



FCC PART 15.247 TEST REPORT

For

Shenzhen Shuoying Technology Co.,Ltd.

Floor1-3 & 5,Block A,No.22 Hebei Industri Area,Hualian Community,Longhua Street, ShenZhen, China

FCC ID: 2AI8H-VF0820

Report Type: Original Report	Product Type: Creative Live! Cam IP SmartHD
Report Number: RDG160808001-00A	
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.(Dongguan). This report may contain data or test methods that are not covered by the NVLAP accreditation scope and shall be marked with an asterisk "*" and noted.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Shenzhen Shuoying Technology Co.,Ltd.* 's product, model number: VF0820 (FCC ID: 2A18H-VF0820) (the "EUT") in this report was a *Creative Live! Cam IP SmartHD*, which was measured approximately: 6.8 cm (L) x 6.8 cm (W) x 12.1cm (H) , rated input voltage: DC5V from adapter.

Adapter Information:

Model: TEKA006-0501000UK
INPUT: 100-240V~ 50/60Hz, 0.2A
OUTPUT: 5V, 1A

** All measurement and test data in this report was gathered from production sample serial number: 160808001. (Assigned by BACL. Dongguan). The EUT was received on 2016-08-08.*

Objective

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

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

Related Submittal(s)/Grant(s)

NO Related Grants.

Test Methodology

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

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

Test Facility

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

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

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

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

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

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

Equipment Modifications

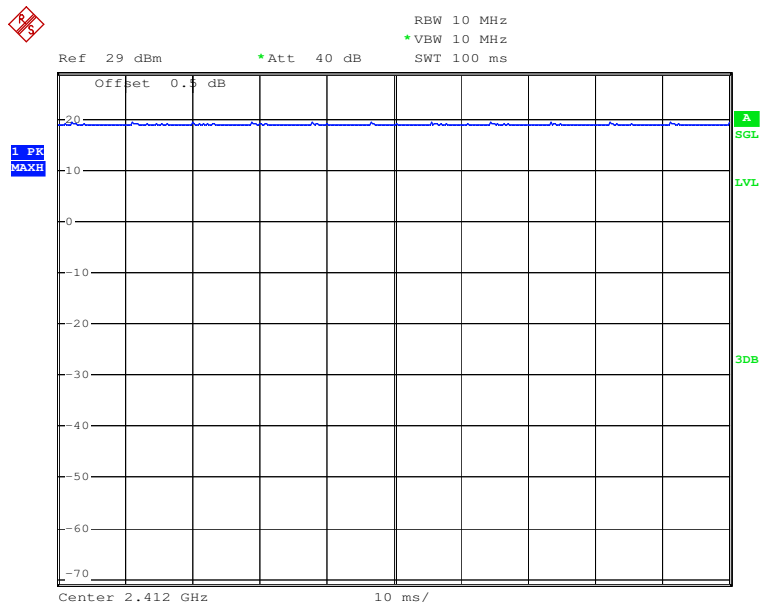
No modification was made to the EUT tested.

EUT Exercise Software

Hyper terminal command was used during test, which was provided by manufacturer, the worst condition was setting by command as following table:

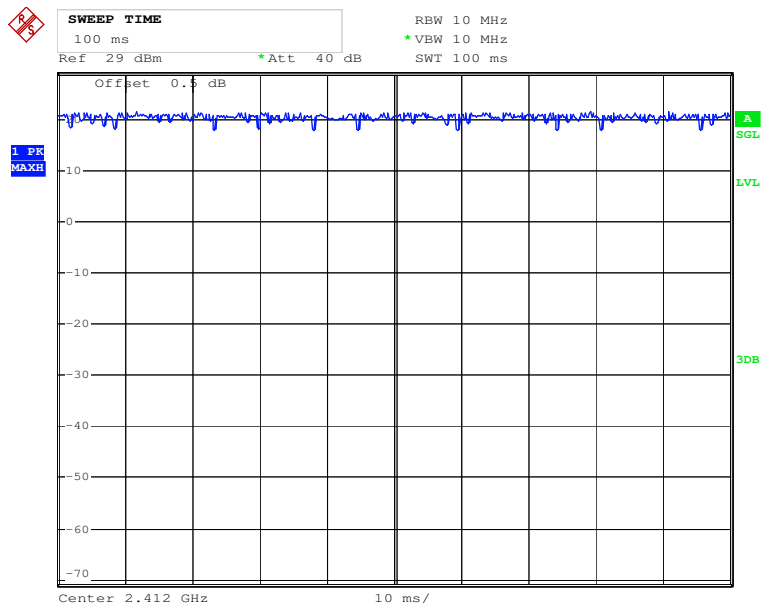
Test mode	T _{on} (ms)	T _{on+off} (ms)	Duty Cycle (%)
802.11b	100	100	100%
802.11g	100	100	100%
802.11n ht20	100	100	100%
802.11n ht40	100	100	100%

802.11b Low Channel



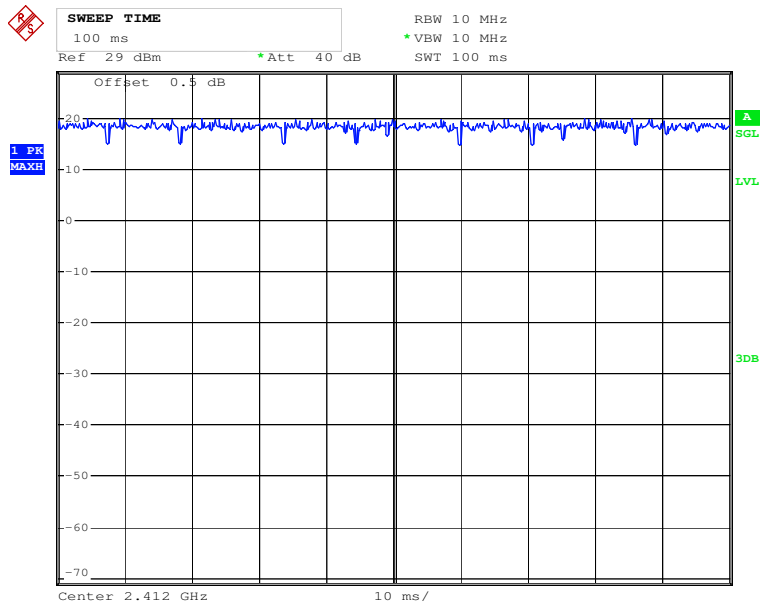
Date: 26.SEP.2016 21:43:38

802.11g Low Channel



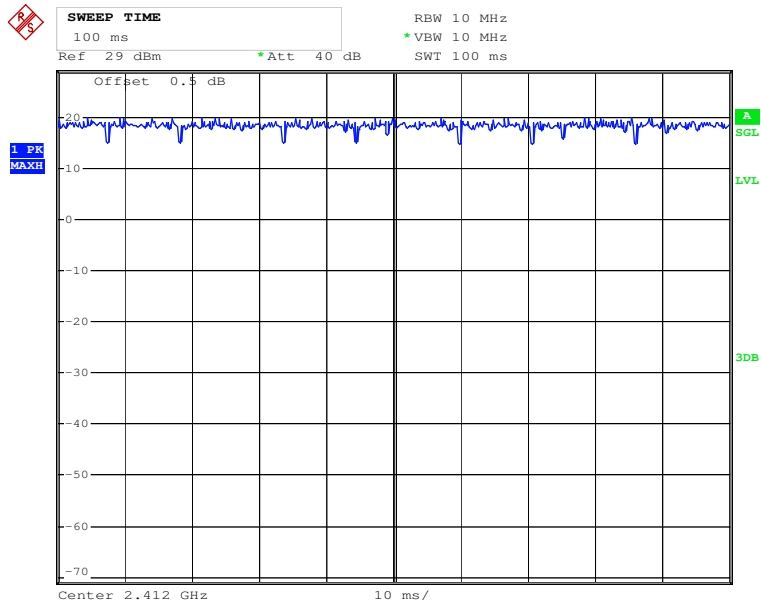
Date: 26.SEP.2016 21:44:10

802.11n ht20 Low Channel



Date: 26.SEP.2016 21:44:31

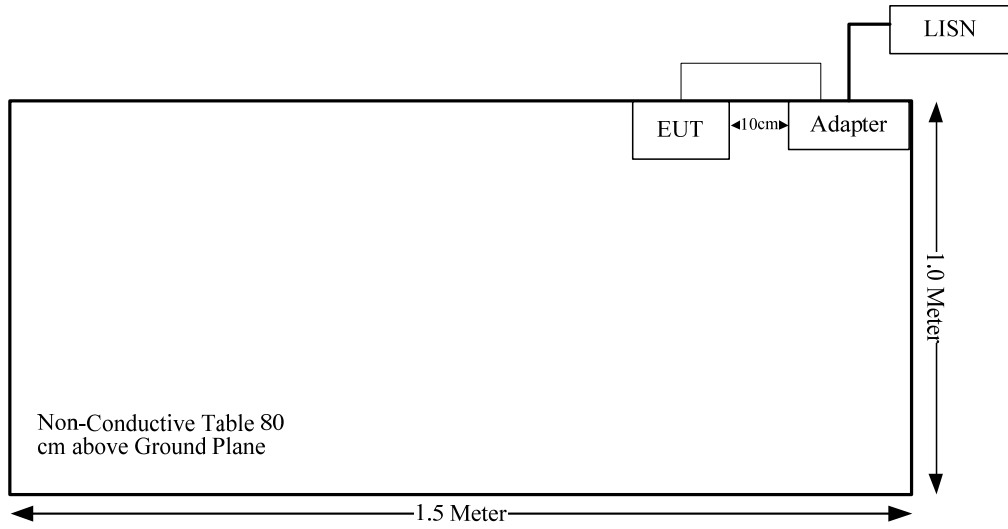
802.11n ht40 Low Channel



Date: 26.SEP.2016 21:44:31

Block Diagram of Test Setup

AC power line conducted emissions



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.247 (i) & §1.1310 & §2.1091	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

Test Time: 2016-09-26~2016-09-26.

