FCC PART 15.247

TEST REPORT

For

Alinket Electronic Technology (Shanghai) Co., Ltd.

Room 403, No. 10, Lane 198,Zhangheng Road, Pudong,Shanghai,China

FCC ID: 2AELJ-ALXCOMBO

Report Type:	**Product Type:**
Original Report	Alinket Wireless Controller

Test Engineer:	Matt Yao
Report Number:	RKS160504002-00L
Report Date:	2016-06-22
Reviewed By:	Jesse Huang EMC Manager
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan) Chenghu Road,Kunshan Development Zone No.248,Kunshan, Jiangsu, China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The Alinket Electronic Technology (Shanghai) Co., Ltd.'s product, model number: ALXC2X (the last "X" is from 0A to 9Z based on deferent software configurations for product marketing purpose) or the "EUT" in this report was a Alinket Wireless Controller, which was measured approximately: 28mm (L) x14.3 mm (W) x2.2mm(H). Rated input voltage: 3.3VDC.

**All measurement and test data in this report was gathered from production sample serial number: 20160120012 (Assigned by the BACL. The EUT supplied by the applicant was received on 2016-01-20)*

Objective

This report is prepared on behalf of Alinket Electronic Technology (Shanghai) Co., Ltd. in accordance with Part 2-Subpart J, Part 15-Subparts A, B and C of the Federal Communication Commissions rules.

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

Related Submittal(s)/Grant(s)

FCC part 15.407 NII and FCC part 15.247 DSS submission with FCC ID: 2AELJ-ALXCOMBO.

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 and FCC KDB558074 D01 DTS Meas Guidance v03r04.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement uncertainty with RF radiated emission is 5.91 dB for 30MHz-1GHz.and 4.92 dB for above 1GHz, 1.95dB for conducted measurement.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the Chenghu Lake Road, Kunshan Development Zone No.248,Kunshan, Jiangsu, China

Test site at Bay Area Compliance Laboratories Corp. (Kunshan) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 06, 2014. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. 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

For 802.11b, 802.11g and 802.11n-HT20 mode, 11 channels are provided to testing:

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

For 802.11b, 802.11g, 802.11n-HT20 mode, EUT was tested with Channel 1, 6 and 11.

For BLE mode, 40 channels are provided to testing:

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

EUT was tested with channel 0, 19 and 39.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

The software “ALX850 MFG” for wifi and “Bluetool” for BLE.

The worst case was performed under:
802.11b: Data rate:1 Mbps, Power level: 15
802.11g: Data rate: 6 Mbps, Power level: 12
802.11n-HT20: Data rate: MCS0, Power level: 12
BLE : power Level: 12

Support Equipment List and Details

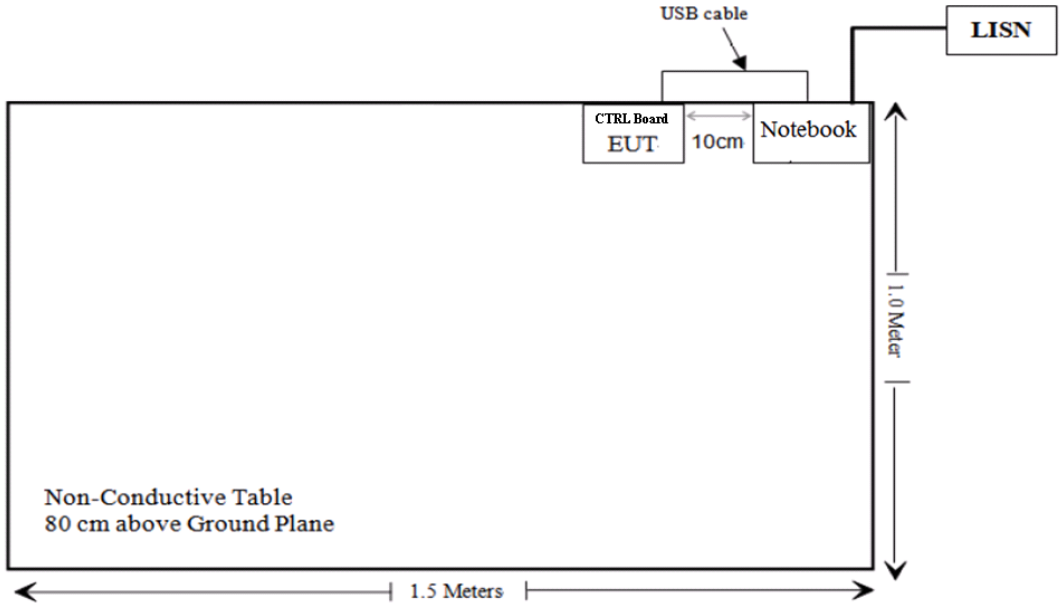
Manufacturer	Description	Model	Serial Number
Lenovo	Notebook	T400	N/A
Alinket	Control Board	N/A	N/A

External I/O Cable

Cable Description	Length (m)	From Port	To
USB Cable	0.9	Control Board	PC

Block Diagram of Test Setup

For conducted emission



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b) (1)& §2.1091	MAXIMUM PERMISSIBLE EXPOSURE (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.247(d)	Spurious Emissions at Antenna Port	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliance
§15.247(b)(3)	Maximum Conducted Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

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

Applicable Standard

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

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f^2)	30
30-300	27.5	0.073	0.2	30
300-1500	/		f/1500	30
1500-100,000	/		1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:
Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

Mode	Frequency (MHz)	Antenna Gain		Target Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11b	2412	1	1.259	17.0	50.12	20	0.013	1.0
802.11g	2412	1	1.259	14.0	25.12	20	0.006	1.0
802.11n HT20	2412	1	1.259	14.0	25.12	20	0.006	1.0
BLE	2440	1	1.259	9.0	7.94	20	0.002	1.0
BDR (GFSK)	2441	1	1.259	10.5	11.22	20	0.003	1.0
802.11a	5150-5250	1	1.259	13	19.95	20	0.005	1.0
802.11n HT20		1	1.259	13	19.95	20	0.005	1.0
802.11a	5725-5850	1	1.259	13	19.95	20	0.005	1.0
802.11n HT20		1	1.259	13	19.95	20	0.005	1.0

Note: (1) The target output power: 802.11b:16 ±1dBm,
802.11g:13±1dBm,
802.11n HT20:13±1dBm
BLE:8±1dBm
BT3.0: 9 ±1.5dBm
802.11a: 12 ±1dBm
802.11n HT20 :12±1dBm

which declared by the Manufacturer.

(2) According to KDB 447498 D01 General RF Exposure Guidance v06, EUT has WIFI, BLE, BT3.0 and 5G module transmitting simultaneously. So the sum of MPE ratio is 0.05 which is less than 1.0, So the collocation exposure exclusion applies.BT3.0 MPE data, Please refer to the FCC 15.247(BT3.0) report: RKS160504002-00N. 5G MPE data, please refer to the FCC 15.407 report: RKS160504002-00M.

Result: The device meet FCC MPE at 20 cm distance.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.
And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has an IPEX connector to attach an external antenna arrangement for BLE and wifi, which the antenna gain is 1 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

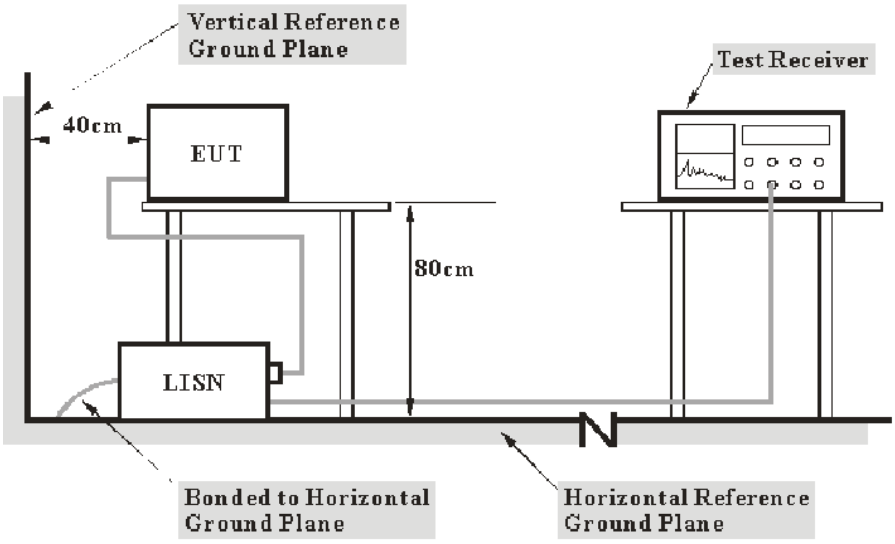
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN and receiver, LISN voltage division factor, LISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Kunshan) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report.

Port	Expanded Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 dB (k=2, 95% level of confidence)

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 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 outlet of the 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.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	934115/007	2015-11-12	2016-11-11
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2015-11-12	2016-11-11
Rohde & Schwarz	LISN	ESH3-Z5	892239/018	2015-06-23	2016-06-22
FCC	ISN	FCC-TLISN-T8-02	20376	2015-06-23	2016-06-22
Rohde & Schwarz	CE Test software	EMC 32	V 09.10.0	--	--
MICRO-COAX	Coaxial line	UFB-293B-1-0480-50X50	97F0173	2015-10-1	2016-10-1

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

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Correction Factor = LISN VDF + Cable Loss

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, the worst margin reading as below:

WIFI Mode:

13.09 dB at 0.170000 MHz in the Neutral conducted mode

BLE Mode:

12.48 dB at 0.175000 MHz in the Neutral conducted mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

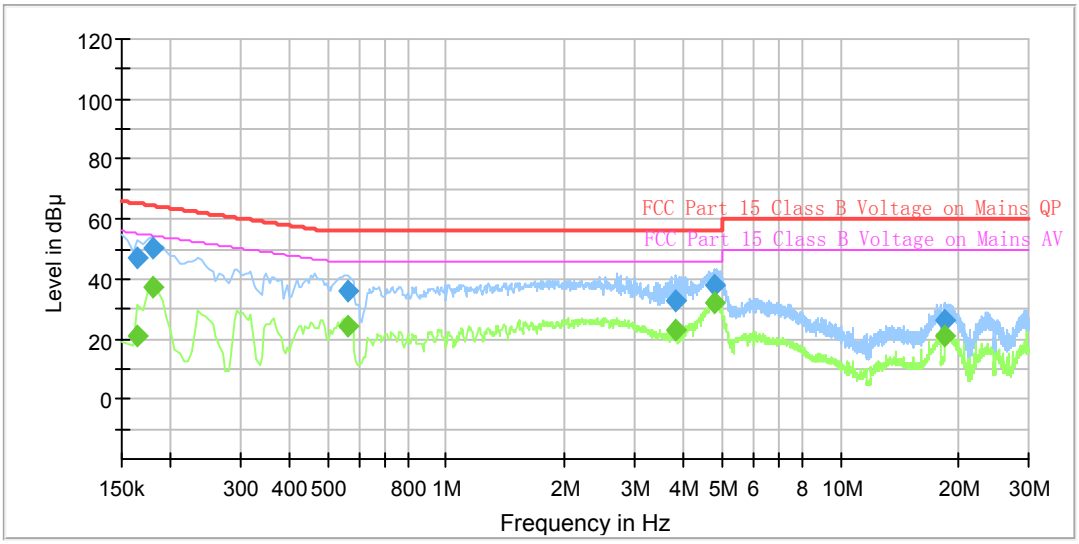
Temperature:	23 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Matt Yao on 2016-03-18.

EUT operation mode: Transmitting

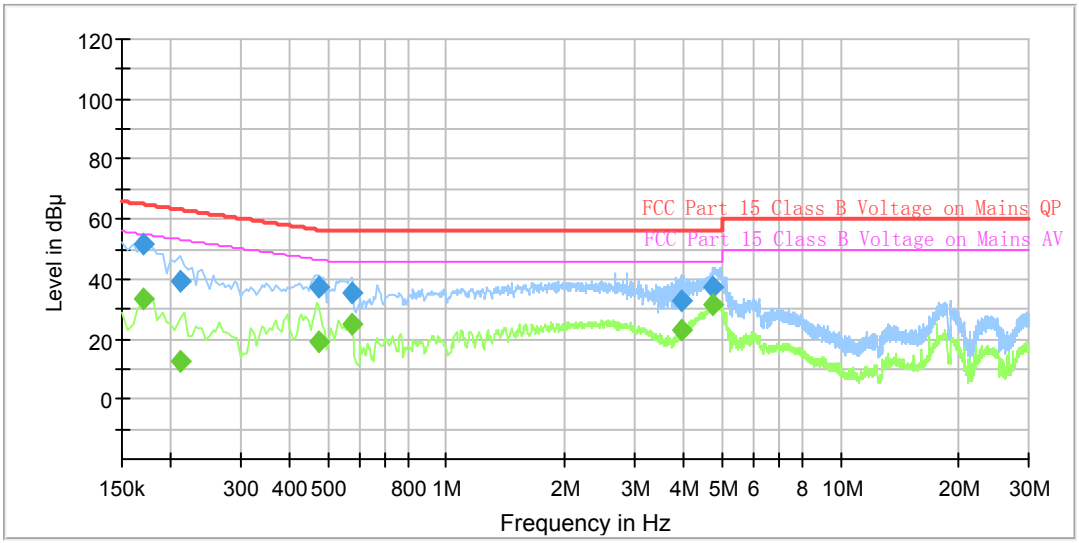
WIFI Mode:

AC 120V/60 Hz, Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.165000	47.34	---	9.000	L1	11.0	17.87	65.21	Compliance
0.165000	---	21.15	9.000	L1	11.0	34.06	55.21	Compliance
0.180000	---	37.47	9.000	L1	11.0	17.02	54.49	Compliance
0.180000	50.23	---	9.000	L1	11.0	14.26	64.49	Compliance
0.560000	---	24.10	9.000	L1	11.1	21.90	46.00	Compliance
0.560000	36.07	---	9.000	L1	11.1	19.93	56.00	Compliance
3.820000	---	22.71	9.000	L1	11.3	23.29	46.00	Compliance
3.820000	33.00	---	9.000	L1	11.3	23.00	56.00	Compliance
4.770000	---	32.31	9.000	L1	11.3	13.69	46.00	Compliance
4.770000	38.00	---	9.000	L1	11.3	18.00	56.00	Compliance
18.335000	---	21.06	9.000	L1	11.4	28.94	50.00	Compliance
18.335000	26.05	---	9.000	L1	11.4	33.95	60.00	Compliance

