FCC PART 15.247

TEST REPORT

For

Shenzhen Topwell Wireless Communication Co Ltd

5F,10Building,Changyuan New Material Port, No.2, Middle Road 1, High Tech Park, Nanshan District, Shenzhen, China

FCC ID: 2AHDDPCDPH3501

Report Type:	**Product Type:**
Original Report	smart phone

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Report Number:	RDG160316008-00C
Report Date:	2016-03-22
Reviewed By:	Jerry Zhang EMC Manager
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan).

TABLE OF CONTENTS

GENERAL INFORMATION **4**
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) 4
OBJECTIVE 4
RELATED SUBMITTAL(S)/GRANT(S) 4
TEST METHODOLOGY 4
TEST FACILITY 4
SYSTEM TEST CONFIGURATION **5**
DESCRIPTION OF TEST CONFIGURATION 5
EQUIPMENT MODIFICATIONS 5
EUT EXERCISE SOFTWARE 6
EXTERNAL CABLE 6
BLOCK DIAGRAM OF TEST SETUP 7
SUMMARY OF TEST RESULTS **8**
FCC §15.247 (i) & §1.1310 & §2.1093- RF EXPOSURE **9**
APPLICABLE STANDARD 9
FCC §15.203 - ANTENNA REQUIREMENT **10**
APPLICABLE STANDARD 10
ANTENNA CONNECTOR CONSTRUCTION 10
FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS **11**
APPLICABLE STANDARD 11
MEASUREMENT UNCERTAINTY 11
EUT SETUP 11
EMI TEST RECEIVER SETUP 12
TEST PROCEDURE 12
CORRECTED AMPLITUDE & MARGIN CALCULATION 12
TEST EQUIPMENT LIST AND DETAILS 13
TEST RESULTS SUMMARY 13
TEST DATA 13
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS **18**
APPLICABLE STANDARD 18
MEASUREMENT UNCERTAINTY 18
EUT SETUP 18
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP 19
TEST PROCEDURE 19
CORRECTED AMPLITUDE & MARGIN CALCULATION 20
TEST EQUIPMENT LIST AND DETAILS 20
TEST RESULTS SUMMARY 20
TEST DATA 20
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH **31**
APPLICABLE STANDARD 31
TEST PROCEDURE 31
TEST EQUIPMENT LIST AND DETAILS 31
TEST DATA 31
FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER **39**

APPLICABLE STANDARD 39
TEST PROCEDURE 39
TEST EQUIPMENT LIST AND DETAILS.....39
TEST DATA 39

FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE.....41

APPLICABLE STANDARD 41
TEST PROCEDURE 41
TEST EQUIPMENT LIST AND DETAILS.....41
TEST DATA 41

FCC §15.247(e) - POWER SPECTRAL DENSITY 46

APPLICABLE STANDARD 46
TEST PROCEDURE 46
TEST EQUIPMENT LIST AND DETAILS.....46
TEST DATA 46

FINAL

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Shenzhen Topwell Wireless Communication Co Ltd*'s product, model number: *PCD PH3501 (FCC ID: 2AHDDPCDPH3501)* (the "EUT") in this report was a *smart phone* , which was measured approximately: 11.9cm (L) x 6.2cm (W) x 1.0cm (H), rated input voltage: DC 3.7V rechargeable Li-ion battery or DC 5V charging from adapter.

Adapter information:
MODELO: PCD PH3501
INPUT: AC 100-240V~ 50/60Hz 0.15A
OUTPUT: DC 5V, 500mA

All measurement and test data in this report was gathered from production sample serial number: 160316008 (Assigned by BACL, Dongguan). The EUT was received on 2016-03-17.

Objective

This report is prepared on behalf of *Shenzhen Topwell Wireless Communication Co Ltd* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communications Commission's rules

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

Related Submittal(s)/Grant(s)

FCC Part 15B JBP submissions with FCC ID: 2AHDDPCDPH3501.
FCC Part 15C DSS submissions with FCC ID: 2AHDDPCDPH3501.
FCC Part 22H, 24E PCE submissions with FCC ID: 2AHDDPCDPH3501.

Test Methodology

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

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

Test Facility

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

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

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

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

For 802.11b, 802.11g, and 802.11n ht20 modes were tested with channel 1, 6 and 11.

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

For WLAN, The worst condition (maximum power with 100% duty cycle) was setting by the engineering mode as following table:

Test Mode	Test Software Version	Engineering Mode		
802.11b	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	1Mbps	1Mbps	1Mbps
	Power Level Setting	11.5	11.5	11.5
802.11g	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting	11.5	11.5	12
802.11n ht20	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	9.5	9.5	9.5

For Bluetooth LE, The engineering mode configured the maximum power as default setting.

External Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB Cable	No	No	1.00	USB Port of Adapter	EUT
Earphone Cable	No	No	1.22	EUT	Earphone

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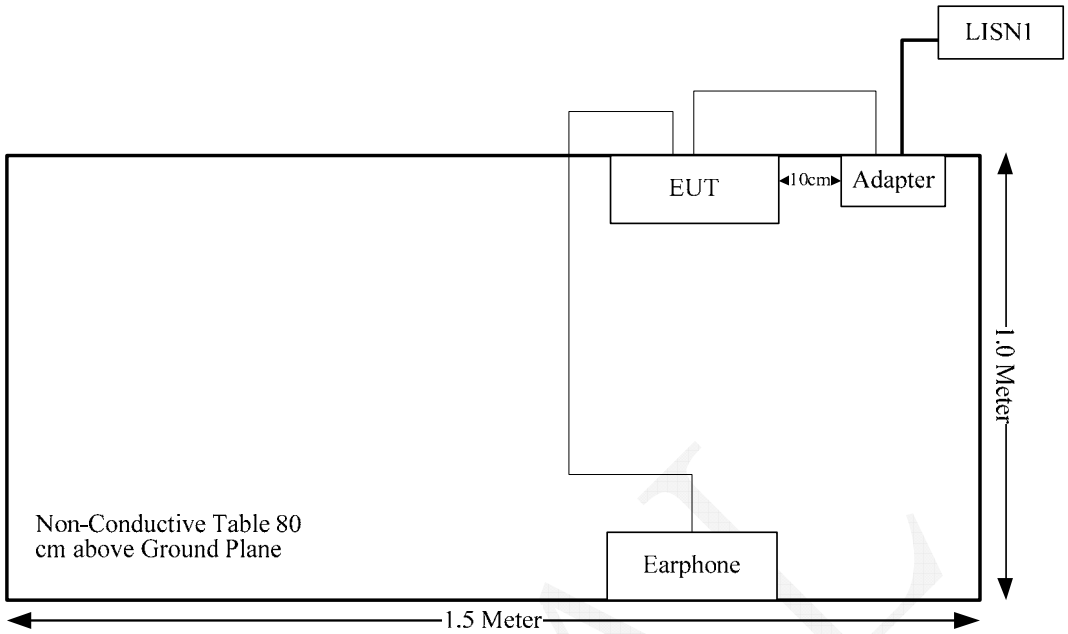
Block Diagram of Test Setup



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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

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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 Wi-Fi mode

Compliant, please refer to the SAR report No: RDG160316008-20.

For bluetooth LE mode

The Max tune-up power is -2.1 dBm (0.62mW).
[(max. power of channel, mW)/(min. test separation distance, mm)][√f(GHz)]
= 0.62/5*(√2.48) = 0.2 < 3.0

So the stand-alone BLE 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 Wi-Fi and the antenna gain is -0.5 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliance.

FINAL

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

Measurement Uncertainty

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

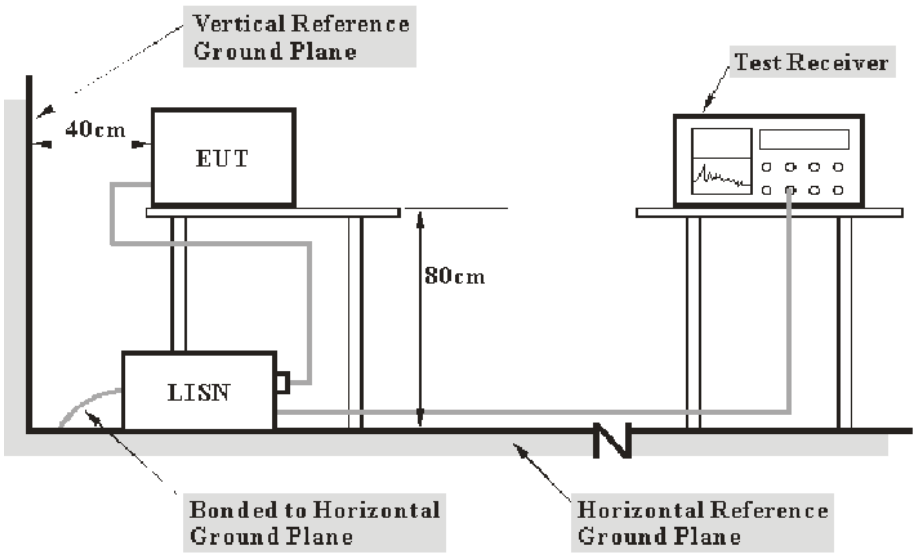
If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
– non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of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

Based on CISPR 16-4-2-2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.12 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	2015-10-20	2016-10-20
R&S	L.I.S.N	ESH2-Z5	892107/021	2015-06-09	2016-06-09
R&S	Two-line V-network	ENV 216	3560.6550.12	2015-11-26	2016-11-25
N/A	Coaxial Cable	1.8m	N/A	2015-05-06	2016-05-06
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, 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:

14.0 dB at **0.472507 MHz** in the **Neutral** conducted mode

Test Data

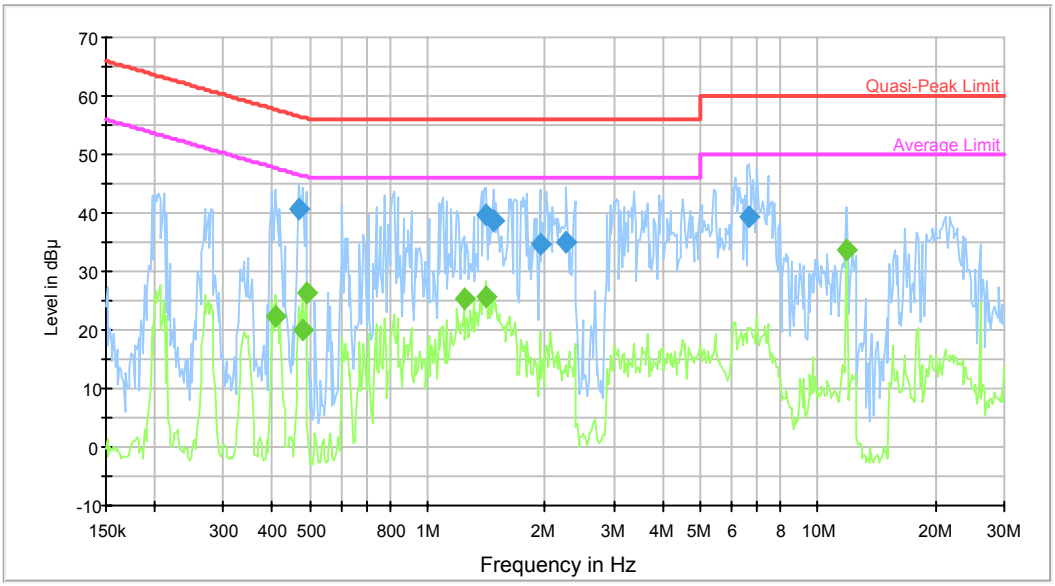
Environmental Conditions

Temperature:	24.2 °C
Relative Humidity:	49 %
ATM Pressure:	100.9 kPa

The testing was performed by Dean Liu on 2016-03-21.

Test Mode: Transmitting (Wi-Fi)

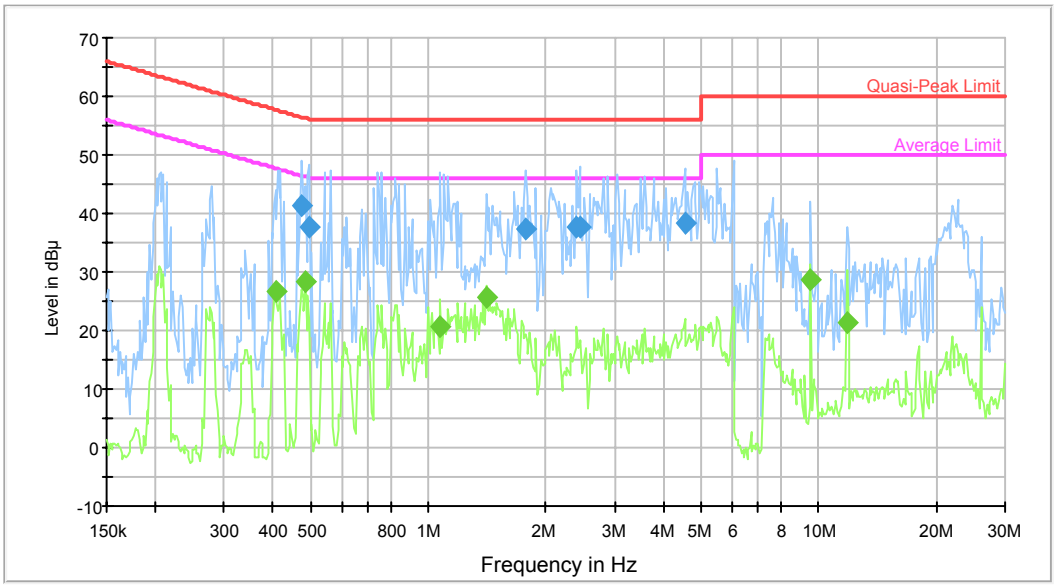
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.468757	40.7	9.000	L1	9.8	15.8	56.5	Compliance
1.407671	39.7	9.000	L1	9.8	16.3	56.0	Compliance
1.476605	38.7	9.000	L1	9.8	17.3	56.0	Compliance
1.936076	34.6	9.000	L1	9.8	21.4	56.0	Compliance
2.270560	35.0	9.000	L1	9.8	21.0	56.0	Compliance
6.657403	39.3	9.000	L1	9.9	20.7	60.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.406123	22.4	9.000	L1	9.8	25.3	47.7	Compliance
0.476287	20.0	9.000	L1	9.8	26.4	46.4	Compliance
0.487810	26.2	9.000	L1	9.8	20.0	46.2	Compliance
1.239175	25.2	9.000	L1	9.8	20.8	46.0	Compliance
1.407671	25.7	9.000	L1	9.8	20.3	46.0	Compliance
11.815800	33.6	9.000	L1	10.0	16.4	50.0	Compliance

AC120 V, 60 Hz, Neutral:

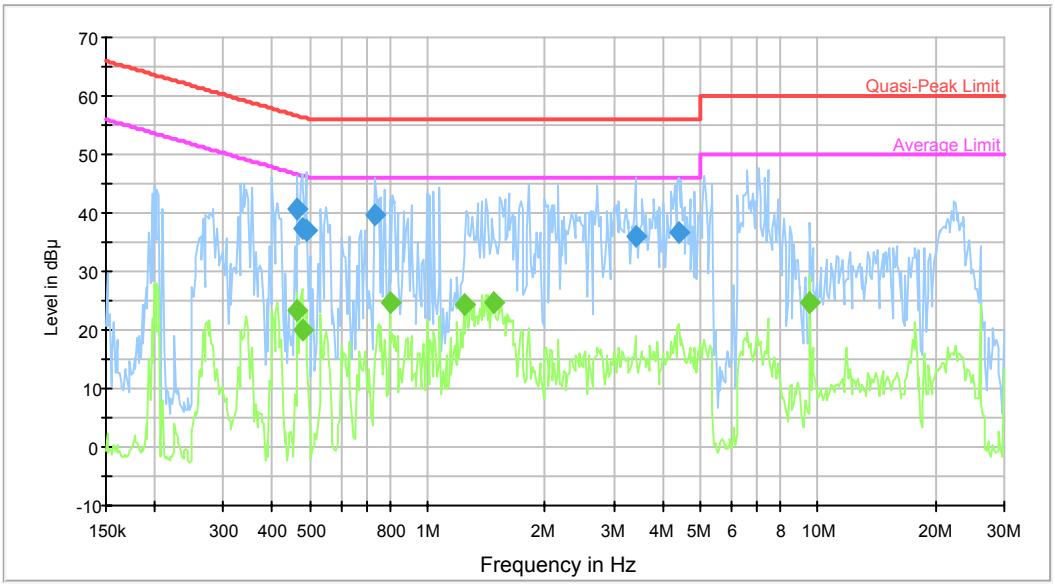


Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.472507	41.4	9.000	N	9.7	15.1	56.5	Compliance
0.495646	37.7	9.000	N	9.7	18.4	56.1	Compliance
1.773603	37.3	9.000	N	9.8	18.7	56.0	Compliance
2.400804	37.5	9.000	N	9.8	18.5	56.0	Compliance
2.439371	37.6	9.000	N	9.8	18.4	56.0	Compliance
4.541500	38.5	9.000	N	9.9	17.5	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.406123	26.7	9.000	N	9.7	21.0	47.7	Compliance
0.483938	28.4	9.000	N	9.7	17.9	46.3	Compliance
1.073601	20.7	9.000	N	9.8	25.3	46.0	Compliance
1.407671	25.6	9.000	N	9.8	20.4	46.0	Compliance
9.528593	28.6	9.000	N	10.0	21.4	50.0	Compliance
11.815800	21.4	9.000	N	10.0	28.6	50.0	Compliance

