FCC PART 15.247

TEST REPORT

For

Digital China Networks(Beijing)Limited

Digital Technology Plaza,No.9 shangdi 9th street,Haidian District Beijing China

FCC ID:2ABKCWL8200-I3

Report Type:	**Product Type:**
Original Report	802.11AC Wireless Access Point

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Report Number:	RBJ141016051-00B
Report Date:	2014-11-19
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Digital China Networks(Beijing)Limited*'s product, model number: *WL8200-I3 (FCC ID: 2ABKCWL8200-I3) or* ("EUT") in this report is a *802.11AC Wireless Access Point,* which was measured approximately: 18.2 cm (L) x 15.4 cm (W) x 4.2 cm (H), rated input voltage: DC48 V form POE adapter or DC 12V form AC/DC adapter .

** All measurement and test data in this report was gathered from production sample serial number: 141016051 (Assigned by BACL.Dongguan). The EUT was received on 2014-10-16.*

Objective

This report is prepared on behalf of *Digital China Networks(Beijing)Limited* 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: 2ABKCWL8200-I3

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, 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 02, 2012. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

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.

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EUT Exercise Software

The software "MT76xxU QA V2.0.4.0 [0325]" 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	MT76xxU QA V2.0.4.0 [0325]		
802.11b	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	1Mbps	1Mbps	1Mbps
	Power Level Setting Chain0	18	18	18
	Power Level Setting Chain1	18	18	18
	Power Level Setting Chain2	18	18	18
802.11g	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting Chain0	15	15	15
	Power Level Setting Chain1	15	15	15
	Power Level Setting Chain2	15	15	15
802.11n ht20	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting Chain0	13	13	13
	Power Level Setting Chain1	13	13	13
	Power Level Setting Chain2	13	13	13
802.11n ht40	Test Frequency	2422MHz	2437MHz	2452MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting Chain0	12	12	12
	Power Level Setting Chain1	12	12	12
	Power Level Setting Chain2	12	12	12

Support Equipment List and Details

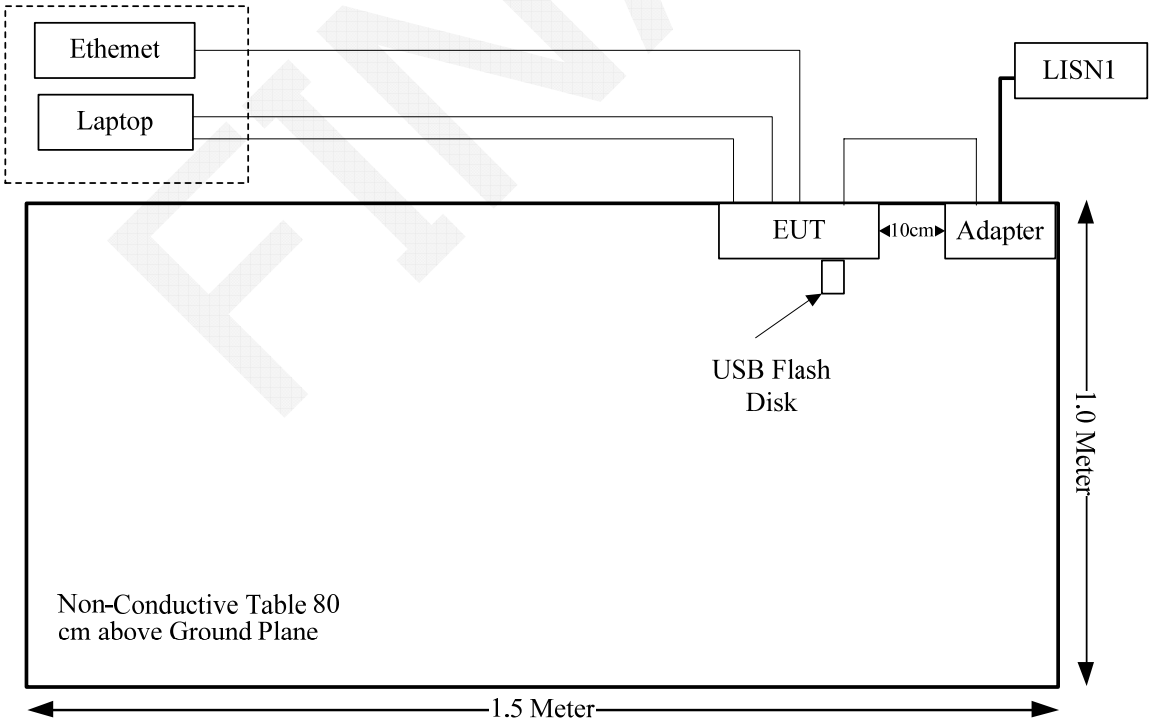
Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1017
CWT	Adapter	KPL-06F	G35-D010123-P100
Kingston	USB Flash disk	N/A	N/A
I.T.E	Adapter(POE)	G0548B-480-050	N/A

External Cable

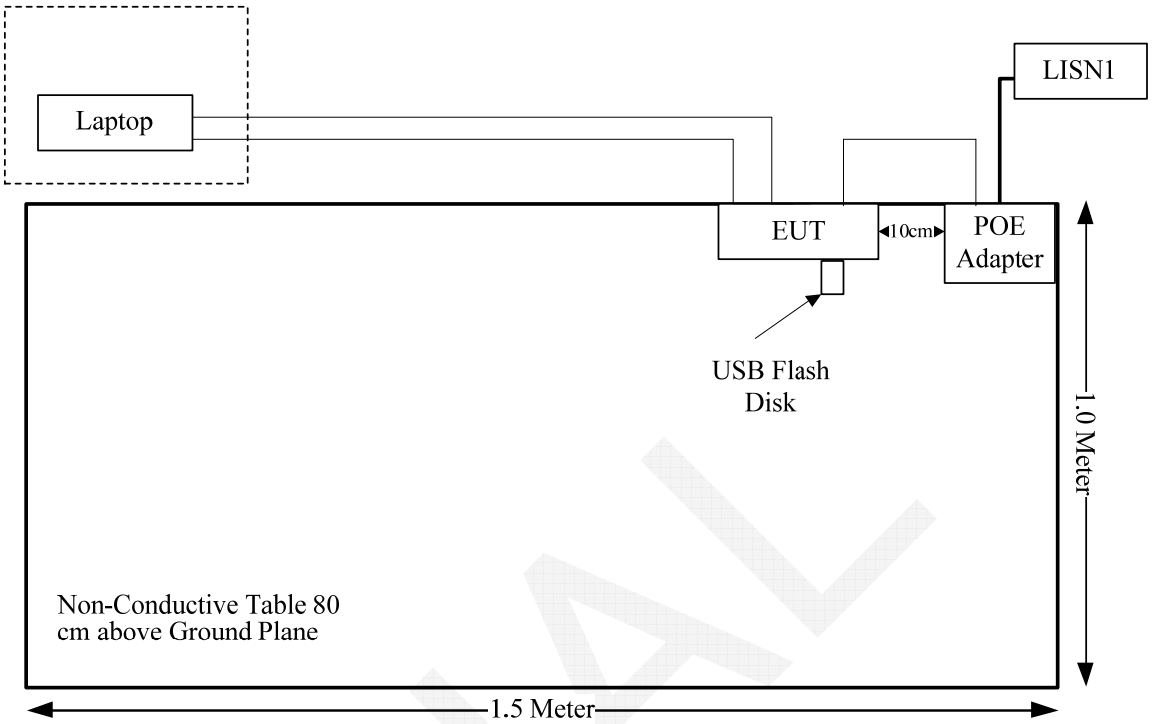
Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
RJ45 Cable	NO	NO	10	EUT	Ethernet
RJ45 Cable	NO	NO	10	EUT	Laptop
Serial Cable	NO	NO	5	EUT	Laptop
RJ45 Cable	NO	NO	1.0	EUT	POE Adapter

Block Diagram of Test Setup

AC Adapter power supply



POE Adapter power supply



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SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.247 (i) & §1.1310 & §2.1091	Maximum Permissible Exposure	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

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

Applicable Standard

According to§15.247(i) and §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

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);

Calculated Data:

Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
	(dBi)	(numeric)	(dBm)	(mW)			
2412	4.5	2.82	28.66	734.51	20.00	0.41205	1.0

Result: The device meet FCC MPE at 20 cm distance

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

The device used 3 internal antennas for 2.4G band, all the antenna gain is 4.5 dBi, which fulfill the requirement of this section, please refer to the EUT photos.

Result: Compliance.

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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.

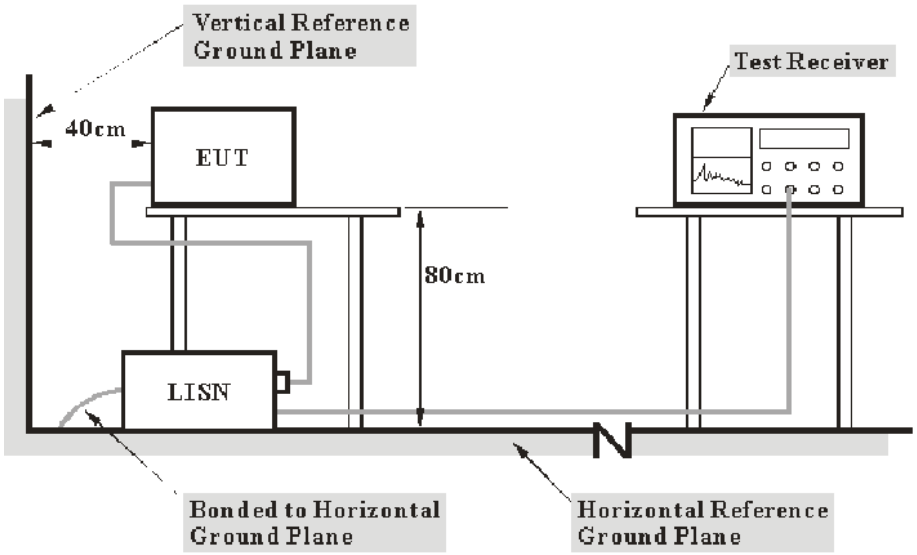
If U_{lab} is greater than U_{cispr} of Table 1, then:
- compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), 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 C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter of laptop 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 of laptop 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	2014-10-16	2015-10-16
R&S	L.I.S.N	ESH3-Z5	843331/015	N/A	N/A
R&S	Two-line V-network	ENV 216	3560.6550.12	2014-01-22	2015-01-22
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:

7.0 dB at **0.483938 MHz** in the **Line** conducted mode

Test Data

Environmental Conditions

Temperature:	22.3°C -26 °C
Relative Humidity:	52 %-59 %
ATM Pressure:	101.1 kPa -101.3 kPa

The testing was performed by Sevin Liu from 2014-11-7 to 2014-11-11.

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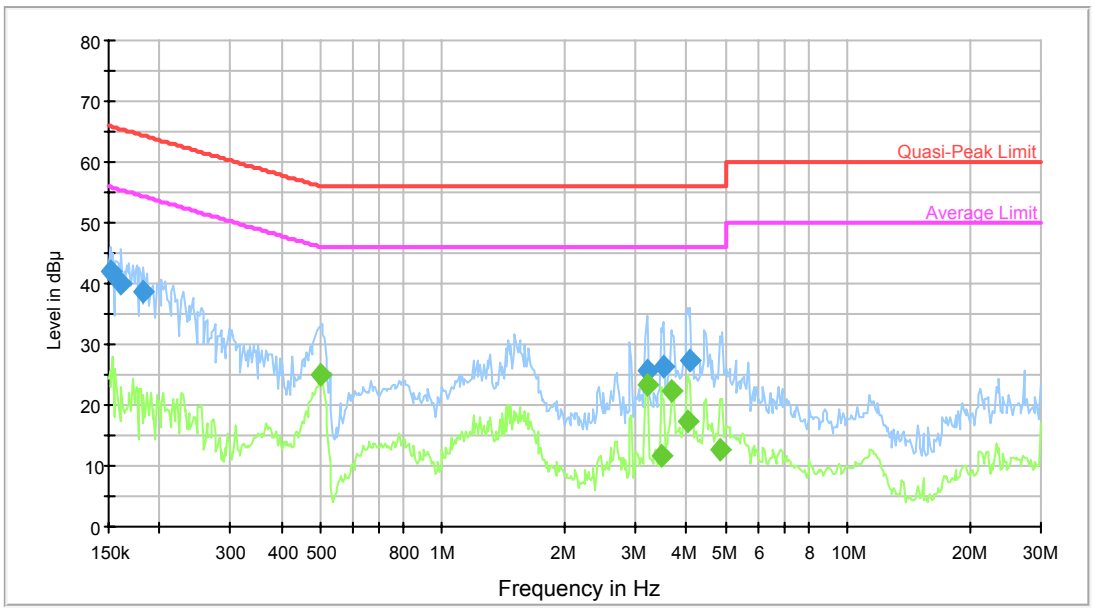
Test Mode: Transmitting (AC/DC adapter)

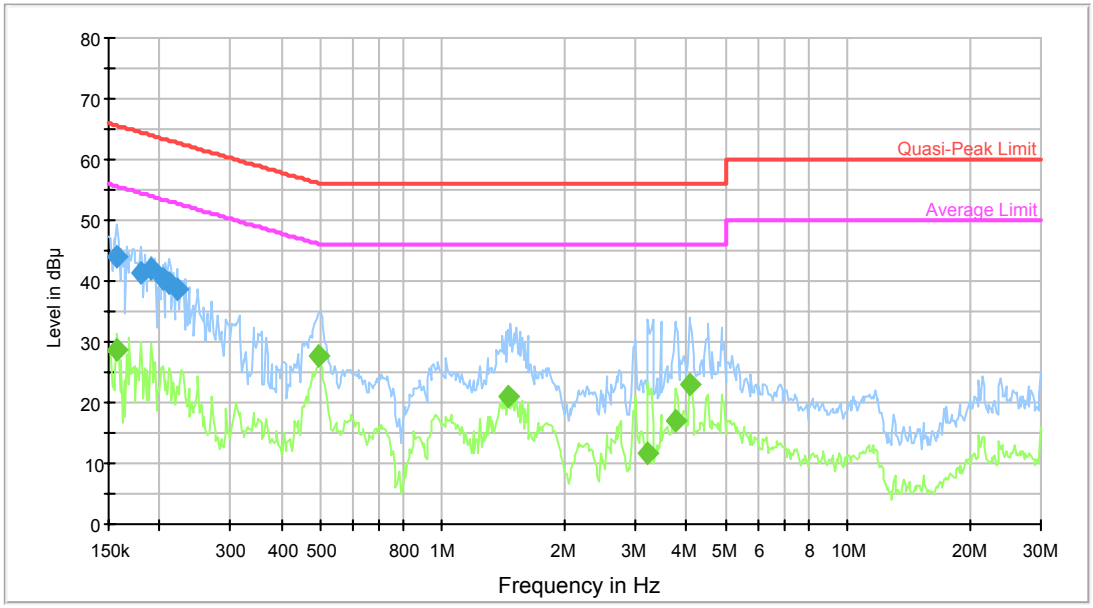
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.151200	42.0	9.000	L1	10.1	23.9	65.9	Compliance
0.161152	39.9	9.000	L1	10.2	25.5	65.4	Compliance
0.183065	38.8	9.000	L1	10.5	25.5	64.3	Compliance
3.198423	25.7	9.000	L1	10.6	30.3	56.0	Compliance
3.519348	26.4	9.000	L1	10.7	29.6	56.0	Compliance
4.094608	27.3	9.000	L1	10.7	28.7	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.499611	25.1	9.000	L1	10.4	20.9	46.0	Compliance
3.224010	23.2	9.000	L1	10.6	22.8	46.0	Compliance
3.463707	11.7	9.000	L1	10.7	34.3	46.0	Compliance
3.691692	22.3	9.000	L1	10.7	23.7	46.0	Compliance
4.029873	17.4	9.000	L1	10.7	28.6	46.0	Compliance
4.840426	12.8	9.000	L1	10.7	33.2	46.0	Compliance

AC120 V, 60 Hz, Neutral:

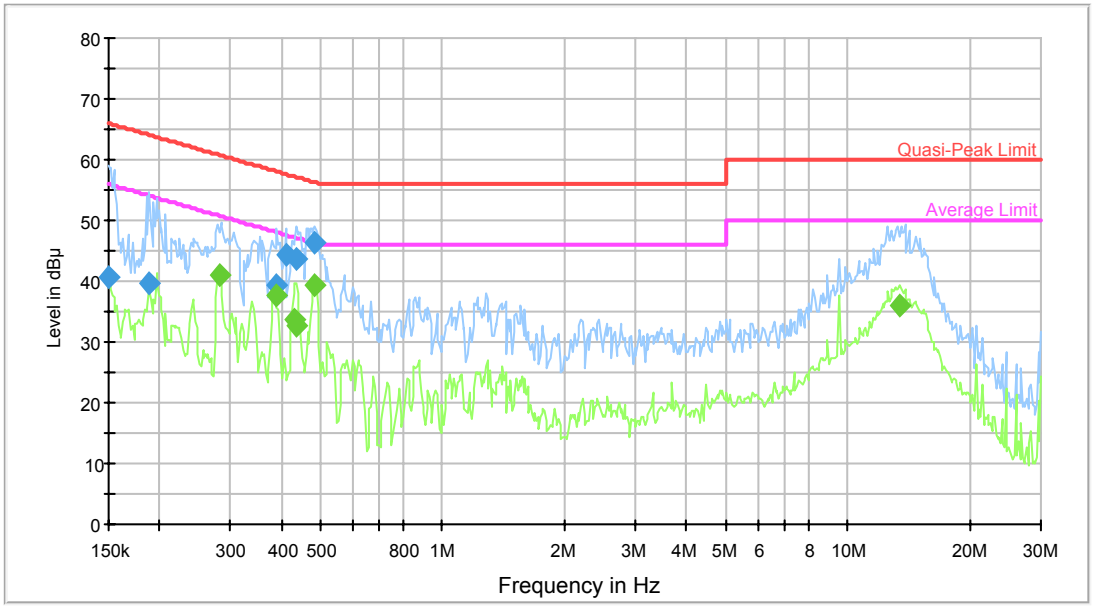


Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.157346	44.1	9.000	N	10.4	21.5	65.6	Compliance
0.180171	41.3	9.000	N	10.9	23.2	64.5	Compliance
0.190505	41.9	9.000	N	11.1	22.1	64.0	Compliance
0.204669	40.3	9.000	N	11.3	23.1	63.4	Compliance
0.211298	39.7	9.000	N	11.3	23.4	63.2	Compliance
0.221645	38.6	9.000	N	11.3	24.2	62.8	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.157346	28.6	9.000	N	10.4	27.0	55.6	Compliance
0.495646	27.7	9.000	N	10.4	18.4	46.1	Compliance
1.453260	21.0	9.000	N	10.5	25.0	46.0	Compliance
3.224010	11.6	9.000	N	10.7	34.4	46.0	Compliance
3.750995	17.1	9.000	N	10.7	28.9	46.0	Compliance
4.062112	22.9	9.000	N	10.8	23.1	46.0	Compliance

Test Mode: Transmitting

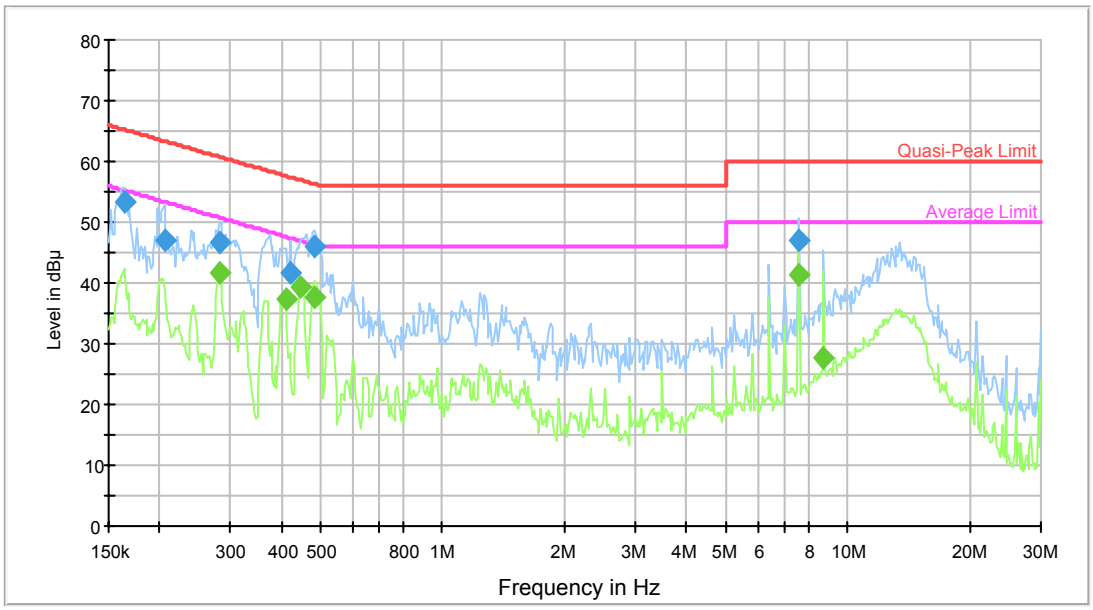
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	40.7	9.000	L1	10.0	25.3	66.0	Compliance
0.188994	39.8	9.000	L1	10.6	24.3	64.1	Compliance
0.390261	39.4	9.000	L1	10.6	18.7	58.1	Compliance
0.409372	44.4	9.000	L1	10.5	13.3	57.7	Compliance
0.436318	43.8	9.000	L1	10.5	13.3	57.1	Compliance
0.483938	46.4	9.000	L1	10.4	9.8	56.3	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.281497	41.1	9.000	L1	10.7	9.7	50.8	Compliance
0.387164	37.5	9.000	L1	10.6	10.6	48.1	Compliance
0.429420	33.7	9.000	L1	10.5	13.6	47.3	Compliance
0.436318	32.8	9.000	L1	10.5	14.4	47.1	Compliance
0.483938	39.3	9.000	L1	10.4	7.0	46.3	Compliance
13.422446	35.9	9.000	L1	10.5	14.1	50.0	Compliance

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.163741	53.2	9.000	N	10.5	12.1	65.3	Compliance
0.206306	47.0	9.000	N	11.3	16.3	63.4	Compliance
0.281497	46.6	9.000	N	11.2	14.2	60.8	Compliance
0.422630	41.7	9.000	N	10.7	15.7	57.4	Compliance
0.483938	46.1	9.000	N	10.4	10.2	56.3	Compliance
7.562639	47.1	9.000	N	10.7	12.9	60.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.281497	41.6	9.000	N	11.2	9.2	50.8	Compliance
0.409372	37.3	9.000	N	10.7	10.4	47.7	Compliance
0.446873	39.3	9.000	N	10.6	7.7	46.9	Compliance
0.483938	37.5	9.000	N	10.4	8.7	46.3	Compliance
7.562639	41.3	9.000	N	10.7	8.7	50.0	Compliance
8.728968	27.6	9.000	N	10.6	22.4	50.0	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.

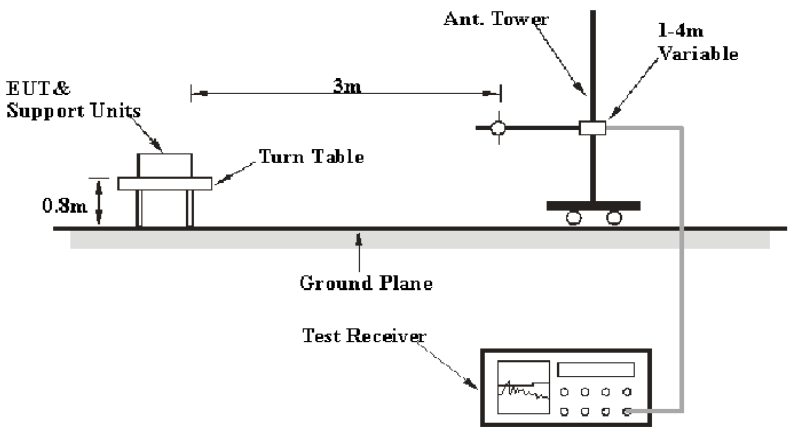
Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:
30M~200MHz: 5.0 dB
200M~1GHz: 6.2 dB
1G~6GHz: 4.45 dB
6G~18GHz: 5.23 dB

Table 2 – Values of U_{cispr}

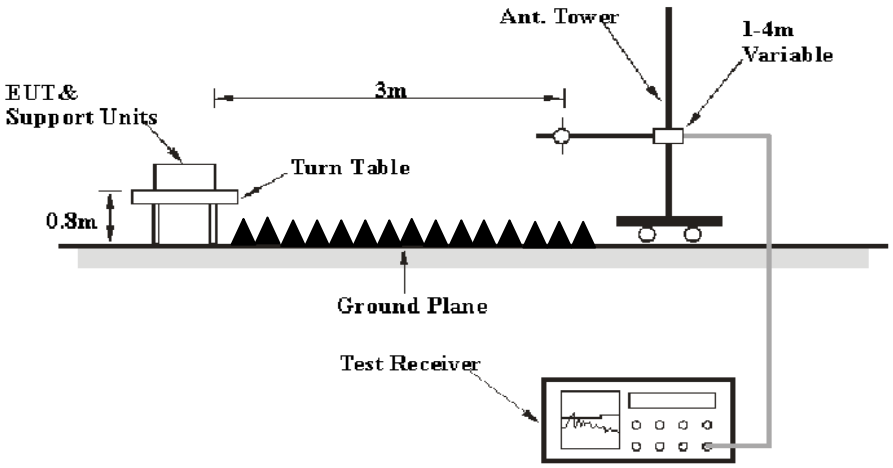
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

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 C63.4-2003. 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 of laptop 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 of laptop 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	2014-07-28	2017-07-27
HP	Amplifier	8447E	2434A02181	2014-09-01	2015-09-01
R&S	Spectrum Analyzer	FSEM	DE31388	2014-05-09	2015-05-09
ETS LINDGREN	Horn Antenna	3115	000 527 35	2012-09-06	2015-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2014-02-19	2015-02-19
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:

2.29 dB at **4924MHz** in the **Horizonal** polarization for 802.11b Mode

Test Data

Environmental Conditions

Temperature:	24.1°C -26.3°C
Relative Humidity:	50%-56 %
ATM Pressure:	100.6-101.3kPa

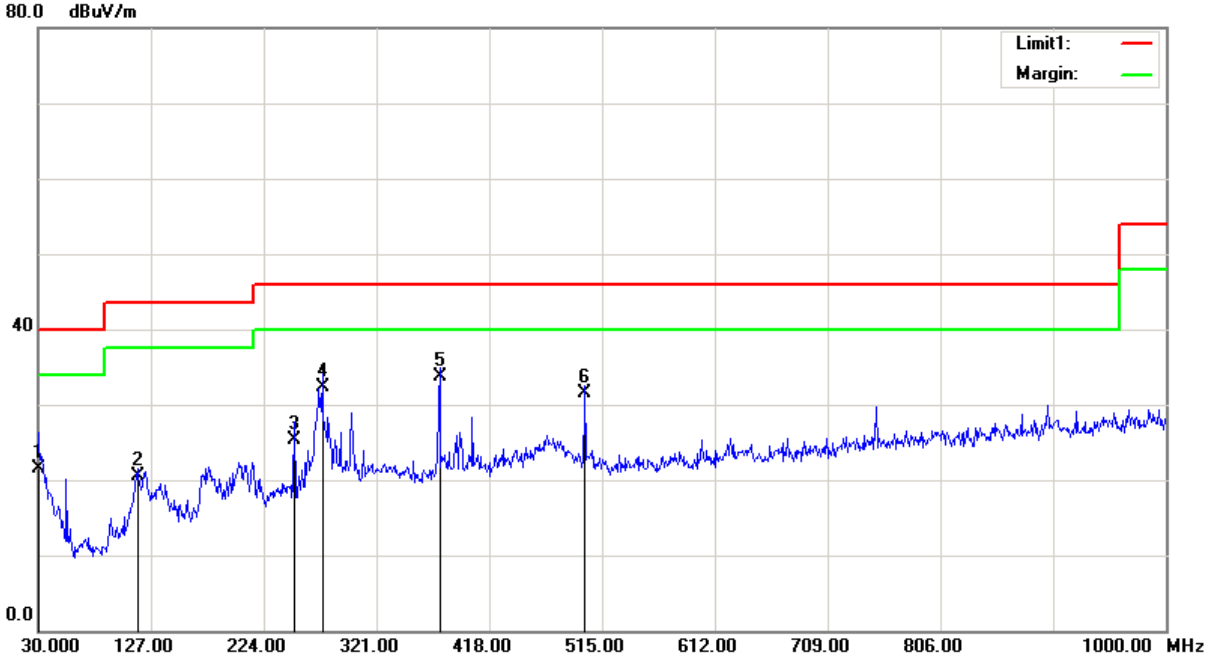
The testing was performed by Sevin Liu on 2014-10-25&2014-11-12.

Test Mode: Transmitting

1) Below 1GHz

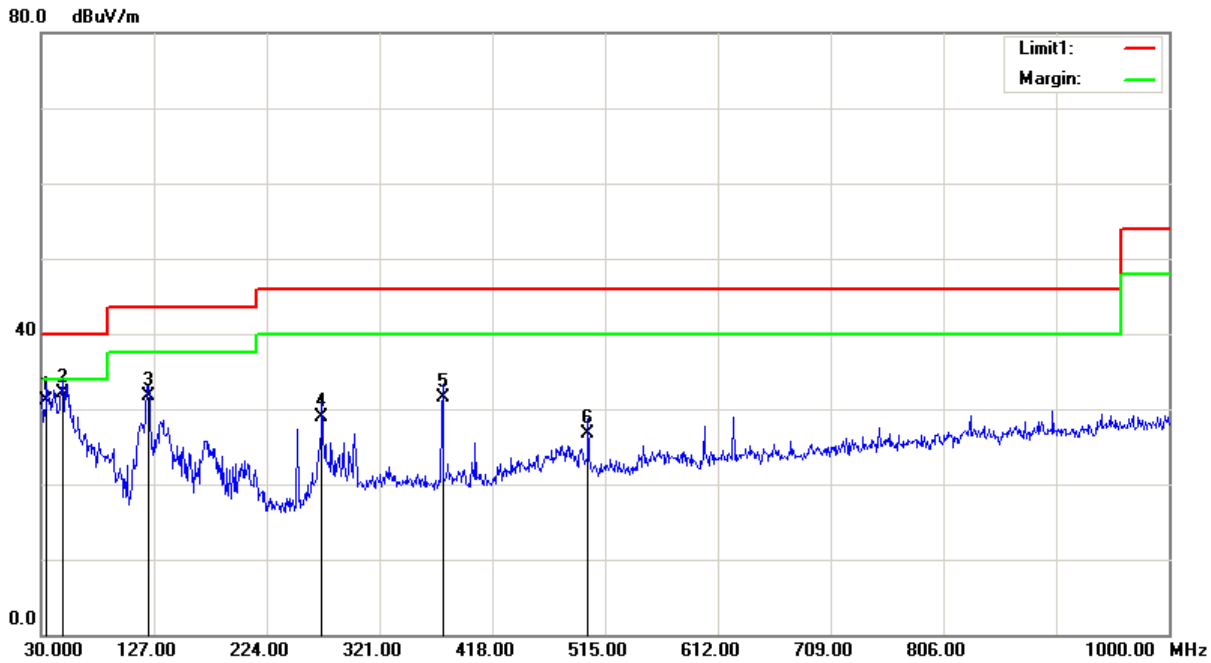
AC/DC adapter:

Horizontal:



Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/ Ave)	Correction Factor (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.0000	18.22	QP	3.38	21.60	40.00	18.40
115.3600	26.71	QP	-6.21	20.50	43.50	23.00
250.1900	33.36	QP	-7.96	25.40	46.00	20.60
274.4400	38.54	QP	-6.14	32.40	46.00	13.60
375.3200	37.96	QP	-4.26	33.70	46.00	12.30
500.4500	33.20	QP	-1.60	31.60	46.00	14.40

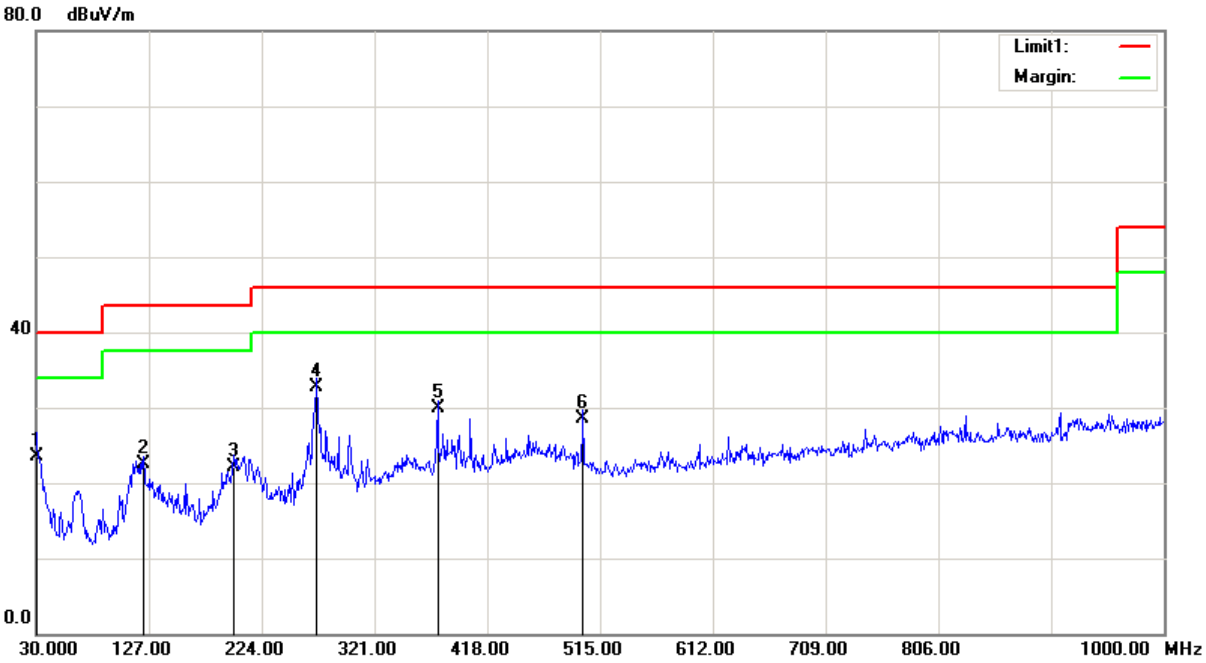
Vertical:



Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/ Ave)	Correction Factor (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
34.8500	32.95	QP	-1.75	31.20	40.00	8.80
48.4300	43.52	QP	-11.42	32.10	40.00	7.90
122.1500	37.37	QP	-5.57	31.80	43.50	11.70
271.5300	35.17	QP	-6.17	29.00	46.00	17.00
375.3200	35.76	QP	-4.26	31.50	46.00	14.50
500.4500	28.30	QP	-1.60	26.70	46.00	19.30