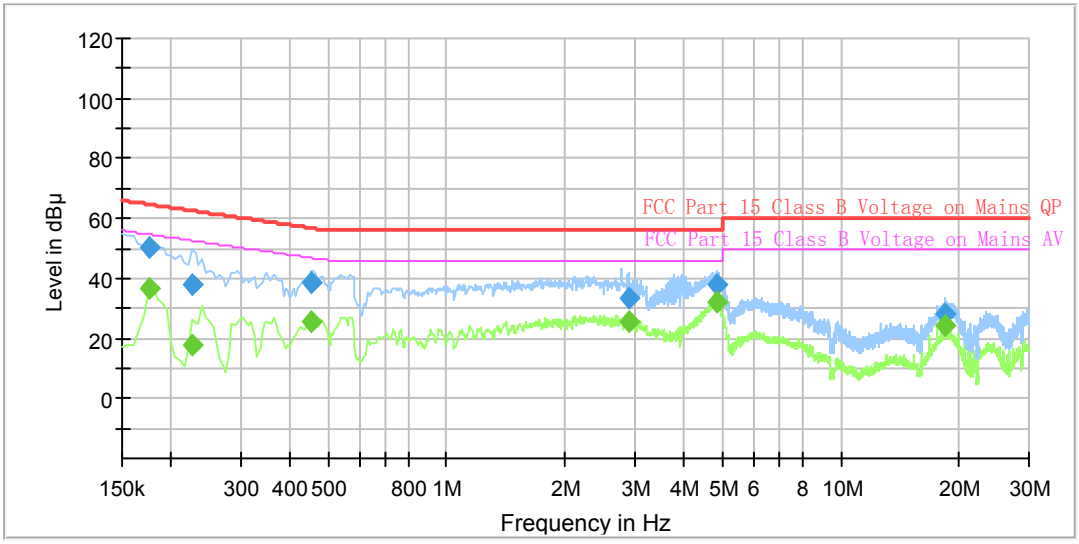
AC 120V/60 Hz, Neutral



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.170000	---	33.60	9.000	N	11.0	21.36	54.96	Compliance
0.170000	51.87	---	9.000	N	11.0	13.09	64.96	Compliance
0.210000	---	12.64	9.000	N	11.0	40.57	53.21	Compliance
0.210000	39.56	---	9.000	N	11.0	23.65	63.21	Compliance
0.475000	---	19.20	9.000	N	11.0	27.23	46.43	Compliance
0.475000	37.60	---	9.000	N	11.0	18.83	56.43	Compliance
0.575000	---	24.85	9.000	N	11.0	21.15	46.00	Compliance
0.575000	35.43	---	9.000	N	11.0	20.57	56.00	Compliance
3.960000	---	22.75	9.000	N	11.3	23.25	46.00	Compliance
3.960000	32.55	---	9.000	N	11.3	23.45	56.00	Compliance
4.750000	---	31.14	9.000	N	11.4	14.86	46.00	Compliance
4.750000	37.42	---	9.000	N	11.4	18.58	56.00	Compliance

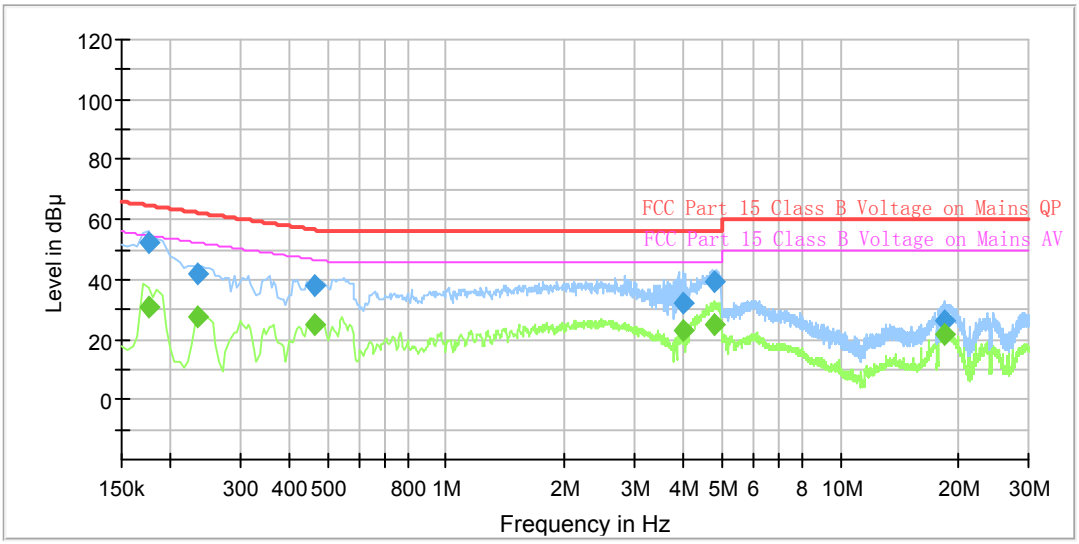
BLE Mode:

AC 120V/60 Hz, Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.175000	---	36.58	9.000	L1	11.0	18.14	54.72	Compliance
0.175000	50.31	---	9.000	L1	11.0	14.41	64.72	Compliance
0.225000	---	17.79	9.000	L1	11.0	34.84	52.63	Compliance
0.225000	37.64	---	9.000	L1	11.0	24.99	62.63	Compliance
0.455000	---	25.33	9.000	L1	11.0	21.45	46.78	Compliance
0.455000	38.77	---	9.000	L1	11.0	18.01	56.78	Compliance
2.900000	---	25.30	9.000	L1	11.2	20.70	46.00	Compliance
2.900000	33.65	---	9.000	L1	11.2	22.35	56.00	Compliance
4.820000	---	31.79	9.000	L1	11.3	14.21	46.00	Compliance
4.820000	38.09	---	9.000	L1	11.3	17.91	56.00	Compliance
18.340000	---	24.47	9.000	L1	11.4	25.53	50.00	Compliance
18.340000	28.03	---	9.000	L1	11.4	31.97	60.00	Compliance

AC 120V/60 Hz, Neutral



Frequency (MHz)	QuasiPeak (dBµV)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.175000	---	30.51	9.000	N	11.0	24.21	54.72	Compliance
0.175000	52.24	---	9.000	N	11.0	12.48	64.72	Compliance
0.235000	---	27.74	9.000	N	11.0	24.53	52.27	Compliance
0.235000	41.89	---	9.000	N	11.0	20.38	62.27	Compliance
0.465000	---	25.21	9.000	N	11.0	21.39	46.60	Compliance
0.465000	38.26	---	9.000	N	11.0	18.34	56.60	Compliance
4.005000	---	23.04	9.000	N	11.3	22.96	46.00	Compliance
4.005000	32.13	---	9.000	N	11.3	23.87	56.00	Compliance
4.775000	---	24.79	9.000	N	11.4	21.21	46.00	Compliance
4.775000	39.57	---	9.000	N	11.4	16.43	56.00	Compliance
18.355000	---	21.75	9.000	N	11.4	28.25	50.00	Compliance
18.355000	26.38	---	9.000	N	11.4	33.62	60.00	Compliance

Note:
1) Corr.=LISN VDF (Voltage Division Factor) + Cable Loss
2) Corrected Amplitude = Reading + Corr.
3) Margin = Limit –Corrected Amplitude

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

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

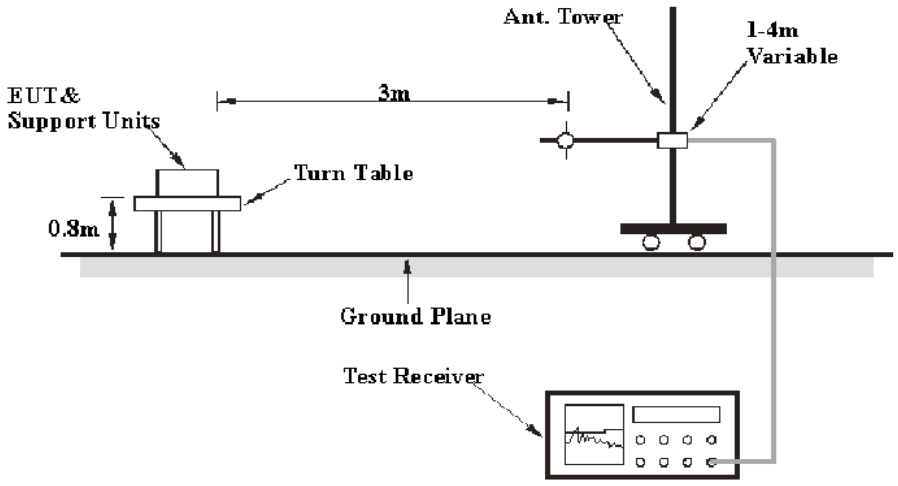
Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

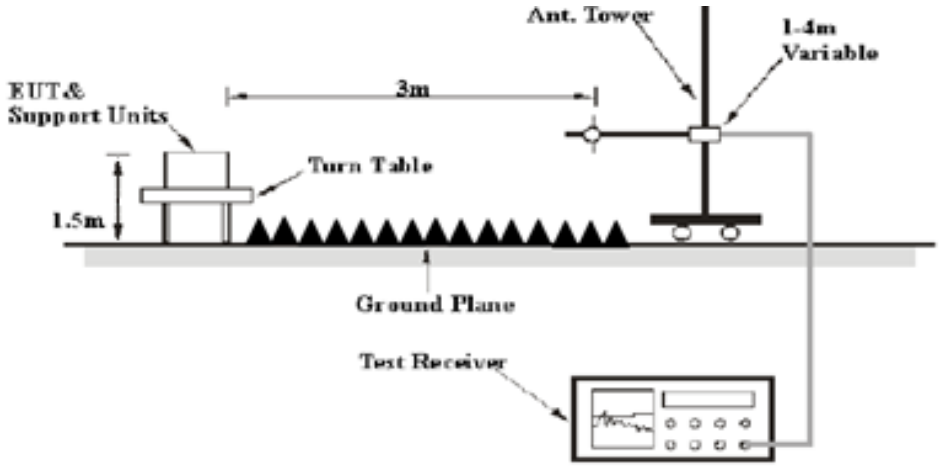
Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Kunshan) is 5.91 dB for 30MHz-1GHz and 4.92 dB for above 1GHz, 1.95dB for conducted measurement at antenna port. And the uncertainty will not be taken into consideration for the test data recorded in the report

EUT Setup

Below 1 GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters 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 adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	100 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.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sonoma Instrunent	Amplifier	330	171377	2015-09-16	2016-09-16
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2015-11-12	2016-11-11
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2015-11-07	2016-11-06
ETS	Horn Antenna	3115	6229	2015-11-07	2016-11-06
EMCO	Horn Antenna	3116	9510-2384	2015-11-07	2016-11-06
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-12	2016-11-11
Rohde & Schwarz	Signal Analyzer	FSV40	101116	2015-09-02	2016-09-02
Mini	Pre-amplifier	ZVA-183-S+	857001418	2015-09-16	2016-09-16
DUCOMMUN	Pre-amplifier	ALN-22093530-01	990147	2015-09-16	2016-09-16
champrotek	Chamber	Chamber A	1#	2015-09-17	2016-09-17
R&S	Auto test Software	EMC32	V 09.10.0	-	-
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15
BACL	RF cable	KS-LAB-010	KS-LAB-010	2015-12-16	2016-12-15

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

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + 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 Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247.

WIFI Mode: 1.45 dB at **191.990000 MHz** in the **Horizontal** polarization

BLE Mode: 8.77 dB at **4880MHz** in the **Horizontal** polarization

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

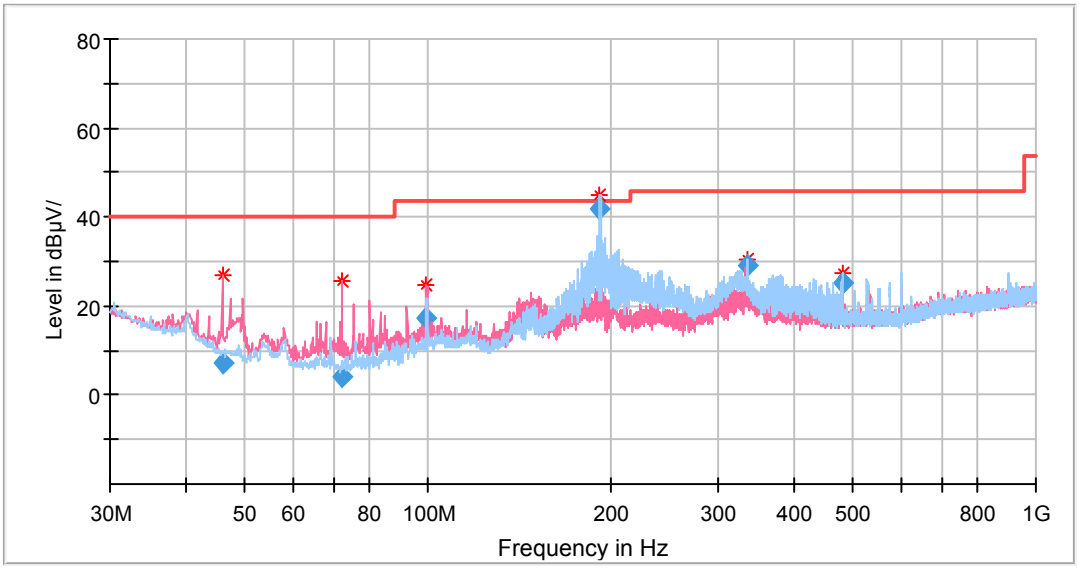
Temperature:	25 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Matt Yao on 2016-06-22.

EUT operation mode: Transmitting

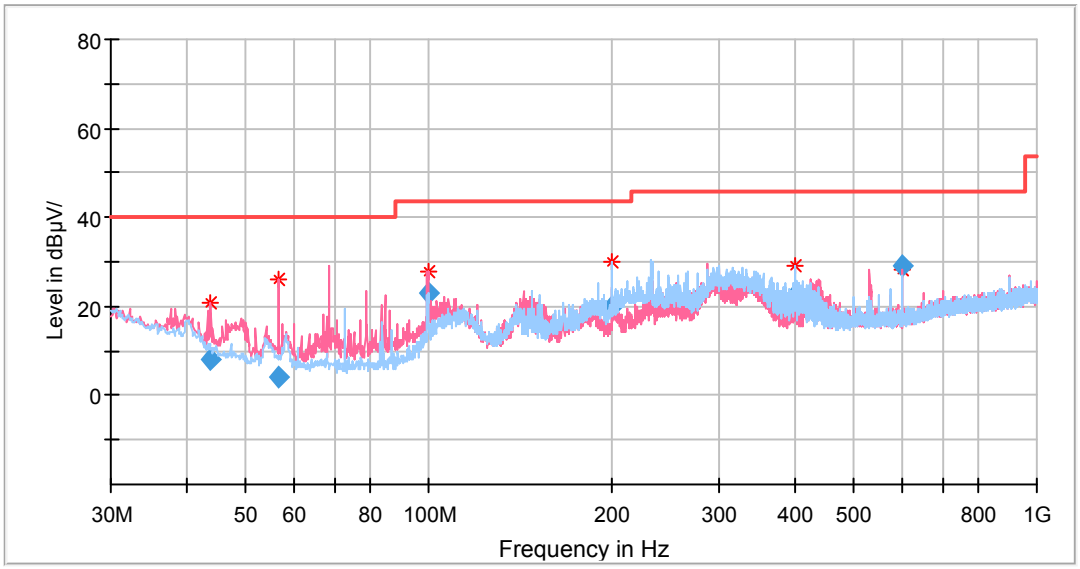
30M-1GMHz

WIFI Mode:



Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBµV/m)	FCC Part 15.247/205/209	
	Reading (dBµV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dB µ V/m)	Margin (dB)
45.883750	21.40	QP	346.0	100.0	V	-14.0	7.40	40.00	32.60
72.073750	21.06	QP	314.0	200.0	V	-17.1	3.96	40.00	36.04
99.476250	31.08	QP	122.0	100.0	V	-14.0	17.08	43.50	26.42
191.990000	54.35	QP	0.0	199.0	H	-12.3	42.05	43.50	1.45
336.035000	38.80	QP	34.0	100.0	H	-9.6	29.20	46.00	16.80
480.080000	31.27	QP	144.0	100.0	H	-6.2	25.07	46.00	20.93

BLE Mode:



Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBµV/m)	FCC Part 15.247/205/209	
	Reading (dBµV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dB µ V/m)	Margin (dB)
43.822500	20.79	QP	281.0	100.0	V	-12.7	8.09	40.00	31.91
56.675000	21.07	QP	76.0	200.0	V	-16.8	4.27	40.00	35.73
99.840000	36.70	QP	18.0	100.0	V	-13.8	22.90	43.50	20.60
199.871250	32.39	QP	190.0	100.0	H	-12.5	19.89	43.50	23.61
399.933750	30.79	QP	31.0	100.0	H	-8.4	22.39	46.00	23.61
599.996250	34.14	QP	180.0	100.0	V	-5.2	28.94	46.00	17.06

