FCC PART 15.247

TEST REPORT

For

CLC HONG KONG LIMITED

1011A, 10/F., Harbour Centre Tower 1, No. 1 Hok Cheung St., Hung Hom, Kowloon, Hong Kong

FCC ID: 2AG4WZ405

Report Type:	Product Type:
Original Report	Gator 3

Report Number:	RDG160908005-00D
Report Date:	2016-09-25
Reviewed By:	Dean Liu RF Engineer
Approved 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

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *CLC HONG KONG LIMITED*'s product, model number: *Z405(FCC ID: 2AG4WZ405)* (the "EUT") in this report was a *Gator 3* , which was measured approximately: 13.7 cm (L) × 7.6 cm (W) × 1.7 cm (H), rated input voltage: DC3.7V rechargeable Li-ion battery or DC5V from adapter.

Adapter information:
Model: PMC43
Input: 100-240V~50/60Hz
Output: DC 5.0V, 1000mA

All measurement and test data in this report was gathered from production sample serial number: 160908005 (Assigned by BACL, Dongguan). The EUT was received on 2016-09-09.

Objective

This report is prepared on behalf of *CLC HONG KONG 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 15B JBP submissions with FCC ID: 2AG4WZ405
FCC Part 15C DSS submissions with FCC ID: 2AG4WZ405
FCC Part 22H, 24E PCE submissions with FCC ID: 2AG4WZ405

Test Methodology

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

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

Test Facility

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

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

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in engineering 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.

For Bluetooth LE mode, 40 channels are provided for testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404	…	…
…	…	…	…
…	…	…	…
..	…	38	2478
19	2440	39	2480

EUT was tested with channel 0, 19 and 39.

Equipment Modifications

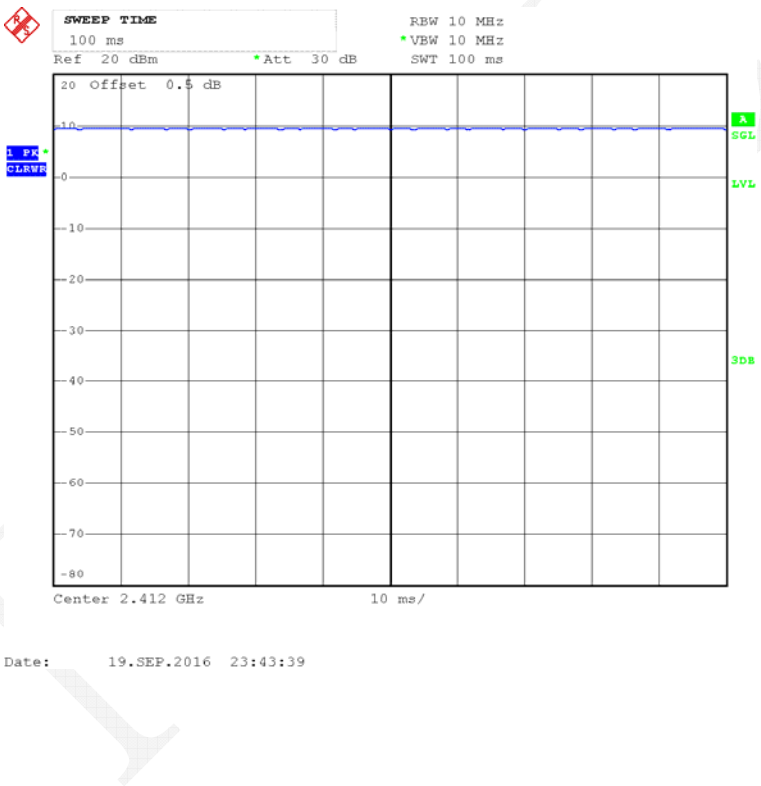
No modification was made to the EUT tested.

EUT Exercise Software

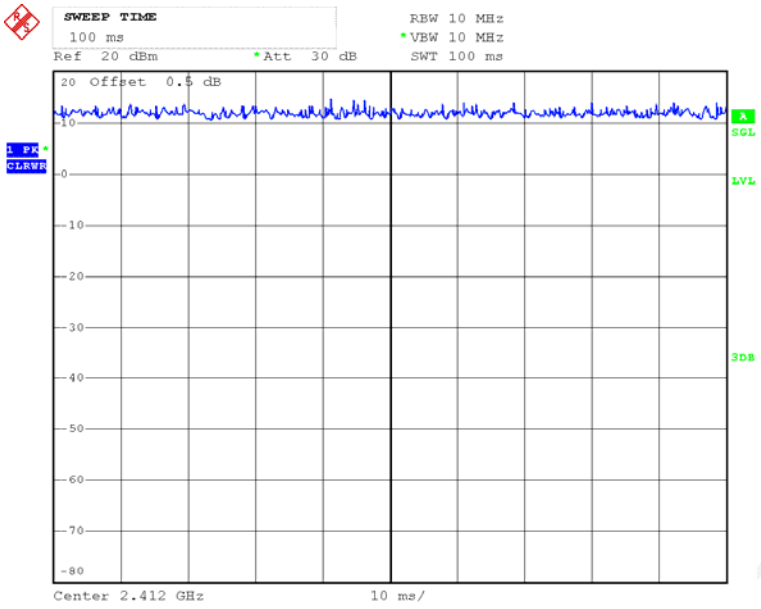
The maximum duty cycle was setting in engineering mode as following table:

Test mode	T_{on} (ms)	T_{on+off} (ms)	Duty Cycle (%)
802.11b	100	100	100%
802.11g	100	100	100%
802.11n ht20	100	100	100%
802.11n ht40	100	100	100%
BLE	0.402	0.63	63.8%

802.11b Low Channel



802.11g Middle Channel



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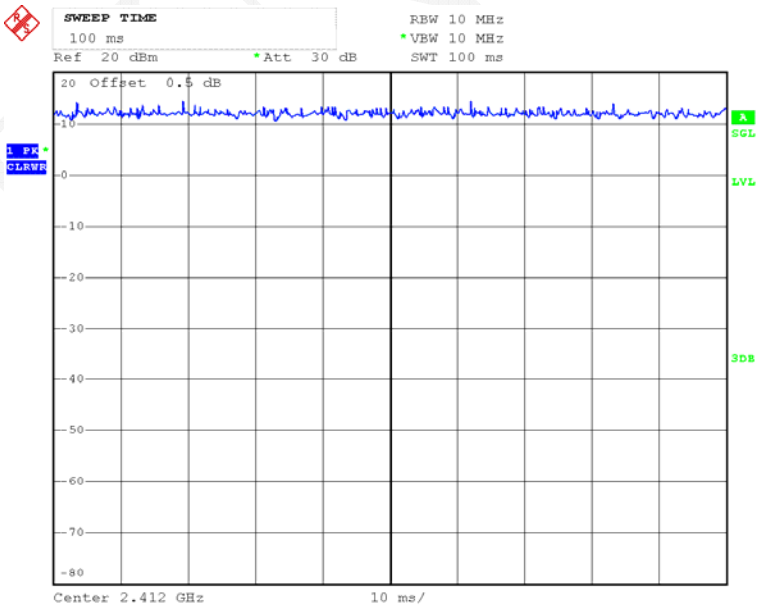
802.11n ht20 Middle Channel



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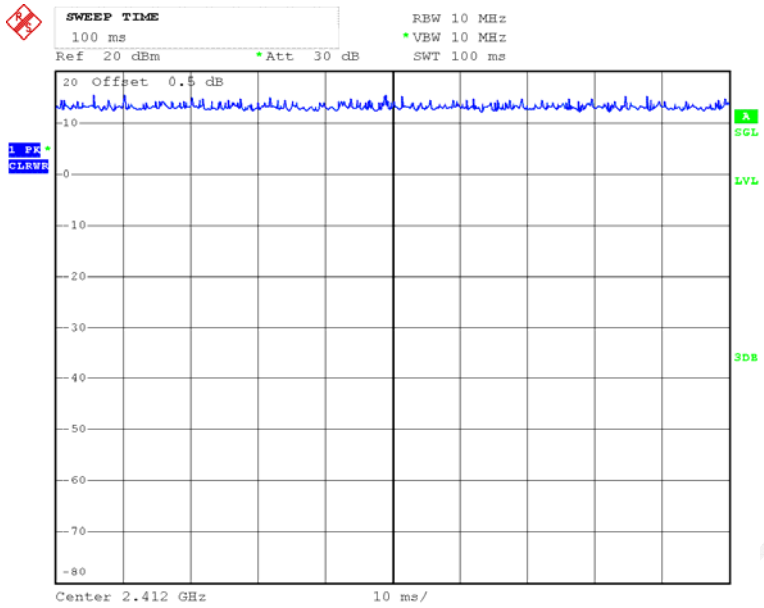
802.11n ht40 Low Channel



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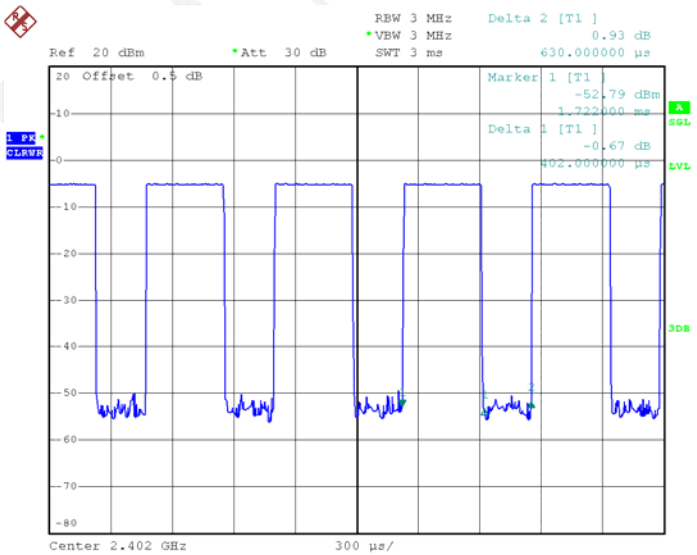
802.11n BLE Middle Channel

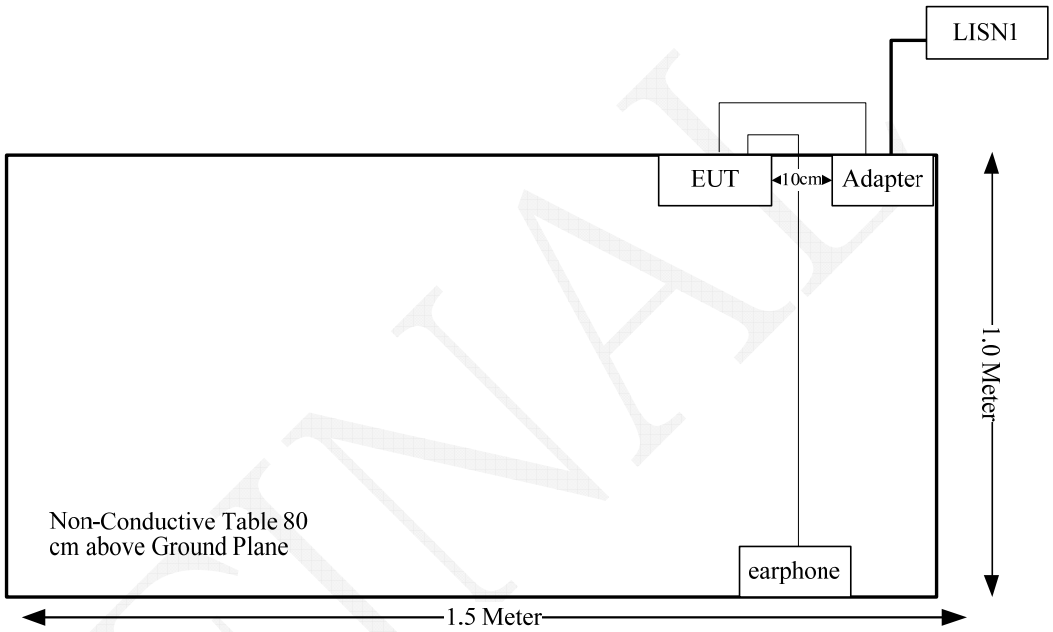


Date: 22.SEP.2016 20:49:48

External Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB Cable	Yes	No	1.0	USB Port of Adater	EUT
Earphone Cable	No	No	1.2	Audio Port of EUT	Earphone

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.247 (i) & §1.1310 & §2.1093	RF 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

Test time: 2016-09-12 ~ 2016-09-22.

FCC §15.247 (i) & §1.1310 & §2.1093- RF EXPOSURE

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.

According to KDB447498 D01 General RF Exposure Guidance v06:

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

Measurement Result

For WiFi mode

The max tune-up conducted power is 9.8 dBm (9.55 mW).
[(max. power of channel, mW)/(min. test separation distance, mm)][√f(GHz)]
= 9.55/5*(√2.462) = 3.0 ≤ 3.0

For bluetooth LE mode

The max tune-up conducted power is -4.3 dBm (0.4 mW).
[(max. power of channel, mW)/(min. test separation distance, mm)][√f(GHz)]
= 0.4/5*(√2.48) = 0.1< 3.0

So the stand-alone SAR evaluation is not necessary.

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 EUT has one internal antenna arrangement for Wifi/BT, and the antenna gain is 1.6 dBi, fulfill the requirement of this section. 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：

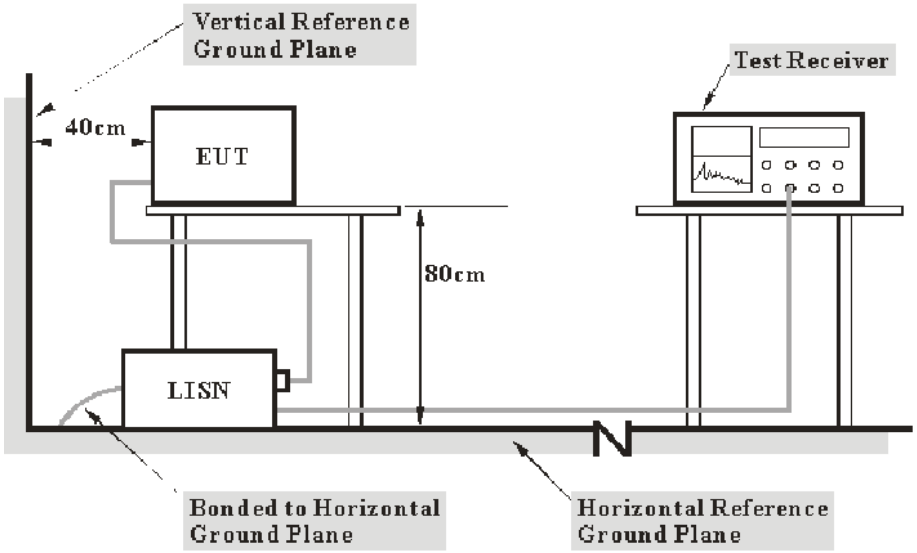
If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
– non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of 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 3.12 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 C63.10-2013 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.

