

FCC PART 15.247

TEST REPORT

For

MAXWEST INTERNATIONAL LIMITED

No.1, Longgang Road, Buji, Longgang, Shenzhen City, Guangdong Province, P.R. China

FCC ID: 2AEN3ASTROX55

Report Type: Original Report	Product Type: Astro X55
Test Engineer:	Lion Xiao
Report Number:	RDG151214002-00B
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Reviewed By:	Jerry Zhang EMC Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan).

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	5
SYSTEM TEST CONFIGURATION.....	6
DESCRIPTION OF TEST CONFIGURATION	6
EQUIPMENT MODIFICATIONS	6
EUT EXERCISE SOFTWARE	7
SUPPORT EQUIPMENT LIST AND DETAILS	7
EXTERNAL CABLE.....	7
BLOCK DIAGRAM OF TEST SETUP	8
SUMMARY OF TEST RESULTS	9
FCC §15.247 (i) & §1.1310 & §2.1093- RF EXPOSURE	10
APPLICABLE STANDARD	10
FCC §15.203 - ANTENNA REQUIREMENT.....	11
APPLICABLE STANDARD	11
ANTENNA CONNECTOR CONSTRUCTION	11
FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS	12
APPLICABLE STANDARD	12
MEASUREMENT UNCERTAINTY.....	12
EUT SETUP.....	12
EMI TEST RECEIVER SETUP.....	13
TEST PROCEDURE	13
CORRECTED AMPLITUDE & MARGIN CALCULATION	13
TEST EQUIPMENT LIST AND DETAILS.....	14
TEST RESULTS SUMMARY	14
TEST DATA	14
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS.....	19
APPLICABLE STANDARD	19
MEASUREMENT UNCERTAINTY.....	19
EUT SETUP	19
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP	20
TEST PROCEDURE	20
CORRECTED AMPLITUDE & MARGIN CALCULATION	21
TEST EQUIPMENT LIST AND DETAILS.....	21
TEST RESULTS SUMMARY	21
TEST DATA	21
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH.....	35
APPLICABLE STANDARD	35
TEST PROCEDURE	35
TEST EQUIPMENT LIST AND DETAILS.....	35
TEST DATA	35
FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER.....	44

APPLICABLE STANDARD	44
TEST PROCEDURE	44
TEST EQUIPMENT LIST AND DETAILS.....	44
TEST DATA	44
FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE.....	46
APPLICABLE STANDARD	46
TEST PROCEDURE	46
TEST EQUIPMENT LIST AND DETAILS.....	46
TEST DATA	46
FCC §15.247(e) - POWER SPECTRAL DENSITY	52
APPLICABLE STANDARD	52
TEST PROCEDURE	52
TEST EQUIPMENT LIST AND DETAILS.....	52
TEST DATA	52
DECLARATION LETTER	61

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The MAXWEST INTERNATIONAL LIMITED's product, model number: *Astro X55* (FCC ID: 2AEN3ASTROX55) (the "EUT") in this report was a *Astro X55*, which was measured approximately: 15.05 cm (L) x 7.7 cm (W) x 0.8 cm (H), rated input voltage: DC3.8V rechargeable Li-ion battery or DC5.0V charging from adapter.

Adapter information:

Model: SCJ-05100

Input: AC100-240V, 50/60 Hz 0.2A

Output: DC 5V, 1A

Note: The model Astro X55 have different samples, they are the same electromagnetic emissions and electromagnetic compatibility characteristics, the difference between them is the colour, the details was explained in the attached declaration letter.

All measurement and test data in this report was gathered from production sample serial number: 151214002 (Assigned byBACL, Dongguan). The EUT was received on 2015-12-14.

Objective

This report is prepared on behalf of MAXWEST INTERNATIONAL 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:2AEN3ASTROX55.

FCC Part 15C DSS submissions with FCC ID:2AEN3ASTROX55.

FCC Part 22H, 24E, 27 PCE submissions with FCC ID:2AEN3ASTROX55.

Test Methodology

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

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

Test Facility

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

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

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

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

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

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.

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

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

The worst condition (maximum power with 100% duty cycle) was setting by the software as following table:

Test Mode	Test Software Version	Engineering Mode-TX		
802.11b	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	1Mbps	1Mbps	1Mbps
	Power Level Setting	15.5	14.5	14
802.11g	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting	15	14.5	14
802.11n ht20	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	15.5	15	14.5
802.11n ht40	Test Frequency	2422MHz	2437MHz	2452MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	14.5	14	13.5
BLE	Test Frequency	2402MHz	2440MHz	2480MHz
	BLE	N/A	N/A	N/A

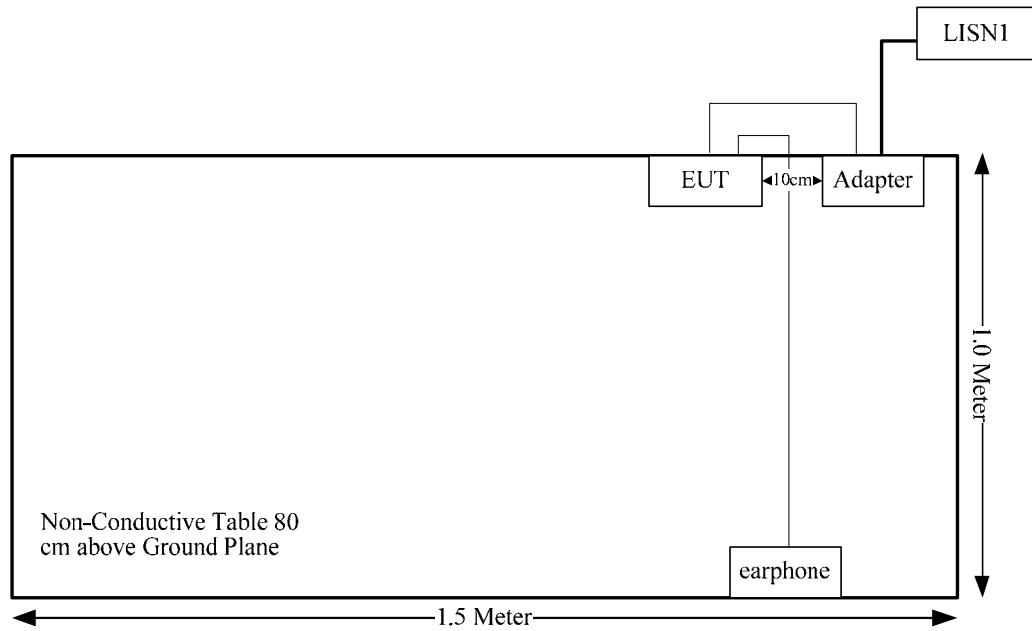
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

External Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB Cable	no	no	1.05	USB Port of Adater	EUT
Earphone Cable	no	no	1.3	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

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:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- $f(\text{GHz})$ 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

Standalone SAR test exclusion considerations

Mode	Frequency (MHz)	Pavg (dBm)	Pavg (mW)	Distance (mm)	Calculated value	Threshold (1-g)	SAR Test Exclusion
WLAN	2462	9.8	9.55	5	3.00	3	YES
BLE	2480	-3.2	0.48	5	0.15	3	YES

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 integral antenna arrangement for WiFi/BT, which was permanently attached and the antenna gain is 2 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:

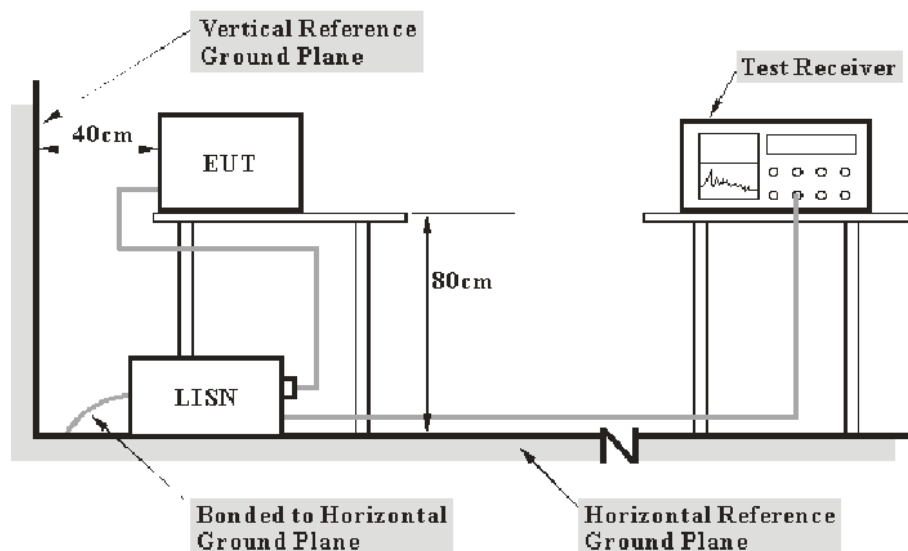
- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit.

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 3.46 dB (150 kHz to 30 MHz).

Table 1 – Values of U_{cispr}

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

EUT Setup



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

The setup of EUT is according with per ANSI C63.10-2013 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:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

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	2015-07-16	2016-07-15
R&S	Two-line V-network	ENV 216	3560.6550.12	2015-11-26	2016-11-25
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:

11.70 dB at 0.554139 MHz in the Line conducted mode for BLE

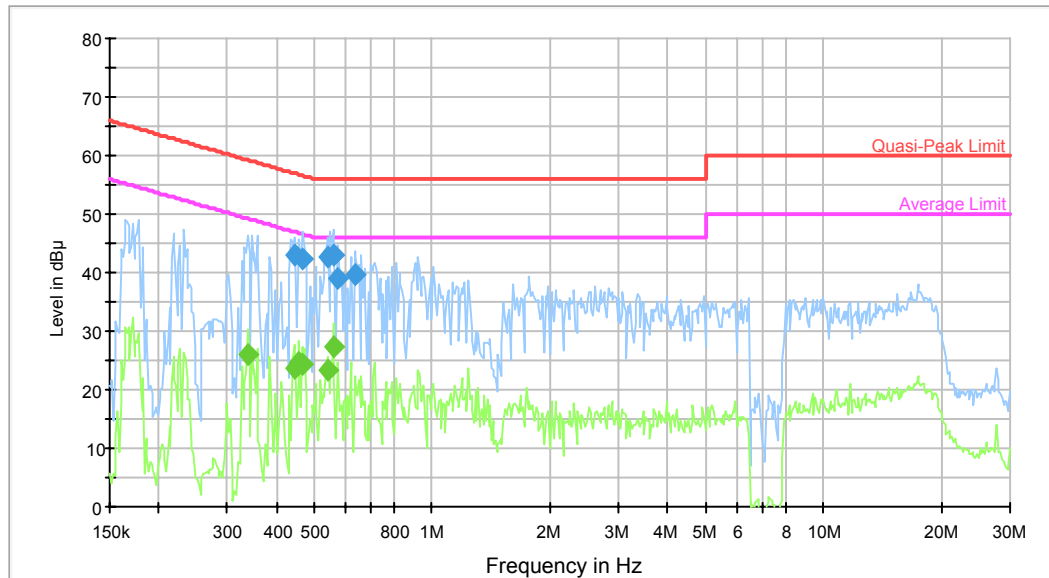
Test Data**Environmental Conditions**

Temperature:	25.6°C
Relative Humidity:	48 %
ATM Pressure:	100.9 kPa

The testing was performed by Lion Xiao on 2015-12-15.

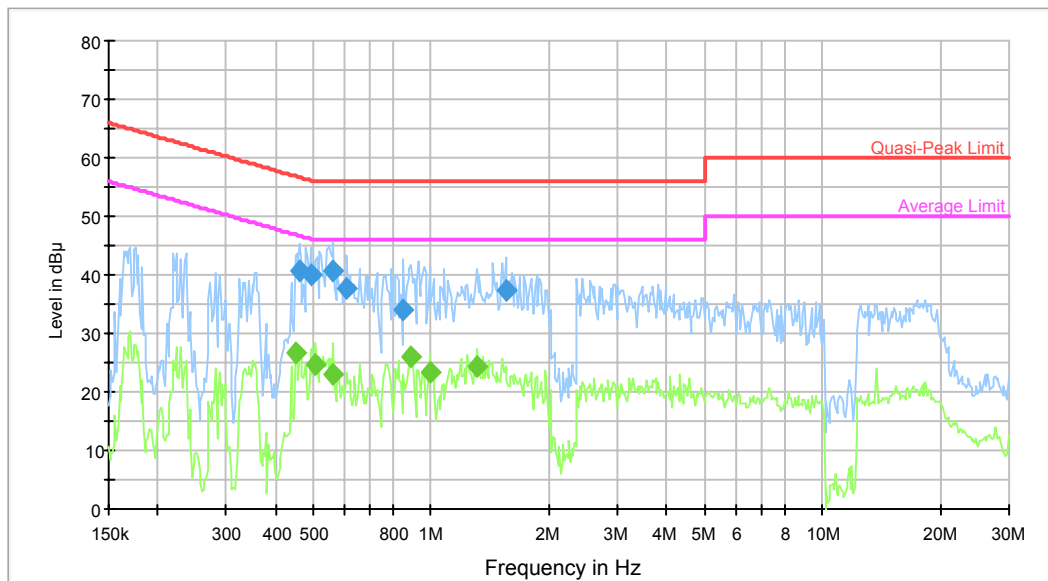
Test Mode: Transmitting (Wi-Fi)

AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.446873	43.1	9.000	L1	9.8	13.8	56.9	Compliance
0.468757	42.3	9.000	L1	9.8	14.2	56.5	Compliance
0.541050	42.7	9.000	L1	9.8	13.3	56.0	Compliance
0.558572	43.1	9.000	L1	9.8	12.9	56.0	Compliance
0.572086	38.9	9.000	L1	9.8	17.1	56.0	Compliance
0.634524	39.8	9.000	L1	9.8	16.2	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.338116	26.0	9.000	L1	9.7	23.2	49.2	Compliance
0.446873	23.7	9.000	L1	9.8	23.2	46.9	Compliance
0.457684	24.5	9.000	L1	9.8	22.2	46.7	Compliance
0.465037	24.4	9.000	L1	9.8	22.2	46.6	Compliance
0.541050	23.2	9.000	L1	9.8	22.8	46.0	Compliance
0.558572	27.3	9.000	L1	9.8	18.7	46.0	Compliance

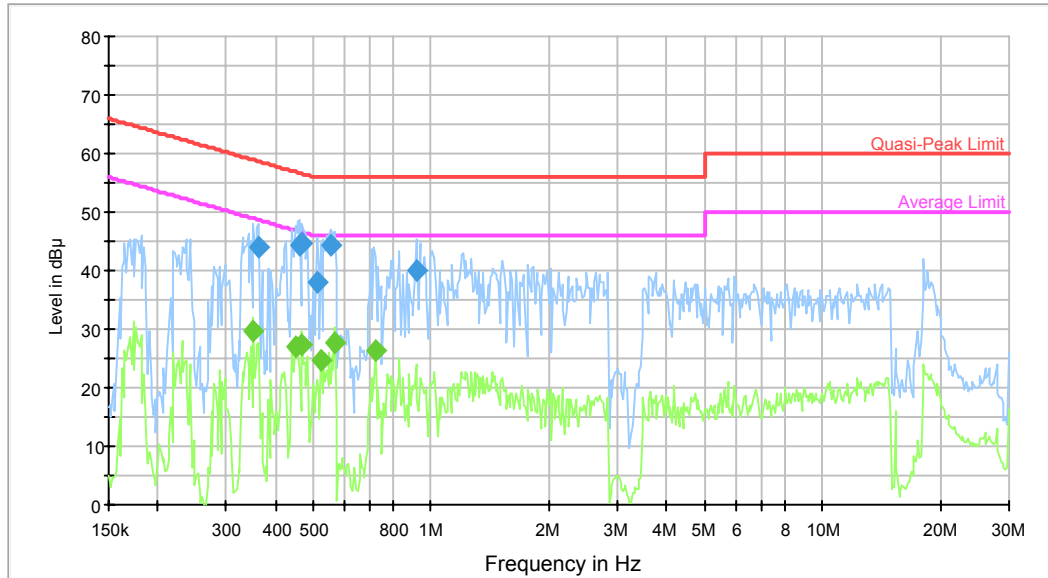
AC120 V, 60 Hz, Neutral:

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.461346	40.8	9.000	N	9.7	15.9	56.7	Compliance
0.491712	39.9	9.000	N	9.7	16.2	56.1	Compliance
0.563041	40.5	9.000	N	9.7	15.5	56.0	Compliance
0.609741	37.6	9.000	N	9.7	18.4	56.0	Compliance
0.852094	34.0	9.000	N	9.8	22.0	56.0	Compliance
1.548915	37.2	9.000	N	9.8	18.8	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.450448	26.8	9.000	N	9.7	20.1	46.9	Compliance
0.507637	24.5	9.000	N	9.7	21.5	46.0	Compliance
0.563041	22.9	9.000	N	9.7	23.1	46.0	Compliance
0.886728	26.1	9.000	N	9.8	19.9	46.0	Compliance
0.991374	23.3	9.000	N	9.8	22.7	46.0	Compliance
1.310256	24.3	9.000	N	9.8	21.7	46.0	Compliance

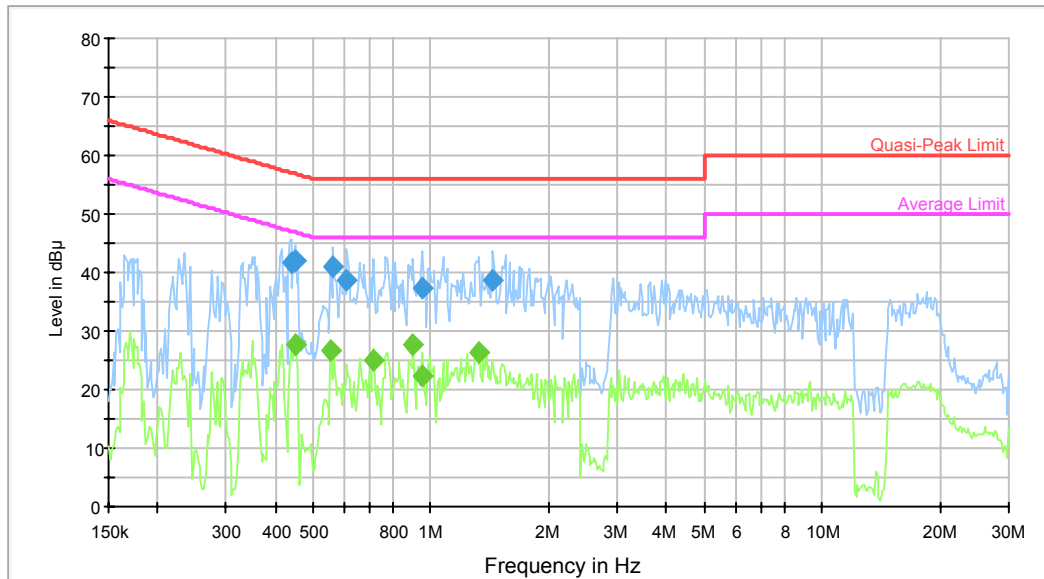
Test Mode: Transmitting (BLE)

AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.363254	44.1	9.000	L1	9.7	14.6	58.7	Compliance
0.461346	44.2	9.000	L1	9.8	12.5	56.7	Compliance
0.468757	44.7	9.000	L1	9.8	11.8	56.5	Compliance
0.511698	37.9	9.000	L1	9.8	18.1	56.0	Compliance
0.554139	44.3	9.000	L1	9.8	11.7	56.0	Compliance
0.915445	40.1	9.000	L1	9.8	15.9	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.351859	29.6	9.000	L1	9.7	19.3	48.9	Compliance
0.450448	26.9	9.000	L1	9.8	20.0	46.9	Compliance
0.468757	27.2	9.000	L1	9.8	19.3	46.5	Compliance
0.524077	24.7	9.000	L1	9.8	21.3	46.0	Compliance
0.567545	27.8	9.000	L1	9.8	18.2	46.0	Compliance
0.720803	26.2	9.000	L1	9.8	19.8	46.0	Compliance

AC120 V, 60 Hz, Neutral:

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.439808	41.5	9.000	N	9.7	15.6	57.1	Compliance
0.450448	41.9	9.000	N	9.7	15.0	56.9	Compliance
0.563041	41.0	9.000	N	9.7	15.0	56.0	Compliance
0.609741	38.8	9.000	N	9.7	17.2	56.0	Compliance
0.952654	37.3	9.000	N	9.8	18.7	56.0	Compliance
1.441726	38.5	9.000	N	9.8	17.5	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.450448	27.5	9.000	N	9.7	19.4	46.9	Compliance
0.554139	26.7	9.000	N	9.7	19.3	46.0	Compliance
0.715082	25.0	9.000	N	9.7	21.0	46.0	Compliance
0.900972	27.8	9.000	N	9.8	18.2	46.0	Compliance
0.952654	22.3	9.000	N	9.8	23.7	46.0	Compliance
1.331304	26.3	9.000	N	9.8	19.7	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_{cisp} 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_{cisp} of Table 2, then:

– compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cisp})$, exceeds the disturbance limit;

– non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cisp})$, exceeds the disturbance limit.

Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:

30M~200MHz: 5.0 dB

200M~1GHz: 6.2 dB

1G~6GHz: 4.45 dB

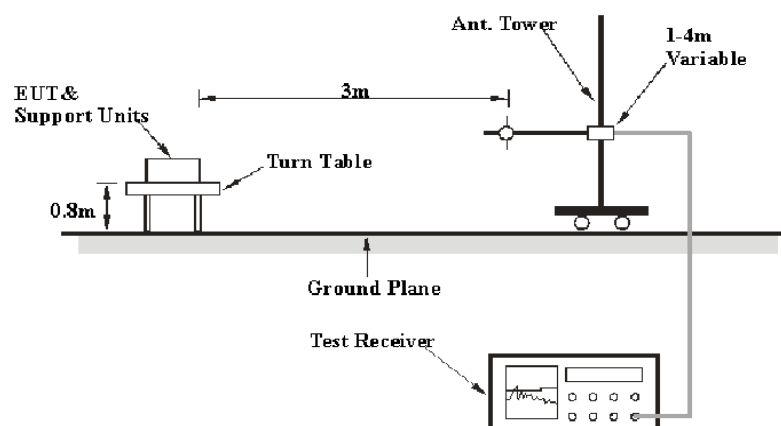
6G~18GHz: 5.23 dB

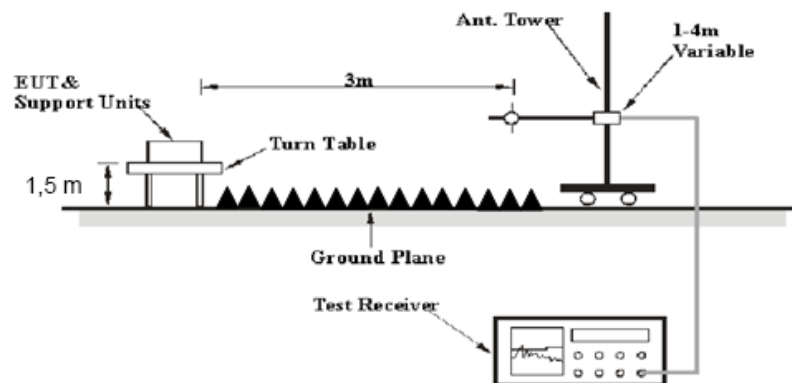
Table 2 – Values of U_{cisp}

Measurement	U_{cisp}
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	/	Ave.

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:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

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:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

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	2015-02-19	2016-02-19
R&S	Spectrum Analyzer	FSP 38	100478	2015-11-23	2016-11-22
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2014-06-16	2017-06-15
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2015-09-06	2016-09-06

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

Test Results Summary

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

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

Test Data

Environmental Conditions

Temperature:	25.1~25.8 °C
Relative Humidity:	49~51 %
ATM Pressure:	100.8~101 kPa

* The testing was performed by Lion Xiao from 2015-12-16 to 2015-12-17.

Test Mode: Transmitting

802.11b Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	65.78	PK	H	25.67	3.68	0.00	95.13	N/A	N/A
2412	60.31	AV	H	25.67	3.68	0.00	89.66	N/A	N/A
2412	67.86	PK	V	25.67	3.68	0.00	97.21	N/A	N/A
2412	62.32	AV	V	25.67	3.68	0.00	91.67	N/A	N/A
2390	26.58	PK	V	25.61	3.63	0.00	55.82	74.00	18.18
2390	14.47	AV	V	25.61	3.63	0.00	43.71	54.00	10.29
4824	42.24	PK	V	30.64	5.03	27.41	50.50	74.00	23.50
4824	39.8	AV	V	30.64	5.03	27.41	48.06	54.00	5.94
7236	34.47	PK	V	34.17	6.65	25.90	49.39	74.00	24.61
7236	22.6	AV	V	34.17	6.65	25.90	37.52	54.00	16.48
9648	29.53	PK	V	36.06	8.55	27.46	46.68	74.00	27.32
9648	17.3	AV	V	36.06	8.55	27.46	34.45	54.00	19.55
3580	35.56	PK	V	28.98	4.58	27.26	41.86	74.00	32.14
3580	23.03	AV	V	28.98	4.58	27.26	29.33	54.00	24.67
243.9	34.7	QP	V	12.26	1.89	21.49	27.36	46.00	18.64
Middle Channel: 2437 MHz									
2437	65.46	PK	H	25.74	3.75	0.00	94.95	N/A	N/A
2437	60.81	AV	H	25.74	3.75	0.00	90.30	N/A	N/A
2437	67.42	PK	V	25.74	3.75	0.00	96.91	N/A	N/A
2437	52.02	AV	V	25.74	3.75	0.00	81.51	N/A	N/A
4874	42.09	PK	V	30.77	5.14	27.42	50.58	74.00	23.42
4874	39.41	AV	V	30.77	5.14	27.42	47.90	54.00	6.10
7311	34.05	PK	V	34.35	6.74	25.88	49.26	74.00	24.74
7311	22.26	AV	V	34.35	6.74	25.88	37.47	54.00	16.53
9748	29.13	PK	V	36.30	8.61	27.24	46.80	74.00	27.20
9748	16.89	AV	V	36.30	8.61	27.24	34.56	54.00	19.44
3580	34.26	PK	V	28.98	4.58	27.26	40.56	74.00	33.44
3580	21.73	AV	V	28.98	4.58	27.26	28.03	54.00	25.97
3475	35.57	PK	V	28.72	4.73	27.23	41.79	74.00	32.21
3475	23.01	AV	V	28.72	4.73	27.23	29.23	54.00	24.77
243.9	34.3	QP	V	12.26	1.89	21.49	26.96	46.00	19.04
High Channel: 2462 MHz									
2462	65.14	PK	H	25.80	3.75	0.00	94.69	N/A	N/A
2462	60.61	AV	H	25.80	3.75	0.00	90.16	N/A	N/A
2462	67.22	PK	V	25.80	3.75	0.00	96.77	N/A	N/A
2462	62.75	AV	V	25.80	3.75	0.00	92.30	N/A	N/A
2483.5	25.42	PK	V	25.86	3.67	0.00	54.95	74.00	19.05
2483.5	14	AV	V	25.86	3.67	0.00	43.53	54.00	10.47
4924	41.96	PK	V	30.90	5.34	27.43	50.77	74.00	23.23
4924	39.31	AV	V	30.90	5.34	27.43	48.12	54.00	5.88
7386	34.17	PK	V	34.53	6.83	25.86	49.67	74.00	24.33
7386	22.22	AV	V	34.53	6.83	25.86	37.72	54.00	16.28
9848	29.09	PK	V	36.54	8.66	26.94	47.35	74.00	26.65
9848	16.9	AV	V	36.54	8.66	26.94	35.16	54.00	18.84
3580	35.13	PK	V	28.98	4.58	27.26	41.43	74.00	32.57
3580	23.57	AV	V	28.98	4.58	27.26	29.87	54.00	24.13
243.9	34.9	QP	V	12.26	1.89	21.49	27.56	46.00	18.44

802.11g Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	64.31	PK	H	25.67	3.68	0.00	93.66	N/A	N/A
2412	56.12	AV	H	25.67	3.68	0.00	85.47	N/A	N/A
2412	66.53	PK	V	25.67	3.68	0.00	95.88	N/A	N/A
2412	58.26	AV	V	25.67	3.68	0.00	87.61	N/A	N/A
2390	27.84	PK	V	25.61	3.63	0.00	57.08	74.00	16.92
2390	15.9	AV	V	25.61	3.63	0.00	45.14	54.00	8.86
4824	37.66	PK	V	30.64	5.03	27.41	45.92	74.00	28.08
4824	24.16	AV	V	30.64	5.03	27.41	32.42	54.00	21.58
7236	32.14	PK	V	34.17	6.65	25.90	47.06	74.00	26.94
7236	19.2	AV	V	34.17	6.65	25.90	34.12	54.00	19.88
9648	29.24	PK	V	36.06	8.55	27.46	46.39	74.00	27.61
9648	16.22	AV	V	36.06	8.55	27.46	33.37	54.00	20.63
3580	35.23	PK	V	28.98	4.58	27.26	41.53	74.00	32.47
3580	23.69	AV	V	28.98	4.58	27.26	29.99	54.00	24.01
243.9	34.9	QP	V	12.26	1.89	21.49	27.56	46.00	18.44
Middle Channel: 2437 MHz									
2437	64.08	PK	H	25.74	3.75	0.00	93.57	N/A	N/A
2437	56.65	AV	H	25.74	3.75	0.00	86.14	N/A	N/A
2437	66.12	PK	V	25.74	3.75	0.00	95.61	N/A	N/A
2437	58.74	AV	V	25.74	3.75	0.00	88.23	N/A	N/A
4874	37.55	PK	V	30.77	5.14	27.42	46.04	74.00	27.96
4874	24.08	AV	V	30.77	5.14	27.42	32.57	54.00	21.43
7311	31.71	PK	V	34.35	6.74	25.88	46.92	74.00	27.08
7311	18.85	AV	V	34.35	6.74	25.88	34.06	54.00	19.94
9748	29.14	PK	V	36.30	8.61	27.24	46.81	74.00	27.19
9748	16.13	AV	V	36.30	8.61	27.24	33.80	54.00	20.20
3040	33.77	PK	V	27.33	6.67	27.50	40.27	74.00	33.73
3040	21.24	AV	V	27.33	6.67	27.50	27.74	54.00	26.26
3580	35.62	PK	V	28.98	4.58	27.26	41.92	74.00	32.08
3580	23.05	AV	V	28.98	4.58	27.26	29.35	54.00	24.65
243.9	34.1	QP	V	12.26	1.89	21.49	26.76	46.00	19.24
High Channel: 2462 MHz									
2462	64.68	PK	H	25.80	3.75	0.00	94.23	N/A	N/A
2462	56.34	AV	H	25.80	3.75	0.00	85.89	N/A	N/A
2462	66.85	PK	V	25.80	3.75	0.00	96.40	N/A	N/A
2462	58.52	AV	V	25.80	3.75	0.00	88.07	N/A	N/A
2483.5	26.78	PK	V	25.86	3.67	0.00	56.31	74.00	17.69
2483.5	14.05	AV	V	25.86	3.67	0.00	43.58	54.00	10.42
4924	37.28	PK	V	30.90	5.34	27.43	46.09	74.00	27.91
4924	23.78	AV	V	30.90	5.34	27.43	32.59	54.00	21.41
7386	31.8	PK	V	34.53	6.83	25.86	47.30	74.00	26.70
7386	18.84	AV	V	34.53	6.83	25.86	34.34	54.00	19.66
9848	29.03	PK	V	36.54	8.66	26.94	47.29	74.00	26.71
9848	16.11	AV	V	36.54	8.66	26.94	34.37	54.00	19.63
3580	35.87	PK	V	28.98	4.58	27.26	42.17	74.00	31.83
3580	23.37	AV	V	28.98	4.58	27.26	29.67	54.00	24.33
243.9	34.5	QP	V	12.26	1.89	21.49	27.16	46.00	18.84

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	64.11	PK	H	25.67	3.68	0.00	93.46	N/A	N/A
2412	54.89	AV	H	25.67	3.68	0.00	84.24	N/A	N/A
2412	66.03	PK	V	25.67	3.68	0.00	95.38	N/A	N/A
2412	56.7	AV	V	25.67	3.68	0.00	86.05	N/A	N/A
2390	28.33	PK	V	25.61	3.63	0.00	57.57	74.00	16.43
2390	16.83	AV	V	25.61	3.63	0.00	46.07	54.00	7.93
4824	37.9	PK	V	30.64	5.03	27.41	46.16	74.00	27.84
4824	23.16	AV	V	30.64	5.03	27.41	31.42	54.00	22.58
7236	32.37	PK	V	34.17	6.65	25.90	47.29	74.00	26.71
7236	19.14	AV	V	34.17	6.65	25.90	34.06	54.00	19.94
9648	29.37	PK	V	36.06	8.55	27.46	46.52	74.00	27.48
9648	16.25	AV	V	36.06	8.55	27.46	33.40	54.00	20.60
3580	35.6	PK	V	28.98	4.58	27.26	41.90	74.00	32.10
3580	23.13	AV	V	28.98	4.58	27.26	29.43	54.00	24.57
243.9	34.9	QP	V	12.26	1.89	21.49	27.56	46.00	18.44
Middle Channel: 2437 MHz									
2437	64.66	PK	H	25.74	3.75	0.00	94.15	N/A	N/A
2437	54.12	AV	H	25.74	3.75	0.00	83.61	N/A	N/A
2437	66.44	PK	V	25.74	3.75	0.00	95.93	N/A	N/A
2437	56.25	AV	V	25.74	3.75	0.00	85.74	N/A	N/A
4874	37.67	PK	V	30.77	5.14	27.42	46.16	74.00	27.84
4874	22.81	AV	V	30.77	5.14	27.42	31.30	54.00	22.70
7311	31.91	PK	V	34.35	6.74	25.88	47.12	74.00	26.88
7311	18.95	AV	V	34.35	6.74	25.88	34.16	54.00	19.84
9748	29.31	PK	V	36.30	8.61	27.24	46.98	74.00	27.02
9748	16.24	AV	V	36.30	8.61	27.24	33.91	54.00	20.09
3040	32.23	PK	V	27.33	6.67	27.50	38.73	74.00	35.27
3040	19.63	AV	V	27.33	6.67	27.50	26.13	54.00	27.87
3580	35.38	PK	V	28.98	4.58	27.26	41.68	74.00	32.32
3580	23.82	AV	V	28.98	4.58	27.26	30.12	54.00	23.88
243.9	34.6	QP	V	12.26	1.89	21.49	27.26	46.00	18.74
High Channel: 2462 MHz									
2462	64.22	PK	H	25.80	3.75	0.00	93.77	N/A	N/A
2462	54.84	AV	H	25.80	3.75	0.00	84.39	N/A	N/A
2462	66.31	PK	V	25.80	3.75	0.00	95.86	N/A	N/A
2462	56.03	AV	V	25.80	3.75	0.00	85.58	N/A	N/A
2483.5	26.96	PK	V	25.86	3.67	0.00	56.49	74.00	17.51
2483.5	14.99	AV	V	25.86	3.67	0.00	44.52	54.00	9.48
4924	37.72	PK	V	30.90	5.34	27.43	46.53	74.00	27.47
4924	22.93	AV	V	30.90	5.34	27.43	31.74	54.00	22.26
7386	31.89	PK	V	34.53	6.83	25.86	47.39	74.00	26.61
7386	18.83	AV	V	34.53	6.83	25.86	34.33	54.00	19.67
9848	29.46	PK	V	36.54	8.66	26.94	47.72	74.00	26.28
9848	16.26	AV	V	36.54	8.66	26.94	34.52	54.00	19.48
3580	35.23	PK	V	28.98	4.58	27.26	41.53	74.00	32.47
3580	23.66	AV	V	28.98	4.58	27.26	29.96	54.00	24.04
243.9	34.6	QP	V	12.26	1.89	21.49	27.26	46.00	18.74

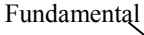
802.11 n ht40 Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2422 MHz									
2422	62.77	PK	H	25.70	3.71	0.00	92.18	N/A	N/A
2422	50.36	AV	H	25.70	3.71	0.00	79.77	N/A	N/A
2422	64.97	PK	V	25.70	3.71	0.00	94.38	N/A	N/A
2422	52.5	AV	V	25.70	3.71	0.00	81.91	N/A	N/A
2390	28.66	PK	V	25.61	3.63	0.00	57.90	74.00	16.10
2390	16.98	AV	V	25.61	3.63	0.00	46.22	54.00	7.78
4844	33.15	PK	V	30.69	4.99	27.42	41.41	74.00	32.59
4844	20.21	AV	V	30.69	4.99	27.42	28.47	54.00	25.53
7266	31.66	PK	V	34.24	6.68	25.89	46.69	74.00	27.31
7266	19.07	AV	V	34.24	6.68	25.89	34.10	54.00	19.90
9688	29.02	PK	V	36.15	8.58	27.37	46.38	74.00	27.62
9688	16.13	AV	V	36.15	8.58	27.37	33.49	54.00	20.51
3580	35.45	PK	V	28.98	4.58	27.26	41.75	74.00	32.25
3580	23.89	AV	V	28.98	4.58	27.26	30.19	54.00	23.81
243.9	34.8	QP	V	12.26	1.89	21.49	27.46	46.00	18.54
Middle Channel: 2437 MHz									
2437	62.41	PK	H	25.74	3.75	0.00	91.90	N/A	N/A
2437	50.98	AV	H	25.74	3.75	0.00	80.47	N/A	N/A
2437	64.52	PK	V	25.74	3.75	0.00	94.01	N/A	N/A
2437	52.12	AV	V	25.74	3.75	0.00	81.61	N/A	N/A
4874	33.02	PK	V	30.77	5.14	27.42	41.51	74.00	32.49
4874	20.09	AV	V	30.77	5.14	27.42	28.58	54.00	25.42
7311	31.31	PK	V	34.35	6.74	25.88	46.52	74.00	27.48
7311	18.68	AV	V	34.35	6.74	25.88	33.89	54.00	20.11
9748	29.25	PK	V	36.30	8.61	27.24	46.92	74.00	27.08
9748	16.37	AV	V	36.30	8.61	27.24	34.04	54.00	19.96
3175	32.95	PK	V	27.76	6.53	27.39	39.85	74.00	34.15
3175	20.49	AV	V	27.76	6.53	27.39	27.39	54.00	26.61
3580	35.19	PK	V	28.98	4.58	27.26	41.49	74.00	32.51
3580	23.1	AV	V	28.98	4.58	27.26	29.40	54.00	24.60
243.9	34	QP	V	12.26	1.89	21.49	26.66	46.00	19.34
High Channel: 2452 MHz									
2452	62.06	PK	H	25.78	3.78	0.00	91.62	N/A	N/A
2452	50.75	AV	H	25.78	3.78	0.00	80.31	N/A	N/A
2452	64.28	PK	V	25.78	3.78	0.00	93.84	N/A	N/A
2452	52.95	AV	V	25.78	3.78	0.00	82.51	N/A	N/A
2483.5	27.73	PK	V	25.86	3.67	0.00	57.26	74.00	16.74
2483.5	15.58	AV	V	25.86	3.67	0.00	45.11	54.00	8.89
4904	32.86	PK	V	30.85	5.31	27.43	41.59	74.00	32.41
4904	19.89	AV	V	30.85	5.31	27.43	28.62	54.00	25.38
7356	31.26	PK	V	34.45	6.79	25.87	46.63	74.00	27.37
7356	18.65	AV	V	34.45	6.79	25.87	34.02	54.00	19.98
9808	29.16	PK	V	36.44	8.64	27.09	47.15	74.00	26.85
9808	16.28	AV	V	36.44	8.64	27.09	34.27	54.00	19.73
3580	35.09	PK	V	28.98	4.58	27.26	41.39	74.00	32.61
3580	23.52	AV	V	28.98	4.58	27.26	29.82	54.00	24.18
243.9	34.5	QP	V	12.26	1.89	21.49	27.16	46.00	18.84