Test Mode: Transmitting (BLE)

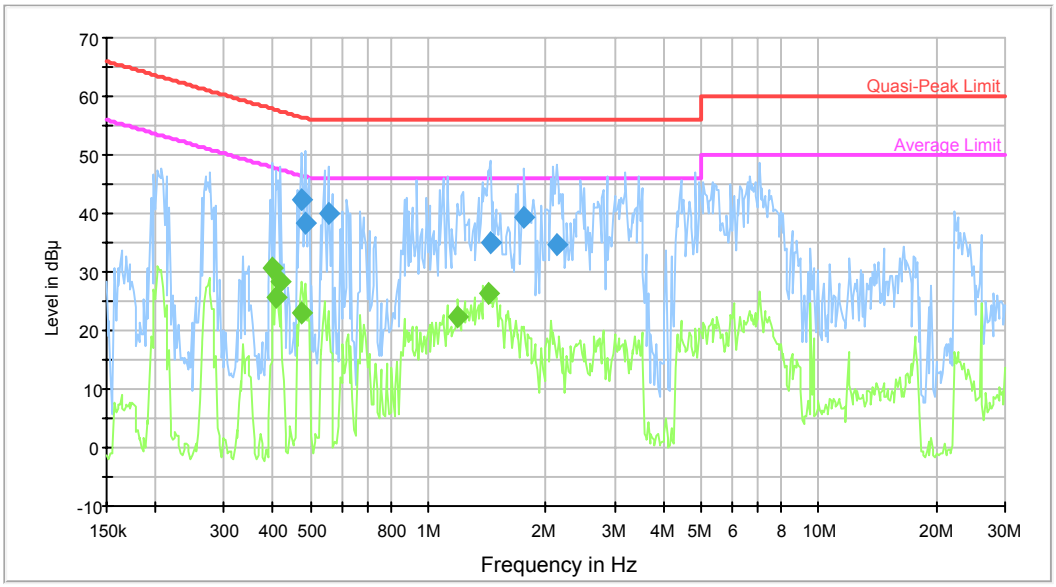
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.465037	40.8	9.000	L1	9.8	15.8	56.6	Compliance
0.476287	37.3	9.000	L1	9.8	19.1	56.4	Compliance
0.487810	37.0	9.000	L1	9.8	19.2	56.2	Compliance
0.732382	39.6	9.000	L1	9.8	16.4	56.0	Compliance
3.408946	35.9	9.000	L1	9.8	20.1	56.0	Compliance
4.399032	36.7	9.000	L1	9.9	19.3	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.465037	23.3	9.000	L1	9.8	23.3	46.6	Compliance
0.476287	20.0	9.000	L1	9.8	26.4	46.4	Compliance
0.799472	24.8	9.000	L1	9.8	21.2	46.0	Compliance
1.239175	24.5	9.000	L1	9.8	21.5	46.0	Compliance
1.476605	24.6	9.000	L1	9.8	21.4	46.0	Compliance
9.528593	24.6	9.000	L1	10.0	25.4	50.0	Compliance

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.472507	42.5	9.000	N	9.7	14.0	56.5	Compliance
0.483938	38.4	9.000	N	9.7	17.9	56.3	Compliance
0.554139	40.1	9.000	N	9.7	15.9	56.0	Compliance
1.441726	35.2	9.000	N	9.8	20.8	56.0	Compliance
1.759527	39.2	9.000	N	9.8	16.8	56.0	Compliance
2.130339	34.6	9.000	N	9.8	21.4	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.399703	30.9	9.000	N	9.7	17.0	47.9	Compliance
0.406123	25.6	9.000	N	9.7	22.1	47.7	Compliance
0.419276	28.2	9.000	N	9.7	19.3	47.5	Compliance
0.472507	23.1	9.000	N	9.7	23.4	46.5	Compliance
1.190776	22.3	9.000	N	9.8	23.7	46.0	Compliance
1.430284	26.2	9.000	N	9.8	19.8	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.

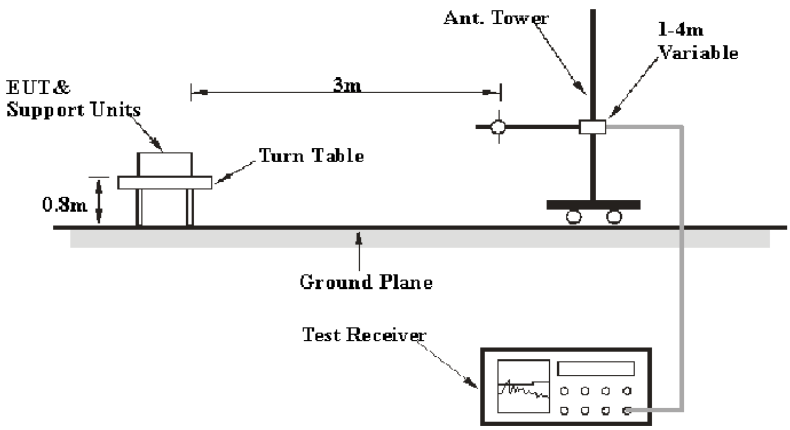
Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical; 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical; 1G~6GHz: 4.45 dB, 6G~18GHz: 5.23 dB

Table 2 – Values of U_{cispr}

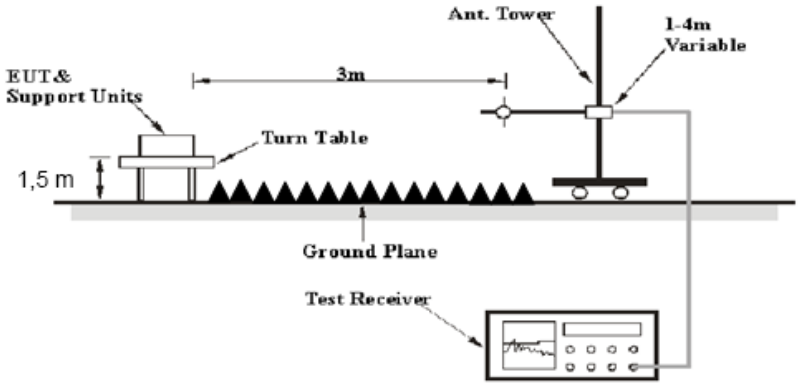
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

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:

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	/	AV

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	2015-08-03	2016-08-02
Sunol Sciences	Antenna	JB3	A060611-3	2014-11-06	2017-11-05
HP	Amplifier	8447E	2434A02181	2015-09-01	2016-09-01
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	2015-05-09	2016-05-09
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2014-06-16	2017-06-15
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2015-09-06	2016-09-06
N/A	Coaxial Cable	14m	N/A	2015-05-06	2016-05-06
N/A	Coaxial Cable	8m	N/A	2015-05-06	2016-05-06
N/A	Coaxial Cable	0.1m	N/A	2015-05-06	2016-05-06
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2015-05-06	2016-05-06

* **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:

8.35 dB at **2483.5 MHz** in the **Horizontal** polarization

Test Data

Environmental Conditions

Temperature:	24.4°C
Relative Humidity:	64 ~ 68%
ATM Pressure:	100.7 ~ 100.9 kPa

** The testing was performed by Dean Liu from 2016-03-19 to 2016-03-22.*

Test Mode: Transmitting

802.11b Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	67.47	PK	H	25.67	3.68	0.00	96.82	N/A	N/A
2412	64.41	AV	H	25.67	3.68	0.00	93.76	N/A	N/A
2412	63.14	PK	V	25.67	3.68	0.00	92.49	N/A	N/A
2412	60.04	AV	V	25.67	3.68	0.00	89.39	N/A	N/A
2400	27.56	PK	H	25.64	3.65	0.00	56.85	74.00	17.15
2400	15.75	AV	H	25.64	3.65	0.00	45.04	54.00	8.96
4824	32.57	PK	H	30.64	5.03	27.41	40.83	74.00	33.17
4824	18.84	AV	H	30.64	5.03	27.41	27.10	54.00	26.90
7236	32.62	PK	H	34.17	6.65	25.90	47.54	74.00	26.46
7236	18.94	AV	H	34.17	6.65	25.90	33.86	54.00	20.14
9648	29.42	PK	H	36.06	8.55	27.46	46.57	74.00	27.43
9648	16.51	AV	H	36.06	8.55	27.46	33.66	54.00	20.34
3490	41.31	PK	H	28.77	4.60	27.23	47.45	74.00	26.55
3490	27.64	AV	H	28.77	4.60	27.23	33.78	54.00	20.22
452.3	28.5	QP	H	17.27	2.57	21.90	26.44	46.00	19.56
Middle Channel: 2437 MHz									
2437	67.84	PK	H	25.74	3.75	0.00	97.33	N/A	N/A
2437	64.78	AV	H	25.74	3.75	0.00	94.27	N/A	N/A
2437	63.56	PK	V	25.74	3.75	0.00	93.05	N/A	N/A
2437	60.41	AV	V	25.74	3.75	0.00	89.90	N/A	N/A
4874	32.7	PK	H	30.77	5.14	27.42	41.19	74.00	32.81
4874	18.89	AV	H	30.77	5.14	27.42	27.38	54.00	26.62
7311	32.46	PK	H	34.35	6.74	25.88	47.67	74.00	26.33
7311	18.98	AV	H	34.35	6.74	25.88	34.19	54.00	19.81
9748	29.47	PK	H	36.30	8.61	27.24	47.14	74.00	26.86
9748	16.59	AV	H	36.30	8.61	27.24	34.26	54.00	19.74
3490	41.22	PK	H	28.77	4.60	27.23	47.36	74.00	26.64
3490	27.72	AV	H	28.77	4.60	27.23	33.86	54.00	20.14
3955	44.84	PK	H	29.80	4.86	27.24	52.26	74.00	21.74
3955	31.25	AV	H	29.80	4.86	27.24	38.67	54.00	15.33
452.3	28.7	QP	H	17.27	2.57	21.90	26.64	46.00	19.36
High Channel: 2462 MHz									
2462	67.94	PK	H	25.80	3.75	0.00	97.49	N/A	N/A
2462	64.88	AV	H	25.80	3.75	0.00	94.43	N/A	N/A
2462	63.61	PK	V	25.80	3.75	0.00	93.16	N/A	N/A
2462	60.56	AV	V	25.80	3.75	0.00	90.11	N/A	N/A
2483.5	27.87	PK	H	25.86	3.67	0.00	57.40	74.00	16.60
2483.5	15.96	AV	H	25.86	3.67	0.00	45.49	54.00	8.51
4924	32.95	PK	H	30.90	5.34	27.43	41.76	74.00	32.24
4924	19.06	AV	H	30.90	5.34	27.43	27.87	54.00	26.13
7386	32.56	PK	H	34.53	6.83	25.86	48.06	74.00	25.94
7386	19.02	AV	H	34.53	6.83	25.86	34.52	54.00	19.48
9848	29.56	PK	H	36.54	8.66	26.94	47.82	74.00	26.18
9848	16.61	AV	H	36.54	8.66	26.94	34.87	54.00	19.13
3490	41.61	PK	H	28.77	4.60	27.23	47.75	74.00	26.25
3490	28.03	AV	H	28.77	4.60	27.23	34.17	54.00	19.83
452.3	28.3	QP	H	17.27	2.57	21.90	26.24	46.00	19.76

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	66.82	PK	H	25.67	3.68	0.00	96.17	N/A	N/A
2412	58.38	AV	H	25.67	3.68	0.00	87.73	N/A	N/A
2412	62.65	PK	V	25.67	3.68	0.00	92.00	N/A	N/A
2412	54.13	AV	V	25.67	3.68	0.00	83.48	N/A	N/A
2400	27.46	PK	H	25.64	3.65	0.00	56.75	74.00	17.25
2400	15.79	AV	H	25.64	3.65	0.00	45.08	54.00	8.92
4824	32.37	PK	H	30.64	5.03	27.41	40.63	74.00	33.37
4824	18.84	AV	H	30.64	5.03	27.41	27.10	54.00	26.90
7236	32.03	PK	H	34.17	6.65	25.90	46.95	74.00	27.05
7236	18.81	AV	H	34.17	6.65	25.90	33.73	54.00	20.27
9648	29.32	PK	H	36.06	8.55	27.46	46.47	74.00	27.53
9648	16.45	AV	H	36.06	8.55	27.46	33.60	54.00	20.40
3490	42.18	PK	H	28.77	4.60	27.23	48.32	74.00	25.68
3490	28.75	AV	H	28.77	4.60	27.23	34.89	54.00	19.11
452.3	28.3	QP	H	17.27	2.57	21.90	26.24	46.00	19.76
Middle Channel: 2437 MHz									
2437	67.66	PK	H	25.74	3.75	0.00	97.15	N/A	N/A
2437	59.28	AV	H	25.74	3.75	0.00	88.77	N/A	N/A
2437	63.22	PK	V	25.74	3.75	0.00	92.71	N/A	N/A
2437	54.77	AV	V	25.74	3.75	0.00	84.26	N/A	N/A
4874	32.54	PK	H	30.77	5.14	27.42	41.03	74.00	32.97
4874	18.92	AV	H	30.77	5.14	27.42	27.41	54.00	26.59
7311	32.07	PK	H	34.35	6.74	25.88	47.28	74.00	26.72
7311	18.88	AV	H	34.35	6.74	25.88	34.09	54.00	19.91
9748	29.43	PK	H	36.30	8.61	27.24	47.10	74.00	26.90
9748	16.46	AV	H	36.30	8.61	27.24	34.13	54.00	19.87
3490	42.33	PK	H	28.77	4.60	27.23	48.47	74.00	25.53
3490	28.76	AV	H	28.77	4.60	27.23	34.90	54.00	19.10
3955	42.13	PK	H	29.80	4.86	27.24	49.55	74.00	24.45
3955	28.52	AV	H	29.80	4.86	27.24	35.94	54.00	18.06
452.3	28.7	QP	H	17.27	2.57	21.90	26.64	46.00	19.36
High Channel: 2462 MHz									
2462	67.8	PK	H	25.80	3.75	0.00	97.35	N/A	N/A
2462	59.47	AV	H	25.80	3.75	0.00	89.02	N/A	N/A
2462	63.52	PK	V	25.80	3.75	0.00	93.07	N/A	N/A
2462	55.09	AV	V	25.80	3.75	0.00	84.64	N/A	N/A
2483.5	27.05	PK	H	25.86	3.67	0.00	56.58	74.00	17.42
2483.5	16.11	AV	H	25.86	3.67	0.00	45.64	54.00	8.36
4924	32.55	PK	H	30.90	5.34	27.43	41.36	74.00	32.64
4924	18.86	AV	H	30.90	5.34	27.43	27.67	54.00	26.33
7386	31.97	PK	H	34.53	6.83	25.86	47.47	74.00	26.53
7386	18.84	AV	H	34.53	6.83	25.86	34.34	54.00	19.66
9848	29.45	PK	H	36.54	8.66	26.94	47.71	74.00	26.29
9848	16.55	AV	H	36.54	8.66	26.94	34.81	54.00	19.19
3490	42.3	PK	H	28.77	4.60	27.23	48.44	74.00	25.56
3490	28.74	AV	H	28.77	4.60	27.23	34.88	54.00	19.12
452.3	28.1	QP	H	17.27	2.57	21.90	26.04	46.00	19.96