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	2015-12-10	2016-12-09
R&S	L.I.S.N	ESH2-Z5	892107/021	2016-07-16	2017-07-15
R&S	Two-line V-network	ENV 216	3560.6550.12	2015-11-26	2016-11-25
N/A	Coaxial Cable	1.8m	N/A	2016-05-06	2017-05-06
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 in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

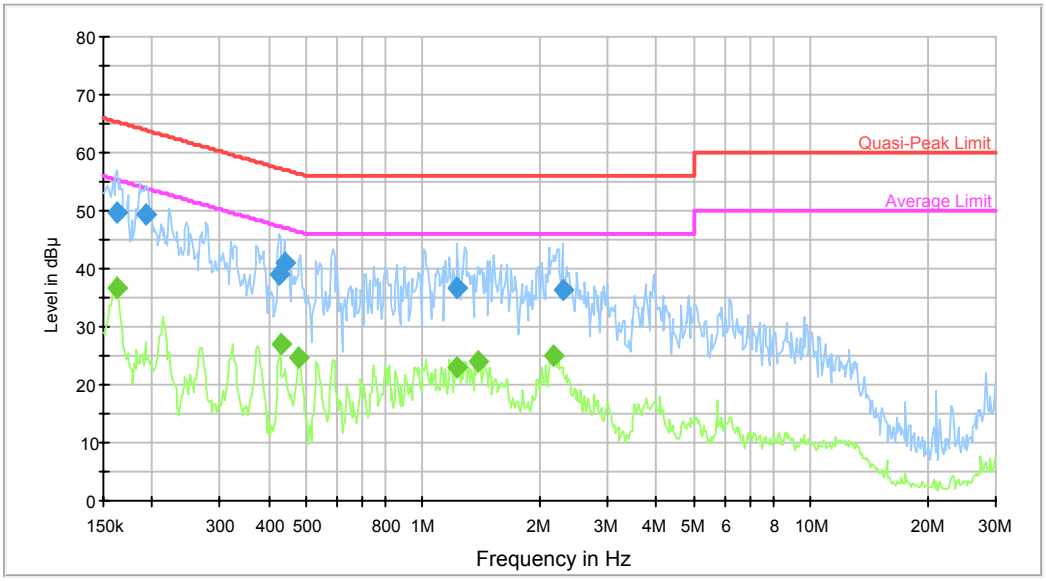
Environmental Conditions

Temperature:	29.1°C
Relative Humidity:	58 %
ATM Pressure:	100.2kPa

The testing was performed by Sun Zhong on 2016-09-13.

Test Mode: Transmitting (Wi-Fi)

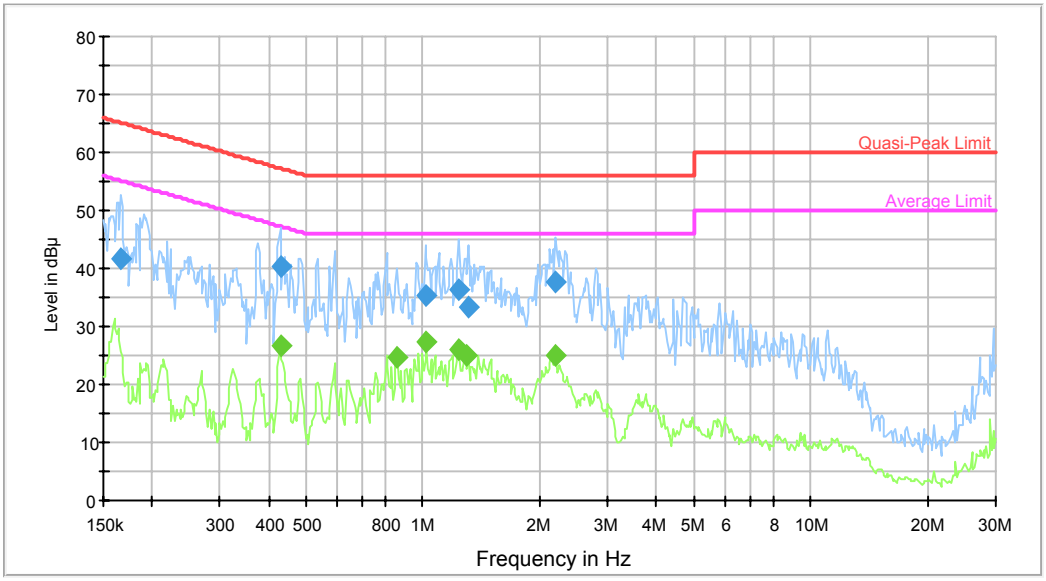
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.162441	49.6	9.000	L1	9.7	15.7	65.3	Compliance
0.192030	49.3	9.000	L1	9.7	14.6	63.9	Compliance
0.426011	39.0	9.000	L1	9.7	18.3	57.3	Compliance
0.439808	41.0	9.000	L1	9.7	16.1	57.1	Compliance
1.229340	36.7	9.000	L1	9.7	19.3	56.0	Compliance
2.288725	36.3	9.000	L1	9.7	19.7	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.162441	36.5	9.000	L1	9.7	18.8	55.3	Compliance
0.429420	27.1	9.000	L1	9.7	20.2	47.3	Compliance
0.480097	24.6	9.000	L1	9.7	21.7	46.3	Compliance
1.229340	22.9	9.000	L1	9.7	23.1	46.0	Compliance
1.385415	24.2	9.000	L1	9.7	21.8	46.0	Compliance
2.181877	25.0	9.000	L1	9.7	21.0	46.0	Compliance

AC120 V, 60 Hz, Neutral:

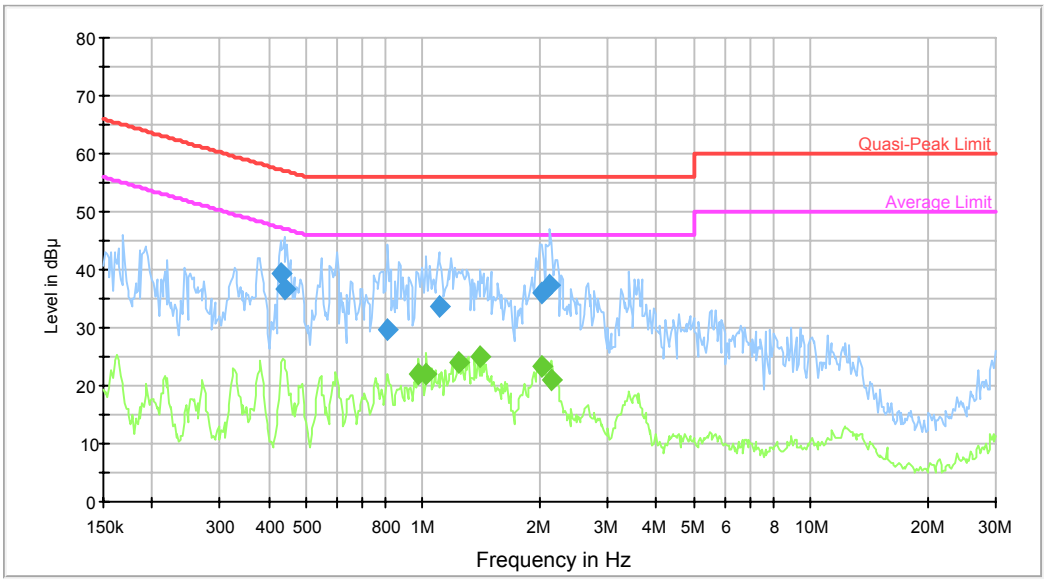


Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.166371	41.7	9.000	N	9.6	23.4	65.1	Compliance
0.429420	40.2	9.000	N	9.6	17.1	57.3	Compliance
1.015358	35.5	9.000	N	9.7	20.5	56.0	Compliance
1.239175	36.5	9.000	N	9.7	19.5	56.0	Compliance
1.310256	33.3	9.000	N	9.7	22.7	56.0	Compliance
2.199332	37.6	9.000	N	9.7	18.4	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.429420	26.8	9.000	N	9.6	20.5	47.3	Compliance
0.858911	24.6	9.000	N	9.6	21.4	46.0	Compliance
1.023481	27.4	9.000	N	9.7	18.6	46.0	Compliance
1.239175	26.1	9.000	N	9.7	19.9	46.0	Compliance
1.289541	24.9	9.000	N	9.7	21.1	46.0	Compliance
2.199332	25.1	9.000	N	9.7	20.9	46.0	Compliance

Test Mode: Transmitting (BLE)

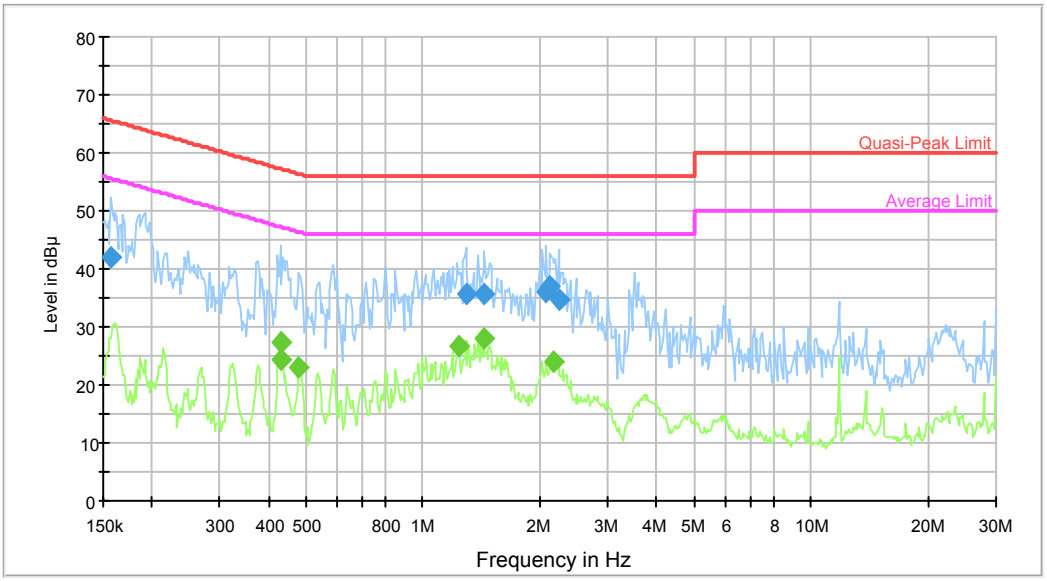
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.429420	39.5	9.000	L1	9.7	17.8	57.3	Compliance
0.439808	36.6	9.000	L1	9.7	20.5	57.1	Compliance
0.812315	29.6	9.000	L1	9.7	26.4	56.0	Compliance
1.099574	33.7	9.000	L1	9.7	22.3	56.0	Compliance
2.030886	36.1	9.000	L1	9.7	19.9	56.0	Compliance
2.130339	37.3	9.000	L1	9.7	18.7	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.975701	22.0	9.000	L1	9.7	24.0	46.0	Compliance
1.023481	22.1	9.000	L1	9.7	23.9	46.0	Compliance
1.239175	24.1	9.000	L1	9.7	21.9	46.0	Compliance
1.407671	25.0	9.000	L1	9.7	21.0	46.0	Compliance
2.014768	23.4	9.000	L1	9.7	22.6	46.0	Compliance
2.147382	21.1	9.000	L1	9.7	24.9	46.0	Compliance

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.157346	41.9	9.000	N	9.6	23.7	65.6	Compliance
1.289541	35.7	9.000	N	9.7	20.3	56.0	Compliance
1.441726	35.5	9.000	N	9.7	20.5	56.0	Compliance
2.080018	35.9	9.000	N	9.7	20.1	56.0	Compliance
2.130339	37.0	9.000	N	9.7	19.0	56.0	Compliance
2.234662	34.7	9.000	N	9.7	21.3	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.429420	27.5	9.000	N	9.6	19.8	47.3	Compliance
0.432855	24.2	9.000	N	9.6	23.0	47.2	Compliance
0.480097	23.0	9.000	N	9.6	23.3	46.3	Compliance
1.239175	26.6	9.000	N	9.7	19.4	46.0	Compliance
1.430284	28.2	9.000	N	9.7	17.8	46.0	Compliance
2.181877	23.9	9.000	N	9.7	22.1	46.0	Compliance

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

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

Measurement Uncertainty

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

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

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

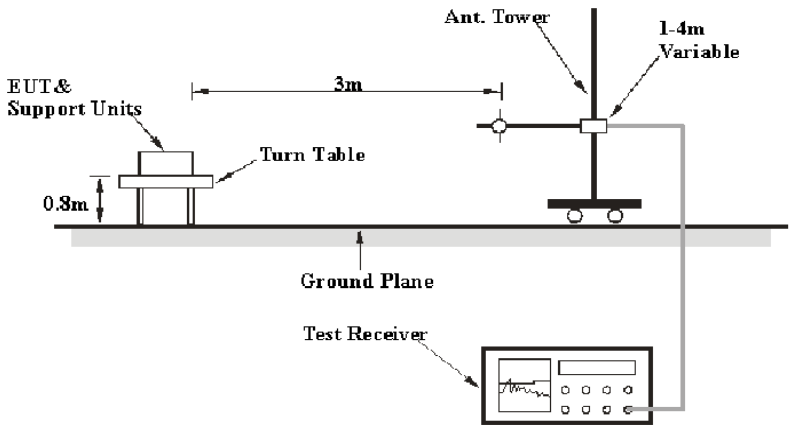
Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical; 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical; 1G~6GHz: 4.45 dB, 6G~18GHz: 5.23 dB

Table 2 – Values of U_{cispr}

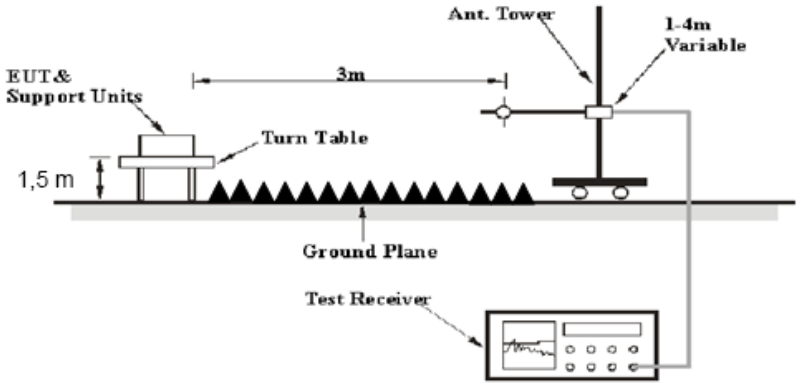
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

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 C63.10-2013. 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.

