FCC PART 15.247

TEST REPORT

For

Iconnect

No.9, Aly. 58, Ln. 112, Ruiguang Rd., Neihu Dist.,Taipei City,Taiwan

FCC ID: 2AB87934

Report Type:	Product Type:
Original Report	Concurrent Dual-Radios 2.4GHz+5GHz MIMO AP/CPE

Test Engineer:	Allen Qiao
Report Number:	RDG150401005-00A
Report Date:	2015-04-16
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

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Iconnect* 's product, model number: *AP120C (FCC ID: 2AB87934) or* ("EUT") in this report is a *Concurrent Dual-Radios 2.4GHz+5GHz MIMO AP/CPE* , which was measured approximately: 19.5 cm (L) x 19.5 cm (W) x4.7 cm (H), rated input voltage: DC 12V from adapter or DC48V from POE.

Adapter Information: Sunny
Model: SYS1308-2412-W2
Input: AC 100-240V, 50/60Hz, MAX 1.0A
Output: DC 12V, 2.0A

Note: The series product, model AP120C , Matrix-Pro,Matrix,AP120C-AC,Matrix-Pro-AC,Matrix-AC,AP120C-ACU.AP120RC,AP120RC-AC,AP120RC-ACU are electrically identical, the difference between them is just the model name, we selected AP120C 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: 153UAP12C0007(Assigned by Applicant).The EUT was received on 2015-04-03.*

Objective

This report is prepared on behalf of *Iconnect* 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)

FCC Part 15E NII submissions with FCC ID: 2AB87934
FCC Part 15C JBP submissions with FCC ID: 2AB87934

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

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 Communication 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 facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

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.

EUT Exercise Software

The software "Atheros Radio Test 2" 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	Atheros Radio Test 2-Chain0		
802.11b	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	(CCK)1Mbps	(CCK)1Mbps	(CCK)1Mbps
	Power Level Setting	17.5	17.5	18
802.11g	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	(OFDM)6Mbps	(OFDM)6Mbps	(OFDM)6Mbps
	Power Level Setting	14	14	14
802.11n ht20	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	(HT Mixmode) MCS0	(HT Mixmode) MCS0	(HT Mixmode) MCS0
	Power Level Setting	13.5	13.5	13.5
802.11n ht40	Test Frequency	2422MHz	2437MHz	2452MHz
	Data Rate	(HT Mixmode) MCS0	(HT Mixmode) MCS0	(HT Mixmode) MCS0
	Power Level Setting	12	12	12.5

Test Mode	Test Software Version	Atheros Radio Test 2-Chain1		
802.11b	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	(CCK)1Mbps	(CCK)1Mbps	(CCK)1Mbps
	Power Level Setting	17.5	17.5	18
802.11g	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	(OFDM)6Mbps	(OFDM)6Mbps	(OFDM)6Mbps
	Power Level Setting	14	14	14
802.11n ht20	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	(HT Mixmode) MCS0	(HT Mixmode) MCS0	(HT Mixmode) MCS0
	Power Level Setting	13.5	13.5	13.5
802.11n ht40	Test Frequency	2422MHz	2437MHz	2452MHz
	Data Rate	(HT Mixmode) MCS0	(HT Mixmode) MCS0	(HT Mixmode) MCS0
	Power Level Setting	12	12	12.5

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1017
HP	Printer	C3941A	JPTVOB2337
DELL	Keyboard	L100	CNORH656658907BL05DC
SAST	Modem	AEM-2100	0293
ALFA	802.3af/at Gigabit PoE Adapter	PSE-1000GU	1411-0002460

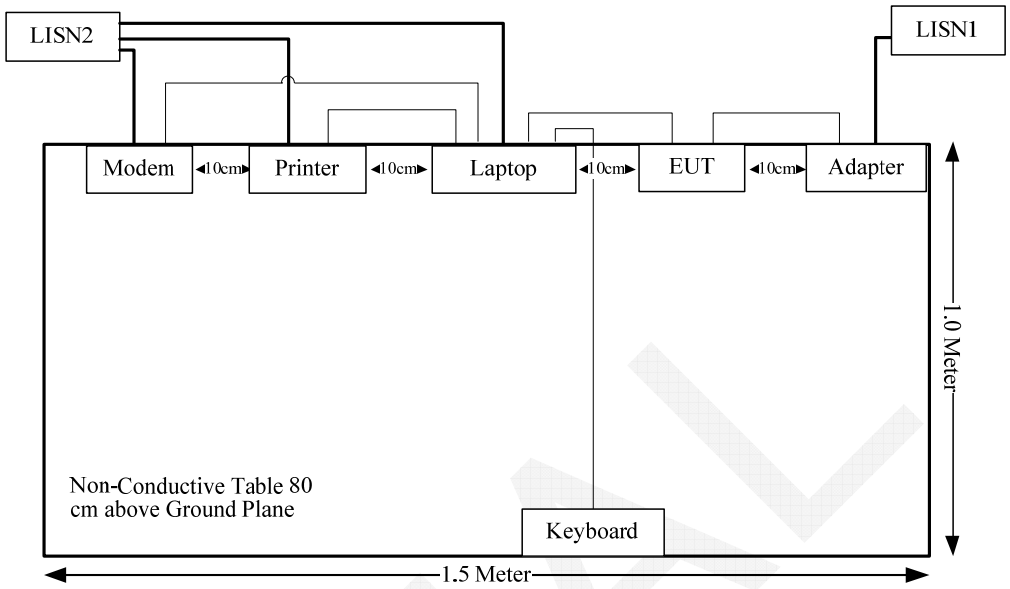
Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From	To
Serial Cable	Yes	No	1.2	Serial Port of Laptop	Modem
Parallel Cable	Yes	No	1.2	Parallel Port of Laptop	Printer
Keyboard Cable	Yes	No	1.8	USB Port of Laptop	Keyboard
RJ45 Cable	No	No	0.8	RJ45 Port of Laptop	EUT
Adapter Cable	No	No	1.5	DC Jack of EUT	Adapter
RJ45 Cable	No	No	1.5	POE	EUT
RJ45 Cable	No	No	1.5	POE	Laptop

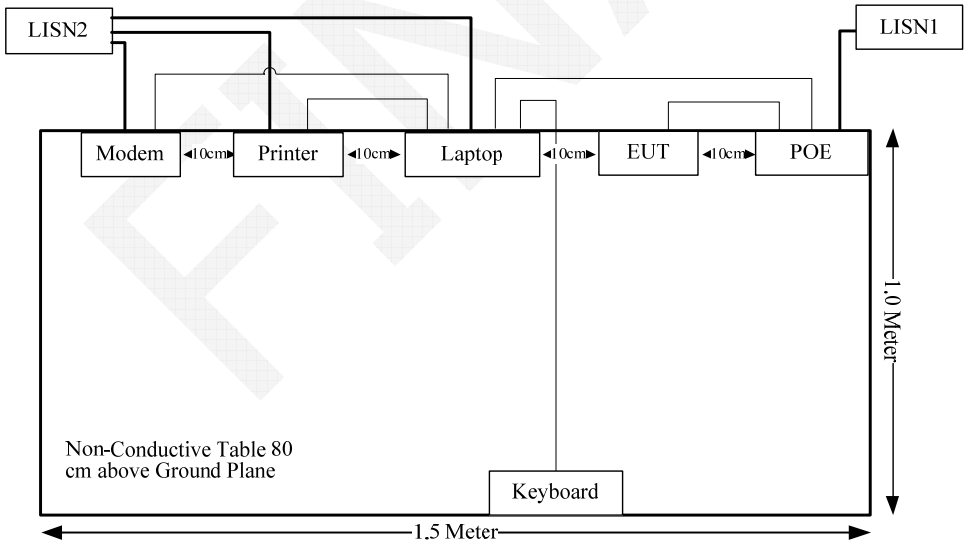
Block Diagram of Test Setup

For AC Line Conducted Emissions Test

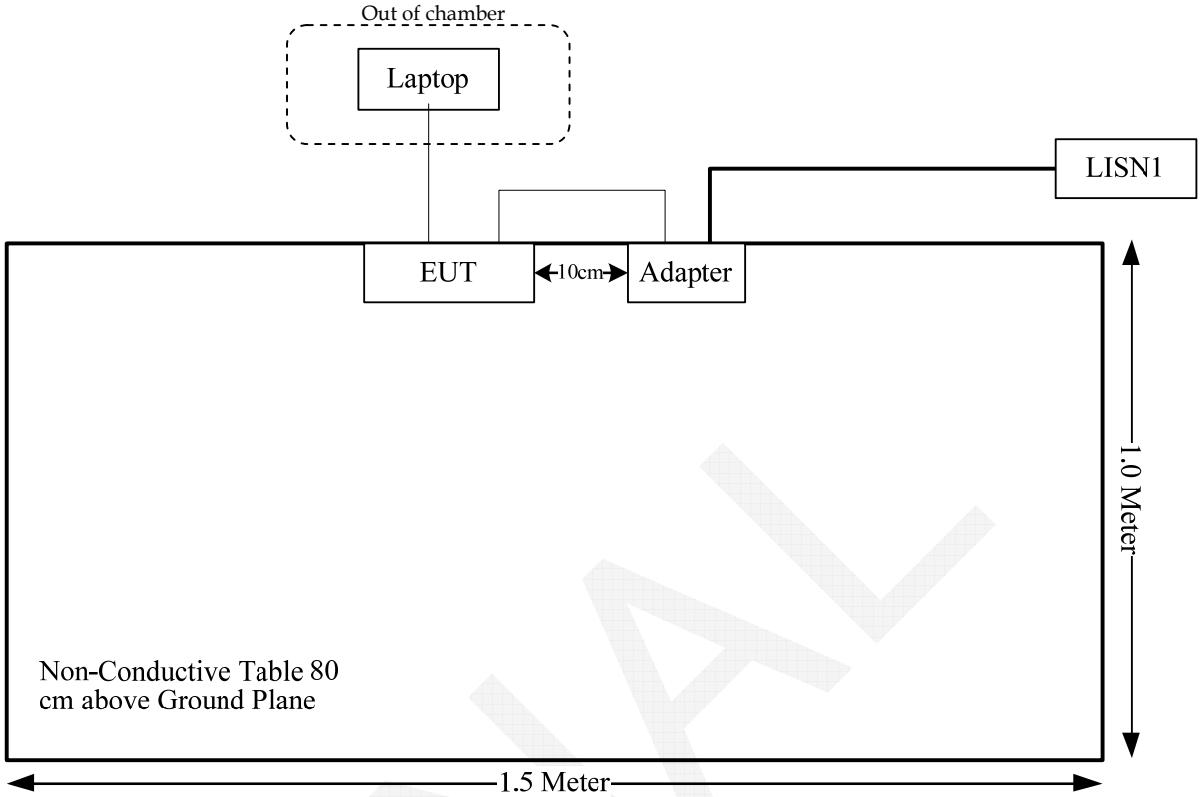
Powered by Adapter:



Powered by POE:



For Radiated Emissions Test



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.247 (i) & §1.1310 & §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

FCC §15.247 (i) & §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247(i)and subpart §1.1310, 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/f²)	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:

MPE evaluation for single transmission:

Frequency Range (MHz)	Mode	Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
			(dBi)	(numeric)	(dBm)	(mW)			
2412-2462	2.4G-802.11b	2462	5.0	3.16	23.00	199.53	20	0.125	1.0
	2.4G-802.11g	2437	5.0	3.16	25.59	362.24	20	0.228	1.0
	2.4G-802.11n HT20	2412	5.0	3.16	24.92	310.46	20	0.195	1.0
	2.4G-802.11n HT40	2422	5.0	3.16	23.70	234.42	20	0.147	1.0
5150-5250	5G-802.11a	5180	5.0	3.16	17.32	53.95	20	0.034	1.0
	5G-802.11n HT20	5180	5.0	3.16	15.59	36.22	20	0.023	1.0
	5G-802.11n HT40	5190	5.0	3.16	12.21	16.63	20	0.010	1.0
5725-5850	802.11a	5825	5.0	3.16	14.81	30.27	20	0.019	1.0
	5G-802.11n HT20	5825	5.0	3.16	14.18	26.18	20	0.016	1.0
	5G-802.11n HT40	5755	5.0	3.16	10.36	10.86	20	0.007	1.0

MPE evaluation for simultaneous transmission:

2.4 G and 5G can transmit at the same time, MPE evaluation is as below formula:

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

MPE evaluation= Max MPE of 2.4G + Max MPE of 5G = 0.228/1+0.034/1=0.262＜1

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

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 four internal dipole antennas which were connected to the mainboard with I-PEX socket, two of them is for 2.4G band and the maximum gain is 5 dBi, the other two is for 5.0 G band and the maximum gain is 5 dBi, which fulfill the requirement of this section, and please refer to the EUT photos.

Result: Compliance.

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：

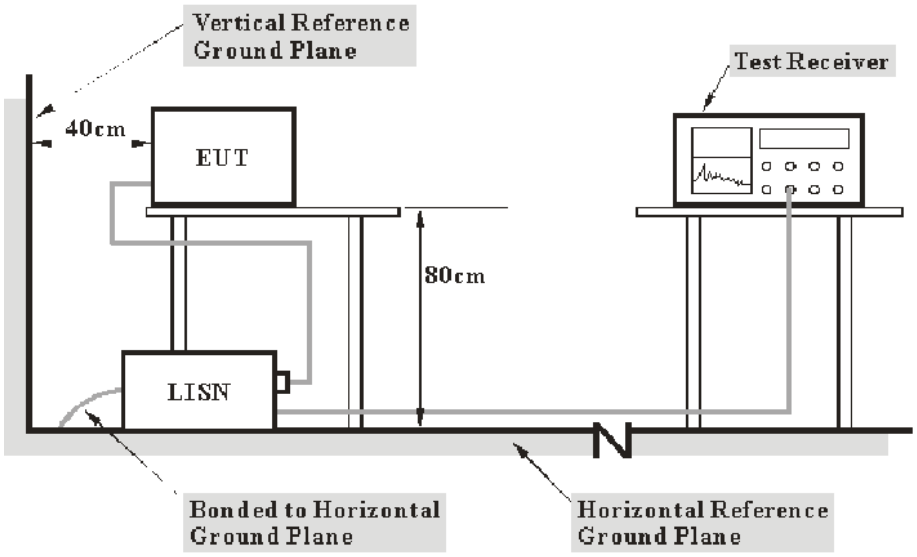
If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
– non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of 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 C63.4-2009 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 and the other support equipments were connected to the outlet of 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	2014-06-09	2015-06-09
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:

2.2 dB at **0.266226 MHz** in the **Neutral** conducted mode for powered by POE

Test Data

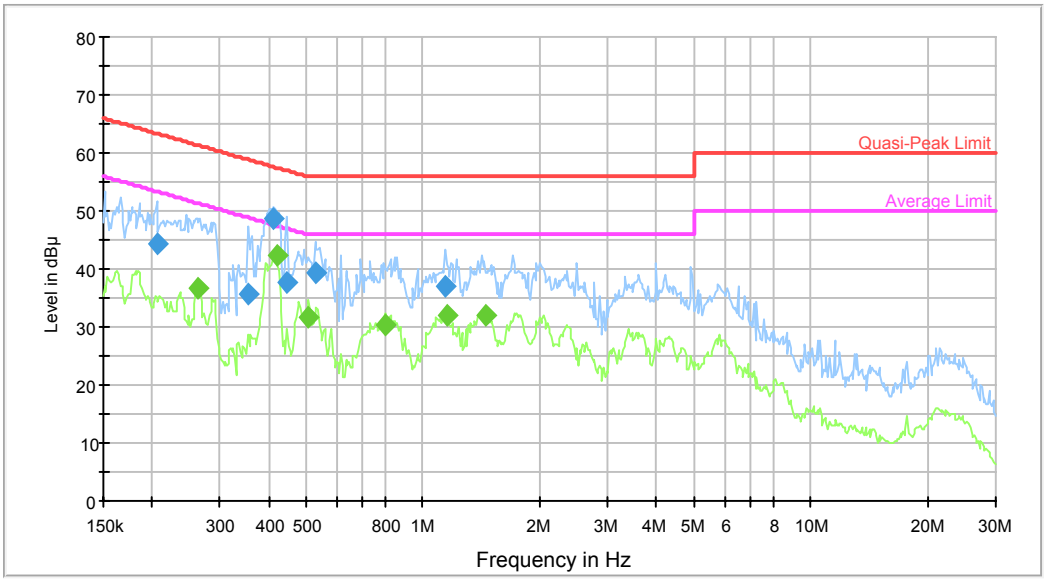
Environmental Conditions

Temperature:	26.2 °C
Relative Humidity:	64 %
ATM Pressure:	100.1 kPa

The testing was performed by Allen Qiao on 2015-04-03.

Test Mode: Powered by Adapter

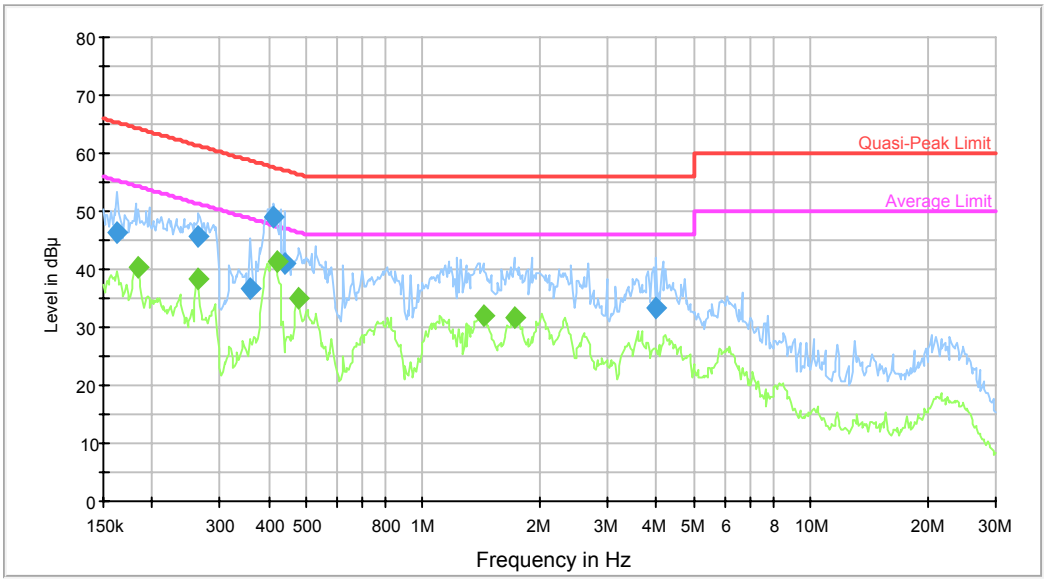
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.206306	44.5	9.000	L1	10.2	18.9	63.4	Compliance
0.354674	35.7	9.000	L1	10.3	23.2	58.9	Compliance
0.412647	48.7	9.000	L1	10.2	8.9	57.6	Compliance
0.446873	37.7	9.000	L1	10.2	19.2	56.9	Compliance
0.528270	39.3	9.000	L1	10.1	16.7	56.0	Compliance
1.144267	37.1	9.000	L1	10.4	18.9	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.262017	36.7	9.000	L1	10.2	14.7	51.4	Compliance
0.419276	42.3	9.000	L1	10.2	5.2	47.5	Compliance
0.507637	31.6	9.000	L1	10.1	14.4	46.0	Compliance
0.799472	30.4	9.000	L1	10.4	15.6	46.0	Compliance
1.153421	32.0	9.000	L1	10.4	14.0	46.0	Compliance
1.453260	32.0	9.000	L1	10.4	14.0	46.0	Compliance

AC120 V, 60 Hz, Neutral:

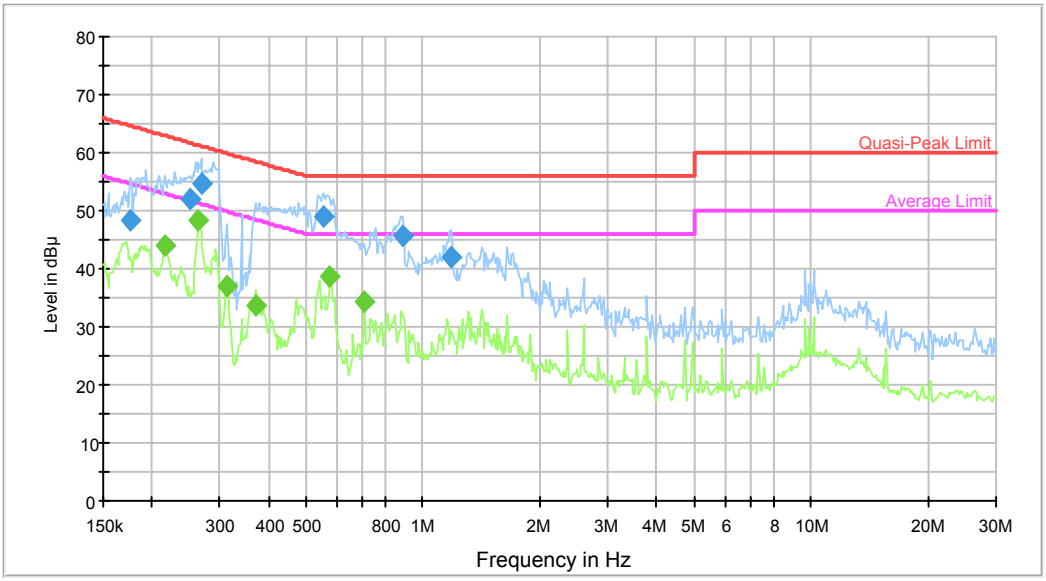


Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.162441	46.2	9.000	N	10.2	19.1	65.3	Compliance
0.264113	45.5	9.000	N	10.2	15.8	61.3	Compliance
0.360371	36.7	9.000	N	10.3	22.0	58.7	Compliance
0.412647	48.9	9.000	N	10.2	8.7	57.6	Compliance
0.439808	41.0	9.000	N	10.2	16.1	57.1	Compliance
3.997889	33.5	9.000	N	10.7	22.5	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.184529	40.3	9.000	N	10.2	14.0	54.3	Compliance
0.264113	38.5	9.000	N	10.2	12.8	51.3	Compliance
0.419276	41.5	9.000	N	10.2	6.0	47.5	Compliance
0.476287	35.1	9.000	N	10.1	11.3	46.4	Compliance
1.430284	32.1	9.000	N	10.4	13.9	46.0	Compliance
1.717965	31.6	9.000	N	10.4	14.4	46.0	Compliance

Test Mode: Powered by POE

AC120 V, 60 Hz, Line:

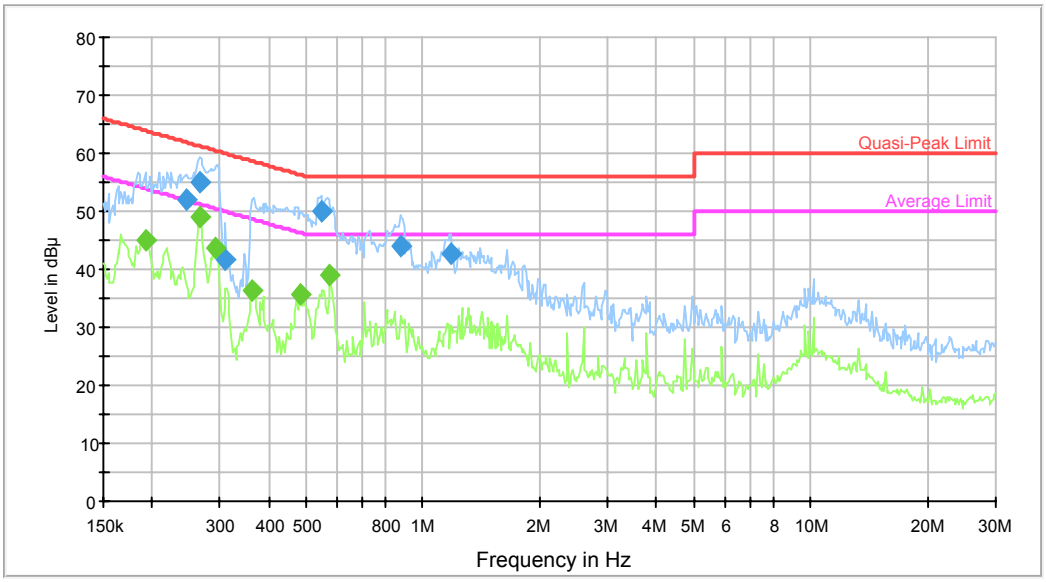


Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.175915	48.4	9.000	L1	10.2	16.3	64.7	Compliance
0.251783	52.1	9.000	L1	10.2	9.6	61.7	Compliance
0.268355	54.5	9.000	L1	10.2	6.7	61.2	Compliance
0.554139	49.1	9.000	L1	10.1	6.9	56.0	Compliance
0.886728	45.6	9.000	L1	10.4	10.4	56.0	Compliance
1.181325	42.1	9.000	L1	10.4	13.9	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.216409	43.9	9.000	L1	10.2	9.1	53.0	Compliance
0.264113	48.2	9.000	L1	10.2	3.1*	51.3	Compliance
0.312220	37.1	9.000	L1	10.3	12.8	49.9	Compliance
0.372042	33.7	9.000	L1	10.3	14.8	48.5	Compliance
0.576662	38.6	9.000	L1	10.2	7.4	46.0	Compliance
0.709407	34.5	9.000	L1	10.5	11.5	46.0	Compliance

**Within measurement uncertainty!*

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.245835	52.1	9.000	N	10.2	9.8	61.9	Compliance
0.266226	54.9	9.000	N	10.2	6.3	61.2	Compliance
0.309742	41.7	9.000	N	10.3	18.3	60.0	Compliance
0.545378	50.1	9.000	N	10.1	5.9	56.0	Compliance
0.872708	44.0	9.000	N	10.4	12.0	56.0	Compliance
1.181325	42.5	9.000	N	10.4	13.5	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.192030	45.0	9.000	N	10.2	8.9	53.9	Compliance
0.266226	49.0	9.000	N	10.2	2.2*	51.2	Compliance
0.292938	43.5	9.000	N	10.3	6.9	50.4	Compliance
0.363254	36.3	9.000	N	10.3	12.3	48.7	Compliance
0.483938	35.5	9.000	N	10.1	10.8	46.3	Compliance
0.576662	39.1	9.000	N	10.2	6.9	46.0	Compliance

**Within measurement uncertainty!*

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.

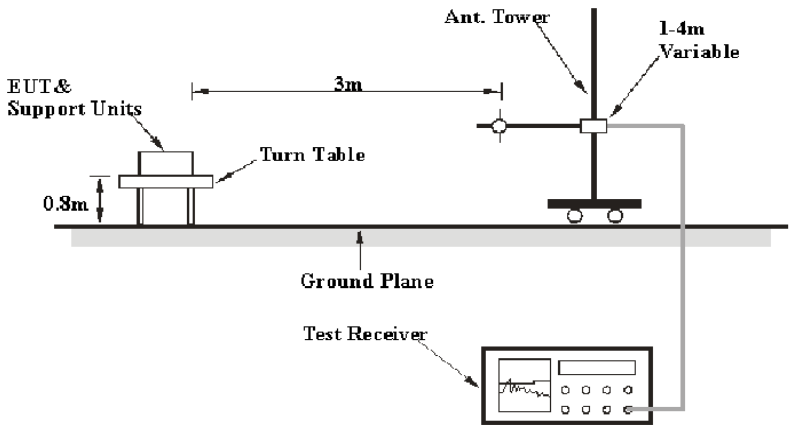
Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:
30M~200MHz: 5.0 dB
200M~1GHz: 6.2 dB
1G~6GHz: 4.45 dB
6G~18GHz: 5.23 dB

Table 2 – Values of U_{cispr}

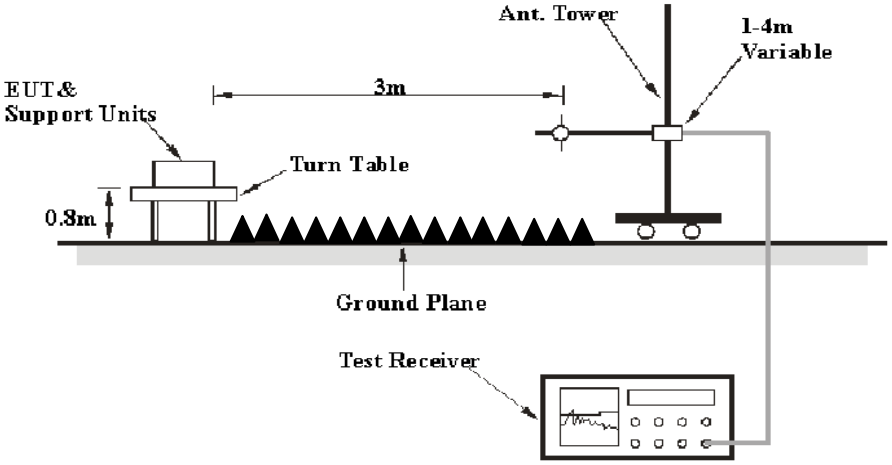
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

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 C63.4-2009. 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 and the other support equipments were connected to the second 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	2014-05-09	2015-05-09
Sunol Sciences	Antenna	JB3	A060611-3	2014-11-06	2017-11-05
HP	Amplifier	8447E	2434A02181	2014-09-01	2015-09-01
Agilent	Spectrum Analyzer	E4440A	SG43360054	2014-12-04	2015-12-04
ETS-Lindgren	Horn Antenna	3115	000 527 35	2012-09-06	2015-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2015-02-19	2016-02-19
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2014-06-16	2017-06-15
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2014-09-06	2015-09-06

*** 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:

2.18 dB at **2483.50MHz** in the **Horizontal** polarization for 802.11b Mode

Test Data

Environmental Conditions

Temperature:	23.6°C
Relative Humidity:	66 %
ATM Pressure:	101.3 kPa

The testing was performed by Allen Qiao on 2015-04-10.