802.11 n ht20 Mode

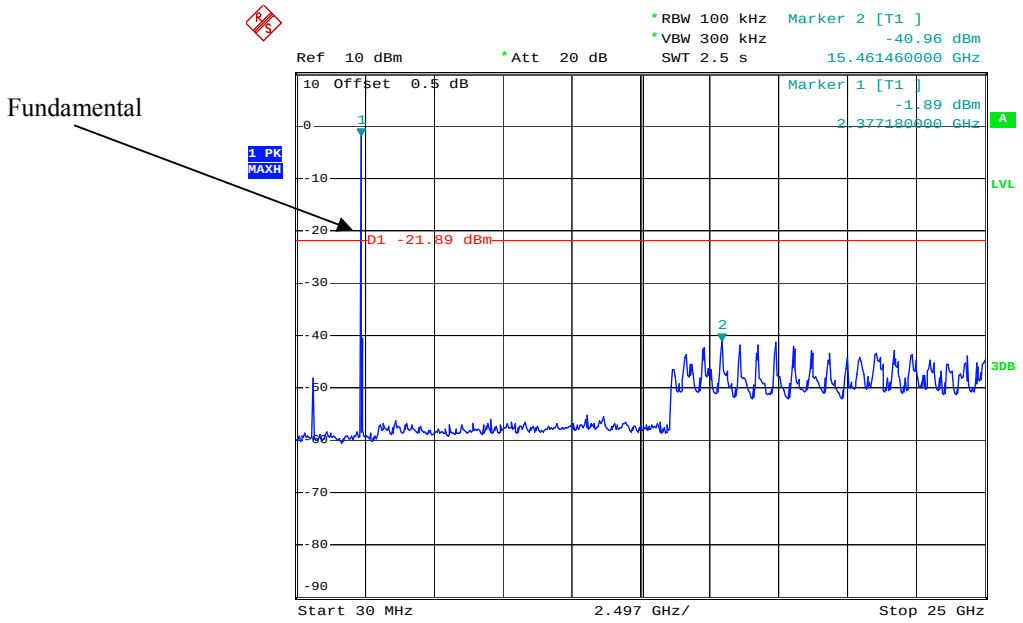
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	64.85	PK	H	25.67	3.68	0.00	94.20	N/A	N/A
2412	56.38	AV	H	25.67	3.68	0.00	85.73	N/A	N/A
2412	60.38	PK	V	25.67	3.68	0.00	89.73	N/A	N/A
2412	51.99	AV	V	25.67	3.68	0.00	81.34	N/A	N/A
2400	27.61	PK	H	25.64	3.65	0.00	56.90	74.00	17.10
2400	15.84	AV	H	25.64	3.65	0.00	45.13	54.00	8.87
4824	32.69	PK	H	30.64	5.03	27.41	40.95	74.00	33.05
4824	18.86	AV	H	30.64	5.03	27.41	27.12	54.00	26.88
7236	32.37	PK	H	34.17	6.65	25.90	47.29	74.00	26.71
7236	18.73	AV	H	34.17	6.65	25.90	33.65	54.00	20.35
9648	29.25	PK	H	36.06	8.55	27.46	46.40	74.00	27.60
9648	16.51	AV	H	36.06	8.55	27.46	33.66	54.00	20.34
3490	41.25	PK	H	28.77	4.60	27.23	47.39	74.00	26.61
3490	27.66	AV	H	28.77	4.60	27.23	33.80	54.00	20.20
452.3	28.4	QP	H	17.27	2.57	21.90	26.34	46.00	19.66
Middle Channel: 2437 MHz									
2437	65.22	PK	H	25.74	3.75	0.00	94.71	N/A	N/A
2437	56.73	AV	H	25.74	3.75	0.00	86.22	N/A	N/A
2437	60.76	PK	V	25.74	3.75	0.00	90.25	N/A	N/A
2437	52.23	AV	V	25.74	3.75	0.00	81.72	N/A	N/A
4874	32.61	PK	H	30.77	5.14	27.42	41.10	74.00	32.90
4874	18.82	AV	H	30.77	5.14	27.42	27.31	54.00	26.69
7311	31.98	PK	H	34.35	6.74	25.88	47.19	74.00	26.81
7311	18.81	AV	H	34.35	6.74	25.88	34.02	54.00	19.98
9748	29.43	PK	H	36.30	8.61	27.24	47.10	74.00	26.90
9748	16.57	AV	H	36.30	8.61	27.24	34.24	54.00	19.76
3490	42.22	PK	H	28.77	4.60	27.23	48.36	74.00	25.64
3490	28.65	AV	H	28.77	4.60	27.23	34.79	54.00	19.21
3955	42.36	PK	H	29.80	4.86	27.24	49.78	74.00	24.22
3955	28.69	AV	H	29.80	4.86	27.24	36.11	54.00	17.89
452.3	28.7	QP	H	17.27	2.57	21.90	26.64	46.00	19.36
High Channel: 2462 MHz									
2462	65.45	PK	H	25.80	3.75	0.00	95.00	N/A	N/A
2462	56.94	AV	H	25.80	3.75	0.00	86.49	N/A	N/A
2462	60.92	PK	V	25.80	3.75	0.00	90.47	N/A	N/A
2462	52.45	AV	V	25.80	3.75	0.00	82.00	N/A	N/A
2483.5	27.11	PK	H	25.86	3.67	0.00	56.64	74.00	17.36
2483.5	16.12	AV	H	25.86	3.67	0.00	45.65	54.00	8.35
4924	32.74	PK	H	30.90	5.34	27.43	41.55	74.00	32.45
4924	18.86	AV	H	30.90	5.34	27.43	27.67	54.00	26.33
7386	32.57	PK	H	34.53	6.83	25.86	48.07	74.00	25.93
7386	18.89	AV	H	34.53	6.83	25.86	34.39	54.00	19.61
9848	29.54	PK	H	36.54	8.66	26.94	47.80	74.00	26.20
9848	16.65	AV	H	36.54	8.66	26.94	34.91	54.00	19.09
3490	41.13	PK	H	28.77	4.60	27.23	47.27	74.00	26.73
3490	27.6	AV	H	28.77	4.60	27.23	33.74	54.00	20.26
452.3	28.9	QP	H	17.27	2.57	21.90	26.84	46.00	19.16

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 (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2402 MHz									
2402	59.28	PK	H	25.65	3.66	0.00	88.59	N/A	N/A
2402	54.44	AV	H	25.65	3.66	0.00	83.75	N/A	N/A
2402	54.51	PK	V	25.65	3.66	0.00	83.82	N/A	N/A
2402	49.48	AV	V	25.65	3.66	0.00	78.79	N/A	N/A
2400	27.1	PK	H	25.64	3.65	0.00	56.39	74.00	17.61
2400	16.3	AV	H	25.64	3.65	0.00	45.59	54.00	8.41
4804	31.72	PK	H	30.59	5.06	27.41	39.96	74.00	34.04
4804	18.56	AV	H	30.59	5.06	27.41	26.80	54.00	27.20
7206	31.54	PK	H	34.09	6.61	25.91	46.33	74.00	27.67
7206	18.5	AV	H	34.09	6.61	25.91	33.29	54.00	20.71
9608	29.84	PK	H	35.96	8.53	27.55	46.78	74.00	27.22
9608	16.83	AV	H	35.96	8.53	27.55	33.77	54.00	20.23
3760	47.78	PK	H	29.37	4.56	27.36	54.35	74.00	19.65
3760	34.22	AV	H	29.37	4.56	27.36	40.79	54.00	13.21
433.52	27.8	QP	H	16.84	2.49	21.85	25.28	46.00	20.72
Middle Channel: 2440 MHz									
2440	60.1	PK	H	25.74	3.76	0.00	89.60	N/A	N/A
2440	55.22	AV	H	25.74	3.76	0.00	84.72	N/A	N/A
2440	55.4	PK	V	25.74	3.76	0.00	84.90	N/A	N/A
2440	50.72	AV	V	25.74	3.76	0.00	80.22	N/A	N/A
4880	31.83	PK	H	30.79	5.18	27.42	40.38	74.00	33.62
4880	19.04	AV	H	30.79	5.18	27.42	27.59	54.00	26.41
7320	31.68	PK	H	34.37	6.75	25.88	46.92	74.00	27.08
7320	18.72	AV	H	34.37	6.75	25.88	33.96	54.00	20.04
9760	29.53	PK	H	36.32	8.62	27.21	47.26	74.00	26.74
9760	16.52	AV	H	36.32	8.62	27.21	34.25	54.00	19.75
3760	47.67	PK	H	29.37	4.56	27.36	54.24	74.00	19.76
3760	34.3	AV	H	29.37	4.56	27.36	40.87	54.00	13.13
3595	48.95	PK	H	29.01	4.62	27.27	55.31	74.00	18.69
3595	35.37	AV	H	29.01	4.62	27.27	41.73	54.00	12.27
433.52	27.6	QP	H	16.84	2.49	21.85	25.08	46.00	20.92
High Channel: 2480 MHz									
2480	60.51	PK	H	25.85	3.68	0.00	90.04	N/A	N/A
2480	55.71	AV	H	25.85	3.68	0.00	85.24	N/A	N/A
2480	55.86	PK	V	25.85	3.68	0.00	85.39	N/A	N/A
2480	51.03	AV	V	25.85	3.68	0.00	80.56	N/A	N/A
2483.5	25.57	PK	H	25.86	3.67	0.00	55.10	74.00	18.90
2483.5	13.87	AV	H	25.86	3.67	0.00	43.40	54.00	10.60
4960	32.09	PK	H	31.00	5.34	27.43	41.00	74.00	33.00
4960	19.05	AV	H	31.00	5.34	27.43	27.96	54.00	26.04
7440	31.84	PK	H	34.66	6.89	25.97	47.42	74.00	26.58
7440	18.81	AV	H	34.66	6.89	25.97	34.39	54.00	19.61
9920	29.59	PK	H	36.71	8.71	26.66	48.35	74.00	25.65
9920	16.54	AV	H	36.71	8.71	26.66	35.30	54.00	18.70
3760	47.5	PK	H	29.37	4.56	27.36	54.07	74.00	19.93
3760	34.06	AV	H	29.37	4.56	27.36	40.63	54.00	13.37
433.52	27.1	QP	H	16.84	2.49	21.85	24.58	46.00	21.42

Conducted Spurious Emissions at Antenna Port

802.11b Low Channel



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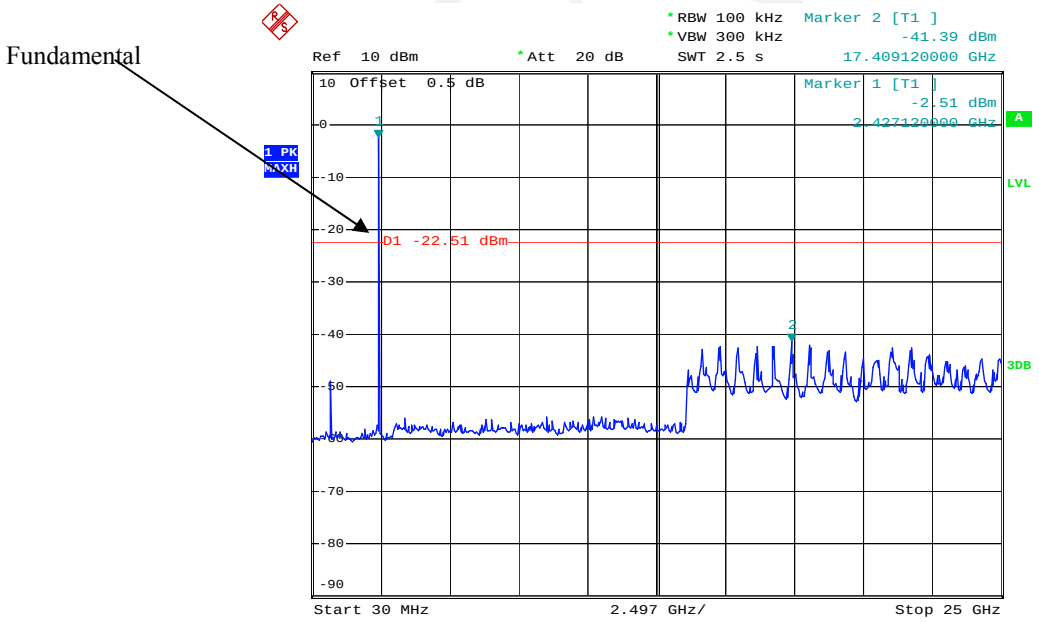
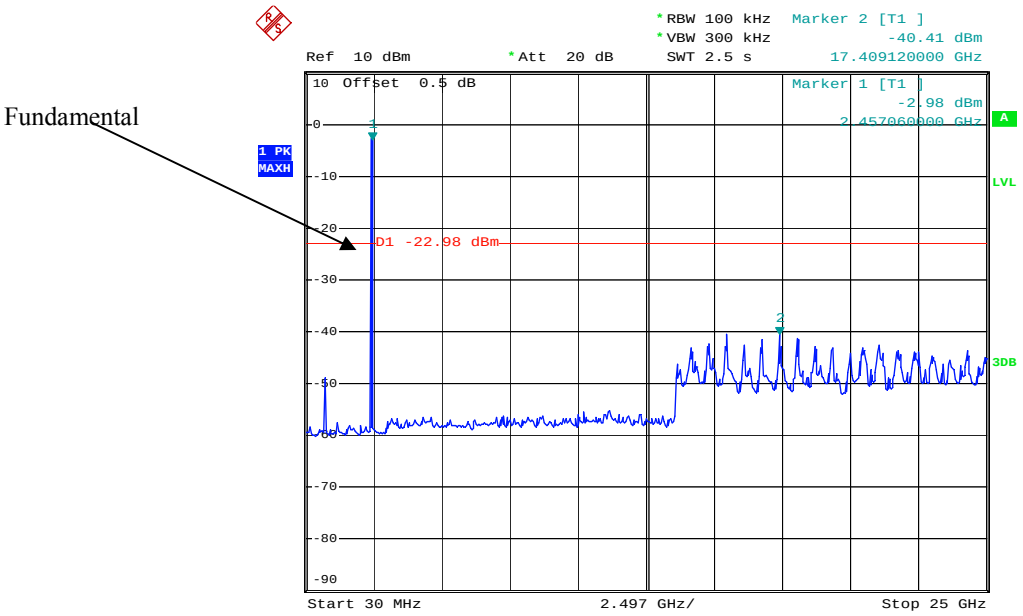
802.11b Middle Channel



