FCC PART 15.247

TEST REPORT

For

Sierra Monitor Corporation

1991 Tarob Court, Milpitas CA 95035-6840, UNITED STATES

FCC ID: 2AIVJ-FPAC34
Model Number: FPA-C34, FPA-W34

Report Type:	**Product Name:**
Original Report	M2M Gateway

Test Engineer:	Kevin Hu
Report Number:	RSC160616002-0C
Report Date:	2016-07-18
Reviewed By:	Henry Ding EMC Leader
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Chengdu) 5040, HuiLongWan Plaza, No. 1, ShaWan Road, JinNiu District, ChengDu, China Tel: 028-65523123, Fax: 028-65525125 www.baclcorp.com

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The ***Sierra Monitor Corporation***'s product, model number: ***FPA-C34(FCC ID: 2AIVJ-FPAC34)*** (the "EUT") in this report was the **M2M Gateway**.
The highest operating frequency was **2480 MHz.**

Mechanical Description of EUT

The EUT was measured approximately 100 mm L x 78 mm W x 28 mm H.

Rated input voltage: DC 12-24V

The products, test model: FPA-C34, multiple model: FPA-W34, FPA-C34-XXXX, FPA-W34-XXXX, Where X can be used as "0-9"for application software changes or marketing purposes only. Their differences were presented in Product Difference Statement provided by the applicant. And we selected FPA-C34 to fully test.

**All measurement and test data in this report was gathered from final production sample, serial number: 160616002/03 (Assigned by Chengdu BACL). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2016-06-20, and EUT conformed to test requirement.*

Objective

This report is prepared on behalf of ***Sierra Monitor Corporation*** 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 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: 2AIVJ-FPAC34.
FCC Part 15.247 DSS submission with FCC ID: 2AIVJ-FPAC34

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. (Chengdu). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

The uncertainty of any RF tests which use conducted method measurement is ±3.17 dB, the uncertainty of any radiation on emissions measurement is:

30M~200MHz: ±4.7 dB;
200M~1GHz: ±6.0 dB;
1G-6GHz:: ±5.13dB;

6G~25GHz: ±5.47dB；

And the uncertainty will not be taken into consideration for all test data recorded in the report.

Test Facility

The test site used by BACL to collect test data is located in the 5040, HuiLongWan Plaza, No. 1, ShaWan Road, JinNiu District, ChengDu, China

Test site at BACL 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 April 24, 2015. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 560332. 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 test in testing mode, which was provided by manufacturer. 11 channels are provided to testing:

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

For 802.11b, 802.11g, and 802.11n HT20 modes were tested with Channel 1, 6 and 11.
For 802.11n HT40 mode were tested with Channel 3, 6 and 9.

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

EUT Exercise Software

The software "putty_V0.63.0.0.43510830.exe" was used for testing, which was provided by manufacturer.

Test Mode	Test Software Version	putty_V0.63.0.0.43510830.exe		
802.11b	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	CCK 1M	CCK 1M	CCK 1M
	Power Level Setting Antenna	17	17	17
802.11g	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	OFDM 6M	OFDM 6M	OFDM 6M
	Power Level Setting Antenna	15	15	15
802.11n HT20	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting Antenna	9	9	9
802.11n HT40	Test Frequency	2422MHz	2437MHz	2452MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting Antenna	9	9	9

Equipment Modifications

No modification was made to the EUT.

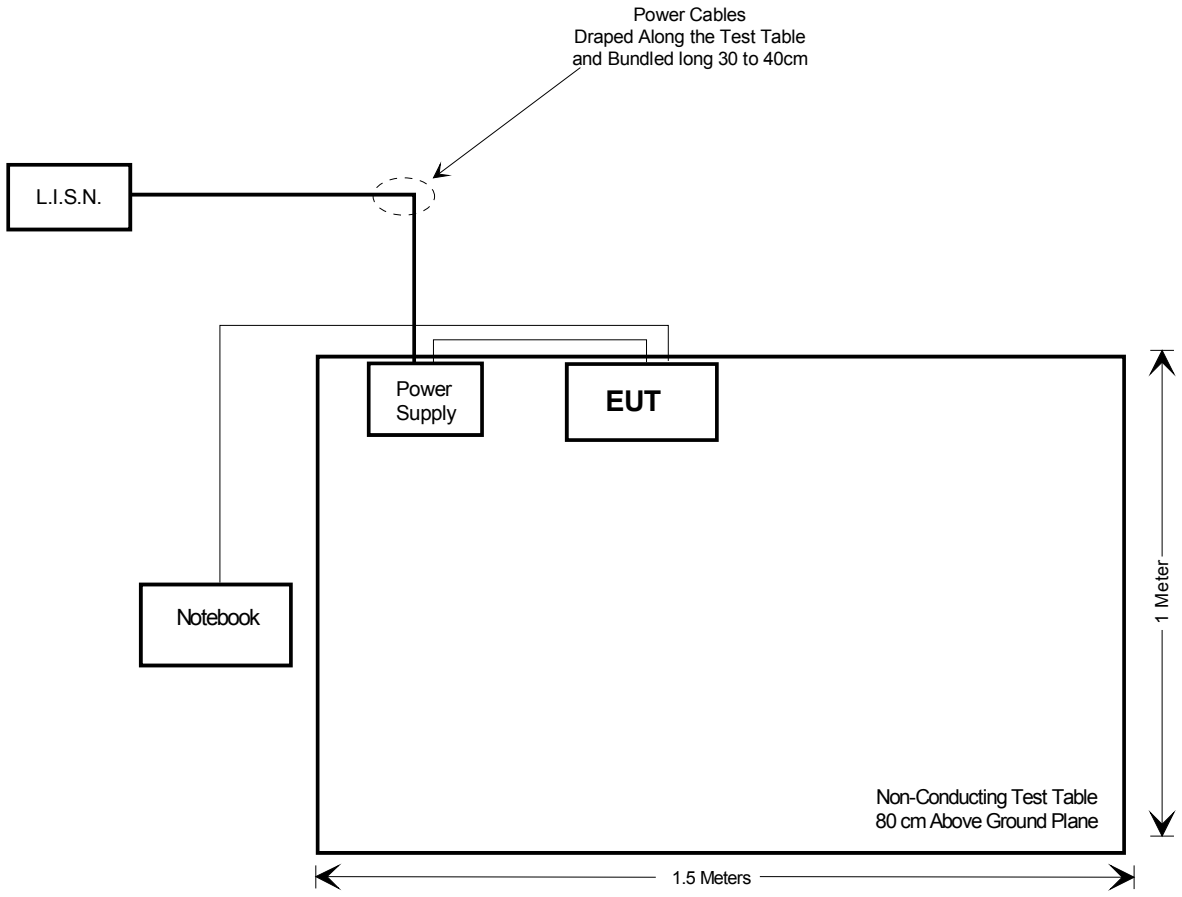
Local Support Equipment List and Details

Manufacturer	Description	Model Number	Serial Number
Anthin	Power Supply	AP1315-1212	None
DELL	Notebook	C640	5P804A00

External I/O Cable

Cable Description	Length (m)	From	To
Unshielded RJ45 Cable	3	EUT	Notebook
Power Supply Cable	2	EUT	Power Supply

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247(i), §2.1091 & §1.1307(b)(1)	Maximum Permissible exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emissions	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 Peak 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), §2.1091 & §1.1307(B)(1) - 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/f²)	30
30–300	27.5	0.073	0.2	30
300–1500	-	-	f/1500	30
1500–100,000	-	-	1.0	30

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

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

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = PG/4\pi R^2$$

Where:
S = 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);

The rated turn-up output power and antenna gain in the below table:

WIFI + GSM (FCC ID: RI7HE910)

Worst case

Mode	Frequency	Antenna Gain		Conducted Power		Evaluation Distance	Power Density	Limit	MPE Ratios
	MHz	dBi	numeric	dBm	mW	cm	mW/cm^2	mW/cm^2	(%)
WIFI	2412-2462	2	1.58	18.50	70.79	20	0.022	1.0	2.2
GSM	824-849	2.7	1.86	29.20	831.76	20	0.308	0.55	**56.0**
Total sum of MPE ratios (%)									58.2

For WIFI and GSM module, WIFI and WCDMA transmit simultaneously, two modes were tested, the worst case for MPE was chosen to be added up.
For GSM mode, the worst case for MPE was chosen to be added up.

Result: 58.2%<1, the device meet FCC MPE at 20 cm distance.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to FCC §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 two external antennas, which are installed one 2G/3G antenna and one WIFI/BT antenna, Which must be professionally installed and declared by the applicant, and complied with 15.203, please refer to EUT external photos and following table:

RF Module	Manufacturer	Model Name	Connector Type	Max. Antenna Gain
Test Model: FPA-C34				
WIFI/BT Antenna	Dongguan Guoxu Electronics Communication Co.,Ltd.	GX042S.100001.S01	SMA Female	2 dBi
2G/3G Antenna	Cortec Technology Inc.	GX042S.100001.S01	SMA Female	2.7dBi
Multi-listing Model: FPA-W34				
WIFI/BT Antenna	Dongguan Guoxu Electronics Communication Co.,Ltd.	GX042S.100001.S01	SMA Female	2 dBi

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：

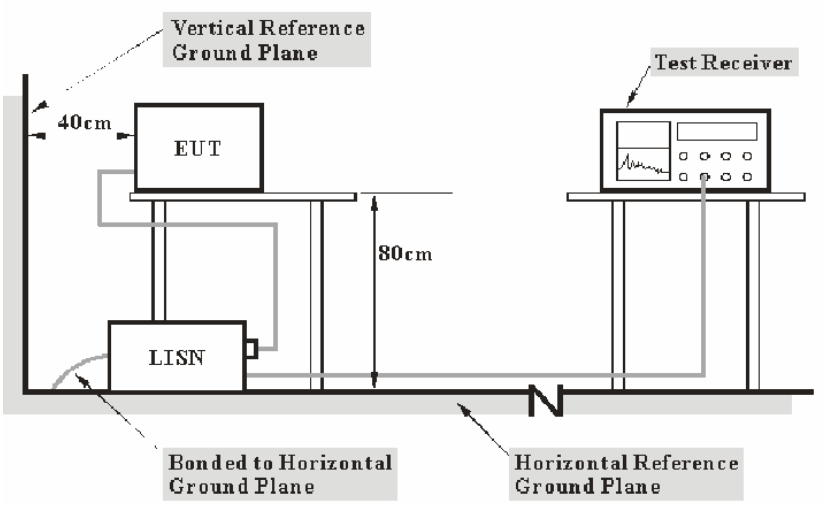
If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of 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. (Chengdu) is ±3.17 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 was according to ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The power cables and 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.

DC 12V power source was provided to EUT.

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

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:

$V_C = V_R + A_C + VDF$

Herein,s
V_C: corrected voltage amplitude
V_R: reading voltage amplitude
A_c: attenuation caused by cable loss
VDF: voltage division factor of AMN or ISN

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

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model Number	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS 30	836858/0016	2015-12-02	2016-12-01
Rohde & Schwarz	L.I.S.N.	ENV216	3560.6550.06	2015-12-02	2016-12-01
Rohde & Schwarz	L.I.S.N.	ENV216	3560.6550.12	None	None
N/A	Conducted Cable	NO.5	N/A	2015-11-10	2016-11-09

*** Statement of Traceability:** BACL (Chengdu) attested 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:

3.2 dB at **0.465682 MHz** in the **Neutral** conducted mode

Test Data

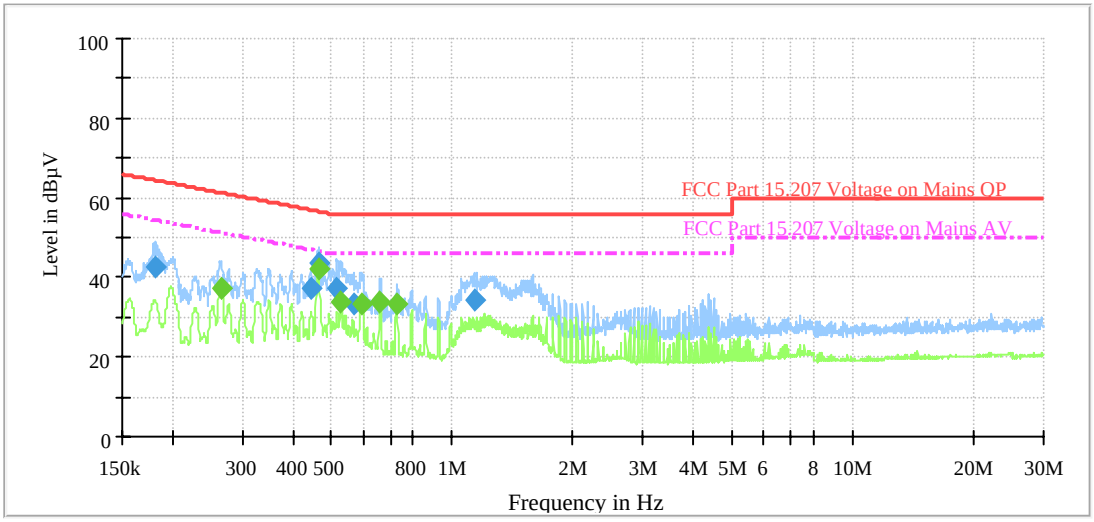
Environmental Conditions

Temperature:	27 °C
Relative Humidity:	62 %
ATM Pressure:	94.8 kPa

The testing was performed by Kevin Hu on 2016-06-27.

