	Ant. 1	Ant. 2
802.11 b/g/n/ac SISO	V	V
802.11 b/g/n/ac MIMO	V	V

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.**	
	CO05-HY	03CH07-HY

Note: The test site complies with ANSI C63.4 2014 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 v03r05
- 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 v01r04
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. 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).

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 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.

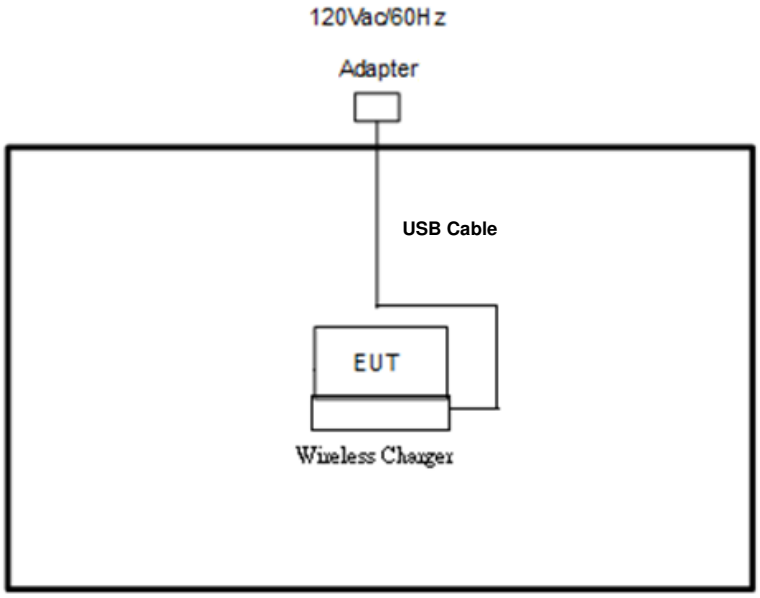
MIMO Antenna

Modulation	Data Rate
802.11n HT20	MCS0

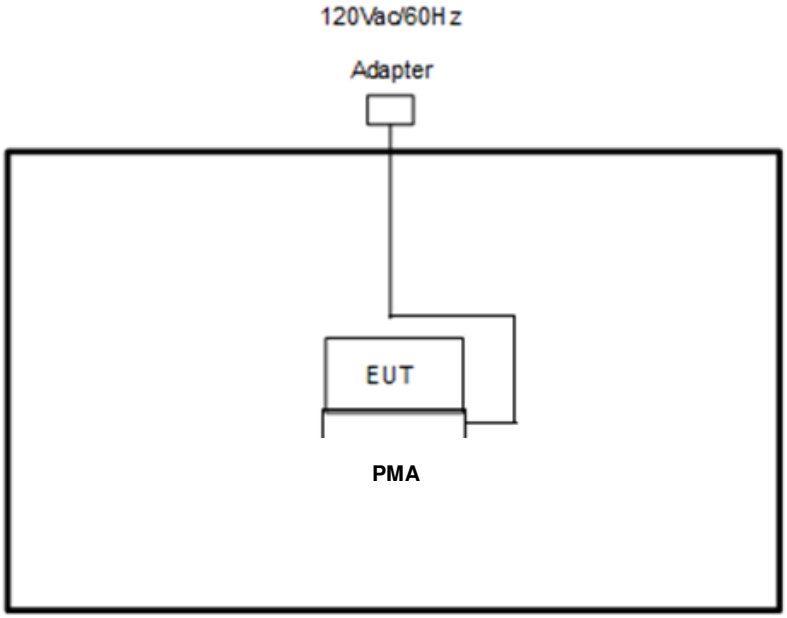
Test Cases	
AC Conducted Emission	Mode 1 :GSM1900 Idle + Bluetooth Link + WLAN (2.4GHz) Link + Camera + WPC Back Cover + WPC Charging Pad + USB Cable (Charging from Adapter) Mode 2 :WCDMA Band V Idle + Bluetooth Link + WLAN (2.4GHz) Link + MPEG4 + WPC Back Cover + PMA Charging Pad + Adapter

2.3 Connection Diagram of Test System

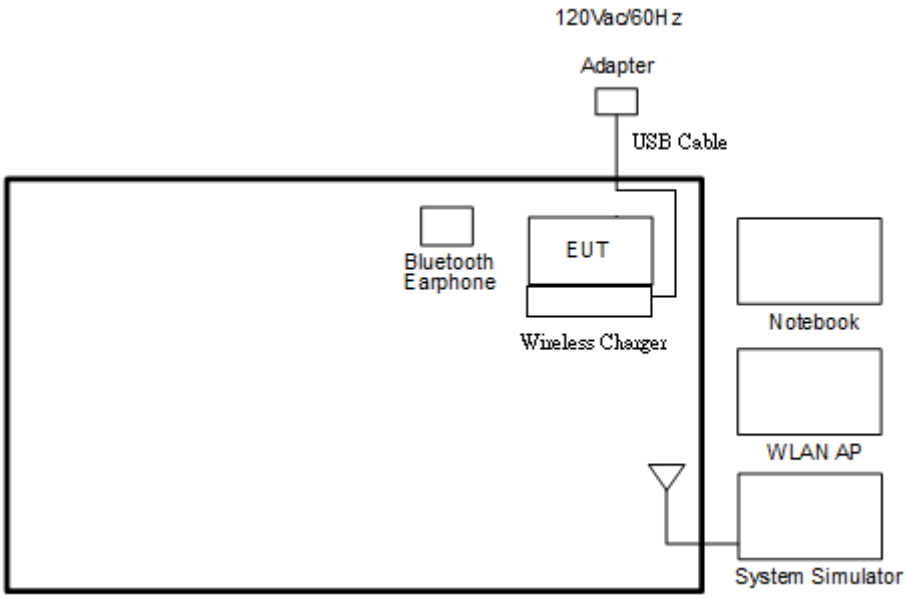
<WLAN Tx with WPC Charging Mode>



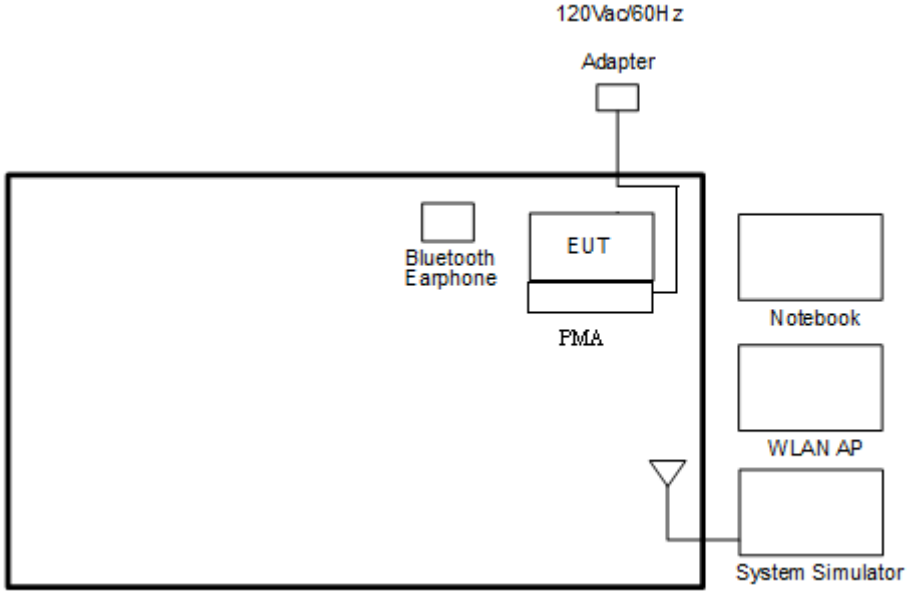
<WLAN Tx with PMA Charging Mode>



<AC Conducted Emission with WPC Charging Mode>



<AC Conducted Emission with PMA Charging Mode>



2.4 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.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
4.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A
6.	Wireless Charger	LG	WCD-100	FCC DoC	N/A	N/A
7.	PMA	DURACELL	M-018B-518A	FCC DoC	N/A	N/A
8.	USB Cable	Motorola	SKN6461A	N/A	Unshielded, 1.0 m	N/A
9.	Adapter	Motorola	SPN5865A	N/A	N/A	N/A

2.5 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.

3 Test Result

3.1 Radiated Band Edges and Spurious Emission Measurement

3.1.1 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

3.1.2 Measuring Instruments

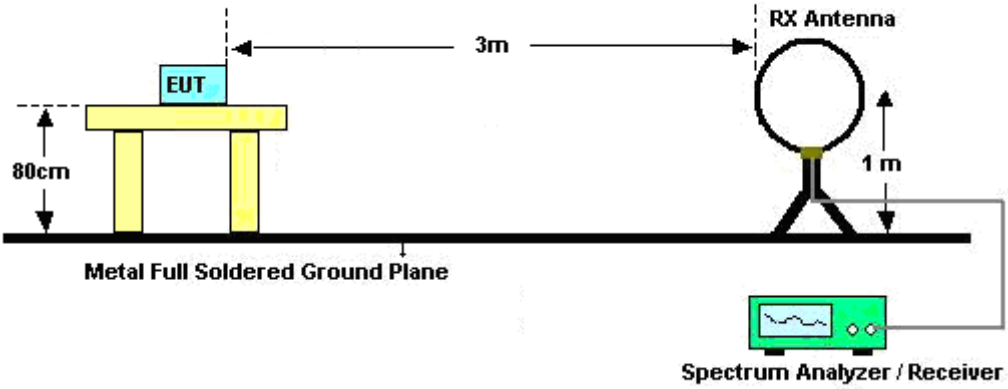
The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedure

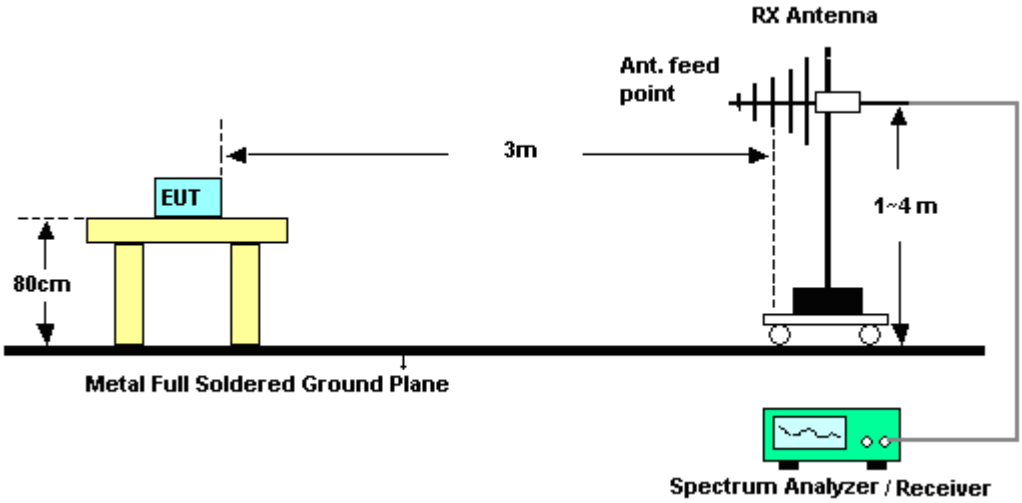
1. The testing follows ANSI C63.10-2013.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. 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.

3.1.4 Test Setup

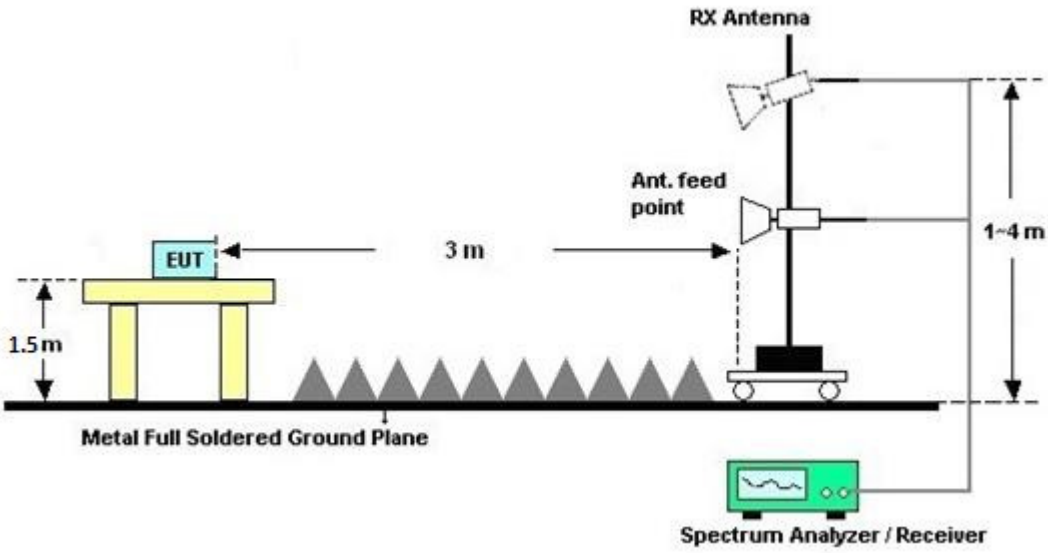
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.1.5 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.

3.1.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A and B.

3.1.7 Duty Cycle

Please refer to Appendix C.

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

Please refer to Appendix A and B.

3.2 AC Conducted Emission Measurement

3.2.1 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.

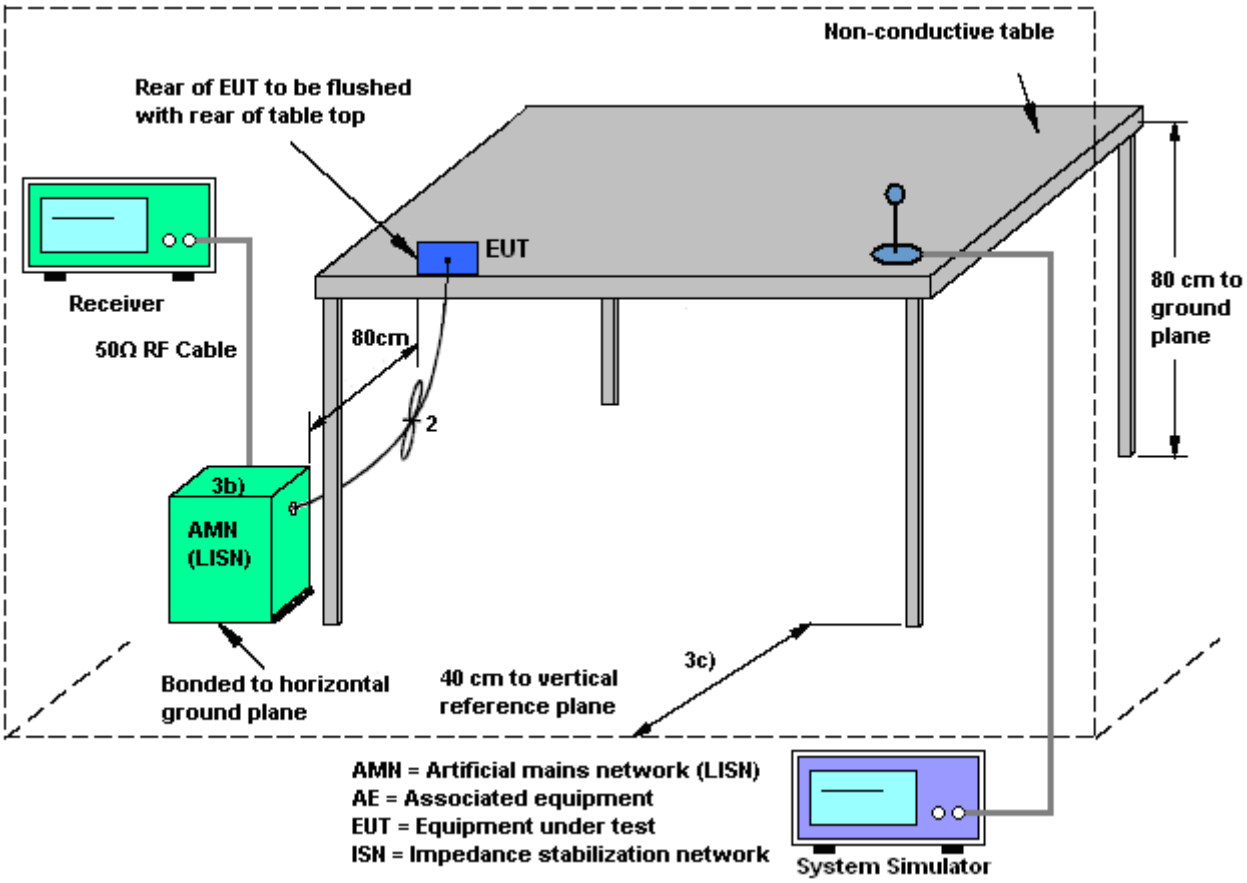
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

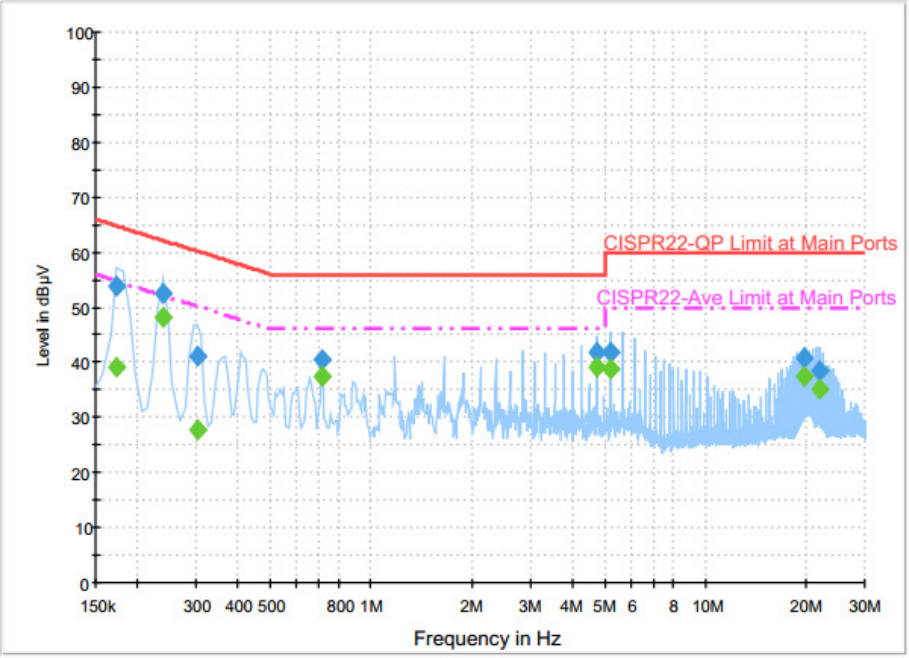
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other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

3.2.4 Test Setup



3.2.5 Test Result of AC Conducted Emission

Test Mode :	Mode 2	**Temperature :**	23~24℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	44~45%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	WCDMA Band V Idle + Bluetooth Link + WLAN (2.4GHz) Link + MPEG4 + WPC Back Cover + PMA Charging Pad + Adapter		



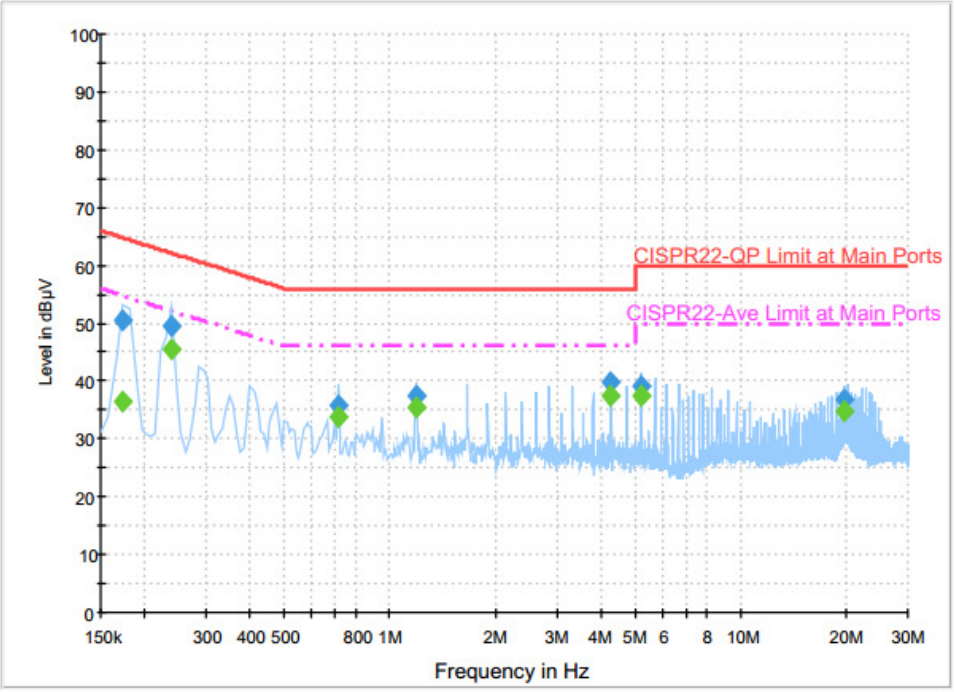
Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.174000	53.8	Off	L1	19.6	11.0	64.8
0.238000	52.5	Off	L1	19.6	9.7	62.2
0.302000	41.3	Off	L1	19.6	18.9	60.2
0.710000	40.6	Off	L1	19.6	15.4	56.0
4.734000	41.9	Off	L1	19.8	14.1	56.0
5.206000	41.8	Off	L1	19.8	18.2	60.0
19.734000	40.7	Off	L1	20.7	19.3	60.0
22.006000	38.3	Off	L1	20.8	21.7	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.174000	39.2	Off	L1	19.6	15.6	54.8
0.238000	48.1	Off	L1	19.6	4.1	52.2
0.302000	27.8	Off	L1	19.6	22.4	50.2
0.710000	37.4	Off	L1	19.6	8.6	46.0
4.734000	39.0	Off	L1	19.8	7.0	46.0
5.206000	38.9	Off	L1	19.8	11.1	50.0
19.734000	37.4	Off	L1	20.7	12.6	50.0
22.006000	35.1	Off	L1	20.8	14.9	50.0

Test Mode :	Mode 2	**Temperature :**	23~24℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	44~45%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	WCDMA Band V Idle + Bluetooth Link + WLAN (2.4GHz) Link + MPEG4 + WPC Back Cover + PMA Charging Pad + Adapter		



Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.174000	50.6	Off	N	19.6	14.2	64.8
0.238000	49.5	Off	N	19.6	12.7	62.2
0.710000	35.7	Off	N	19.6	20.3	56.0
1.190000	37.5	Off	N	19.6	18.5	56.0
4.278000	39.6	Off	N	19.8	16.4	56.0
5.230000	39.2	Off	N	19.8	20.8	60.0
19.726000	36.8	Off	N	20.7	23.2	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.174000	36.4	Off	N	19.6	18.4	54.8
0.238000	45.4	Off	N	19.6	6.8	52.2
0.710000	33.6	Off	N	19.6	12.4	46.0
1.190000	35.6	Off	N	19.6	10.4	46.0
4.278000	37.5	Off	N	19.8	8.5	46.0
5.230000	37.4	Off	N	19.8	12.6	50.0
19.726000	34.8	Off	N	20.7	15.2	50.0

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	May 23, 2016	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Aug. 26, 2015	May 23, 2016	Aug. 25, 2016	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 02, 2015	May 23, 2016	Dec. 01, 2016	Conduction (CO05-HY)
Bilog Antenna	TESEQ	CBL 6111D	35419	30MHz to 1GHz	Jan. 13, 2016	May 20, 2016 ~ May 21, 2016	Jan. 12, 2017	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 21, 2015	May 20, 2016 ~ May 21, 2016	Aug. 20, 2016	Radiation (03CH07-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY54130085	20Hz ~ 8.4GHz	Nov. 04, 2015	May 20, 2016 ~ May 21, 2016	Nov. 03, 2016	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	May 20, 2016 ~ May 21, 2016	Sep. 01, 2016	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1590075	1GHz ~ 18GHz	Apr. 15, 2016	May 20, 2016 ~ May 21, 2016	Apr. 14, 2017	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz-1GHz	Mar. 18, 2016	May 20, 2016 ~ May 21, 2016	Mar. 17, 2017	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Oct. 19, 2015	May 20, 2016 ~ May 21, 2016	Oct. 18, 2016	Radiation (03CH07-HY)
Spectrum Analyzer	Agilent	N9010A	MY53470118	10Hz~44GHz	Feb. 27, 2016	May 20, 2016 ~ May 21, 2016	Feb. 26, 2017	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	May 20, 2016 ~ May 21, 2016	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	May 20, 2016 ~ May 21, 2016	N/A	Radiation (03CH07-HY)
Preamplifier	MITEQ	JS44-18004000-33-8P	1840917	18GHz ~ 40GHz	Jun. 02, 2015	May 20, 2016 ~ May 21, 2016	Jun. 01, 2016	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 02, 2015	May 20, 2016 ~ May 21, 2016	Nov. 01, 2016	Radiation (03CH07-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))	5.60

Appendix A. Radiated Spurious Emission

Test Engineer :	Jesse Wang, James Chiu, and Kyle Jhuang	Temperature :	21~23°C
		Relative Humidity :	55~58%

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

<PMA Charging Mode>

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 11 2462MHz	*	2456	106.32	-	-	101.07	32.11	7.36	34.22	122	58	P	H
	*	2456	98.64	-	-	93.39	32.11	7.36	34.22	122	58	A	H
		2483.64	64.13	-9.87	74	58.75	32.16	7.4	34.18	122	58	P	H
		2483.6	52.79	-1.21	54	47.41	32.16	7.4	34.18	122	58	A	H
													H
													H
	*	2462	104.96	-	-	99.66	32.11	7.4	34.21	302	285	P	V
	*	2462	97.44	-	-	92.14	32.11	7.4	34.21	302	285	A	V
		2483.6	62.25	-11.75	74	56.87	32.16	7.4	34.18	302	285	P	V
		2483.52	51.63	-2.37	54	46.25	32.16	7.4	34.18	302	285	A	V
													V
													V

Remark

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

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

<WPC Charging Mode>

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 11 2462MHz	*	2462	105.02	-	-	99.72	32.11	7.4	34.21	245	183	P	H
	*	2462	97.81	-	-	92.51	32.11	7.4	34.21	245	183	A	H
		2483.52	60.68	-13.32	74	55.3	32.16	7.4	34.18	245	183	P	H
		2483.56	49.59	-4.41	54	44.21	32.16	7.4	34.18	245	183	A	H
													H
													H
	*	2462	106.15	-	-	100.85	32.11	7.4	34.21	100	300	P	V
	*	2462	98.34	-	-	93.04	32.11	7.4	34.21	100	300	A	V
		2483.88	63.25	-10.75	74	57.87	32.16	7.4	34.18	100	300	P	V
		2483.52	53.42	-0.58	54	48.04	32.16	7.4	34.18	100	300	A	V
													V
													V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

<PMA Charging Mode>

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 11 2462MHz		4920	46.25	-27.75	74	59.46	34.26	11.37	58.84	100	0	P	H
		7386	41.27	-32.73	74	49.78	35.6	13.95	58.06	100	0	P	H
													H
													H
		4932	46.99	-27.01	74	60.2	34.26	11.37	58.84	100	0	P	V
		7386	40.38	-33.62	74	48.89	35.6	13.95	58.06	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

<WPC Charging Mode>

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 11 2462MHz		4926	48.85	-25.15	74	62.06	34.26	11.37	58.84	100	0	P	H
		7386	40.89	-33.11	74	49.4	35.6	13.95	58.06	100	0	P	H
													H
													H
		4926	48.43	-25.57	74	61.64	34.26	11.37	58.84	100	0	P	V
		7386	41.31	-32.69	74	49.82	35.6	13.95	58.06	100	0	P	V
													V
													V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

<PMA Charging Mode>

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11n HT20 LF		30	28.8	-11.2	40	33.08	26	1.07	31.35	100	0	P	H
		177.96	27.14	-16.36	43.5	41.34	15.51	1.78	31.49			P	H
		244.92	34.7	-11.3	46	45.47	18.55	2.07	31.39			P	H
		765.5	31.57	-14.43	46	31.04	27.35	3.82	30.64			P	H
		855.1	32.22	-13.78	46	29.95	28.73	4.1	30.56			P	H
		926.5	33.92	-12.08	46	30.69	29.64	4.12	30.53			P	H
													H
													H
													H
													H
													H
													H
		56.46	35.89	-4.11	40	53.17	13.24	1.07	31.59	100	0	P	V
		89.4	26.73	-16.77	43.5	42.01	14.98	1.28	31.54			P	V
		244.92	31.4	-14.6	46	42.17	18.55	2.07	31.39			P	V
		826.4	32.02	-13.98	46	30.27	28.23	4.1	30.58			P	V
		885.2	32.17	-13.83	46	29.64	28.91	4.17	30.55			P	V
		911.8	33.19	-12.81	46	30.33	29.28	4.12	30.54			P	V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

<WPC Charging Mode>

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11n HT20 LF		95.34	27.15	-16.35	43.5	41.65	15.75	1.28	31.53			P	H
		187.68	31.77	-11.73	43.5	45.91	15.48	1.87	31.49			P	H
		209.55	29.39	-14.11	43.5	42.71	16.27	1.87	31.46			P	H
		734.7	35.55	-10.45	46	35.53	26.95	3.74	30.67	100	0	P	H
		772.5	34.81	-11.19	46	34.2	27.42	3.82	30.63			P	H
		988.1	34.59	-19.41	54	30.85	30.28	3.98	30.52			P	H
													H
													H
													H
													H
													H
													H
		53.76	31.65	-8.35	40	48	14.17	1.07	31.59	100	0	P	V
		84.27	27.96	-12.04	40	43.85	14.38	1.28	31.55			P	V
		191.73	29.17	-14.33	43.5	43.18	15.6	1.87	31.48			P	V
		855.1	32.95	-13.05	46	30.68	28.73	4.1	30.56			P	V
		927.2	33.31	-12.69	46	30.06	29.66	4.12	30.53			P	V
		977.6	33.55	-20.45	54	29.74	30.26	4.07	30.52			P	V
													V
													V
													V
													V
													V
													V
Remark	3. No other spurious found. 4. 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.
!	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”.