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:

30MHz-1000MHz:

Detector	RBW	Video B/W	IF B/W
QP	120 kHz	300 kHz	120kHz

1GHz- 25GHz:

Detector	Duty cycle	RBW	Video B/W
PK	Any	1MHz	3 MHz
Ave.	>98%	1MHz	10 Hz
	<98%	1MHz	1/T

Note: T is minimum transmission duration

Test Procedure

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	2016-08-03	2017-08-02
Sunol Sciences	Antenna	JB3	A060611-3	2014-11-06	2017-11-05
HP	Amplifier	8447E	2434A02181	2016-09-01	2017-09-01
Agilent	Spectrum Analyzer	E4440A	SG43360054	2015-11-23	2016-11-22
ETS-Lindgren	Horn Antenna	3115	9808-5557	2015-09-06	2018-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2016-02-19	2017-02-19
R&S	Spectrum Analyzer	FSP 38	100478	2015-11-23	2016-11-22
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2014-06-16	2017-06-15
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2016-09-06	2017-09-06
N/A	Coaxial Cable	14m	N/A	2016-05-06	2017-05-06
N/A	Coaxial Cable	8m	N/A	2016-05-06	2017-05-06

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

Test Data

Environmental Conditions

Temperature:	26.6 °C
Relative Humidity:	49%
ATM Pressure:	100.2 kPa

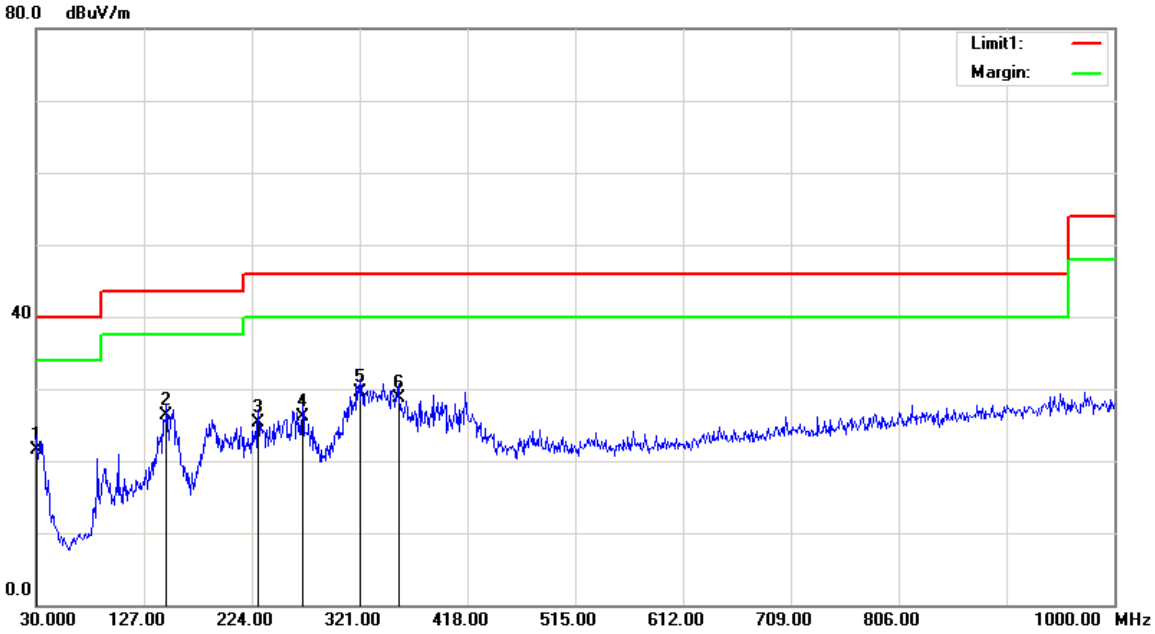
** The testing was performed by Sun Zhong on 2016-09-13.*

Test Mode: Transmitting

1) Below 1GHz

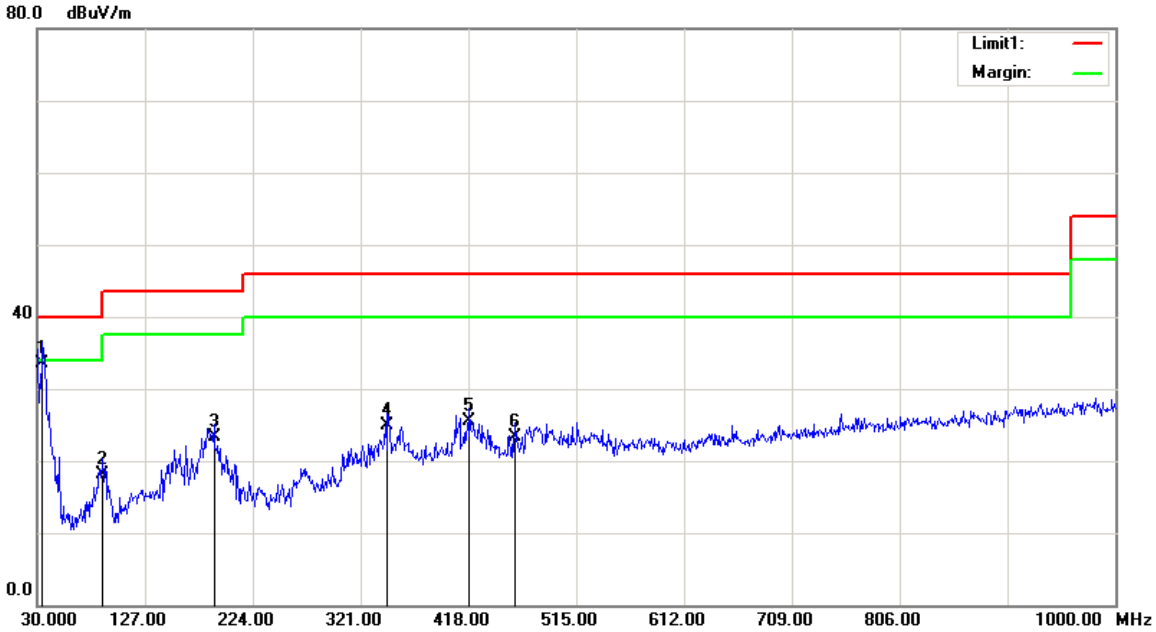
WI-FI: (802.11 n ht20 mode middle channel was the worst case**):**

Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.0000	20.47	QP	1.03	21.50	40.00	18.50
147.3700	33.51	QP	-7.21	26.30	43.50	17.20
229.8200	33.83	QP	-8.43	25.40	46.00	20.60
269.5900	32.39	QP	-6.29	26.10	46.00	19.90
321.9700	35.05	QP	-5.55	29.50	46.00	16.50
355.9200	33.28	QP	-4.58	28.70	46.00	17.30

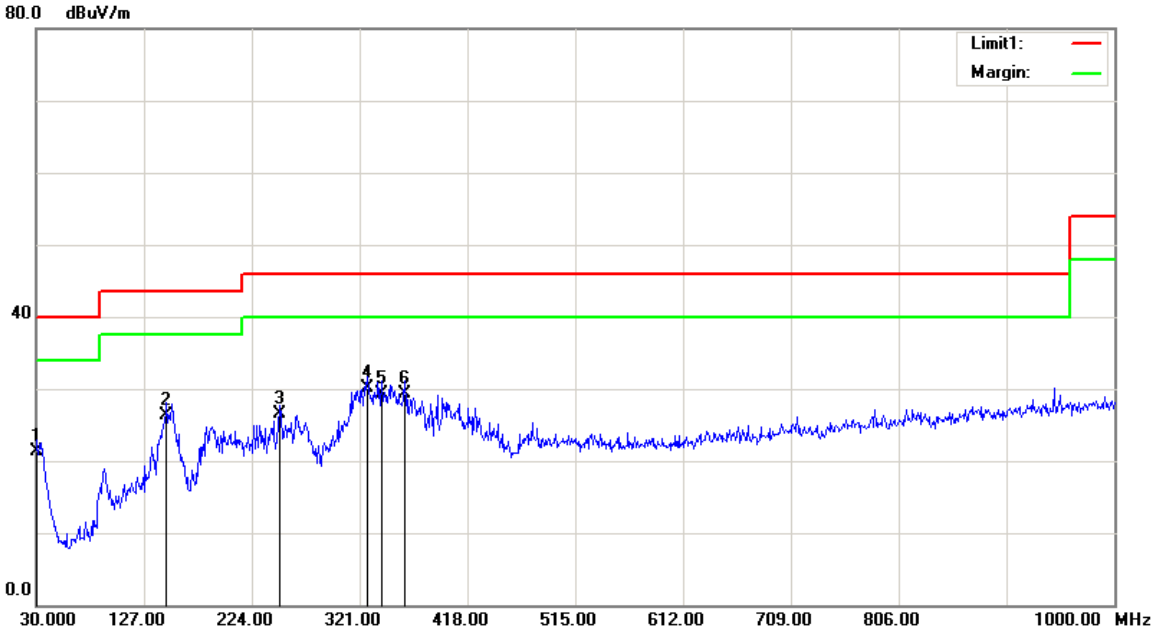
Vertical



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
34.8500	36.27	QP	-2.67	33.60	40.00	6.40
89.1700	30.24	QP	-12.14	18.10	43.50	25.40
189.0800	31.89	QP	-8.59	23.30	43.50	20.20
345.2500	29.97	QP	-5.07	24.90	46.00	21.10
418.9700	28.58	QP	-2.98	25.60	46.00	20.40
459.7100	25.60	QP	-2.20	23.40	46.00	22.60

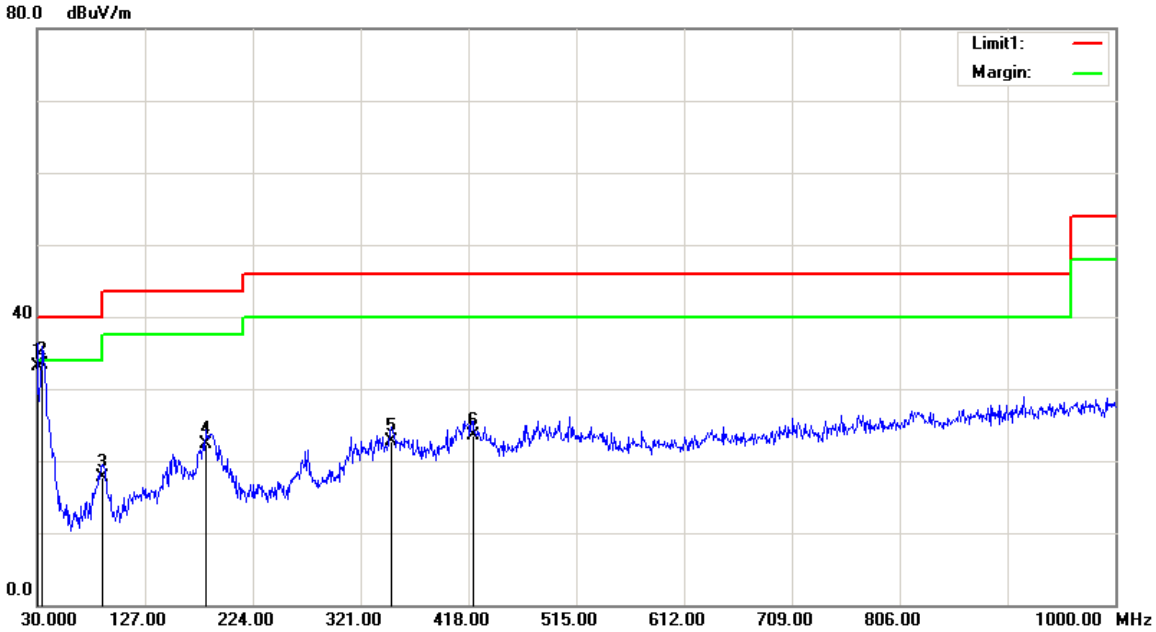
BLE (High channel was the worst):

Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.0000	20.27	QP	1.03	21.30	40.00	18.70
147.3700	33.51	QP	-7.21	26.30	43.50	17.20
249.2200	34.29	QP	-7.79	26.50	46.00	19.50
327.7900	35.58	QP	-5.48	30.10	46.00	15.90
340.4000	34.67	QP	-5.37	29.30	46.00	16.70
361.7400	33.84	QP	-4.44	29.40	46.00	16.60

Vertical



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.0000	32.17	QP	1.03	33.20	40.00	6.80
34.8500	35.97	QP	-2.67	33.30	40.00	6.70
88.2000	30.03	QP	-12.23	17.80	43.50	25.70
181.3200	31.16	QP	-8.76	22.40	43.50	21.10
348.1600	27.55	QP	-4.85	22.70	46.00	23.30
421.8800	26.52	QP	-2.92	23.60	46.00	22.40

2) 1-25GHz:

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	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	61.16	PK	H	25.67	3.68	0.00	90.51	N/A	N/A
2412	58.11	AV	H	25.67	3.68	0.00	87.46	N/A	N/A
2412	55.8	PK	V	25.67	3.68	0.00	85.15	N/A	N/A
2412	52.63	AV	V	25.67	3.68	0.00	81.98	N/A	N/A
2390	25.48	PK	H	25.61	3.63	0.00	54.72	74.00	19.28
2390	13.31	AV	H	25.61	3.63	0.00	42.55	54.00	11.45
4824	37.1	PK	H	30.64	5.03	27.41	45.36	74.00	28.64
4824	33.54	AV	H	30.64	5.03	27.41	41.80	54.00	12.20
7236	33.14	PK	H	34.17	6.65	25.90	48.06	74.00	25.94
7236	29.74	AV	H	34.17	6.65	25.90	44.66	54.00	9.34
3618	35.06	PK	H	29.06	4.59	27.28	41.43	74.00	32.57
3618	22.68	AV	H	29.06	4.59	27.28	29.05	54.00	24.95
Middle Channel: 2437 MHz									
2437	60.69	PK	H	25.74	3.75	0.00	90.18	N/A	N/A
2437	57.55	AV	H	25.74	3.75	0.00	87.04	N/A	N/A
2437	55.25	PK	V	25.74	3.75	0.00	84.74	N/A	N/A
2437	52.85	AV	V	25.74	3.75	0.00	82.34	N/A	N/A
4874	36.94	PK	H	30.77	5.14	27.42	45.43	74.00	28.57
4874	33.37	AV	H	30.77	5.14	27.42	41.86	54.00	12.14
7311	32.97	PK	H	34.35	6.74	25.88	48.18	74.00	25.82
7311	29.6	AV	H	34.35	6.74	25.88	44.81	54.00	9.19
3131	34.91	PK	H	27.62	6.93	27.43	42.03	74.00	31.97
3131	22.53	AV	H	27.62	6.93	27.43	29.65	54.00	24.35
3190	33.51	PK	H	27.81	6.26	27.38	40.20	74.00	33.80
3190	21.17	AV	H	27.81	6.26	27.38	27.86	54.00	26.14
High Channel: 2462 MHz									
2462	59.74	PK	H	25.80	3.75	0.00	89.29	N/A	N/A
2462	56.72	AV	H	25.80	3.75	0.00	86.27	N/A	N/A
2462	54.57	PK	V	25.80	3.75	0.00	84.12	N/A	N/A
2462	51.52	AV	V	25.80	3.75	0.00	81.07	N/A	N/A
2483.5	25.85	PK	H	25.86	3.67	0.00	55.38	74.00	18.62
2483.5	13.88	AV	H	25.86	3.67	0.00	43.41	54.00	10.59
4924	33.97	PK	H	30.90	5.34	27.43	42.78	74.00	31.22
4924	29.88	AV	H	30.90	5.34	27.43	38.69	54.00	15.31
7386	33.62	PK	H	34.53	6.83	25.86	49.12	74.00	24.88
7386	29.15	AV	H	34.53	6.83	25.86	44.65	54.00	9.35
3688	33.05	PK	H	29.21	4.61	27.32	39.55	74.00	34.45
3688	20.54	AV	H	29.21	4.61	27.32	27.04	54.00	26.96

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	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	64.08	PK	H	25.67	3.68	0.00	93.43	N/A	N/A
2412	54.57	AV	H	25.67	3.68	0.00	83.92	N/A	N/A
2412	58.92	PK	V	25.67	3.68	0.00	88.27	N/A	N/A
2412	49.17	AV	V	25.67	3.68	0.00	78.52	N/A	N/A
2390	25.55	PK	H	25.61	3.63	0.00	54.79	74.00	19.21
2390	14.28	AV	H	25.61	3.63	0.00	43.52	54.00	10.48
4824	35.12	PK	H	30.64	5.03	27.41	43.38	74.00	30.62
4824	23.2	AV	H	30.64	5.03	27.41	31.46	54.00	22.54
7236	33.19	PK	H	34.17	6.65	25.90	48.11	74.00	25.89
7236	21.01	AV	H	34.17	6.65	25.90	35.93	54.00	18.07
3618	33.43	PK	H	29.06	4.59	27.28	39.80	74.00	34.20
3618	21.03	AV	H	29.06	4.59	27.28	27.40	54.00	26.60
Middle Channel: 2437 MHz									
2437	63.18	PK	H	25.74	3.75	0.00	92.67	N/A	N/A
2437	53.43	AV	H	25.74	3.75	0.00	82.92	N/A	N/A
2437	58.28	PK	V	25.74	3.75	0.00	87.77	N/A	N/A
2437	48.42	AV	V	25.74	3.75	0.00	77.91	N/A	N/A
4874	35.32	PK	H	30.77	5.14	27.42	43.81	74.00	30.19
4874	23.41	AV	H	30.77	5.14	27.42	31.90	54.00	22.10
7311	33.41	PK	H	34.35	6.74	25.88	48.62	74.00	25.38
7311	21.18	AV	H	34.35	6.74	25.88	36.39	54.00	17.61
3095	33.62	PK	H	27.50	6.82	27.45	40.49	74.00	33.51
3095	21.25	AV	H	27.50	6.82	27.45	28.12	54.00	25.88
3610	33.92	PK	H	29.04	4.61	27.28	40.29	74.00	33.71
3610	21.52	AV	H	29.04	4.61	27.28	27.89	54.00	26.11
High Channel: 2462 MHz									
2462	62.08	PK	H	25.80	3.75	0.00	91.63	N/A	N/A
2462	51.97	AV	H	25.80	3.75	0.00	81.52	N/A	N/A
2462	57.47	PK	V	25.80	3.75	0.00	87.02	N/A	N/A
2462	47.61	AV	V	25.80	3.75	0.00	77.16	N/A	N/A
2483.5	25.28	PK	H	25.86	3.67	0.00	54.81	74.00	19.19
2483.5	14.02	AV	H	25.86	3.67	0.00	43.55	54.00	10.45
4924	35.55	PK	H	30.90	5.34	27.43	44.36	74.00	29.64
4924	23.65	AV	H	30.90	5.34	27.43	32.46	54.00	21.54
7386	33.59	PK	H	34.53	6.83	25.86	49.09	74.00	24.91
7386	21.37	AV	H	34.53	6.83	25.86	36.87	54.00	17.13
3688	33.8	PK	H	29.21	4.61	27.32	40.30	74.00	33.70
3688	21.48	AV	H	29.21	4.61	27.32	27.98	54.00	26.02