Test Mode: Transmitting

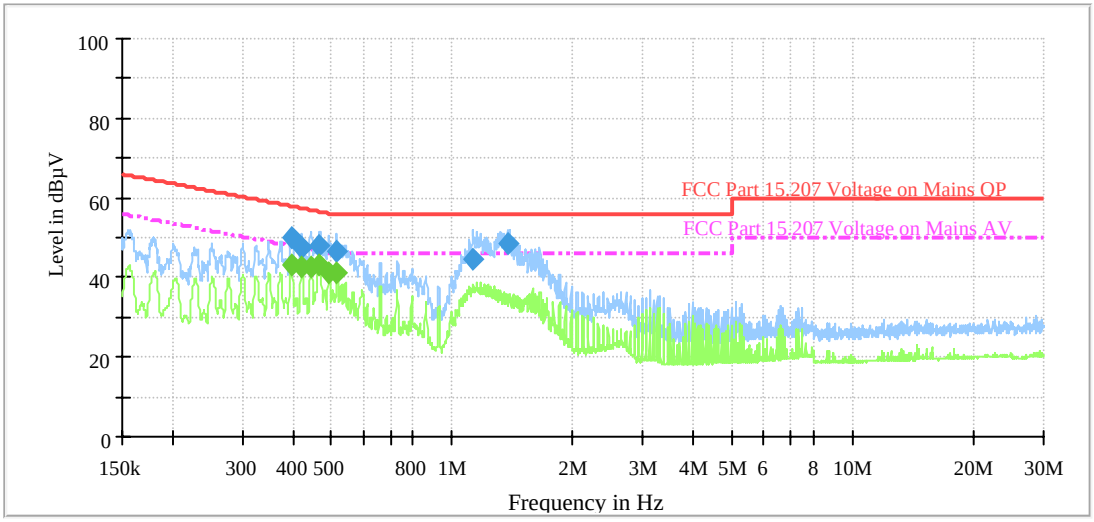
Line



Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.182443	42.5	9.000	L1	18.9	21.9	64.4
0.444766	37.2	9.000	L1	19.9	19.8	57.0
0.465682	43.4	9.000	L1	19.9	13.2	56.6
0.514607	37.2	9.000	L1	20.0	18.8	56.0
0.567537	33.5	9.000	L1	20.0	22.5	56.0
1.132989	34.2	9.000	L1	20.0	21.8	56.0

Frequency (MHz)	Average (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.264560	37.2	9.000	L1	19.3	14.1	51.3
0.462899	42.0	9.000	L1	19.9	4.6	46.6
0.528149	34.0	9.000	L1	20.0	12.0	46.0
0.594226	33.4	9.000	L1	20.0	12.6	46.0
0.660604	34.0	9.000	L1	20.0	12.0	46.0
0.727096	33.1	9.000	L1	19.9	12.9	46.0

Neutral



Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.395309	50.1	9.000	N	19.9	7.9	58.0
0.419728	47.6	9.000	N	19.9	9.9	57.5
0.467547	48.0	9.000	N	19.9	8.6	56.6
0.515636	46.7	9.000	N	19.9	9.3	56.0
1.128471	44.9	9.000	N	20.0	11.1	56.0
1.372546	48.6	9.000	N	20.0	7.4	56.0

Frequency (MHz)	Average (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.396892	43.3	9.000	N	19.9	4.6	47.9
0.420568	42.8	9.000	N	19.9	4.6	47.4
0.443879	42.7	9.000	N	19.9	4.3	47.0
0.465682	43.4	9.000	N	19.9	**3.2**	46.6
0.492477	41.4	9.000	N	19.9	4.7	46.1
0.516668	41.1	9.000	N	19.9	4.9	46.0

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

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

Measurement Uncertainty

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

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

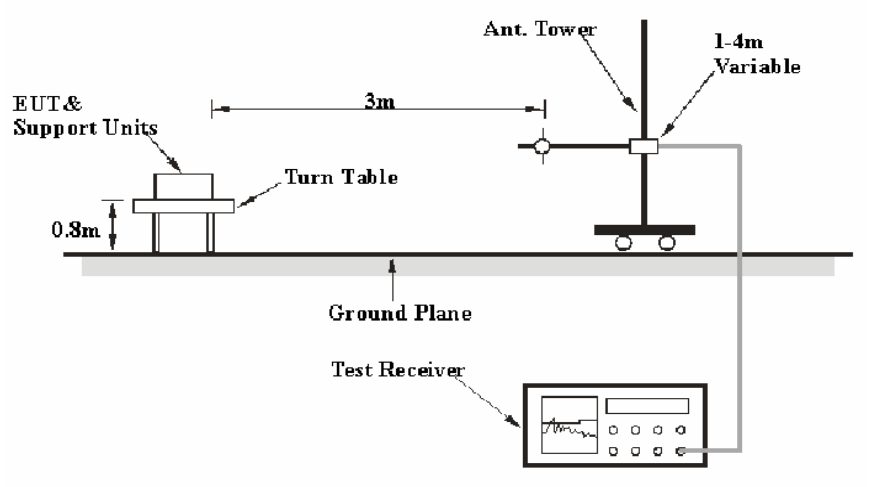
Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Chengdu) is:
30M~200MHz: ±4.7 dB ;
200M~1GHz: ±6.0 dB ;
1G-6GHz: ±5.13dB;
6G~25GHz: ±5.47 dB;

Table 2 – Values of U_{cispr}

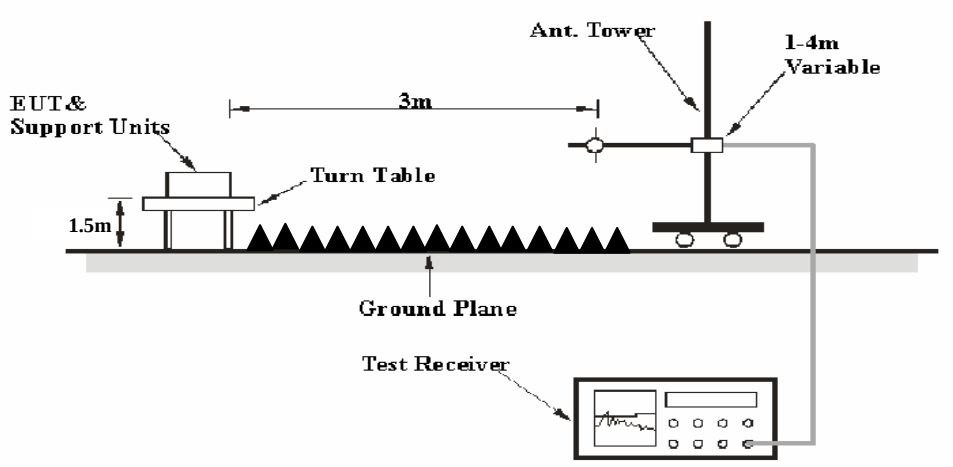
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1 GHz:



Above 1 GHz:



The radiated emission tests were performed in the 3 meters Semi-Anechoic Chamber, using the setup in 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.

DC 12V power source was provided to EUT.

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	1 MHz	3 MHz	/	PK
	1 MHz	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 factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Receiver Reading + Cable loss + Antenna Factor – Amplifier Gain

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

Margin = Limit-Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model Number	Serial Number	Calibration Date	Calibration Due Date
Agilent	Amplifier	8447D	2944A10442	2015-12-02	2016-12-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2015-12-02	2016-12-01
Sunol Sciences	Broadband Antenna	JB3	A101808	2016-04-10	2019-04-09
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2015-12-02	2016-12-01
EM TEST	Horn Antenna	3115	003-6076	2015-12-02	2016-12-01
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-0113024	2014-06-16	2017-06-15
HP	Amplifier	8449B	3008A00277	2016-04-09	2019-04-08
EMCT	Semi-Anechoic Chamber	966	N/A	2015-04-24	2018-04-23
N/A	RF Cable (below 1GHz)	NO.1	N/A	2015-11-10	2016-11-09
N/A	RF Cable (below 1GHz)	NO.4	N/A	2015-11-10	2016-11-09
N/A	RF Cable (above 1GHz)	NO.2	N/A	2015-11-10	2016-11-09
WEINSCHEL ENGINEERING	Attenuator	1A10dB	AA4135	2015-11-10	2016-11-09
Rohde & Schwarz	EMC32	N/A	V 8.54.0	N/A	N/A

*** Statement of Traceability:** BACL (Chengdu) attested 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:

6.77 dB at **2483.5 MHz** in the **Vertical** polarization

Test Data

Environmental Conditions

Temperature:	28 °C
Relative Humidity:	51 %
ATM Pressure:	94.6 kPa

The testing was performed by Kevin Hu on 2016-06-24.

Test Mode: Transmitting

30 MHz to 25 GHz

Test Model: FPA-C34

B Mode

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dBµV	PK/QP/AV	H/V	dB	dB	dB	dBµV/m	dBµV/m	dB
2412 MHz									
2412	84.95	PK	V	23.14	2.80	0.00	110.89	N/A	N/A
2412	79.64	AV	V	23.14	2.80	0.00	105.58	N/A	N/A
2412	84.34	PK	H	23.14	2.80	0.00	110.28	N/A	N/A
2412	75.74	AV	H	23.14	2.80	0.00	101.68	N/A	N/A
2390	32.87	PK	V	23.08	2.63	0.00	58.58	74.00	15.42
2390	20.52	AV	V	23.08	2.63	0.00	46.23	54.00	7.77
4824	45.35	PK	V	30.76	4.26	26.81	53.56	74.00	20.44
4824	26.58	AV	V	30.76	4.26	26.81	34.79	54.00	19.21
7236	38.41	PK	V	34.35	4.80	26.62	50.94	74.00	23.06
7236	18.92	AV	V	34.35	4.80	26.62	31.45	54.00	22.55
9648	33.78	PK	V	37.08	6.15	26.35	50.66	74.00	23.34
9648	16.74	AV	V	37.08	6.15	26.35	33.62	54.00	20.38
85.65	35.49	QP	V	14.86	0.76	28.02	23.09	40.00	16.91
2437 MHz									
2437	83.74	PK	V	25.74	2.81	0.00	112.29	N/A	N/A
2437	78.47	AV	V	25.74	2.81	0.00	107.02	N/A	N/A
2437	82.48	PK	H	25.74	2.81	0.00	111.03	N/A	N/A
2437	78.24	AV	H	25.74	2.81	0.00	106.79	N/A	N/A
4874	46.14	PK	V	30.77	4.29	26.78	54.42	74.00	19.58
4874	25.63	AV	V	30.77	4.29	26.78	33.91	54.00	20.09
7311	38.41	PK	V	34.35	4.79	26.56	50.99	74.00	23.01
7311	18.49	AV	V	34.35	4.79	26.56	31.07	54.00	22.93
9748	33.95	PK	V	36.30	6.19	26.32	50.12	74.00	23.88
9748	15.59	AV	V	36.30	6.19	26.32	31.76	54.00	22.24
85.65	35.11	QP	V	14.86	0.76	28.02	22.71	40.00	17.29

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dBµV	PK/QP/AV	H/V	dB	dB	dB	dBµV/m	dBµV/m	dB
2462 MHz									
2462	83.6	PK	V	25.80	2.82	0.00	112.22	N/A	N/A
2462	79.02	AV	V	25.80	2.82	0.00	107.64	N/A	N/A
2462	82.41	PK	H	25.80	2.82	0.00	111.03	N/A	N/A
2462	77.82	AV	H	25.80	2.82	0.00	106.44	N/A	N/A
2483.5	31.85	PK	V	25.86	2.83	0.00	60.54	74.00	13.46
2483.5	17.27	AV	V	25.86	2.83	0.00	45.96	54.00	8.04
4924	40.82	PK	V	30.90	4.31	26.71	49.32	74.00	24.68
4924	26.89	AV	V	30.90	4.31	26.71	35.39	54.00	18.61
7386	37.63	PK	V	34.53	4.85	26.53	50.48	74.00	23.52
7386	17.65	AV	V	34.53	4.85	26.53	30.50	54.00	23.50
9848	33.86	PK	V	36.54	6.24	26.30	50.34	74.00	23.66
9848	14.04	AV	V	36.54	6.24	26.30	30.52	54.00	23.48
85.65	36.04	QP	V	14.86	0.76	28.02	23.64	40.00	16.36

G Mode

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dBµV	PK/QP/AV	H/V	dB	dB	dB	dBµV/m	dBµV/m	dB
2412 MHz									
2412	82.11	PK	V	23.14	2.80	0.00	108.05	N/A	N/A
2412	70.59	AV	V	23.14	2.80	0.00	96.53	N/A	N/A
2412	80.37	PK	H	23.14	2.80	0.00	106.31	N/A	N/A
2412	75.12	AV	H	23.14	2.80	0.00	101.06	N/A	N/A
2390	35.24	PK	V	23.08	2.63	0.00	60.95	74.00	13.05
2390	20.07	AV	V	23.08	2.63	0.00	45.78	54.00	8.22
4824	43.52	PK	V	30.76	4.26	26.81	51.73	74.00	22.27
4824	30.49	AV	V	30.76	4.26	26.81	38.70	54.00	15.30
7236	35.82	PK	V	34.35	4.80	26.62	48.35	74.00	25.65
7236	15.48	AV	V	34.35	4.80	26.62	28.01	54.00	25.99
9648	34.79	PK	V	37.08	6.15	26.35	51.67	74.00	22.33
9648	13.88	AV	V	37.08	6.15	26.35	30.76	54.00	23.24
85.16	34.89	QP	V	14.86	0.76	28.00	22.51	40.00	17.49

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dBµV	PK/QP/AV	H/V	dB	dB	dB	dBµV/m	dBµV/m	dB
2437 MHz									
2437	82.28	PK	V	25.74	2.81	0.00	110.83	N/A	N/A
2437	75.93	AV	V	25.74	2.81	0.00	104.48	N/A	N/A
2437	84.13	PK	H	25.74	2.81	0.00	112.68	N/A	N/A
2437	77.97	AV	H	25.74	2.81	0.00	106.52	N/A	N/A
4874	46.87	PK	V	30.77	4.29	26.78	55.15	74.00	18.85
4874	32.71	AV	V	30.77	4.29	26.78	40.99	54.00	13.01
7311	38.94	PK	V	34.35	4.79	26.56	51.52	74.00	22.48
7311	16.86	AV	V	34.35	4.79	26.56	29.44	54.00	24.56
9748	34.71	PK	V	36.30	6.19	26.32	50.88	74.00	23.12
9748	14.89	AV	V	36.30	6.19	26.32	31.06	54.00	22.94
85.3	35.22	QP	V	14.86	0.76	28.02	22.82	40.00	17.18
2462 MHz									
2462	82.02	PK	V	25.80	2.82	0.00	110.64	N/A	N/A
2462	71	AV	V	25.80	2.82	0.00	99.62	N/A	N/A
2462	84.88	PK	H	25.80	2.82	0.00	113.50	N/A	N/A
2462	75.34	AV	H	25.80	2.82	0.00	103.96	N/A	N/A
2483.5	32.49	PK	V	25.86	2.83	0.00	61.18	74.00	12.82
2483.5	17.85	AV	V	25.86	2.83	0.00	46.54	54.00	7.46
4924	44.16	PK	V	30.90	4.31	26.71	52.66	74.00	21.34
4924	30.21	AV	V	30.90	4.31	26.71	38.71	54.00	15.29
7386	36.75	PK	V	34.53	4.85	26.53	49.60	74.00	24.40
7386	15.68	AV	V	34.53	4.85	26.53	28.53	54.00	25.47
9848	34.65	PK	V	36.54	6.24	26.30	51.13	74.00	22.87
9848	15.08	AV	V	36.54	6.24	26.30	31.56	54.00	22.44
85.25	35.74	QP	V	14.86	0.76	28.02	23.34	40.00	16.66

N20 Mode

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dBµV	PK/QP/AV	H/V	dB	dB	dB	dBµV/m	dBµV/m	dB
2412 MHz									
2412	79.55	PK	V	23.14	2.80	0.00	105.49	N/A	N/A
2412	71.24	AV	V	23.14	2.80	0.00	97.18	N/A	N/A
2412	77.86	PK	H	23.14	2.80	0.00	103.80	N/A	N/A
2412	70.54	AV	H	23.14	2.80	0.00	96.48	N/A	N/A
2390	32.56	PK	V	23.08	2.63	0.00	58.27	74.00	15.73
2390	20.22	AV	V	23.08	2.63	0.00	45.93	54.00	8.07
4824	43.68	PK	V	30.76	4.26	26.81	51.89	74.00	22.11
4824	24.52	AV	V	30.76	4.26	26.81	32.73	54.00	21.27
7236	35.41	PK	V	34.35	4.80	26.62	47.94	74.00	26.06
7236	16.82	AV	V	34.35	4.80	26.62	29.35	54.00	24.65
9648	33.74	PK	V	37.08	6.15	26.35	50.62	74.00	23.38
9648	14.95	AV	V	37.08	6.15	26.35	31.83	54.00	22.17
85.5	36.11	QP	V	14.86	0.76	28.02	23.71	40.00	16.29
2437 MHz									
2437	81.87	PK	V	25.74	2.81	0.00	110.42	N/A	N/A
2437	73.71	AV	V	25.74	2.81	0.00	102.26	N/A	N/A
2437	79.23	PK	H	25.74	2.81	0.00	107.78	N/A	N/A
2437	71.65	AV	H	25.74	2.81	0.00	100.20	N/A	N/A
4874	43.58	PK	V	30.77	4.29	26.78	51.86	74.00	22.14
4874	23.68	AV	V	30.77	4.29	26.78	31.96	54.00	22.04
7311	34.16	PK	V	34.35	4.79	26.56	46.74	74.00	27.26
7311	17.34	AV	V	34.35	4.79	26.56	29.92	54.00	24.08
9748	33.37	PK	V	36.30	6.19	26.32	49.54	74.00	24.46
9748	15.29	AV	V	36.30	6.19	26.32	31.46	54.00	22.54
85.55	36.08	QP	V	14.86	0.76	28.02	23.68	40.00	16.32