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

Applicable Standard

According to §15.247(i) and §1.1310, systems operating under the provisions of this section shall be operated in a manner that 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/cm²);

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:

Frequency (MHz)	Antenna Gain		Tune-up Peak Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
	(dBi)	(numeric)	(dBm)	(mW)			
2412-2462	1.87	1.54	21	125.89	20.00	0.039	1.00

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.

Antenna Connector Construction

The EUT has one integrated antenna arrangement, which was permanently attached and the antenna gain is 1.87 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

Measurement Uncertainty

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

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} of Table 1, then:

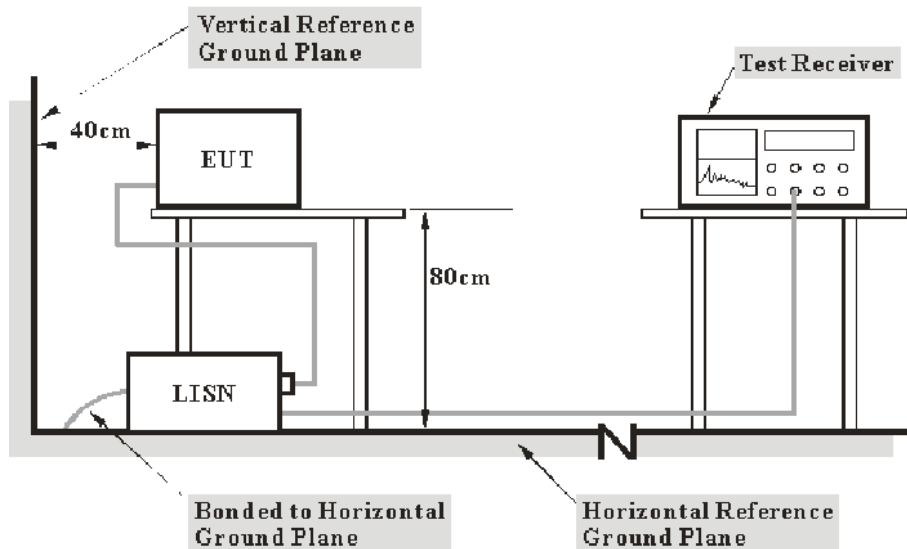
- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit.

Based on CISPR 16-4-2-2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.12 dB (150 kHz to 30 MHz).

Table 1 – Values of U_{cispr}

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

EUT Setup



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

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the first LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

$$C_f = A_C + VDF$$

Herein,

V_C (cord. Reading): corrected voltage amplitude

V_R : reading voltage amplitude

A_C : attenuation caused by cable loss

VDF : voltage division factor of AMN

C_f : Correction Factor

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2015-12-10	2016-12-9
R&S	L.I.S.N	ESH2-Z5	892107/021	2016-09-01	2017-08-31
R&S	Two-line V-network	ENV 216	3560.6550.12	2015-11-26	2016-11-25
N/A	Coaxial Cable	1.8m	N/A	2016-05-06	2017-05-06
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A

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

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207.

Test Data

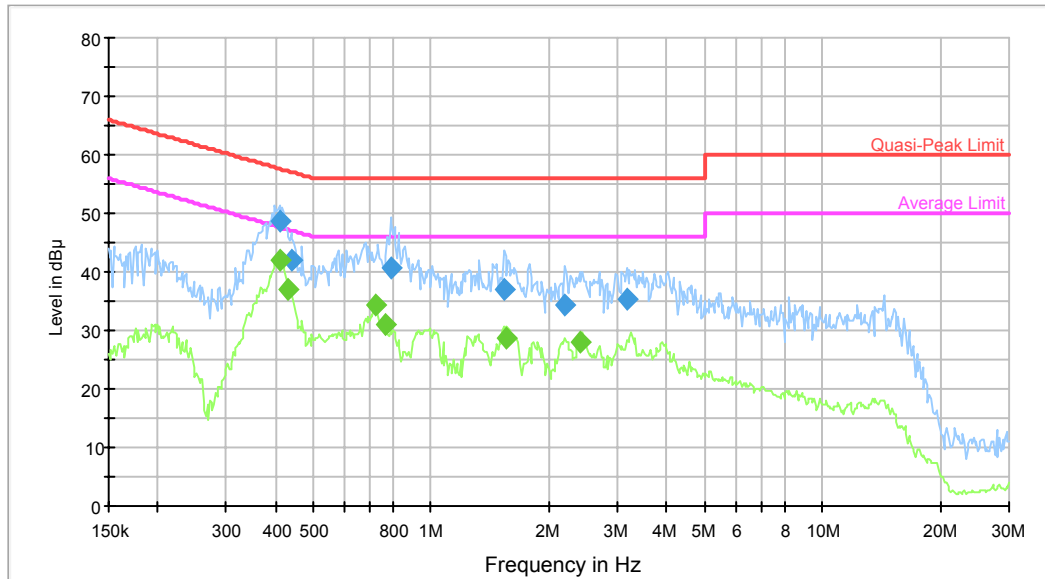
Environmental Conditions

Temperature:	29.6 °C
Relative Humidity:	49 %
ATM Pressure:	100.1 kPa

The testing was performed by Sun Zhong on 2016-09-26.

Test Mode: Transmitting

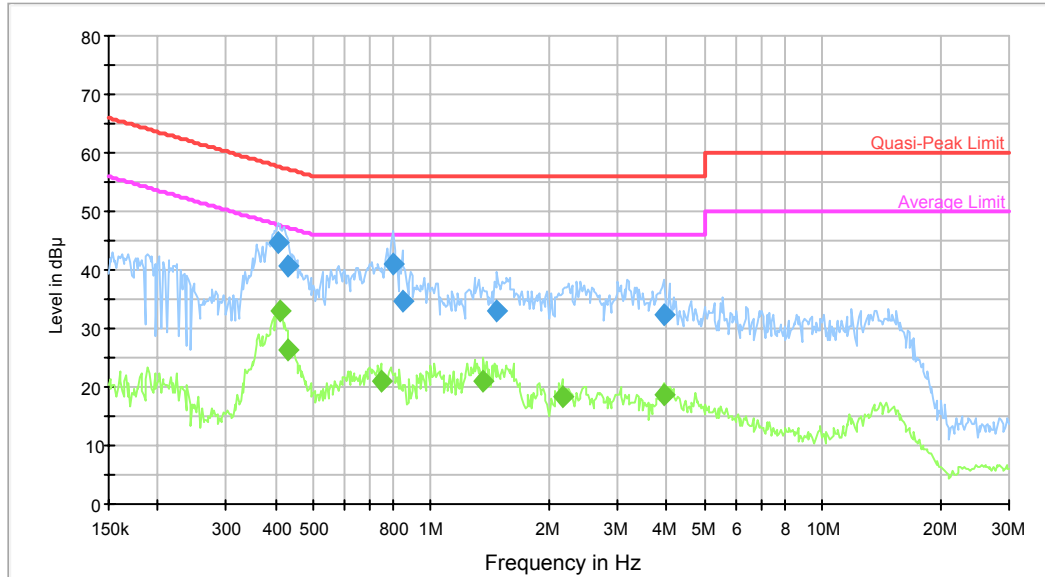
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.409372	48.5	9.000	L1	9.7	9.2	57.7	Compliance
0.439808	41.9	9.000	L1	9.7	15.2	57.1	Compliance
0.786832	40.8	9.000	L1	9.7	15.2	56.0	Compliance
1.536622	36.8	9.000	L1	9.7	19.2	56.0	Compliance
2.199332	34.4	9.000	L1	9.7	21.6	56.0	Compliance
3.173039	35.4	9.000	L1	9.7	20.6	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.409372	42.2	9.000	L1	9.7	5.5	47.7	Compliance
0.432855	37.0	9.000	L1	9.7	10.2	47.2	Compliance
0.720803	34.2	9.000	L1	9.7	11.8	46.0	Compliance
0.768247	31.1	9.000	L1	9.7	14.9	46.0	Compliance
1.561306	28.6	9.000	L1	9.7	17.4	46.0	Compliance
2.420011	28.1	9.000	L1	9.7	17.9	46.0	Compliance

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.406123	44.6	9.000	N	9.6	13.1	57.7	Compliance
0.432855	40.6	9.000	N	9.6	16.6	57.2	Compliance
0.799472	41.0	9.000	N	9.6	15.0	56.0	Compliance
0.845331	34.8	9.000	N	9.6	21.2	56.0	Compliance
1.476605	33.0	9.000	N	9.7	23.0	56.0	Compliance
3.934683	32.3	9.000	N	9.7	23.7	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.409372	33.0	9.000	N	9.6	14.7	47.7	Compliance
0.432855	26.4	9.000	N	9.6	20.8	47.2	Compliance
0.744147	21.0	9.000	N	9.6	25.0	46.0	Compliance
1.363512	20.9	9.000	N	9.7	25.1	46.0	Compliance
2.164561	18.4	9.000	N	9.7	27.6	46.0	Compliance
3.934683	18.7	9.000	N	9.7	27.3	46.0	Compliance

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

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

Measurement Uncertainty

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

If U_{lab} is less than or equal to U_{cispr} of Table 2, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} of Table 2, then:

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

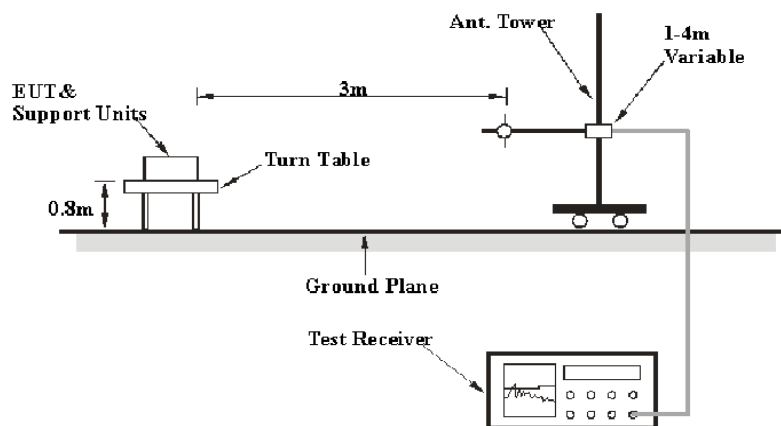
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 10m at Bay Area Compliance Laboratories Corp. (Dongguan) is:30M~200MHz: 4.55 dB for Horizontal, 4.57 dB for Vertical; 200M~1GHz: 4.66 dB for Horizontal, 4.56 dB for Vertical; measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical; 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical; 1G~6GHz: 4.45 dB, 6G~18GHz: 5.23 dB