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	60.18	PK	H	25.65	3.66	0.00	89.49	N/A	N/A
2402	54.83	AV	H	25.65	3.66	0.00	84.14	N/A	N/A
2402	61.57	PK	V	25.65	3.66	0.00	90.88	N/A	N/A
2402	55.19	AV	V	25.65	3.66	0.00	84.50	N/A	N/A
2390	26.01	PK	V	25.61	3.63	0.00	55.25	74.00	18.75
2390	13.35	AV	V	25.61	3.63	0.00	42.59	54.00	11.41
4804	31.82	PK	V	30.59	5.06	27.41	40.06	74.00	33.94
4804	18.66	AV	V	30.59	5.06	27.41	26.90	54.00	27.10
7206	32.47	PK	V	34.09	6.61	25.91	47.26	74.00	26.74
7206	19.23	AV	V	34.09	6.61	25.91	34.02	54.00	19.98
9608	30.28	PK	V	35.96	8.53	27.55	47.22	74.00	26.78
9608	16.99	AV	V	35.96	8.53	27.55	33.93	54.00	20.07
3085	34.77	PK	V	27.47	6.78	27.46	41.56	74.00	32.44
3085	22.16	AV	V	27.47	6.78	27.46	28.95	54.00	25.05
243.9	34.3	QP	V	12.26	1.89	21.49	26.96	46.00	19.04
Middle Channel: 2440 MHz									
2440	60.62	PK	H	25.74	3.76	0.00	90.12	N/A	N/A
2440	54.01	AV	H	25.74	3.76	0.00	83.51	N/A	N/A
2440	61.85	PK	V	25.74	3.76	0.00	91.35	N/A	N/A
2440	55.29	AV	V	25.74	3.76	0.00	84.79	N/A	N/A
4880	31.77	PK	V	30.79	5.18	27.42	40.32	74.00	33.68
4880	18.5	AV	V	30.79	5.18	27.42	27.05	54.00	26.95
7320	32.52	PK	V	34.37	6.75	25.88	47.76	74.00	26.24
7320	19.34	AV	V	34.37	6.75	25.88	34.58	54.00	19.42
9760	30.18	PK	V	36.32	8.62	27.21	47.91	74.00	26.09
9760	17.02	AV	V	36.32	8.62	27.21	34.75	54.00	19.25
3085	34.8	PK	V	27.47	6.78	27.46	41.59	74.00	32.41
3085	22.13	AV	V	27.47	6.78	27.46	28.92	54.00	25.08
3205	33.88	PK	V	27.86	6.10	27.37	40.47	74.00	33.53
3205	21.23	AV	V	27.86	6.10	27.37	27.82	54.00	26.18
243.9	34	QP	V	12.26	1.89	21.49	26.66	46.00	19.34
High Channel: 2480 MHz									
2480	61.56	PK	H	25.85	3.68	0.00	91.09	N/A	N/A
2480	55.25	AV	H	25.85	3.68	0.00	84.78	N/A	N/A
2480	62.13	PK	V	25.85	3.68	0.00	91.66	N/A	N/A
2480	56.3	AV	V	25.85	3.68	0.00	85.83	N/A	N/A
2483.5	26.15	PK	V	25.86	3.67	0.00	55.68	74.00	18.32
2483.5	13.83	AV	V	25.86	3.67	0.00	43.36	54.00	10.64
4960	31.38	PK	V	31.00	5.34	27.43	40.29	74.00	33.71
4960	18.27	AV	V	31.00	5.34	27.43	27.18	54.00	26.82
7440	32.26	PK	V	34.66	6.89	25.97	47.84	74.00	26.16
7440	19.01	AV	V	34.66	6.89	25.97	34.59	54.00	19.41
9920	30.06	PK	V	36.71	8.71	26.66	48.82	74.00	25.18
9920	16.82	AV	V	36.71	8.71	26.66	35.58	54.00	18.42
3085	34.53	PK	V	27.47	6.78	27.46	41.32	74.00	32.68
3085	21.89	AV	V	27.47	6.78	27.46	28.68	54.00	25.32
243.9	34.6	QP	V	12.26	1.89	21.49	27.26	46.00	18.74

802.11b Low Channel



Ref Lvl 10.5 dBm Marker 2 [T1] -54.99 dBm RBW 100 kHz RF Att 20 dB
 4.88388778 GHz VBW 300 kHz SWT 6.4 s Unit dBm