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	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	63.11	PK	H	25.67	3.68	0.00	92.46	N/A	N/A
2412	52.99	AV	H	25.67	3.68	0.00	82.34	N/A	N/A
2412	58.07	PK	V	25.67	3.68	0.00	87.42	N/A	N/A
2412	48.23	AV	V	25.67	3.68	0.00	77.58	N/A	N/A
2390	27.3	PK	H	25.61	3.63	0.00	56.54	74.00	17.46
2390	14.18	AV	H	25.61	3.63	0.00	43.42	54.00	10.58
4824	35.37	PK	H	30.64	5.03	27.41	43.63	74.00	30.37
4824	22.94	AV	H	30.64	5.03	27.41	31.20	54.00	22.80
7236	34.48	PK	H	34.17	6.65	25.90	49.40	74.00	24.60
7236	21.95	AV	H	34.17	6.65	25.90	36.87	54.00	17.13
3630	33.37	PK	H	29.09	4.57	27.29	39.74	74.00	34.26
3630	21.04	AV	H	29.09	4.57	27.29	27.41	54.00	26.59
Middle Channel: 2437 MHz									
2437	62.72	PK	H	25.74	3.75	0.00	92.21	N/A	N/A
2437	52.71	AV	H	25.74	3.75	0.00	82.20	N/A	N/A
2437	58.17	PK	V	25.74	3.75	0.00	87.66	N/A	N/A
2437	48.19	AV	V	25.74	3.75	0.00	77.68	N/A	N/A
4874	35.31	PK	H	30.77	5.14	27.42	43.80	74.00	30.20
4874	22.84	AV	H	30.77	5.14	27.42	31.33	54.00	22.67
7311	34.41	PK	H	34.35	6.74	25.88	49.62	74.00	24.38
7311	21.87	AV	H	34.35	6.74	25.88	37.08	54.00	16.92
3120	33.29	PK	H	27.58	6.90	27.43	40.34	74.00	33.66
3120	20.93	AV	H	27.58	6.90	27.43	27.98	54.00	26.02
3584	33.85	PK	H	28.98	4.59	27.26	40.16	74.00	33.84
3584	21.41	AV	H	28.98	4.59	27.26	27.72	54.00	26.28
High Channel: 2462 MHz									
2462	62.03	PK	H	25.80	3.75	0.00	91.58	N/A	N/A
2462	52.01	AV	H	25.80	3.75	0.00	81.56	N/A	N/A
2462	57.95	PK	V	25.80	3.75	0.00	87.50	N/A	N/A
2462	47.93	AV	V	25.80	3.75	0.00	77.48	N/A	N/A
2483.5	25.82	PK	H	25.86	3.67	0.00	55.35	74.00	18.65
2483.5	14.12	AV	H	25.86	3.67	0.00	43.65	54.00	10.35
4924	35.19	PK	H	30.90	5.34	27.43	44.00	74.00	30.00
4924	22.71	AV	H	30.90	5.34	27.43	31.52	54.00	22.48
7386	34.32	PK	H	34.53	6.83	25.86	49.82	74.00	24.18
7386	21.75	AV	H	34.53	6.83	25.86	37.25	54.00	16.75
3688	33.27	PK	H	29.21	4.61	27.32	39.77	74.00	34.23
3688	20.9	AV	H	29.21	4.61	27.32	27.40	54.00	26.60

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	Polar (H/V)	Factor (dB)					
Low Channel: 2422 MHz									
2422	62.54	PK	H	25.70	3.71	0.00	91.95	N/A	N/A
2422	52.1	AV	H	25.70	3.71	0.00	81.51	N/A	N/A
2422	57.64	PK	V	25.70	3.71	0.00	87.05	N/A	N/A
2422	47.06	AV	V	25.70	3.71	0.00	76.47	N/A	N/A
2390	34.67	PK	H	25.61	3.63	0.00	63.91	74.00	10.09
2390	16.52	AV	H	25.61	3.63	0.00	45.76	54.00	8.24
4844	35.09	PK	H	30.69	4.99	27.42	43.35	74.00	30.65
4844	22.59	AV	H	30.69	4.99	27.42	30.85	54.00	23.15
7266	34.21	PK	H	34.24	6.68	25.89	49.24	74.00	24.76
7266	21.65	AV	H	34.24	6.68	25.89	36.68	54.00	17.32
3618	33.15	PK	H	29.06	4.59	27.28	39.52	74.00	34.48
3618	20.81	AV	H	29.06	4.59	27.28	27.18	54.00	26.82
Middle Channel: 2437 MHz									
2437	62.25	PK	H	25.74	3.75	0.00	91.74	N/A	N/A
2437	52.05	AV	H	25.74	3.75	0.00	81.54	N/A	N/A
2437	57.65	PK	V	25.74	3.75	0.00	87.14	N/A	N/A
2437	47.01	AV	V	25.74	3.75	0.00	76.50	N/A	N/A
4874	34.96	PK	H	30.77	5.14	27.42	43.45	74.00	30.55
4874	22.51	AV	H	30.77	5.14	27.42	31.00	54.00	23.00
7311	34.07	PK	H	34.35	6.74	25.88	49.28	74.00	24.72
7311	21.49	AV	H	34.35	6.74	25.88	36.70	54.00	17.30
3150	32.99	PK	H	27.68	6.98	27.41	40.24	74.00	33.76
3150	20.69	AV	H	27.68	6.98	27.41	27.94	54.00	26.06
3584	33.83	PK	H	28.98	4.59	27.26	40.14	74.00	33.86
3584	21.41	AV	H	28.98	4.59	27.26	27.72	54.00	26.28
High Channel: 2452 MHz									
2452	61.71	PK	H	25.78	3.78	0.00	91.27	N/A	N/A
2452	51.55	AV	H	25.78	3.78	0.00	81.11	N/A	N/A
2452	56.69	PK	V	25.78	3.78	0.00	86.25	N/A	N/A
2452	46.64	AV	V	25.78	3.78	0.00	76.20	N/A	N/A
2483.5	32.72	PK	H	25.86	3.67	0.00	62.25	74.00	11.75
2483.5	14.37	AV	H	25.86	3.67	0.00	43.90	54.00	10.10
4904	34.82	PK	H	30.85	5.31	27.43	43.55	74.00	30.45
4904	22.36	AV	H	30.85	5.31	27.43	31.09	54.00	22.91
7356	33.97	PK	H	34.45	6.79	25.87	49.34	74.00	24.66
7356	21.36	AV	H	34.45	6.79	25.87	36.73	54.00	17.27
3688	32.85	PK	H	29.21	4.61	27.32	39.35	74.00	34.65
3688	20.59	AV	H	29.21	4.61	27.32	27.09	54.00	26.91

BLE Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB)					
Low Channel: 2402 MHz									
2402	59.16	PK	H	25.65	3.66	0.00	88.47	N/A	N/A
2402	58.04	AV	H	25.65	3.66	0.00	87.35	N/A	N/A
2402	53.49	PK	V	25.65	3.66	0.00	82.80	N/A	N/A
2402	52.18	AV	V	25.65	3.66	0.00	81.49	N/A	N/A
2390	24.81	PK	H	25.61	3.63	0.00	54.05	74.00	19.95
2390	12.15	AV	H	25.61	3.63	0.00	41.39	54.00	12.61
4804	33.11	PK	H	30.59	5.06	27.41	41.35	74.00	32.65
4804	21.1	AV	H	30.59	5.06	27.41	29.34	54.00	24.66
7206	33.64	PK	H	34.09	6.61	25.91	48.43	74.00	25.57
7206	22.09	AV	H	34.09	6.61	25.91	36.88	54.00	17.12
3252	32.36	PK	H	28.01	6.26	27.33	39.30	74.00	34.70
3252	21.85	AV	H	28.01	6.26	27.33	28.79	54.00	25.21
Middle Channel: 2440 MHz									
2440	59.13	PK	H	25.74	3.76	0.00	88.63	N/A	N/A
2440	57.58	AV	H	25.74	3.76	0.00	87.08	N/A	N/A
2440	53.34	PK	V	25.74	3.76	0.00	82.84	N/A	N/A
2440	52.78	AV	V	25.74	3.76	0.00	82.28	N/A	N/A
4880	33.35	PK	H	30.79	5.18	27.42	41.90	74.00	32.10
4880	21.37	AV	H	30.79	5.18	27.42	29.92	54.00	24.08
7320	33.9	PK	H	34.37	6.75	25.88	49.14	74.00	24.86
7320	22.36	AV	H	34.37	6.75	25.88	37.60	54.00	16.40
2765	32.05	PK	H	26.59	4.39	27.54	35.49	74.00	38.51
2765	21.51	AV	H	26.59	4.39	27.54	24.95	54.00	29.05
3252	32.85	PK	H	28.01	6.26	27.33	39.79	74.00	34.21
3252	21.47	AV	H	28.01	6.26	27.33	28.41	54.00	25.59
High Channel: 2480 MHz									
2480	59.06	PK	H	25.85	3.68	0.00	88.59	N/A	N/A
2480	57.74	AV	H	25.85	3.68	0.00	87.27	N/A	N/A
2480	53.87	PK	V	25.85	3.68	0.00	83.40	N/A	N/A
2480	53.02	AV	V	25.85	3.68	0.00	82.55	N/A	N/A
2483.5	26.31	PK	H	25.86	3.67	0.00	55.84	74.00	18.16
2483.5	13.27	AV	H	25.86	3.67	0.00	42.80	54.00	11.20
4960	32.78	PK	H	31.00	5.34	27.43	41.69	74.00	32.31
4960	21.58	AV	H	31.00	5.34	27.43	30.49	54.00	23.51
7440	33.63	PK	H	34.66	6.89	25.97	49.21	74.00	24.79
7440	22.35	AV	H	34.66	6.89	25.97	37.93	54.00	16.07
3252	32.12	PK	H	28.01	6.26	27.33	39.06	74.00	34.94
3252	21.94	AV	H	28.01	6.26	27.33	28.88	54.00	25.12

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

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
Agilent	Spectrum Analyzer	E4440A	SG43360054	2015-11-23	2016-11-22
N/A	Coaxial Cable	0.1m	N/A	2016-05-06	2017-05-06
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2016-05-06	2017-05-06

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

Test Data

Environmental Conditions

Temperature:	25.8~26.1 °C
Relative Humidity:	32~35%
ATM Pressure:	100.7~100.9 kPa

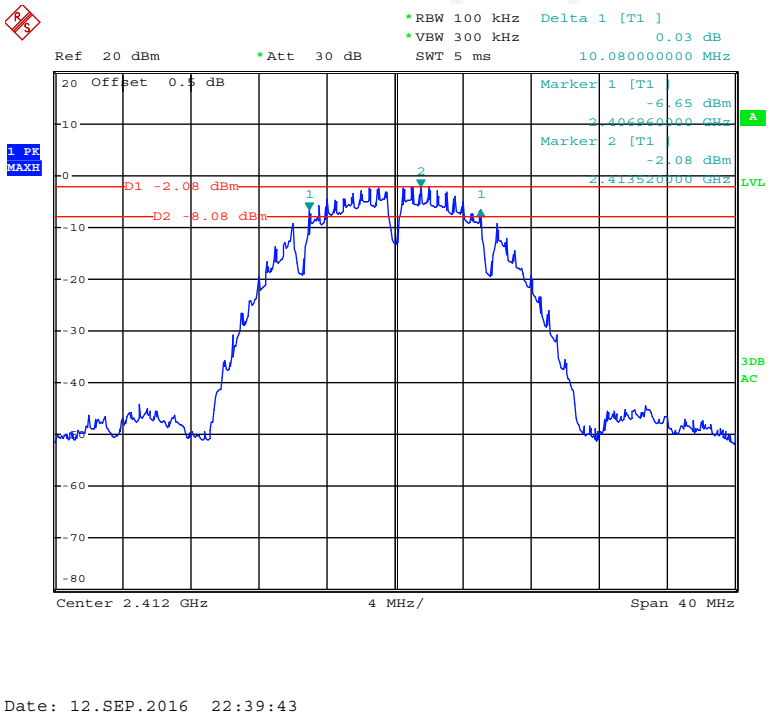
** The testing was performed by Sun Zhong from 2016-09-12 to 2016-09-22.*

Test Mode: Transmitting

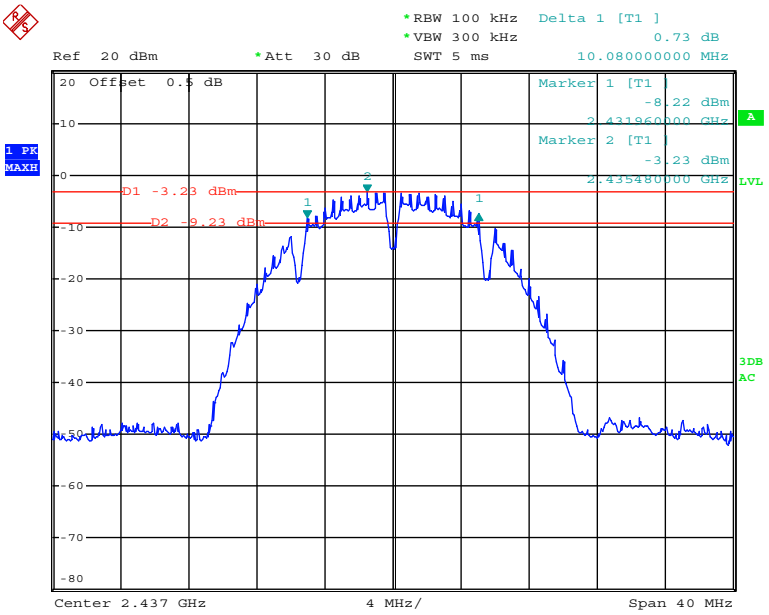
Test Result: Compliant. Please refer to the following table and plots.