Table 2 – Values of U_{cispr}

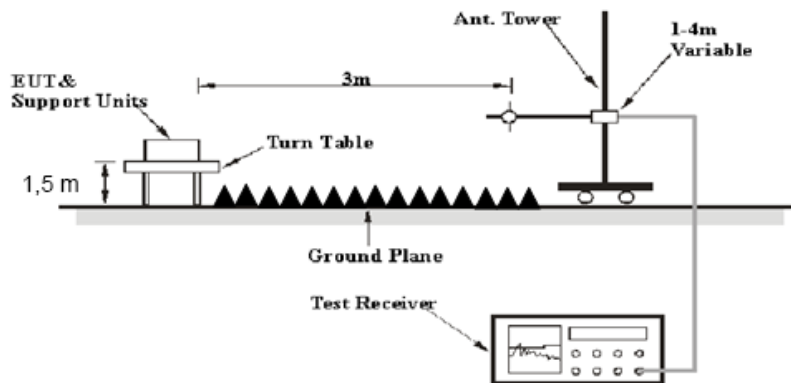
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits. The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	AV

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

Corrected Amplitude & Margin Calculation

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

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

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2016-09-01	2017-09-01
Sunol Sciences	Antenna	JB3	A060611-1	2014-11-06	2017-11-05
HP	Amplifier	8447E	2434A02181	2016-09-01	2017-09-01
Agilent	Spectrum Analyzer	E4440A	SG43360054	2015-11-23	2016-11-22
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
Mini-Circuit	Amplifier	ZVA-213-S+	54201245	2016-02-19	2017-02-19
R&S	Spectrum Analyzer	FSEM	DE23437	2015-11-23	2016-11-22
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2014-06-16	2017-06-15
N/A	Coaxial Cable	14m	N/A	2016-05-06	2017-05-06
N/A	Coaxial Cable	8m	N/A	2016-05-06	2017-05-06
Quinstar	Amplifier	QLW- 18405536-JO	15964001001	2016-09-06	2017-09-06

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

Test Results Summary

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

Test Data

Environmental Conditions

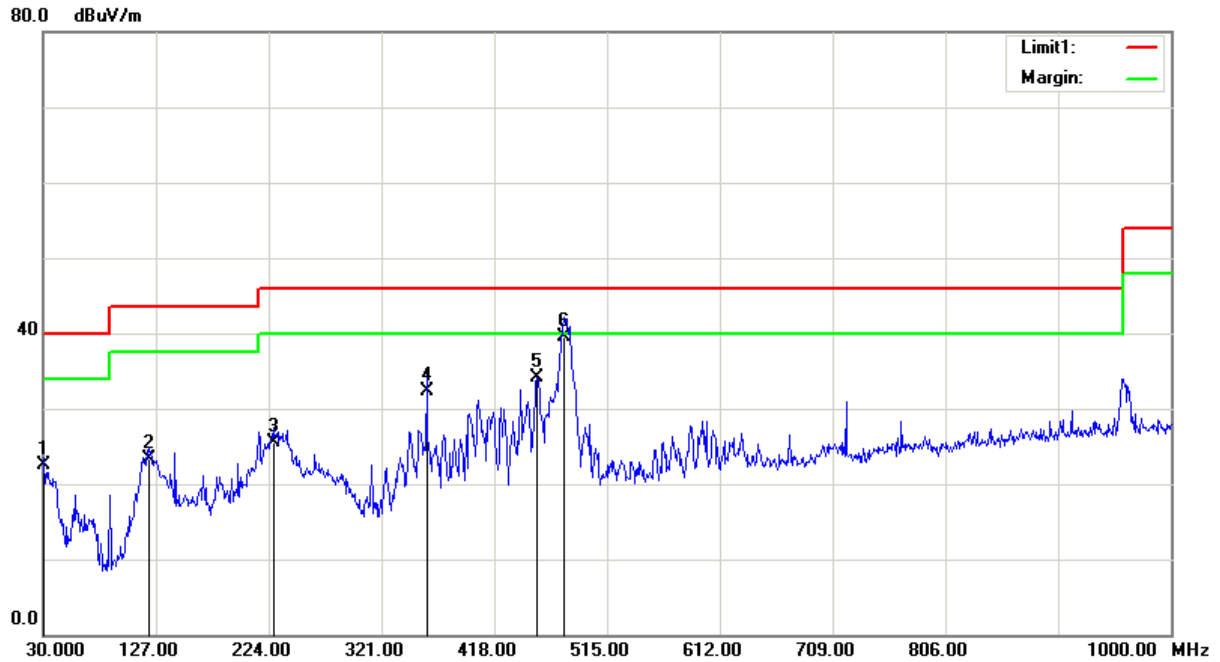
Temperature:	27.6 °C
Relative Humidity:	40%
ATM Pressure:	100.1kPa

The testing was performed by Sun Zhong on 2016-09-26.

Test Mode: Transmitting

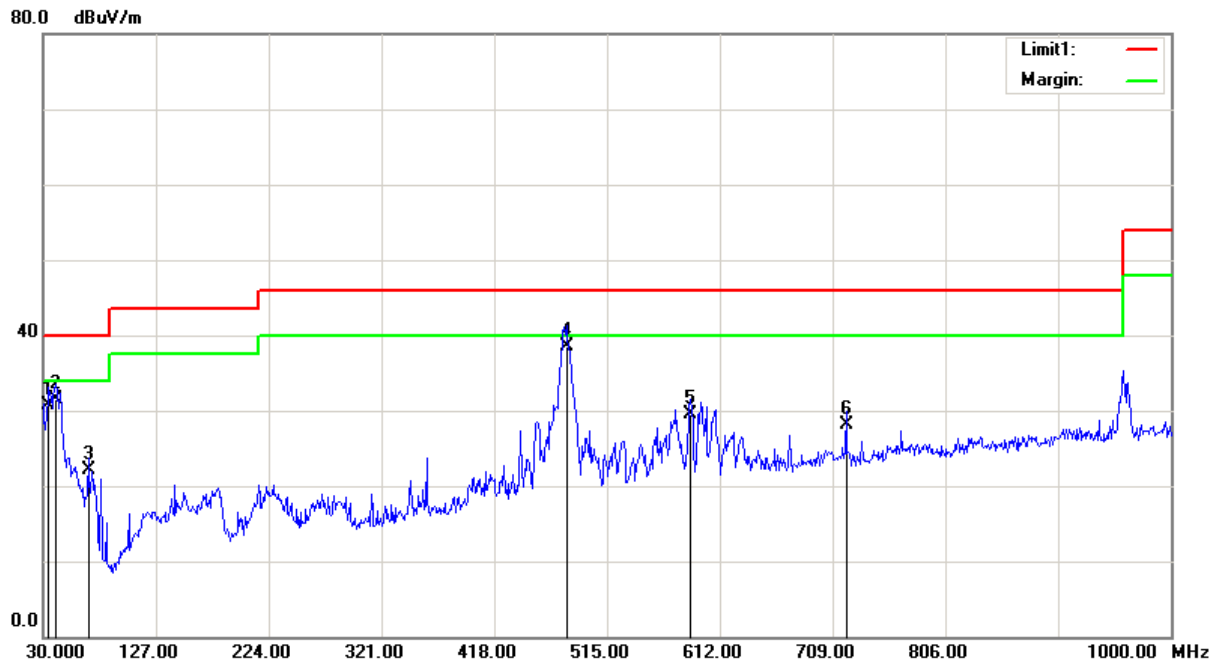
1) Below 1GHz:-802.11b low channel is worst case

Horizontal:



Frequency (MHz)	Receiver Reading (dBuV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
30.0000	21.57	QP	1.03	22.60	40.00	17.40
121.1800	29.13	QP	-5.83	23.30	43.50	20.20
227.8800	34.08	QP	-8.48	25.60	46.00	20.40
359.8000	36.75	QP	-4.45	32.30	46.00	13.70
454.8600	36.68	QP	-2.49	34.20	46.00	11.80
478.1400	41.04	QP	-1.44	39.60	46.00	6.40

Vertical:



Frequency (MHz)	Receiver Reading (dBuV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
34.8500	33.47	QP	-2.67	30.80	40.00	9.20
40.6700	38.72	QP	-7.12	31.60	40.00	8.40
68.8000	34.37	QP	-12.27	22.10	40.00	17.90
480.0800	39.88	QP	-1.38	38.50	46.00	7.50
586.7800	29.90	QP	-0.30	29.60	46.00	16.40
720.6400	26.51	QP	1.69	28.20	46.00	17.80

2) Above 1GHz:

802.11b Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	73.56	PK	H	25.67	3.68	0.00	102.91	N/A	N/A
2412	68.69	AV	H	25.67	3.68	0.00	98.04	N/A	N/A
2412	76.95	PK	V	25.67	3.68	0.00	106.30	N/A	N/A
2412	72.23	AV	V	25.67	3.68	0.00	101.58	N/A	N/A
2390	33.36	PK	V	25.61	3.63	0.00	62.60	74.00	11.40
2390	17.01	AV	V	25.61	3.63	0.00	46.25	54.00	7.75
4824	41.89	PK	V	30.64	5.03	27.41	50.15	74.00	23.85
4824	37.52	AV	V	30.64	5.03	27.41	45.78	54.00	8.22
7236	34.5	PK	V	34.17	6.65	25.90	49.42	74.00	24.58
7236	29.14	AV	V	34.17	6.65	25.90	44.06	54.00	9.94
3218	39.3	PK	V	27.90	6.16	27.35	46.01	74.00	27.99
3218	26.57	AV	V	27.90	6.16	27.35	33.28	54.00	20.72
Middle Channel: 2437 MHz									
2437	73.95	PK	H	25.74	3.75	0.00	103.44	N/A	N/A
2437	69.02	AV	H	25.74	3.75	0.00	98.51	N/A	N/A
2437	77.28	PK	V	25.74	3.75	0.00	106.77	N/A	N/A
2437	72.59	AV	V	25.74	3.75	0.00	102.08	N/A	N/A
4874	43.12	PK	V	30.77	5.14	27.42	51.61	74.00	22.39
4874	37.74	AV	V	30.77	5.14	27.42	46.23	54.00	7.77
7311	34.79	PK	V	34.35	6.74	25.88	50.00	74.00	24.00
7311	29.42	AV	V	34.35	6.74	25.88	44.63	54.00	9.37
3217	39.54	PK	V	27.89	6.16	27.36	46.23	74.00	27.77
3217	26.8	AV	V	27.89	6.16	27.36	33.49	54.00	20.51
3131	35.14	PK	V	27.62	6.93	27.43	42.26	74.00	31.74
3131	23.58	AV	V	27.62	6.93	27.43	30.70	54.00	23.30
High Channel: 2462 MHz									
2462	70.19	PK	H	25.80	3.75	0.00	99.74	N/A	N/A
2462	65.47	AV	H	25.80	3.75	0.00	95.02	N/A	N/A
2462	73.58	PK	V	25.80	3.75	0.00	103.13	N/A	N/A
2462	68.2	AV	V	25.80	3.75	0.00	97.75	N/A	N/A
2483.5	28.81	PK	V	25.86	3.67	0.00	58.34	74.00	15.66
2483.5	13.48	AV	V	25.86	3.67	0.00	43.01	54.00	10.99
4924	43.68	PK	V	30.90	5.34	27.43	52.49	74.00	21.51
4924	39.02	AV	V	30.90	5.34	27.43	47.83	54.00	6.17
7386	35.54	PK	V	34.53	6.83	25.86	51.04	74.00	22.96
7386	30.82	AV	V	34.53	6.83	25.86	46.32	54.00	7.68
3227	36.02	PK	V	27.93	6.20	27.35	42.80	74.00	31.20
3227	23.95	AV	V	27.93	6.20	27.35	30.73	54.00	23.27

802.11g Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	74.56	PK	H	25.67	3.68	0.00	103.91	N/A	N/A
2412	63.9	AV	H	25.67	3.68	0.00	93.25	N/A	N/A
2412	75.43	PK	V	25.67	3.68	0.00	104.78	N/A	N/A
2412	65.98	AV	V	25.67	3.68	0.00	95.33	N/A	N/A
2390	38.37	PK	H	25.61	3.63	0.00	67.61	74.00	6.39
2390	15.43	AV	H	25.61	3.63	0.00	44.67	54.00	9.33
4824	43.36	PK	H	30.64	5.03	27.41	51.62	74.00	22.38
4824	31.07	AV	H	30.64	5.03	27.41	39.33	54.00	14.67
7236	33.99	PK	H	34.17	6.65	25.90	48.91	74.00	25.09
7236	22.91	AV	H	34.17	6.65	25.90	37.83	54.00	16.17
3272	38.57	PK	H	28.07	5.80	27.31	45.13	74.00	28.87
3272	26.32	AV	H	28.07	5.80	27.31	32.88	54.00	21.12
Middle Channel: 2437 MHz									
2437	75.14	PK	H	25.74	3.75	0.00	104.63	N/A	N/A
2437	64.87	AV	H	25.74	3.75	0.00	94.36	N/A	N/A
2437	77.01	PK	V	25.74	3.75	0.00	106.50	N/A	N/A
2437	65.85	AV	V	25.74	3.75	0.00	95.34	N/A	N/A
4874	40.08	PK	H	30.77	5.14	27.42	48.57	74.00	25.43
4874	29.66	AV	H	30.77	5.14	27.42	38.15	54.00	15.85
7311	34.51	PK	H	34.35	6.74	25.88	49.72	74.00	24.28
7311	23.46	AV	H	34.35	6.74	25.88	38.67	54.00	15.33
3227	39.07	PK	H	27.93	6.20	27.35	45.85	74.00	28.15
3227	26.81	AV	H	27.93	6.20	27.35	33.59	54.00	20.41
3614	36.78	PK	H	29.05	4.60	27.28	43.15	74.00	30.85
3614	24.93	AV	H	29.05	4.60	27.28	31.30	54.00	22.70
High Channel: 2462 MHz									
2462	74.76	PK	H	25.80	3.75	0.00	104.31	N/A	N/A
2462	64.54	AV	H	25.80	3.75	0.00	94.09	N/A	N/A
2462	76.63	PK	V	25.80	3.75	0.00	106.18	N/A	N/A
2462	65.5	AV	V	25.80	3.75	0.00	95.05	N/A	N/A
2483.5	42.42	PK	H	25.86	3.67	0.00	71.95	74.00	2.05
2483.5	20.51	AV	H	25.86	3.67	0.00	50.04	54.00	3.96
4924	42.39	PK	H	30.90	5.34	27.43	51.20	74.00	22.80
4924	31.28	AV	H	30.90	5.34	27.43	40.09	54.00	13.91
7386	34.22	PK	H	34.53	6.83	25.86	49.72	74.00	24.28
7386	23.17	AV	H	34.53	6.83	25.86	38.67	54.00	15.33
3272	38.83	PK	H	28.07	5.80	27.31	45.39	74.00	28.61
3272	26.59	AV	H	28.07	5.80	27.31	33.15	54.00	20.85

802.11n ht20 Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	71.89	PK	H	25.67	3.68	0.00	101.24	N/A	N/A
2412	60.25	AV	H	25.67	3.68	0.00	89.60	N/A	N/A
2412	73.02	PK	V	25.67	3.68	0.00	102.37	N/A	N/A
2412	61.4	AV	V	25.67	3.68	0.00	90.75	N/A	N/A
2390	32.63	PK	H	25.61	3.63	0.00	61.87	74.00	12.13
2390	13.48	AV	H	25.61	3.63	0.00	42.72	54.00	11.28
4824	44.21	PK	H	30.64	5.03	27.41	52.47	74.00	21.53
4824	32.58	AV	H	30.64	5.03	27.41	40.84	54.00	13.16
7236	34.06	PK	H	34.17	6.65	25.90	48.98	74.00	25.02
7236	23.07	AV	H	34.17	6.65	25.90	37.99	54.00	16.01
3227	38.68	PK	H	27.93	6.20	27.35	45.46	74.00	28.54
3227	26.45	AV	H	27.93	6.20	27.35	33.23	54.00	20.77
Middle Channel: 2437 MHz									
2437	74.62	PK	H	25.74	3.75	0.00	104.11	N/A	N/A
2437	63.47	AV	H	25.74	3.75	0.00	92.96	N/A	N/A
2437	76.03	PK	V	25.74	3.75	0.00	105.52	N/A	N/A
2437	64.99	AV	V	25.74	3.75	0.00	94.48	N/A	N/A
4874	42.36	PK	H	30.77	5.14	27.42	50.85	74.00	23.15
4874	31.24	AV	H	30.77	5.14	27.42	39.73	54.00	14.27
7311	34.15	PK	H	34.35	6.74	25.88	49.36	74.00	24.64
7311	23.13	AV	H	34.35	6.74	25.88	38.34	54.00	15.66
3147	38.76	PK	H	27.67	6.97	27.41	45.99	74.00	28.01
3147	26.52	AV	H	27.67	6.97	27.41	33.75	54.00	20.25
3369	34.67	PK	H	28.38	4.93	27.23	40.75	74.00	33.25
3369	22.11	AV	H	28.38	4.93	27.23	28.19	54.00	25.81
High Channel: 2462 MHz									
2462	74.25	PK	H	25.80	3.75	0.00	103.80	N/A	N/A
2462	63.14	AV	H	25.80	3.75	0.00	92.69	N/A	N/A
2462	75.66	PK	V	25.80	3.75	0.00	105.21	N/A	N/A
2462	64.61	AV	V	25.80	3.75	0.00	94.16	N/A	N/A
2484.14	41.51	PK	H	25.86	3.67	0.00	71.04	74.00	2.96
2484.14	17.01	AV	H	25.86	3.67	0.00	46.54	54.00	7.46
4924	41.29	PK	H	30.90	5.34	27.43	50.10	74.00	23.90
4924	30.51	AV	H	30.90	5.34	27.43	39.32	54.00	14.68
7386	34.07	PK	H	34.53	6.83	25.86	49.57	74.00	24.43
7386	22.98	AV	H	34.53	6.83	25.86	38.48	54.00	15.52
3126	38.62	PK	H	27.60	6.91	27.43	45.70	74.00	28.30
3126	26.41	AV	H	27.60	6.91	27.43	33.49	54.00	20.51