0.5 dB Offset

1 [T1] -54.99 dBm
 4.88388778 GHz
 2 [T1] -0.77 dBm
 2.43192385 GHz

1MAX -20.77 dBm

Start 30 MHz 2.497 GHz/ Stop 25 GHz

Date: 16.DEC.2015 22:27:53

Ref Lvl 10.5 dBm

Marker 2 [T1] -58.74 dBm

3.58284569 GHz

RBW 100 kHz RF Att 20 dB

VBW 300 kHz

SWT 6.4 s Unit dBm

0.5 dB Offse

MAX -23.53 dBm

2

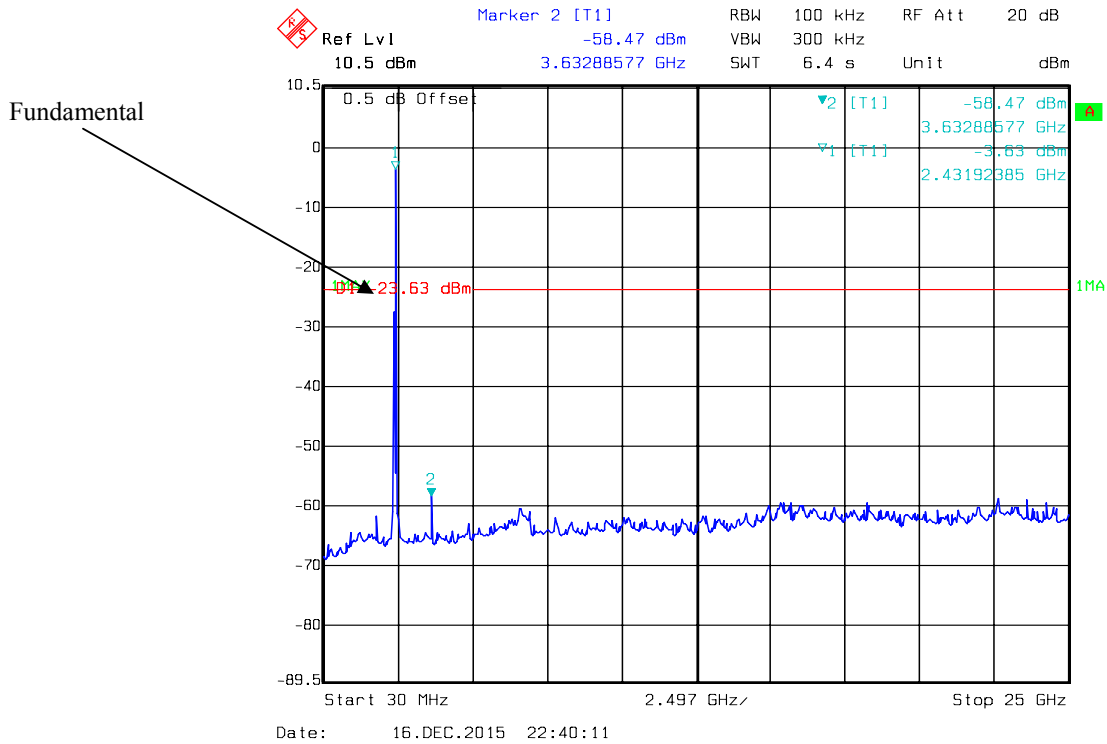
Start 30 MHz

2.497 GHz

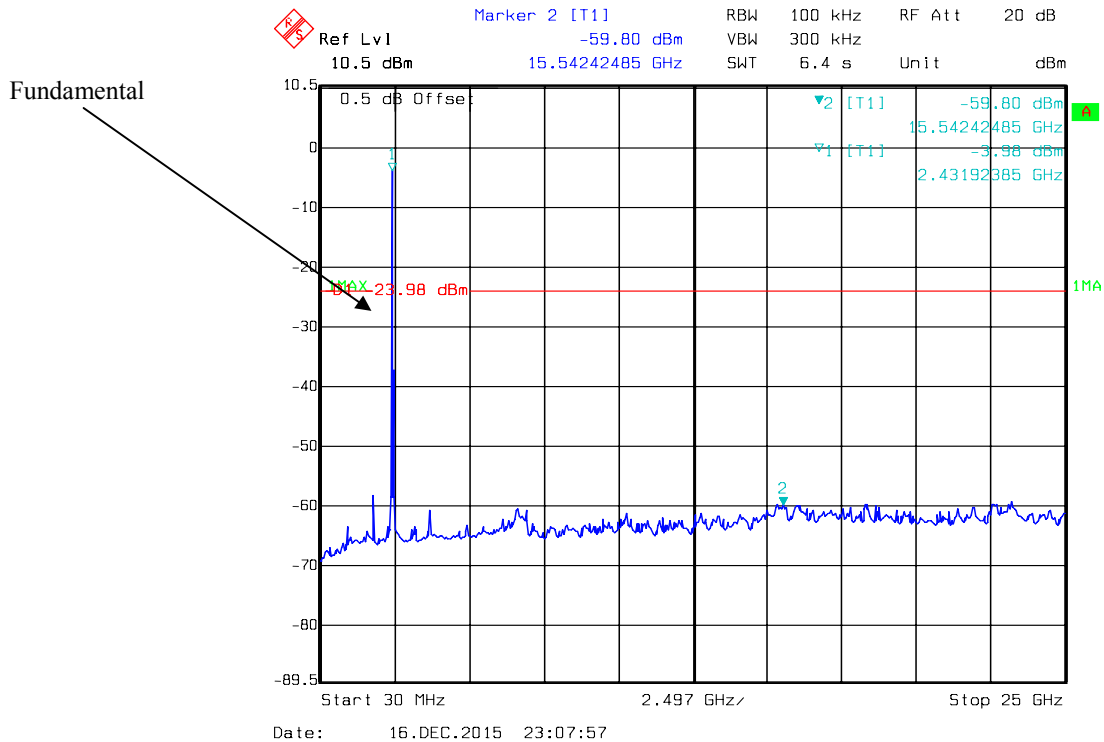
Stop 25 GHz

Date: 16.DEC.2015 22:33:16

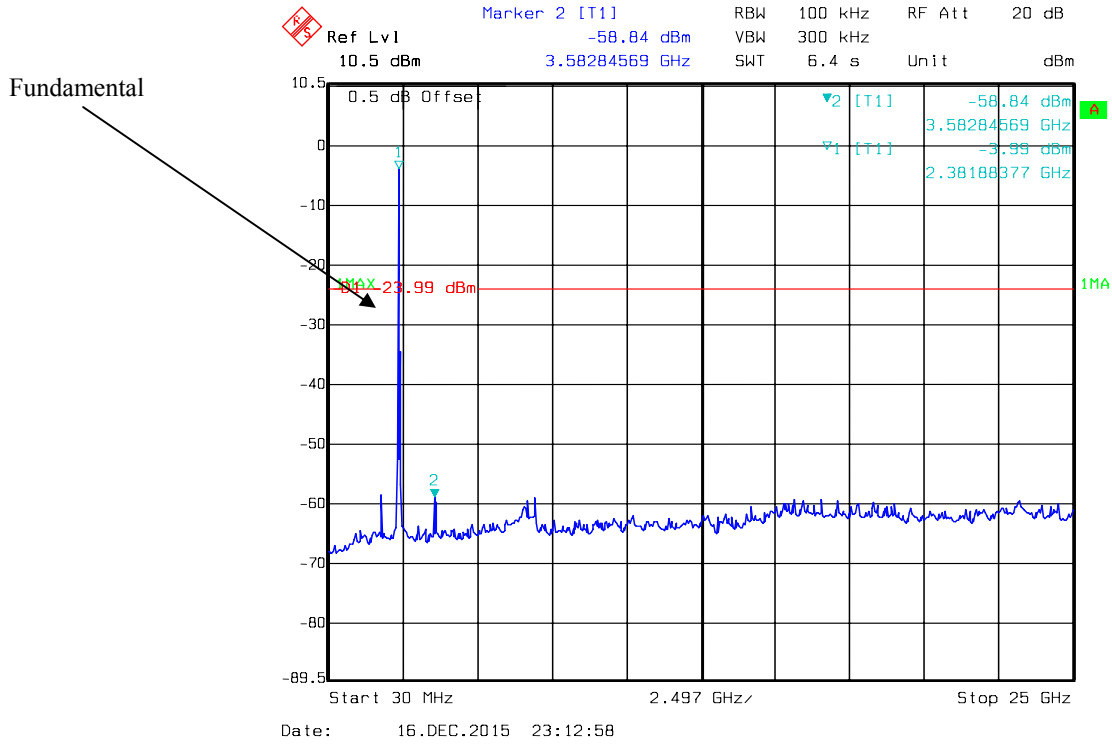
802.11g Middle Channel



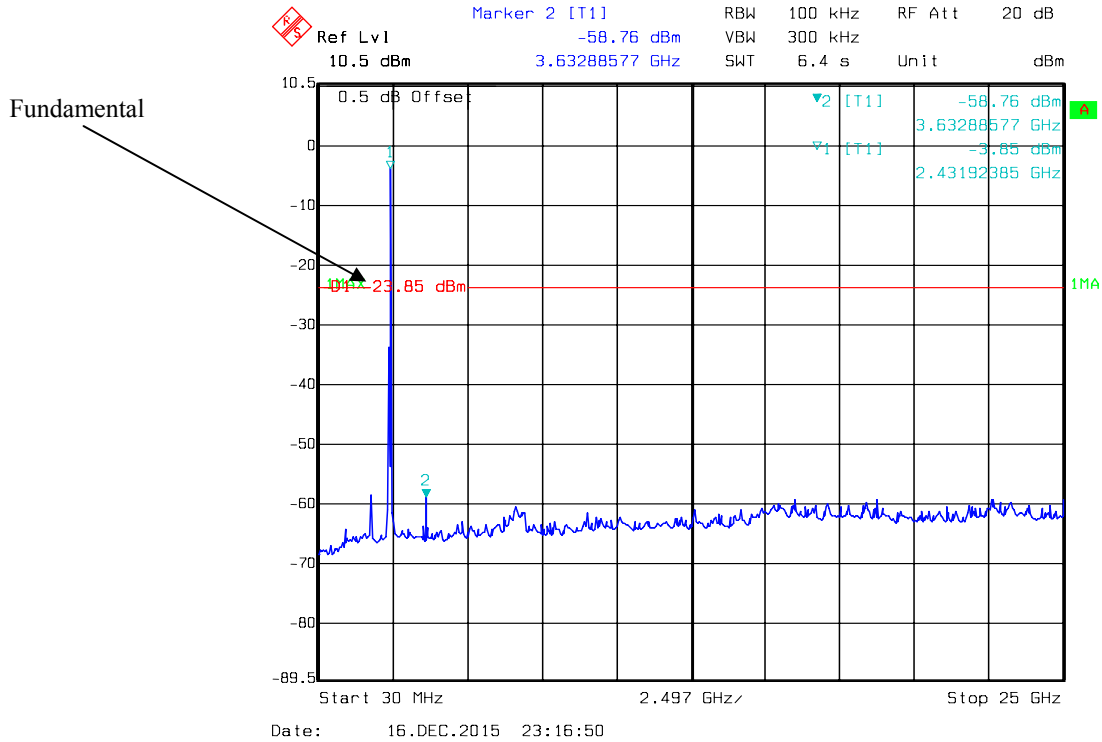
802.11g High Channel



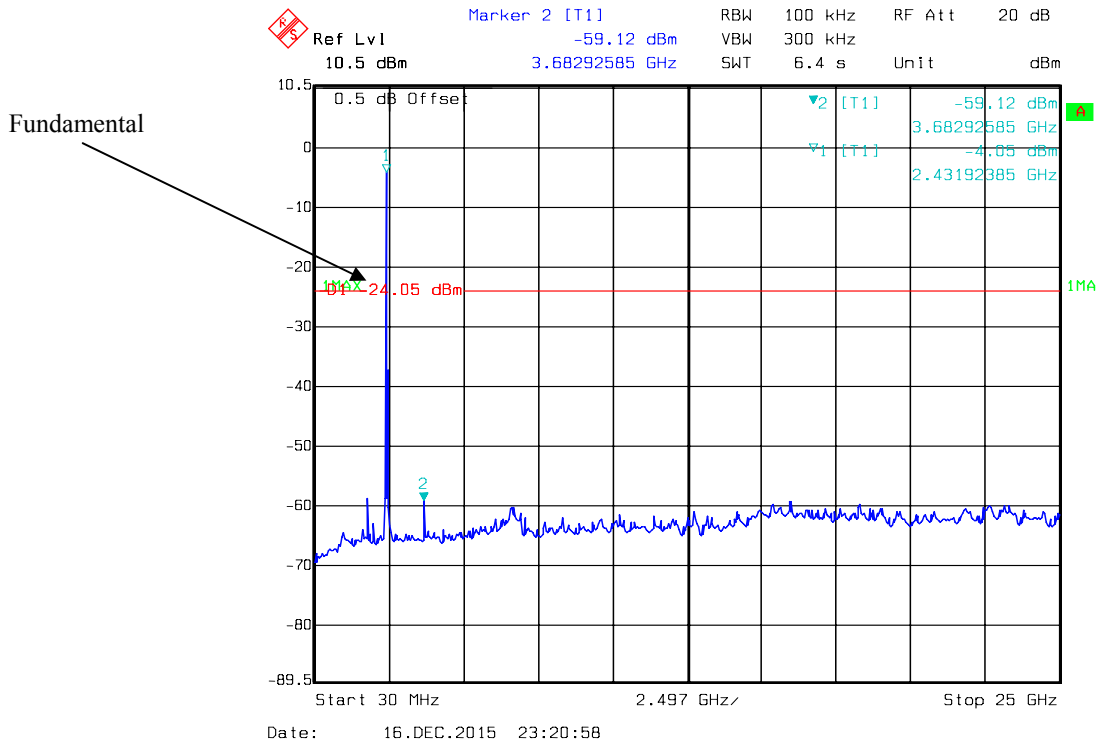
802.11n ht20 Low Channel



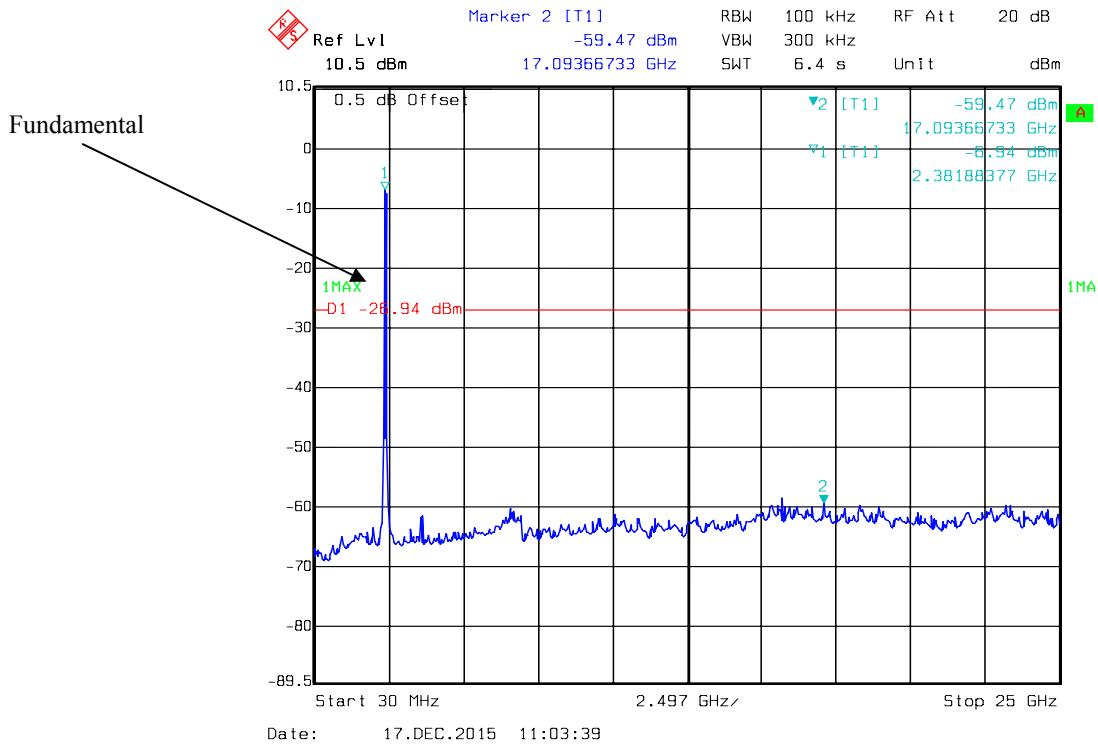
802.11n ht20 Middle Channel



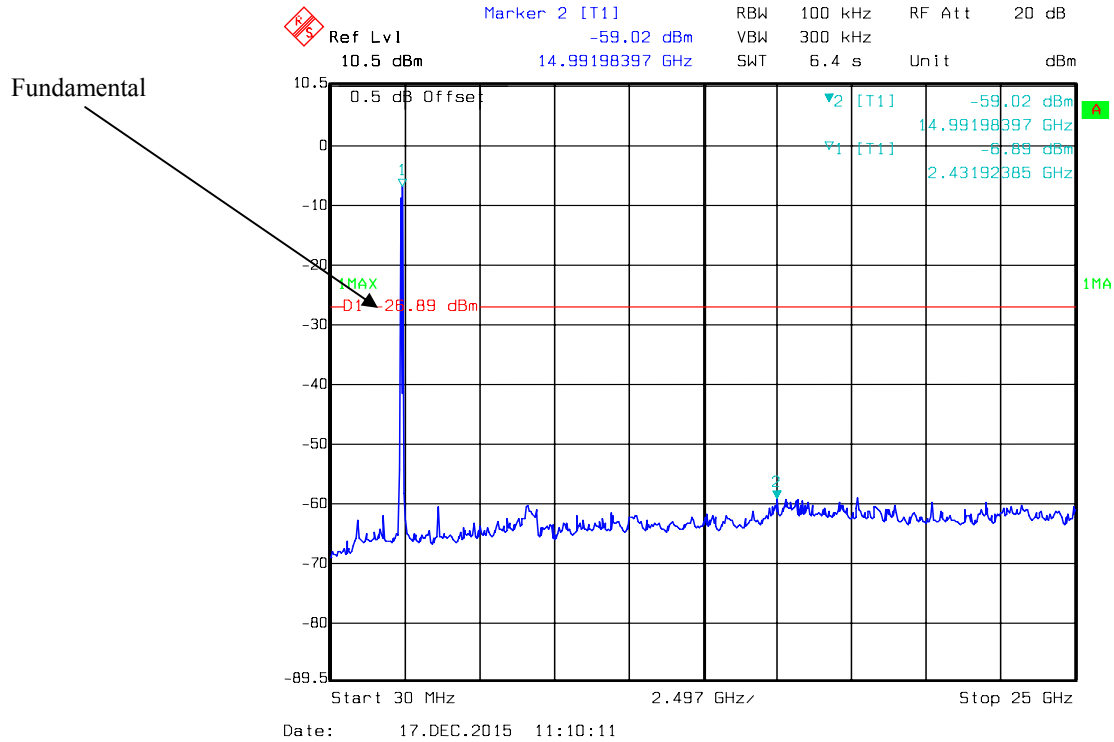
802.11n ht20 High Channel



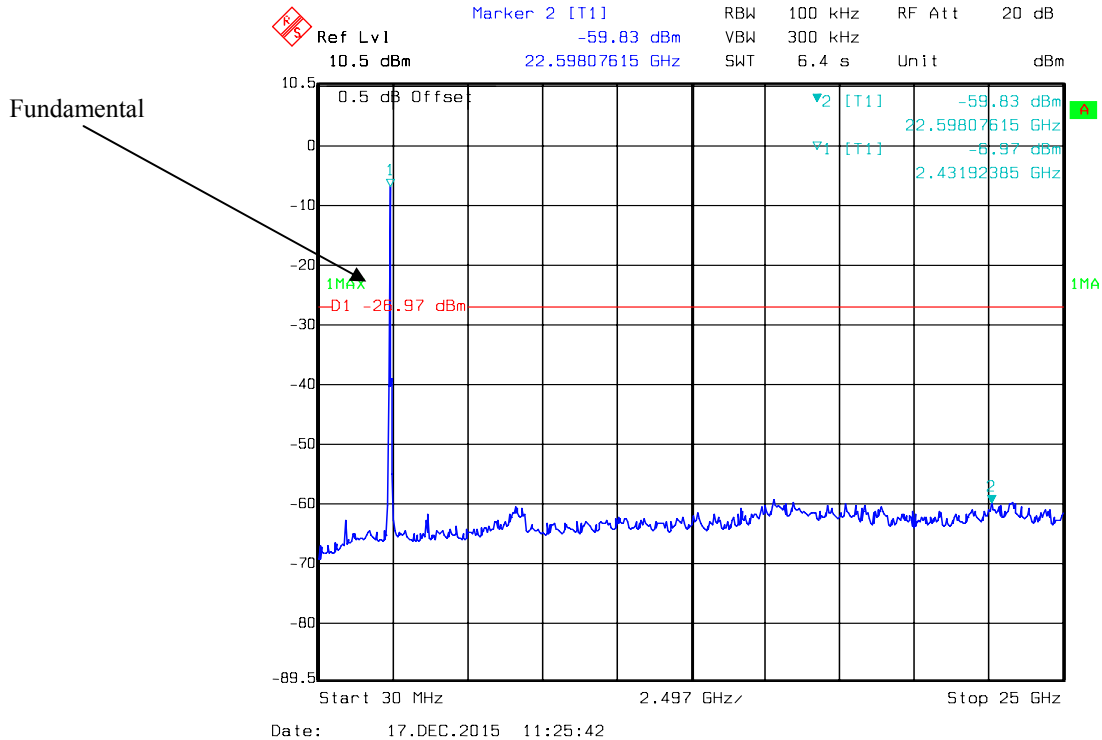
802.11n ht40 Low Channel



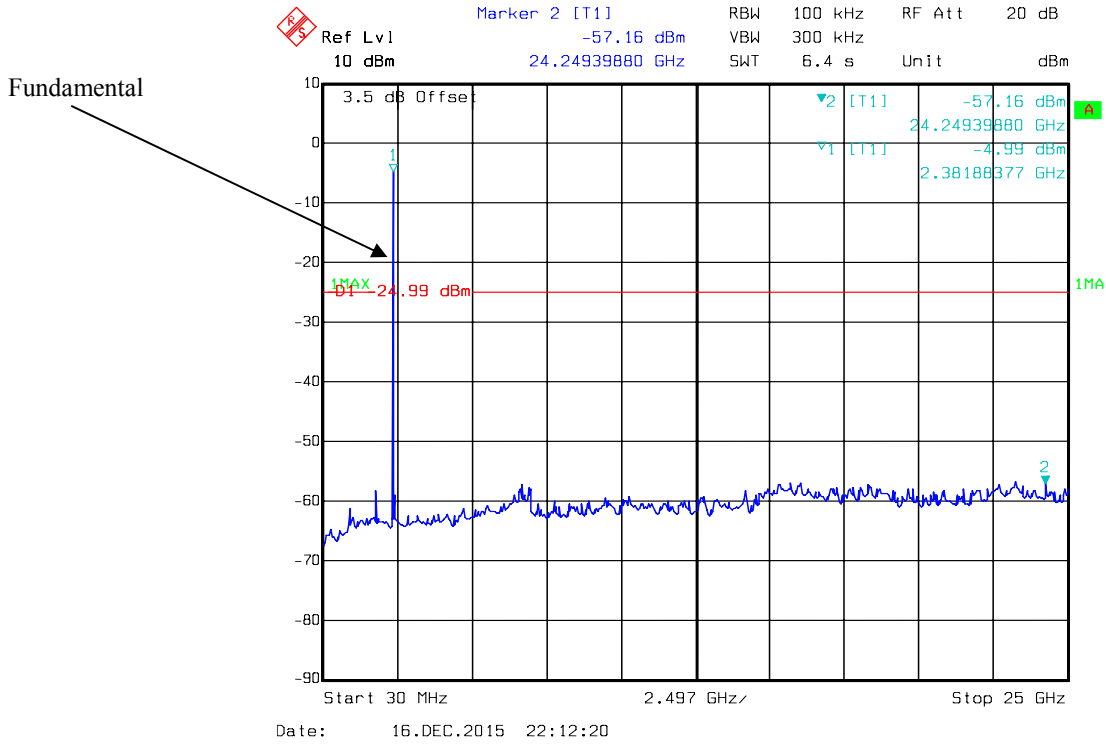
802.11n ht40 Middle Channel



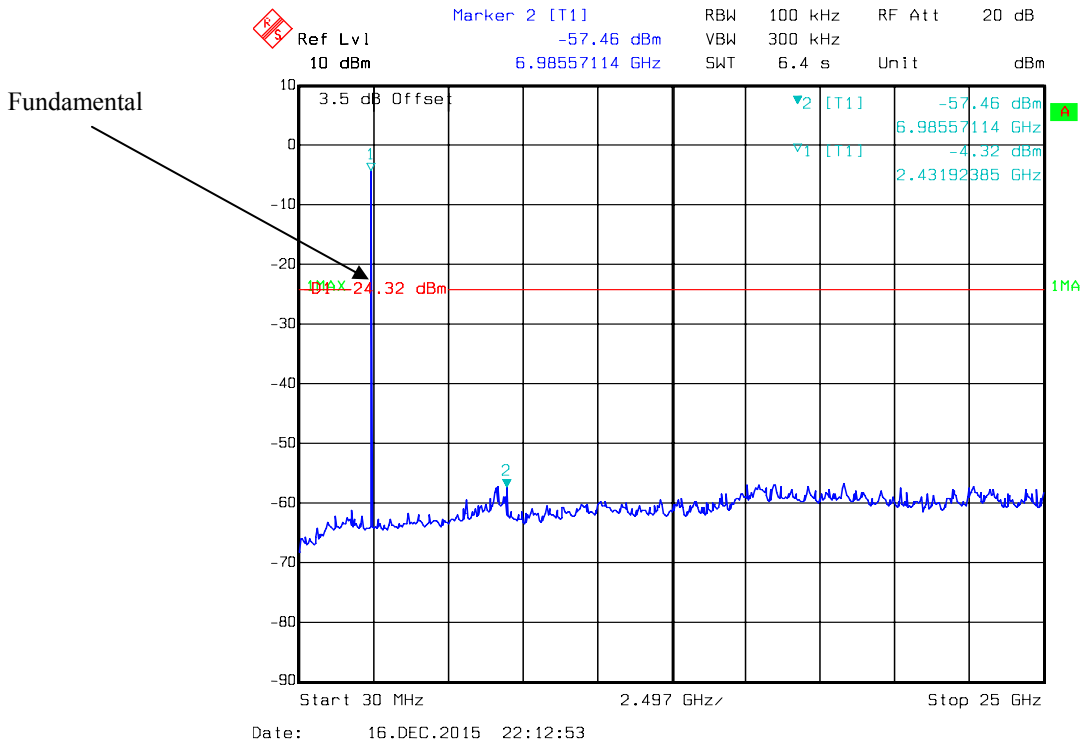
802.11n ht40 High Channel



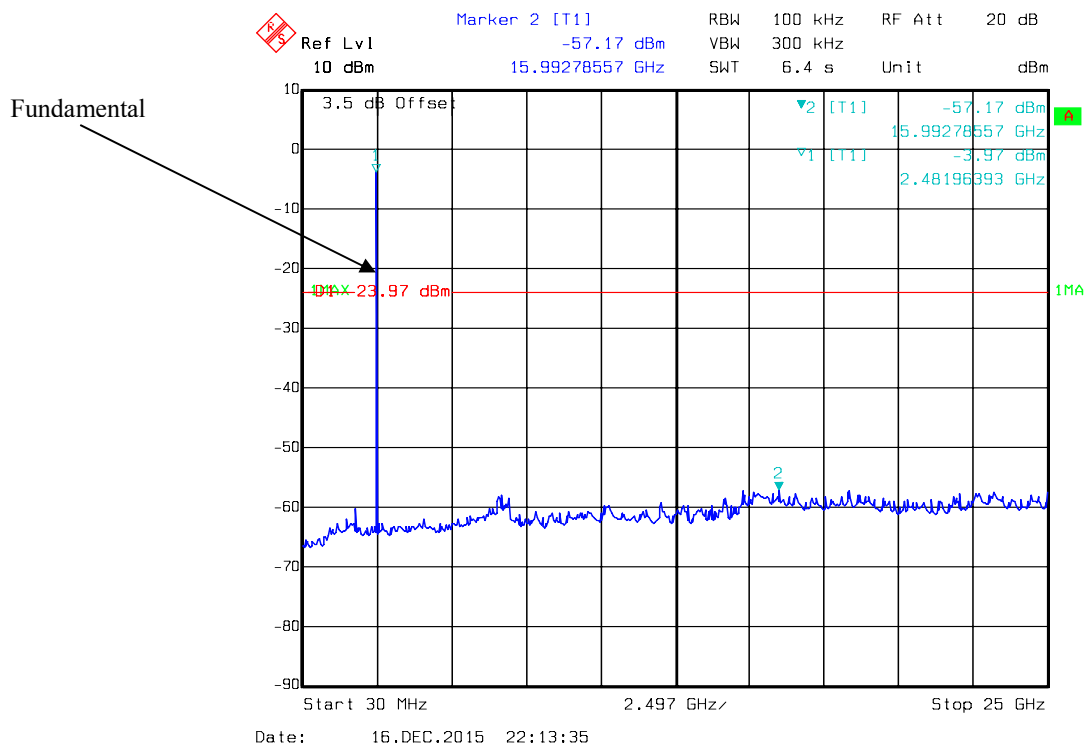
BLE Low Channel



BLE Middle Channel



BLE High Channel



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

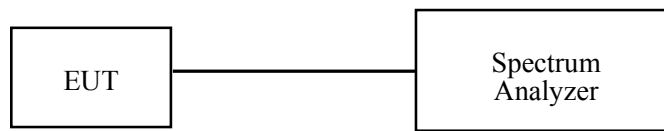
Applicable Standard

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

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r03

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



Test Equipment List and Details

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

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

Test Data

Environmental Conditions

Temperature:	25.5~26.3 °C
Relative Humidity:	49~53 %
ATM Pressure:	100.2~100.6 kPa

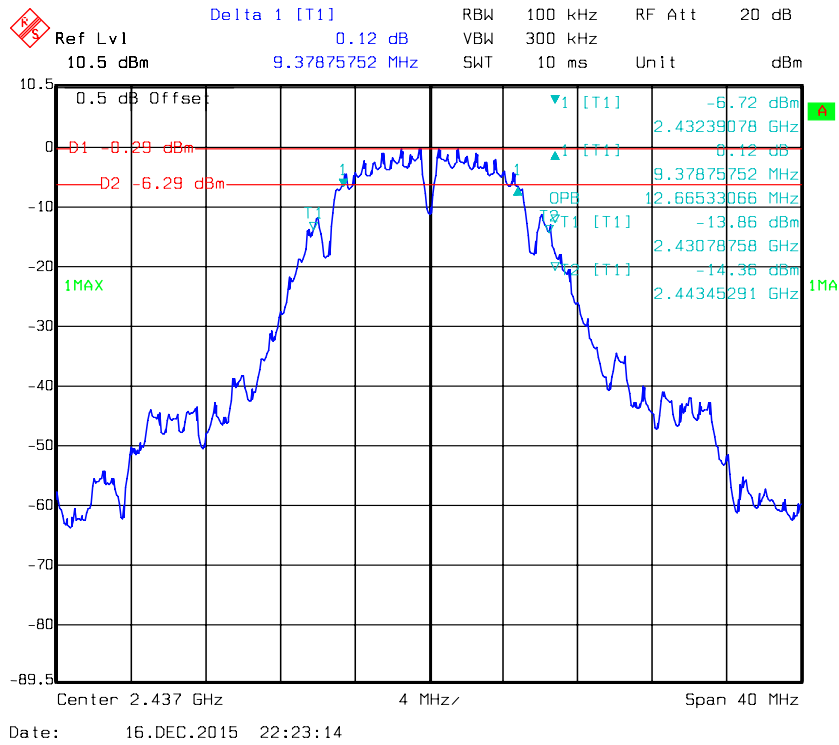
* The testing was performed by Lion Xiao from 2015-12-15 to 2015-12-17

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

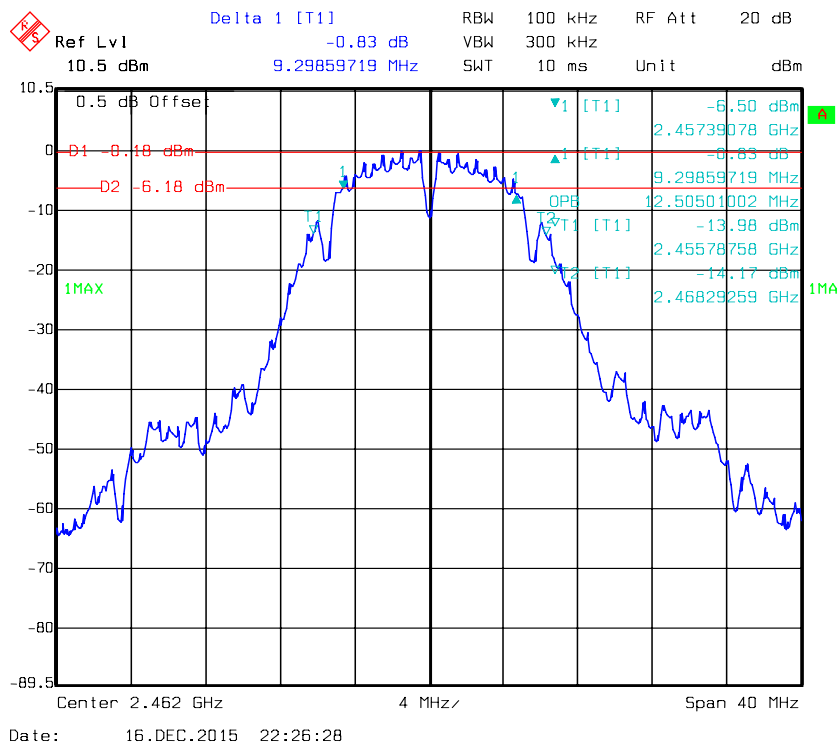
Test mode	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)
802.11b	Low	2412	9.299	≥ 0.5
	Middle	2437	9.379	≥ 0.5
	High	2462	9.299	≥ 0.5
802.11g	Low	2412	16.513	≥ 0.5
	Middle	2437	16.513	≥ 0.5
	High	2462	16.513	≥ 0.5
802.11n20	Low	2412	17.796	≥ 0.5
	Middle	2437	17.796	≥ 0.5
	High	2462	17.796	≥ 0.5
802.11n40	Low	2422	36.553	≥ 0.5
	Middle	2437	36.553	≥ 0.5
	High	2452	36.553	≥ 0.5
BLE	Low	2402	0.745	≥ 0.5
	Middle	2440	0.745	≥ 0.5
	High	2480	0.745	≥ 0.5

