FCC PART 15.247

TEST REPORT

For

Beijing InHand Networks Technology Co.,Ltd

101, West Wing, 11th Floor, No.101, Lize central Park, Wangjing, Chaoyang District, Beijing, 100102, China

FCC ID: 2AANYIR6S

Report Type:	Product Type:
Original Report	Industrial cellular router

Test Engineer:	Lion Xiao
Report Number:	RBJ150824050-00A
Report Date:	2015-09-10
Reviewed By:	Sula Huang RF Leader
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan). This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

TABLE OF CONTENTS

FINAL

FINAL

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Beijing InHand Networks Technology Co.,Ltd.* 's product, model number: *IR611(FCC ID: 2AANYIR6S)* (the "EUT") in this report was a *Industrial cellular router,* which was measured approximately: 10.0 cm (L) x 10.0 cm (W) x 2.3 cm (H), rated input voltage: DC9~26V from adapter.

Note: The series product, model IR611and IR621, IR631, IR641, IR651, IR661, IR671 , IR681, IR691, IR601 are electrically identical, the difference between them are model name and software for the marketing requirement, we selected IR611 for fully testing, the details was explained in the attached declaration letter.

All measurement and test data in this report was gathered from production sample serial number: RP6111210000052 (Assigned by Applicant). The EUT was received on 2015-08-25.

Objective

This report is prepared on behalf of *Beijing InHand Networks Technology Co.,Ltd.* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communications Commission's rules

The tests were performed in order to determine the compliance of the EUT with FCC Part 15-Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

N/A

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Dongguan).

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communications Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 06, 2015.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in testing mode, which was provided by manufacturer.
For 2.4GHz band, 11 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	/	/

For 802.11b, 802.11g and 802.11n ht20 modes were tested with Channel 1, 6 and 11.
For 802.11n ht40 mode were tested with Channel 3, 6 and 9.

The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all data rates bandwidths, and modulations.

Equipment Modifications

No modification was made to the EUT tested.

FINAL

EUT Exercise Software

The software "**QA7620.exe**" was used for testing, which was provided by manufacturer. The worst condition (maximum power with 100% duty cycle) was setting by the software as following table:

Test Mode	Test Software Version	QA7620.exe					
802.11b	Test Frequency	2412MHz		2437MHz		2462MHz	
	Data Rate	1Mbps		1Mbps		1Mbps	
	Chain	0	1	0	1	0	1
	Power Level Setting	04	08	04	08	04	08
802.11g	Test Frequency	2412MHz		2437MHz		2462MHz	
	Data Rate	(OFDM)6Mbps		(OFDM)6Mbps		(OFDM)6Mbps	
	Chain	0	1	0	1	0	1
	Power Level Setting	00	01	00	01	00	01
802.11n ht20	Test Frequency	2412MHz		2437MHz		2462MHz	
	Data Rate	MCS0		MCS0		MCS0	
	Chain	0	1	0	1	0	1
	Power Level Setting	00	01	00	01	00	01
802.11n ht40	Test Frequency	2422MHz		2437MHz		2452MHz	
	Data Rate	MCS0		MCS0		MCS0	
	Chain	0	1	0	1	0	1
	Power Level Setting	02	03	02	03	02	03

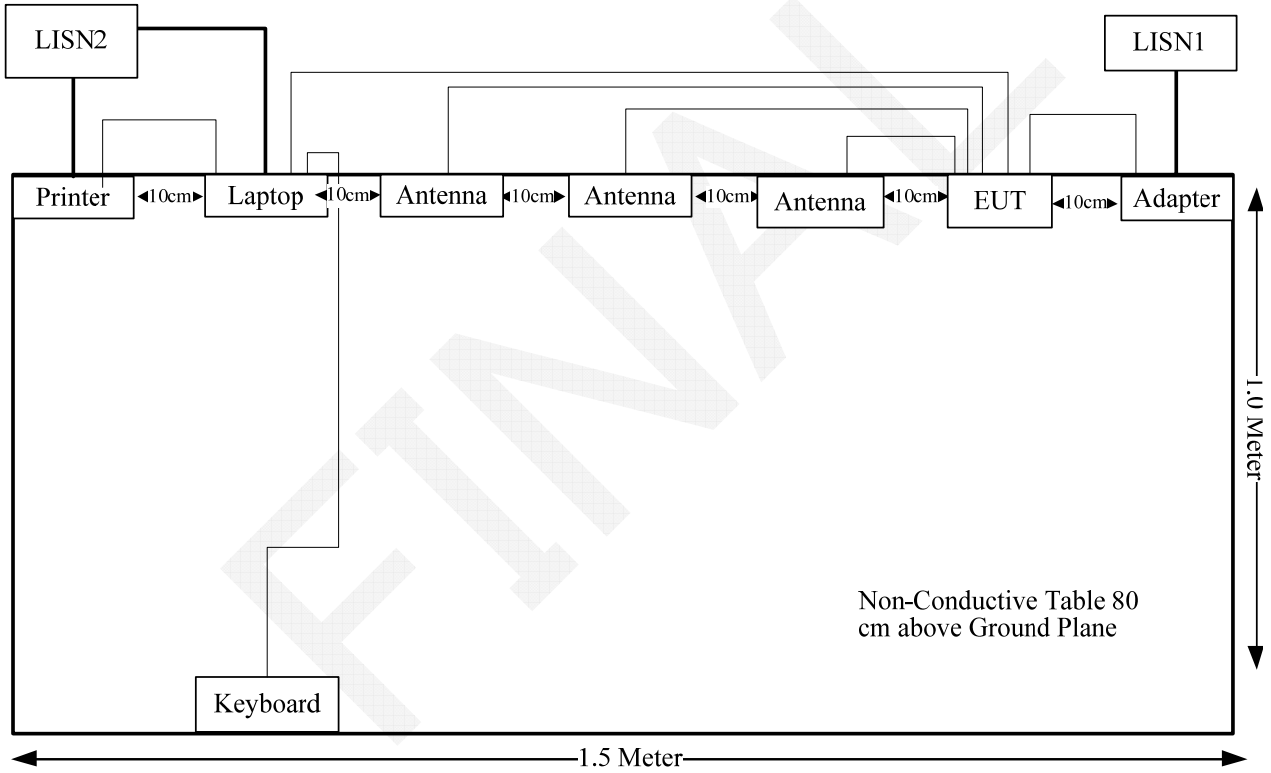
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1017
HP	Printer	C3941A	JPTVOB2337
DELL	Keyboard	L100	CNORH656658907BL05DC
Milesight	SWITCHING ADAPTER	FKS308HSC-1201500U	N/A

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Serial Cable	Yes	No	1.2	Serial Port of Laptop	EUT
Parallel Cable	Yes	No	1.2	Parallel Port of Laptop	Printer
Keyboard Cable	Yes	Yes	1.8	USB Port of Laptop	Keyboard
RJ45 Cable*1	Yes	No	1.0	LAN Port of EUT	Laptop

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 & §2.1091	Maximum Permissible Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.247(d)	Spurious Emissions at Antenna Port	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliance
§15.247(b)(3)	Maximum conducted output power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

FINAL

FCC §15.247 (i) & §1.1307 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247(i) and subpart §1.1307, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Calculated Data:

Maximum MPE evaluation for single transmission:

Mode	Frequency (MHz)	Antenna Gain		Max. Target Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
Wi-Fi	2462	2.0	1.58	23.0	199.53	20	0.063	1.0

Mode	Frequency (MHz)	Antenna Gain		Target Power		Duty cycle	Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)	%			
GPRS850	824.2	2.0	1.58	33.5	2239	50	20	0.352	0.549

Wi-Fi (2.4 G) and GPRS850 can transmit at the same time, MPE evaluation is as below formula:

PD1/Limit1+PD2/Limit2+……＜1, PD (Power Density)

= 0.063/1+0.352/0.549 = 0.704＜1

Note: The minimum distance of antenna to body is 20cm, GPRS maximum duty cycle is 50%.

Result: MPE evaluation of single and simultaneous transmission meet the requirement of standard.

FINAL

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

Antenna Connector Construction

This product used three external detachable omni-directional antennas, two of them with RP-SMA female connector for WWAN, another is for 2G/3G/4G, the maximum gain of each one is 2.0 dBi, which fulfill the requirement of this section, please refer to the EUT photos.

Result: Compliance.

FINAL

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner：

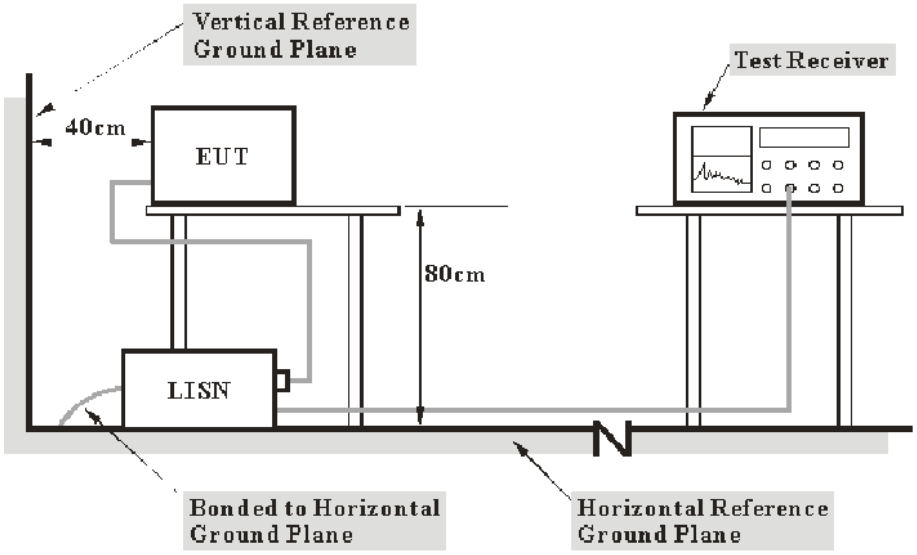
If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
– non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 1, then:
– compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
– non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

Based on CISPR 16-4-2-2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.46 dB (150 kHz to 30 MHz).

Table 1 – Values of U_{cispr}

Measurement	U_{cispr}
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	3.4 dB

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the first LISN, the other equipments were connected to the second LISN .

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$V_C = V_R + A_C + VDF$
$C_f = A_C + VDF$

Herein,
V_C (cord. Reading): corrected voltage amplitude
V_R: reading voltage amplitude
A_c: attenuation caused by cable loss
VDF: voltage division factor of AMN
C_f: Correction Factor

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2014-10-20	2015-10-20
R&S	L.I.S.N	ESH2-Z5	892107/021	2015-06-09	2016-06-09
R&S	Two-line V-network	ENV 216	3560.6550.12	2014-12-11	2015-12-11
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, with the worst margin reading of:

13.3 dB at **0.204669 MHz** in the **Line** conducted mode

Test Data

Environmental Conditions

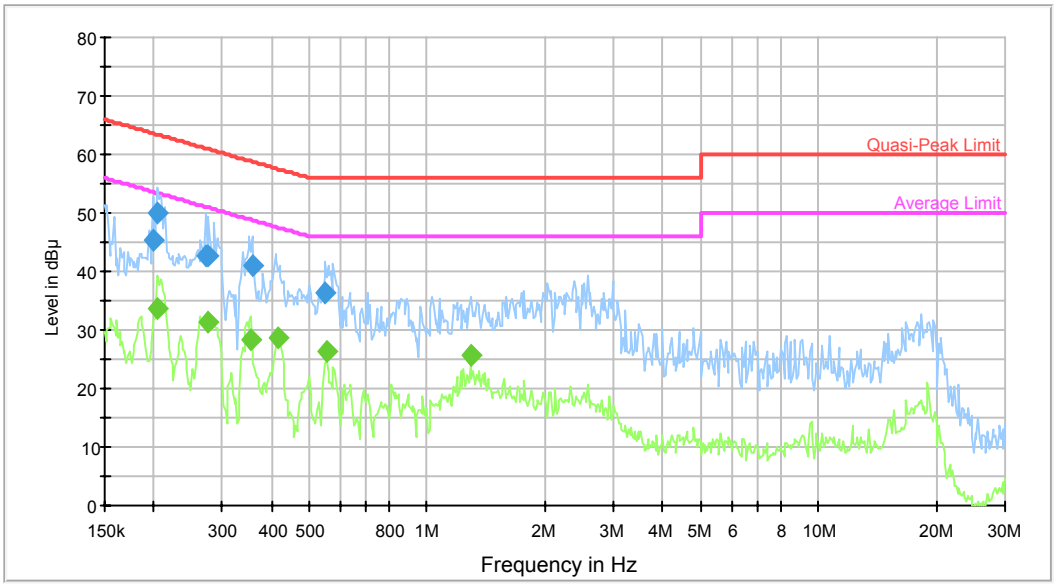
Temperature:	27.4 °C
Relative Humidity:	60 %
ATM Pressure:	100.1 kPa

The testing was performed by Lion Xiao on 2015-08-25.

FINAL

Test Mode: Transmitting

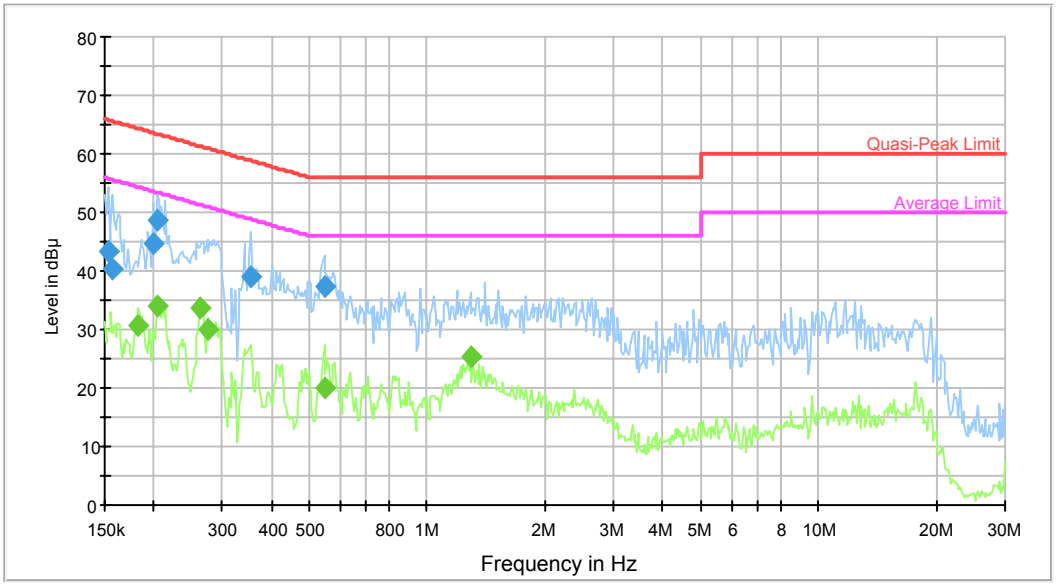
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.199835	45.4	9.000	L1	9.8	18.2	63.6	Compliance
0.204669	50.1	9.000	L1	9.8	13.3	63.4	Compliance
0.272666	42.7	9.000	L1	9.8	18.3	61.0	Compliance
0.277046	42.6	9.000	L1	9.8	18.3	60.9	Compliance
0.357511	40.9	9.000	L1	9.8	17.9	58.8	Compliance
0.549741	36.4	9.000	L1	9.8	19.6	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.204669	33.7	9.000	L1	9.8	19.8	53.4	Compliance
0.277046	31.2	9.000	L1	9.8	19.7	50.9	Compliance
0.354674	28.4	9.000	L1	9.8	20.4	48.9	Compliance
0.415949	28.5	9.000	L1	9.8	19.0	47.5	Compliance
0.554139	26.2	9.000	L1	9.8	19.8	46.0	Compliance
1.289541	25.7	9.000	L1	9.8	20.3	46.0	Compliance

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.153629	43.3	9.000	N	9.8	22.5	65.8	Compliance
0.157346	40.2	9.000	N	9.8	25.4	65.6	Compliance
0.199835	44.5	9.000	N	9.8	19.1	63.6	Compliance
0.204669	48.8	9.000	N	9.8	14.6	63.4	Compliance
0.354674	39.1	9.000	N	9.8	19.8	58.9	Compliance
0.545378	37.2	9.000	N	9.8	18.8	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.183065	30.5	9.000	N	9.8	23.8	54.3	Compliance
0.204669	33.9	9.000	N	9.8	19.5	53.4	Compliance
0.262017	33.7	9.000	N	9.8	17.7	51.4	Compliance
0.274848	29.9	9.000	N	9.8	21.0	51.0	Compliance
0.545378	19.9	9.000	N	9.8	26.1	46.0	Compliance
1.289541	25.5	9.000	N	9.8	20.5	46.0	Compliance

FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner：

If U_{lab} is less than or equal to U_{cispr} of Table 2, then:
- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} of Table 2, then:
- compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

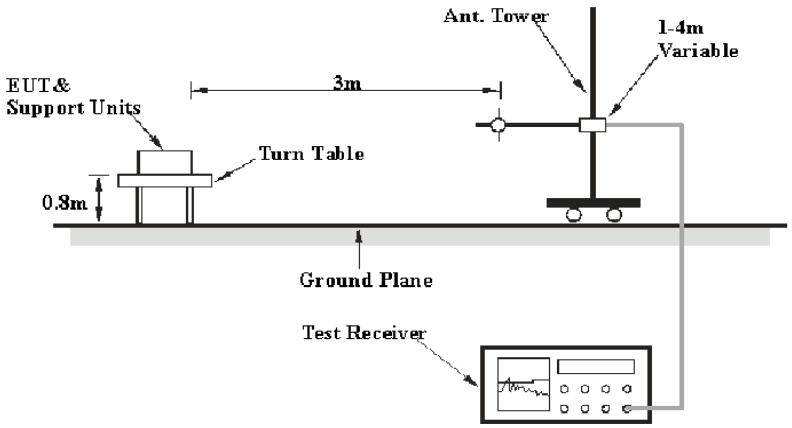
Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:
30M~200MHz: 5.0 dB
200M~1GHz: 6.2 dB
1G~6GHz: 4.45 dB
6G~18GHz: 5.23 dB

Table 2 – Values of U_{cispr}

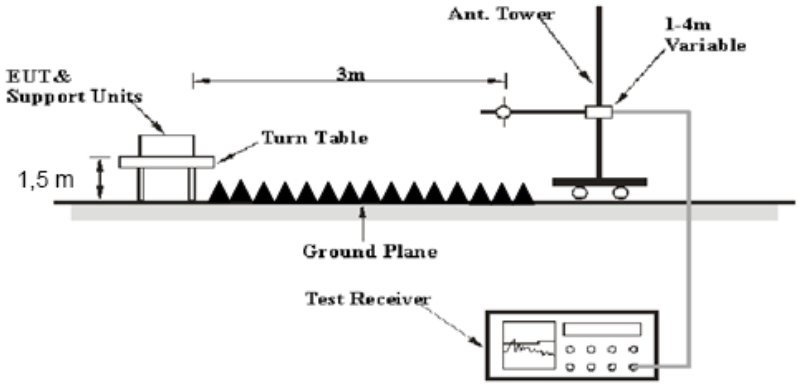
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2014. The specification used was the FCC 15.209, and FCC 15.247 limits.
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Procedure

During the radiated emission test, the adapter was connected to the first AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Loss + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit –Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2015-05-09	2016-05-09
Sunol Sciences	Antenna	JB3	A060611-3	2014-07-28	2017-07-27
HP	Amplifier	8447E	2434A02181	2015-09-01	2016-09-01
R&S	Spectrum Analyzer	FSEM	DE31388	2015-05-09	2016-05-09
ETS LINDGREN	Horn Antenna	3115	000 527 35	2015-09-06	2018-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2015-02-19	2016-02-19
R&S	Spectrum Analyzer	FSP 38	100478	2015-05-09	2016-05-09
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2014-06-16	2017-06-15
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2015-09-06	2016-09-06

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Section 15.205, 15.209 and 15.247, with the worst margin reading of:

4.41dB at **4924 MHz** in the **Vertical** polarization for 802.11b Mode

Test Data

Environmental Conditions

Temperature:	26.8 °C
Relative Humidity:	60 %
ATM Pressure:	100.5 kPa

The testing was performed by Lion Xiao on 2015-09-08.

Test Mode: Transmitting

802.11b Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	65.97	PK	H	25.67	3.68	0.00	95.32	N/A	N/A
2412	62.28	AV	H	25.67	3.68	0.00	91.63	N/A	N/A
2412	72.93	PK	V	25.67	3.68	0.00	102.28	N/A	N/A
2412	69.01	AV	V	25.67	3.68	0.00	98.36	N/A	N/A
2390	31.03	PK	V	25.61	3.63	0.00	60.27	74.00	13.73
2390	16.52	AV	V	25.61	3.63	0.00	45.76	54.00	8.24
4824	43.63	PK	V	30.64	5.03	27.41	51.89	74.00	22.11
4824	40.76	AV	V	30.64	5.03	27.41	49.02	54.00	4.98*
7236	31.63	PK	V	34.17	6.65	25.90	46.55	74.00	27.45
7236	19.17	AV	V	34.17	6.65	25.90	34.09	54.00	19.91
9648	30.52	PK	V	36.06	8.55	27.46	47.67	74.00	26.33
9648	18.19	AV	V	36.06	8.55	27.46	35.34	54.00	18.66
3280	38.55	PK	V	28.10	5.61	27.30	44.96	74.00	29.04
3280	26.2	AV	V	28.10	5.61	27.30	32.61	54.00	21.39
169.7	40.3	QP	V	11.94	1.56	21.44	32.36	43.50	11.14
Middle Channel: 2437 MHz									
2437	66.2	PK	H	25.74	3.75	0.00	95.69	N/A	N/A
2437	63.46	AV	H	25.74	3.75	0.00	92.95	N/A	N/A
2437	73.11	PK	V	25.74	3.75	0.00	102.60	N/A	N/A
2437	70.29	AV	V	25.74	3.75	0.00	99.78	N/A	N/A
4874	43.74	PK	V	30.77	5.14	27.42	52.23	74.00	21.77
4874	40.96	AV	V	30.77	5.14	27.42	49.45	54.00	4.55*
7311	31.72	PK	V	34.35	6.74	25.88	46.93	74.00	27.07
7311	19.35	AV	V	34.35	6.74	25.88	34.56	54.00	19.44
9748	30.54	PK	V	36.30	8.61	27.24	48.21	74.00	25.79
9748	18.24	AV	V	36.30	8.61	27.24	35.91	54.00	18.09
3280	38.62	PK	V	28.10	5.61	27.30	45.03	74.00	28.97
3280	22.15	AV	V	28.10	5.61	27.30	28.56	54.00	25.44
3880	38.16	PK	V	29.64	4.45	27.31	44.94	74.00	29.06
3880	26.41	AV	V	29.64	4.45	27.31	33.19	54.00	20.81
169.7	40.7	QP	V	11.94	1.56	21.44	32.76	43.50	10.74
High Channel: 2462 MHz									
2462	65.96	PK	H	25.80	3.75	0.00	95.51	N/A	N/A
2462	62.34	AV	H	25.80	3.75	0.00	91.89	N/A	N/A
2462	72.87	PK	V	25.80	3.75	0.00	102.42	N/A	N/A
2462	69.45	AV	V	25.80	3.75	0.00	99.00	N/A	N/A
2483.5	33.52	PK	V	25.86	3.67	0.00	63.05	74.00	10.95
2483.5	16.17	AV	V	25.86	3.67	0.00	45.70	54.00	8.30
4924	43.27	PK	V	30.90	5.34	27.43	52.08	74.00	21.92
4924	40.78	AV	V	30.90	5.34	27.43	49.59	54.00	4.41*
7386	31.42	PK	V	34.53	6.83	25.86	46.92	74.00	27.08
7386	19.07	AV	V	34.53	6.83	25.86	34.57	54.00	19.43
9848	30.37	PK	V	36.54	8.66	26.94	48.63	74.00	25.37
9848	18.02	AV	V	36.54	8.66	26.94	36.28	54.00	17.72
3280	38.38	PK	V	28.10	5.61	27.30	44.79	74.00	29.21
3280	26.04	AV	V	28.10	5.61	27.30	32.45	54.00	21.55
169.7	40.1	QP	V	11.94	1.56	21.44	32.16	43.50	11.34

**within measurement uncertainty!*

802.11g Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	64.04	PK	H	25.67	3.68	0.00	93.39	N/A	N/A
2412	53.21	AV	H	25.67	3.68	0.00	82.56	N/A	N/A
2412	70.88	PK	V	25.67	3.68	0.00	100.23	N/A	N/A
2412	59.11	AV	V	25.67	3.68	0.00	88.46	N/A	N/A
2390	30.26	PK	V	25.61	3.63	0.00	59.50	74.00	14.50
2390	18.33	AV	V	25.61	3.63	0.00	47.57	54.00	6.43
4824	36.13	PK	V	30.64	5.03	27.41	44.39	74.00	29.61
4824	23.75	AV	V	30.64	5.03	27.41	32.01	54.00	21.99
7236	31.51	PK	V	34.17	6.65	25.90	46.43	74.00	27.57
7236	19.26	AV	V	34.17	6.65	25.90	34.18	54.00	19.82
9648	30.68	PK	V	36.06	8.55	27.46	47.83	74.00	26.17
9648	18.24	AV	V	36.06	8.55	27.46	35.39	54.00	18.61
3280	39.43	PK	V	28.10	5.61	27.30	45.84	74.00	28.16
3280	22.77	AV	V	28.10	5.61	27.30	29.18	54.00	24.82
169.7	40.6	QP	V	11.94	1.56	21.44	32.66	43.50	10.84
Middle Channel: 2437 MHz									
2437	64.37	PK	H	25.74	3.75	0.00	93.86	N/A	N/A
2437	53.47	AV	H	25.74	3.75	0.00	82.96	N/A	N/A
2437	70.31	PK	V	25.74	3.75	0.00	99.80	N/A	N/A
2437	59.28	AV	V	25.74	3.75	0.00	88.77	N/A	N/A
4874	38.26	PK	V	30.77	5.14	27.42	46.75	74.00	27.25
4874	24.95	AV	V	30.77	5.14	27.42	33.44	54.00	20.56
7311	31.54	PK	V	34.35	6.74	25.88	46.75	74.00	27.25
7311	19.12	AV	V	34.35	6.74	25.88	34.33	54.00	19.67
9748	30.63	PK	V	36.30	8.61	27.24	48.30	74.00	25.70
9748	18.22	AV	V	36.30	8.61	27.24	35.89	54.00	18.11
3280	39.41	PK	V	28.10	5.61	27.30	45.82	74.00	28.18
3280	22.82	AV	V	28.10	5.61	27.30	29.23	54.00	24.77
3880	34.28	PK	V	29.64	4.45	27.31	41.06	74.00	32.94
3880	21.74	AV	V	29.64	4.45	27.31	28.52	54.00	25.48
169.7	40	QP	V	11.94	1.56	21.44	32.06	43.50	11.44
High Channel: 2462 MHz									
2462	64.74	PK	H	25.80	3.75	0.00	94.29	N/A	N/A
2462	54.12	AV	H	25.80	3.75	0.00	83.67	N/A	N/A
2462	70.57	PK	V	25.80	3.75	0.00	100.12	N/A	N/A
2462	59.73	AV	V	25.80	3.75	0.00	89.28	N/A	N/A
2483.5	31.14	PK	V	25.86	3.67	0.00	60.67	74.00	13.33
2483.5	18.62	AV	V	25.86	3.67	0.00	48.15	54.00	5.85
4924	35.08	PK	V	30.90	5.34	27.43	43.89	74.00	30.11
4924	21.79	AV	V	30.90	5.34	27.43	30.60	54.00	23.40
7386	31.3	PK	V	34.53	6.83	25.86	46.80	74.00	27.20
7386	18.99	AV	V	34.53	6.83	25.86	34.49	54.00	19.51
9848	30.39	PK	V	36.54	8.66	26.94	48.65	74.00	25.35
9848	18.07	AV	V	36.54	8.66	26.94	36.33	54.00	17.67
3280	39.15	PK	V	28.10	5.61	27.30	45.56	74.00	28.44
3280	22.56	AV	V	28.10	5.61	27.30	28.97	54.00	25.03
169.7	40.5	QP	V	11.94	1.56	21.44	32.56	43.50	10.94