Test Mode: Transmitting-worst case (Powered by adapter)

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	83.12	PK	H	25.67	3.68	0.00	112.47	N/A	N/A
2412	79.36	AV	H	25.67	3.68	0.00	108.71	N/A	N/A
2412	75.47	PK	V	25.67	3.68	0.00	104.82	N/A	N/A
2412	71.41	AV	V	25.67	3.68	0.00	100.76	N/A	N/A
2390	31.72	PK	H	25.61	3.63	0.00	60.96	74.00	13.04
2390	19.38	AV	H	25.61	3.63	0.00	48.62	54.00	5.38
4824	33.66	PK	H	30.64	5.03	27.41	41.92	74.00	32.08
4824	25.15	AV	H	30.64	5.03	27.41	33.41	54.00	20.59
7236	30.8	PK	H	34.17	6.65	25.90	45.72	74.00	28.28
7236	19.83	AV	H	34.17	6.65	25.90	34.75	54.00	19.25
9648	29.13	PK	H	36.06	8.55	27.46	46.28	74.00	27.72
9648	16.11	AV	H	36.06	8.55	27.46	33.26	54.00	20.74
2125	32.94	PK	H	24.93	3.22	27.36	33.73	74.00	40.27
2125	20.15	AV	H	24.93	3.22	27.36	20.94	54.00	33.06
250.19	35.85	QP	H	12.17	1.92	21.49	28.45	46.00	17.55
Middle Channel: 2437 MHz									
2437	83.35	PK	H	25.74	3.75	0.00	112.84	N/A	N/A
2437	79.5	AV	H	25.74	3.75	0.00	108.99	N/A	N/A
2437	75.66	PK	V	25.74	3.75	0.00	105.15	N/A	N/A
2437	71.58	AV	V	25.74	3.75	0.00	101.07	N/A	N/A
4874	34.4	PK	H	30.77	5.14	27.42	42.89	74.00	31.11
4874	25.68	AV	H	30.77	5.14	27.42	34.17	54.00	19.83
7311	31.53	PK	H	34.35	6.74	25.88	46.74	74.00	27.26
7311	20.37	AV	H	34.35	6.74	25.88	35.58	54.00	18.42
9748	29.87	PK	H	36.30	8.61	27.24	47.54	74.00	26.46
9748	16.81	AV	H	36.30	8.61	27.24	34.48	54.00	19.52
2125	33.49	PK	H	24.93	3.22	27.36	34.28	74.00	39.72
2125	20.82	AV	H	24.93	3.22	27.36	21.61	54.00	32.39
2634	36.15	PK	H	26.25	4.64	27.44	39.60	74.00	34.40
2634	32.24	AV	H	26.25	4.64	27.44	35.69	54.00	18.31
250.19	35.83	QP	H	12.17	1.92	21.49	28.43	46.00	17.57
High Channel: 2462 MHz									
2462	82.38	PK	H	25.80	3.75	0.00	111.93	N/A	N/A
2462	79.64	AV	H	25.80	3.75	0.00	109.19	N/A	N/A
2462	75.78	PK	V	25.80	3.75	0.00	105.33	N/A	N/A
2462	71.69	AV	V	25.80	3.75	0.00	101.24	N/A	N/A
2483.5	40.02	PK	H	25.86	3.67	0.00	69.55	74.00	4.45
2483.5	22.29	AV	H	25.86	3.67	0.00	51.82	54.00	2.18 *
4924	34.92	PK	H	30.90	5.34	27.43	43.73	74.00	30.27
4924	26.34	AV	H	30.90	5.34	27.43	35.15	54.00	18.85
7386	32.28	PK	H	34.53	6.83	25.86	47.78	74.00	26.22
7386	21.13	AV	H	34.53	6.83	25.86	36.63	54.00	17.37
9848	30.47	PK	H	36.54	8.66	26.94	48.73	74.00	25.27
9848	17.36	AV	H	36.54	8.66	26.94	35.62	54.00	18.38
2125	34.25	PK	H	24.93	3.22	27.36	35.04	74.00	38.96
2125	21.58	AV	H	24.93	3.22	27.36	22.37	54.00	31.63
250.19	35.79	QP	H	12.17	1.92	21.49	28.39	46.00	17.61

**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	83.64	PK	H	25.67	3.68	0.00	112.99	N/A	N/A
2412	73.36	AV	H	25.67	3.68	0.00	102.71	N/A	N/A
2412	75.64	PK	V	25.67	3.68	0.00	104.99	N/A	N/A
2412	64.28	AV	V	25.67	3.68	0.00	93.63	N/A	N/A
2390	35.26	PK	H	25.61	3.63	0.00	64.50	74.00	9.50
2390	18.06	AV	H	25.61	3.63	0.00	47.30	54.00	6.70
4824	34.26	PK	H	30.64	5.03	27.41	42.52	74.00	31.48
4824	22.55	AV	H	30.64	5.03	27.41	30.81	54.00	23.19
7236	32.16	PK	H	34.17	6.65	25.90	47.08	74.00	26.92
7236	20.04	AV	H	34.17	6.65	25.90	34.96	54.00	19.04
9648	30.15	PK	H	36.06	8.55	27.46	47.30	74.00	26.70
9648	17.68	AV	H	36.06	8.55	27.46	34.83	54.00	19.17
2634	34.59	PK	H	26.25	4.64	27.44	38.04	74.00	35.96
2634	21.26	AV	H	26.25	4.64	27.44	24.71	54.00	29.29
250.19	36.25	QP	H	12.17	1.92	21.49	28.85	46.00	17.15
Middle Channel: 2437 MHz									
2437	83.8	PK	H	25.74	3.75	0.00	113.29	N/A	N/A
2437	73.76	AV	H	25.74	3.75	0.00	103.25	N/A	N/A
2437	75.94	PK	V	25.74	3.75	0.00	105.43	N/A	N/A
2437	64.54	AV	V	25.74	3.75	0.00	94.03	N/A	N/A
4874	34.73	PK	H	30.77	5.14	27.42	43.22	74.00	30.78
4874	22.8	AV	H	30.77	5.14	27.42	31.29	54.00	22.71
7311	32.61	PK	H	34.35	6.74	25.88	47.82	74.00	26.18
7311	20.31	AV	H	34.35	6.74	25.88	35.52	54.00	18.48
9748	30.57	PK	H	36.30	8.61	27.24	48.24	74.00	25.76
9748	17.9	AV	H	36.30	8.61	27.24	35.57	54.00	18.43
2634	35.05	PK	H	26.25	4.64	27.44	38.50	74.00	35.50
2634	21.76	AV	H	26.25	4.64	27.44	25.21	54.00	28.79
3610	33.36	PK	H	29.04	4.61	27.28	39.73	74.00	34.27
3610	20.51	AV	H	29.04	4.61	27.28	26.88	54.00	27.12
250.19	35.94	QP	H	12.17	1.92	21.49	28.54	46.00	17.46
High Channel: 2462 MHz									
2462	83.76	PK	H	25.80	3.75	0.00	113.31	N/A	N/A
2462	73.66	AV	H	25.80	3.75	0.00	103.21	N/A	N/A
2462	76.26	PK	V	25.80	3.75	0.00	105.81	N/A	N/A
2462	64.72	AV	V	25.80	3.75	0.00	94.27	N/A	N/A
2483.5	38.85	PK	H	25.86	3.67	0.00	68.38	74.00	5.62
2483.5	22.03	AV	H	25.86	3.67	0.00	51.56	54.00	2.44
4924	35.13	PK	H	30.90	5.34	27.43	43.94	74.00	30.06
4924	23.28	AV	H	30.90	5.34	27.43	32.09	54.00	21.91
7386	33.03	PK	H	34.53	6.83	25.86	48.53	74.00	25.47
7386	20.52	AV	H	34.53	6.83	25.86	36.02	54.00	17.98
9848	30.82	PK	H	36.54	8.66	26.94	49.08	74.00	24.92
9848	18.31	AV	H	36.54	8.66	26.94	36.57	54.00	17.43
2634	35.46	PK	H	26.25	4.64	27.44	38.91	74.00	35.09
2634	22.2	AV	H	26.25	4.64	27.44	25.65	54.00	28.35
250.19	36.07	QP	H	12.17	1.92	21.49	28.67	46.00	17.33

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	81.45	PK	H	25.67	3.68	0.00	110.80	N/A	N/A
2412	72.88	AV	H	25.67	3.68	0.00	102.23	N/A	N/A
2412	72.39	PK	V	25.67	3.68	0.00	101.74	N/A	N/A
2412	61.24	AV	V	25.67	3.68	0.00	90.59	N/A	N/A
2390	37.62	PK	H	25.61	3.63	0.00	66.86	74.00	7.14
2390	22.34	AV	H	25.61	3.63	0.00	51.58	54.00	2.42*
4824	33.33	PK	H	30.64	5.03	27.41	41.59	74.00	32.41
4824	24.63	AV	H	30.64	5.03	27.41	32.89	54.00	21.11
7236	30.49	PK	H	34.17	6.65	25.90	45.41	74.00	28.59
7236	19.28	AV	H	34.17	6.65	25.90	34.20	54.00	19.80
9648	28.53	PK	H	36.06	8.55	27.46	45.68	74.00	28.32
9648	15.59	AV	H	36.06	8.55	27.46	32.74	54.00	21.26
2634	32.53	PK	H	26.25	4.64	27.44	35.98	74.00	38.02
2634	19.67	AV	H	26.25	4.64	27.44	23.12	54.00	30.88
250.19	35.62	QP	H	12.17	1.92	21.49	28.22	46.00	17.78
Middle Channel: 2437 MHz									
2437	81.84	PK	H	25.74	3.75	0.00	111.33	N/A	N/A
2437	73.06	AV	H	25.74	3.75	0.00	102.55	N/A	N/A
2437	72.73	PK	V	25.74	3.75	0.00	102.22	N/A	N/A
2437	61.47	AV	V	25.74	3.75	0.00	90.96	N/A	N/A
4874	34.28	PK	H	30.77	5.14	27.42	42.77	74.00	31.23
4874	22.23	AV	H	30.77	5.14	27.42	30.72	54.00	23.28
7311	32.18	PK	H	34.35	6.74	25.88	47.39	74.00	26.61
7311	19.71	AV	H	34.35	6.74	25.88	34.92	54.00	19.08
9748	30.11	PK	H	36.30	8.61	27.24	47.78	74.00	26.22
9748	17.34	AV	H	36.30	8.61	27.24	35.01	54.00	18.99
2634	34.7	PK	H	26.25	4.64	27.44	38.15	74.00	35.85
2634	21.45	AV	H	26.25	4.64	27.44	24.90	54.00	29.10
2125	32.9	PK	H	24.93	3.22	27.36	33.69	74.00	40.31
2125	20.1	AV	H	24.93	3.22	27.36	20.89	54.00	33.11
250.19	35.84	QP	H	12.17	1.92	21.49	28.44	46.00	17.56
High Channel: 2462 MHz									
2462	83.68	PK	H	25.80	3.75	0.00	113.23	N/A	N/A
2462	73.43	AV	H	25.80	3.75	0.00	102.98	N/A	N/A
2462	73.13	PK	V	25.80	3.75	0.00	102.68	N/A	N/A
2462	61.66	AV	V	25.80	3.75	0.00	91.21	N/A	N/A
2483.5	36.34	PK	H	25.86	3.67	0.00	65.87	74.00	8.13
2483.5	19.58	AV	H	25.86	3.67	0.00	49.11	54.00	4.89
4924	34.57	PK	H	30.90	5.34	27.43	43.38	74.00	30.62
4924	22.96	AV	H	30.90	5.34	27.43	31.77	54.00	22.23
7386	32.64	PK	H	34.53	6.83	25.86	48.14	74.00	25.86
7386	20.04	AV	H	34.53	6.83	25.86	35.54	54.00	18.46
9848	30.26	PK	H	36.54	8.66	26.94	48.52	74.00	25.48
9848	17.76	AV	H	36.54	8.66	26.94	36.02	54.00	17.98
2634	35.06	PK	H	26.25	4.64	27.44	38.51	74.00	35.49
2634	21.9	AV	H	26.25	4.64	27.44	25.35	54.00	28.65
250.19	36.03	QP	H	12.17	1.92	21.49	28.63	46.00	17.37

**Within measurement uncertainty!*

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	79.65	PK	H	25.70	3.71	0.00	109.06	N/A	N/A
2422	69.44	AV	H	25.70	3.71	0.00	98.85	N/A	N/A
2422	70.82	PK	V	25.70	3.71	0.00	100.23	N/A	N/A
2422	59.68	AV	V	25.70	3.71	0.00	89.09	N/A	N/A
2390	35.77	PK	H	25.61	3.63	0.00	65.01	74.00	8.99
2390	21.52	AV	H	25.61	3.63	0.00	50.76	54.00	3.24 *
4844	33.01	PK	H	30.69	4.99	27.42	41.27	74.00	32.73
4844	24.23	AV	H	30.69	4.99	27.42	32.49	54.00	21.51
7266	29.99	PK	H	34.24	6.68	25.89	45.02	74.00	28.98
7266	18.89	AV	H	34.24	6.68	25.89	33.92	54.00	20.08
9688	28.01	PK	H	36.15	8.58	27.37	45.37	74.00	28.63
9688	15.2	AV	H	36.15	8.58	27.37	32.56	54.00	21.44
2634	32.2	PK	H	26.25	4.64	27.44	35.65	74.00	38.35
2634	19.13	AV	H	26.25	4.64	27.44	22.58	54.00	31.42
250.19	35.12	QP	H	12.17	1.92	21.49	27.72	46.00	18.28
Middle Channel: 2437 MHz									
2437	80.02	PK	H	25.74	3.75	0.00	109.51	N/A	N/A
2437	69.81	AV	H	25.74	3.75	0.00	99.30	N/A	N/A
2437	71.31	PK	V	25.74	3.75	0.00	100.80	N/A	N/A
2437	60.14	AV	V	25.74	3.75	0.00	89.63	N/A	N/A
4874	33.89	PK	H	30.77	5.14	27.42	42.38	74.00	31.62
4874	21.81	AV	H	30.77	5.14	27.42	30.30	54.00	23.70
7311	31.62	PK	H	34.35	6.74	25.88	46.83	74.00	27.17
7311	19.13	AV	H	34.35	6.74	25.88	34.34	54.00	19.66
9748	29.79	PK	H	36.30	8.61	27.24	47.46	74.00	26.54
9748	16.89	AV	H	36.30	8.61	27.24	34.56	54.00	19.44
2125	34.38	PK	H	24.93	3.22	27.36	35.17	74.00	38.83
2125	20.91	AV	H	24.93	3.22	27.36	21.70	54.00	32.30
2634	32.53	PK	H	26.25	4.64	27.44	35.98	74.00	38.02
2634	19.77	AV	H	26.25	4.64	27.44	23.22	54.00	30.78
250.19	35.49	QP	H	12.17	1.92	21.49	28.09	46.00	17.91
High Channel: 2452 MHz									
2452	80.19	PK	H	25.78	3.78	0.00	109.75	N/A	N/A
2452	70.32	AV	H	25.78	3.78	0.00	99.88	N/A	N/A
2452	71.89	PK	V	25.78	3.78	0.00	101.45	N/A	N/A
2452	60.55	AV	V	25.78	3.78	0.00	90.11	N/A	N/A
2483.5	40.87	PK	H	25.86	3.67	0.00	70.40	74.00	3.60 *
2483.5	21.9	AV	H	25.86	3.67	0.00	51.43	54.00	2.57 *
4904	34.15	PK	H	30.85	5.31	27.43	42.88	74.00	31.12
4904	22.37	AV	H	30.85	5.31	27.43	31.10	54.00	22.90
7356	32.16	PK	H	34.45	6.79	25.87	47.53	74.00	26.47
7356	19.56	AV	H	34.45	6.79	25.87	34.93	54.00	19.07
9808	29.89	PK	H	36.44	8.64	27.09	47.88	74.00	26.12
9808	17.26	AV	H	36.44	8.64	27.09	35.25	54.00	18.75
2634	34.51	PK	H	26.25	4.64	27.44	37.96	74.00	36.04
2634	21.4	AV	H	26.25	4.64	27.44	24.85	54.00	29.15
250.19	35.26	QP	H	12.17	1.92	21.49	27.86	46.00	18.14

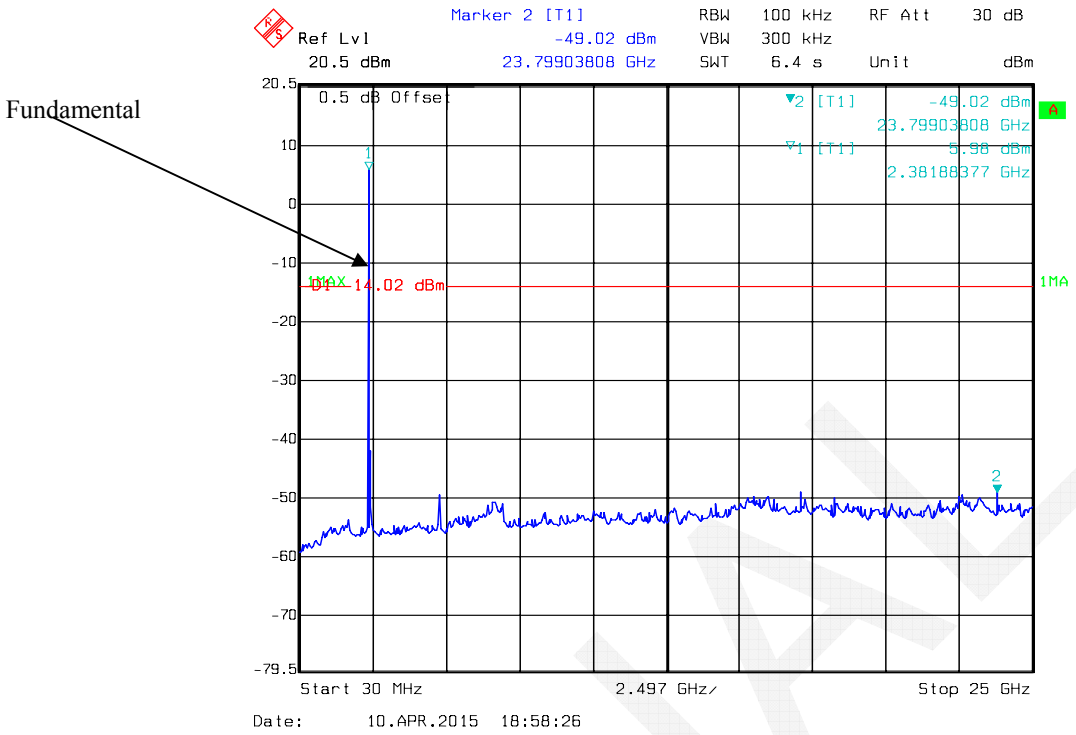
**Within measurement uncertainty!*

Co-location Radiated Emission

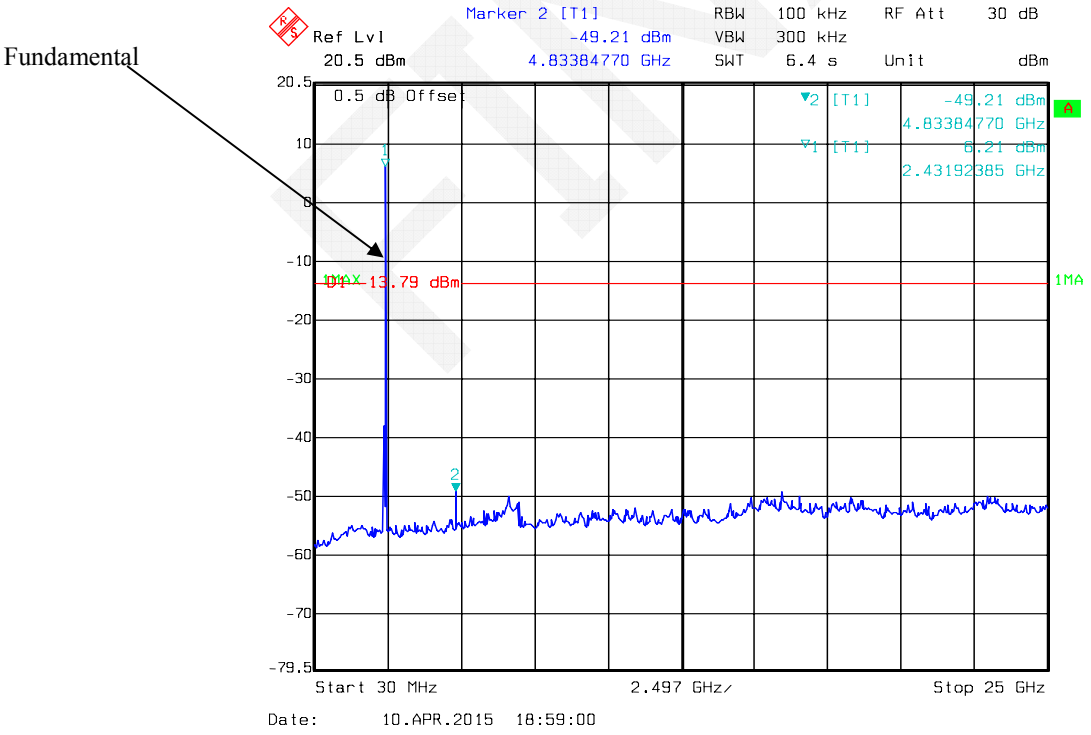
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
2912.5	36.71	PK	H	26.97	6.09	27.54	42.23	74.00	31.77
2912.5	23.93	AV	H	26.97	6.09	27.54	29.45	54.00	24.55
5427.5	35.24	PK	H	31.96	5.51	26.96	45.75	74.00	28.25
5427.5	22.46	AV	H	31.96	5.51	26.96	32.97	54.00	21.03
5590	34.58	PK	H	32.12	5.65	26.78	45.57	74.00	28.43
5590	22.23	AV	H	32.12	5.65	26.78	33.22	54.00	20.78
5090	39.25	PK	V	31.28	5.54	27.28	48.79	74.00	25.21
5090	26.94	AV	V	31.28	5.54	27.28	36.48	54.00	17.52
5585	38.91	PK	V	32.12	5.62	26.79	49.86	74.00	24.14
5585	26.85	AV	V	32.12	5.62	26.79	37.80	54.00	16.20
5870	34.28	PK	V	32.17	5.98	26.73	45.70	74.00	28.30
5870	22.06	AV	V	32.17	5.98	26.73	33.48	54.00	20.52
250.19	45.16	QP	H	12.17	1.92	21.49	37.76	46.00	8.24