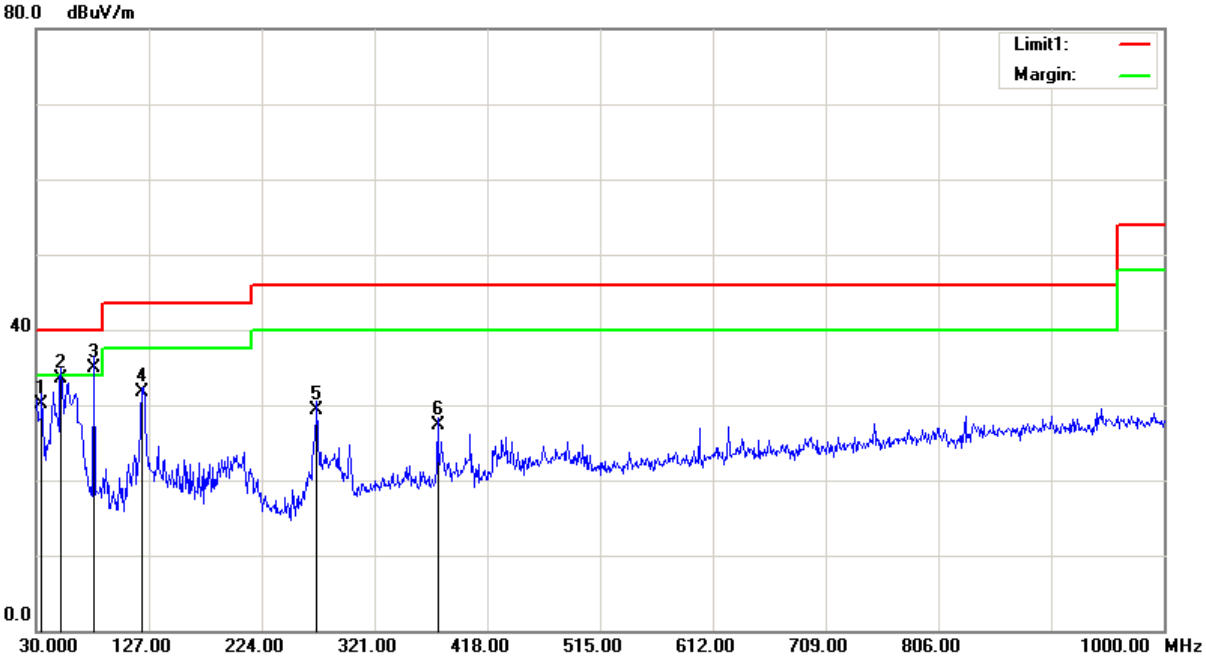
POE adapter:

Horizontal:



Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/ Ave)	Correction Factor (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.0000	20.22	QP	3.38	23.60	40.00	16.40
122.1500	28.17	QP	-5.57	22.60	43.50	20.90
199.7500	29.27	QP	-7.17	22.10	43.50	21.40
271.5300	38.87	QP	-6.17	32.70	46.00	13.30
375.3200	34.16	QP	-4.26	29.90	46.00	16.10
500.4500	30.10	QP	-1.60	28.50	46.00	17.50

Vertical:



Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/ Ave)	Correction Factor (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
34.8500	31.95	QP	-1.75	30.20	40.00	9.80
51.3400	45.96	QP	-12.46	33.50	40.00	6.50
79.4700	47.26	QP	-12.36	34.90	40.00	5.10
121.1800	37.43	QP	-5.63	31.80	43.50	11.70
271.5300	35.47	QP	-6.17	29.30	46.00	16.70
375.3200	31.66	QP	-4.26	27.40	46.00	18.60

2) Above 1GHz (test with POE 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	82.78	PK	H	25.67	4.42	0.00	112.87	N/A	N/A
2412	79.42	AV	H	25.67	4.42	0.00	109.51	N/A	N/A
2412	79.46	PK	V	25.67	4.42	0.00	109.55	N/A	N/A
2412	76.13	AV	V	25.67	4.42	0.00	106.22	N/A	N/A
2390	35.11	PK	H	25.61	4.39	0.00	65.11	74.00	8.89
2390	17.62	AV	H	25.61	4.39	0.00	47.62	54.00	6.38
4824	37.23	PK	H	30.64	6.03	27.41	46.49	74.00	27.51
4824	34.36	AV	H	30.64	6.03	27.41	43.62	54.00	10.38
7236	32.76	PK	H	34.17	7.47	25.90	48.50	74.00	25.50
7236	19.41	AV	H	34.17	7.47	25.90	35.15	54.00	18.85
9648	30.22	PK	H	36.06	8.81	27.46	47.63	74.00	26.37
9648	18.86	AV	H	36.06	8.81	27.46	36.27	54.00	17.73
3140	31.22	PK	H	27.65	7.62	27.42	39.07	74.00	34.93
3140	21.18	AV	H	27.65	7.62	27.42	29.03	54.00	24.97
Middle Channel: 2437 MHz									
2437	83.39	PK	H	25.74	4.41	0.00	113.54	N/A	N/A
2437	79.94	AV	H	25.74	4.41	0.00	110.09	N/A	N/A
2437	77.06	PK	V	25.74	4.41	0.00	107.21	N/A	N/A
2437	73.80	AV	V	25.74	4.41	0.00	103.95	N/A	N/A
4874	41.68	PK	H	30.77	6.09	27.42	51.12	74.00	22.88
4874	39.70	AV	H	30.77	6.09	27.42	49.14	54.00	4.86
7311	31.45	PK	H	34.35	7.51	25.88	47.43	74.00	26.57
7311	18.90	AV	H	34.35	7.51	25.88	34.88	54.00	19.12
9748	28.09	PK	H	36.30	8.83	27.24	45.98	74.00	28.02
9748	16.37	AV	H	36.30	8.83	27.24	34.26	54.00	19.74
3140	30.22	PK	H	27.65	7.62	27.42	38.07	74.00	35.93
3140	20.28	AV	H	27.65	7.62	27.42	28.13	54.00	25.87
High Channel: 2462 MHz									
2462	81.93	PK	H	25.80	4.43	0.00	112.16	N/A	N/A
2462	78.89	AV	H	25.80	4.43	0.00	109.12	N/A	N/A
2462	77.87	PK	V	25.80	4.43	0.00	108.10	N/A	N/A
2462	73.90	AV	V	25.80	4.43	0.00	104.13	N/A	N/A
2483.5	37.98	PK	H	25.86	4.49	0.00	68.33	74.00	5.67
2483.5	18.34	AV	H	25.86	4.49	0.00	48.69	54.00	5.31
4924	44.05	PK	H	30.90	5.97	27.43	53.49	74.00	20.51
4924	42.27	AV	H	30.90	5.97	27.43	51.71	54.00	2.29*
7386	32.09	PK	H	34.53	7.55	25.86	48.31	74.00	25.69
7386	22.43	AV	H	34.53	7.55	25.86	38.65	54.00	15.35
9848	29.25	PK	H	36.54	8.85	26.94	47.70	74.00	26.30
9848	20.67	AV	H	36.54	8.85	26.94	39.12	54.00	14.88
3140	31.08	PK	H	27.65	7.62	27.42	38.93	74.00	35.07
3140	21.58	AV	H	27.65	7.62	27.42	29.43	54.00	24.57

*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	78.16	PK	H	25.67	4.42	0.00	108.25	N/A	N/A
2412	69.39	AV	H	25.67	4.42	0.00	99.48	N/A	N/A
2412	72.15	PK	V	25.67	4.42	0.00	102.24	N/A	N/A
2412	61.63	AV	V	25.67	4.42	0.00	91.72	N/A	N/A
2390	37.74	PK	H	25.61	4.39	0.00	67.74	74.00	6.26
2390	20.78	AV	H	25.61	4.39	0.00	50.78	54.00	3.22*
4824	38.07	PK	H	30.64	6.03	27.41	47.33	74.00	26.67
4824	24.55	AV	H	30.64	6.03	27.41	33.81	54.00	20.19
7236	32.06	PK	H	34.17	7.47	25.90	47.80	74.00	26.20
7236	18.58	AV	H	34.17	7.47	25.90	34.32	54.00	19.68
9648	27.71	PK	H	36.06	8.81	27.46	45.12	74.00	28.88
9648	16.24	AV	H	36.06	8.81	27.46	33.65	54.00	20.35
12110	25.30	PK	V	37.79	9.10	24.36	47.83	74.00	26.17
12110	15.24	AV	V	37.79	9.10	24.36	37.77	54.00	16.23
Middle Channel: 2437 MHz									
2437	83.55	PK	H	25.74	4.41	0.00	113.70	N/A	N/A
2437	74.00	AV	H	25.74	4.41	0.00	104.15	N/A	N/A
2437	80.19	PK	V	25.74	4.41	0.00	110.34	N/A	N/A
2437	70.38	AV	V	25.74	4.41	0.00	100.53	N/A	N/A
4874	37.42	PK	H	30.77	6.09	27.42	46.86	74.00	27.14
4874	23.18	AV	H	30.77	6.09	27.42	32.62	54.00	21.38
7311	31.41	PK	H	34.35	7.51	25.88	47.39	74.00	26.61
7311	19.14	AV	H	34.35	7.51	25.88	35.12	54.00	18.88
9748	28.48	PK	H	36.30	8.83	27.24	46.37	74.00	27.63
9748	16.29	AV	H	36.30	8.83	27.24	34.18	54.00	19.82
3120	30.25	PK	H	27.58	7.49	27.43	37.89	74.00	36.11
3120	21.24	AV	H	27.58	7.49	27.43	28.88	54.00	25.12
High Channel: 2462 MHz									
2462	83.38	PK	H	25.80	4.43	0.00	113.61	N/A	N/A
2462	74.05	AV	H	25.80	4.43	0.00	104.28	N/A	N/A
2462	79.71	PK	V	25.80	4.43	0.00	109.94	N/A	N/A
2462	70.28	AV	V	25.80	4.43	0.00	100.51	N/A	N/A
2483.5	39.45	PK	H	25.86	4.49	0.00	69.80	74.00	4.20*
2483.5	20.84	AV	H	25.86	4.49	0.00	51.19	54.00	2.81*
4924	41.00	PK	H	30.90	5.97	27.43	50.44	74.00	23.56
4924	27.35	AV	H	30.90	5.97	27.43	36.79	54.00	17.21
7386	33.99	PK	H	34.53	7.55	25.86	50.21	74.00	23.79
7386	20.07	AV	H	34.53	7.55	25.86	36.29	54.00	17.71
9848	29.08	PK	H	36.54	8.85	26.94	47.53	74.00	26.47
9848	16.63	AV	H	36.54	8.85	26.94	35.08	54.00	18.92
3140	30.57	PK	H	27.65	7.62	27.42	38.42	74.00	35.58
3140	21.92	AV	H	27.65	7.62	27.42	29.77	54.00	24.23

*Within measurement uncertainty!

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	80.06	PK	H	25.67	4.42	0.00	110.15	N/A	N/A
2412	70.56	AV	H	25.67	4.42	0.00	100.65	N/A	N/A
2412	74.38	PK	V	25.67	4.42	0.00	104.47	N/A	N/A
2412	64.98	AV	V	25.67	4.42	0.00	95.07	N/A	N/A
2390	38.93	PK	H	25.61	4.39	0.00	68.93	74.00	5.07
2390	20.63	AV	H	25.61	4.39	0.00	50.63	54.00	3.37*
4824	30.67	PK	H	30.64	6.03	27.41	39.93	74.00	34.07
4824	19.11	AV	H	30.64	6.03	27.41	28.37	54.00	25.63
7236	30.45	PK	H	34.17	7.47	25.90	46.19	74.00	27.81
7236	18.95	AV	H	34.17	7.47	25.90	34.69	54.00	19.31
9648	27.48	PK	H	36.06	8.81	27.46	44.89	74.00	29.11
9648	16.47	AV	H	36.06	8.81	27.46	33.88	54.00	20.12
3140	30.58	PK	H	27.65	7.62	27.42	38.43	74.00	35.57
3140	21.71	AV	H	27.65	7.62	27.42	29.56	54.00	24.44
Middle Channel: 2437 MHz									
2437	75.15	PK	H	25.74	4.41	0.00	105.30	N/A	N/A
2437	65.79	AV	H	25.74	4.41	0.00	95.94	N/A	N/A
2437	71.50	PK	V	25.74	4.41	0.00	101.65	N/A	N/A
2437	61.46	AV	V	25.74	4.41	0.00	91.61	N/A	N/A
4874	30.87	PK	H	30.77	6.09	27.42	40.31	74.00	33.69
4874	18.85	AV	H	30.77	6.09	27.42	28.29	54.00	25.71
7311	30.78	PK	H	34.35	7.51	25.88	46.76	74.00	27.24
7311	19.24	AV	H	34.35	7.51	25.88	35.22	54.00	18.78
9748	28.40	PK	H	36.30	8.83	27.24	46.29	74.00	27.71
9748	16.50	AV	H	36.30	8.83	27.24	34.39	54.00	19.61
3015.5	32.01	PK	H	27.25	7.37	27.52	39.11	74.00	34.89
3015.5	19.49	AV	V	27.25	7.37	27.52	26.59	54.00	27.41
High Channel: 2462 MHz									
2462	75.67	PK	H	25.80	4.43	0.00	105.90	N/A	N/A
2462	65.92	AV	H	25.80	4.43	0.00	96.15	N/A	N/A
2462	70.51	PK	V	25.80	4.43	0.00	100.74	N/A	N/A
2462	61.14	AV	V	25.80	4.43	0.00	91.37	N/A	N/A
2483.5	33.16	PK	H	25.86	4.49	0.00	63.51	74.00	10.49
2483.5	16.50	AV	H	25.86	4.49	0.00	46.85	54.00	7.15
4924	30.26	PK	H	30.90	5.97	27.43	39.70	74.00	34.30
4924	18.68	AV	H	30.90	5.97	27.43	28.12	54.00	25.88
7386	30.95	PK	H	34.53	7.55	25.86	47.17	74.00	26.83
7386	19.13	AV	H	34.53	7.55	25.86	35.35	54.00	18.65
9848	28.31	PK	H	36.54	8.85	26.94	46.76	74.00	27.24
9848	16.80	AV	H	36.54	8.85	26.94	35.25	54.00	18.75
3188.3	32.16	PK	H	27.80	6.85	27.38	39.43	74.00	34.57
3188.3	20.85	AV	H	27.80	6.85	27.38	28.12	54.00	25.88

*Within measurement uncertainty!

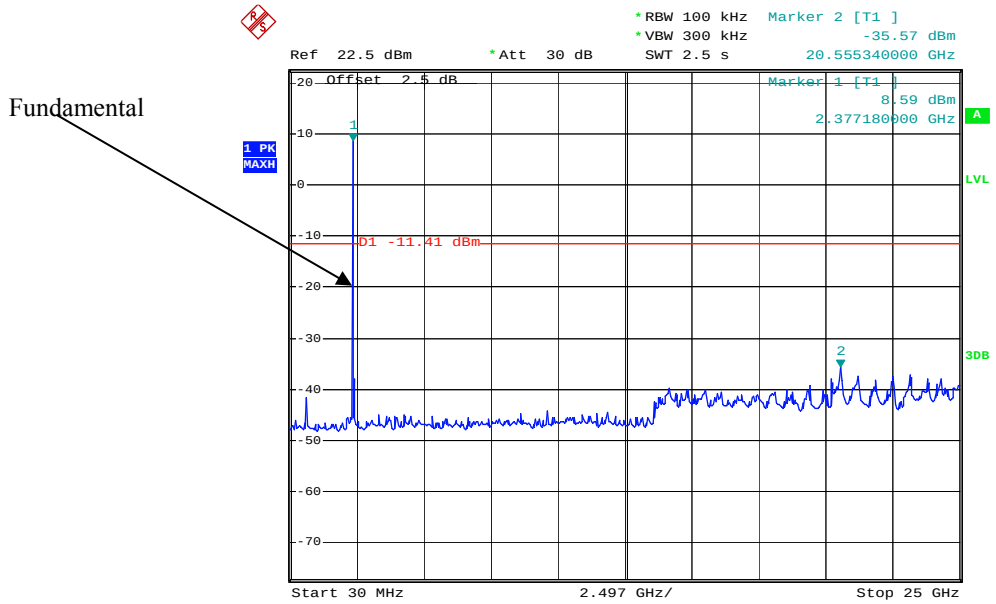
802.11 n ht40 Mode

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	76.63	PK	H	25.70	4.41	0.00	106.74	N/A	N/A
2422	67.28	AV	H	25.70	4.41	0.00	97.39	N/A	N/A
2422	70.65	PK	V	25.70	4.41	0.00	100.76	N/A	N/A
2422	61.01	AV	V	25.70	4.41	0.00	91.12	N/A	N/A
2390	39.63	PK	H	25.61	4.39	0.00	69.63	74.00	4.37*
2390	21.56	AV	H	25.61	4.39	0.00	51.56	54.00	2.44 *
4844	31.29	PK	H	30.69	6.08	27.42	40.64	74.00	33.36
4844	18.91	AV	H	30.69	6.08	27.42	28.26	54.00	25.74
7266	30.83	PK	H	34.24	7.48	25.89	46.66	74.00	27.34
7266	18.90	AV	H	34.24	7.48	25.89	34.73	54.00	19.27
9688	26.78	PK	H	36.15	8.82	27.37	44.38	74.00	29.62
9688	16.33	AV	H	36.15	8.82	27.37	33.93	54.00	20.07
3140	29.16	PK	H	27.65	7.62	27.42	37.01	74.00	36.99
3140	20.42	AV	H	27.65	7.62	27.42	28.27	54.00	25.73
Middle Channel: 2437 MHz									
2437	79.16	PK	H	25.74	4.41	0.00	109.31	N/A	N/A
2437	69.69	AV	H	25.74	4.41	0.00	99.84	N/A	N/A
2437	73.61	PK	V	25.74	4.41	0.00	103.76	N/A	N/A
2437	64.62	AV	V	25.74	4.41	0.00	94.77	N/A	N/A
4874	28.23	PK	H	30.77	6.09	27.42	37.67	74.00	36.33
4874	18.98	AV	H	30.77	6.09	27.42	28.42	54.00	25.58
7311	30.46	PK	H	34.35	7.51	25.88	46.44	74.00	27.56
7311	19.26	AV	H	34.35	7.51	25.88	35.24	54.00	18.76
9748	27.45	PK	H	36.30	8.83	27.24	45.34	74.00	28.66
9748	16.62	AV	H	36.30	8.83	27.24	34.51	54.00	19.49
3120	31.37	PK	H	27.58	7.49	27.43	39.01	74.00	34.99
3120	20.55	AV	H	27.58	7.49	27.43	28.19	54.00	25.81
High Channel: 2452 MHz									
2452	79.40	PK	H	25.78	4.41	0.00	109.59	N/A	N/A
2452	70.31	AV	H	25.78	4.41	0.00	100.50	N/A	N/A
2452	71.79	PK	V	25.78	4.41	0.00	101.98	N/A	N/A
2452	61.85	AV	V	25.78	4.41	0.00	92.04	N/A	N/A
2483.5	27.88	PK	H	25.86	4.49	0.00	58.23	74.00	15.77
2483.5	16.63	AV	H	25.86	4.49	0.00	46.98	54.00	7.02
4904	30.70	PK	H	30.85	6.06	27.43	40.18	74.00	33.82
4904	18.85	AV	H	30.85	6.06	27.43	28.33	54.00	25.67
7356	30.71	PK	H	34.45	7.53	25.87	46.82	74.00	27.18
7356	19.35	AV	H	34.45	7.53	25.87	35.46	54.00	18.54
9808	27.89	PK	H	36.44	8.84	27.09	46.08	74.00	27.92
9808	17.09	AV	H	36.44	8.84	27.09	35.28	54.00	18.72
7298	30.73	PK	H	34.32	7.50	25.89	46.66	74.00	27.34
7298	19.03	AV	H	34.32	7.50	25.89	34.96	54.00	19.04
3140	31.04	PK	H	27.65	7.62	27.42	38.89	74.00	35.11
3140	20.71	AV	H	27.65	7.62	27.42	28.56	54.00	25.44

*Within measurement uncertainty!

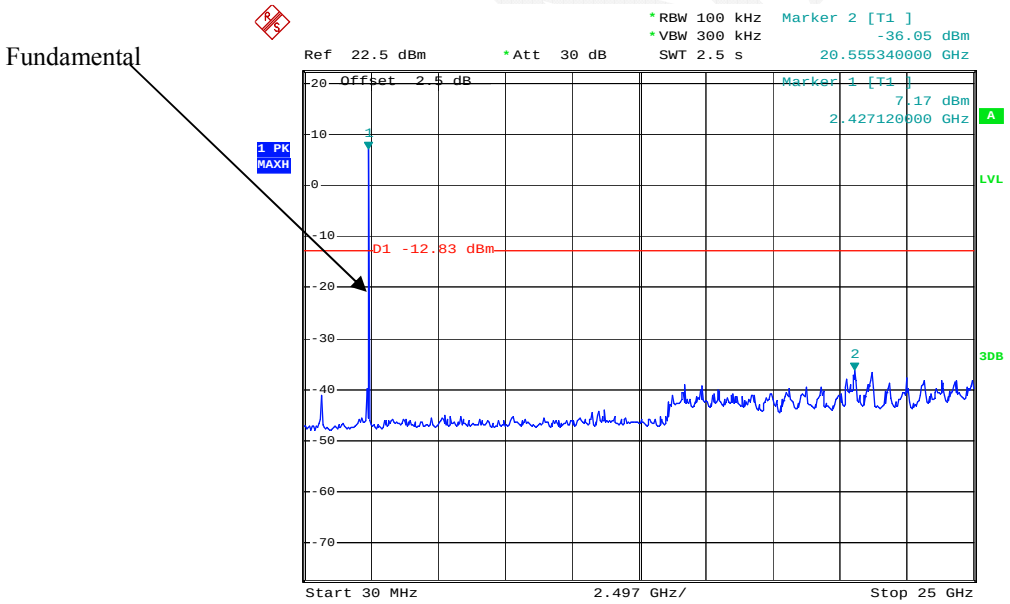
Conducted Spurious Emissions at Antenna Port