Appendix B. Radiated Spurious Emission Plots

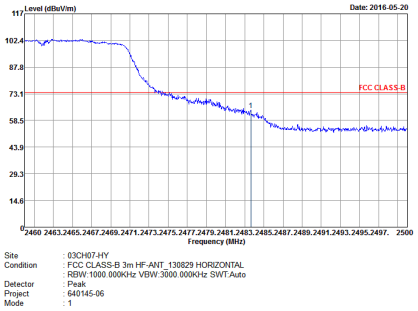
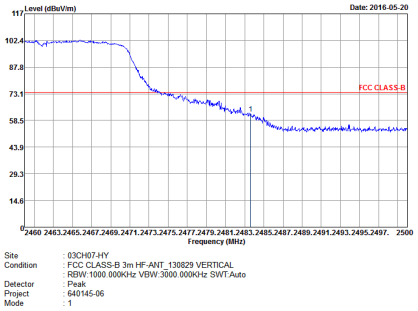
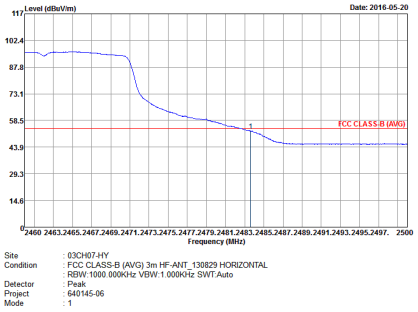
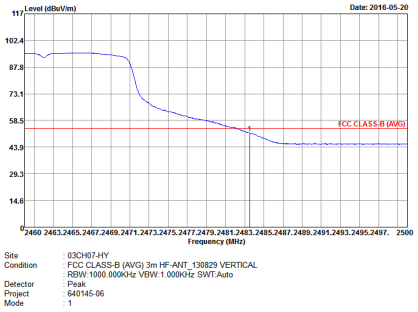
Note symbol

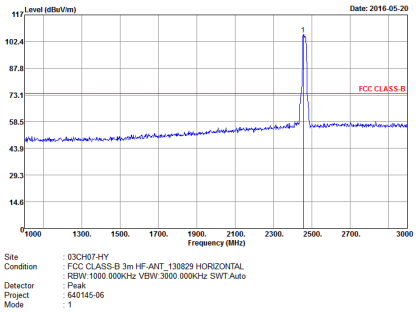
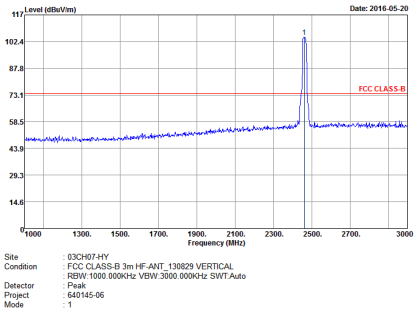
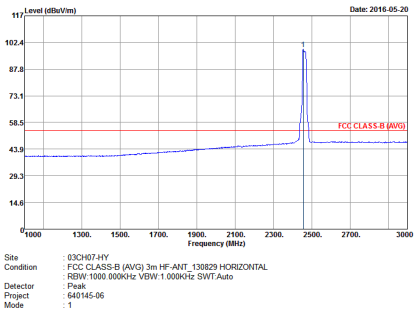
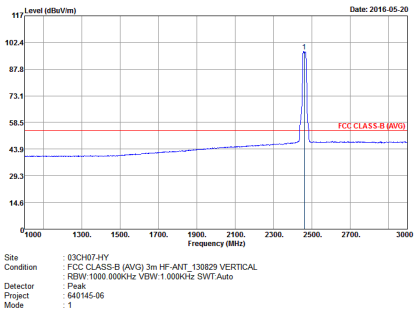
-L	**Low channel location**
-R	**High channel location**

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

<PMA Charging Mode>

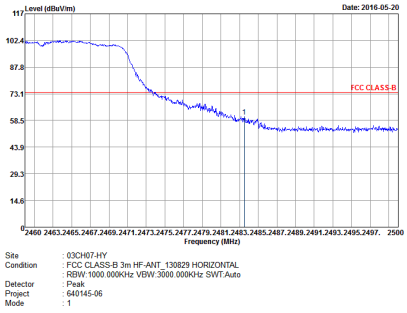
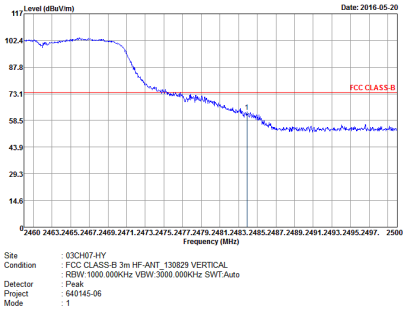
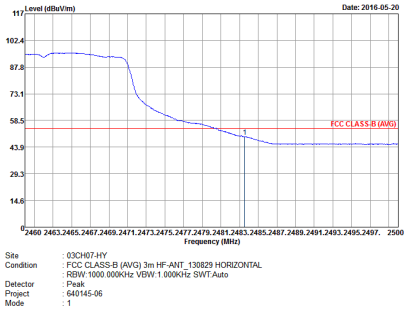
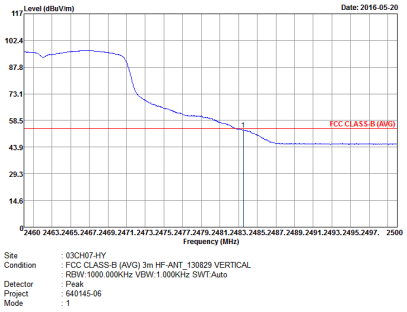
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1+2	Horizontal	Vertical
Peak		
Avg.		

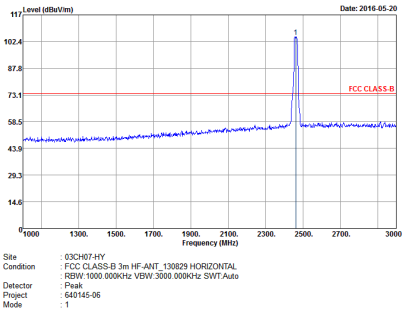
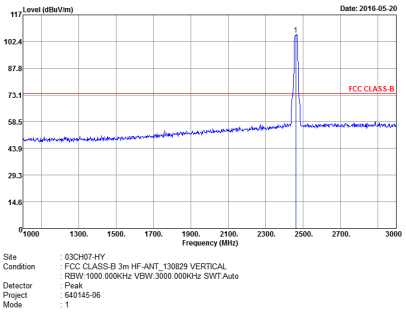
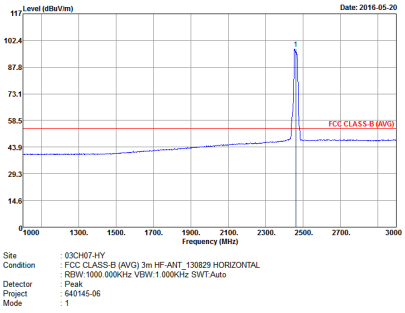
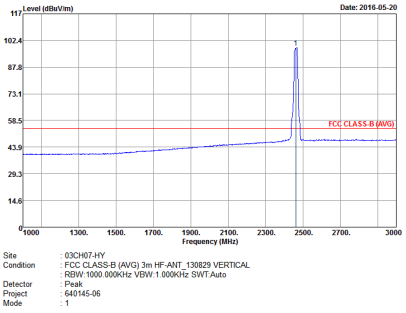
WIFI	2.4GHz 2400~2483.5MHz Fundamental @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1+2	Horizontal	Vertical
Peak		
Avg.		

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

<WPC Charging Mode>

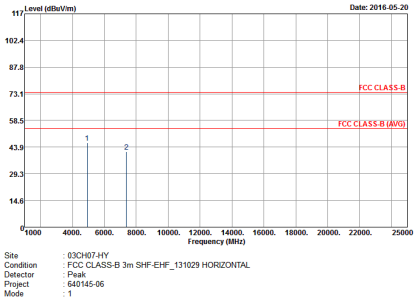
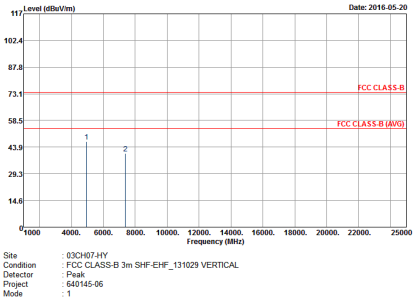
WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1+2	Horizontal	Vertical
Peak		
Avg.		

WIFI	2.4GHz 2400~2483.5MHz Fundamental @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1+2	Horizontal	Vertical
Peak		
Avg.		

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

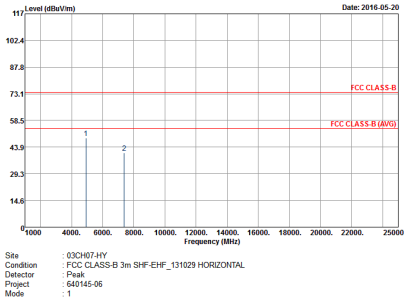
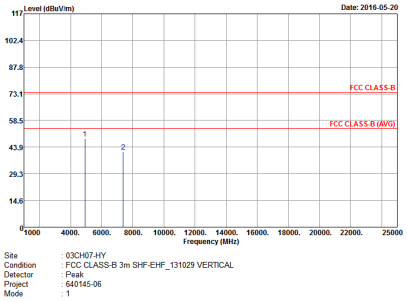
<PMA Charging Mode>

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1+2	Horizontal	Vertical
Peak Avg.		

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

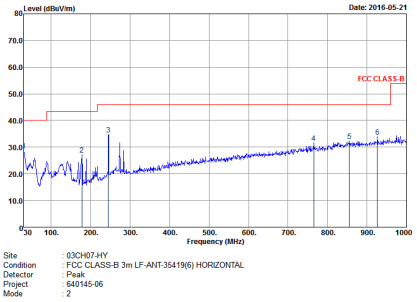
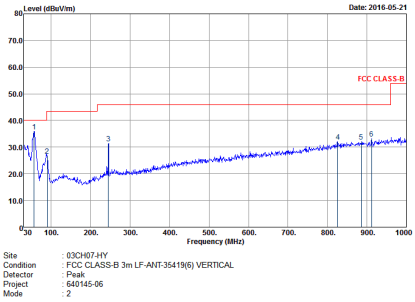
<WPC Charging Mode>

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	802.11n HT20 CH11 2462MHz	
1+2	Horizontal	Vertical
Peak Avg.		

Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

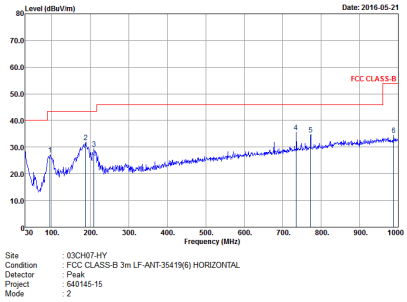
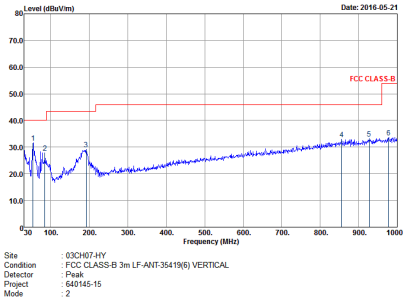
<PMA Charging Mode>

WIFI	2.4GHz 2400~2483.5MHz	
ANT	802.11n HT20 LF	
1+2	Horizontal	Vertical
QP / Peak		

Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

<WPC Charging Mode>

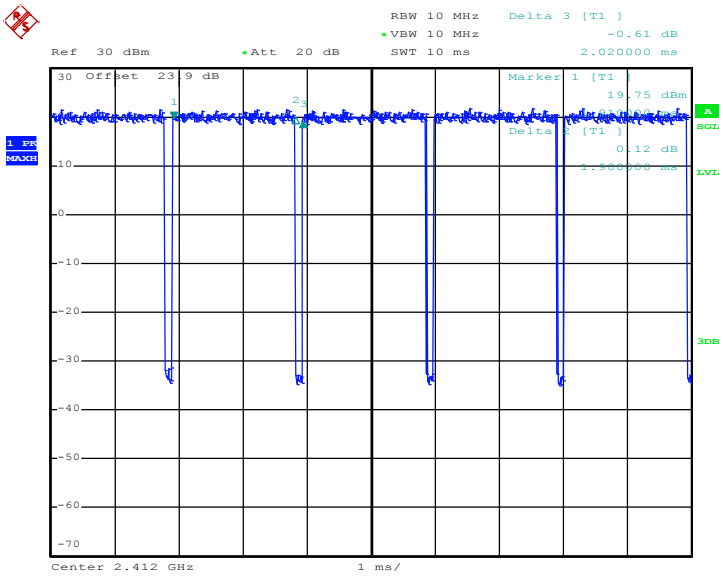
WIFI	2.4GHz 2400~2483.5MHz	
ANT	802.11n HT20 LF	
1+2	Horizontal	Vertical
QP / Peak		

Appendix C. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1+2	2.4GHz 802.11n HT20 for 1	94.06	1900	0.53	1kHz
1+2	2.4GHz 802.11n HT20 for 2	94.12	1920	0.52	1kHz

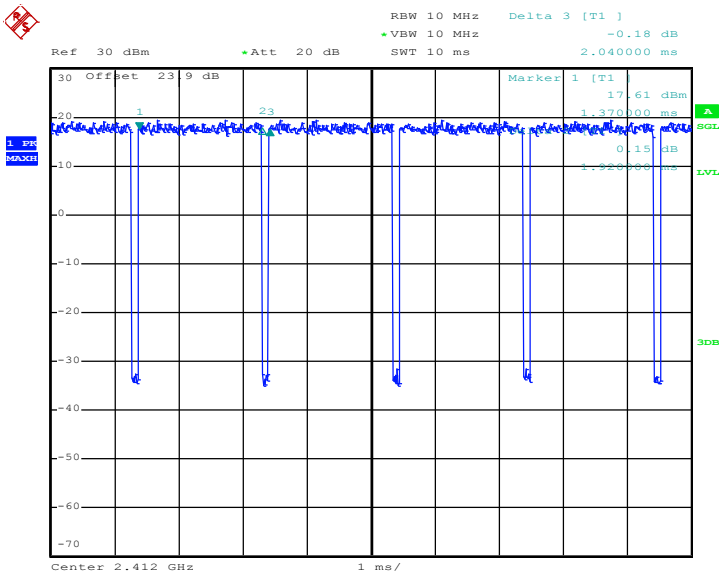
MIMO <Ant. 1+2(1)>

802.11n HT20



MIMO <Ant. 1+2(2)>

802.11n HT20



Appendix D. Original Report

Please refer to Sporton report number FR640145C as below.

FCC RF Test Report

APPLICANT	:	Motorola Mobility, LLC
EQUIPMENT	:	Mobile Cellular Phone
BRAND NAME	:	Motorola
MODEL NAME	:	6574
FCC ID	:	IHDT56VB2
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System

The product was received on Apr. 01, 2016 and testing was completed on Apr. 28, 2016. 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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APPENDIX B. RADIATED SPURIOUS EMISSION

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR640145C	Rev. 01	Initial issue of report	May 11, 2016

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.1	-	99% Bandwidth	-	Pass	-
3.2	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.3	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.79 dB at 2390.000 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 12.00 dB at 0.630 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	6574
FCC ID	IHDT56VB2
IMEI Code	354108070054047 (for Radiation) 354108070053932 (for Conduction)
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 v4.2 LE
HW Version	DVT2
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 : SPN5912A

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz
Maximum Output Power to antenna	**SISO <Ant. 1>** 802.11b : 19.37 dBm (0.0865 W) 802.11g : 17.87 dBm (0.0612 W) 802.11n HT20 : 17.77 dBm (0.0598 W) 802.11ac VHT20 : 17.77 dBm (0.0598 W) **SISO <Ant. 2>** 802.11b : 15.50 dBm (0.0355 W) 802.11g : 14.03 dBm (0.0253 W) 802.11n HT20 : 13.84 dBm (0.0242 W) 802.11ac VHT20 : 13.88 dBm (0.0244 W) **MIMO <Ant. 1+2>** 802.11b : 20.21 dBm (0.1050 W) 802.11g : 18.59 dBm (0.0723 W) 802.11n HT20 : 18.41 dBm (0.0693 W) 802.11ac VHT20 : 18.54 dBm (0.0714 W)
99% Occupied Bandwidth	802.11b : 15.25MHz 802.11g : 19.25MHz 802.11n HT20 : 19.55MHz 802.11ac VHT20 : 19.80MHz
Antenna Type	Fixed Internal Antenna (The antenna peak gain of EUT is less than 6 dBi)
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Antenna Function for Transmitter	

	Ant. 1	Ant. 2
802.11 b/g/n/ac SISO	V	V
802.11 b/g/n/ac MIMO	V	V

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

Note: The test site complies with ANSI C63.4 2014 requirement.

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.**
	03CH11-HY

Note: The test site complies with ANSI C63.4 2014 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 v03r05
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- FCC KDB 644545 D03 Guidance for IEEE 802 11ac New Rules v01
- ANSI C63.10-2013

Remark:

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

2 Test Configuration of Equipment Under Test

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

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

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

2.1 Carrier Frequency 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 Average Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412MHz	17.90	17.75	17.88	17.89
CH 06	2437MHz	19.15	18.83	19.11	19.01
CH 11	2462MHz	19.37	19.19	19.31	19.33

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412MHz	20.02	19.95	19.94	19.99
CH 06	2437MHz	21.24	20.92	20.95	20.98
CH 11	2462MHz	21.64	21.31	21.30	21.33

Channel	Frequency	2.4GHz 802.11g Average Power (dBm)							
		OFDM Data Rate							
		6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 01	2412MHz	17.02	16.98	16.91	17.00	16.76	16.69	16.83	16.23
CH 06	2437MHz	17.87	17.59	17.57	17.74	17.20	17.23	17.28	16.50
CH 11	2462MHz	16.20	16.11	16.13	16.15	15.80	15.61	15.63	15.77

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		OFDM Data Rate							
		6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 01	2412MHz	21.82	21.80	22.04	22.60	23.30	23.29	23.17	23.15
CH 06	2437MHz	22.64	22.57	22.60	23.15	23.87	23.75	23.69	23.64
CH 11	2462MHz	21.79	21.76	22.20	22.59	24.04	23.80	23.79	24.02

Channel	Frequency	2.4GHz 802.11n HT20 Average Power (dBm)							
		OFDM Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412MHz	16.10	15.87	16.05	15.80	15.83	15.77	15.87	15.43
CH 06	2437MHz	17.77	17.35	17.55	17.24	17.30	17.29	17.47	15.11
CH 11	2462MHz	16.11	15.94	16.10	15.66	15.72	15.96	15.99	15.96

Channel	Frequency	2.4GHz 802.11n HT20 RF Power (dBm)							
		OFDM Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412MHz	21.49	21.31	21.55	22.88	23.04	22.87	23.19	23.00
CH 06	2437MHz	22.77	22.57	22.59	23.72	23.65	23.72	23.86	23.36
CH 11	2462MHz	22.27	22.09	21.92	23.80	23.98	23.81	24.27	23.96

Channel	Frequency	2.4GHz 802.11a VHT20 Average Power (dBm)								
		OFDM Data Rate								
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
CH 01	2412MHz	16.04	15.87	15.96	15.89	15.70	15.74	16.00	15.35	15.28
CH 06	2437MHz	17.77	17.42	17.59	17.67	17.49	17.49	16.20	14.91	15.05
CH 11	2462MHz	15.58	15.55	15.55	15.26	15.25	15.34	15.38	15.33	15.19

Channel	Frequency	2.4GHz 802.11a VHT20 RF Power (dBm)								
		OFDM Data Rate								
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
CH 01	2412MHz	21.40	21.74	21.55	22.95	23.04	22.85	23.13	22.97	22.92
CH 06	2437MHz	22.68	22.60	22.64	23.75	23.71	23.70	23.60	23.40	23.43
CH 11	2462MHz	21.61	21.80	21.76	23.69	23.56	23.75	24.08	23.78	23.94

SISO <Ant. 2>

Channel	Frequency	2.4GHz 802.11b Average Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412MHz	13.01	12.97	12.99	12.98
CH 06	2437MHz	15.02	14.90	14.91	14.99
CH 11	2462MHz	**15.50**	15.34	15.44	15.40

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412MHz	15.44	15.34	15.29	15.35
CH 06	2437MHz	17.06	16.94	16.83	16.96
CH 11	2462MHz	17.55	17.37	17.42	17.45

Channel	Frequency	2.4GHz 802.11g Average Power (dBm)							
		OFDM Data Rate							
		6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 01	2412MHz	11.79	11.57	11.47	11.69	11.24	11.28	11.15	10.65
CH 06	2437MHz	**14.03**	13.86	13.85	14.00	13.61	13.71	13.80	12.96
CH 11	2462MHz	13.11	12.94	12.90	13.09	12.67	12.57	12.88	12.87

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		OFDM Data Rate							
		6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 01	2412MHz	17.54	17.50	17.69	17.27	18.52	18.43	18.47	18.23
CH 06	2437MHz	18.27	18.25	18.39	18.47	18.80	18.66	18.99	18.98
CH 11	2462MHz	18.09	18.05	18.24	18.47	19.30	19.26	19.05	18.97

Channel	Frequency	2.4GHz 802.11n HT20 Average Power (dBm)							
		OFDM Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412MHz	10.28	10.24	10.25	10.12	10.13	10.24	10.20	9.70
CH 06	2437MHz	13.84	13.70	13.71	13.54	13.67	13.75	13.79	11.89
CH 11	2462MHz	12.93	12.90	12.92	11.97	12.85	12.84	12.80	12.84

Channel	Frequency	2.4GHz 802.11n HT20 RF Power (dBm)							
		OFDM Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412MHz	16.63	16.73	16.79	18.24	18.12	18.79	18.52	17.99
CH 06	2437MHz	18.31	18.59	18.49	18.65	18.58	18.75	18.97	18.81
CH 11	2462MHz	18.20	18.28	18.52	19.07	18.90	18.97	19.15	19.00

Channel	Frequency	2.4GHz 802.11a VHT20 Average Power (dBm)								
		OFDM Data Rate								
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
CH 01	2412MHz	10.47	10.28	10.45	9.93	10.19	10.23	10.09	9.90	9.75
CH 06	2437MHz	13.88	13.77	13.78	13.81	13.85	13.77	13.02	12.22	12.03
CH 11	2462MHz	12.58	12.31	12.41	12.19	12.28	12.44	12.32	12.55	12.25

Channel	Frequency	2.4GHz 802.11a VHT20 RF Power (dBm)								
		OFDM Data Rate								
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
CH 01	2412MHz	16.82	17.07	16.97	18.09	18.60	18.40	18.59	18.28	18.06
CH 06	2437MHz	18.33	18.36	18.35	18.67	18.73	18.85	18.82	18.87	18.84
CH 11	2462MHz	17.92	18.07	18.01	18.92	19.05	19.28	19.36	19.14	19.21

MIMO <Ant. 1+2>

Channel	Frequency	2.4GHz 802.11b Average Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412MHz	18.53	18.46	18.50	18.48
CH 06	2437MHz	19.80	19.72	19.74	19.78
CH 11	2462MHz	20.21	20.11	20.14	20.15

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412MHz	20.76	20.71	20.69	20.66
CH 06	2437MHz	21.88	21.81	21.81	21.81
CH 11	2462MHz	22.22	22.15	22.12	22.14

Channel	Frequency	2.4GHz 802.11g Average Power (dBm)							
		OFDM Data Rate							
		6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 01	2412MHz	17.65	17.59	17.46	17.58	17.25	17.24	17.48	16.91
CH 06	2437MHz	18.59	18.48	18.49	18.42	18.12	18.17	18.33	17.40
CH 11	2462MHz	17.47	17.32	17.18	17.15	16.56	16.61	16.81	16.67

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		OFDM Data Rate							
		6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 01	2412MHz	22.74	22.75	23.06	23.25	24.19	24.23	24.28	24.21
CH 06	2437MHz	23.39	23.44	23.56	24.15	24.80	24.66	24.62	24.55
CH 11	2462MHz	22.90	23.02	23.08	23.30	24.68	24.56	24.64	24.72

Channel	Frequency	2.4GHz 802.11n HT20 Average Power (dBm)							
		OFDM Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412MHz	16.64	16.53	16.61	16.15	16.41	16.48	16.49	15.95
CH 06	2437MHz	**18.41**	18.24	18.40	18.11	18.35	18.39	18.33	16.37
CH 11	2462MHz	17.22	17.00	17.17	16.63	16.65	16.78	16.76	16.71

Channel	Frequency	2.4GHz 802.11n HT20 RF Power (dBm)							
		OFDM Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412MHz	22.36	22.34	22.41	23.87	23.97	23.77	24.13	23.84
CH 06	2437MHz	23.51	23.55	23.48	24.59	24.60	24.64	24.78	24.49
CH 11	2462MHz	23.12	23.08	22.89	24.50	24.43	24.49	25.17	24.64

Channel	Frequency	2.4GHz 802.11a VHT20 Average Power (dBm)								
		OFDM Data Rate								
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
CH 01	2412MHz	16.65	16.59	16.63	16.34	16.42	16.39	16.52	15.94	15.98
CH 06	2437MHz	**18.54**	18.49	18.44	18.20	18.32	18.32	17.42	16.51	16.46
CH 11	2462MHz	16.68	16.58	16.65	16.23	16.33	16.33	16.52	16.40	16.53

Channel	Frequency	2.4GHz 802.11a VHT20 RF Power (dBm)								
		OFDM Data Rate								
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
CH 01	2412MHz	22.34	22.45	22.38	23.96	23.88	23.77	24.07	23.86	24.15
CH 06	2437MHz	23.47	23.62	23.55	24.56	24.63	24.61	24.54	24.49	24.47
CH 11	2462MHz	22.68	22.71	22.60	24.34	24.42	24.41	25.11	24.51	24.67

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

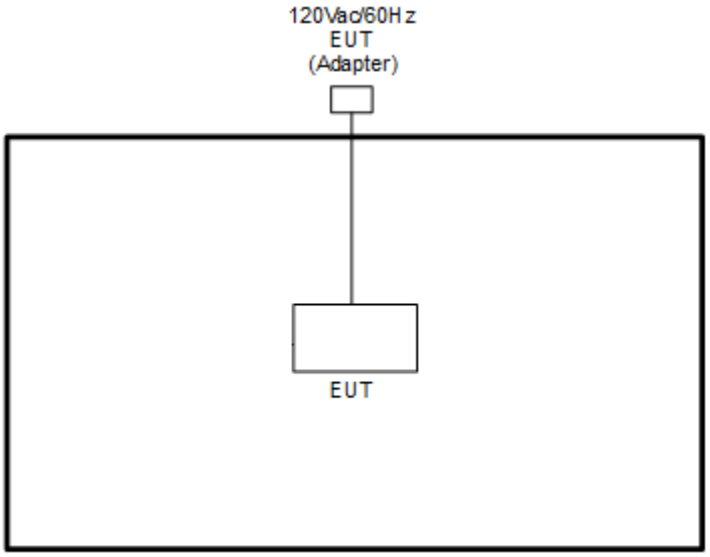
MIMO Antenna

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

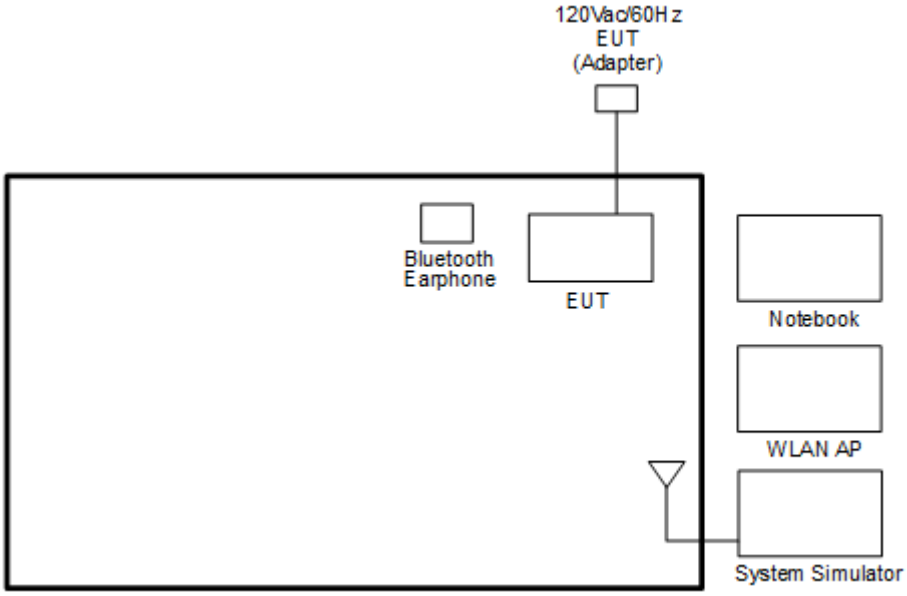
Test Cases	
AC Conducted Emission	Mode 1 :GSM850 Idle + Bluetooth Link + WLAN Link + MP3 + Adapter

2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	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.	SD Card	SanDisk	MicroSD HC	FCC DoC	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 and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

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

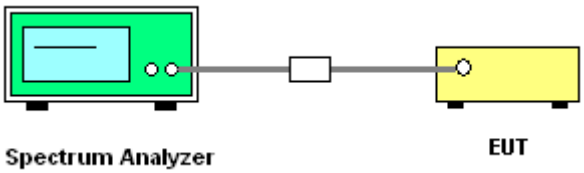
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

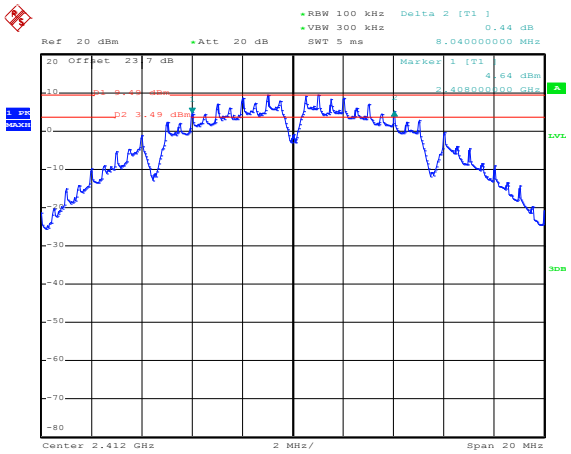
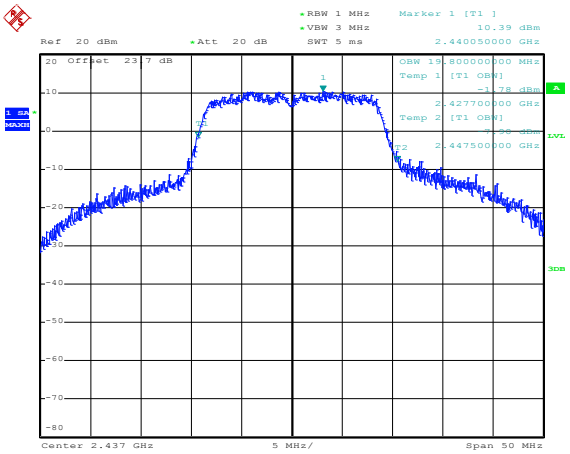
1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v03r05.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) = 1MHz and set the Video bandwidth (VBW) = 3MHz.
6. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Please refer to Appendix A of this report.