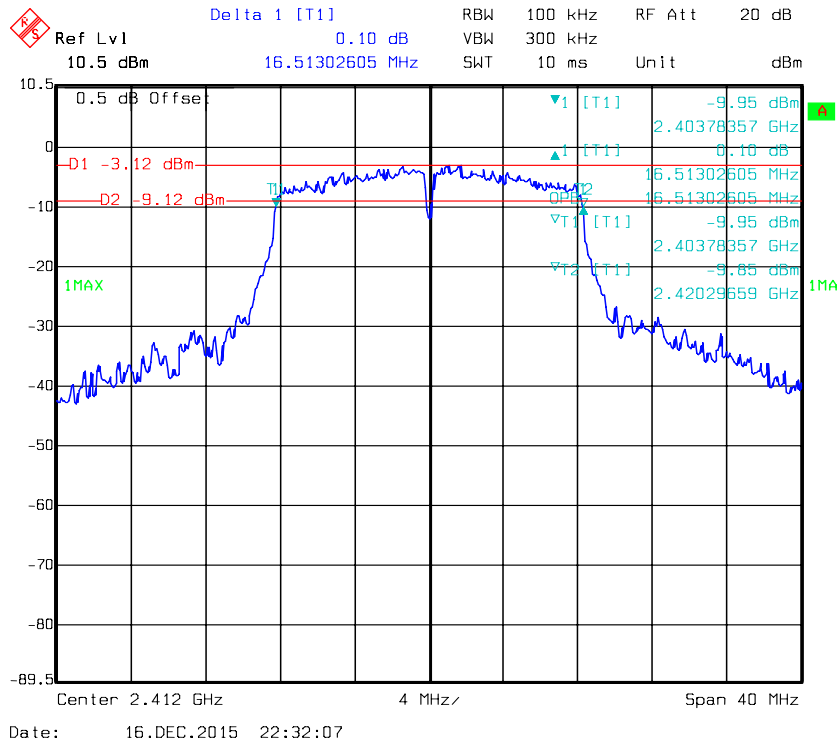
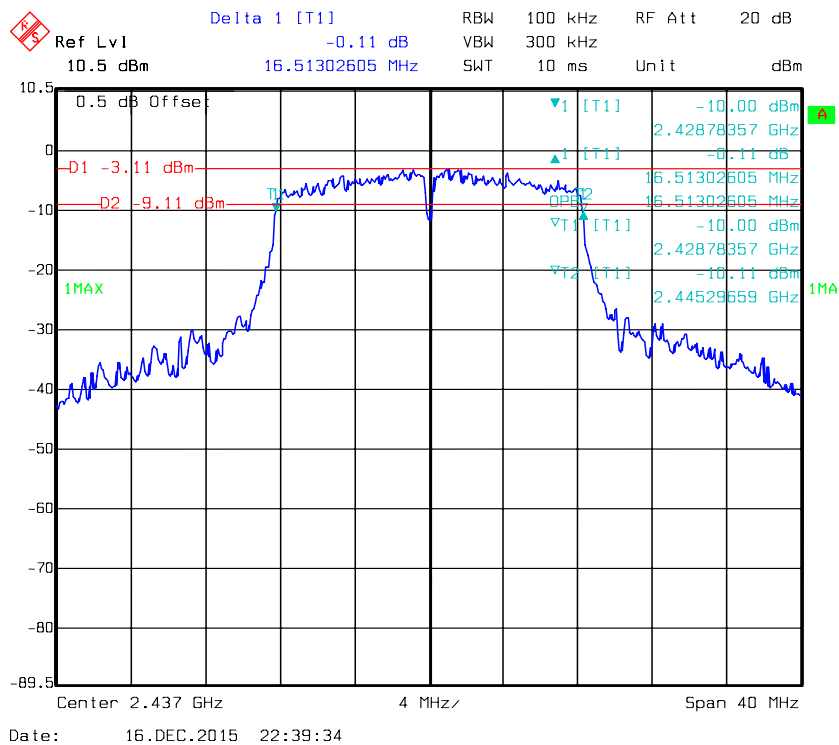


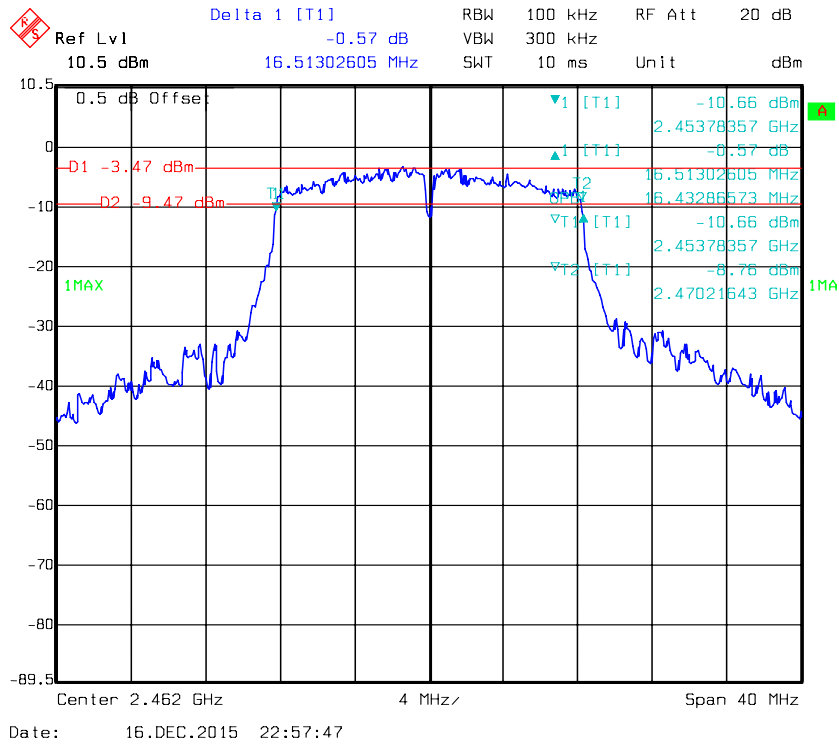
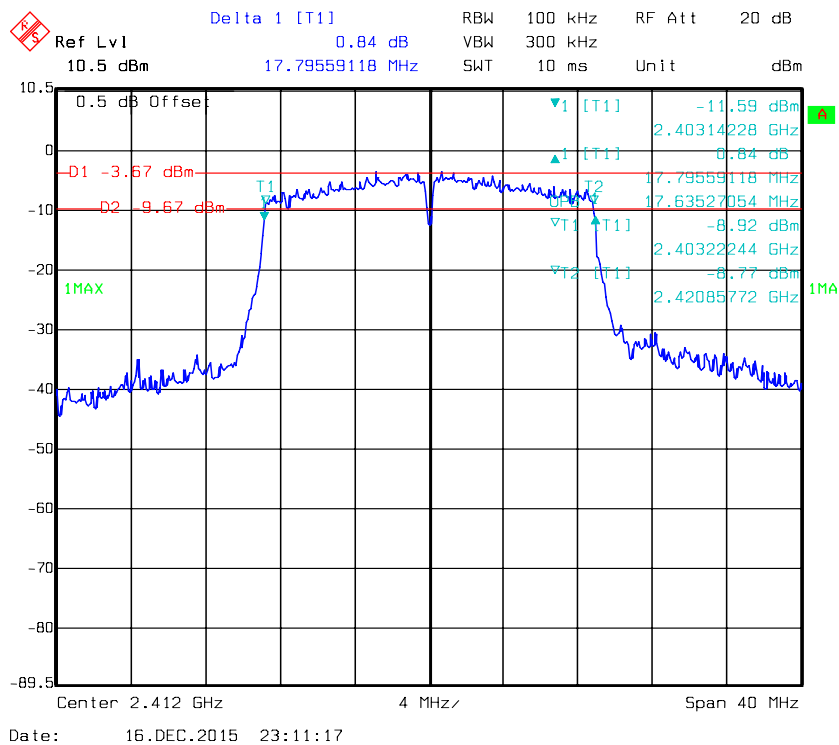
802.11b Middle Channel



802.11b High Channel



802.11g Low Channel**802.11g Middle Channel**

802.11g High Channel**802.11n ht20 Low Channel**

Delta 1 [T1] RBW 100 kHz RF Att 20 dB
 Ref Lvl 0.89 dBm VBW 300 kHz
 10.5 dBm 17.79559118 MHz SWT 10 ms Unit dBm

0.5 dB Offset
 -D1 -3.67 dBm
 -D2 -9.67 dBm
 T1
 1MAX
 1MAX
 1MAX

-11.15 dBm
 2.42814228 GHz
 0.89 dBm
 17.79559118 MHz
 17.71543086 MHz
 -8.40 dBm
 2.4282244 GHz
 -10.25 dBm
 2.44593788 GHz

Center 2.437 GHz 4 MHz Span 40 MHz

Date: 16.DEC.2015 23:15:52

Ref Lvl 0.35 dB RBW 100 kHz RF Att 20 dB
 10.5 dBm 17.79559118 MHz VBW 300 kHz
 10 ms Unit dBm

0.5 dB Offset

D1 -3.55 dBm D2 -9.55 dBm

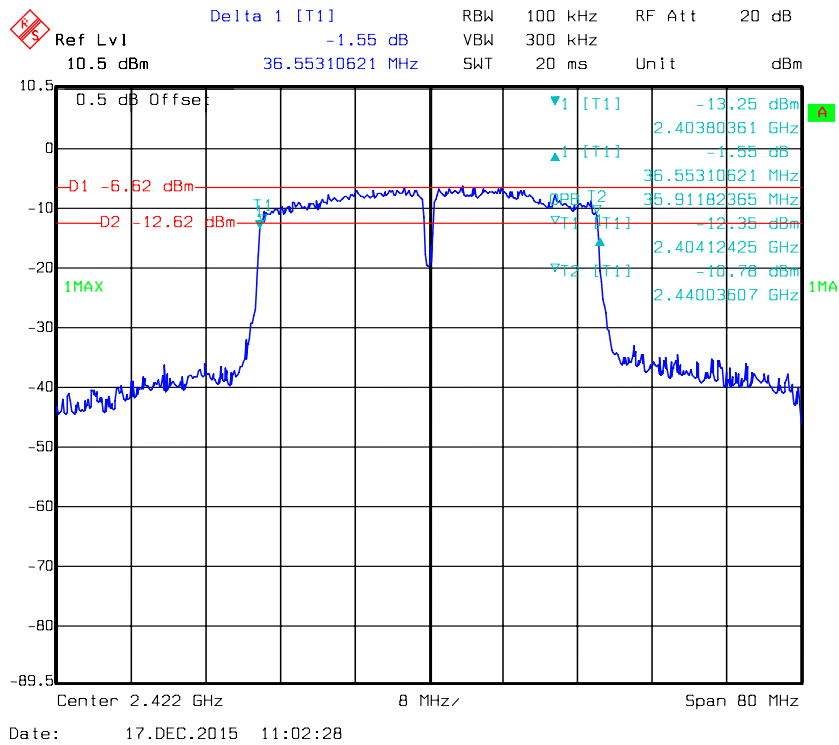
T1 T2

1MAX 1MA

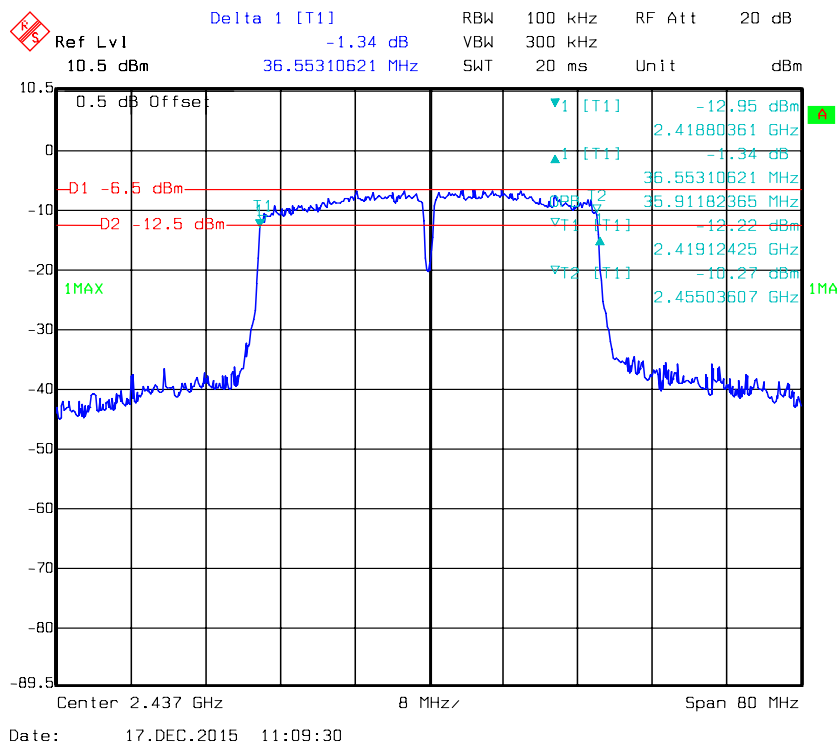
Center 2.462 GHz 4 MHz/ Span 40 MHz

Marker	Type	Frequency (GHz)	Amplitude (dBm)
1	[T1]	2.45314228	-11.38
2	[T1]	2.4532244	-8.55
3	[T1]	2.47085772	-8.99