Test mode	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)
802.11b	Low	2412	10.08	≥0.5
	Middle	2437	10.08	≥0.5
	High	2462	10.08	≥0.5
802.11g	Low	2412	16.48	≥0.5
	Middle	2437	16.48	≥0.5
	High	2462	16.48	≥0.5
802.11n20	Low	2412	17.76	≥0.5
	Middle	2437	17.68	≥0.5
	High	2462	17.6	≥0.5
802.11n40	Low	2422	35.52	≥0.5
	Middle	2437	35.52	≥0.5
	High	2452	35.52	≥0.5
BLE	Low	2402	0.7	≥0.5
	Middle	2440	0.7	≥0.5
	High	2480	0.7	≥0.5

802.11b Low Channel

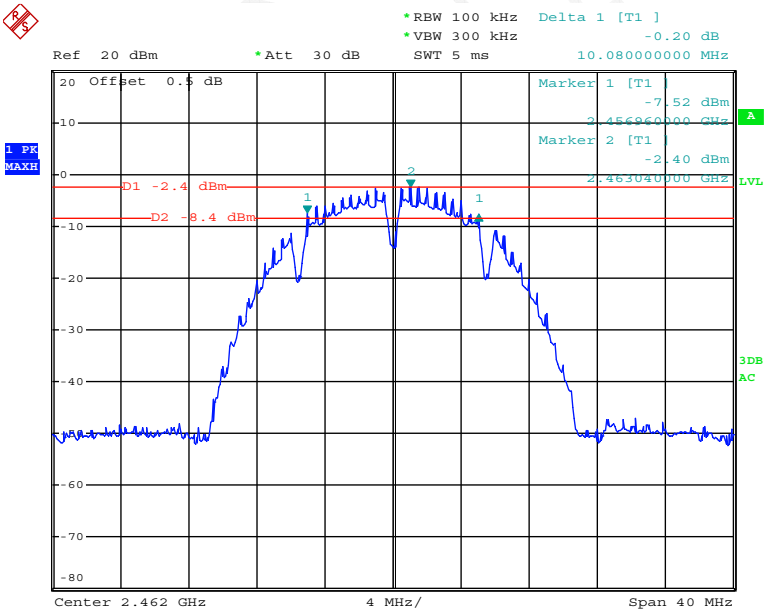


802.11b Middle Channel



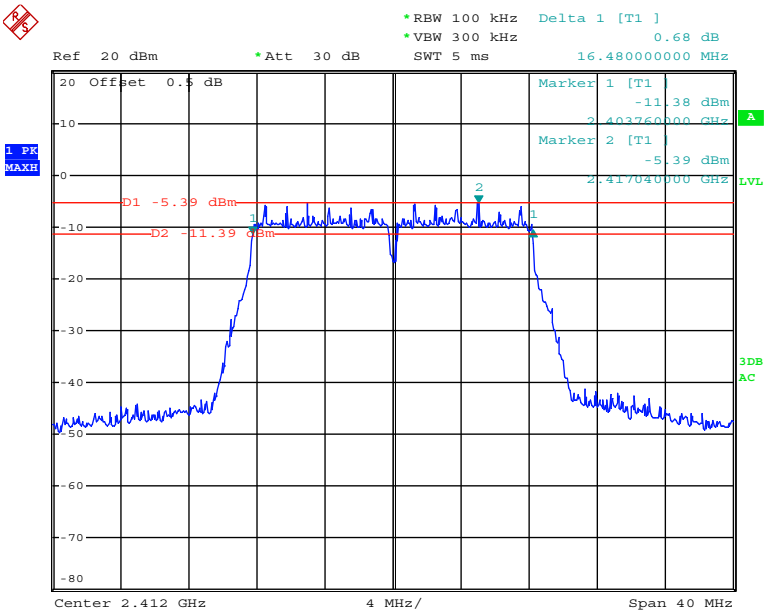
Date: 12.SEP.2016 22:41:36

802.11b High Channel



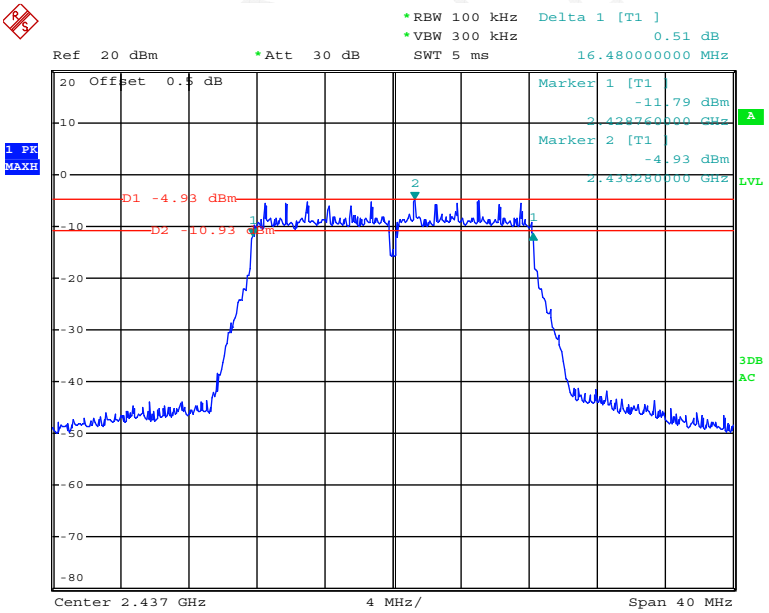
Date: 12.SEP.2016 22:43:42

802.11g Low Channel



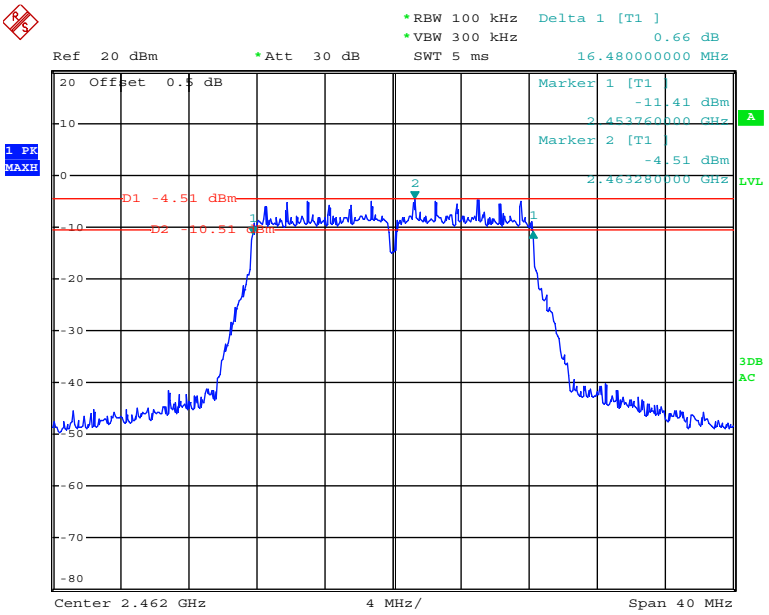
Date: 12.SEP.2016 21:38:04

802.11g Middle Channel



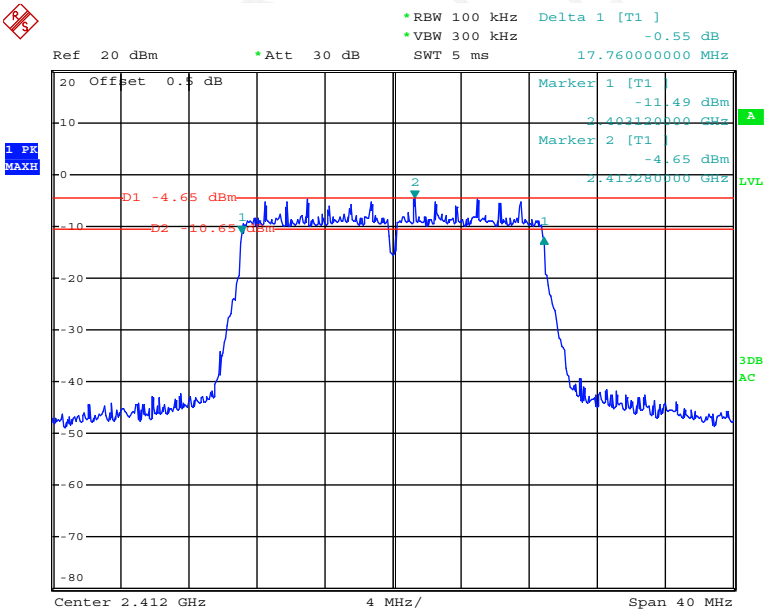
Date: 12.SEP.2016 21:39:49

802.11g High Channel



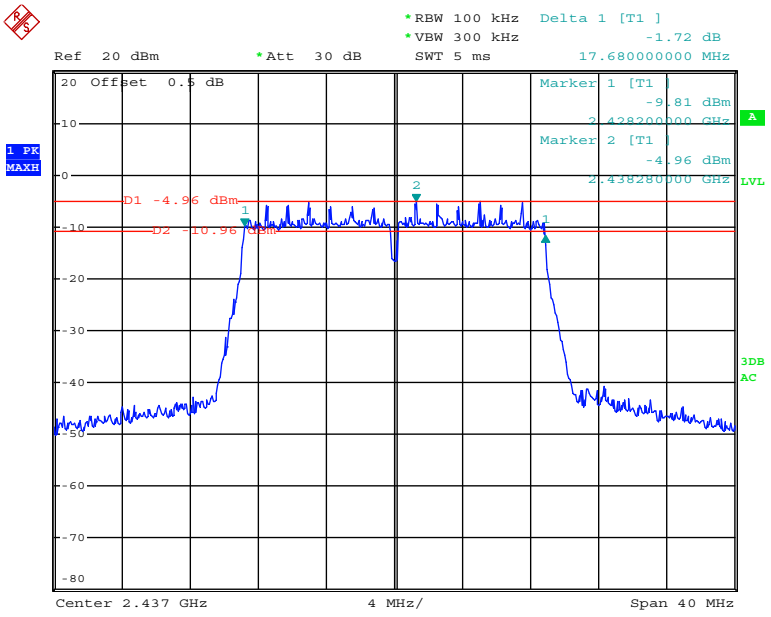
Date: 12.SEP.2016 22:37:28

802.11n ht20 Low Channel



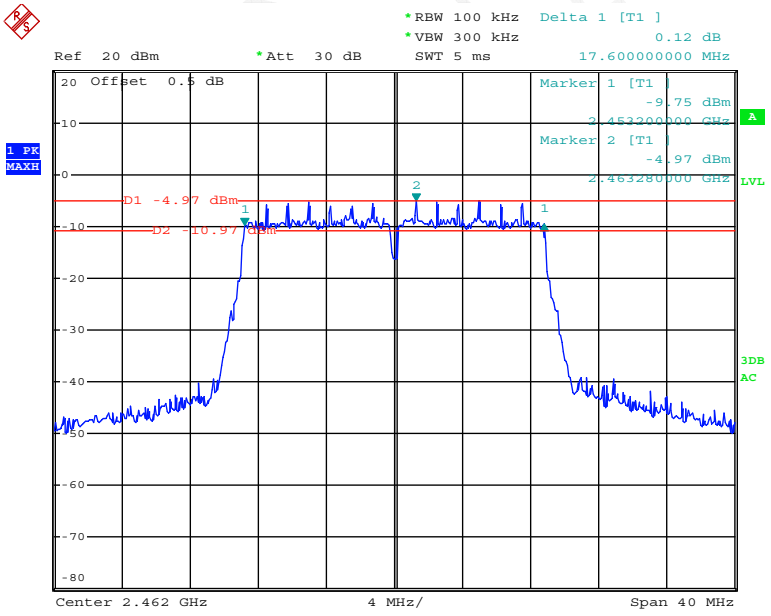
Date: 12.SEP.2016 21:32:54

802.11n ht20 Middle Channel



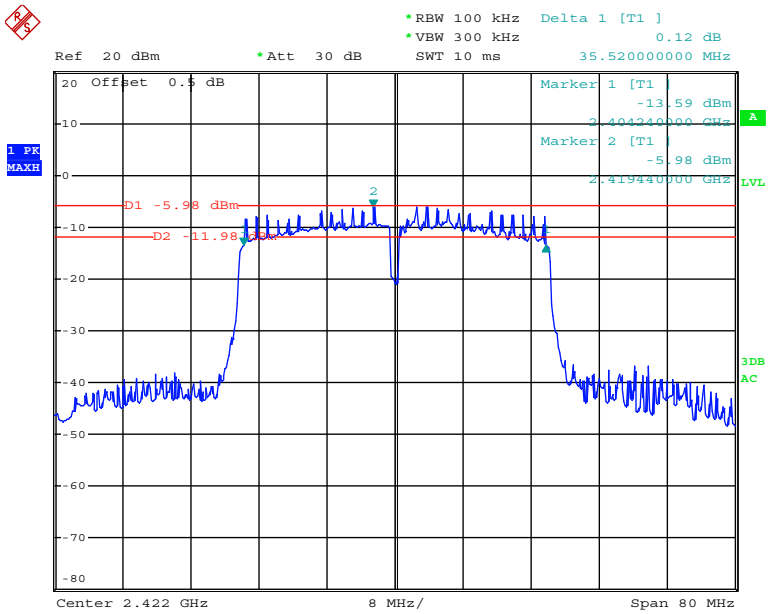
Date: 12.SEP.2016 21:34:49

802.11n ht20 High Channel



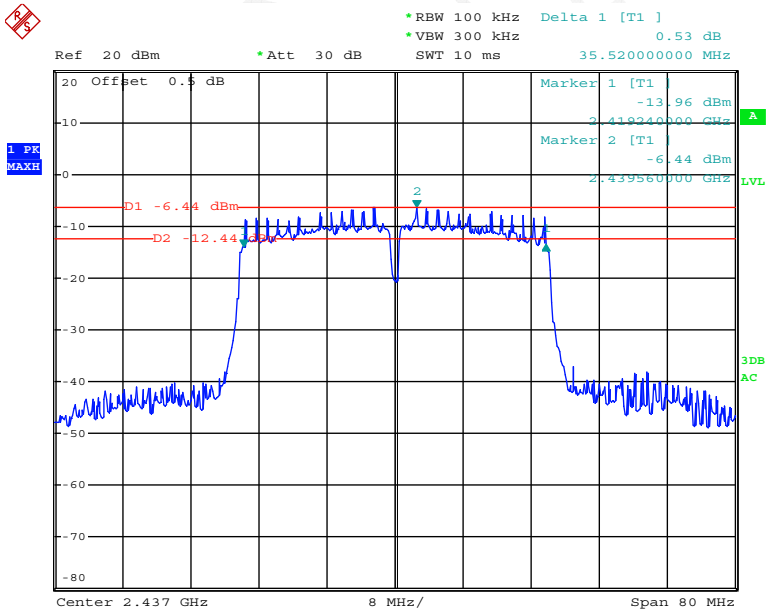
Date: 12.SEP.2016 21:36:02

802.11n ht40 Low Channel



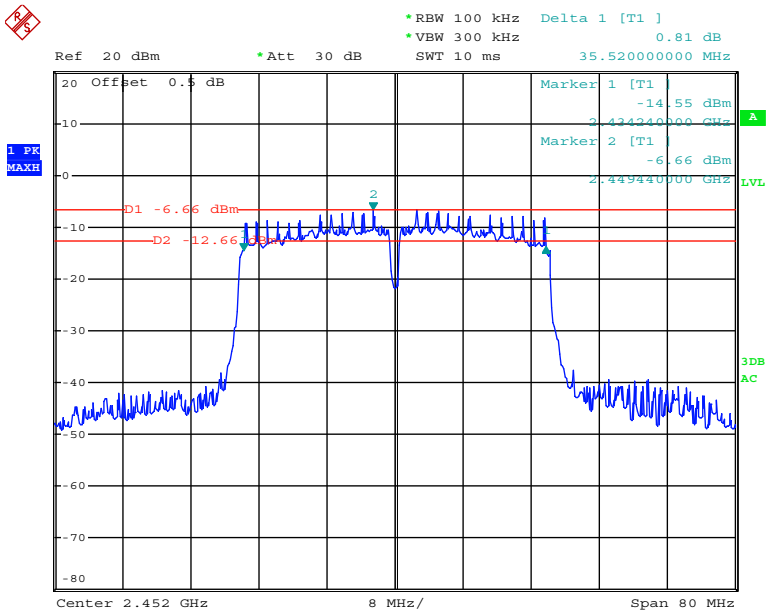
Date: 12.SEP.2016 21:26:15

802.11n ht40 Middle Channel



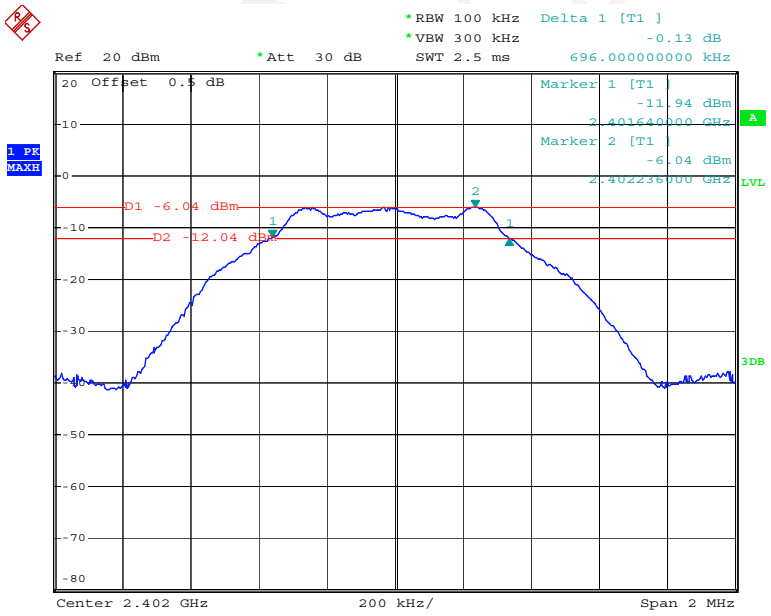
Date: 12.SEP.2016 21:23:30

802.11n ht40 High Channel



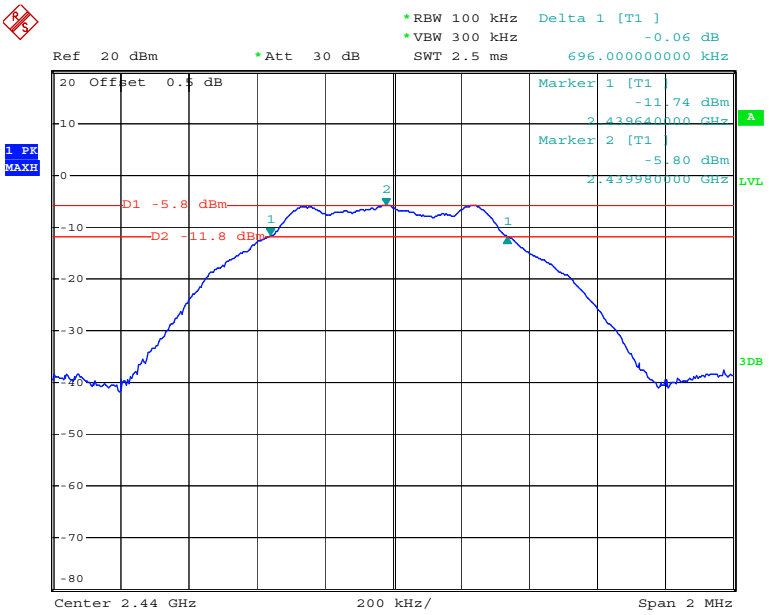
Date: 12.SEP.2016 21:21:29

BLE Low Channel



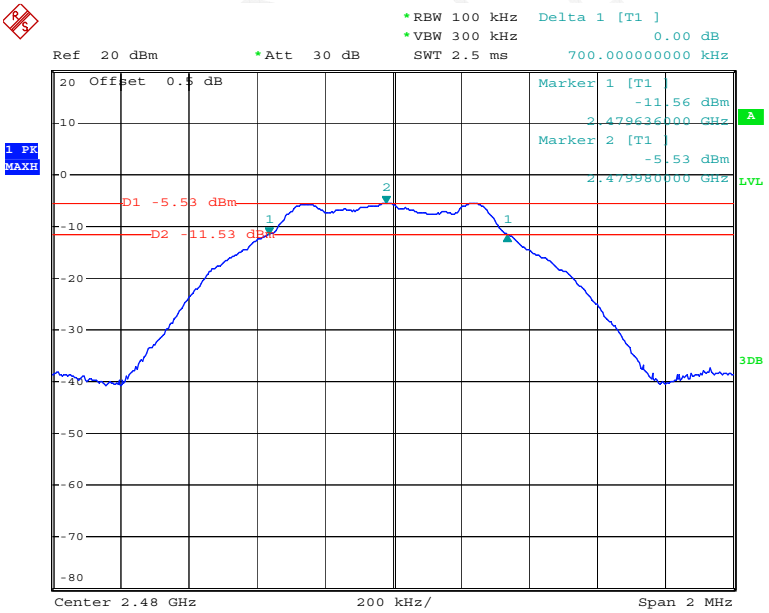
Date: 22.SEP.2016 20:31:10

BLE Middle Channel



Date: 22.SEP.2016 20:32:38

BLE High Channel



Date: 22.SEP.2016 20:33:40

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