Chain0 802.11b Low Channel



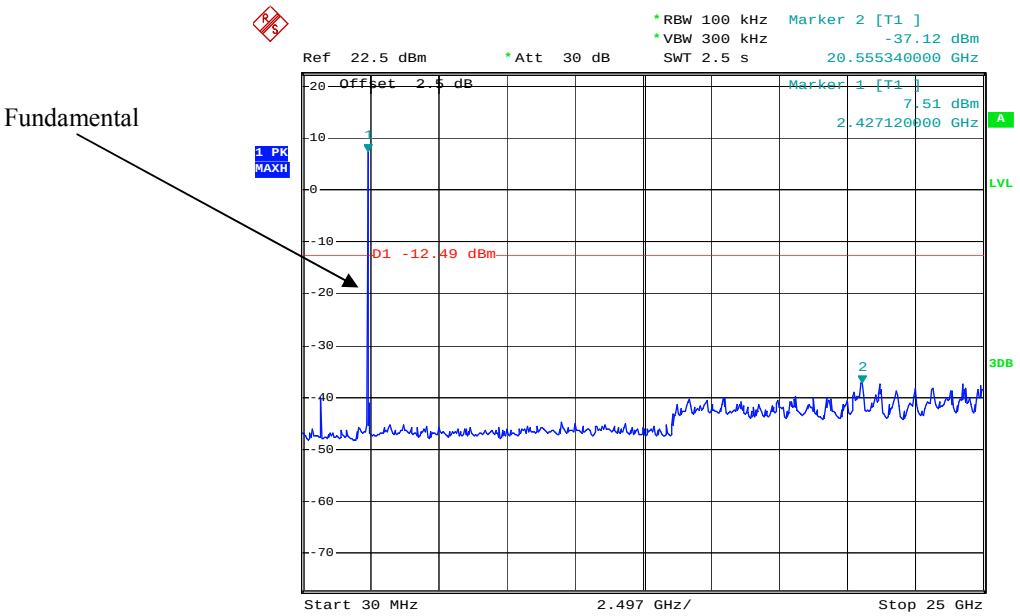
Date: 13.NOV.2014 16:49:29

Chain0 802.11b Middle Channel



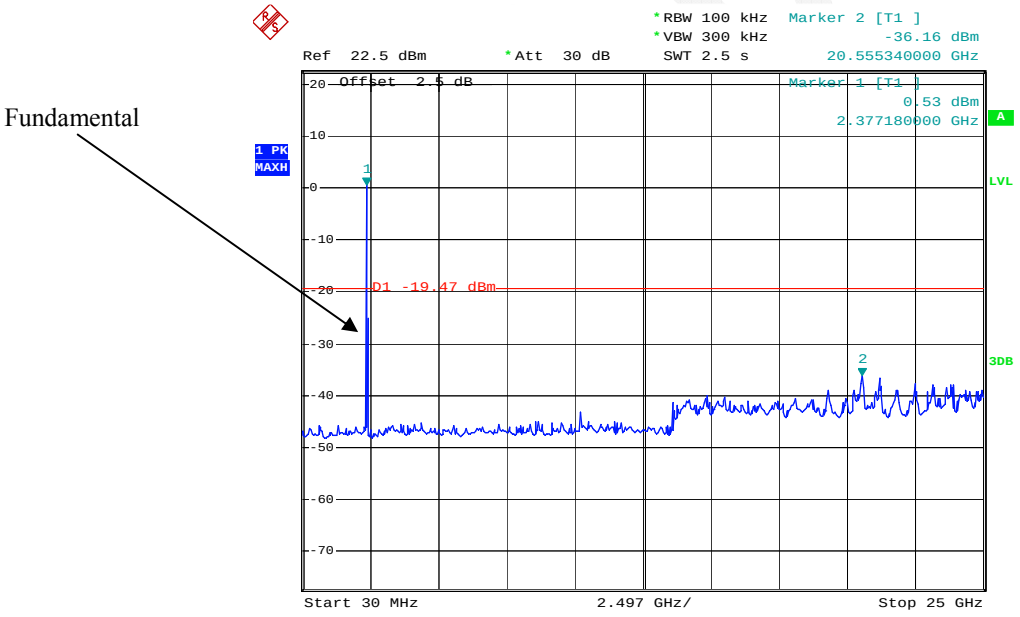
Date: 13.NOV.2014 17:05:51

Chain0 802.11b High Channel



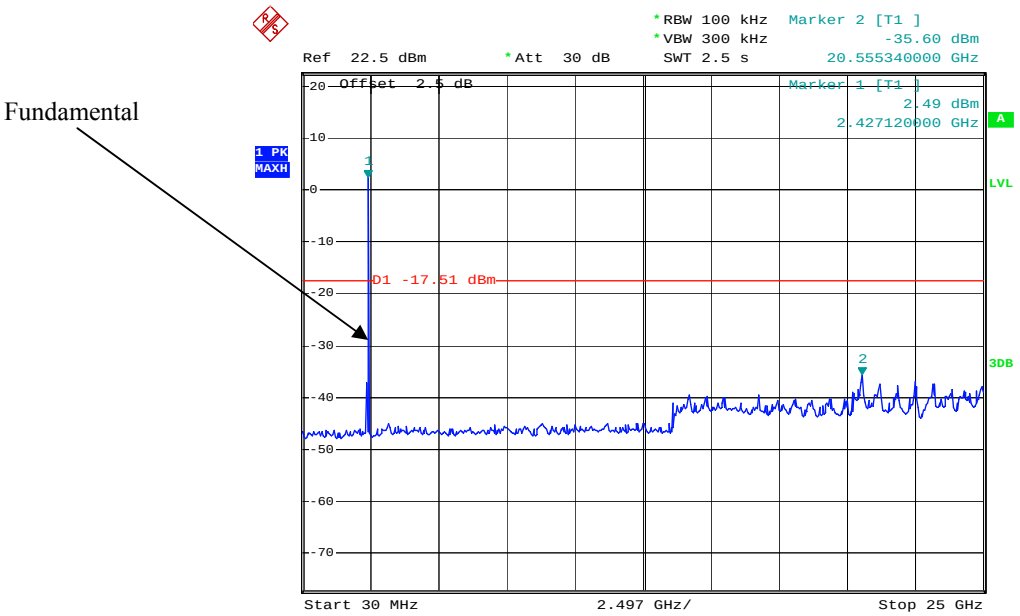
Date: 13.NOV.2014 17:10:47

Chain0 802.11g Low Channel



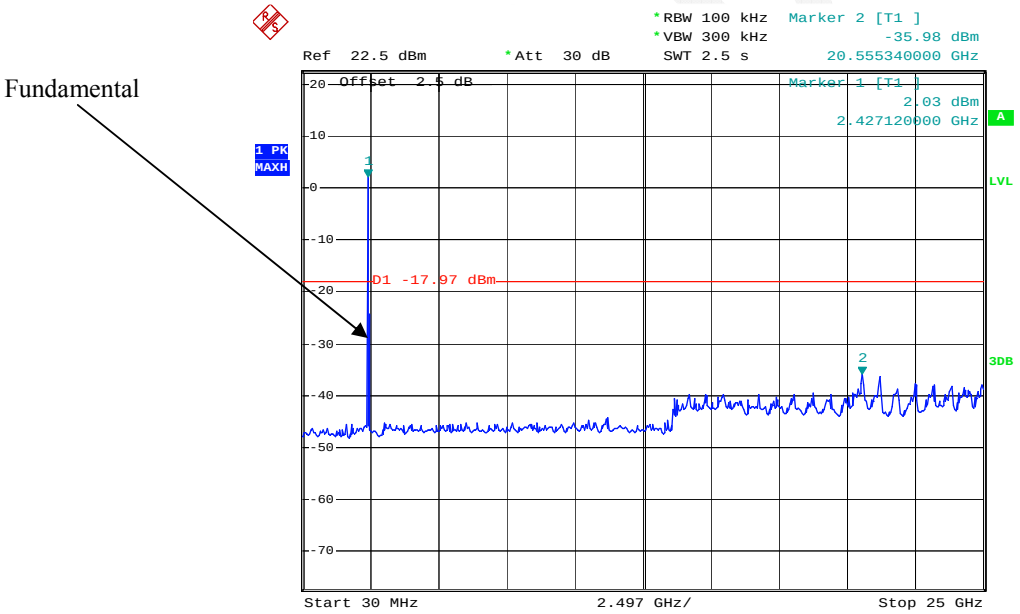
Date: 13.NOV.2014 17:28:11

Chain0 802.11g Middle Channel



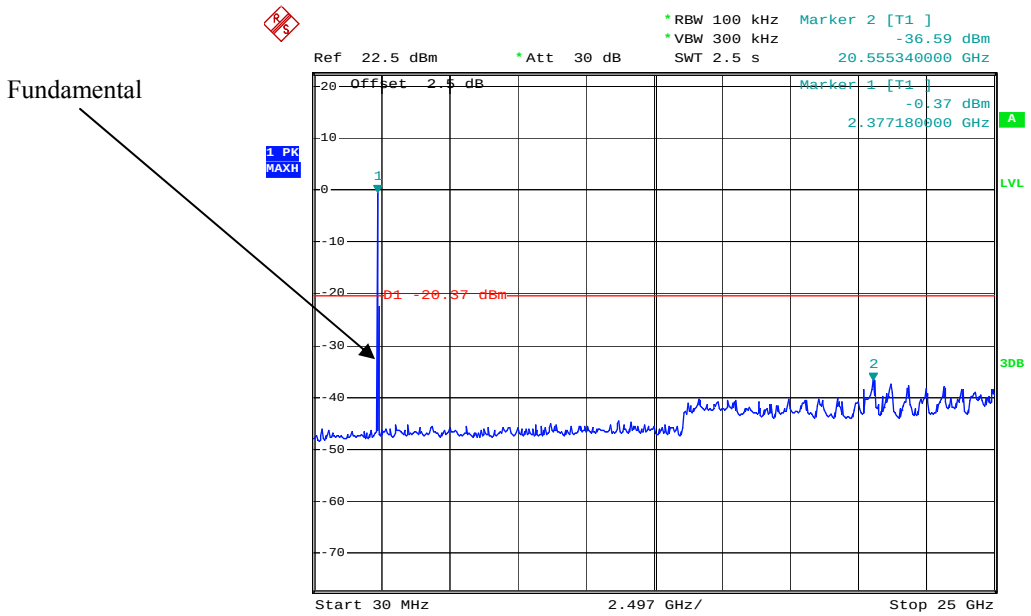
Date: 13.NOV.2014 17:23:16

Chain0 802.11g High Channel



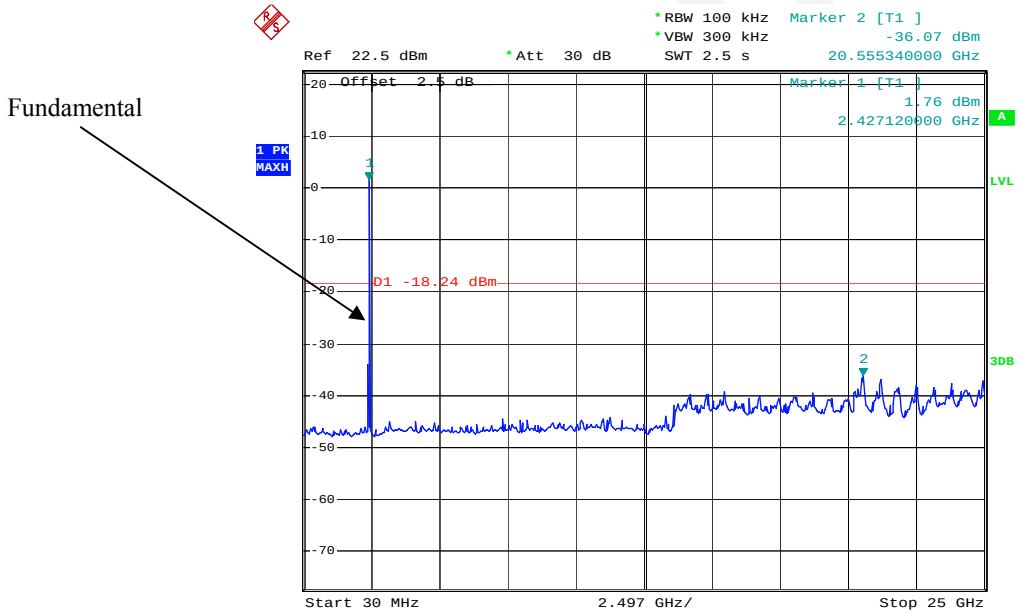
Date: 13.NOV.2014 17:17:48

Chain0 802.11n ht20 Low Channel



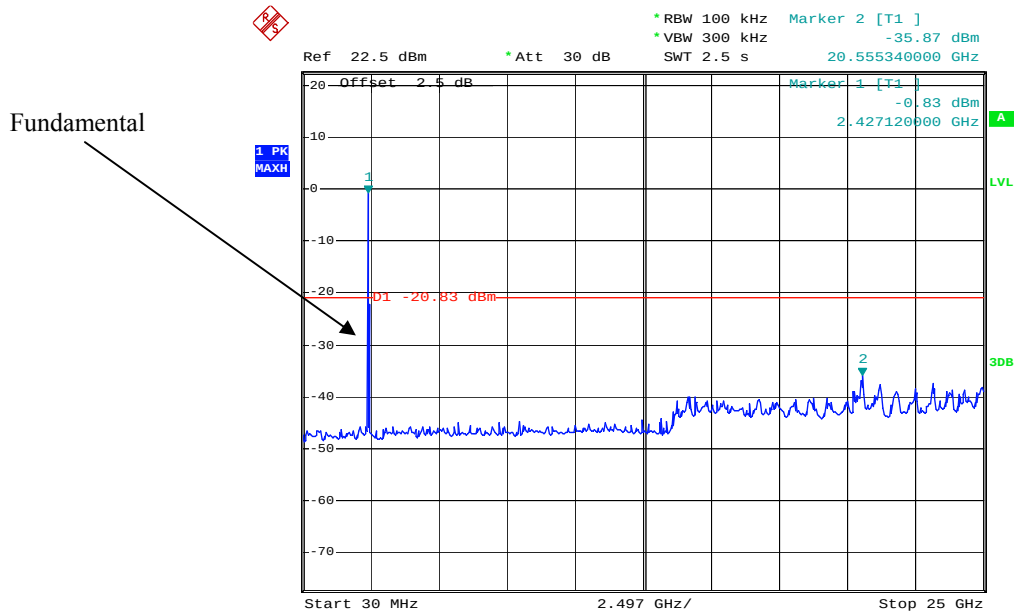
Date: 13.NOV.2014 17:34:09

Chain0 802.11n ht20 Middle Channel



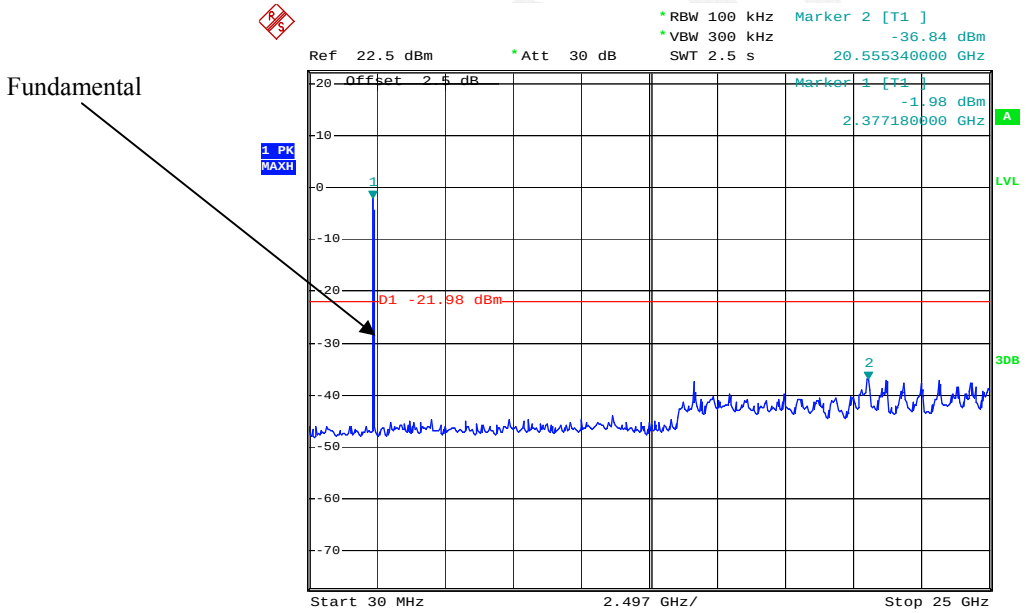
Date: 13.NOV.2014 17:40:13

Chain0 802.11n ht20 High Channel



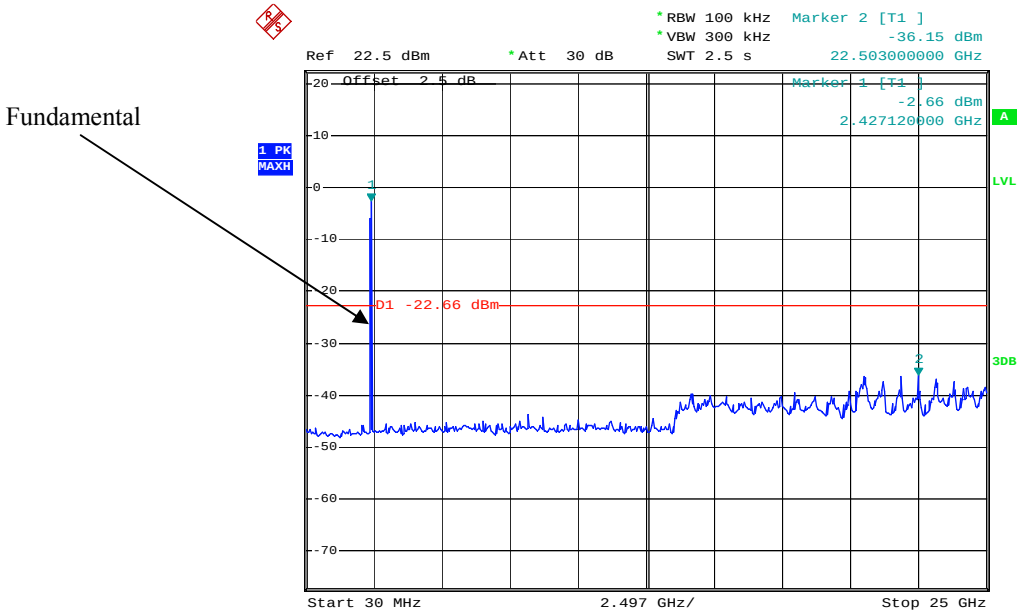
Date: 13.NOV.2014 17:45:21

Chain0 802.11n ht40 Low Channel



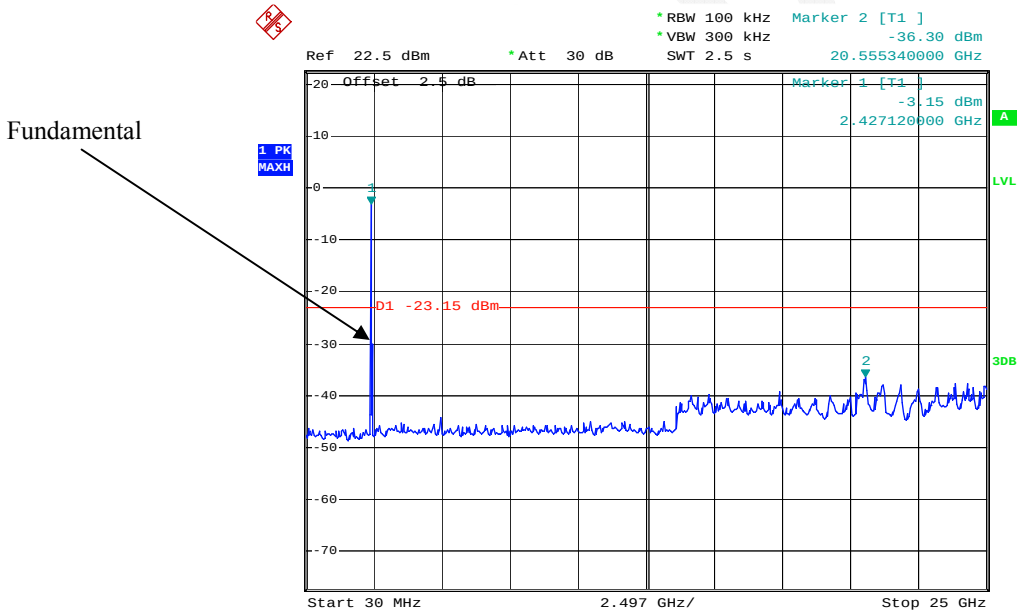
Date: 13.NOV.2014 16:43:12

Chain0 802.11n ht40 Middle Channel



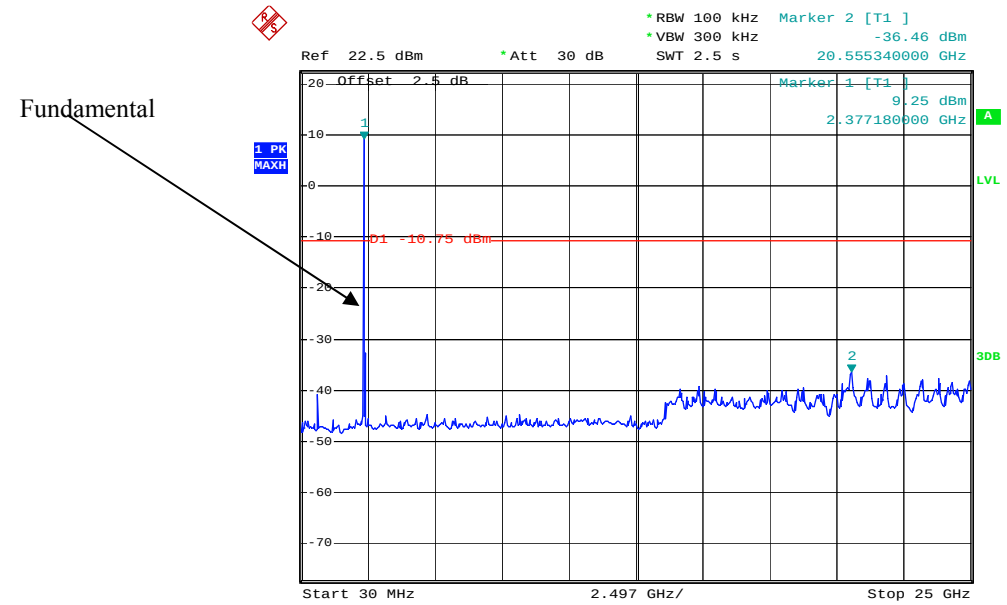
Date: 13.NOV.2014 16:36:39

Chain0 802.11n ht40 High Channel



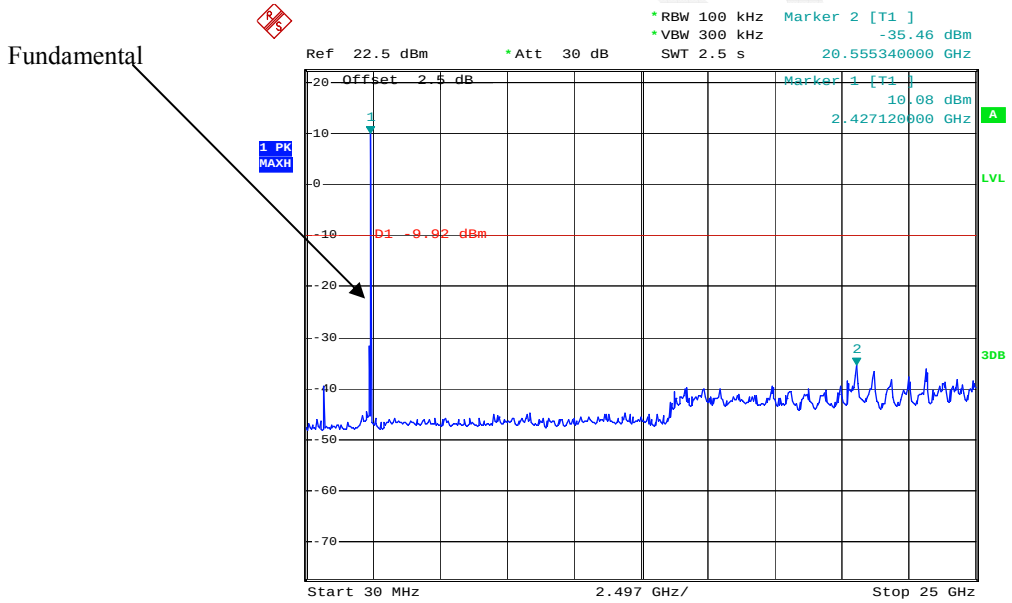
Date: 13.NOV.2014 16:30:42

Chain1 802.11b Low Channel



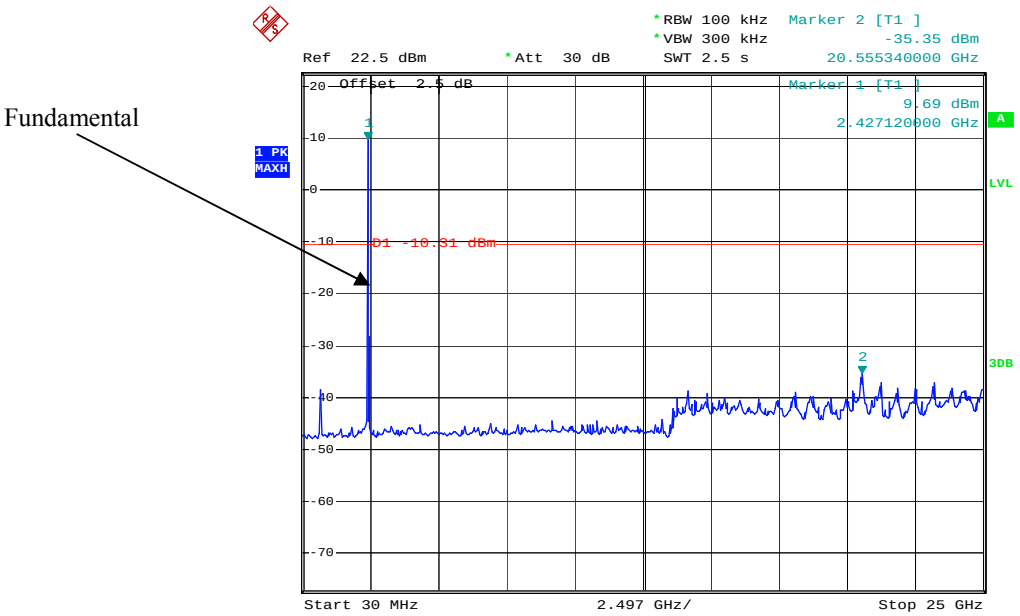
Date: 13.NOV.2014 14:53:08

Chain1 802.11b Middle Channel



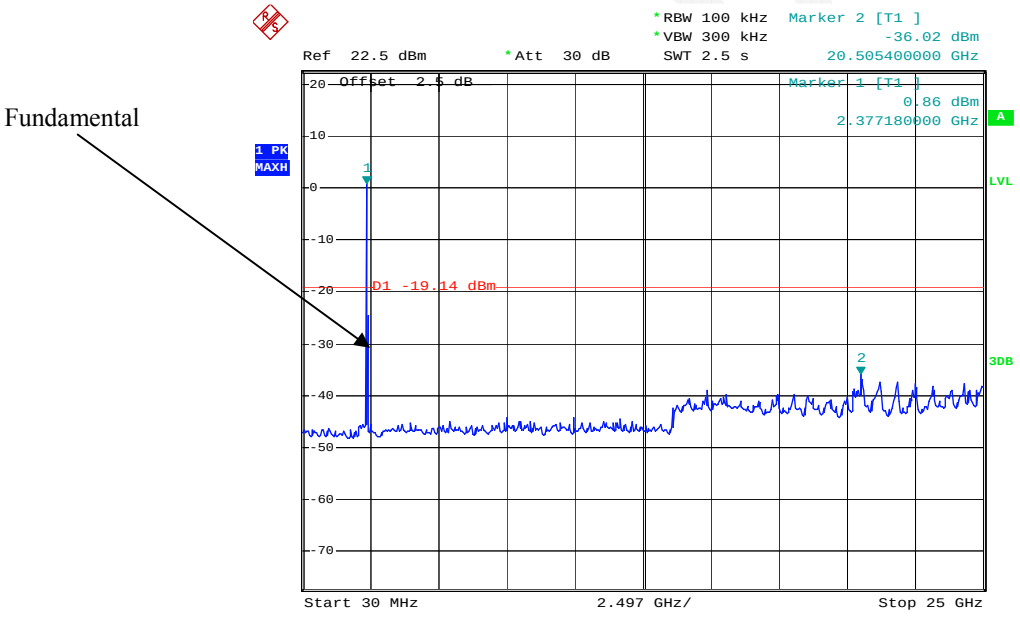
Date: 13.NOV.2014 14:58:09

Chain1 802.11b High Channel



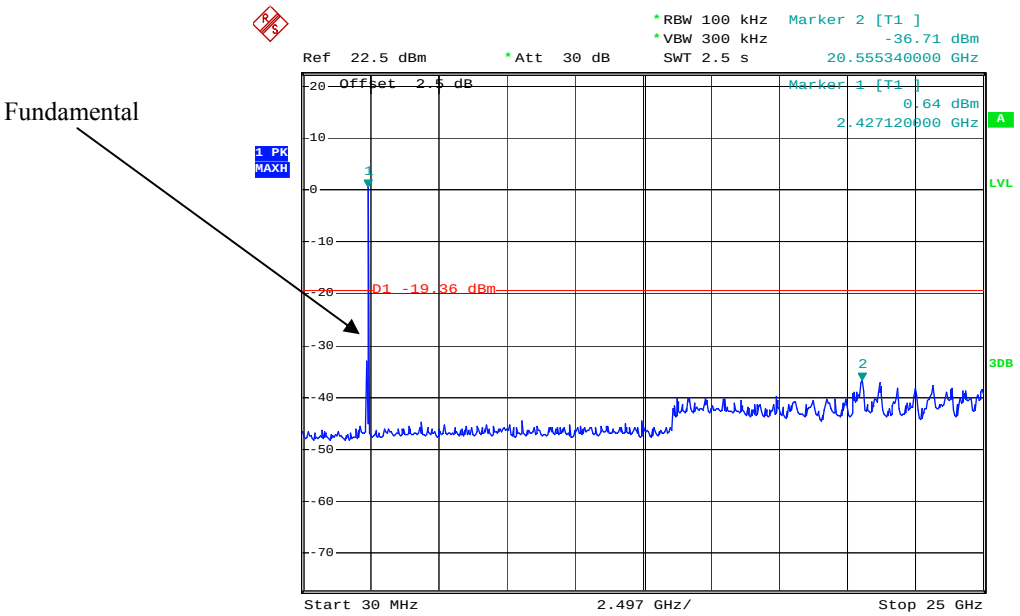
Date: 13.NOV.2014 15:05:12

Chain1 802.11g Low Channel



Date: 13.NOV.2014 15:35:16

Chain1 802.11g Middle Channel



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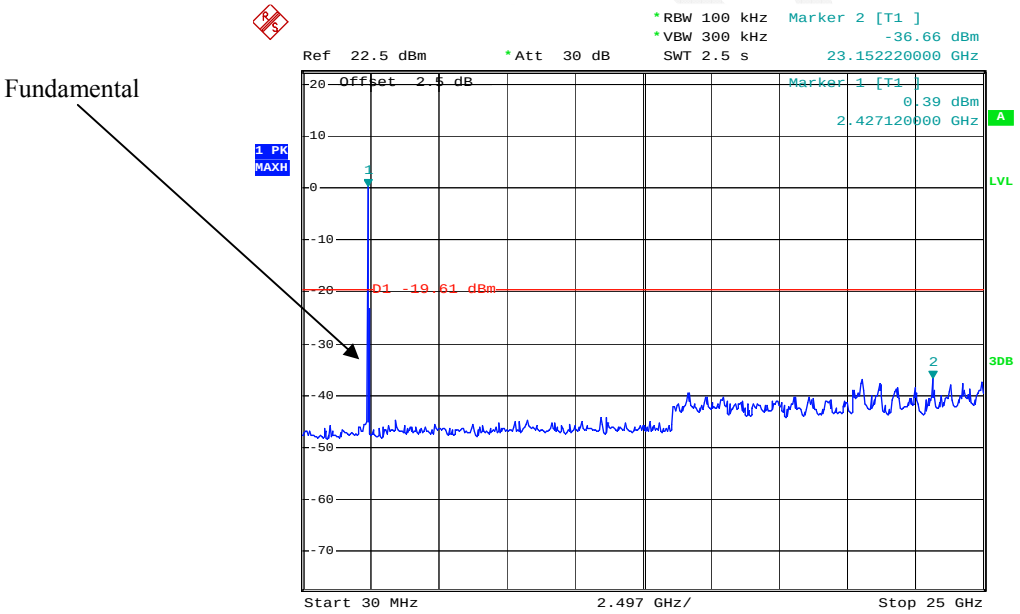
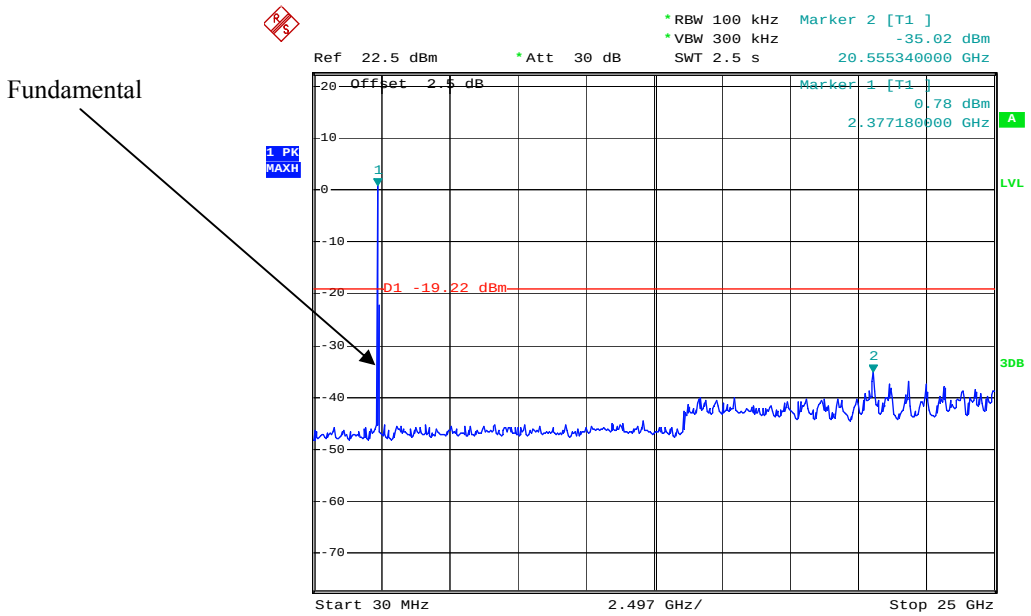
Chain1 802.11g High Channel