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dBµV	PK/QP/AV	H/V	dB	dB	dB	dBµV/m	dBµV/m	dB
2462 MHz									
2462	81.55	PK	V	25.80	2.82	0.00	110.17	N/A	N/A
2462	73.24	AV	V	25.80	2.82	0.00	101.86	N/A	N/A
2462	79.86	PK	H	25.80	2.82	0.00	108.48	N/A	N/A
2462	70.54	AV	H	25.80	2.82	0.00	99.16	N/A	N/A
2483.5	33.41	PK	V	25.86	2.83	0.00	62.10	74.00	11.90
2483.5	18.16	AV	V	25.86	2.83	0.00	46.85	54.00	7.15
4924	43.58	PK	V	30.90	4.31	26.71	52.08	74.00	21.92
4924	23.79	AV	V	30.90	4.31	26.71	32.29	54.00	21.71
7386	34.28	PK	V	34.53	4.85	26.53	47.13	74.00	26.87
7386	17.43	AV	V	34.53	4.85	26.53	30.28	54.00	23.72
9848	33.85	PK	V	36.54	6.24	26.30	50.33	74.00	23.67
9848	14.29	AV	V	36.54	6.24	26.30	30.77	54.00	23.23
84.93	35.78	QP	V	14.86	0.76	28.02	23.38	40.00	16.62

N40 Mode

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dBµV	PK/QP/AV	H/V	dB	dB	dB	dBµV/m	dBµV/m	dB
2422 MHz									
2422	81.18	PK	V	23.14	2.80	0.00	107.12	N/A	N/A
2422	76.92	AV	V	23.14	2.80	0.00	102.86	N/A	N/A
2422	80.42	PK	H	23.14	2.80	0.00	106.36	N/A	N/A
2422	74.13	AV	H	23.14	2.80	0.00	100.07	N/A	N/A
2390	33.11	PK	V	23.08	2.63	0.00	58.82	74.00	15.18
2390	20.18	AV	V	23.08	2.63	0.00	45.89	54.00	8.11
4844	42.17	PK	V	30.76	4.27	26.81	50.39	74.00	23.61
4844	20.41	AV	V	30.76	4.27	26.81	28.63	54.00	25.37
7266	35.71	PK	V	34.35	4.79	26.62	48.23	74.00	25.77
7266	17.85	AV	V	34.35	4.79	26.62	30.37	54.00	23.63
9688	33.25	PK	V	37.08	6.16	26.35	50.14	74.00	23.86
9688	15.08	AV	V	37.08	6.16	26.35	31.97	54.00	22.03
85.41	34.93	QP	V	14.86	0.76	28.02	22.53	40.00	17.47

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dBµV	PK/QP/AV	H/V	dB	dB	dB	dBµV/m	dBµV/m	dB
2437 MHz									
2437	79.21	PK	V	25.74	2.81	0.00	107.76	N/A	N/A
2437	73.47	AV	V	25.74	2.81	0.00	102.02	N/A	N/A
2437	77.32	PK	H	25.74	2.81	0.00	105.87	N/A	N/A
2437	71.24	AV	H	25.74	2.81	0.00	99.79	N/A	N/A
4874	42.86	PK	V	30.77	4.29	26.78	51.14	74.00	22.86
4874	20.68	AV	V	30.77	4.29	26.78	28.96	54.00	25.04
7311	35.23	PK	V	34.35	4.79	26.56	47.81	74.00	26.19
7311	17.38	AV	V	34.35	4.79	26.56	29.96	54.00	24.04
9748	33.49	PK	V	36.30	6.19	26.32	49.66	74.00	24.34
9748	15.16	AV	V	36.30	6.19	26.32	31.33	54.00	22.67
85.44	35.85	QP	V	14.86	0.76	28.02	23.45	40.00	16.55
2452 MHz									
2452	80.24	PK	V	25.78	2.81	0.00	108.83	N/A	N/A
2452	70.53	AV	V	25.78	2.81	0.00	99.12	N/A	N/A
2452	78.14	PK	H	25.78	2.81	0.00	106.73	N/A	N/A
2452	72.35	AV	H	25.78	2.81	0.00	100.94	N/A	N/A
2483.5	31.14	PK	V	25.86	2.83	0.00	59.83	74.00	14.17
2483.5	16.48	AV	V	25.86	2.83	0.00	45.17	54.00	8.83
4904	43.05	PK	V	30.85	4.30	26.71	51.49	74.00	22.51
4904	23.64	AV	V	30.85	4.30	26.71	32.08	54.00	21.92
7356	34.9	PK	V	34.45	4.83	26.53	47.65	74.00	26.35
7356	17.06	AV	V	34.45	4.83	26.53	29.81	54.00	24.19
9808	33.49	PK	V	36.44	6.22	26.30	49.85	74.00	24.15
9808	15.56	AV	V	36.44	6.22	26.30	31.92	54.00	22.08
86.08	34.95	QP	V	14.86	0.76	28.02	22.55	40.00	17.45

2G/3G Module, FCC ID: RI7HE910

For co-location evaluation data (WIFI + GSM transmitting simultaneously)

Worst case

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dBµV	PK/QP/AV	H/V	dB(1/m)	dB	dB	dBµV/m	dBµV/m	dB
84.72	41.61	QP	V	13.37	0.26	26.20	29.04	40.00	10.96
2400	55.26	PK	V	23.20	2.56	26.85	54.17	74.00	19.83
2400	40.43	AV	V	23.20	2.56	26.85	39.34	54.00	14.66
2483.5	50.38	PK	V	23.20	2.57	26.85	49.30	74.00	24.70
2483.5	32.59	AV	V	23.20	2.57	26.85	31.51	54.00	22.49
4824	46.37	PK	V	31.40	4.50	26.82	55.45	74.00	18.55
4824	31.14	AV	V	31.40	4.50	26.82	40.22	54.00	13.78
7236	45.85	PK	V	35.30	5.15	27.00	59.30	74.00	14.70
7236	30.37	AV	V	35.30	5.15	27.00	43.82	54.00	10.18
9648	43.52	PK	V	37.00	6.25	25.65	61.12	74.00	12.88
9648	28.36	AV	V	37.00	6.25	25.65	45.96	54.00	8.04

Multi-listing Model: FPA-W34

B Mode

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dBµV	PK/QP/AV	H/V	dB	dB	dB	dBµV/m	dBµV/m	dB
2412 MHz									
2412	85.59	PK	V	23.14	2.80	0.00	111.53	N/A	N/A
2412	80.28	AV	V	23.14	2.80	0.00	106.22	N/A	N/A
2412	74.98	PK	H	23.14	2.80	0.00	100.92	N/A	N/A
2412	70.38	AV	H	23.14	2.80	0.00	96.32	N/A	N/A
2390	31.11	PK	V	23.08	2.63	0.00	56.82	74.00	17.18
2390	20.52	AV	V	23.08	2.63	0.00	46.23	54.00	7.77
4824	44.37	PK	V	30.76	4.26	26.81	52.58	74.00	21.42
4824	27.55	AV	V	30.76	4.26	26.81	35.76	54.00	18.24
7236	36.81	PK	V	34.35	4.80	26.62	49.34	74.00	24.66
7236	19.99	AV	V	34.35	4.80	26.62	32.52	54.00	21.48
9648	34.78	PK	V	37.08	6.15	26.35	51.66	74.00	22.34
9648	17.84	AV	V	37.08	6.15	26.35	34.72	54.00	19.28
85.65	36.55	QP	V	14.86	0.76	28.02	24.15	40.00	15.85
2437 MHz									
2437	83.4	PK	V	25.74	2.81	0.00	111.95	N/A	N/A
2437	78.13	AV	V	25.74	2.81	0.00	106.68	N/A	N/A
2437	77.14	PK	H	25.74	2.81	0.00	105.69	N/A	N/A
2437	72.9	AV	H	25.74	2.81	0.00	101.45	N/A	N/A
4874	47.47	PK	V	30.77	4.29	26.78	55.75	74.00	18.25
4874	31.15	AV	V	30.77	4.29	26.78	39.43	54.00	14.57
7311	37.45	PK	V	34.35	4.79	26.56	50.03	74.00	23.97
7311	23.51	AV	V	34.35	4.79	26.56	36.09	54.00	17.91
9748	35.85	PK	V	36.30	6.19	26.32	52.02	74.00	21.98
9748	21.32	AV	V	36.30	6.19	26.32	37.49	54.00	16.51
85.65	34.15	QP	V	14.86	0.76	28.02	21.75	40.00	18.25

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dBµV	PK/QP/AV	H/V	dB	dB	dB	dBµV/m	dBµV/m	dB
2462 MHz									
2462	82.26	PK	V	25.80	2.82	0.00	110.88	N/A	N/A
2462	75.68	AV	V	25.80	2.82	0.00	104.30	N/A	N/A
2462	77.07	PK	H	25.80	2.82	0.00	105.69	N/A	N/A
2462	72.48	AV	H	25.80	2.82	0.00	101.10	N/A	N/A
2483.5	30.88	PK	V	25.86	2.83	0.00	59.57	74.00	14.43
2483.5	18.26	AV	V	25.86	2.83	0.00	46.95	54.00	7.05
4924	41.85	PK	V	30.90	4.31	26.71	50.35	74.00	23.65
4924	31.21	AV	V	30.90	4.31	26.71	39.71	54.00	14.29
7386	36.67	PK	V	34.53	4.85	26.53	49.52	74.00	24.48
7386	22.31	AV	V	34.53	4.85	26.53	35.16	54.00	18.84
9848	34.85	PK	V	36.54	6.24	26.30	51.33	74.00	22.67
9848	19.74	AV	V	36.54	6.24	26.30	36.22	54.00	17.78
85.65	35.66	QP	V	14.86	0.76	28.02	23.26	40.00	16.74

G Mode

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dBµV	PK/QP/AV	H/V	dB	dB	dB	dBµV/m	dBµV/m	dB
2412 MHz									
2412	82.51	PK	V	23.14	2.80	0.00	108.45	N/A	N/A
2412	72.16	AV	V	23.14	2.80	0.00	98.10	N/A	N/A
2412	73.72	PK	H	23.14	2.80	0.00	99.66	N/A	N/A
2412	66.12	AV	H	23.14	2.80	0.00	92.06	N/A	N/A
2390	35.24	PK	V	23.08	2.63	0.00	60.95	74.00	13.05
2390	18.58	AV	V	23.08	2.63	0.00	44.29	54.00	9.71
4824	43.74	PK	V	30.76	4.26	26.81	51.95	74.00	22.05
4824	32.42	AV	V	30.76	4.26	26.81	40.63	54.00	13.37
7236	33.83	PK	V	34.35	4.80	26.62	46.36	74.00	27.64
7236	18.21	AV	V	34.35	4.80	26.62	30.74	54.00	23.26
9648	34.75	PK	V	37.08	6.15	26.35	51.63	74.00	22.37
9648	22.17	AV	V	37.08	6.15	26.35	39.05	54.00	14.95
85.16	35.82	QP	V	14.86	0.76	28.00	23.44	40.00	16.56

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dBµV	PK/QP/AV	H/V	dB	dB	dB	dBµV/m	dBµV/m	dB
2437 MHz									
2437	80.85	PK	V	25.74	2.81	0.00	109.40	N/A	N/A
2437	70.44	AV	V	25.74	2.81	0.00	98.99	N/A	N/A
2437	74.21	PK	H	25.74	2.81	0.00	102.76	N/A	N/A
2437	72.54	AV	H	25.74	2.81	0.00	101.09	N/A	N/A
4874	46.85	PK	V	30.77	4.29	26.78	55.13	74.00	18.87
4874	32.55	AV	V	30.77	4.29	26.78	40.83	54.00	13.17
7311	39.94	PK	V	34.35	4.79	26.56	52.52	74.00	21.48
7311	23.51	AV	V	34.35	4.79	26.56	36.09	54.00	17.91
9748	35.46	PK	V	36.30	6.19	26.32	51.63	74.00	22.37
9748	18.36	AV	V	36.30	6.19	26.32	34.53	54.00	19.47
85.3	34.85	QP	V	14.86	0.76	28.02	22.45	40.00	17.55
2462 MHz									
2462	82.53	PK	V	25.80	2.82	0.00	111.15	N/A	N/A
2462	73.51	AV	V	25.80	2.82	0.00	102.13	N/A	N/A
2462	75.39	PK	H	25.80	2.82	0.00	104.01	N/A	N/A
2462	65.85	AV	H	25.80	2.82	0.00	94.47	N/A	N/A
2483.5	32.74	PK	V	25.86	2.83	0.00	61.43	74.00	12.57
2483.5	18.54	AV	V	25.86	2.83	0.00	47.23	54.00	**6.77**
4924	46.12	PK	V	30.90	4.31	26.71	54.62	74.00	19.38
4924	31.25	AV	V	30.90	4.31	26.71	39.75	54.00	14.25
7386	35.76	PK	V	34.53	4.85	26.53	48.61	74.00	25.39
7386	21.54	AV	V	34.53	4.85	26.53	34.39	54.00	19.61
9848	35.55	PK	V	36.54	6.24	26.30	52.03	74.00	21.97
9848	20.35	AV	V	36.54	6.24	26.30	36.83	54.00	17.17
85.25	37.76	QP	V	14.86	0.76	28.02	25.36	40.00	14.64