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	2015-11-03	2016-11-03
Agilent	Wideband Power Sensor	N1921A	MY54170013	2015-11-03	2016-11-03
Agilent	P-Series Power Meter	N1912A	MY5000448	2015-11-03	2016-11-03
N/A	Coaxial Cable	0.1m	N/A	2016-05-06	2017-05-06
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2016-05-06	2017-05-06

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

Test Data

Environmental Conditions

Temperature:	26.4 °C
Relative Humidity:	34%
ATM Pressure:	100.1 kPa

** The testing was performed by Sun Zhong on 2016-09-14.*

Test Mode: Transmitting

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

Test mode	Channel	Frequency (MHz)	Max Peak Conducted Output Power (dBm)	Max Conducted Average Output Power (dBm)	Limit (dBm)
802.11b	Low	2412	10.53	9.68	30
	Middle	2437	9.65	9.24	30
	High	2462	10.02	9.25	30
802.11g	Low	2412	12.61	9.62	30
	Middle	2437	12.81	9.75	30
	High	2462	13.12	9.51	30
802.11n20	Low	2412	13.15	9.70	30
	Middle	2437	12.86	9.77	30
	High	2462	12.79	9.74	30
802.11n40	Low	2422	15.42	8.57	30
	Middle	2437	14.94	8.67	30
	High	2452	14.63	8.4	30
BLE	Low	2402	-5.06	/	30
	Middle	2440	-4.75	/	30
	High	2480	-4.45	/	30

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
Agilent	Spectrum Analyzer	E4440A	SG43360054	2015-11-23	2016-11-22
N/A	Coaxial Cable	0.1m	N/A	2016-05-06	2017-05-06
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2016-05-06	2017-05-06

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

Test Data

Environmental Conditions

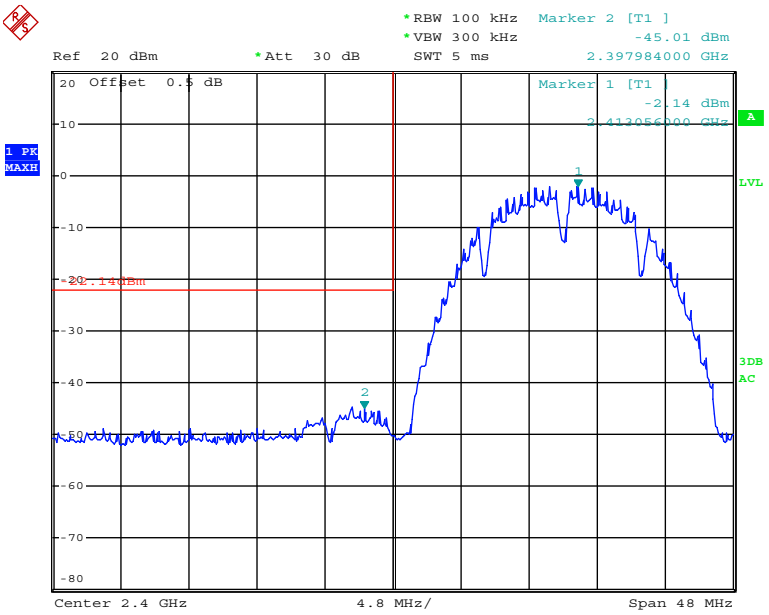
Temperature:	25.8~26.1 °C
Relative Humidity:	32~35%
ATM Pressure:	100.7~100.9 kPa

** The testing was performed by Sun Zhong from 2016-09-12 to 2016-09-22.*

Test mode: Transmitting

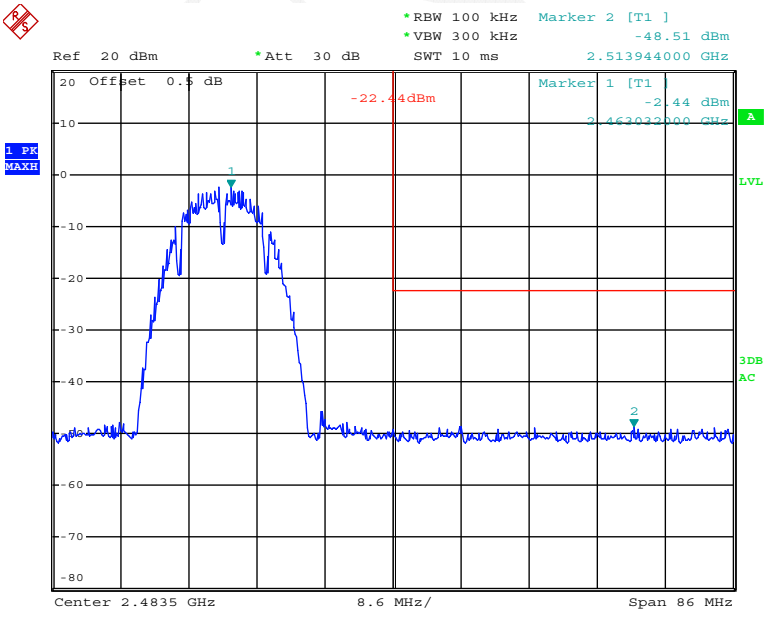
Test Result: Compliant. Please refer to following plots.