1GMHz-25GHz

BLE Mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2402 MHz)									
2402	91.88	PK	185.0	150.0	V	3.0	94.88	/	/
2402	85.87	Ave	185.0	150.0	V	3.0	84.87	/	/
2402	91.7	PK	150.0	150.0	H	3.0	94.7	/	/
2402	85.91	Ave	150.0	150.0	H	3.0	84.91	/	/
2363	29.61	Ave	66.0	150.0	H	4.1	33.71	54	20.29
2363	38.66	PK	66.0	150.0	H	4.1	42.76	74	31.24
2390	23.07	Ave	38.0	150.0	V	4.1	27.17	54	26.83
2390	31.67	PK	38.0	150.0	V	4.1	35.77	74	38.23
4804	31.21	Ave	124.0	150.0	H	13.7	44.91	54	9.09
4804	41.15	PK	124.0	150.0	H	13.7	54.85	74	19.15
6679	32.89	PK	154.0	250.0	V	18.8	51.69	74	22.31
6679	21.3	Ave	154.0	250.0	V	18.8	40.1	54	13.9
7206	32.03	PK	269.0	150.0	V	20.5	52.53	74	21.47
7206	24.32	Ave.	269.0	150.0	V	20.5	44.82	54	9.18
requency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel (2440MHz)									
2440	92.21	PK	168.0	150.0	V	2.6	95.2	/	/
2440	86.2	Ave	168.0	150.0	V	2.6	85.19	/	/
2440	92.03	PK	168.0	150.0	H	2.6	95.02	/	/
2440	86.24	Ave	168.0	150.0	H	2.6	85.23	/	/
1505	29.94	Ave	156.0	250.0	V	0.0	34.03	54	19.97
1505	38.99	PK	156.0	250.0	V	0.0	43.08	74	30.92
2265	23.4	Ave	320.0	150.0	V	0.7	27.49	54	26.51
2265	32	PK	320.0	150.0	V	0.7	36.09	74	37.91
4880	31.54	PK	21.0	150.0	H	13.9	45.23	74	8.77
4880	41.48	Ave	21.0	150.0	H	13.9	55.17	54	18.83
6659	33.22	PK	83.0	249.0	H	18.8	52.01	74	21.99
6659	21.63	Ave	83.0	249.0	H	18.8	40.42	54	13.58
7320	32.36	PK	266.0	150.0	V	20.8	52.85	74	21.15
7320	24.65	Ave.	266.0	150.0	V	20.8	45.14	54	8.86

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2480 MHz)									
2480	92.1	PK	154	100.0	V	3.2	95.05	/	/
2480	86.09	Ave	154	100.0	V	3.2	85.04	/	/
2480	91.92	PK	136	100.0	H	3.2	94.87	/	/
2480	86.13	Ave	136	100.0	H	3.2	85.08	/	/
2483.5	29.83	PK	50	249.0	H	4.2	33.88	74	20.12
2483.5	38.88	Ave	50	249.0	H	4.2	42.93	54	31.07
2530	23.29	PK	100	249.0	H	4.4	27.34	74	26.66
2530	31.89	Ave	100	249.0	H	4.4	35.94	54	38.06
4960	31.43	Ave	321	150.0	H	14.1	45.08	54	8.92
4960	41.37	PK	321	150.0	H	14.1	55.02	74	18.98
6688	33.11	PK	25	250.0	V	18.8	51.86	74	22.14
6688	21.52	Ave	25	250.0	V	18.8	40.27	54	13.73
7440	32.25	PK	208	150.0	V	21.2	52.7	74	21.3
7440	24.54	Ave	208	150.0	V	21.2	44.99	54	9.01

WIFI Mode:

802.11b Mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dB μ V/m)	Margin (dB)
Low Channel (2412 MHz)									
2412	91.26	PK	160	200.0	V	3.0	94.26	/	/
2412	87.11	Ave	160	200.0	V	3.0	90.11	/	/
2412	92.84	PK	89	200.0	H	3.0	95.84	/	/
2412	89.59	Ave	89	200.0	H	3.0	92.59	/	/
2300	35.15	PK	290	150.0	H	2.9	38.05	74	35.95
2300	23.54	Ave	290	150.0	H	2.9	26.44	54	27.56
2390	44.36	PK	119	150.0	V	2.9	47.26	74	26.74
2390	24.35	Ave	119	150.0	V	2.9	27.25	54	26.75
4824	38.39	PK	61	200.0	H	13.8	52.19	74	21.81
4824	31.37	Ave	61	200.0	H	13.8	45.17	54	8.83
6663	34.46	PK	322	150.0	V	18.8	53.26	74	20.74
6663	20.34	Ave	322	150.0	V	18.8	39.14	54	14.86
7236	37.08	PK	188	200.0	H	18.8	55.88	74	18.12
7236	16.79	Ave	188	200.0	H	18.8	35.59	54	18.41
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel (2437MHz)									
2437	92.26	PK	150	200.0	V	3.0	95.26	/	/
2437	87.55	Ave	150	200.0	V	3.0	90.55	/	/
2437	92.71	PK	90	200.0	H	3.0	95.71	/	/
2437	87.65	Ave	90	200.0	H	3.0	90.65	/	/
1575	37.25	PK	220	200.0	V	0.0	37.25	74	36.75
1575	23.88	Ave	220	200.0	V	0.0	23.88	54	30.12
2309	40.24	PK	110	200.0	H	0.7	40.94	74	33.06
2309	28.37	Ave	110	200.0	H	0.7	29.07	54	24.93
4874	39.21	PK	30	200.0	V	13.9	53.11	74	20.89
4874	30.88	Ave	30	200.0	V	13.9	44.78	54	9.22
6639	35.76	PK	340	150.0	H	18.8	54.56	74	19.44
6639	21.07	Ave	340	150.0	H	18.8	39.87	54	14.13
7311	36.04	PK	224	150.0	H	18.9	54.94	74	19.06
7311	16.54	Ave	224	150.0	H	18.9	35.44	54	18.56

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
2462	92.62	PK	126	200.0	V	3.0	95.62	/	/
2462	87.16	Ave	126	200.0	V	3.0	90.16	/	/
2462	92.39	PK	90	150.0	H	3.0	95.39	/	/
2462	87.87	Ave	90	150.0	H	3.0	90.87	/	/
2483.5	51.69	PK	180	150.0	V	3.2	54.89	74	19.11
2483.5	40.35	Ave	180	150.0	V	3.2	43.55	54	10.45
2475	41.39	PK	90	150.0	H	4.2	45.59	74	28.41
2475	22.85	Ave	90	150.0	H	4.2	27.05	54	26.95
4924	40.14	PK	230	200.0	V	14.0	54.14	74	19.86
4924	29.62	Ave	230	200.0	V	14.0	43.62	54	10.38
6653	35.2	PK	289	150.0	H	18.7	53.9	74	20.1
6653	19.12	Ave	289	150.0	H	18.7	37.82	54	16.18
7386	27.49	PK	188	200.0	V	19.8	47.29	74	26.71
7386	15.74	Ave	188	200.0	V	19.8	35.54	54	18.46

802.11g Mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
2412	92.26	PK	160	200.0	V	3.0	95.26	/	/
2412	87.32	Ave	160	200.0	V	3.0	90.32	/	/
2412	92.69	PK	89	200.0	H	3.0	95.69	/	/
2412	89.51	Ave	89	200.0	H	3.0	92.51	/	/
2285	34.62	PK	290	150.0	H	2.9	37.52	74	36.48
2285	21.22	Ave	290	150.0	H	2.9	24.12	54	29.88
2390	45.46	PK	119	150.0	V	2.9	48.36	74	25.64
2390	34.67	Ave	119	150.0	V	2.9	37.57	54	16.43
4824	39.65	PK	61	200.0	H	13.8	53.45	74	20.55
4824	29.49	Ave	61	200.0	H	13.8	43.29	54	10.71
6653	34.14	PK	322	150.0	V	18.8	52.94	74	21.06
6653	20.7	Ave	322	150.0	V	18.8	39.5	54	14.50
7236	38.14	PK	188	200.0	H	18.8	56.94	74	17.06
7236	17.72	Ave	188	200.0	H	18.8	36.52	54	17.48

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel (2437 MHz)									
2437	92.36	PK	150	200.0	V	3.0	95.36	/	/
2437	87.15	Ave	150	200.0	V	3.0	90.15	/	/
2437	92.87	PK	90	200.0	H	3.0	95.87	/	/
2437	87.26	Ave	90	200.0	H	3.0	90.26	/	/
1589	40.55	PK	220	200.0	V	0.0	40.55	74	33.45
1589	25.61	Ave	220	200.0	V	0.0	25.61	54	28.39
2365	45.56	PK	110	200.0	H	0.7	46.26	74	27.74
2365	33.51	Ave	110	200.0	H	0.7	34.21	54	19.79
4874	40.95	PK	30	200.0	V	13.9	54.85	74	19.15
4874	32.37	Ave	30	200.0	V	13.9	46.27	54	7.73
6611	36.46	PK	340	150.0	H	18.8	55.26	74	18.74
6611	22.15	Ave	340	150.0	H	18.8	40.95	54	13.05
7311	36.87	PK	224	150.0	H	18.9	55.77	74	18.23
7311	17.74	Ave	224	150.0	H	18.9	36.64	54	17.36

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
2462	93.54	PK	126	200.0	V	3.0	96.54	/	/
2462	87.59	Ave	126	200.0	V	3.0	90.59	/	/
2462	92.34	PK	90	150.0	H	3.0	95.34	/	/
2462	87.58	Ave	90	150.0	H	3.0	90.58	/	/
2483.5	52.25	PK	180	150.0	V	3.2	55.45	74	18.55
2483.5	41.06	Ave	180	150.0	V	3.2	44.26	54	9.74
2472	41.04	PK	90	150.0	H	4.2	45.24	74	28.76
2472	24.44	Ave	90	150.0	H	4.2	28.64	54	25.36
4924	41.08	PK	230	200.0	V	14.0	55.08	74	18.92
4924	28.63	Ave	230	200.0	V	14.0	42.63	54	11.37
6625	33.61	PK	289	150.0	H	18.7	52.31	74	21.69
6625	20.97	Ave	289	150.0	H	18.7	39.67	54	14.33
7386	29.51	PK	188	200.0	V	19.8	49.31	74	24.69
7386	15.97	Ave	188	200.0	V	19.8	35.77	54	18.23

802.11n-HT20 Mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
2412	92.06	PK	160	200.0	V	3.0	95.06	/	/
2412	87.58	Ave	160	200.0	V	3.0	90.58	/	/
2412	92.32	PK	89	200.0	H	3.0	95.32	/	/
2412	88.97	Ave	89	200.0	H	3.0	91.97	/	/
2315	36.67	PK	290	150.0	H	2.9	39.57	74	34.43
2315	24.28	Ave	290	150.0	H	2.9	27.18	54	26.82
2390	45.36	PK	119	150.0	V	2.9	48.26	74	25.74
2390	26.71	Ave	119	150.0	V	2.9	29.61	54	24.39
4824	39.29	PK	61	200.0	H	13.8	53.09	74	20.91
4824	31.57	Ave	61	200.0	H	13.8	45.37	54	8.63
6625	34.84	PK	322	150.0	V	18.8	53.64	74	20.36
6625	20.91	Ave	322	150.0	V	18.8	39.71	54	14.29
7236	38.11	PK	188	200.0	H	18.8	56.91	74	17.09
7236	17.66	Ave	188	200.0	H	18.8	36.46	54	17.54

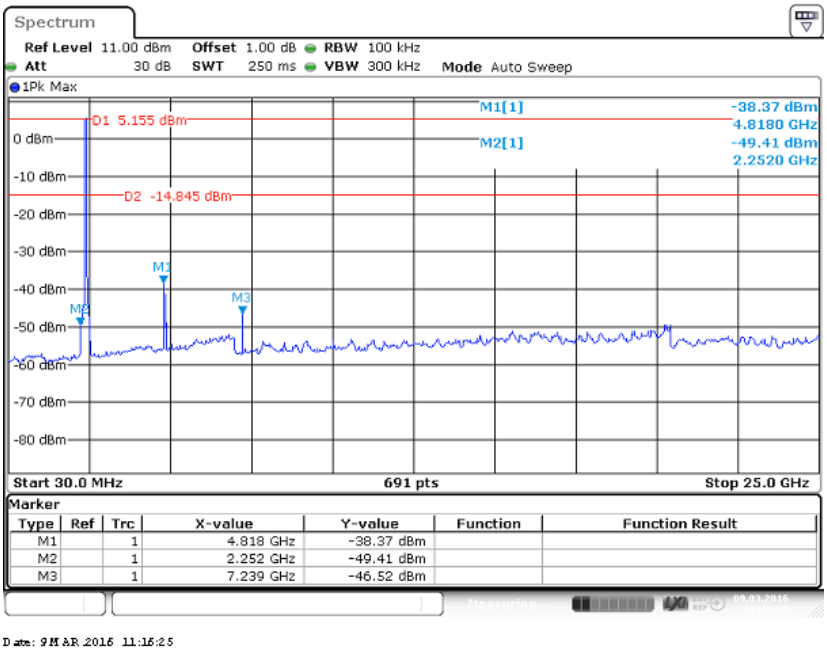
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel (2437 MHz)									
2437	92.63	PK	150	200.0	V	3.0	95.63	/	/
2437	87.12	Ave	150	200.0	V	3.0	90.12	/	/
2437	92.32	PK	90	200.0	H	3.0	95.32	/	/
2437	87.62	Ave	90	200.0	H	3.0	90.62	/	/
1757	37.61	PK	220	200.0	V	0.0	37.61	74	36.39
1757	24.08	Ave	220	200.0	V	0.0	24.08	54	29.92
2295	42.95	PK	110	200.0	H	0.7	43.65	74	30.35
2295	29.46	Ave	110	200.0	H	0.7	30.16	54	23.84
4874	39.27	PK	30	200.0	V	13.9	53.17	74	20.83
4874	31.33	Ave	30	200.0	V	13.9	45.23	54	8.77
6611	33.77	PK	340	150.0	H	18.8	52.57	74	21.43
6611	20.52	Ave	340	150.0	H	18.8	39.32	54	14.68
7311	36.12	PK	224	150.0	H	18.9	55.02	74	18.98
7311	16.26	Ave	224	150.0	H	18.9	35.16	54	18.84

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
2462	93.26	PK	126	200.0	V	3.0	96.26	/	/
2462	88.21	Ave	126	200.0	V	3.0	91.21	/	/
2462	92.37	PK	90	150.0	H	3.0	95.37	/	/
2462	87.61	Ave	90	150.0	H	3.0	90.61	/	/
2483.5	51.14	PK	180	150.0	V	3.2	54.34	74	19.66
2483.5	40.31	Ave	180	150.0	V	3.2	43.51	54	10.49
2458	41.42	PK	90	150.0	H	4.2	45.62	74	28.38
2458	28.13	Ave	90	150.0	H	4.2	32.33	54	21.67
4924	39.99	PK	230	200.0	V	14.0	53.99	74	20.01
4924	30.07	Ave	230	200.0	V	14.0	44.07	54	9.93
6639	35.2	PK	289	150.0	H	18.7	53.9	74	20.1
6639	19.12	Ave	289	150.0	H	18.7	37.82	54	16.18
7386	27.49	PK	188	200.0	V	19.8	47.29	74	26.71
7386	15.74	Ave	188	200.0	V	19.8	35.54	54	18.46

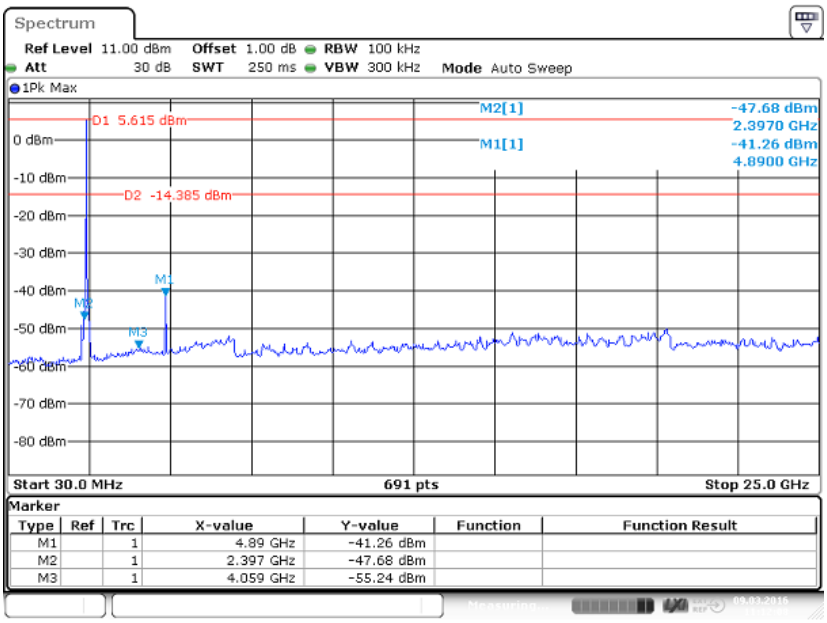
Note: 2.4 GHz &5 GHz radios can transmit simultaneously, they share the same antenna.