N20 Mode

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dBµV	PK/QP/AV	H/V	dB	dB	dB	dBµV/m	dBµV/m	dB
2412 MHz									
2412	82.84	PK	V	23.14	2.80	0.00	108.78	N/A	N/A
2412	72	AV	V	23.14	2.80	0.00	97.94	N/A	N/A
2412	83.45	PK	H	23.14	2.80	0.00	109.39	N/A	N/A
2412	69.14	AV	H	23.14	2.80	0.00	95.08	N/A	N/A
2390	33.57	PK	V	23.08	2.63	0.00	59.28	74.00	14.72
2390	20.85	AV	V	23.08	2.63	0.00	46.56	54.00	7.44
4824	42.42	PK	V	30.76	4.26	26.81	50.63	74.00	23.37
4824	29.55	AV	V	30.76	4.26	26.81	37.76	54.00	16.24
7236	37.51	PK	V	34.35	4.80	26.62	50.04	74.00	23.96
7236	23.58	AV	V	34.35	4.80	26.62	36.11	54.00	17.89
9648	33.71	PK	V	37.08	6.15	26.35	50.59	74.00	23.41
9648	18.63	AV	V	37.08	6.15	26.35	35.51	54.00	18.49
85.5	36.46	QP	V	14.86	0.76	28.02	24.06	40.00	15.94
2437 MHz									
2437	81.23	PK	V	25.74	2.81	0.00	109.78	N/A	N/A
2437	76.07	AV	V	25.74	2.81	0.00	104.62	N/A	N/A
2437	81.59	PK	H	25.74	2.81	0.00	110.14	N/A	N/A
2437	72.64	AV	H	25.74	2.81	0.00	101.19	N/A	N/A
4874	42.56	PK	V	30.77	4.29	26.78	50.84	74.00	23.16
4874	27.36	AV	V	30.77	4.29	26.78	35.64	54.00	18.36
7311	34.62	PK	V	34.35	4.79	26.56	47.20	74.00	26.80
7311	23.17	AV	V	34.35	4.79	26.56	35.75	54.00	18.25
9748	33.45	PK	V	36.30	6.19	26.32	49.62	74.00	24.38
9748	20.36	AV	V	36.30	6.19	26.32	36.53	54.00	17.47
85.55	38.54	QP	V	14.86	0.76	28.02	26.14	40.00	13.86

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dBµV	PK/QP/AV	H/V	dB	dB	dB	dBµV/m	dBµV/m	dB
2462 MHz									
2462	81.05	PK	V	25.80	2.82	0.00	109.67	N/A	N/A
2462	84.85	AV	V	25.80	2.82	0.00	113.47	N/A	N/A
2462	80.45	PK	H	25.80	2.82	0.00	109.07	N/A	N/A
2462	72.35	AV	H	25.80	2.82	0.00	100.97	N/A	N/A
2483.5	32.49	PK	V	25.86	2.83	0.00	61.18	74.00	12.82
2483.5	16.17	AV	V	25.86	2.83	0.00	44.86	54.00	9.14
4924	45.59	PK	V	30.90	4.31	26.71	54.09	74.00	19.91
4924	28.31	AV	V	30.90	4.31	26.71	36.81	54.00	17.19
7386	35.28	PK	V	34.53	4.85	26.53	48.13	74.00	25.87
7386	18.44	AV	V	34.53	4.85	26.53	31.29	54.00	22.71
9848	35.65	PK	V	36.54	6.24	26.30	52.13	74.00	21.87
9848	19.38	AV	V	36.54	6.24	26.30	35.86	54.00	18.14
84.93	36.79	QP	V	14.86	0.76	28.02	24.39	40.00	15.61

N40 Mode

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dBµV	PK/QP/AV	H/V	dB	dB	dB	dBµV/m	dBµV/m	dB
2422 MHz									
2422	80.71	PK	V	23.14	2.80	0.00	106.65	N/A	N/A
2422	72.28	AV	V	23.14	2.80	0.00	98.22	N/A	N/A
2422	80.06	PK	H	23.14	2.80	0.00	106.00	N/A	N/A
2422	74.49	AV	H	23.14	2.80	0.00	100.43	N/A	N/A
2390	35.12	PK	V	23.08	2.63	0.00	60.83	74.00	13.17
2390	18.55	AV	V	23.08	2.63	0.00	44.26	54.00	9.74
4844	41.56	PK	V	30.76	4.27	26.81	49.78	74.00	24.22
4844	27.34	AV	V	30.76	4.27	26.81	35.56	54.00	18.44
7266	35.87	PK	V	34.35	4.79	26.62	48.39	74.00	25.61
7266	22.53	AV	V	34.35	4.79	26.62	35.05	54.00	18.95
9688	34.85	PK	V	37.08	6.16	26.35	51.74	74.00	22.26
9688	19.05	AV	V	37.08	6.16	26.35	35.94	54.00	18.06
85.41	33.84	QP	V	14.86	0.76	28.02	21.44	40.00	18.56

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Detector	Polar	Factor					
MHz	dBµV	PK/QP/AV	H/V	dB	dB	dB	dBµV/m	dBµV/m	dB
2437 MHz									
2437	79.57	PK	V	25.74	2.81	0.00	108.12	N/A	N/A
2437	73.11	AV	V	25.74	2.81	0.00	101.66	N/A	N/A
2437	77.68	PK	H	25.74	2.81	0.00	106.23	N/A	N/A
2437	70.88	AV	H	25.74	2.81	0.00	99.43	N/A	N/A
4874	43.85	PK	V	30.77	4.29	26.78	52.13	74.00	21.87
4874	28.32	AV	V	30.77	4.29	26.78	36.60	54.00	17.40
7311	34.65	PK	V	34.35	4.79	26.56	47.23	74.00	26.77
7311	19.88	AV	V	34.35	4.79	26.56	32.46	54.00	21.54
9748	36.45	PK	V	36.30	6.19	26.32	52.62	74.00	21.38
9748	21.35	AV	V	36.30	6.19	26.32	37.52	54.00	16.48
85.44	33.45	QP	V	14.86	0.76	28.02	21.05	40.00	18.95
2452 MHz									
2452	77.81	PK	V	25.78	2.81	0.00	106.40	N/A	N/A
2452	70.89	AV	V	25.78	2.81	0.00	99.48	N/A	N/A
2452	79.78	PK	H	25.78	2.81	0.00	108.37	N/A	N/A
2452	72.71	AV	H	25.78	2.81	0.00	101.30	N/A	N/A
2483.5	30.65	PK	V	25.86	2.83	0.00	59.34	74.00	14.66
2483.5	16.62	AV	V	25.86	2.83	0.00	45.31	54.00	8.69
4904	42.52	PK	V	30.85	4.30	26.71	50.96	74.00	23.04
4904	25.54	AV	V	30.85	4.30	26.71	33.98	54.00	20.02
7356	35.96	PK	V	34.45	4.83	26.53	48.71	74.00	25.29
7356	18.72	AV	V	34.45	4.83	26.53	31.47	54.00	22.53
9808	34.45	PK	V	36.44	6.22	26.30	50.81	74.00	23.19
9808	17.12	AV	V	36.44	6.22	26.30	33.48	54.00	20.52
86.08	35.61	QP	V	14.86	0.76	28.02	23.21	40.00	16.79

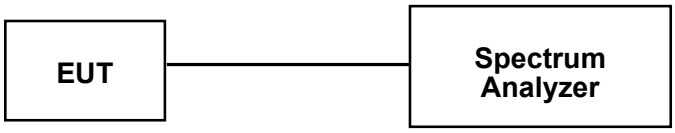
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

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	Spectrum Analyzer	FSEM30	100018	2015-12-02	2016-12-01
N/A	RF Cable	NO.3	N/A	2015-11-10	2016-11-09
WEINSCHEL ENGINEERING	Attenuator	1A10dB	AA4135	2015-11-10	2016-11-09

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	29 °C
Relative Humidity:	59 %
ATM Pressure:	96 kPa

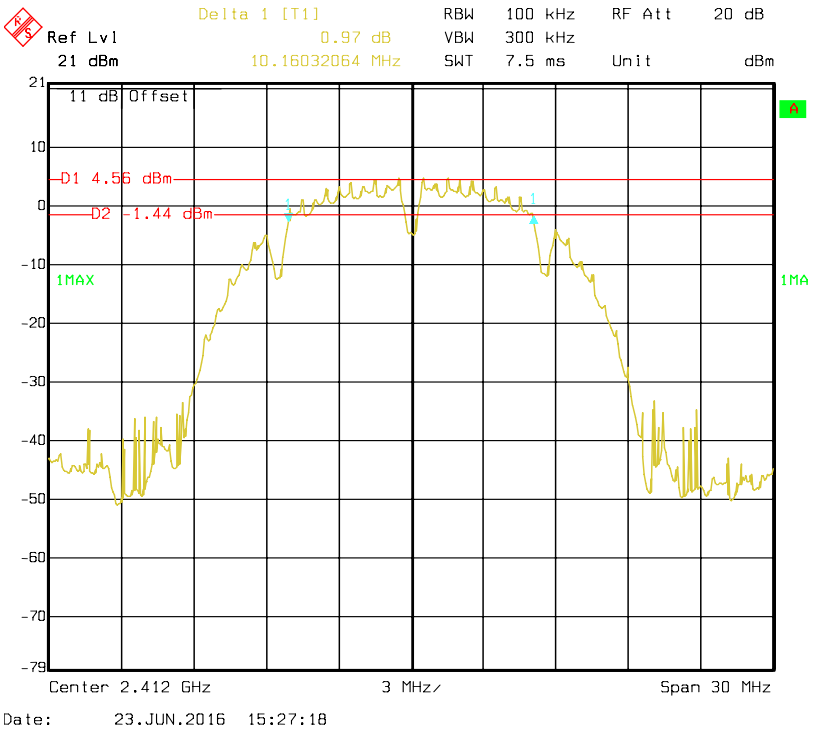
The testing was performed by Kevin Hu on 2016-06-23.

Test Mode: Transmitting

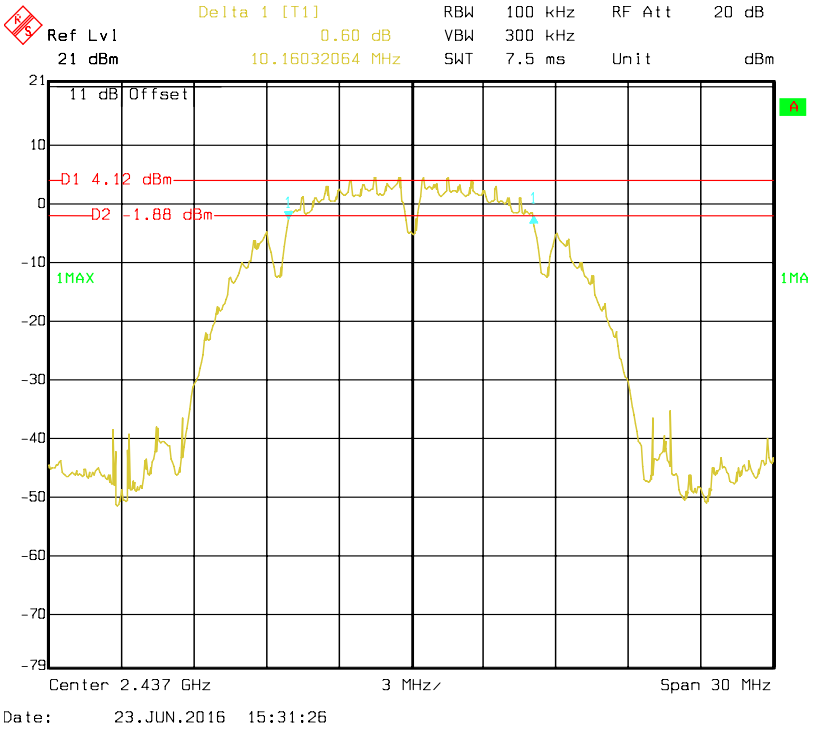
Mode	Channel	Frequency	Ant	
			6 dB Bandwidth	Limit
		MHz	MHz	KHz
2.4G band 802.11b	Low	2412	10.16	500.00
	Middle	2437	10.16	500.00
	High	2462	10.10	500.00
2.4G band 802.11 g	Low	2412	16.59	500.00
	Middle	2437	16.65	500.00
	High	2462	16.65	500.00
2.4G band 802.11nHT20	Low	2412	17.68	500.00
	Middle	2437	17.74	500.00
	High	2462	17.68	500.00
2.4G band 802.11n HT40	Low	2422	35.97	500.00
	Middle	2437	35.97	500.00
	High	2452	36.47	500.00

Please refer to the following plots:

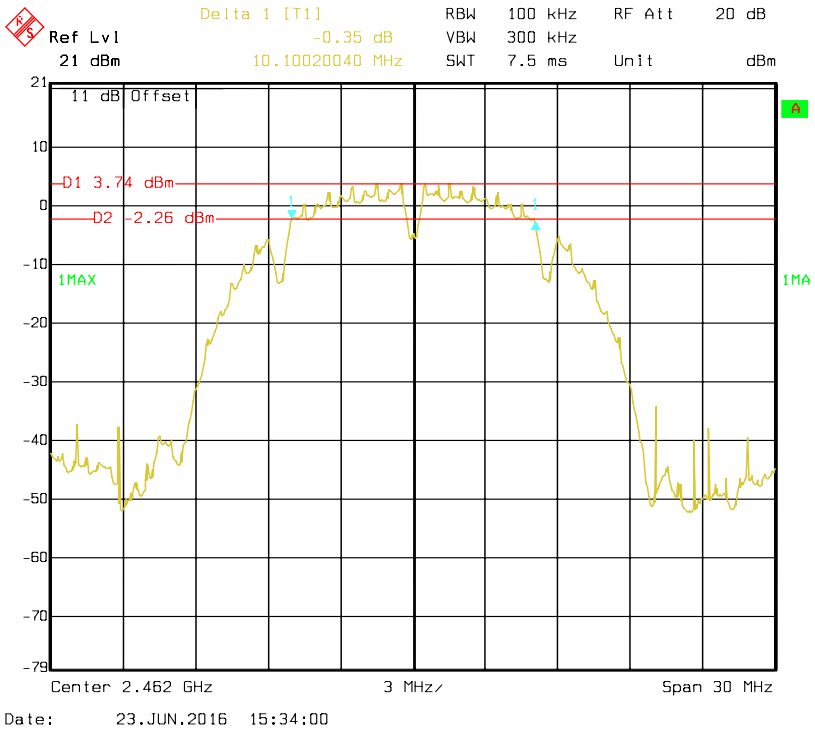
802.11b Low Channel



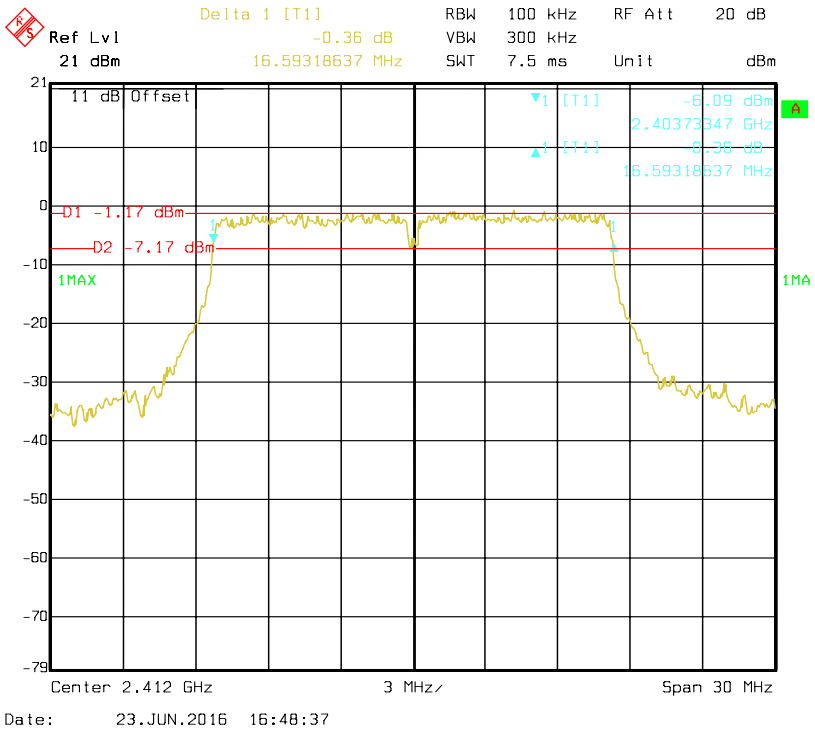
802.11b Middle Channel



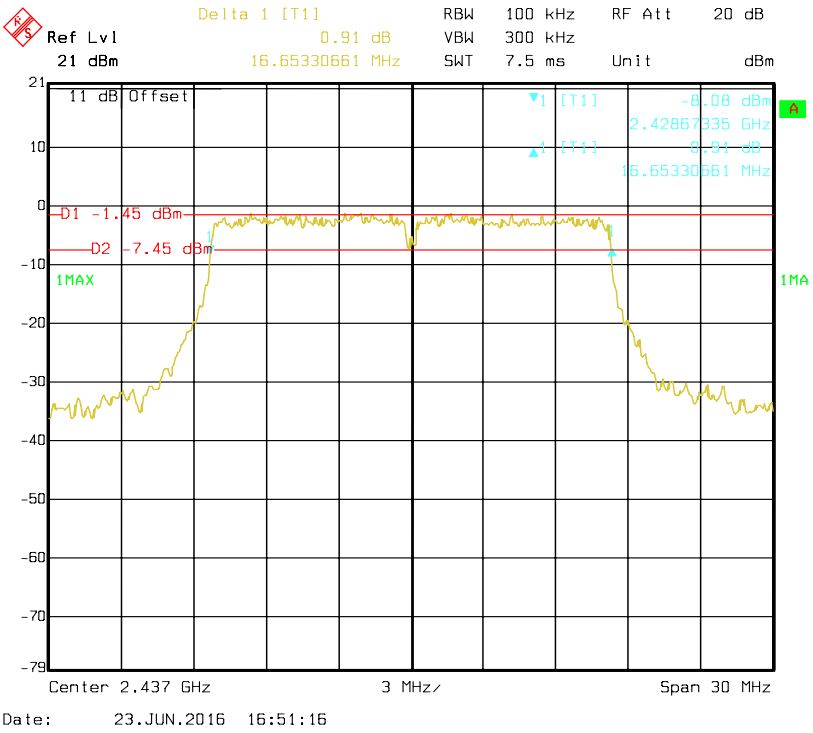
802.11b High Channel



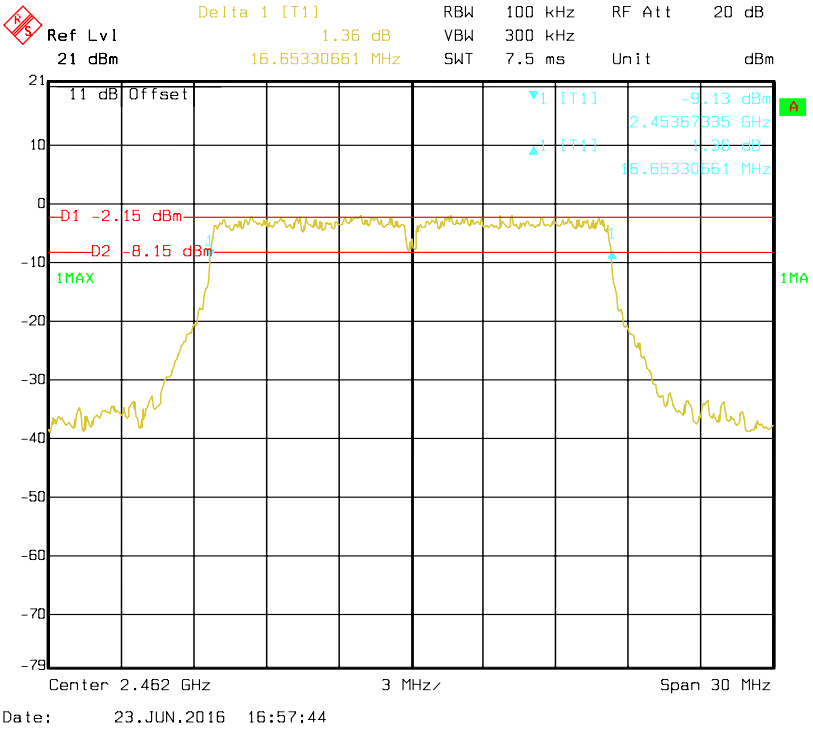
802.11g Low Channel



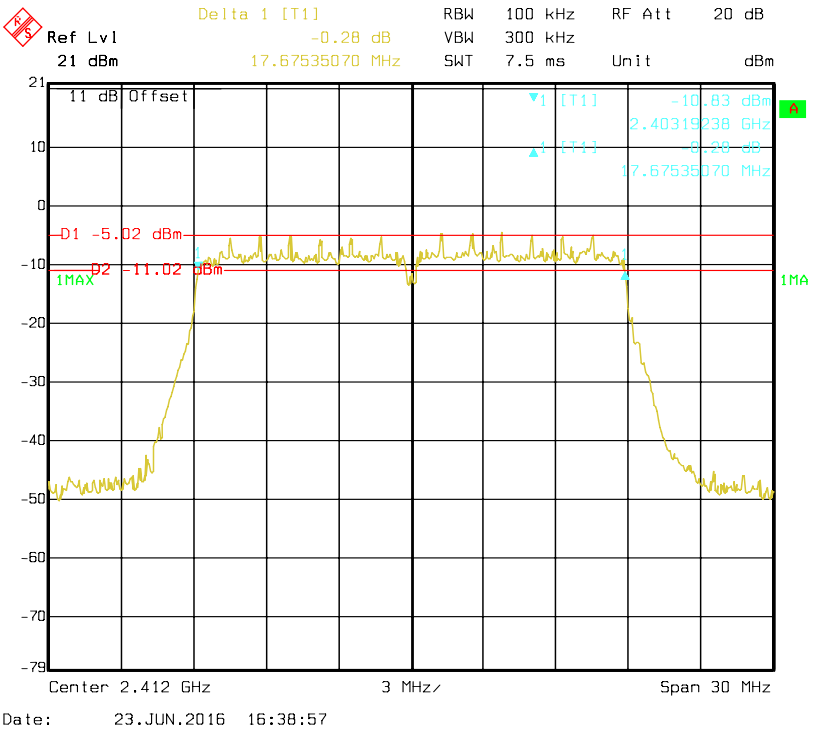
802.11g Middle Channel



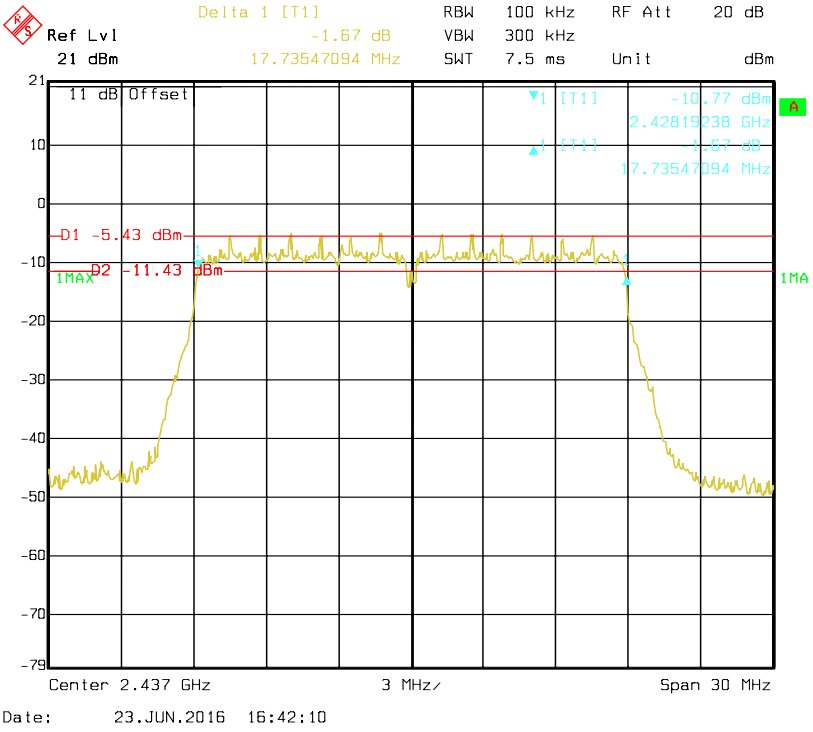
802.11g High Channel



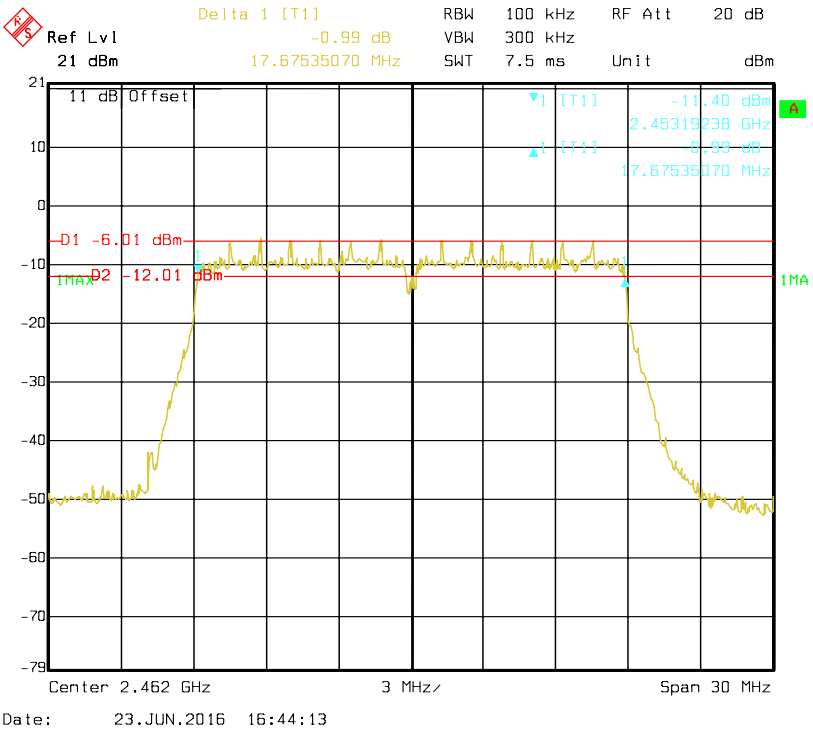
802.11n HT20 Low Channel



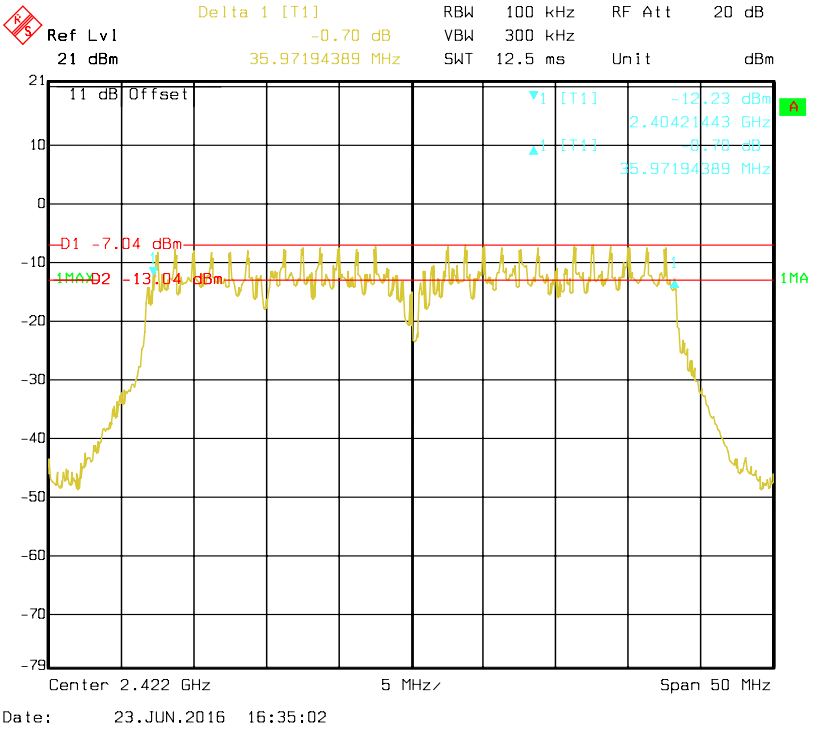
802.11n HT20 Middle Channel



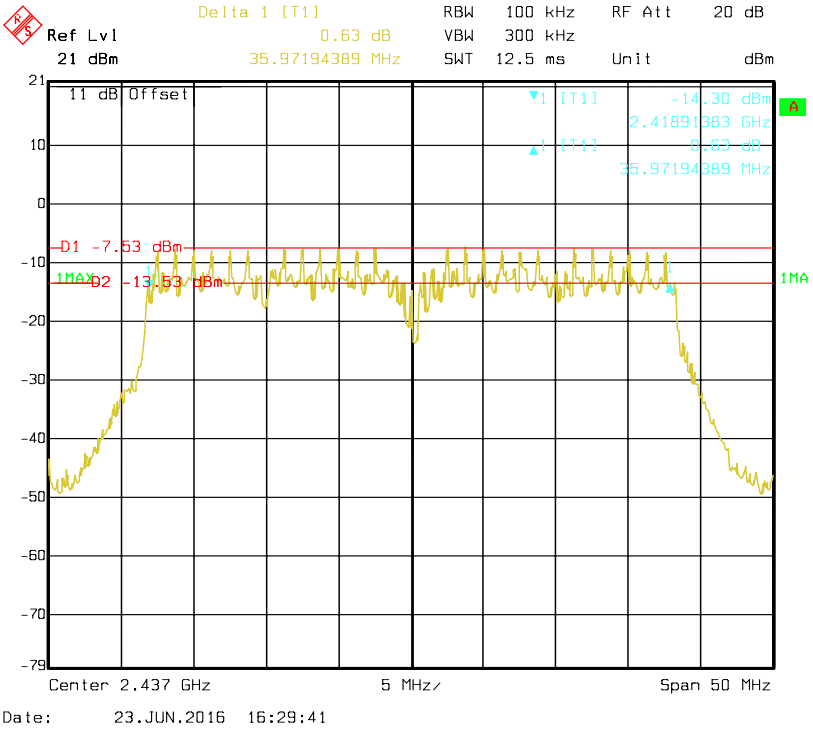
802.11n HT20 High Channel



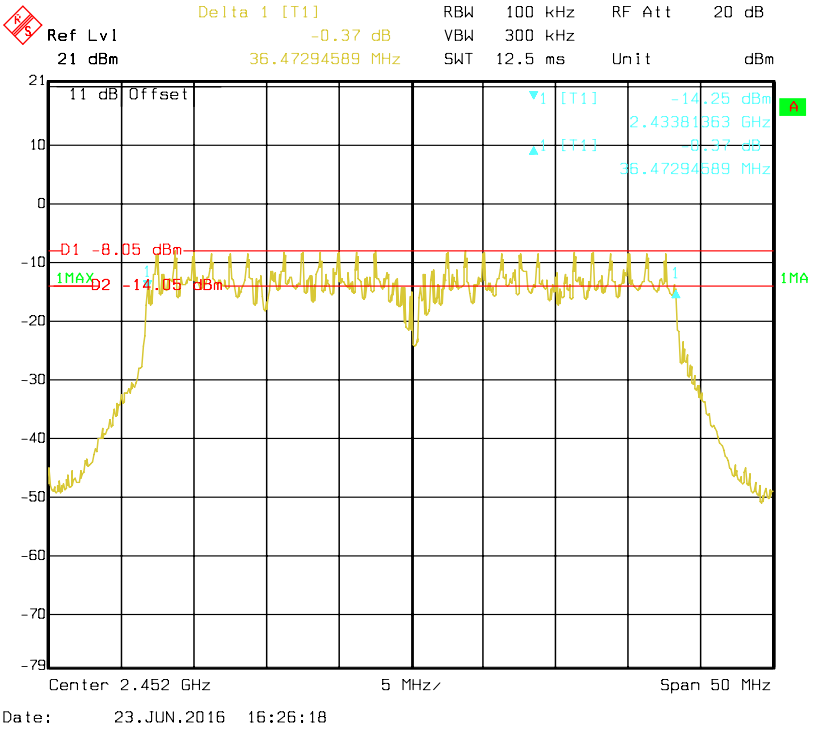
802.11n HT40 Low Channel



802.11n HT40 Middle Channel



802.11n HT40 High Channel



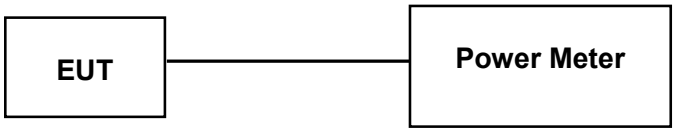
FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