Conducted Spurious Emissions at Antenna Port

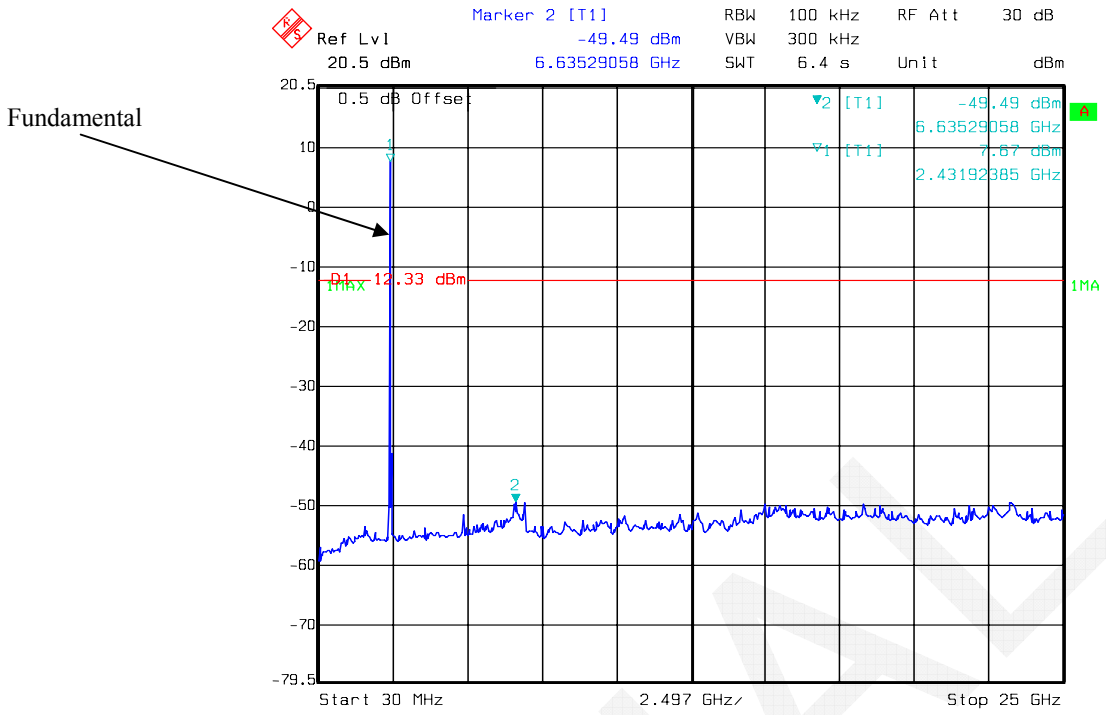
802.11b Low Channel - Chain0



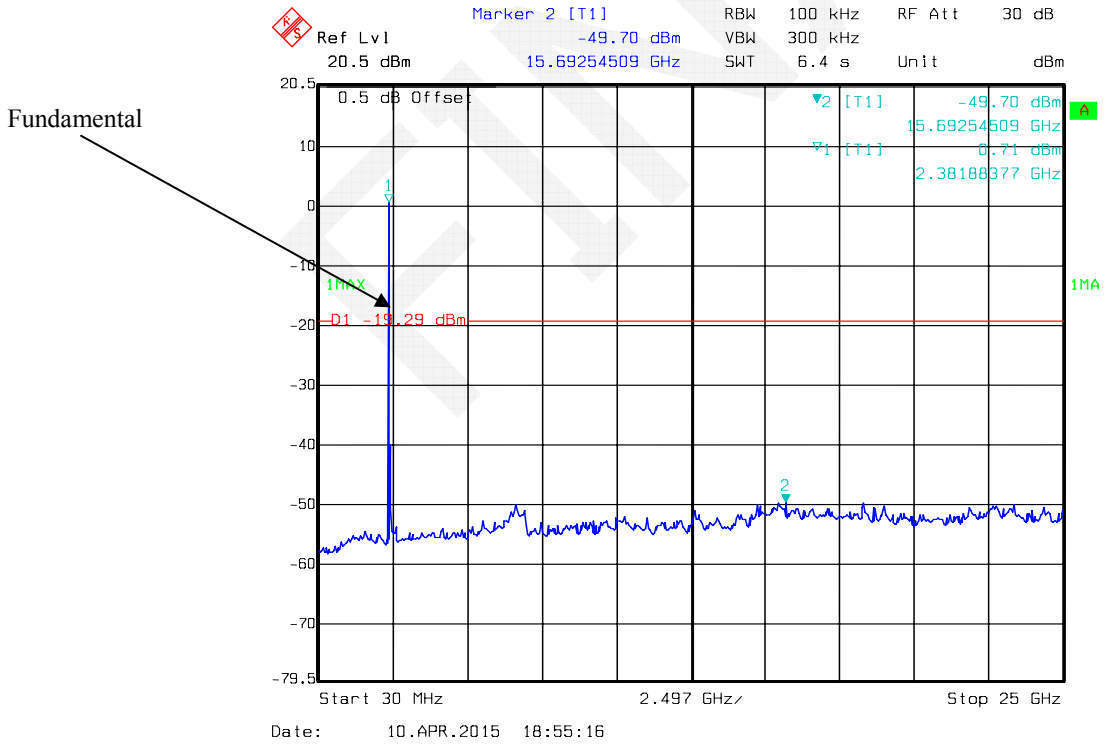
802.11b Middle Channel - Chain0



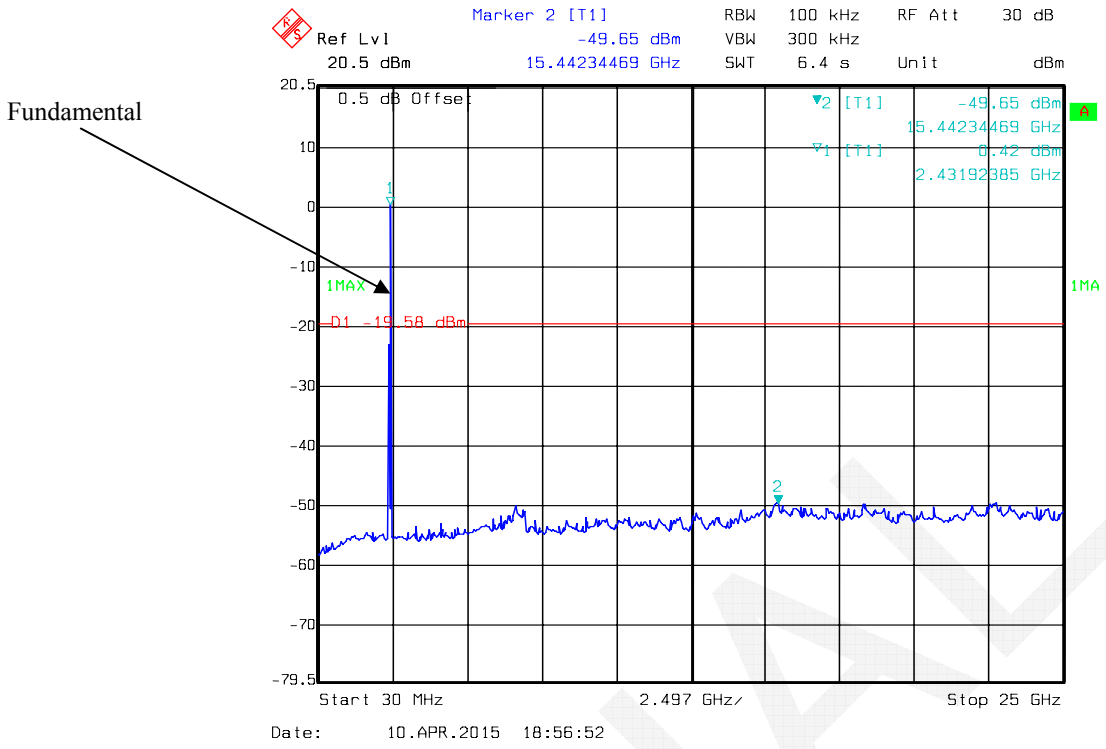
802.11b High Channel - Chain0



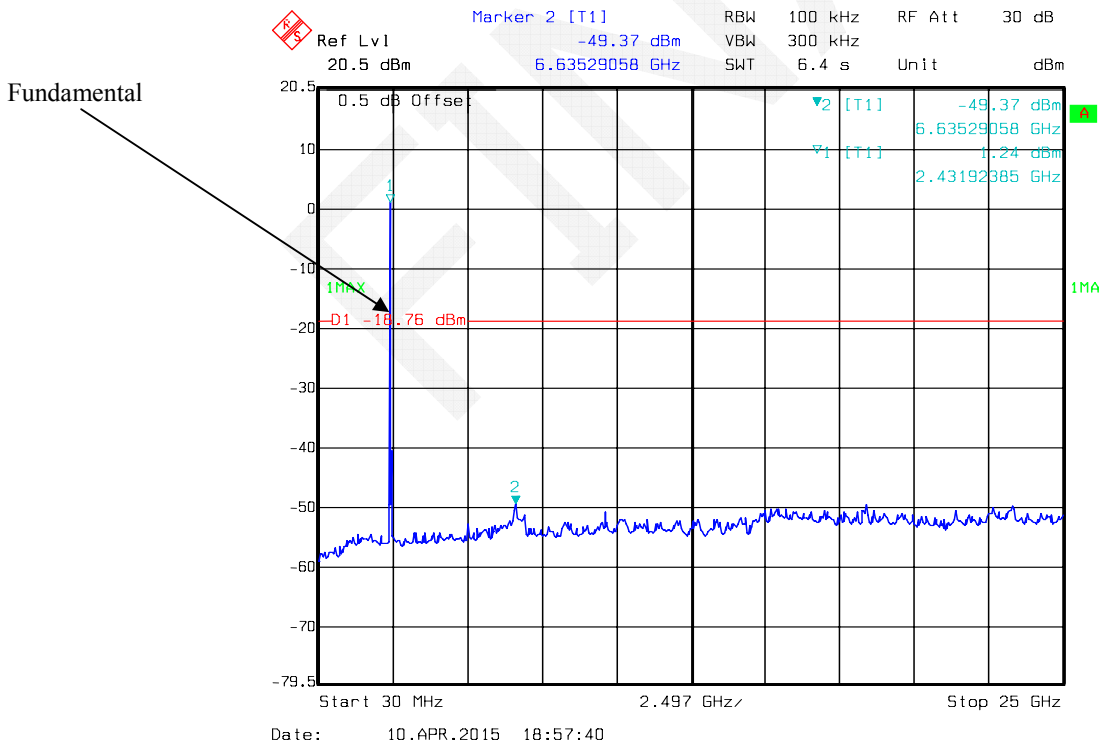
802.11g Low Channel - Chain0



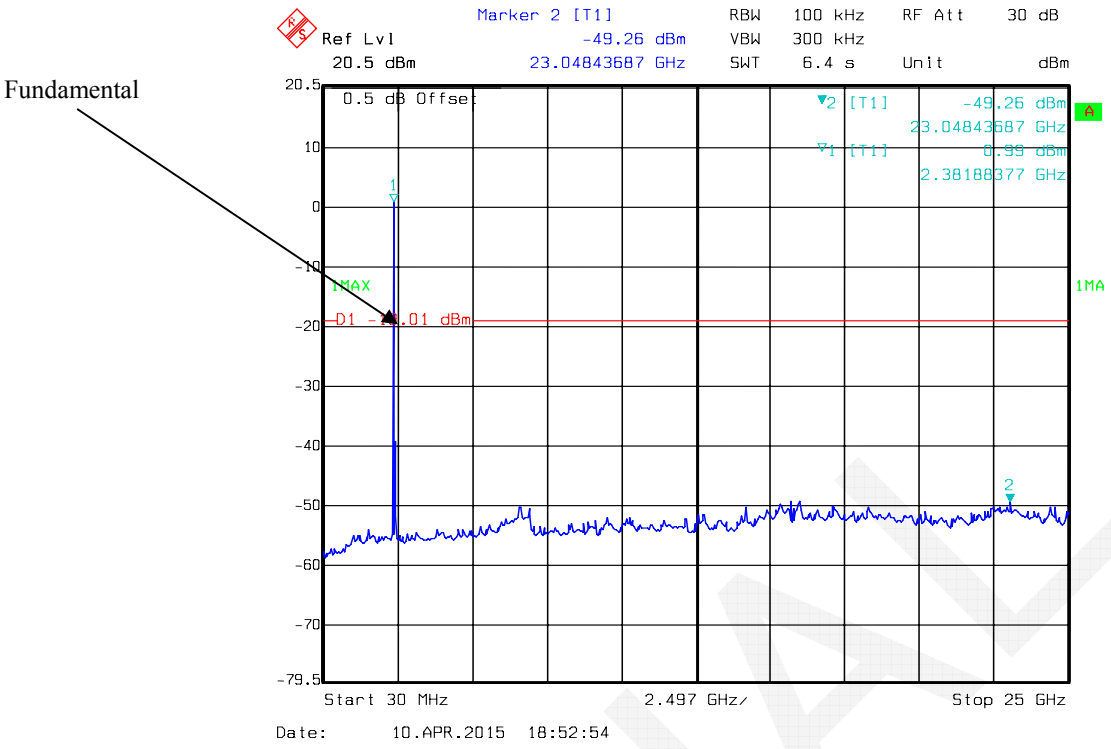
802.11g Middle Channel - Chain0



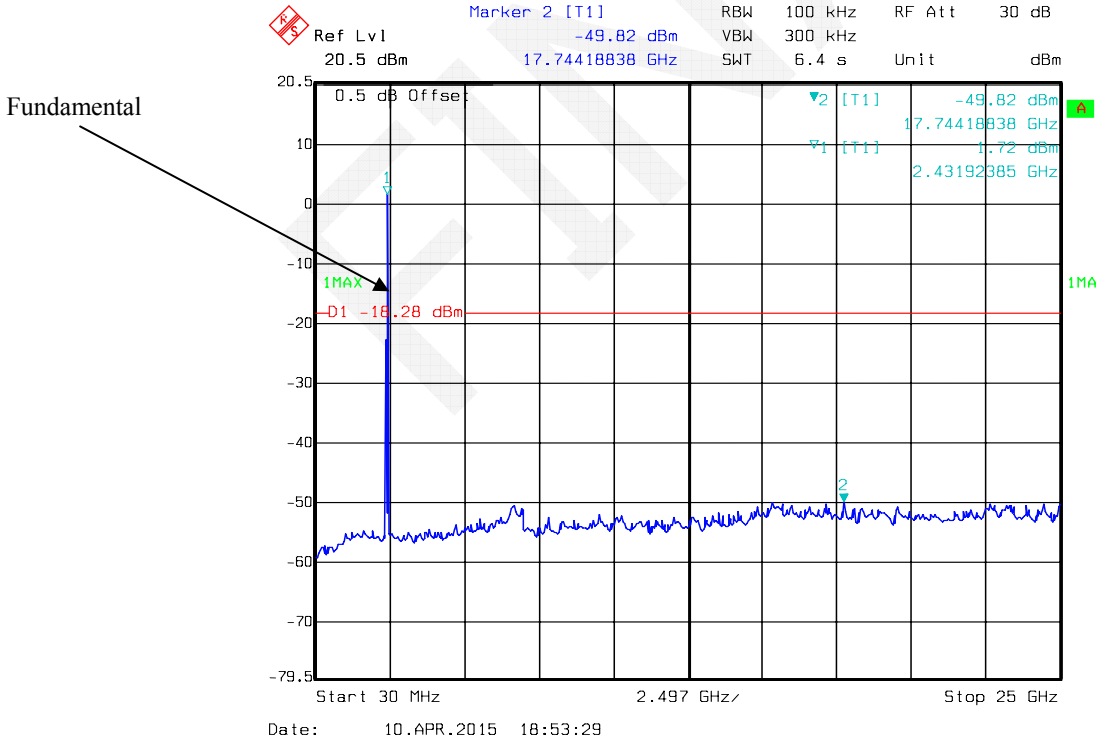
802.11g High Channel - Chain0



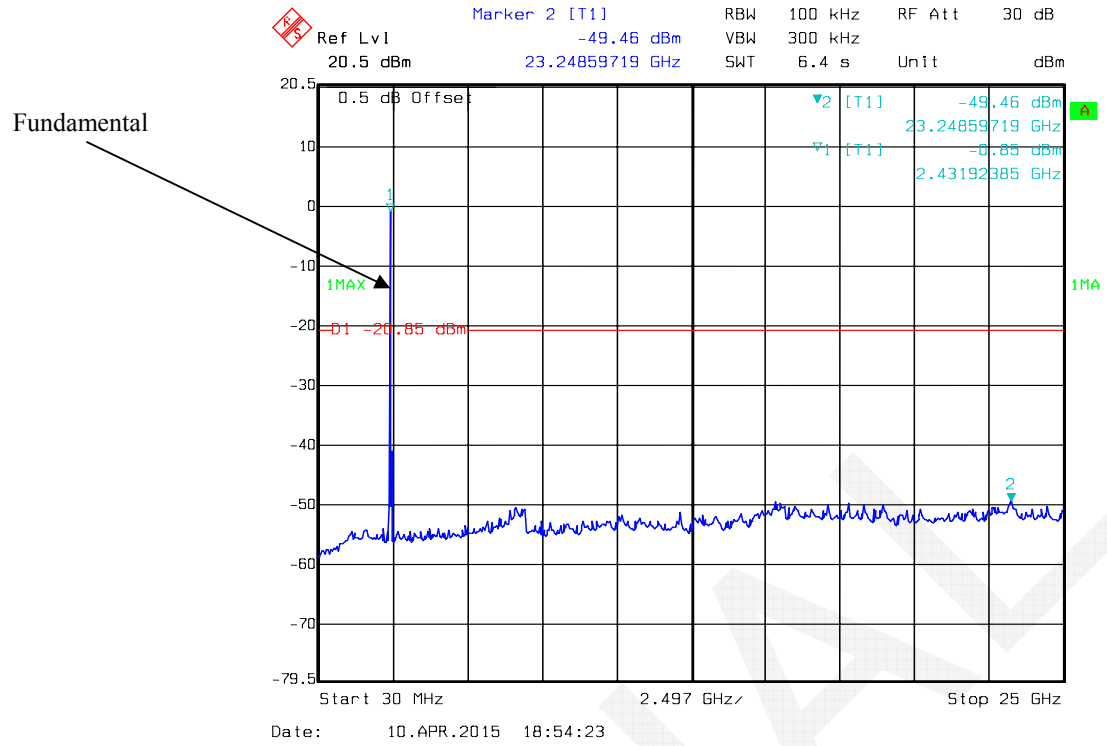
802.11n ht20 Low Channel - Chain0



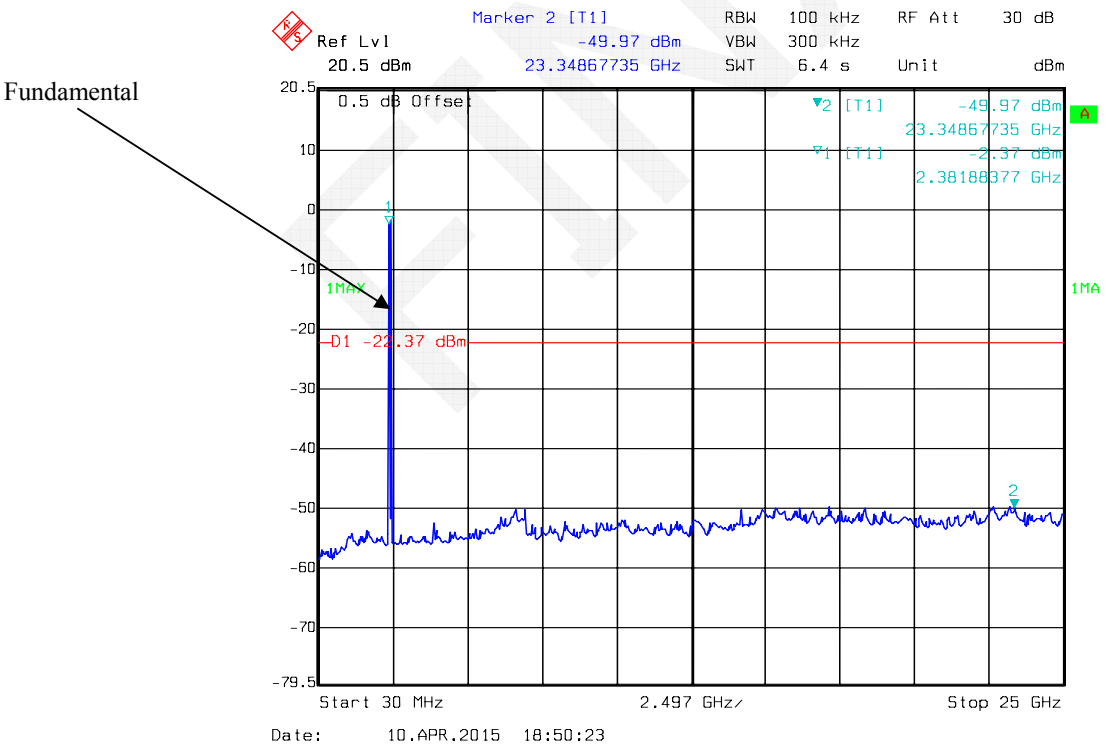
802.11n ht20 Middle Channel - Chain0



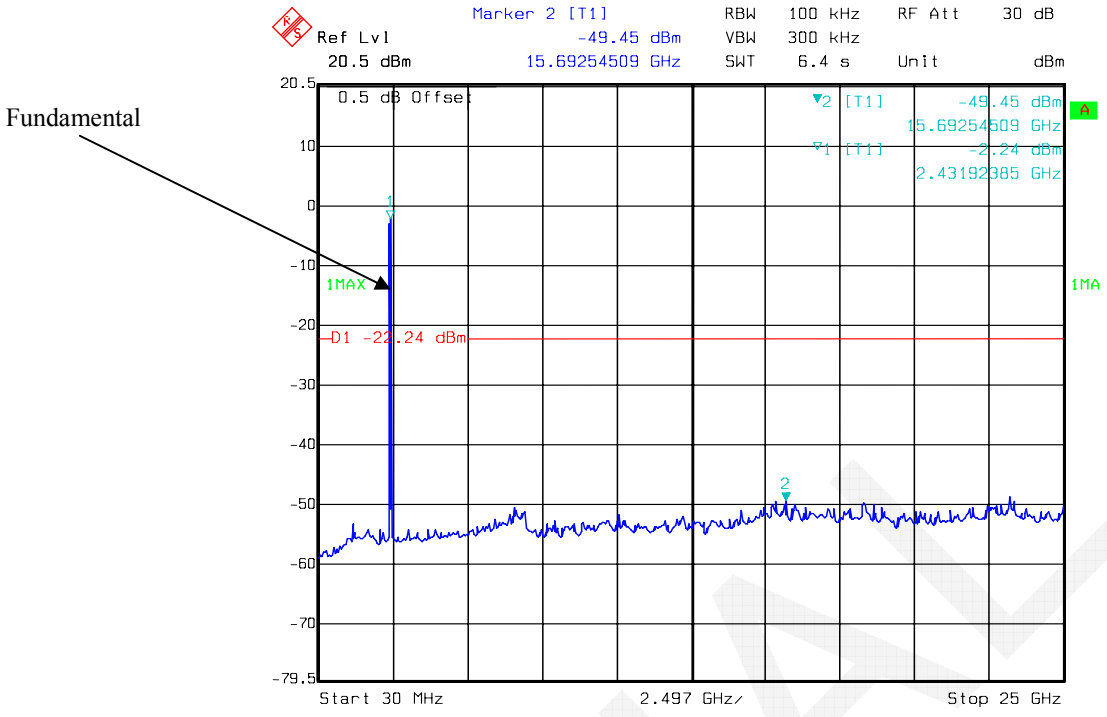
802.11n ht20 High Channel - Chain0



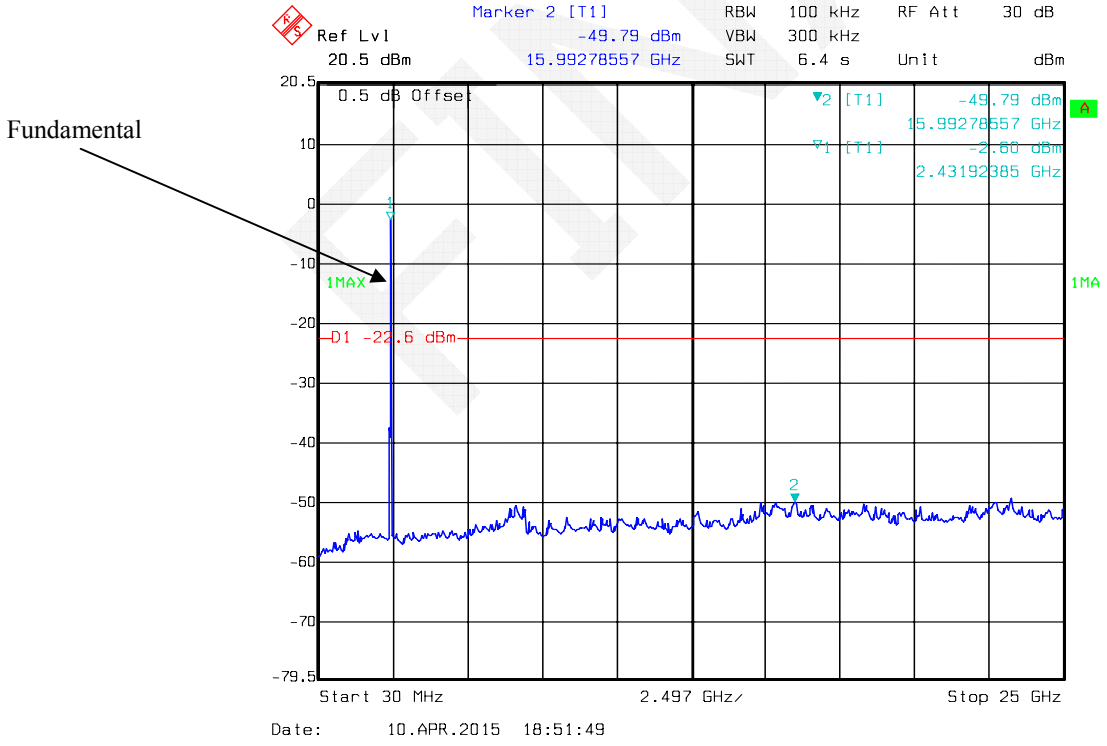
802.11n ht40 Low Channel - Chain0



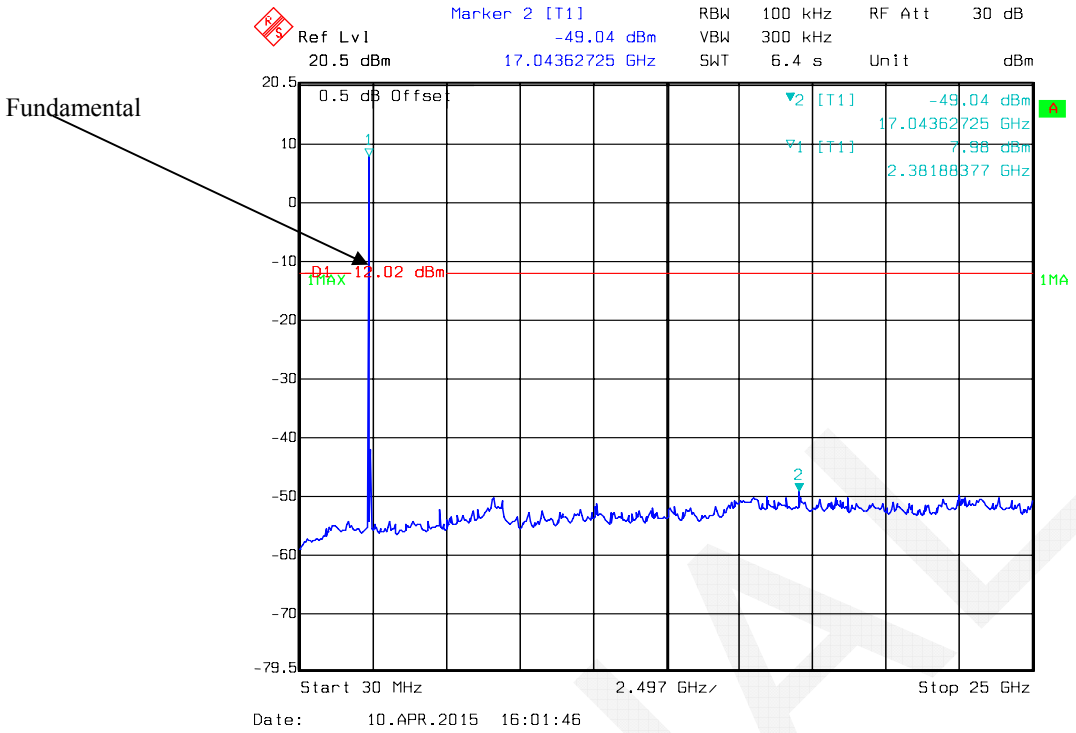
802.11n ht40 Middle Channel - Chain0



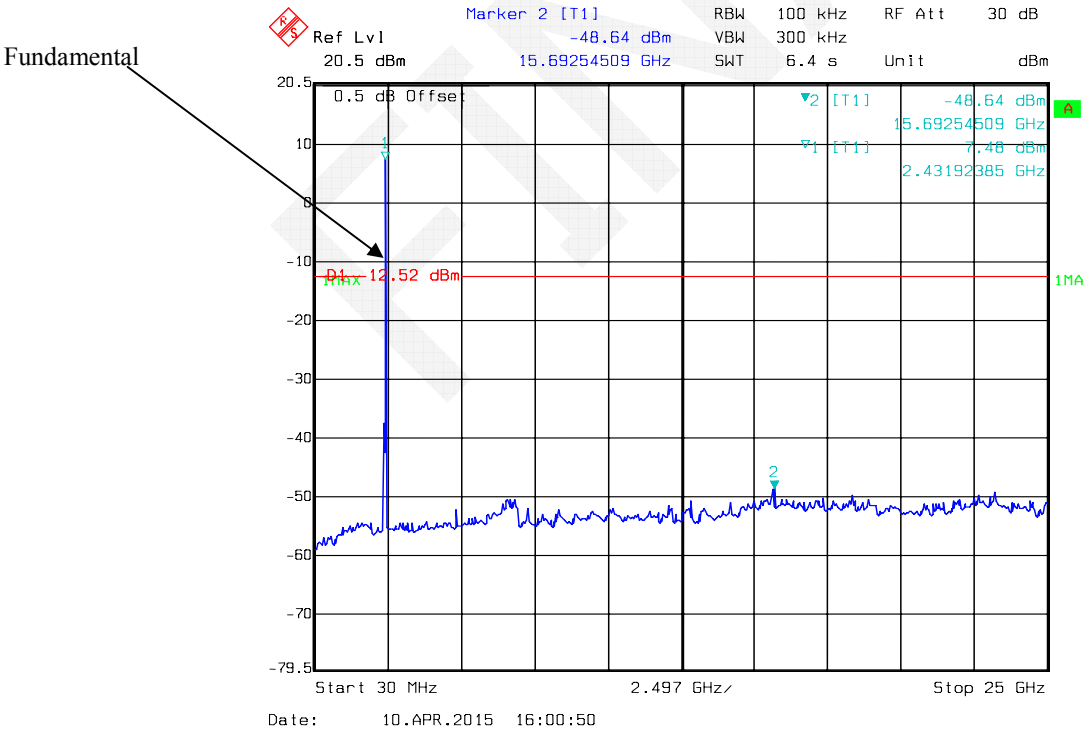
802.11n ht40 High Channel - Chain0



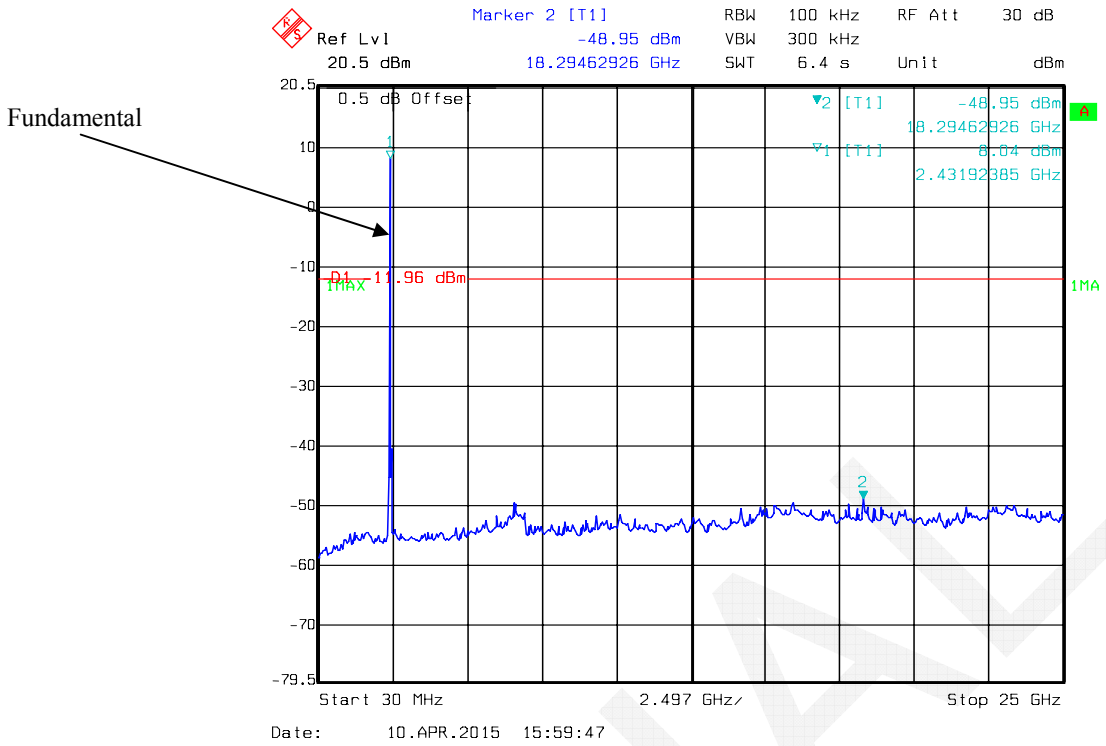
802.11b Low Channel – Chain1



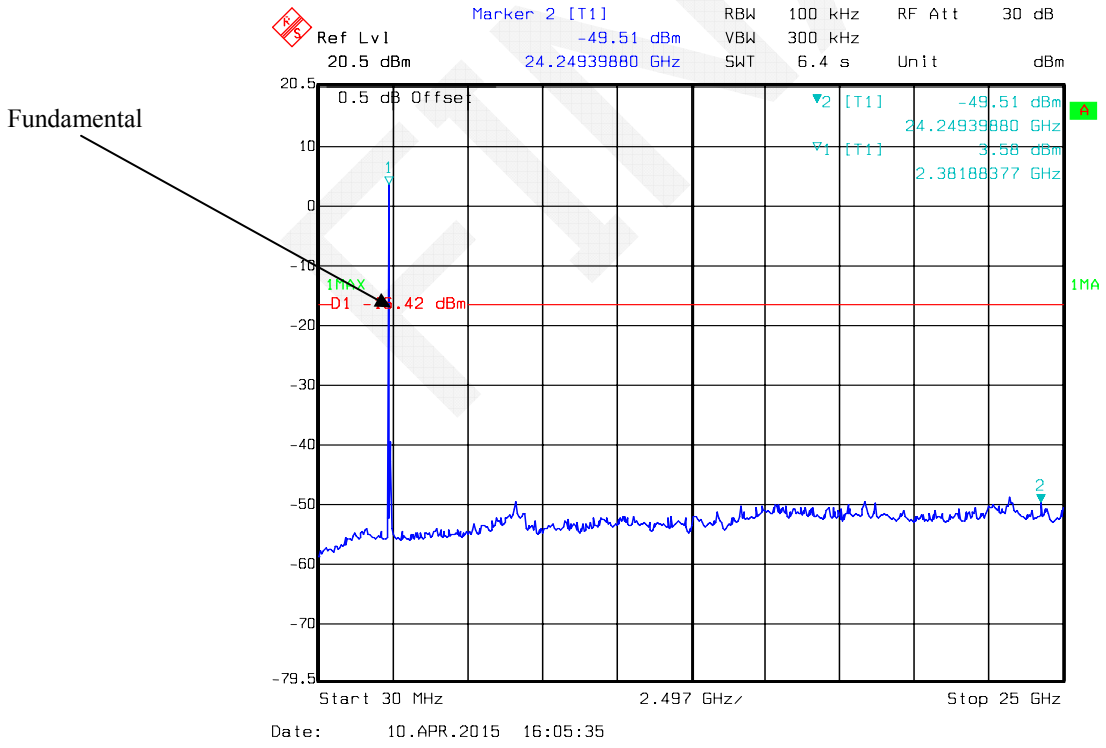
802.11b Middle Channel – Chain1



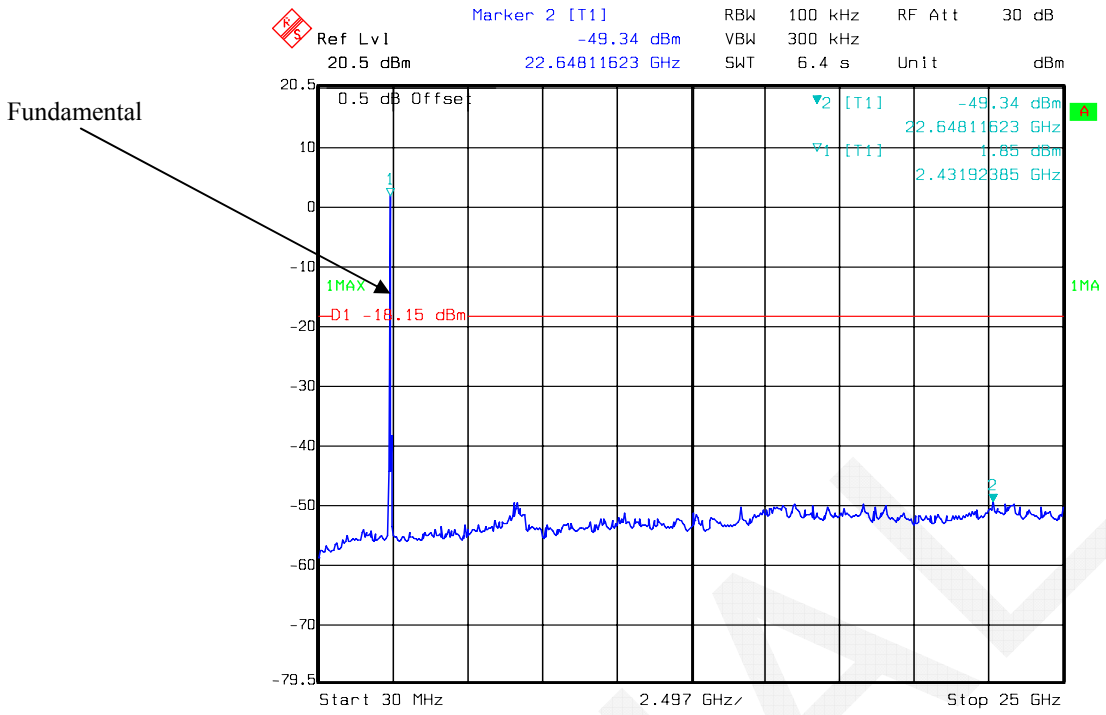
802.11b High Channel – Chain1



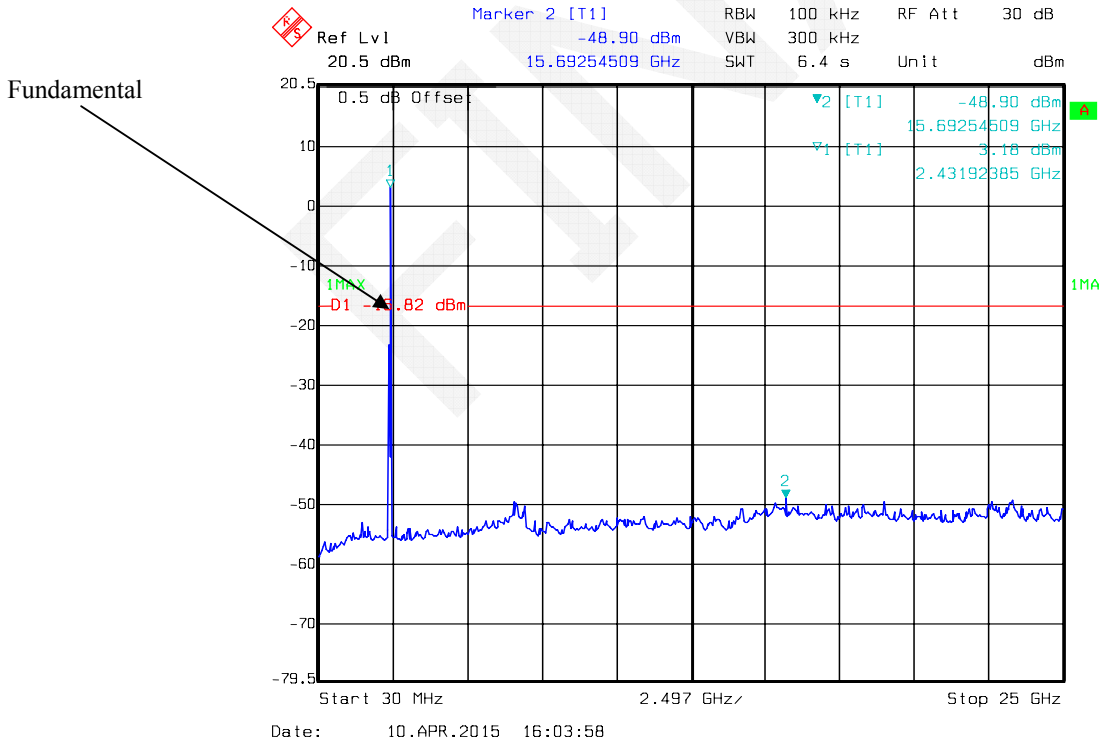
802.11g Low Channel – Chain1



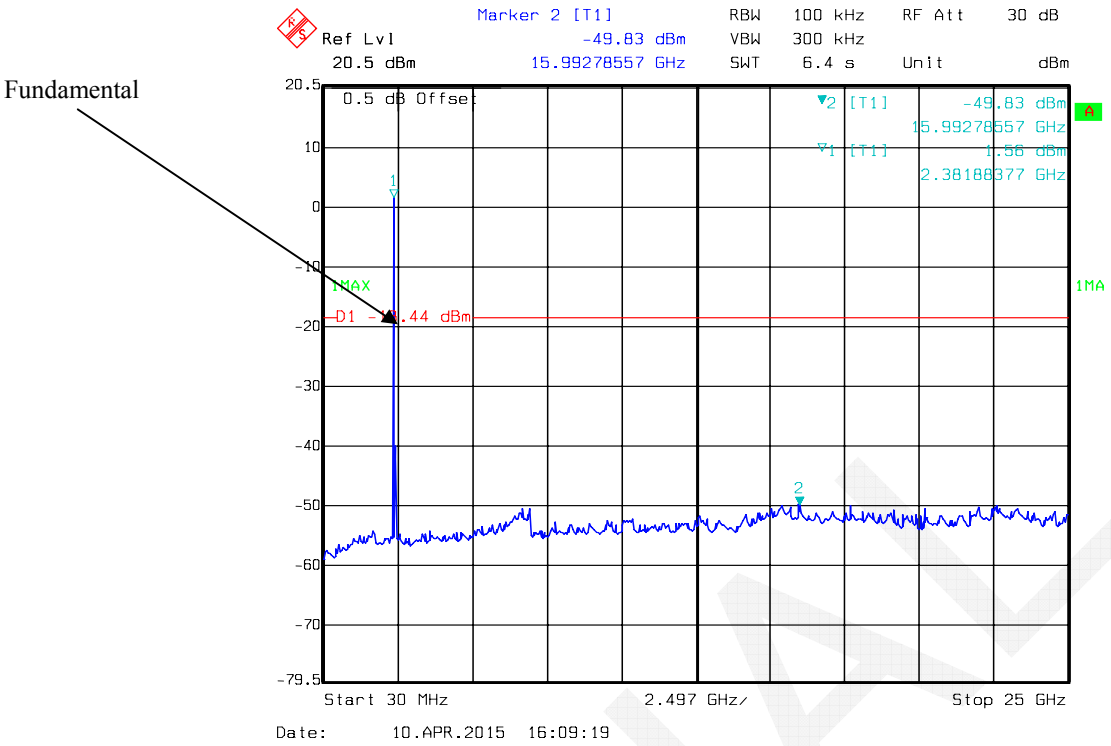
802.11g Middle Channel – Chain1



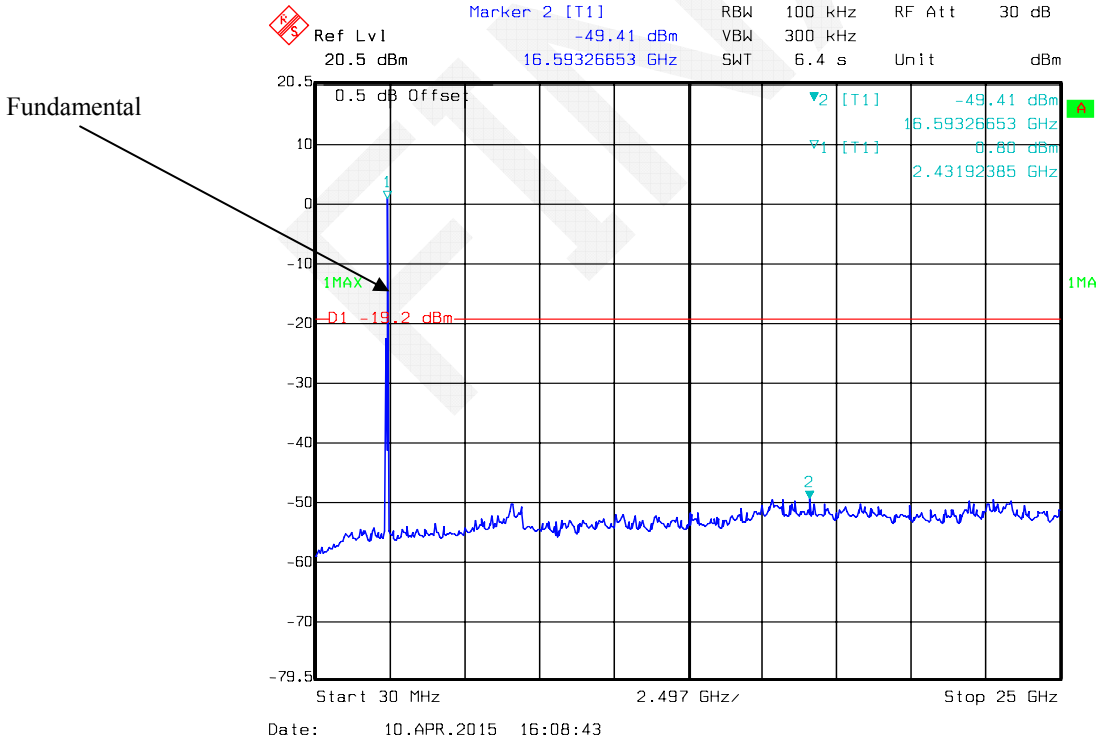
802.11g High Channel – Chain1