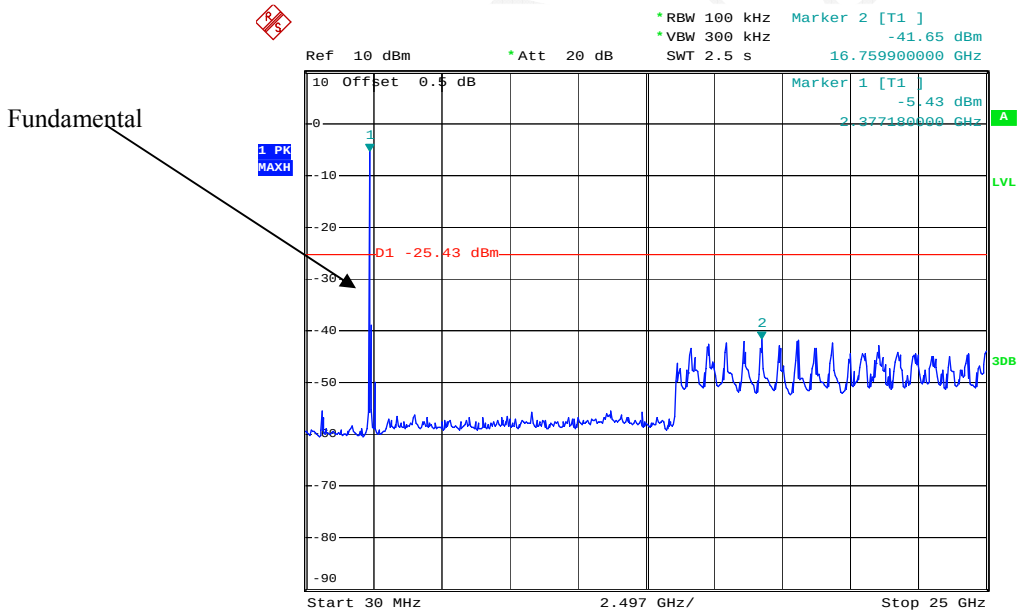
Date: 22.MAR.2016 15:12:51

802.11b High Channel



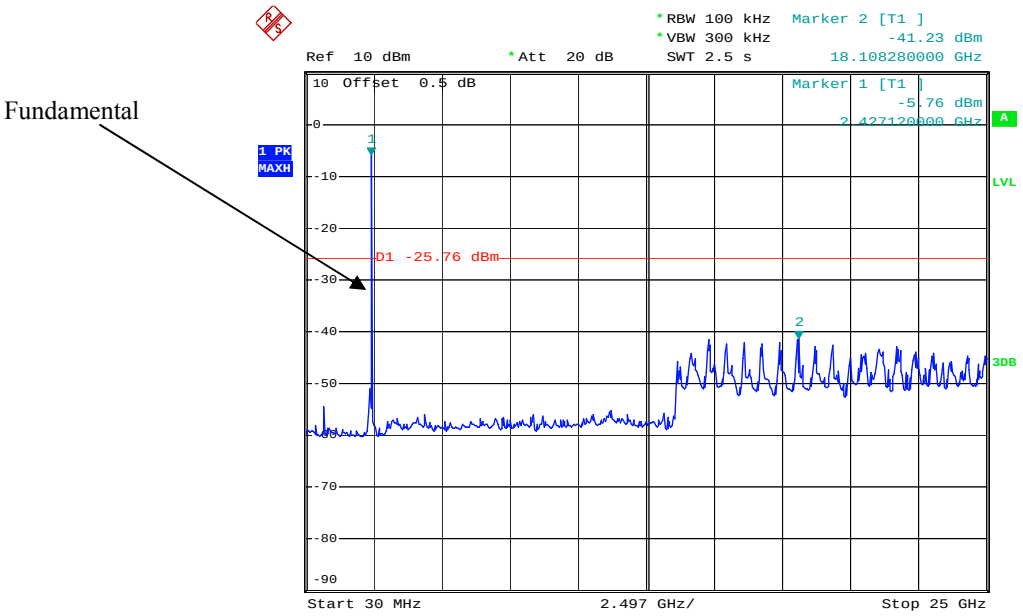
Date: 22.MAR.2016 15:16:29

802.11g Low Channel



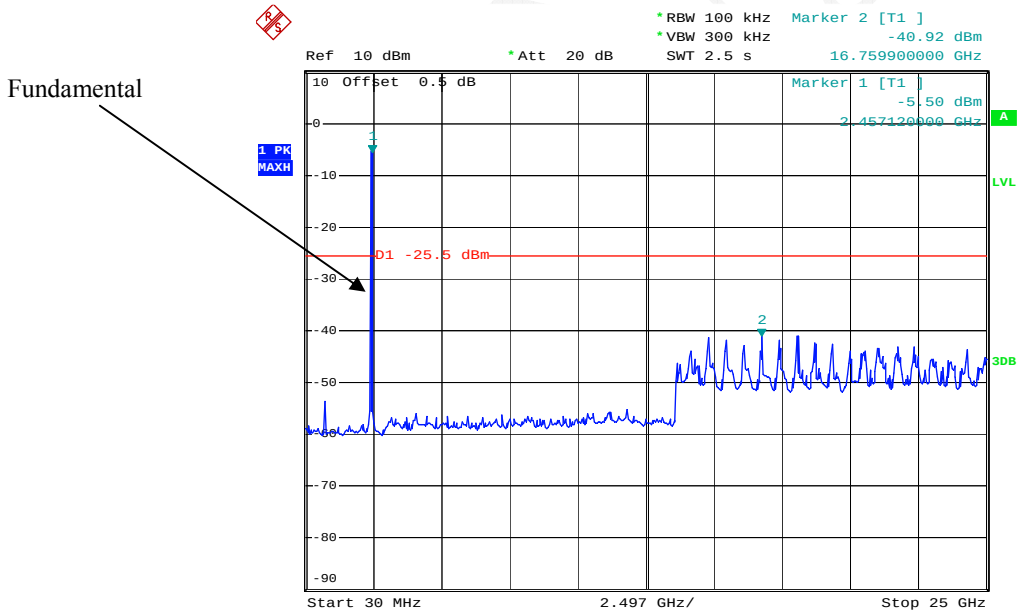
Date: 22.MAR.2016 15:18:59

802.11g Middle Channel



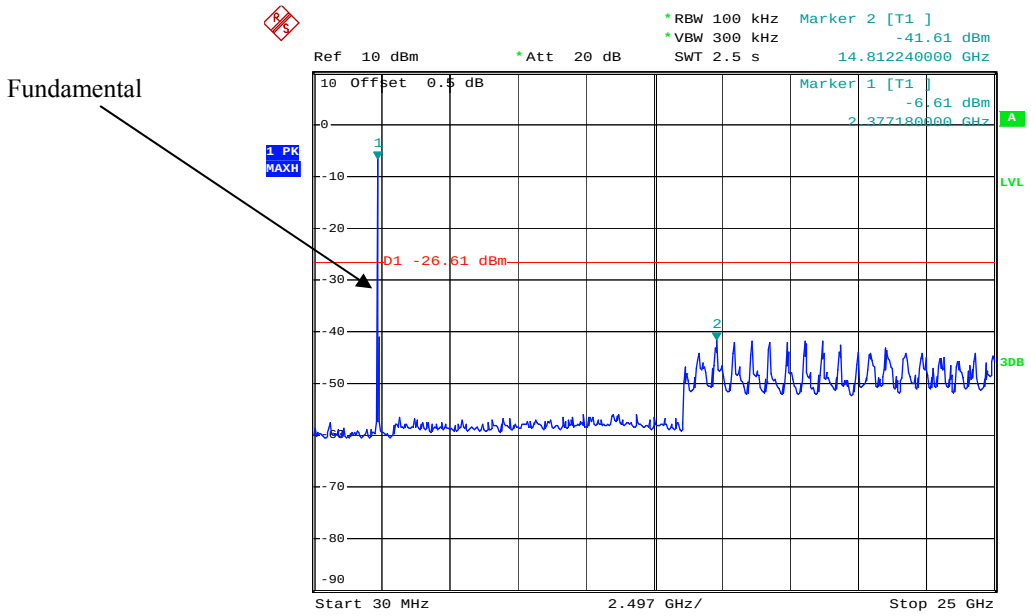
Date: 22.MAR.2016 15:21:05

802.11g High Channel



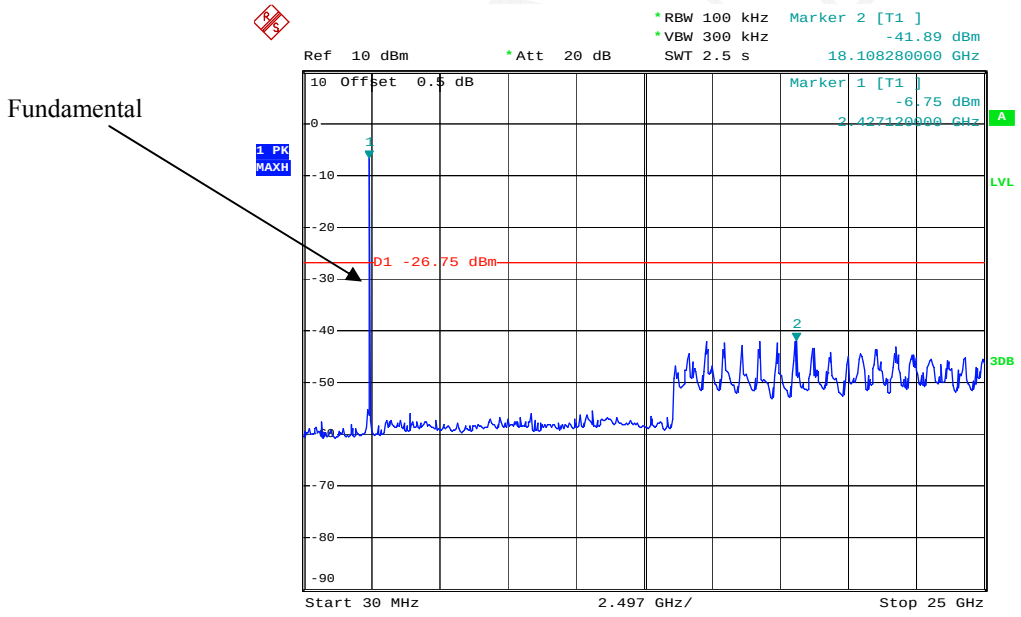
Date: 22.MAR.2016 15:23:14

802.11n ht20 Low Channel



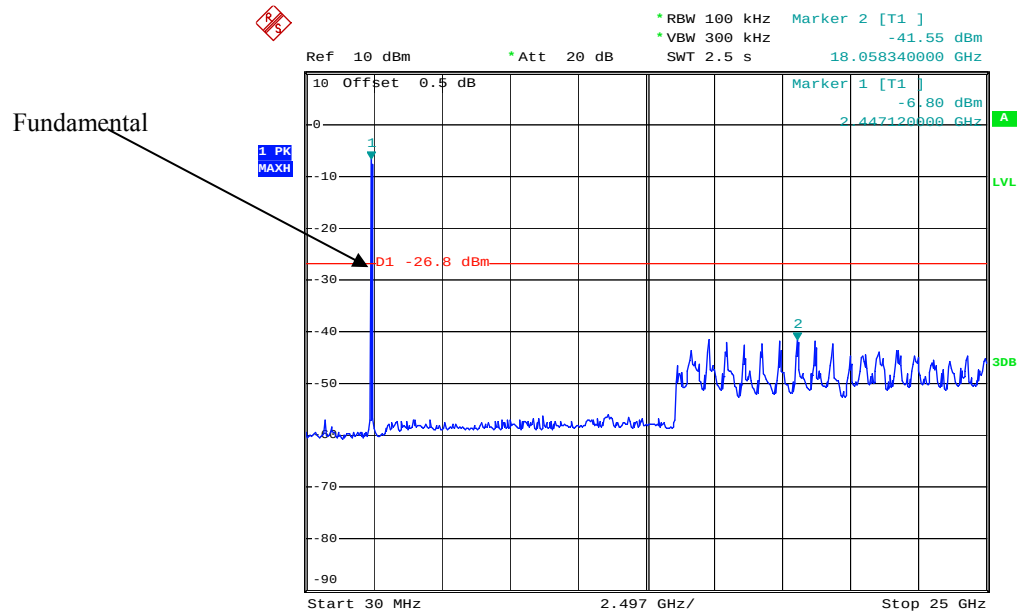
Date: 22.MAR.2016 15:26:26

802.11n ht20 Middle Channel



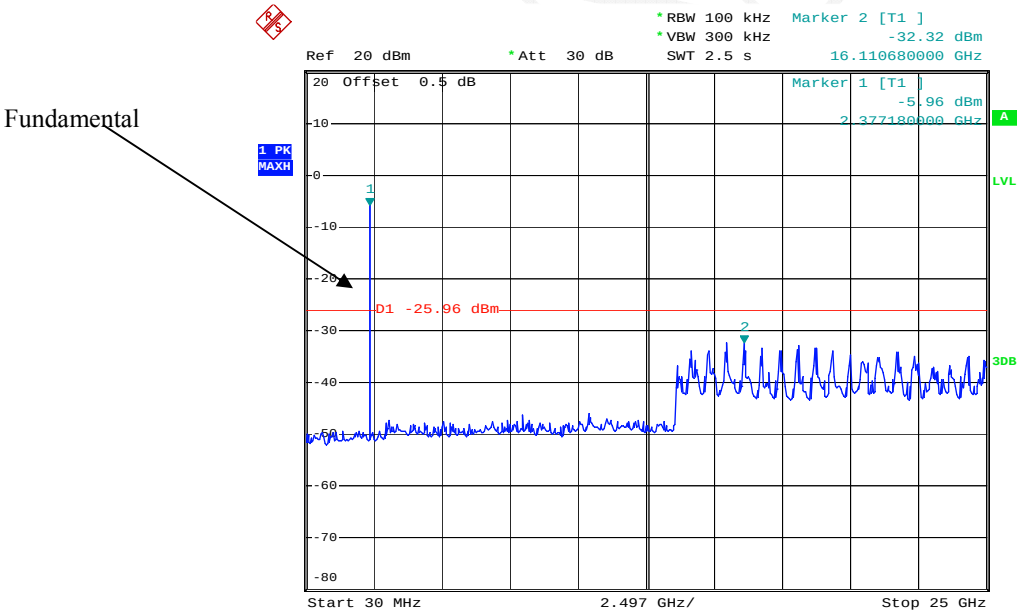
Date: 22.MAR.2016 15:27:26

802.11n ht20 High Channel



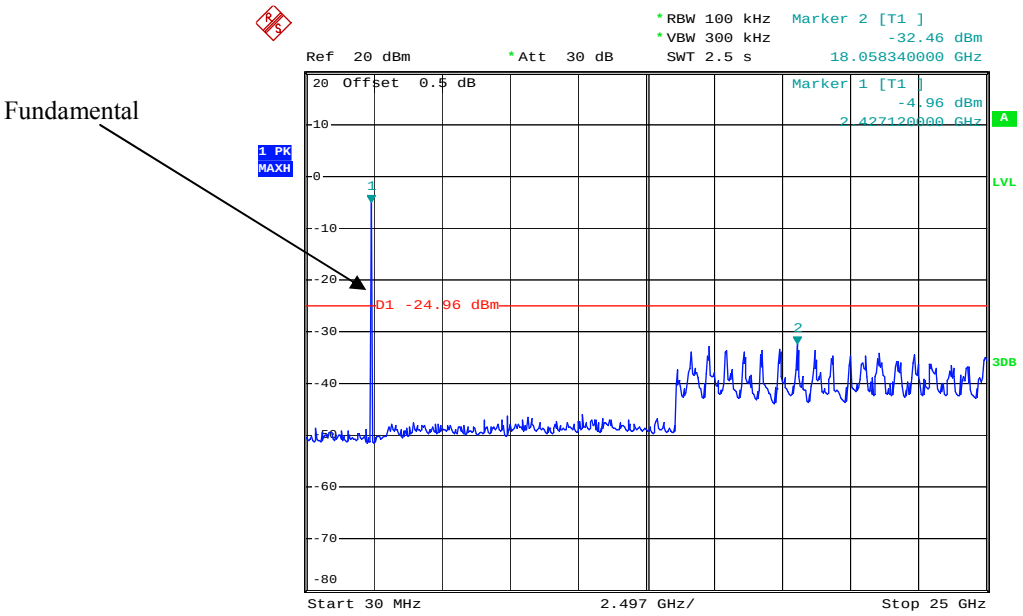
Date: 22.MAR.2016 15:29:02

BLE Low Channel



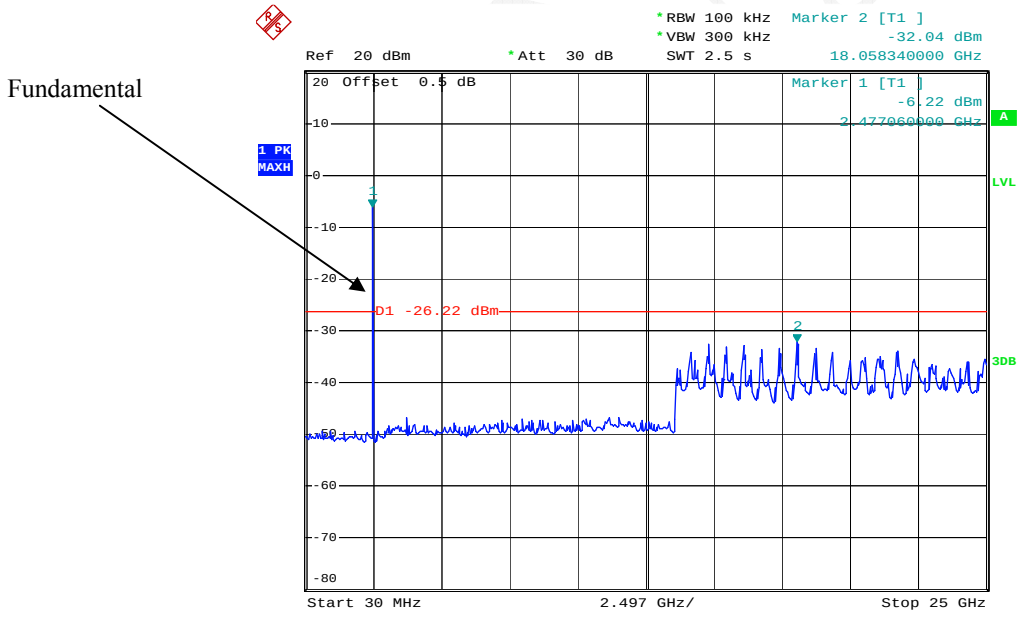
Date: 19.MAR.2016 10:49:09

BLE Middle Channel



Date: 19.MAR.2016 10:51:01

BLE High Channel



Date: 19.MAR.2016 10:52:30

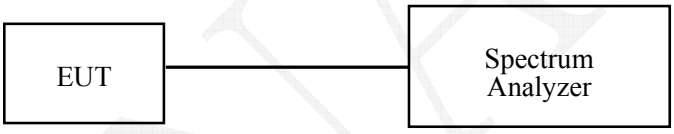
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