802.11 n ht20 Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	62.91	PK	H	25.67	3.68	0.00	92.26	N/A	N/A
2412	51.77	AV	H	25.67	3.68	0.00	81.12	N/A	N/A
2412	69.45	PK	V	25.67	3.68	0.00	98.80	N/A	N/A
2412	58.2	AV	V	25.67	3.68	0.00	87.55	N/A	N/A
2390	31.36	PK	V	25.61	3.63	0.00	60.60	74.00	13.40
2390	19.2	AV	V	25.61	3.63	0.00	48.44	54.00	5.56
4824	35.16	PK	V	30.64	5.03	27.41	43.42	74.00	30.58
4824	21.03	AV	V	30.64	5.03	27.41	29.29	54.00	24.71
7236	31.58	PK	V	34.17	6.65	25.90	46.50	74.00	27.50
7236	19.19	AV	V	34.17	6.65	25.90	34.11	54.00	19.89
9648	30.64	PK	V	36.06	8.55	27.46	47.79	74.00	26.21
9648	18.32	AV	V	36.06	8.55	27.46	35.47	54.00	18.53
3280	39.04	PK	V	28.10	5.61	27.30	45.45	74.00	28.55
3280	22.62	AV	V	28.10	5.61	27.30	29.03	54.00	24.97
169.7	40.9	QP	V	11.94	1.56	21.44	32.96	43.50	10.54
Middle Channel: 2437 MHz									
2437	63.24	PK	H	25.74	3.75	0.00	92.73	N/A	N/A
2437	51.97	AV	H	25.74	3.75	0.00	81.46	N/A	N/A
2437	69.56	PK	V	25.74	3.75	0.00	99.05	N/A	N/A
2437	58.44	AV	V	25.74	3.75	0.00	87.93	N/A	N/A
4874	35.34	PK	V	30.77	5.14	27.42	43.83	74.00	30.17
4874	22.07	AV	V	30.77	5.14	27.42	30.56	54.00	23.44
7311	31.7	PK	V	34.35	6.74	25.88	46.91	74.00	27.09
7311	19.11	AV	V	34.35	6.74	25.88	34.32	54.00	19.68
9748	30.7	PK	V	36.30	8.61	27.24	48.37	74.00	25.63
9748	18.43	AV	V	36.30	8.61	27.24	36.10	54.00	17.90
3280	39.01	PK	V	28.10	5.61	27.30	45.42	74.00	28.58
3280	22.58	AV	V	28.10	5.61	27.30	28.99	54.00	25.01
3880	34.57	PK	V	29.64	4.45	27.31	41.35	74.00	32.65
3880	21.86	AV	V	29.64	4.45	27.31	28.64	54.00	25.36
169.7	40.4	QP	V	11.94	1.56	21.44	32.46	43.50	11.04
High Channel: 2462 MHz									
2462	63.4	PK	H	25.80	3.75	0.00	92.95	N/A	N/A
2462	52.62	AV	H	25.80	3.75	0.00	82.17	N/A	N/A
2462	69.93	PK	V	25.80	3.75	0.00	99.48	N/A	N/A
2462	59.13	AV	V	25.80	3.75	0.00	88.68	N/A	N/A
2483.5	31.41	PK	V	25.86	3.67	0.00	60.94	74.00	13.06
2483.5	19.04	AV	V	25.86	3.67	0.00	48.57	54.00	5.43
4924	34.77	PK	V	30.90	5.34	27.43	43.58	74.00	30.42
4924	21.53	AV	V	30.90	5.34	27.43	30.34	54.00	23.66
7386	31.33	PK	V	34.53	6.83	25.86	46.83	74.00	27.17
7386	18.93	AV	V	34.53	6.83	25.86	34.43	54.00	19.57
9848	30.5	PK	V	36.54	8.66	26.94	48.76	74.00	25.24
9848	18.15	AV	V	36.54	8.66	26.94	36.41	54.00	17.59
3280	38.91	PK	V	28.10	5.61	27.30	45.32	74.00	28.68
3280	22.41	AV	V	28.10	5.61	27.30	28.82	54.00	25.18
169.7	40.1	QP	V	11.94	1.56	21.44	32.16	43.50	11.34

802.11 n ht40 Mode

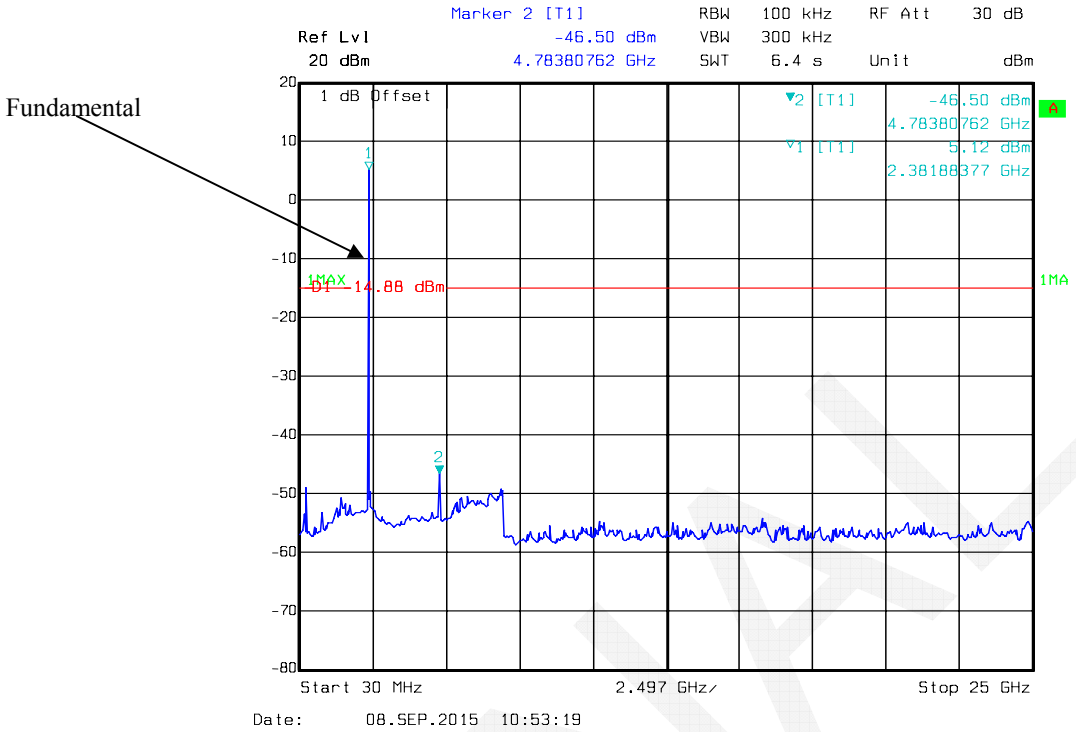
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2422 MHz									
2422	62.22	PK	H	25.70	3.71	0.00	91.63	N/A	N/A
2422	49.33	AV	H	25.70	3.71	0.00	78.74	N/A	N/A
2422	69.13	PK	V	25.70	3.71	0.00	98.54	N/A	N/A
2422	56.25	AV	V	25.70	3.71	0.00	85.66	N/A	N/A
2390	32.81	PK	V	25.61	3.63	0.00	62.05	74.00	11.95
2390	19.36	AV	V	25.61	3.63	0.00	48.60	54.00	5.40
4844	34.85	PK	V	30.69	4.99	27.42	43.11	74.00	30.89
4844	21.68	AV	V	30.69	4.99	27.42	29.94	54.00	24.06
7266	31.25	PK	V	34.24	6.68	25.89	46.28	74.00	27.72
7266	18.9	AV	V	34.24	6.68	25.89	33.93	54.00	20.07
9688	30.4	PK	V	36.15	8.58	27.37	47.76	74.00	26.24
9688	18.15	AV	V	36.15	8.58	27.37	35.51	54.00	18.49
3280	39.1	PK	V	28.10	5.61	27.30	45.51	74.00	28.49
3280	22.47	AV	V	28.10	5.61	27.30	28.88	54.00	25.12
169.7	40.8	QP	V	11.94	1.56	21.44	32.86	43.50	10.64
Middle Channel: 2437 MHz									
2437	62.6	PK	H	25.74	3.75	0.00	92.09	N/A	N/A
2437	49.57	AV	H	25.74	3.75	0.00	79.06	N/A	N/A
2437	69.29	PK	V	25.74	3.75	0.00	98.78	N/A	N/A
2437	56.43	AV	V	25.74	3.75	0.00	85.92	N/A	N/A
4874	35.06	PK	V	30.77	5.14	27.42	43.55	74.00	30.45
4874	21.83	AV	V	30.77	5.14	27.42	30.32	54.00	23.68
7311	31.19	PK	V	34.35	6.74	25.88	46.40	74.00	27.60
7311	18.93	AV	V	34.35	6.74	25.88	34.14	54.00	19.86
9748	30.32	PK	V	36.30	8.61	27.24	47.99	74.00	26.01
9748	18.08	AV	V	36.30	8.61	27.24	35.75	54.00	18.25
3280	39.07	PK	V	28.10	5.61	27.30	45.48	74.00	28.52
3280	22.45	AV	V	28.10	5.61	27.30	28.86	54.00	25.14
3880	33.05	PK	V	29.64	4.45	27.31	39.83	74.00	34.17
3880	20.52	AV	V	29.64	4.45	27.31	27.30	54.00	26.70
169.7	40.5	QP	V	11.94	1.56	21.44	32.56	43.50	10.94
High Channel: 2452 MHz									
2452	62.52	PK	H	25.78	3.78	0.00	92.08	N/A	N/A
2452	49.71	AV	H	25.78	3.78	0.00	79.27	N/A	N/A
2452	69.47	PK	V	25.78	3.78	0.00	99.03	N/A	N/A
2452	56.58	AV	V	25.78	3.78	0.00	86.14	N/A	N/A
2483.5	32.39	PK	V	25.86	3.67	0.00	61.92	74.00	12.08
2483.5	19.54	AV	V	25.86	3.67	0.00	49.07	54.00	4.93*
4904	34.72	PK	V	30.85	5.31	27.43	43.45	74.00	30.55
4904	21.71	AV	V	30.85	5.31	27.43	30.44	54.00	23.56
7356	31.09	PK	V	34.45	6.79	25.87	46.46	74.00	27.54
7356	18.78	AV	V	34.45	6.79	25.87	34.15	54.00	19.85
9808	30.21	PK	V	36.44	8.64	27.09	48.20	74.00	25.80
9808	17.97	AV	V	36.44	8.64	27.09	35.96	54.00	18.04
3280	38.86	PK	V	28.10	5.61	27.30	45.27	74.00	28.73
3280	22.32	AV	V	28.10	5.61	27.30	28.73	54.00	25.27
169.7	40.9	QP	V	11.94	1.56	21.44	32.96	43.50	10.54

**within measurement uncertainty!*

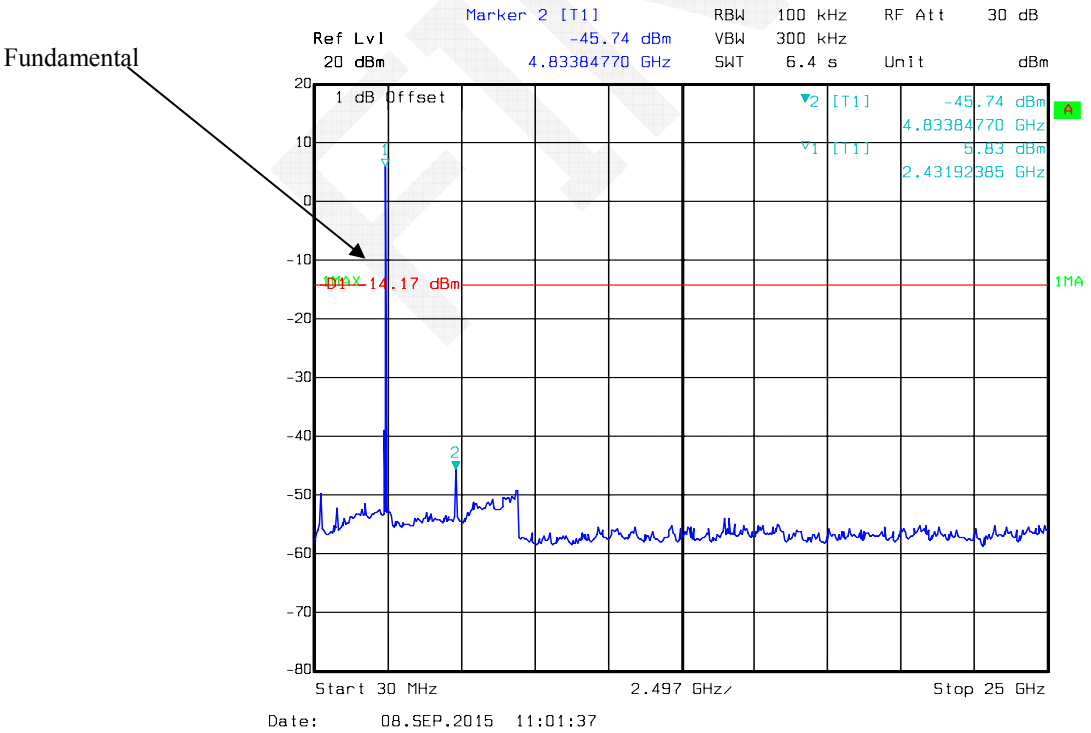
Conducted Spurious Emissions at Antenna Port