802.11n ht40 Low Channel



802.11n ht40 Middle Channel



Ref Lvl 10.5 dBm Delta 1 [T1] -2.34 dB RBW 100 kHz RF Att 20 dB

0.5 dB Offset 36.55310621 MHz SWT 20 ms Unit dBm

Center 2.452 GHz 8 MHz/ Span 80 MHz

IMAX

IMIN

1 [T1] -13.47 dBm 2.43380361 GHz

2 [T1] -2.34 dBm 36.55310621 MHz

3 [T1] 13.03 dBm 2.43412425 GHz

4 [T1] -11.64 dBm 2.47003607 GHz

5 [T1] -13.47 dBm 2.43380361 GHz

6 [T1] -2.34 dBm 36.55310621 MHz

7 [T1] 13.03 dBm 2.43412425 GHz

8 [T1] -11.64 dBm 2.47003607 GHz

9 [T1] -13.47 dBm 2.43380361 GHz

10 [T1] -2.34 dBm 36.55310621 MHz

11 [T1] 13.03 dBm 2.43412425 GHz

12 [T1] -11.64 dBm 2.47003607 GHz

13 [T1] -13.47 dBm 2.43380361 GHz

14 [T1] -2.34 dBm 36.55310621 MHz

15 [T1] 13.03 dBm 2.43412425 GHz

16 [T1] -11.64 dBm 2.47003607 GHz

17 [T1] -13.47 dBm 2.43380361 GHz

18 [T1] -2.34 dBm 36.55310621 MHz

19 [T1] 13.03 dBm 2.43412425 GHz

20 [T1] -11.64 dBm 2.47003607 GHz

21 [T1] -13.47 dBm 2.43380361 GHz

22 [T1] -2.34 dBm 36.55310621 MHz

23 [T1] 13.03 dBm 2.43412425 GHz

24 [T1] -11.64 dBm 2.47003607 GHz

25 [T1] -13.47 dBm 2.43380361 GHz

26 [T1] -2.34 dBm 36.55310621 MHz

27 [T1] 13.03 dBm 2.43412425 GHz

28 [T1] -11.64 dBm 2.47003607 GHz

29 [T1] -13.47 dBm 2.43380361 GHz

30 [T1] -2.34 dBm 36.55310621 MHz

31 [T1] 13.03 dBm 2.43412425 GHz

32 [T1] -11.64 dBm 2.47003607 GHz

33 [T1] -13.47 dBm 2.43380361 GHz

34 [T1] -2.34 dBm 36.55310621 MHz

35 [T1] 13.03 dBm 2.43412425 GHz

36 [T1] -11.64 dBm 2.47003607 GHz

37 [T1] -13.47 dBm 2.43380361 GHz

38 [T1] -2.34 dBm 36.55310621 MHz

39 [T1] 13.03 dBm 2.43412425 GHz

40 [T1] -11.64 dBm 2.47003607 GHz

41 [T1] -13.47 dBm 2.43380361 GHz

42 [T1] -2.34 dBm 36.55310621 MHz

43 [T1] 13.03 dBm 2.43412425 GHz

44 [T1] -11.64 dBm 2.47003607 GHz

45 [T1] -13.47 dBm 2.43380361 GHz

46 [T1] -2.34 dBm 36.55310621 MHz

47 [T1] 13.03 dBm 2.43412425 GHz

48 [T1] -11.64 dBm 2.47003607 GHz

49 [T1] -13.47 dBm 2.43380361 GHz

50 [T1] -2.34 dBm 36.55310621 MHz

51 [T1] 13.03 dBm 2.43412425 GHz

52 [T1] -11.64 dBm 2.47003607 GHz

53 [T1] -13.47 dBm 2.43380361 GHz

54 [T1] -2.34 dBm 36.55310621 MHz

55 [T1] 13.03 dBm 2.43412425 GHz

56 [T1] -11.64 dBm 2.47003607 GHz

57 [T1] -13.47 dBm 2.43380361 GHz

58 [T1] -2.34 dBm 36.55310621 MHz

59 [T1] 13.03 dBm 2.43412425 GHz

60 [T1] -11.64 dBm 2.47003607 GHz

61 [T1] -13.47 dBm 2.43380361 GHz

62 [T1] -2.34 dBm 36.55310621 MHz

63 [T1] 13.03 dBm 2.43412425 GHz

64 [T1] -11.64 dBm 2.47003607 GHz

65 [T1] -13.47 dBm 2.43380361 GHz

66 [T1] -2.34 dBm 36.55310621 MHz

67 [T1] 13.03 dBm 2.43412425 GHz

68 [T1] -11.64 dBm 2.47003607 GHz

69 [T1] -13.47 dBm 2.43380361 GHz

70 [T1] -2.34 dBm 36.55310621 MHz

71 [T1] 13.03 dBm 2.43412425 GHz

72 [T1] -11.64 dBm 2.47003607 GHz

73 [T1] -13.47 dBm 2.43380361 GHz

74 [T1] -2.34 dBm 36.55310621 MHz

75 [T1] 13.03 dBm 2.43412425 GHz

76 [T1] -11.64 dBm 2.47003607 GHz

77 [T1] -13.47 dBm 2.43380361 GHz

78 [T1] -2.34 dBm 36.55310621 MHz

79 [T1] 13.03 dBm 2.43412425 GHz

80 [T1] -11.64 dBm 2.47003607 GHz

81 [T1] -13.47 dBm 2.43380361 GHz

82 [T1] -2.34 dBm 36.55310621 MHz

83 [T1] 13.03 dBm 2.43412425 GHz

84 [T1] -11.64 dBm 2.47003607 GHz

85 [T1] -13.47 dBm 2.43380361 GHz

86 [T1] -2.34 dBm 36.55310621 MHz

87 [T1] 13.03 dBm 2.43412425 GHz

88 [T1] -11.64 dBm 2.47003607 GHz

89 [T1] -13.47 dBm 2.43380361 GHz

90 [T1] -2.34 dBm 36.55310621 MHz

91 [T1] 13.03 dBm 2.43412425 GHz

92 [T1] -11.64 dBm 2.47003607 GHz

93 [T1] -13.47 dBm 2.43380361 GHz

94 [T1] -2.34 dBm 36.55310621 MHz

95 [T1] 13.03 dBm 2.43412425 GHz

96 [T1] -11.64 dBm 2.47003607 GHz

97 [T1] -13.47 dBm 2.43380361 GHz

98 [T1] -2.34 dBm 36.55310621 MHz

99 [T1] 13.03 dBm 2.43412425 GHz

100 [T1] -11.64 dBm 2.47003607 GHz

101 [T1] -13.47 dBm 2.43380361 GHz

102 [T1] -2.34 dBm 36.55310621 MHz

103 [T1] 13.03 dBm 2.43412425 GHz

104 [T1] -11.64 dBm 2.47003607 GHz

105 [T1] -13.47 dBm 2.43380361 GHz

106 [T1] -2.34 dBm 36.55310621 MHz

107 [T1] 13.03 dBm 2.43412425 GHz

108 [T1] -11.64 dBm 2.47003607 GHz

109 [T1] -13.47 dBm 2.43380361 GHz

110 [T1] -2.34 dBm 36.55310621 MHz

111 [T1] 13.03 dBm 2.43412425 GHz

112 [T1] -11.64 dBm 2.47003607 GHz

113 [T1] -13.47 dBm 2.43380361 GHz

114 [T1] -2.34 dBm 36.55310621 MHz

115 [T1] 13.03 dBm 2.43412425 GHz

116 [T1] -11.64 dBm 2.47003607 GHz

117 [T1] -13.47 dBm 2.43380361 GHz

118 [T1] -2.34 dBm 36.55310621 MHz

119 [T1] 13.03 dBm 2.43412425 GHz

120 [T1] -11.64 dBm 2.47003607 GHz

121 [T1] -13.47

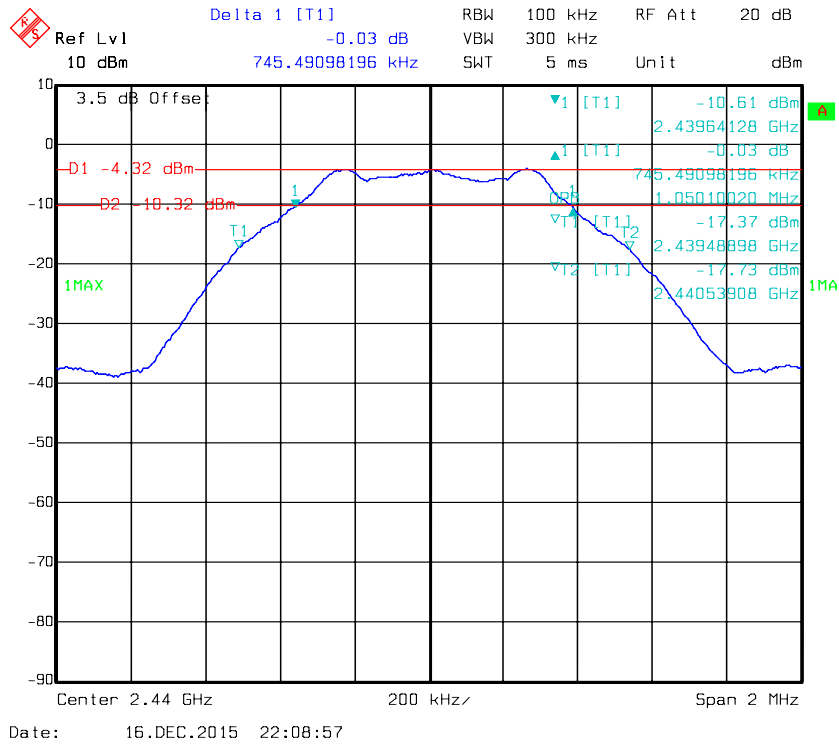
Ref Lvl 10 dBm
 Delta 1 [T1] -0.15 dB
 RBW 100 kHz
 RF Att 20 dB
 VBW 300 kHz
 SWT 5 ms
 Unit dBm

3.5 dB Offset
 -D1 -4.85 dBm
 -D2 -10.85 dBm
 1MAX
 T1
 T2
 1MA

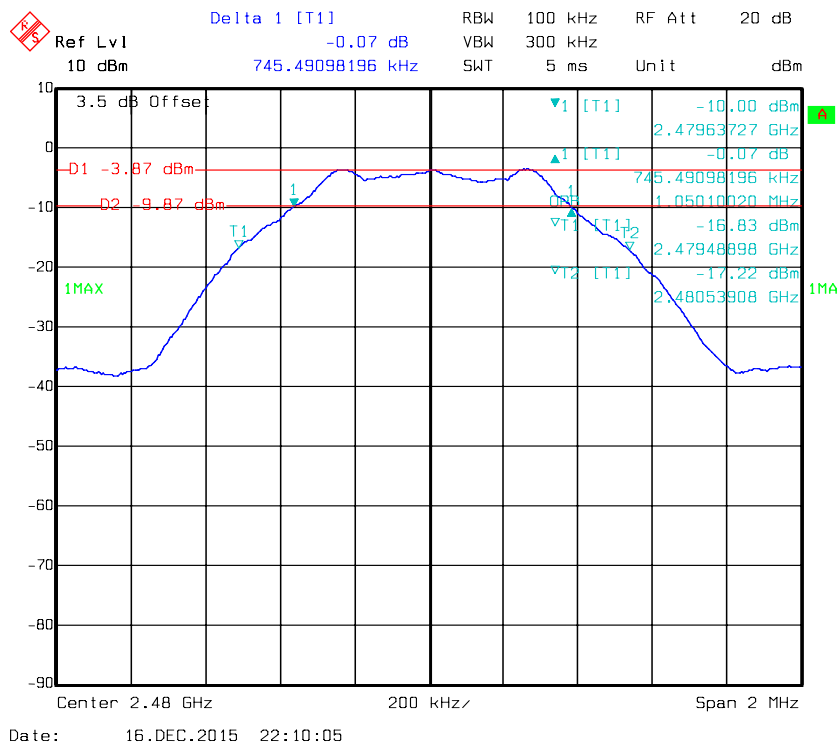
Center 2.402 GHz
 200 kHz
 Span 2 MHz

-11.02 dBm
 2.40164128 GHz
 -0.15 dB
 745.49098196 kHz
 1.05010020 MHz
 -17.99 dBm
 2.40148998 GHz
 -18.20 dBm
 2.40253908 GHz

BLE Middle Channel



BLE High Channel



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

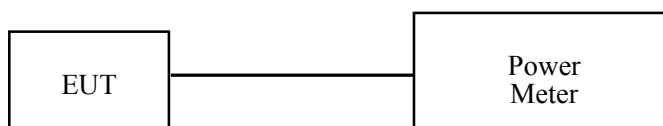
Applicable Standard

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

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r03

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



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Wideband Power Sensor	N1921A	MY54210016	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

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

Test Data

Environmental Conditions

Temperature:	25.7 °C
Relative Humidity:	48 %
ATM Pressure:	100.4 kPa

* The testing was performed by Lion Xiao on 2015-12-15.

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
		(MHz)	(dBm)	(dBm)	(dBm)
802.11b	Low	2412	12.76	9.46	30
	Middle	2437	12.91	9.59	30
	High	2462	12.89	9.57	30
802.11g	Low	2412	16.01	9.58	30
	Middle	2437	16.06	9.63	30
	High	2462	16.08	9.66	30
802.11n20	Low	2412	16.39	9.37	30
	Middle	2437	16.41	9.40	30
	High	2462	16.33	9.31	30
802.11n40	Low	2422	16.90	9.33	30
	Middle	2437	16.98	9.40	30
	High	2452	16.86	9.27	30
BLE	Low	2402	-4.3	/	30
	Middle	2440	-3.77	/	30
	High	2480	-3.25	/	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
R&S	Spectrum Analyzer	FSEM	DE31388	2015-05-09	2016-05-09

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

Test Data

Environmental Conditions

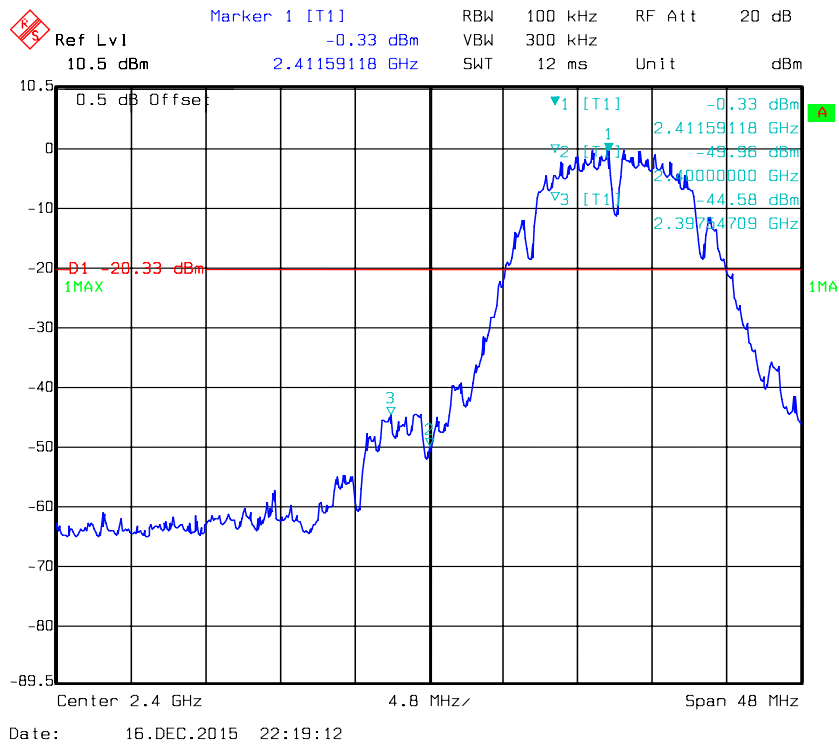
Temperature:	25.5~26.3 °C
Relative Humidity:	49~53 %
ATM Pressure:	100.2~100.6 kPa

* The testing was performed by Lion Xiao from 2015-12-15 to 2015-12-17

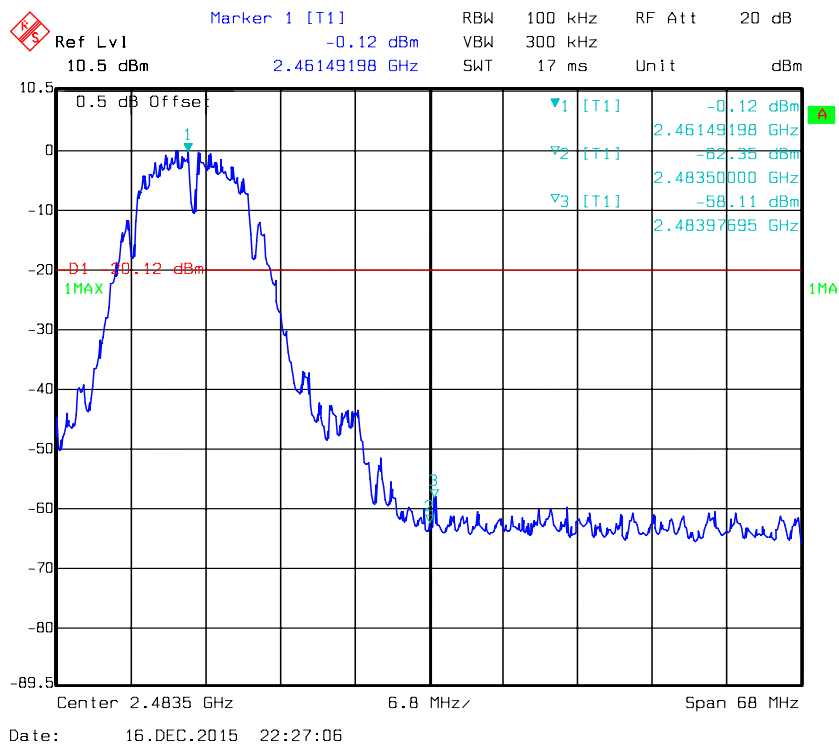
Test mode: Transmitting

Test Result: Compliant. Please refer to following plots.