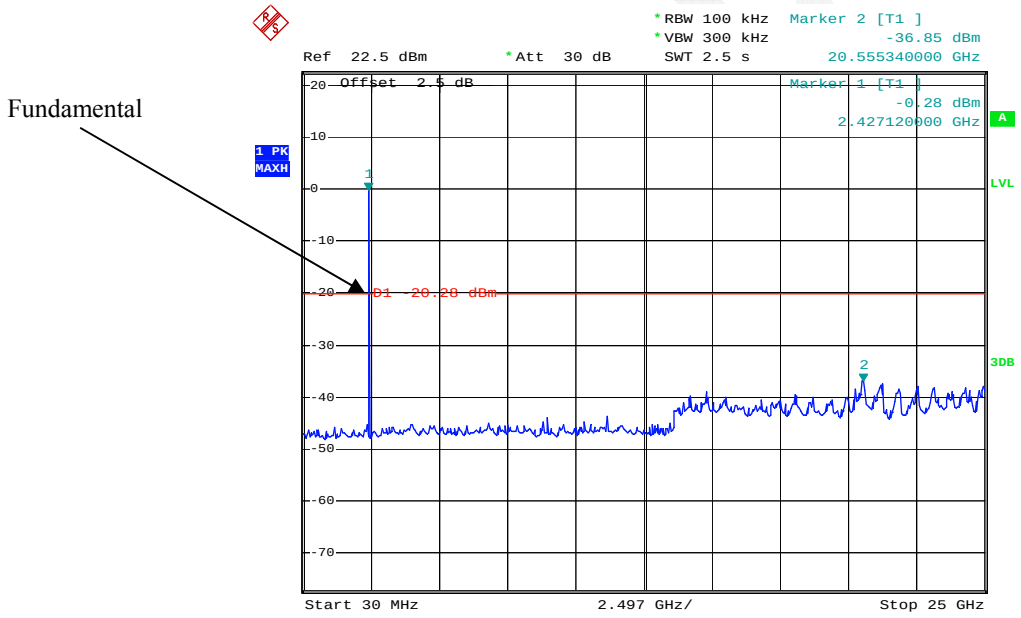
Date: 13.NOV.2014 15:20:15

Chain1 802.11n ht20 Low Channel



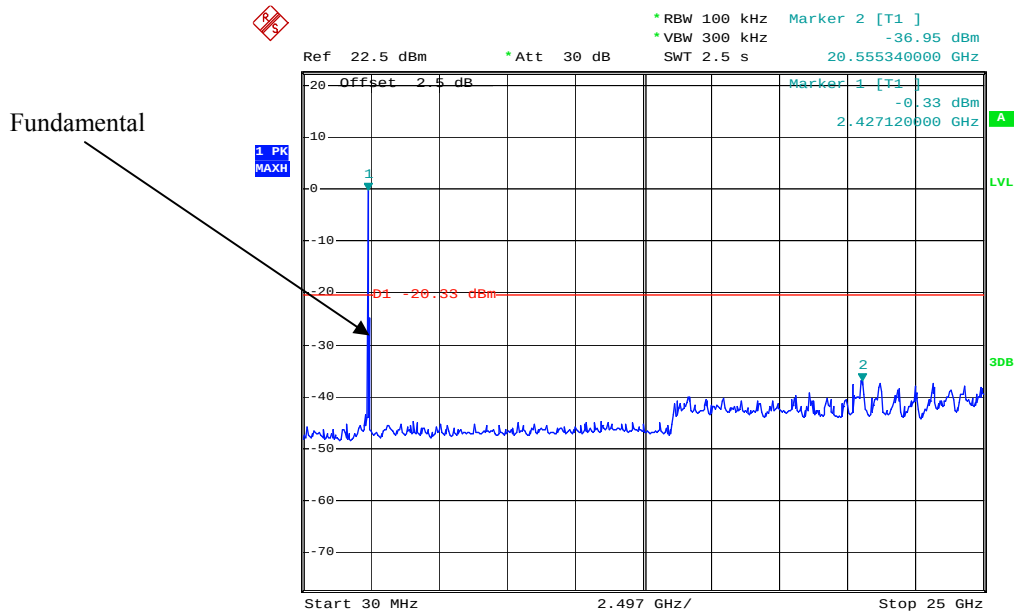
Date: 13.NOV.2014 15:41:14

Chain1 802.11n ht20 Middle Channel



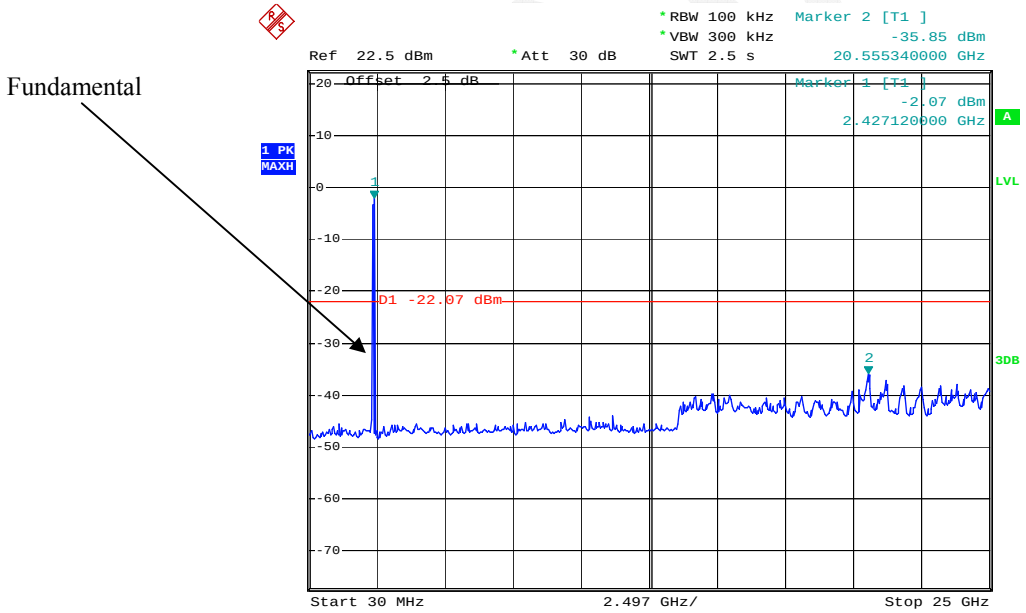
Date: 7.DEC.2014 15:39:22

Chain1 802.11n ht20 High Channel



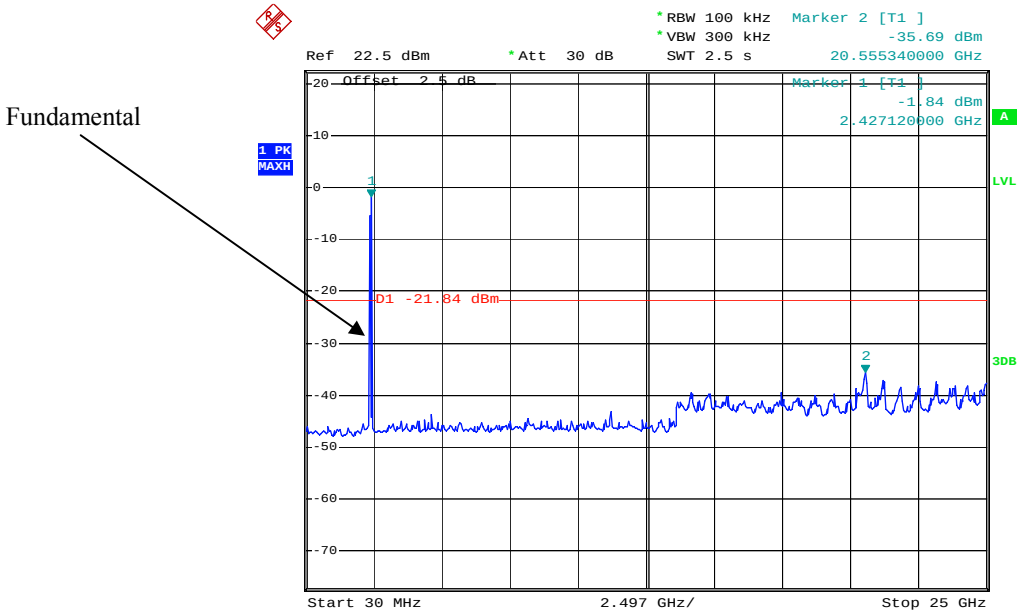
Date: 13.NOV.2014 15:58:31

Chain1 802.11n ht40 Low Channel



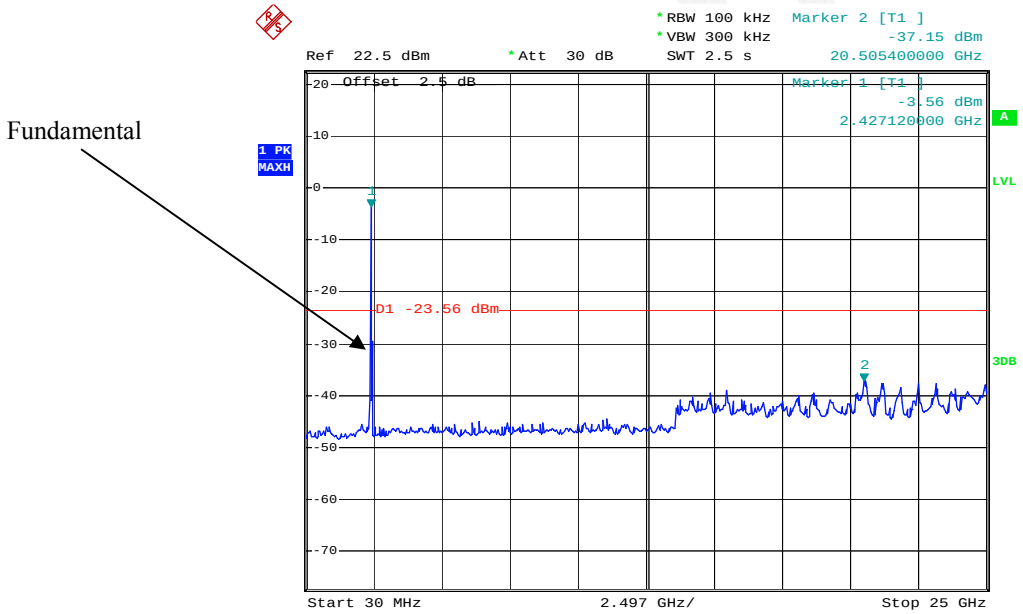
Date: 13.NOV.2014 16:07:04

Chain1 802.11n ht40 Middle Channel



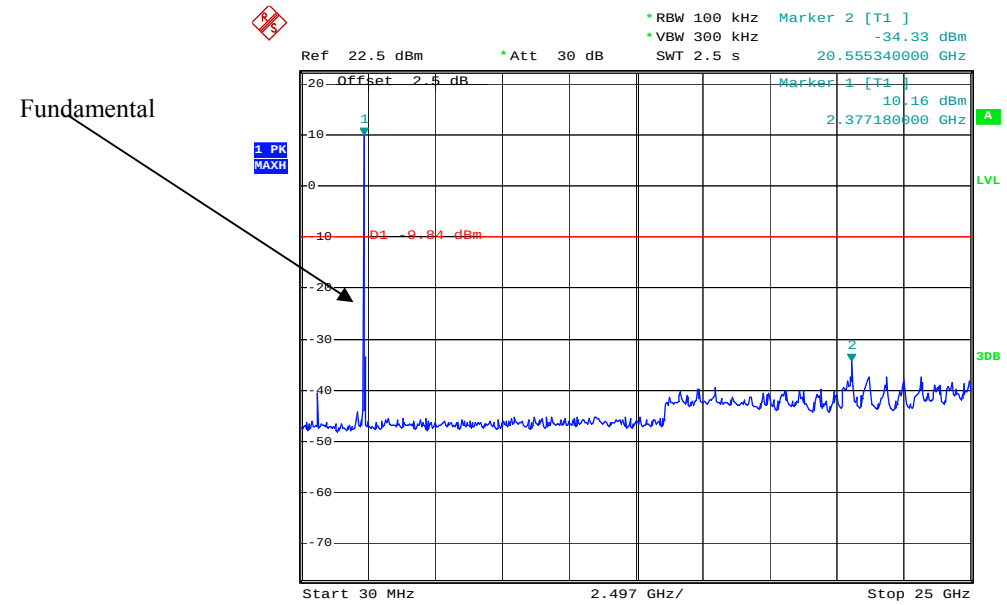
Date: 13.NOV.2014 16:15:59

Chain1 802.11n ht40 High Channel



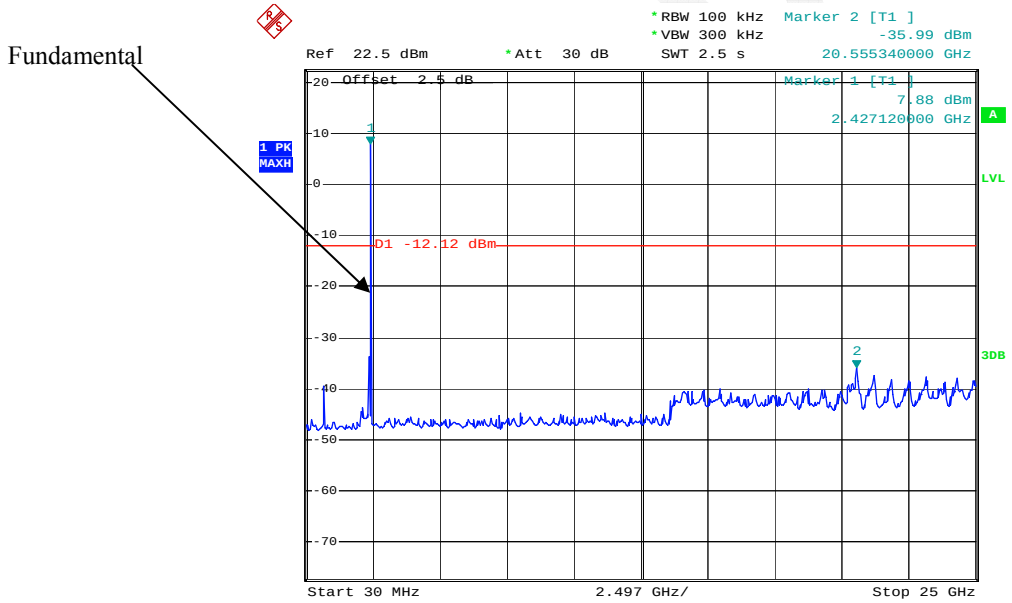
Date: 13.NOV.2014 16:21:21

Chain2 802.11b Low Channel



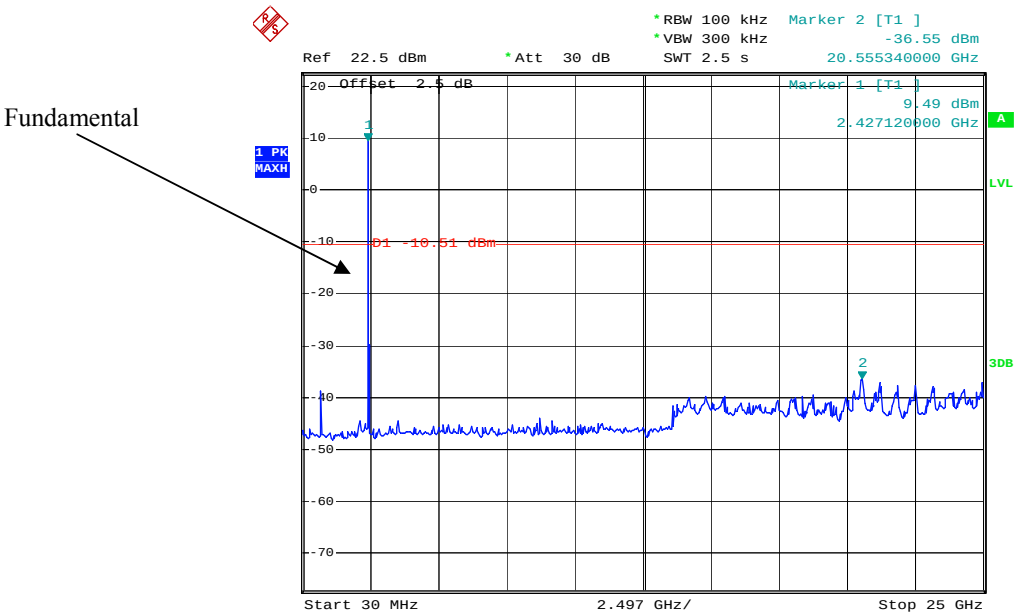
Date: 13.NOV.2014 18:50:21

Chain2 802.11b Middle Channel



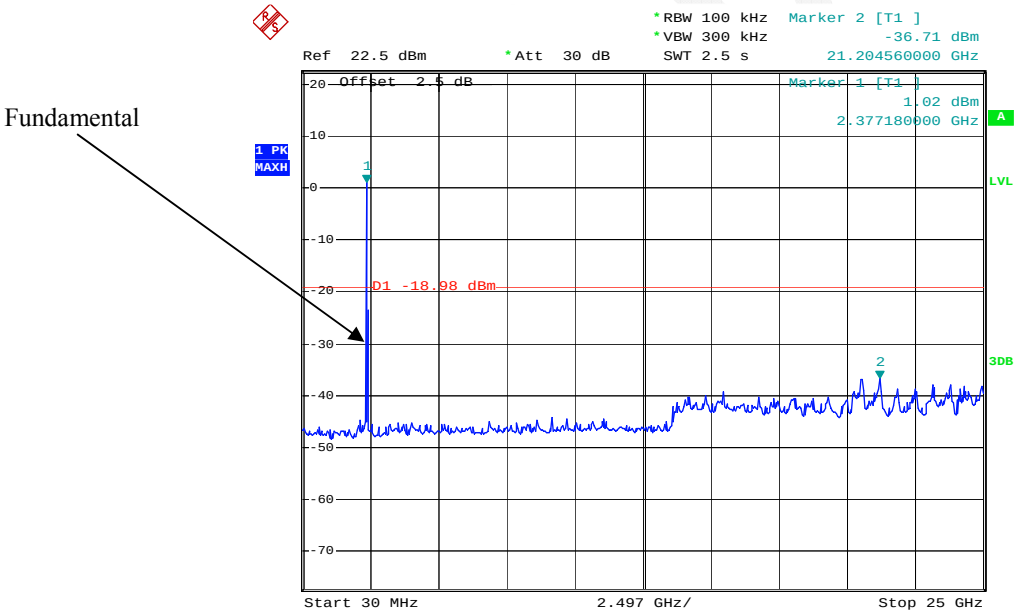
Date: 13.NOV.2014 18:54:32

Chain2 802.11b High Channel



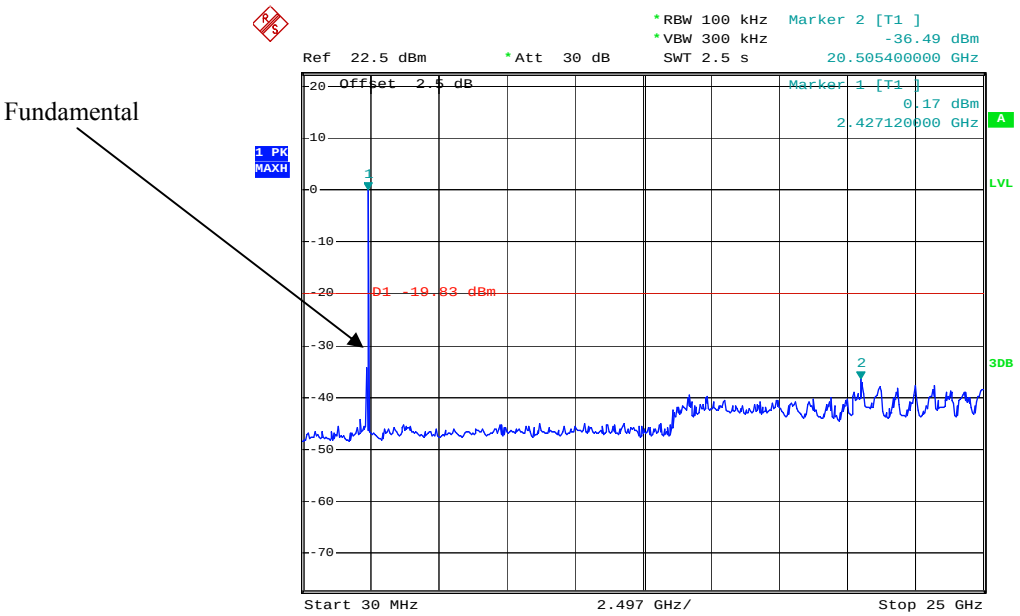
Date: 13.NOV.2014 18:58:13

Chain2 802.11g Low Channel



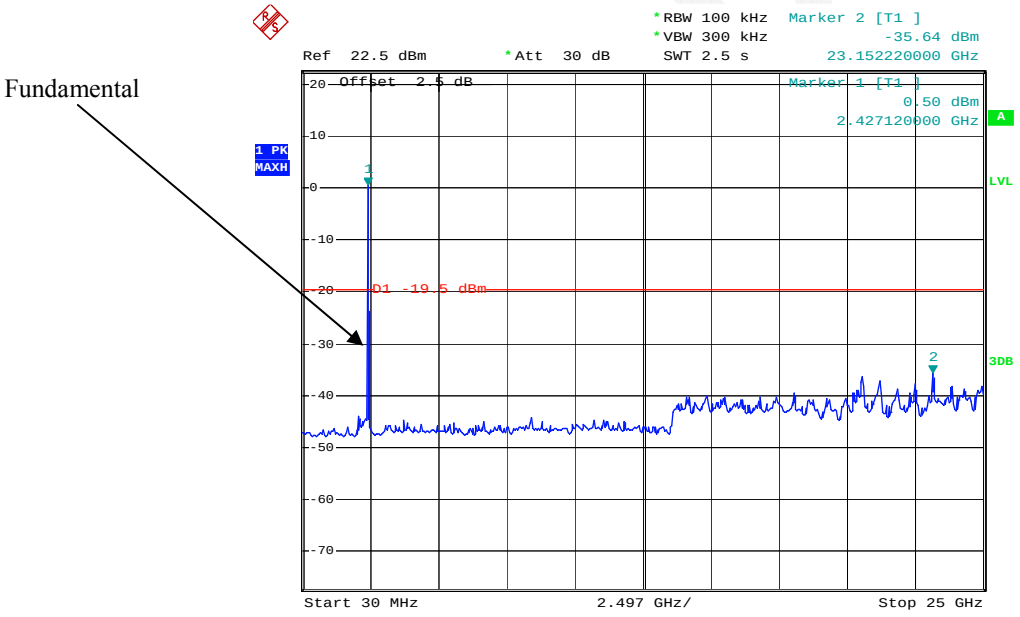
Date: 13.NOV.2014 18:21:29

Chain2 802.11g Middle Channel



Date: 13.NOV.2014 18:28:06

Chain2 802.11g High Channel



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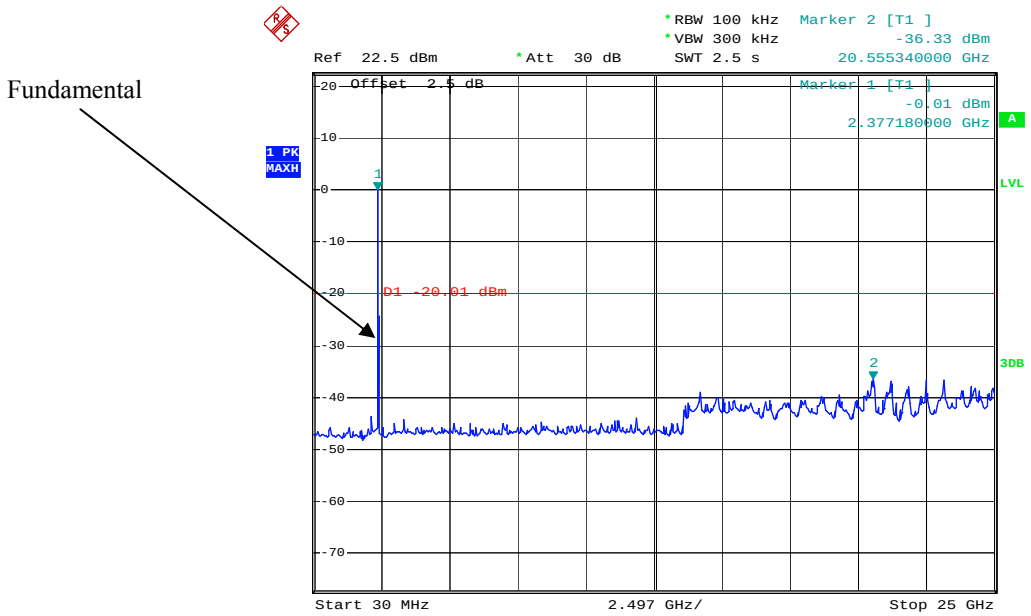
Chain2 802.11n ht20 Low Channel



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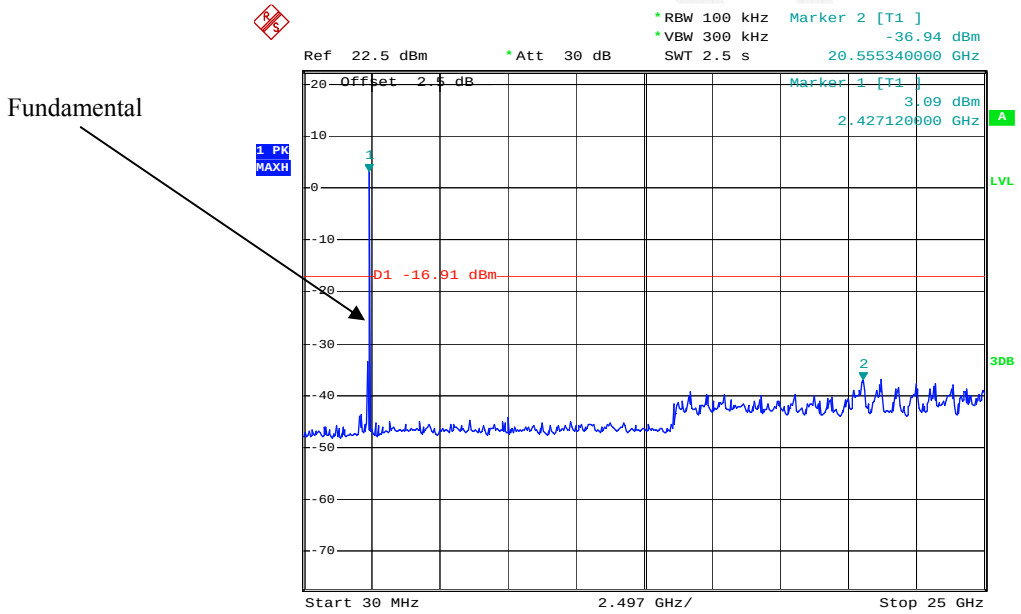
Chain2 802.11n ht20 Middle Channel



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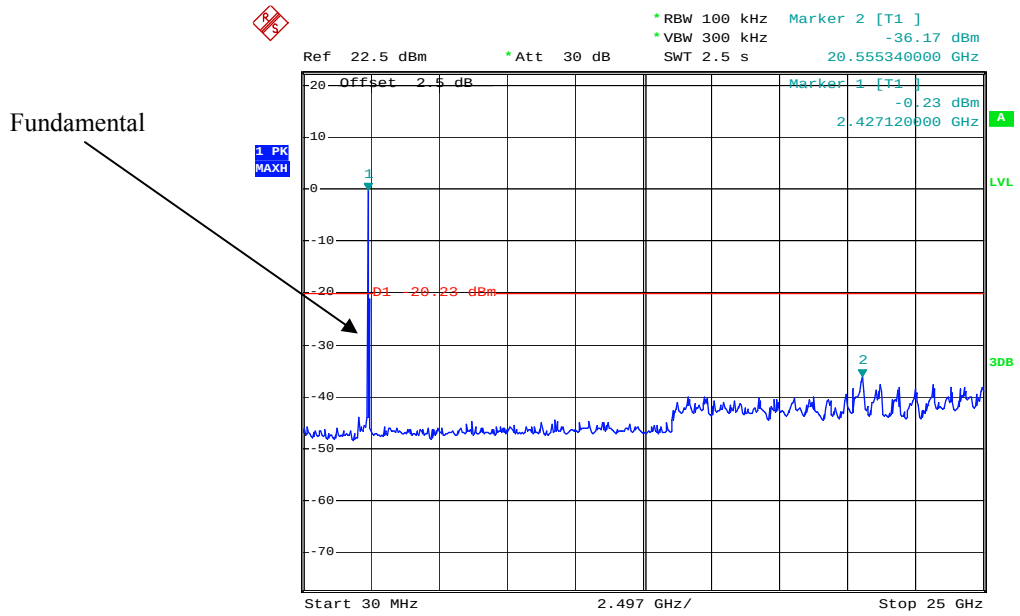
Chain2 802.11n ht20 High Channel



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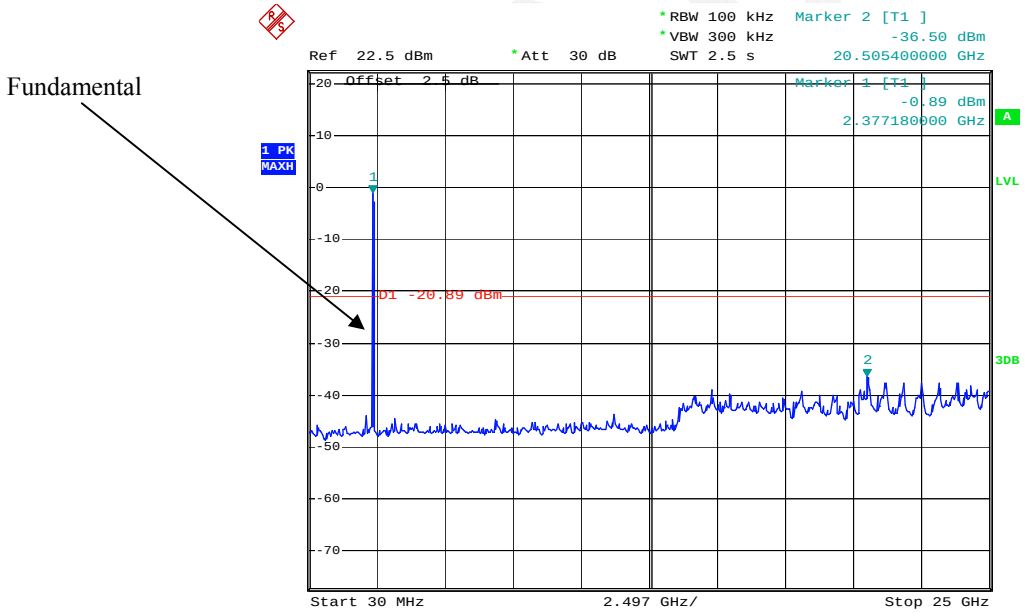
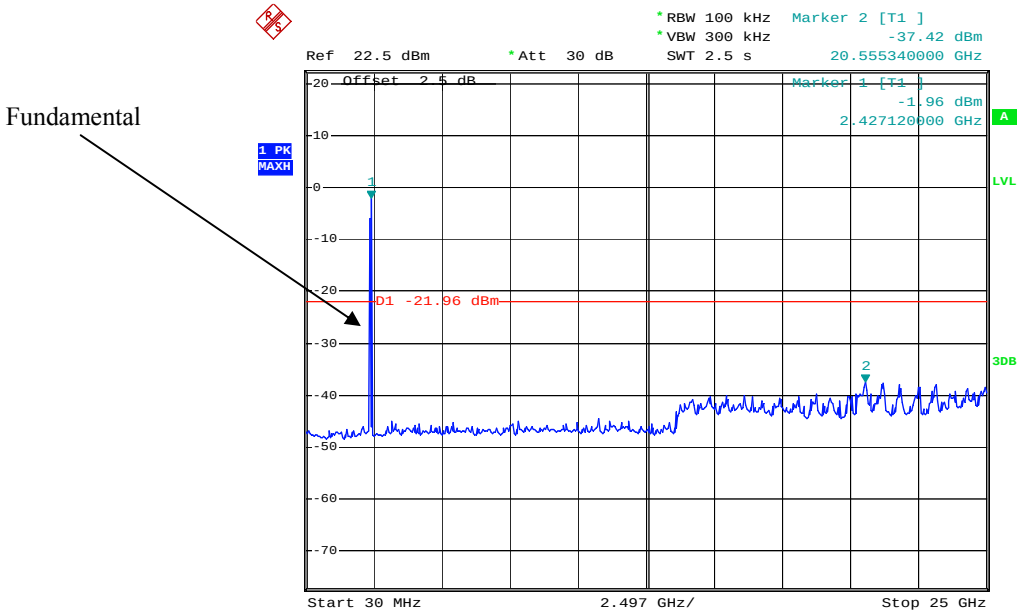
Chain2 802.11n ht40 Low Channel



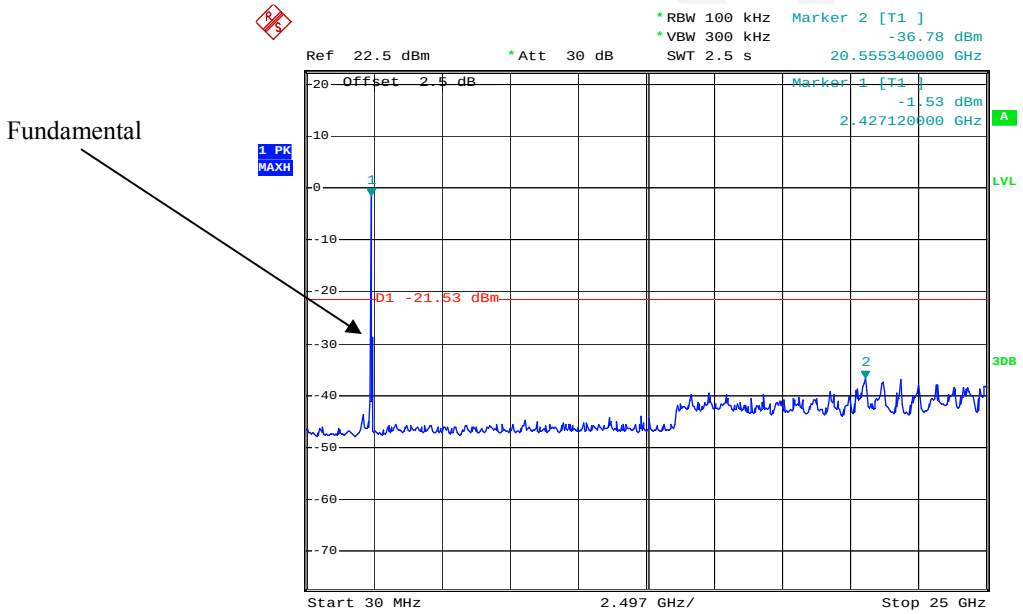
Date: 13.NOV.2014 19:24:02

Chain2 802.11n ht40 Middle Channel



Date: 13.NOV.2014 19:17:57

Chain2 802.11n ht40 High Channel



Date: 13.NOV.2014 19:31:08

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:	25.5 °C
Relative Humidity:	51 %
ATM Pressure:	101.6 kPa

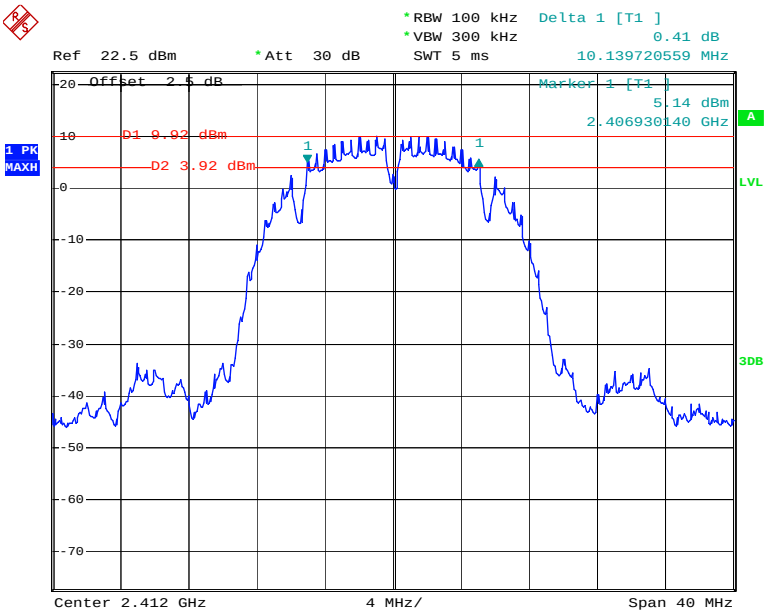
The testing was performed by Sevin Liu on 2014-11-13.

Test Mode: Transmitting

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

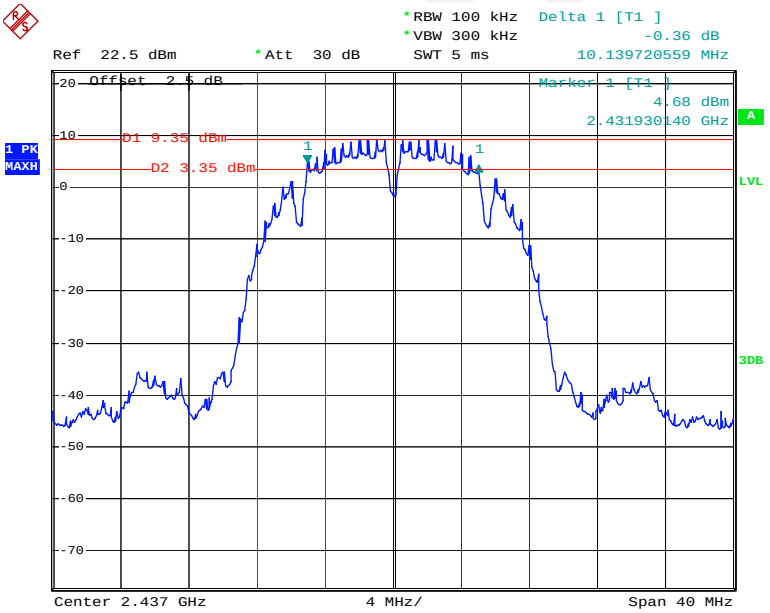
Mode	Channel	Frequency (MHz)	6dB Emission Bandwidth (MHz)			Limit (MHz)
			Chain 0	Chain 1	Chain 2	
2.4G Band 802.11 b	Low	2412	10.14	10.14	10.14	0.5
	Middle	2437	10.14	10.14	10.06	0.5
	High	2462	10.14	10.06	10.14	0.5
2.4G Band 802.11 g	Low	2412	16.53	16.53	16.45	0.5
	Middle	2437	16.53	16.53	16.45	0.5
	High	2462	16.53	16.45	16.53	0.5
2.4G Band 802.11 n20	Low	2412	17.64	17.64	17.72	0.5
	Middle	2437	17.72	17.72	17.72	0.5
	High	2462	17.72	17.64	17.64	0.5
2.4G Band 802.11 n40	Low	2422	36.41	35.93	36.41	0.5
	Middle	2437	36.41	36.41	36.09	0.5
	High	2452	36.41	36.09	36.09	0.5