Conducted Spurious Emissions at Antenna Port

802.11b Low Channel

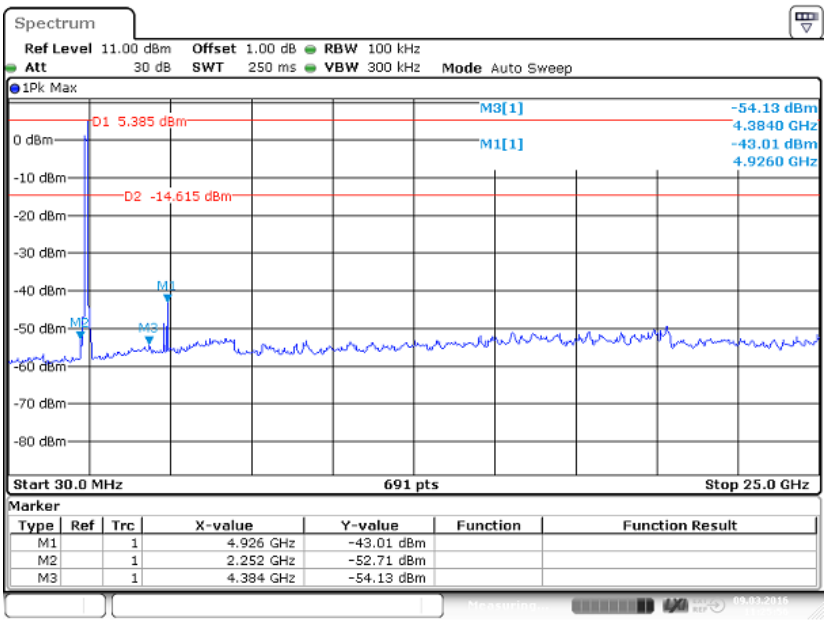


802.11b Middle Channel



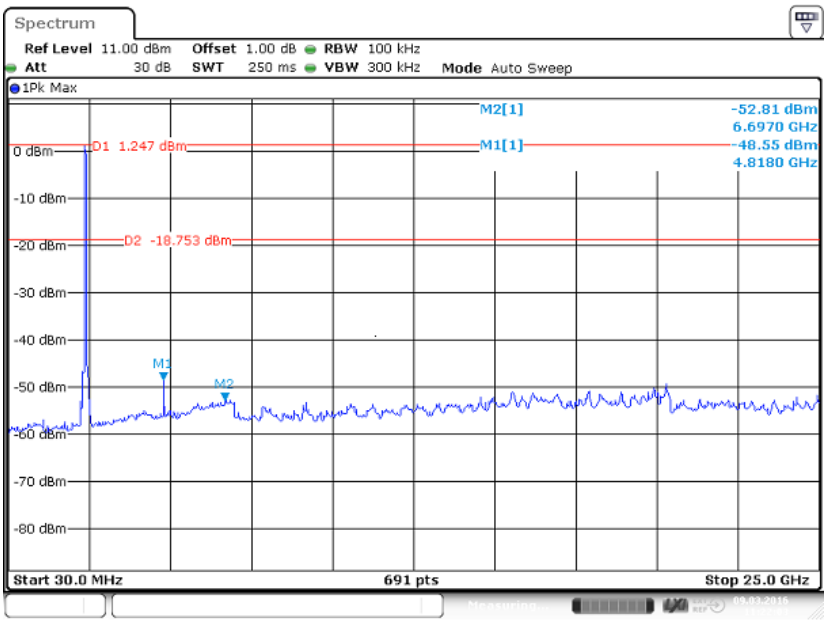
Date: 9 MAR 2016 11:12:09

802.11b High Channel



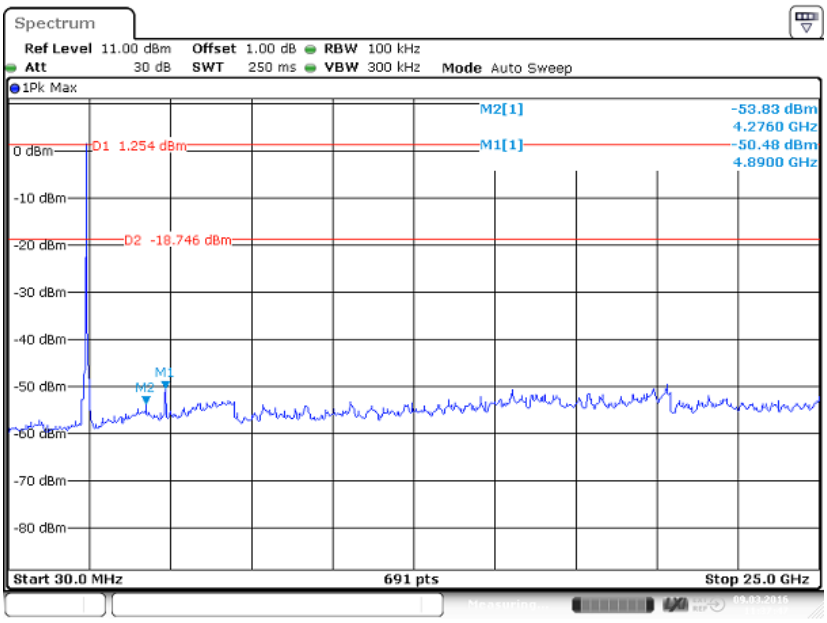
Date: 9 MAR 2016 11:25:56

802.11g Low Channel



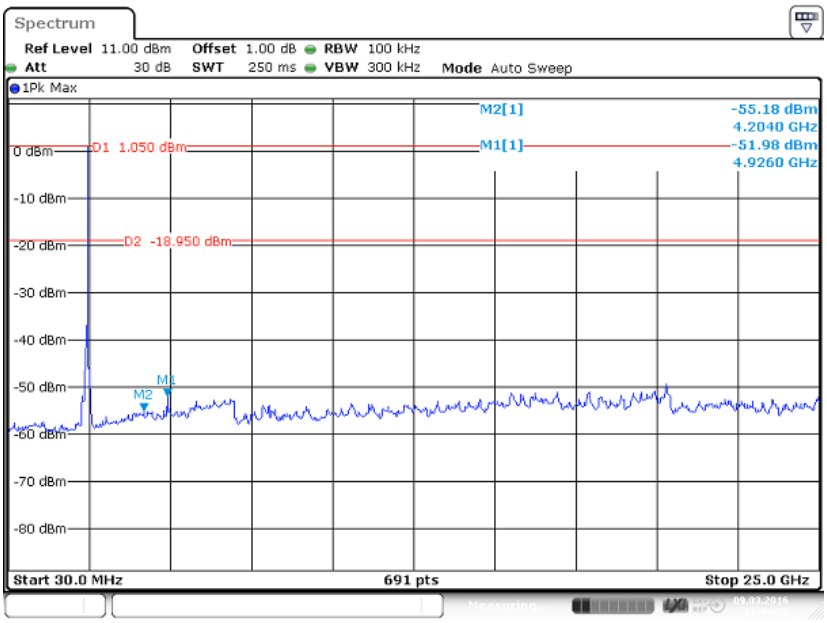
Date: 9 MAR 2016 11:22:04

802.11g Middle Channel



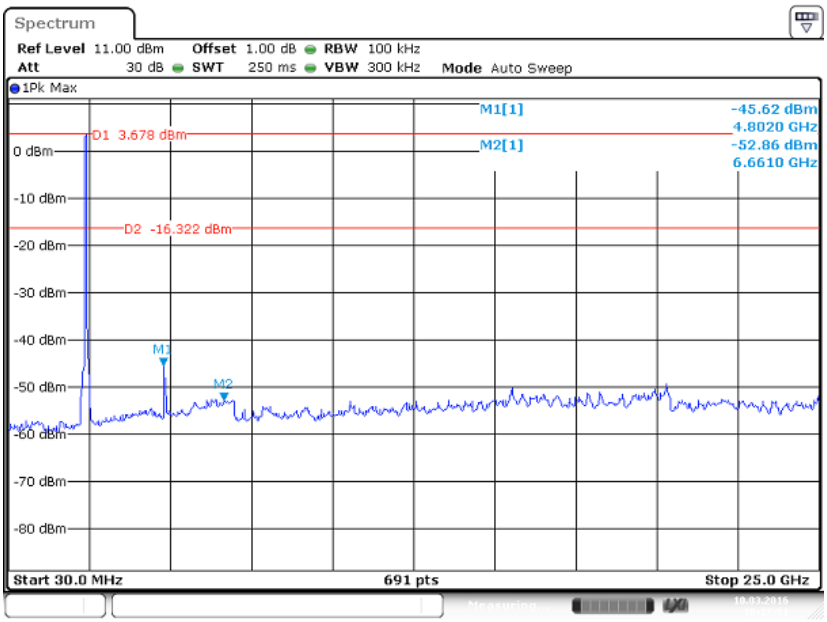
Date: 9 MAR 2016 11:37:46

802.11g High Channel



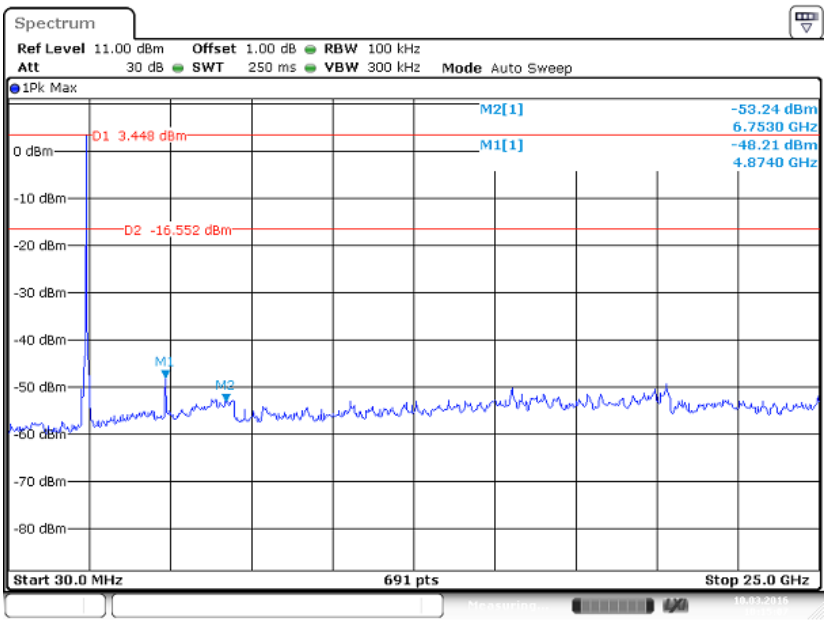
Date: 9 MAR 2016 11:43:20

802.11n-HT20 Low Channel



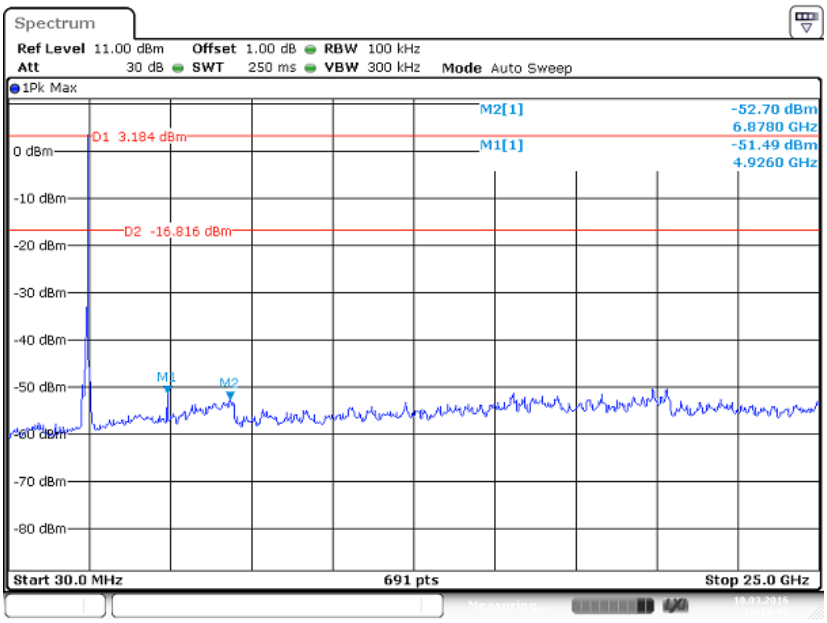
Date: 10 MAR 2016 10:17:51

802.11n-HT20 Middle Channel



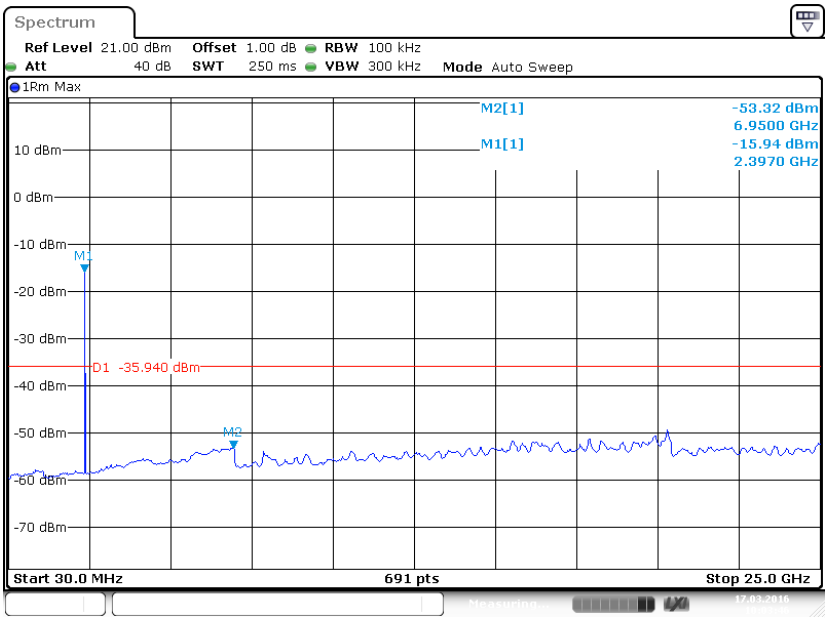
Date: 10.MAR.2016 10:15:07

802.11n-HT20 High Channel



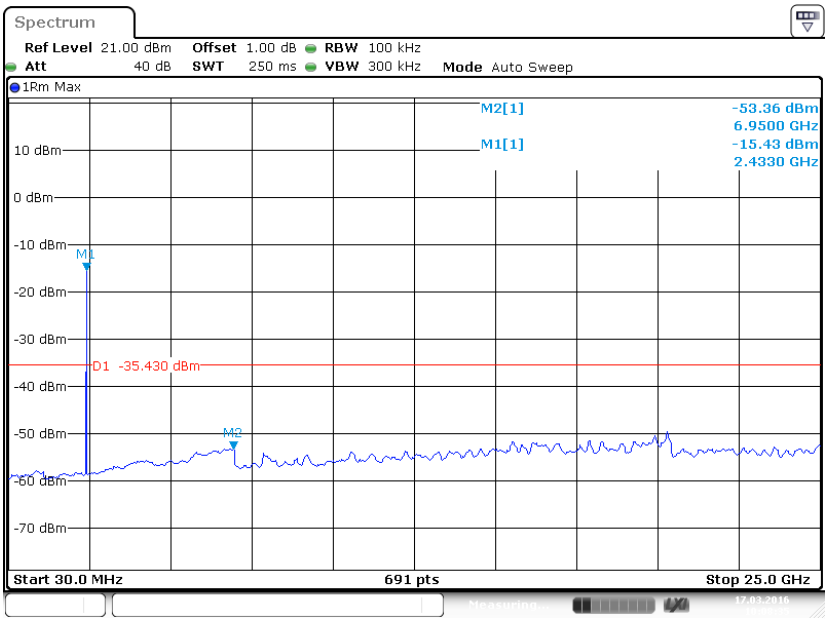
Date: 10.MAR.2016 10:10:48

BLE Mode Low Channel



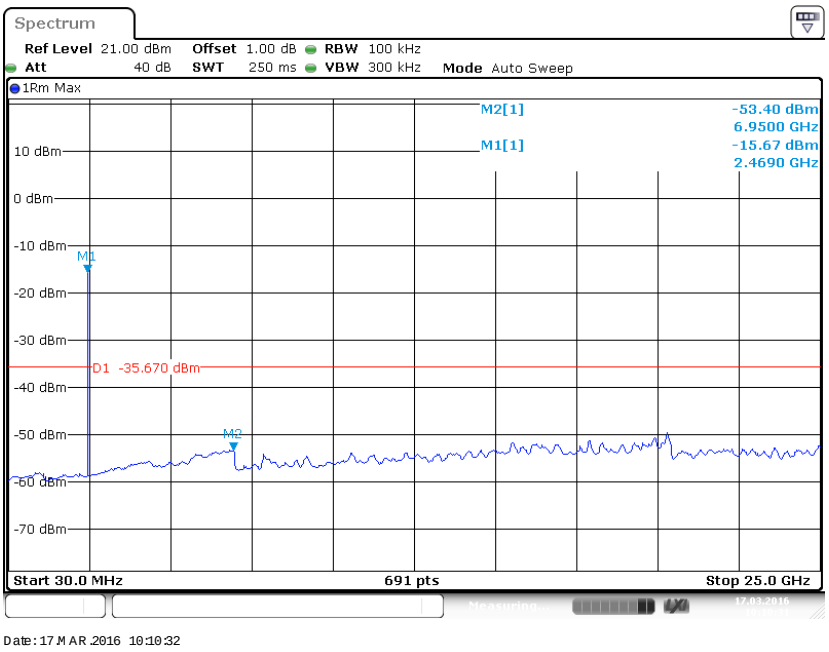
Date: 17.MAR.2016 10:03:46

BLE Mode Middle Channel



Date: 17.MAR.2016 10:08:35

BLE Mode High Channel



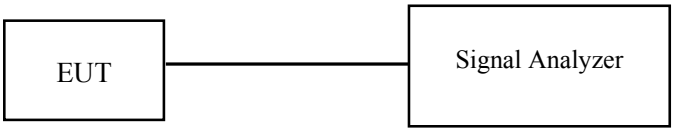
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

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

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 it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSV40	101116	2015-09-02	2016-09-02
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-12	2016-11-11
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15

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

Test Data

Environmental Conditions

Temperature:	27 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Matt Yao on 2016-03-08&2016-03-17 .

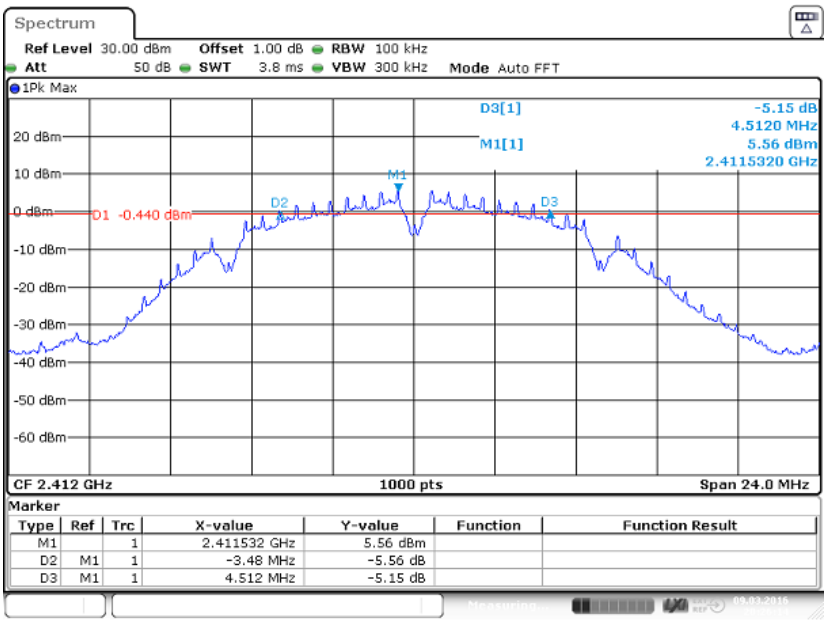
Test Result: Pass.

Please refer to the following tables and plots.

EUT operation mode: Transmitting

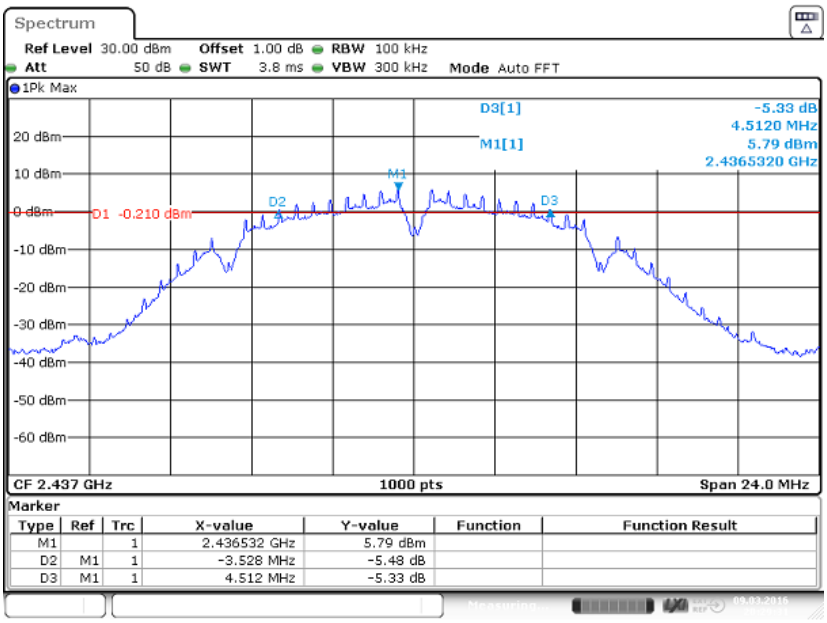
Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (kHz)
802.11b mode			
Low	2412	7.99	⩾500
Middle	2437	8.04	⩾500
High	2462	8.04	⩾500
802.11g mode			
Low	2412	15.02	⩾500
Middle	2437	16.41	⩾500
High	2462	16.37	⩾500
802.11n-HT20 mode			
Low	2412	15.98	⩾500
Middle	2437	17.54	⩾500
High	2462	17.58	⩾500
BLE mode			
Low	2402	1.09	≥500
Middle	2440	1.09	≥500
High	2480	1.08	≥500