Chain 0

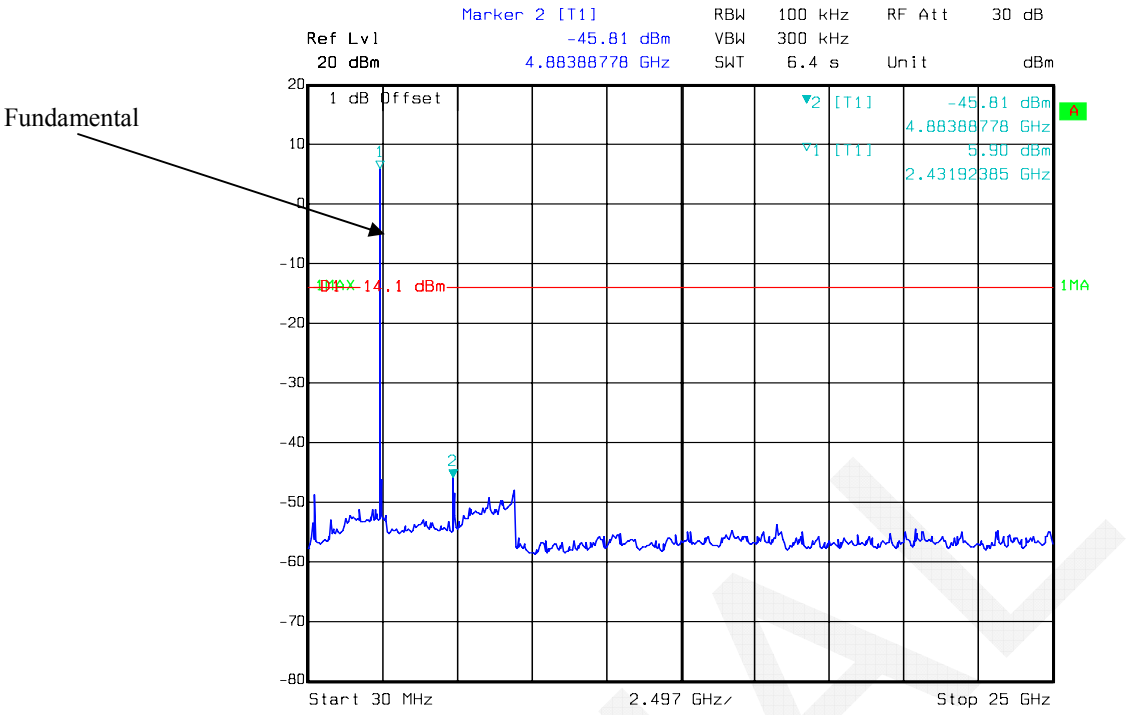
802.11b Low Channel



802.11b Middle Channel

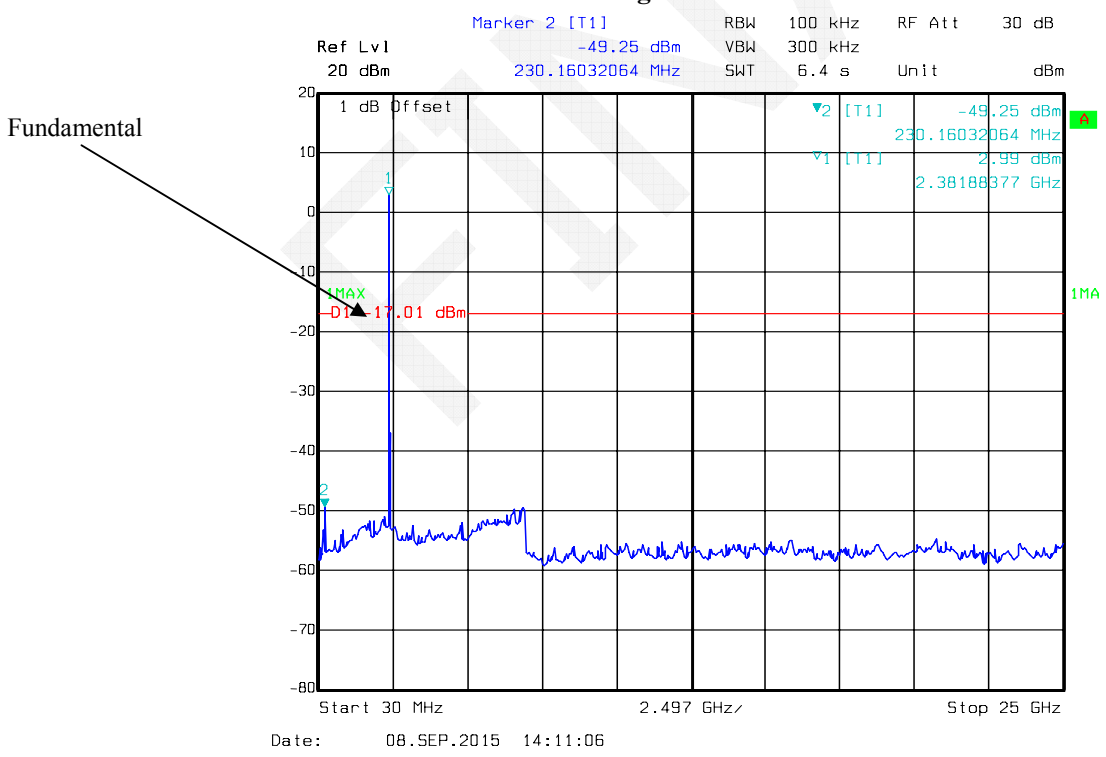


802.11b High Channel

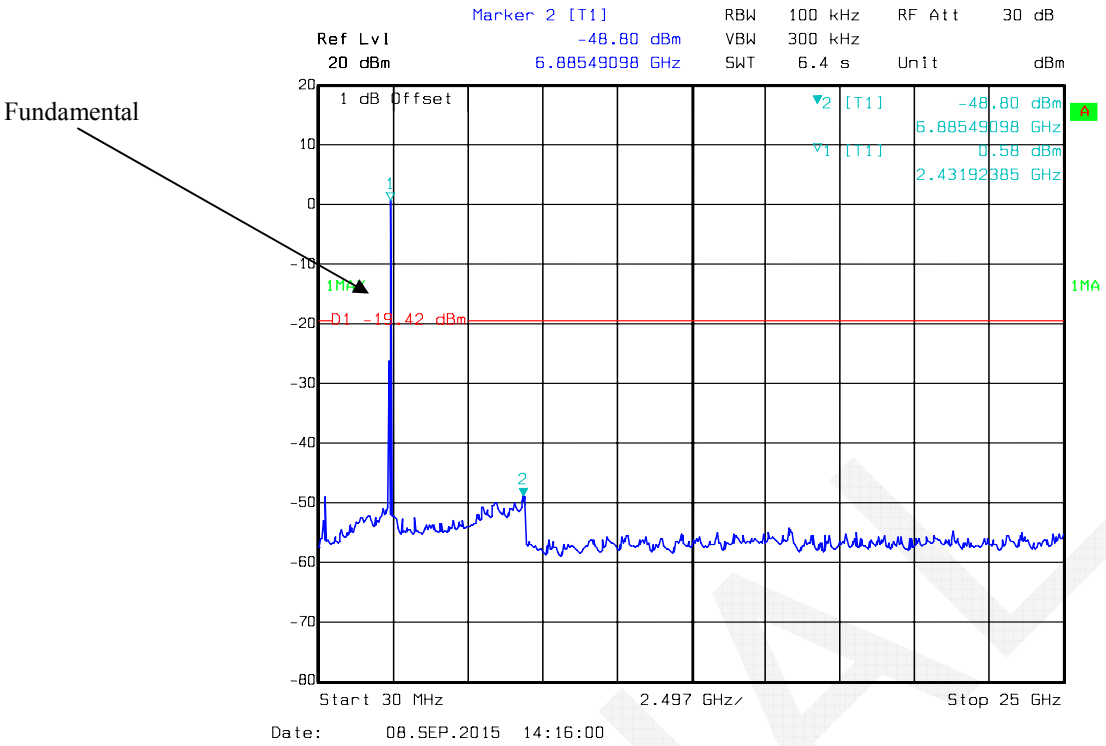


.3

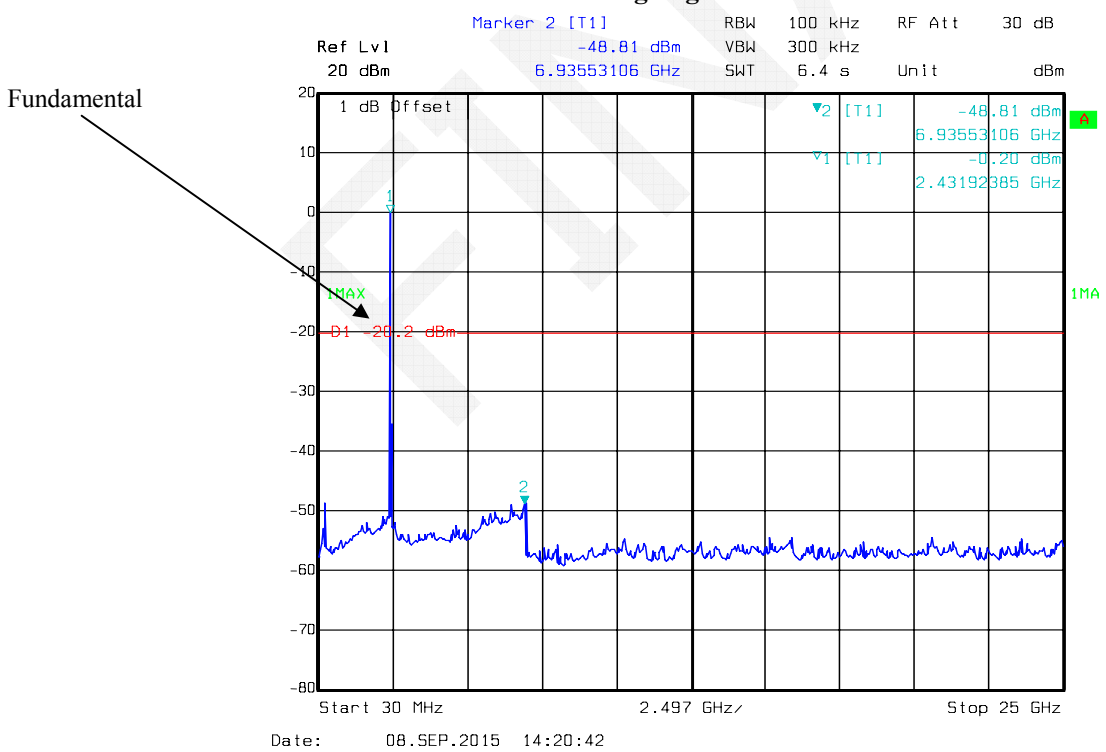
802.11g Low Channel



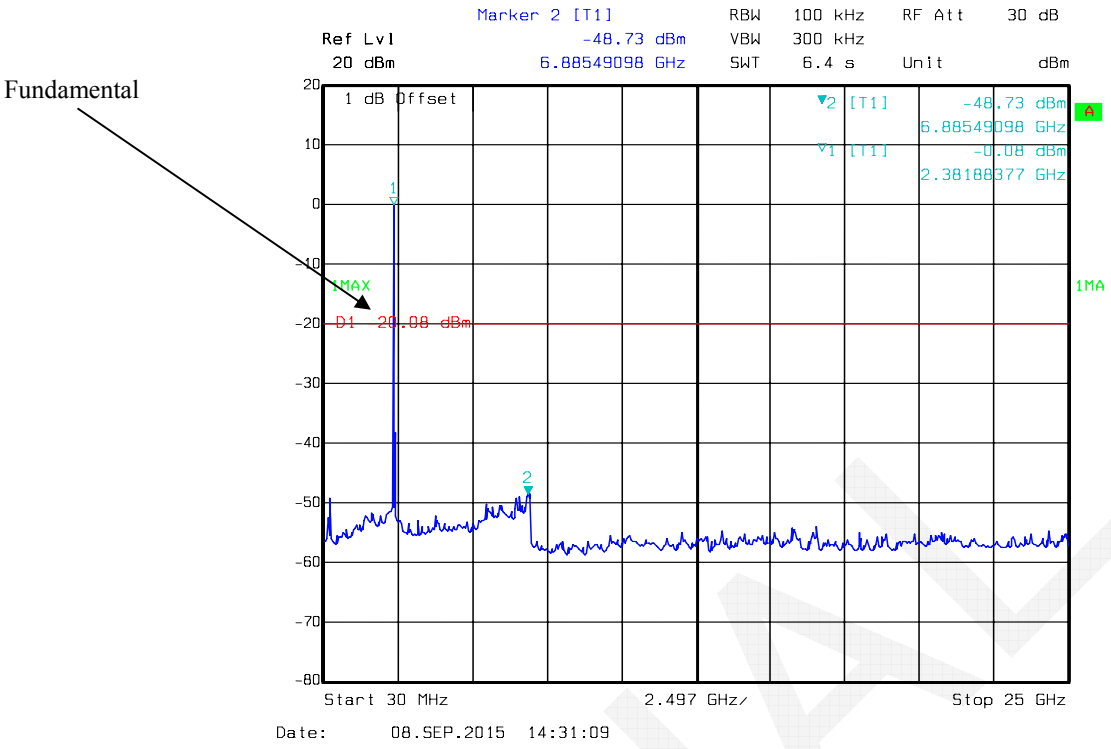
802.11g Middle Channel



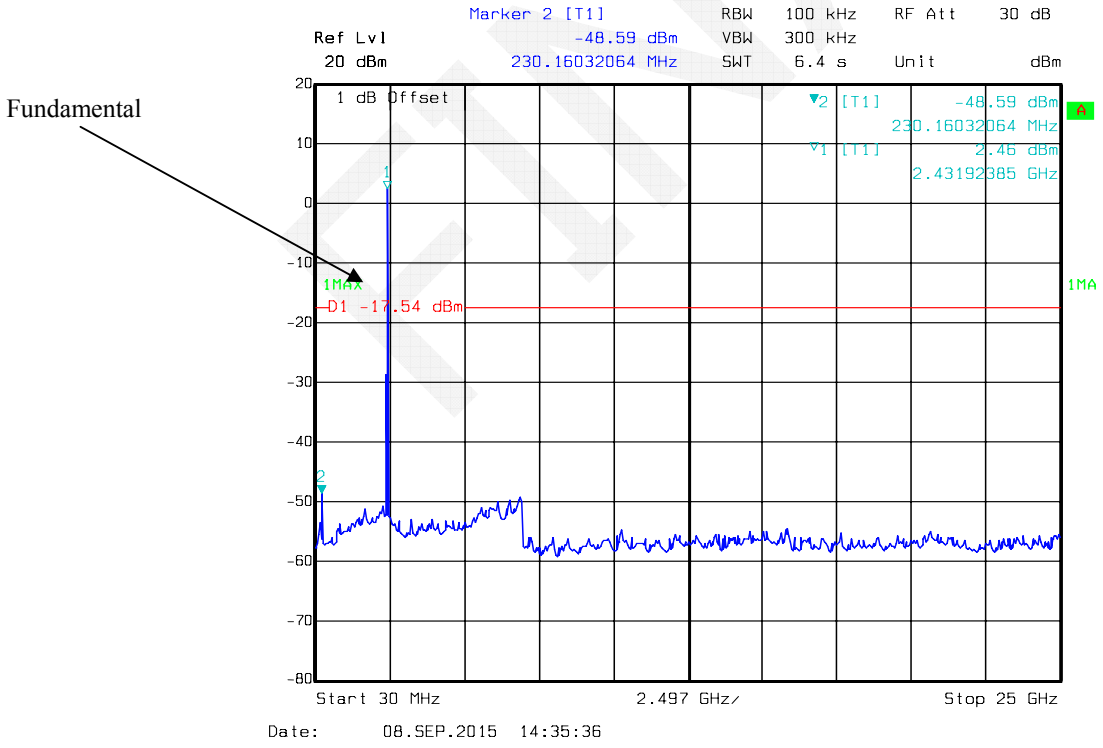
802.11g High Channel



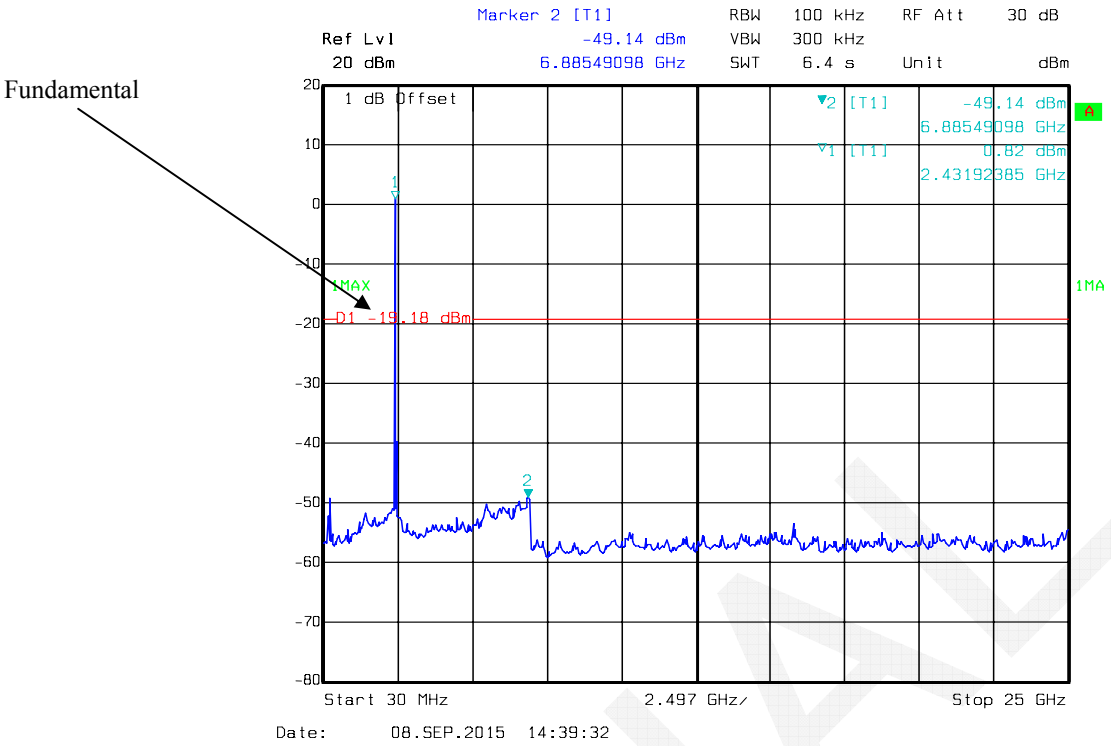
802.11n ht20 Low Channel



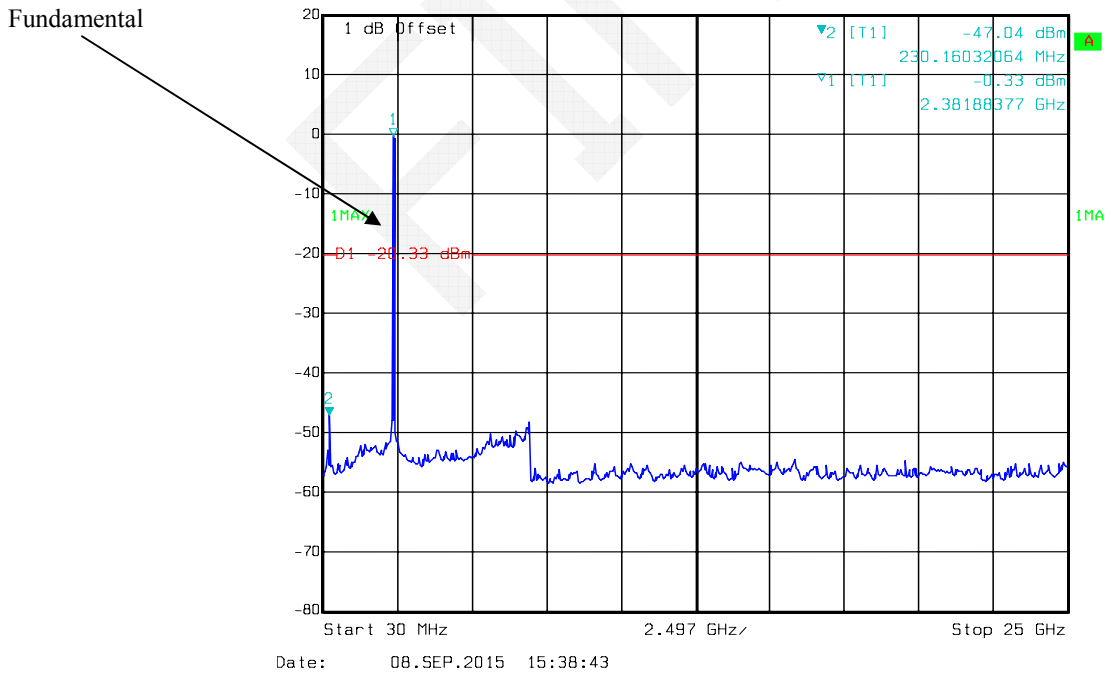
802.11n ht20 Middle Channel



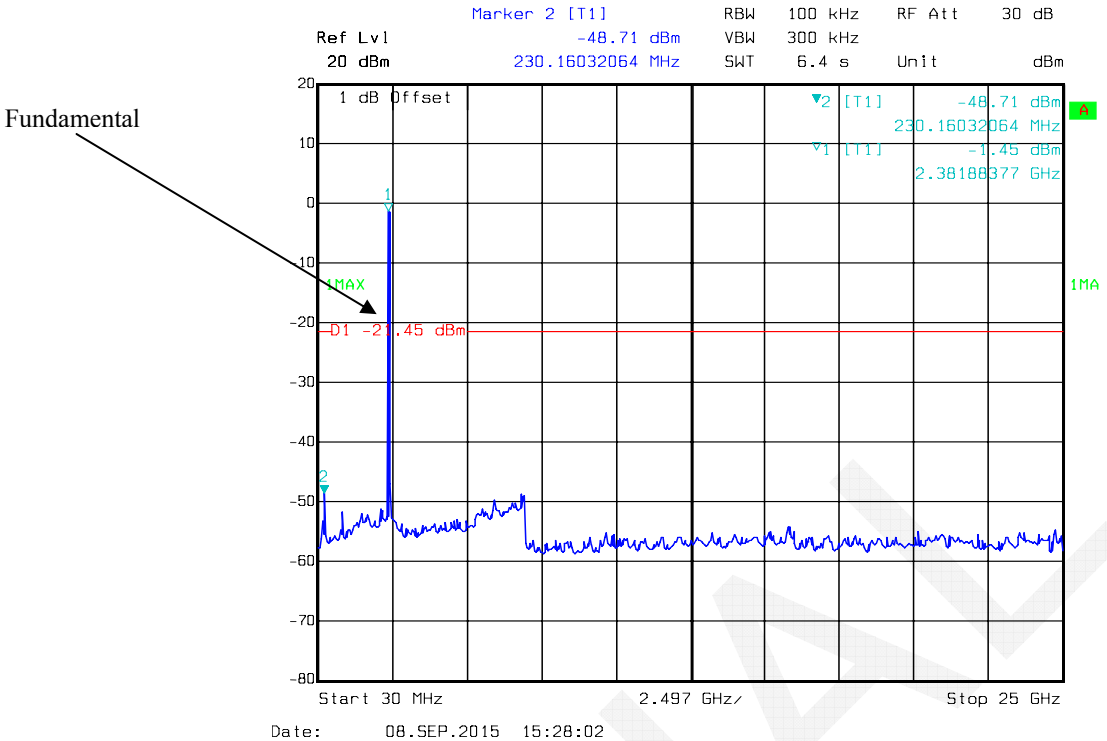
802.11n ht20 High Channel



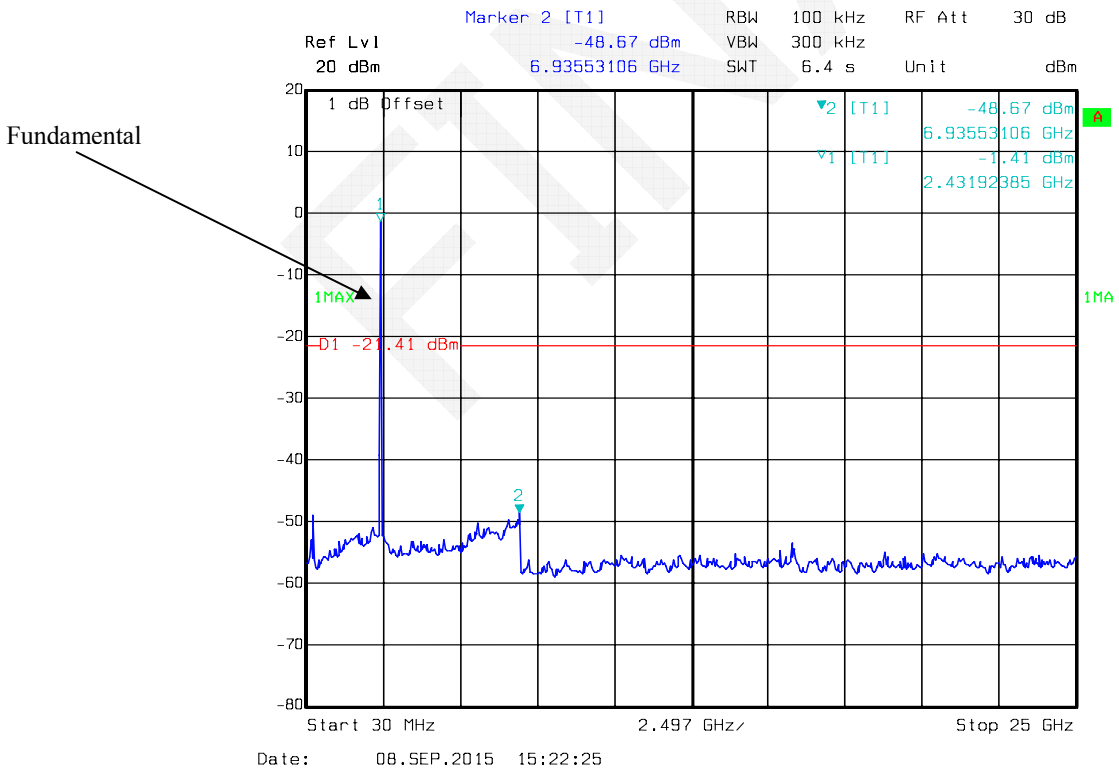
802.11n ht40 Low Channel



802.11n ht40 Middle Channel

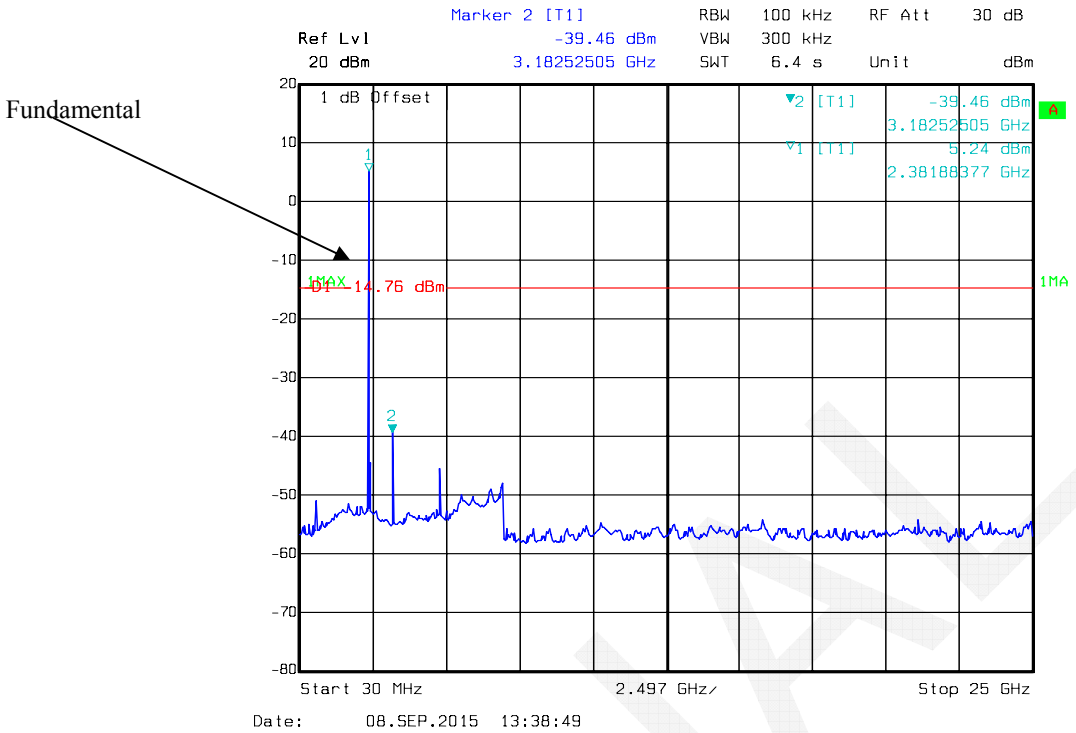


802.11n ht40 High Channel

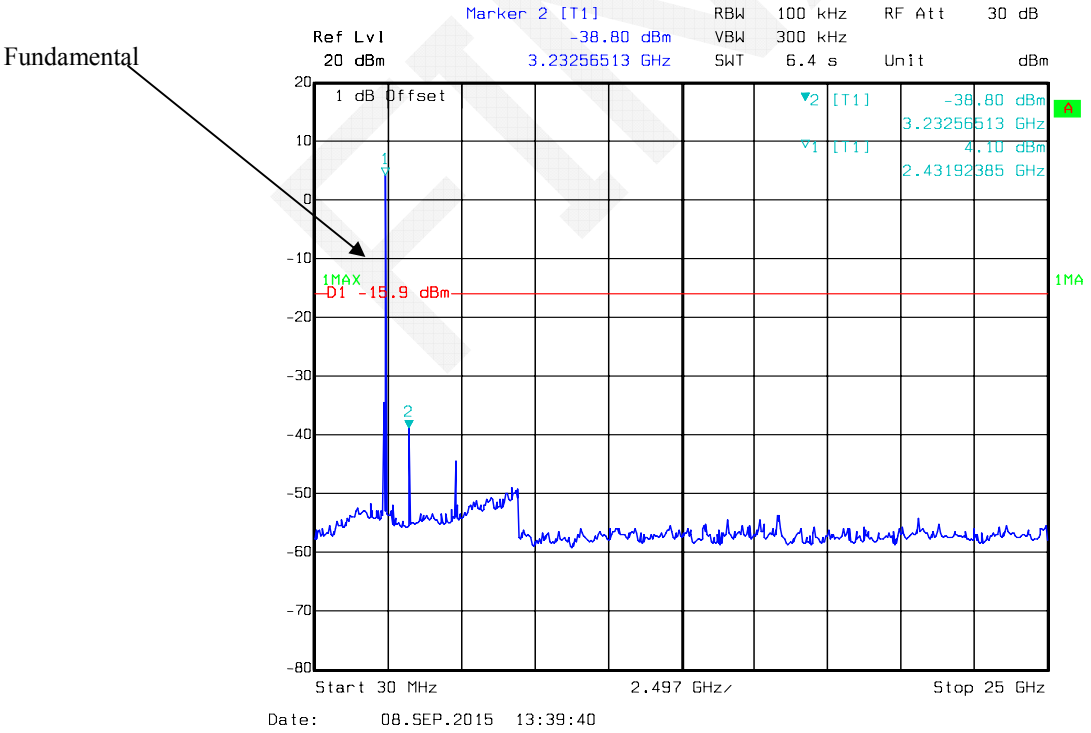


Chain 1

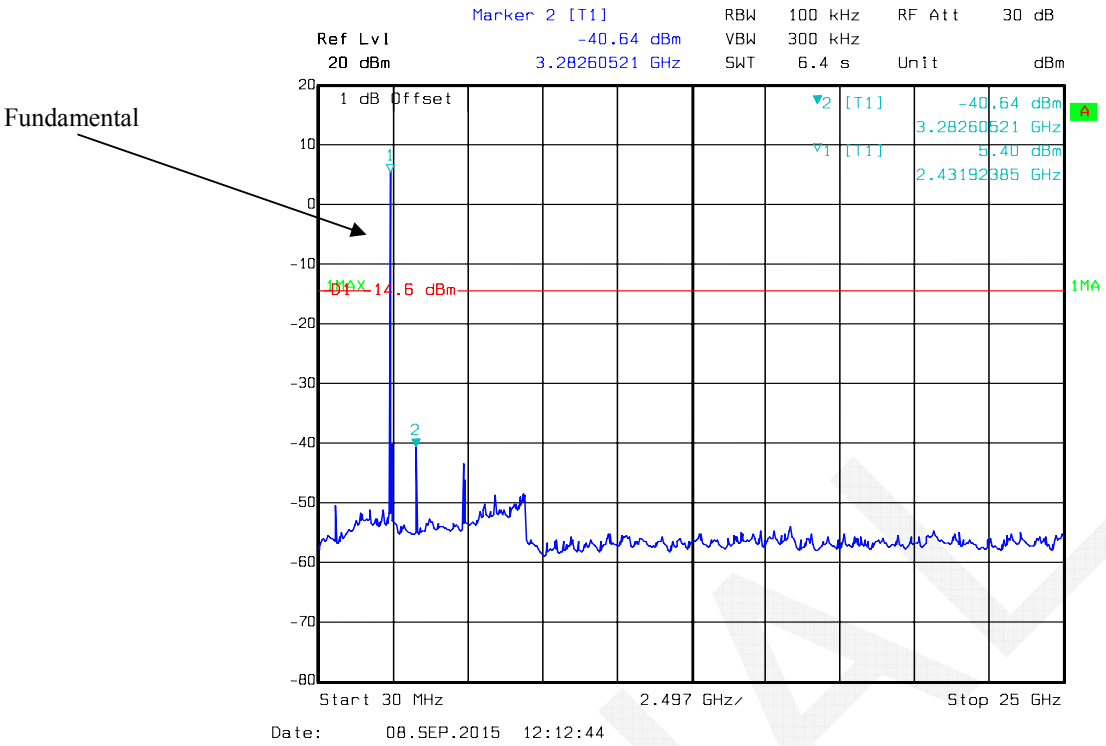
802.11b Low Channel



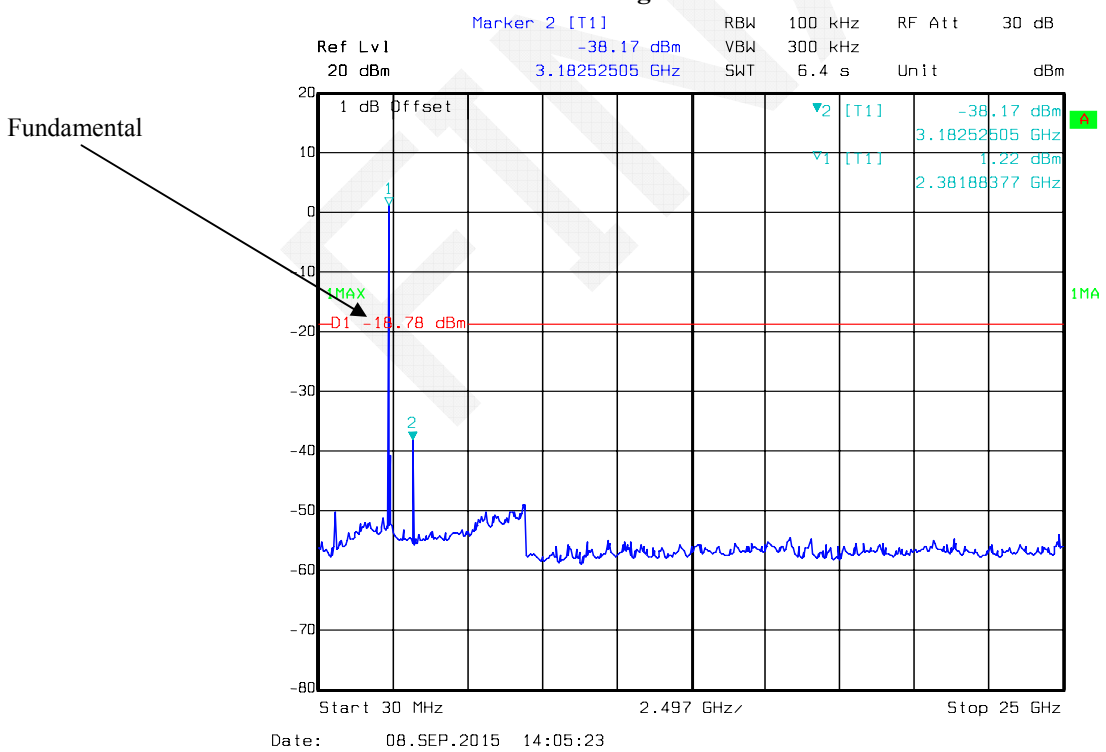
802.11b Middle Channel



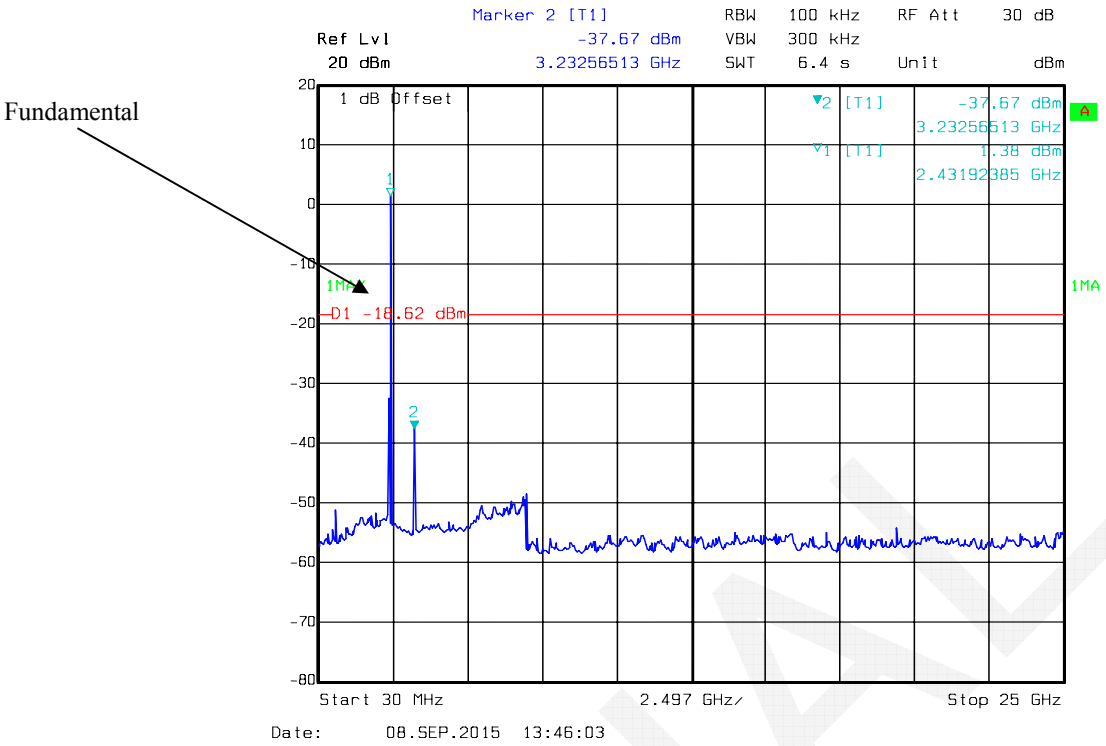
802.11b High Channel



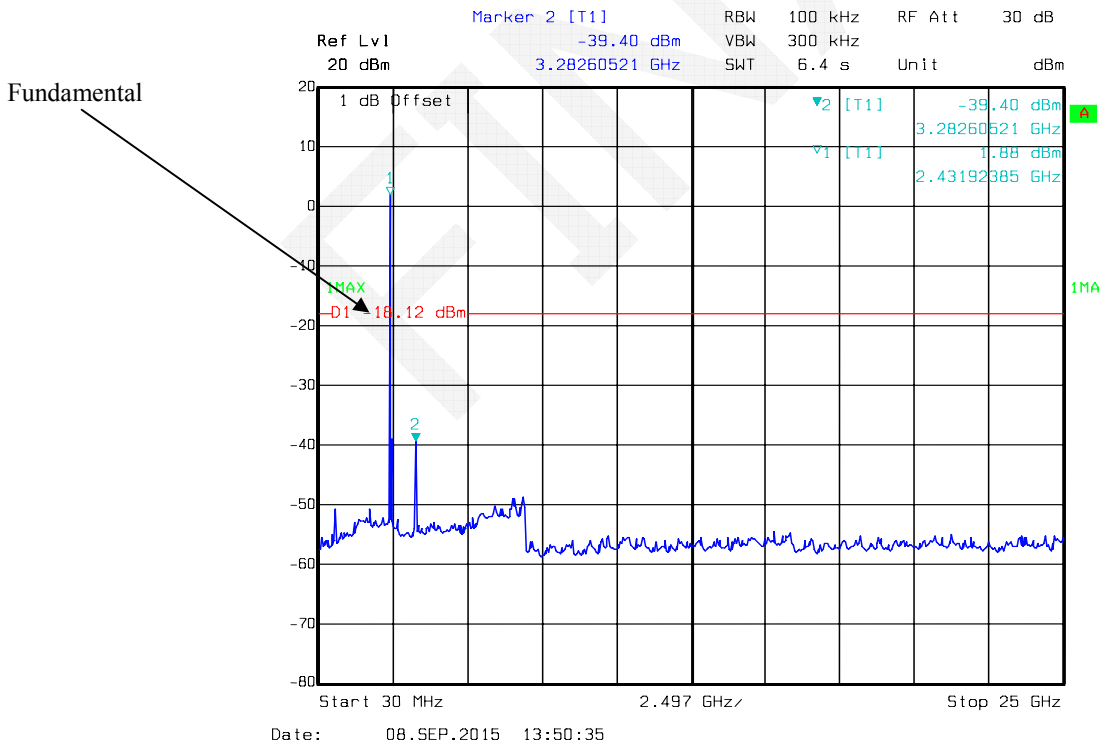
802.11g Low Channel



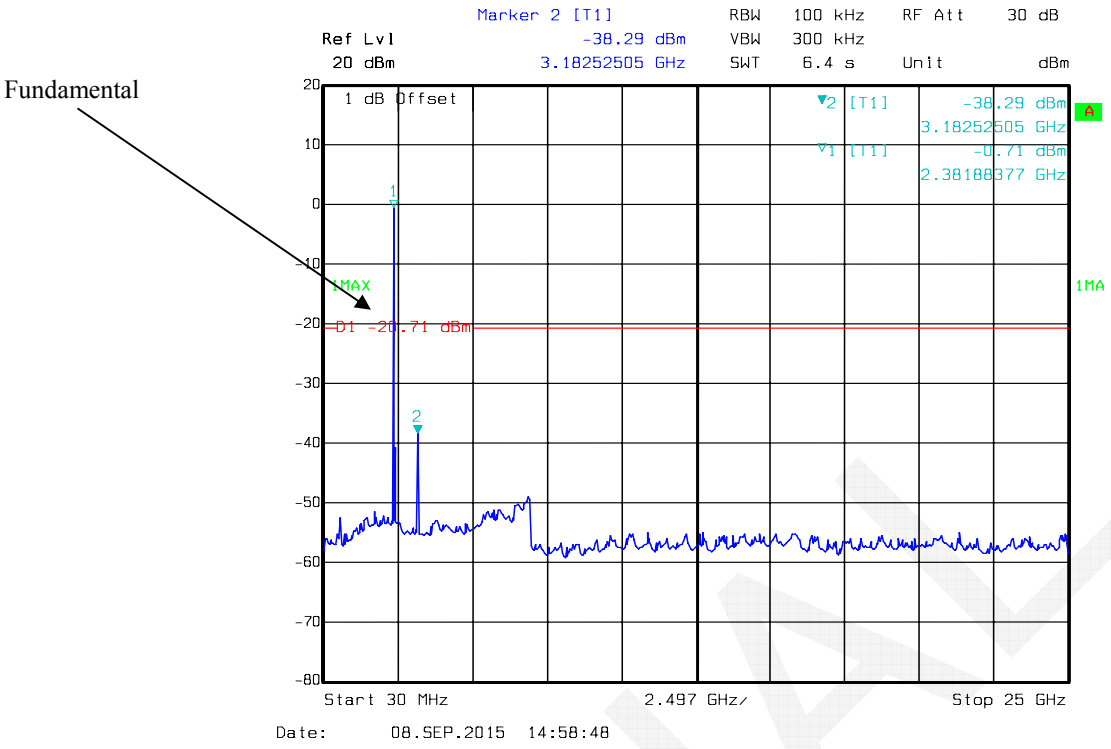
802.11g Middle Channel



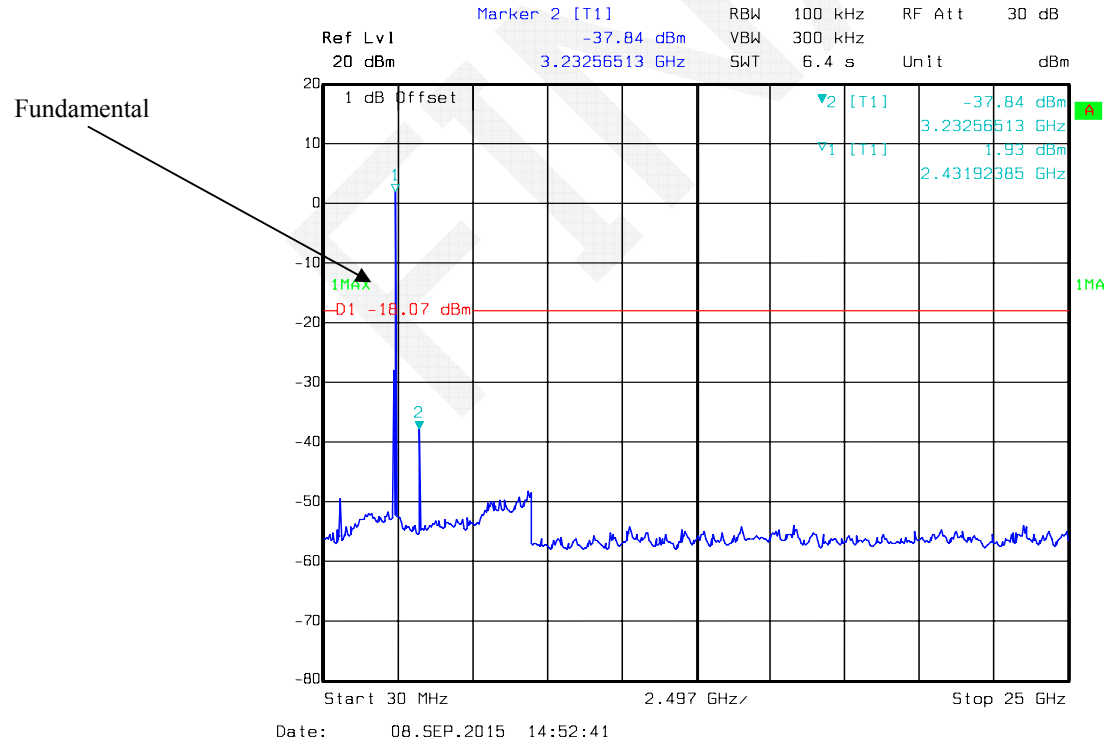
802.11g High Channel



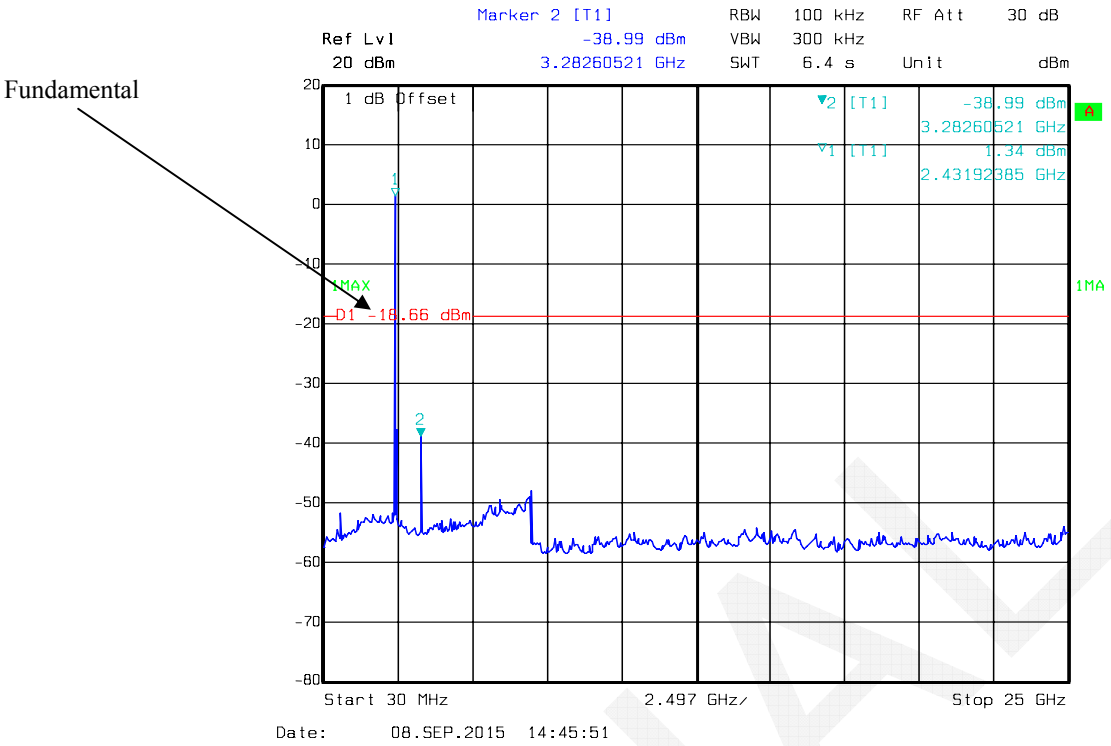
802.11n ht20 Low Channel