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



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSEM	DE31388	2015-05-09	2016-05-09
N/A	Coaxial Cable	0.1m	N/A	2015-05-06	2016-05-06
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2015-05-06	2016-05-06

*** 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 Data

Environmental Conditions

Temperature:	24.4 ~ 24.6 °C
Relative Humidity:	64 ~72 %
ATM Pressure:	100.5 ~ 100.9 kPa

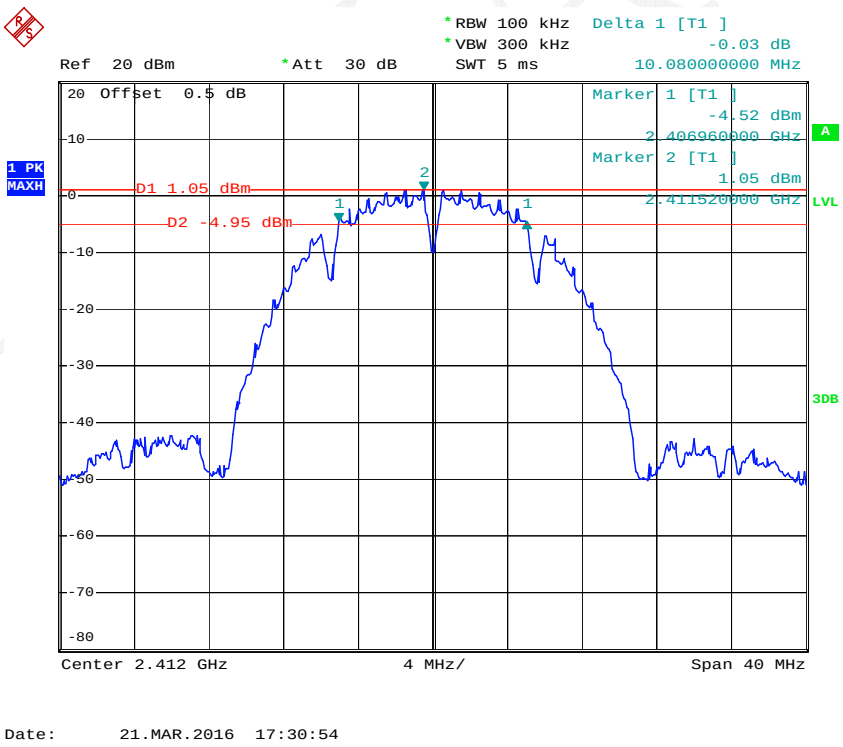
** The testing was performed by Dean Liu from 2016-03-21 to 2016-03-23*

Test Mode: Transmitting

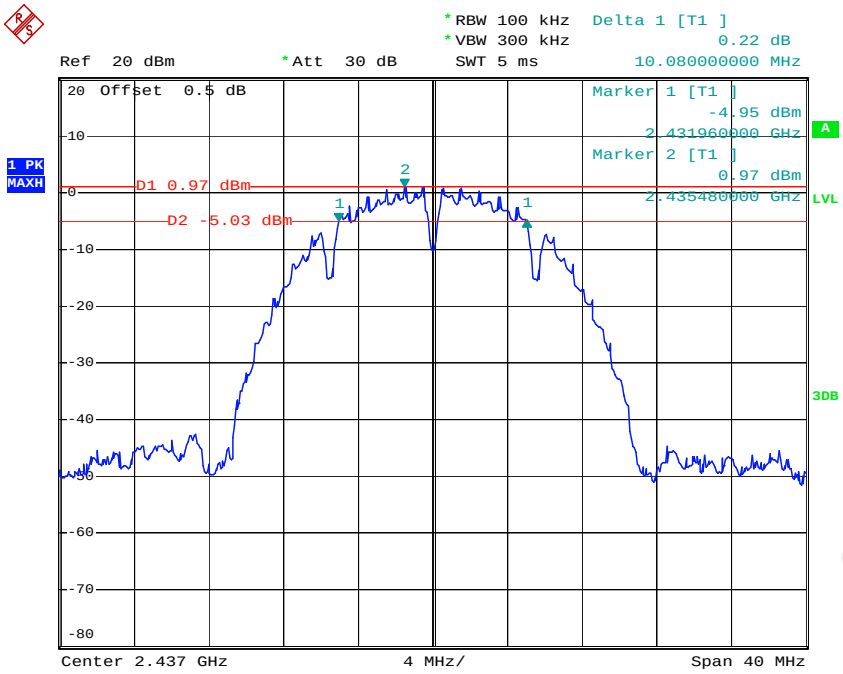
Test Result: Compliant. Please refer to the following table and plots.

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	16.64	≥0.5
	Middle	2437	16.64	≥0.5
	High	2462	16.64	≥0.5
802.11n20	Low	2412	17.84	≥0.5
	Middle	2437	17.92	≥0.5
	High	2462	17.92	≥0.5
BLE	Low	2402	0.708	≥0.5
	Middle	2440	0.704	≥0.5
	High	2480	0.704	≥0.5