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 a Power Meter.
3. Add a correction factor to the display.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
N/A	RF Cable	NO.3	N/A	2015-11-10	2016-11-09
Agilent	Wideband Power Sensor	N1921A	MY54170013	2015-11-12	2016-11-12
Agilent	P-Series Power Meter	N1912A	MY5000448	2015-11-12	2016-11-12

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	28 °C
Relative Humidity:	52 %
zATM Pressure:	94.6 kPa

The testing was performed by Kevin Hu on 2016-06-24.

Test Mode: Transmitting

Mode	Channel	Frequency	Conducted Peak Output Power	Limit	Result
		(MHz)	dBm	dBm	
2.4G band 802.11b	Low	2412	18.15	30	Pass
	Middle	2437	18.04	30	Pass
	High	2462	17.36	30	Pass
2.4G band 802.11 g	Low	2412	15.39	30	Pass
	Middle	2437	15.02	30	Pass
	High	2462	14.35	30	Pass
2.4G band 802.11nHT20	Low	2412	14.68	30	Pass
	Middle	2437	14.50	30	Pass
	High	2462	13.87	30	Pass
2.4G band 802.11n HT40	Low	2422	14.76	30	Pass
	Middle	2437	14.21	30	Pass
	High	2452	14.03	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	Spectrum Analyzer	FSEM30	100018	2015-12-02	2016-12-01
N/A	RF Cable	NO.3	N/A	2015-11-10	2016-11-09
WEINSCHEL ENGINEERING	Attenuator	1A10dB	AA4135	2015-11-10	2016-11-09

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

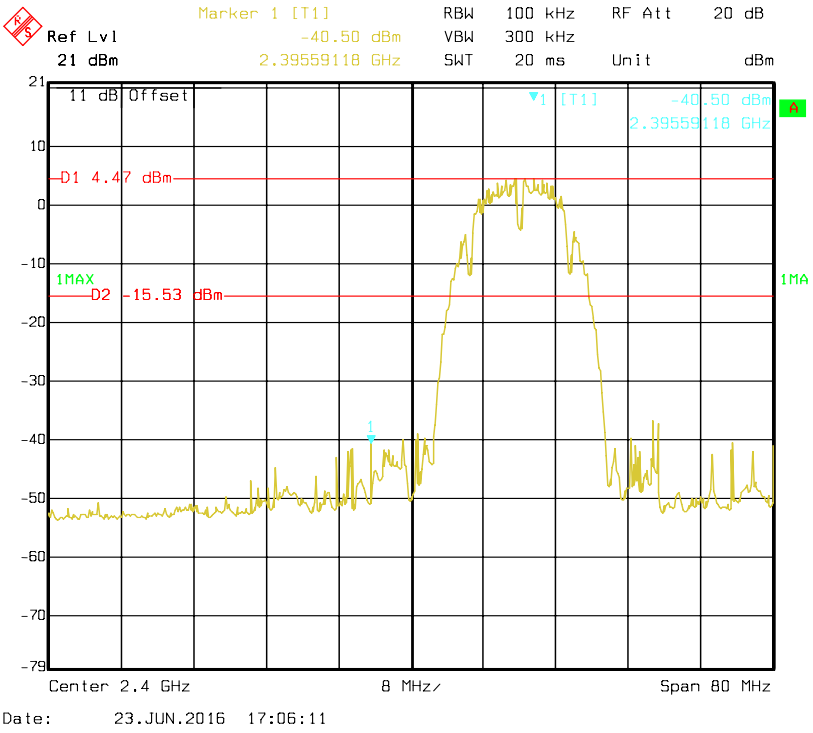
Temperature:	29 °C
Relative Humidity:	59 %
ATM Pressure:	96 kPa

The testing was performed by Kevin Hu on 2016-06-23.

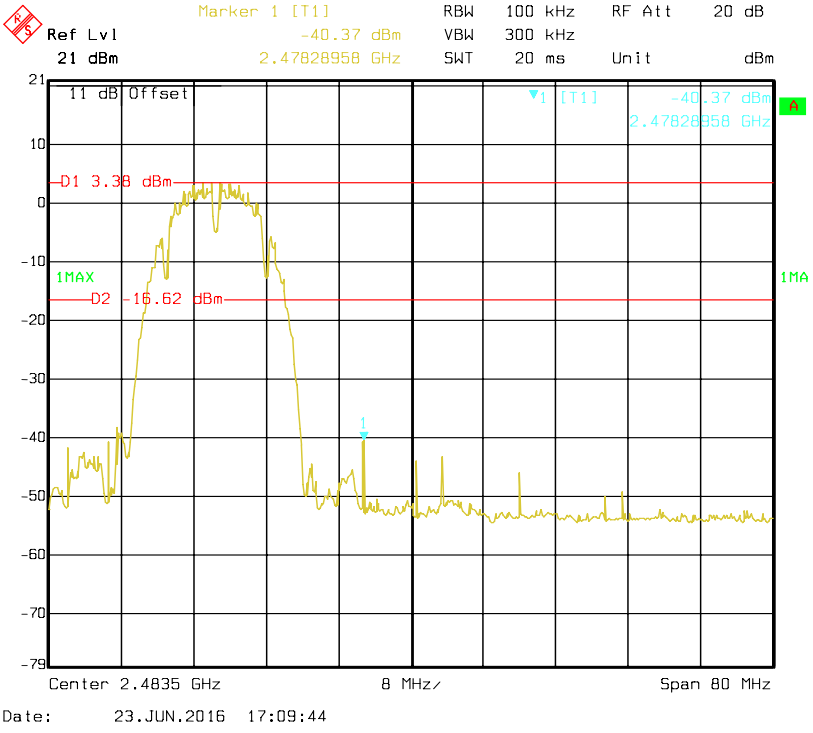
Test Mode: Transmitting

Test Result: Compliance, Please refer to following plots.