802.11b Low Channel



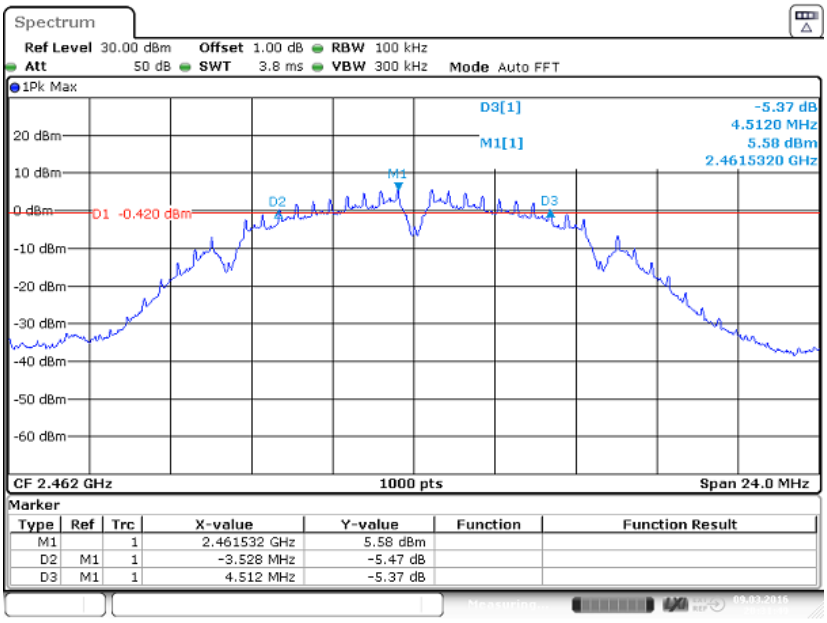
Date: 9MAR.2016 20:26:14

802.11b Middle Channel



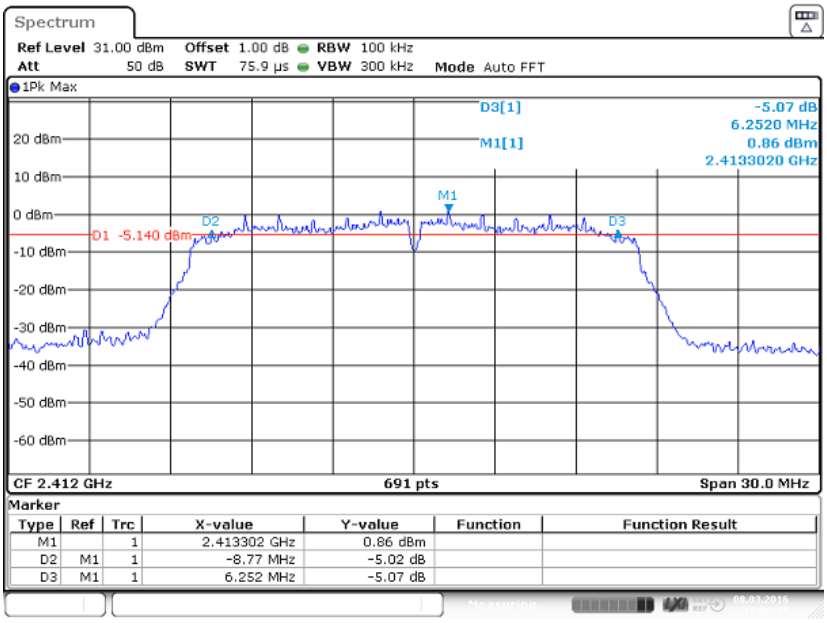
Date: 9MAR.2016 20:29:32

802.11b High Channel



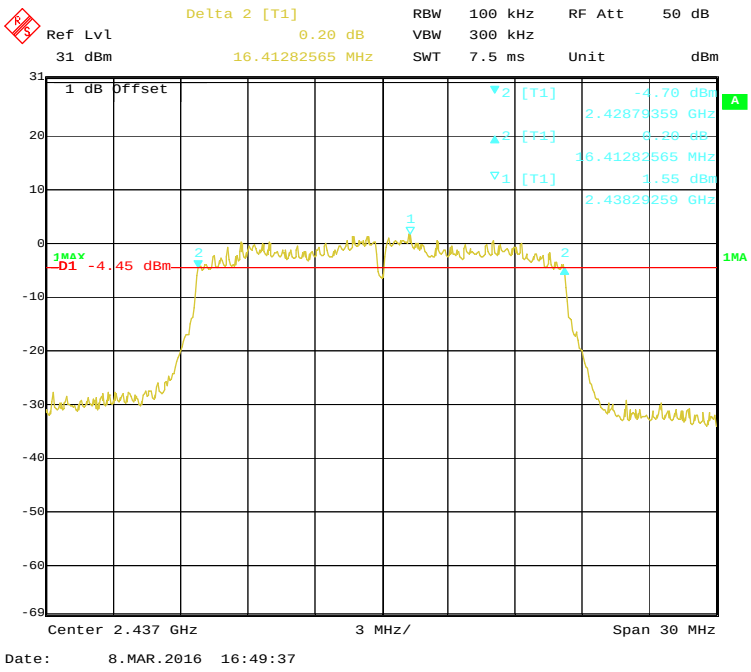
Date: 9 MAR 2016 20:31:50

802.11g Low Channel

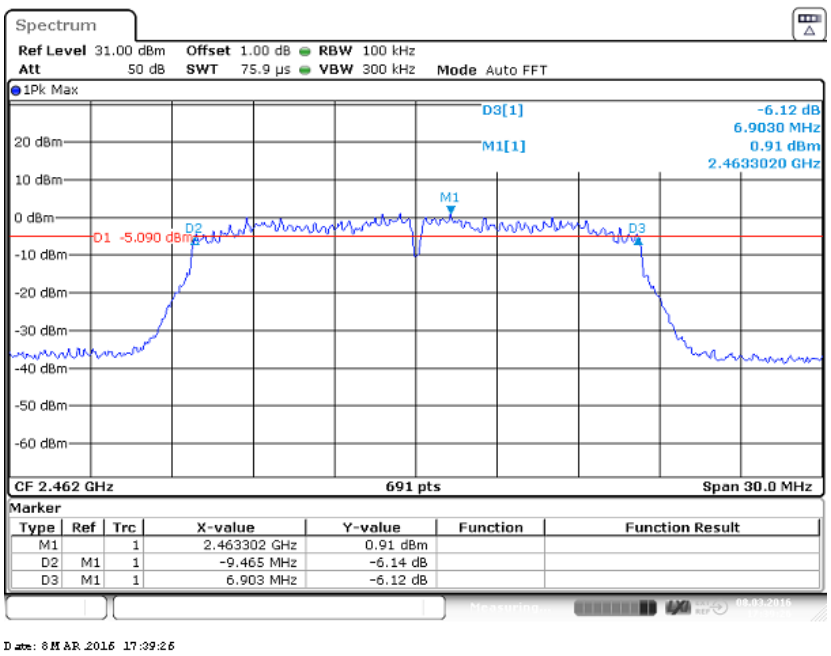


Date: 8 MAR 2016 17:30:17

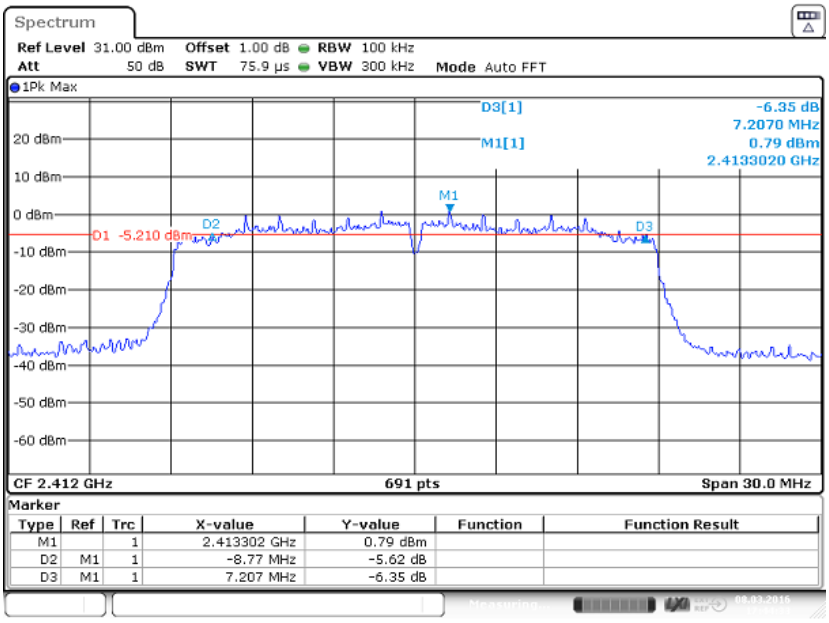
802.11g Middle Channel



802.11g High Channel

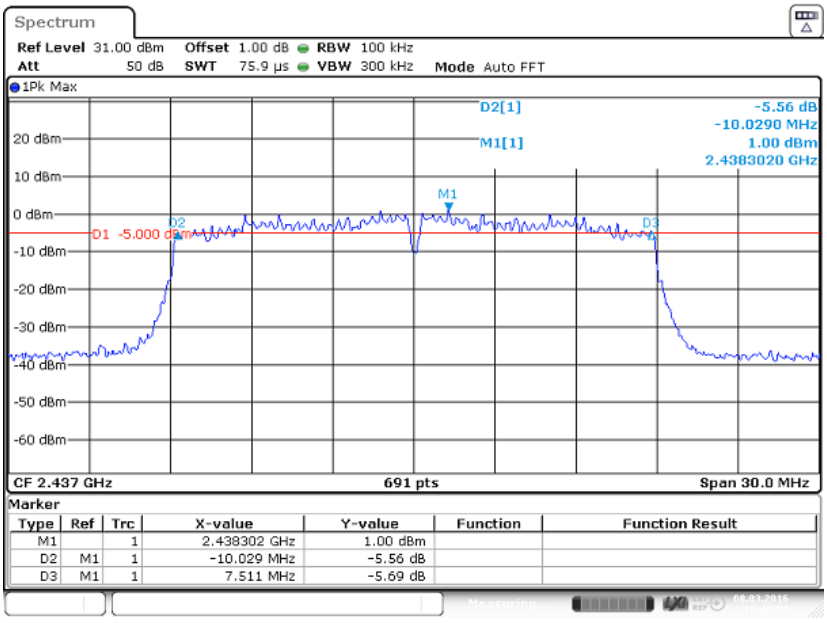


802.11n-HT20 Low Channel



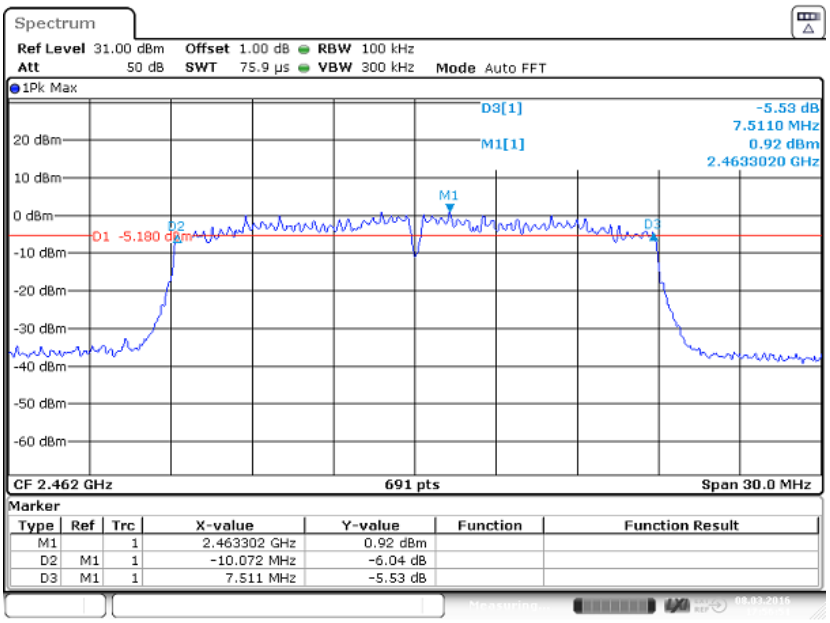
Date: 8.MAR.2016 17:44:33

802.11n-HT20 Middle Channel



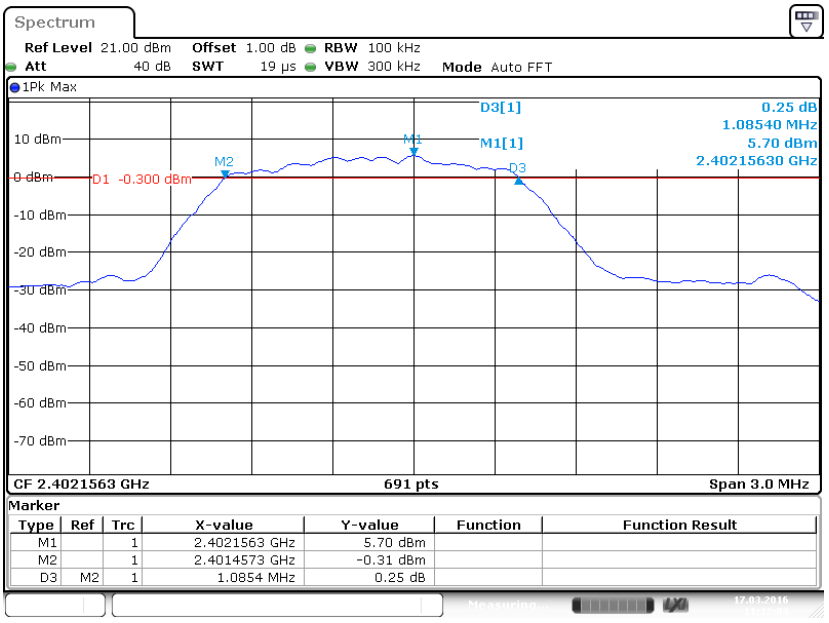
Date: 8.MAR.2016 17:49:53

802.11n-HT20 High Channel



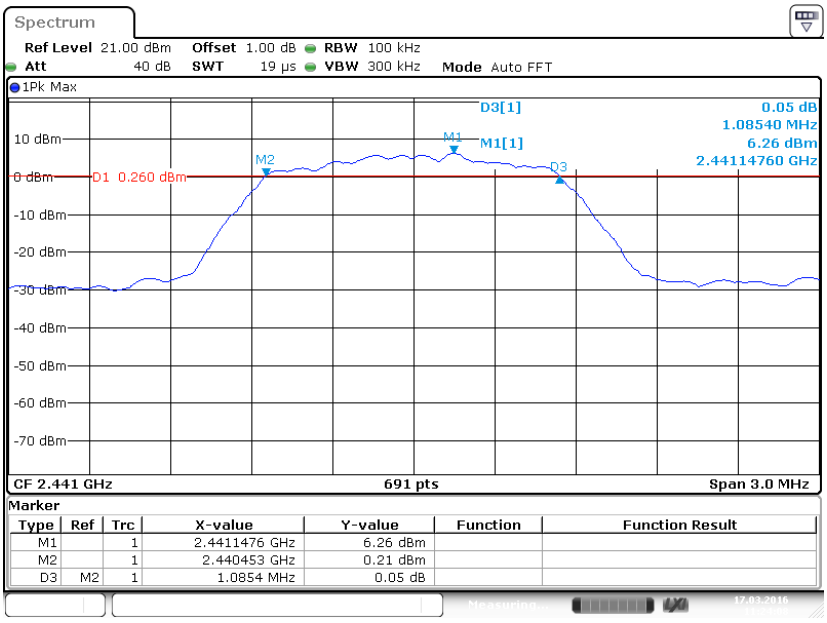
Date: 8.MAR.2016 17:56:51

BLE Low Channel



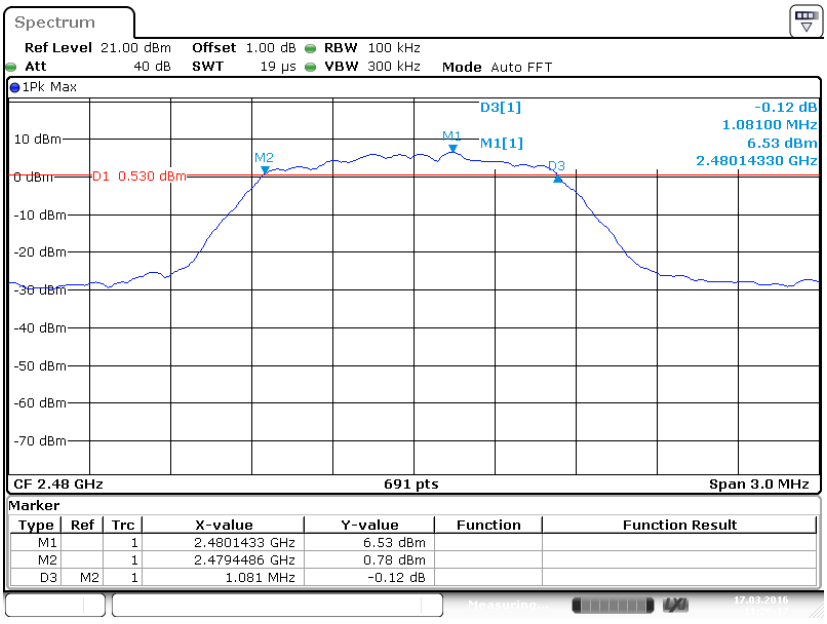
Date: 17.MAR.2016 11:12:03

BLE Middle Channel



Date:17.MAR.2016 11:24:08

BLE High Channel



Date:17.MAR.2016 11:26:17

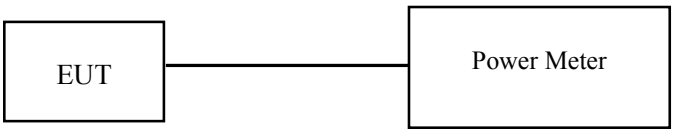
FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

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

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 one 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
Rohde & Schwarz	OSP120 BASE UNIT	OSP120	101247	2014-5-27	2016-5-27
Rohde & Schwarz	Power Sensor	NRP-Z91	200014	2015-8-1	2017-7-31