Minimum 6dB Bandwidth	Maximum 99% Occupied Bandwidth
	
Date: 26.APR.2016 21:36:25	Date: 27.APR.2016 02:14:30

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

3.2 Maximum Average Output Power Measurement

3.2.1 Limit of Average Output Power

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

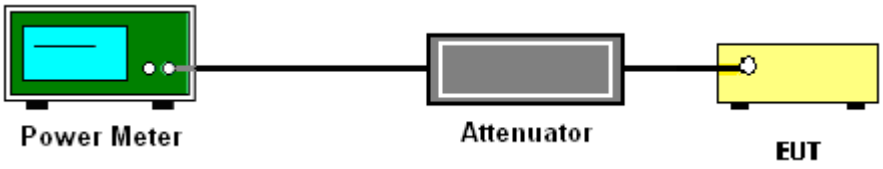
3.2.2 Measuring Instruments

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. Guidancev03r05 section 9.2.3.1 Method AVGPM (Measurement using an RF average power meter)
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 (Reporting Only)

Please refer to Appendix A of this report.

3.2.6 Test Result of Average output Power

Please refer to Appendix A of this report.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

The 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 v03r05
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 = RMS, Sweep time = auto couple. Allow max hold to run for at least 60 s, or longer as needed to allow the trace to 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.

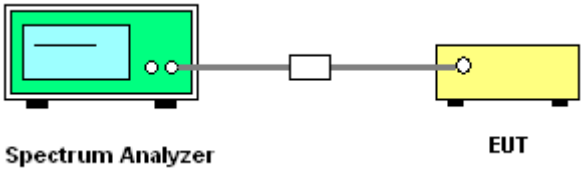
   If measurements performed using method (2) plus 10 log (N) exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

   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)

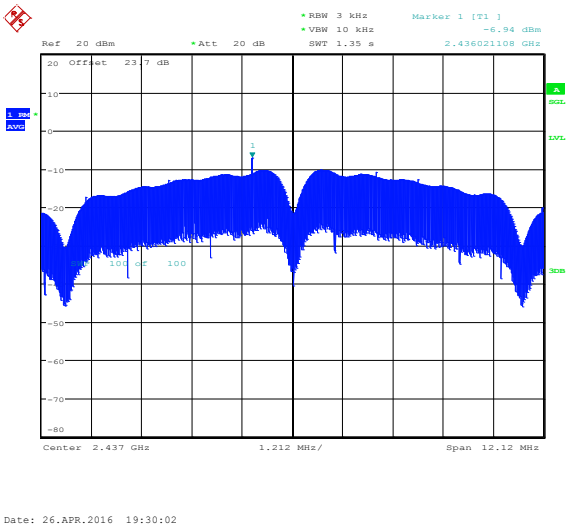
3.3.4 Test Setup



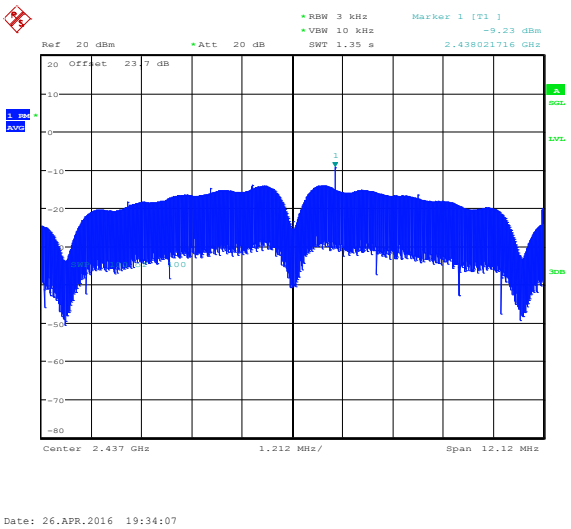
3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A of this report.

Worst Case Power Density (dBm/3kHz) for MIMO Ant. 1



Worst Case Power Density (dBm/3kHz) for MIMO Ant. 2



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).

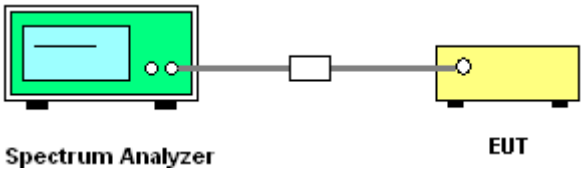
3.4.2 Measuring Instruments

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 v03r05.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.4.4 Test Setup



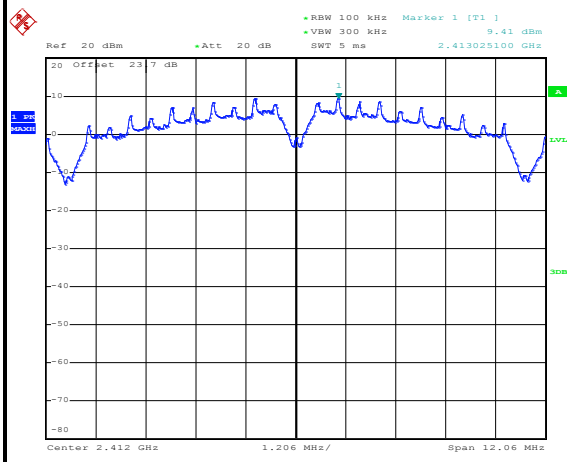
3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Number of TX = 1, 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 :**	AC Chang

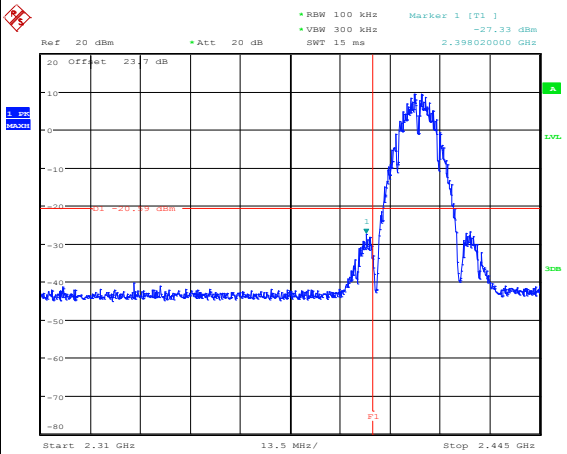
WLAN 802.11b Channel 01

100kHz PSD reference Level



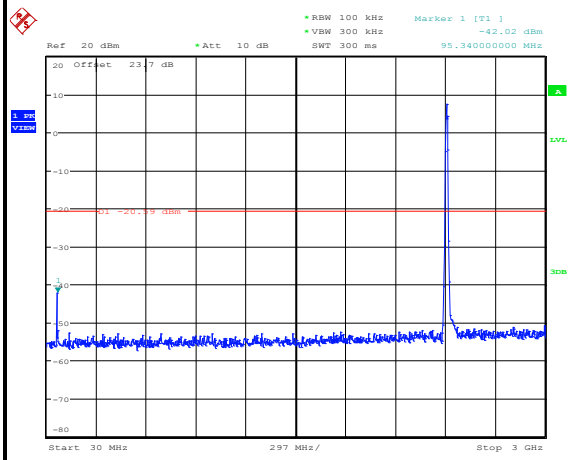
Date: 26.APR.2016 21:41:20

Low Channel Plot



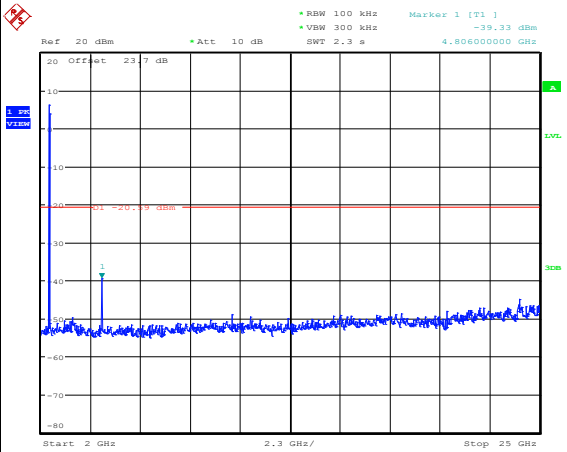
Date: 26.APR.2016 18:41:04

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 18:41:40

Spurious Emission 2GHz~25GHz

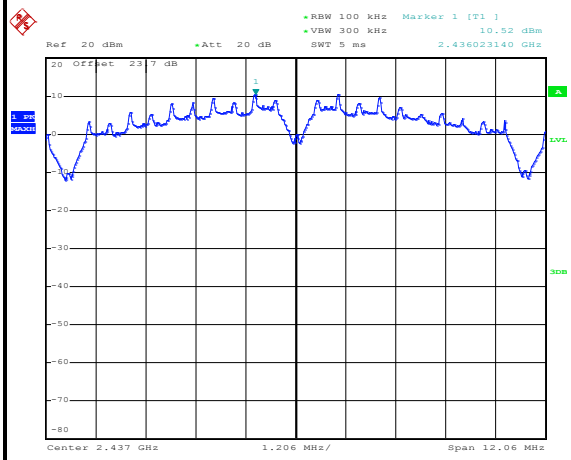


Date: 26.APR.2016 18:41:48

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

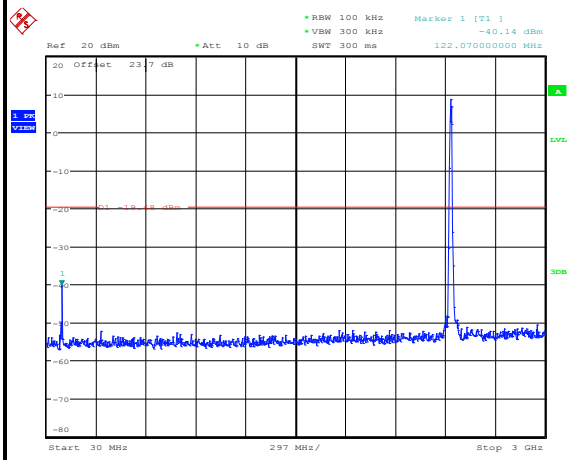
WLAN 802.11b Channel 06

100kHz PSD reference Level



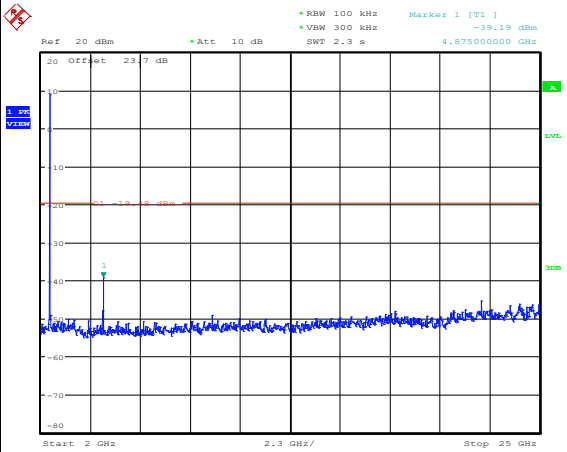
Date: 26.APR.2016 21:48:18

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 18:46:24

Spurious Emission 2GHz~25GHz

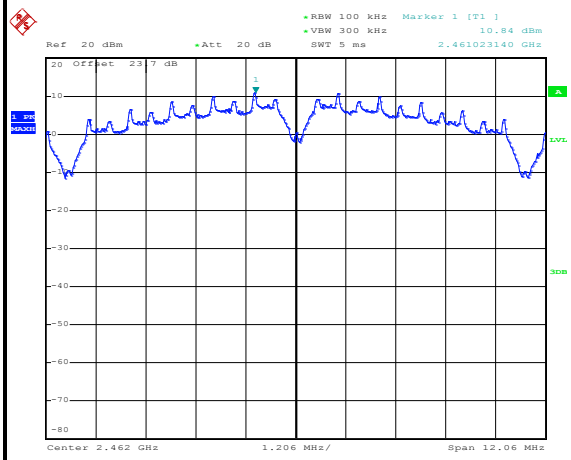


Date: 26.APR.2016 18:46:32

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

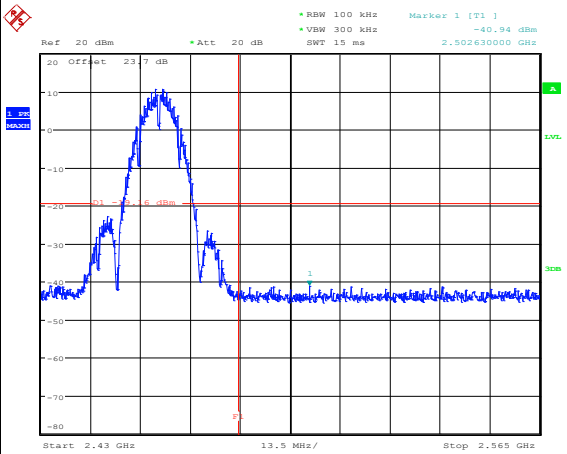
WLAN 802.11b Channel 11

100kHz PSD reference Level



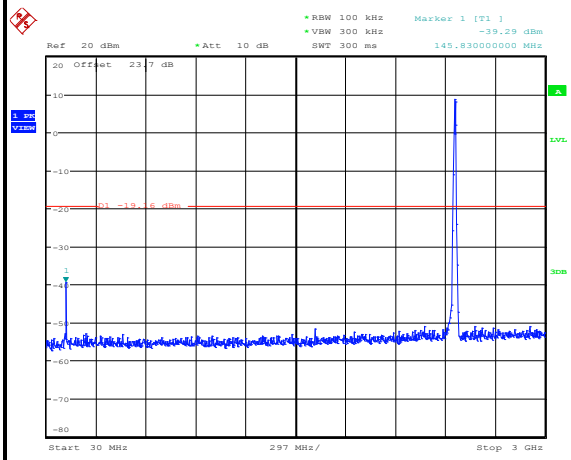
Date: 26.APR.2016 21:54:31

High Channel Plot



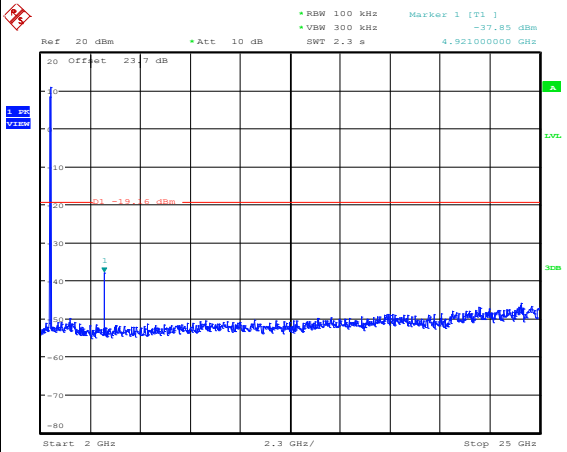
Date: 26.APR.2016 18:53:00

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 18:53:17

Spurious Emission 2GHz~25GHz

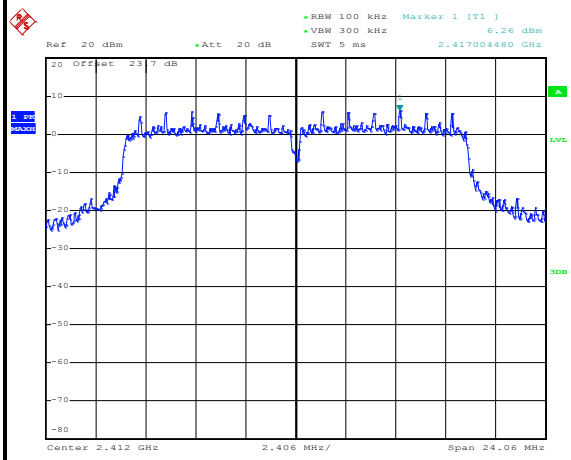


Date: 26.APR.2016 18:53:25

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

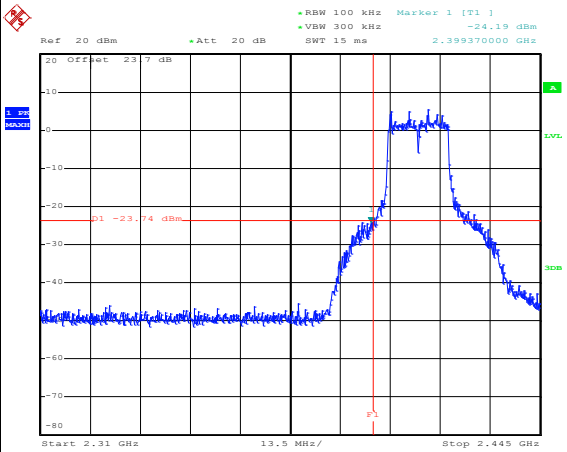
WLAN 802.11g Channel 01

100kHz PSD reference Level



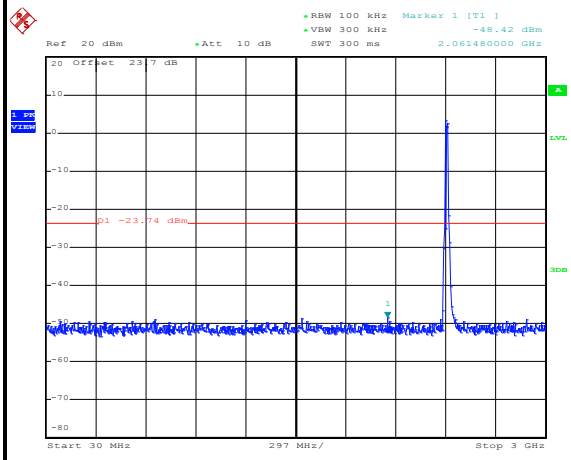
Date: 27.APR.2016 00:30:18

Low Channel Plot



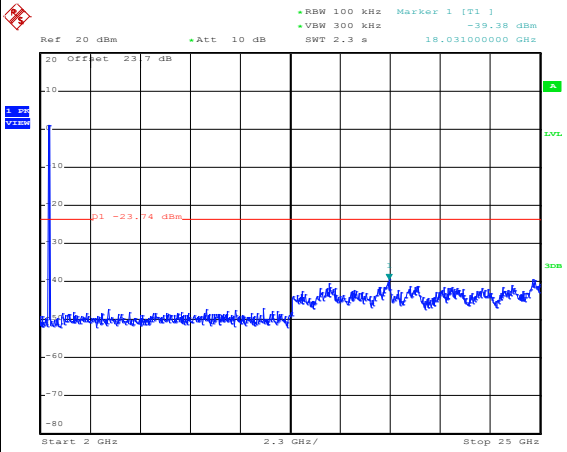
Date: 28.APR.2016 21:34:21

Spurious Emission 30MHz~3GHz



Date: 28.APR.2016 21:20:57

Spurious Emission 2GHz~25GHz

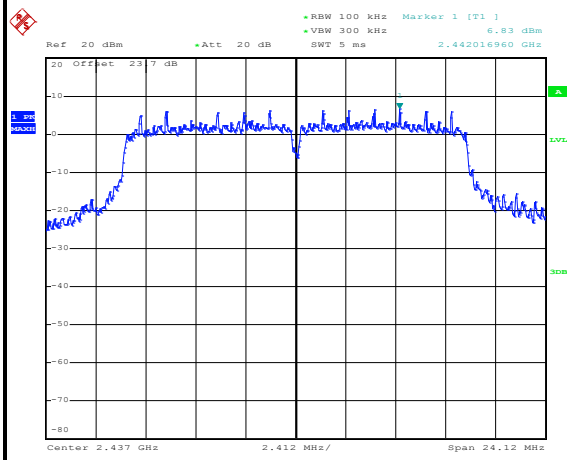


Date: 28.APR.2016 21:21:05

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

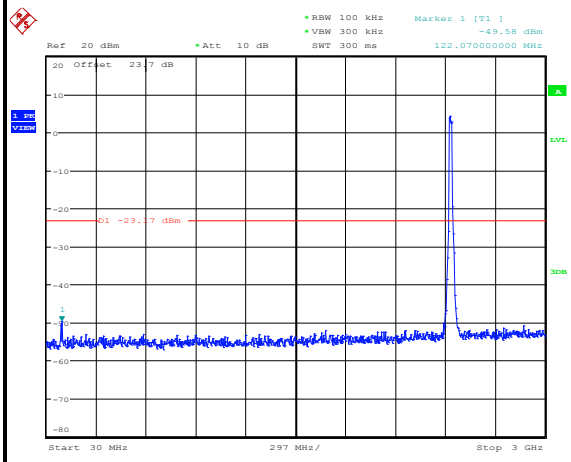
WLAN 802.11g Channel 06

100kHz PSD reference Level



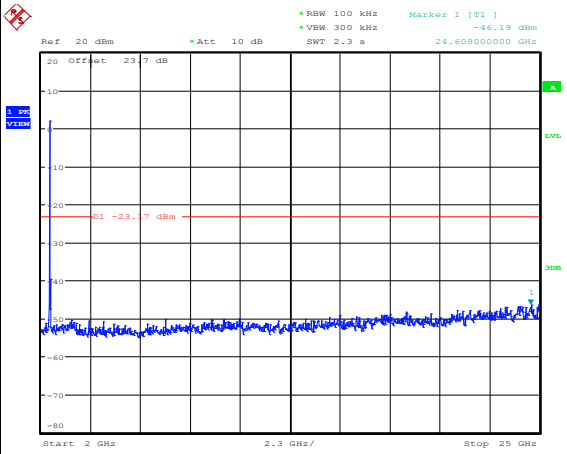
Date: 27.APR.2016 00:33:01

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 20:12:18

Spurious Emission 2GHz~25GHz

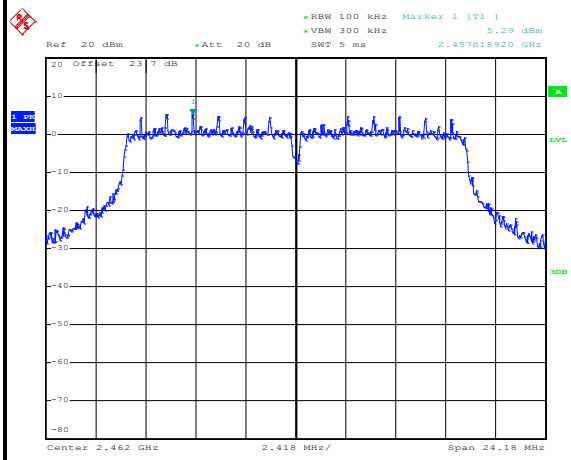


Date: 26.APR.2016 20:12:26

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

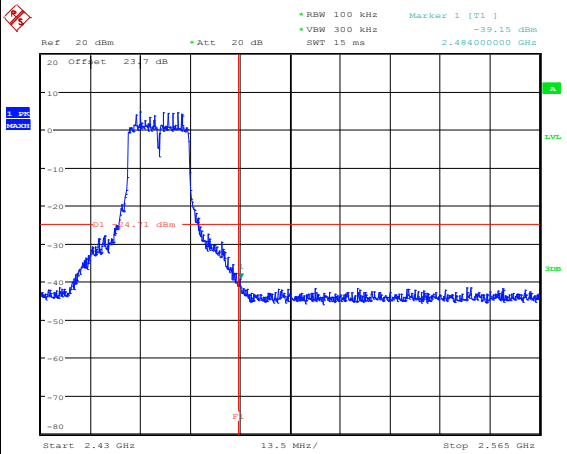
WLAN 802.11g Channel 11

100kHz PSD reference Level



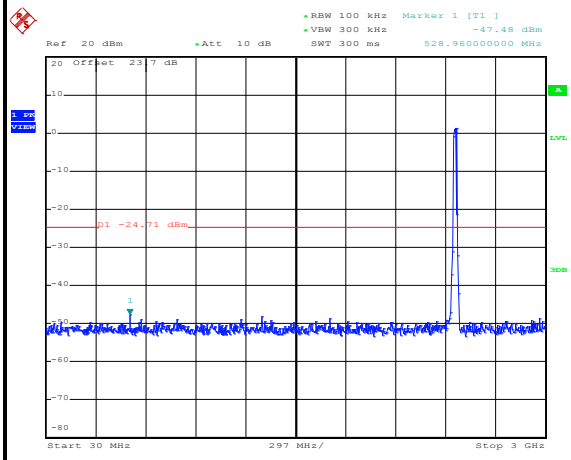
Date: 27.APR.2016 00:35:29

High Channel Plot



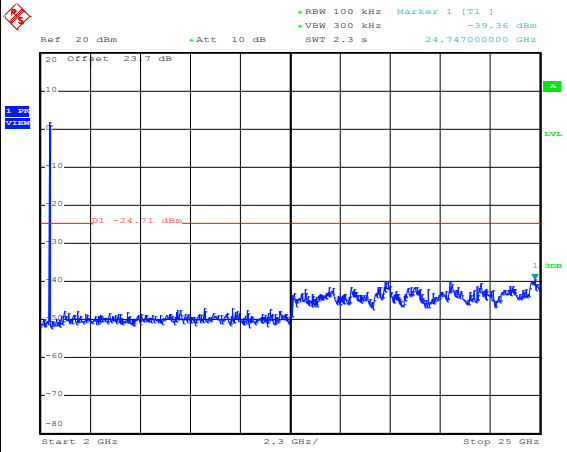
Date: 26.APR.2016 20:21:27

Spurious Emission 30MHz~3GHz



Date: 28.APR.2016 21:23:24

Spurious Emission 2GHz~25GHz

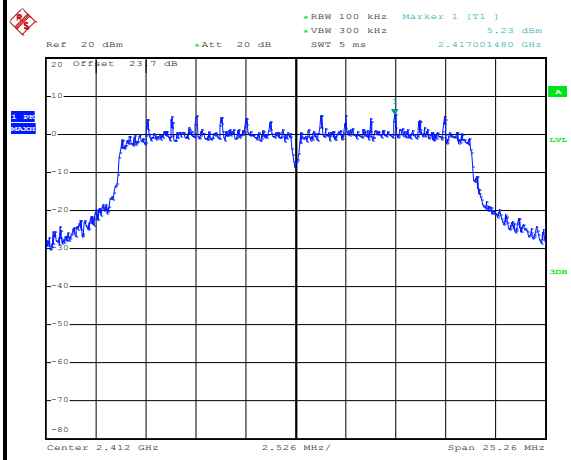


Date: 28.APR.2016 21:23:33

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

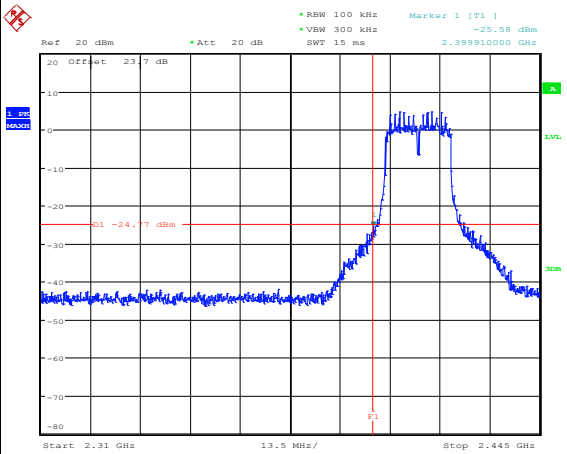
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