802.11b: Band Edge, Left Side



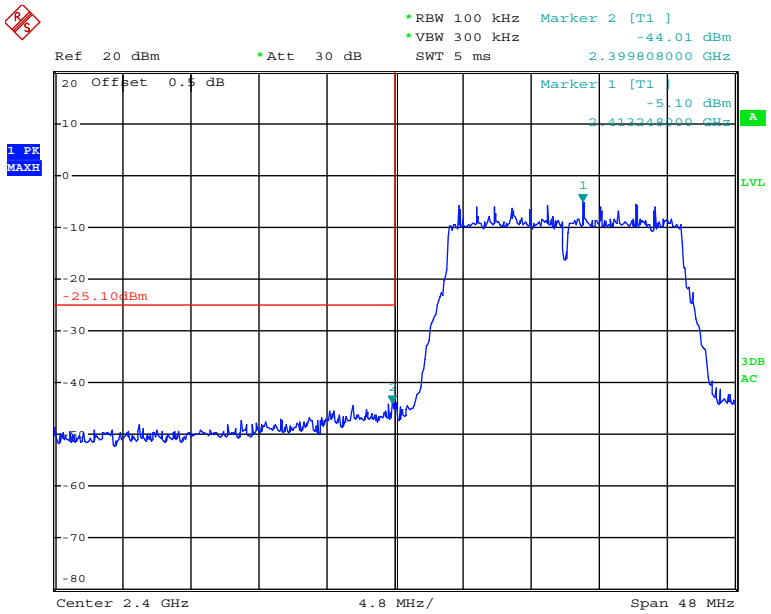
Date: 12.SEP.2016 22:40:45

802.11b: Band Edge, Right Side



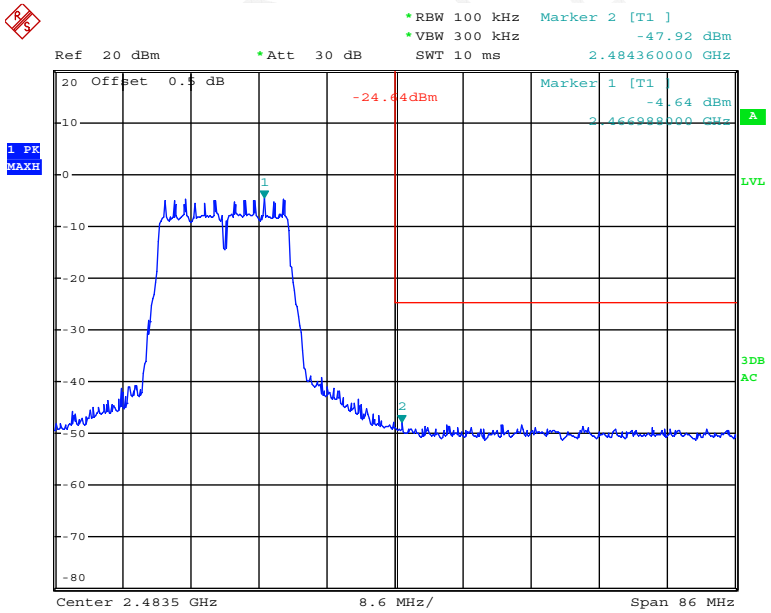
Date: 12.SEP.2016 22:44:51

802.11g: Band Edge, Left Side



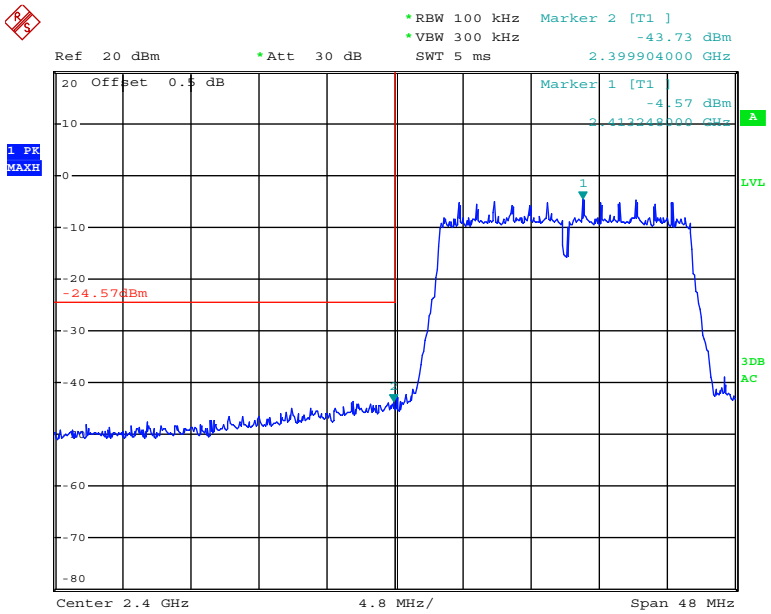
Date: 12.SEP.2016 21:38:57

802.11g: Band Edge, Right Side



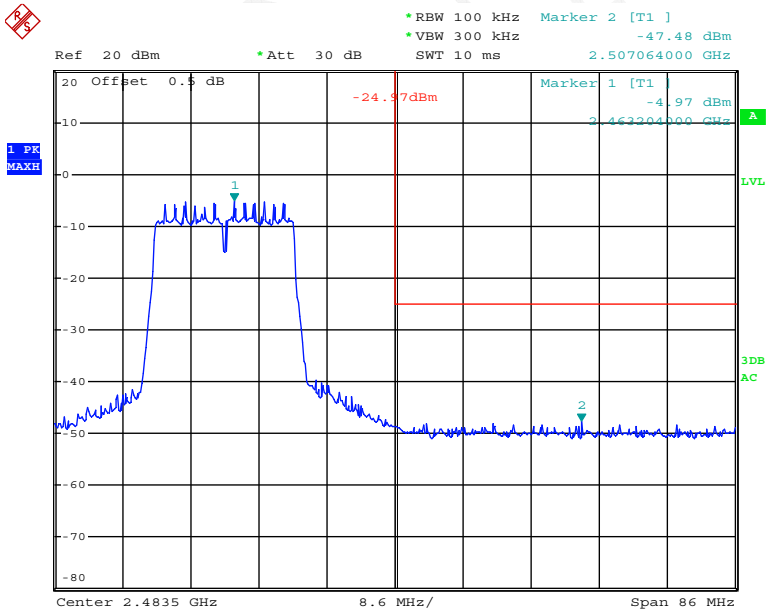
Date: 12.SEP.2016 22:38:46

802.11n ht20 Band Edge, Left Side



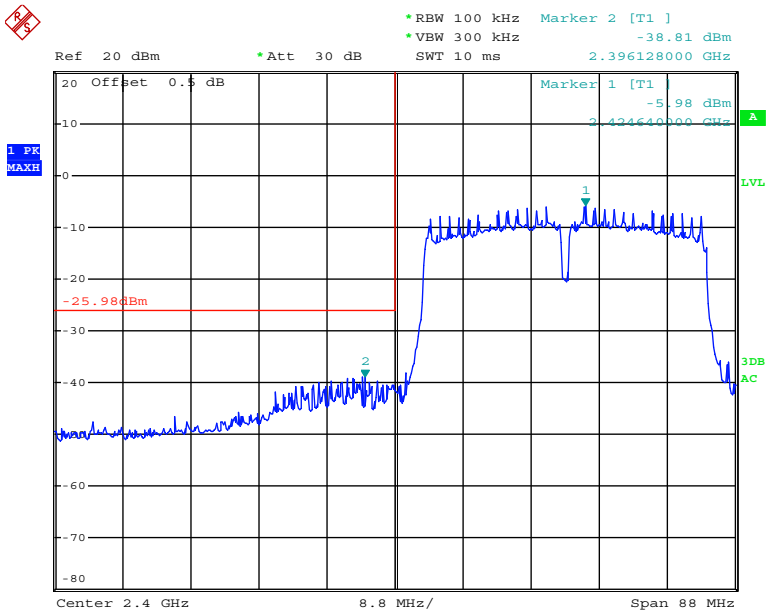
Date: 12.SEP.2016 21:33:55

802.11n ht20 Band Edge, Right Side



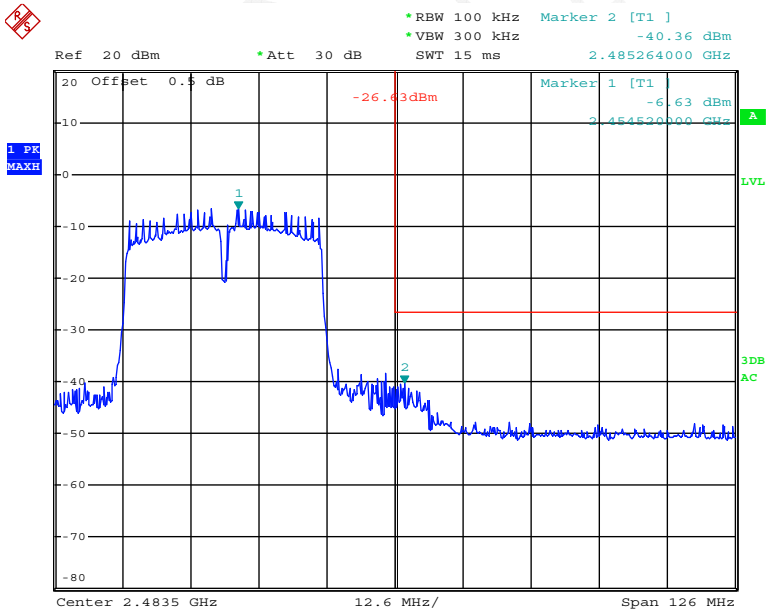
Date: 12.SEP.2016 21:37:03

802.11n ht40 Band Edge, Left Side



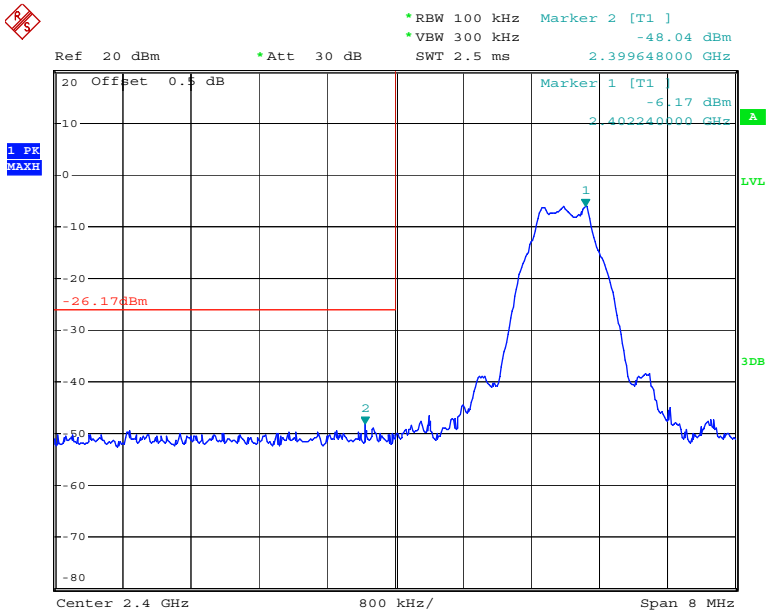
Date: 12.SEP.2016 21:27:10

802.11n ht40 Band Edge, Right Side



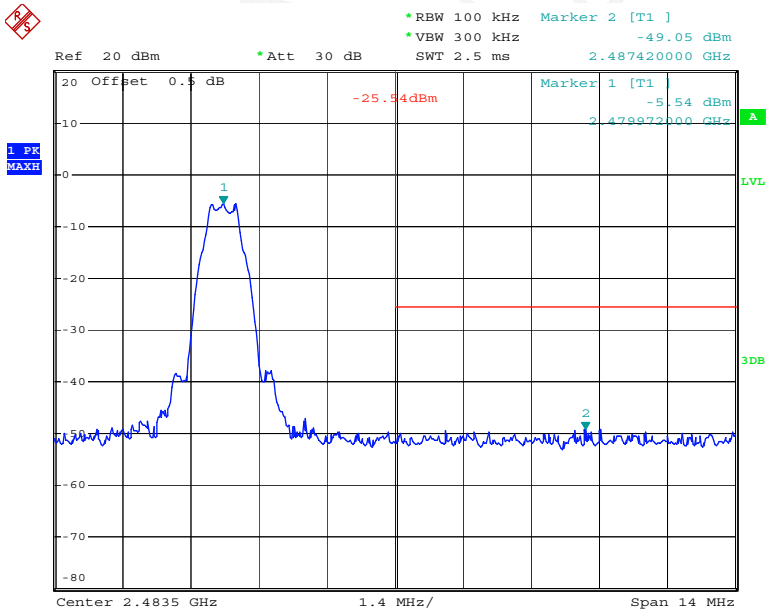
Date: 12.SEP.2016 21:22:23

BLE Band Edge， Left Side



Date: 22.SEP.2016 20:32:09

BLE Band Edge, Right Side



Date: 22.SEP.2016 20:34:34

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

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
Agilent	Spectrum Analyzer	E4440A	SG43360054	2015-11-23	2016-11-22
N/A	Coaxial Cable	0.1m	N/A	2016-05-06	2017-05-06
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2016-05-06	2017-05-06

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

Test Data

Environmental Conditions

Temperature:	25.8~26.1 °C
Relative Humidity:	32~35%
ATM Pressure:	100.7~100.9 kPa

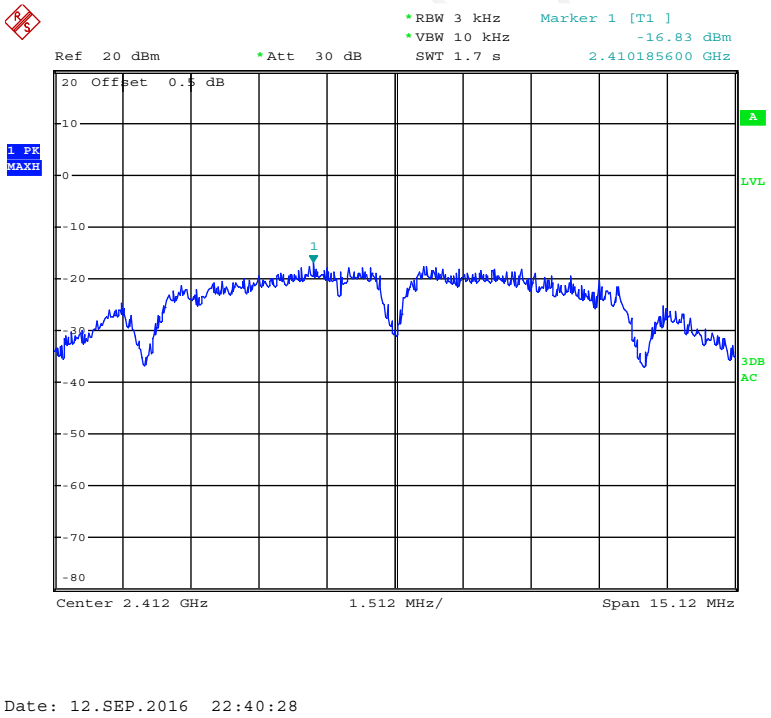
** The testing was performed by Sun Zhong from 2016-09-12 to 2016-09-22.*

Test Mode: Transmitting

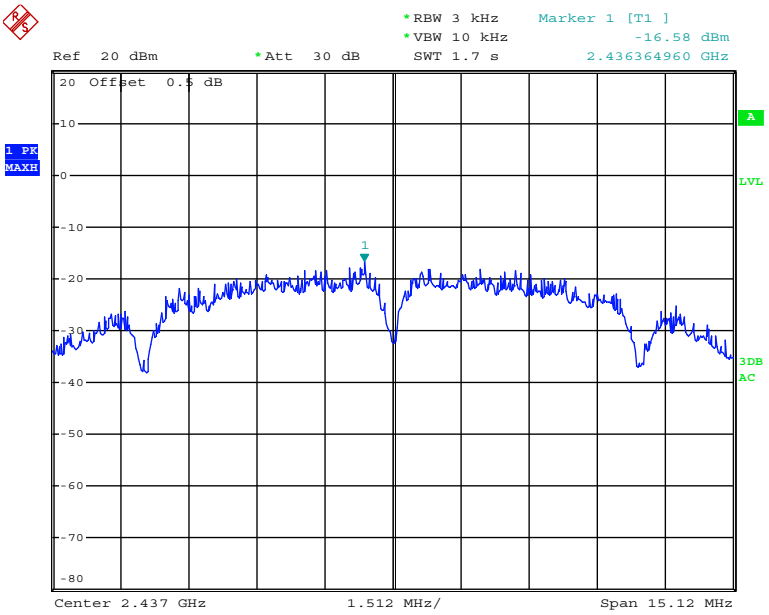
Test Result: Compliant. Please refer to the following table and plots

Test mode	Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
802.11b	Low	2412	-16.83	≤8
	Middle	2437	-16.58	≤8
	High	2462	-16.94	≤8
802.11g	Low	2412	-18.58	≤8
	Middle	2437	-19.55	≤8
	High	2462	-18.84	≤8
802.11n20	Low	2412	-19.57	≤8
	Middle	2437	-19.43	≤8
	High	2462	-19.32	≤8
802.11n40	Low	2422	-20.18	≤8
	Middle	2437	-20.81	≤8
	High	2452	-21.1	≤8
BLE	Low	2402	-20.94	≤8
	Middle	2440	-20.65	≤8
	High	2480	-20.36	≤8