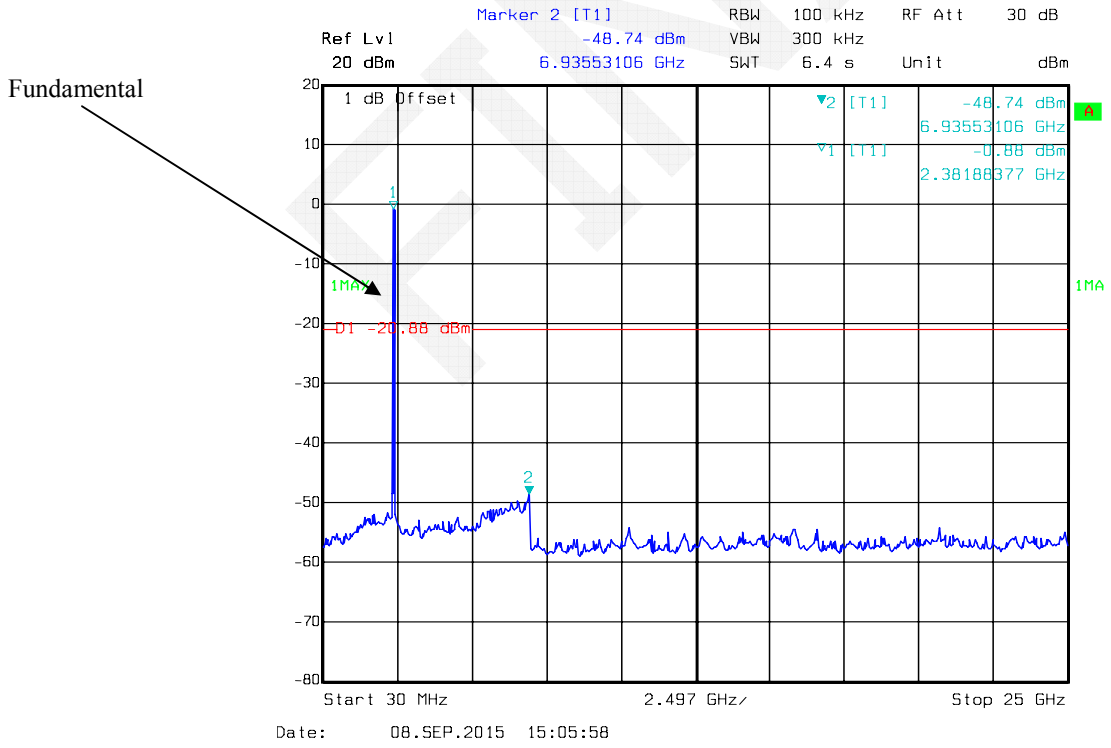
802.11n ht20 Middle Channel



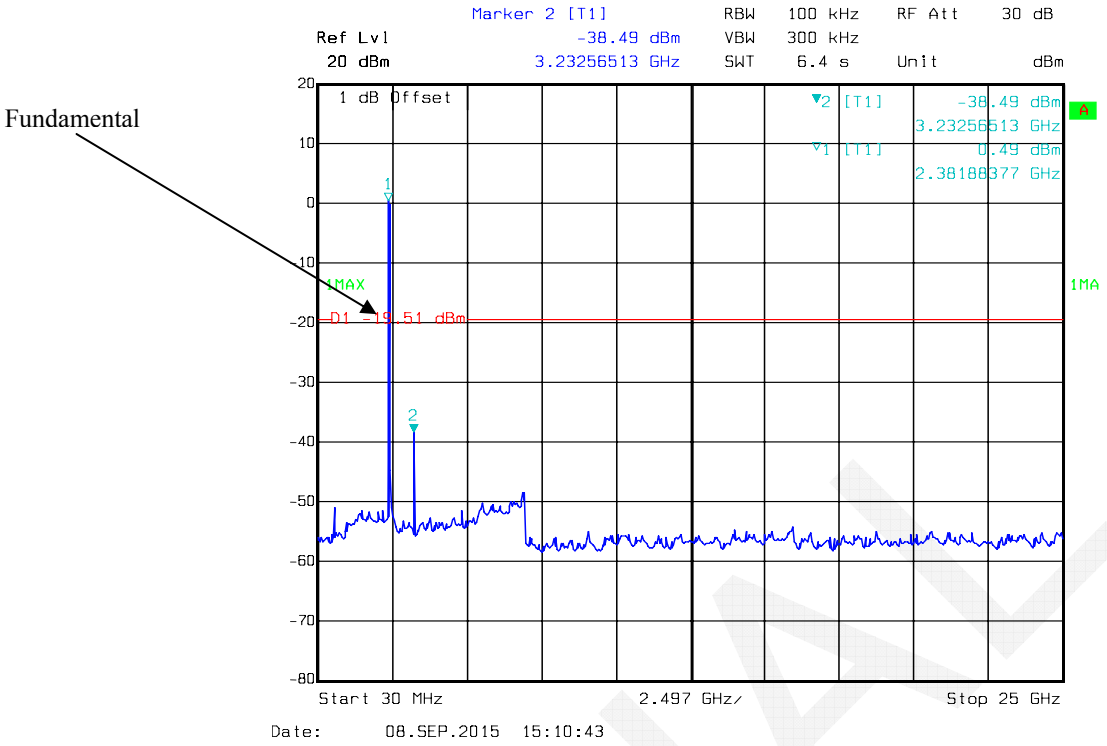
802.11n ht20 High Channel



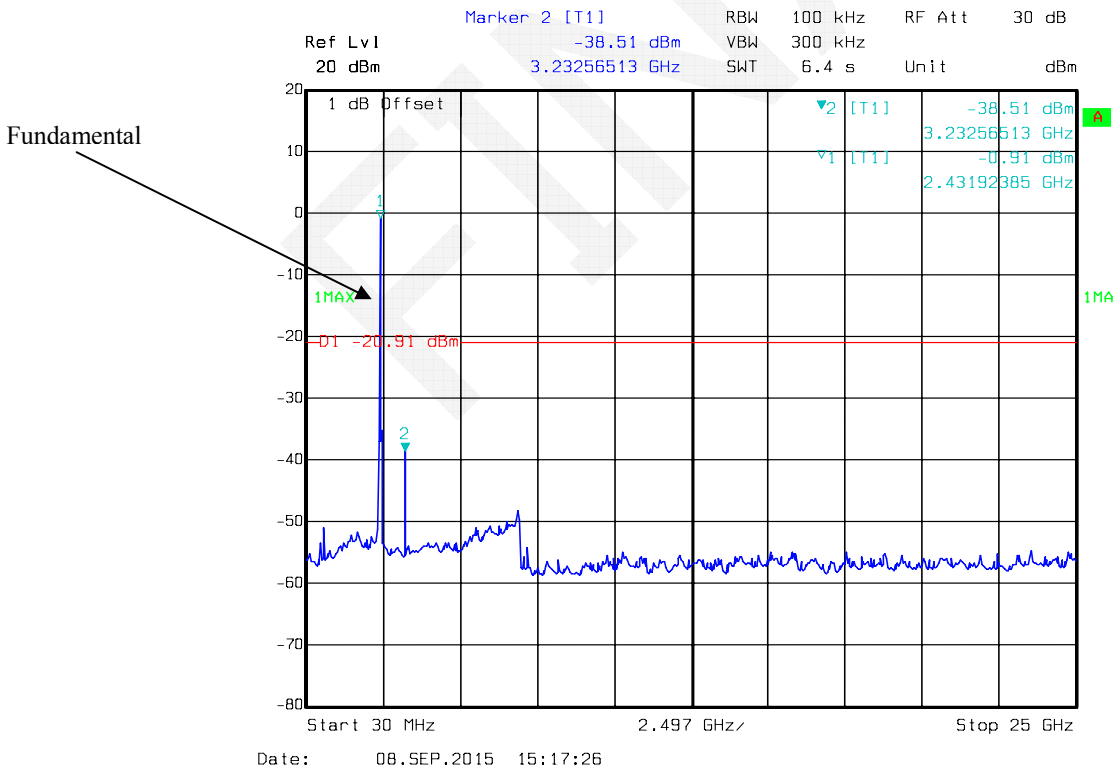
802.11n ht40 Low Channel



802.11n ht40 Middle Channel



802.11n ht40 High Channel



FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r03
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3×RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSEM	DE31388	2015-05-09	2016-05-09

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	26.8 °C
Relative Humidity:	60 %
ATM Pressure:	100.5 kPa

The testing was performed by Lion Xiao on 2015-09-08.

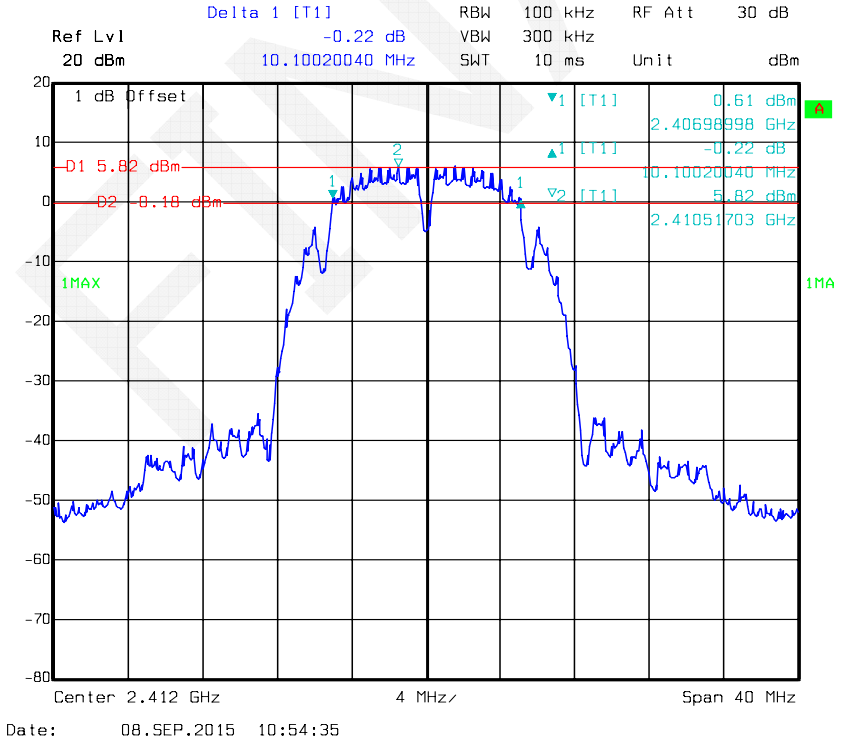
Test Mode: Transmitting

Test Result: Compliant. Please refer to the following table and plots.

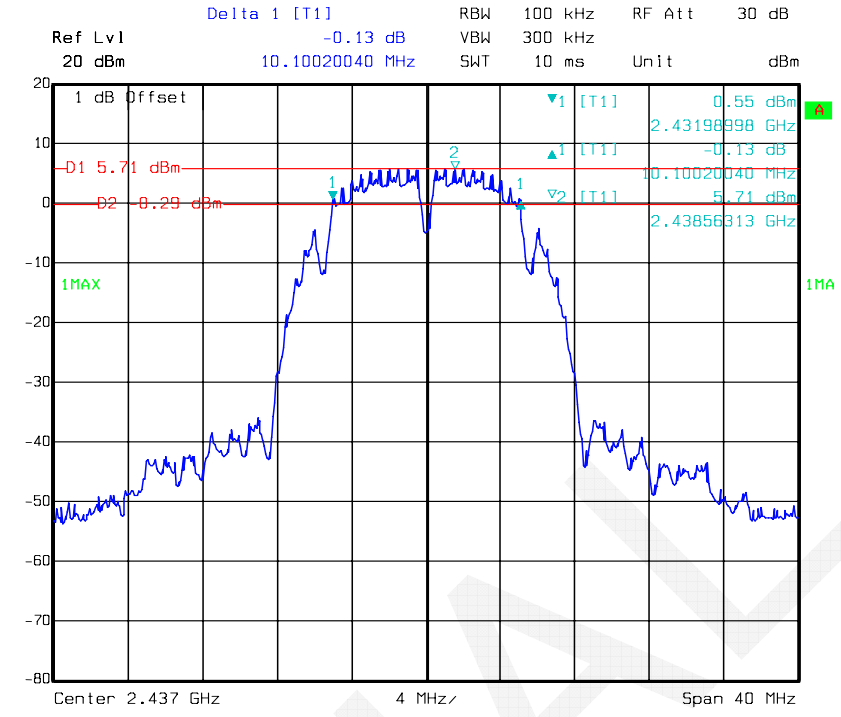
Test mode	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Limit (MHz)
			Chain 0	Chain 1	
802.11b	Low	2412	10.10	10.10	≥0.5
	Middle	2437	10.10	10.10	≥0.5
	High	2462	10.10	10.10	≥0.5
802.11g	Low	2412	16.51	16.51	≥0.5
	Middle	2437	16.43	16.51	≥0.5
	High	2462	16.43	16.43	≥0.5
802.11n20	Low	2412	17.31	17.31	≥0.5
	Middle	2437	17.23	17.23	≥0.5
	High	2462	17.23	17.31	≥0.5
802.11n40	Low	2422	36.23	36.39	≥0.5
	Middle	2437	36.23	36.23	≥0.5
	High	2452	36.23	36.23	≥0.5