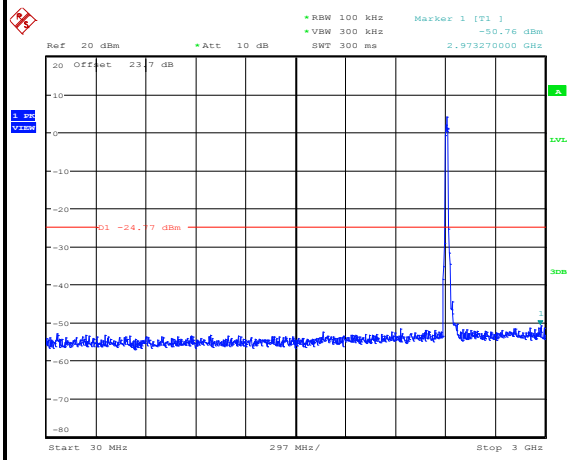
Date: 27.APR.2016 01:13:02

Low Channel Plot



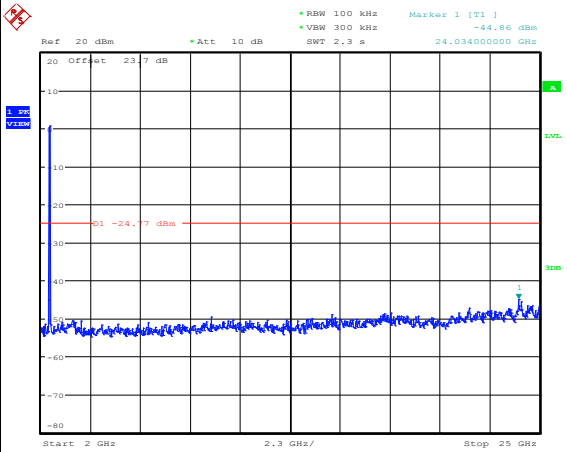
Date: 26.APR.2016 21:55:25

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 21:55:55

Spurious Emission 2GHz~25GHz

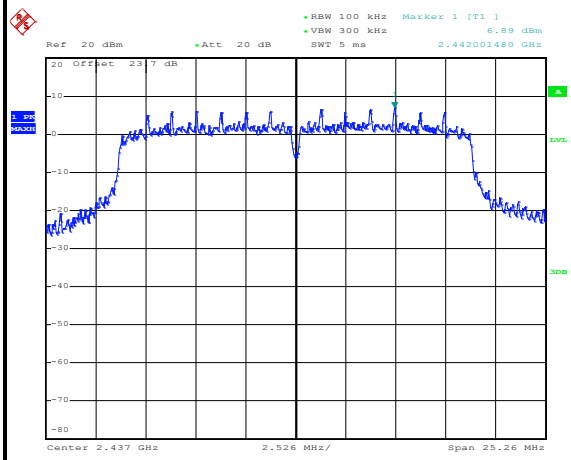


Date: 26.APR.2016 21:56:03

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

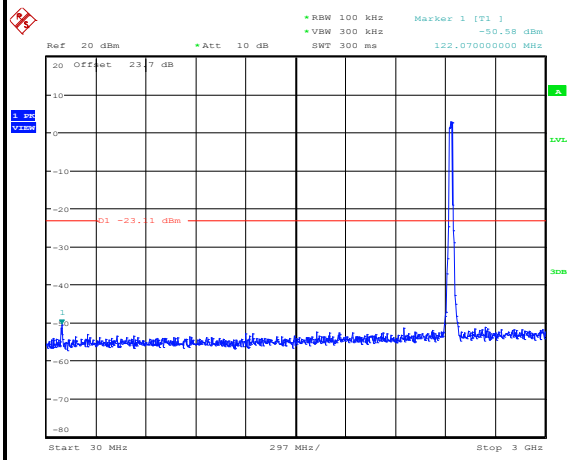
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



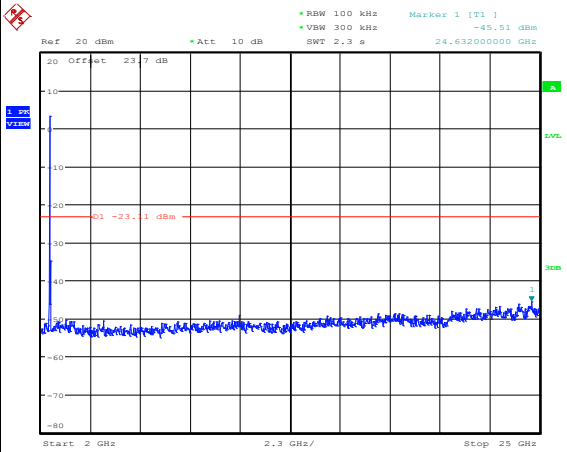
Date: 27.APR.2016 01:15:57

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 00:02:01

Spurious Emission 2GHz~25GHz

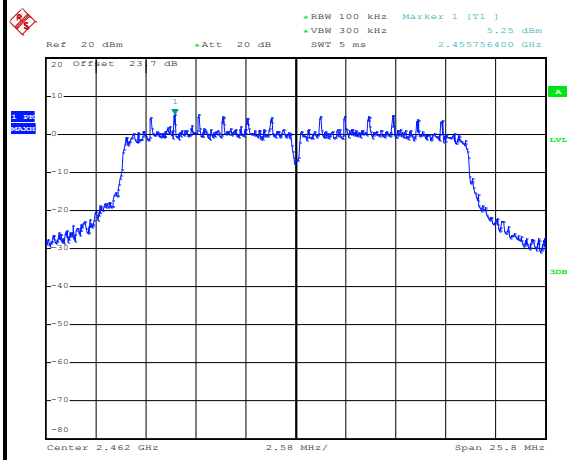


Date: 27.APR.2016 00:02:09

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

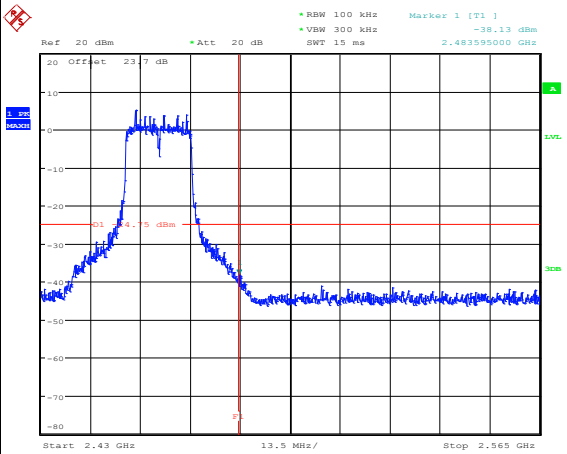
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