802.11b Low Channel

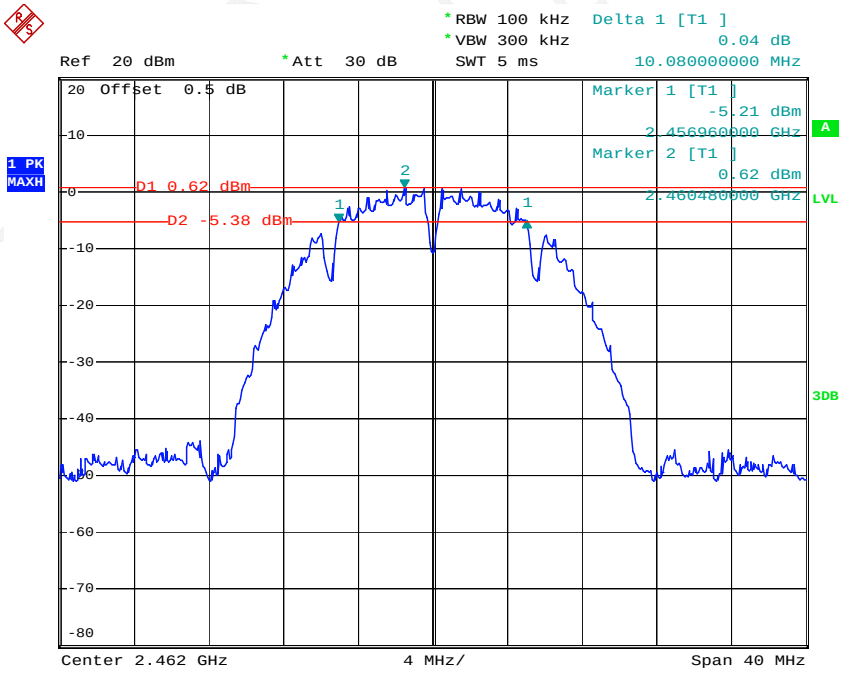


802.11b Middle Channel



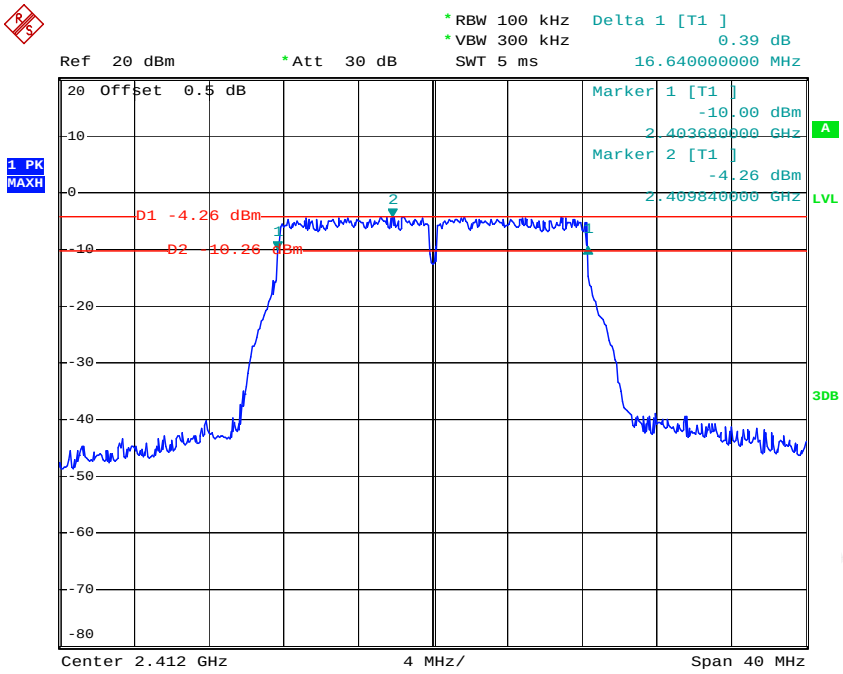
Date: 21.MAR.2016 17:34:32

802.11b High Channel



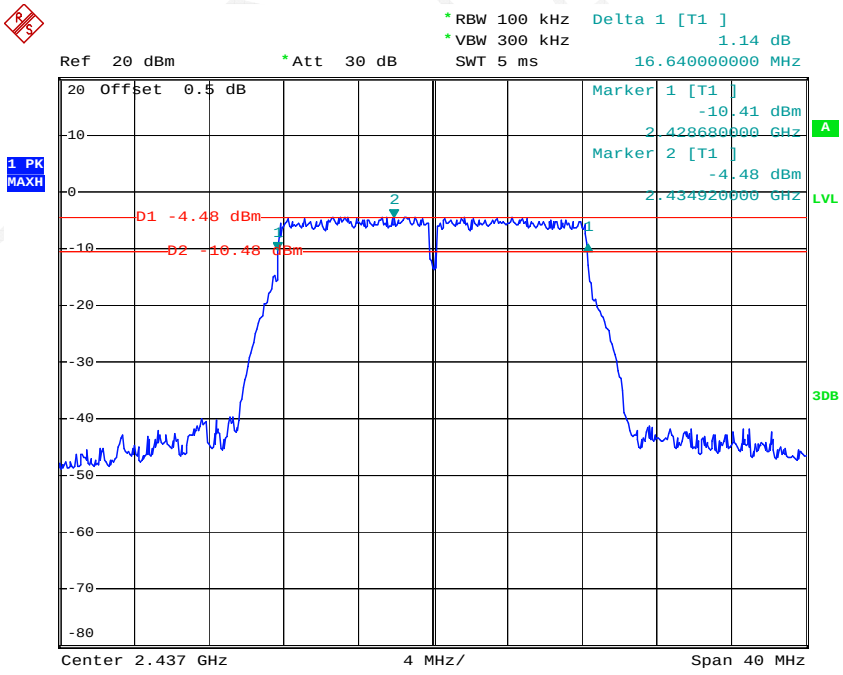
Date: 21.MAR.2016 17:37:35

802.11g Low Channel



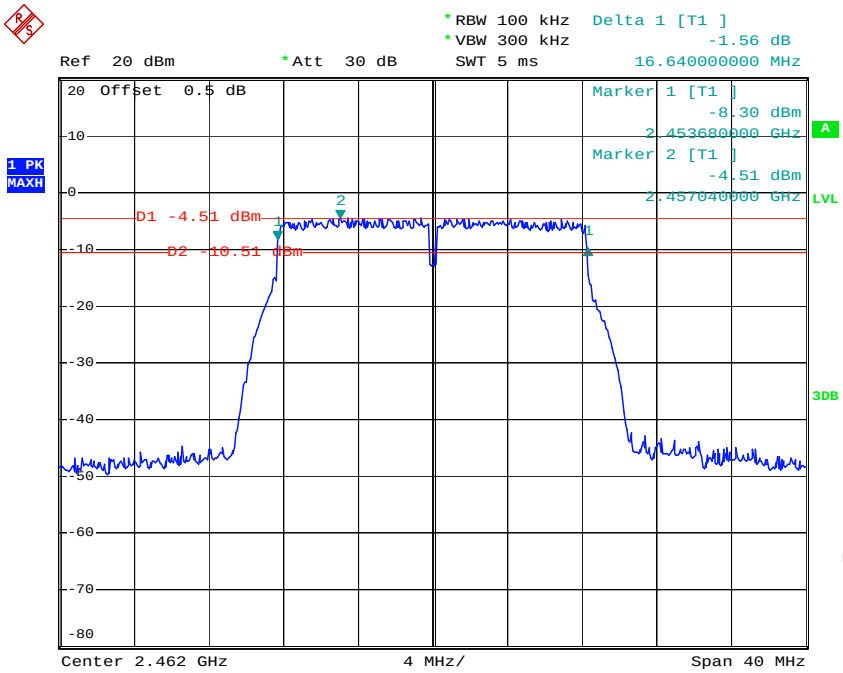
Date: 21.MAR.2016 17:48:52

802.11g Middle Channel



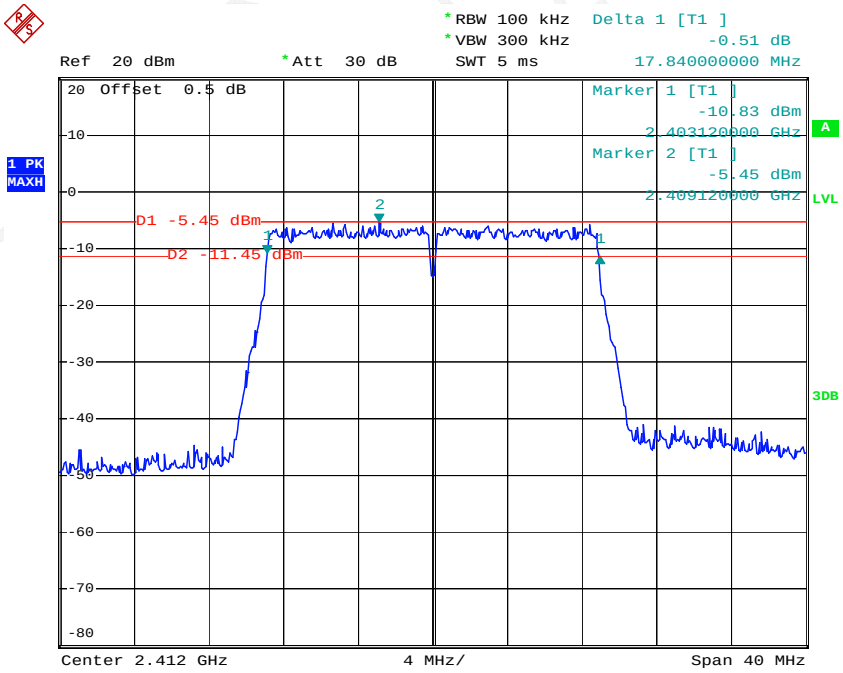
Date: 21.MAR.2016 17:45:49

802.11g High Channel



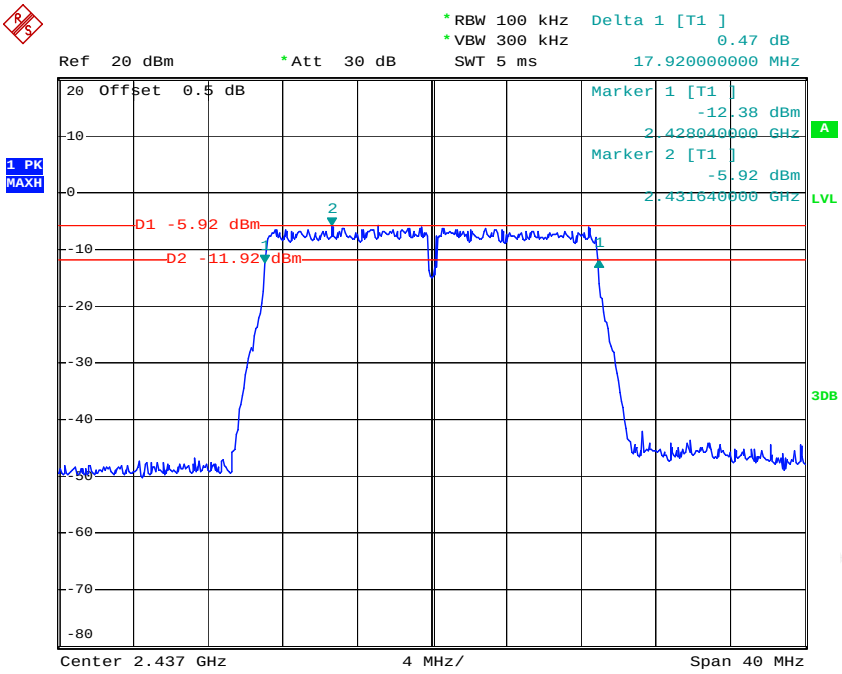
Date: 21.MAR.2016 17:42:14

802.11n ht20 Low Channel



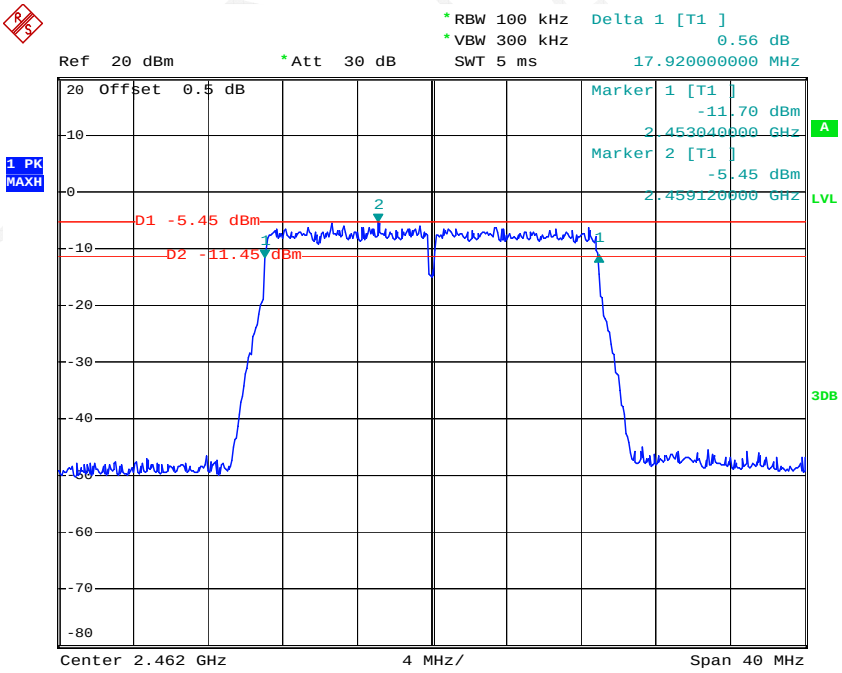
Date: 21.MAR.2016 17:53:43

802.11n ht20 Middle Channel



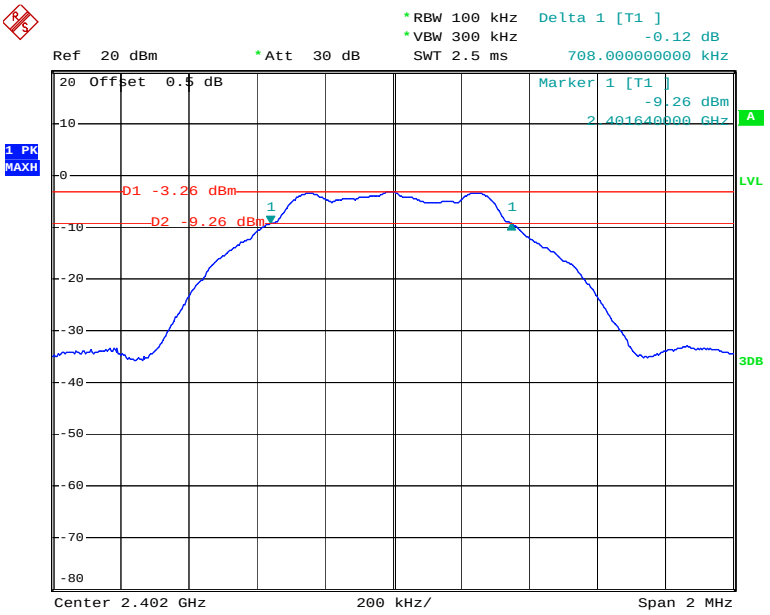
Date: 21.MAR.2016 17:59:01

802.11n ht20 High Channel



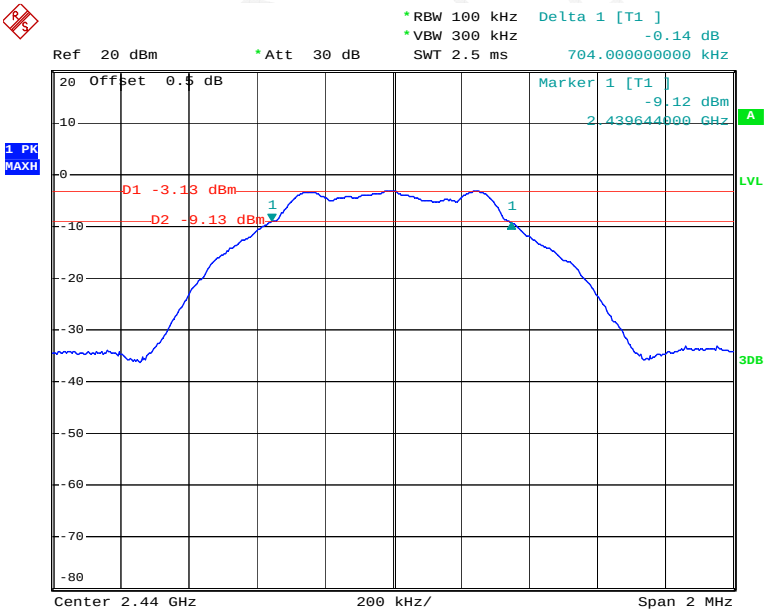
Date: 21.MAR.2016 18:02:12

BLE Low Channel



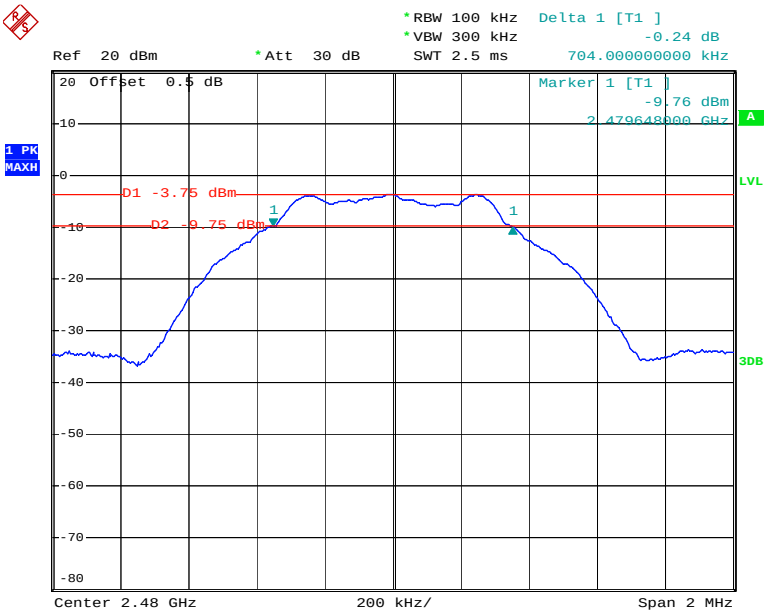
Date: 23.MAR.2016 18:01:05

BLE Middle Channel



Date: 23.MAR.2016 18:01:40

BLE High Channel



Date: 23.MAR.2016 18:02:17

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

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	2015-05-06	2016-05-06
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2015-05-06	2016-05-06

*** 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 Data

Environmental Conditions

Temperature:	24.4 °C
Relative Humidity:	64 %
ATM Pressure:	100.7 kPa

** The testing was performed by Dean Liu on 2016-03-21.*

Test Mode: Transmitting

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

Test mode	Channel	Frequency	Max Peak Conducted Output Power	Max Conducted Average Output Power	Limit	Result
		(MHz)	(dBm)	(dBm)	(dBm)	
802.11b	Low	2412	15.88	14.89	30	Compliance
	Middle	2437	15.84	14.87	30	Compliance
	High	2462	15.44	14.43	30	Compliance
802.11g	Low	2412	17.12	13.76	30	Compliance
	Middle	2437	17.07	13.70	30	Compliance
	High	2462	17.00	13.63	30	Compliance
802.11n20	Low	2412	15.54	11.97	30	Compliance
	Middle	2437	15.43	11.87	30	Compliance
	High	2462	15.27	11.81	30	Compliance
BLE	Low	2402	-2.34	/	30	Compliance
	Middle	2440	-2.22	/	30	Compliance
	High	2480	-2.80	/	30	Compliance

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	FSEM	DE31388	2015-05-09	2016-05-09
N/A	Coaxial Cable	0.1m	N/A	2015-05-06	2016-05-06
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2015-05-06	2016-05-06

*** 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 Data

Environmental Conditions

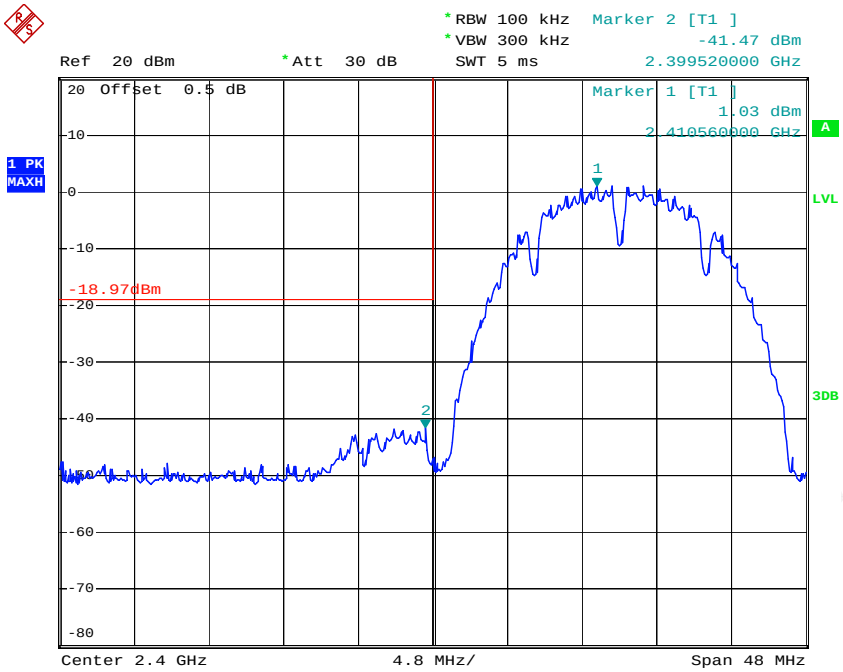
Temperature:	24.4°C
Relative Humidity:	64 ~ 68 %
ATM Pressure:	100.7 ~ 100.9 kPa

** The testing was performed by Dean Liu from 2016-03-19 to 2016-03-21.*

Test mode: Transmitting

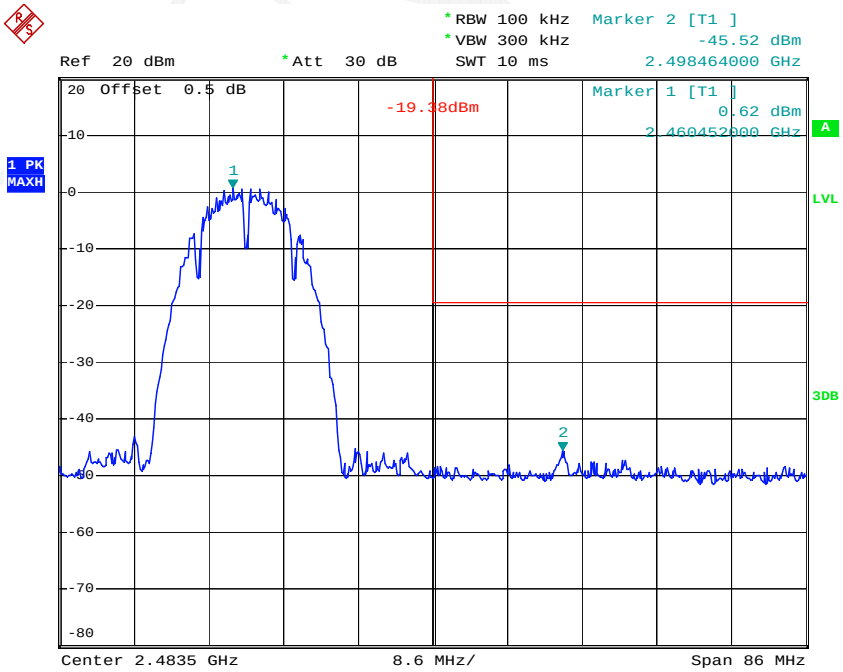
Test Result: Compliant. Please refer to following plots.