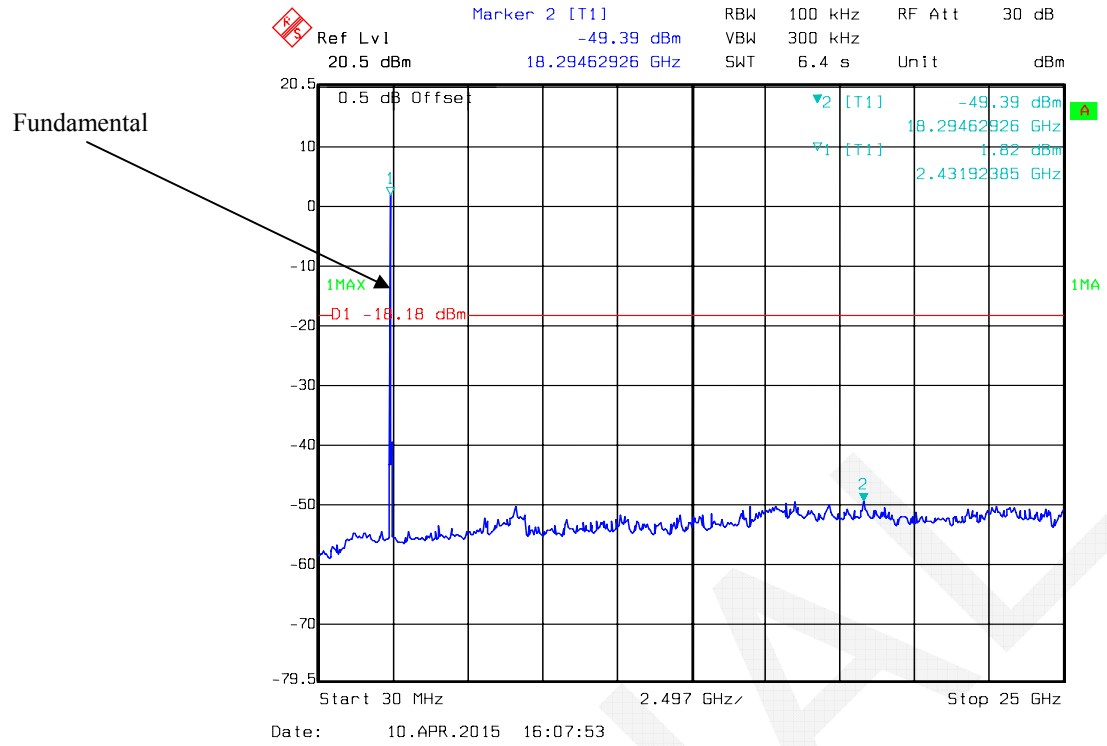
802.11n ht20 Low Channel – Chain1



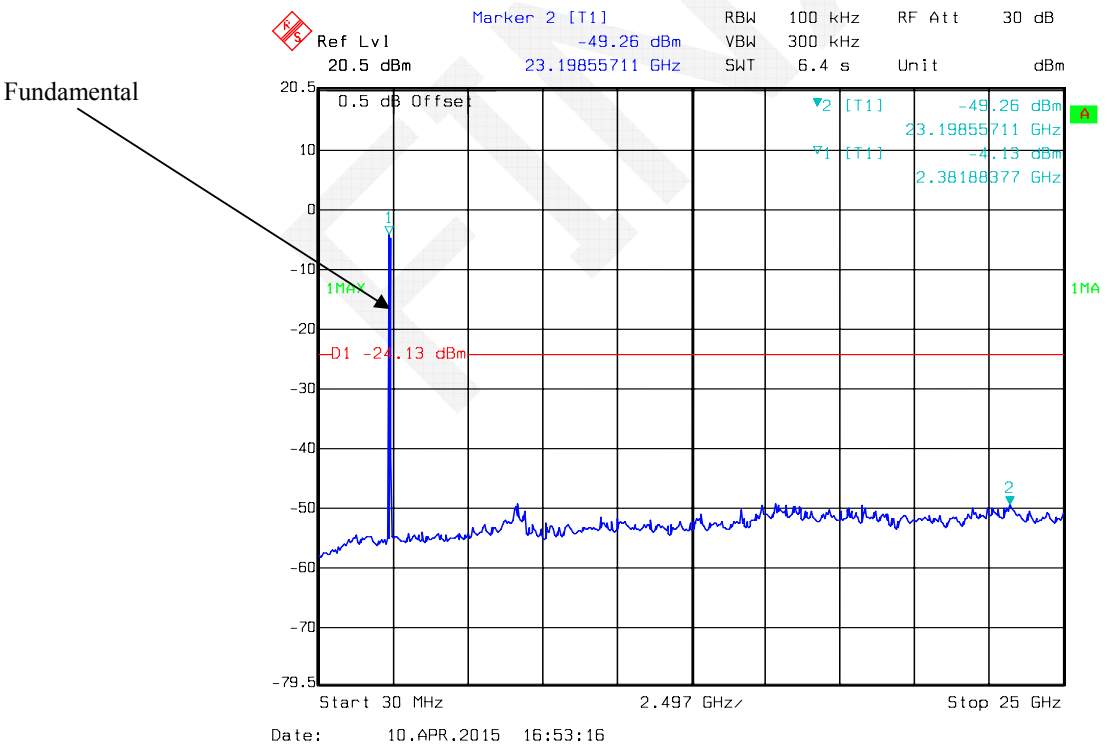
802.11n ht20 Middle Channel – Chain1



802.11n ht20 High Channel – Chain1

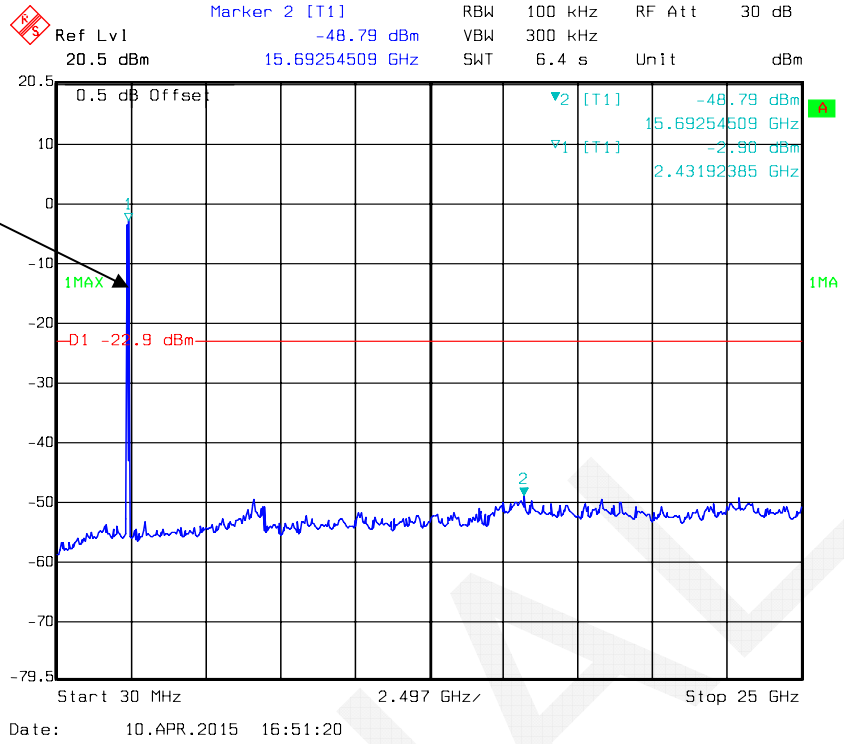


802.11n ht40 Low Channel – Chain1



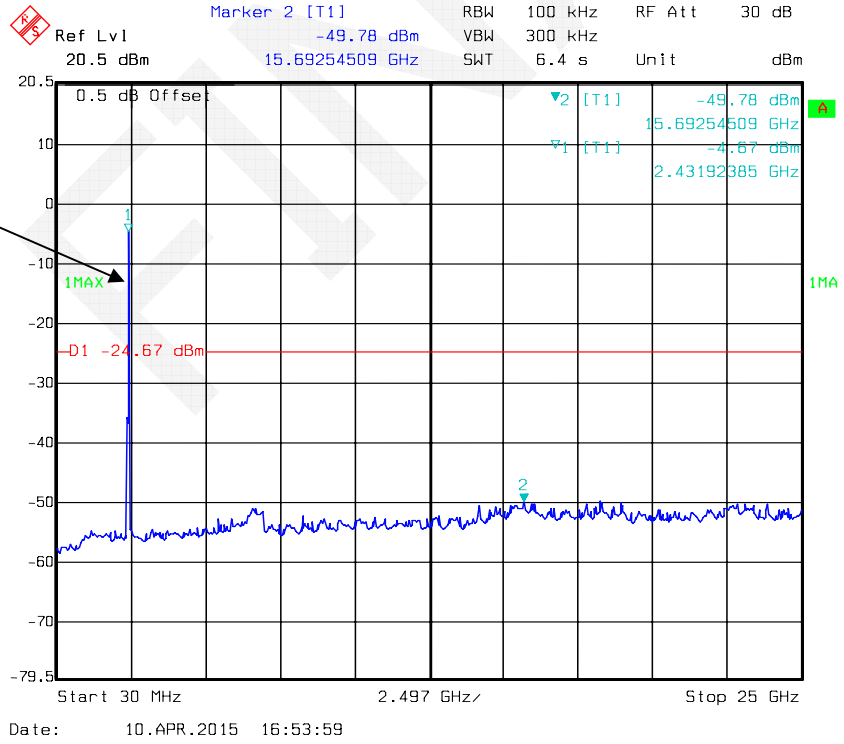
802.11n ht40 Middle Channel – Chain1

Fundamental



802.11n ht40 High Channel – Chain1

Fundamental



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 v03r02 clause8.1 Option 1:
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	FSP 38	100478	2014-05-09	2015-05-09

*** 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:	24.1 °C
Relative Humidity:	54 %
ATM Pressure:	101.3 kPa

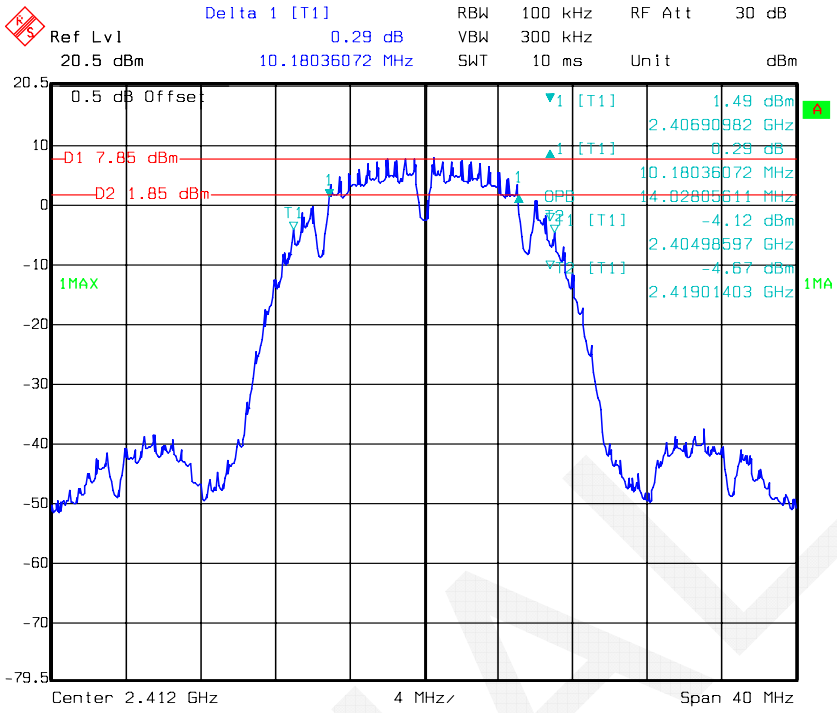
The testing was performed by Allen Qiao on 2015-04-10.

Test Mode: Transmitting

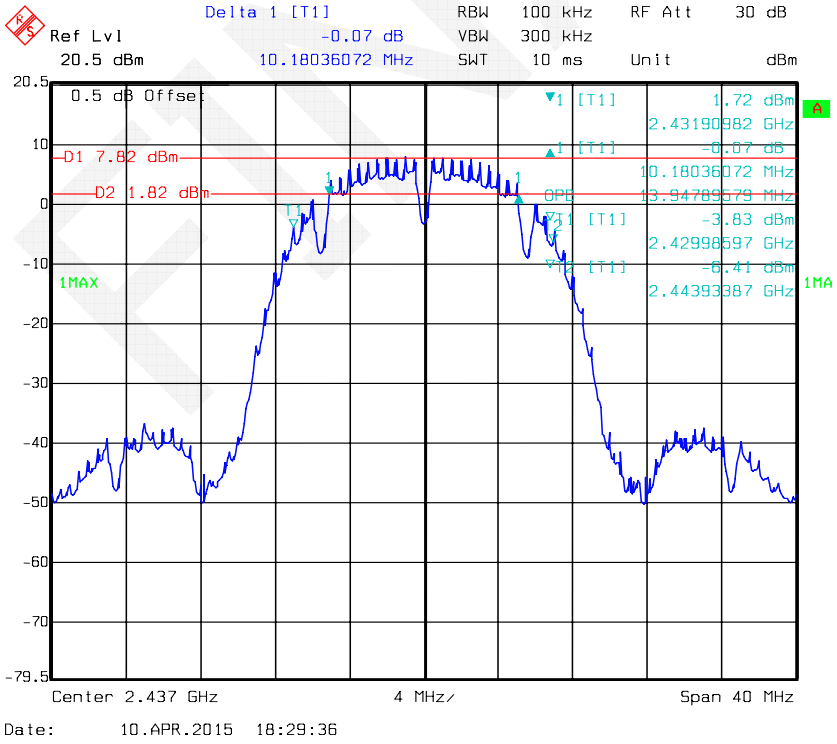
Test Result: Compliant. Please refer to the following table and plots.

Mode	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Limit (MHz)
			Chain0	Chain1	
802.11b	Low	2412	10.18	10.10	≥0.5
	Middle	2437	10.18	10.18	≥0.5
	High	2462	10.18	10.19	≥0.5
802.11g	Low	2412	16.51	16.51	≥0.5
	Middle	2437	16.44	16.59	≥0.5
	High	2462	16.37	16.42	≥0.5
802.11n20	Low	2412	17.64	17.64	≥0.5
	Middle	2437	17.55	17.75	≥0.5
	High	2462	17.17	17.54	≥0.5
802.11n40	Low	2422	36.61	36.55	≥0.5
	Middle	2437	36.52	36.58	≥0.5
	High	2452	36.59	36.49	≥0.5