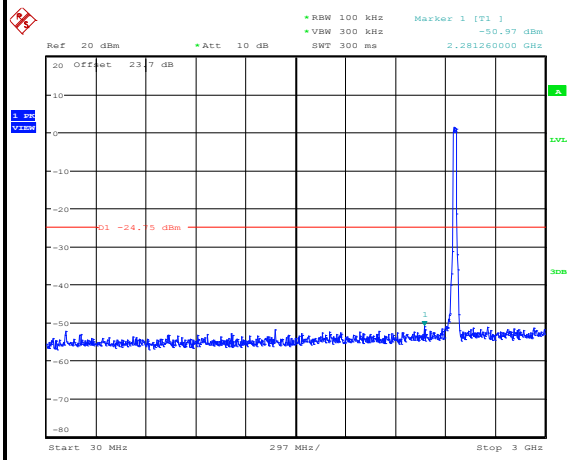
Date: 27.APR.2016 01:19:07

High Channel Plot



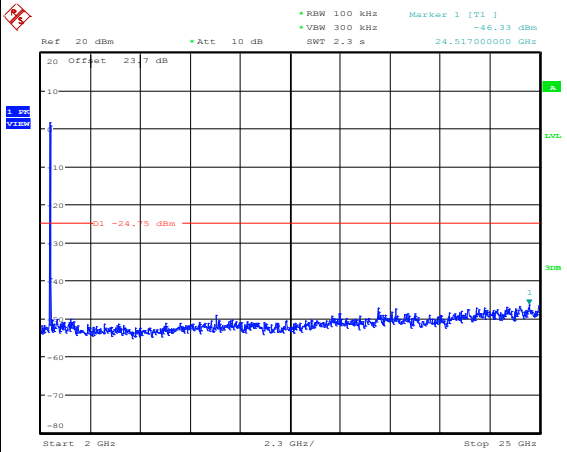
Date: 27.APR.2016 00:15:20

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 00:16:14

Spurious Emission 2GHz~25GHz

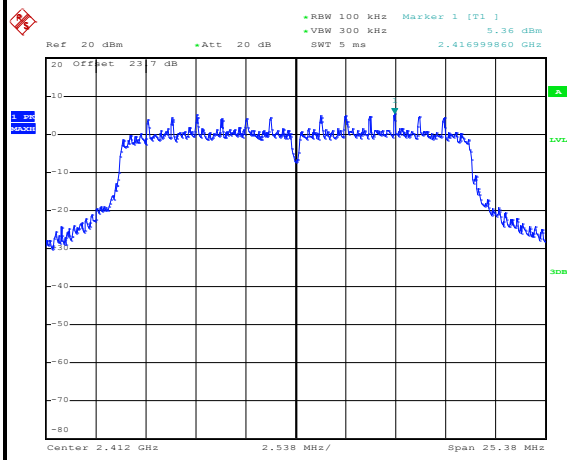


Date: 27.APR.2016 00:16:22

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

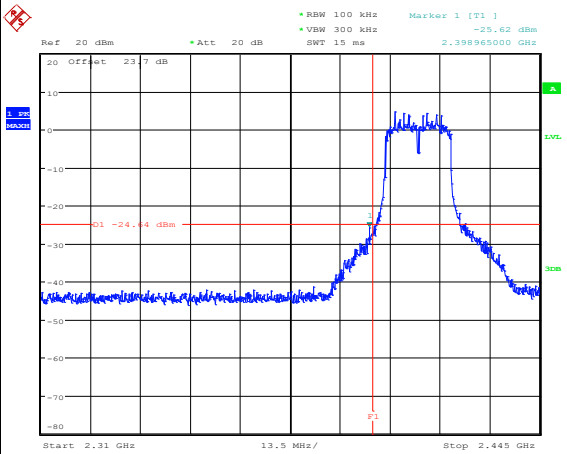
WLAN 802.11ac VHT20 Channel 01

100kHz PSD reference Level



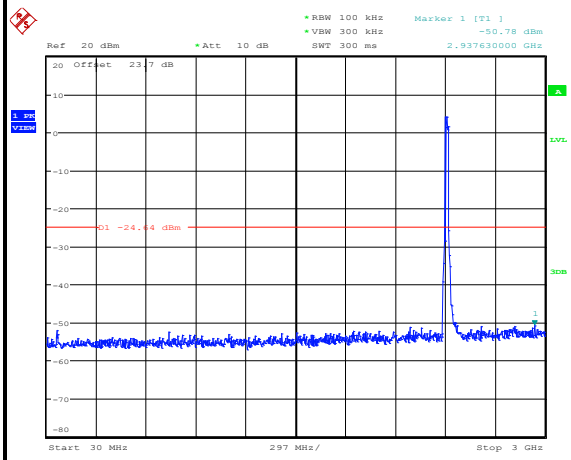
Date: 27.APR.2016 01:59:40

Low Channel Plot



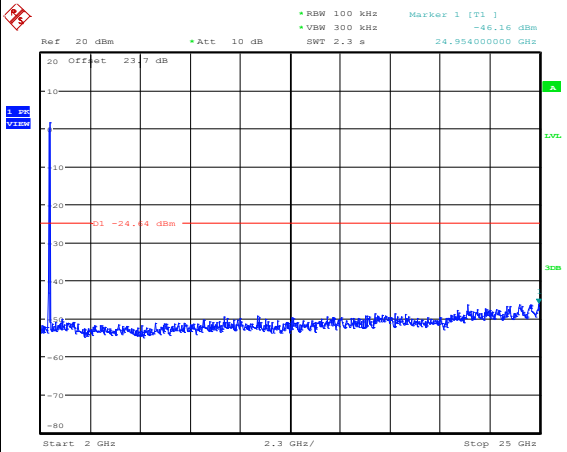
Date: 27.APR.2016 05:52:20

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 05:52:33

Spurious Emission 2GHz~25GHz

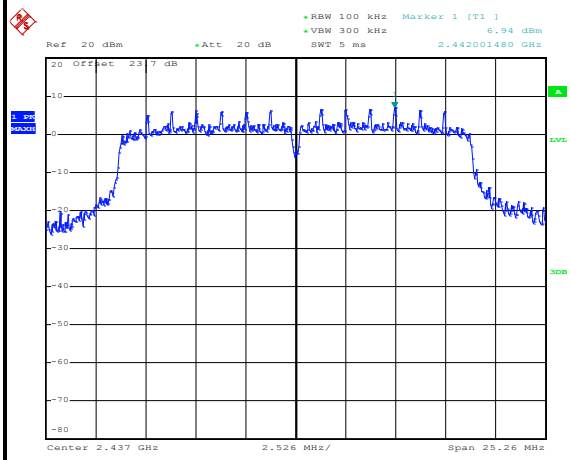


Date: 27.APR.2016 05:52:41

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

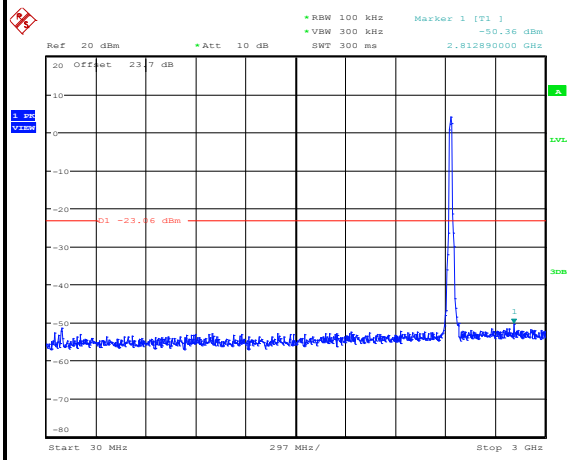
WLAN 802.11ac VHT20 Channel 06

100kHz PSD reference Level



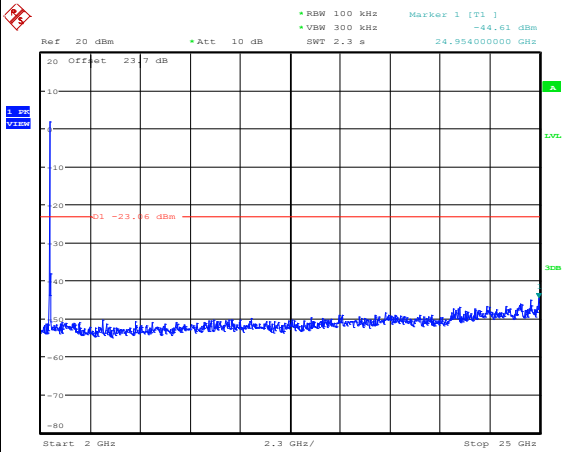
Date: 27.APR.2016 02:02:10

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 06:11:08

Spurious Emission 2GHz~25GHz

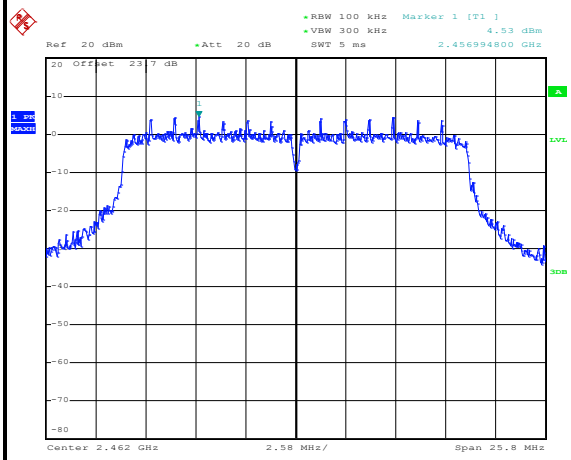


Date: 27.APR.2016 06:11:16

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

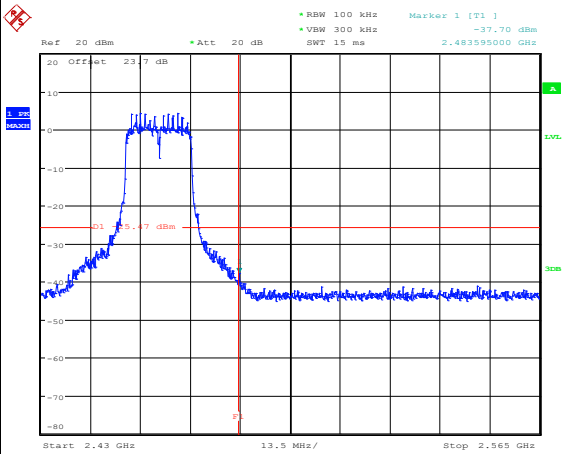
WLAN 802.11ac VHT20 Channel 11

100kHz PSD reference Level



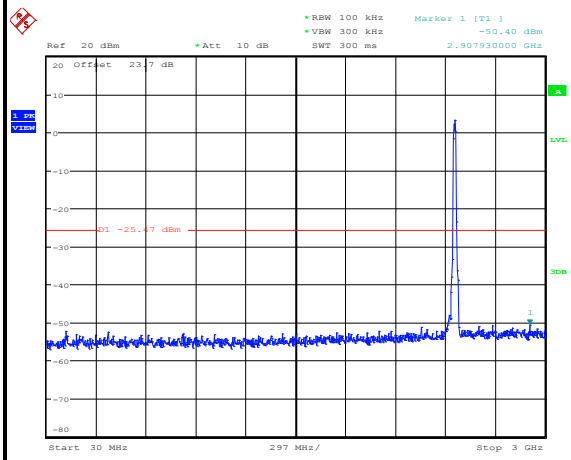
Date: 27.APR.2016 02:05:21

High Channel Plot



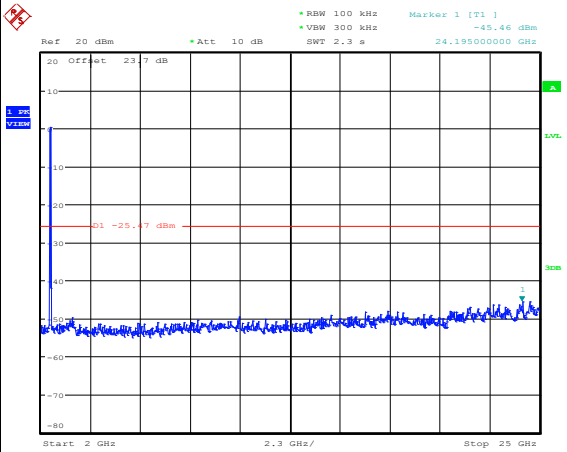
Date: 27.APR.2016 06:17:37

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 06:17:53

Spurious Emission 2GHz~25GHz



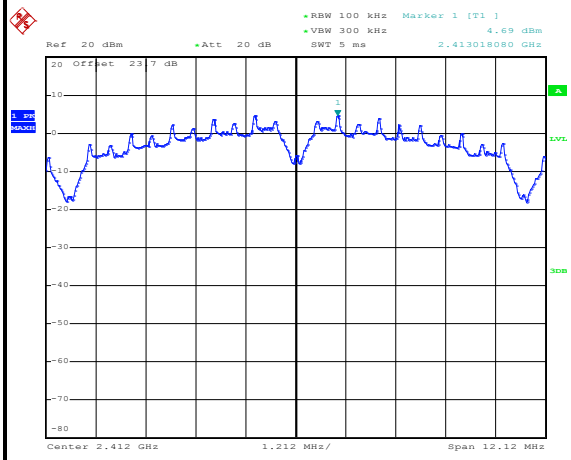
Date: 27.APR.2016 06:18:01

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

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

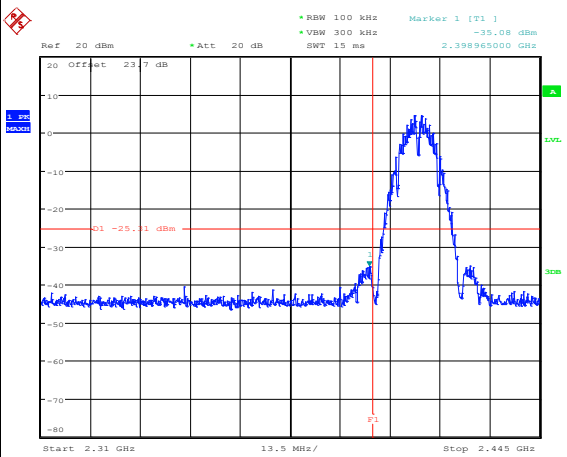
WLAN 802.11b Channel 01

100kHz PSD reference Level



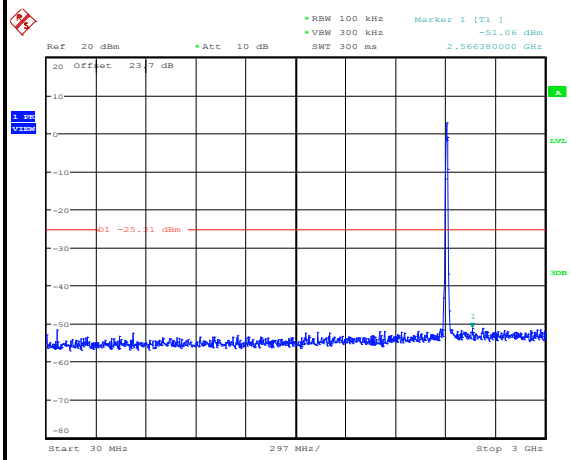
Date: 26.APR.2016 23:58:59

Low Channel Plot



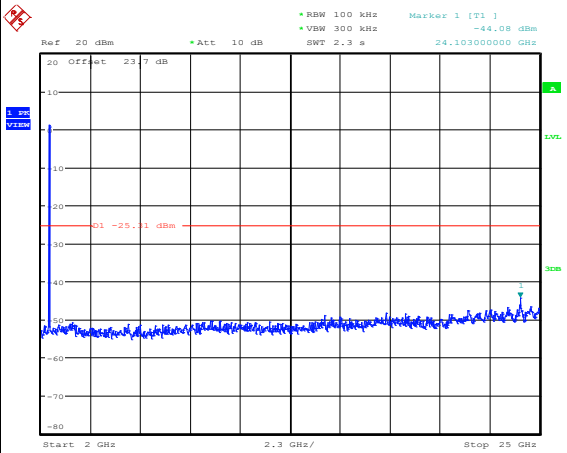
Date: 26.APR.2016 18:58:29

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 18:58:40

Spurious Emission 2GHz~25GHz

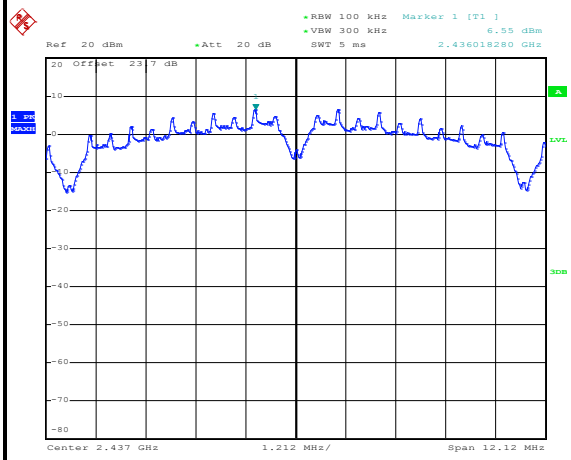


Date: 26.APR.2016 18:58:48

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

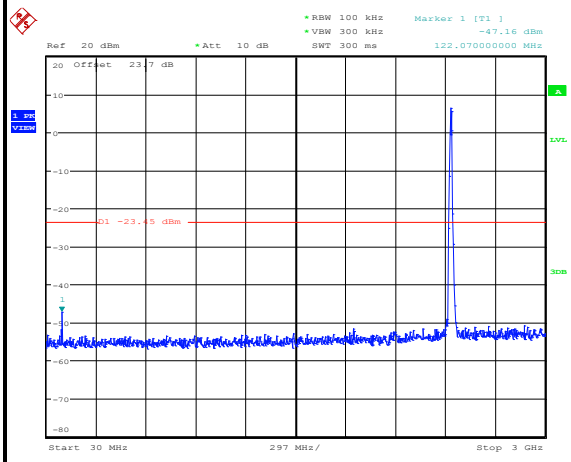
WLAN 802.11b Channel 06

100kHz PSD reference Level



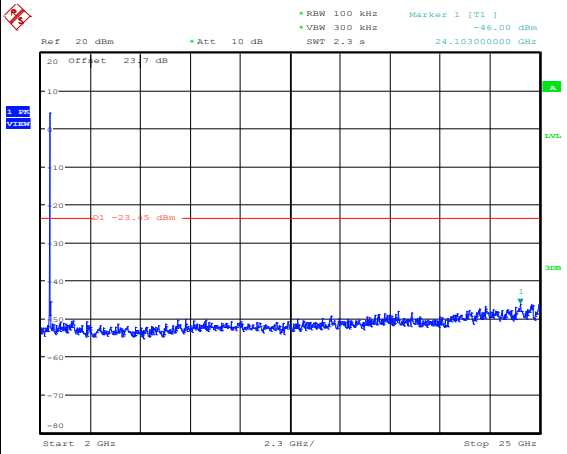
Date: 27.APR.2016 00:01:21

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 19:05:27

Spurious Emission 2GHz~25GHz

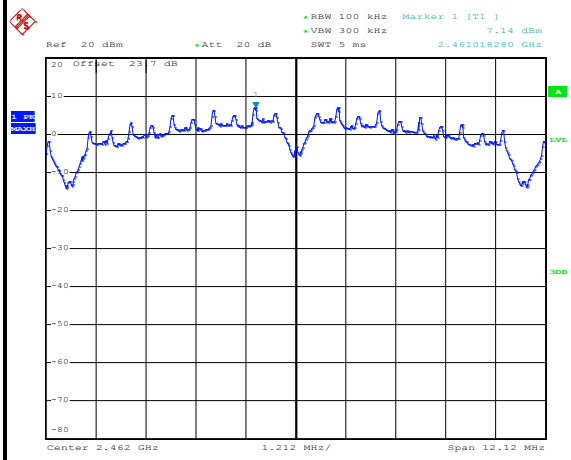


Date: 26.APR.2016 19:05:35

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

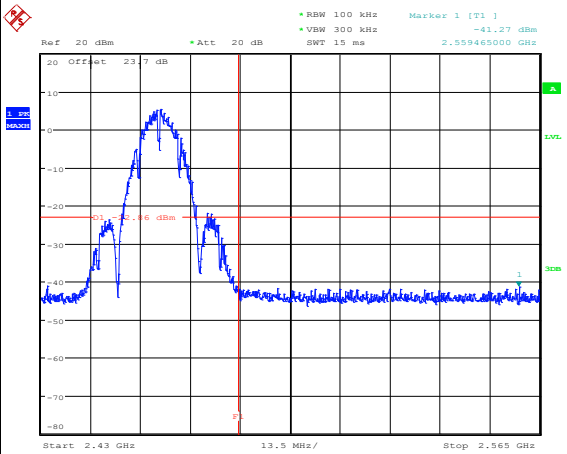
WLAN 802.11b Channel 11

100kHz PSD reference Level



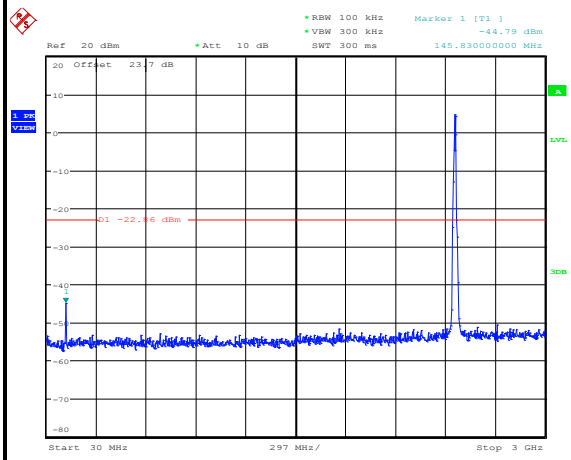
Date: 27.APR.2016 00:03:55

High Channel Plot



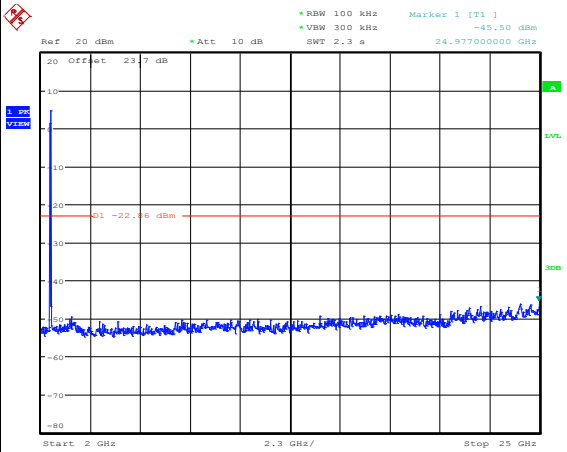
Date: 26.APR.2016 19:13:29

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 19:13:45

Spurious Emission 2GHz~25GHz

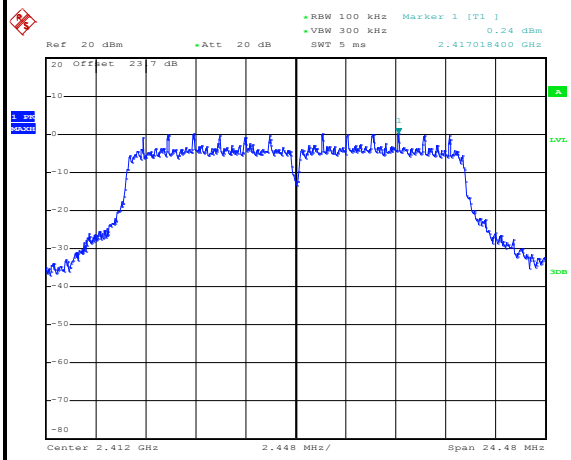


Date: 26.APR.2016 19:13:53

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

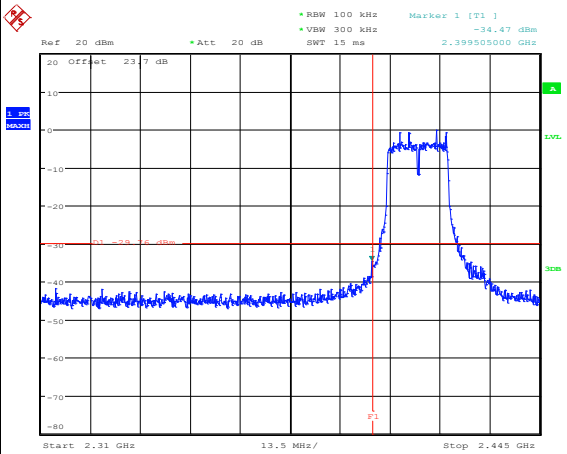
WLAN 802.11g Channel 01

100kHz PSD reference Level



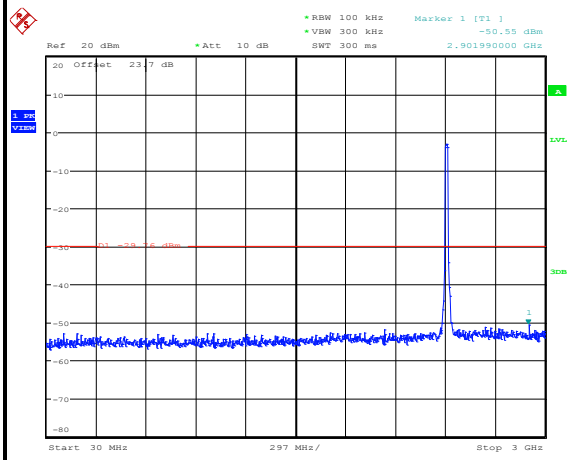
Date: 27.APR.2016 00:40:14

Low Channel Plot



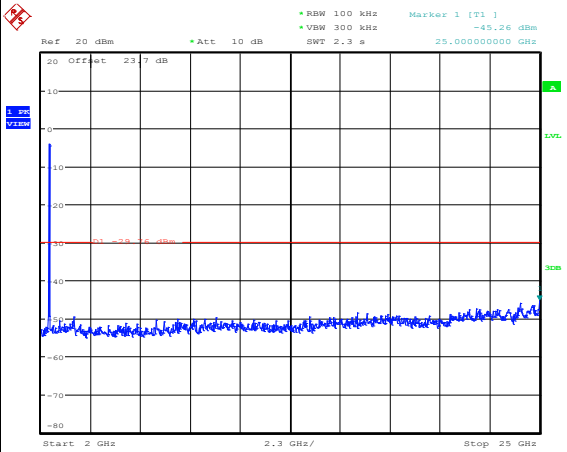
Date: 26.APR.2016 20:31:03

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 20:31:15

Spurious Emission 2GHz~25GHz

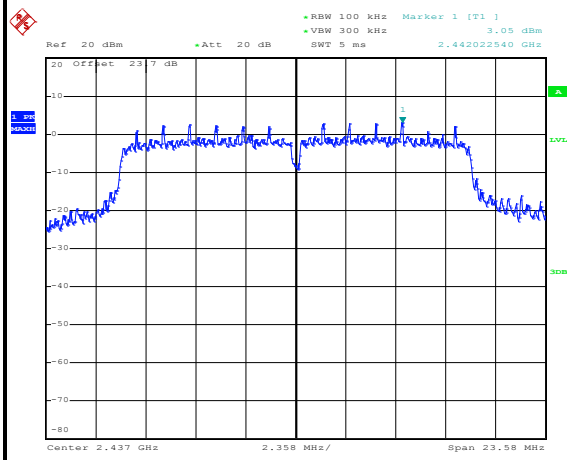


Date: 26.APR.2016 20:31:24

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

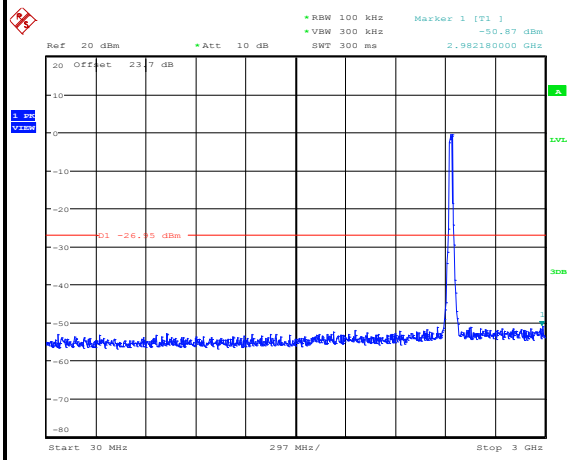
WLAN 802.11g Channel 06

100kHz PSD reference Level



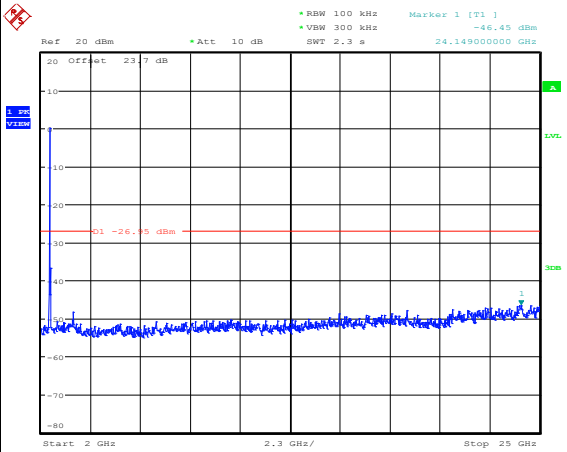
Date: 27.APR.2016 00:42:44

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 20:39:22

Spurious Emission 2GHz~25GHz

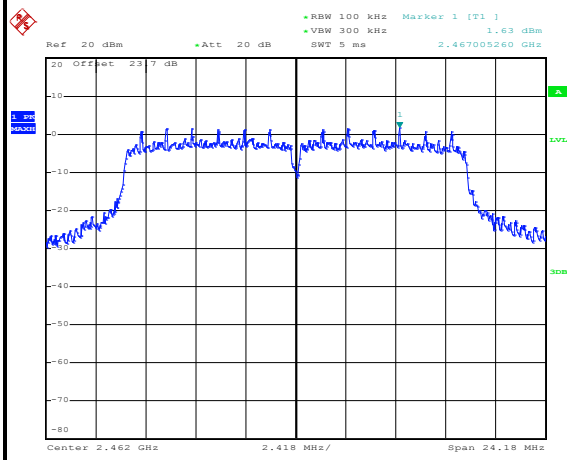


Date: 26.APR.2016 20:39:30

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

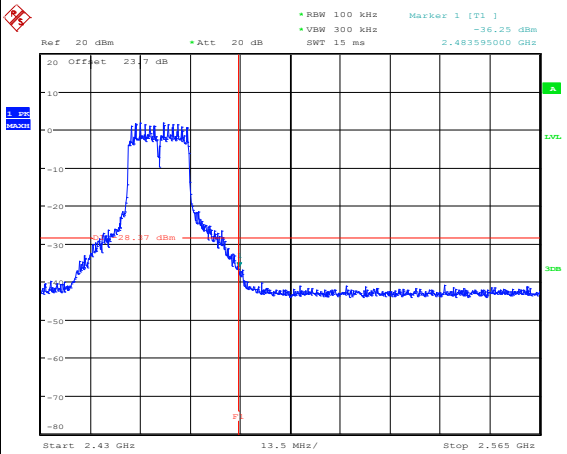
WLAN 802.11g Channel 11

100kHz PSD reference Level



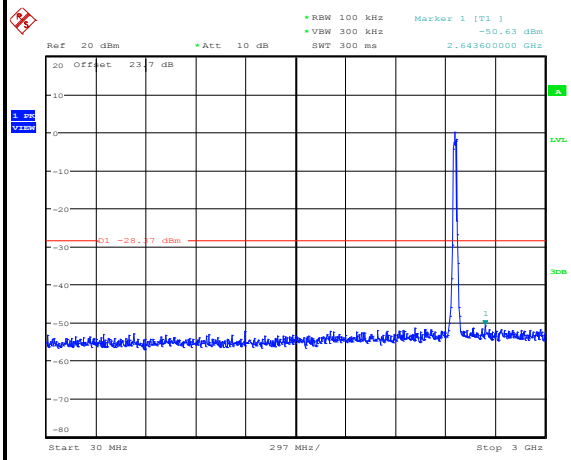
Date: 27.APR.2016 00:45:37

High Channel Plot



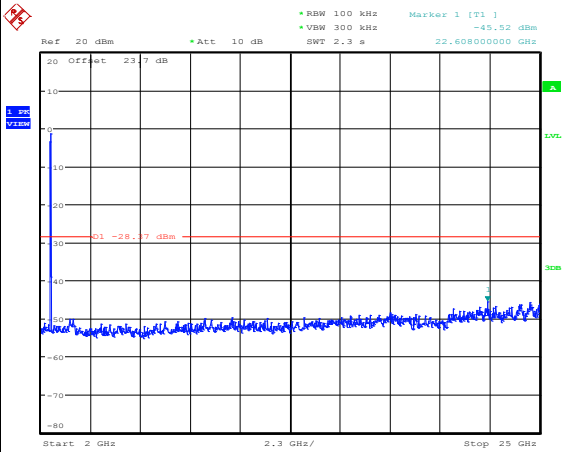
Date: 26.APR.2016 20:46:57

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 20:47:38

Spurious Emission 2GHz~25GHz

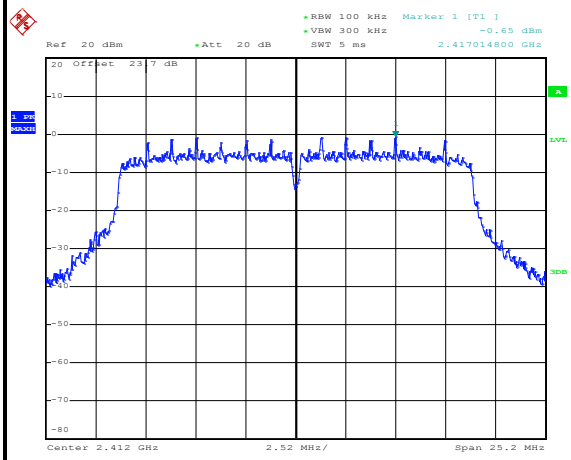


Date: 26.APR.2016 20:47:46

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

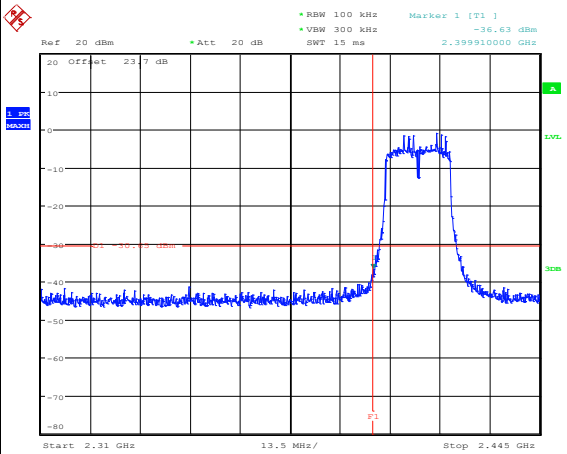
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



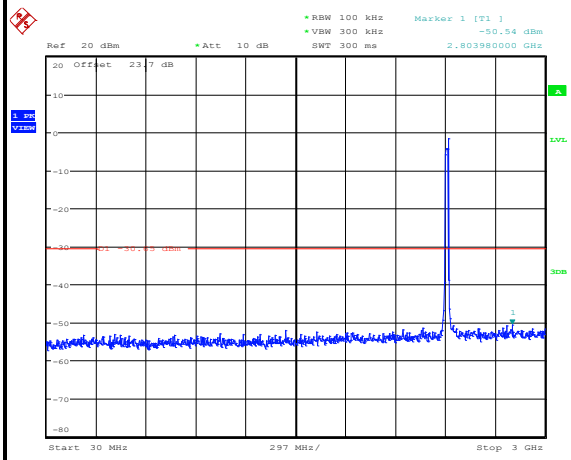
Date: 27.APR.2016 01:22:13

Low Channel Plot



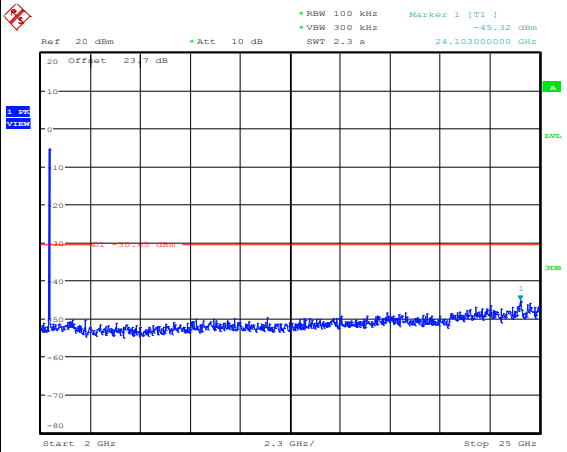
Date: 27.APR.2016 01:34:51

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 01:35:03

Spurious Emission 2GHz~25GHz

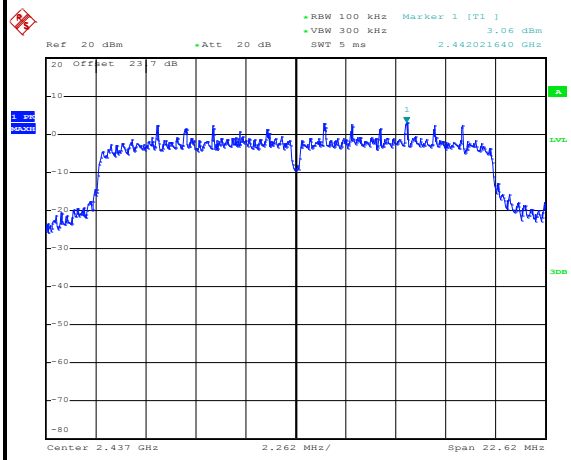


Date: 27.APR.2016 01:35:11

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

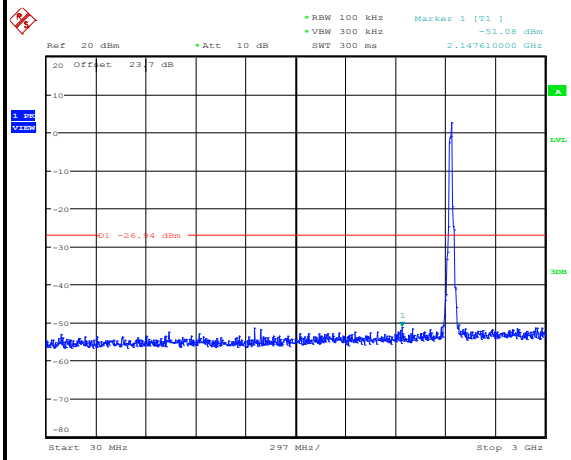
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



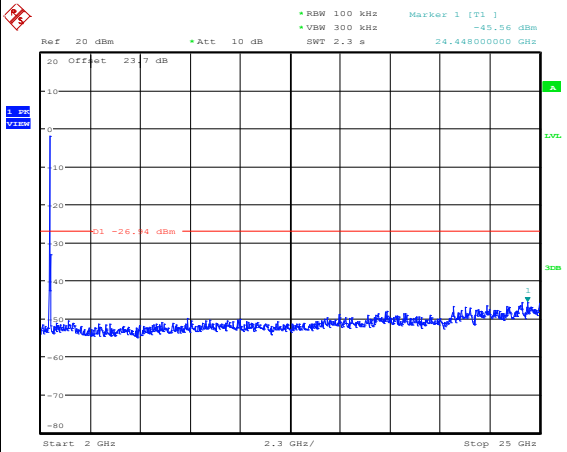
Date: 27.APR.2016 01:24:33

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 04:48:08

Spurious Emission 2GHz~25GHz

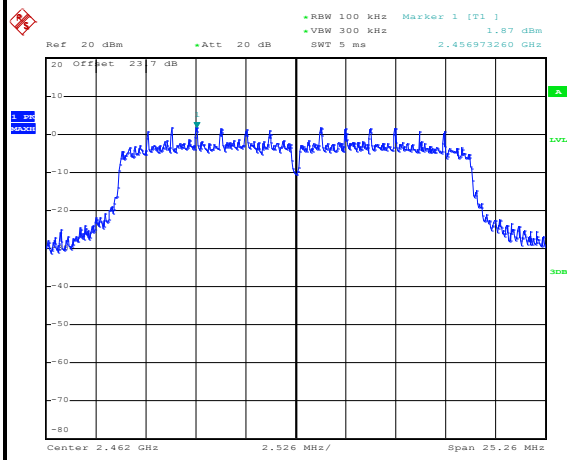


Date: 27.APR.2016 04:48:16

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

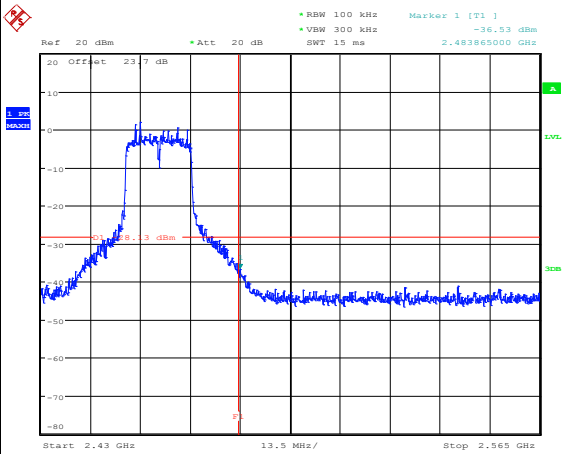
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