Chain0 802.11b Low Channel



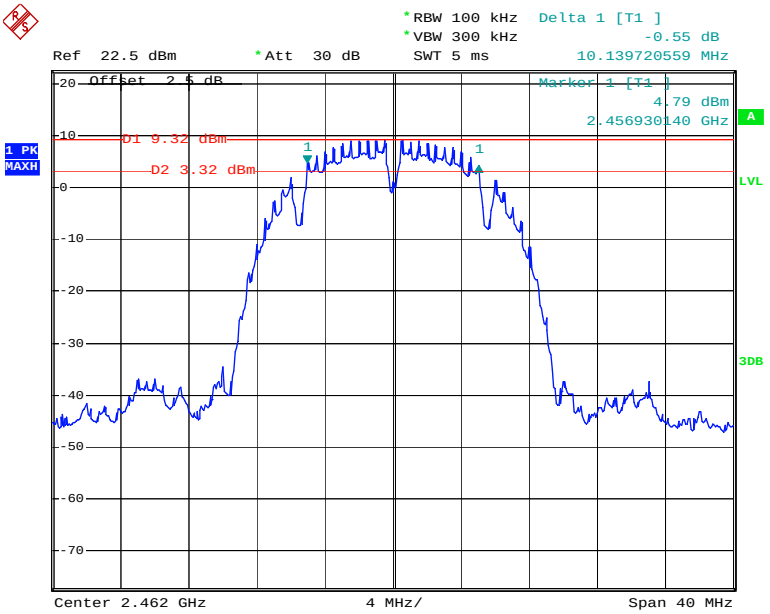
Date: 13.NOV.2014 16:46:23

Chain0 802.11b Middle Channel



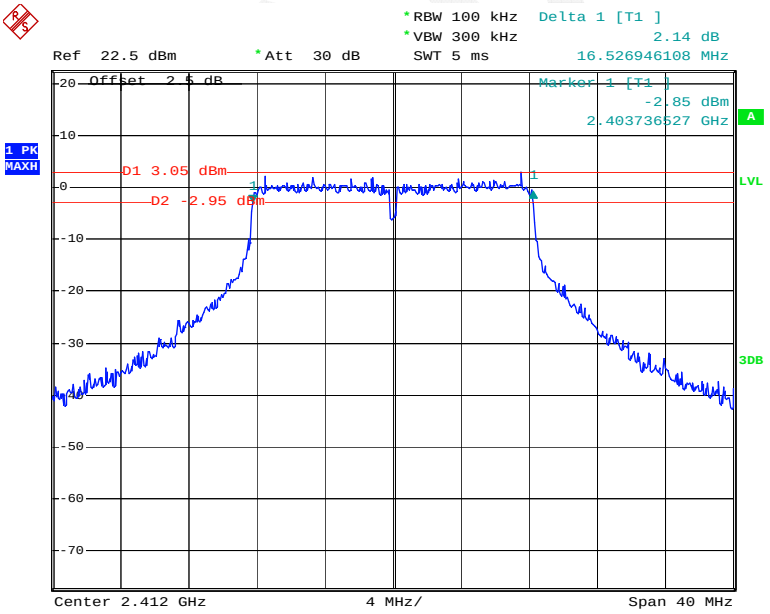
Date: 13.NOV.2014 17:02:59

Chain0 802.11b High Channel



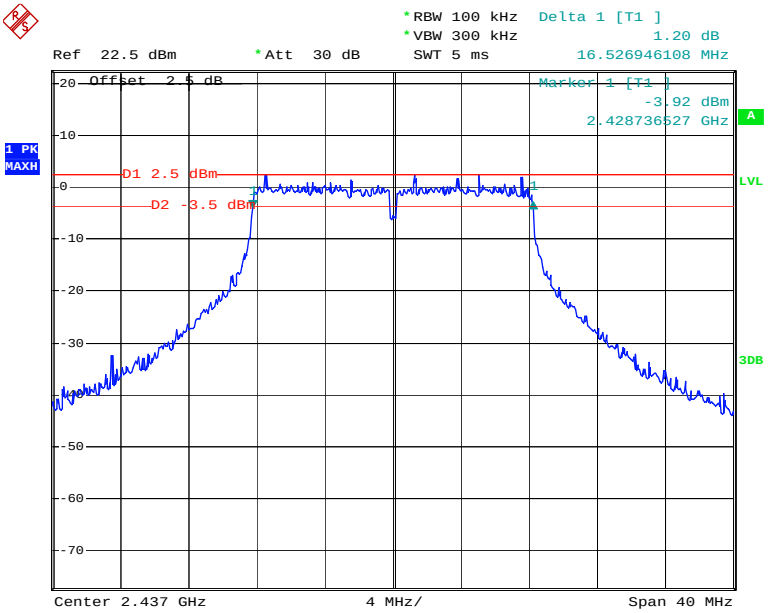
Date: 13.NOV.2014 17:07:34

Chain0 802.11g Low Channel



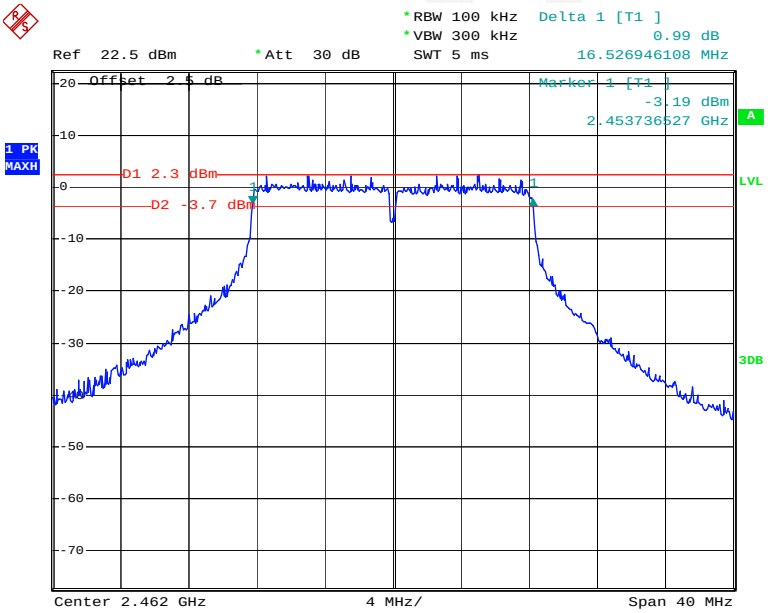
Date: 13.NOV.2014 17:24:23

Chain0 802.11g Middle Channel



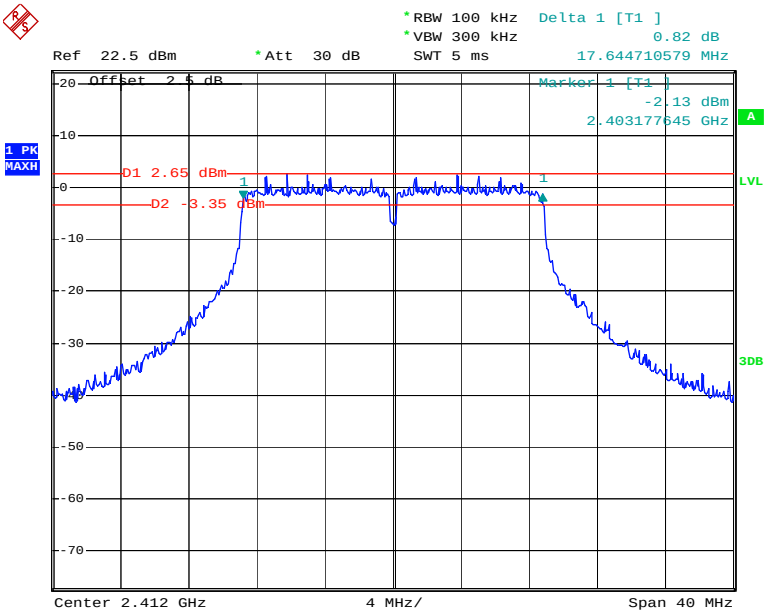
Date: 13.NOV.2014 17:19:10

Chain0 802.11g High Channel



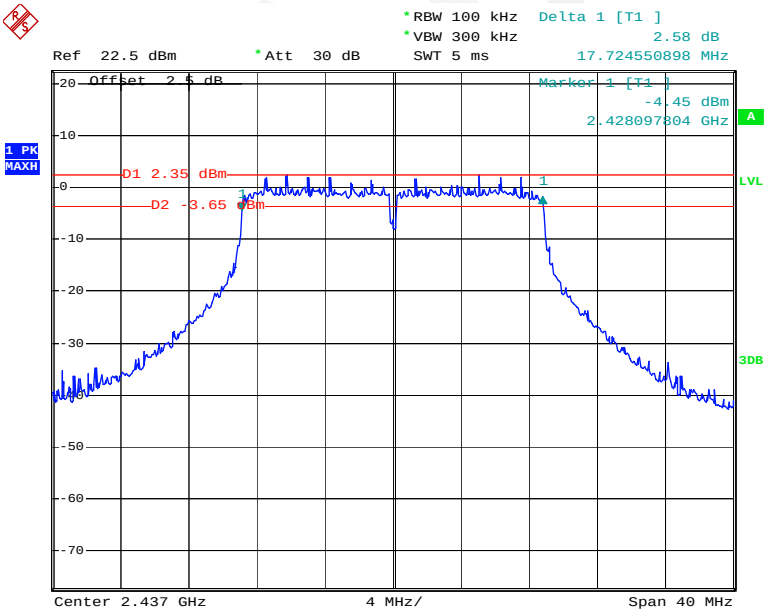
Date: 13.NOV.2014 17:13:01

Chain0 802.11n ht20 Low Channel



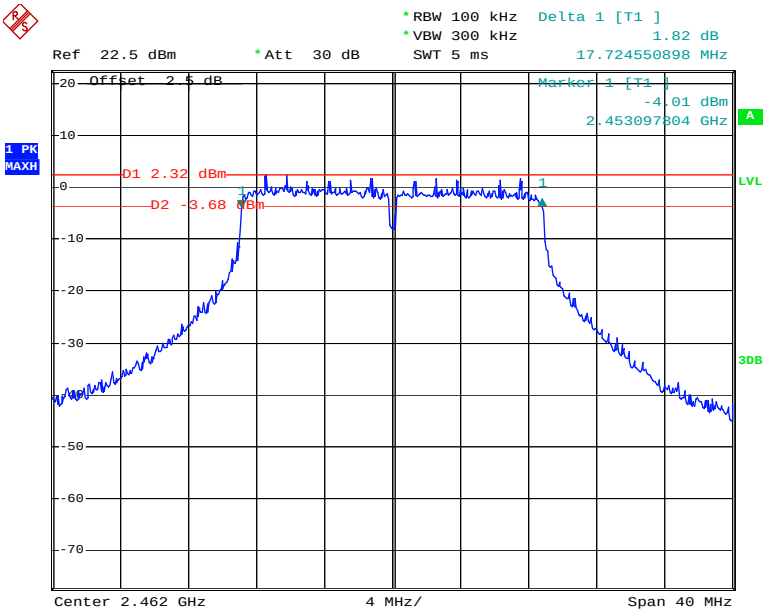
Date: 13.NOV.2014 17:30:13

Chain0 802.11n ht20 Middle Channel



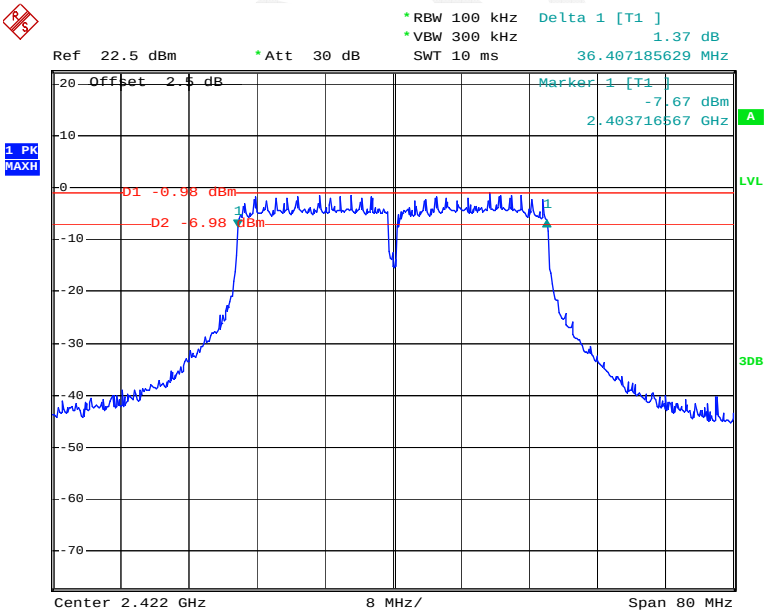
Date: 13.NOV.2014 17:36:00

Chain0 802.11n ht20 High Channel



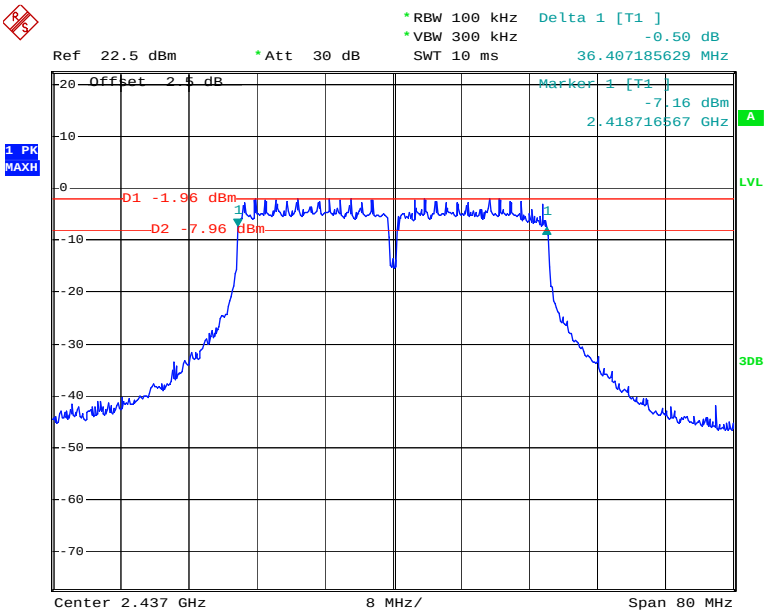
Date: 13.NOV.2014 17:41:16

Chain0 802.11n ht40 Low Channel



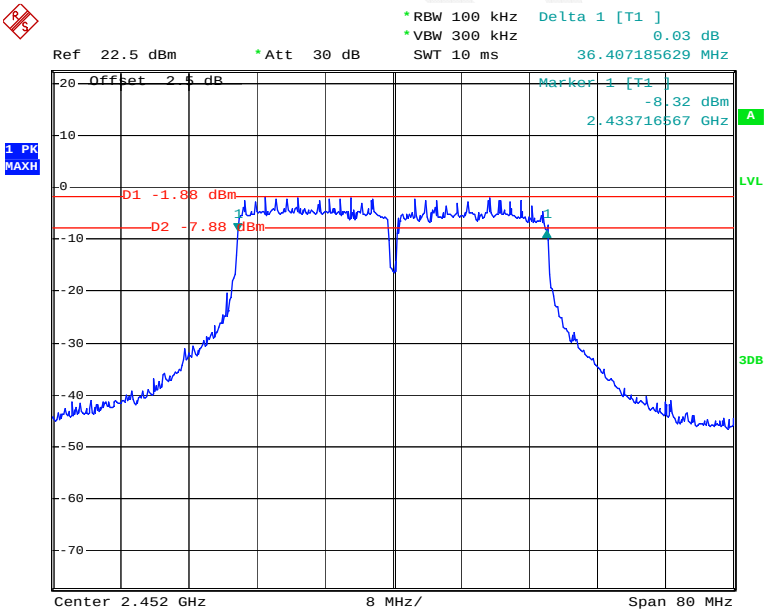
Date: 13.NOV.2014 16:38:17

Chain0 802.11n ht40 Middle Channel



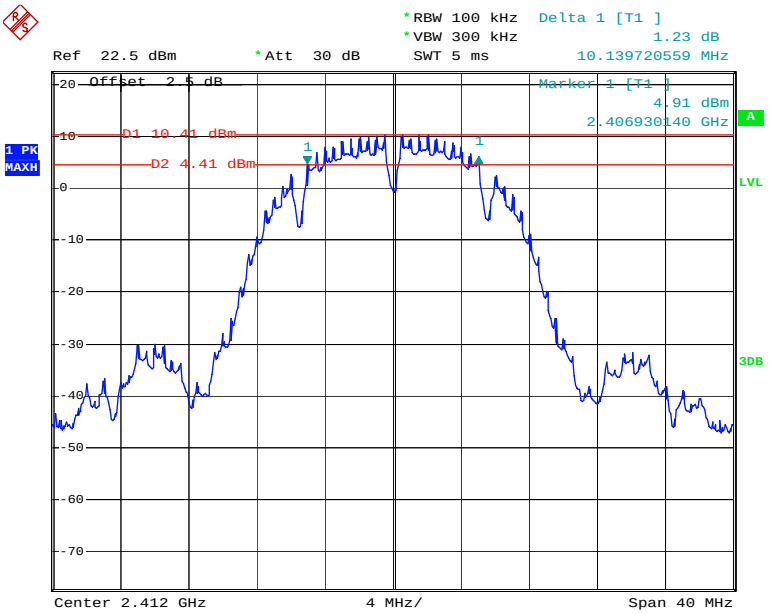
Date: 13.NOV.2014 16:32:47

Chain0 802.11n ht40 High Channel



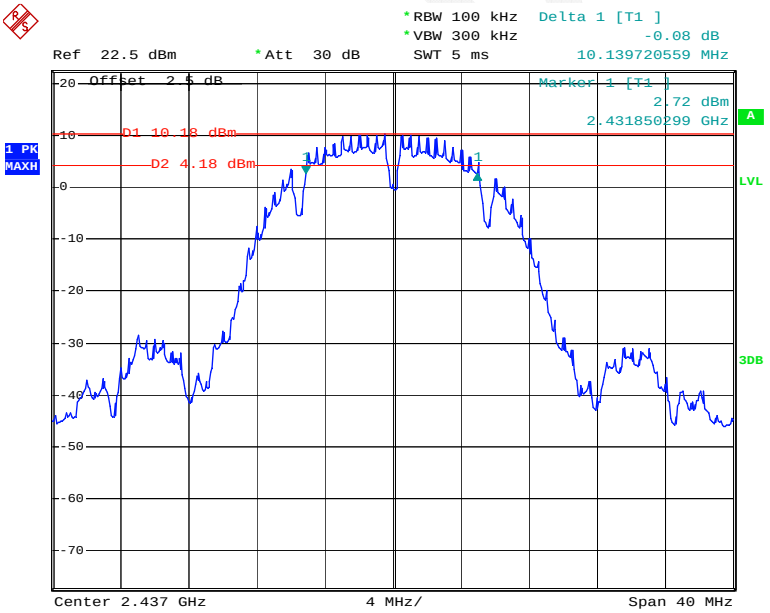
Date: 13.NOV.2014 16:26:21

Chain1 802.11b Low Channel



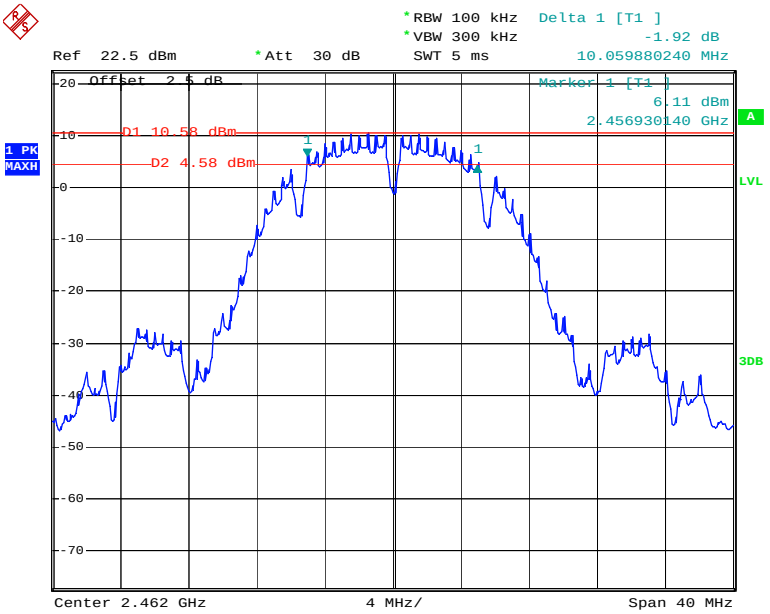
Date: 13.NOV.2014 14:51:44

Chain1 802.11b Middle Channel



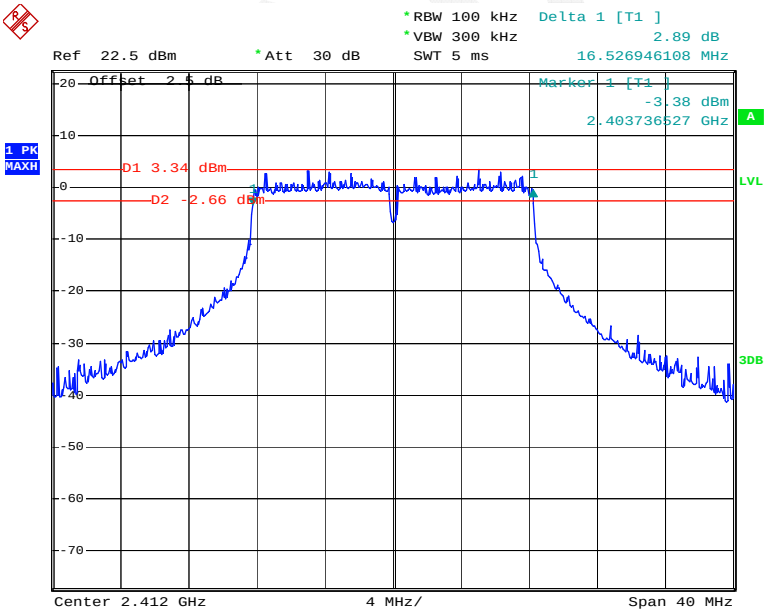
Date: 13.NOV.2014 14:54:50

Chain1 802.11b High Channel



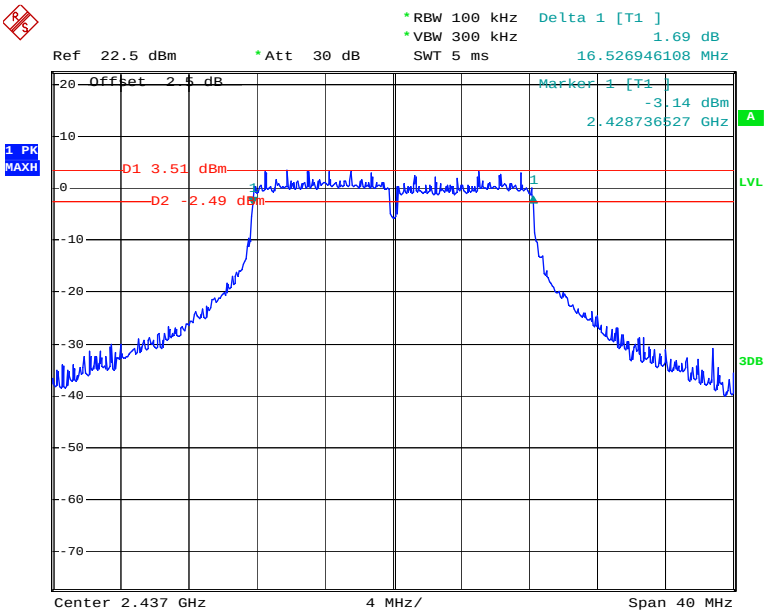
Date: 13.NOV.2014 15:02:13

Chain1 802.11g Low Channel



Date: 13.NOV.2014 15:30:01

Chain1 802.11g Middle Channel



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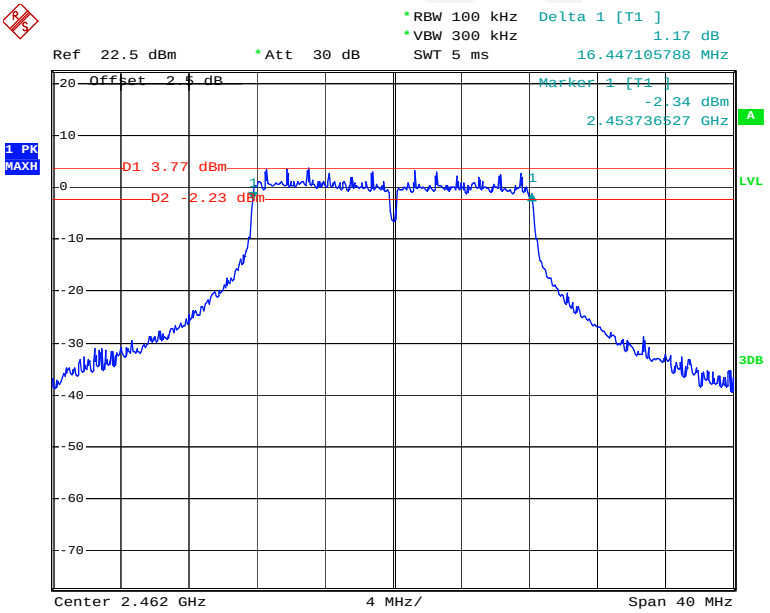
Chain1 802.11g High Channel



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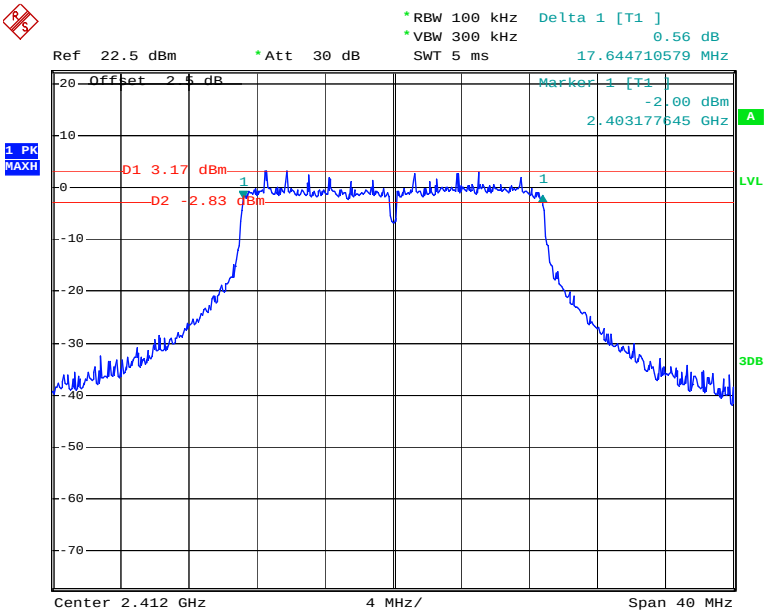
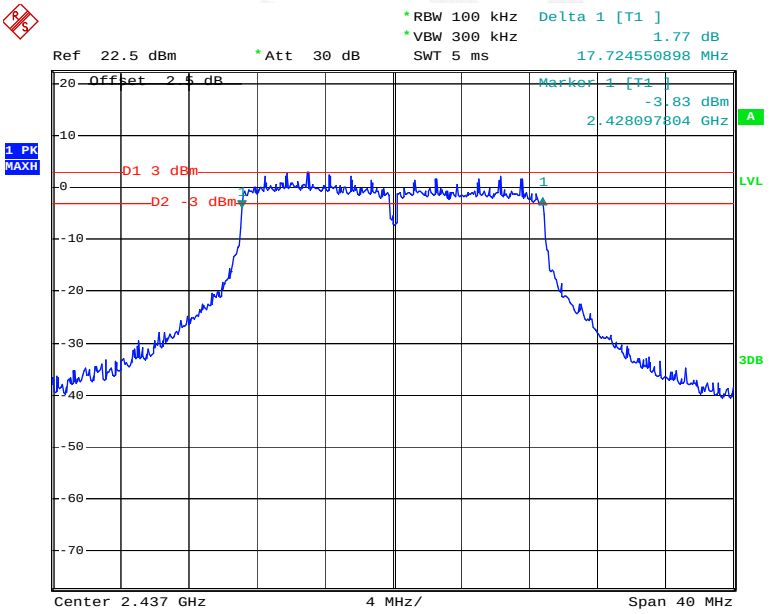
Chain1 802.11n ht20 Low Channel