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15

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

Test Data

Environmental Conditions

Temperature:	27 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Matt Yao on2016-03-17

EUT operation mode: Transmitting

Channel	Frequency (MHz)	Max Conducted Average Output Power (dBm)	Max Conducted Peak Output Power (dBm)	Limit (dBm)
802.11b				
Low	2412	15.23	16.01	30
Middle	2437	15.77	16.81	30
High	2462	16.23	17.12	30
802.11g				
Low	2412	12.55	13.22	30
Middle	2437	13.14	13.72	30
High	2462	13.68	14.07	30
802.11n-HT20				
Low	2412	13.02	14.23	30
Middle	2437	13.63	14.45	30
High	2462	13.42	14.36	30

BLE mode

Channel	Frequency (MHz)	Max Conducted Average Output Power (dBm)	Max Conducted Peak Output Power (dBm)	Limit (dBm)	Result
Low	2402	6.78	7.69	30	Pass
Middle	2440	6.33	7.42	30	Pass
High	2480	6.70	7.98	30	Pass

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
Rohde & Schwarz	Signal Analyzer	FSV40	101116	2015-09-02	2016-09-02
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15

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

Test Data

Environmental Conditions

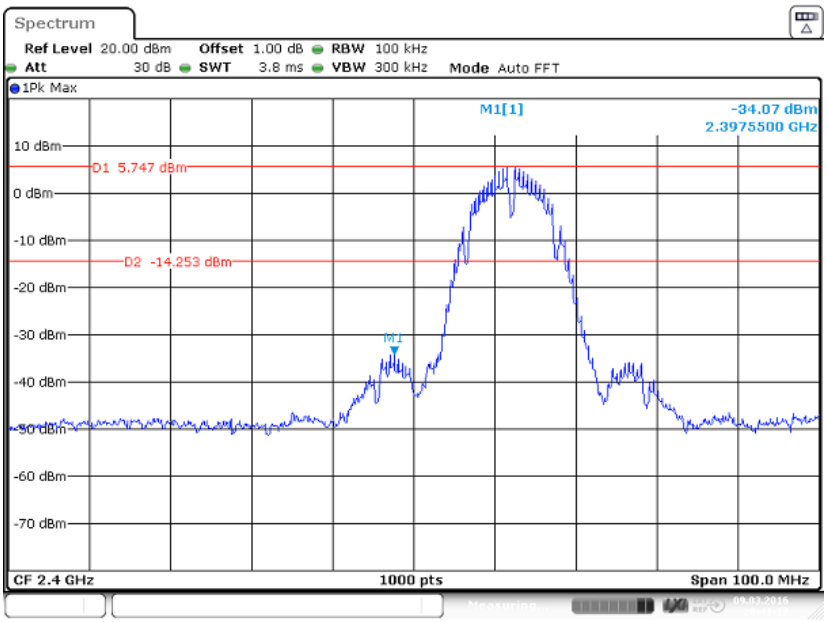
Temperature:	27 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Matt Yao on 2016-03-09&2016-03-17.

Test Result: *Compliance*

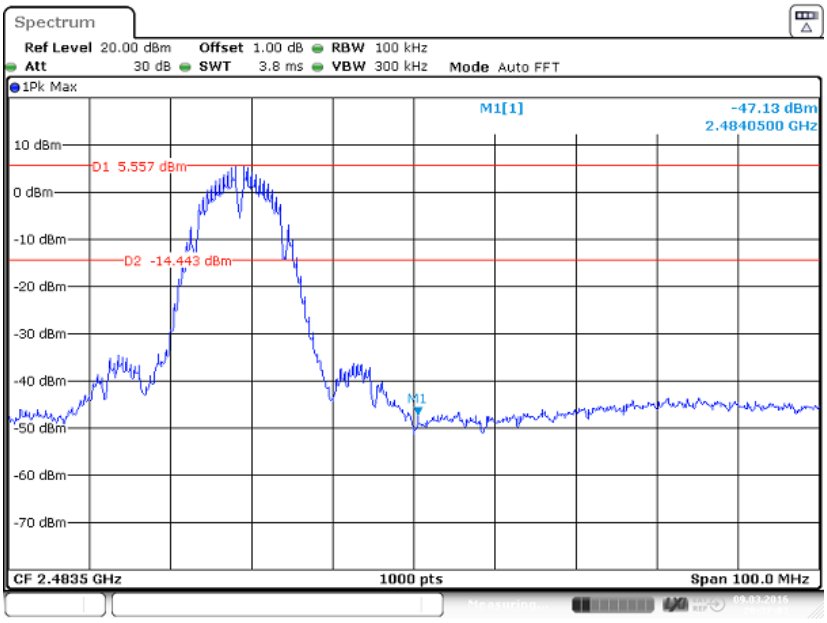
Please refer to the following table and plots.