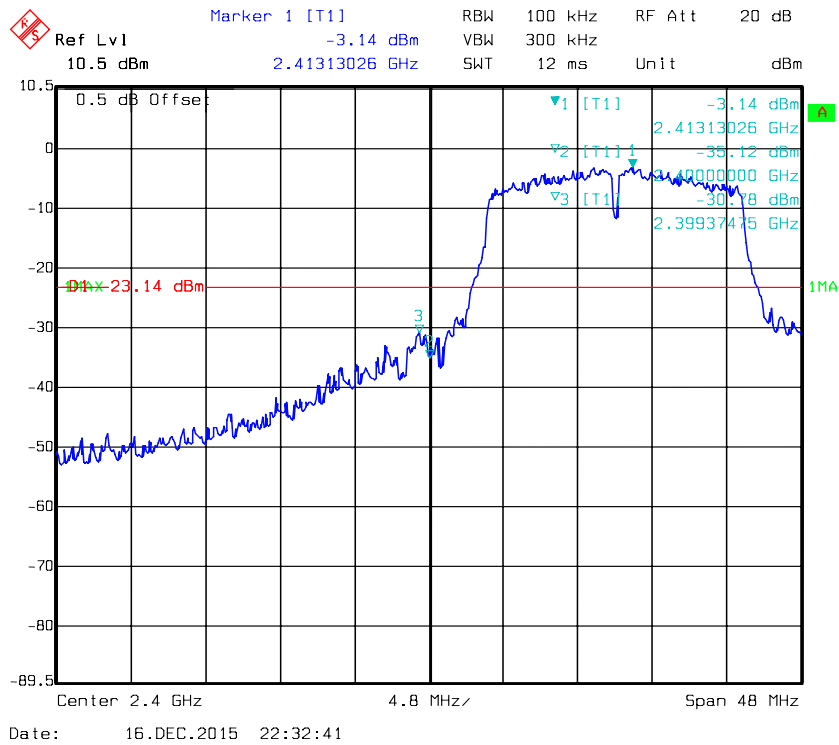
802.11b: Band Edge, Left Side



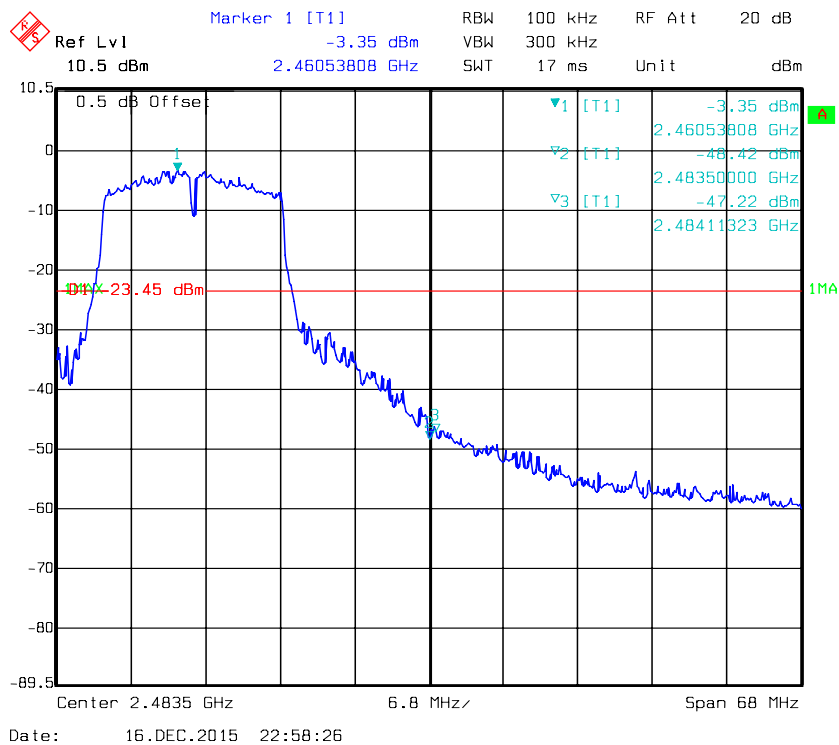
802.11b: Band Edge, Right Side



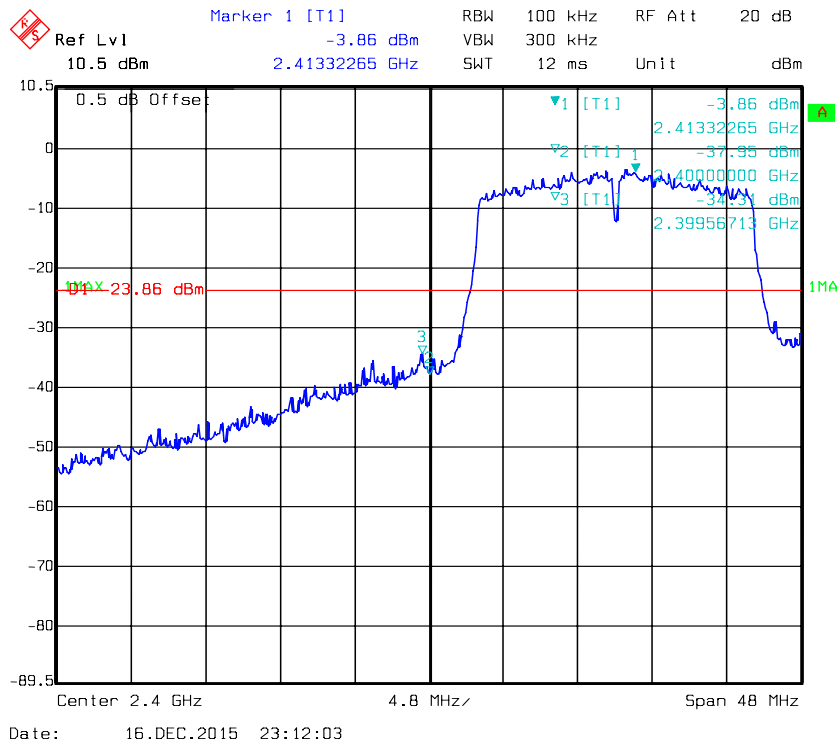
802.11g: Band Edge, Left Side



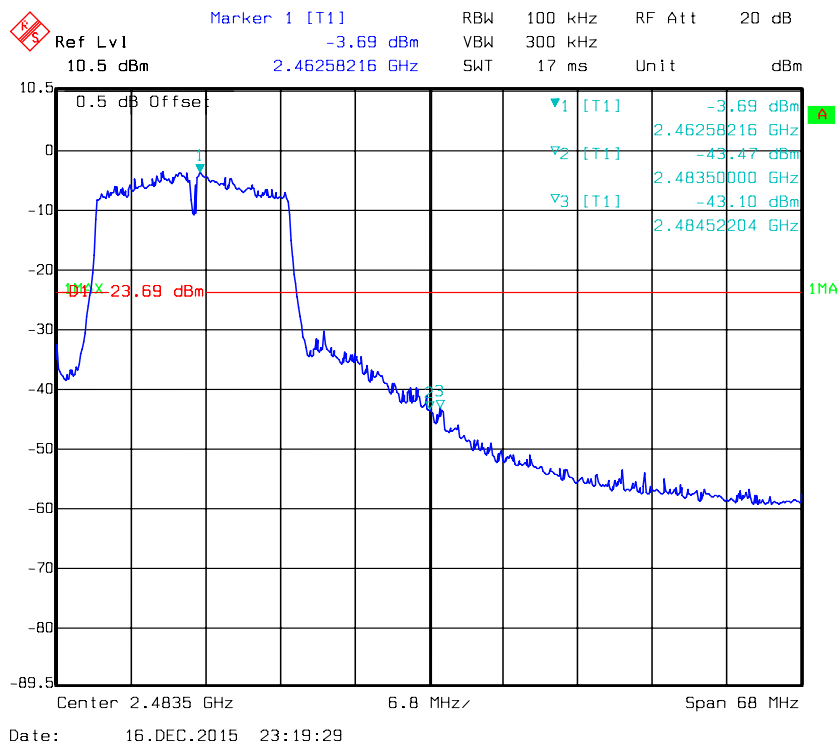
802.11g: Band Edge, Right Side



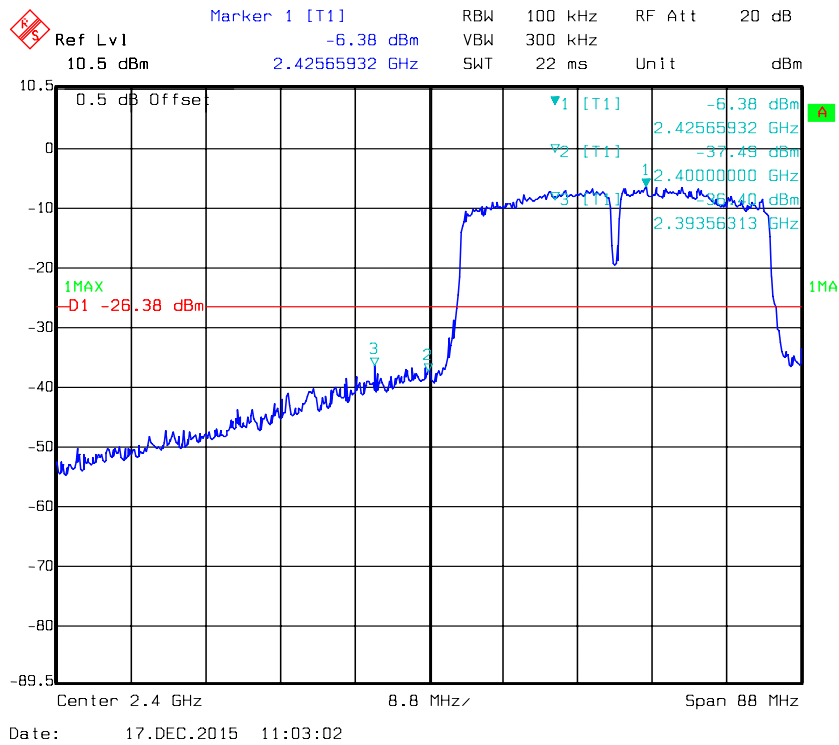
802.11n ht20 Band Edge, Left Side



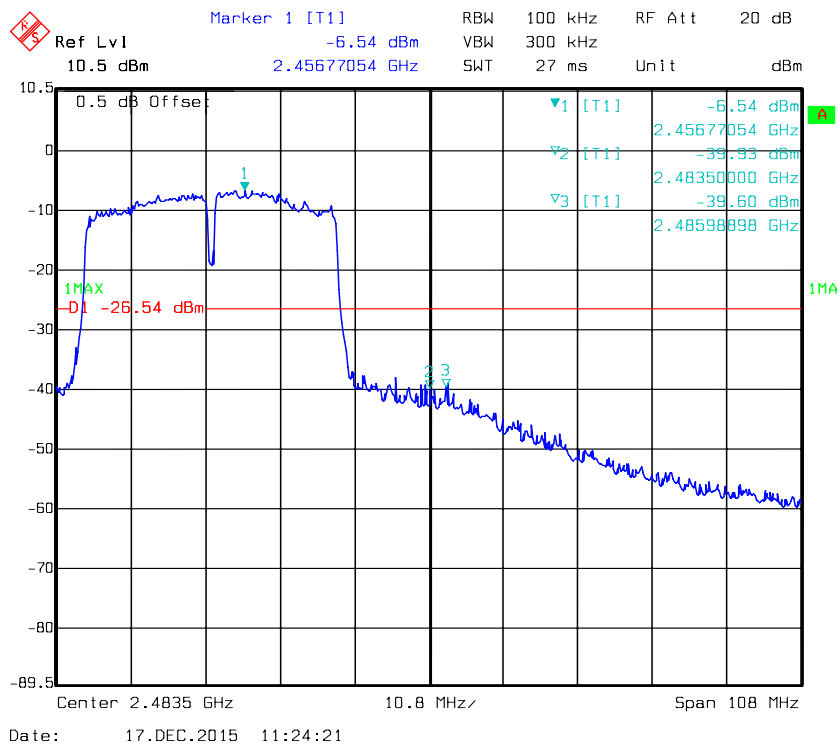
802.11n ht20 Band Edge, Right Side



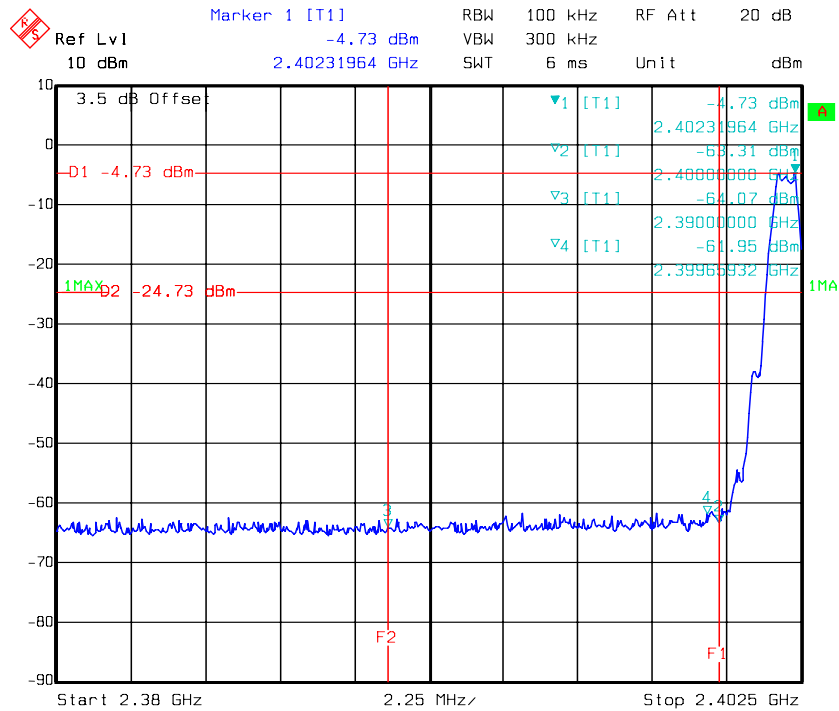
802.11n ht40 Band Edge, Left Side



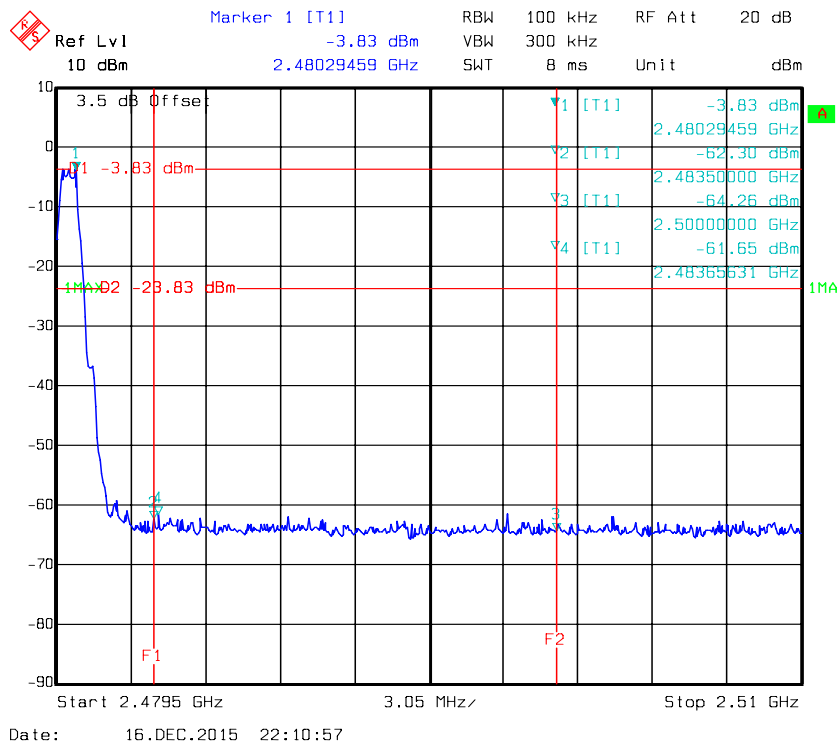
802.11n ht40 Band Edge, Right Side



BLE Band Edge , Left Side



BLE Band Edge, Right Side



FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

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

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r03

- Set analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set the VBW $\geq 3 \times \text{RBW}$.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.
- If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Test Equipment List and Details

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

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

Test Data

Environmental Conditions

Temperature:	25.7 °C
Relative Humidity:	49 %
ATM Pressure:	100.2 kPa

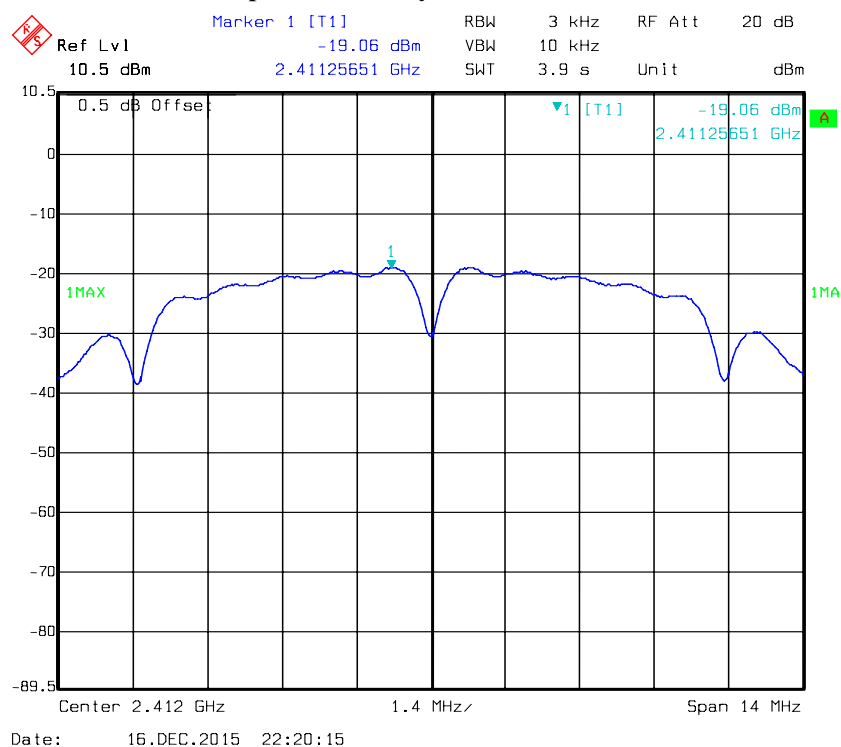
* The testing was performed by Lion Xiao on 2015-12-16.

Test Mode: Transmitting

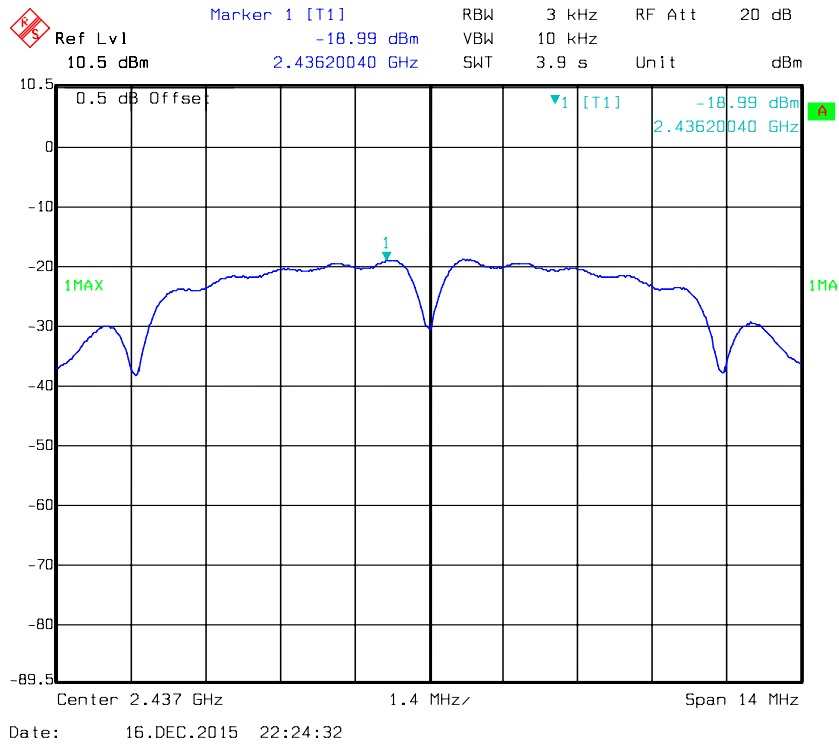
Test Result: Compliant. Please refer to the following table and plots

Test mode	Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
802.11b	Low	2412	-19.06	≤ 8
	Middle	2437	-18.99	≤ 8
	High	2462	-19.00	≤ 8
802.11g	Low	2412	-18.09	≤ 8
	Middle	2437	-18.07	≤ 8
	High	2462	-18.07	≤ 8
802.11n20	Low	2412	-18.15	≤ 8
	Middle	2437	-18.13	≤ 8
	High	2462	-18.20	≤ 8
802.11n40	Low	2422	-21.04	≤ 8
	Middle	2437	-21.02	≤ 8
	High	2452	-21.10	≤ 8
BLE	Low	2402	-19.80	≤ 8
	Middle	2440	-19.13	≤ 8
	High	2480	-18.56	≤ 8

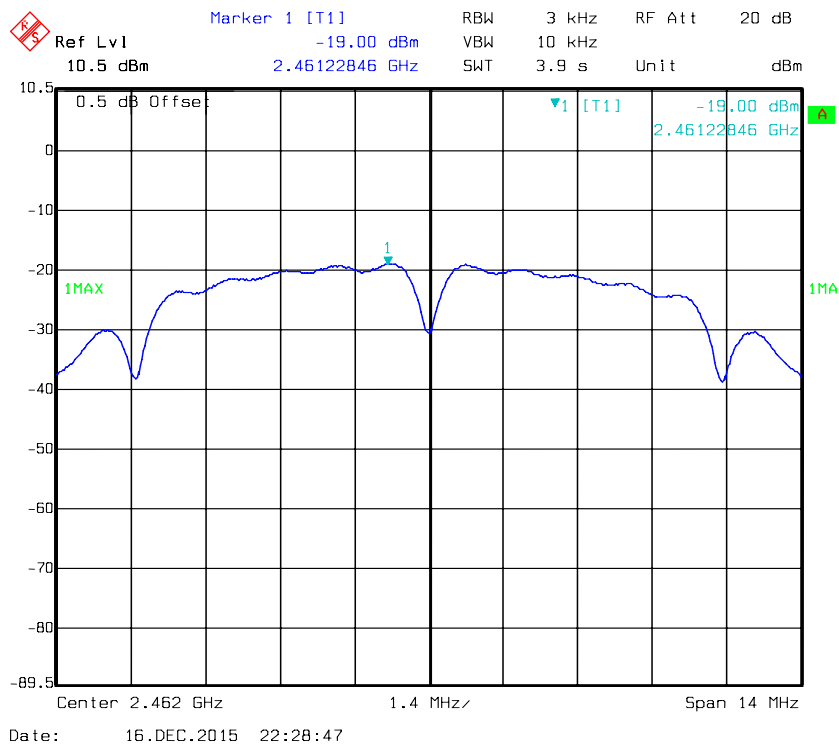
Power Spectral Density, 802.11b Low Channel



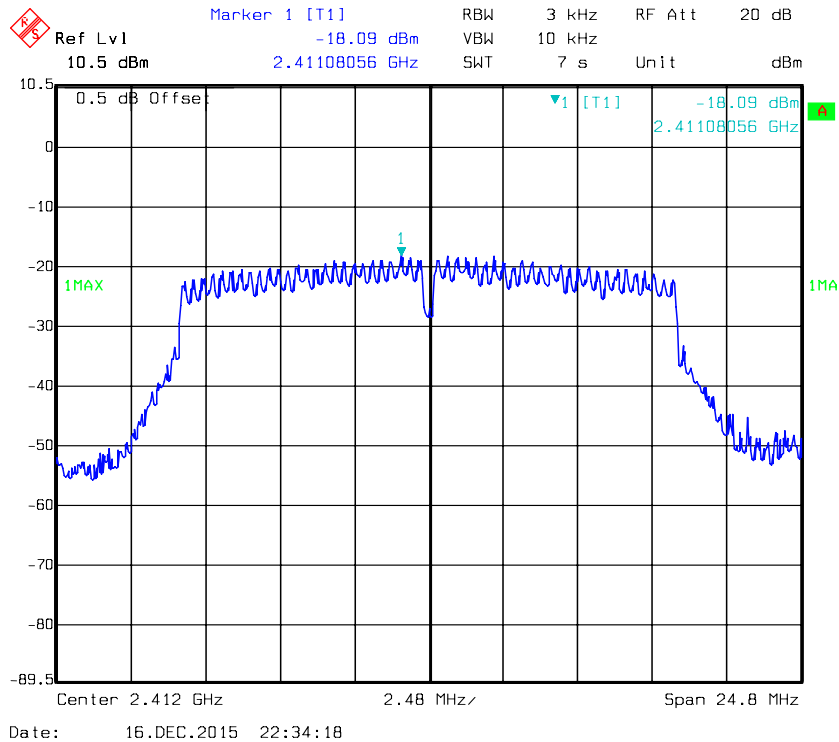
Power Spectral Density, 802.11b Middle Channel



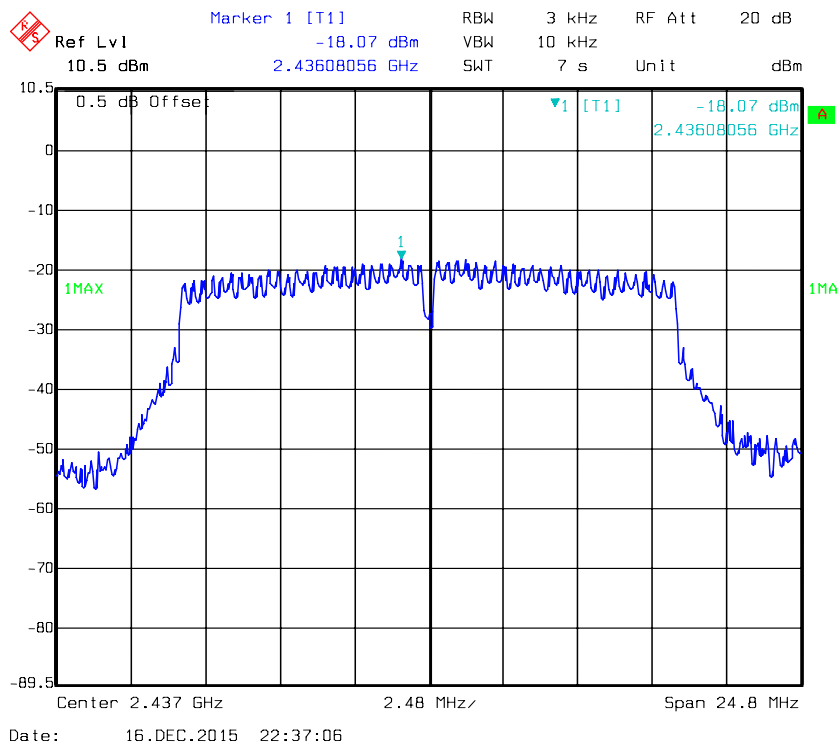
Power Spectral Density, 802.11b High Channel



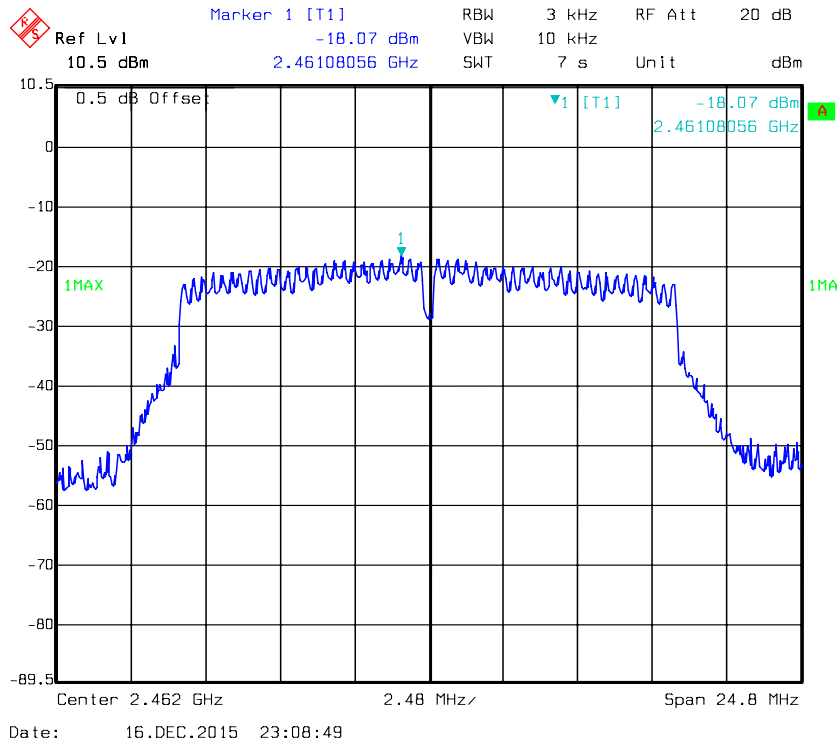
Power Spectral Density, 802.11g Low Channel