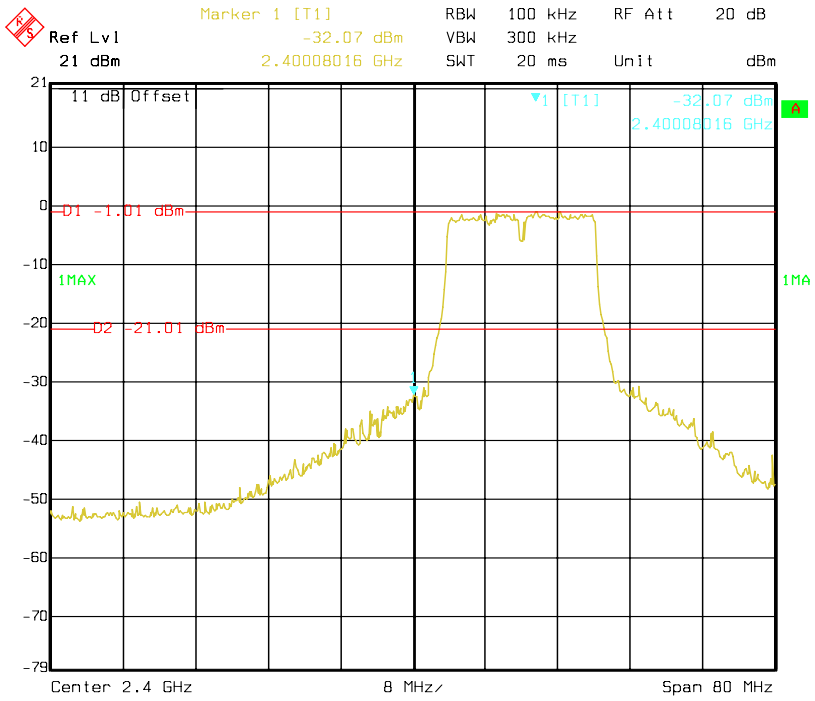
802.11b: Band Edge, Left Side



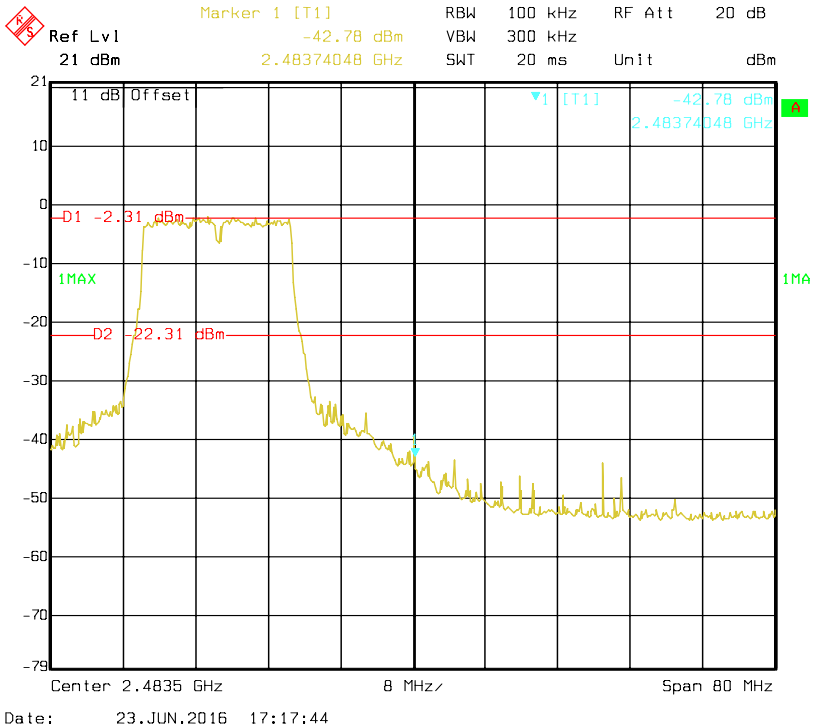
802.11b: Band Edge, Right Side



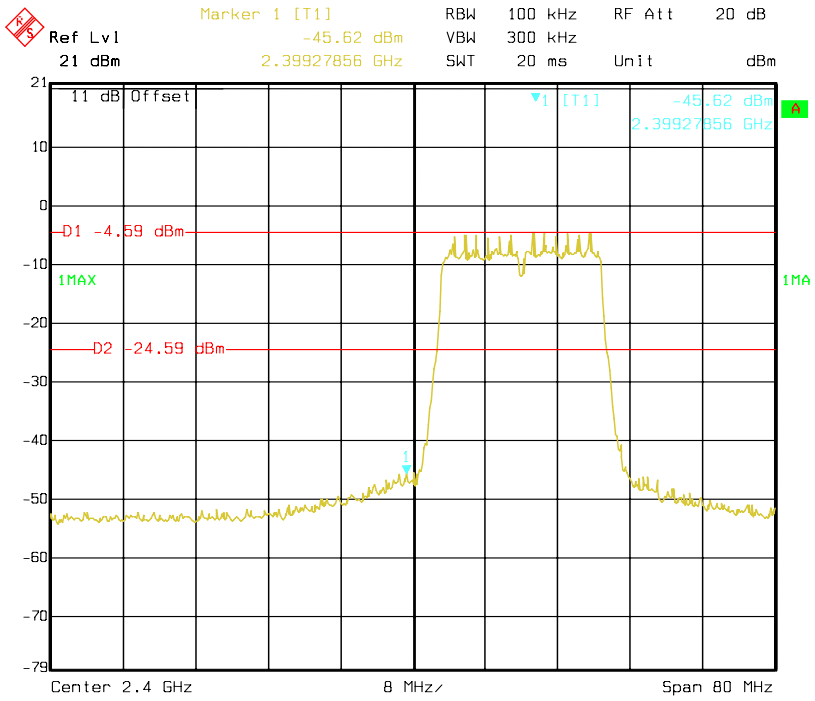
802.11g: Band Edge, Left Side



802.11g: Band Edge, Right Side

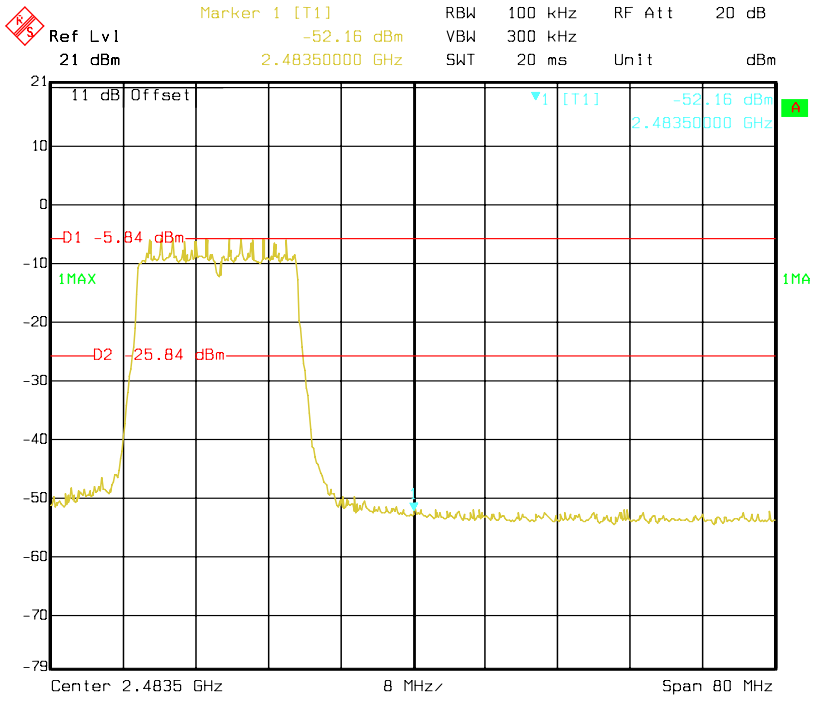


802.11n HT20 Band Edge, Left Side



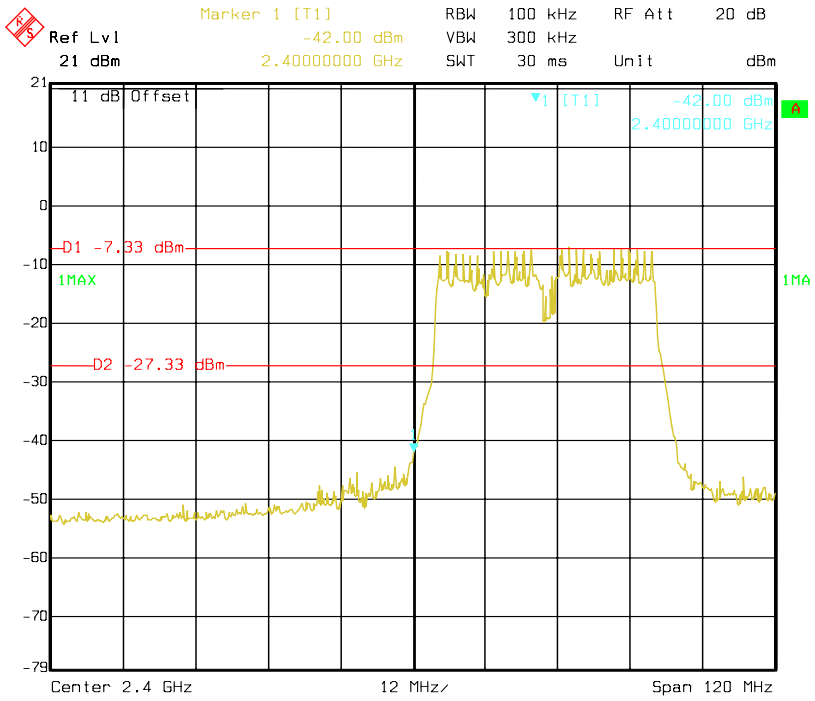
Date: 23.JUN.2016 17:20:04

802.11n HT20 Band Edge, Right Side

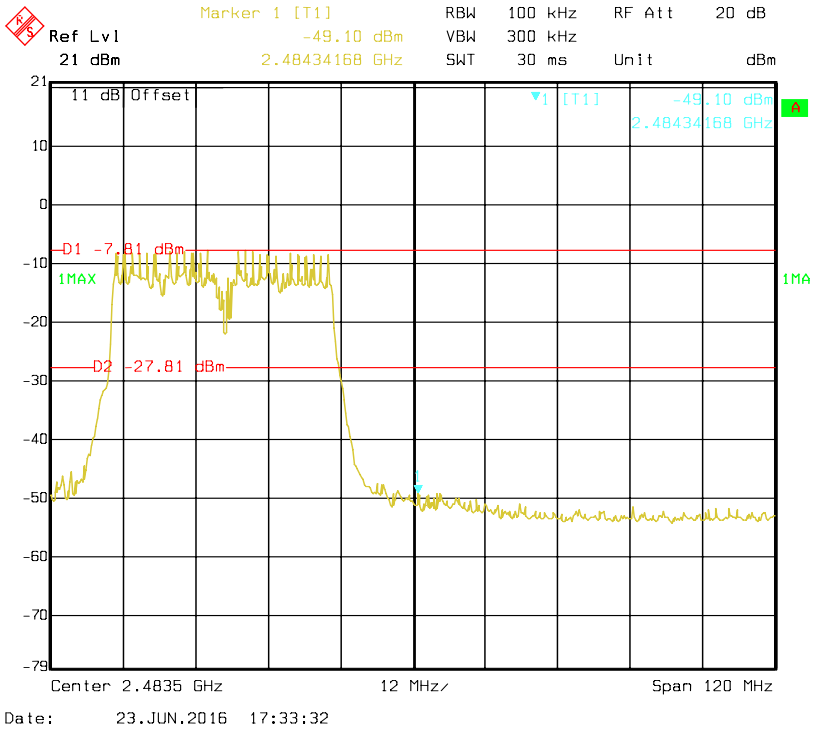


Date: 23.JUN.2016 17:23:03

802.11n HT40 Band Edge, Left Side



802.11n HT40 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

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 was set 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. According to KDB 558074 D01 DTS Meas Guidance v03r05, set the RBW = 3 kHz, VBW = 10 kHz, Set the span to 1.5 times the DTS channel bandwidth.
4. Use the peak marker function to determine the maximum power level in any 3 kHz band segment within the fundamental EBW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2015-12-02	2016-12-01
N/A	RF Cable	NO.3	N/A	2015-11-10	2016-11-09
WEINSCHEL ENGINEERING	Attenuator	1A10dB	AA4135	2015-11-10	2016-11-09

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	28 °C
Relative Humidity:	52 %
ATM Pressure:	94.6 kPa

The testing was performed by Kevin Hu on 2016-06-24.

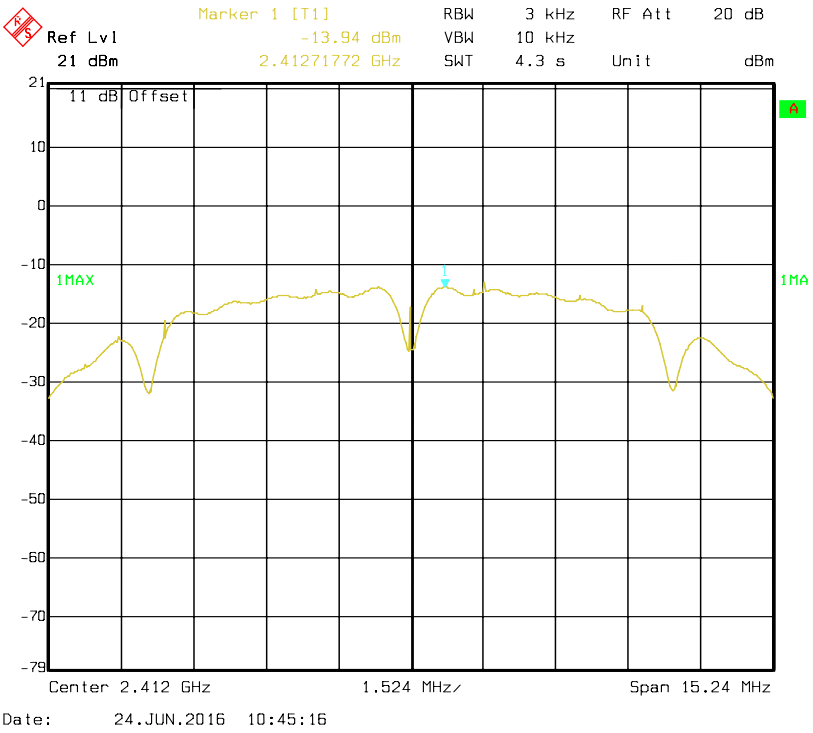
Test Mode: Transmitting

Mode	Channel	Frequency	Power Spectral Density	Limits	Result
		MHz	dBm/3kHz	dBm/3kHz	
2.4G band 802.11b	Low	2412	-13.94	8	Pass
	Middle	2437	-12.64	8	Pass
	High	2462	-15.20	8	Pass
2.4G band 802.11 g	Low	2412	-12.44	8	Pass
	Middle	2437	-11.40	8	Pass
	High	2462	-11.30	8	Pass
2.4G band 802.11nHT20	Low	2412	-17.41	8	Pass
	Middle	2437	-17.46	8	Pass
	High	2462	-16.97	8	Pass
2.4G band 802.11n HT40	Low	2422	-18.80	8	Pass
	Middle	2437	-23.47	8	Pass
	High	2452	-23.03	8	Pass

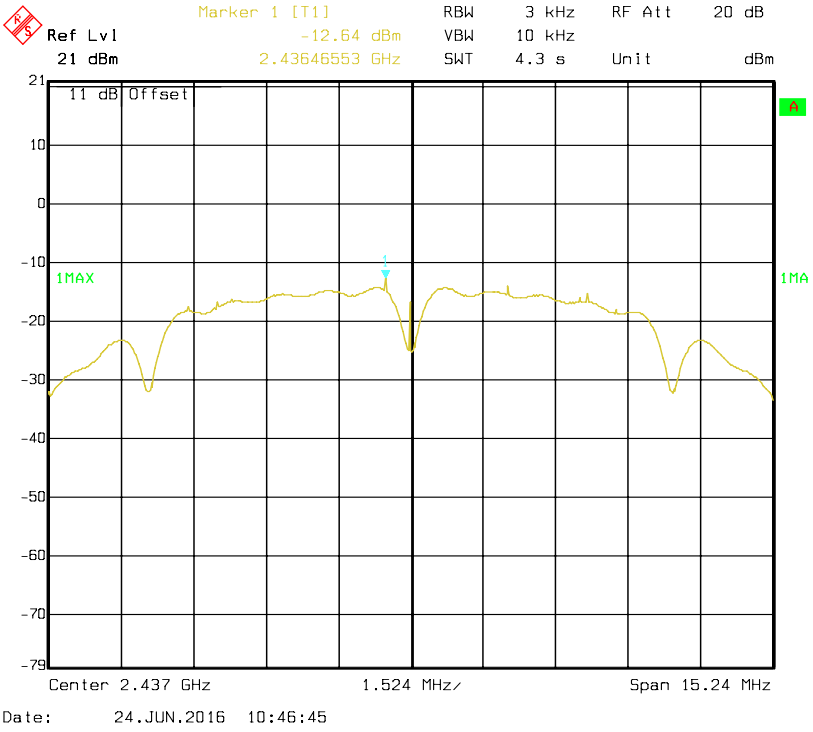
Note: Duty cycle is more than 98%.

Please refer to the following plots.

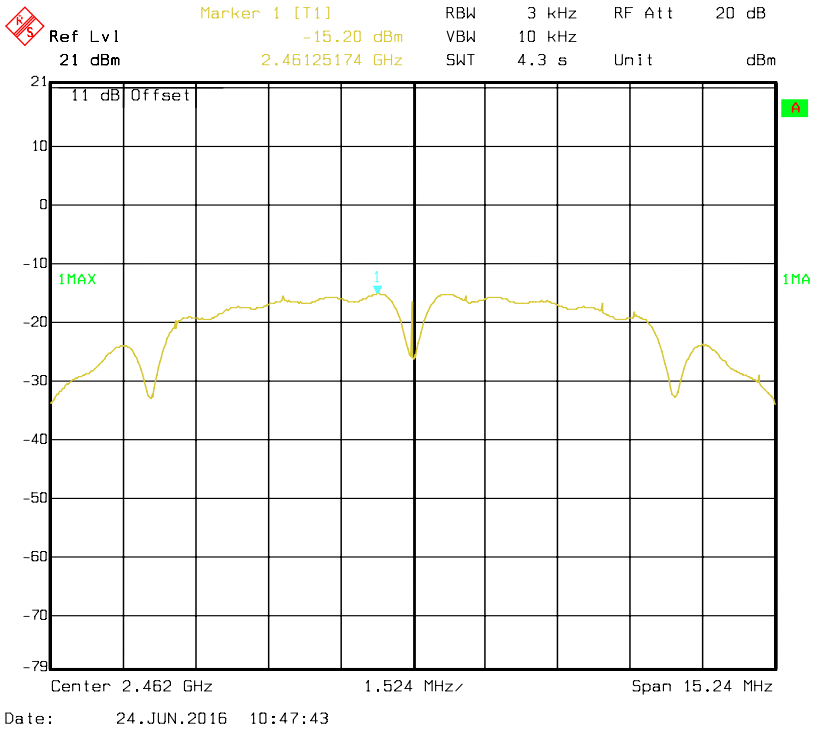
Power Spectral Density, 802.11b Low Channel



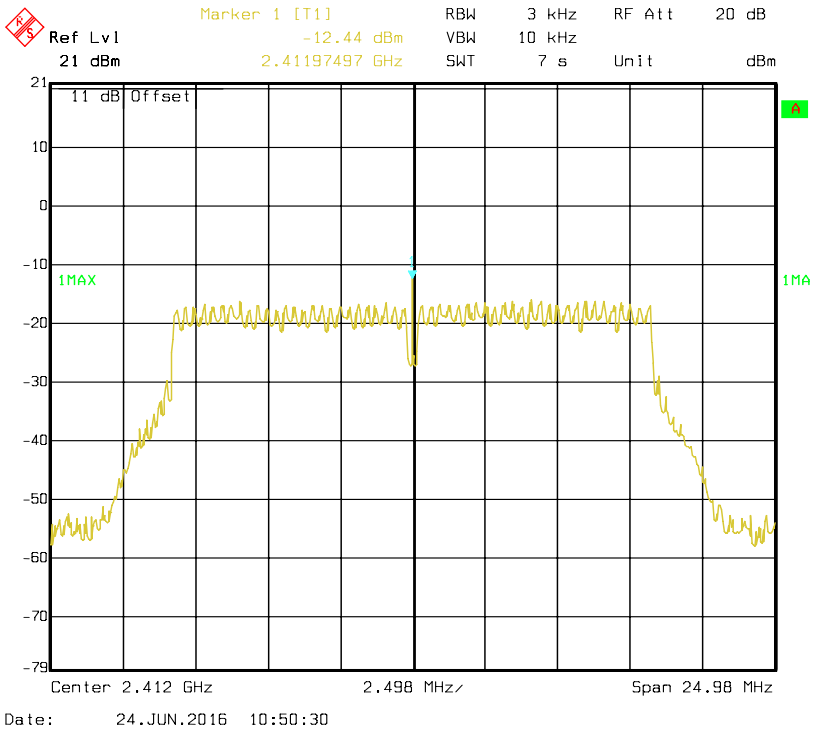
Power Spectral Density, 802.11b Middle Channel



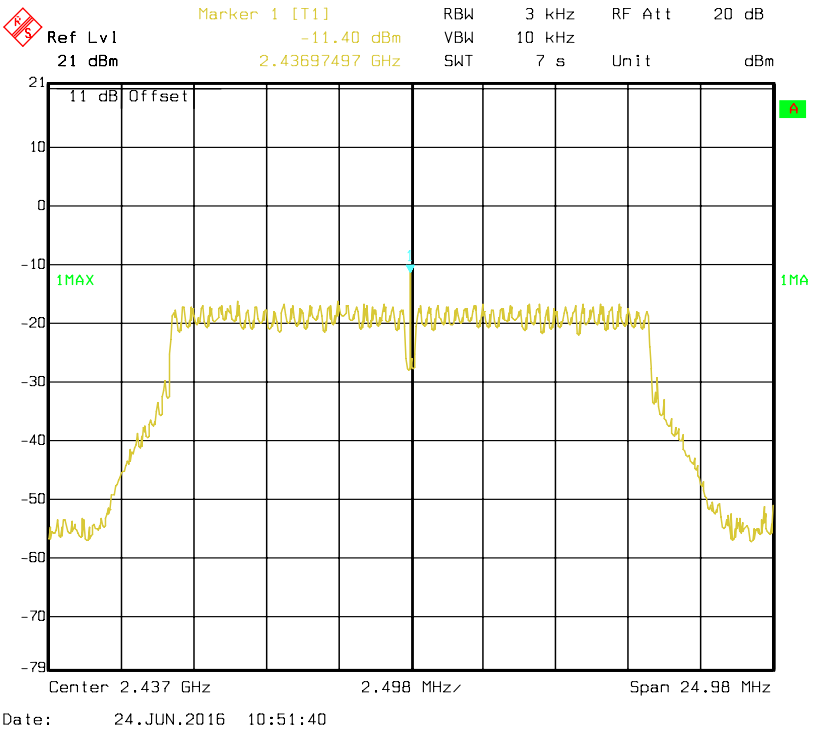
Power Spectral Density, 802.11b High Channel