802.11n ht40 Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2422 MHz									
2422	71.61	PK	H	25.70	3.71	0.00	101.02	N/A	N/A
2422	60.03	AV	H	25.70	3.71	0.00	89.44	N/A	N/A
2422	71.69	PK	V	25.70	3.71	0.00	101.10	N/A	N/A
2422	60.12	AV	V	25.70	3.71	0.00	89.53	N/A	N/A
2387	38.87	PK	H	25.61	3.62	0.00	68.10	74.00	5.90
2387	15.41	AV	H	25.61	3.62	0.00	44.64	54.00	9.36
4844	39.96	PK	H	30.69	4.99	27.42	48.22	74.00	25.78
4844	30.86	AV	H	30.69	4.99	27.42	39.12	54.00	14.88
7266	33.84	PK	H	34.24	6.68	25.89	48.87	74.00	25.13
7266	22.77	AV	H	34.24	6.68	25.89	37.80	54.00	16.20
3263	38.3	PK	H	28.04	6.01	27.32	45.03	74.00	28.97
3263	26.18	AV	H	28.04	6.01	27.32	32.91	54.00	21.09
Middle Channel: 2437 MHz									
2437	70.62	PK	H	25.74	3.75	0.00	100.11	N/A	N/A
2437	58.38	AV	H	25.74	3.75	0.00	87.87	N/A	N/A
2437	72.18	PK	V	25.74	3.75	0.00	101.67	N/A	N/A
2437	59.93	AV	V	25.74	3.75	0.00	89.42	N/A	N/A
4874	43.19	PK	H	30.77	5.14	27.42	51.68	74.00	22.32
4874	31.02	AV	H	30.77	5.14	27.42	39.51	54.00	14.49
7311	34.01	PK	H	34.35	6.74	25.88	49.22	74.00	24.78
7311	22.92	AV	H	34.35	6.74	25.88	38.13	54.00	15.87
3258	38.48	PK	H	28.03	6.12	27.32	45.31	74.00	28.69
3258	26.32	AV	H	28.03	6.12	27.32	33.15	54.00	20.85
1569	34.71	PK	H	23.74	2.61	27.68	33.38	74.00	40.62
1569	22.31	AV	H	23.74	2.61	27.68	20.98	54.00	33.02
High Channel: 2452MHz									
2452	70.26	PK	H	25.78	3.78	0.00	99.82	N/A	N/A
2452	58.06	AV	H	25.78	3.78	0.00	87.62	N/A	N/A
2452	71.79	PK	V	25.78	3.78	0.00	101.35	N/A	N/A
2452	59.55	AV	V	25.78	3.78	0.00	89.11	N/A	N/A
2483.5	43.02	PK	H	25.86	3.67	0.00	72.55	74.00	1.45
2483.5	20.53	AV	H	25.86	3.67	0.00	50.06	54.00	3.94
4904	40.21	PK	H	30.85	5.31	27.43	48.94	74.00	25.06
4904	30.03	AV	H	30.85	5.31	27.43	38.76	54.00	15.24
7356	34.04	PK	H	34.45	6.79	25.87	49.41	74.00	24.59
7356	23.01	AV	H	34.45	6.79	25.87	38.38	54.00	15.62
3112	38.52	PK	H	27.56	6.87	27.44	45.51	74.00	28.49
3112	26.4	AV	H	27.56	6.87	27.44	33.39	54.00	20.61

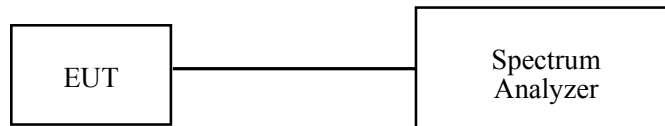
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

Applicable Standard

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

Test Procedure

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



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2015-11-23	2016-11-22
N/A	Coaxial Cable	0.1m	N/A	2016-05-06	2017-05-06
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2016-05-06	2017-05-06

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

Test Data

Environmental Conditions

Temperature:	28.7°C
Relative Humidity:	43%
ATM Pressure:	100 kPa

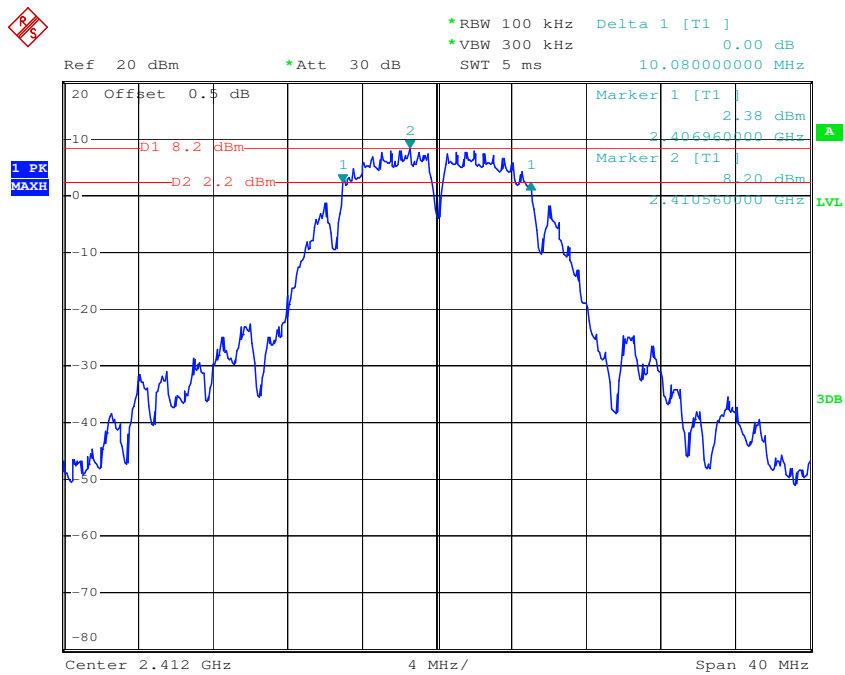
* The testing was performed by Sun Zhong on 2016-09-26.

Test Mode: Transmitting

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

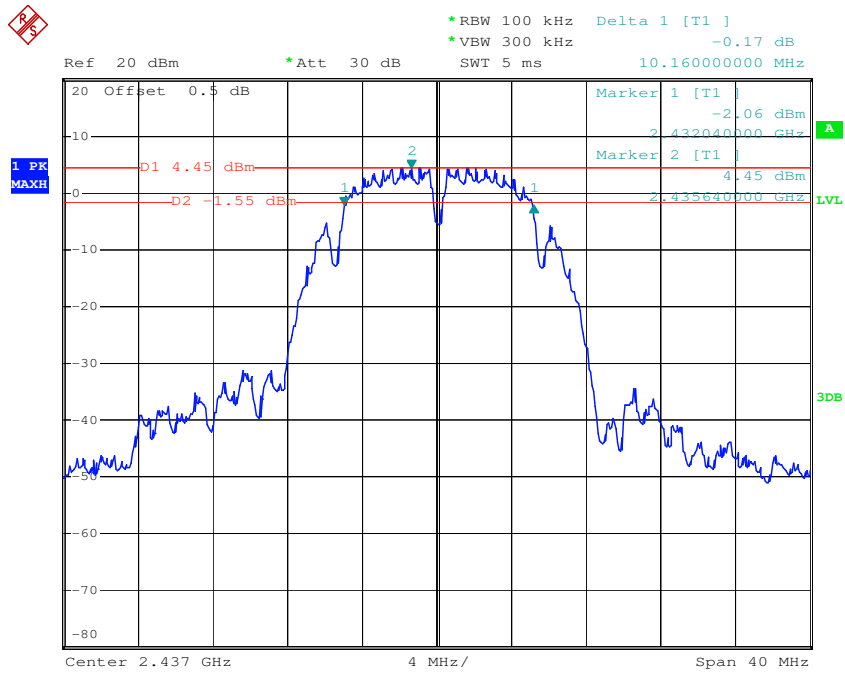
Test mode	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)
802.11b	Low	2412	10.08	≥0.5
	Middle	2437	10.16	≥0.5
	High	2462	10.08	≥0.5
802.11g	Low	2412	16.48	≥0.5
	Middle	2437	16.4	≥0.5
	High	2462	16.48	≥0.5
802.11n20	Low	2412	17.04	≥0.5
	Middle	2437	17.28	≥0.5
	High	2462	17.6	≥0.5
802.11n40	Low	2422	35.68	≥0.5
	Middle	2437	36	≥0.5
	High	2452	35.84	≥0.5

802.11b Low Channel



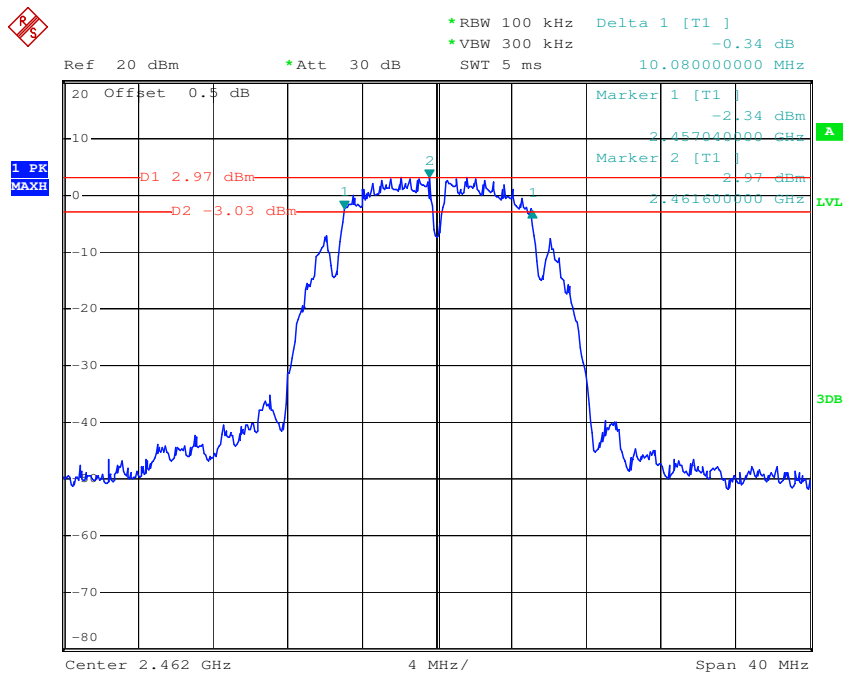
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802.11b Middle Channel