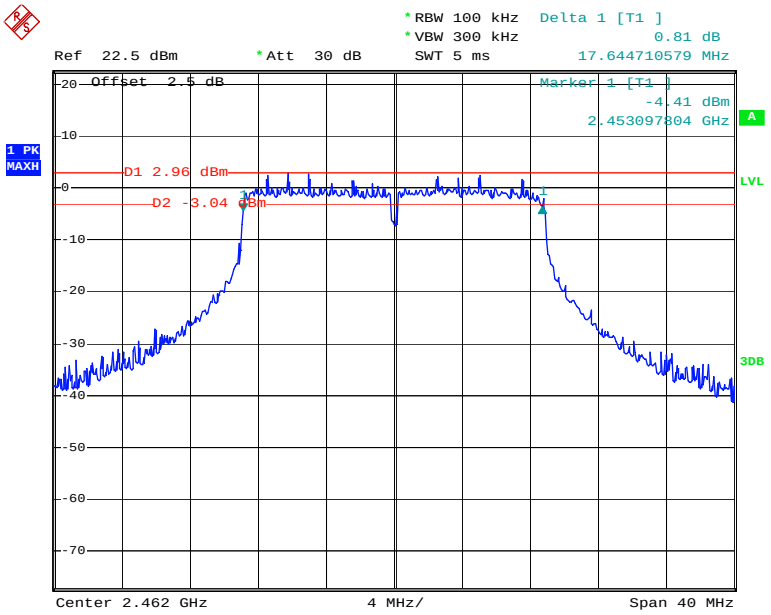
Date: 13.NOV.2014 15:37:11

Chain1 802.11n ht20 Middle Channel



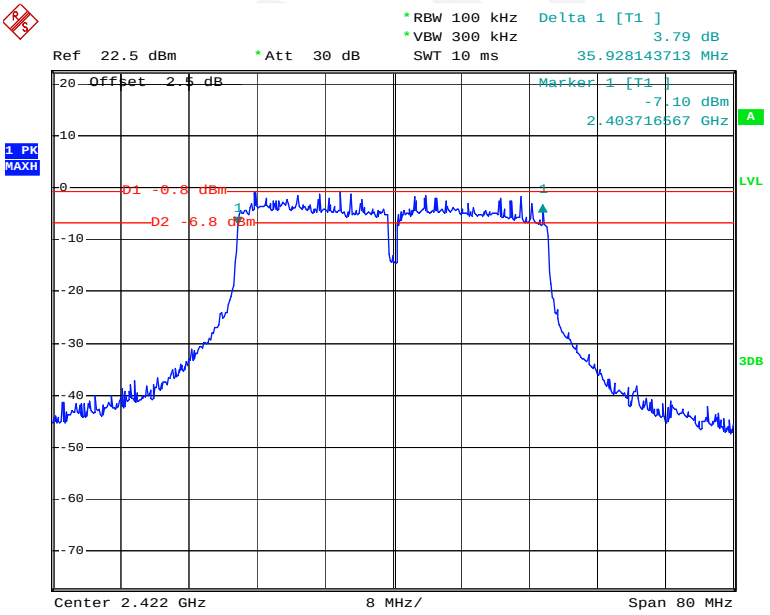
Date: 13.NOV.2014 15:43:05

Chain1 802.11n ht20 High Channel



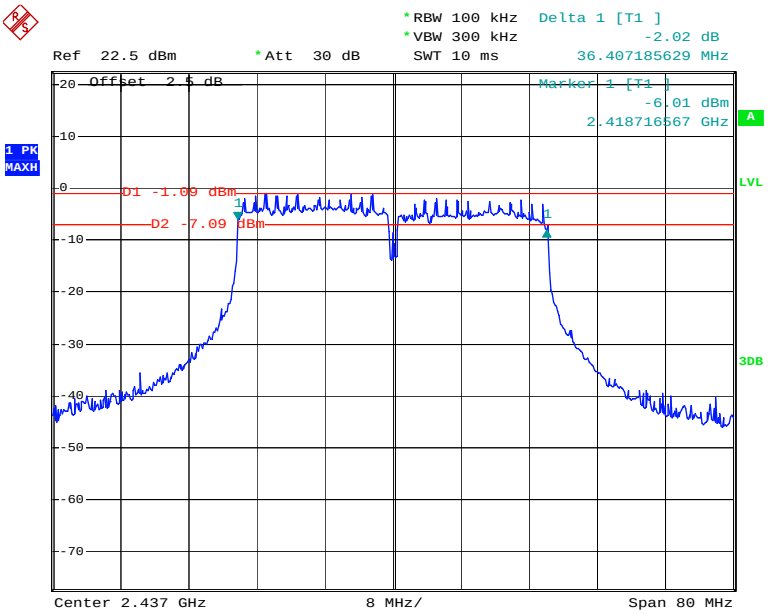
Date: 13.NOV.2014 15:54:39

Chain1 802.11n ht40 Low Channel



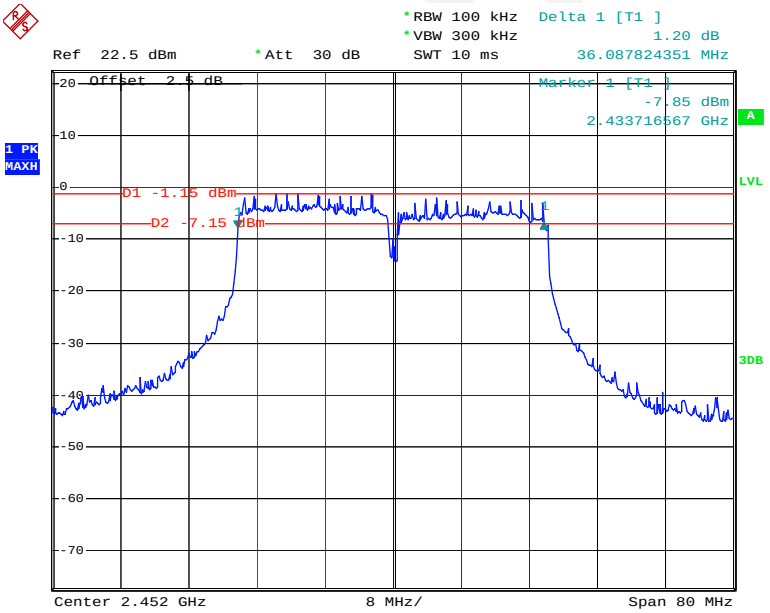
Date: 13.NOV.2014 16:02:34

Chain1 802.11n ht40 Middle Channel



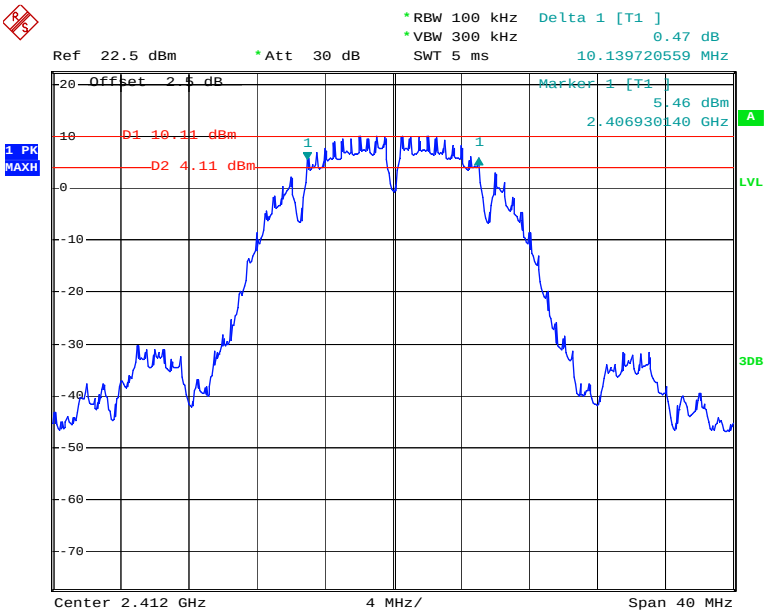
Date: 13.NOV.2014 16:10:30

Chain1 802.11n ht40 High Channel



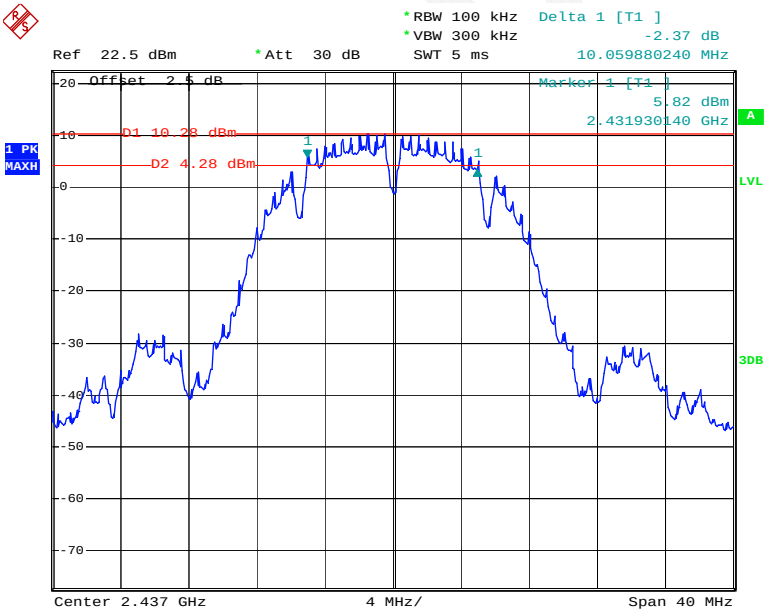
Date: 13.NOV.2014 16:17:24

Chain2 802.11b Low Channel



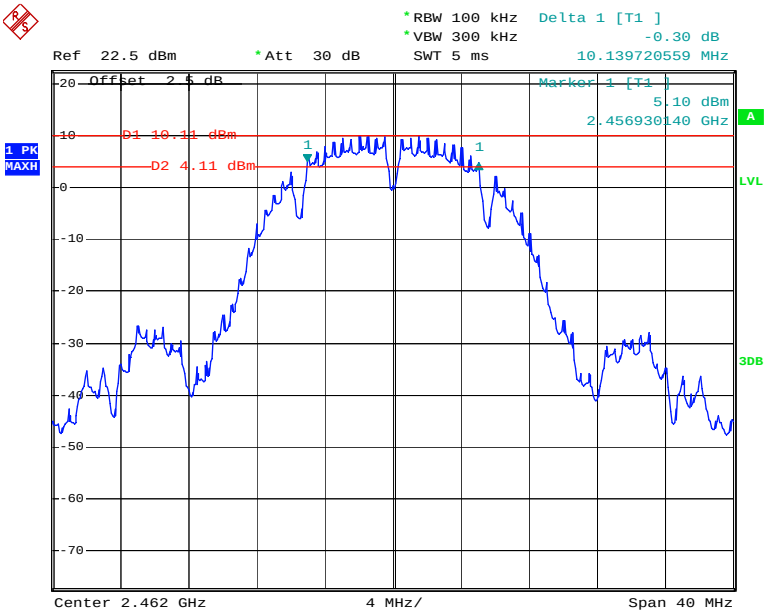
Date: 13.NOV.2014 18:47:20

Chain2 802.11b Middle Channel



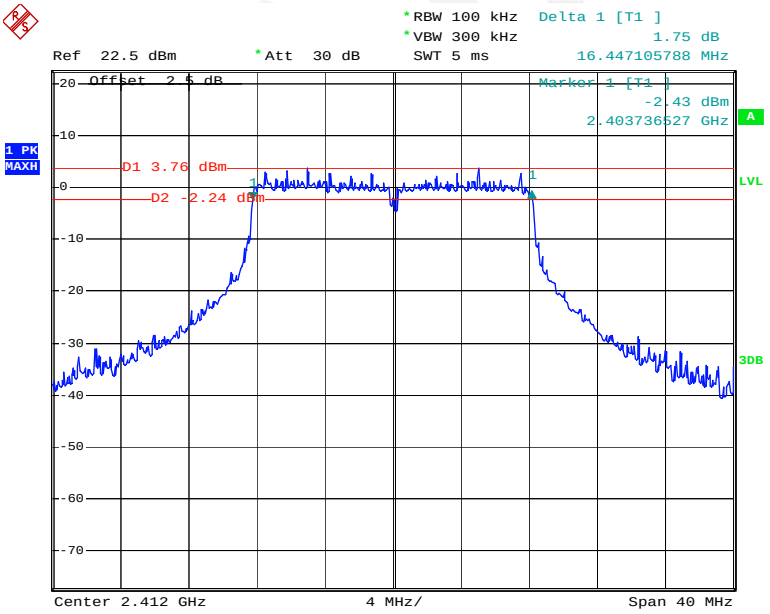
Date: 13.NOV.2014 18:51:42

Chain2 802.11b High Channel



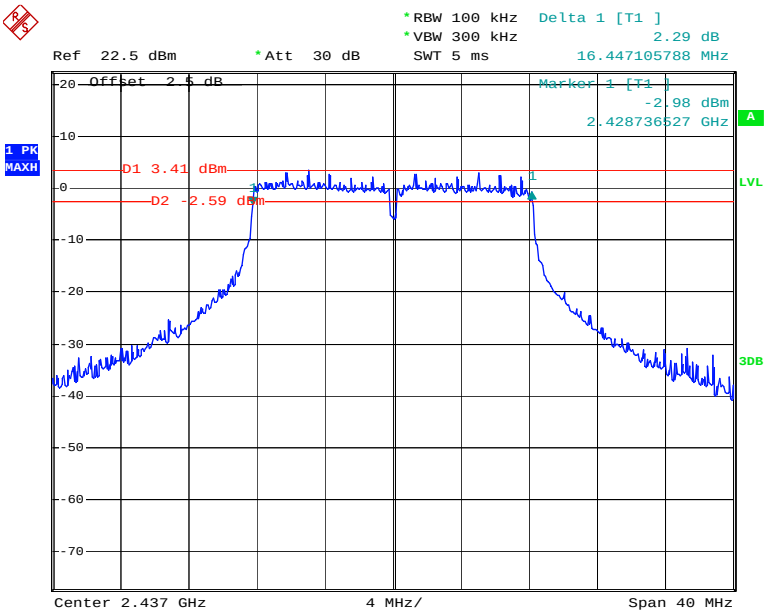
Date: 13.NOV.2014 18:55:28

Chain2 802.11g Low Channel



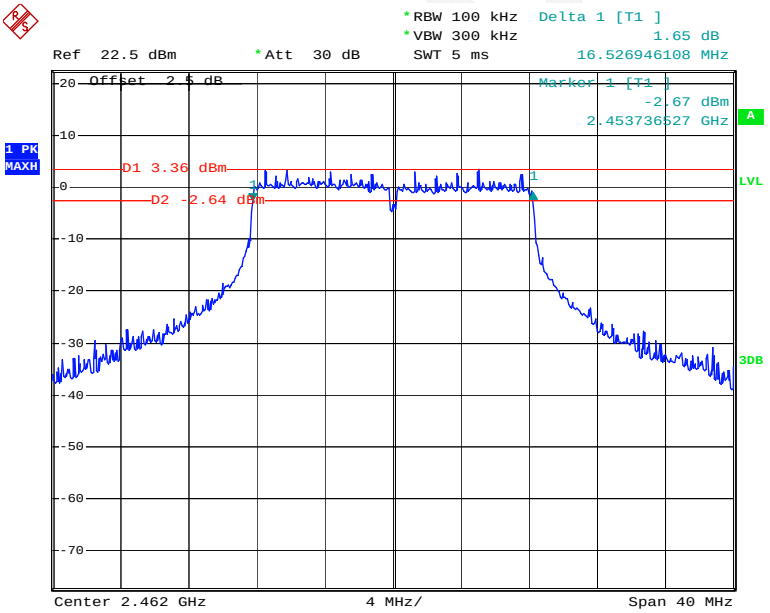
Date: 13.NOV.2014 18:17:01

Chain2 802.11g Middle Channel



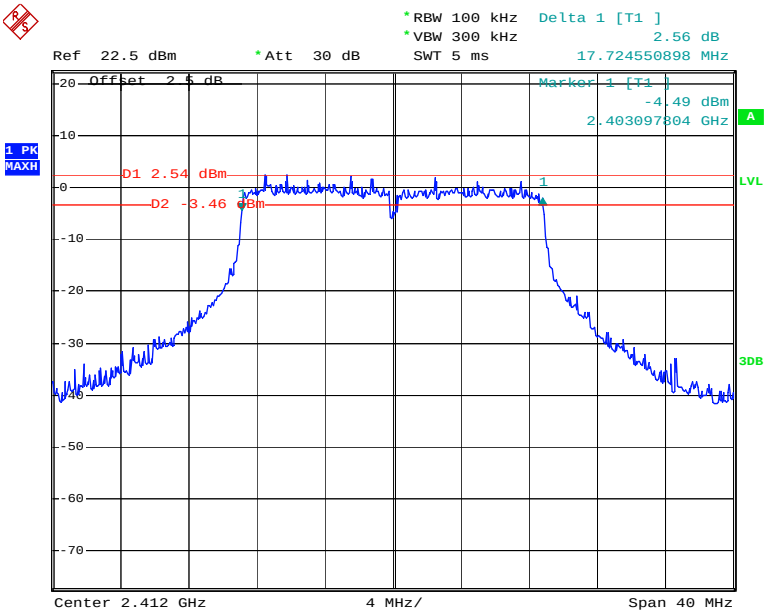
Date: 13.NOV.2014 18:23:25

Chain2 802.11g High Channel



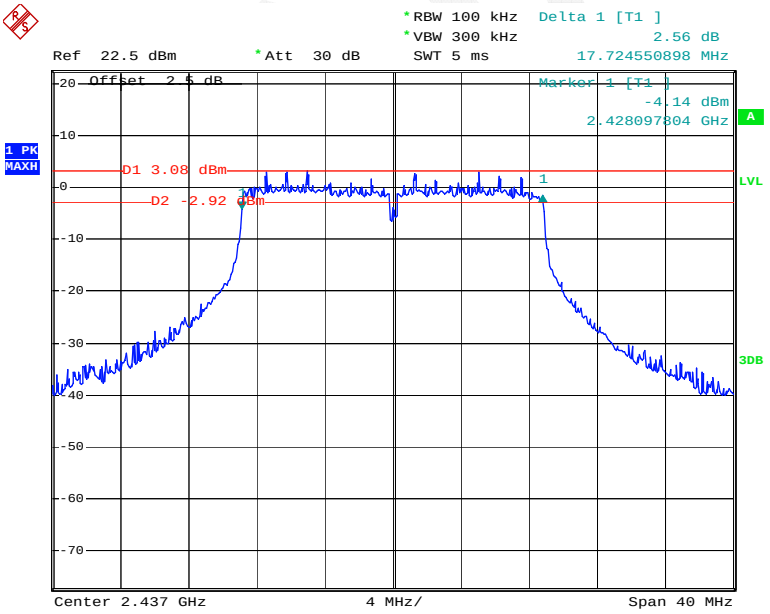
Date: 13.NOV.2014 18:41:07

Chain2 802.11n ht20 Low Channel



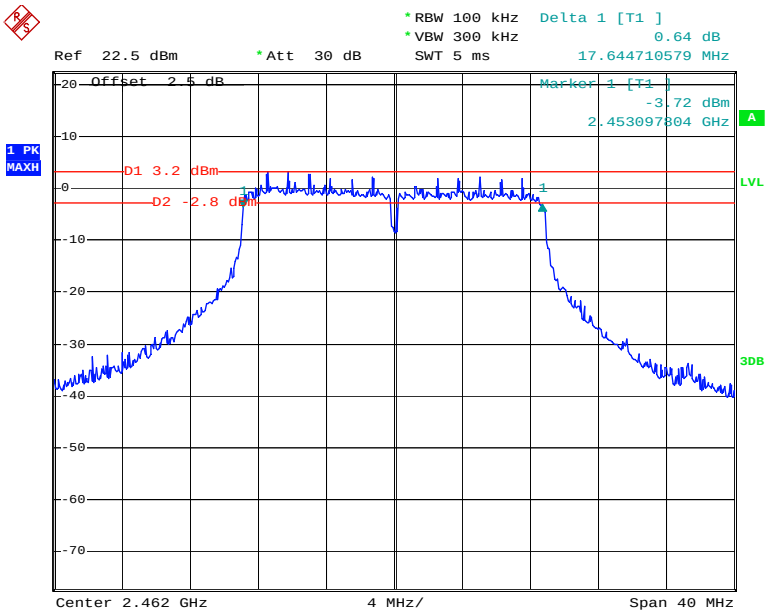
Date: 13.NOV.2014 18:05:00

Chain2 802.11n ht20 Middle Channel



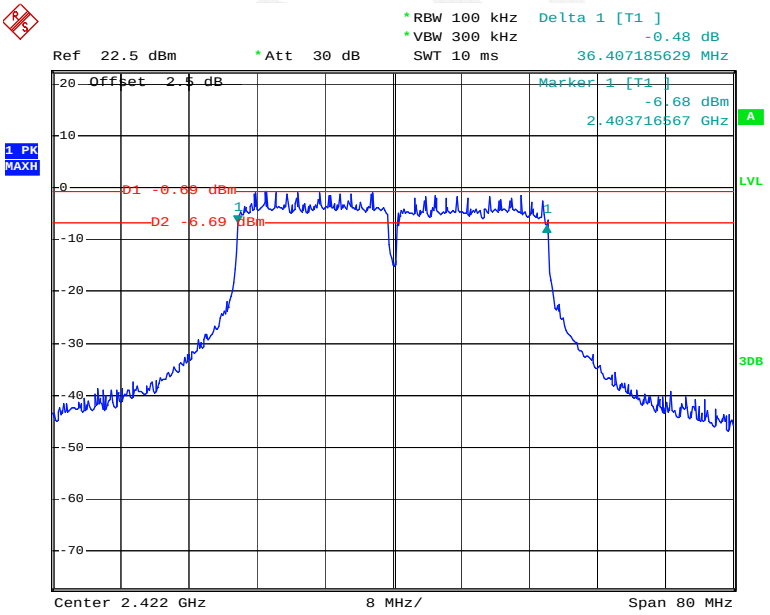
Date: 13.NOV.2014 18:10:46

Chain2 802.11n ht20 High Channel



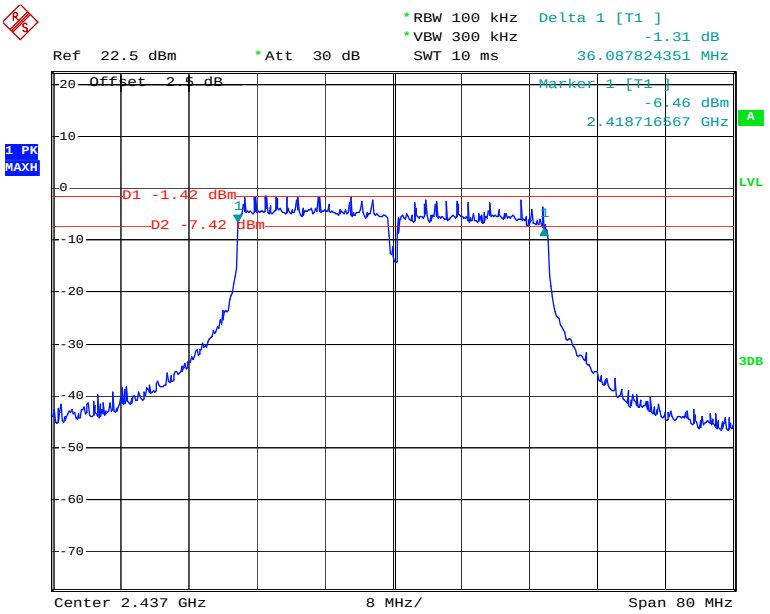
Date: 13.NOV.2014 17:48:26

Chain2 802.11n ht40 Low Channel



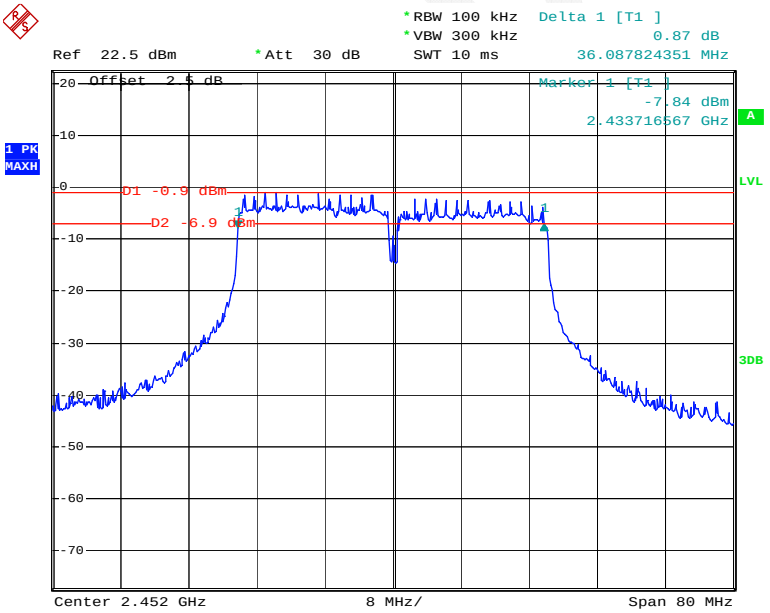
Date: 13.NOV.2014 19:19:40

Chain2 802.11n ht40 Middle Channel



Date: 13.NOV.2014 19:13:28

Chain2 802.11n ht40 High Channel



Date: 13.NOV.2014 19:26:06

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	2013-12-12	2014-12-12
Agilent	Wideband Power Sensor	N1921A	MY54170013	2013-12-12	2014-12-12
Agilent	P-Series Power Meter	N1912A	MY5000448	2013-12-12	2014-12-12

*** 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:	25.5 °C
Relative Humidity:	51 %
ATM Pressure:	101.6 kPa

The testing was performed by Sevin Liu on 2014-11-13.

Test Mode: Transmitting

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

Mode	Channel	Frequency (dBm)	Conducted Peak Output Power (dBm)				Limit (dBm)
			Chain 0	Chain 1	Chain 2	Total	
2.4G Band 802.11 b	Low	2412	22.27	22.68	22.41	27.23	30
	Middle	2437	22.09	22.73	22.56	27.24	30
	High	2462	22.00	22.75	22.33	27.14	30
2.4G Band 802.11 g	Low	2412	23.61	24.06	23.99	28.66	30
	Middle	2437	23.13	24.12	23.90	28.51	30
	High	2462	23.04	23.48	23.96	28.28	30
2.4G Band 802.11 n20	Low	2412	23.06	23.20	23.18	27.92	30
	Middle	2437	22.57	23.10	23.13	27.71	30
	High	2462	22.51	23.27	22.97	27.70	30
2.4G Band 802.11 n40	Low	2422	22.14	22.43	22.42	27.10	30
	Middle	2437	21.28	21.68	21.80	26.36	30
	High	2452	21.51	21.81	22.06	26.57	30

FINAL

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

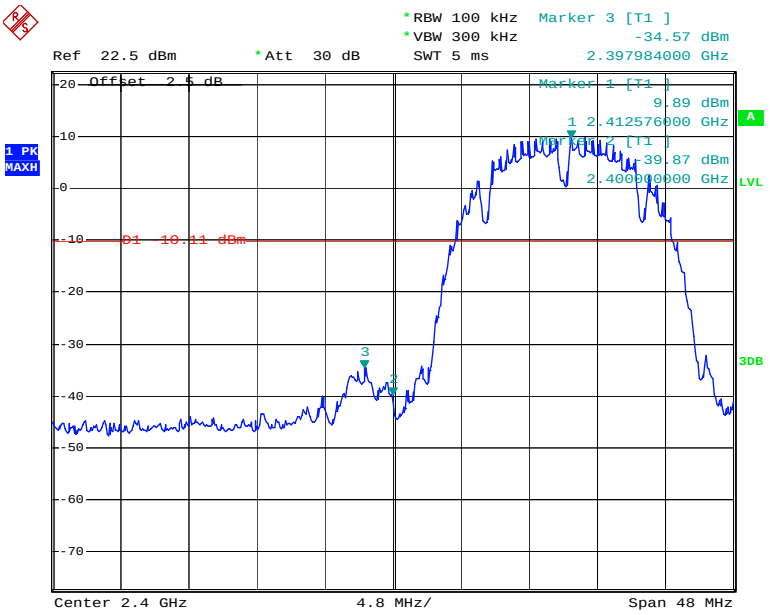
Temperature:	25.5°C
Relative Humidity:	51 %
ATM Pressure:	101.6 kPa

The testing was performed by Sevin Liu on 2014-11-10 & 2014-11-13

Test mode: Transmitting

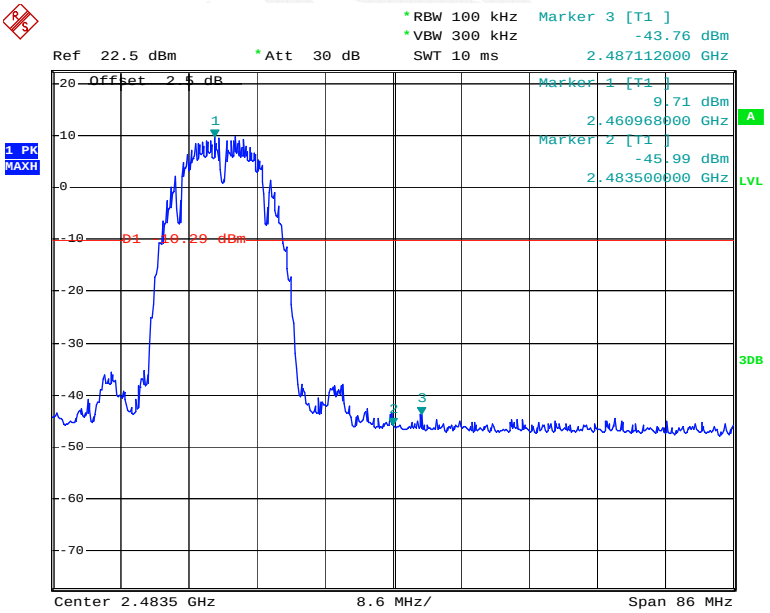
Test Result: Compliant. Please refer to following plots.