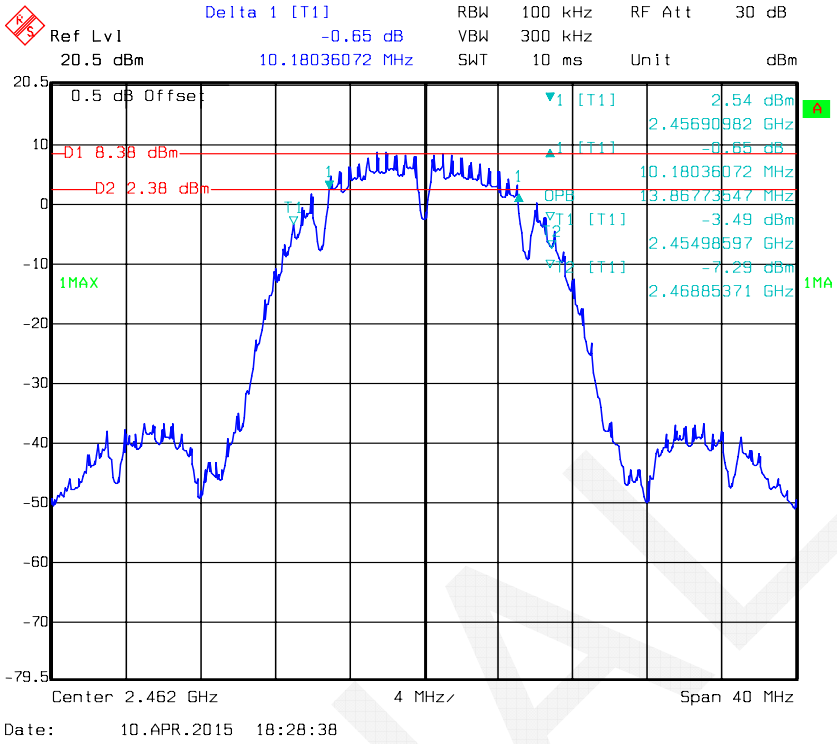
802.11b Low Channel – Chain0



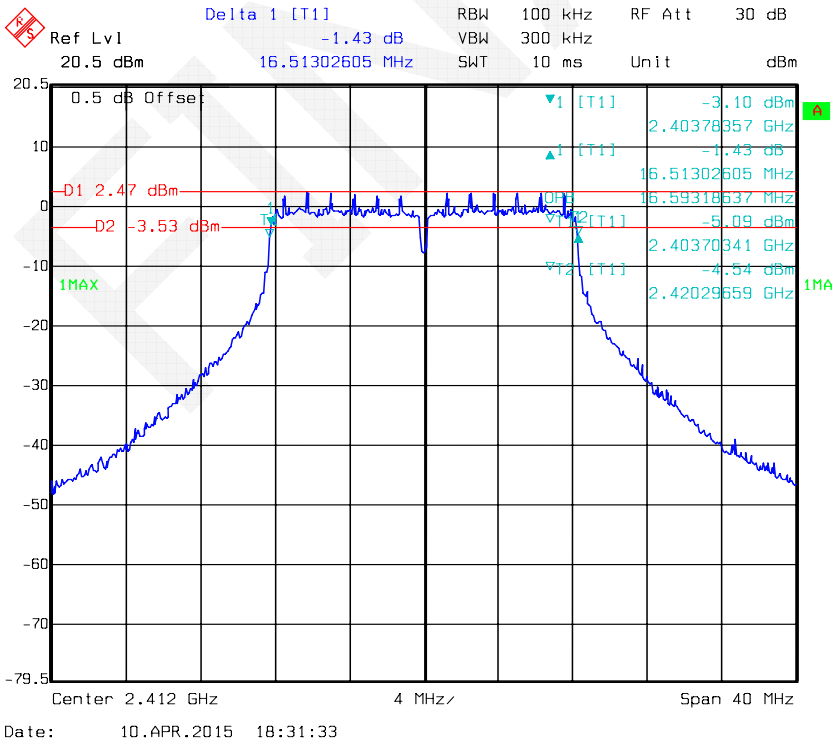
802.11b Middle Channel – Chain0



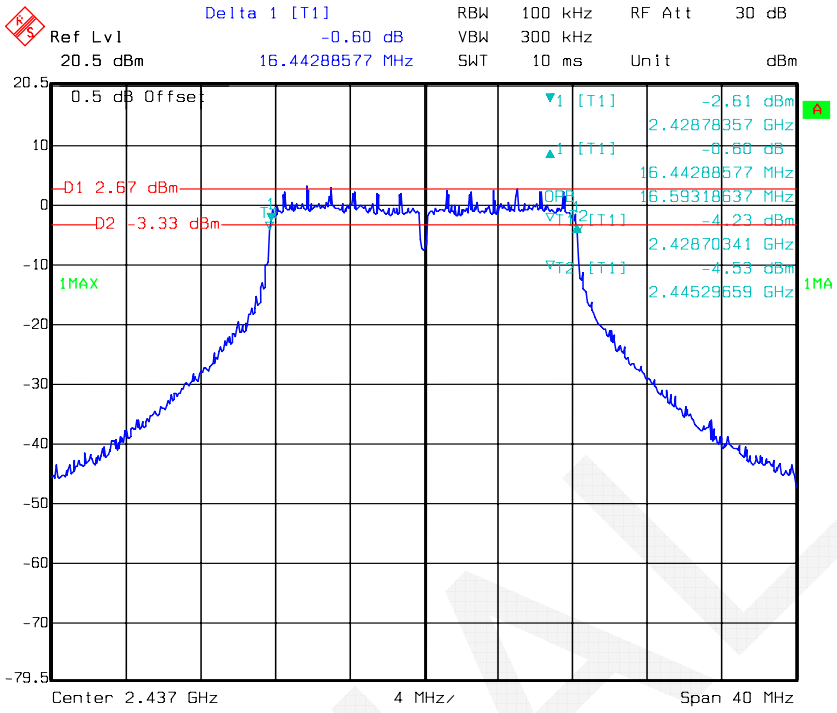
802.11b High Channel – Chain0



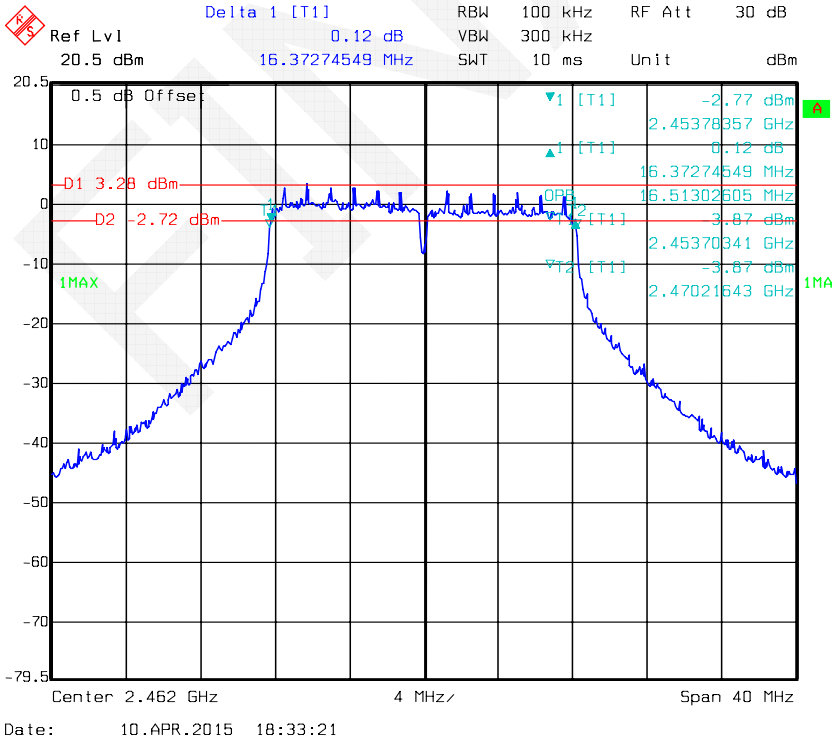
802.11g Low Channel – Chain0



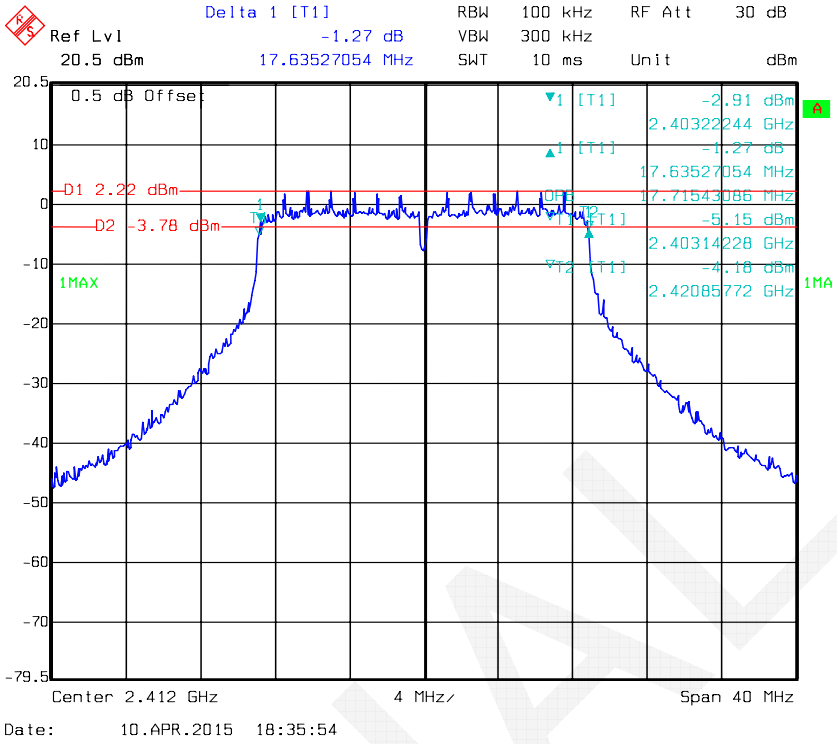
802.11g Middle Channel – Chain0



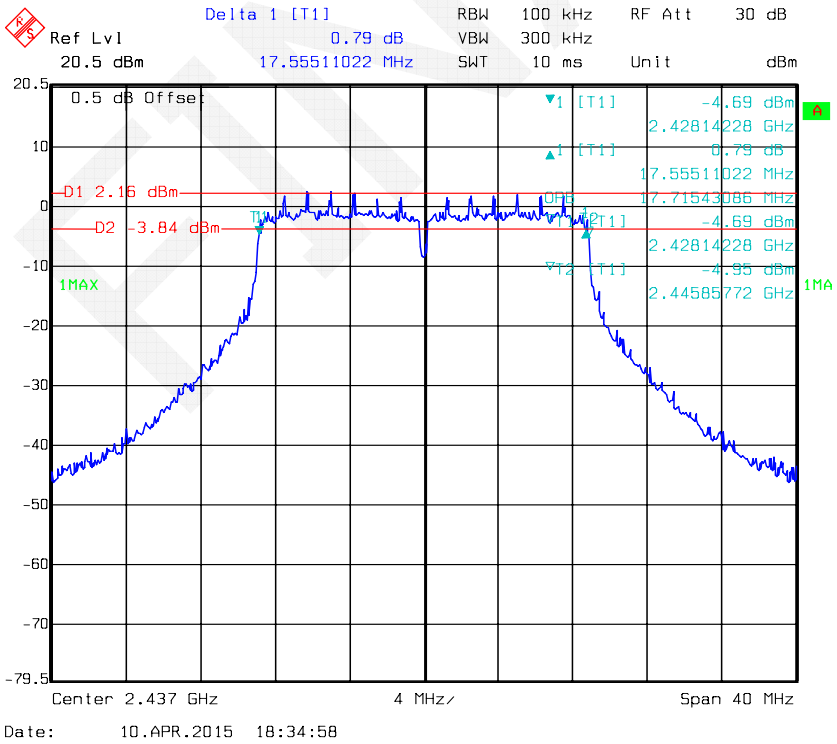
802.11g High Channel – Chain0



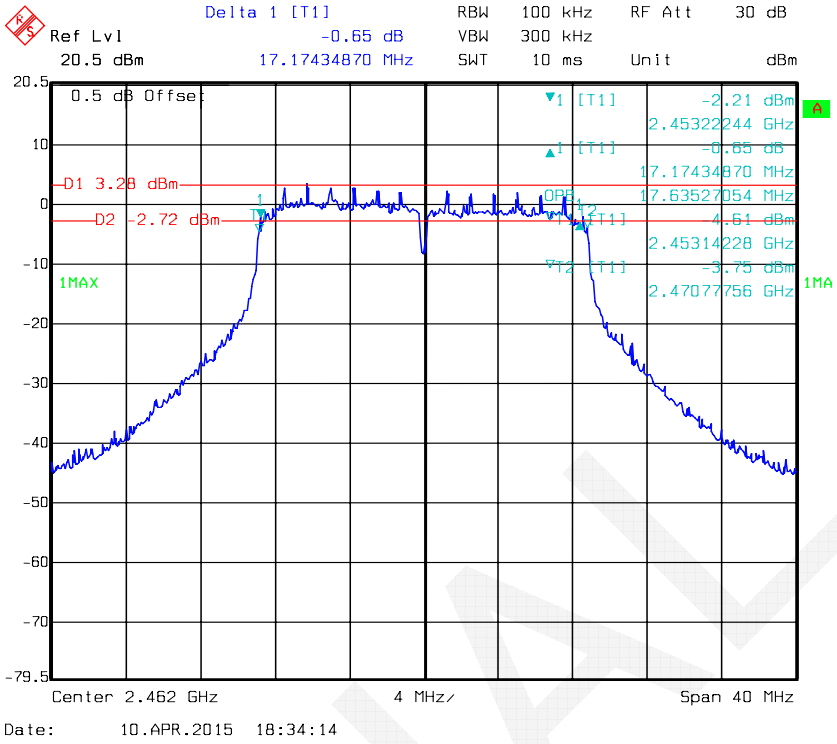
802.11n ht20 Low Channel – Chain0



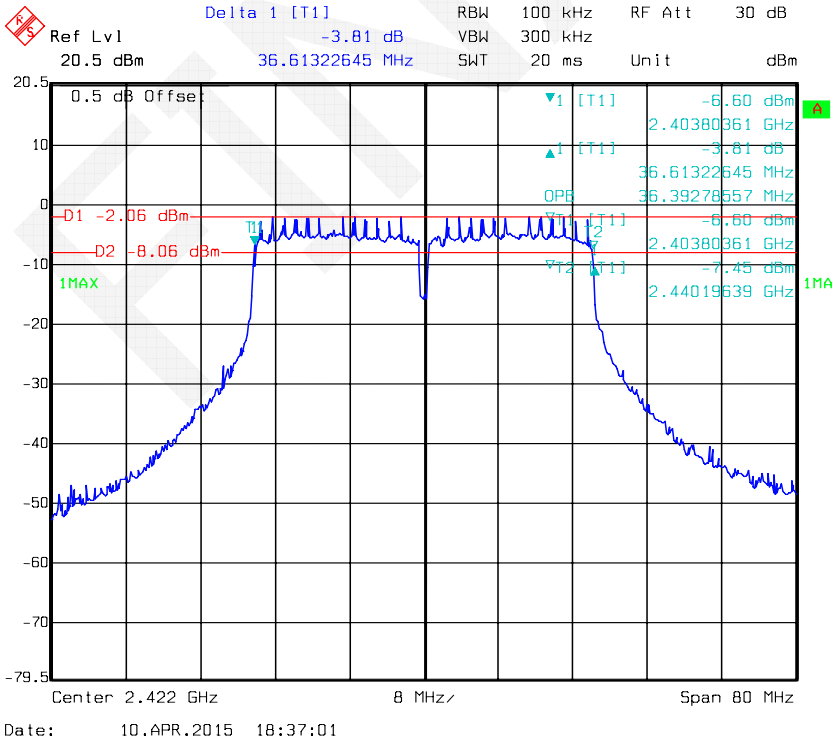
802.11n ht20 Middle Channel – Chain0



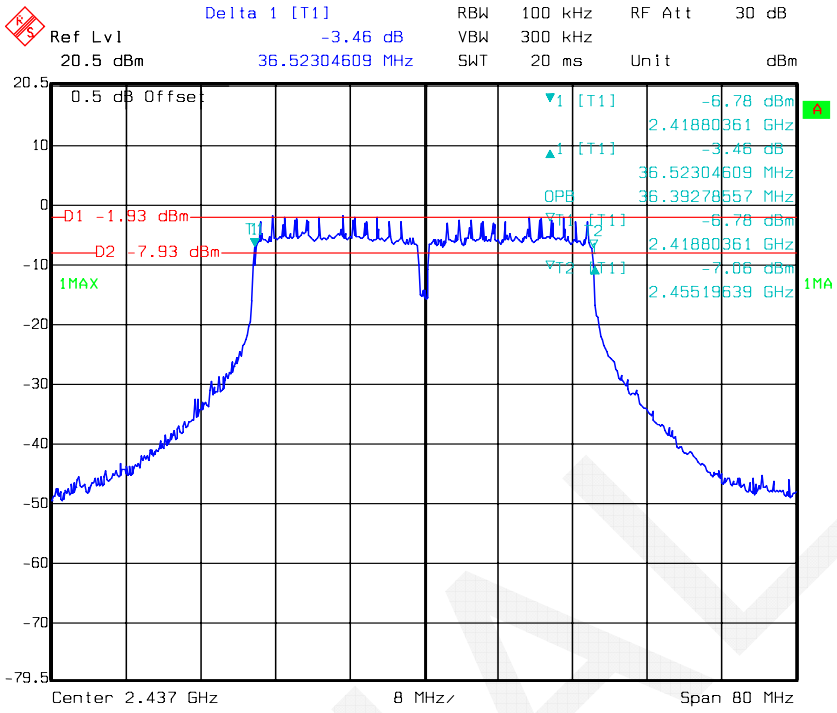
802.11n ht20 High Channel – Chain0



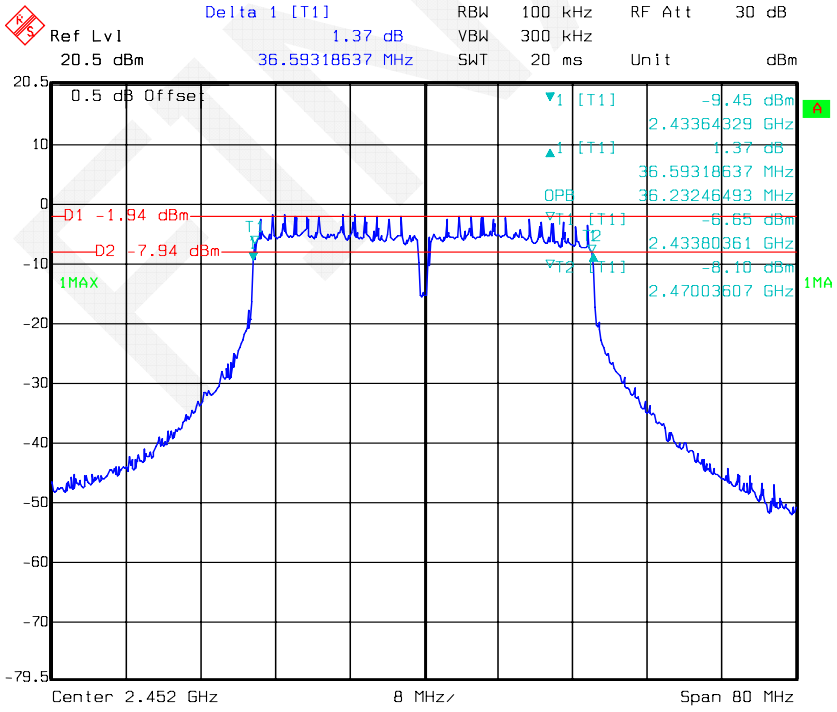
802.11n ht40 Low Channel – Chain0



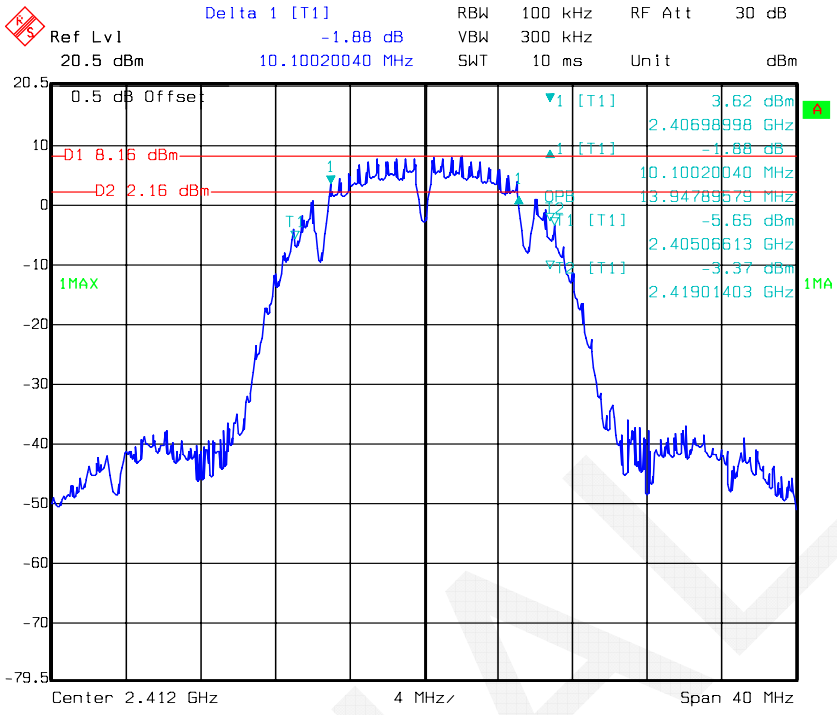
802.11n ht40 Middle Channel – Chain0



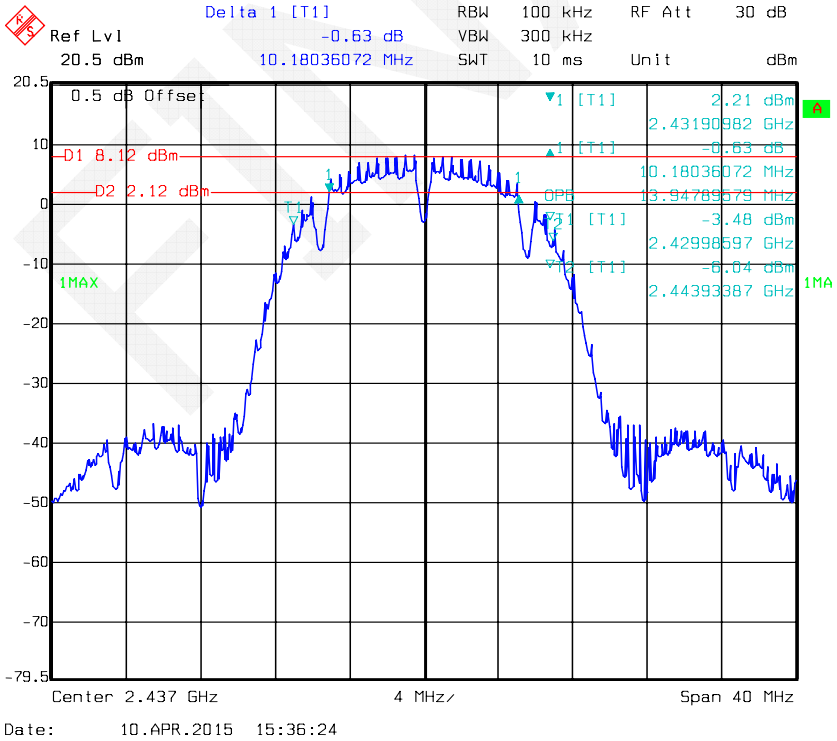
802.11n ht40 High Channel – Chain0



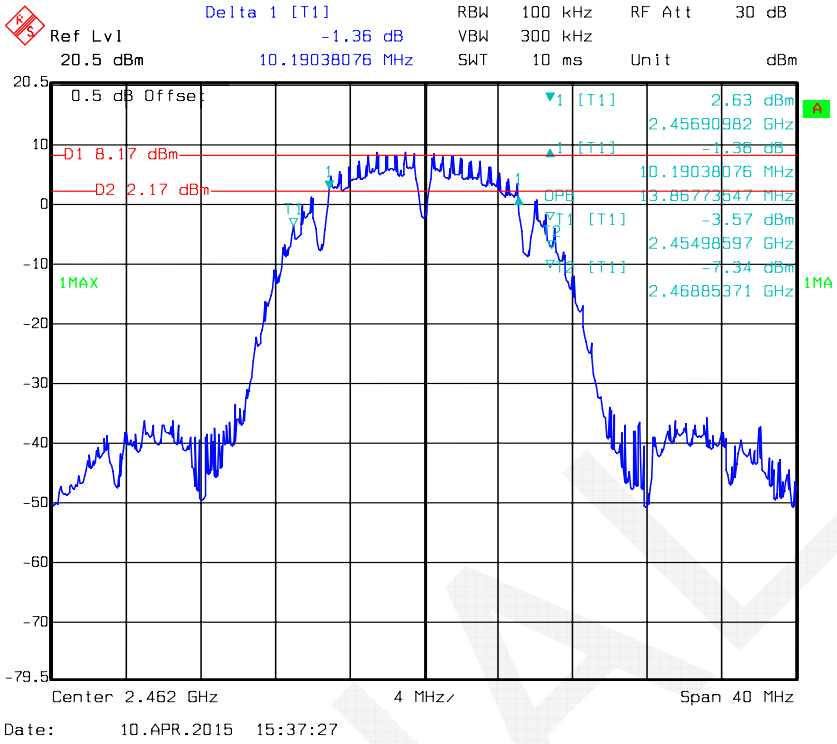
802.11b Low Channel – Chain1



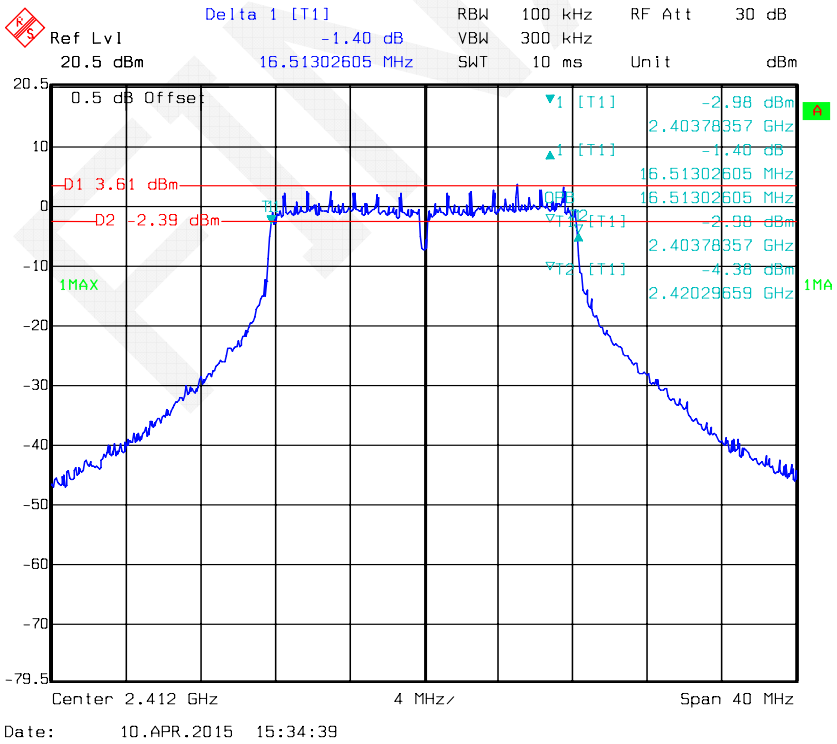
802.11b Middle Channel – Chain1



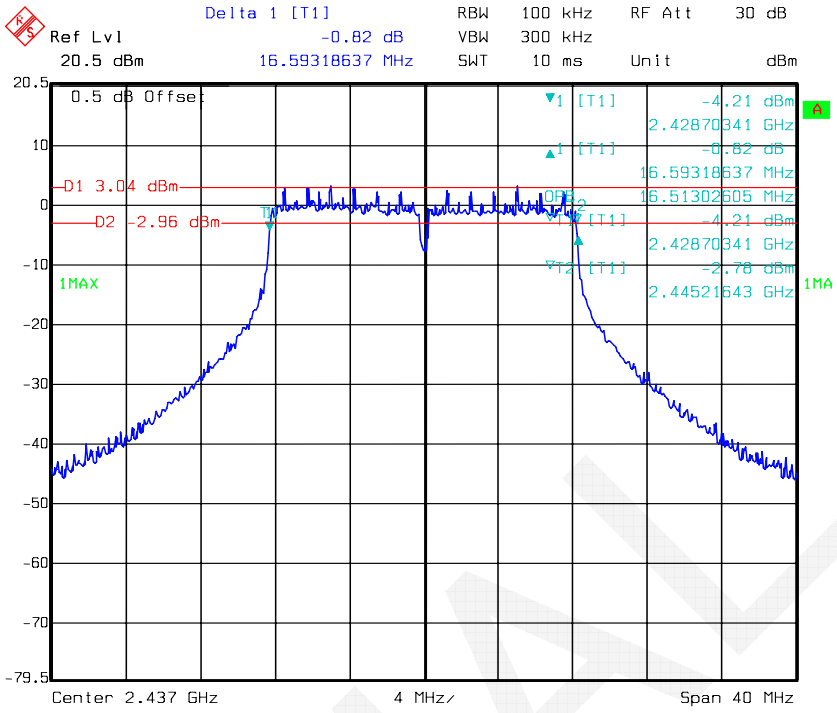
802.11b High Channel – Chain1



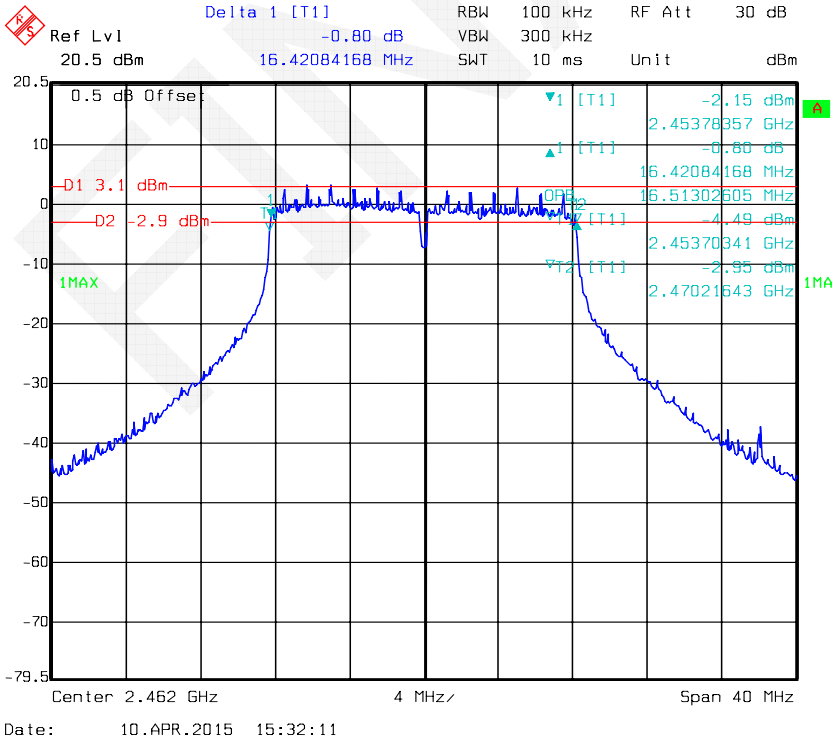
802.11g Low Channel – Chain1



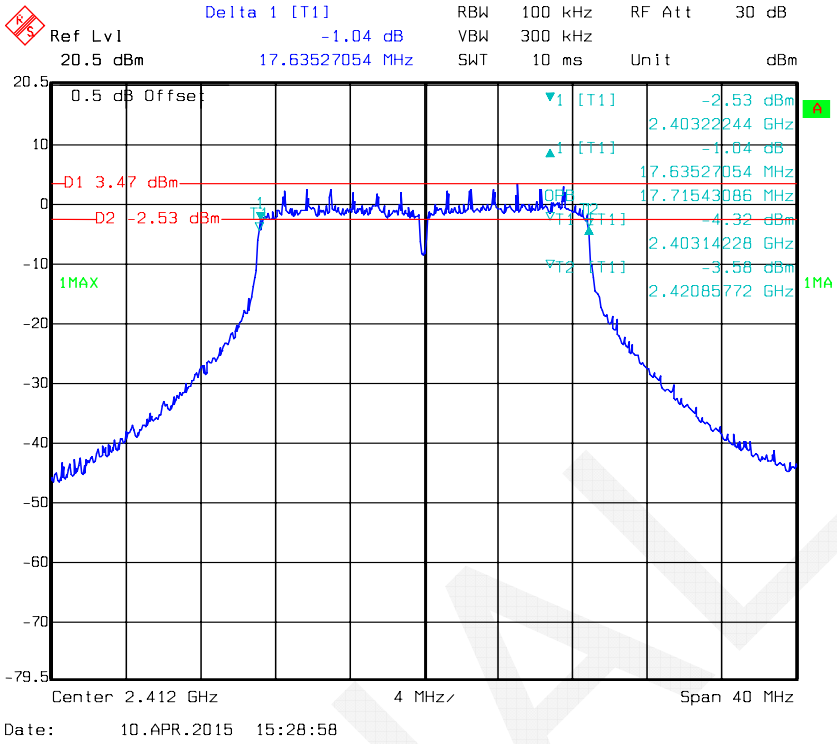
802.11g Middle Channel – Chain1



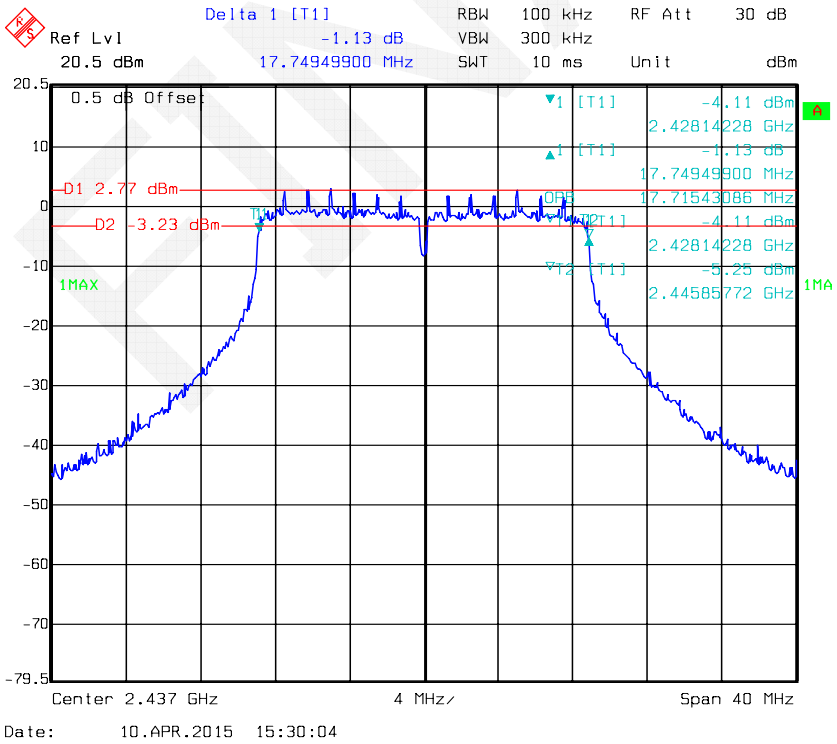
802.11g High Channel – Chain1



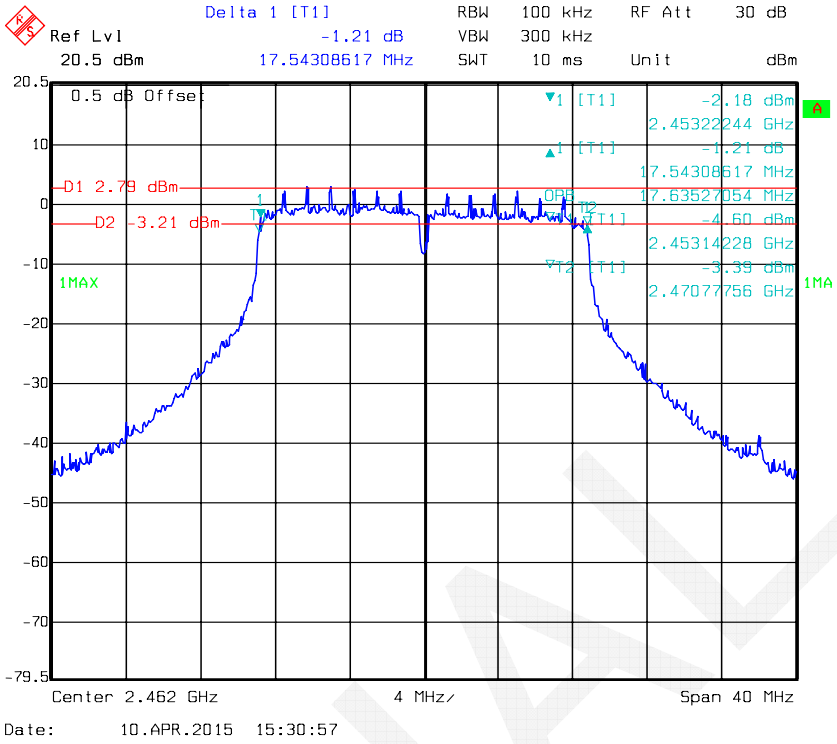
802.11n ht20 Low Channel – Chain1



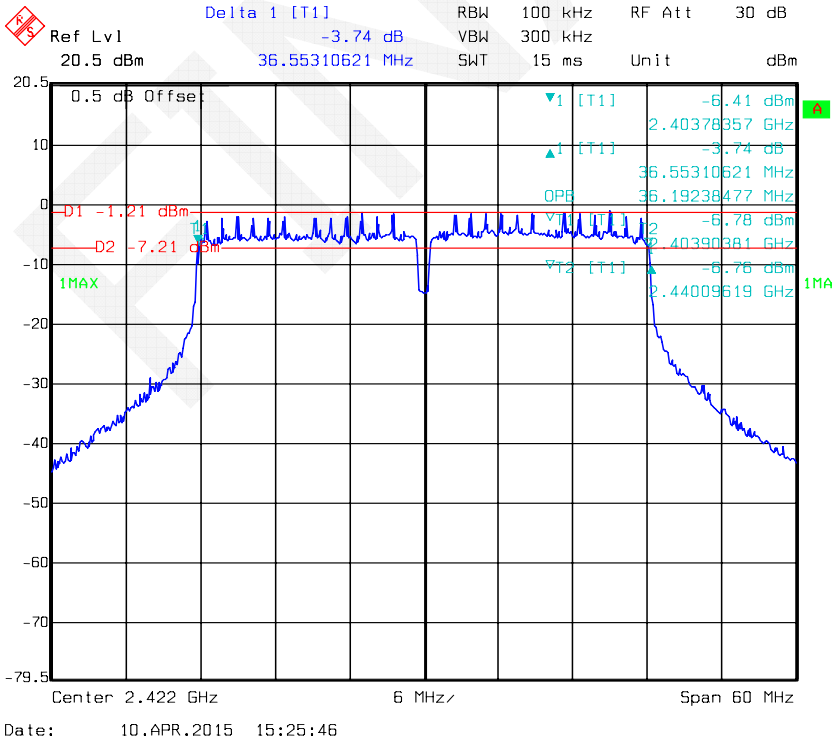
802.11n ht20 Middle Channel – Chain1



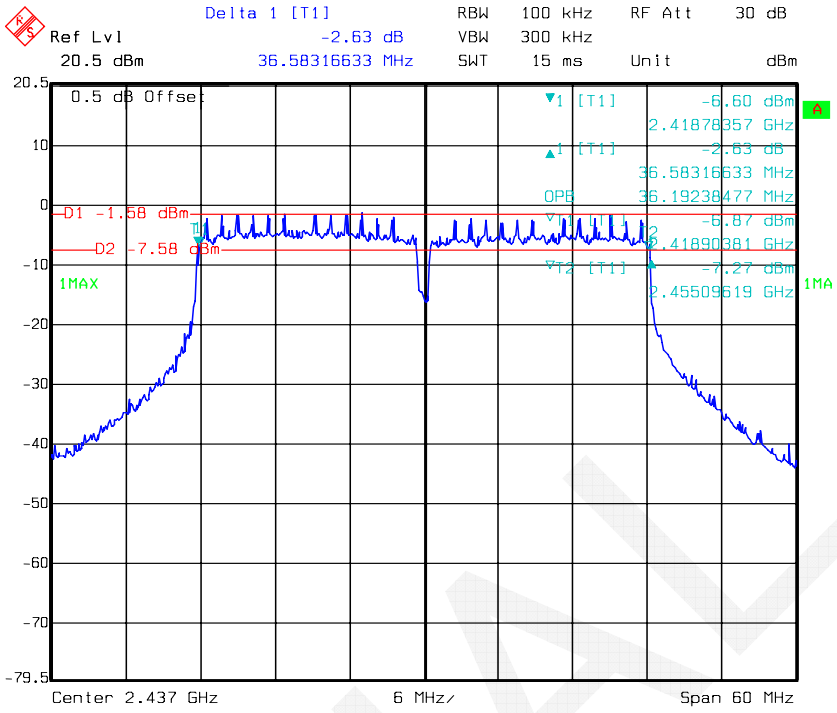
802.11n ht20 High Channel – Chain1



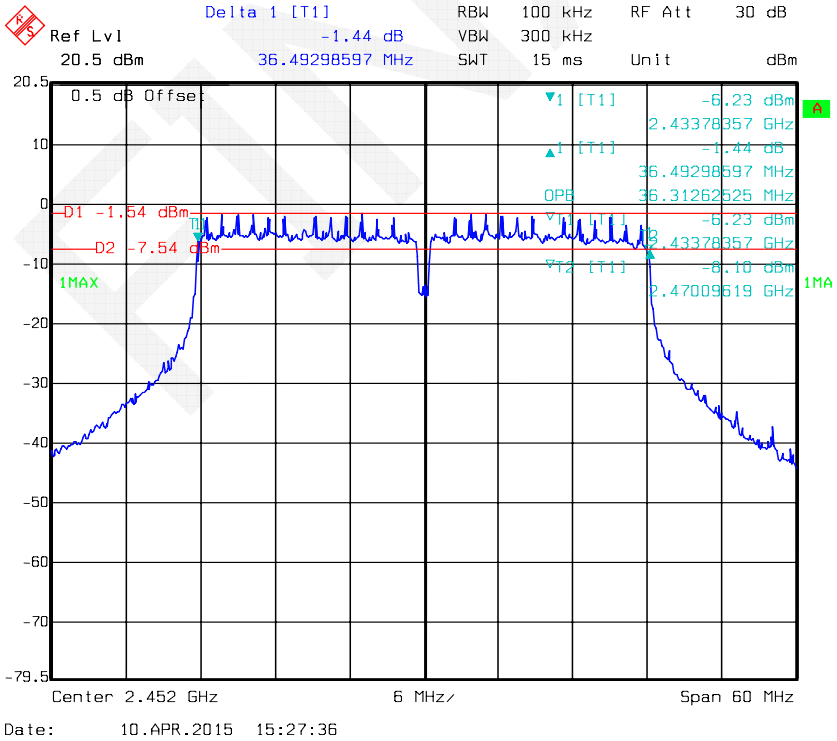
802.11n ht40 Low Channel – Chain1



802.11n ht40 Middle Channel – Chain1



802.11n ht40 High Channel – Chain1



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 v03r02

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:	24.1 °C
Relative Humidity:	54 %
ATM Pressure:	101.3 kPa

The testing was performed by Allen Qiao on 2015-04-10

Test Mode: Transmitting

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

Maximum peak conducted output power:

Mode	Channel	Frequency	Maximum Peak Conducted Output Power (dBm)			Limit
		MHz	Chain 0	Chain 1	Total	dBm
802.11b	Low	2412	19.81	19.56	22.70	29