Power Spectral Density, 802.11b Low Channel

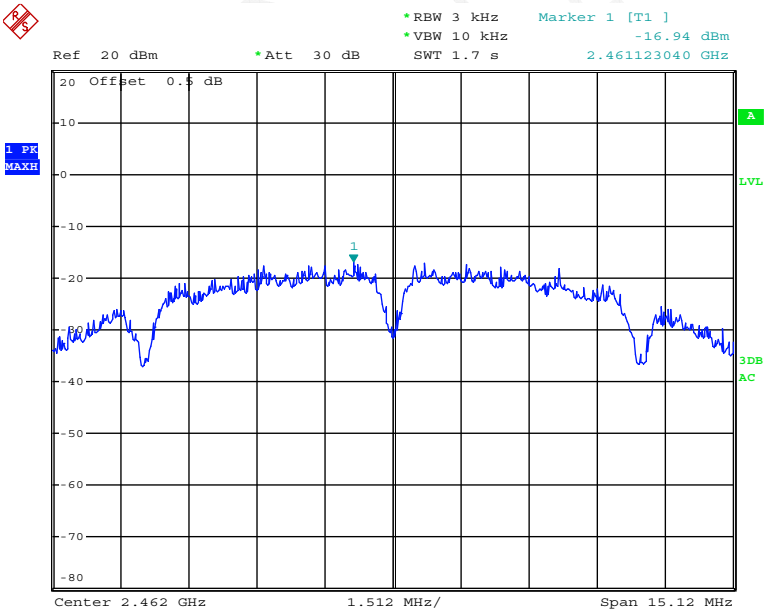


Power Spectral Density, 802.11b Middle Channel



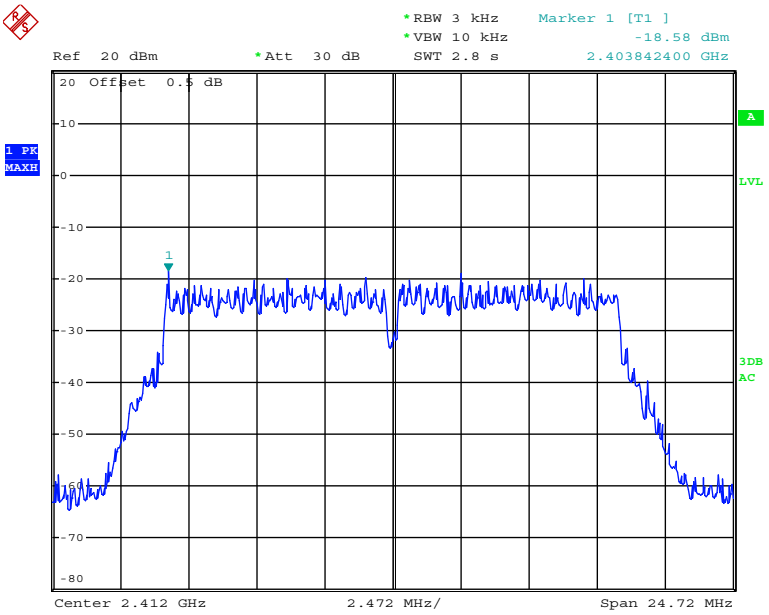
Date: 12.SEP.2016 22:42:23

Power Spectral Density, 802.11b High Channel



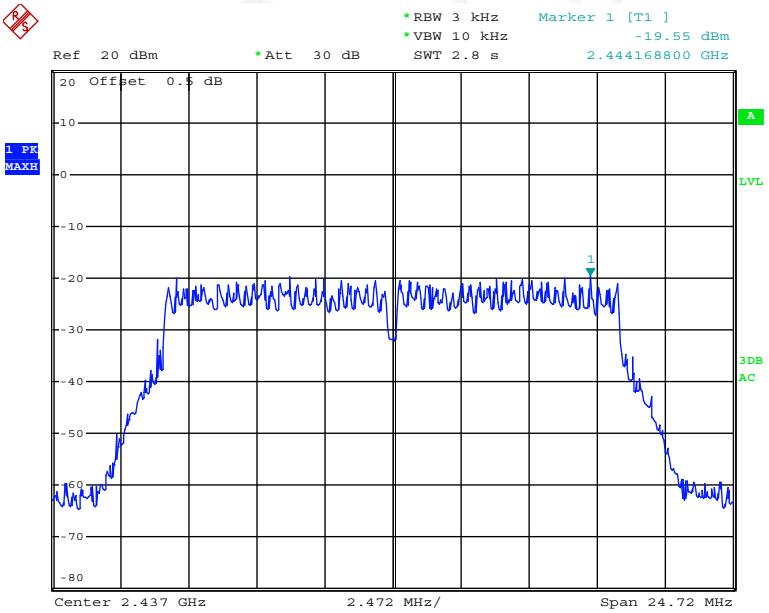
Date: 12.SEP.2016 22:44:33

Power Spectral Density, 802.11g Low Channel



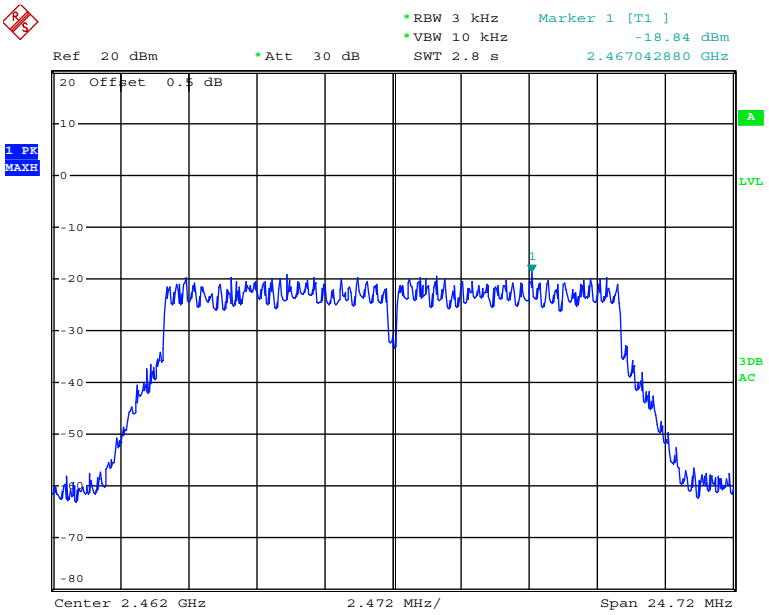
Date: 12.SEP.2016 22:45:59

Power Spectral Density, 802.11g Middle Channel



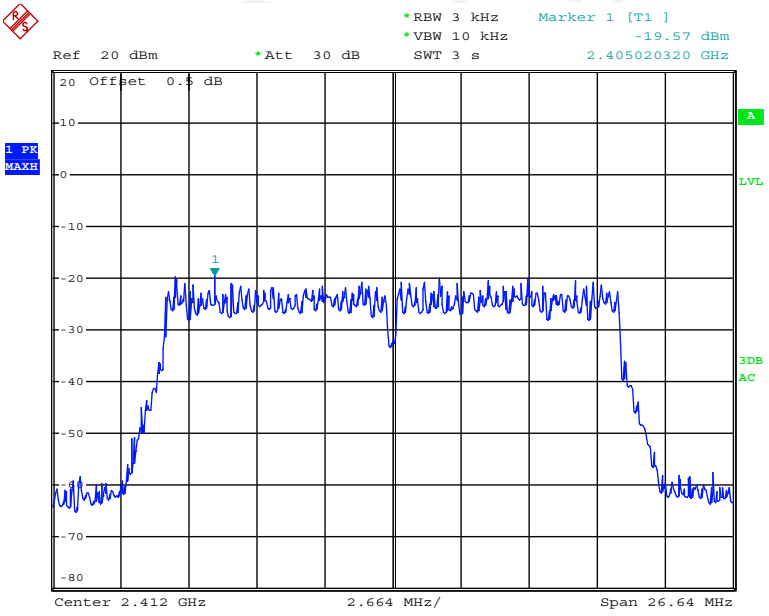
Date: 12.SEP.2016 22:46:44

Power Spectral Density, 802.11g High Channel



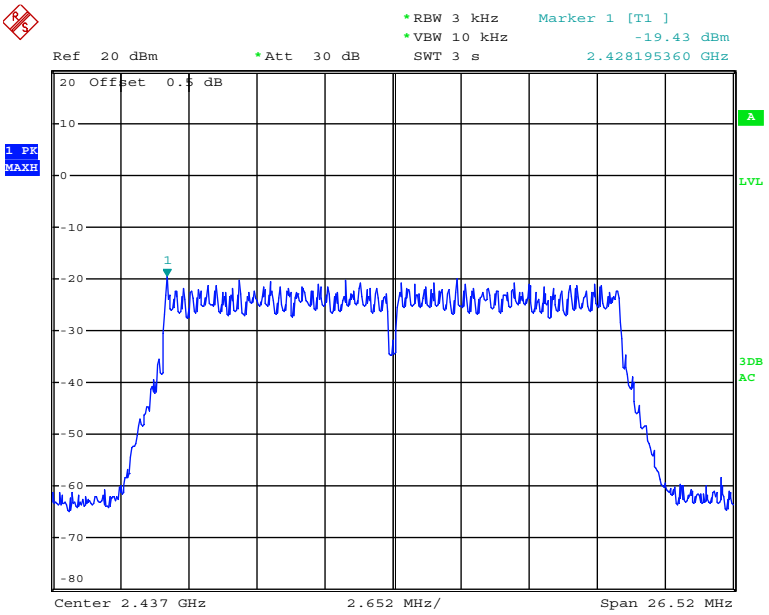
Date: 12.SEP.2016 22:38:22

Power Spectral Density, 802.11n ht20 Low Channel



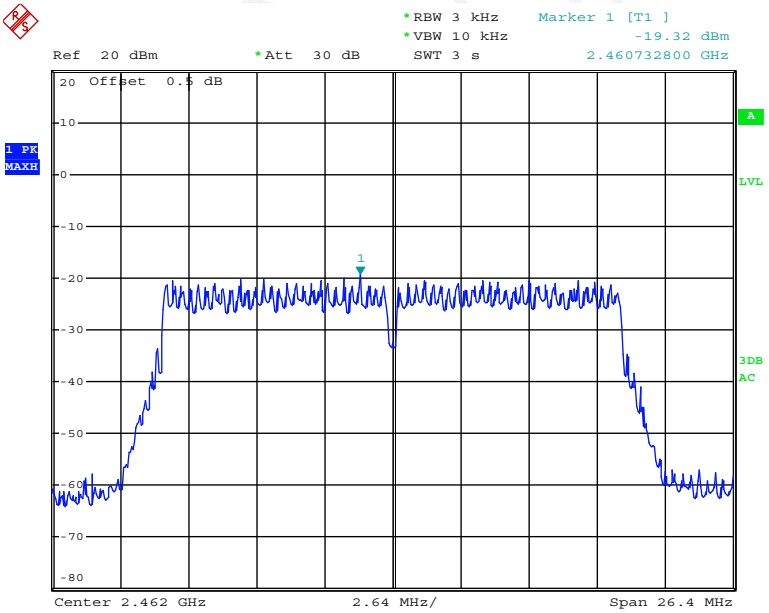
Date: 12.SEP.2016 22:47:26

Power Spectral Density, 802.11n ht20 Middle Channel



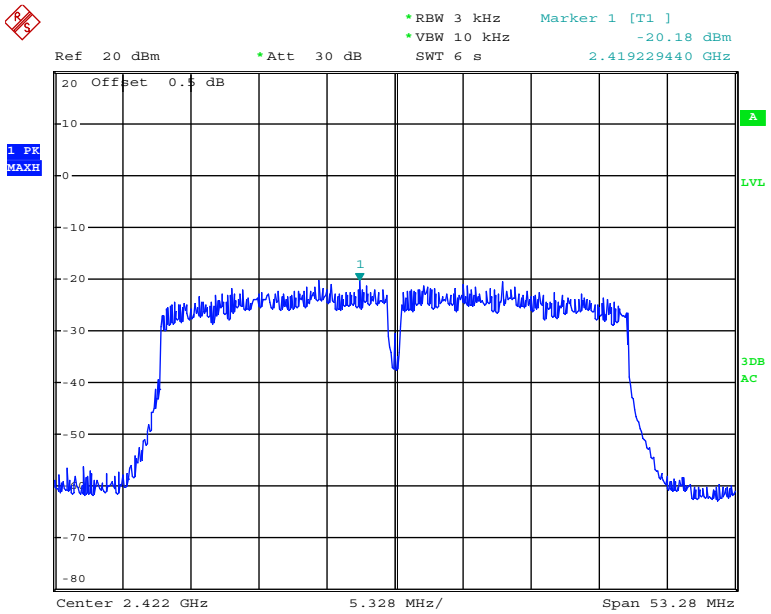
Date: 12.SEP.2016 22:48:20

Power Spectral Density, 802.11n ht20 High Channel



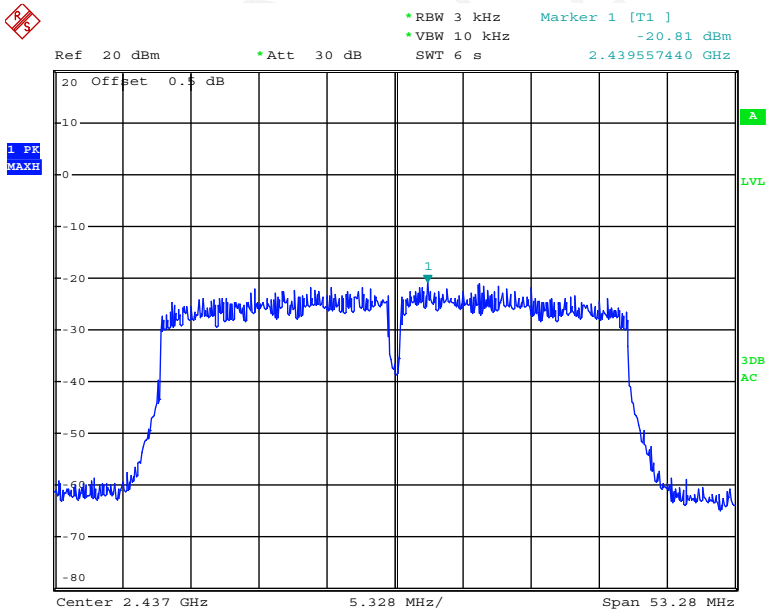
Date: 12.SEP.2016 22:49:03

Power Spectral Density, 802.11n ht40 Low Channel



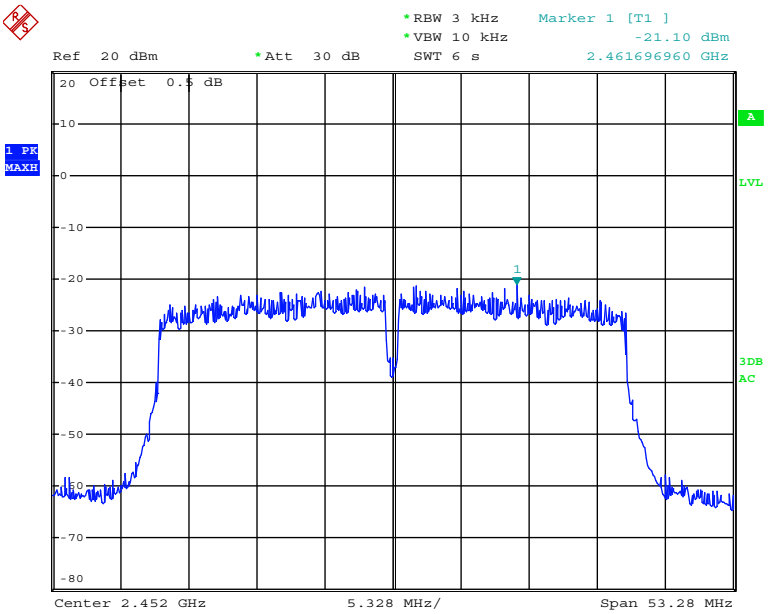
Date: 12.SEP.2016 22:50:12

Power Spectral Density, 802.11n ht40 Middle Channel



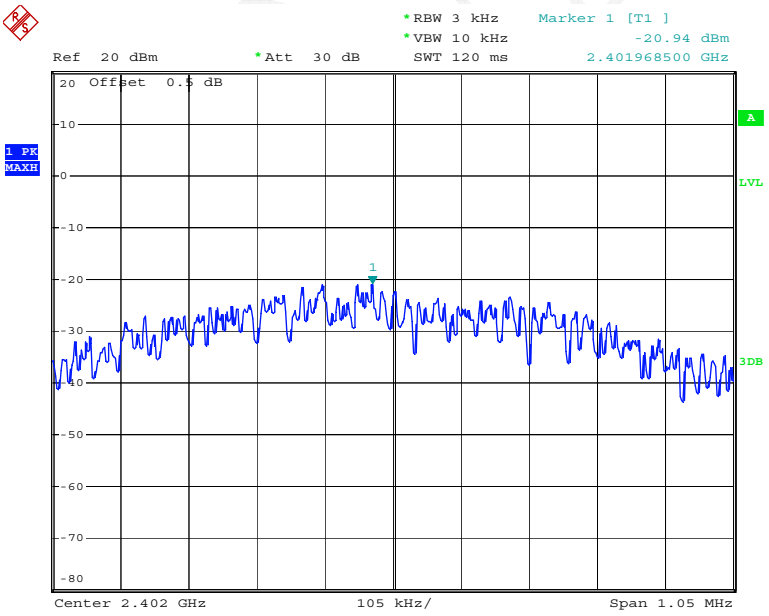
Date: 12.SEP.2016 22:51:21

Power Spectral Density, 802.11n ht40 High Channel



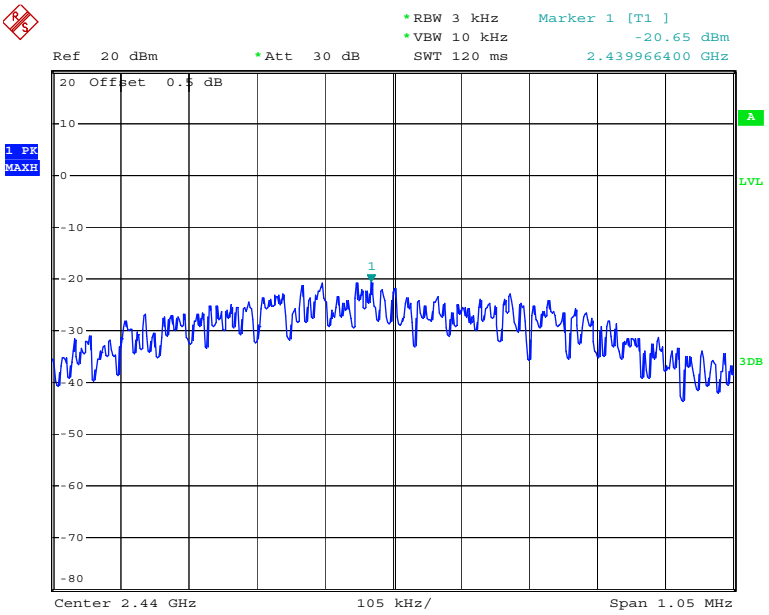
Date: 12.SEP.2016 22:52:13

Power Spectral Density, BLE Low Channel



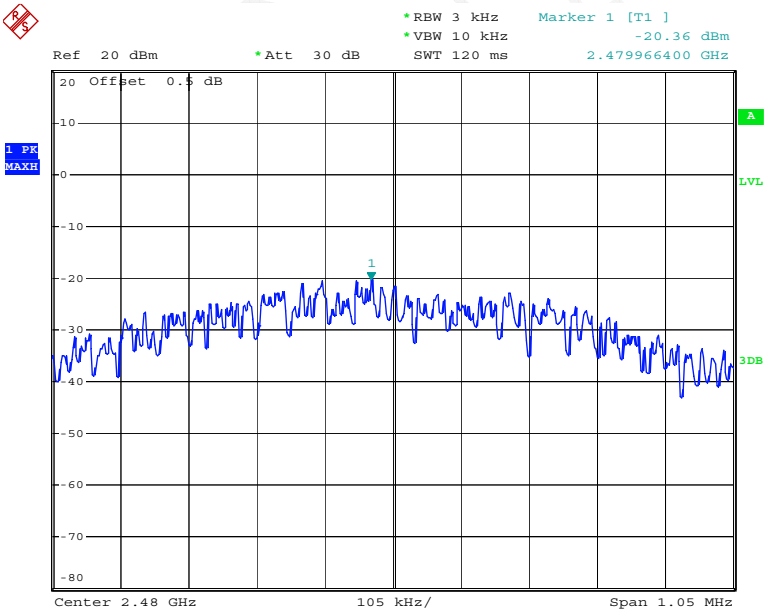
Date: 22.SEP.2016 20:31:46

Power Spectral Density, BLE Middle Channel



Date: 22.SEP.2016 20:33:13

Power Spectral Density, BLE High Channel



Date: 22.SEP.2016 20:34:16

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