Chain 0

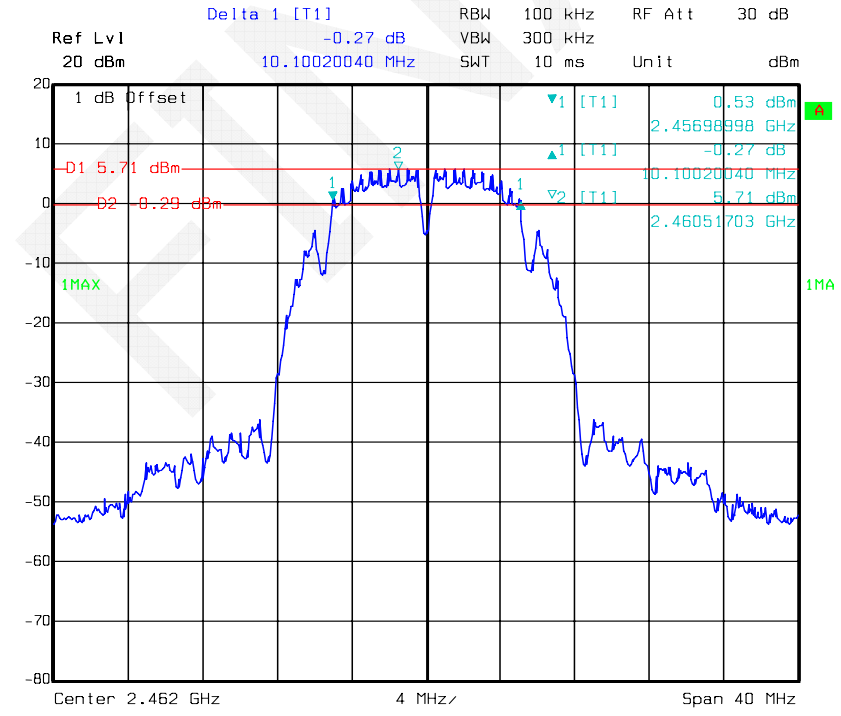
802.11b Low Channel



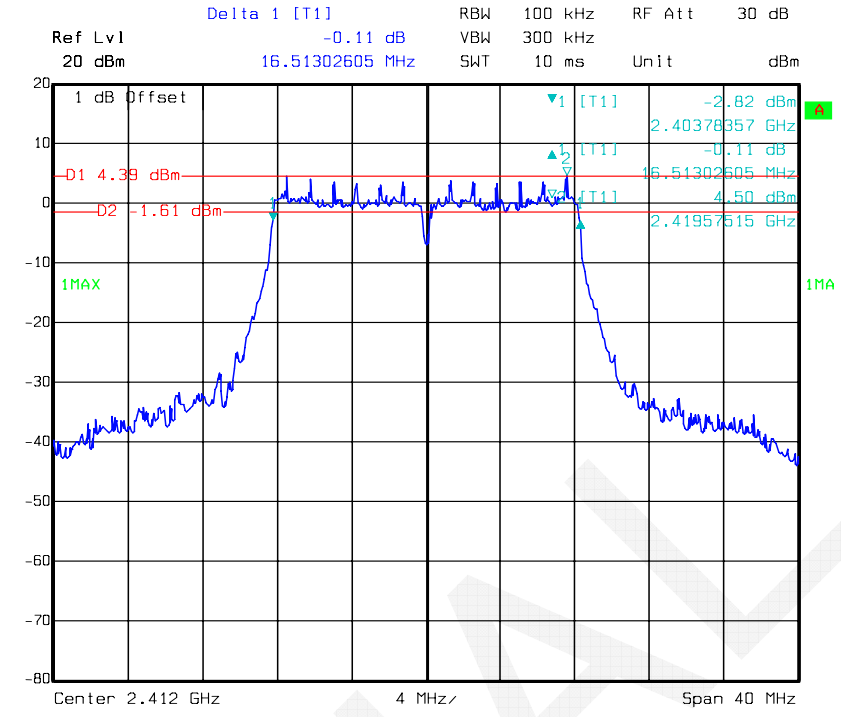
802.11b Middle Channel



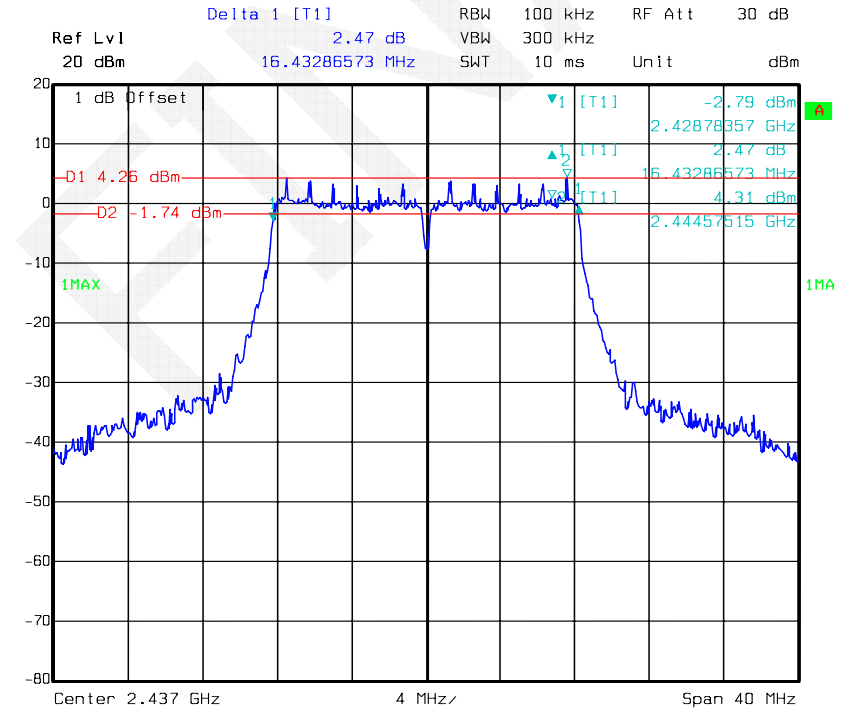
802.11b High Channel



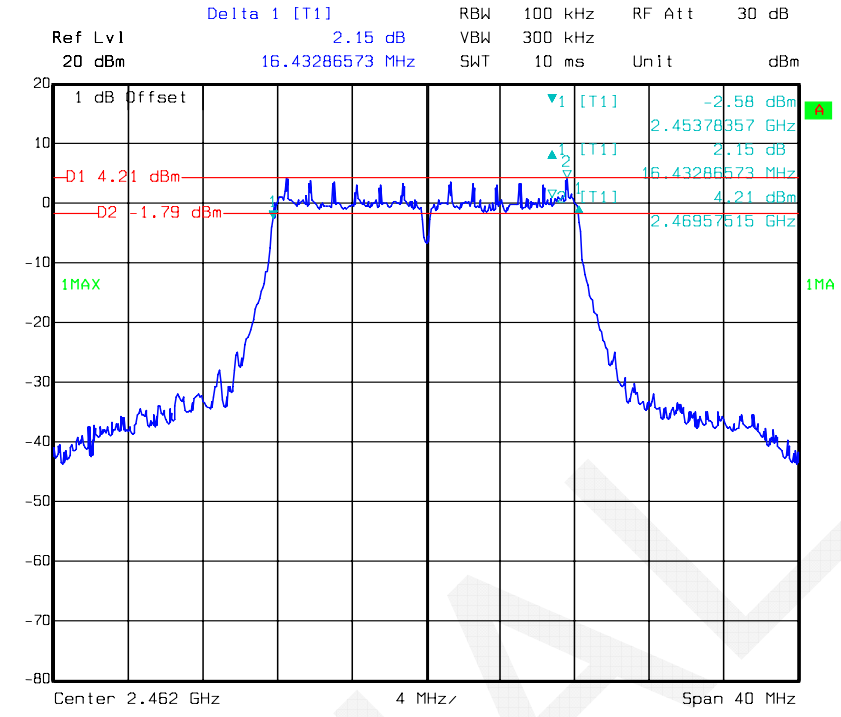
802.11g Low Channel



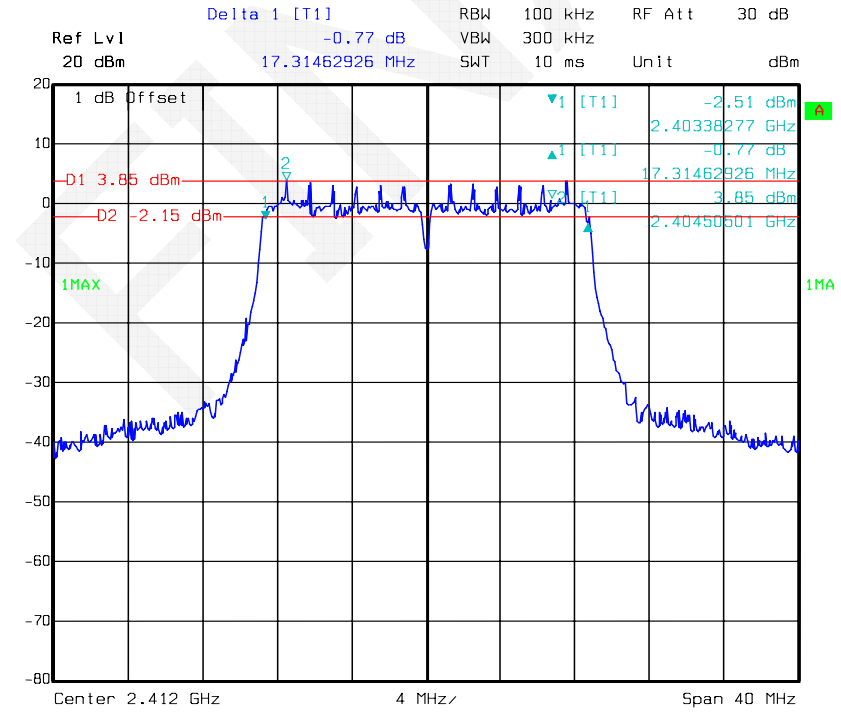
802.11g Middle Channel



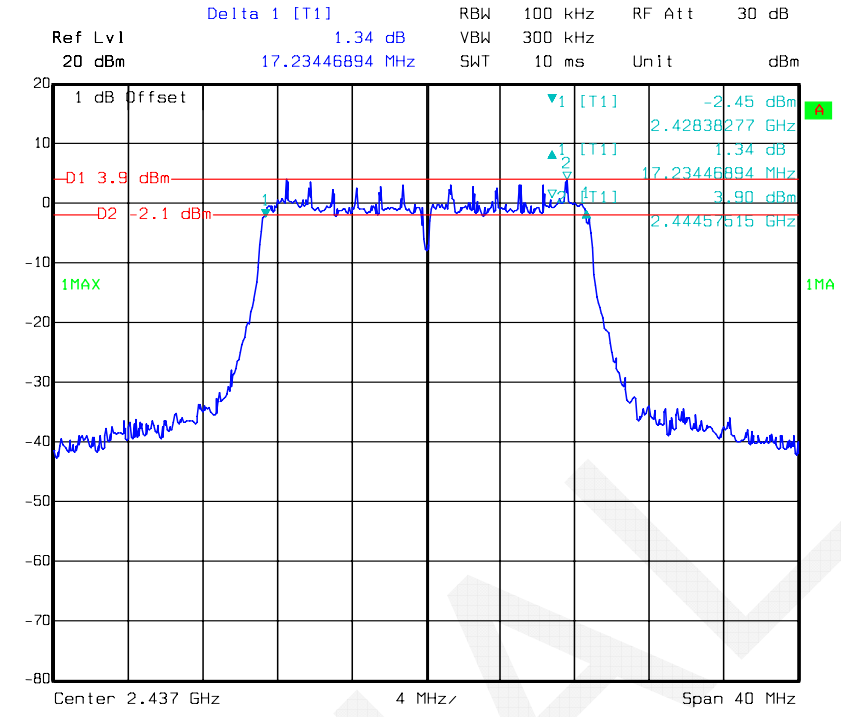
802.11g High Channel



802.11n ht20 Low Channel

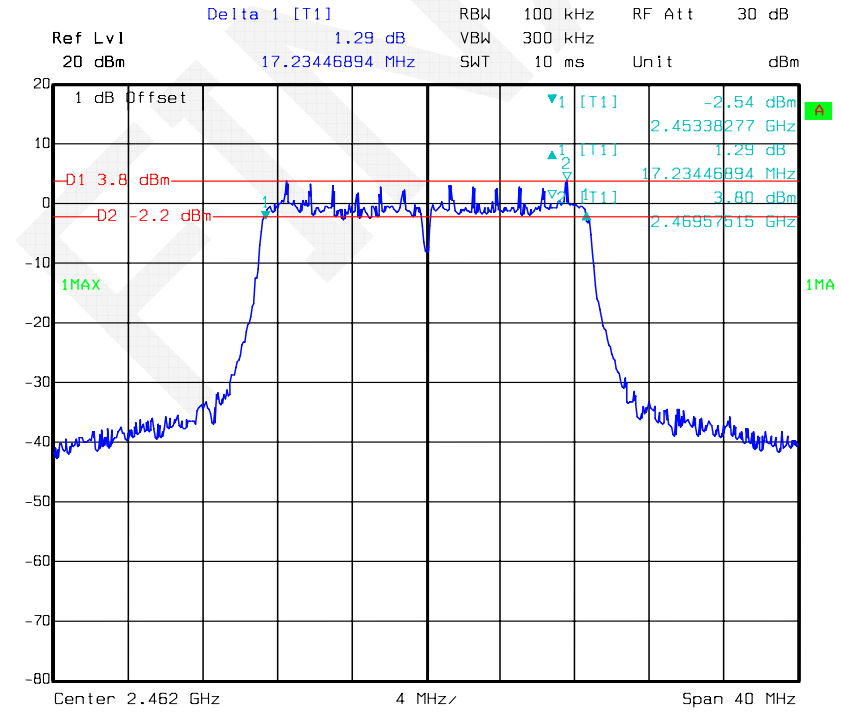


802.11n ht20 Middle Channel



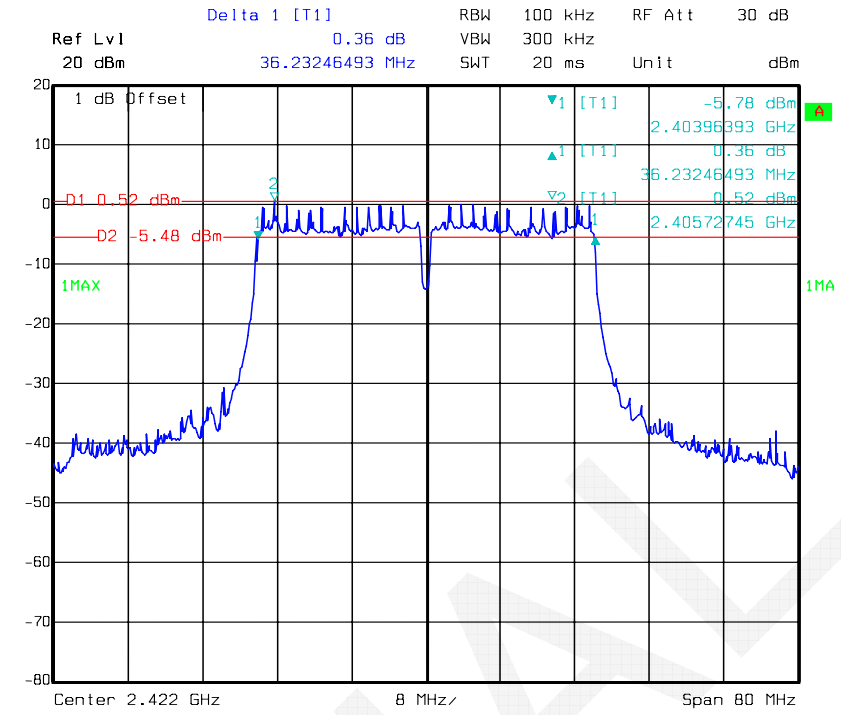
Date: 08.SEP.2015 14:32:52

802.11n ht20 High Channel

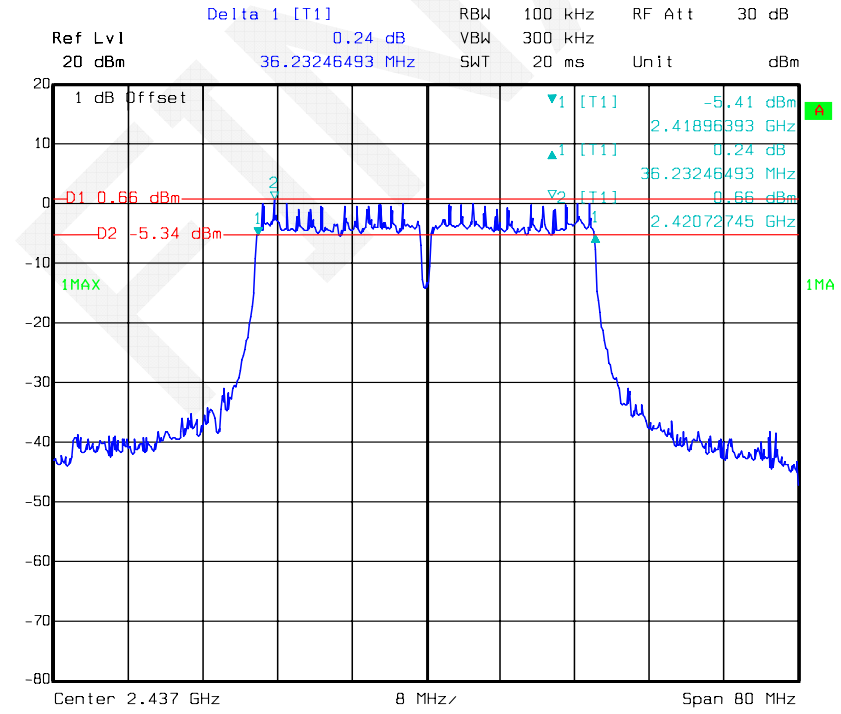


Date: 08.SEP.2015 14:36:52

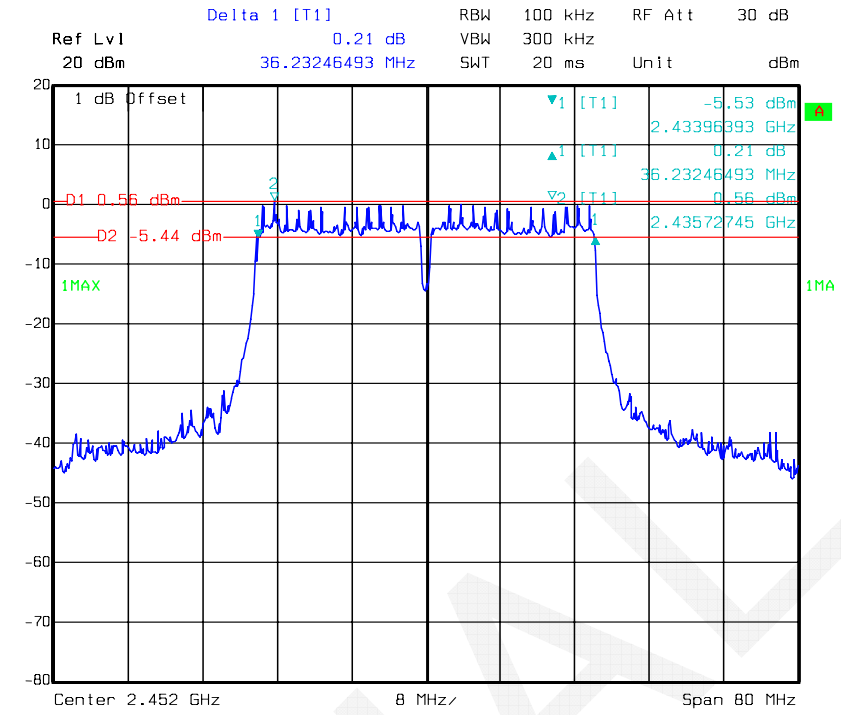
802.11n ht40 Low Channel



802.11n ht40 Middle Channel

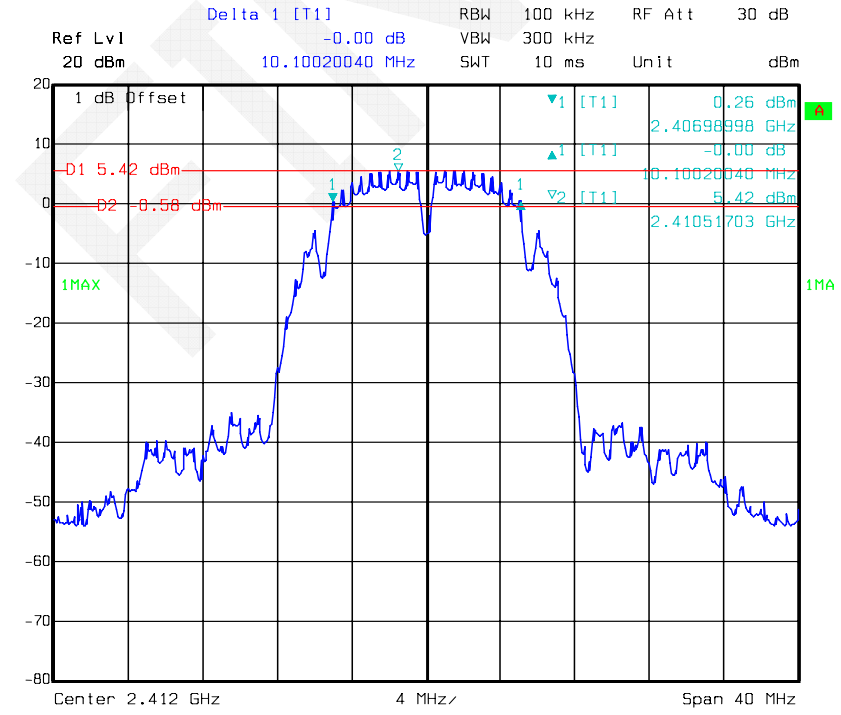


802.11n ht40 High Channel

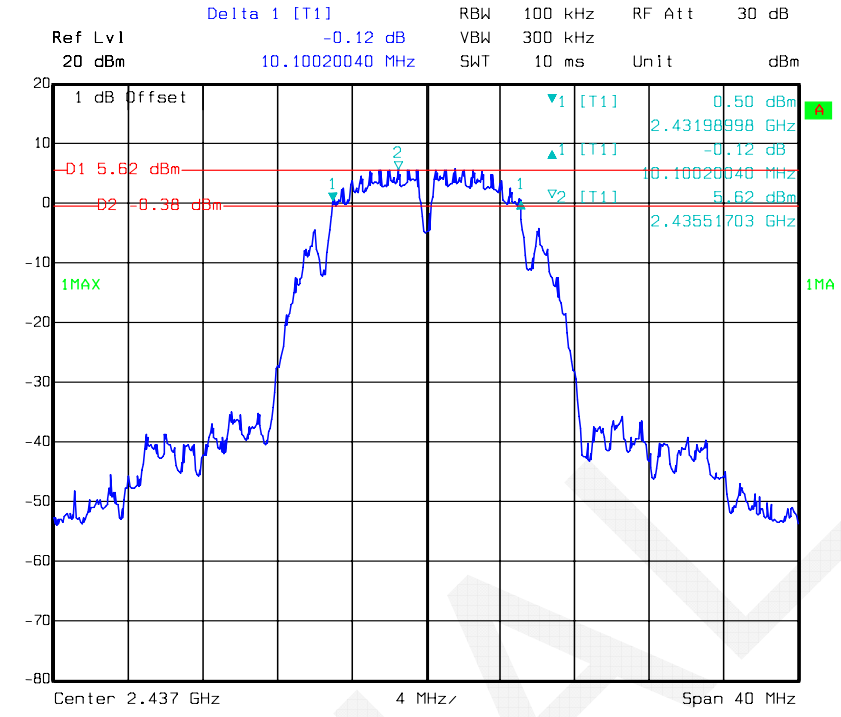


Chain 1

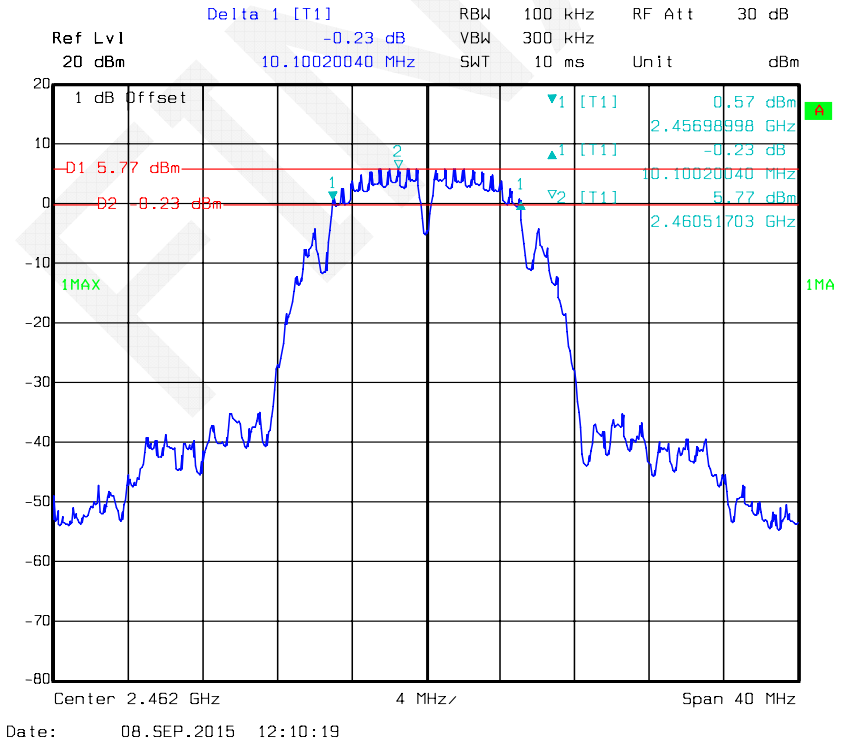
802.11b Low Channel



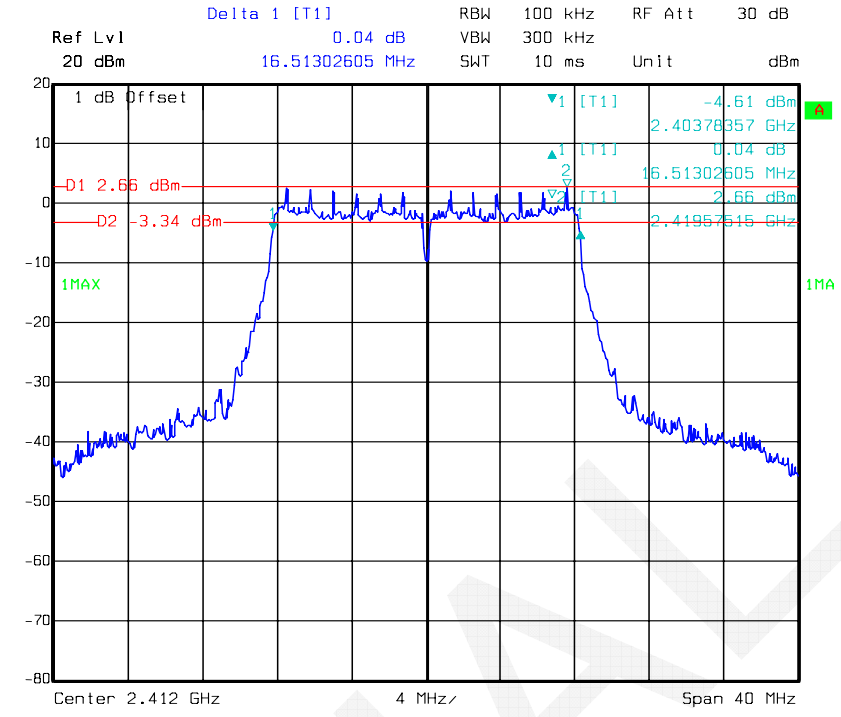
802.11b Middle Channel



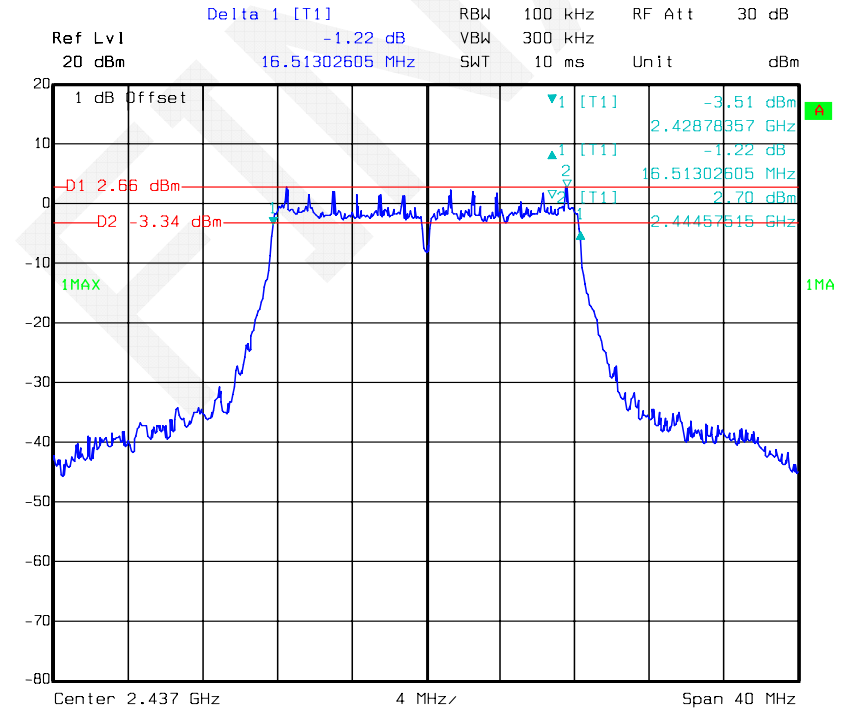
802.11b High Channel



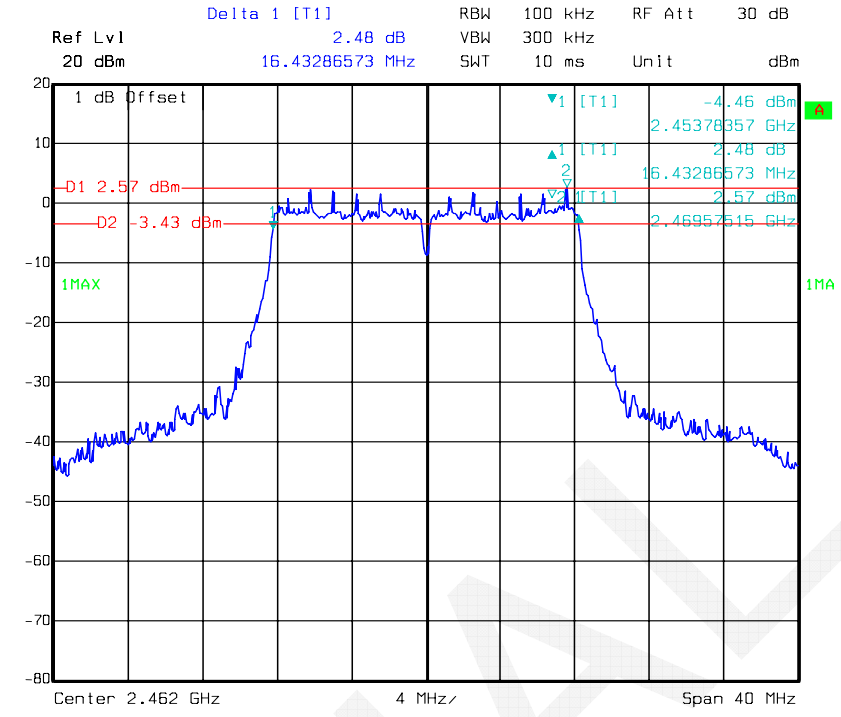
802.11g Low Channel



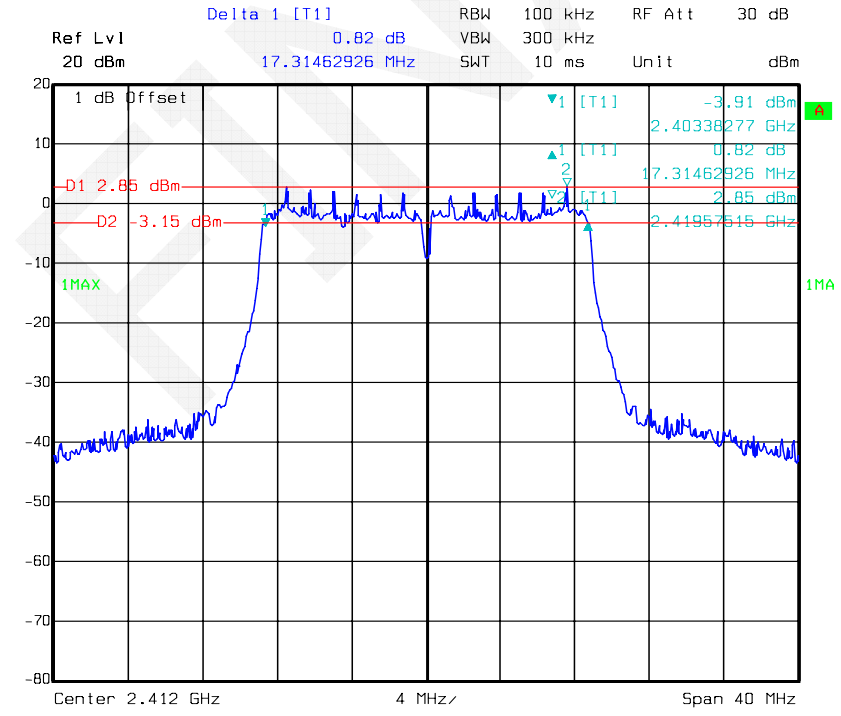
802.11g Middle Channel



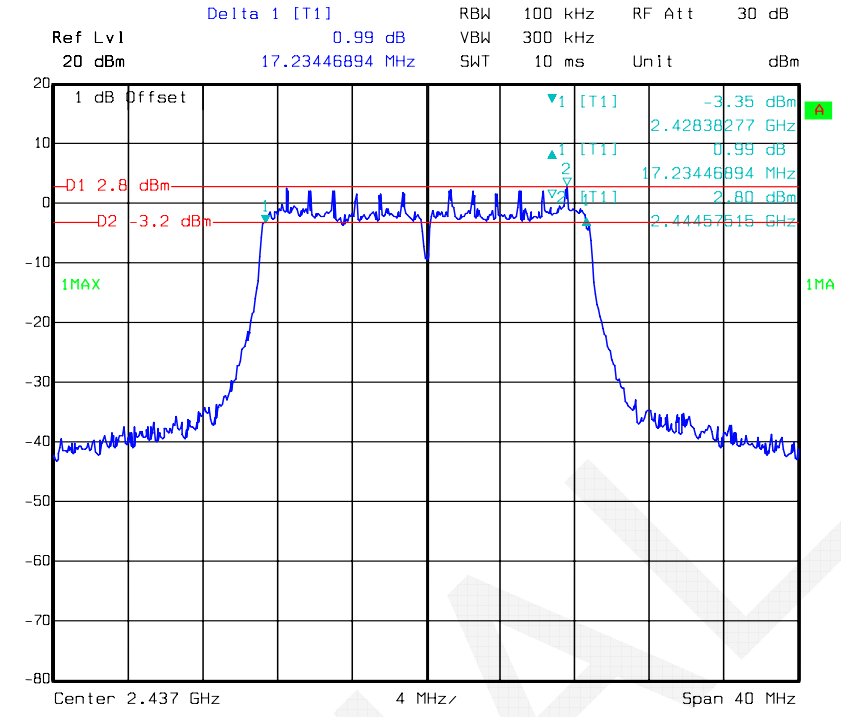
802.11g High Channel



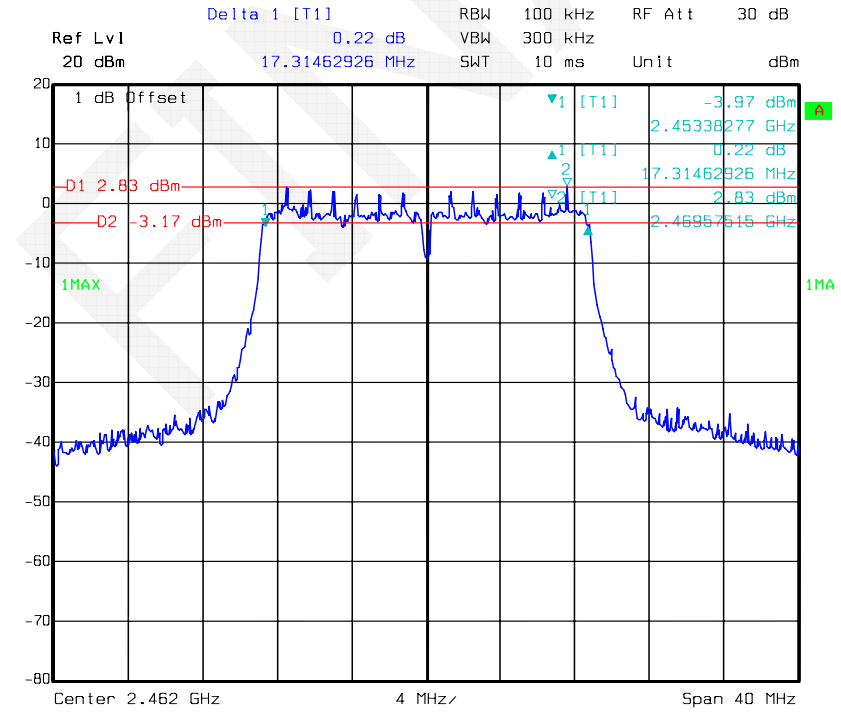
802.11n ht20 Low Channel



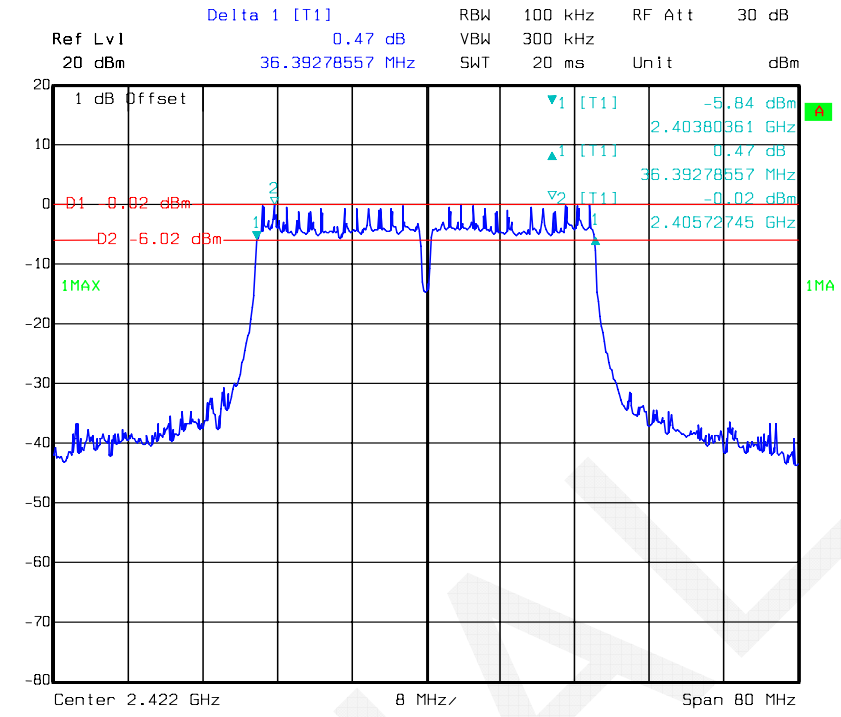
802.11n ht20 Middle Channel



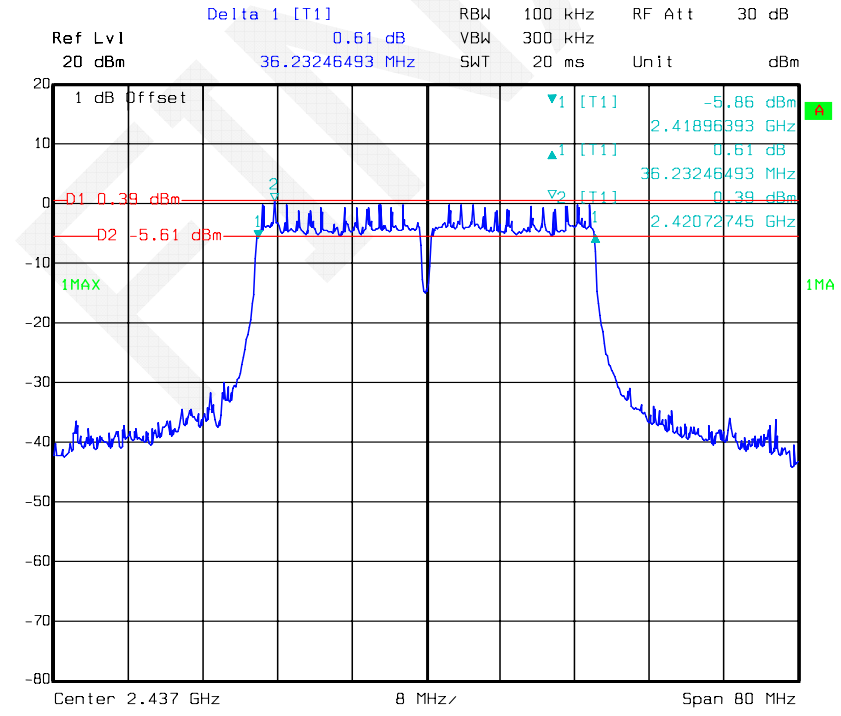
802.11n ht20 High Channel



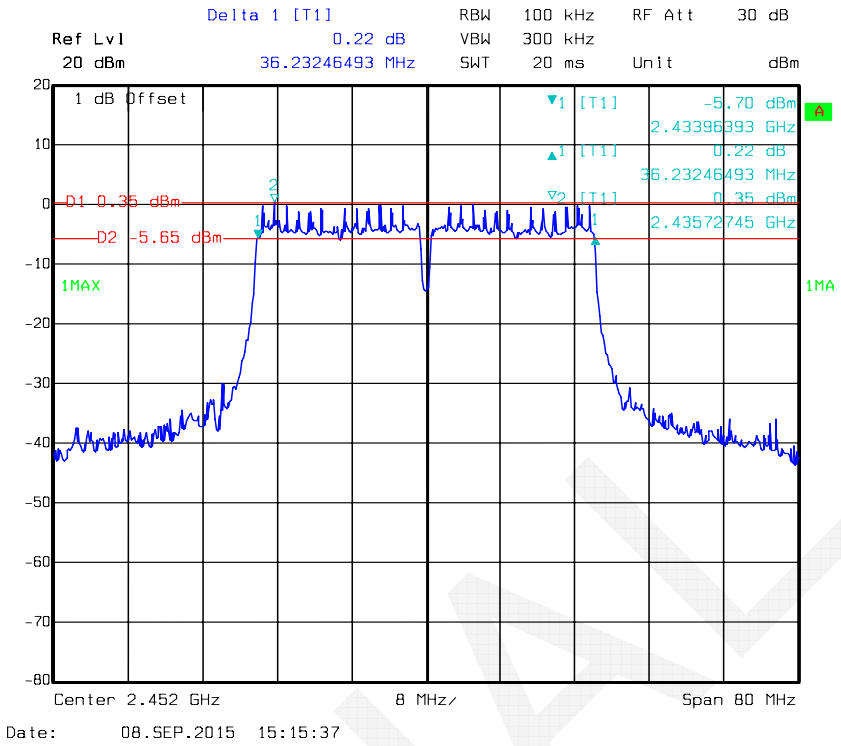
802.11n ht40 Low Channel



802.11n ht40 Middle Channel



802.11n ht40 High Channel



FINAL

FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r03

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to test equipment.
3. Add a correction factor to the display.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Wideband Power Sensor	N1921A	MY54210016	2014-11-03	2015-11-03
Agilent	Wideband Power Sensor	N1921A	MY54170013	2014-11-03	2015-11-03
Agilent	P-Series Power Meter	N1912A	MY5000448	2014-11-03	2015-11-03

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	27 °C
Relative Humidity:	58 %
ATM Pressure:	100 kPa

The testing was performed by Lion Xiao on 2015-09-06.