	Middle	2437	19.67	19.48	22.59	29
	High	2462	20.03	19.95	23.00	29
802.11g	Low	2412	21.60	21.77	24.70	29
	Middle	2437	22.34	22.81	25.59	29
	High	2462	22.19	22.80	25.52	29
802.11n20	Low	2412	21.58	22.21	24.92	29
	Middle	2437	21.60	21.84	24.73	29
	High	2462	21.53	21.77	24.66	29
802.11n40	Low	2422	20.45	20.91	23.70	29
	Middle	2437	20.53	20.43	23.49	29
	High	2452	20.63	20.64	23.65	29

Maximum conducted Average output power:

Mode	Channel	Frequency	Maximum Conducted Average Output Power (dBm)			Limit
		MHz	Chain 0	Chain 1	Total	dBm
802.11b	Low	2412	19.35	19.22	22.30	29
	Middle	2437	19.17	19.14	22.17	29
	High	2462	19.69	19.70	22.71	29
802.11g	Low	2412	15.98	16.44	19.23	29
	Middle	2437	16.28	16.36	19.33	29
	High	2462	16.24	16.52	19.39	29
802.11n20	Low	2412	15.91	16.21	19.07	29
	Middle	2437	15.79	16.05	18.93	29
	High	2462	15.66	15.83	18.76	29
802.11n40	Low	2422	13.62	13.83	16.74	29
	Middle	2437	13.69	13.69	16.70	29
	High	2452	13.24	13.73	16.50	29

Note: 1. Directional gain = G_{ANT} + 10 log(N_{ANT}) dBi
= 8dBi＞6dBi, so the limit shall be reduced to 30-1= 29dBm
2. Duty cycle is 100%.

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	FSP 38	100478	2014-05-09	2015-05-09

*** 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

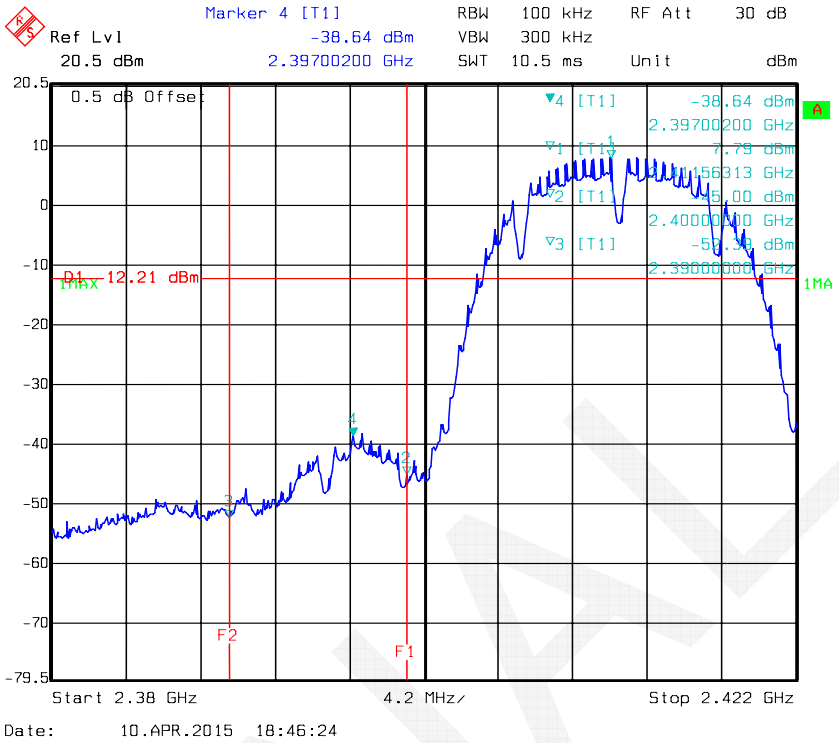
Temperature:	24.1 °C
Relative Humidity:	54 %
ATM Pressure:	101.3 kPa

The testing was performed by Allen Qiao on 2015-04-10.

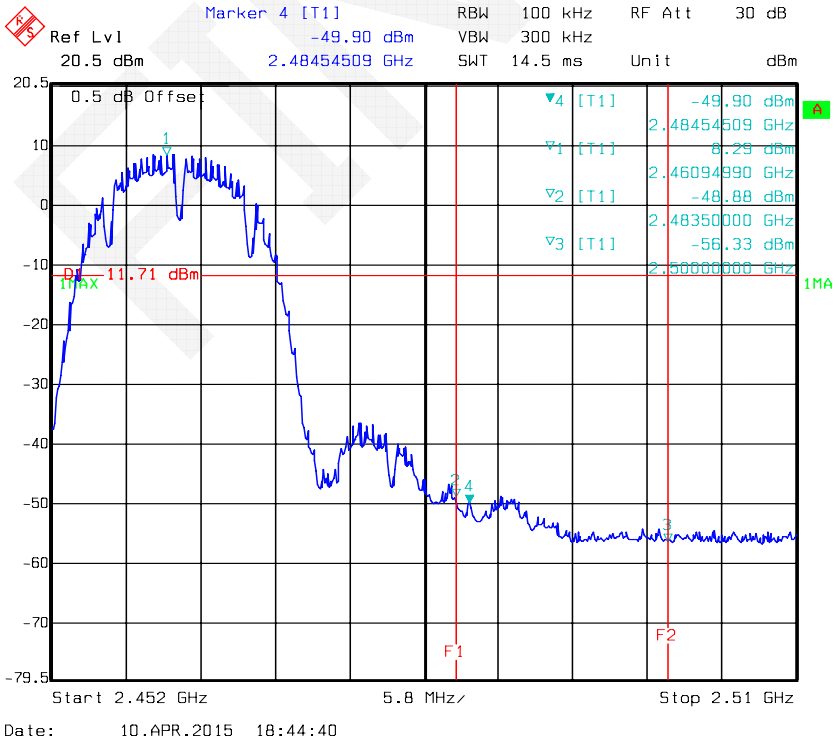
Test mode: Transmitting

Test Result: Compliant. Please refer to following plots.

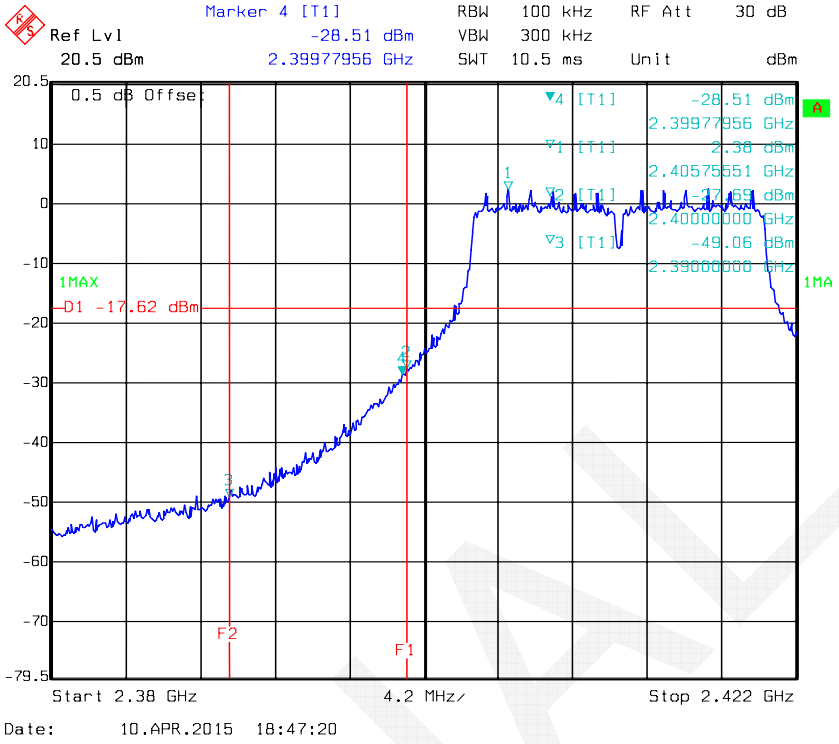
802.11b: Band Edge, Left Side – Chain0



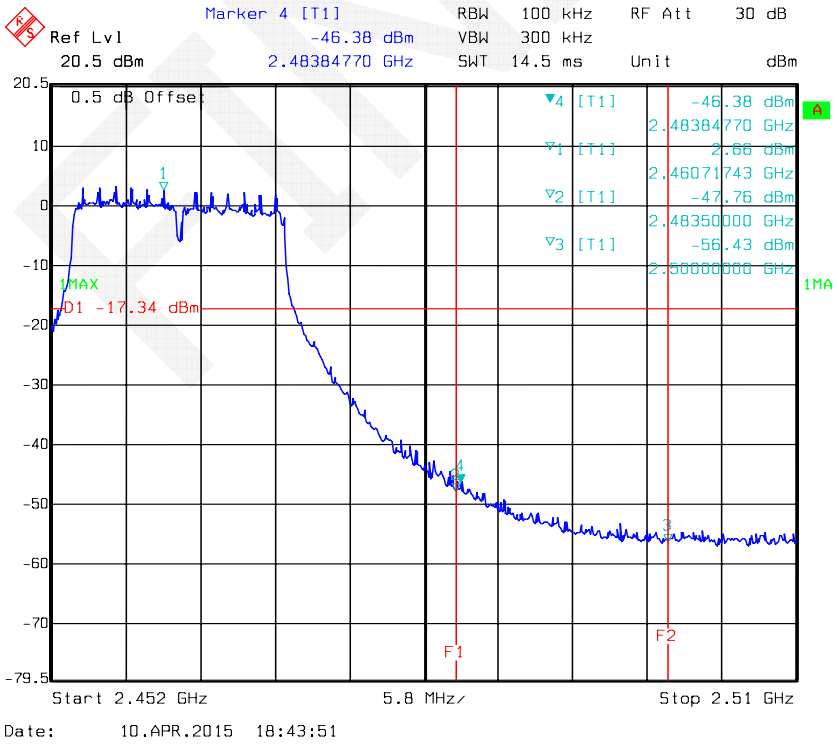
802.11b: Band Edge, Right Side – Chain0



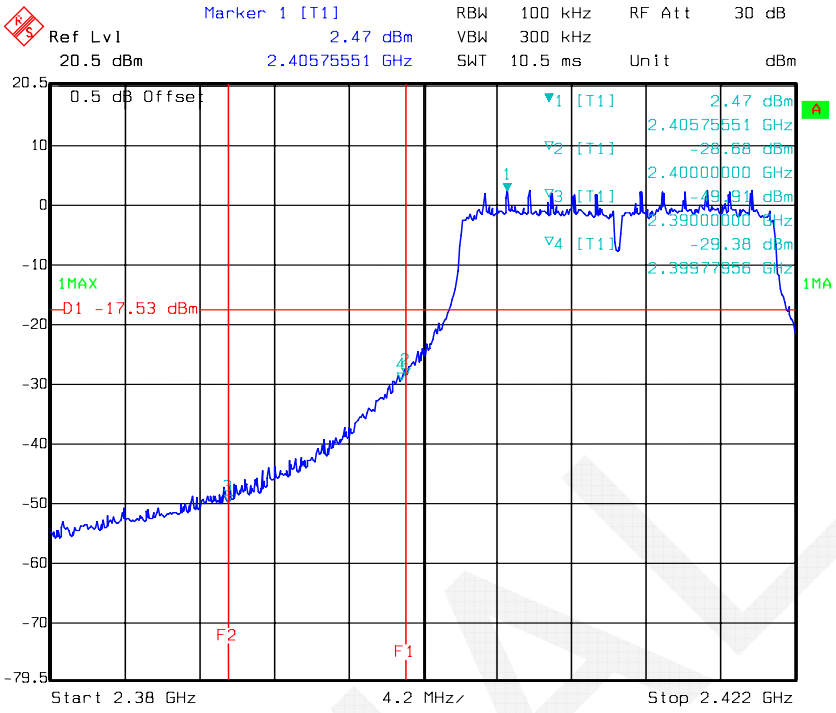
802.11g: Band Edge, Left Side – Chain0



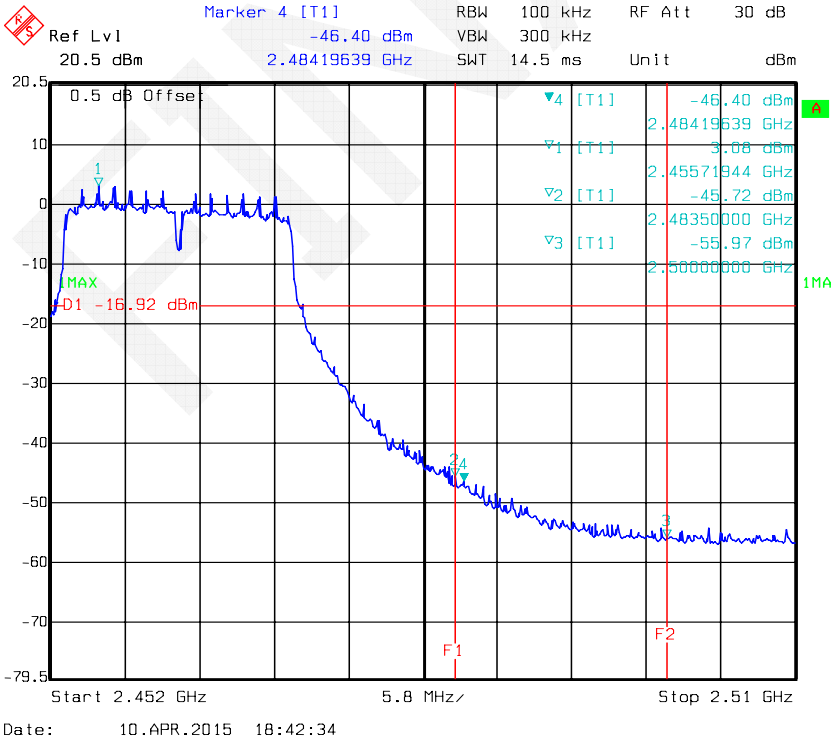
802.11g: Band Edge, Right Side – Chain0



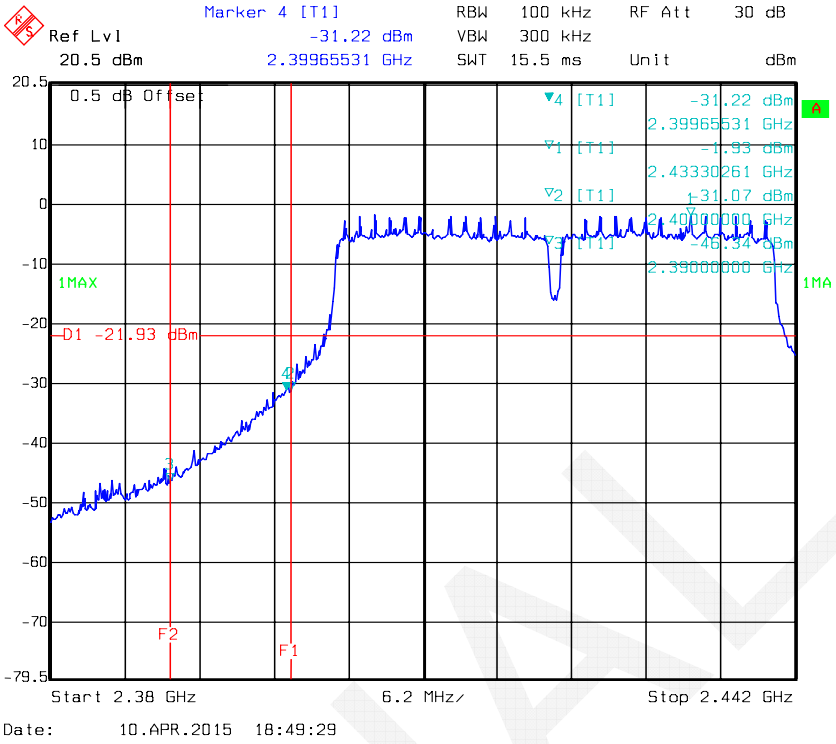
802.11n ht20 Band Edge, Left Side – Chain0



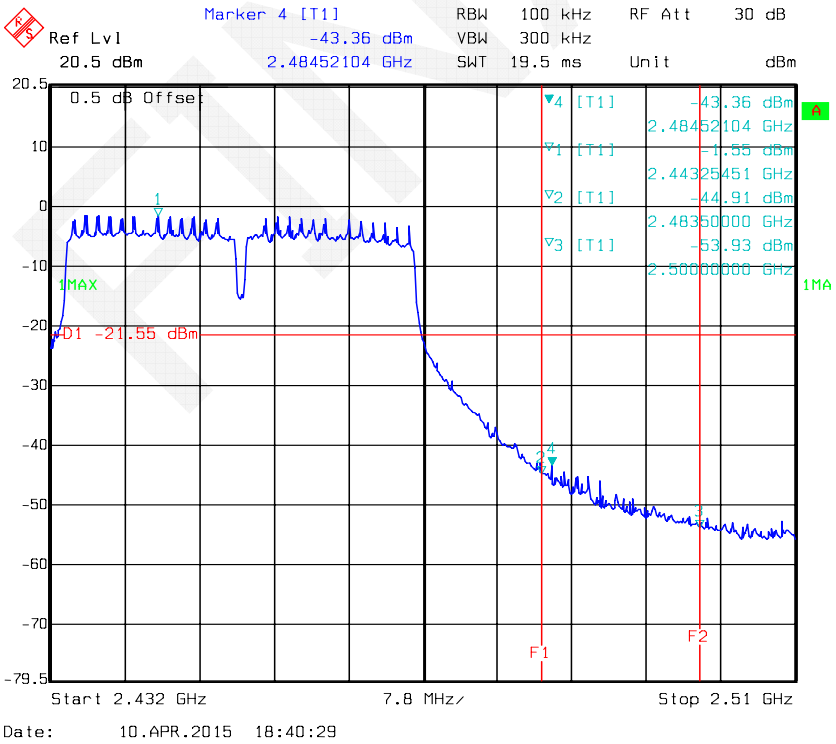
802.11n ht20 Band Edge, Right Side – Chain0



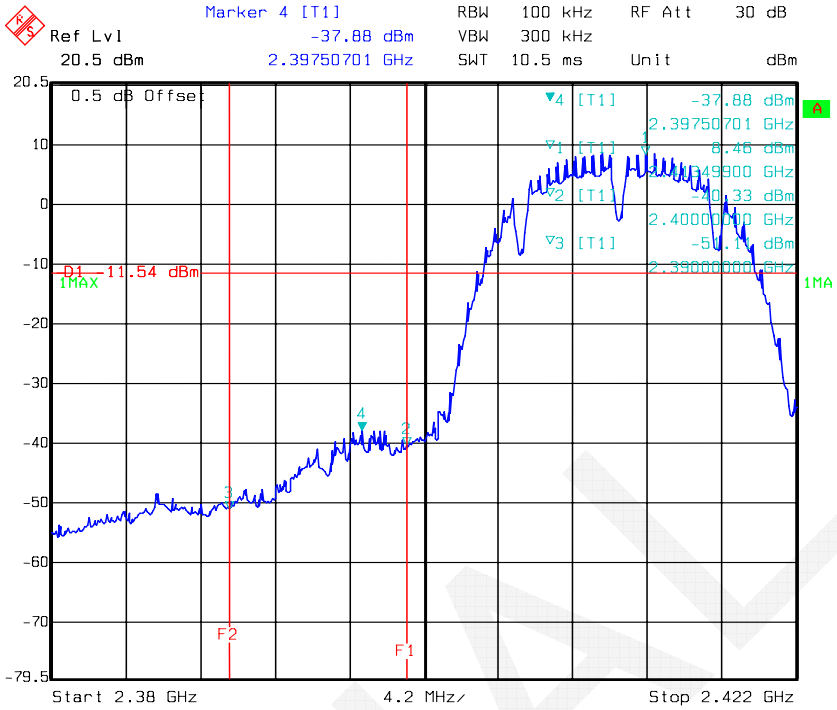
802.11n ht40 Band Edge, Left Side – Chain0



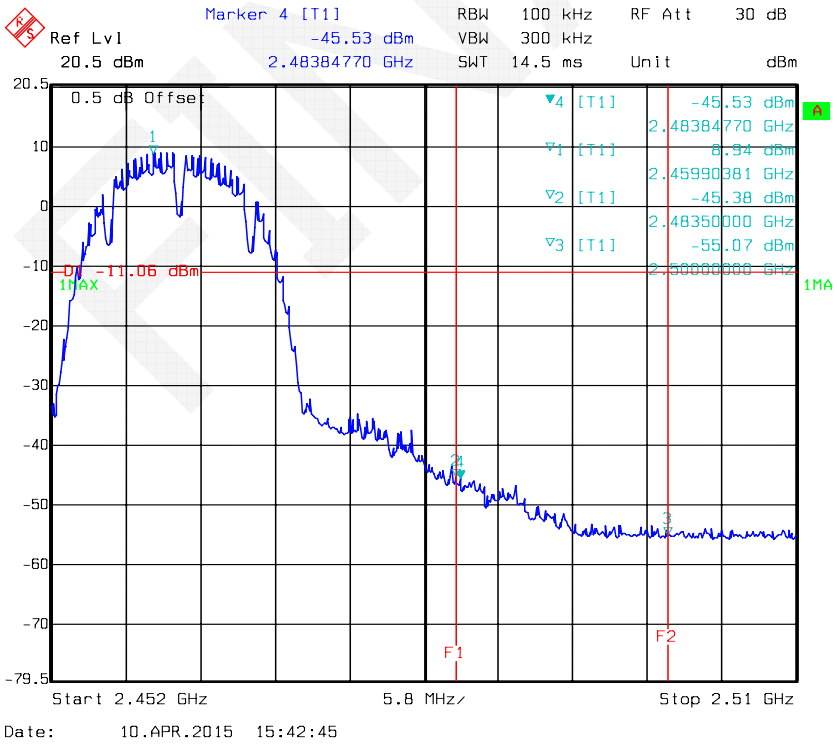
802.11n ht40 Band Edge, Right Side – Chain0