802.11b: Band Edge, Left Side



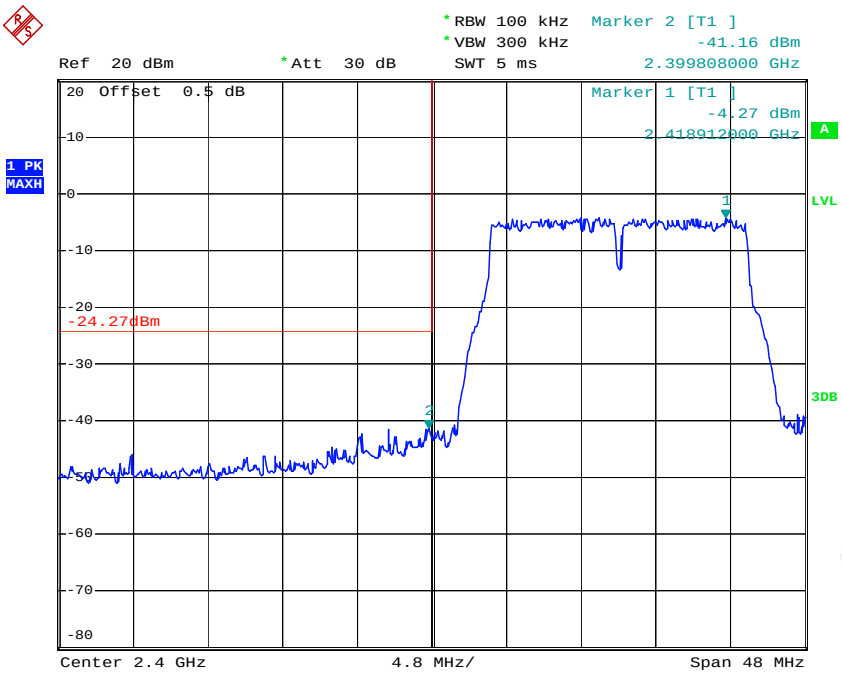
Date: 21.MAR.2016 17:32:42

802.11b: Band Edge, Right Side



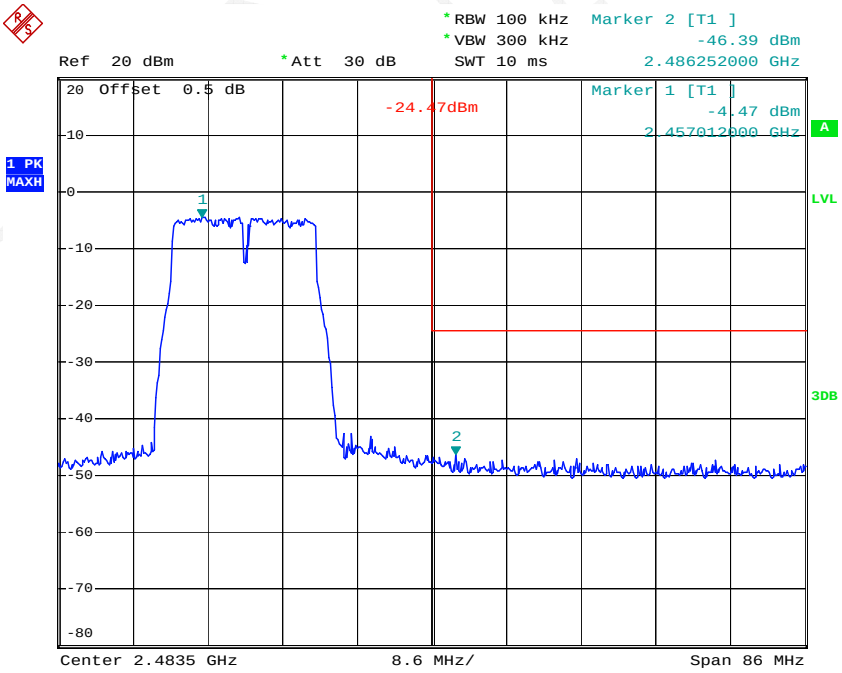
Date: 21.MAR.2016 17:39:32

802.11g: Band Edge, Left Side



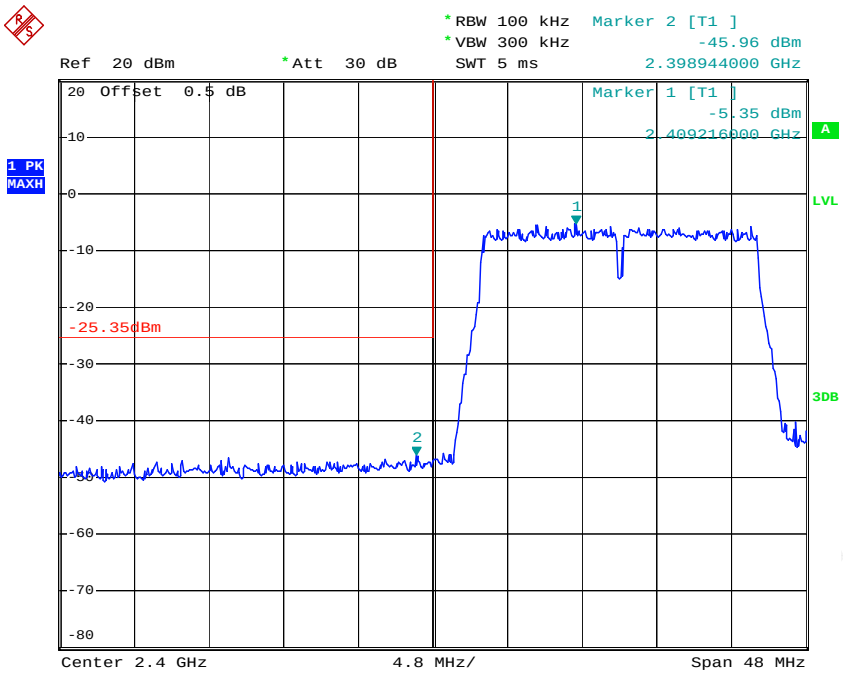
Date: 21.MAR.2016 17:50:49

802.11g: Band Edge, Right Side



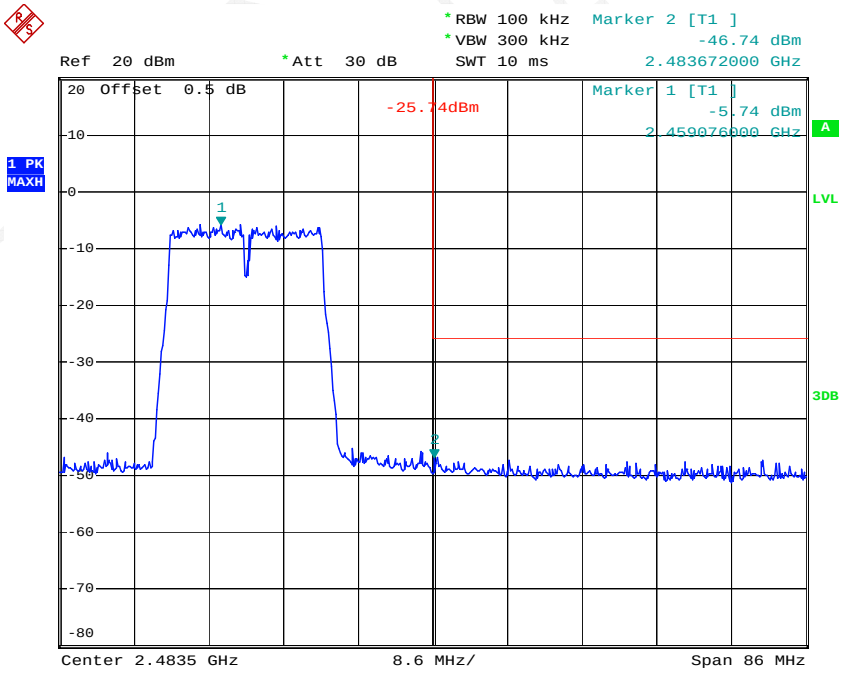
Date: 21.MAR.2016 17:44:20

802.11n ht20 Band Edge, Left Side



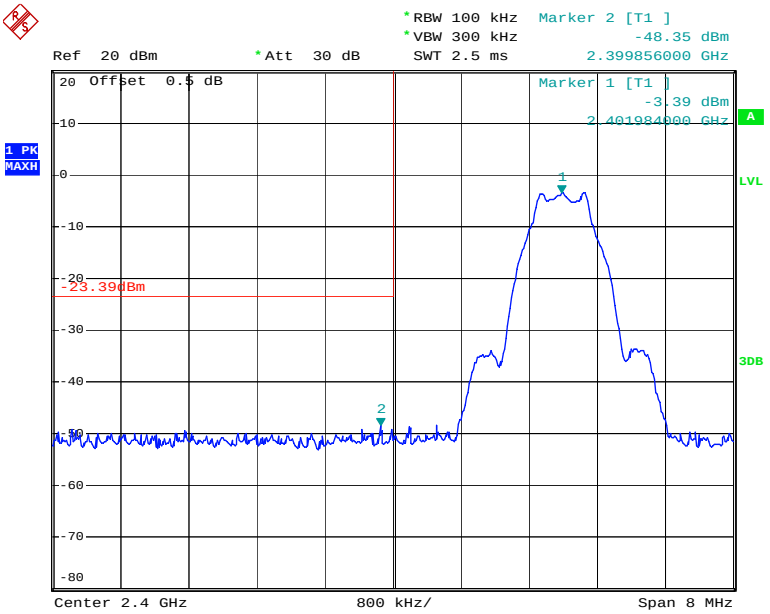
Date: 21.MAR.2016 17:55:58

802.11n ht20 Band Edge, Right Side



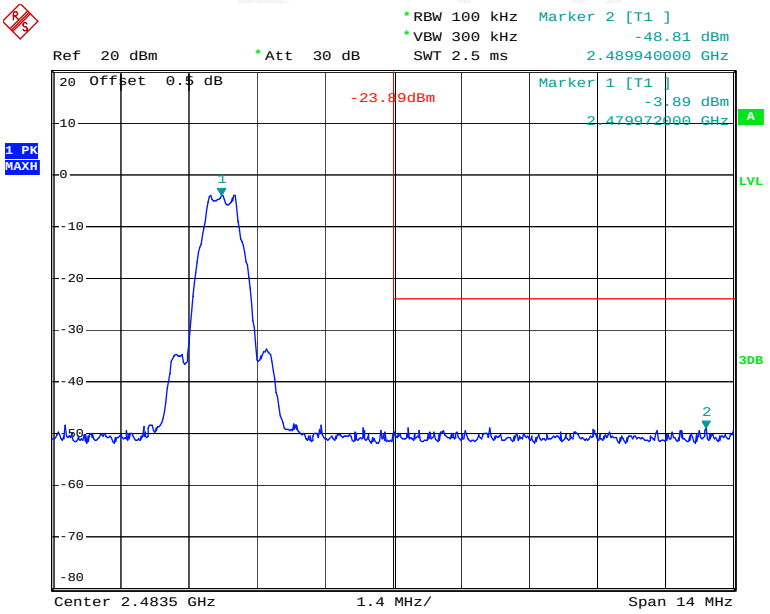
Date: 21.MAR.2016 18:04:13

BLE Band Edge, Left Side



Date: 19.MAR.2016 10:49:28

BLE Band Edge, Right Side



Date: 19.MAR.2016 10:53:05

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSEM	DE31388	2015-05-09	2016-05-09
N/A	Coaxial Cable	0.1m	N/A	2015-05-06	2016-05-06
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2015-05-06	2016-05-06

*** 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 Data

Environmental Conditions

Temperature:	24.4°C
Relative Humidity:	64 ~ 68%
ATM Pressure:	100.7 ~ 100.9 kPa

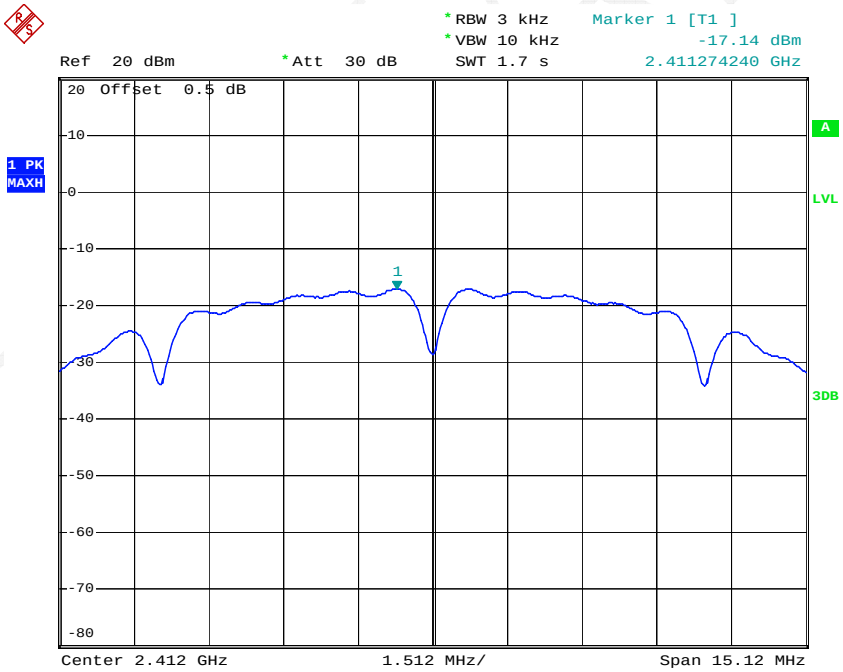
** The testing was performed by Dean Liu from 2016-03-19 to 2016-03-21*

Test Mode: Transmitting

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

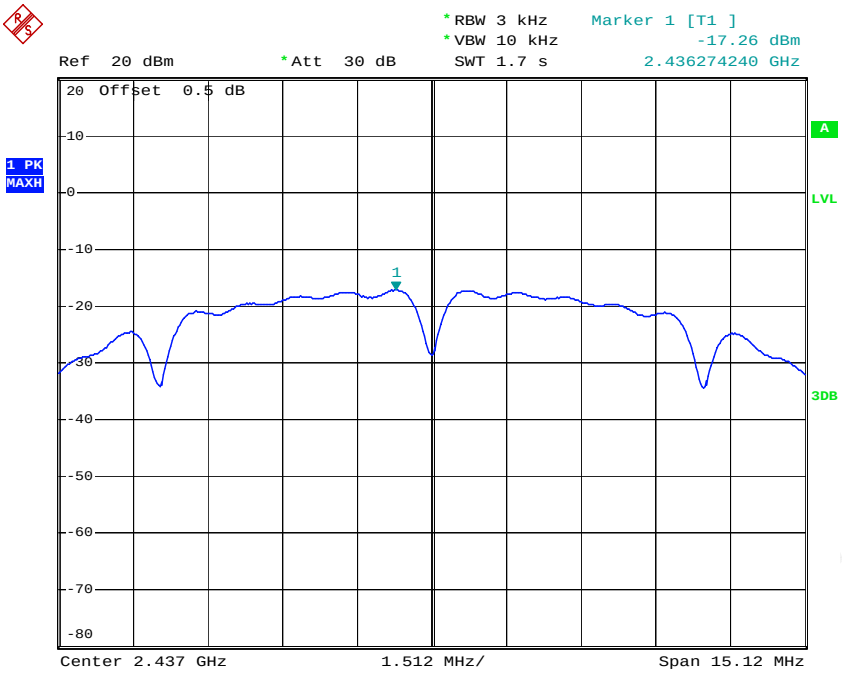
Test mode	Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
802.11b	Low	2412	-17.14	≤8
	Middle	2437	-17.26	≤8
	High	2462	-17.53	≤8
802.11g	Low	2412	-18.39	≤8
	Middle	2437	-18.68	≤8
	High	2462	-18.22	≤8
802.11n20	Low	2412	-18.77	≤8
	Middle	2437	-19.46	≤8
	High	2462	-19.78	≤8
BLE	Low	2402	-18.05	≤8
	Middle	2440	-17.84	≤8
	High	2480	-18.38	≤8