Test Mode: Transmitting

Test Result: Compliant. Please refer to the following table.

Test mode	Channel	Frequency	Max Peak Conducted Output Power (dBm)			Limit	Result
		(MHz)	Chain 0	Chain 1	Total	(dBm)	
802.11b	Low	2412	19.81	19.79	22.81	30	PASS
	Middle	2437	19.88	19.66	22.78	30	PASS
	High	2462	19.78	19.95	22.88	30	PASS
802.11g	Low	2412	19.54	18.50	22.06	30	PASS
	Middle	2437	19.52	18.47	22.04	30	PASS
	High	2462	19.37	18.44	21.94	30	PASS
802.11n20	Low	2412	19.73	18.87	22.33	30	PASS
	Middle	2437	19.66	18.93	22.32	30	PASS
	High	2462	19.61	18.89	22.28	30	PASS
802.11n40	Low	2422	20.03	19.28	22.68	30	PASS
	Middle	2437	20.22	19.41	22.84	30	PASS
	High	2452	20.17	19.04	22.65	30	PASS

Test mode	Channel	Frequency	Max Conducted Average Output Power(dBm)			Limit	Result
		(MHz)	Chain 0	Chain 1	Total	(dBm)	
802.11b	Low	2412	16.21	16.18	19.21	30	PASS
	Middle	2437	16.27	16.05	19.17	30	PASS
	High	2462	16.19	16.31	19.26	30	PASS
802.11g	Low	2412	14.22	13.54	16.90	30	PASS
	Middle	2437	14.19	13.51	16.87	30	PASS
	High	2462	14.05	13.48	16.78	30	PASS
802.11n20	Low	2412	14.84	13.74	17.34	30	PASS
	Middle	2437	14.78	13.83	17.34	30	PASS
	High	2462	14.70	13.80	17.28	30	PASS
802.11n40	Low	2422	13.02	12.83	15.94	30	PASS
	Middle	2437	13.17	12.97	16.08	30	PASS
	High	2452	13.09	12.65	15.89	30	PASS

Note: 1. Duty cycle is 100%.

2. Directional gain = G_{ANT} + 10 log(N_{ANT}) dBi

= 2+3 = 5 dBi＜ 6dBi, no limit reduced.

FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSEM	DE31388	2015-05-09	2016-05-09

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	26.8 °C
Relative Humidity:	60 %
ATM Pressure:	100.5 kPa

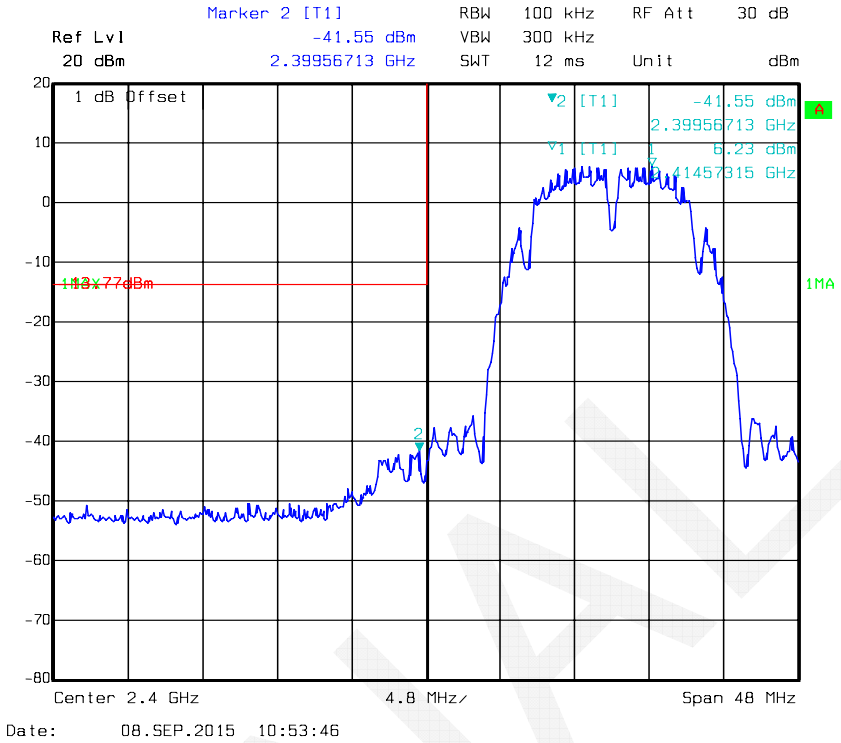
** The testing was performed by Lion Xiao on 2015-09-08.*

Test mode: Transmitting

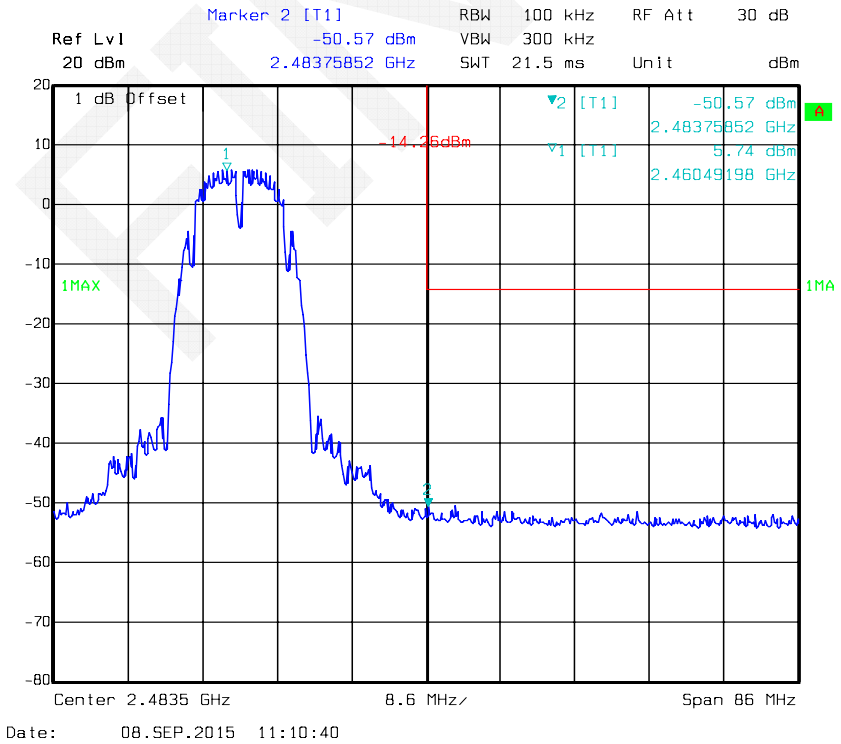
Test Result: Compliant. Please refer to following plots.