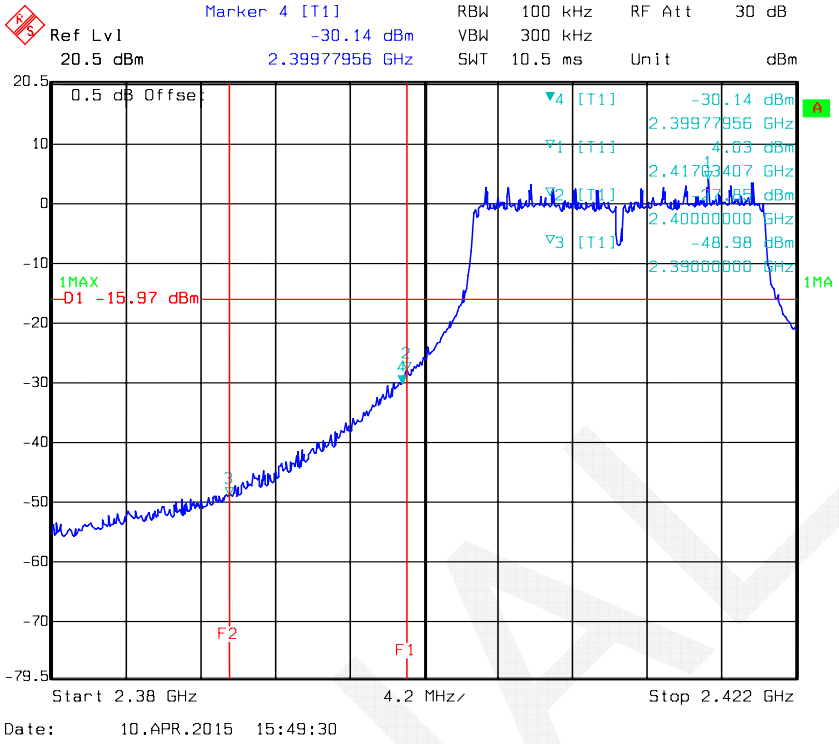
802.11b: Band Edge, Left Side – Chain1



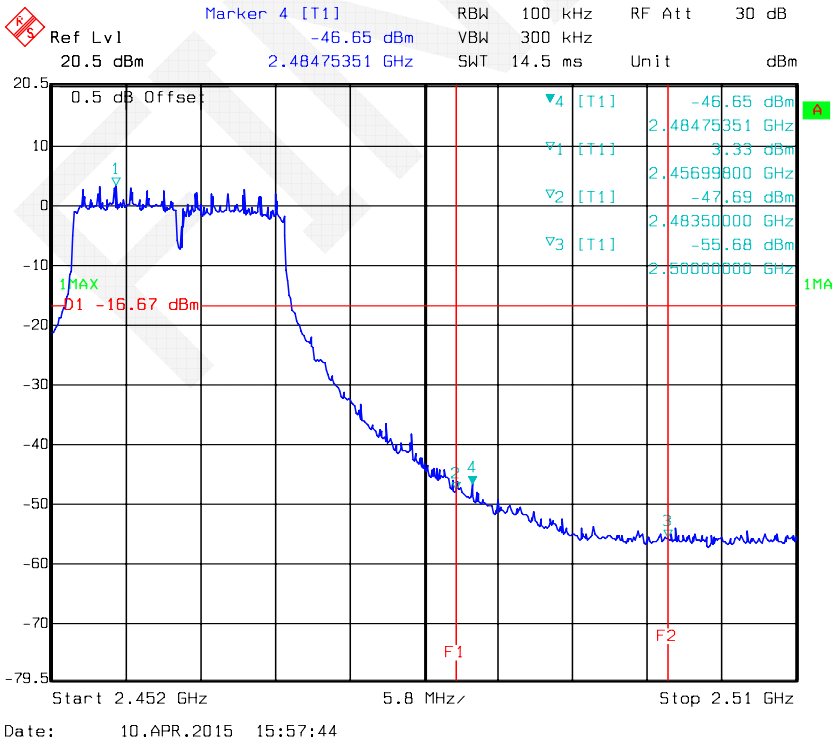
802.11b: Band Edge, Right Side – Chain1



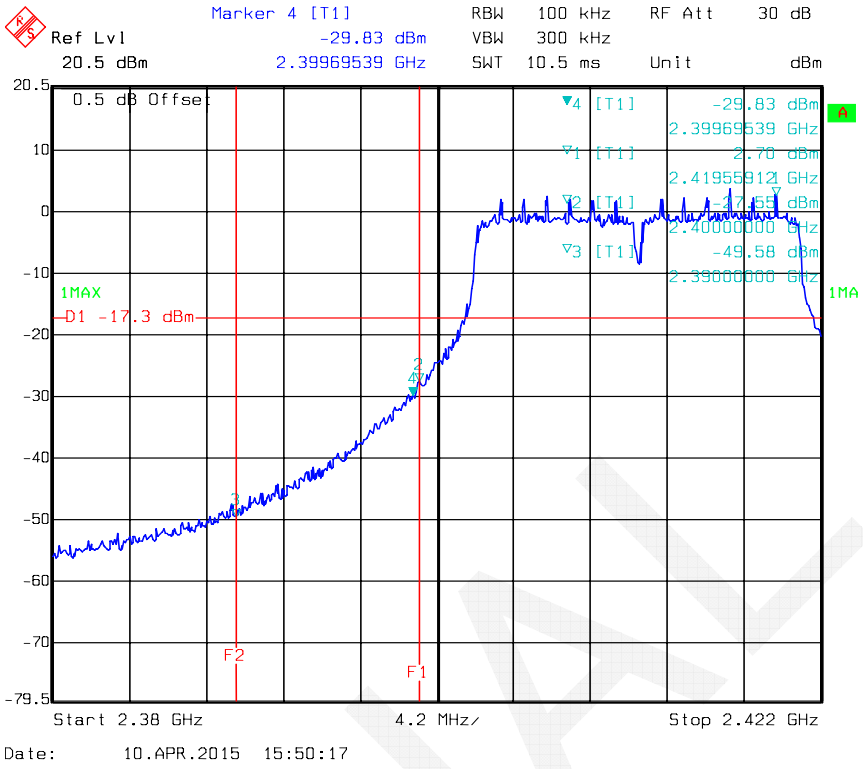
802.11g: Band Edge, Left Side – Chain1



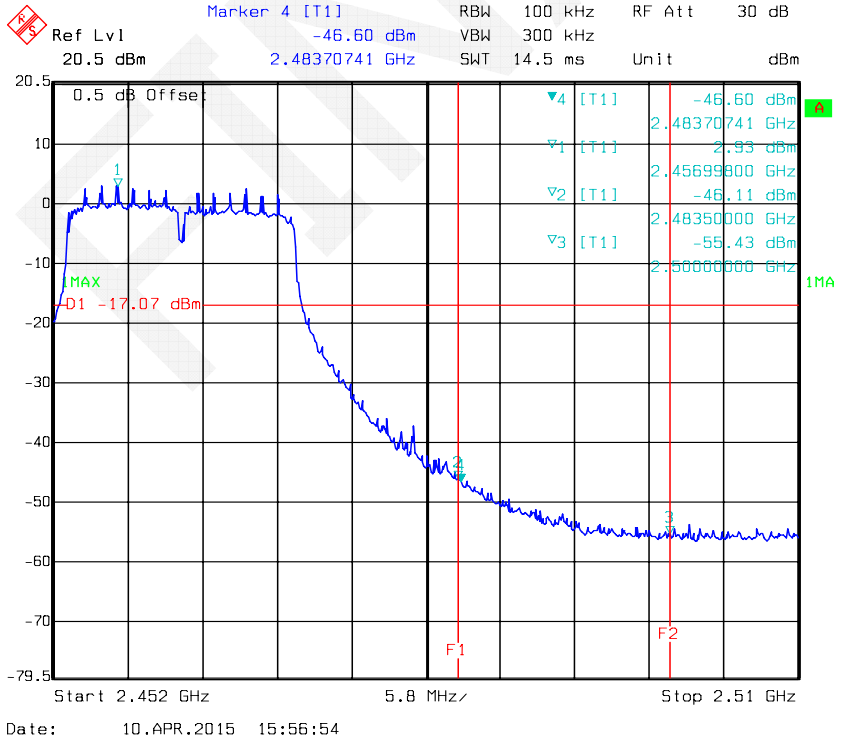
802.11g: Band Edge, Right Side – Chain1



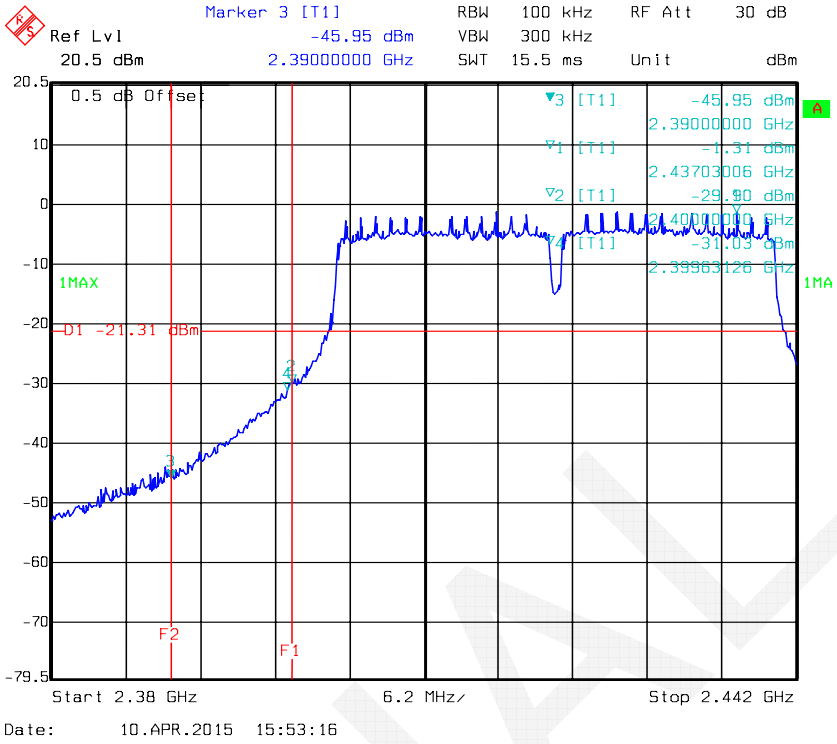
802.11n ht20 Band Edge, Left Side – Chain1



802.11n ht20 Band Edge, Right Side – Chain1

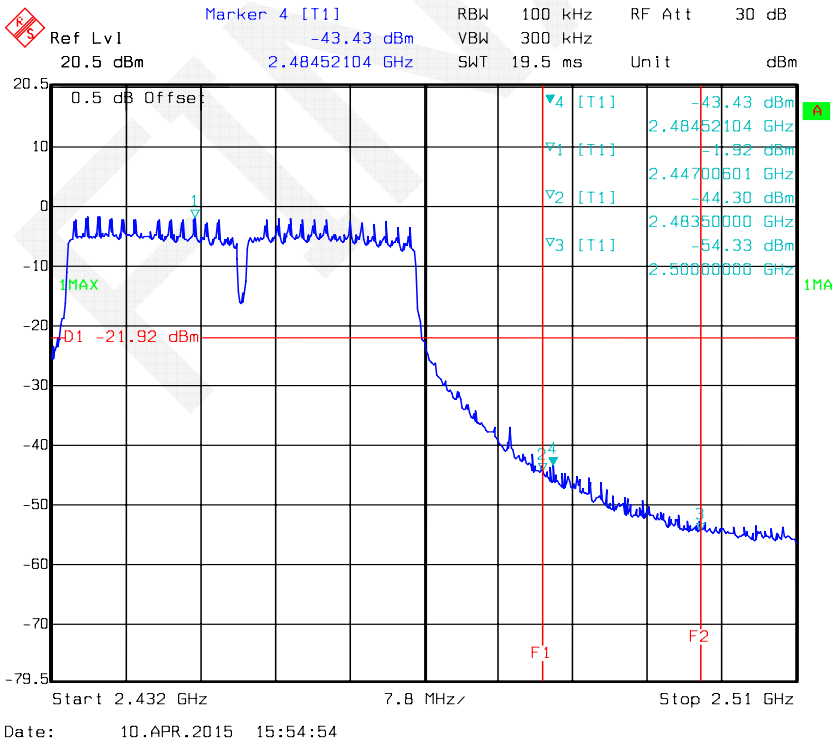


802.11n ht40 Band Edge, Left Side – Chain1



Date: 10.APR.2015 15:53:16

802.11n ht40 Band Edge, Right Side – Chain1



Date: 10.APR.2015 15:54:54

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 v03r02 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	FSP 38	100478	2014-05-09	2015-05-09

*** 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:	24.1 -26.5°C
Relative Humidity:	54-52 %
ATM Pressure:	101.3-101.2 kPa

The testing was performed by Allen Qiao on 2015-04-10 and 2015-04-24.

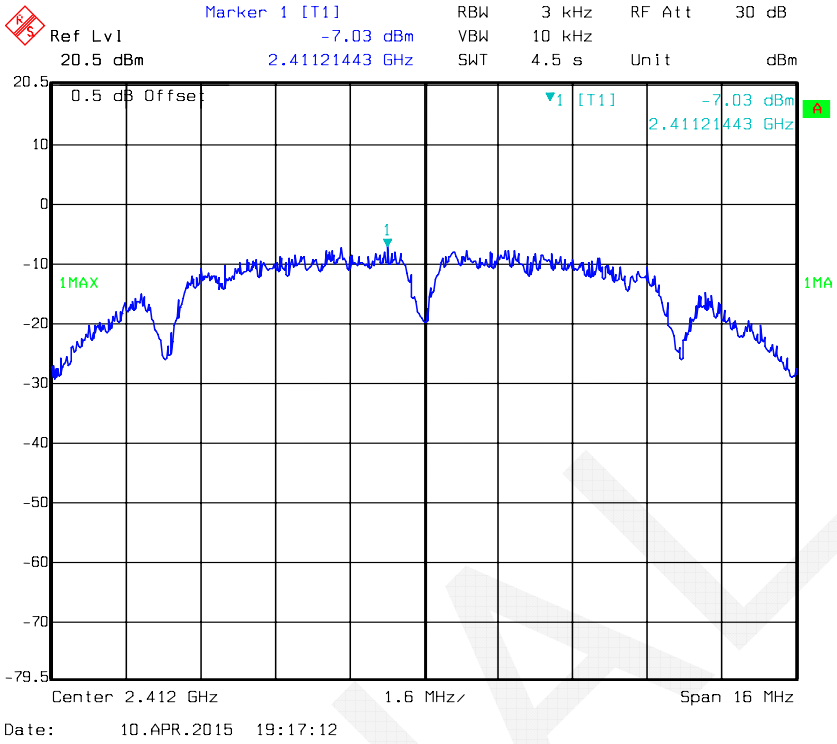
Test Mode: Transmitting

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

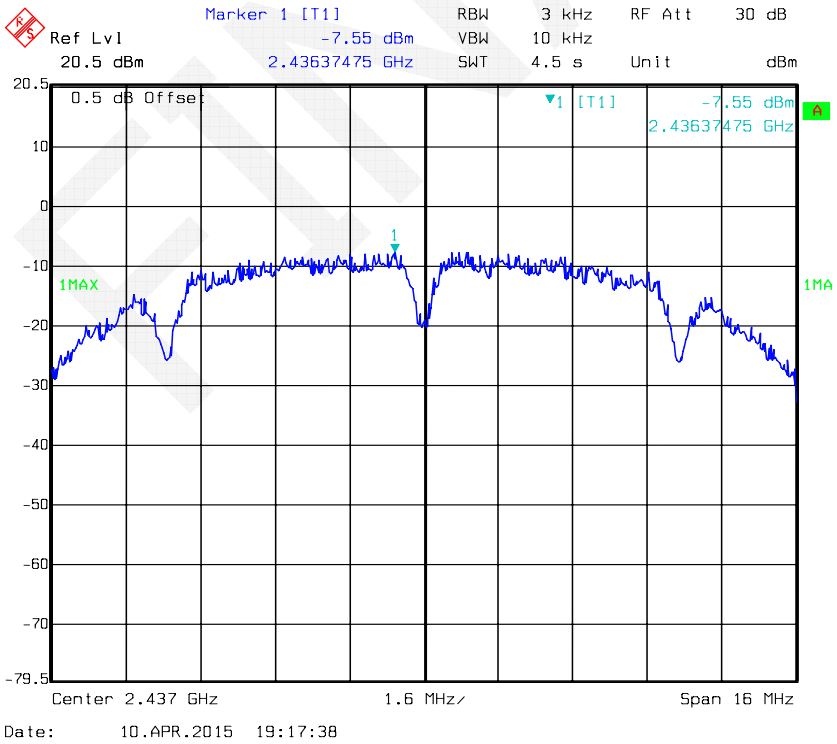
Mode	Channel	Frequency	Power Spectral Density (dBm)			Limit
		MHz	Chain 0	Chain 1	Total	dBm/3kHz
802.11b	Low	2412	-7.03	-6.63	-3.82	≤7
	Middle	2437	-7.55	-6.87	-4.19	≤7
	High	2462	-6.46	-6.68	-3.56	≤7
802.11g	Low	2412	-10.06	-11.55	-7.73	≤7
	Middle	2437	-11.63	-12.35	-8.96	≤7
	High	2462	-11.48	-11.62	-8.54	≤7
802.11n20	Low	2412	-12.53	-12.89	-9.70	≤7
	Middle	2437	-12.61	-12.71	-9.65	≤7
	High	2462	-12.27	-12.80	-9.52	≤7
802.11n40	Low	2422	-16.09	-15.75	-12.91	≤7
	Middle	2437	-15.57	-16.27	-12.90	≤7
	High	2452	-15.62	-15.59	-12.59	≤7

Note: 1. Directional gain = G_{ANT} + 10 log(N_{ANT}) dBi
= 8dBi＞6dBi, so the limit shall be reduced to 8-1= 7dBm
2. Duty cycle is 100%.

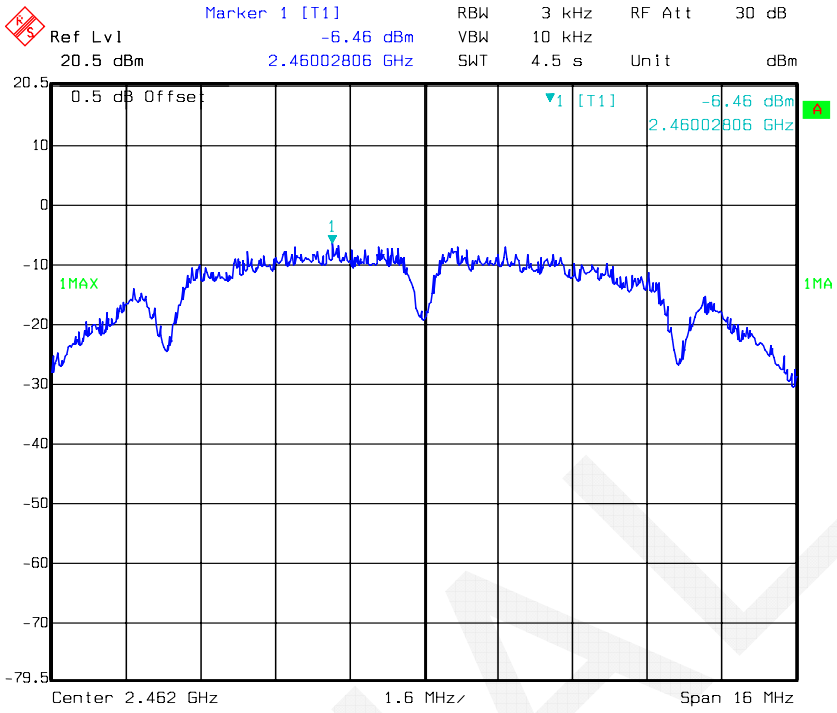
Power Spectral Density, 802.11b Low Channel – Chain0



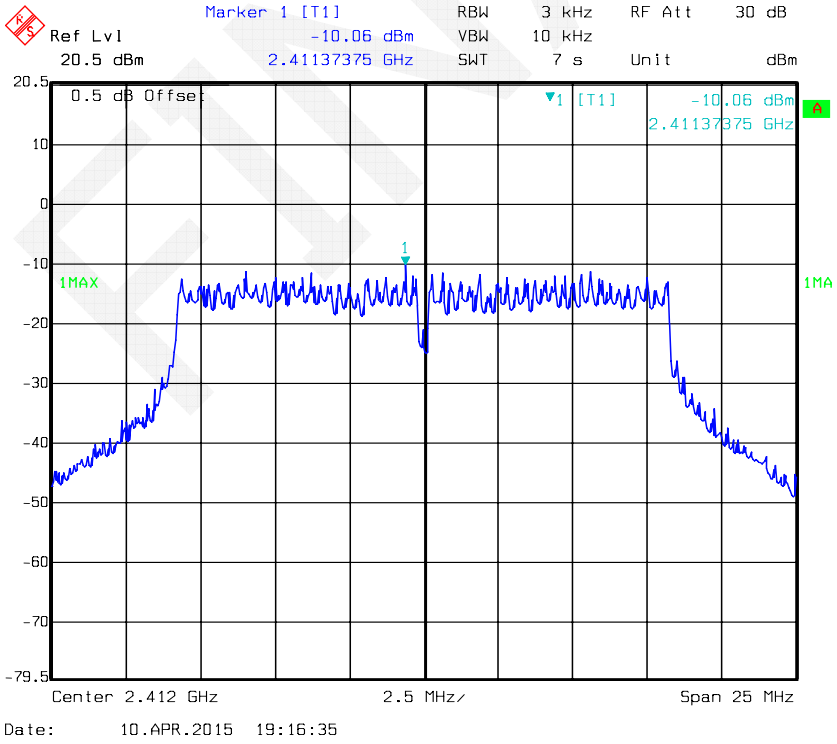
Power Spectral Density, 802.11b Middle Channel – Chain0



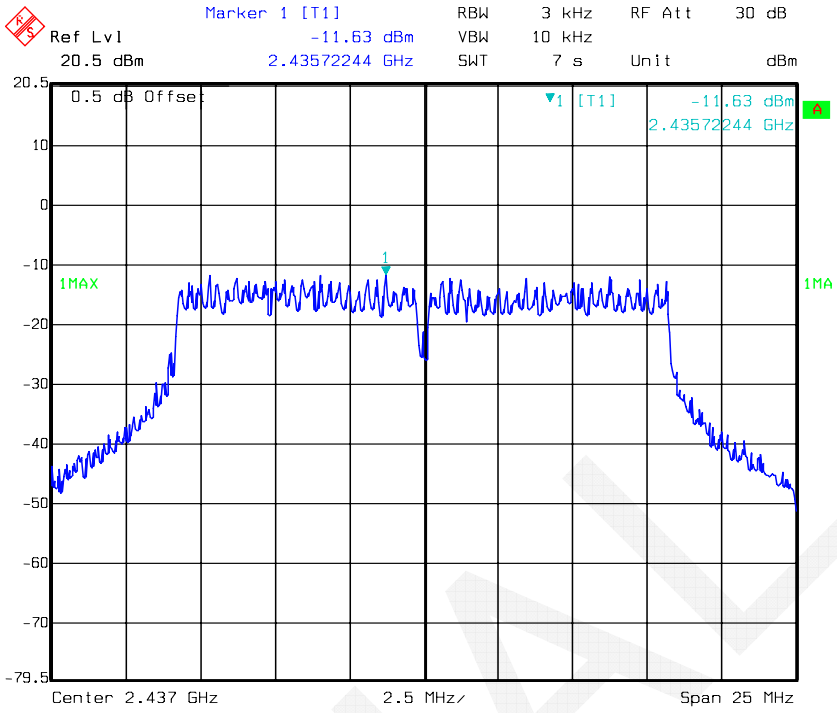
Power Spectral Density, 802.11b High Channel – Chain0



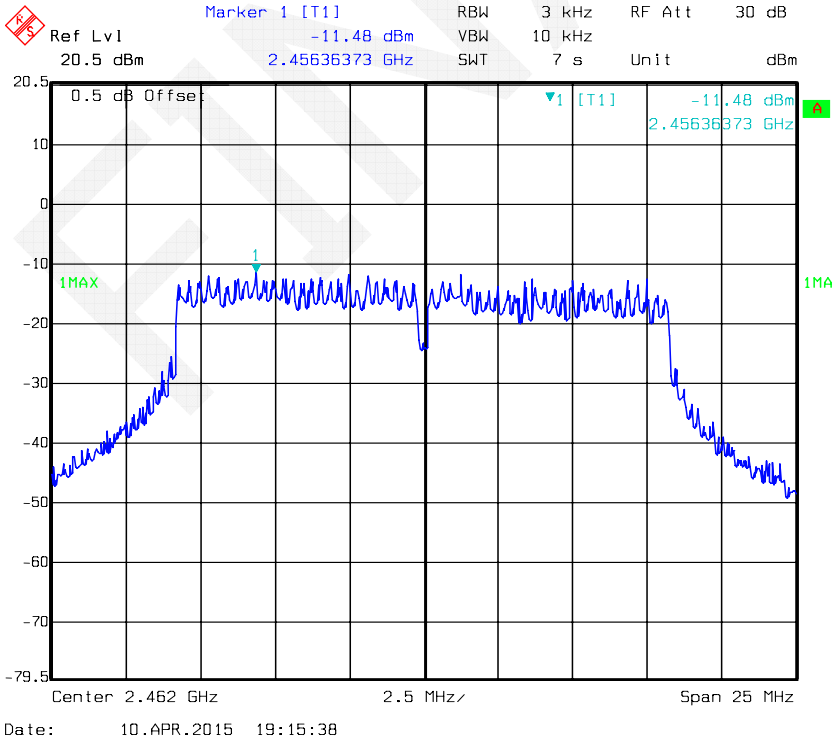
Power Spectral Density, 802.11g Low Channel – Chain0



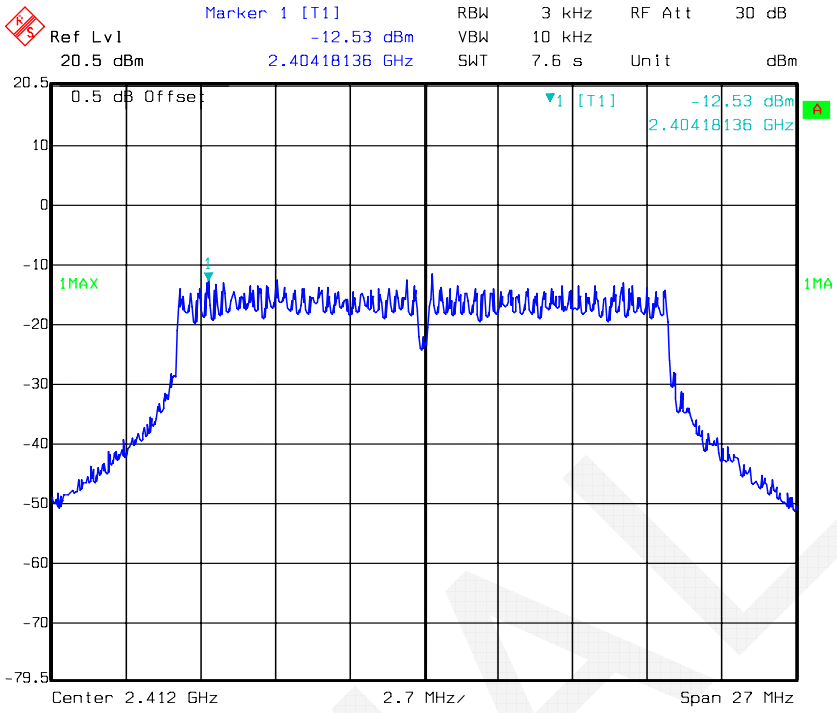
Power Spectral Density, 802.11g Middle Channel – Chain0



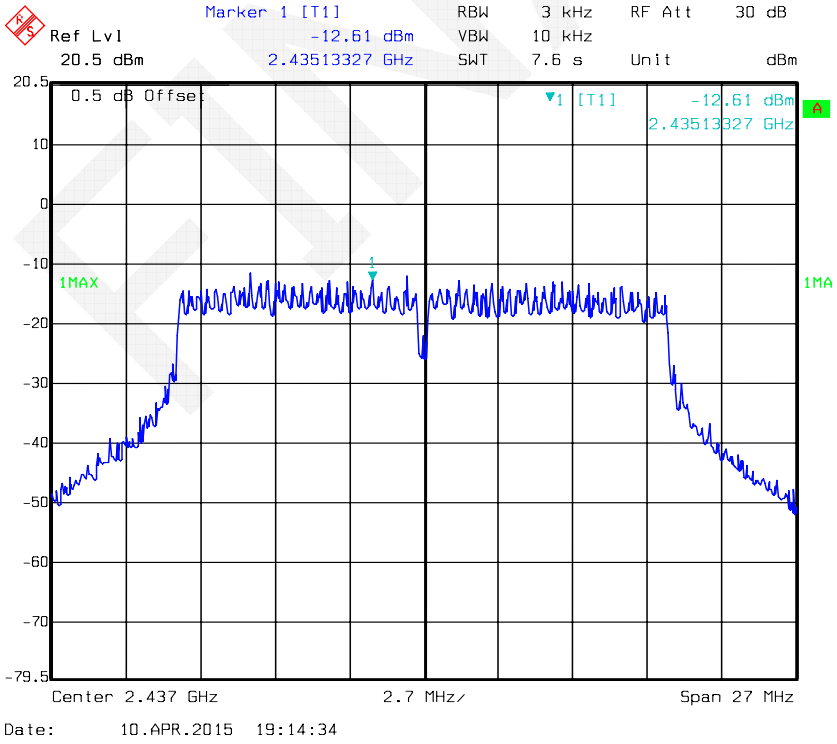
Power Spectral Density, 802.11g High Channel – Chain0



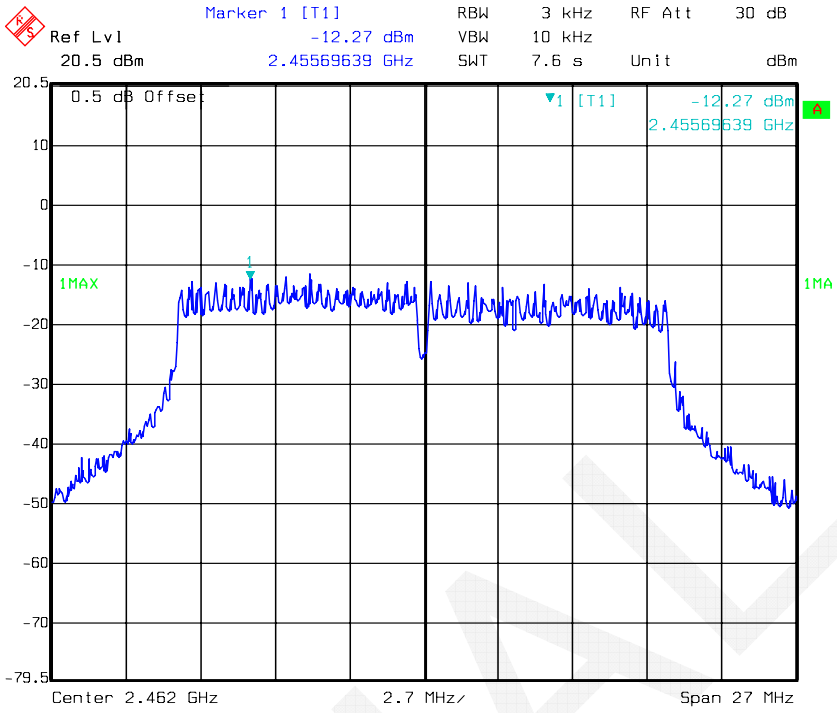
Power Spectral Density, 802.11n ht20 Low Channel – Chain0



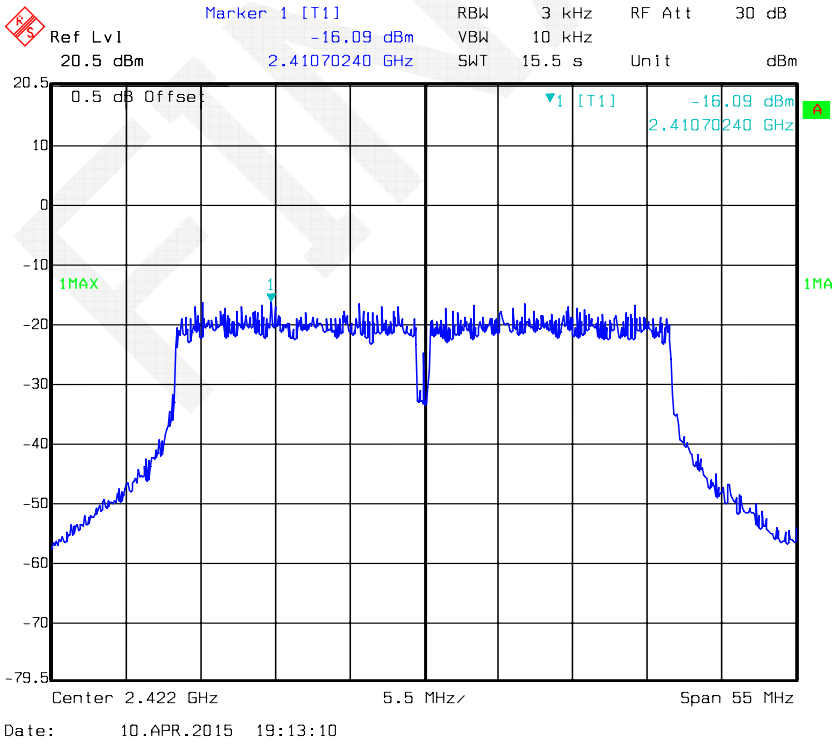
Power Spectral Density, 802.11n ht20 Middle Channel – Chain0