Power Spectral Density, 802.11b Low Channel



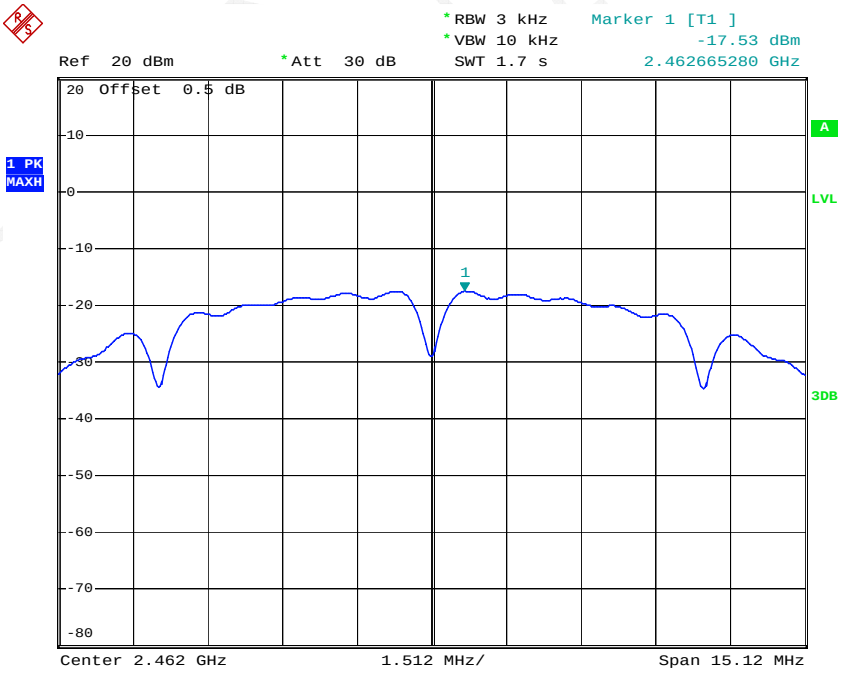
Date: 21.MAR.2016 17:32:22

Power Spectral Density, 802.11b Middle Channel



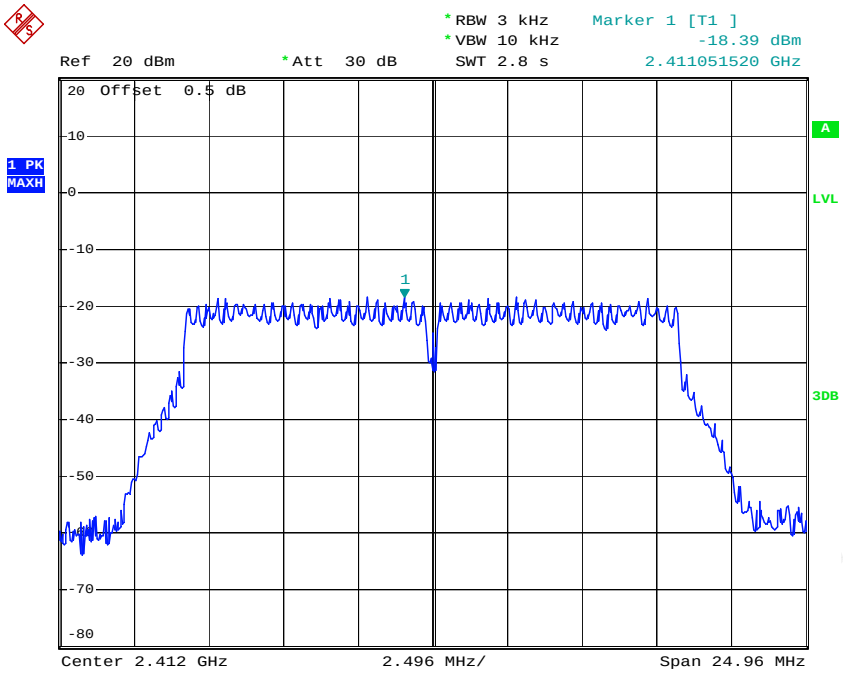
Date: 21.MAR.2016 17:35:58

Power Spectral Density, 802.11b High Channel



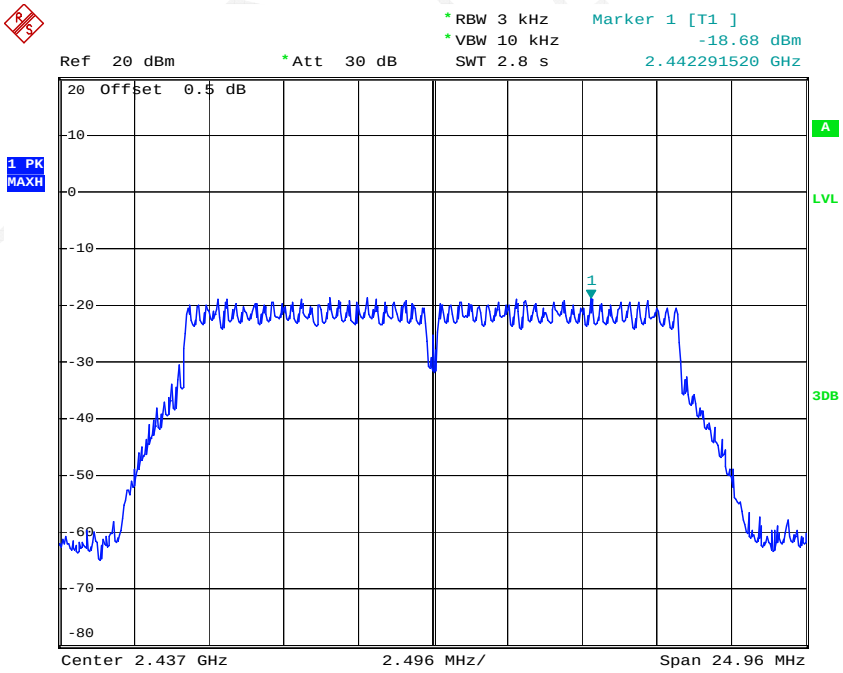
Date: 21.MAR.2016 17:39:13

Power Spectral Density, 802.11g Low Channel



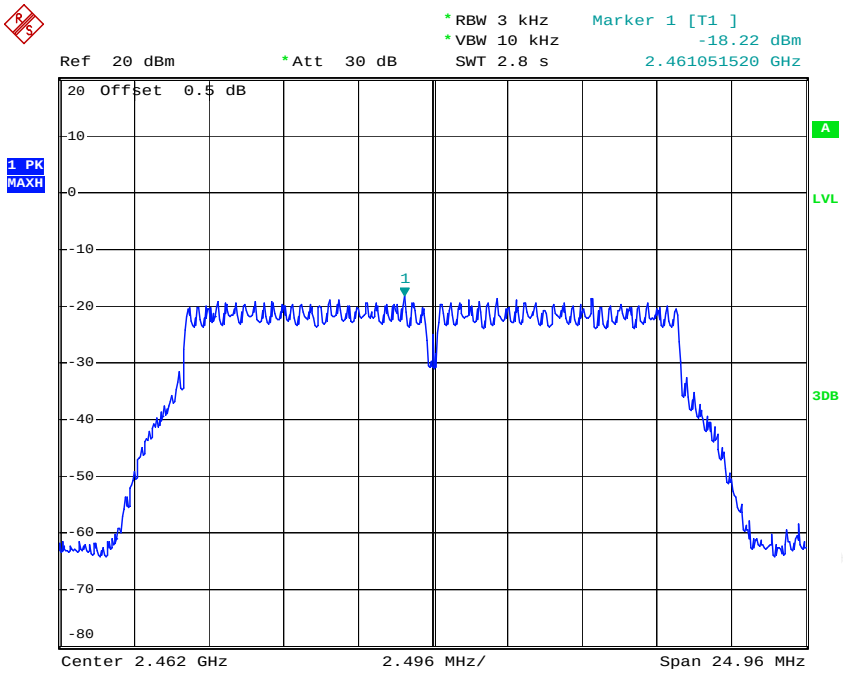
Date: 21.MAR.2016 17:50:28

Power Spectral Density, 802.11g Middle Channel



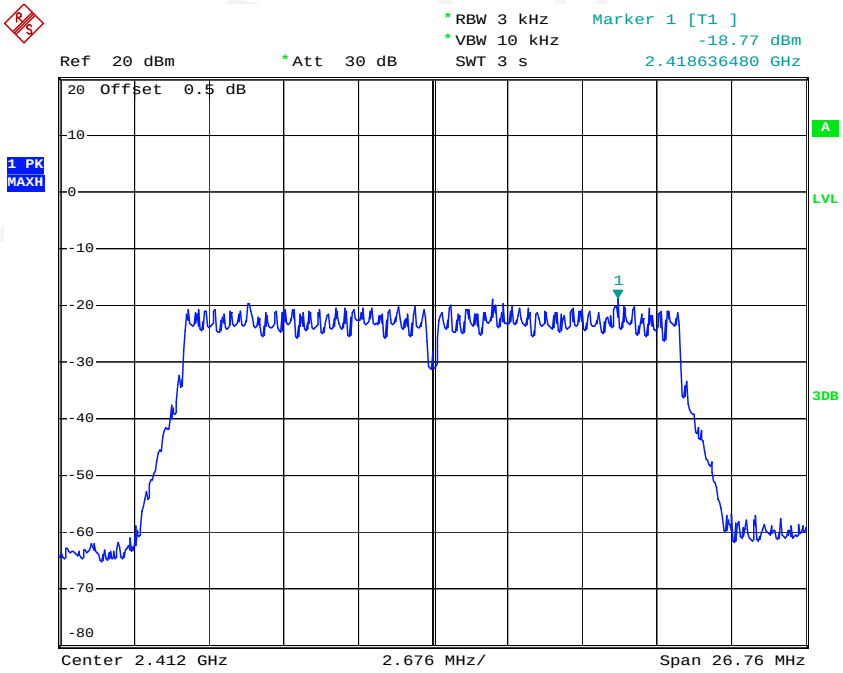
Date: 21.MAR.2016 17:47:22

Power Spectral Density, 802.11g High Channel



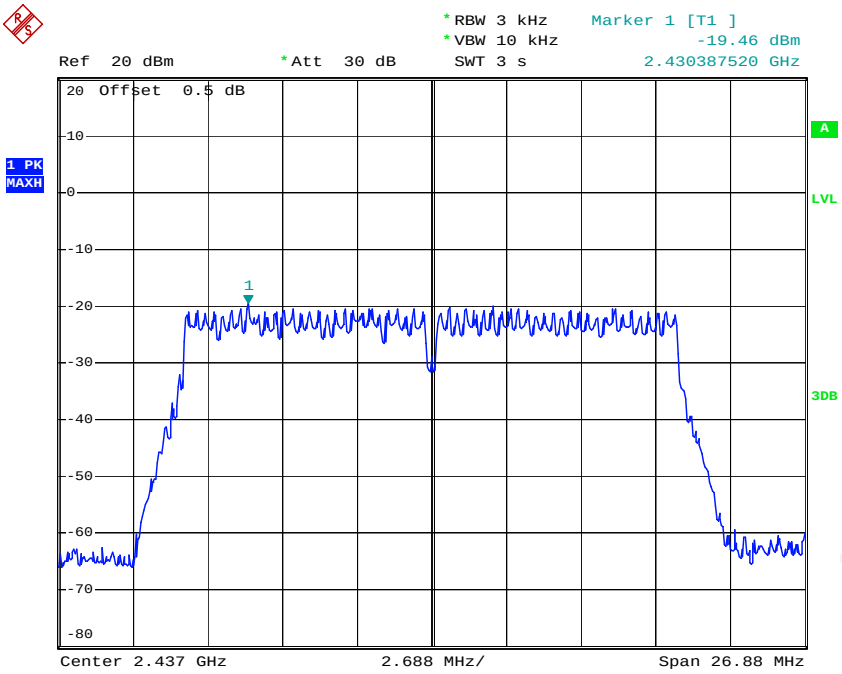
Date: 21.MAR.2016 17:43:54

Power Spectral Density, 802.11n ht20 Low Channel



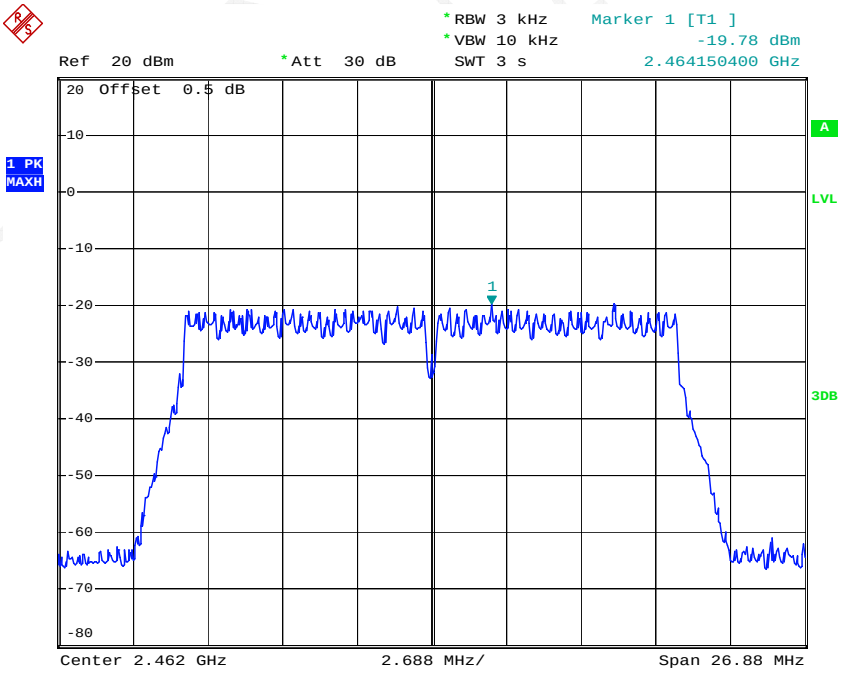
Date: 21.MAR.2016 17:55:31

Power Spectral Density, 802.11n ht20 Middle Channel



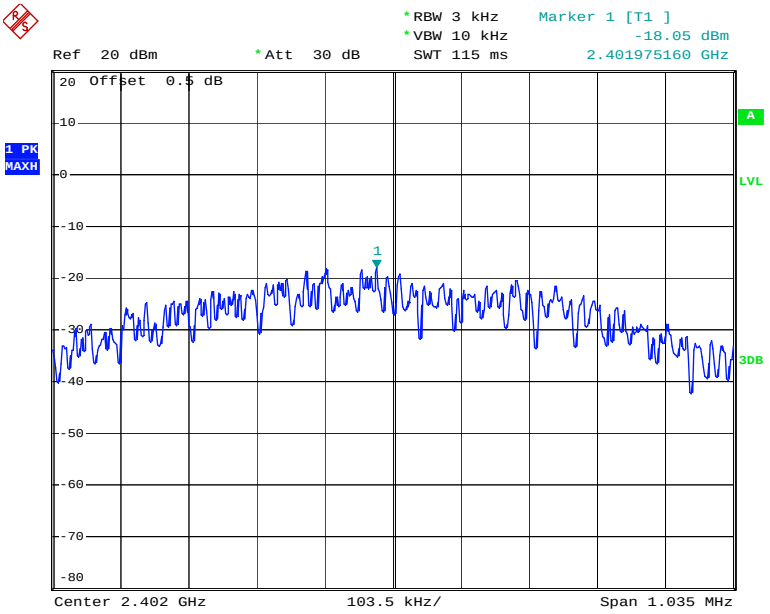
Date: 21.MAR.2016 18:00:38

Power Spectral Density, 802.11n ht20 High Channel



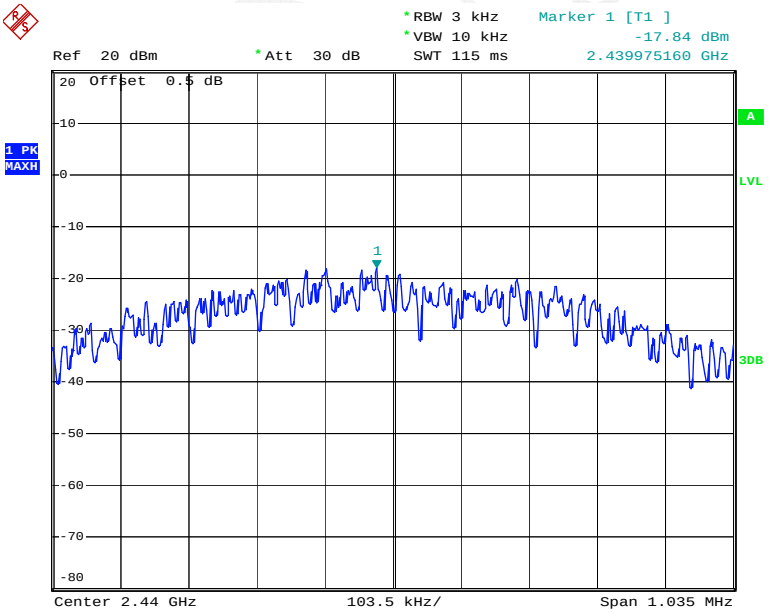
Date: 21.MAR.2016 18:03:52

Power Spectral Density, BLE Low Channel



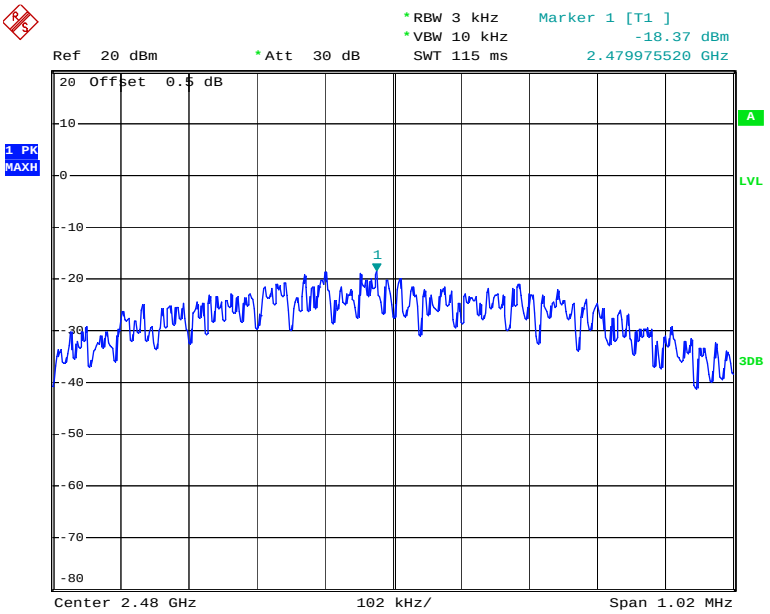
Date: 19.MAR.2016 10:48:51

Power Spectral Density, BLE Middle Channel



Date: 19.MAR.2016 10:50:37

Power Spectral Density, BLE High Channel



Date: 19.MAR.2016 10:52:08

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