Chain 0

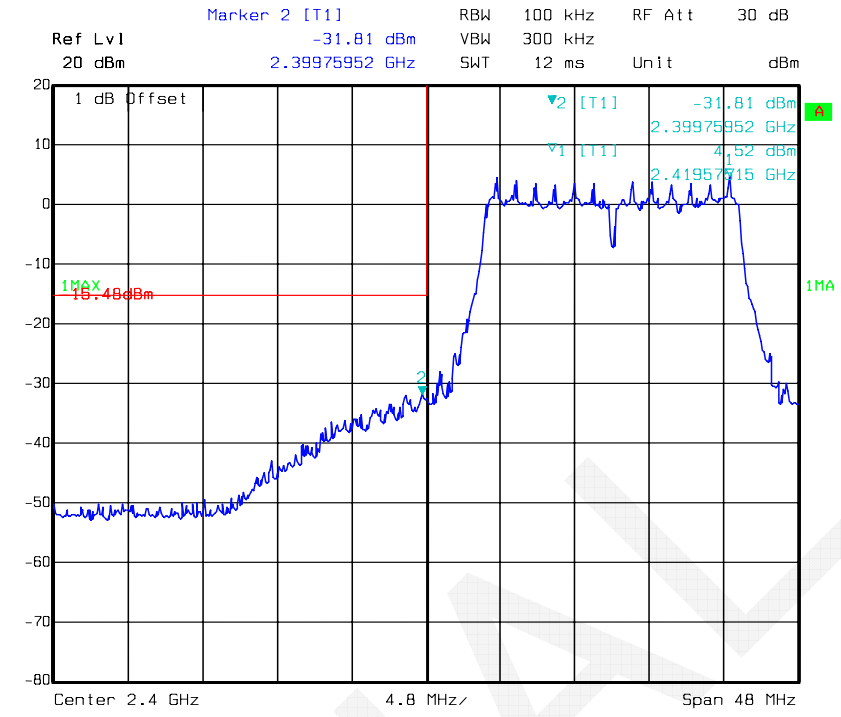
802.11b: Band Edge, Left Side



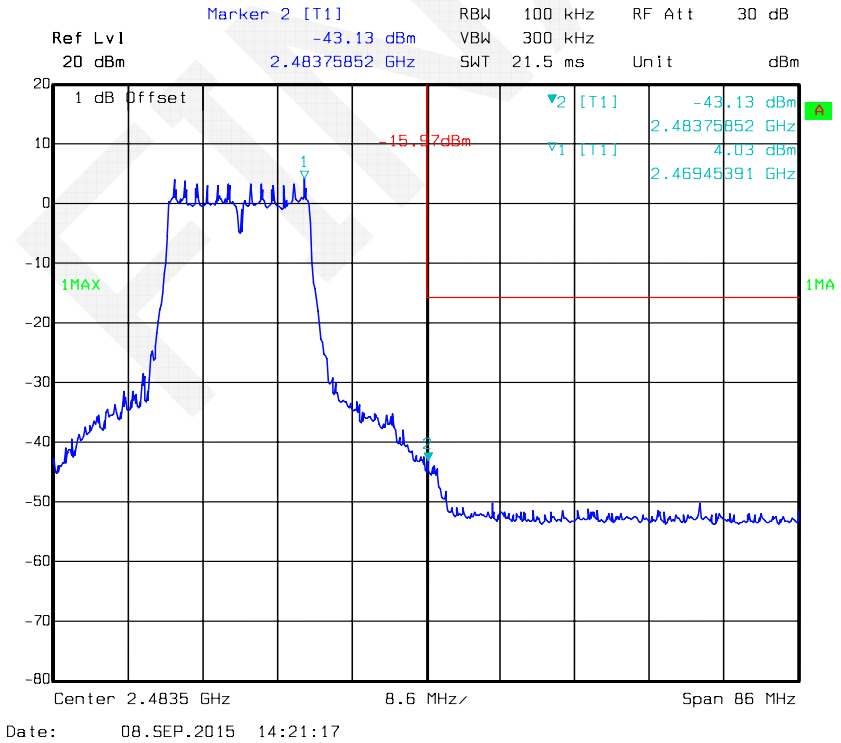
802.11b: Band Edge, Right Side



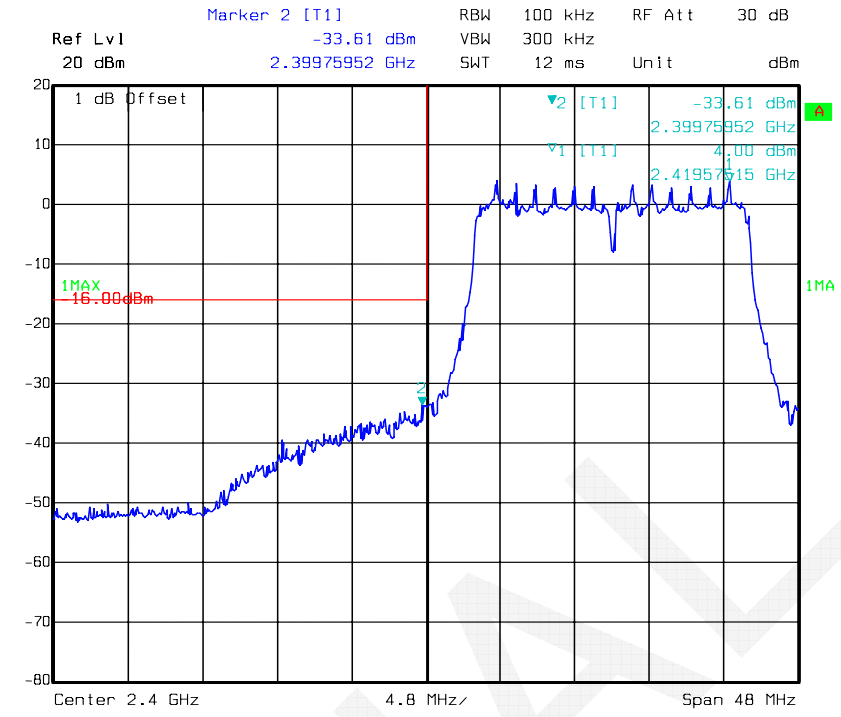
802.11g: Band Edge, Left Side



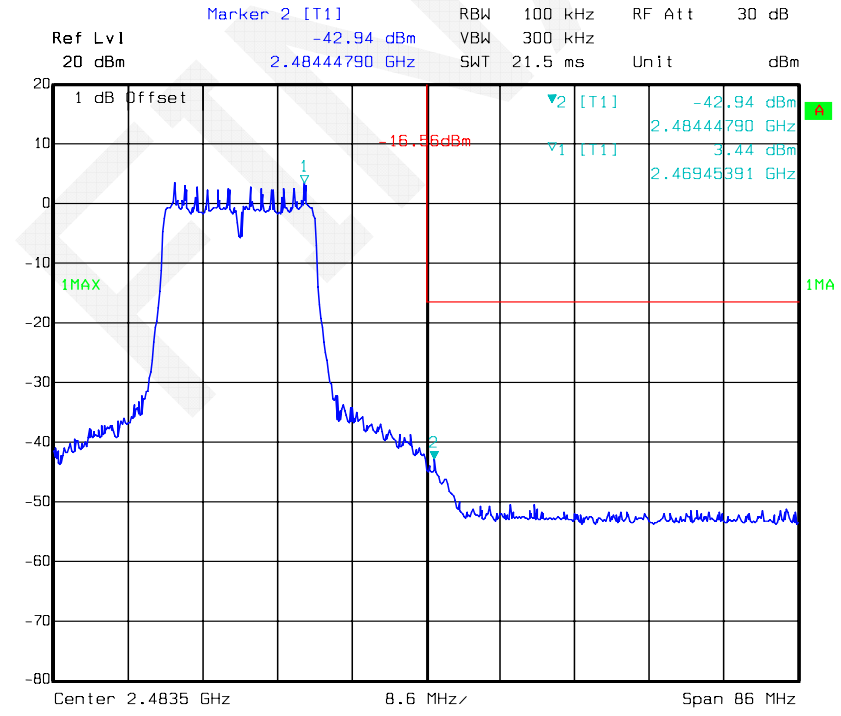
802.11g: Band Edge, Right Side



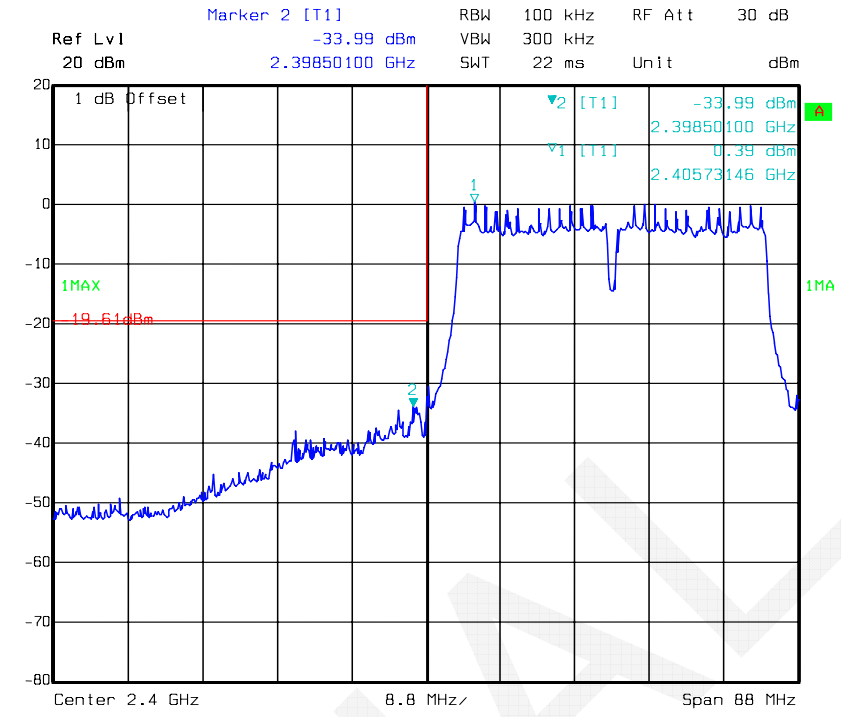
802.11n ht20 Band Edge, Left Side



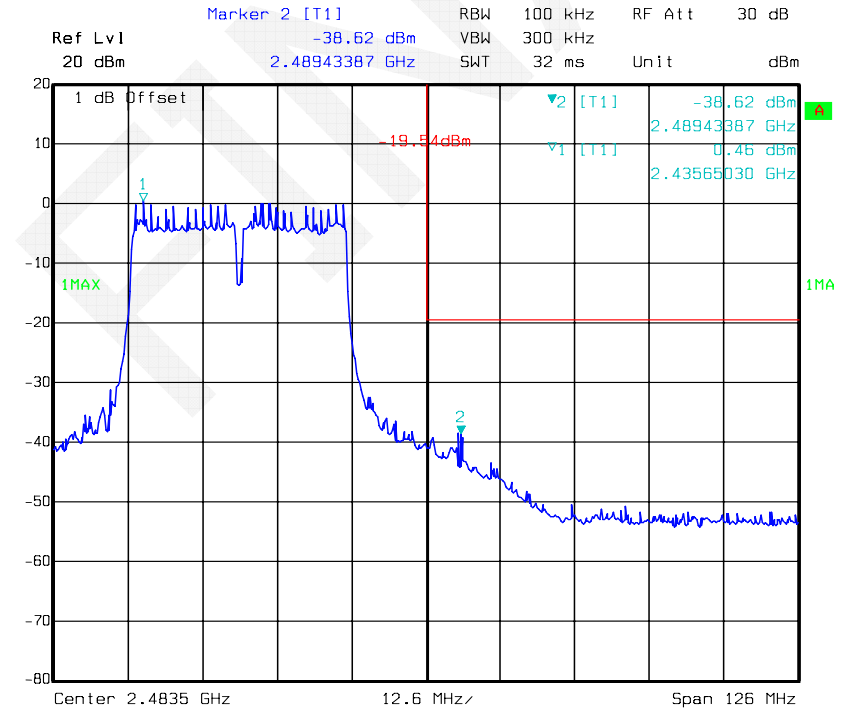
802.11n ht20 Band Edge, Right Side



802.11n ht40 Band Edge， Left Side

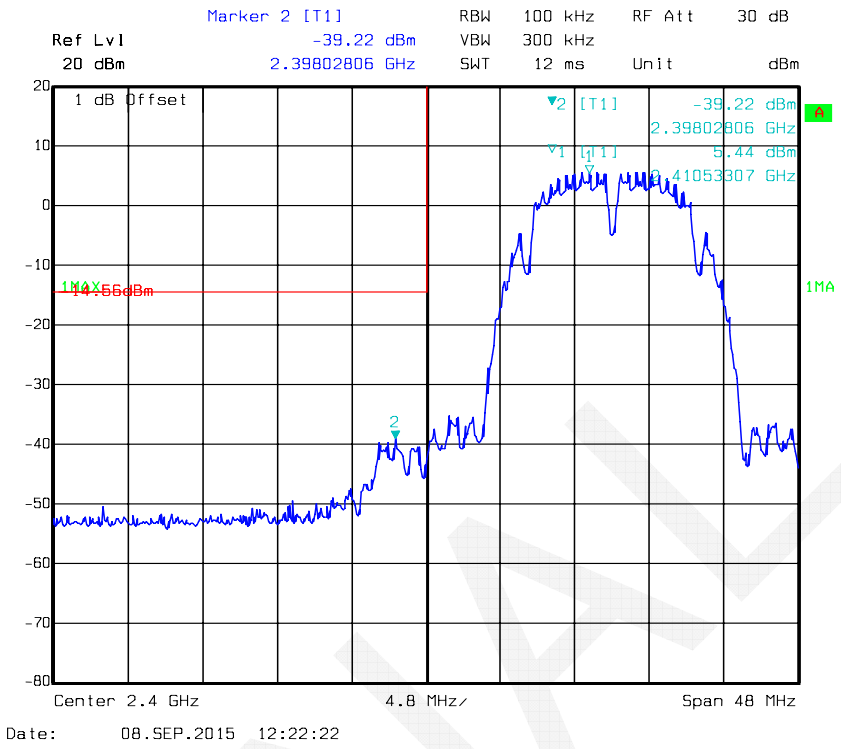


802.11n ht40 Band Edge, Right Side

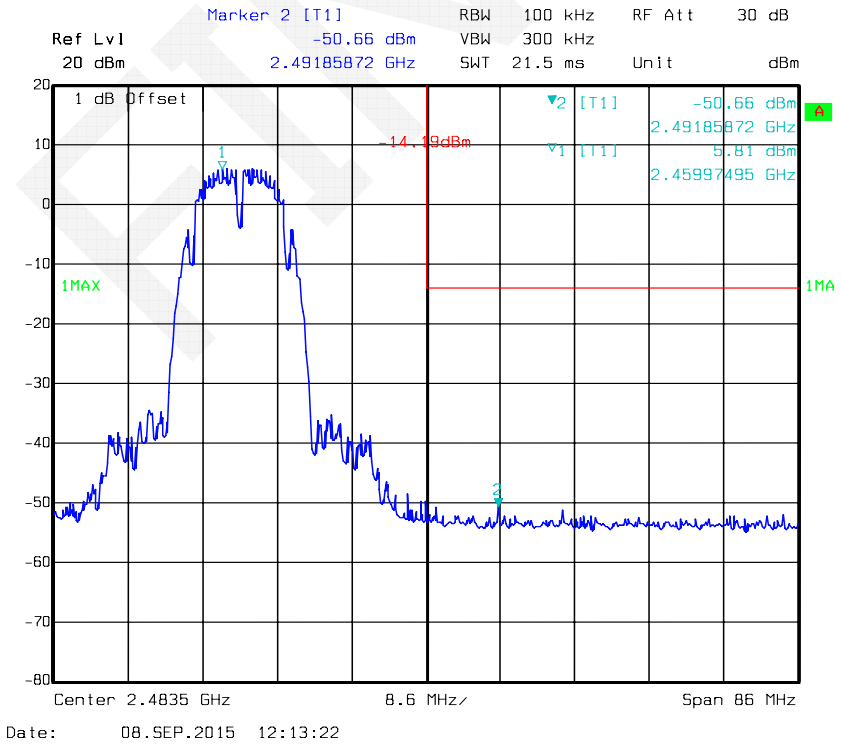


Chain 1

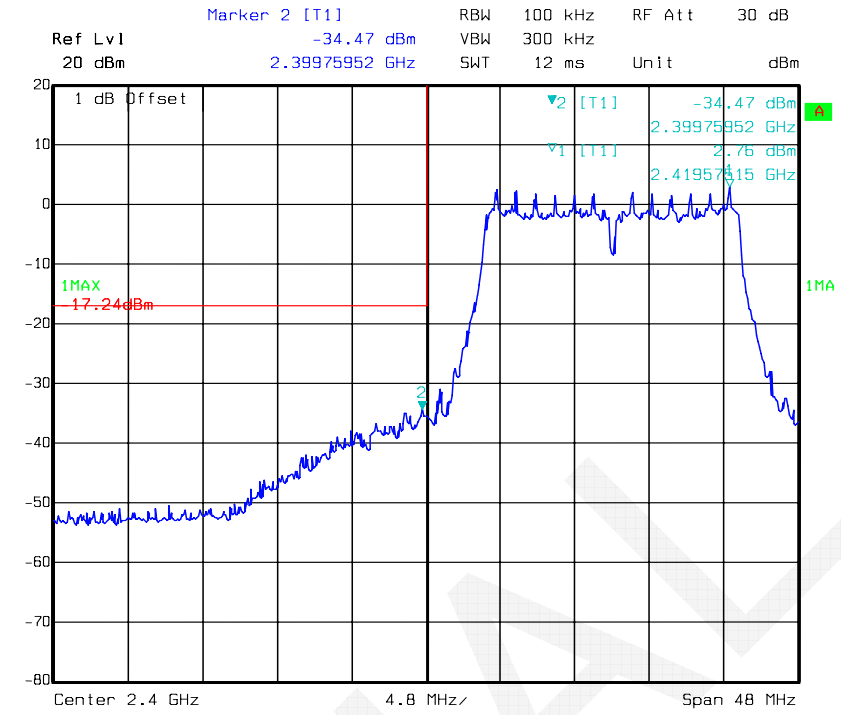
802.11b: Band Edge, Left Side



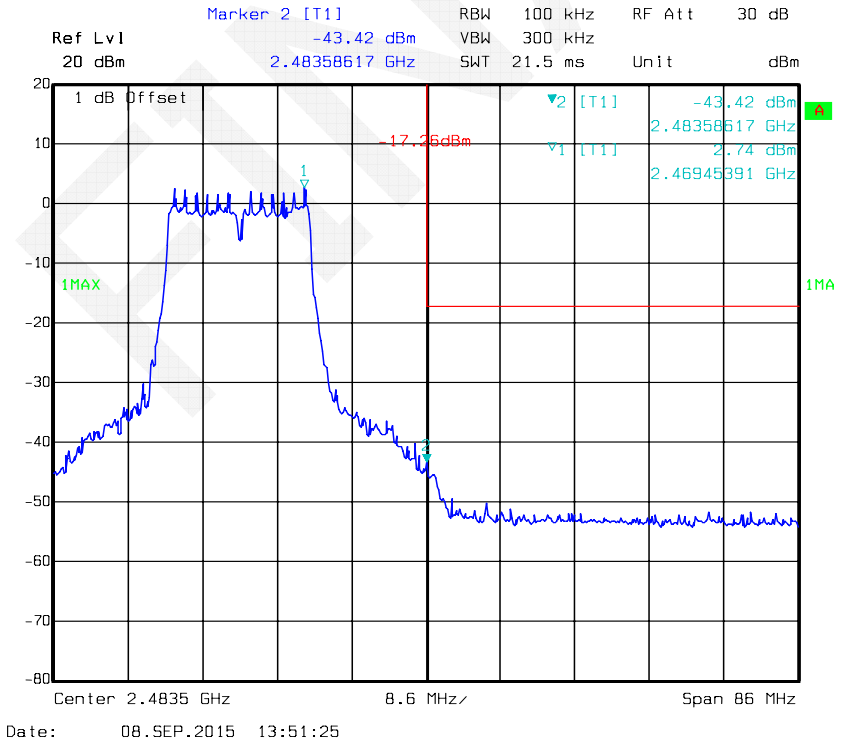
802.11b: Band Edge, Right Side



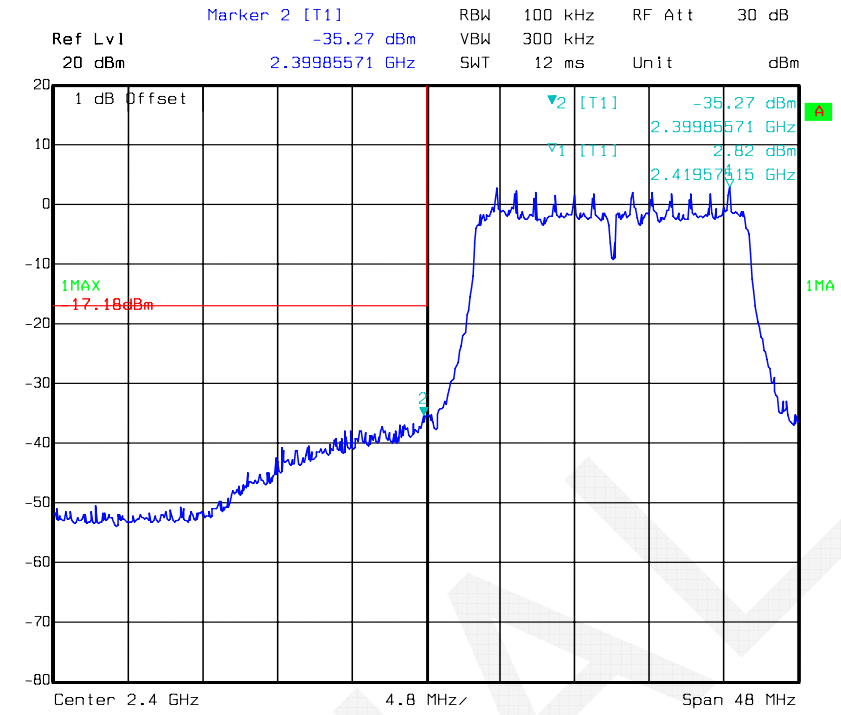
802.11g: Band Edge, Left Side



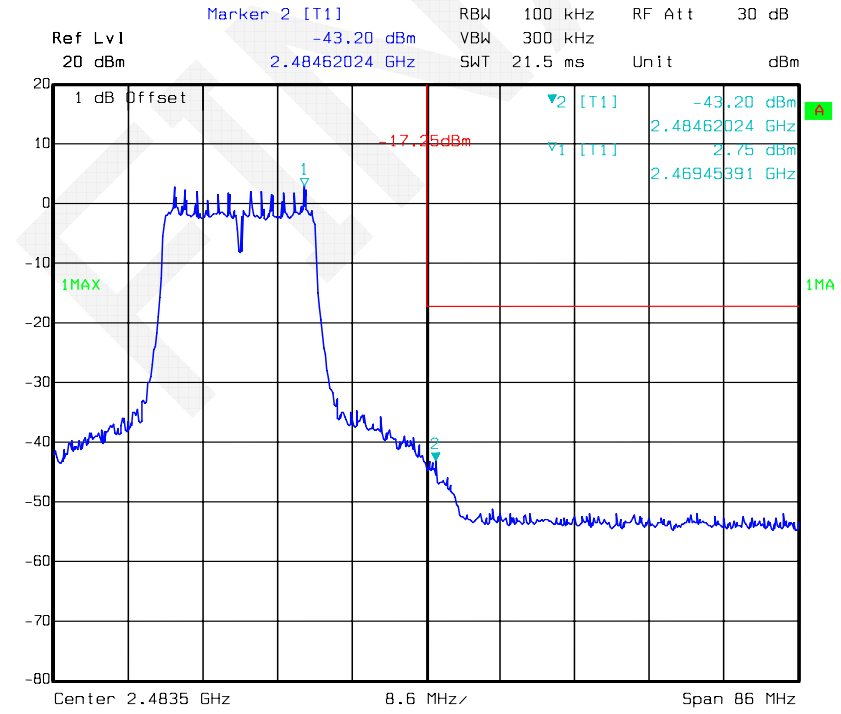
802.11g: Band Edge, Right Side



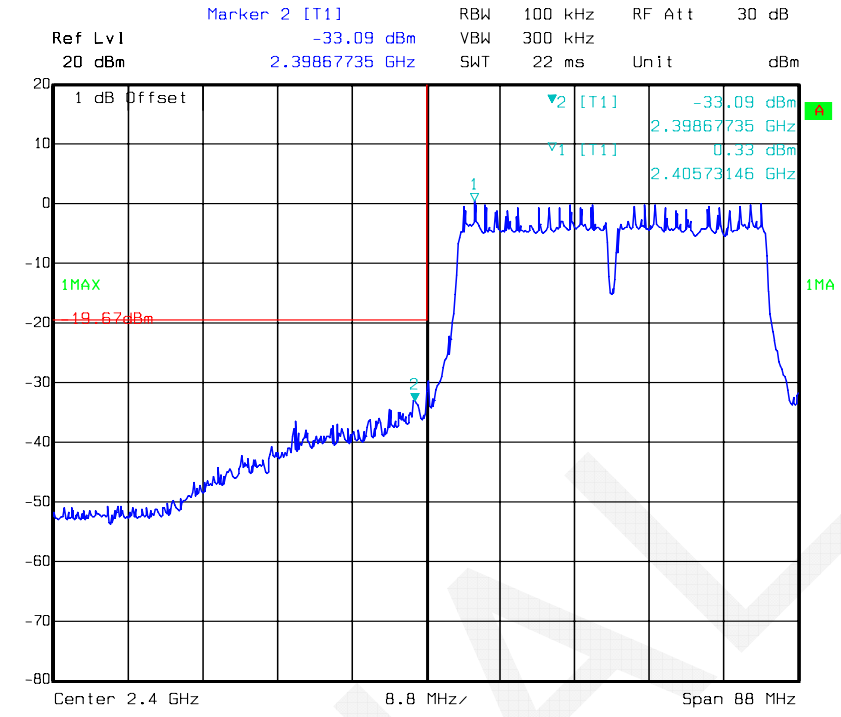
802.11n ht20 Band Edge, Left Side



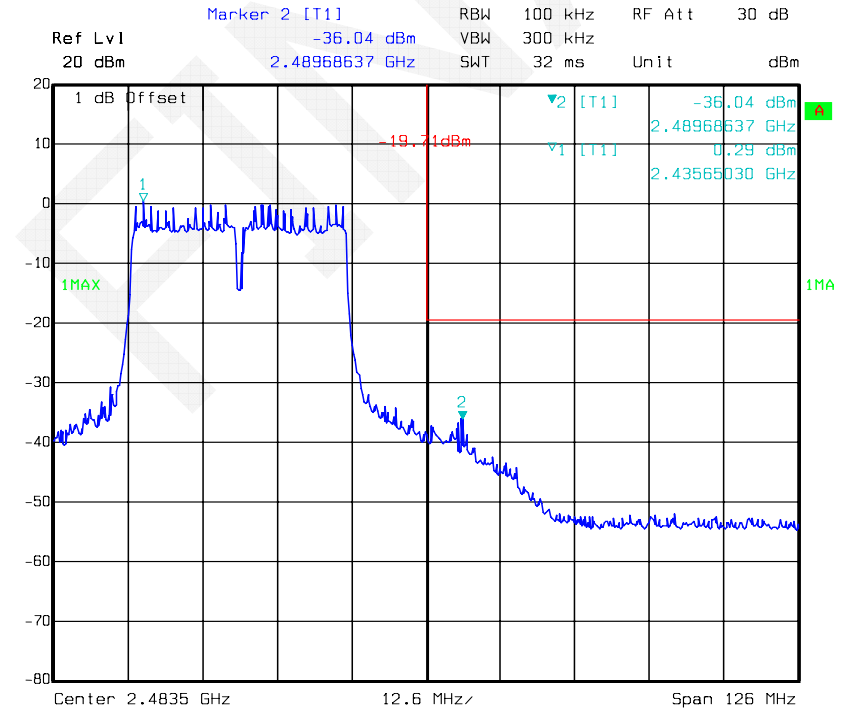
802.11n ht20 Band Edge, Right Side



802.11n ht40 Band Edge，Left Side



802.11n ht40 Band Edge, Right Side



FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r03 clause10.2:

a) Set analyzer center frequency to DTS channel center frequency.
b) Set the span to 1.5 times the DTS bandwidth.
c) Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d) Set the VBW ≥ 3×RBW.
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum amplitude level within the RBW.
j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSEM	DE31388	2015-05-09	2016-05-09

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	26.8 °C
Relative Humidity:	60 %
ATM Pressure:	100.5 kPa

** The testing was performed by Lion Xiao on 2015-09-08.*

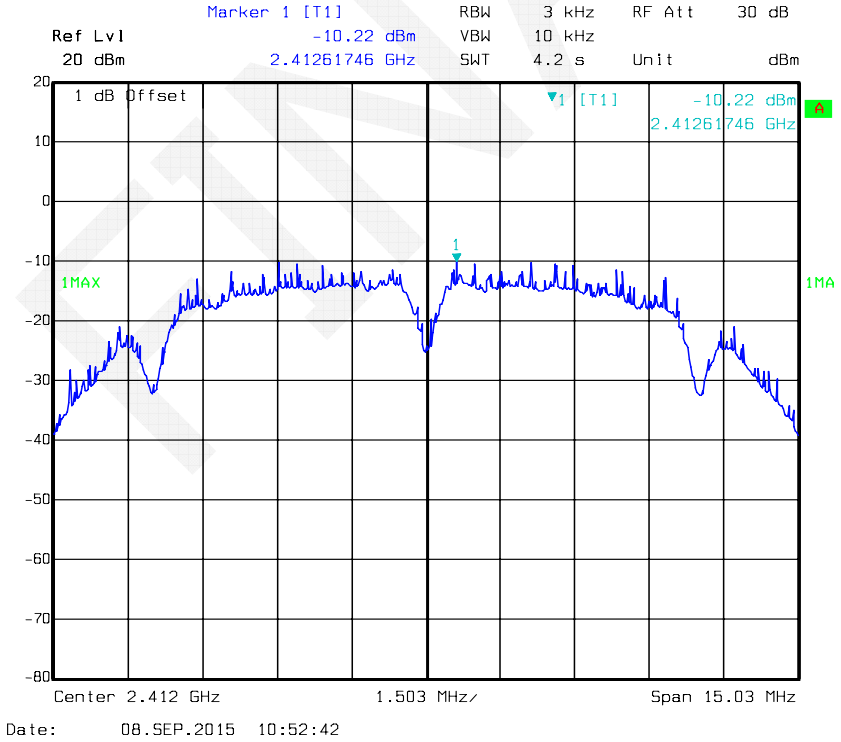
Test Mode: Transmitting

Test Result: Compliant. Please refer to the following table and plots

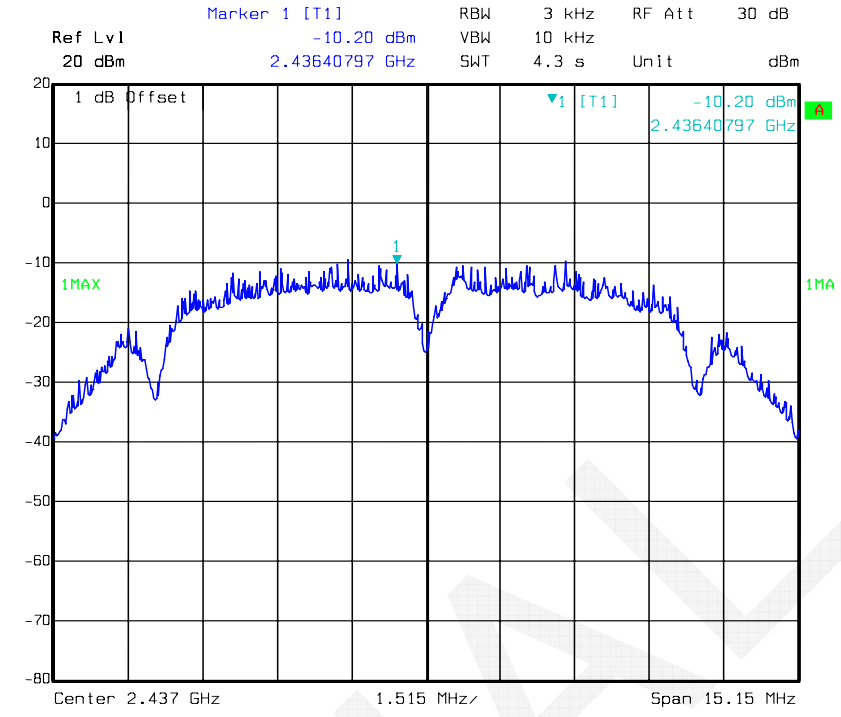
Test mode	Channel	Frequency (MHz)	PSD (dBm/3kHz)			Limit (dBm/3kHz)
			Chain 0	Chain 1	Total	
802.11b	Low	2412	-10.22	-10.23	-7.21	≤8
	Middle	2437	-10.20	-10.30	-7.24	≤8
	High	2462	-10.27	-10.13	-7.19	≤8
802.11g	Low	2412	-13.06	-14.11	-10.54	≤8
	Middle	2437	-13.17	-14.11	-10.60	≤8
	High	2462	-13.14	-14.09	-10.58	≤8
802.11n20	Low	2412	-13.33	-14.88	-11.03	≤8
	Middle	2437	-13.37	-14.84	-11.03	≤8
	High	2462	-13.38	-14.87	-11.05	≤8
802.11n40	Low	2422	-15.96	-16.35	-13.14	≤8
	Middle	2437	-15.87	-16.25	-13.05	≤8
	High	2452	-15.90	-16.47	-13.17	≤8

Chain 0

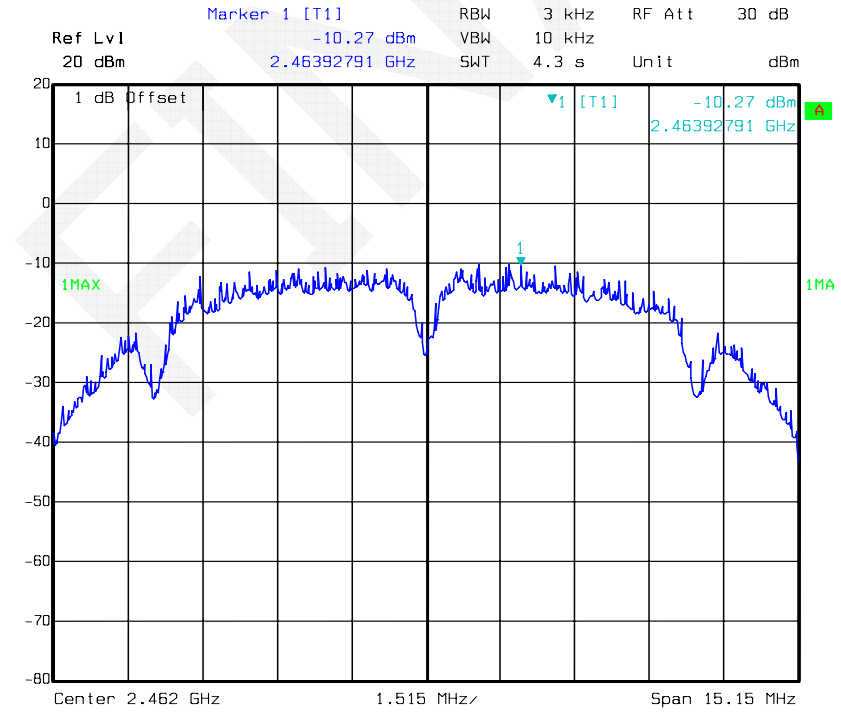
Power Spectral Density, 802.11b Low Channel



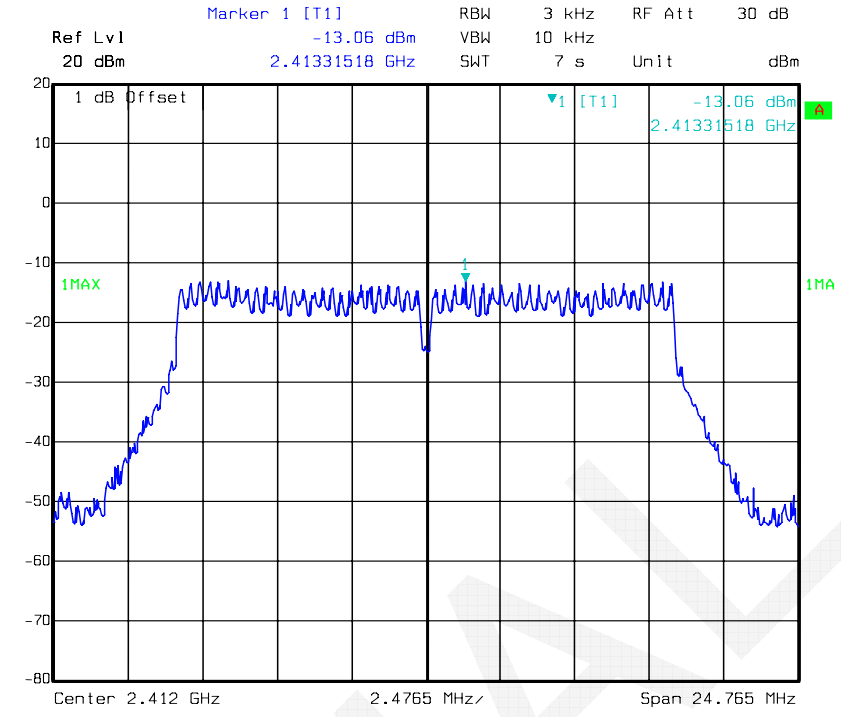
Power Spectral Density, 802.11b Middle Channel



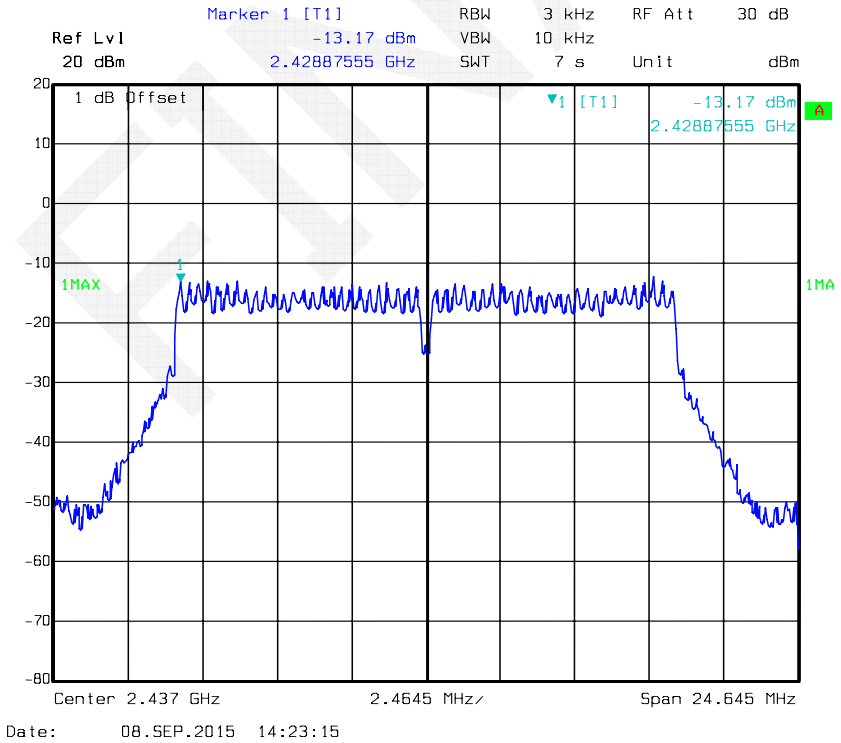
Power Spectral Density, 802.11b High Channel



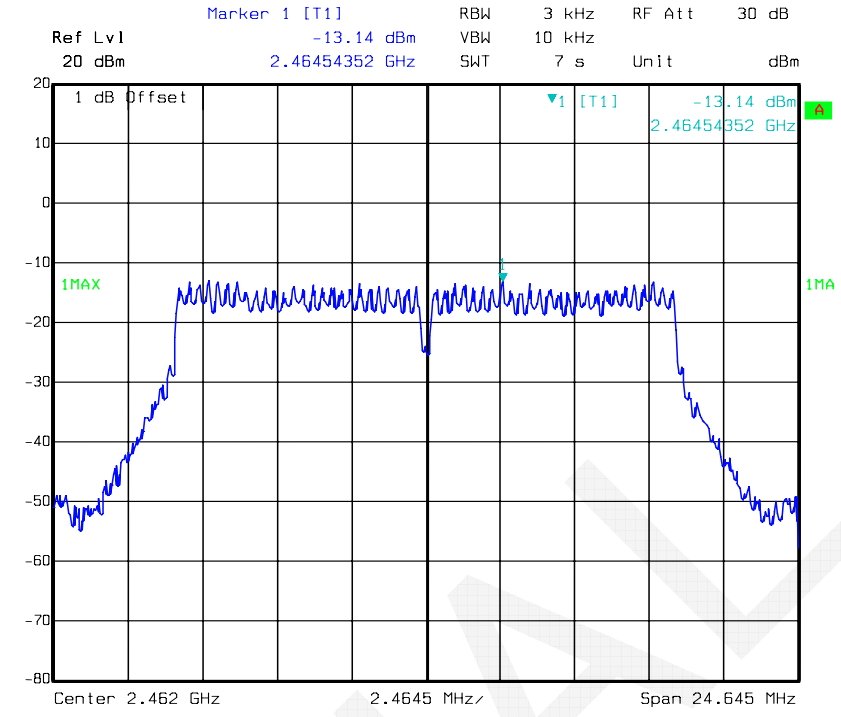
Power Spectral Density, 802.11g Low Channel



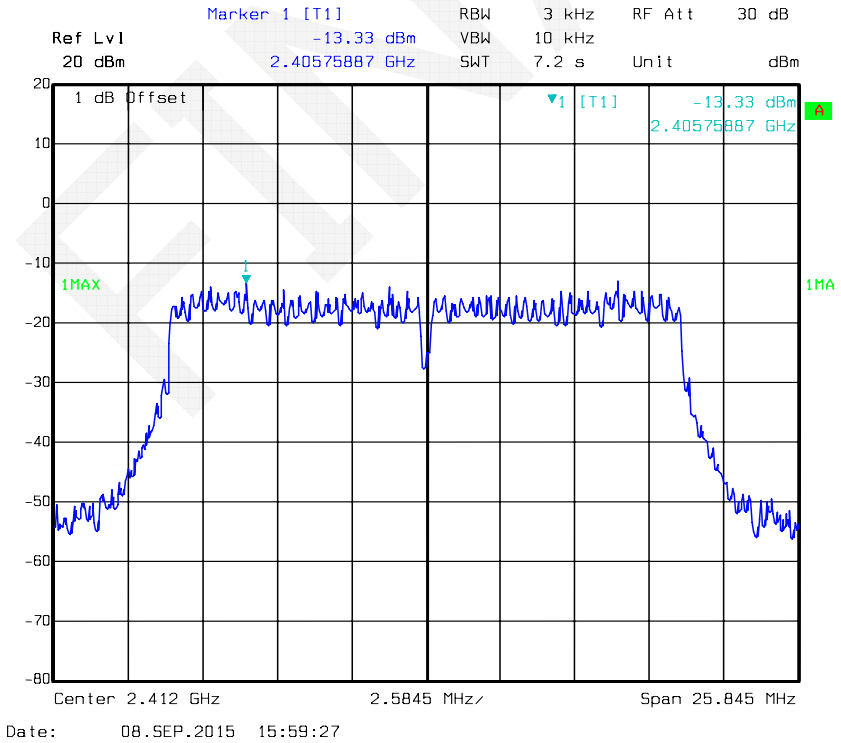
Power Spectral Density, 802.11g Middle Channel



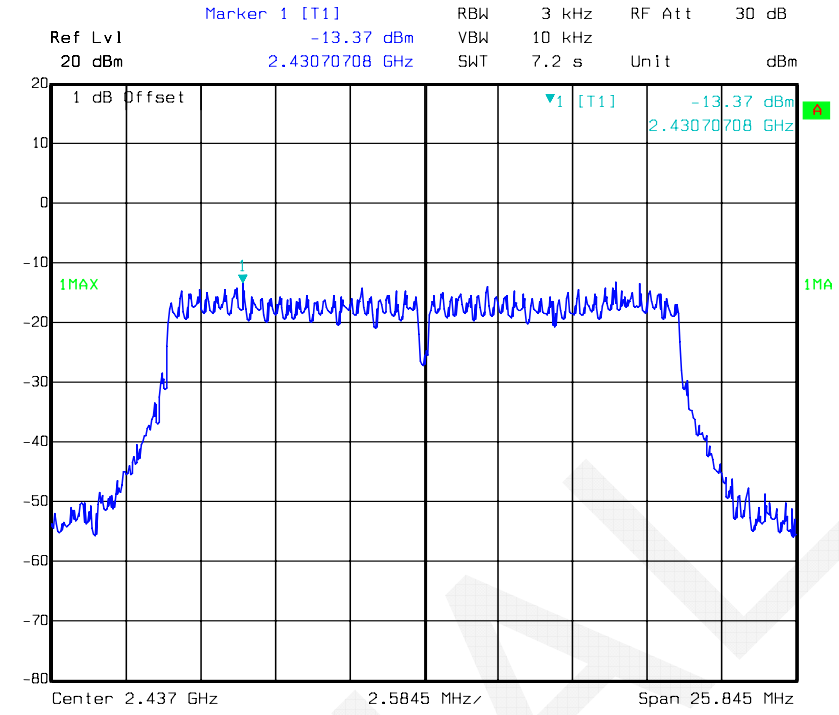
Power Spectral Density, 802.11g High Channel



Power Spectral Density, 802.11n ht20 Low Channel

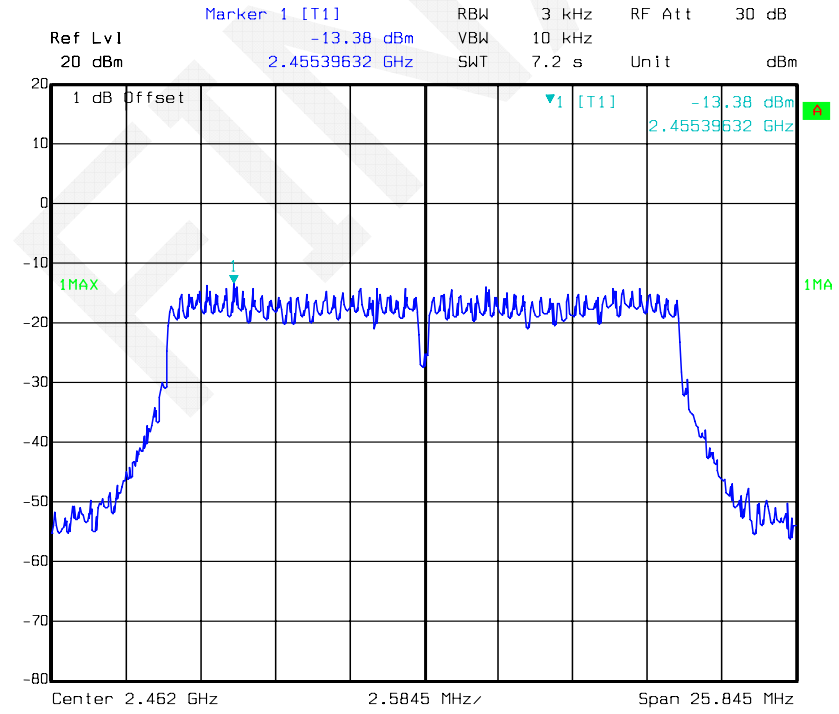


Power Spectral Density, 802.11n ht20 Middle Channel



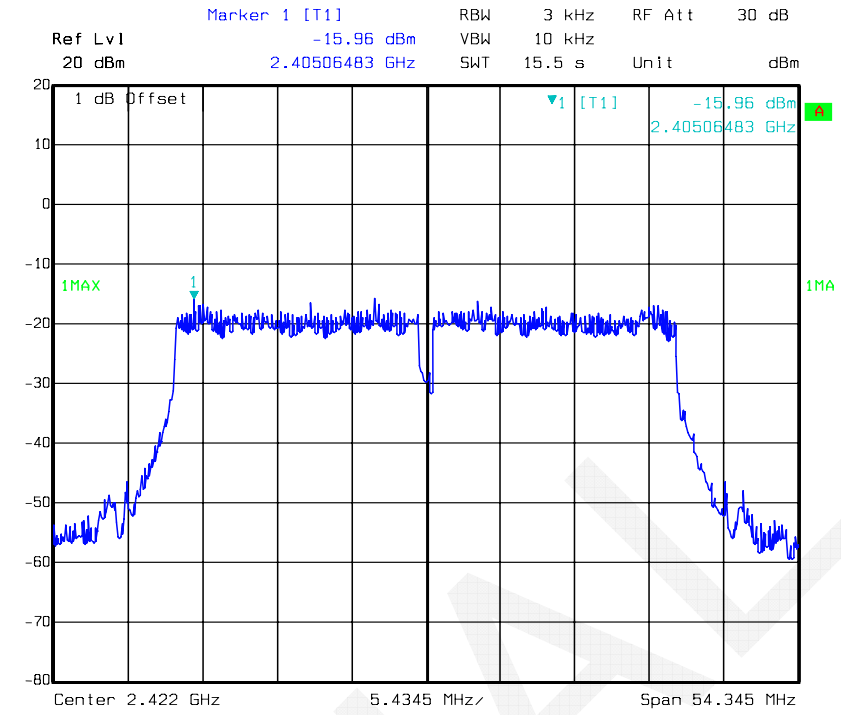
Date: 08.SEP.2015 15:53:59

Power Spectral Density, 802.11n ht20 High Channel

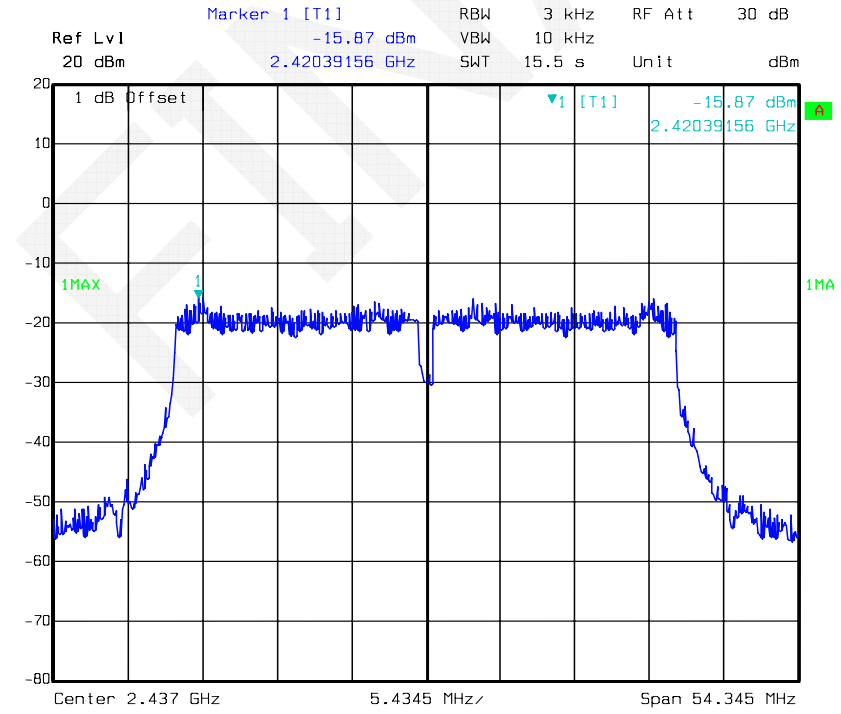


Date: 08.SEP.2015 15:52:44

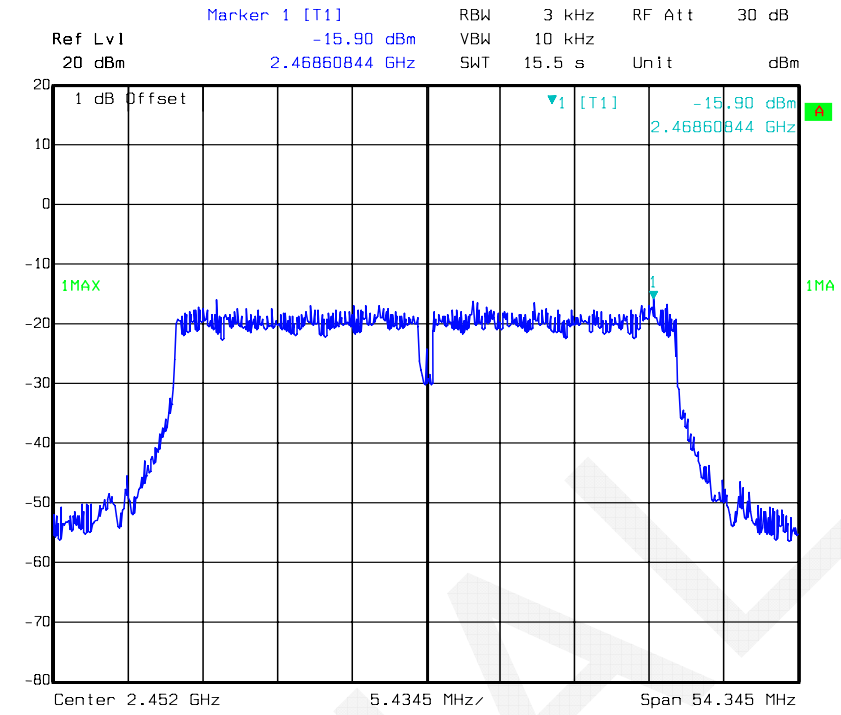
Power Spectral Density, 802.11n ht40 Low Channel