802.11b: Band Edge, Left Side



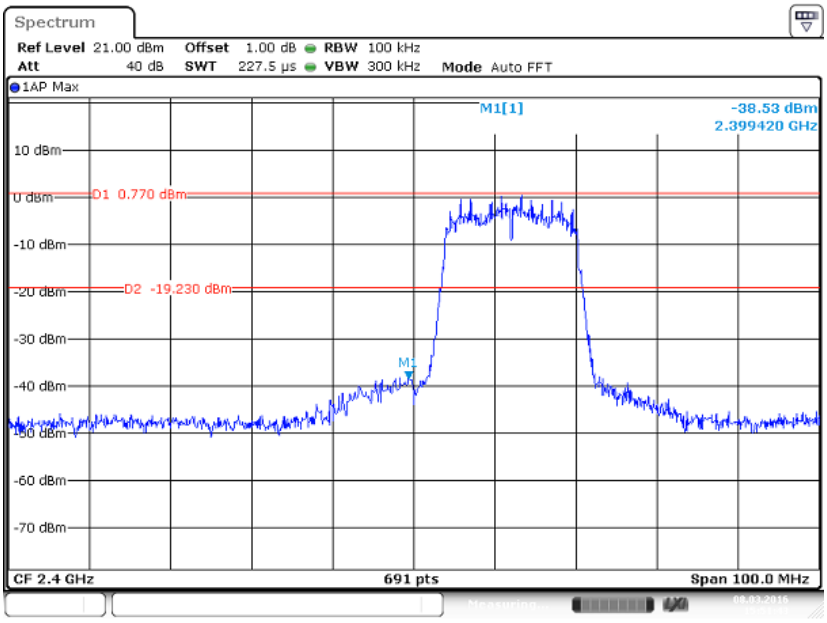
Date: 9.MAR.2016 20:41:17

802.11b: Band Edge, Right Side

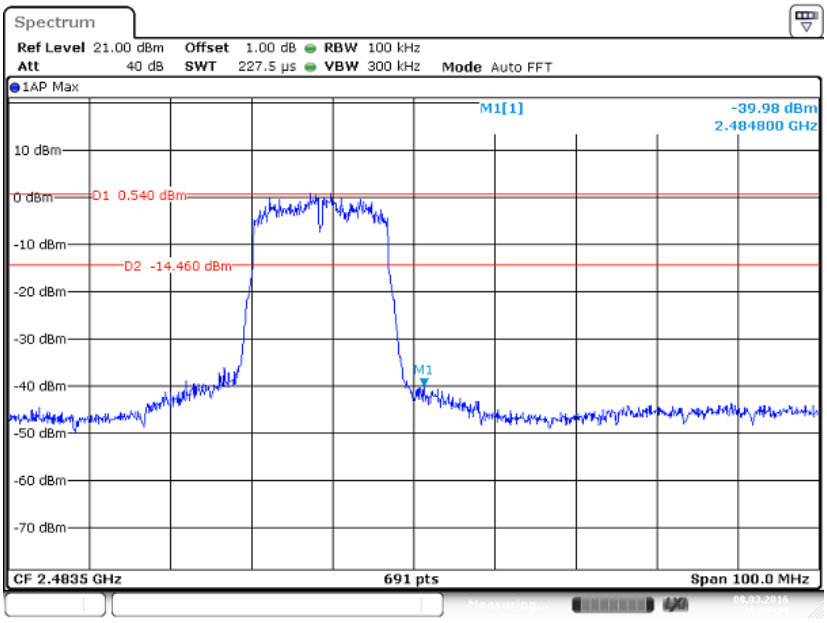


Date: 9.MAR.2016 20:37:04

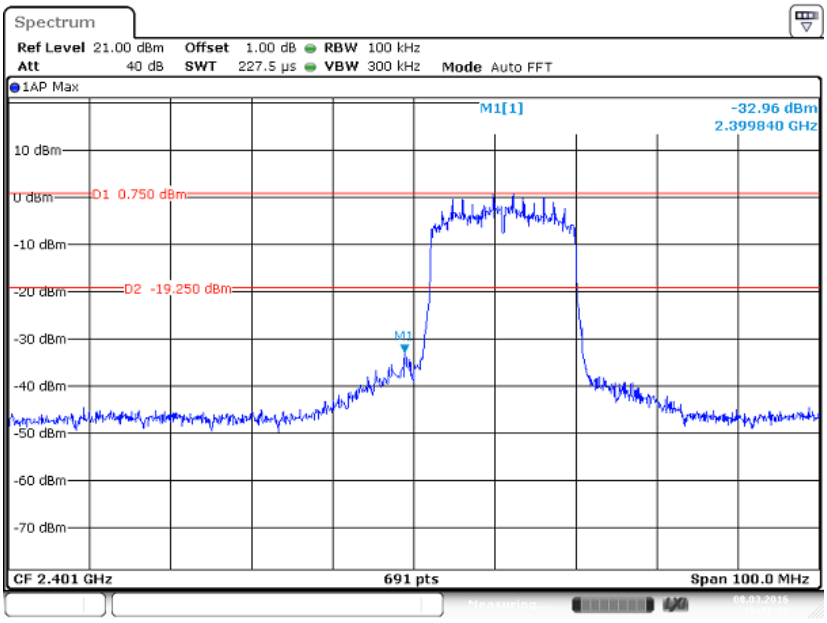
802.11g: Band Edge, Left Side



802.11g: Band Edge, Right Side

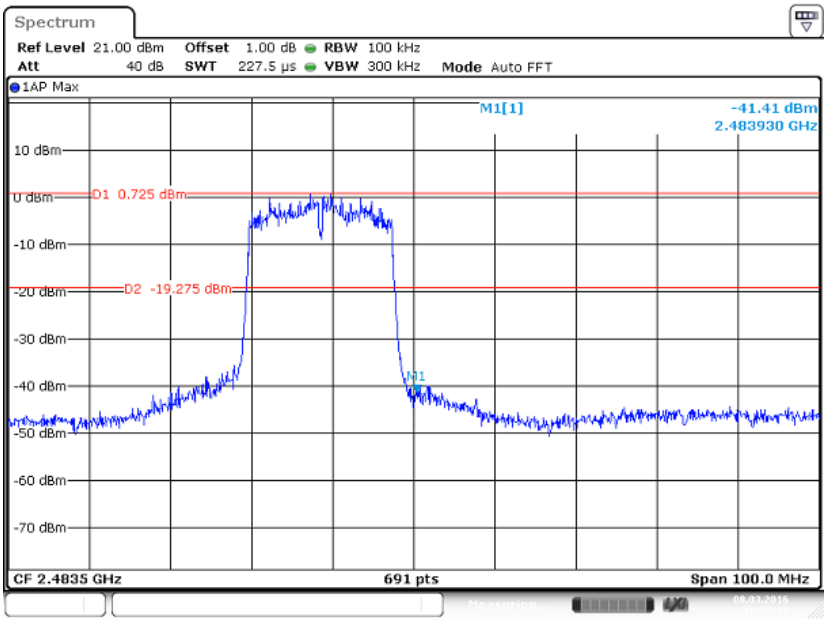


802.11n-HT20: Band Edge, Left Side



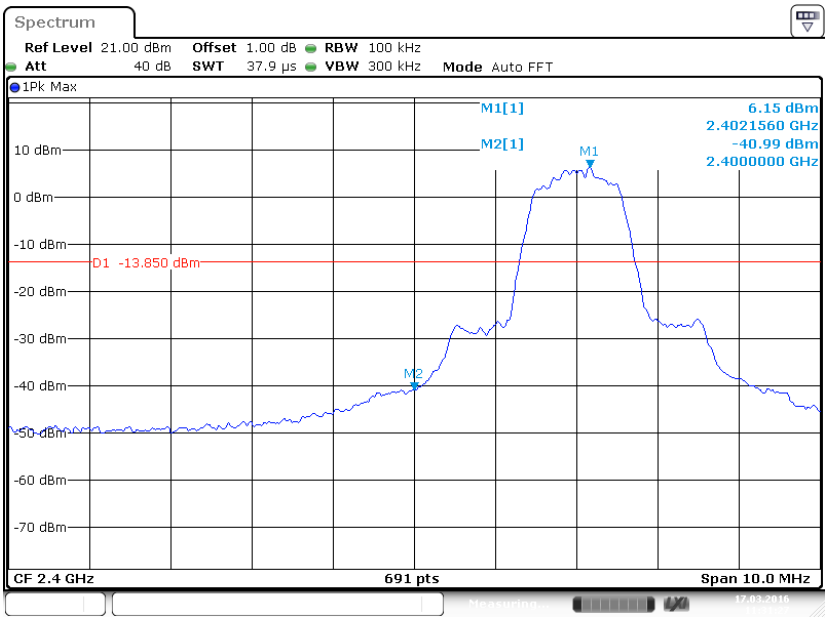
Date: 8.MAR.2016 15:41:12

802.11n-HT20: Band Edge, Right Side



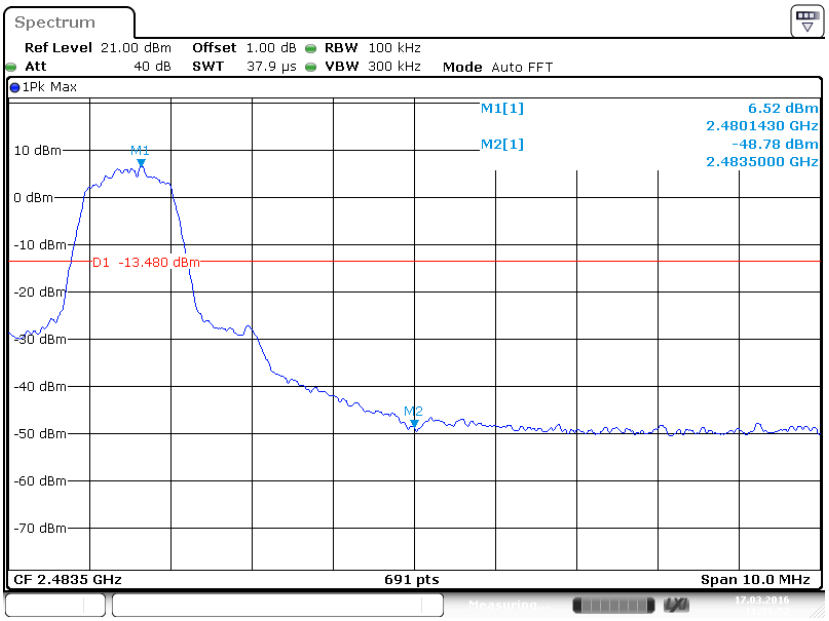
Date: 8.MAR.2016 15:35:37

BLE: Band Edge, Left Side



Date: 17.MAR.2016 11:31:27

BLE: Band Edge, Right Side



Date: 17.MAR.2016 11:33:53

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 KDB558074 D01 DTS Meas Guidance v03r04

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW to: 3kHz≤ RBW≤100 kHz.
3. Set the VBW ≥ 3×RBW.
4. Set the span to 1.5 times the DTS bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. 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
Rohde & Schwarz	Signal Analyzer	FSV40	101116	2015-09-02	2016-09-02
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15

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

Test Data

Environmental Conditions

Temperature:	27 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

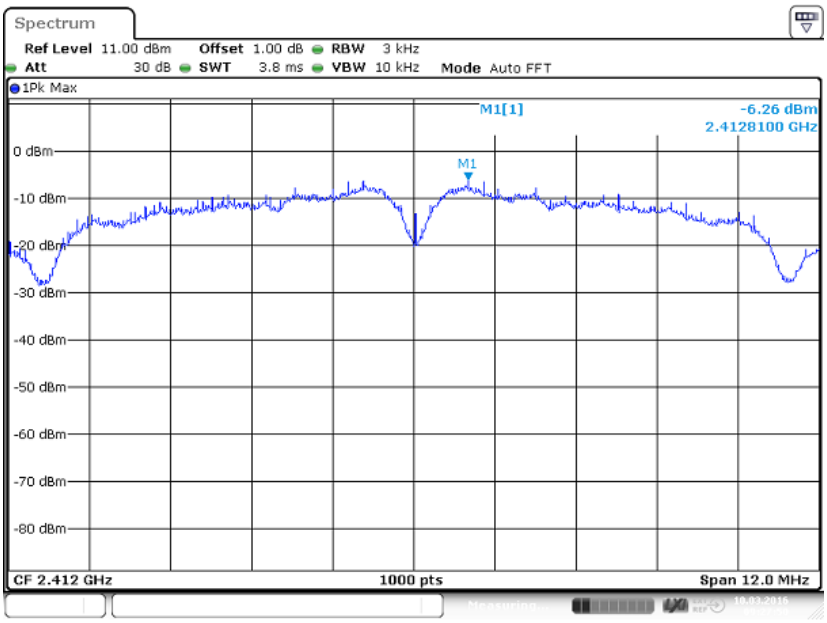
The testing was performed by Matt Yao on 2016-03-09&2016-03-10&2016-03-17.

EUT operation mode: Transmitting

Test Result: Pass

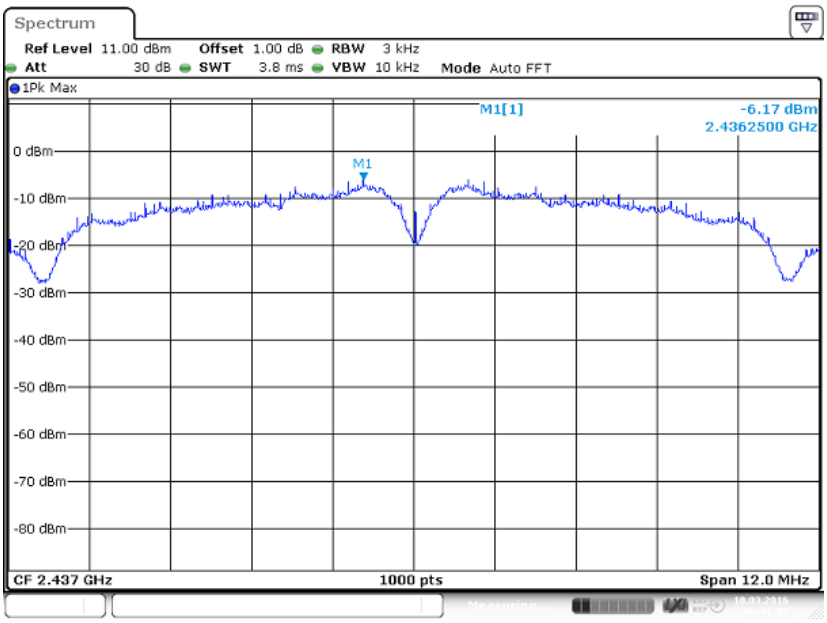
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
802.11b mode			
Low	2412	-6.26	≤8
Middle	2437	-6.17	≤8
High	2462	-6.28	≤8
802.11g mode			
Low	2412	-12.33	≤8
Middle	2437	-9.16	≤8
High	2462	-11.94	≤8
802.11n-HT20 mode			
Low	2412	-12.98	≤8
Middle	2437	-12.40	≤8
High	2462	-10.25	≤8
BLE mode			
Low	2402	-8.35	≤8
Middle	2440	-8.21	≤8
High	2480	-7.93	≤8