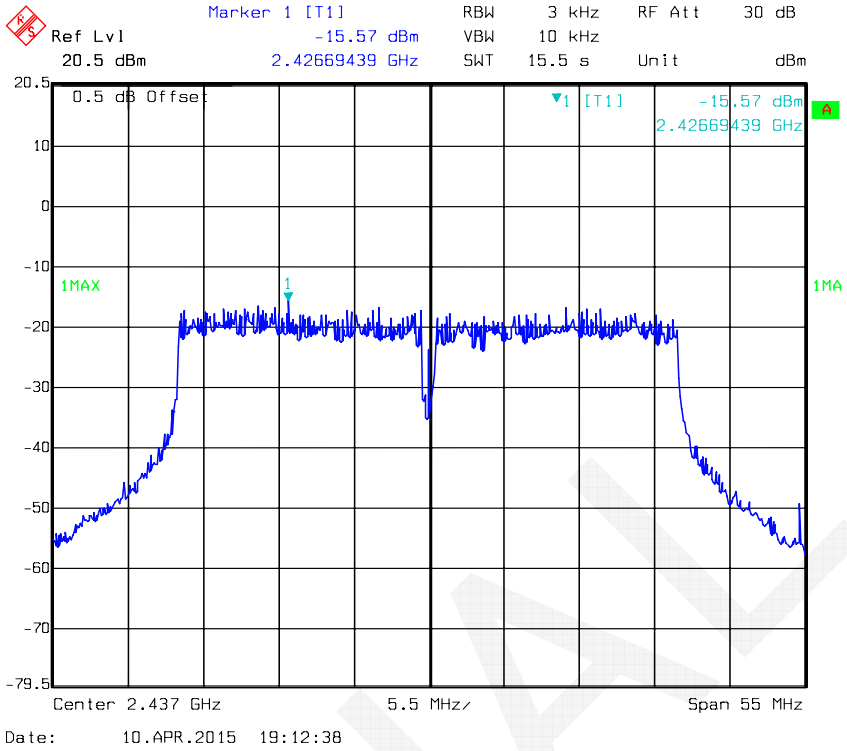
Power Spectral Density, 802.11n ht20 High Channel – Chain0



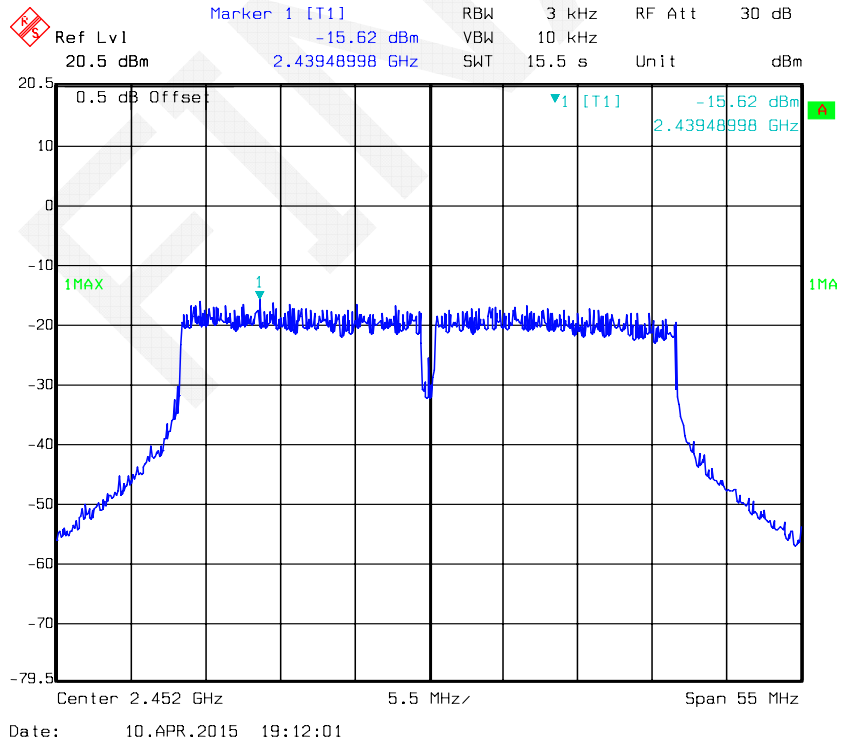
Power Spectral Density, 802.11n ht40 Low Channel – Chain0



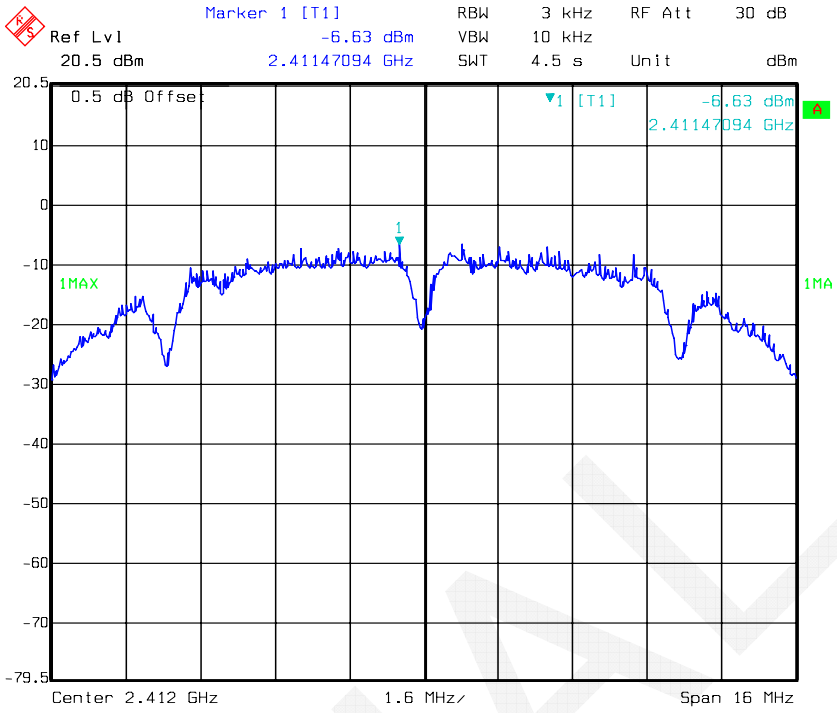
Power Spectral Density, 802.11n ht40 Middle Channel – Chain0



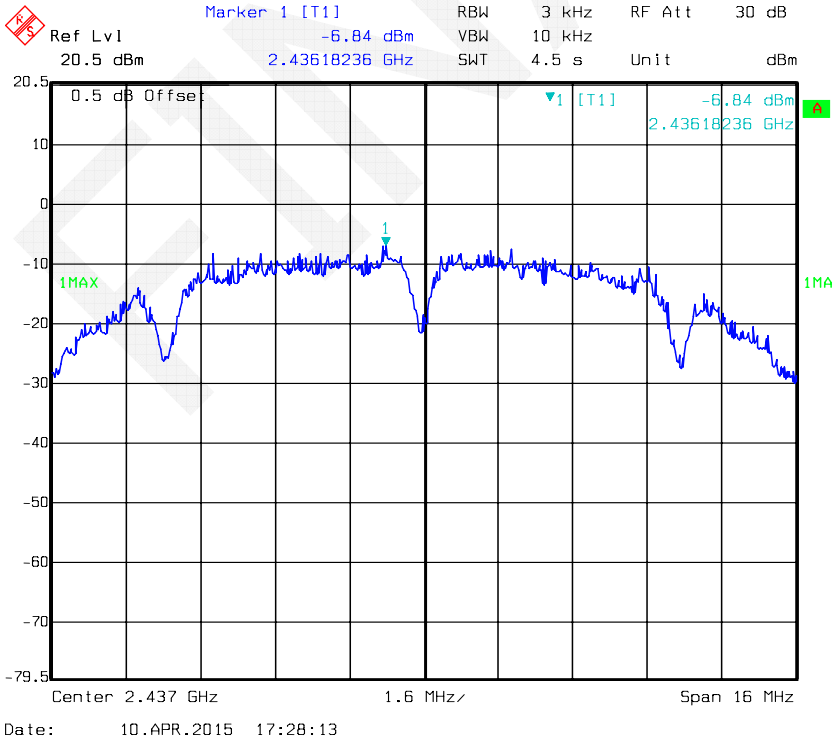
Power Spectral Density, 802.11n ht40 High Channel – Chain0



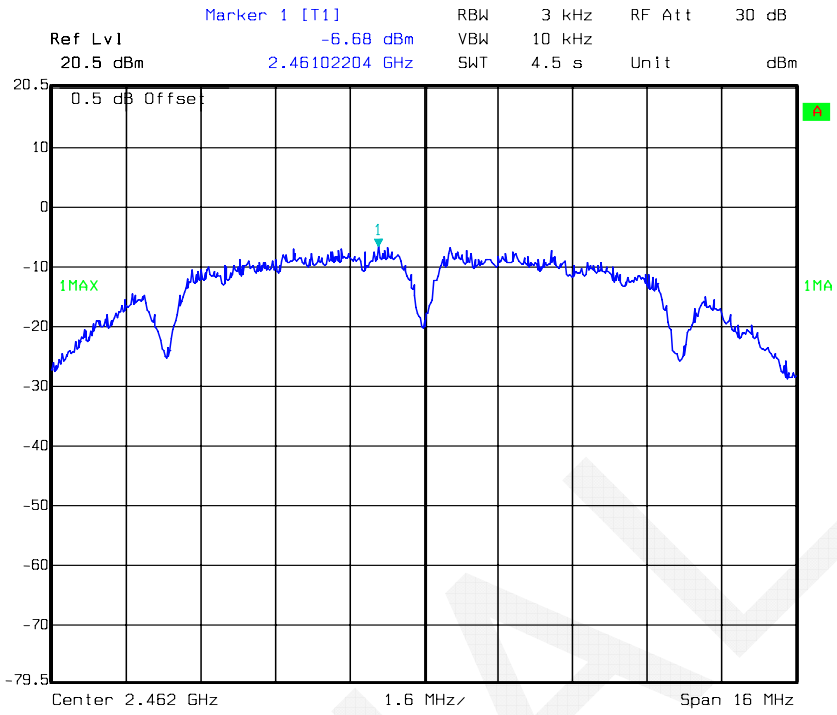
Power Spectral Density, 802.11b Low Channel – Chain1



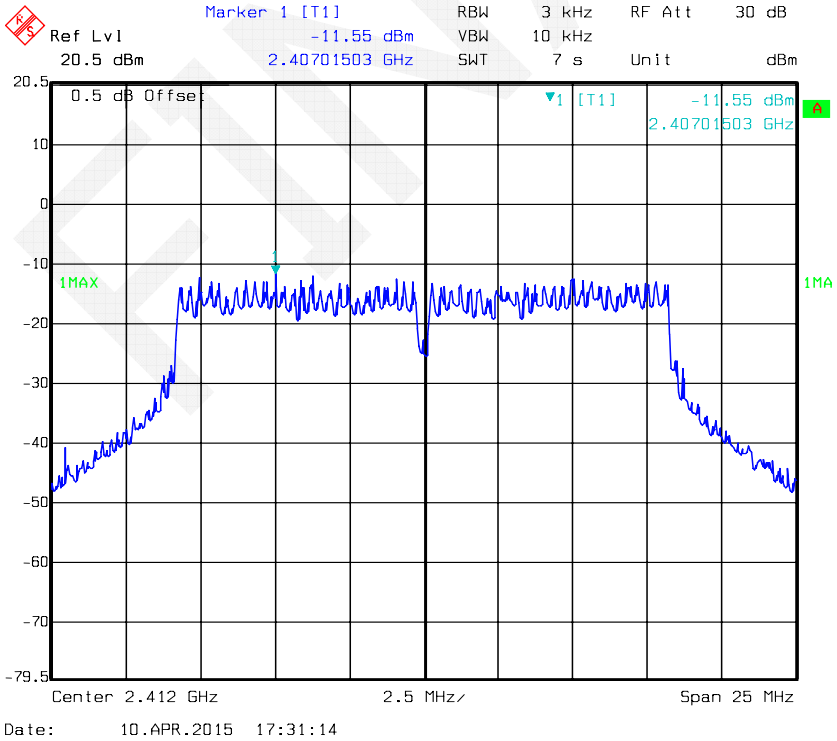
Power Spectral Density, 802.11b Middle Channel – Chain1



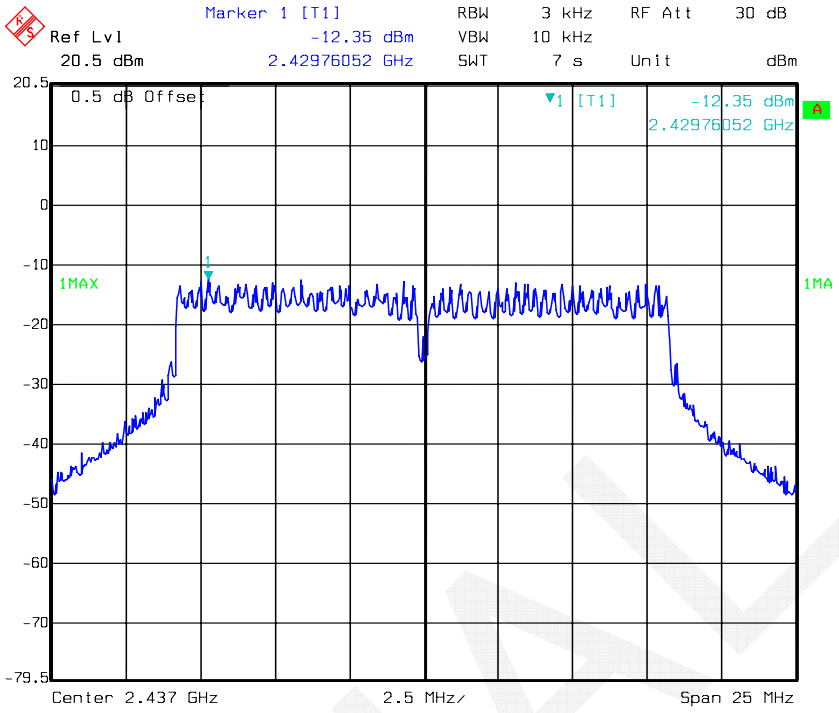
Power Spectral Density, 802.11b High Channel – Chain1



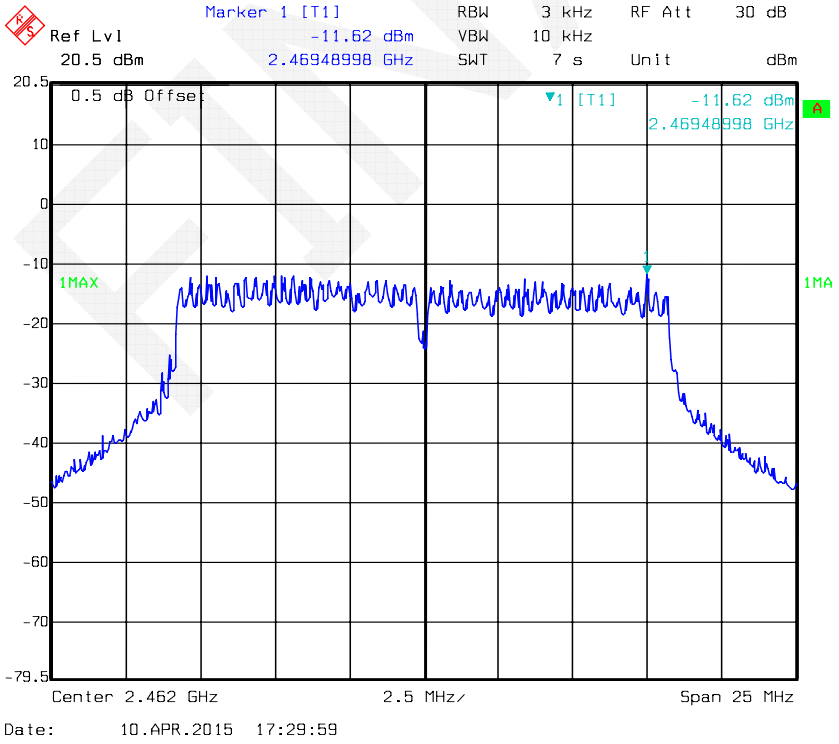
Power Spectral Density, 802.11g Low Channel – Chain1



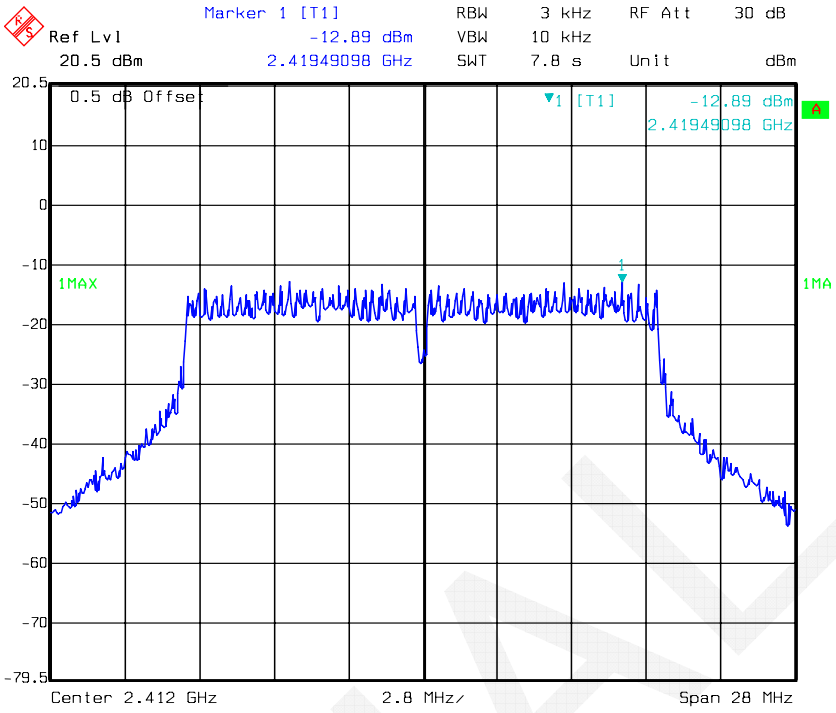
Power Spectral Density, 802.11g Middle Channel – Chain1



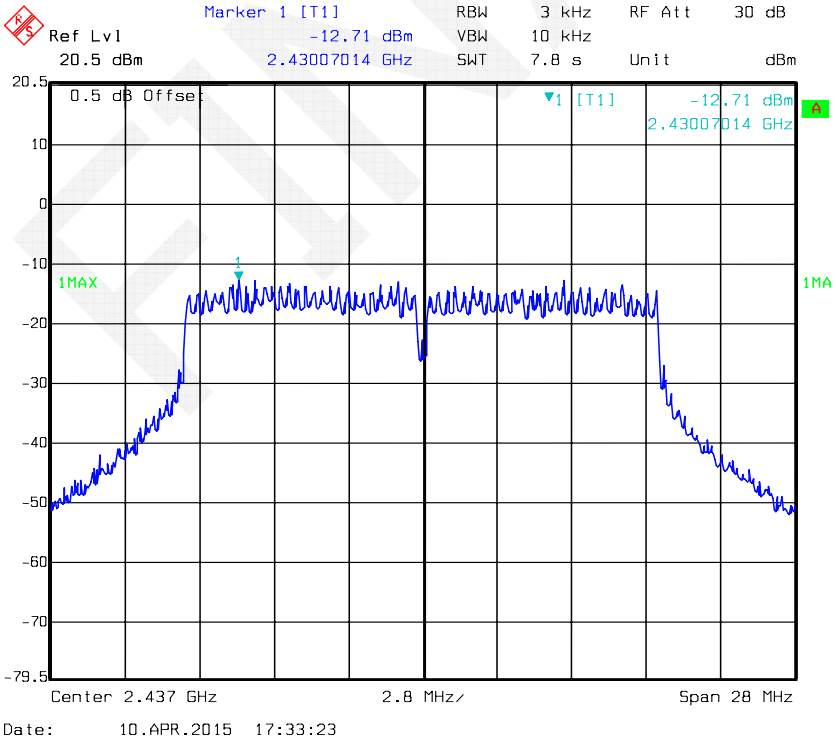
Power Spectral Density, 802.11g High Channel – Chain1



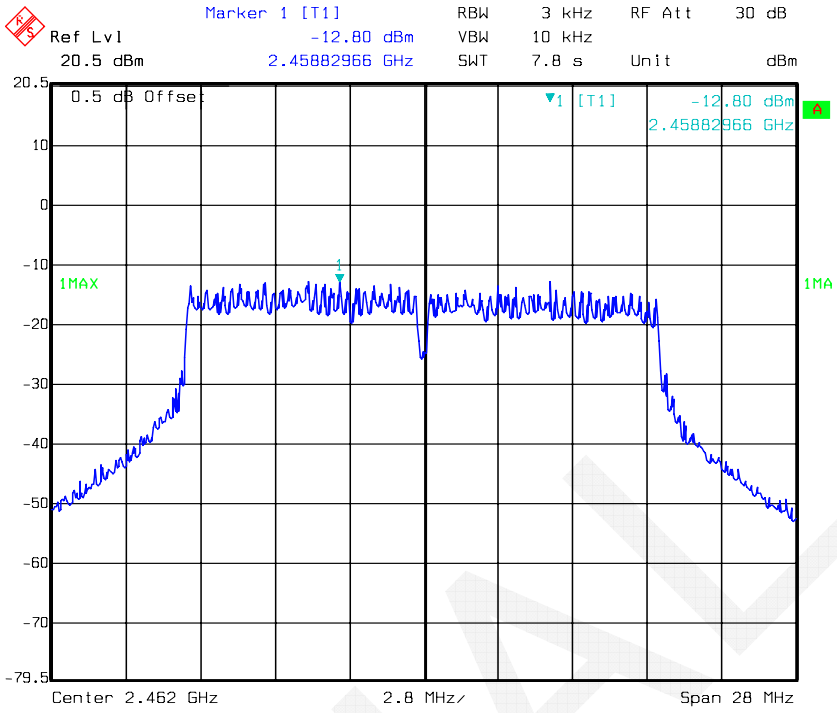
Power Spectral Density, 802.11n ht20 Low Channel – Chain1



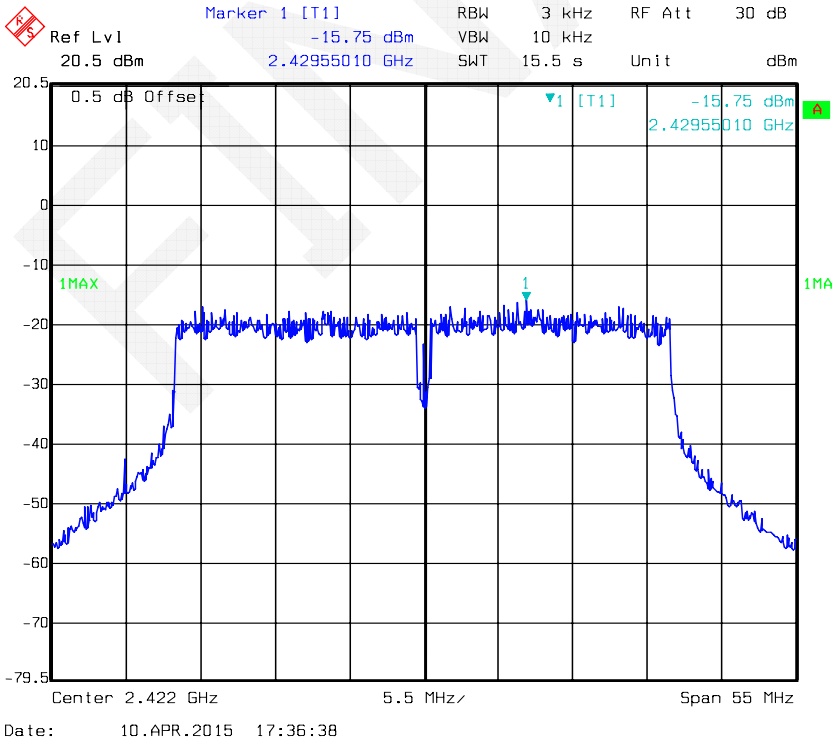
Power Spectral Density, 802.11n ht20 Middle Channel – Chain1



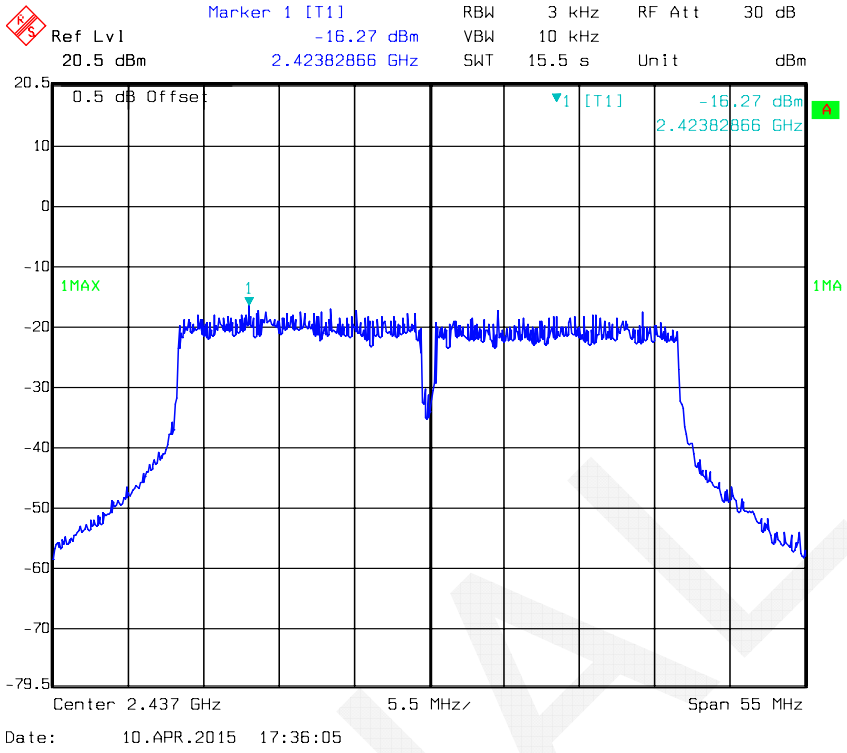
Power Spectral Density, 802.11n ht20 High Channel – Chain1



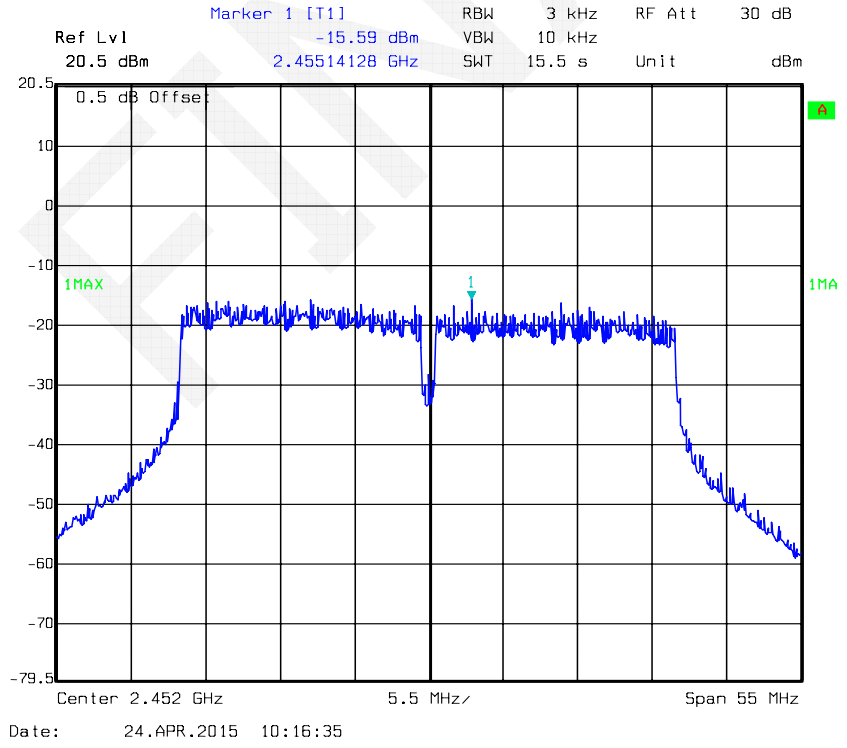
Power Spectral Density, 802.11n ht40 Low Channel – Chain1



Power Spectral Density, 802.11n ht40 Middle Channel – Chain1



Power Spectral Density, 802.11n ht40 High Channel – Chain1



DECLARATION LETTER

Declaration of Alteration

To Whom It May Concern,

We, Iconnect, hereby declare that there are some differences between our Multiple Models and testing products. Details as below:

(This is for your reference only.)

Products Description	Name	Concurrent Dual-Radios 2.4GHz+5GHz MIMO AP/CPE
	Brand	ALFA
	Manufacturer	Iconnect
	Project No.	RDG150401005

Differences Description			
Testing Products	Multiple Models	Differences Items	Details
AP120C	Matrix-Pro,Matrix,AP120C-AC, Matrix-Pro-AC,Matrix-AC, AP120C-ACU,AP120RC, AP120RC-AC,AP120RC-ACU	Model name	They are the same product, and just have the different model name.

Notes: Testing products-the products tested by BACL
Multiple Model- have the same or similar appearance, structure, PCB, Material and function to the testing products, and only are different for little parameters.

Besides the differences in the table above, we declare the products are identical
We guarantee all the information provided above is true, and notice that we'll bear all the consequences caused by any false information or concealing

Best Regards,

Signature:
Print Name: Johnson Wang
Title: Manager

ADD: No.9, Aly. 58, Ln. 112, Ruiguang Rd., Neihu Dist., Taipei City,Taiwan. Tel: 886-2-27968477 Fax: 886-2-27968478 E-mail: admin@iconnect.com.tw

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