Chain0 802.11b: Band Edge, Left Side



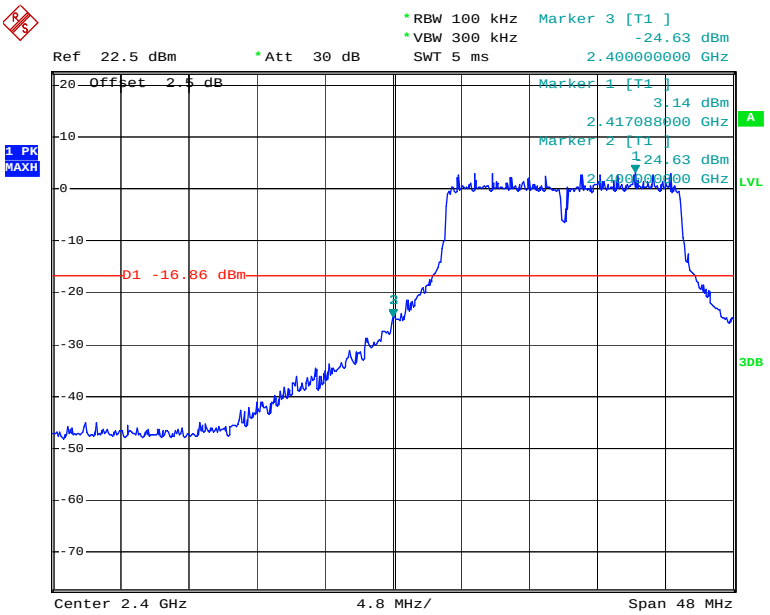
Date: 13.NOV.2014 16:49:50

Chain0 802.11b: Band Edge, Right Side



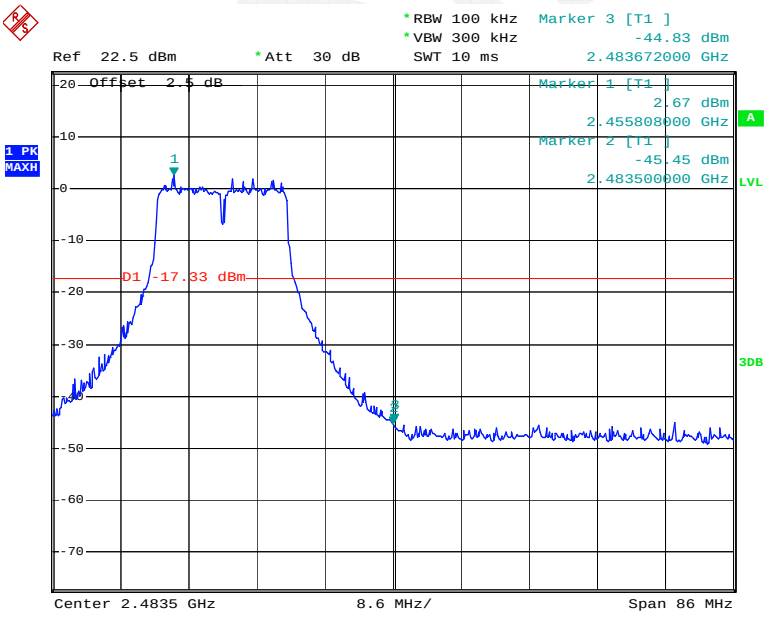
Date: 13.NOV.2014 17:11:20

Chain0 802.11g: Band Edge, Left Side



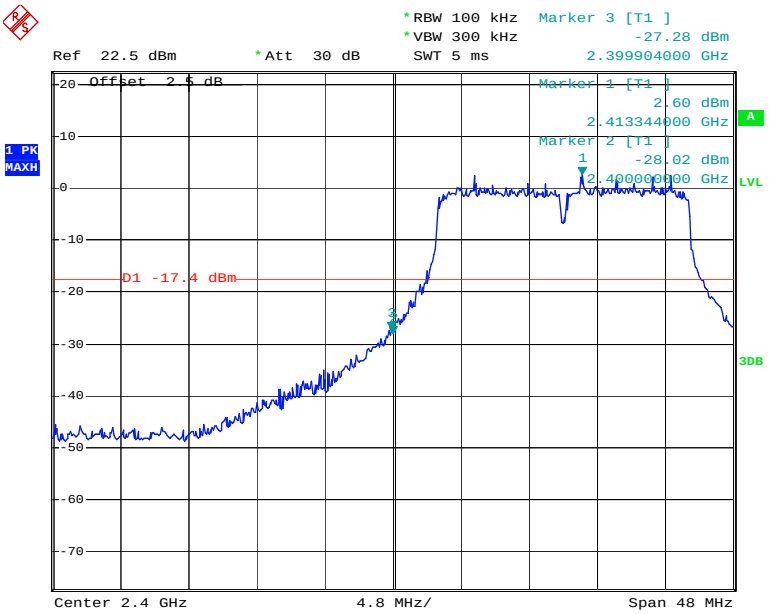
Date: 13.NOV.2014 17:29:00

Chain0 802.11g: Band Edge, Right Side



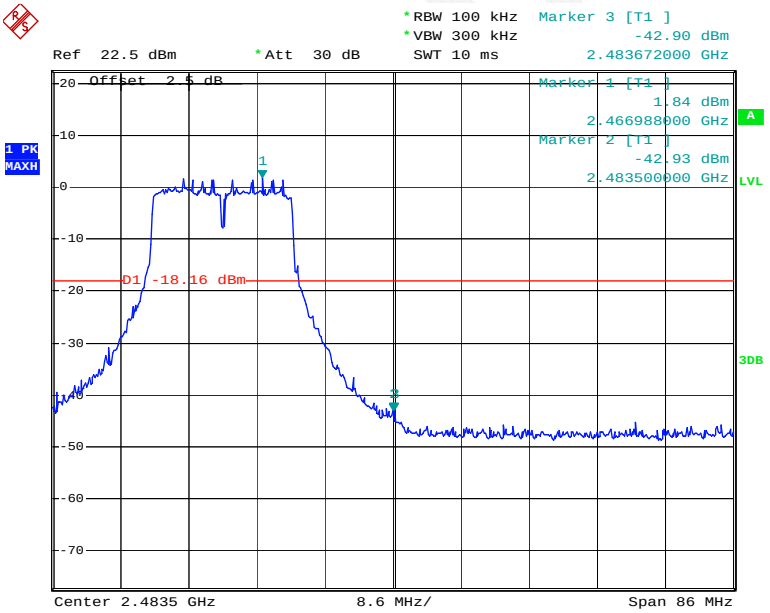
Date: 13.NOV.2014 17:18:11

Chain0 802.11n ht20 Band Edge, Left Side



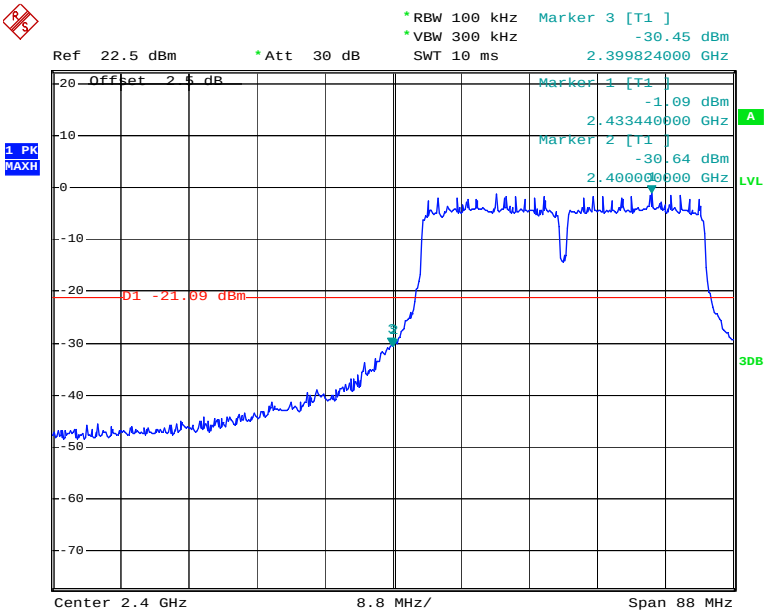
Date: 13.NOV.2014 17:34:32

Chain0 802.11n ht20 Band Edge, Right Side



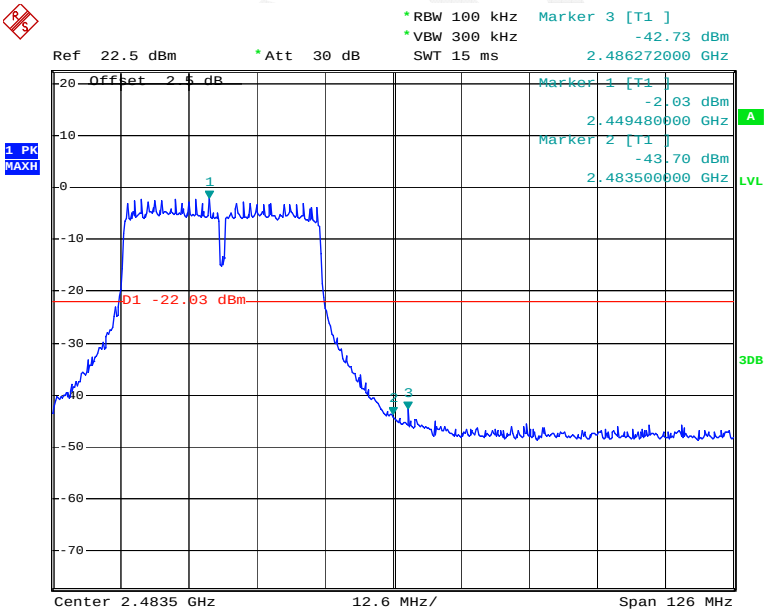
Date: 13.NOV.2014 17:45:50

Chain0 802.11n ht40 Band Edge, Left Side



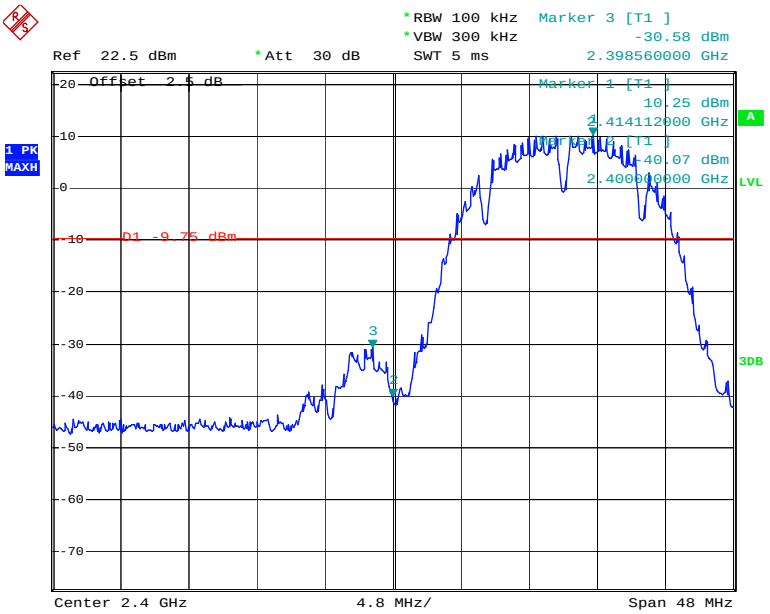
Date: 13.NOV.2014 16:43:43

Chain0 802.11n ht40 Band Edge, Right Side



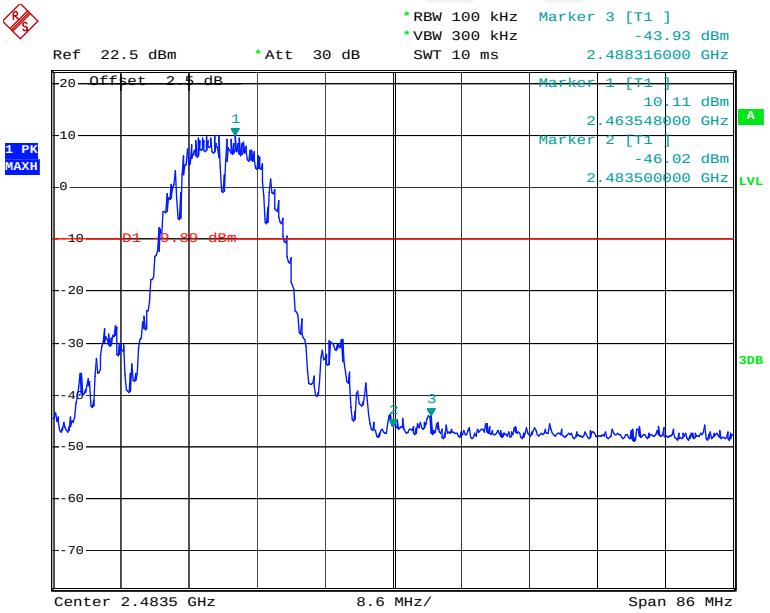
Date: 13.NOV.2014 16:31:14

Chain1 802.11b: Band Edge, Left Side



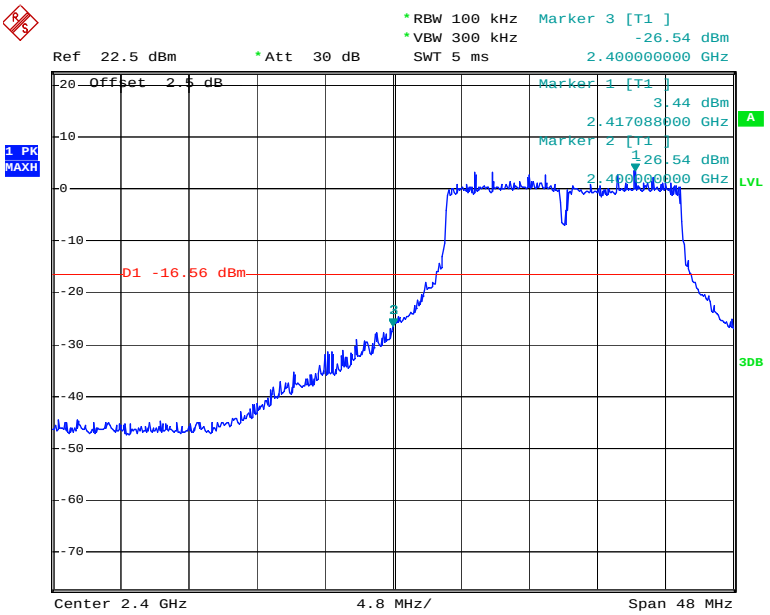
Date: 13.NOV.2014 14:53:37

Chain1 802.11b: Band Edge, Right Side



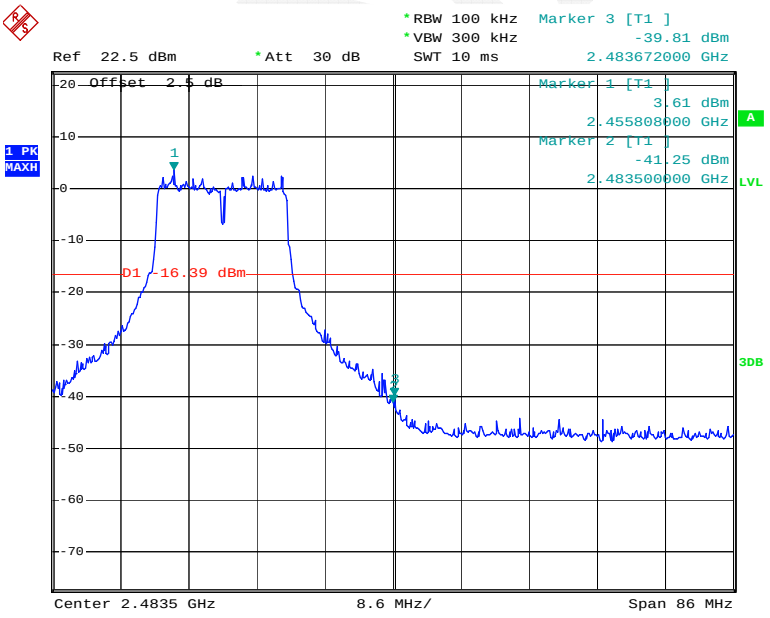
Date: 13.NOV.2014 15:05:34

Chain1 802.11g: Band Edge, Left Side



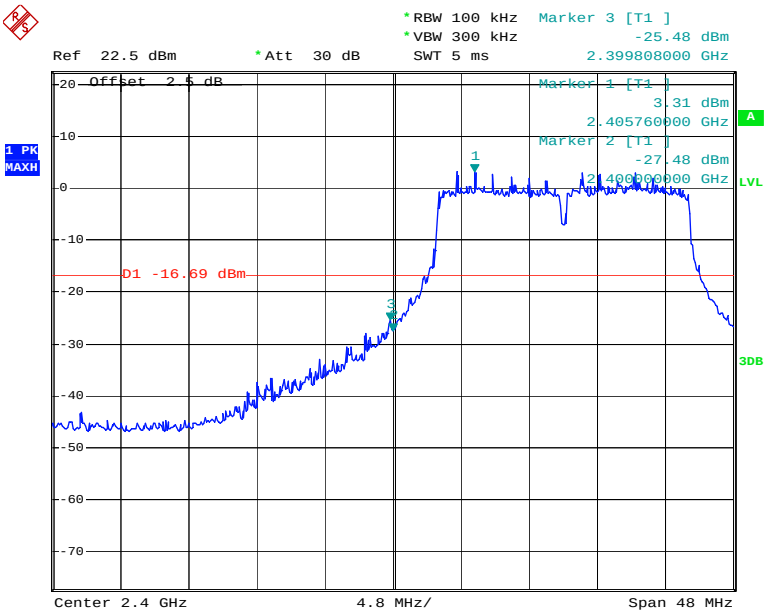
Date: 13.NOV.2014 15:35:37

Chain1 802.11g: Band Edge, Right Side



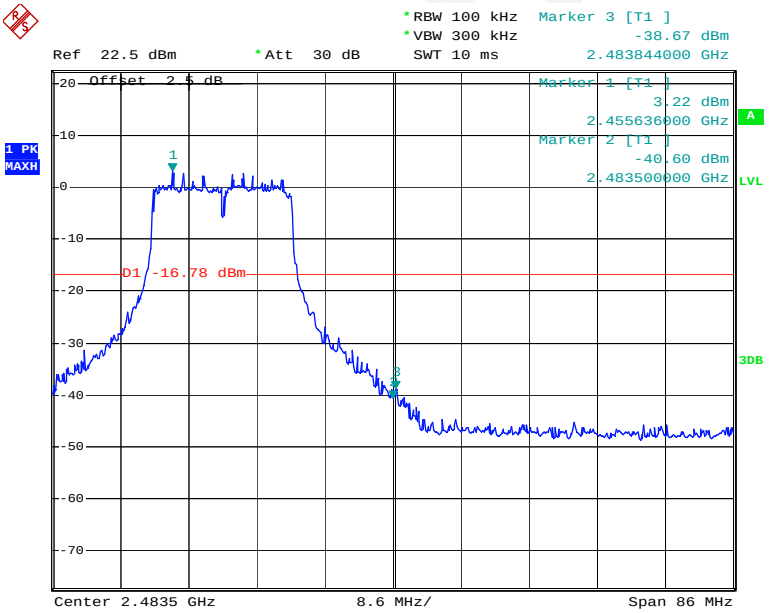
Date: 13.NOV.2014 15:20:38

Chain1 802.11n ht20 Band Edge, Left Side



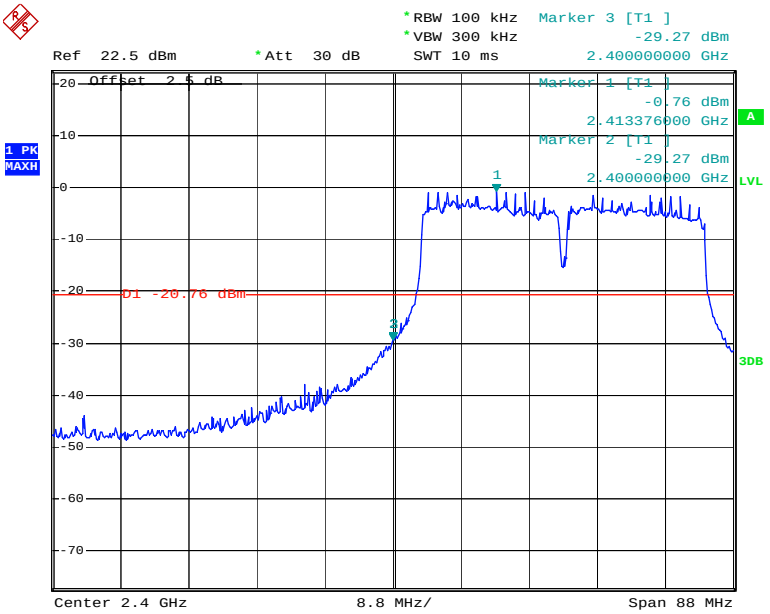
Date: 13.NOV.2014 15:41:45

Chain1 802.11n ht20 Band Edge, Right Side



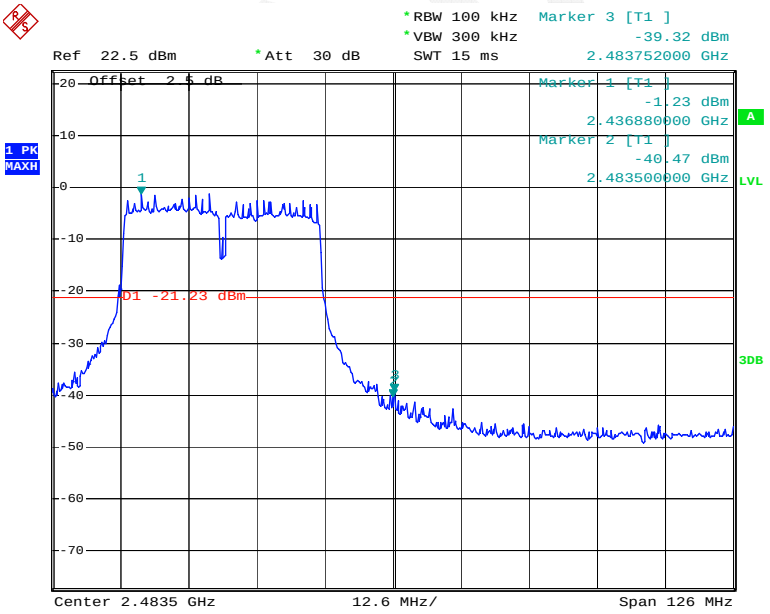
Date: 13.NOV.2014 15:58:52

Chain1 802.11n ht40 Band Edge, Left Side



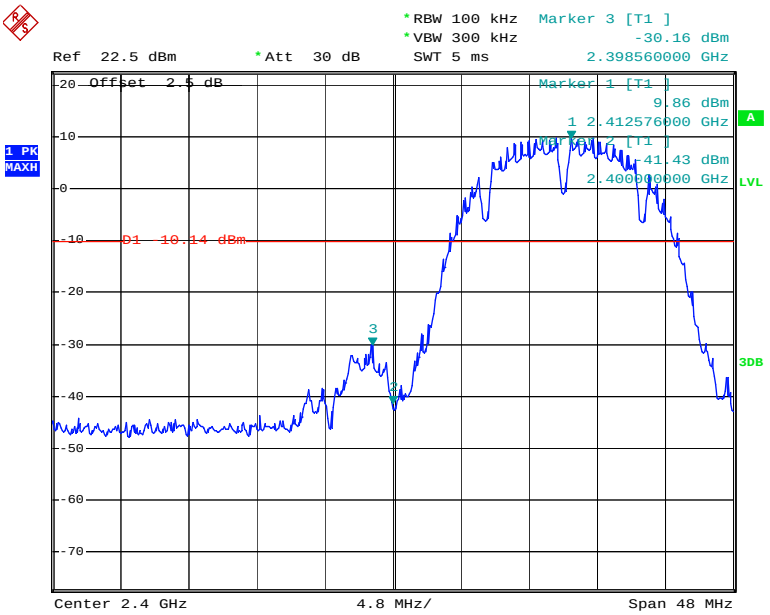
Date: 13.NOV.2014 16:07:27

Chain1 802.11n ht40 Band Edge, Right Side



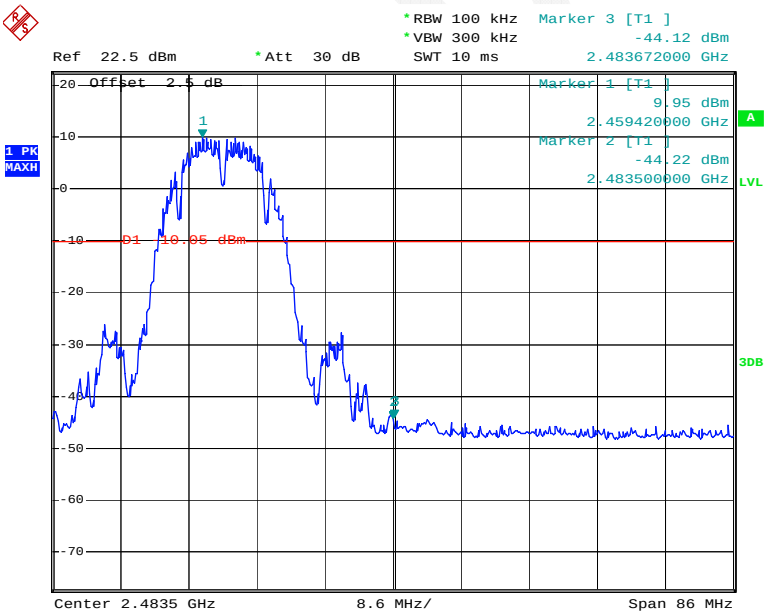
Date: 13.NOV.2014 16:21:44

Chain2 802.11b: Band Edge, Left Side



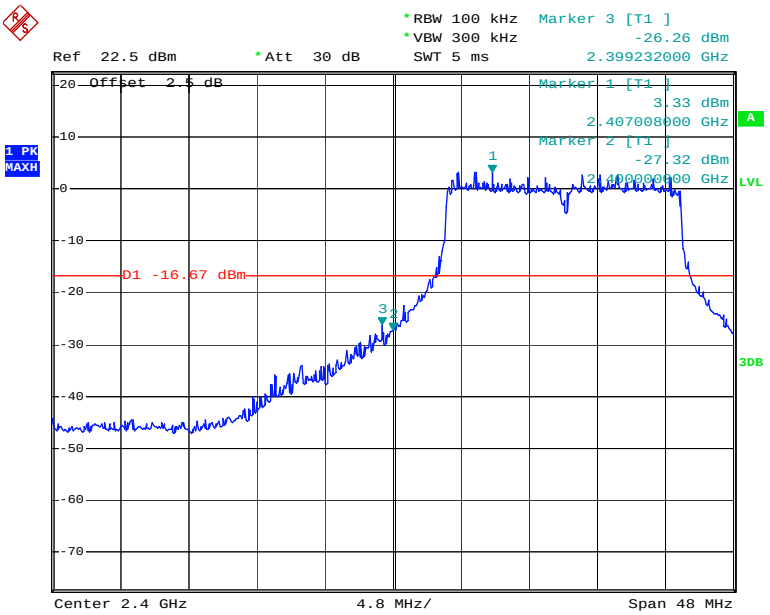
Date: 13.NOV.2014 18:50:42

Chain2 802.11b: Band Edge, Right Side



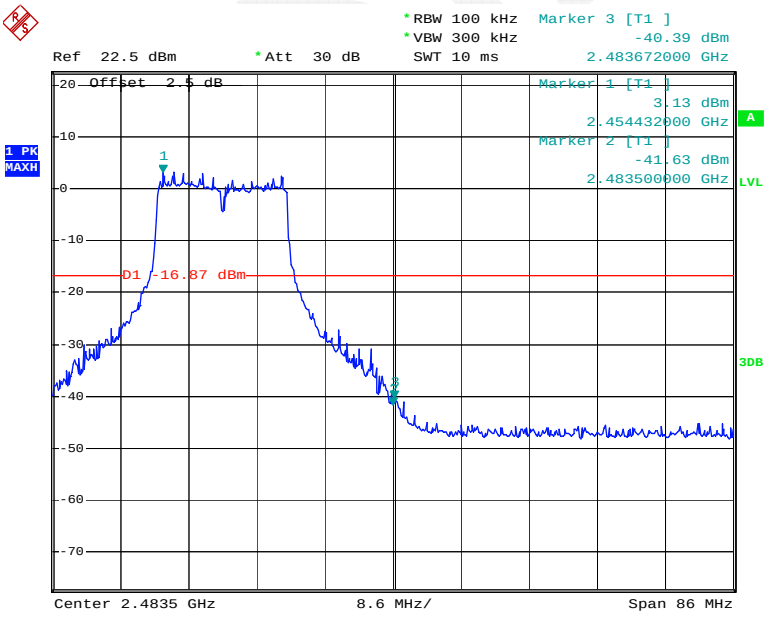
Date: 13.NOV.2014 18:58:50

Chain2 802.11g: Band Edge, Left Side



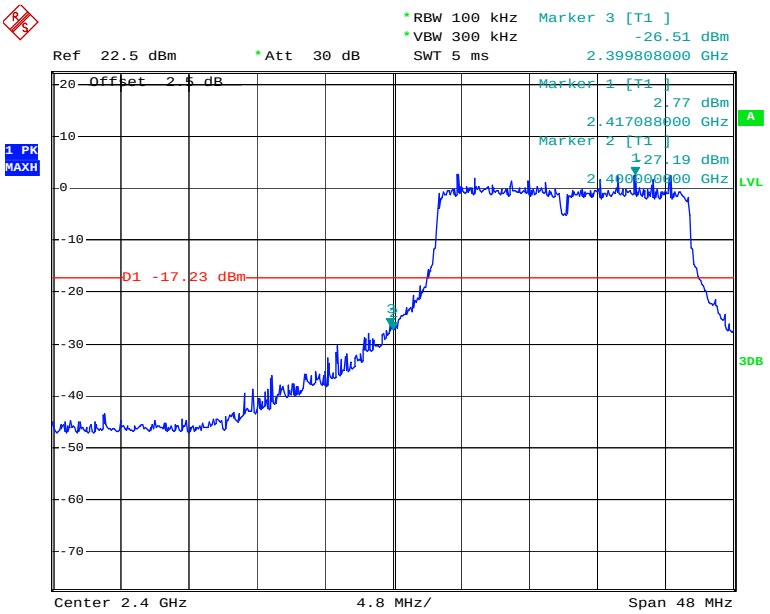
Date: 13.NOV.2014 18:21:58

Chain2 802.11g: Band Edge, Right Side



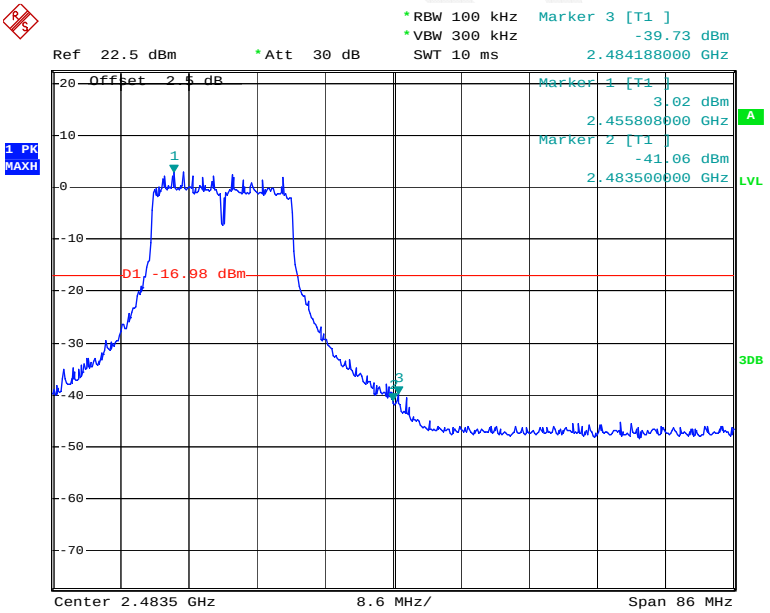
Date: 13.NOV.2014 18:46:02

Chain2 802.11n ht20 Band Edge, Left Side



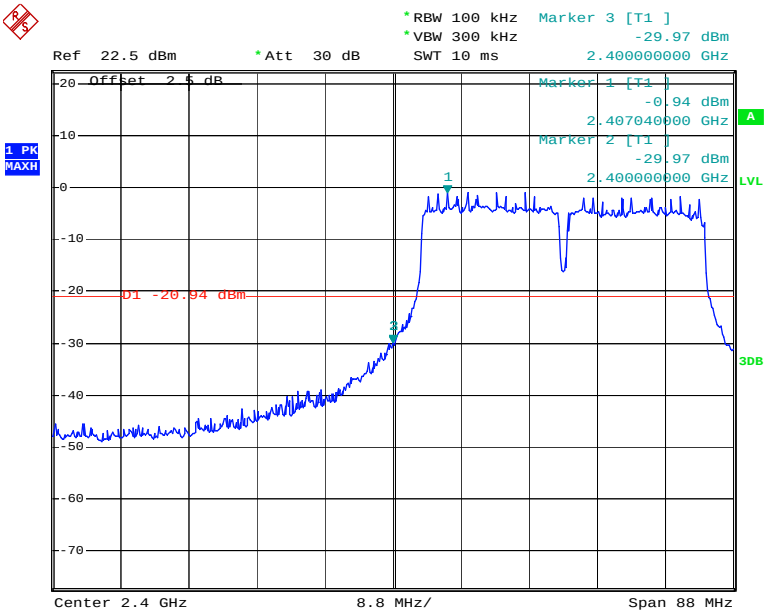
Date: 13.NOV.2014 18:09:52

Chain2 802.11n ht20 Band Edge, Right Side



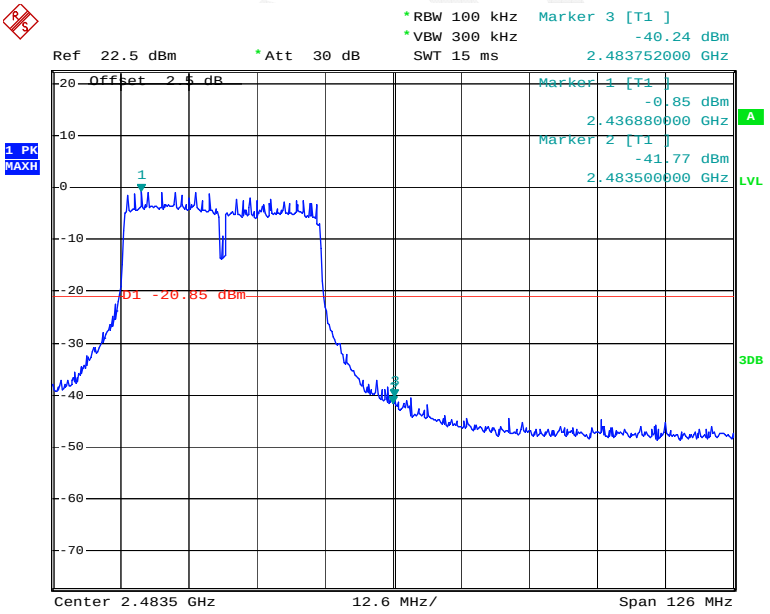
Date: 13.NOV.2014 17:53:02

Chain2 802.11n ht40 Band Edge, Left Side



Date: 13.NOV.2014 19:24:22

Chain2 802.11n ht40 Band Edge, Right Side



Date: 13.NOV.2014 19:31:37

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:	25.5 °C
Relative Humidity:	45 %
ATM Pressure:	101.4 kPa

The testing was performed by Sevin Liu on 2014-11-19.

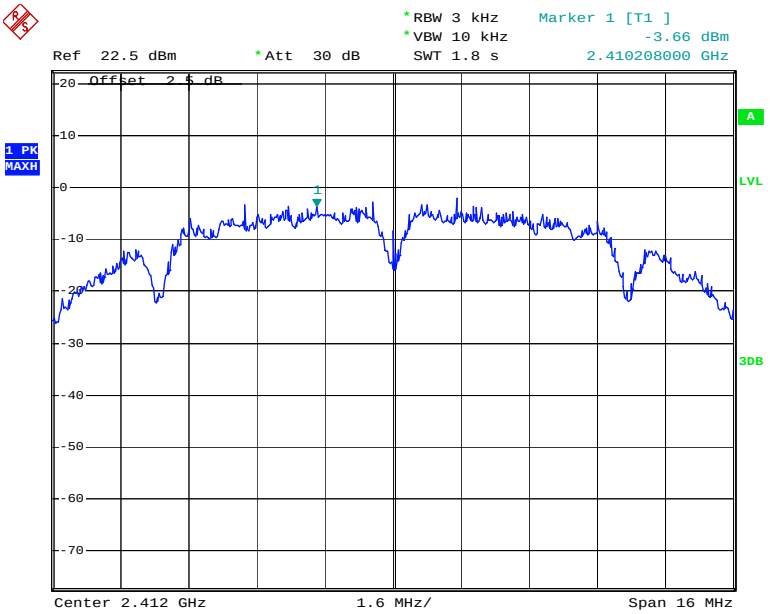
Test Mode: Transmitting

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

Mode	Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)				Limit (dBm/3kHz)
			Chain 0	Chain 1	Chain 2	Total	
2.4G Band 802.11 b	Low	2412	-3.66	-3.9	-3.84	0.97	8
	Middle	2437	-3.57	-4.79	-3.29	0.94	8
	High	2462	-4.12	-2.56	-4.58	1.11	8
2.4G Band 802.11 g	Low	2412	-8.04	-8.07	-7.38	-3.05	8
	Middle	2437	-8.34	-8.97	-8.19	-3.72	8
	High	2462	-7.86	-8.85	-9.22	-3.83	8
2.4G Band 802.11 n20	Low	2412	-9.52	-9.66	-10.06	-4.97	8
	Middle	2437	-9.82	-10.42	-11.95	-5.87	8
	High	2462	-10.28	-10.26	-9.84	-5.35	8
2.4G Band 802.11 n40	Low	2422	-13.98	-14.41	-14.78	-9.61	8
	Middle	2437	-13.51	-14.86	-14.93	-9.61	8
	High	2452	-14.86	-15.44	-15.19	-10.39	8