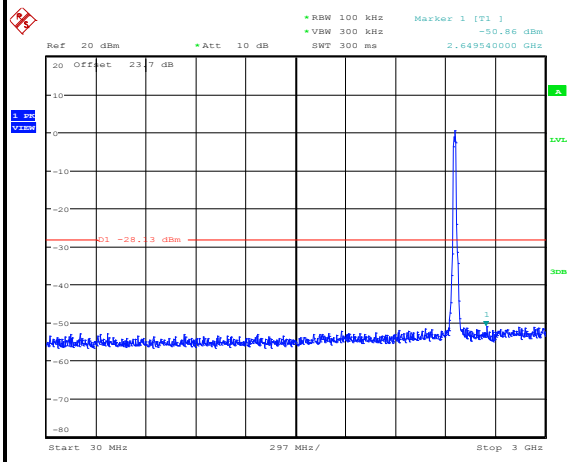
Date: 27.APR.2016 01:26:48

High Channel Plot



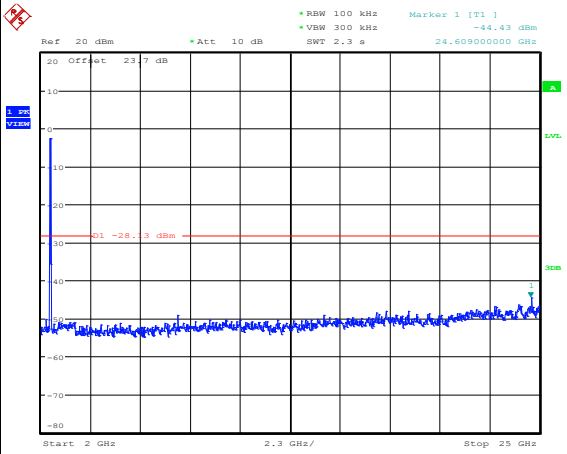
Date: 27.APR.2016 04:55:21

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 04:55:36

Spurious Emission 2GHz~25GHz

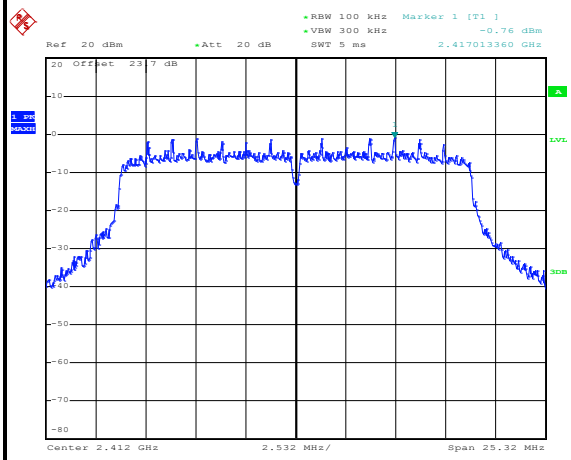


Date: 27.APR.2016 04:55:44

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

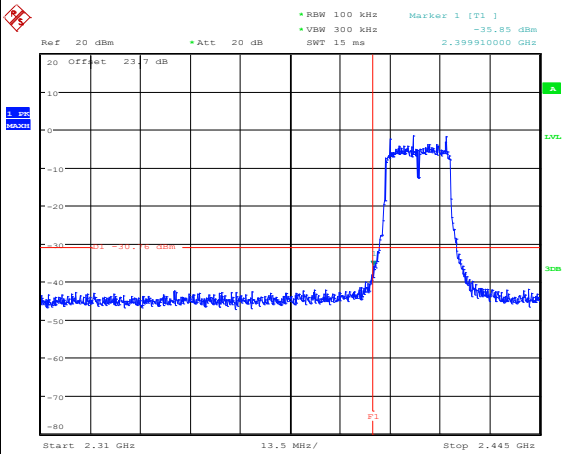
WLAN 802.11ac VHT20 Channel 01

100kHz PSD reference Level



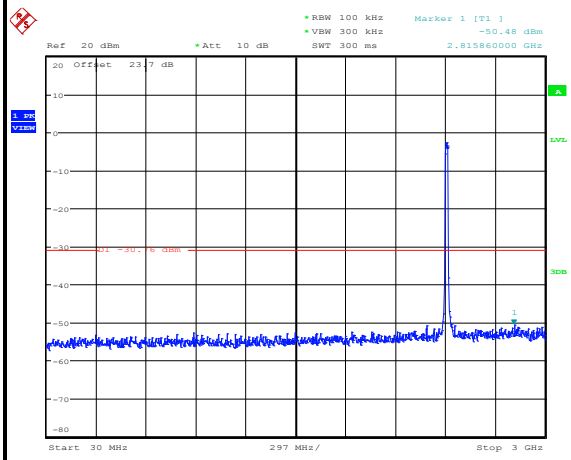
Date: 27.APR.2016 02:09:22

Low Channel Plot



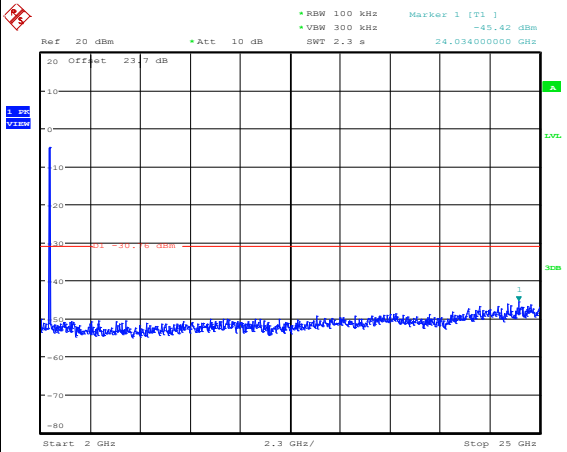
Date: 27.APR.2016 06:24:44

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 06:25:00

Spurious Emission 2GHz~25GHz

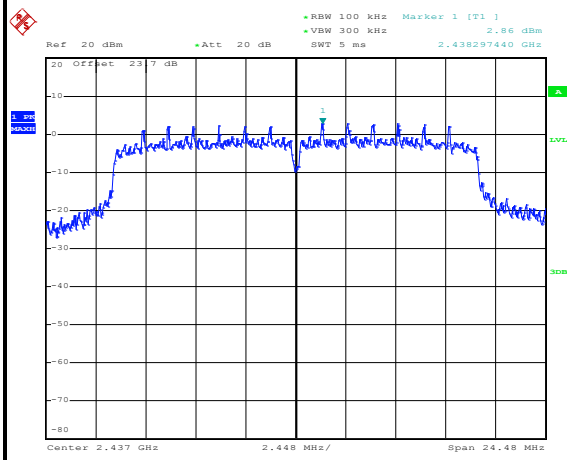


Date: 27.APR.2016 06:25:08

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

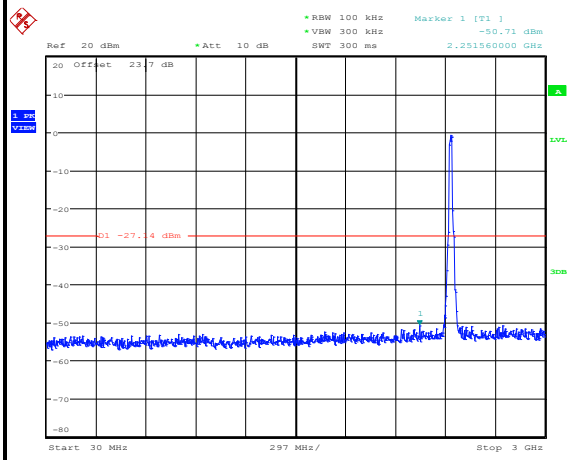
WLAN 802.11ac VHT20 Channel 06

100kHz PSD reference Level



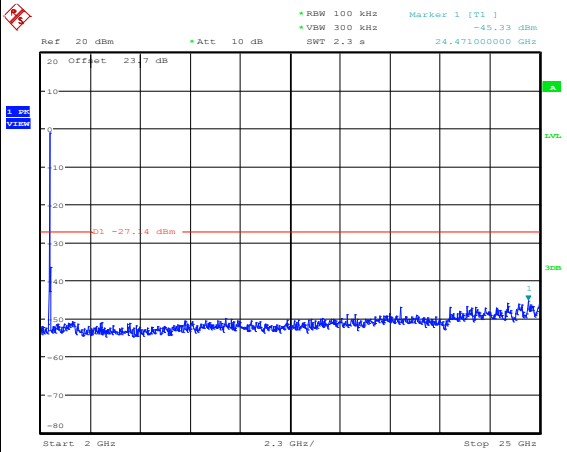
Date: 27.APR.2016 02:14:15

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 06:39:45

Spurious Emission 2GHz~25GHz

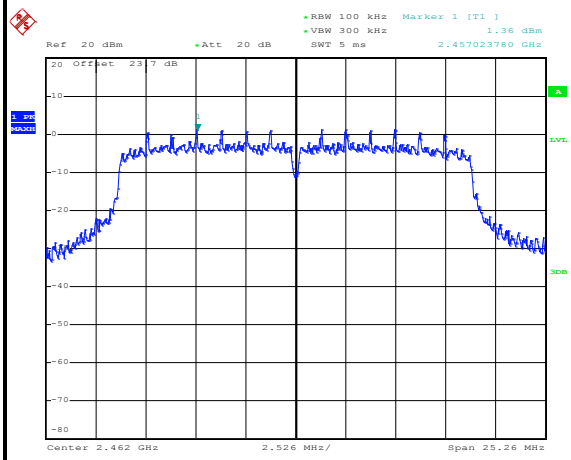


Date: 27.APR.2016 06:39:53

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

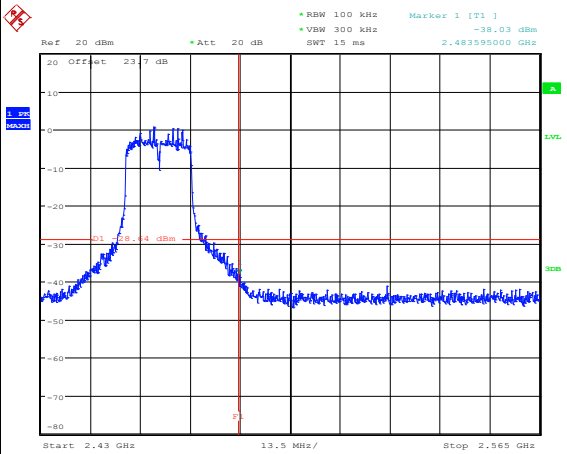
WLAN 802.11ac VHT20 Channel 11

100kHz PSD reference Level



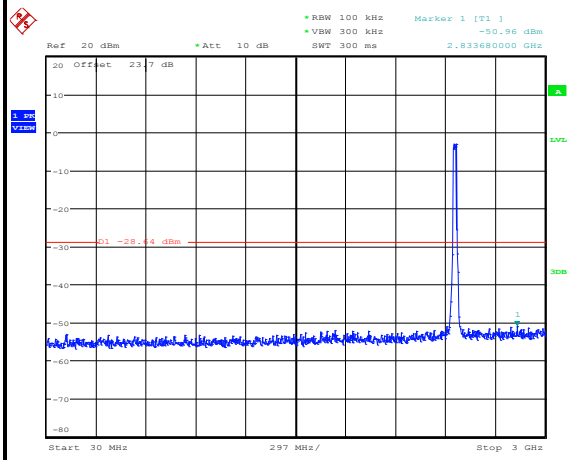
Date: 27.APR.2016 02:20:28

High Channel Plot



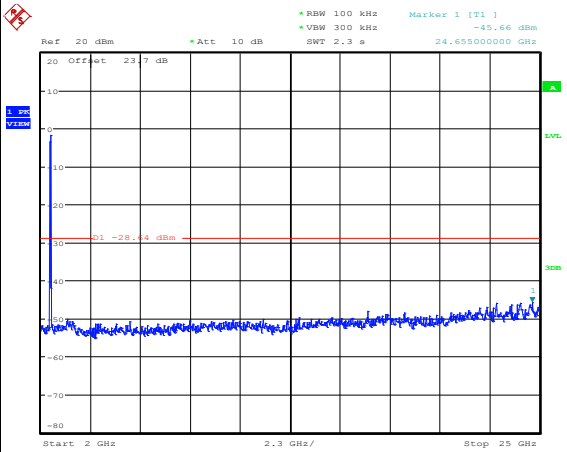
Date: 27.APR.2016 06:46:46

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 06:47:22

Spurious Emission 2GHz~25GHz



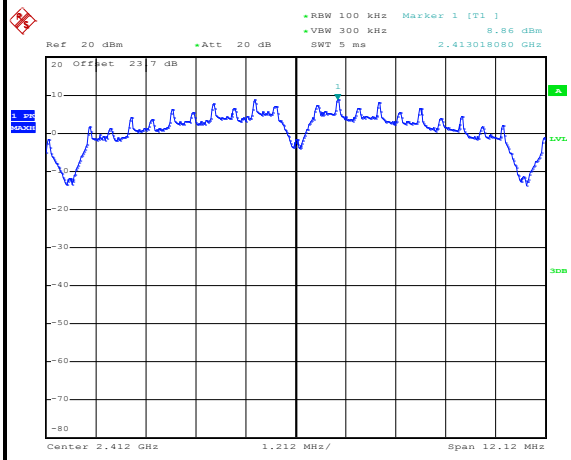
Date: 27.APR.2016 06:47:30

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

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

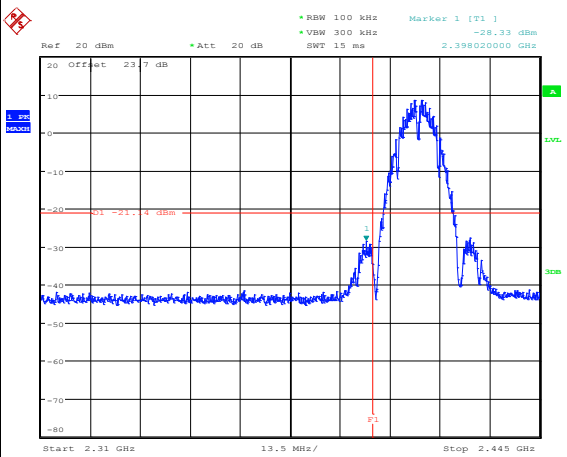
WLAN 802.11b Channel 01

100kHz PSD reference Level



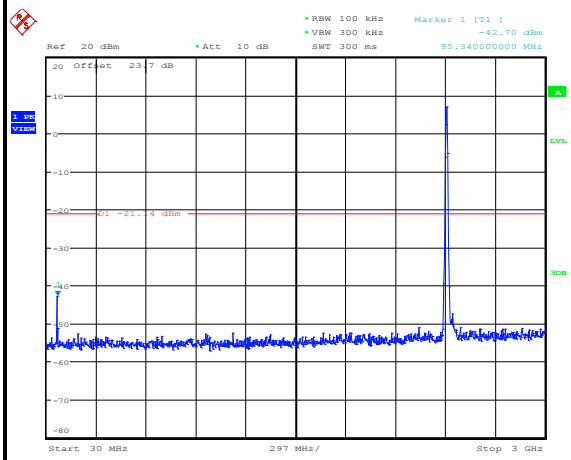
Date: 27.APR.2016 00:08:40

Low Channel Plot



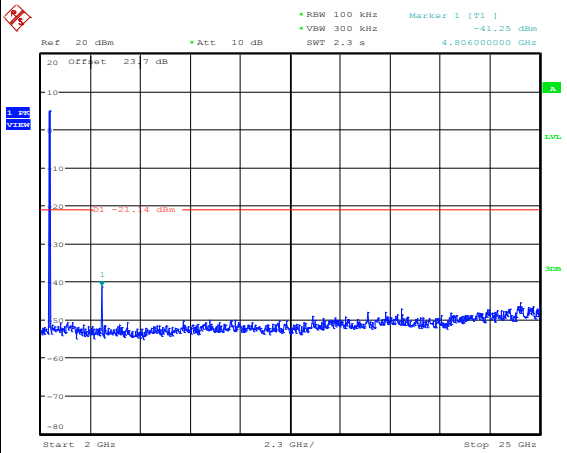
Date: 26.APR.2016 19:20:10

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 19:20:27

Spurious Emission 2GHz~25GHz

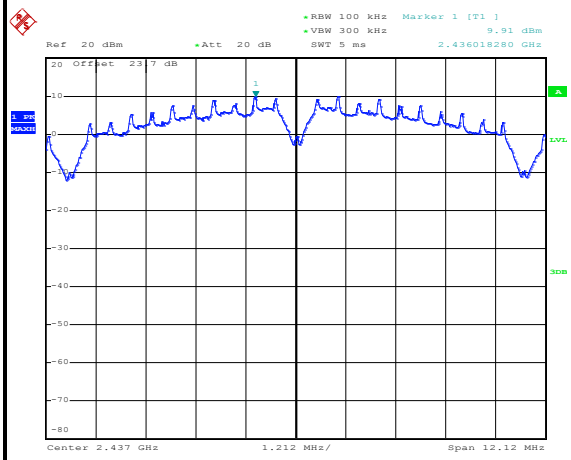


Date: 26.APR.2016 19:20:35

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 :**	AC Chang

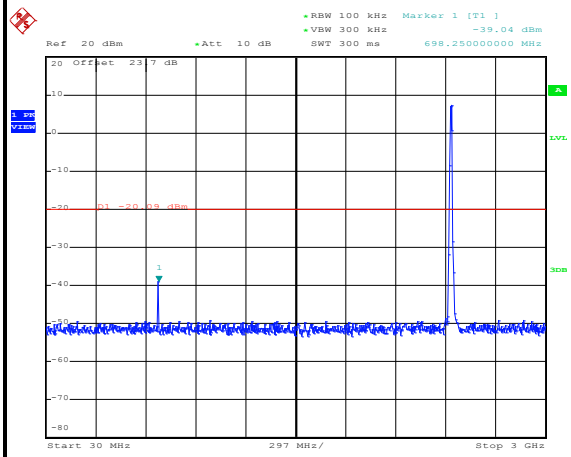
WLAN 802.11b Channel 06

100kHz PSD reference Level



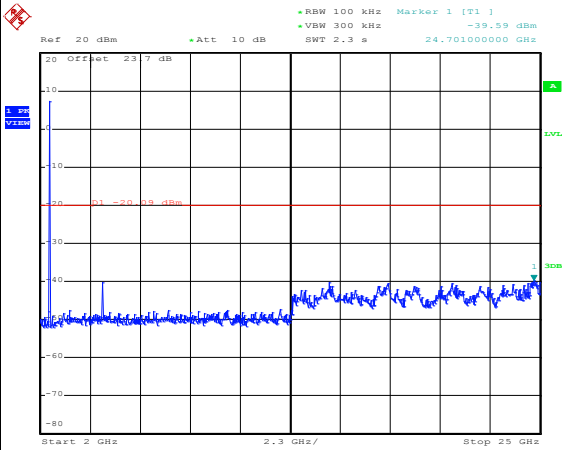
Date: 27.APR.2016 00:19:13

Spurious Emission 30MHz~3GHz



Date: 28.APR.2016 21:11:42

Spurious Emission 2GHz~25GHz

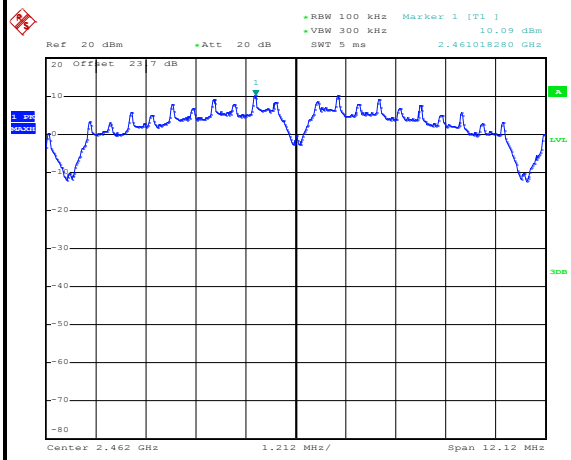


Date: 28.APR.2016 21:11:51

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 :**	AC Chang

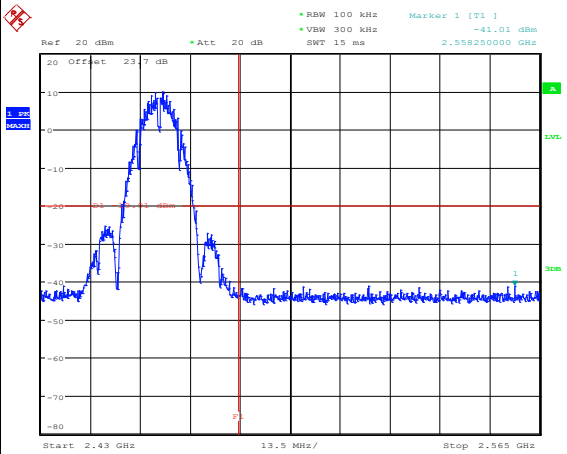
WLAN 802.11b Channel 11

100kHz PSD reference Level



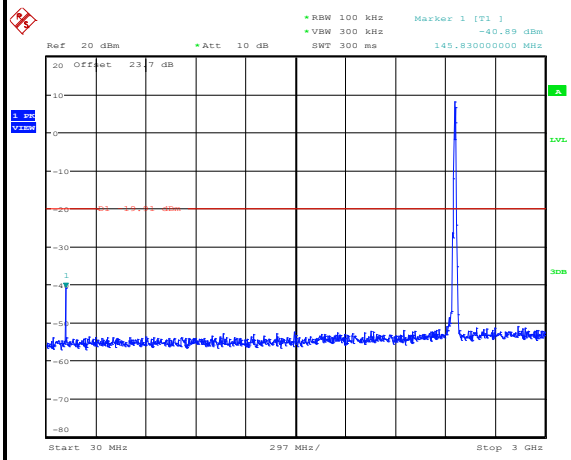
Date: 27.APR.2016 00:24:33

High Channel Plot



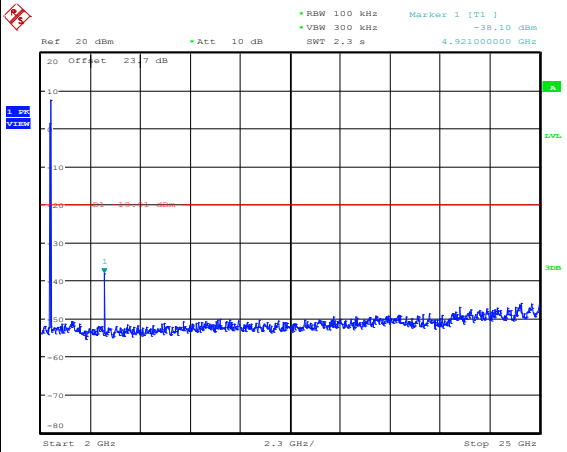
Date: 26.APR.2016 19:38:25

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 19:38:38

Spurious Emission 2GHz~25GHz

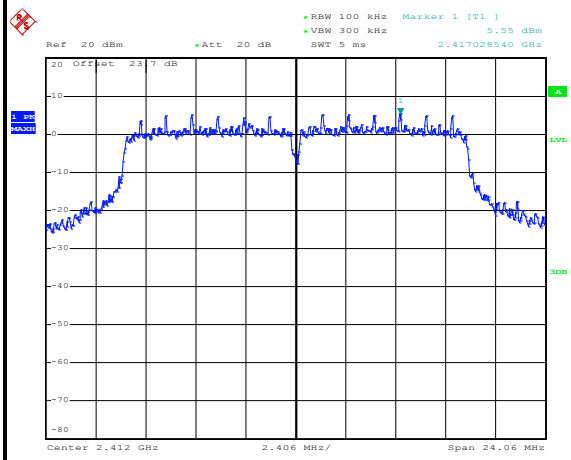


Date: 26.APR.2016 19:38:46

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 :**	AC Chang

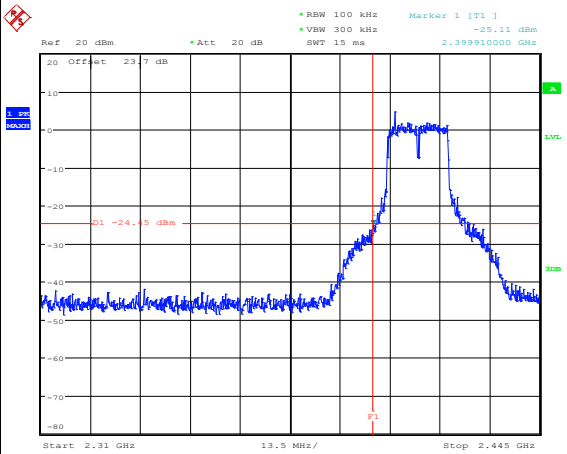
WLAN 802.11g Channel 01

100kHz PSD reference Level



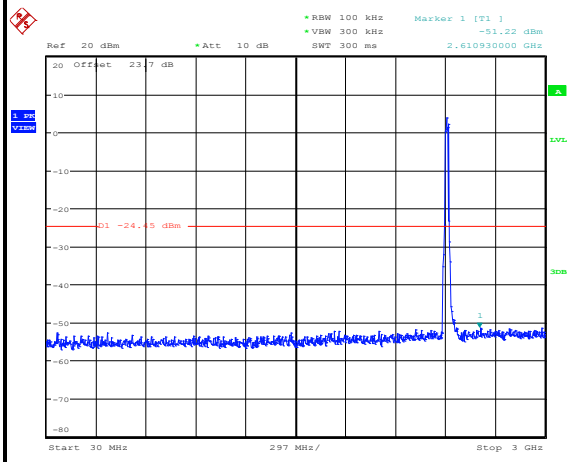
Date: 27.APR.2016 00:50:15

Low Channel Plot



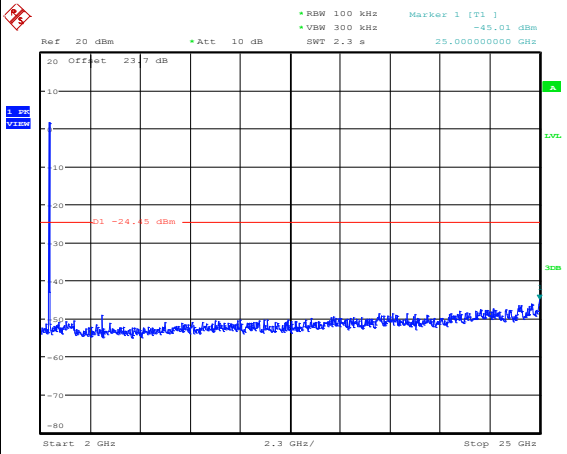
Date: 26.APR.2016 20:59:04

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 21:00:36

Spurious Emission 2GHz~25GHz

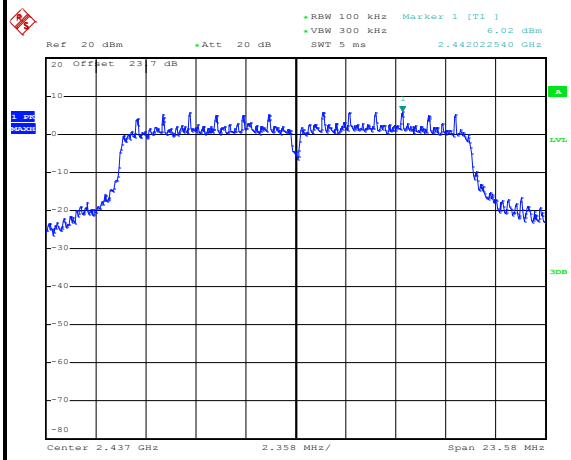


Date: 26.APR.2016 21:00:44

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 :**	AC Chang

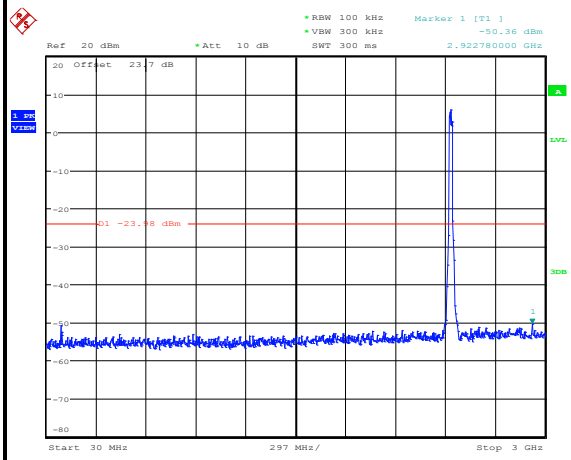
WLAN 802.11g Channel 06

100kHz PSD reference Level



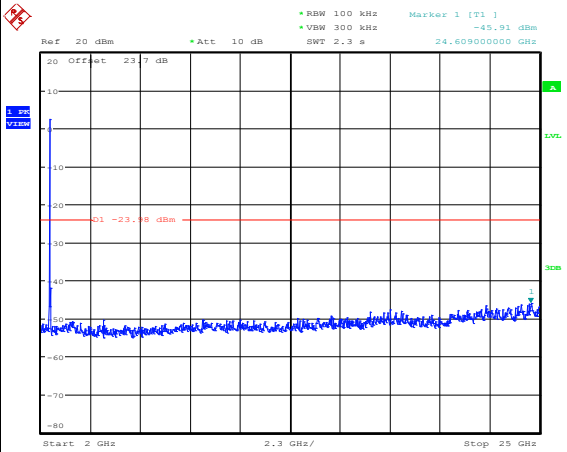
Date: 27.APR.2016 00:57:39

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 21:17:51

Spurious Emission 2GHz~25GHz

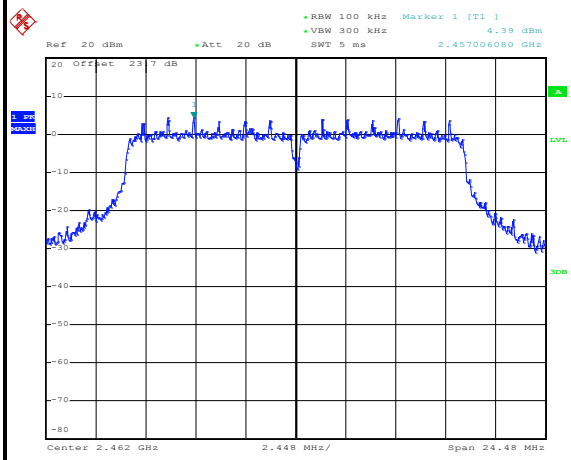


Date: 26.APR.2016 21:17:59

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 :**	AC Chang

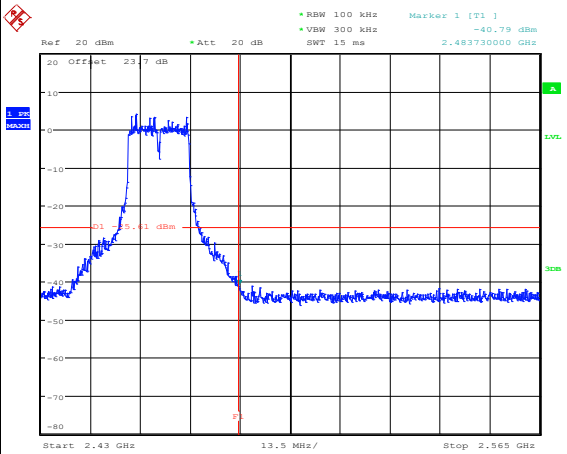
WLAN 802.11g Channel 11

100kHz PSD reference Level



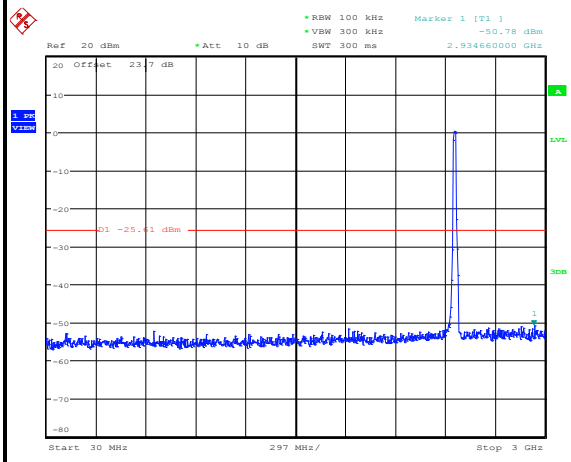
Date: 27.APR.2016 01:04:53

High Channel Plot



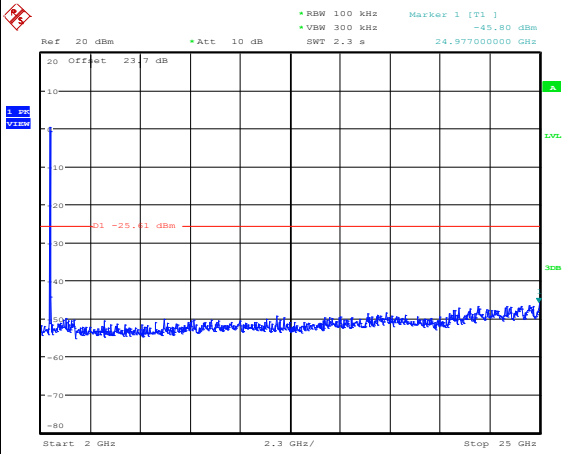
Date: 26.APR.2016 21:37:56

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 21:38:16

Spurious Emission 2GHz~25GHz

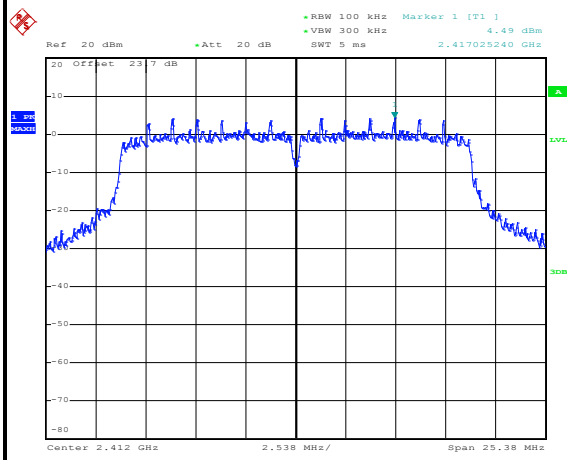


Date: 26.APR.2016 21:38:24

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 :**	AC Chang

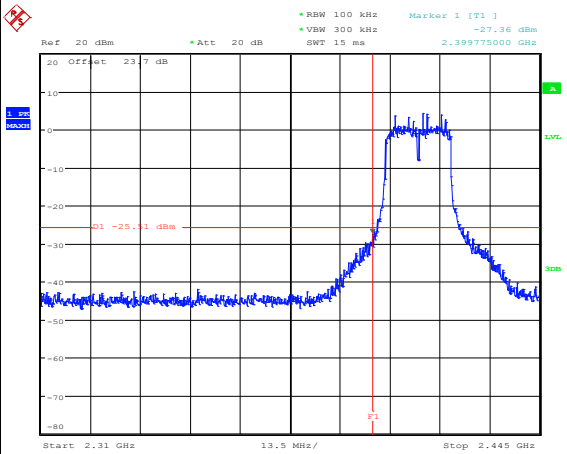
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



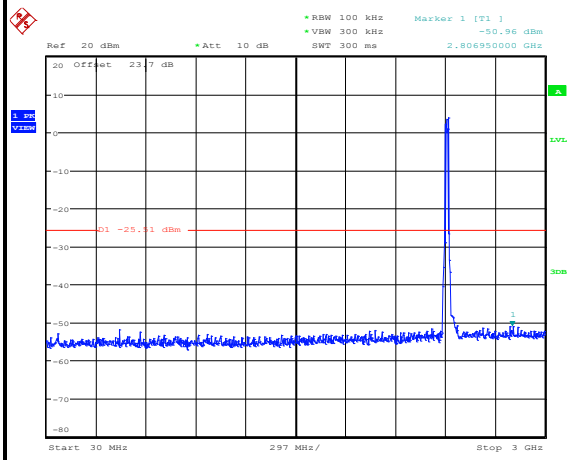
Date: 27.APR.2016 01:29:47

Low Channel Plot



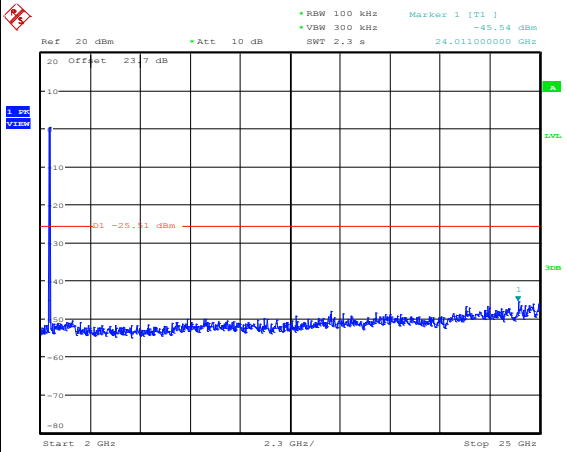
Date: 27.APR.2016 05:02:58

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 05:03:14

Spurious Emission 2GHz~25GHz

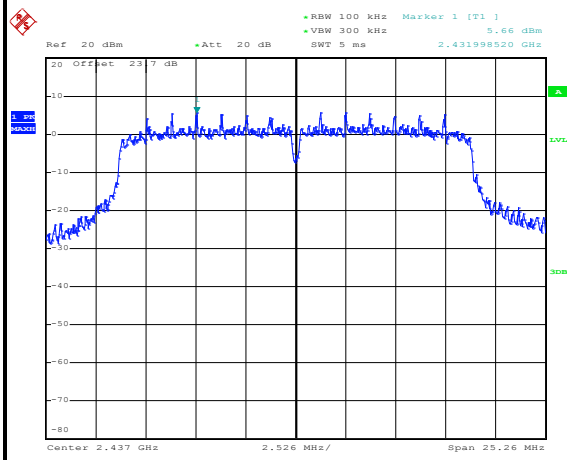


Date: 27.APR.2016 05:03:22

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 :**	AC Chang

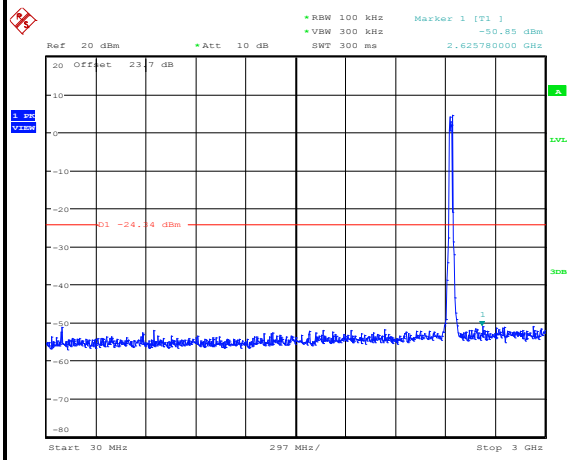
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



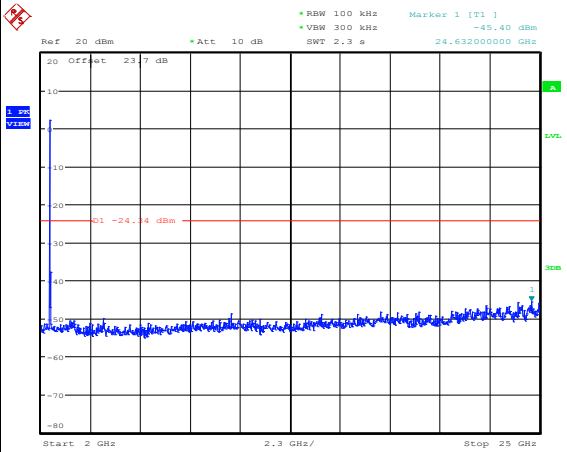
Date: 27.APR.2016 01:34:46

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 05:10:41

Spurious Emission 2GHz~25GHz

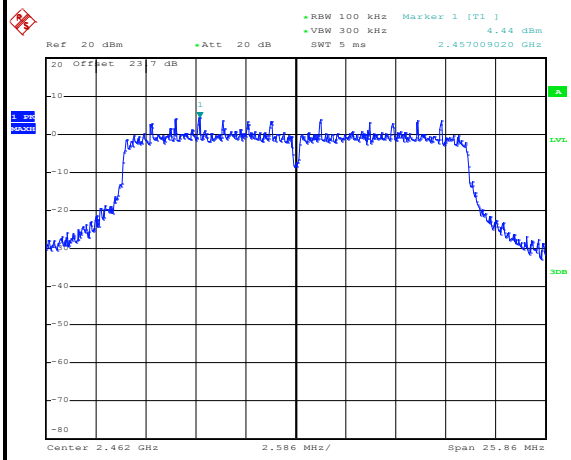


Date: 27.APR.2016 05:10:49

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 :**	AC Chang

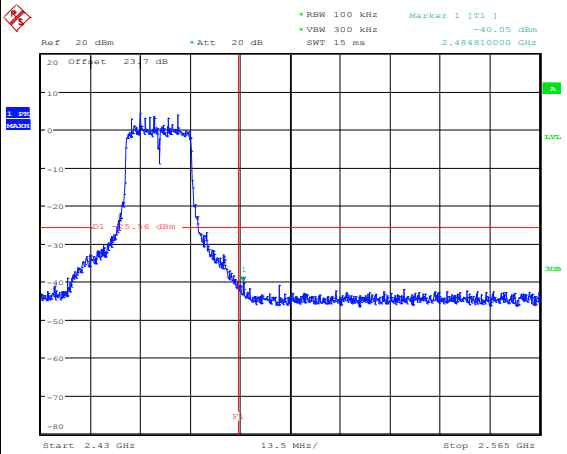
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