Power Spectral Density, 802.11b Low Channel



Date: 10.MAR.2016 09:27:49

Power Spectral Density, 802.11b Middle Channel



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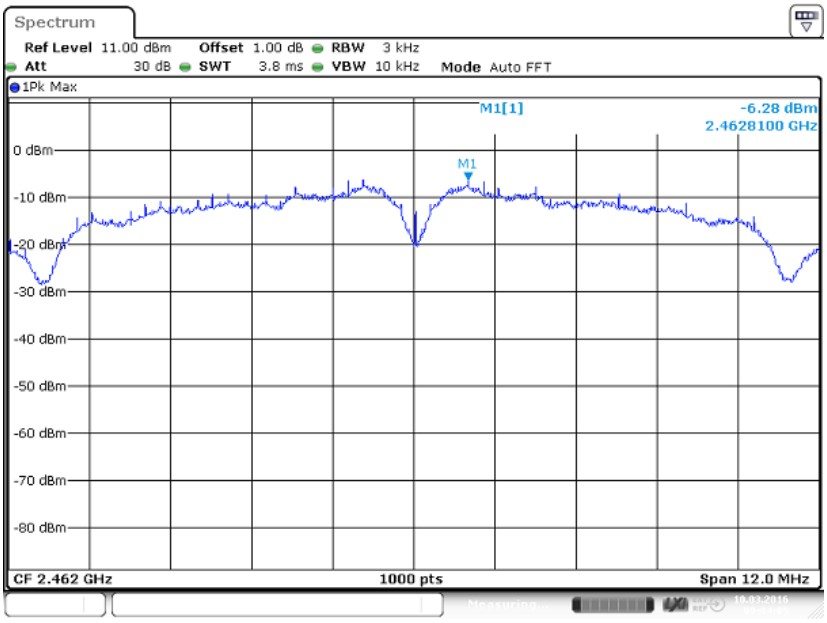
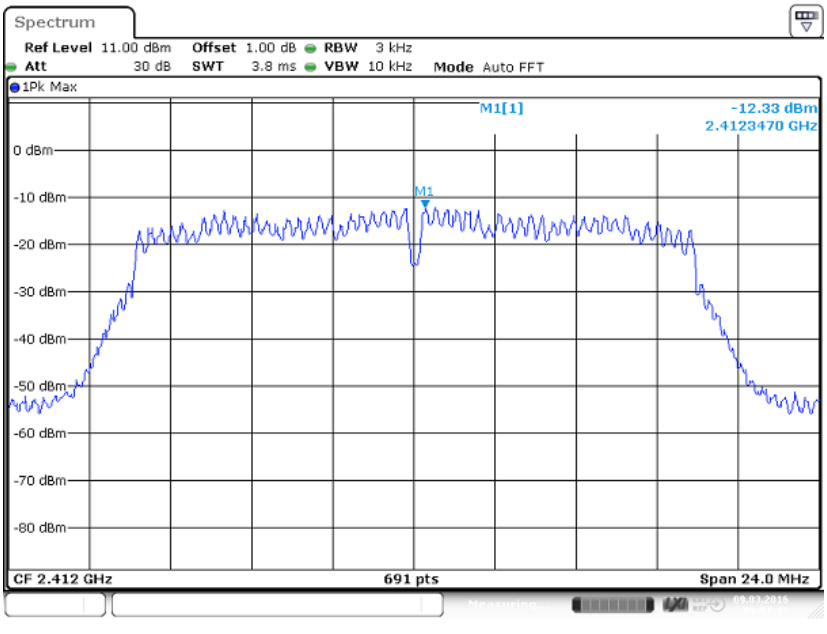
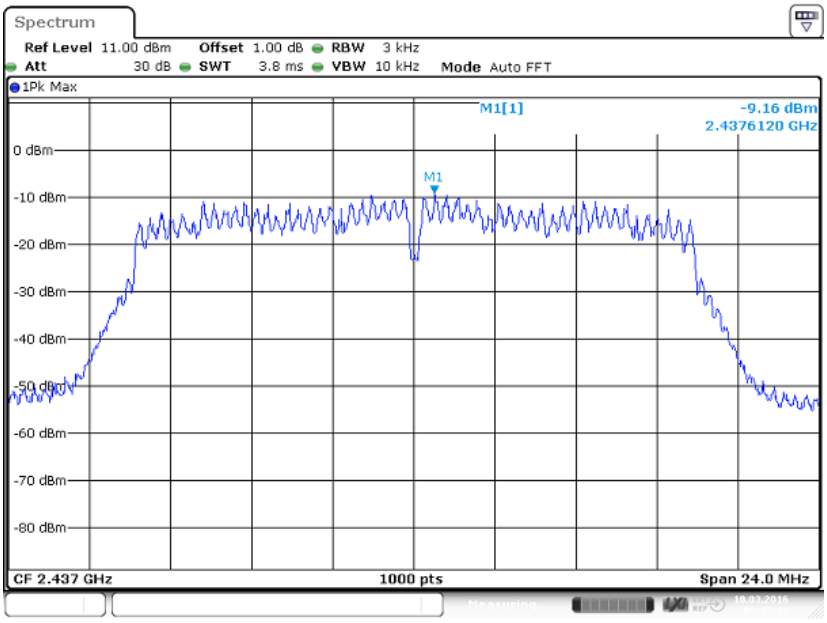
Power Spectral Density, 802.11b High Channel



Power Spectral Density, 802.11g Low Channel



Power Spectral Density, 802.11g Middle Channel



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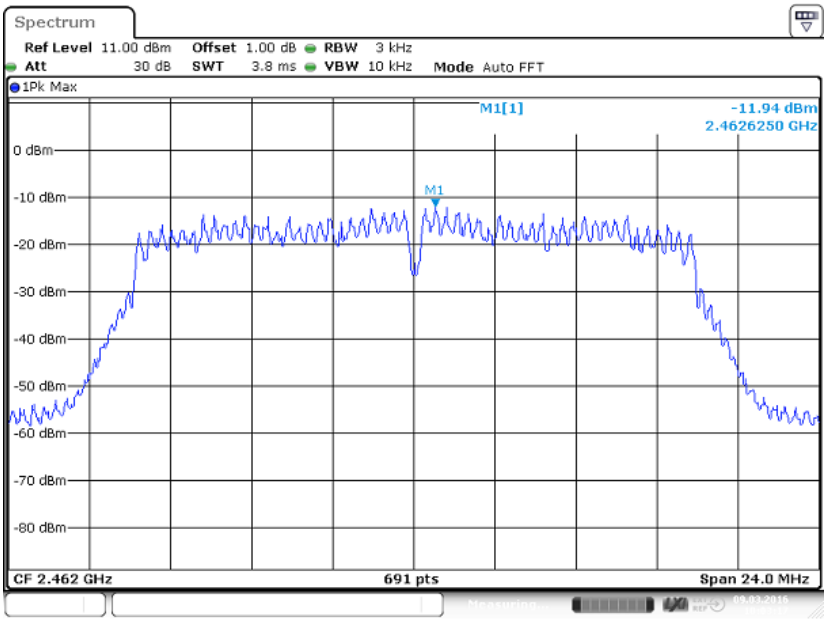
Power Spectral Density, 802.11g High Channel



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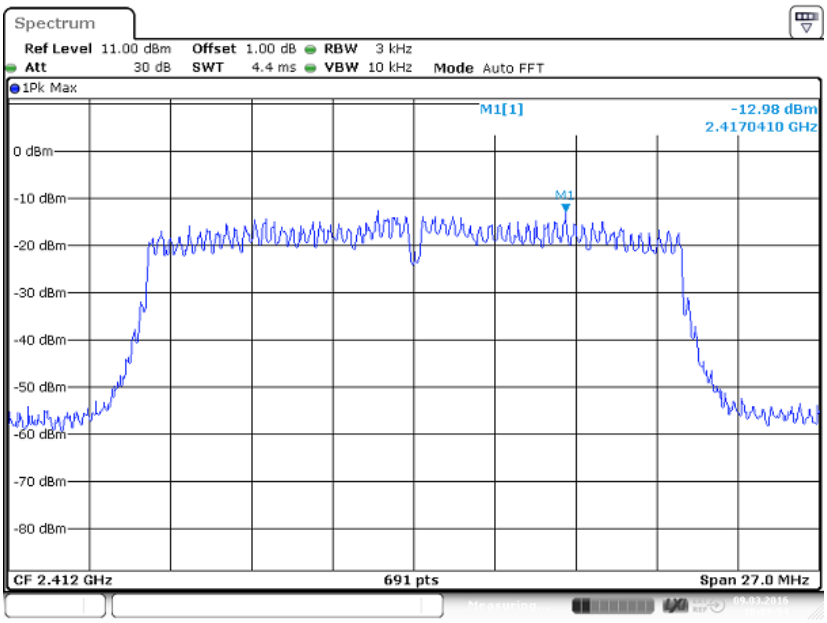
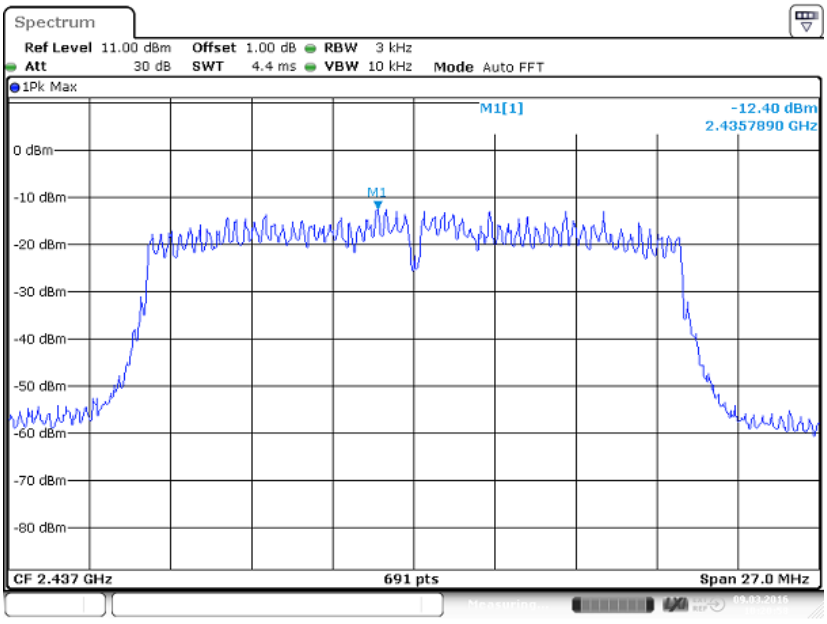
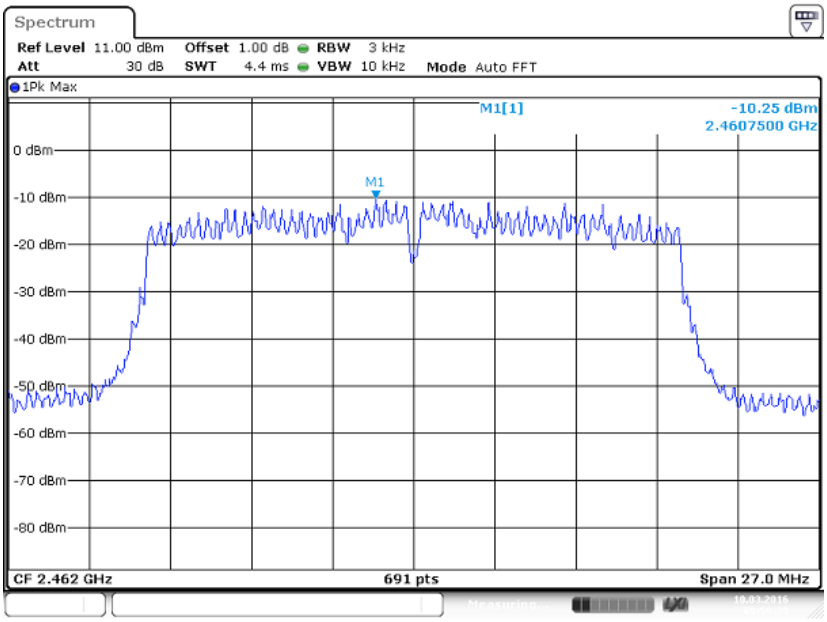
Power Spectral Density, 802.11n-HT20 Low Channel



Power Spectral Density, 802.11n-HT20 Middle Channel



Power Spectral Density, 802.11n-HT20 High Channel



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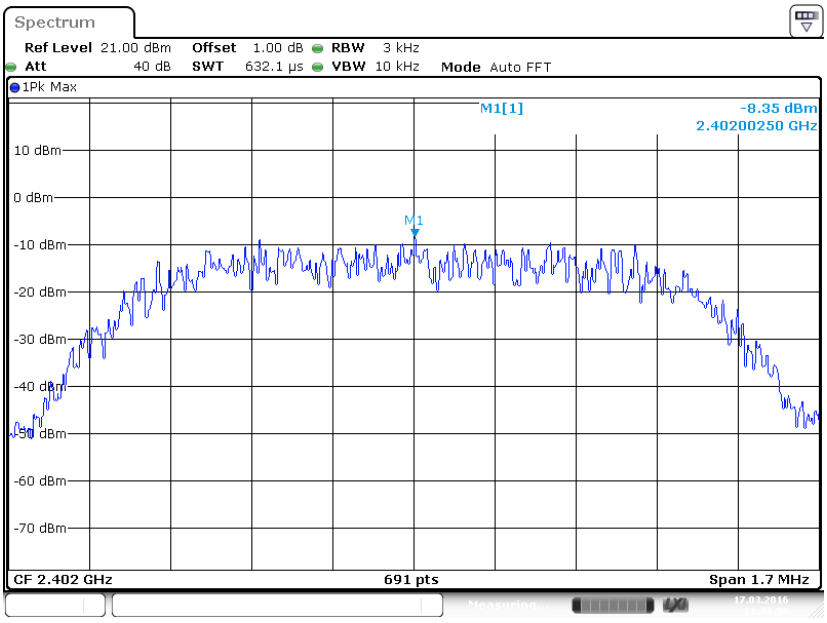
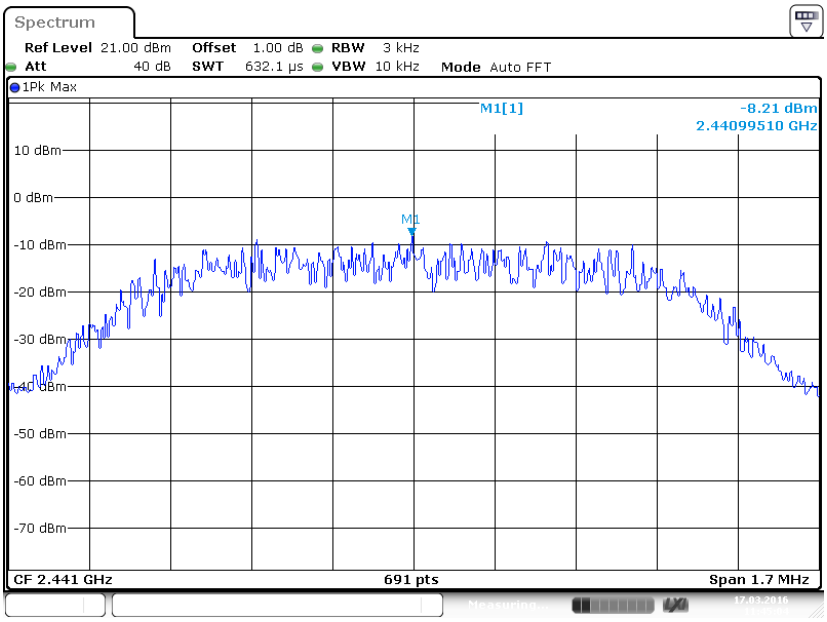
BLE Low Channel



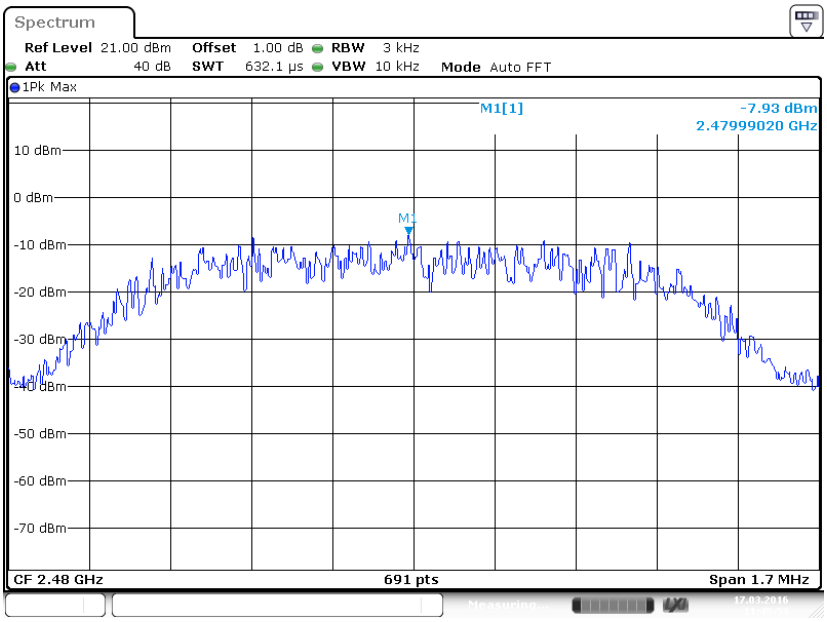
Date: 17.MAR.2016 11:43:50

BLE Middle Channel



Date: 17.MAR.2016 11:45:04

BLE High Channel



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