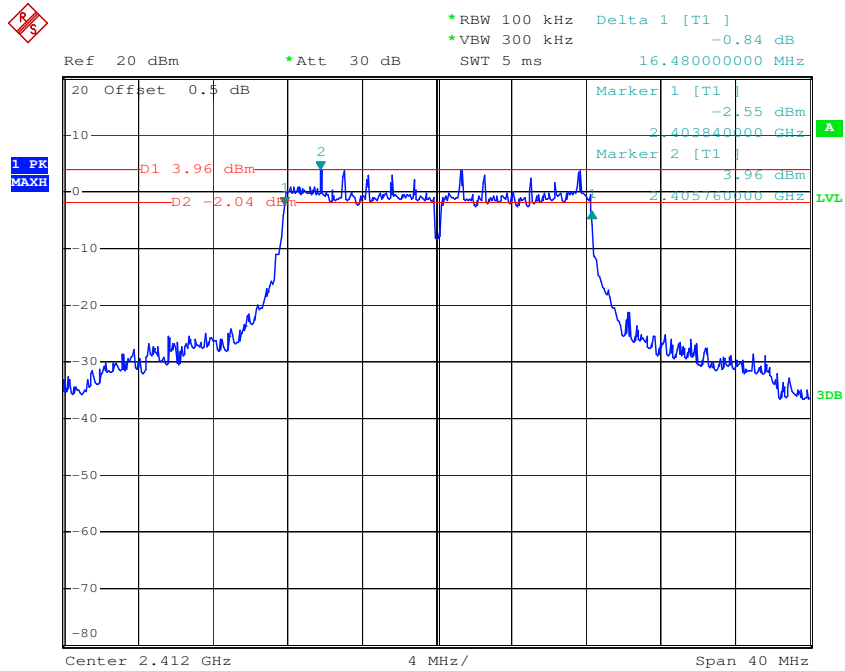
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802.11b High Channel



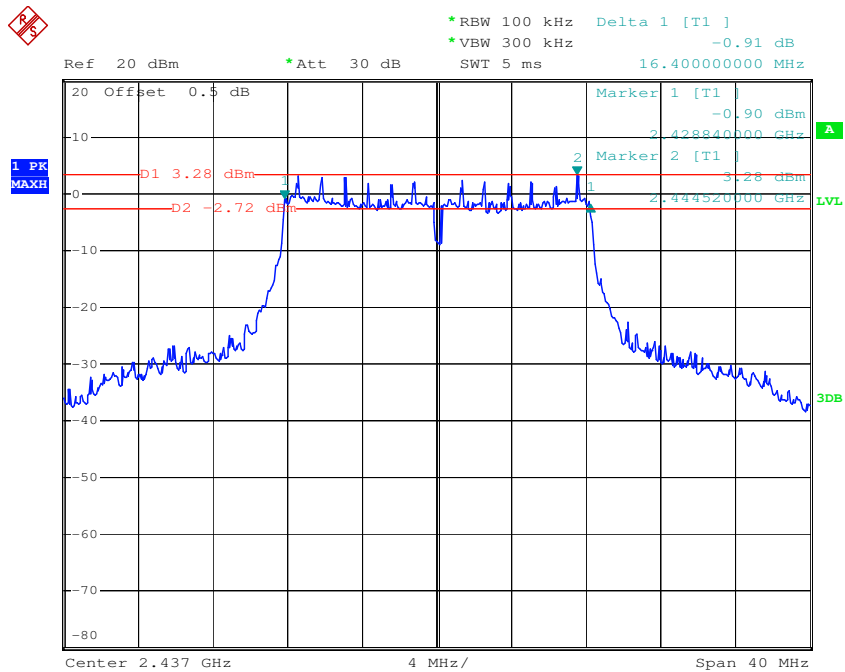
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802.11g Low Channel



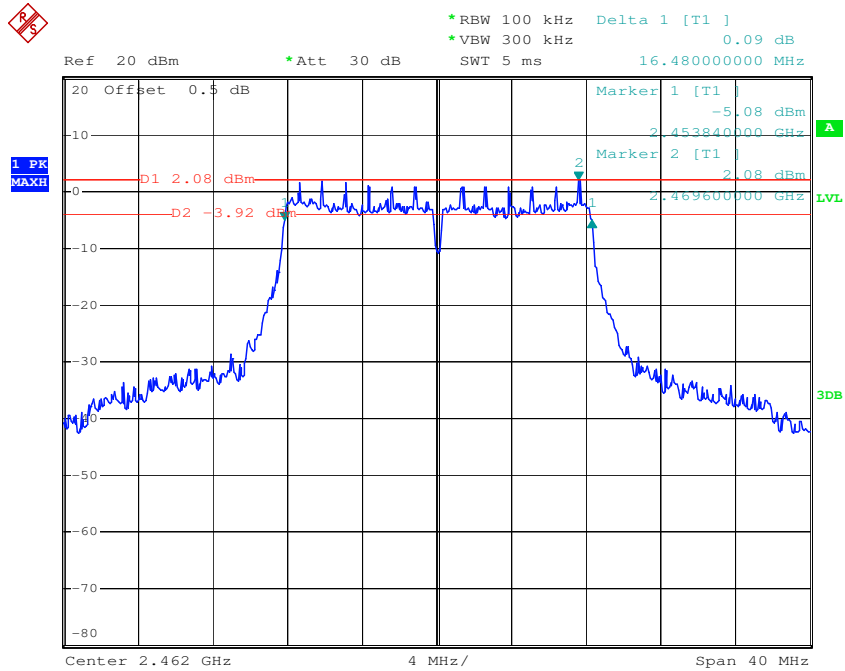
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802.11g Middle Channel



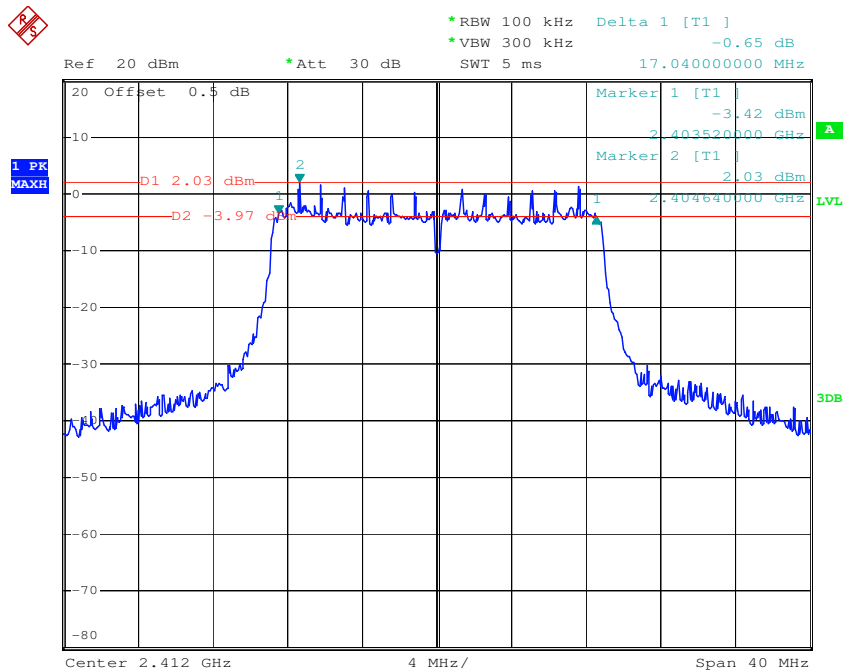
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802.11g High Channel



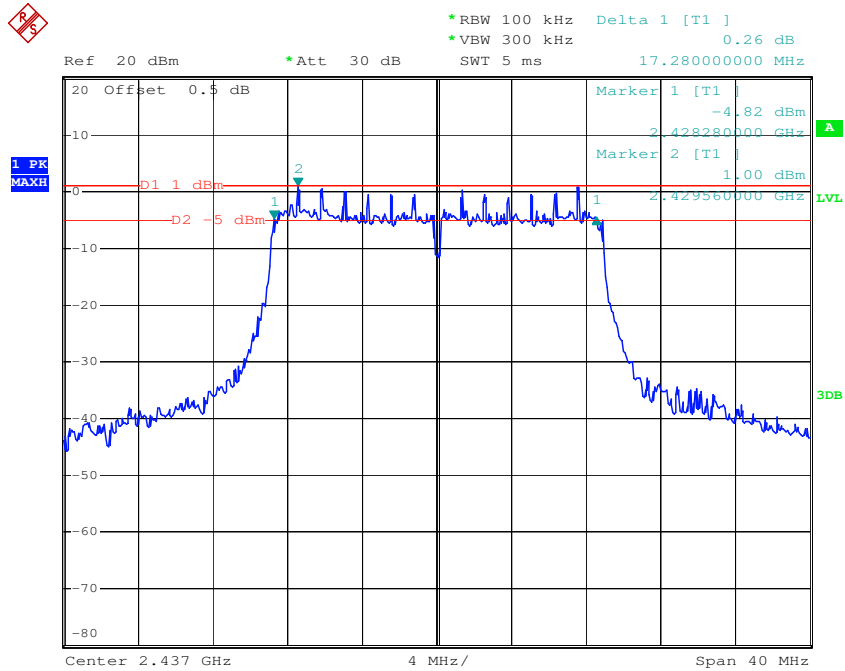
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802.11n ht20 Low Channel