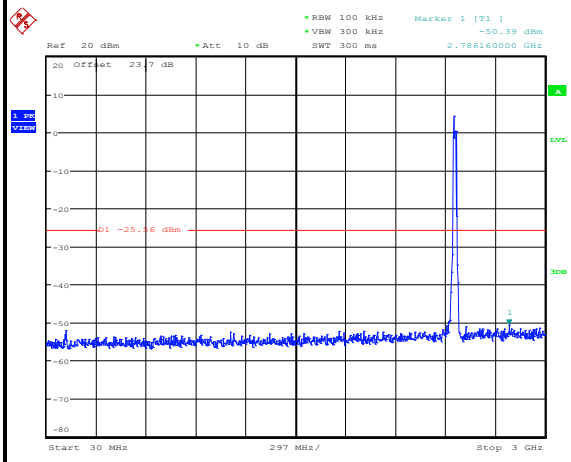
Date: 27.APR.2016 01:40:15

High Channel Plot



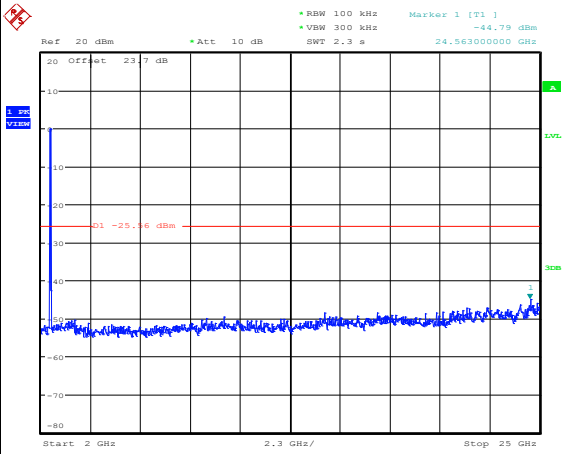
Date: 27.APR.2016 05:17:36

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 05:17:47

Spurious Emission 2GHz~25GHz

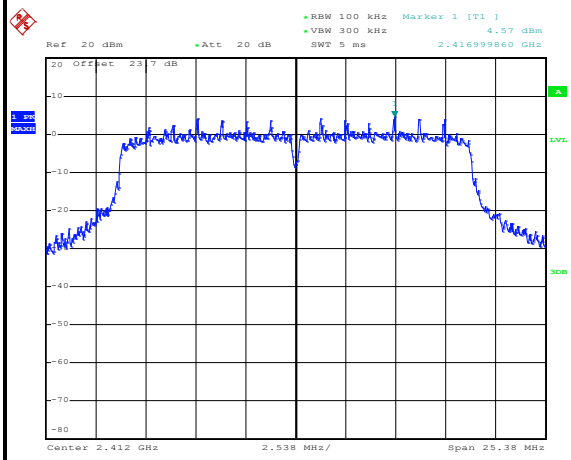


Date: 27.APR.2016 05:17:55

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 :**	AC Chang

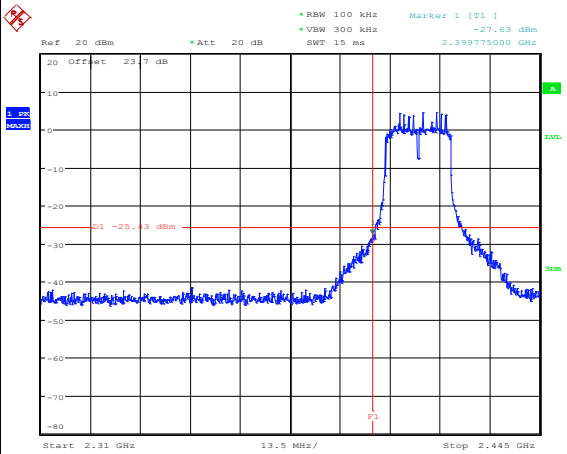
WLAN 802.11ac VHT20 Channel 01

100kHz PSD reference Level



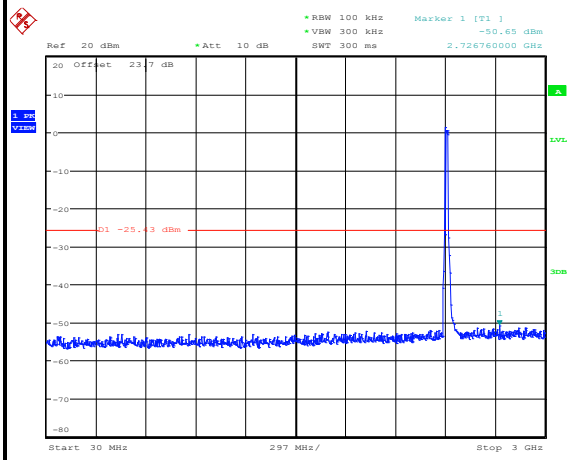
Date: 27.APR.2016 02:36:10

Low Channel Plot



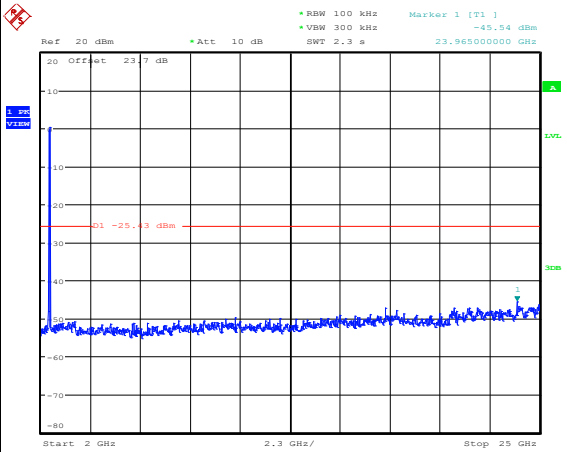
Date: 27.APR.2016 06:54:16

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 06:54:54

Spurious Emission 2GHz~25GHz

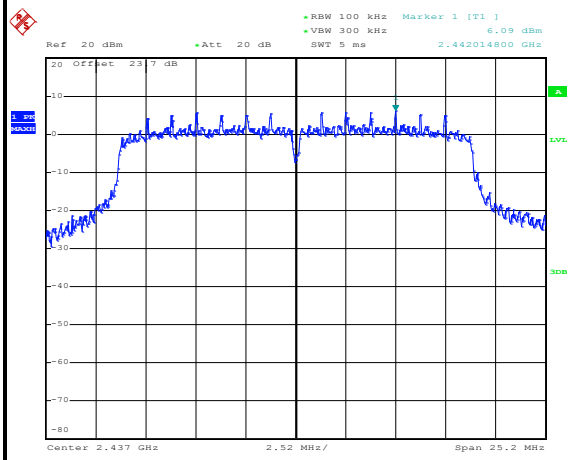


Date: 27.APR.2016 06:55:02

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 :**	AC Chang

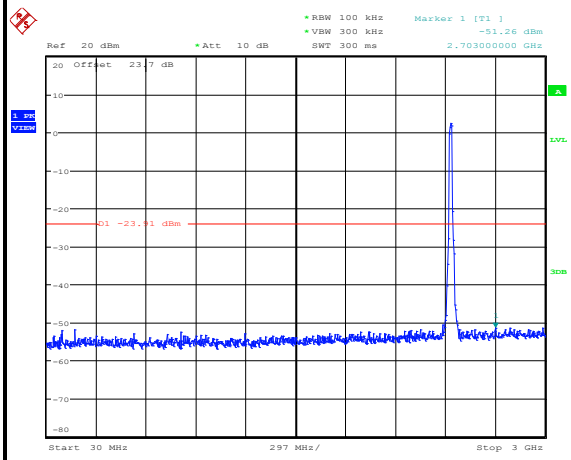
WLAN 802.11ac VHT20 Channel 06

100kHz PSD reference Level



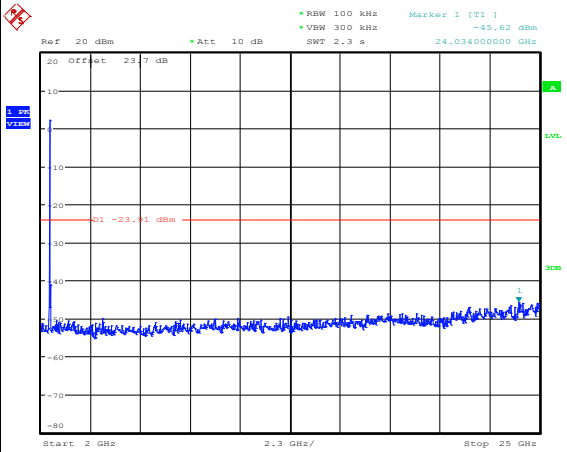
Date: 27.APR.2016 02:41:21

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 07:02:17

Spurious Emission 2GHz~25GHz

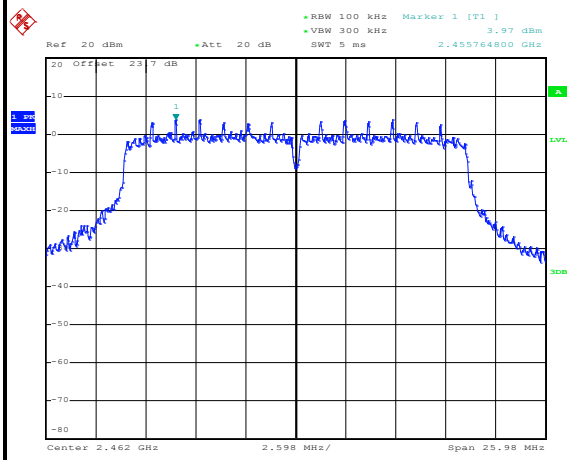


Date: 27.APR.2016 07:02:25

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 :**	AC Chang

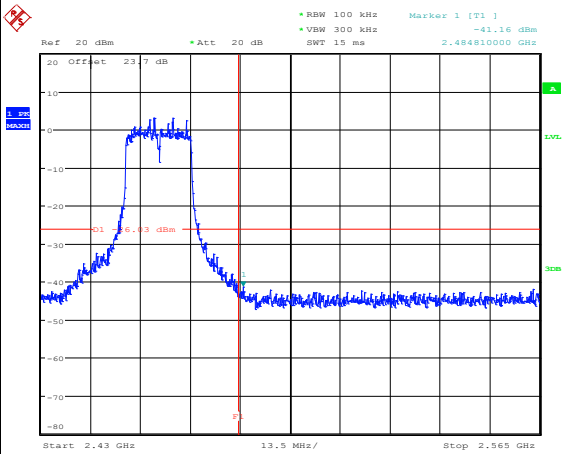
WLAN 802.11ac VHT20 Channel 11

100kHz PSD reference Level



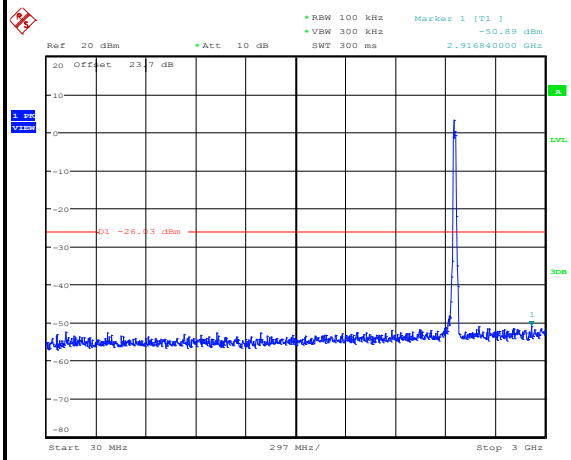
Date: 27.APR.2016 02:51:20

High Channel Plot



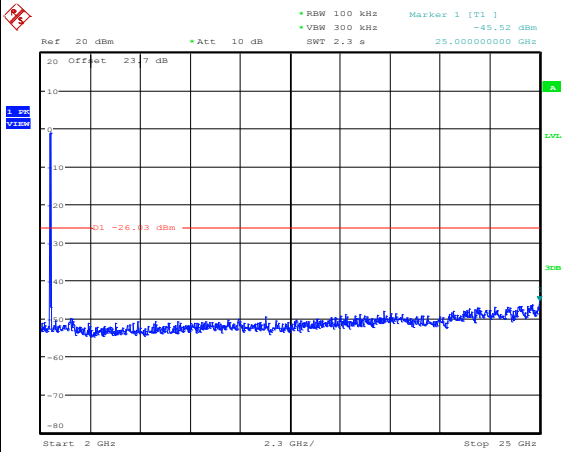
Date: 27.APR.2016 07:09:00

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 07:09:16

Spurious Emission 2GHz~25GHz



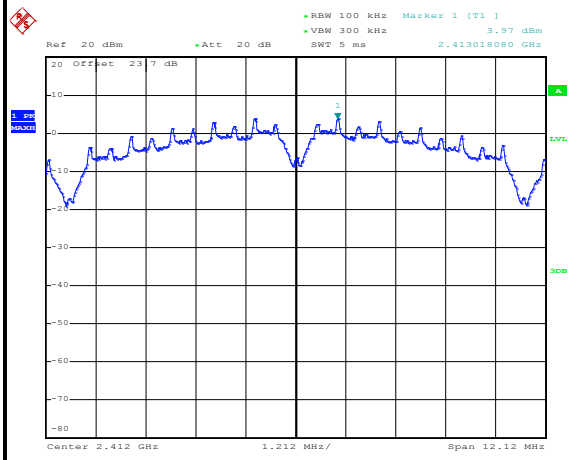
Date: 27.APR.2016 07:09:24

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 :**	AC Chang

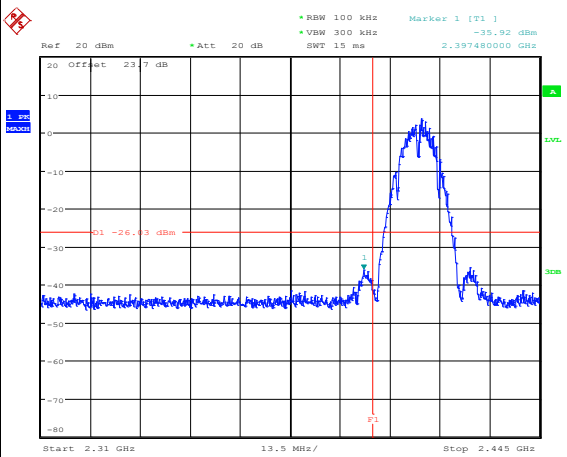
WLAN 802.11b Channel 01

100kHz PSD reference Level



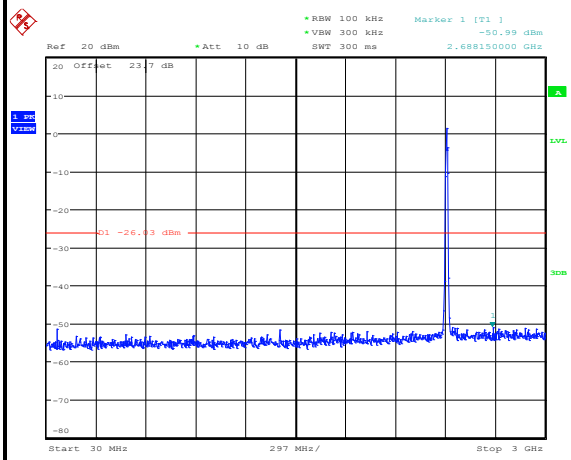
Date: 27.APR.2016 00:11:36

Low Channel Plot



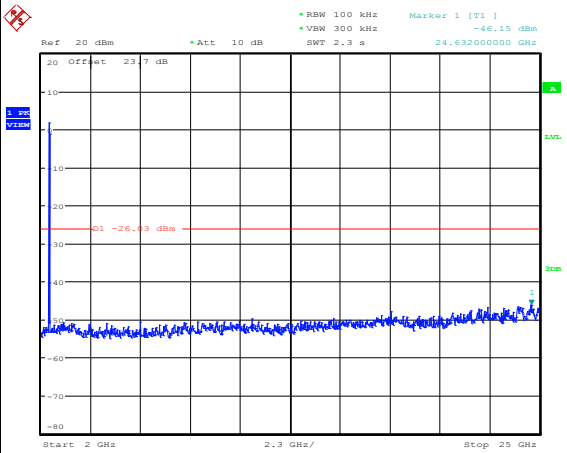
Date: 26.APR.2016 19:25:51

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 19:26:29

Spurious Emission 2GHz~25GHz

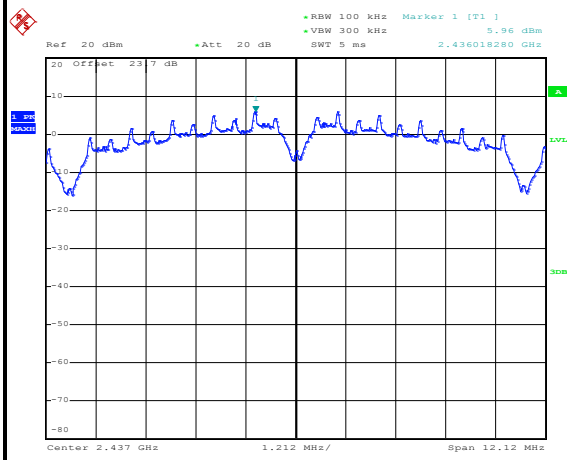


Date: 26.APR.2016 19:26:37

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 :**	AC Chang

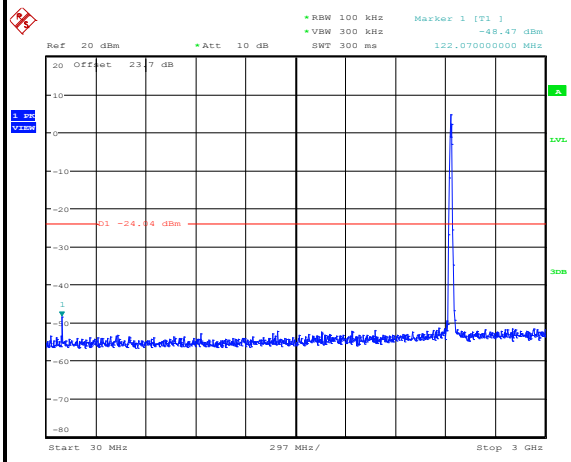
WLAN 802.11b Channel 06

100kHz PSD reference Level



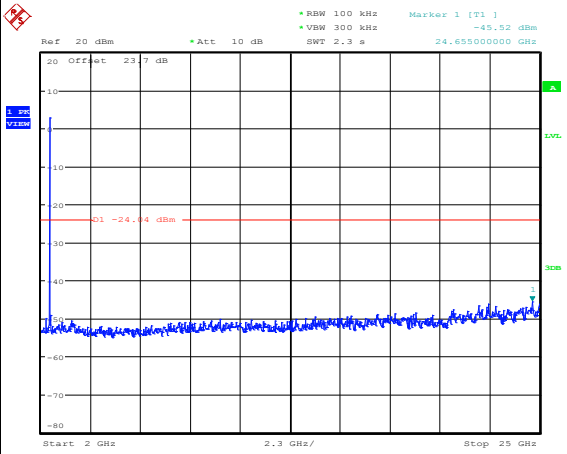
Date: 27.APR.2016 00:21:39

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 19:34:23

Spurious Emission 2GHz~25GHz

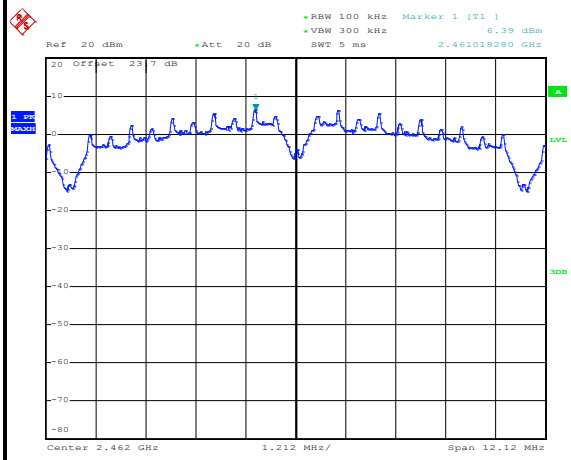


Date: 26.APR.2016 19:34:31

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 :**	AC Chang

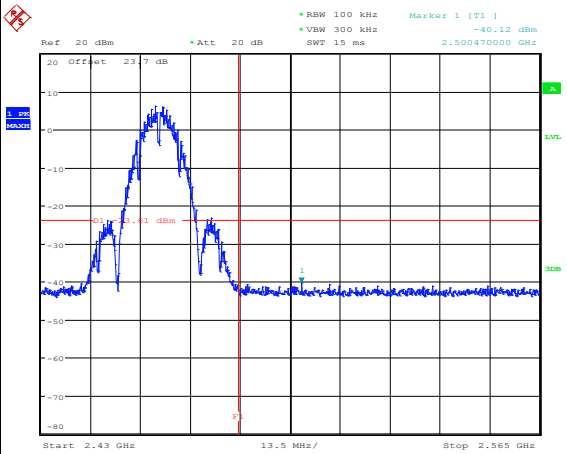
WLAN 802.11b Channel 11

100kHz PSD reference Level



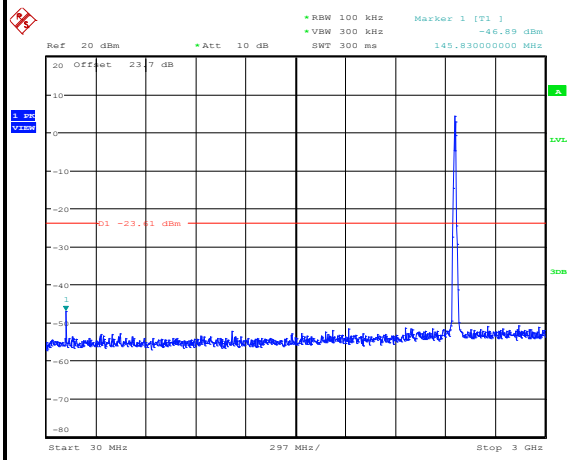
Date: 27.APR.2016 00:26:30

High Channel Plot



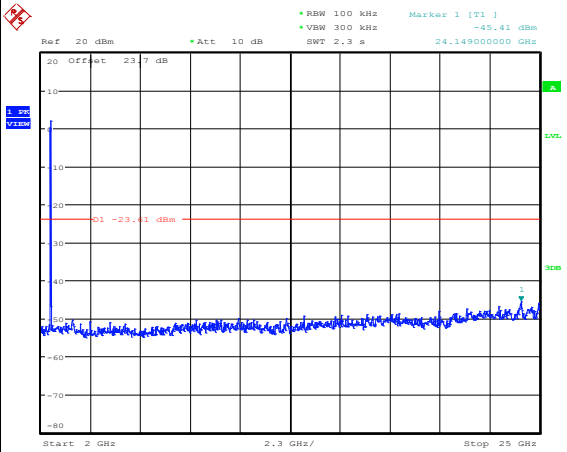
Date: 26.APR.2016 19:46:16

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 19:46:28

Spurious Emission 2GHz~25GHz

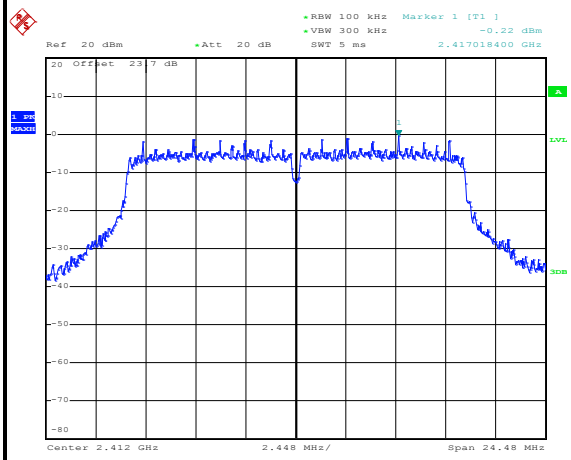


Date: 26.APR.2016 19:46:36

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 :**	AC Chang

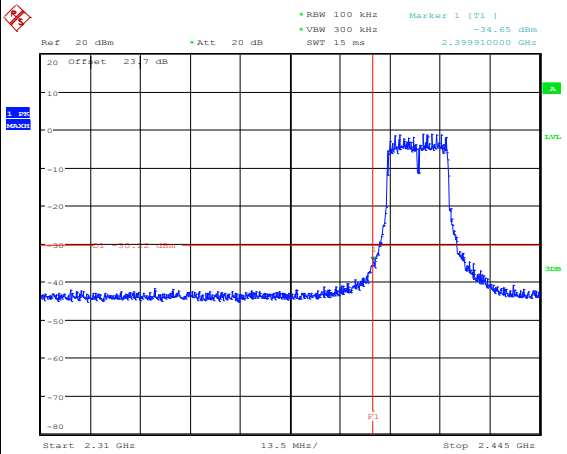
WLAN 802.11g Channel 01

100kHz PSD reference Level



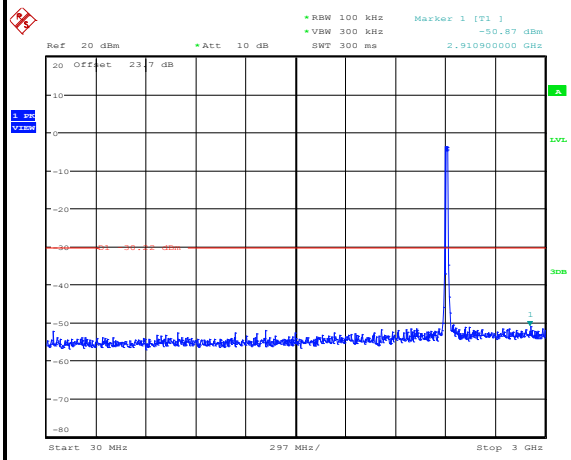
Date: 27.APR.2016 00:53:37

Low Channel Plot



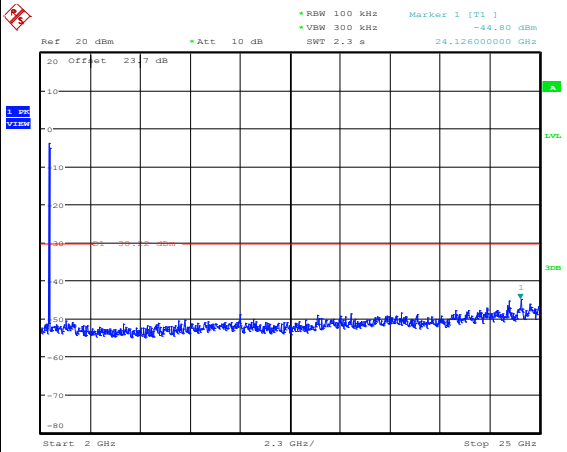
Date: 26.APR.2016 21:08:00

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 21:09:20

Spurious Emission 2GHz~25GHz

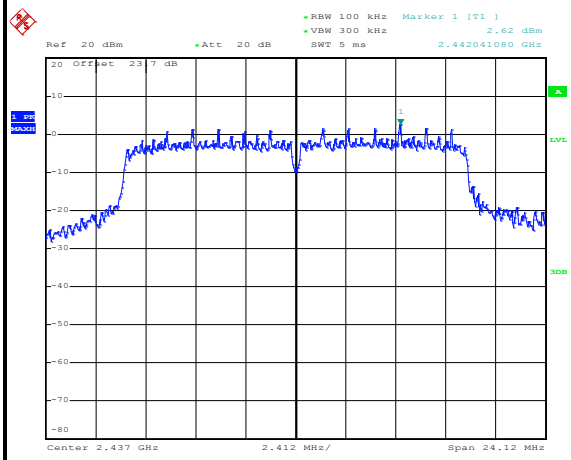


Date: 26.APR.2016 21:09:28

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 :**	AC Chang

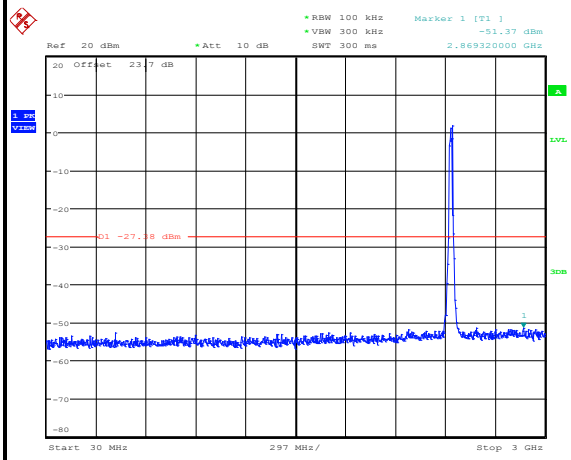
WLAN 802.11g Channel 06

100kHz PSD reference Level



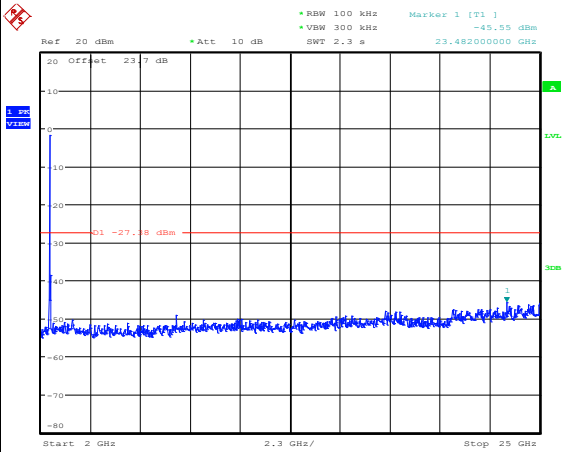
Date: 27.APR.2016 01:01:18

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 21:30:28

Spurious Emission 2GHz~25GHz

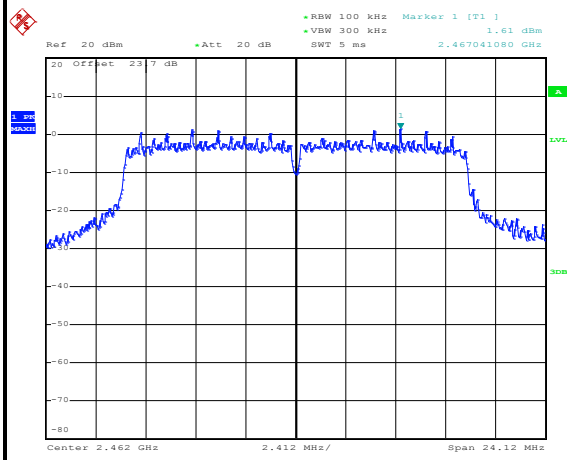