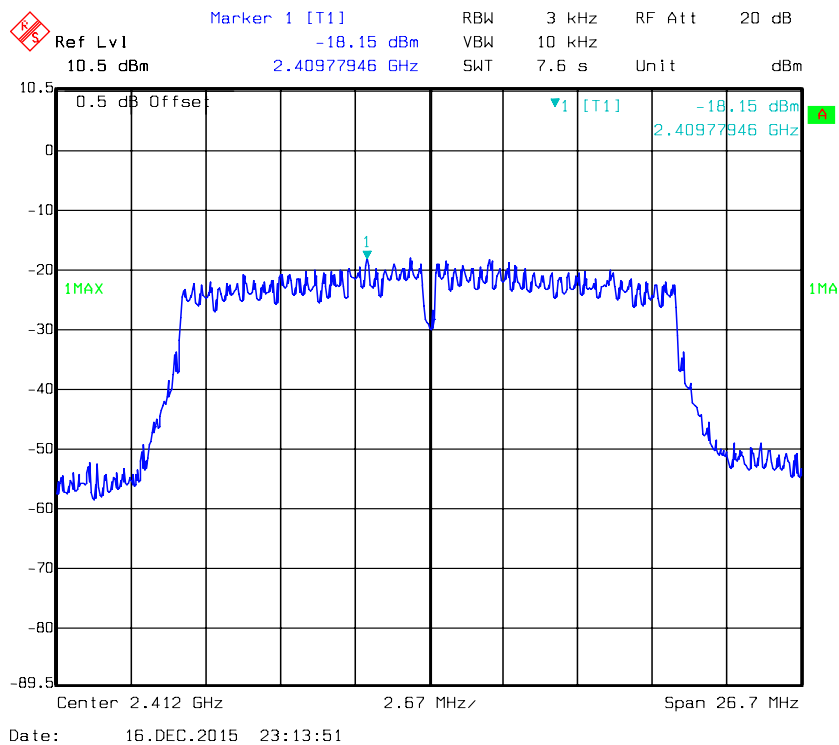
Power Spectral Density, 802.11g Middle Channel



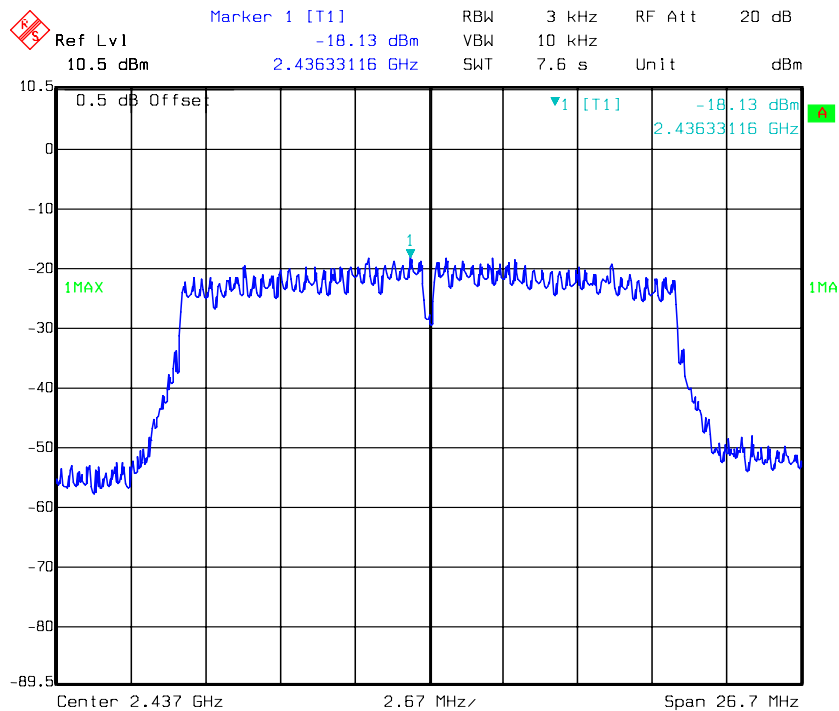
Power Spectral Density, 802.11g High Channel



Power Spectral Density, 802.11n ht20 Low Channel

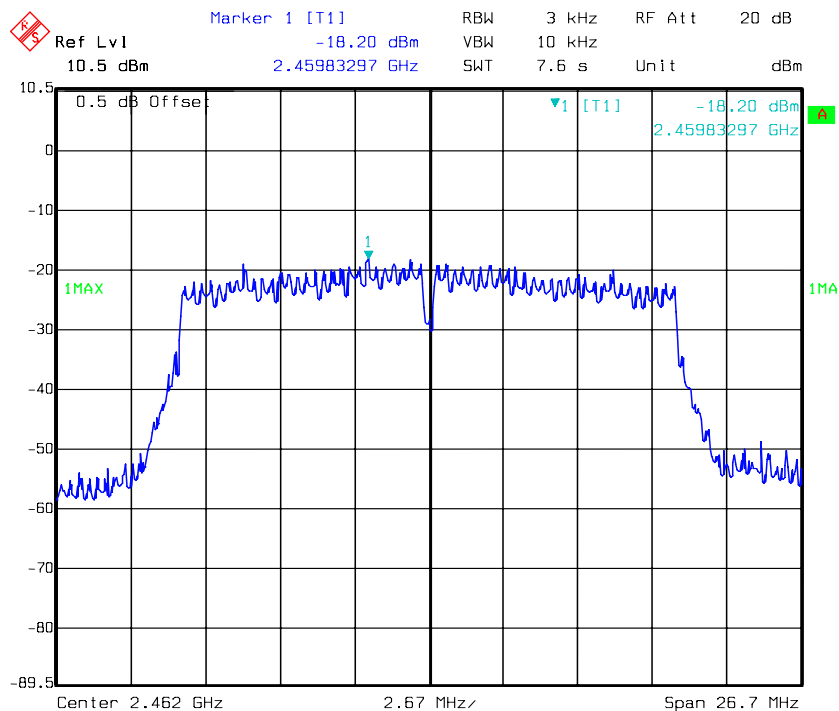


Power Spectral Density, 802.11n ht20 Middle Channel



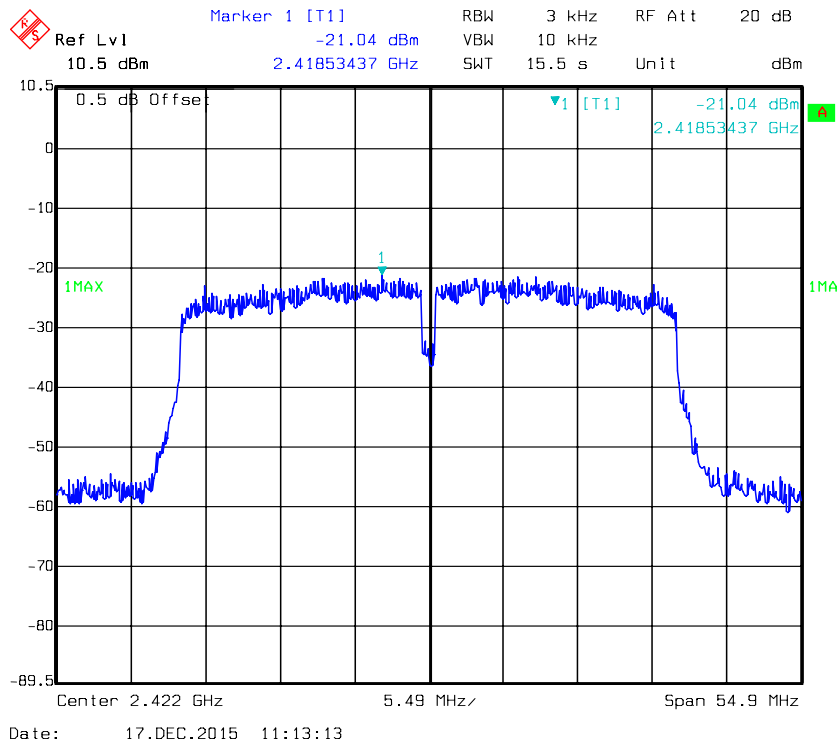
Date: 16.DEC.2015 23:14:24

Power Spectral Density, 802.11n ht20 High Channel

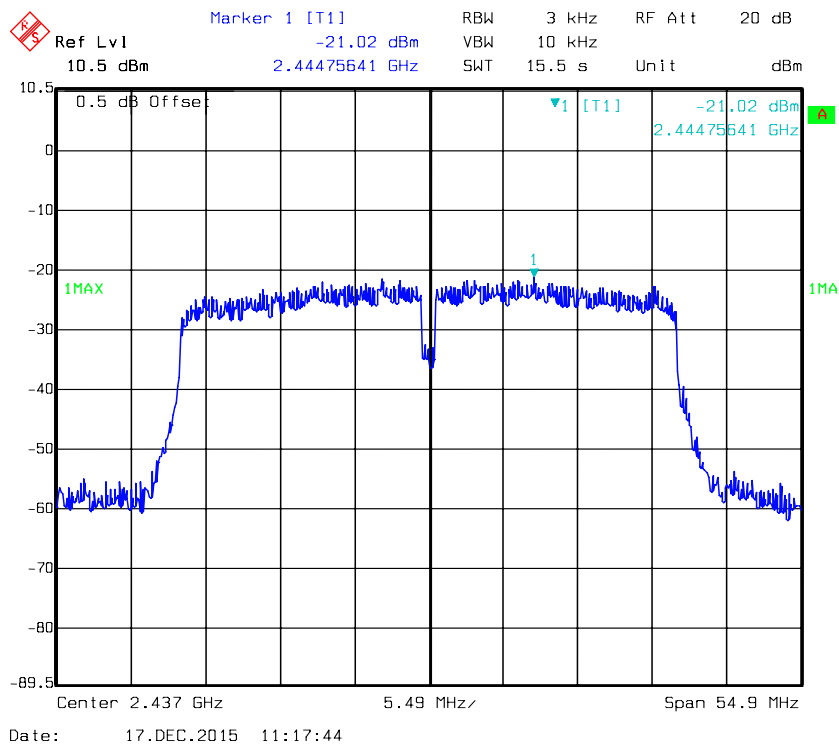


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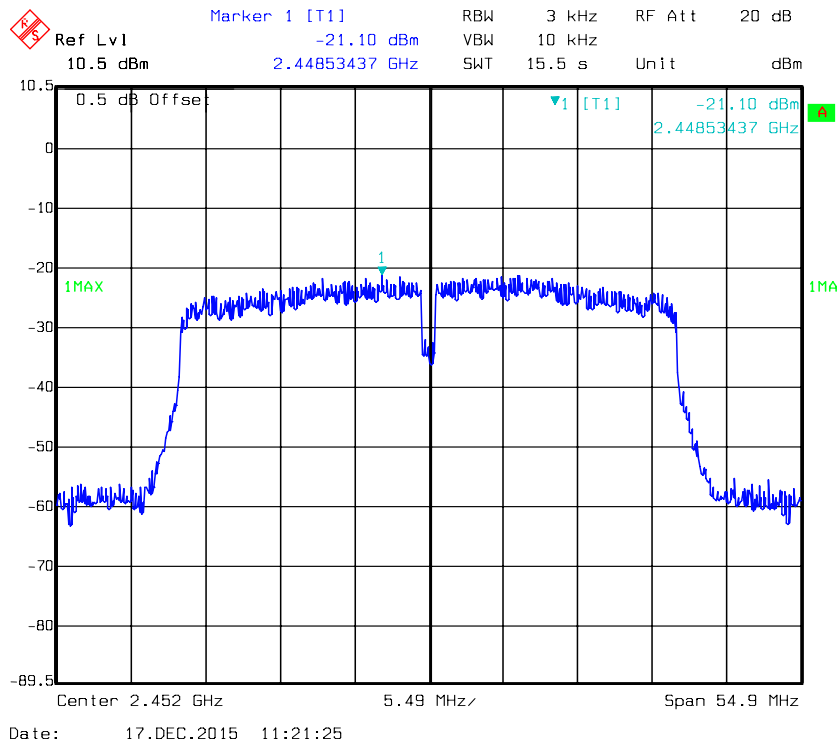
Power Spectral Density, 802.11n ht40 Low Channel



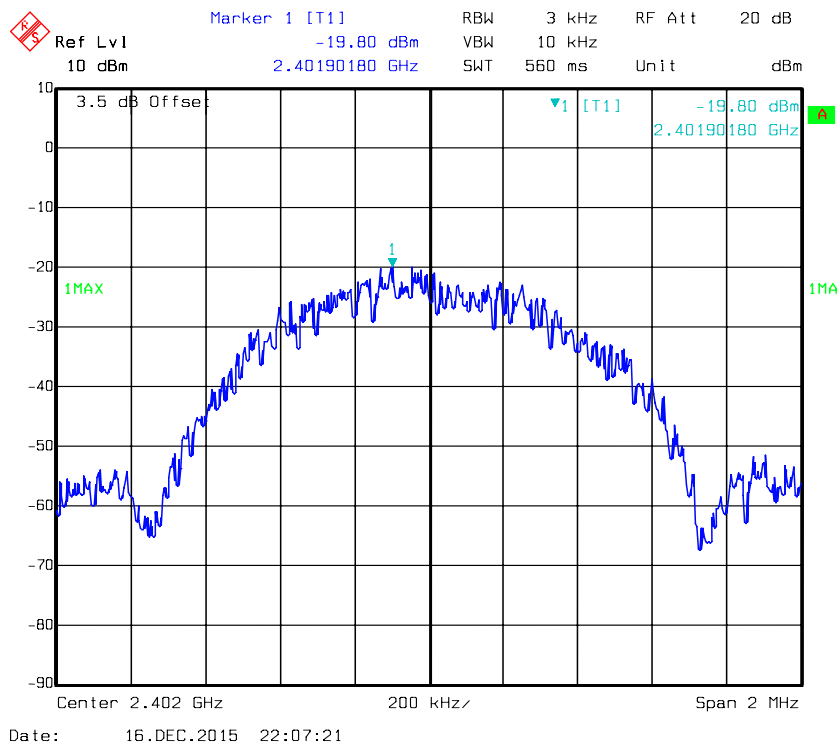
Power Spectral Density, 802.11n ht40 Middle Channel



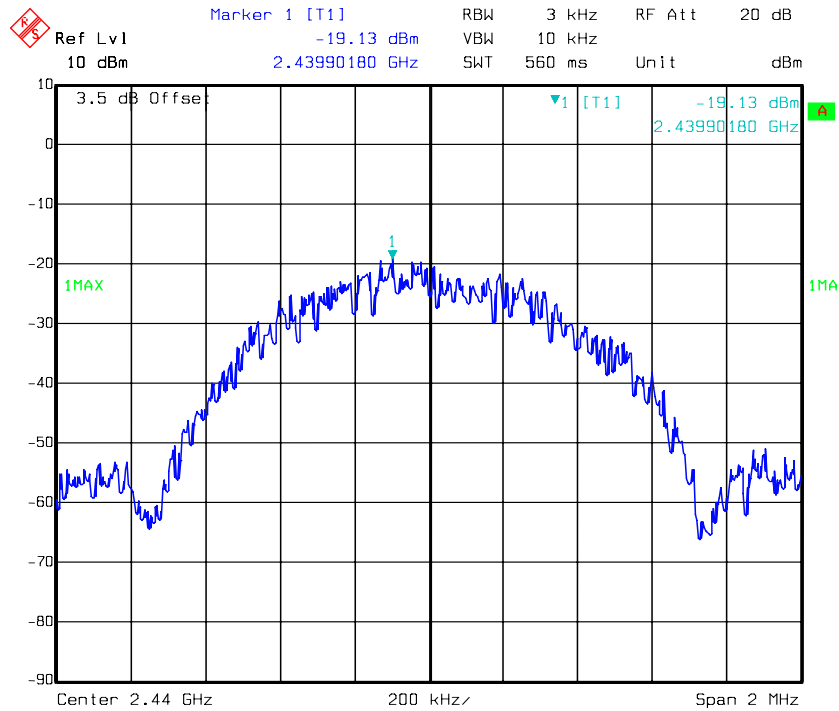
Power Spectral Density, 802.11n ht40 High Channel



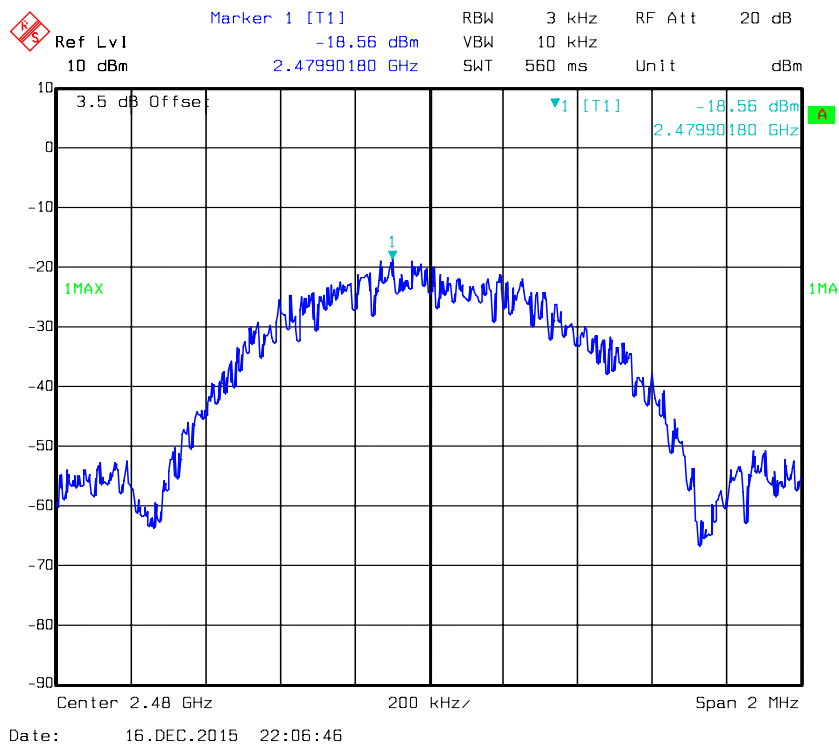
Power Spectral Density, BLE Low Channel



Power Spectral Density, BLE Middle Channel



Power Spectral Density, BLE High Channel



DECLARATION LETTER

MAXWEST INTERNATIONAL LIMITED

Add: No.1,Longgang Road,Buji,Longgang,ShenzhenCity,Guangdong Province, P.R. China

Tel: 9498007607

Fax: 9498007607

DECLARATION OF SIMILARITY

Date: 2015-12-15

Dear Sir or Madam:

We, MAXWEST INTERNATIONAL LIMITED, hereby declare that product name: Astro X55, model: Astro X55, they are the same electromagnetic emissions and electromagnetic compatibility characteristics. A description of the difference between the 2 samples and those that are declared similar are as follows:

1) They have different colours: golden and white

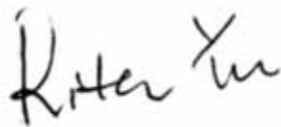
The rest are the same.

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

Best Regards,

Signature:

Rita Yu



Assistant Manager

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