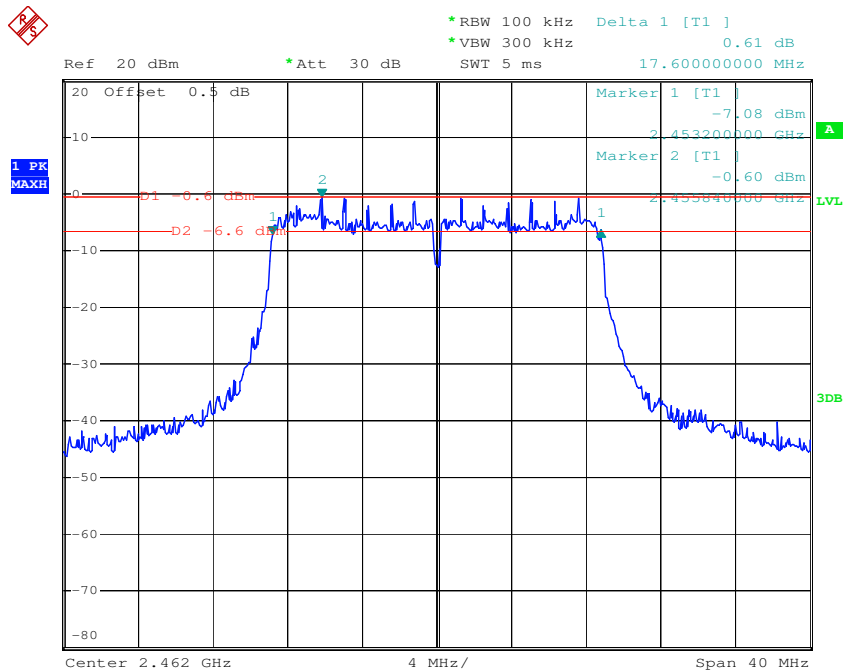


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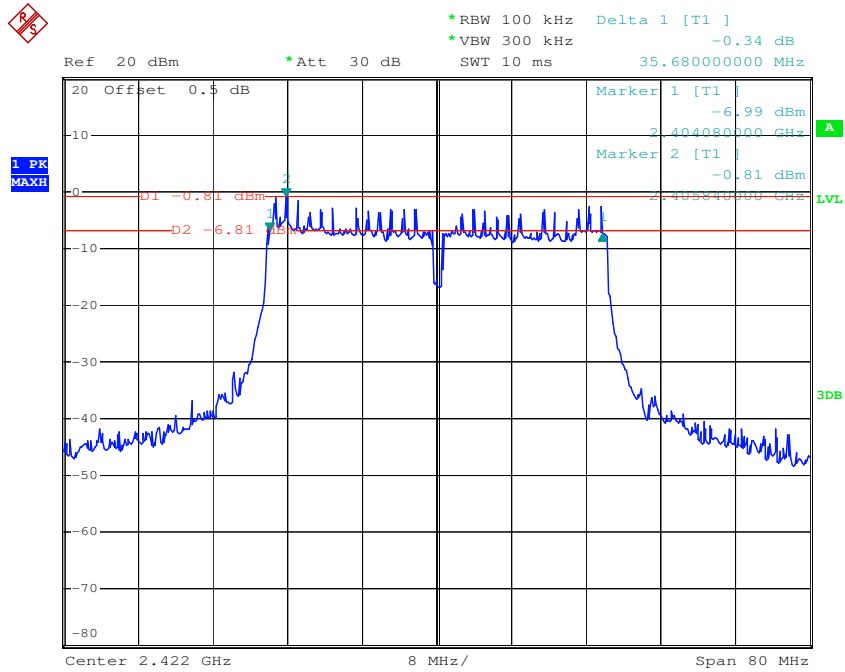
802.11n ht20 Middle Channel



802.11n ht20 High Channel

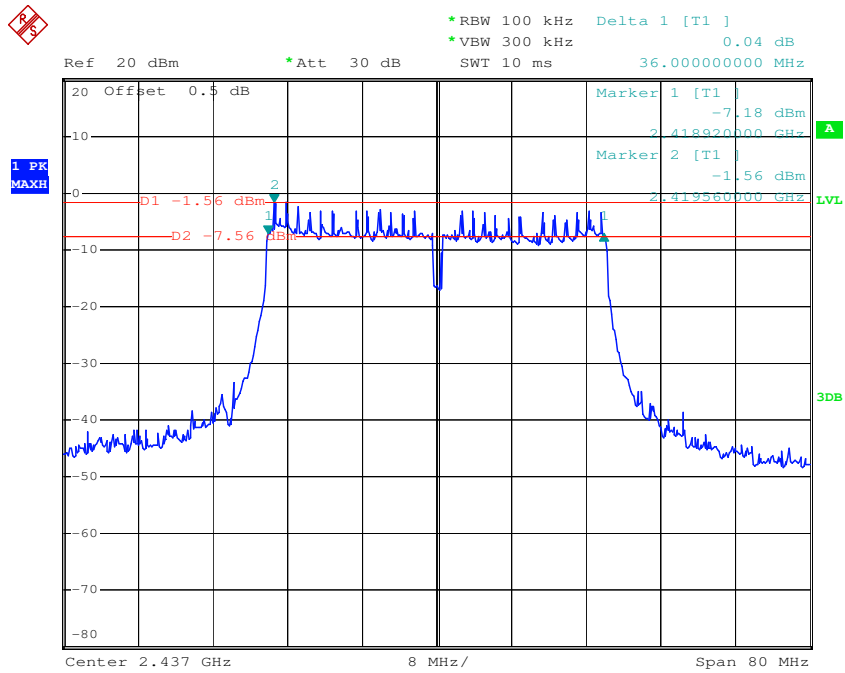


802.11n ht40 Low Channel



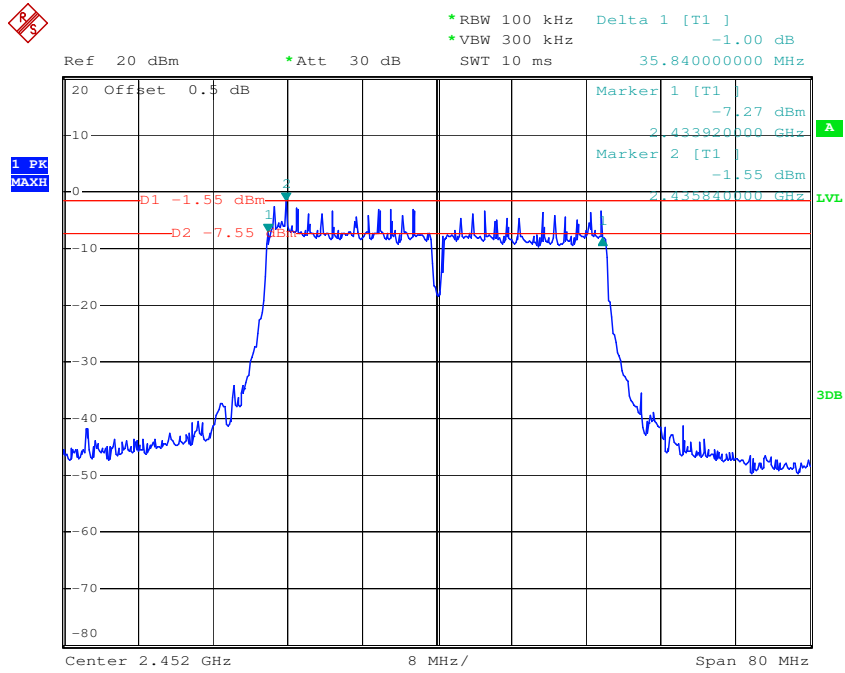
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802.11n ht40 Middle Channel



Date: 26.SEP.2016 16:57:53

802.11n ht40 High Channel



Date: 26.SEP.2016 16:54:45

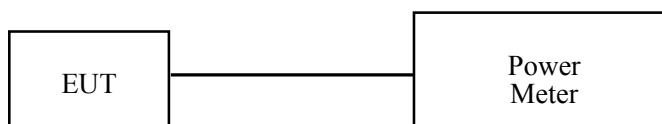
FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

Applicable Standard

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

Test Procedure

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



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Wideband Power Sensor	N1921A	MY54210016	2015-11-03	2016-11-03
Agilent	P-Series Power Meter	N1912A	MY5000448	2015-11-03	2016-11-03
N/A	Coaxial Cable	0.1m	N/A	2016-05-06	2017-05-06
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2016-05-06	2017-05-06

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

Test Data

Environmental Conditions

Temperature:	28.7 °C
Relative Humidity:	43 %
ATM Pressure:	100 kPa

* The testing was performed by Sun Zhong on 2016-09-26.

Test Mode: Transmitting

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

Test mode	Channel	Frequency	Max Peak Conducted Output Power	Max Conducted Average Output Power	Limit
		(MHz)	(dBm)	(dBm)	(dBm)
802.11b	Low	2412	19.78	18.89	30
	Middle	2437	19.09	17.58	30
	High	2462	15.67	14.7	30
802.11g	Low	2412	20.16	17.01	30
	Middle	2437	19.31	16.03	30
	High	2462	18.97	16.08	30
802.11n20	Low	2412	18.31	15.16	30
	Middle	2437	17.44	14.42	30
	High	2462	16.3	13.35	30
802.11n40	Low	2422	19.02	12.79	30
	Middle	2437	18.39	12.23	30
	High	2452	17.57	11.46	30

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

Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2015-11-23	2016-11-22
N/A	Coaxial Cable	0.1m	N/A	2016-05-06	2017-05-06
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2016-05-06	2017-05-06

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

Test Data

Environmental Conditions

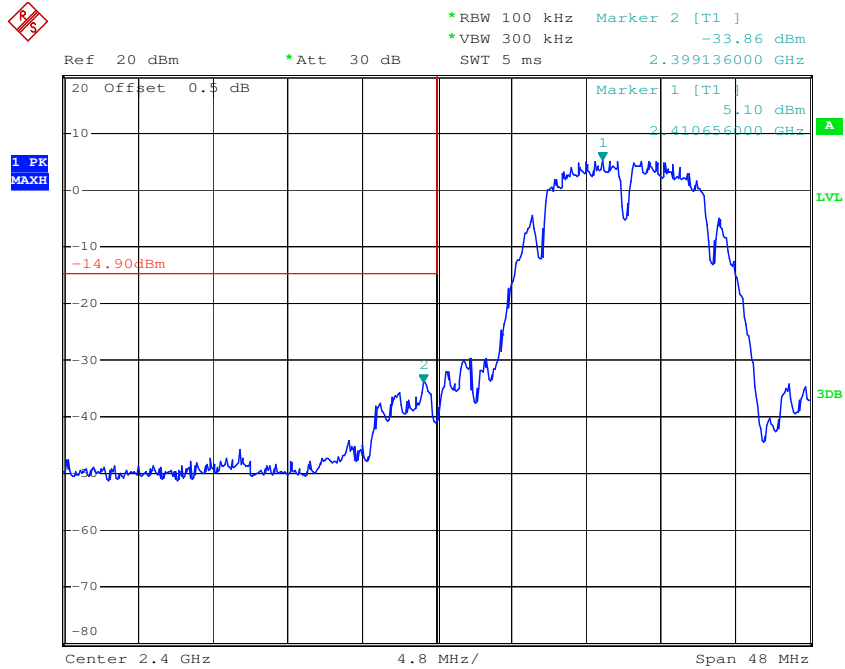
Temperature:	28.7 °C
Relative Humidity:	43 %
ATM Pressure:	100 kPa

* The testing was performed by Sun Zhong on 2016-09-26.