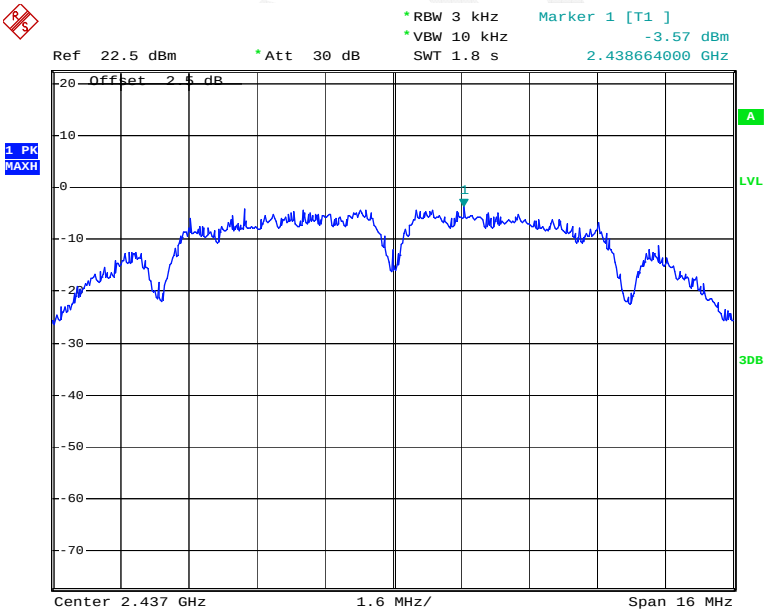
FINAL

Chain0 Power Spectral Density, 802.11b Low Channel



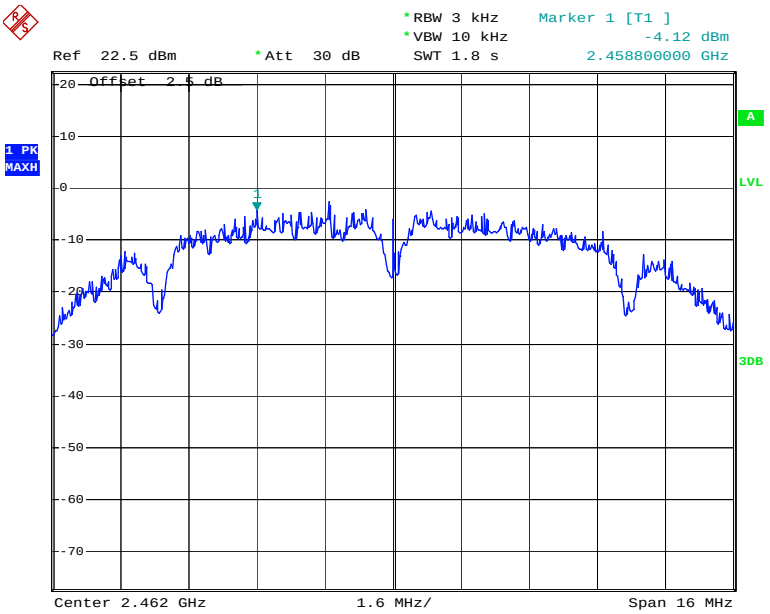
Date: 19.NOV.2014 09:25:56

Chain0 Power Spectral Density, 802.11b Middle Channel



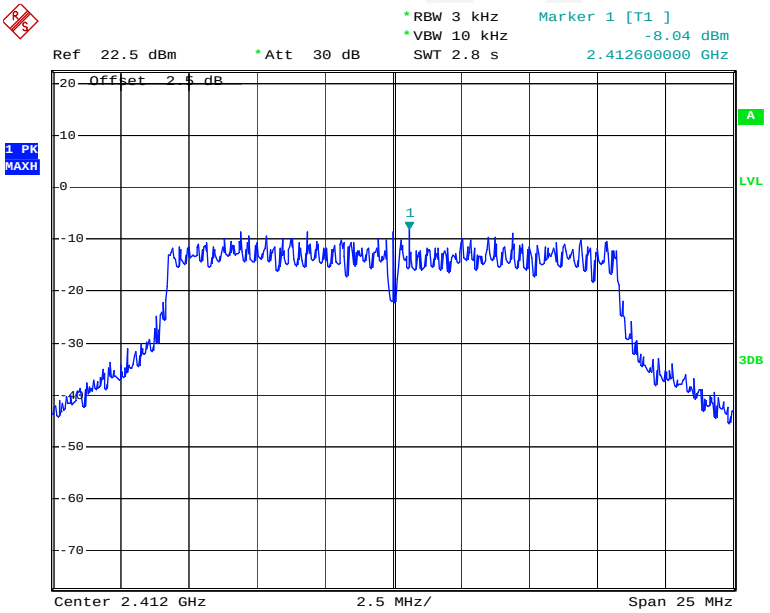
Date: 19.NOV.2014 09:30:31

Chain0 Power Spectral Density, 802.11b High Channel



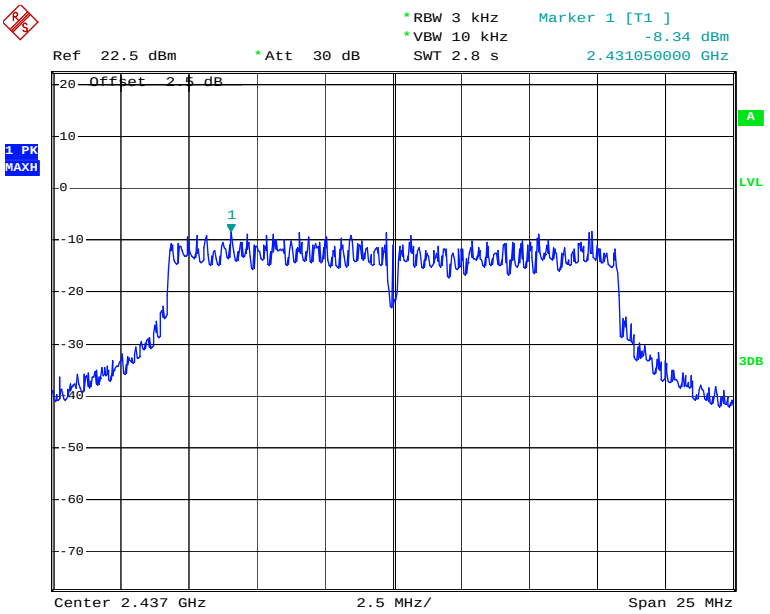
Date: 19.NOV.2014 09:31:19

Chain0 Power Spectral Density, 802.11g Low Channel



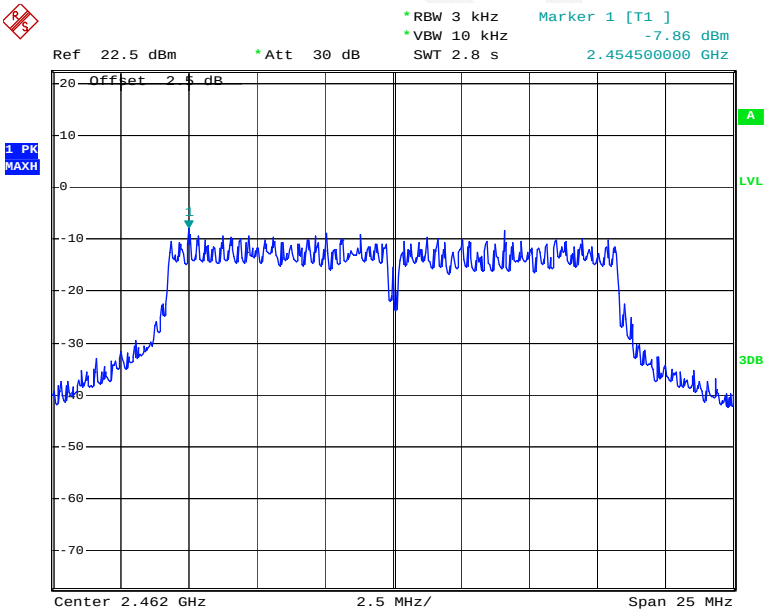
Date: 19.NOV.2014 09:33:36

Chain0 Power Spectral Density, 802.11g Middle Channel



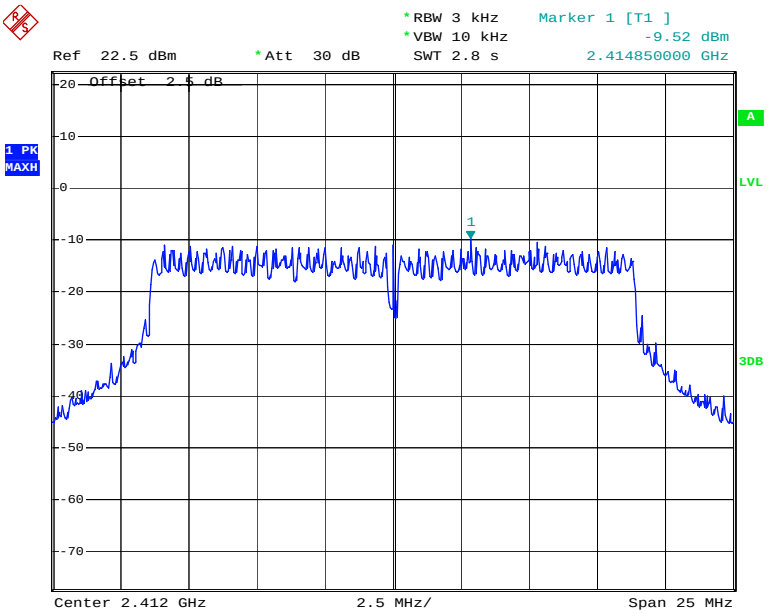
Date: 19.NOV.2014 09:37:05

Chain0 Power Spectral Density, 802.11g High Channel



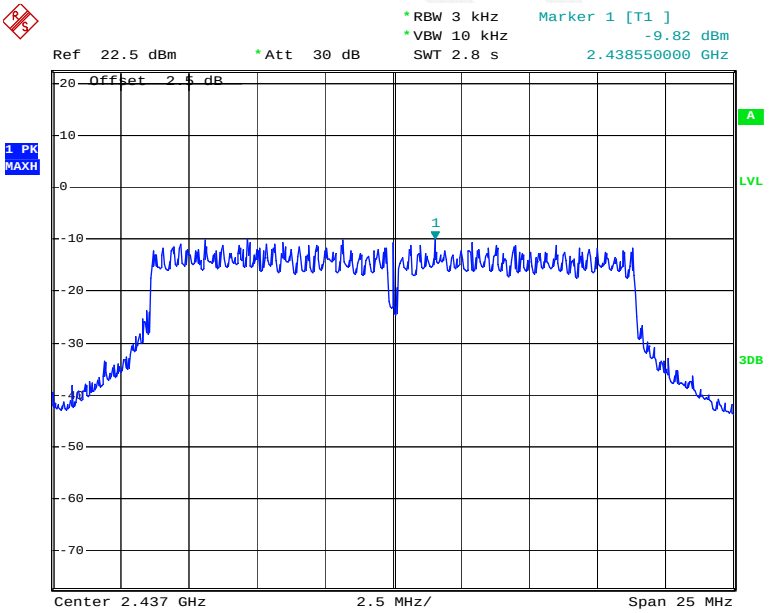
Date: 19.NOV.2014 09:38:00

Chain0 Power Spectral Density, 802.11n ht20 Low Channel



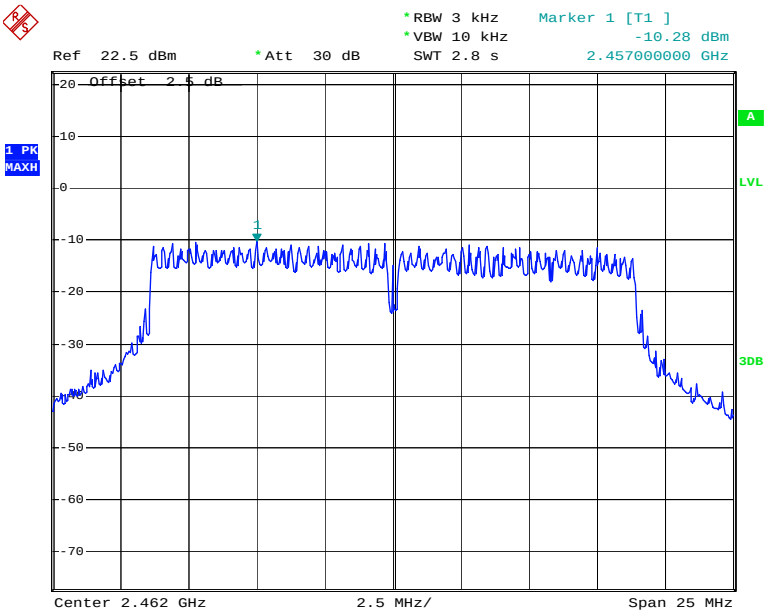
Date: 19.NOV.2014 09:43:20

Chain0 Power Spectral Density, 802.11n ht20 Middle Channel



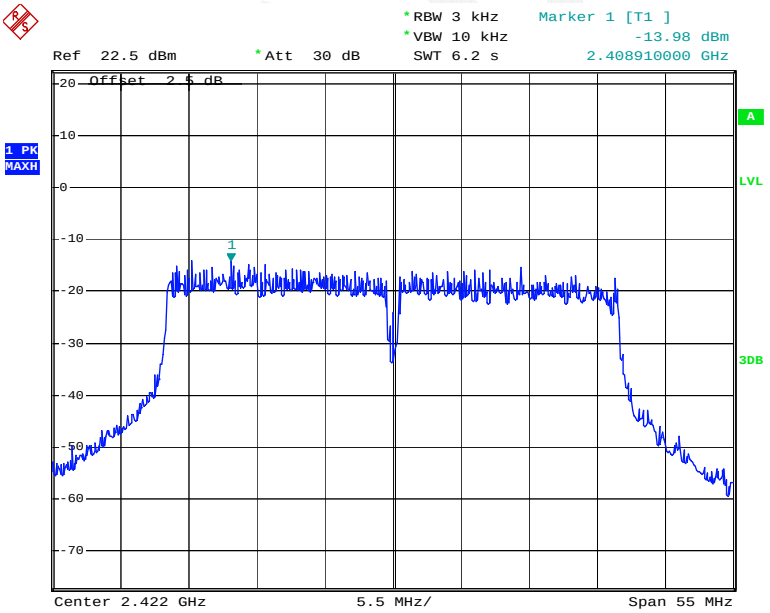
Date: 19.NOV.2014 09:42:49

Chain0 Power Spectral Density, 802.11n ht20 High Channel



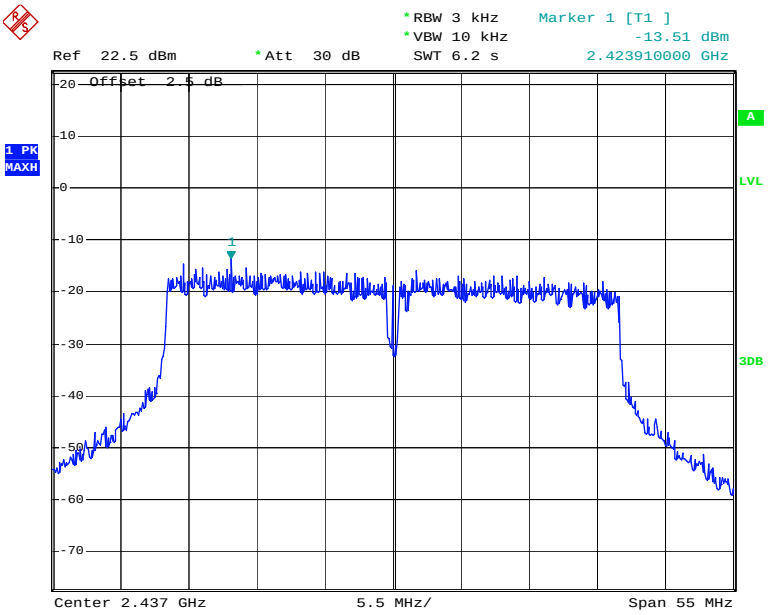
Date: 19.NOV.2014 09:43:32

Chain0 Power Spectral Density, 802.11n ht40 Low Channel



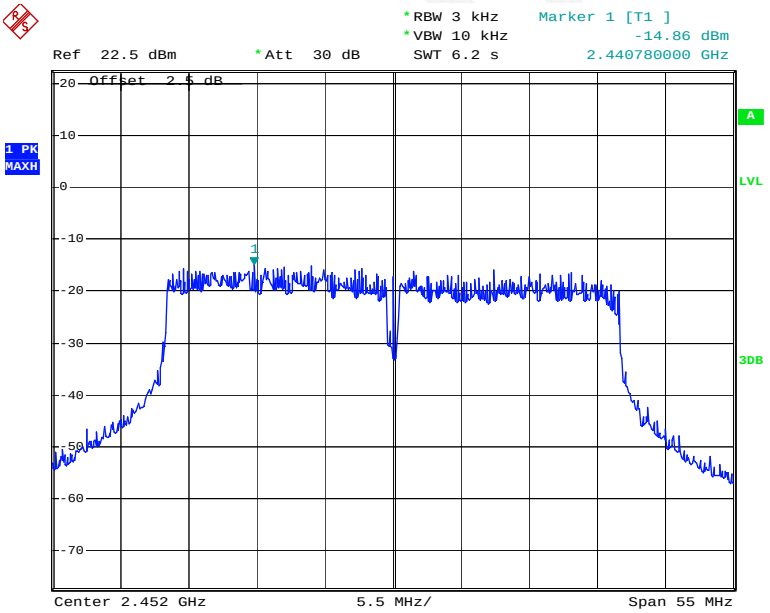
Date: 19.NOV.2014 09:52:18

Chain0 Power Spectral Density, 802.11n ht40 Middle Channel



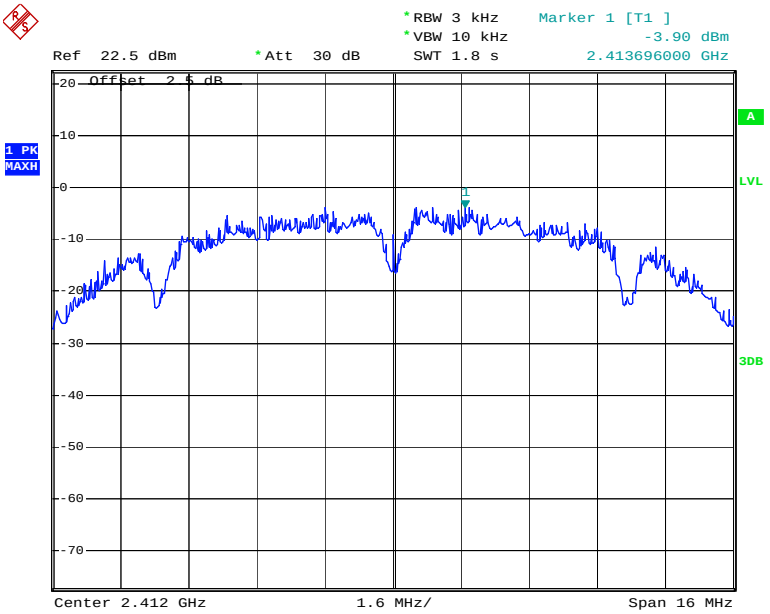
Date: 19.NOV.2014 09:56:53

Chain0 Power Spectral Density, 802.11n ht40 High Channel



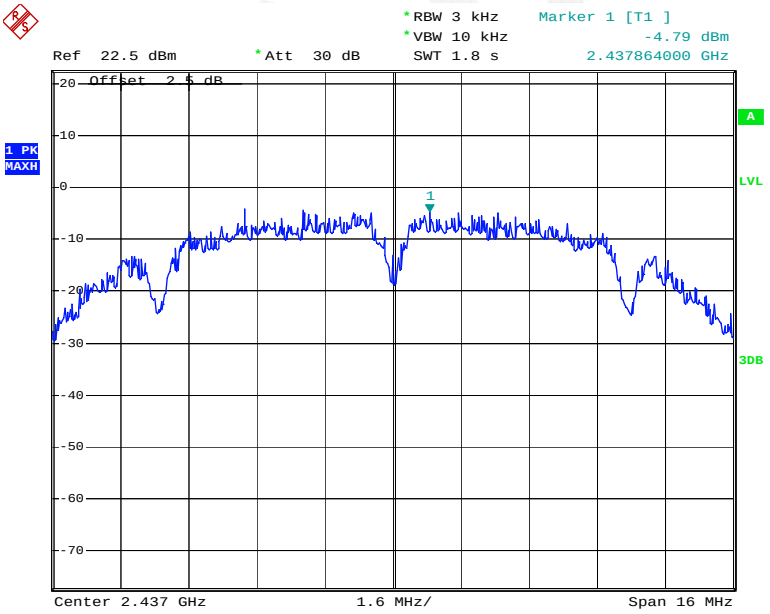
Date: 19.NOV.2014 09:58:03

Chain1 Power Spectral Density, 802.11b Low Channel



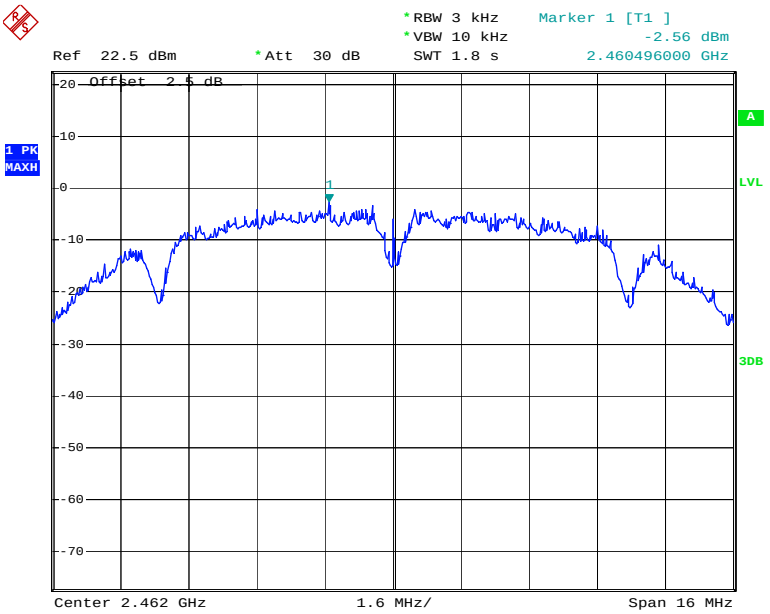
Date: 19.NOV.2014 10:26:10

Chain1 Power Spectral Density, 802.11b Middle Channel



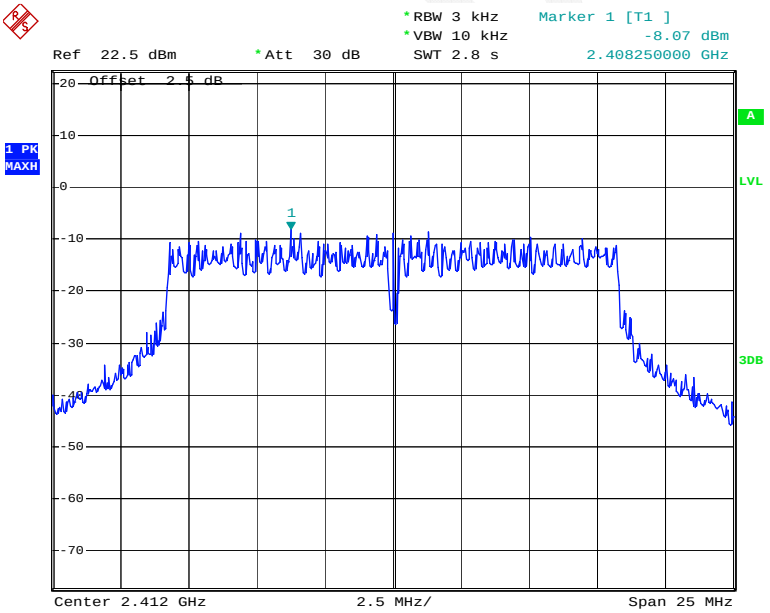
Date: 19.NOV.2014 10:28:14

Chain1 Power Spectral Density, 802.11b High Channel



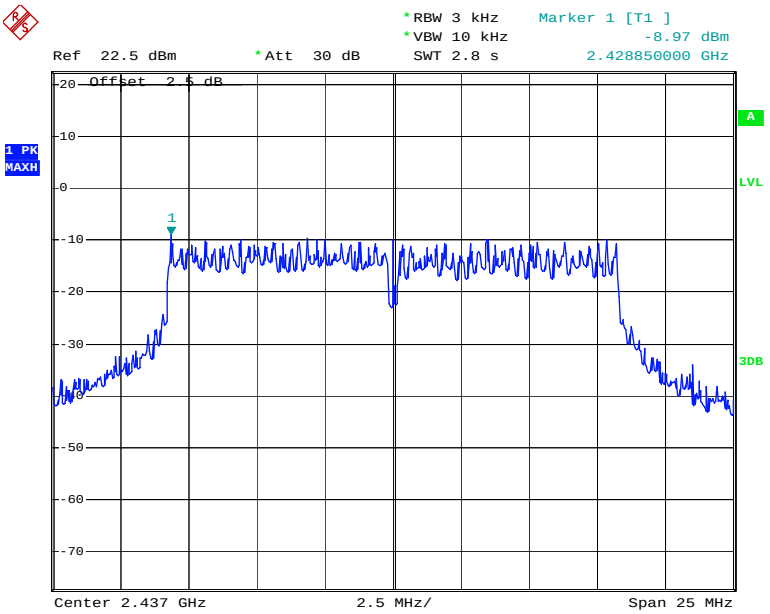
Date: 19.NOV.2014 10:02:37

Chain1 Power Spectral Density, 802.11g Low Channel



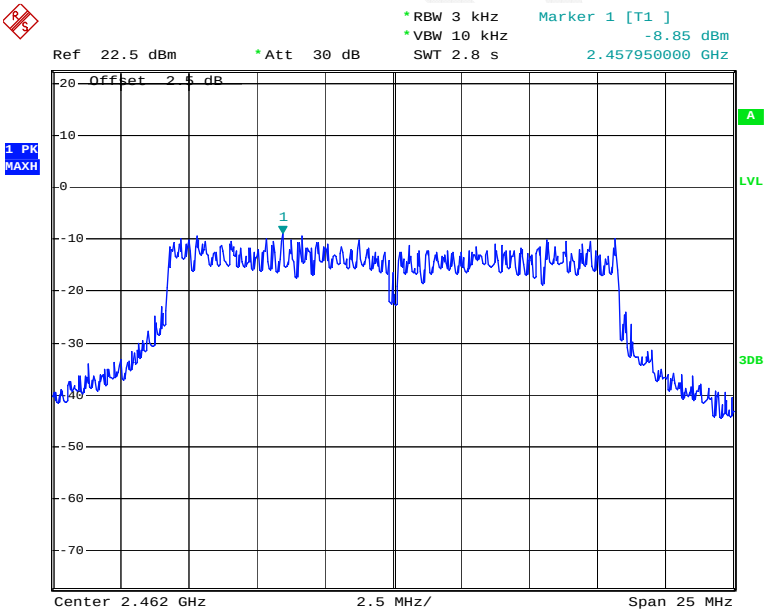
Date: 19.NOV.2014 10:06:49

Chain1Power Spectral Density, 802.11g Middle Channel



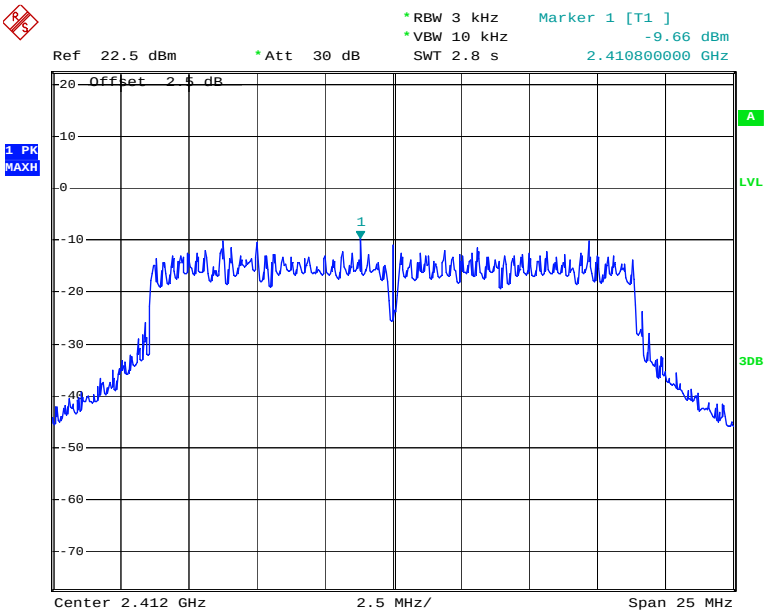
Date: 19.NOV.2014 10:08:46

Chain1 Power Spectral Density, 802.11g High Channel



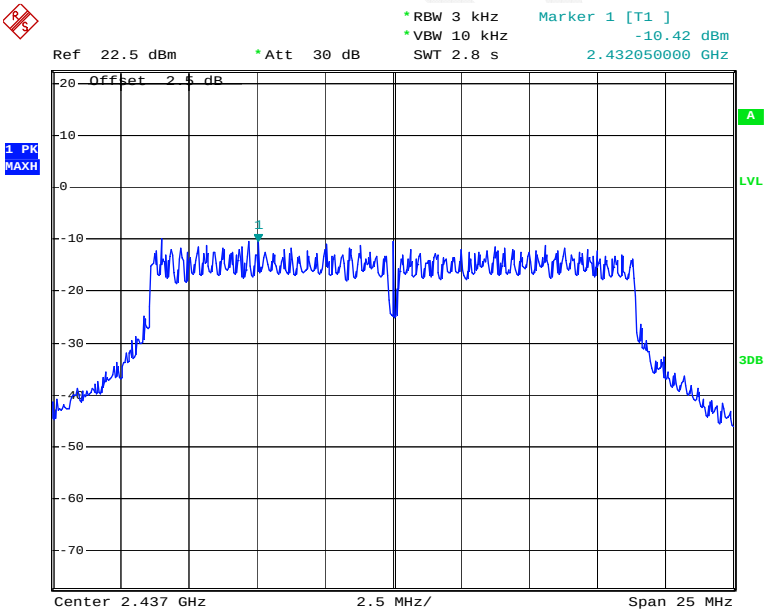
Date: 19.NOV.2014 10:15:16

Chain1 Power Spectral Density, 802.11n ht20 Low Channel



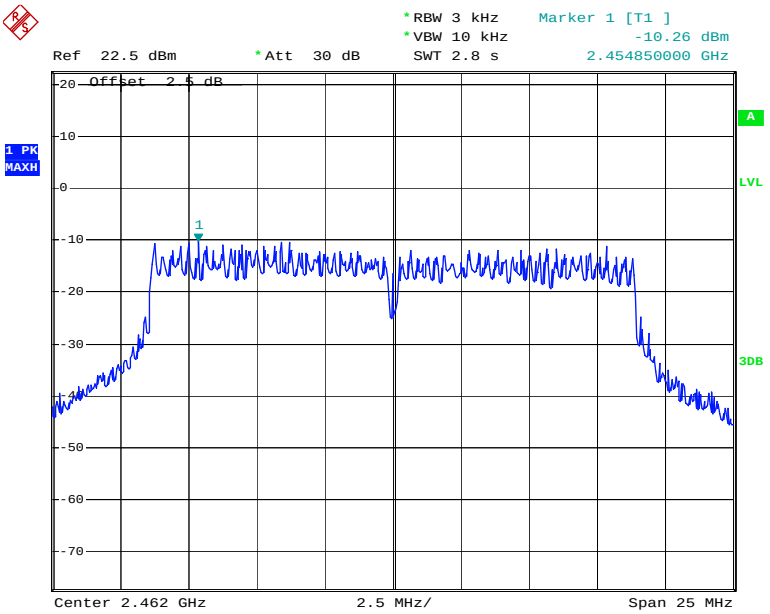
Date: 19.NOV.2014 10:23:38

Chain1Power Spectral Density, 802.11n ht20 Middle Channel



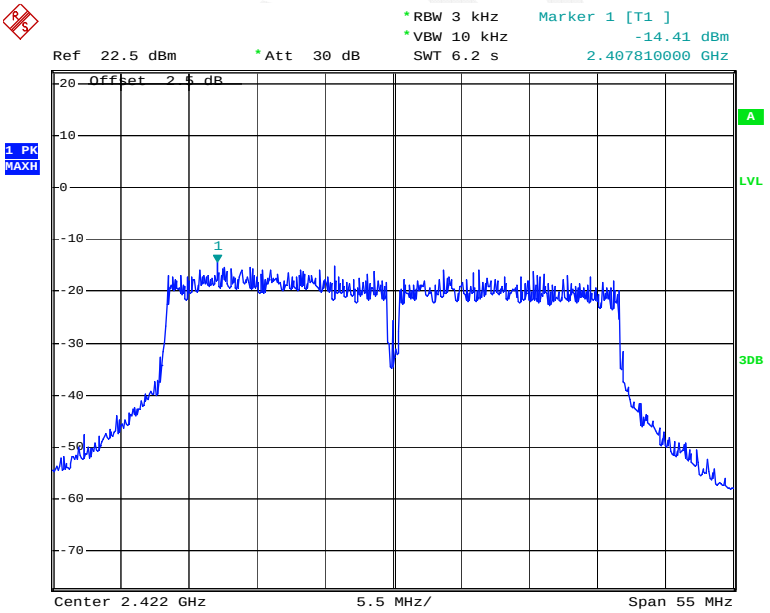
Date: 19.NOV.2014 10:35:20

Chain1 Power Spectral Density, 802.11n ht20 High Channel



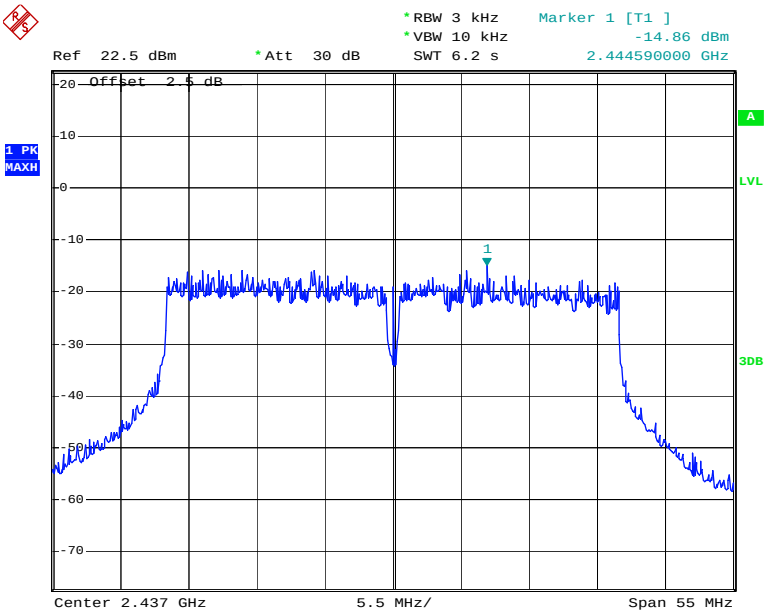
Date: 19.NOV.2014 10:39:52

Chain1 Power Spectral Density, 802.11n ht40 Low Channel



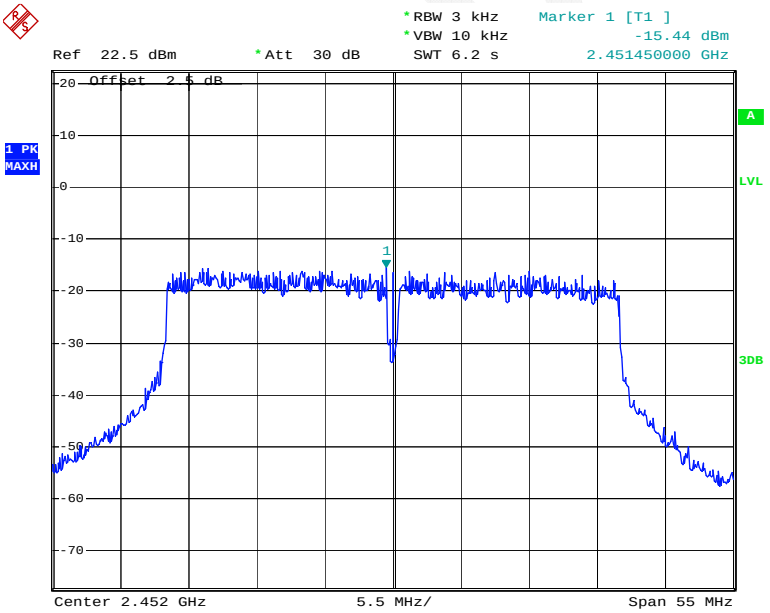
Date: 19.NOV.2014 10:50:44

Chain1Power Spectral Density, 802.11n ht40 Middle Channel



Date: 19.NOV.2014 10:54:26

Chain1 Power Spectral Density, 802.11n ht40 High Channel



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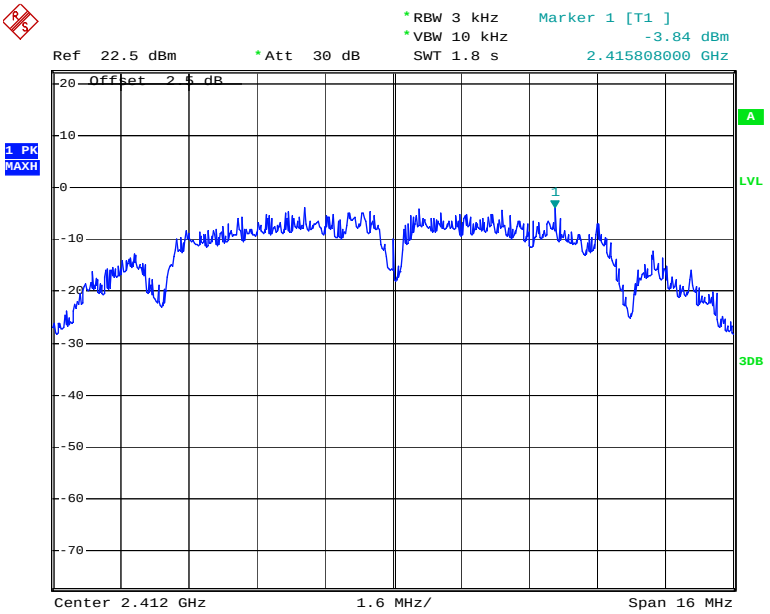
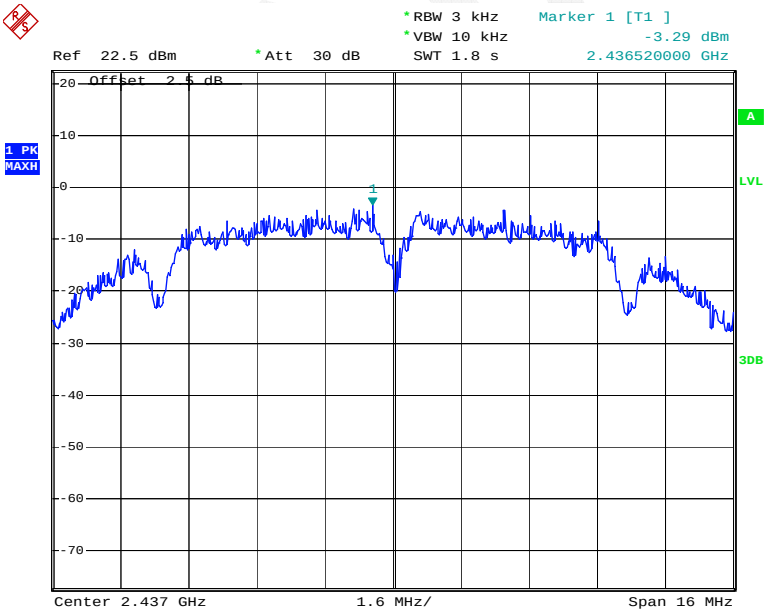
Chain2 Power Spectral Density, 802.11b Low Channel



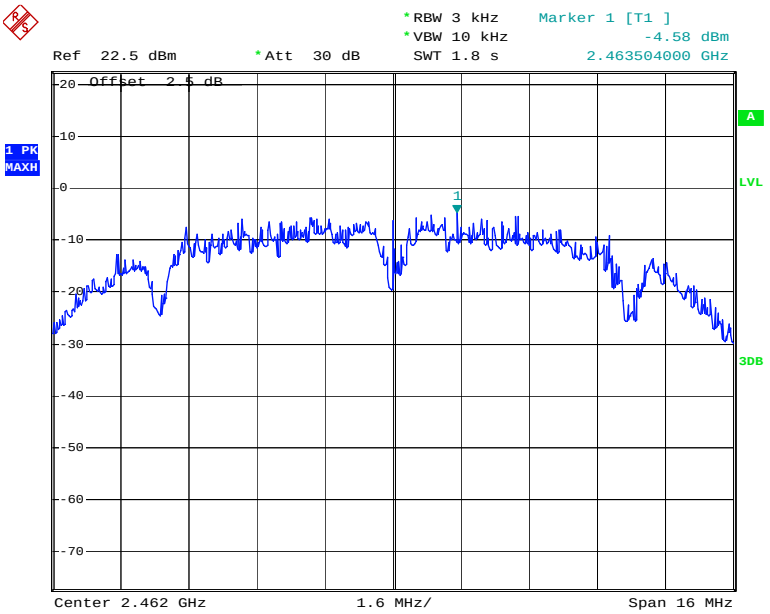
Date: 19.NOV.2014 11:27:26

Chain2 Power Spectral Density, 802.11b Middle Channel



Date: 19.NOV.2014 11:27:50

Chain2 Power Spectral Density, 802.11b High Channel



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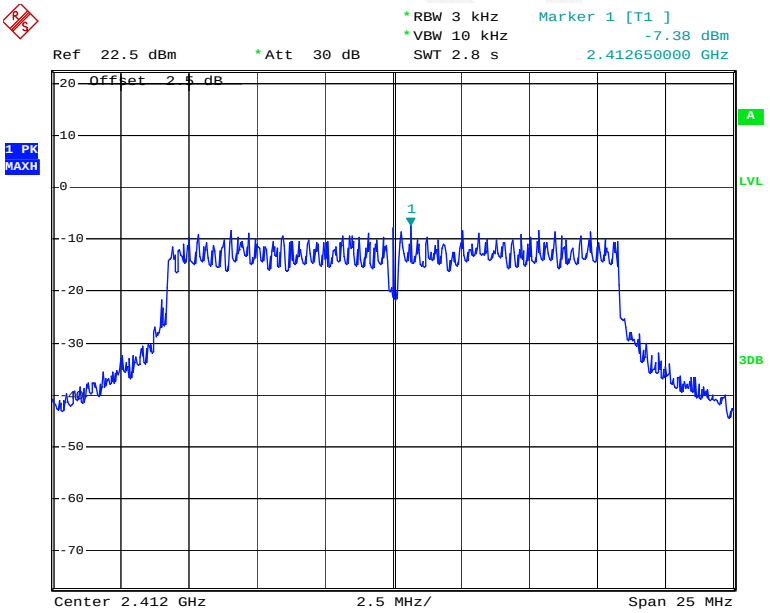
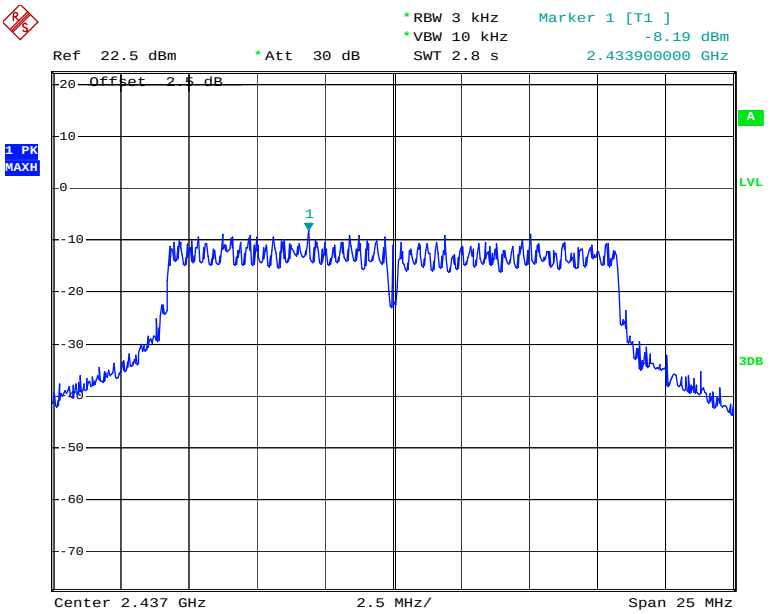
Chain2 Power Spectral Density, 802.11g Low Channel



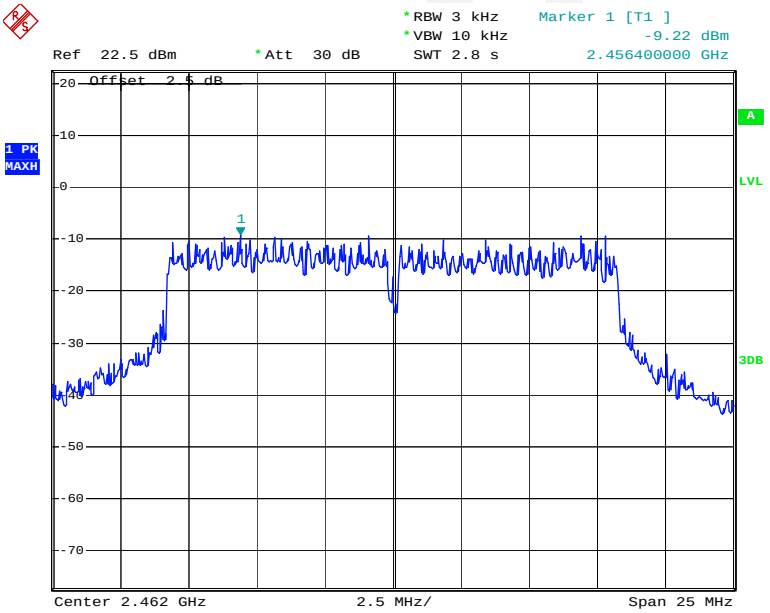
Date: 19.NOV.2014 11:08:07

Chain2Power Spectral Density, 802.11g Middle Channel



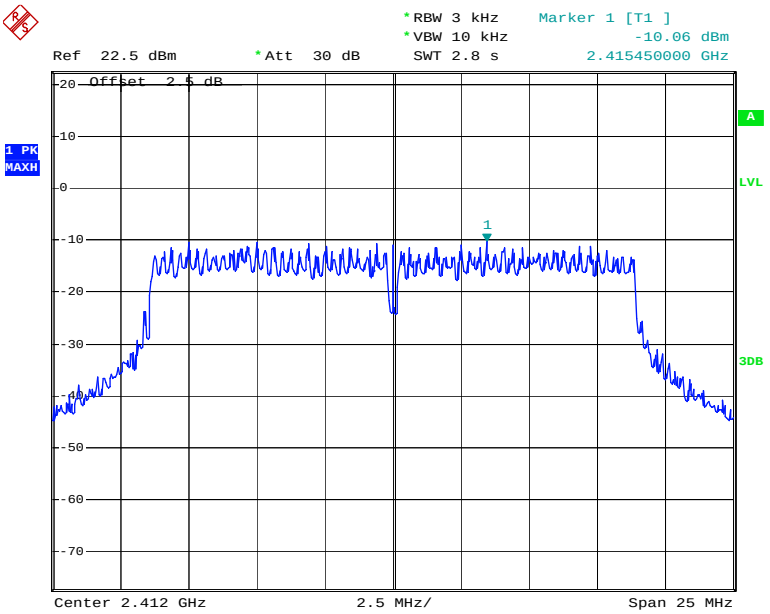
Date: 19.NOV.2014 11:10:31

Chain2 Power Spectral Density, 802.11g High Channel



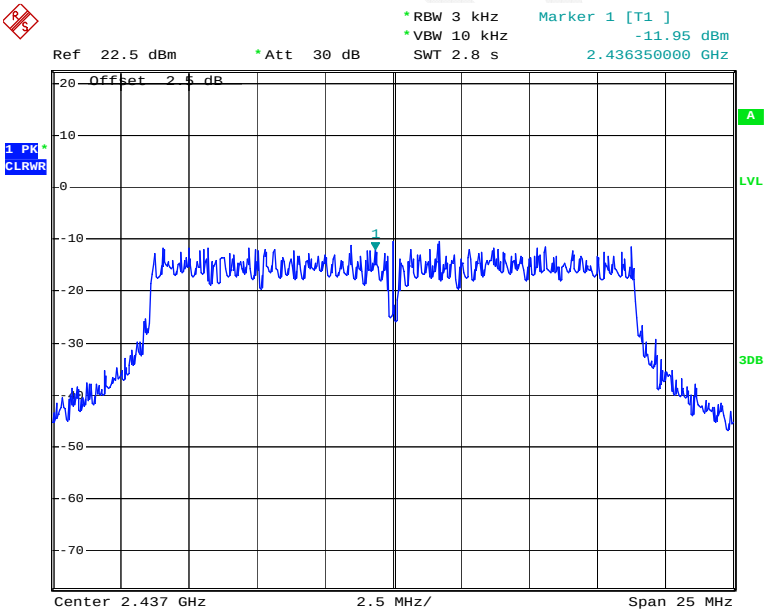
Date: 19.NOV.2014 11:19:37

Chain2 Power Spectral Density, 802.11n ht20 Low Channel



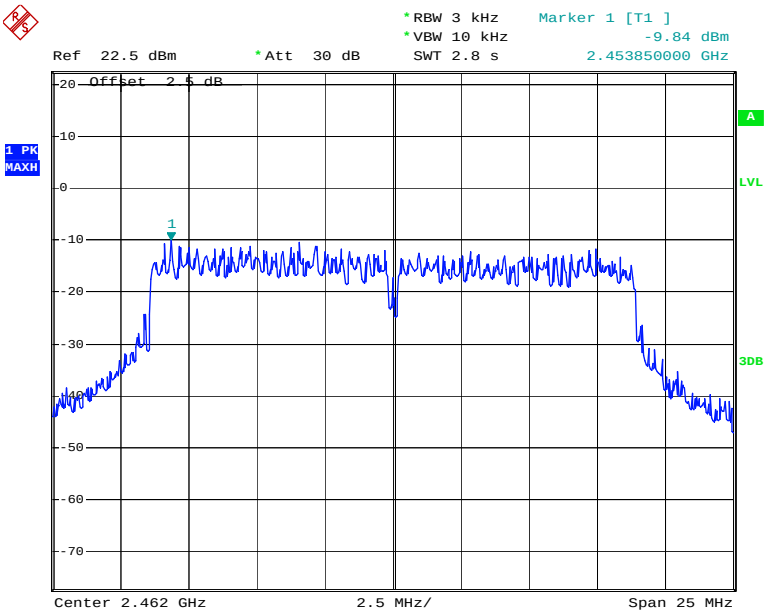
Date: 19.NOV.2014 11:27:03

Chain2 Power Spectral Density, 802.11n ht20 Middle Channel



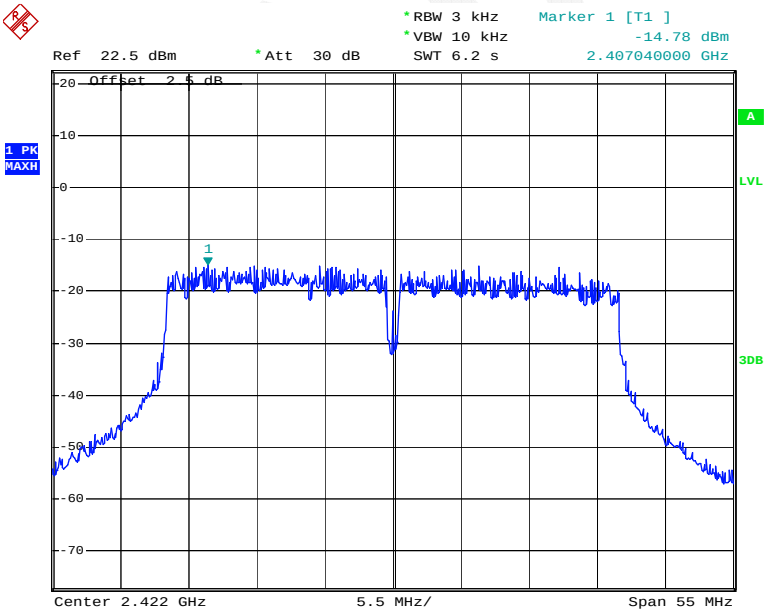
Date: 19.NOV.2014 11:27:47

Chain2 Power Spectral Density, 802.11n ht20 High Channel



Date: 19.NOV.2014 11:47:11

Chain2 Power Spectral Density, 802.11n ht40 Low Channel



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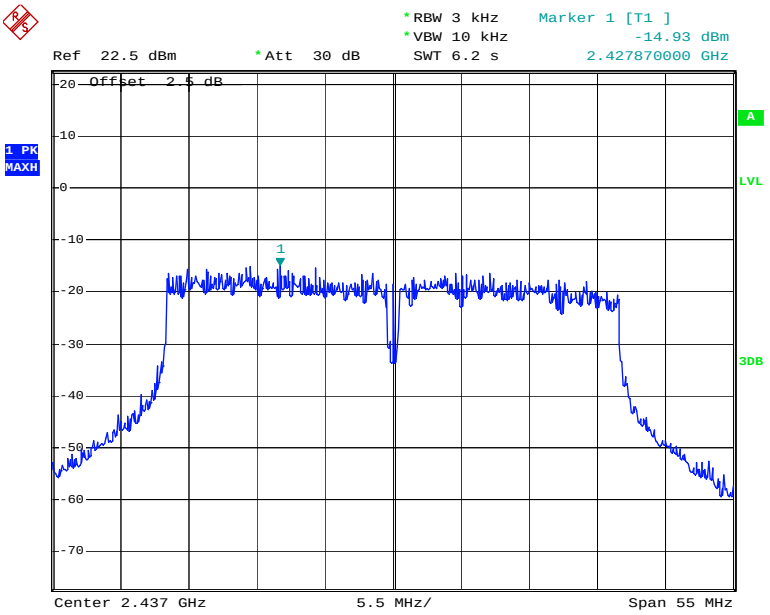
Chain2 Power Spectral Density, 802.11n ht40 Middle Channel



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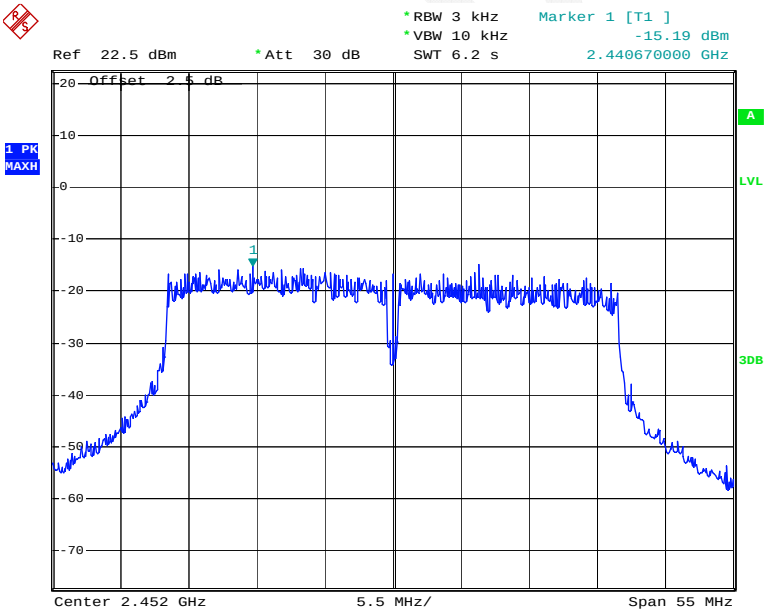
Chain2 Power Spectral Density, 802.11n ht40 High Channel



Date: 19.NOV.2014 12:00:03

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