Power Spectral Density, 802.11n ht40 Middle Channel

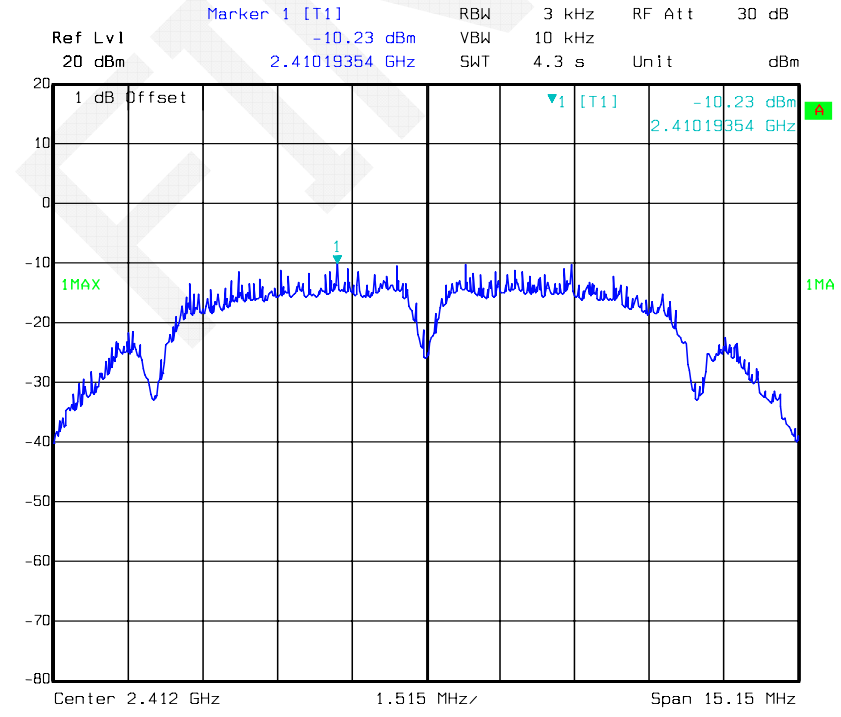


Power Spectral Density, 802.11n ht40 High Channel

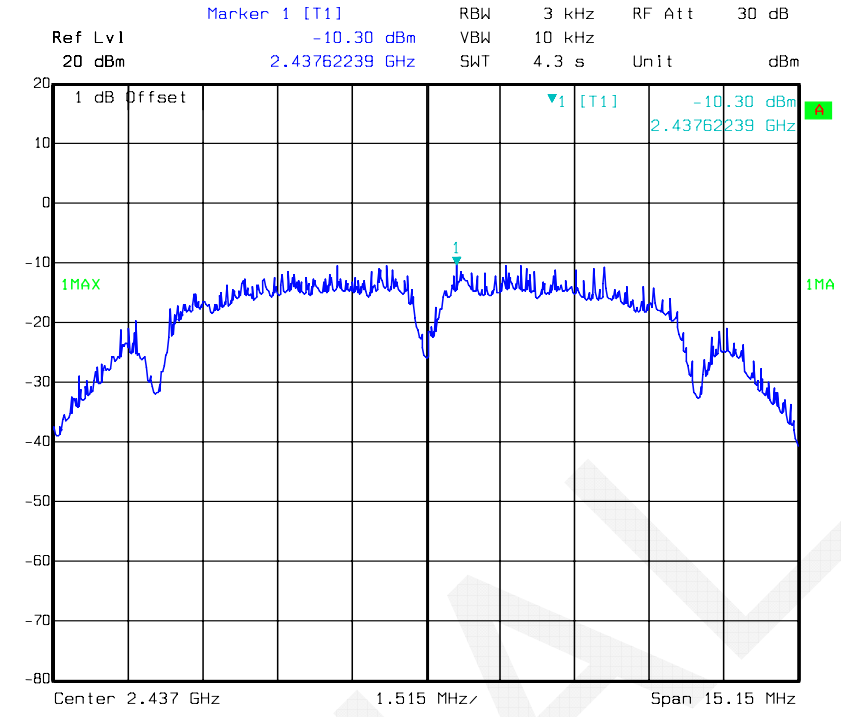


Chain 1

Power Spectral Density, 802.11b Low Channel

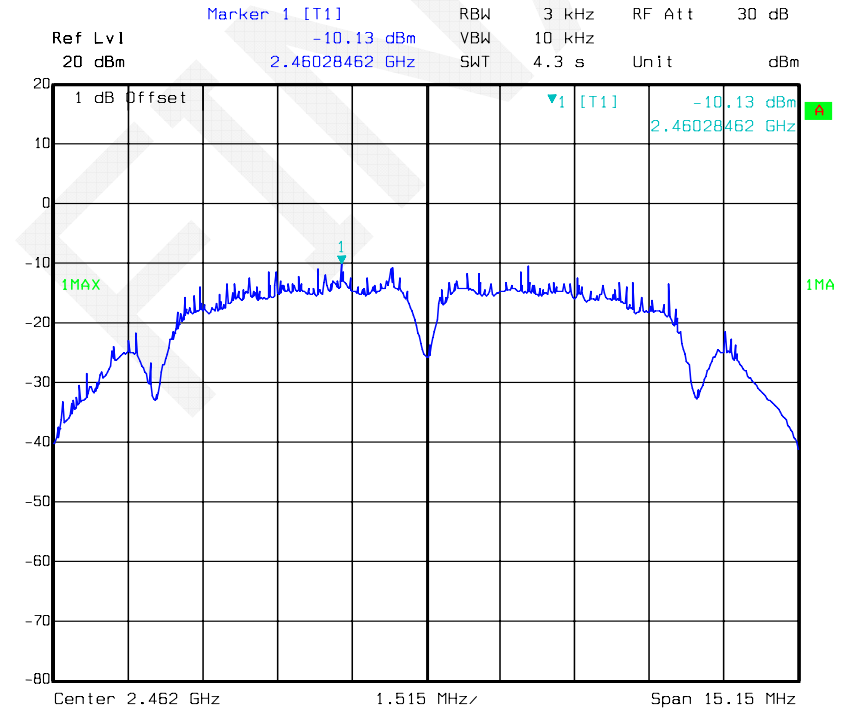


Power Spectral Density, 802.11b Middle Channel



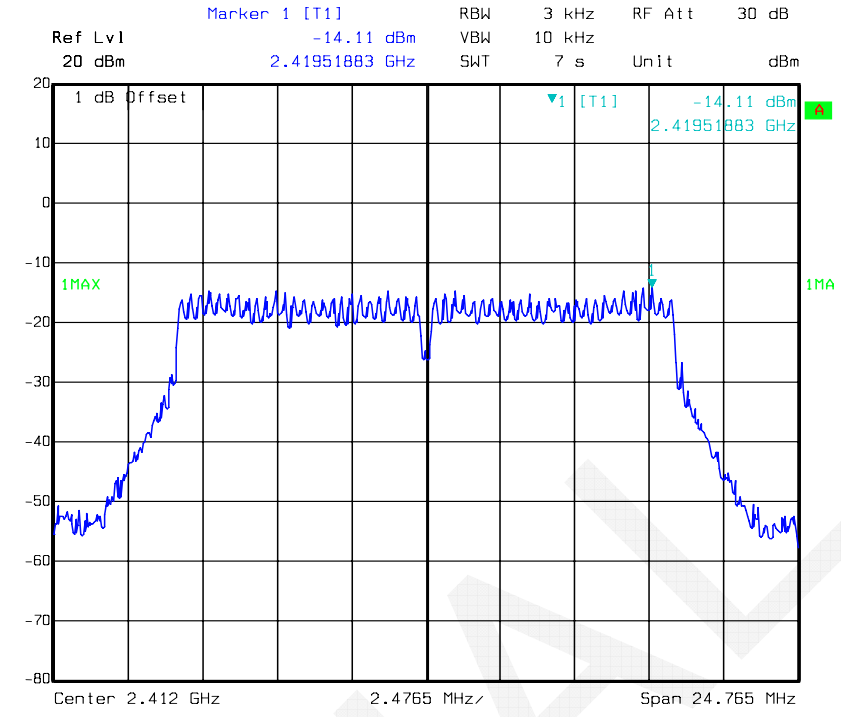
Date: 08.SEP.2015 12:27:17

Power Spectral Density, 802.11b High Channel

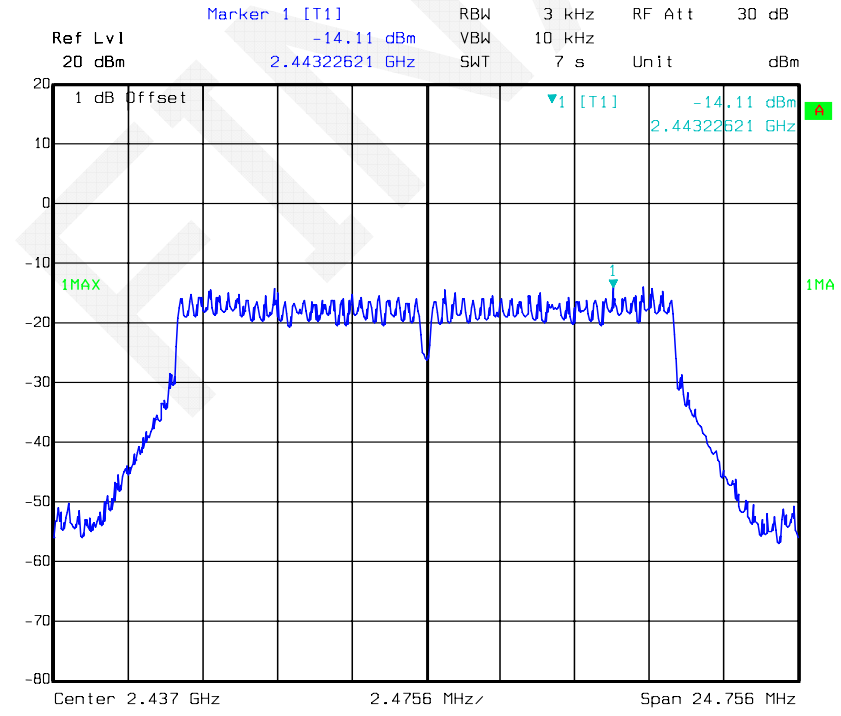


Date: 08.SEP.2015 12:29:29

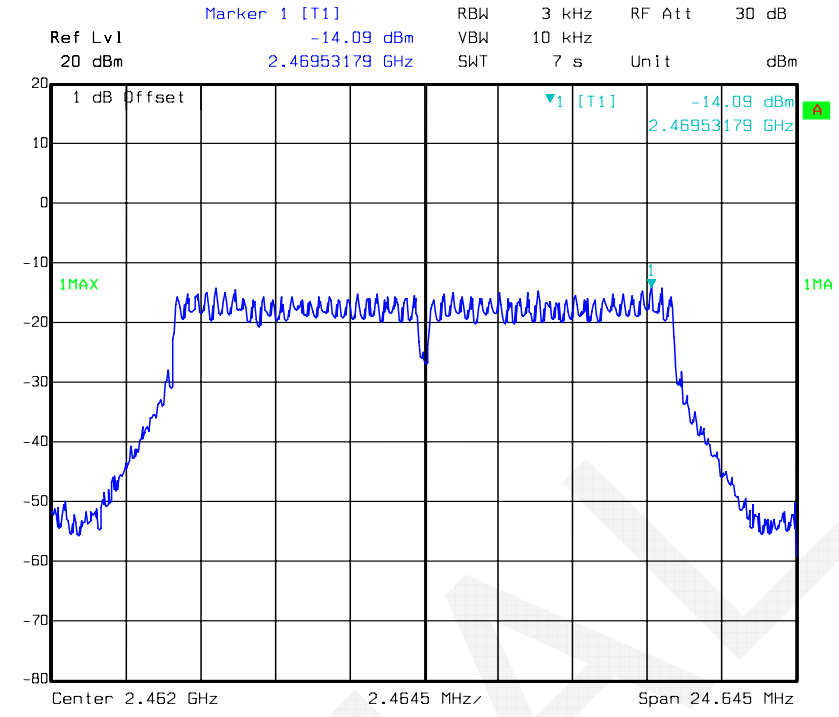
Power Spectral Density, 802.11g Low Channel



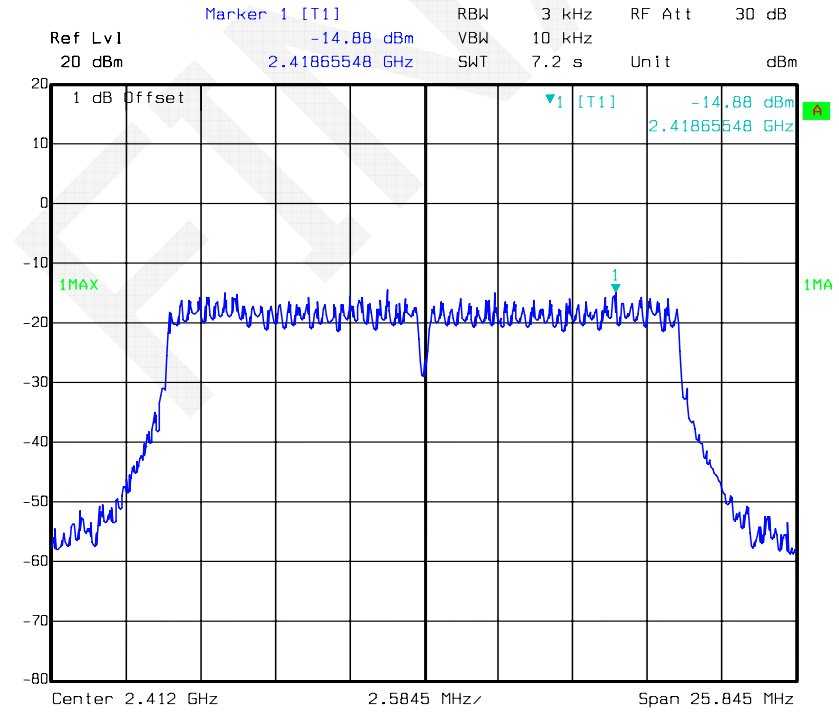
Power Spectral Density, 802.11g Middle Channel



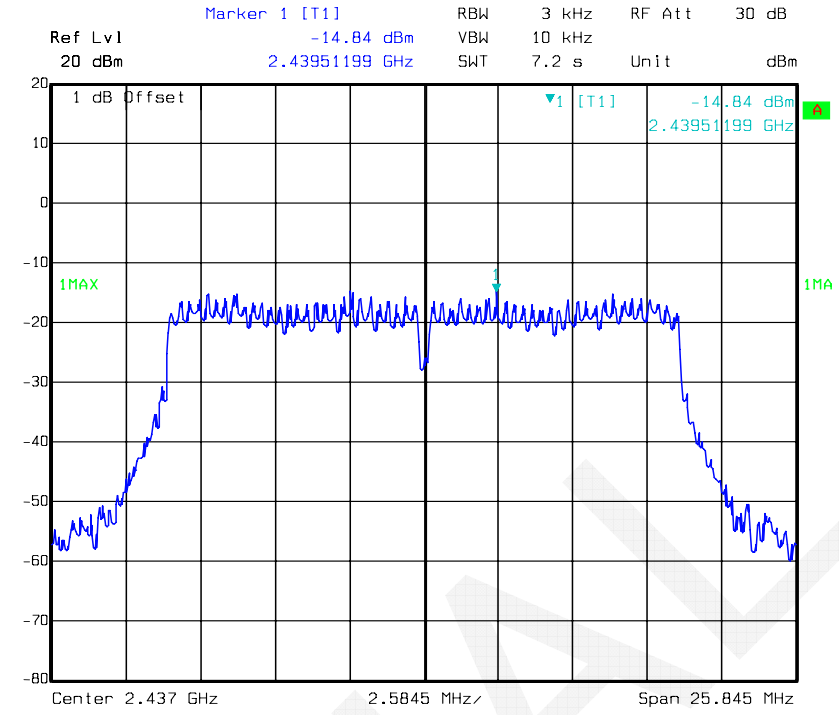
Power Spectral Density, 802.11g High Channel



Power Spectral Density, 802.11n ht20 Low Channel

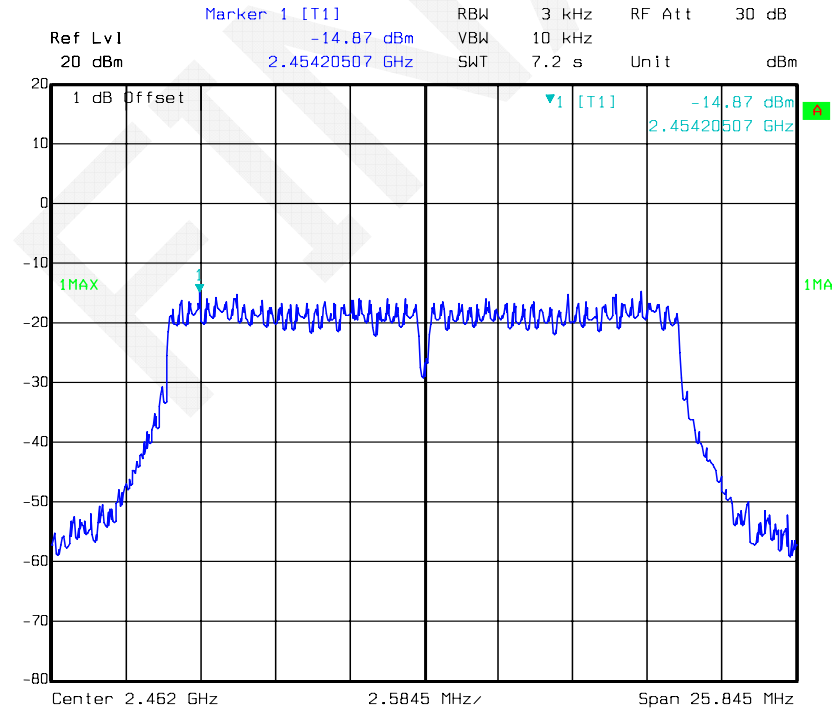


Power Spectral Density, 802.11n ht20 Middle Channel



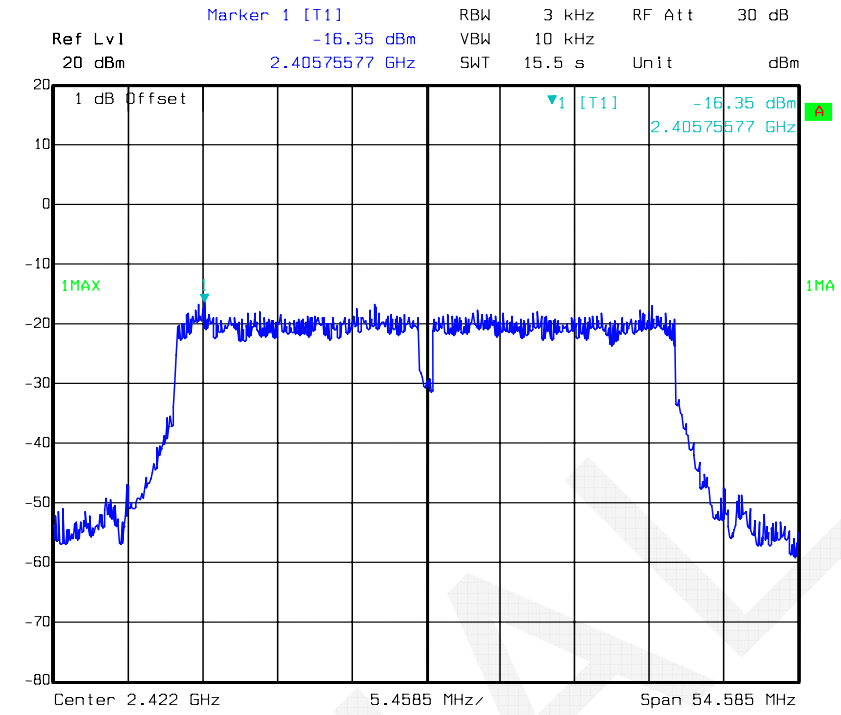
Date: 08.SEP.2015 15:54:33

Power Spectral Density, 802.11n ht20 High Channel

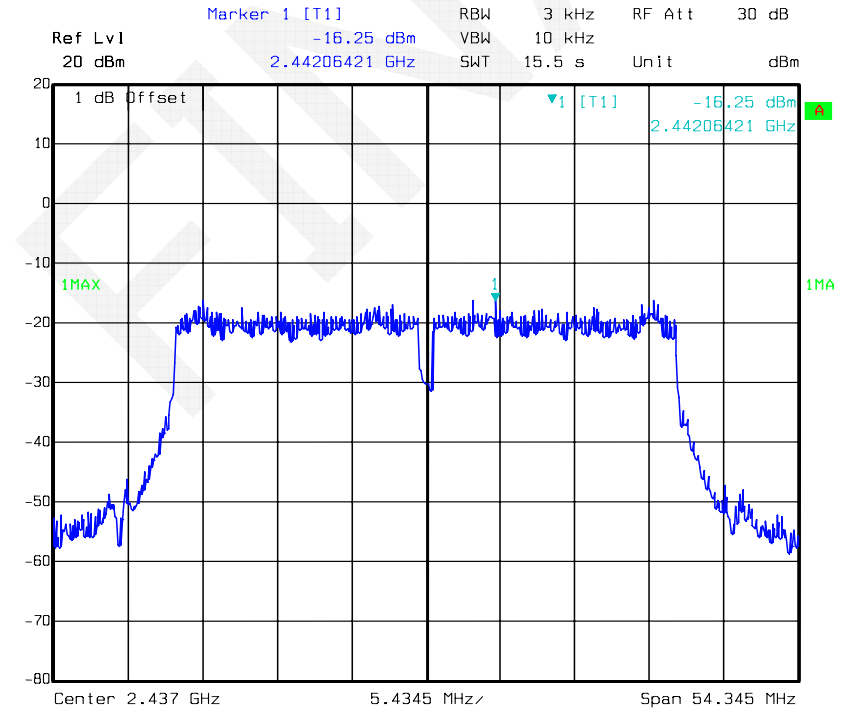


Date: 08.SEP.2015 15:51:07

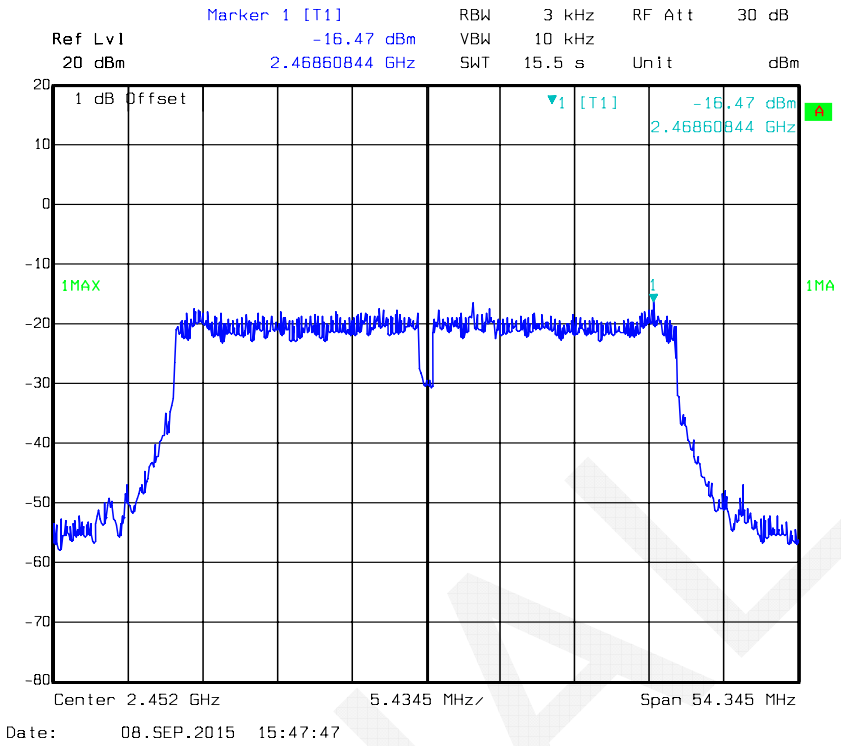
Power Spectral Density, 802.11n ht40 Low Channel



Power Spectral Density, 802.11n ht40 Middle Channel



Power Spectral Density, 802.11n ht40 High Channel



FINAL

DECLARATION LETTER

Beijing InHand Networks Technology Co.,Ltd.
101, West Wing, 11th Floor, No.101, Lize central Park, Wangjing, Chaoyang District, Beijing, 100102, China
TEL: +86-010-64391099
FAX :+ 86-010-84170089

DECLARATION OF SIMILARITY

To:
Bay Area Compliance Laboratories Corp.（Dongguan）
69# Pulongcun, Puxinhu Industrial Zone Tangxia Town,
Dongguan, Guangdong, China
Tel: +86 769 86858888
Website:http://www.baclcorp.com.cn

Dear Sir or Madam:

We Beijing InHand Networks Technology Co.,Ltd., Hereby declare that product: Industrial cellular router, model(s): IR621, IR631, IR641, IR651, IR661, IR671, IR681, IR691, IR601 are electrically identical with the same electromagnetic emissions and electromagnetic compatibility characteristics. with the model IR611 that were tested by BACL., the results of which are featured in BACL project:
A description of the differences between the tested model and those that are declared similar areas follows:

Their differences as the following:
IR611 ,IR621, IR631, IR641, IR651, IR661, IR671, IR681, IR691, IR601, just have different is model name and software for the marketing requirement.

Please contact me should there be need for any additional clarification or information.

Best Regards,

Signature:

Biao Wang

Biao Wang
EMC Engineer

*******END OF REPORT*******