Date: 26.APR.2016 21:30:36

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 :**	AC Chang

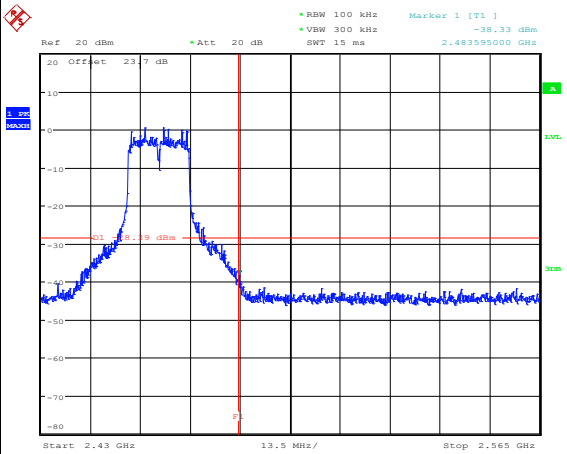
WLAN 802.11g Channel 11

100kHz PSD reference Level



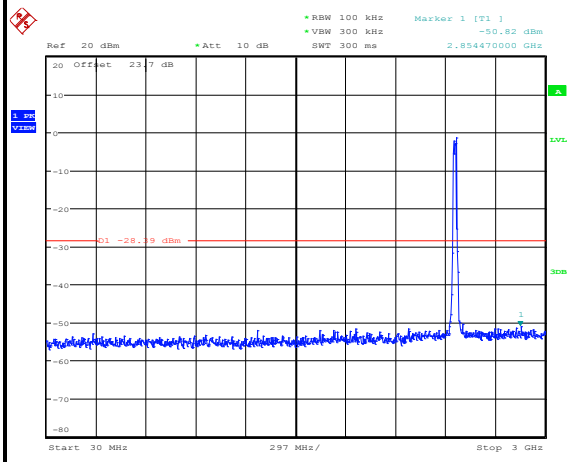
Date: 27.APR.2016 01:08:11

High Channel Plot



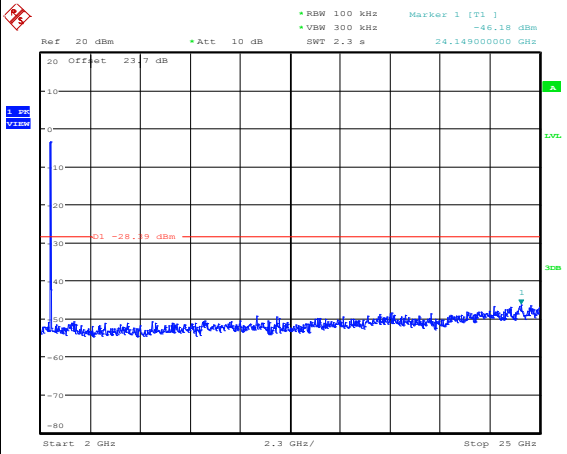
Date: 26.APR.2016 21:45:31

Spurious Emission 30MHz~3GHz



Date: 26.APR.2016 21:45:56

Spurious Emission 2GHz~25GHz

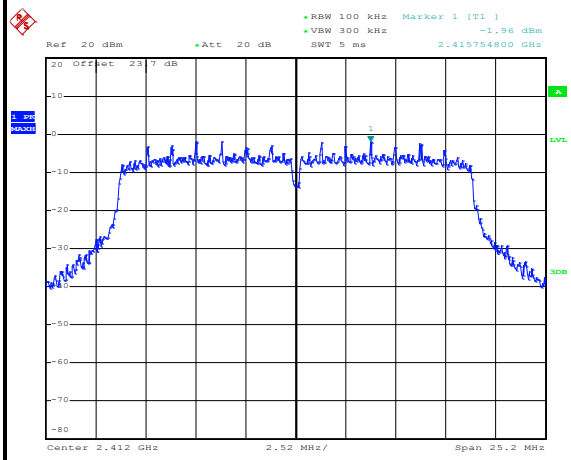


Date: 26.APR.2016 21:46:04

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 :**	AC Chang

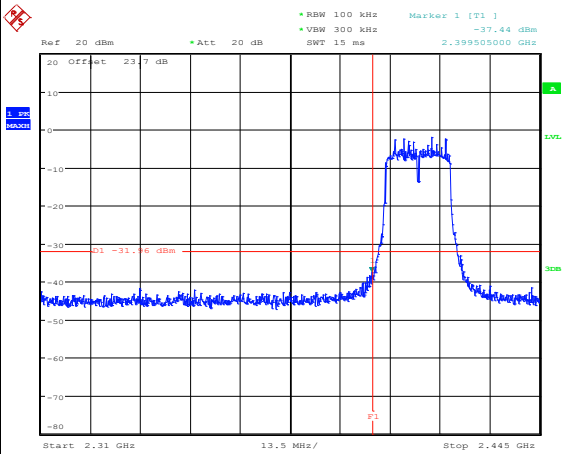
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



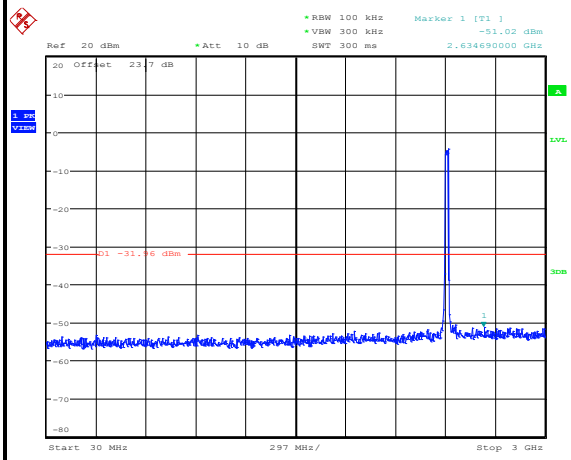
Date: 27.APR.2016 01:31:48

Low Channel Plot



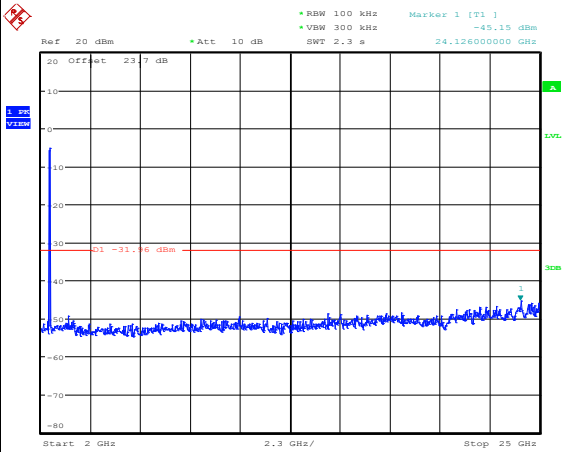
Date: 27.APR.2016 05:28:24

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 05:28:36

Spurious Emission 2GHz~25GHz

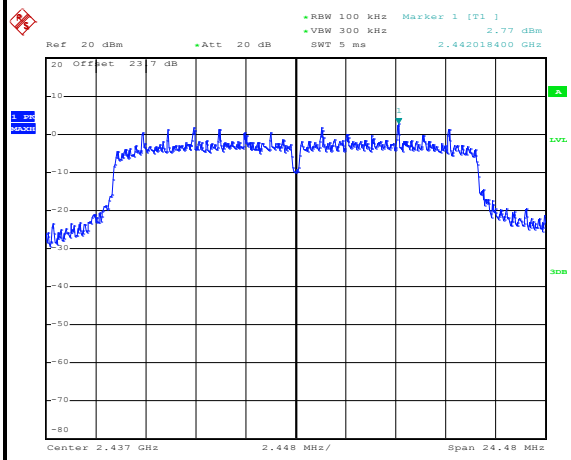


Date: 27.APR.2016 05:28:44

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 :**	AC Chang

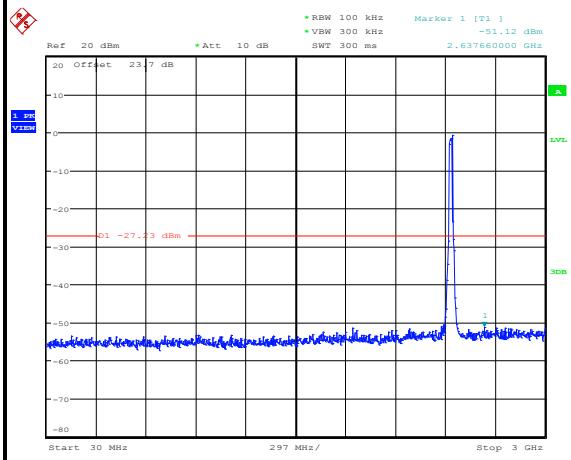
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



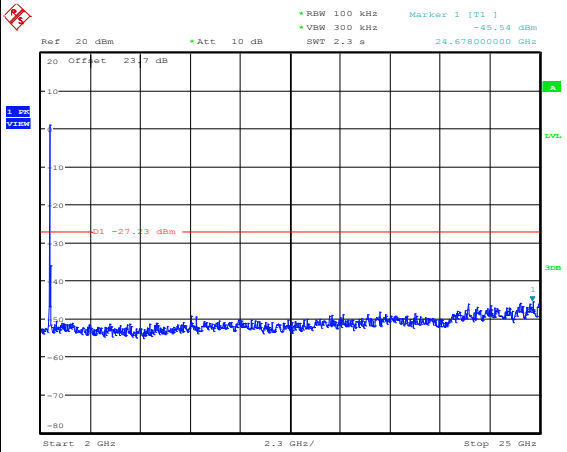
Date: 27.APR.2016 01:36:48

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 05:36:15

Spurious Emission 2GHz~25GHz

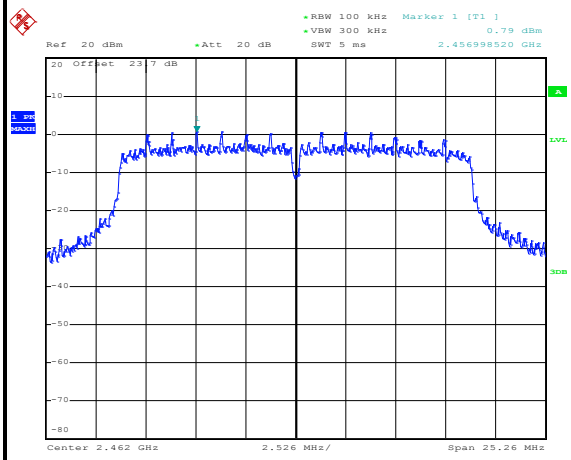


Date: 27.APR.2016 05:36:23

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 :**	AC Chang

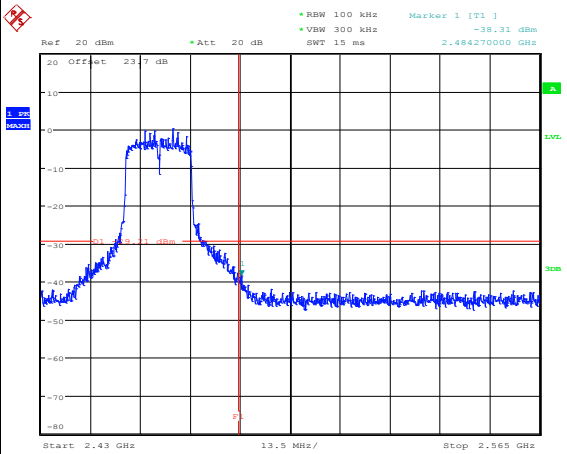
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



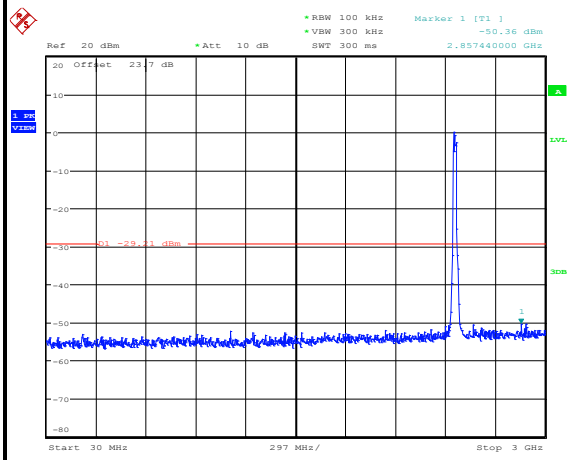
Date: 27.APR.2016 01:44:48

High Channel Plot



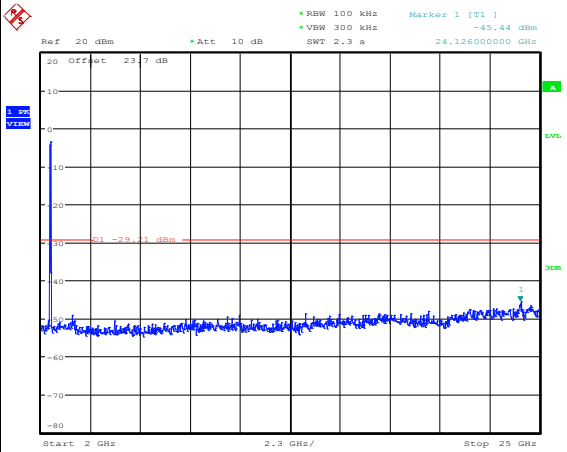
Date: 27.APR.2016 05:42:59

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 05:43:12

Spurious Emission 2GHz~25GHz

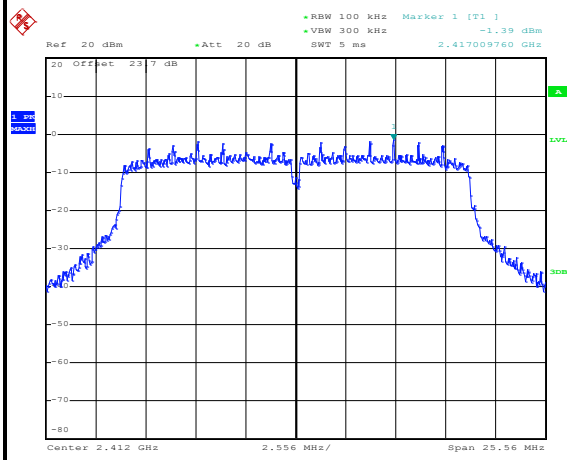


Date: 27.APR.2016 05:43:20

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 :**	AC Chang

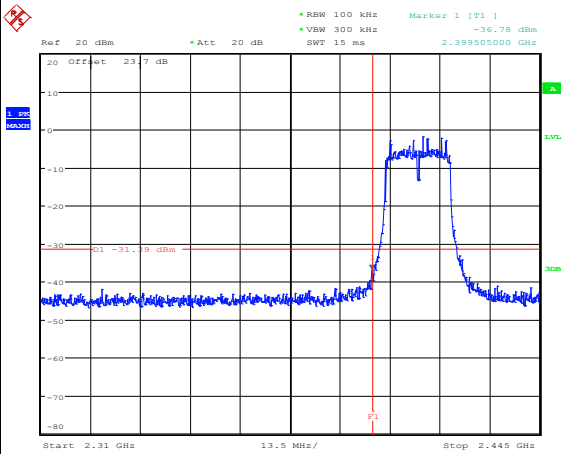
WLAN 802.11ac VHT20 Channel 01

100kHz PSD reference Level



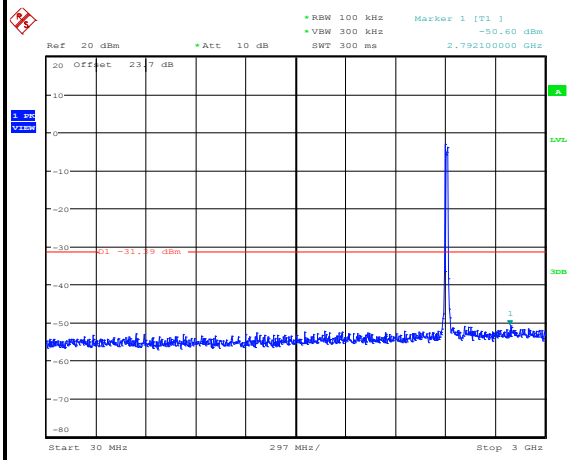
Date: 27.APR.2016 02:38:27

Low Channel Plot



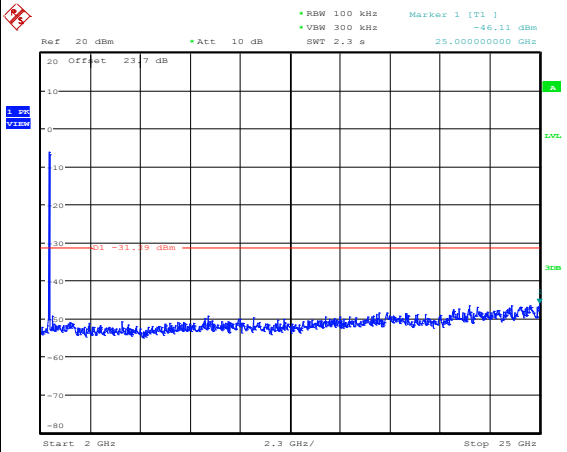
Date: 27.APR.2016 07:16:44

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 07:16:58

Spurious Emission 2GHz~25GHz

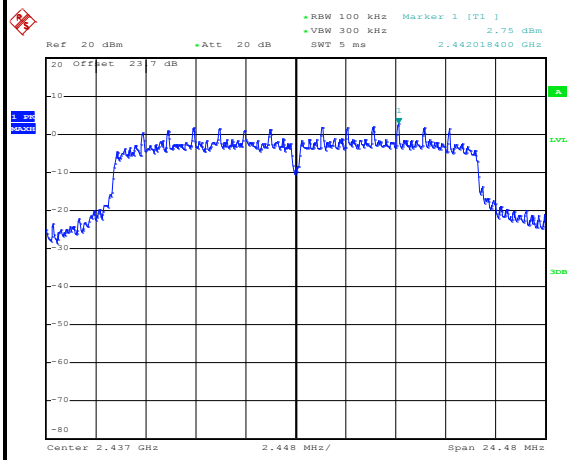


Date: 27.APR.2016 07:17:06

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 :**	AC Chang

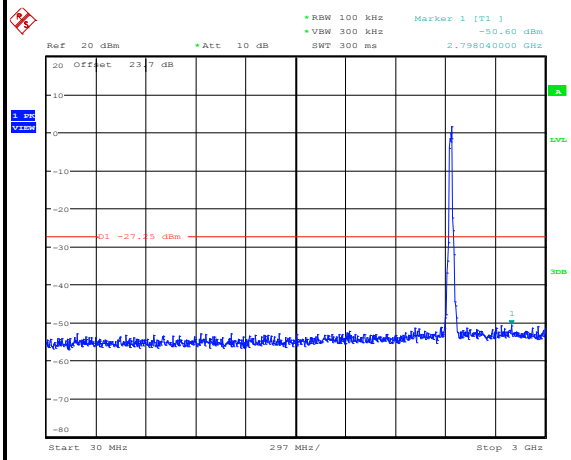
WLAN 802.11ac VHT20 Channel 06

100kHz PSD reference Level



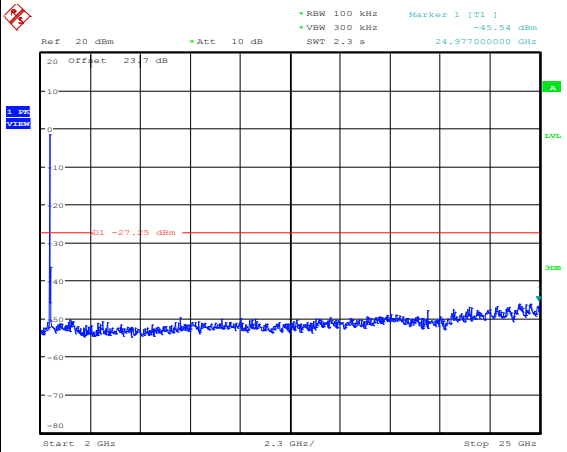
Date: 27.APR.2016 02:46:50

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 07:23:46

Spurious Emission 2GHz~25GHz

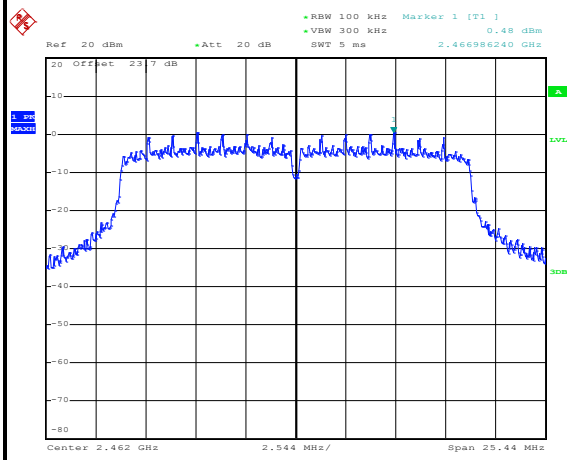


Date: 27.APR.2016 07:23:54

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 :**	AC Chang

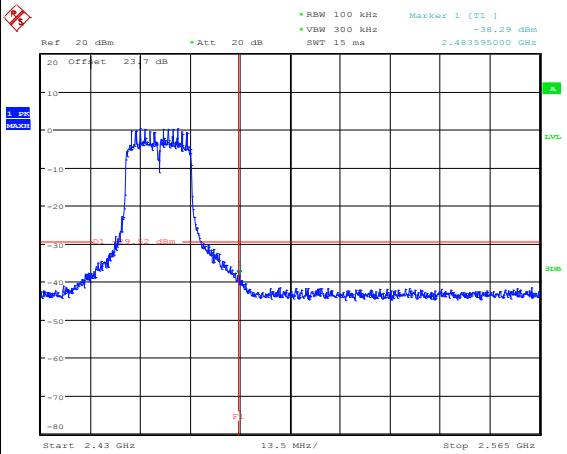
WLAN 802.11ac VHT20 Channel 11

100kHz PSD reference Level



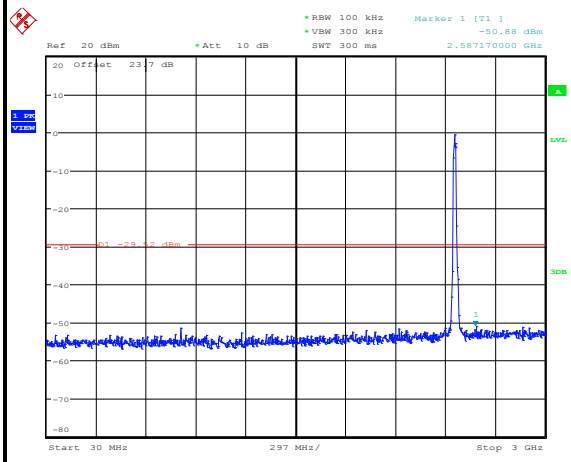
Date: 27.APR.2016 02:54:20

High Channel Plot



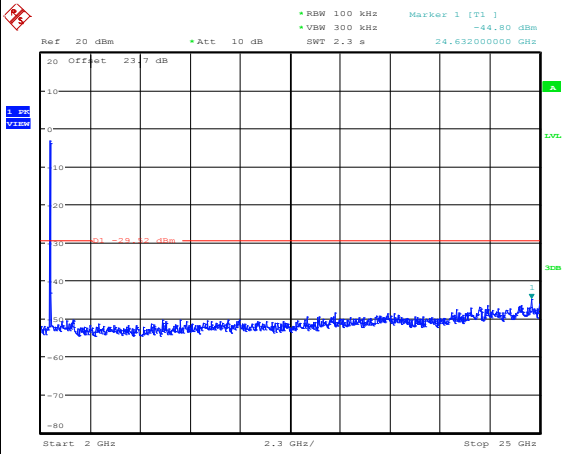
Date: 27.APR.2016 07:31:41

Spurious Emission 30MHz~3GHz



Date: 27.APR.2016 07:31:57

Spurious Emission 2GHz~25GHz



Date: 27.APR.2016 07:32:05

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 ANSI C63.10-2013.
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;

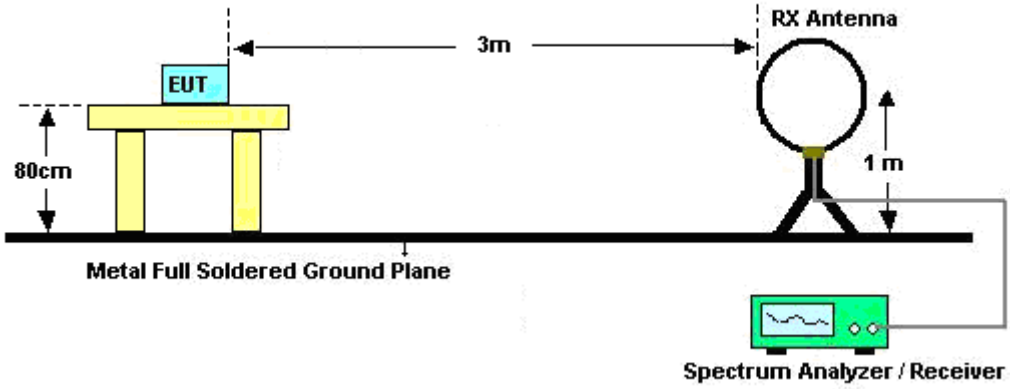
(3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.

For average measurement:

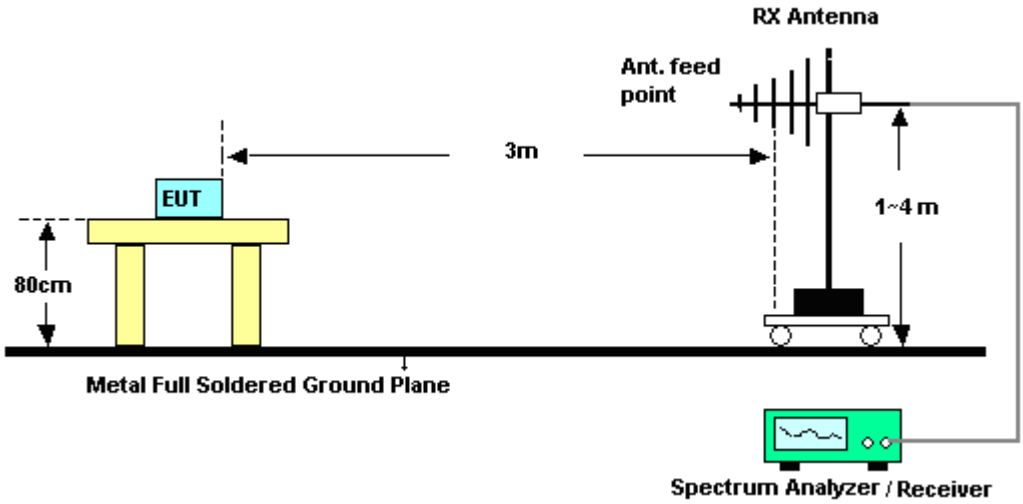
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

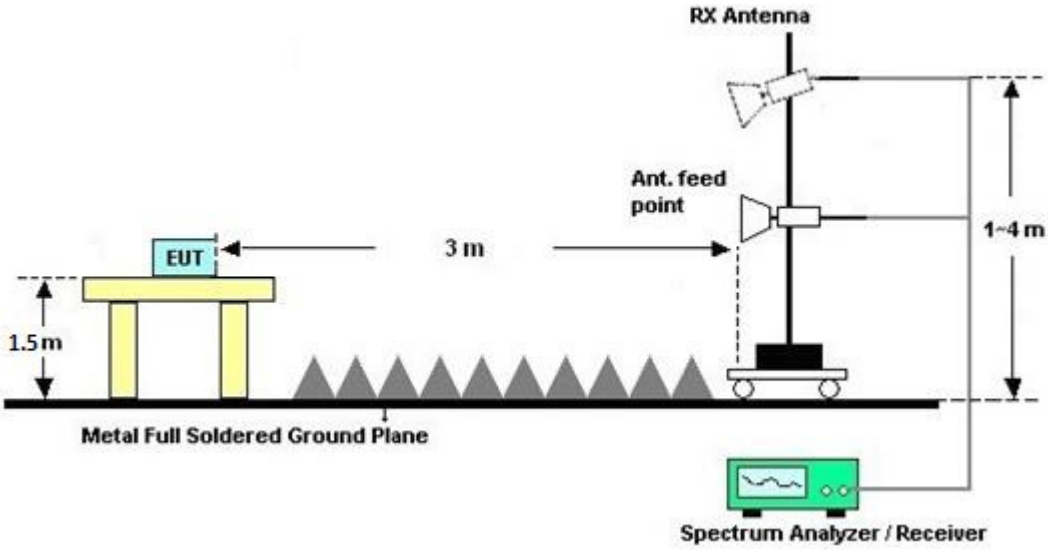
For radiated emissions below 30MHz



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 and C of this report.

3.5.7 Duty Cycle

Please refer to Appendix D of this report.

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

Please refer to Appendix B and C 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.