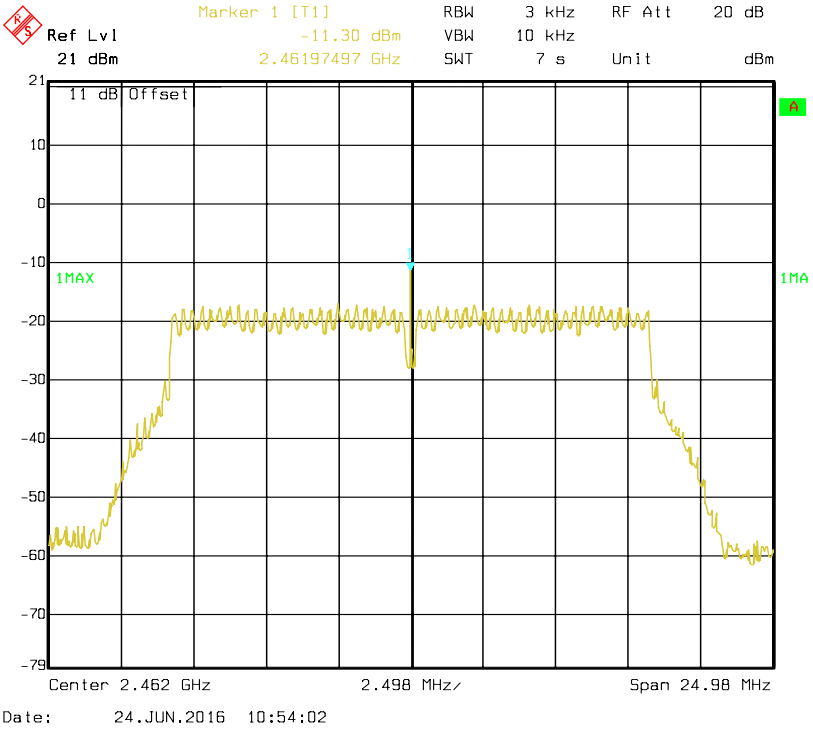
Power Spectral Density, 802.11g Low Channel



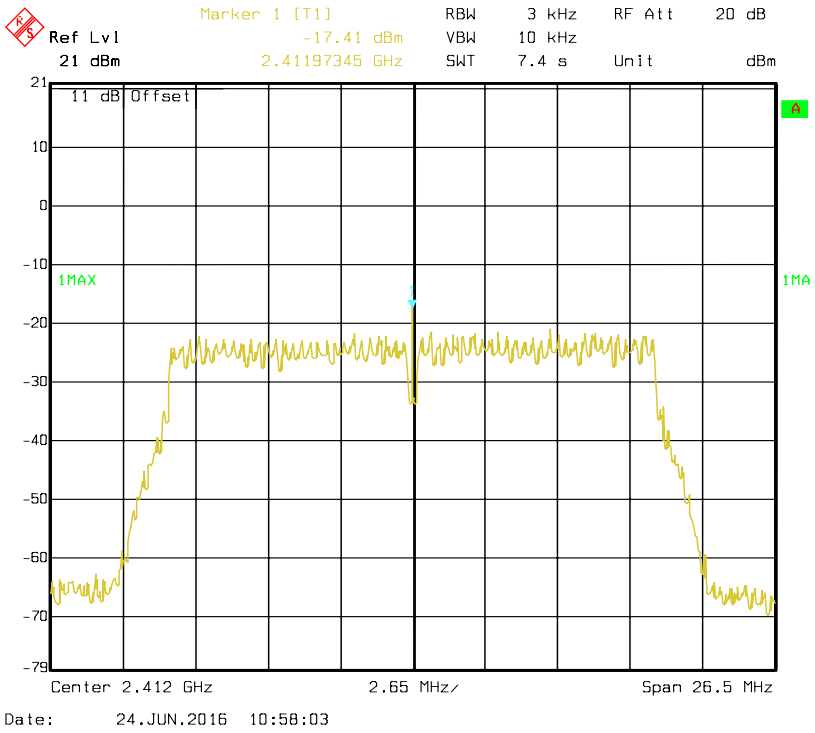
Power Spectral Density, 802.11g Middle Channel



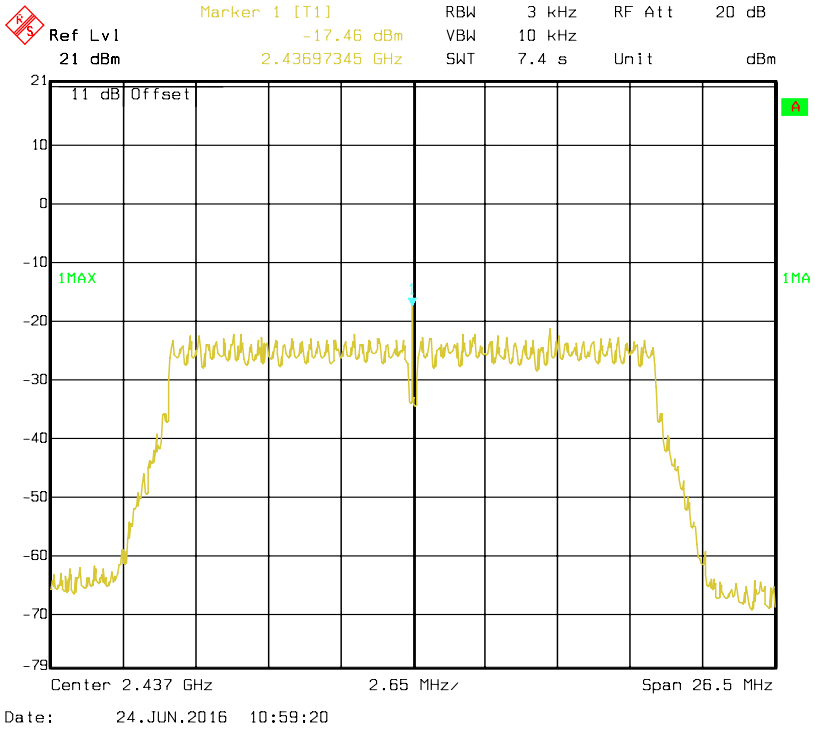
Power Spectral Density, 802.11g High Channel



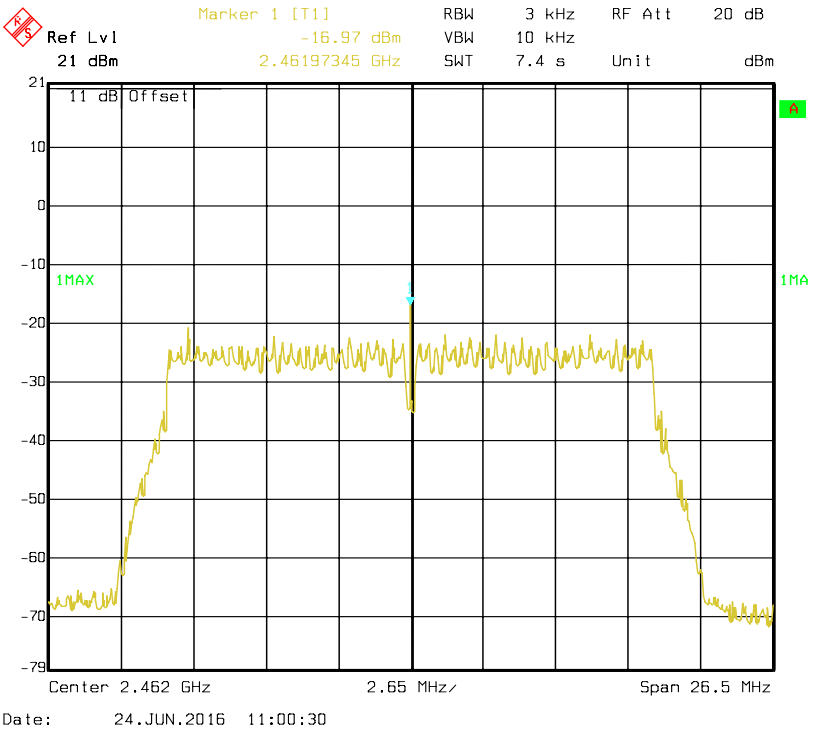
Power Spectral Density, 802.11n HT20 Low Channel



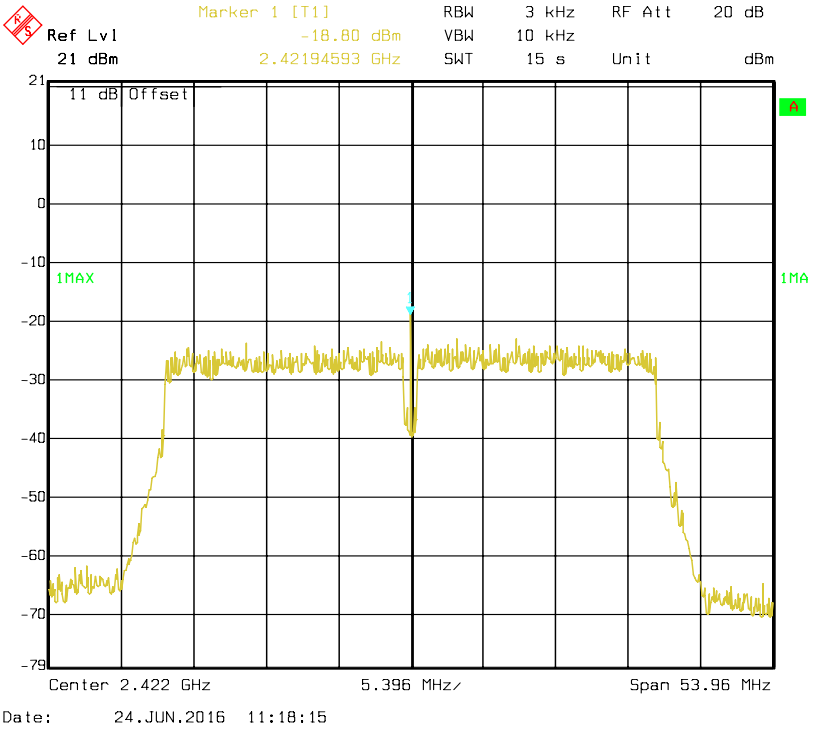
Power Spectral Density, 802.11n HT20 Middle Channel



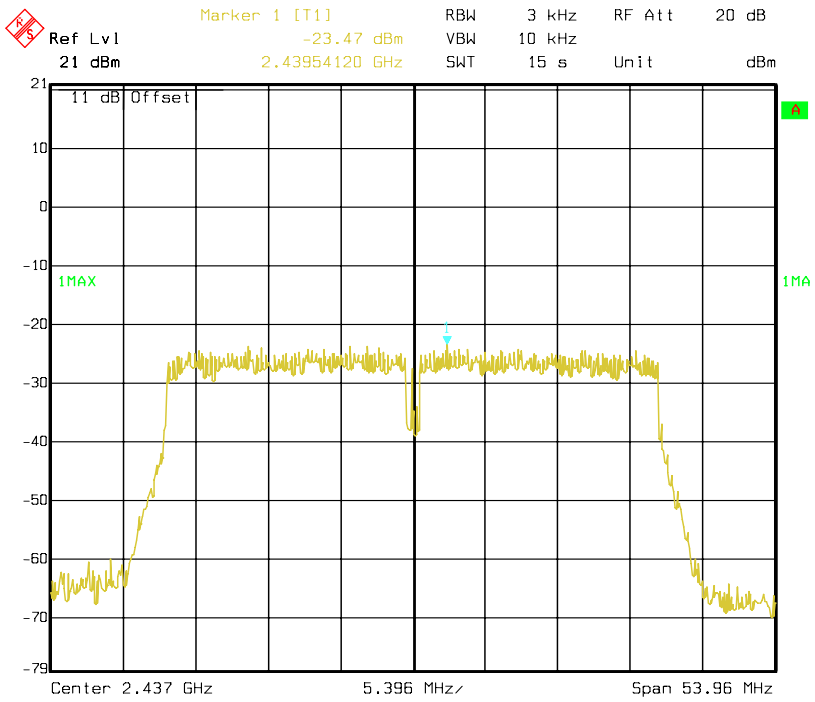
Power Spectral Density, 802.11n HT20 High Channel



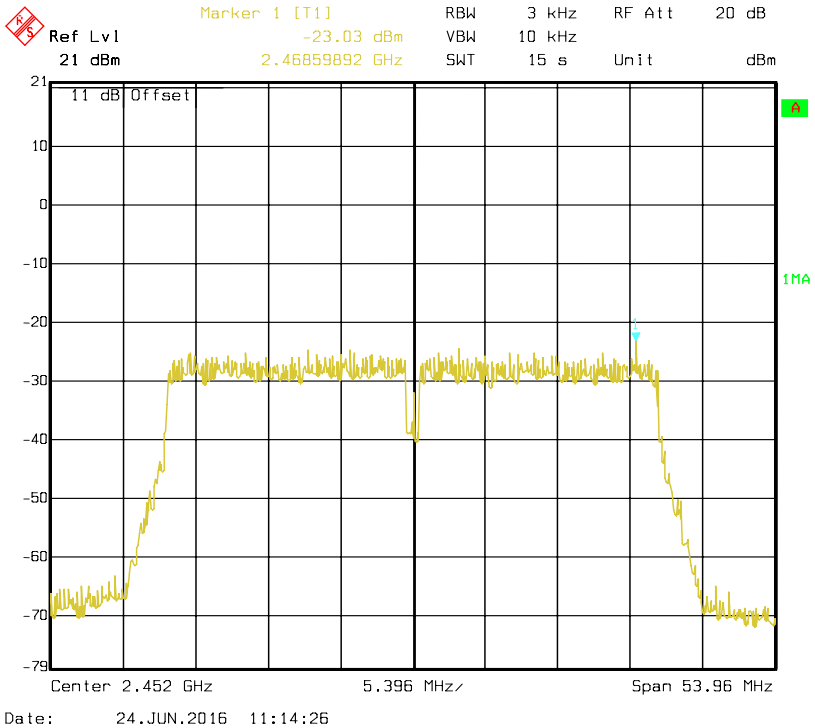
Power Spectral Density, 802.11n HT40 Low Channel



Power Spectral Density, 802.11n HT40 Middle Channel



Power Spectral Density, 802.11n HT40 High Channel



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