Test mode: Transmitting

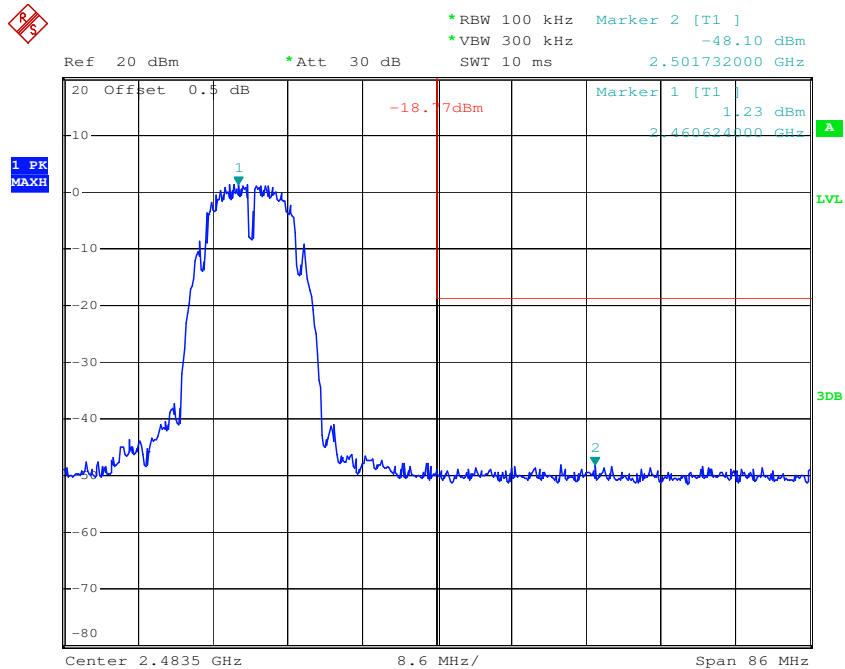
Test Result: Compliant. Please refer to following plots.

802.11b: Band Edge, Left Side



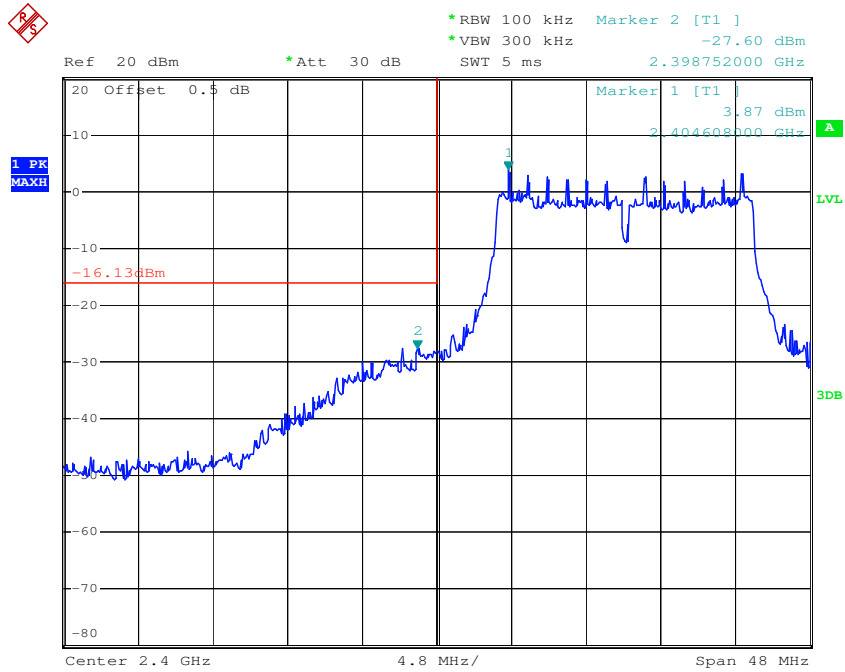
Date: 26.SEP.2016 16:25:19

802.11b: Band Edge, Right Side



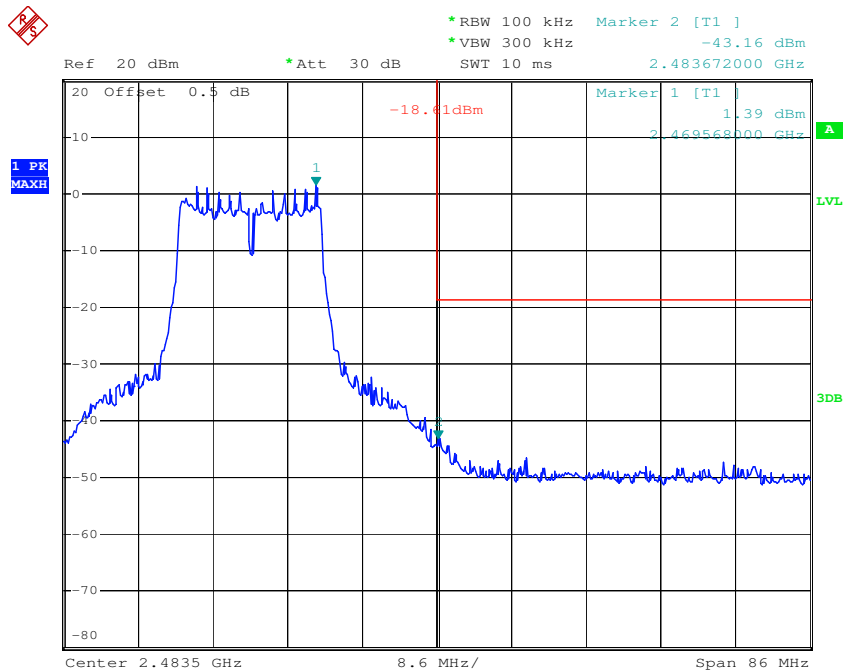
Date: 26.SEP.2016 16:35:28

802.11g: Band Edge, Left Side



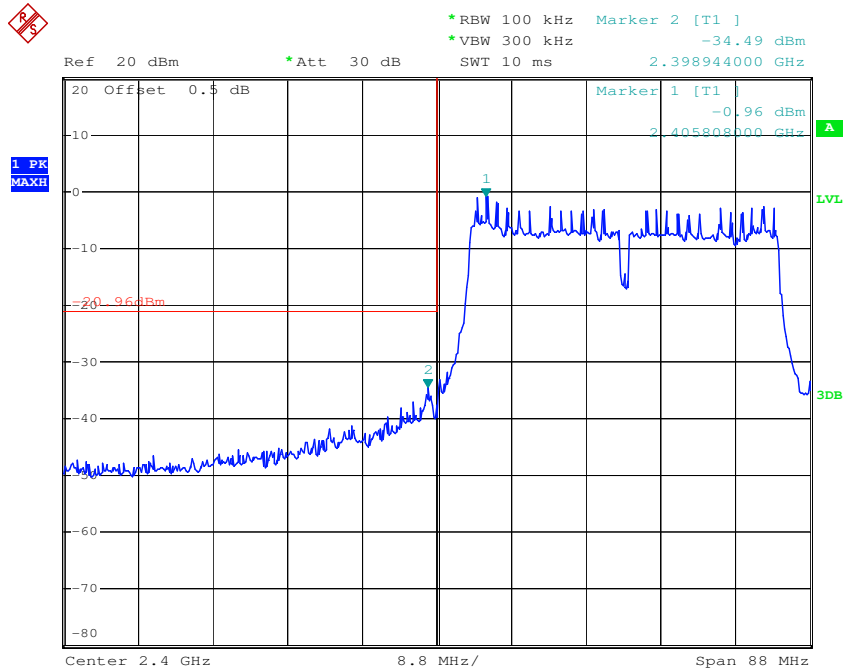
Date: 26.SEP.2016 16:44:33

802.11g: Band Edge, Right Side



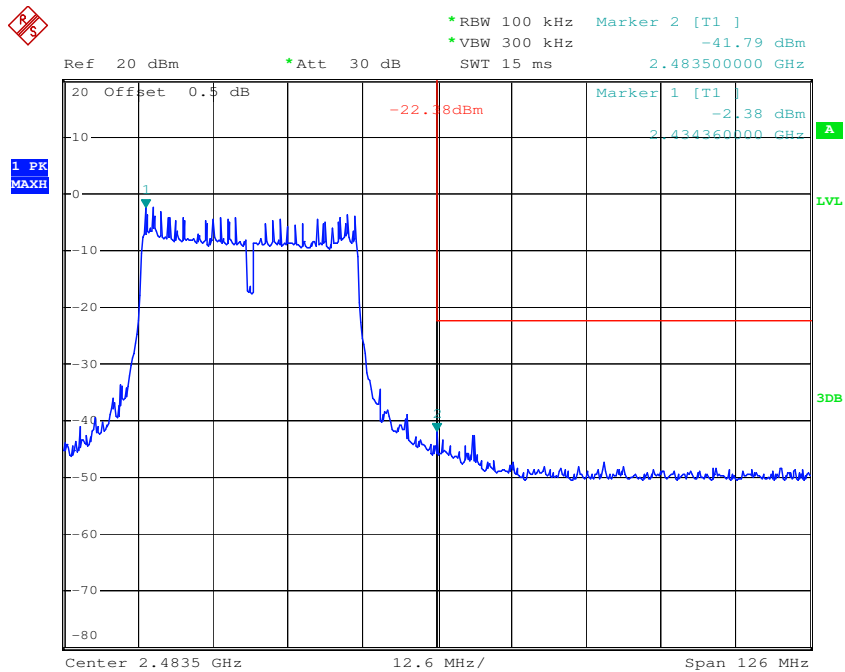
Date: 26.SEP.2016 21:27:51

802.11n ht40 Band Edge, Left Side



Date: 26.SEP.2016 17:05:33

802.11n ht40 Band Edge, Right Side



Date: 26.SEP.2016 16:57:06

FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

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

Test Procedure

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2015-11-23	2016-11-22
N/A	Coaxial Cable	0.1m	N/A	2016-05-06	2017-05-06
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2016-05-06	2017-05-06

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

Test Data

Environmental Conditions

Temperature:	28.7°C
Relative Humidity:	43 %
ATM Pressure:	100kPa

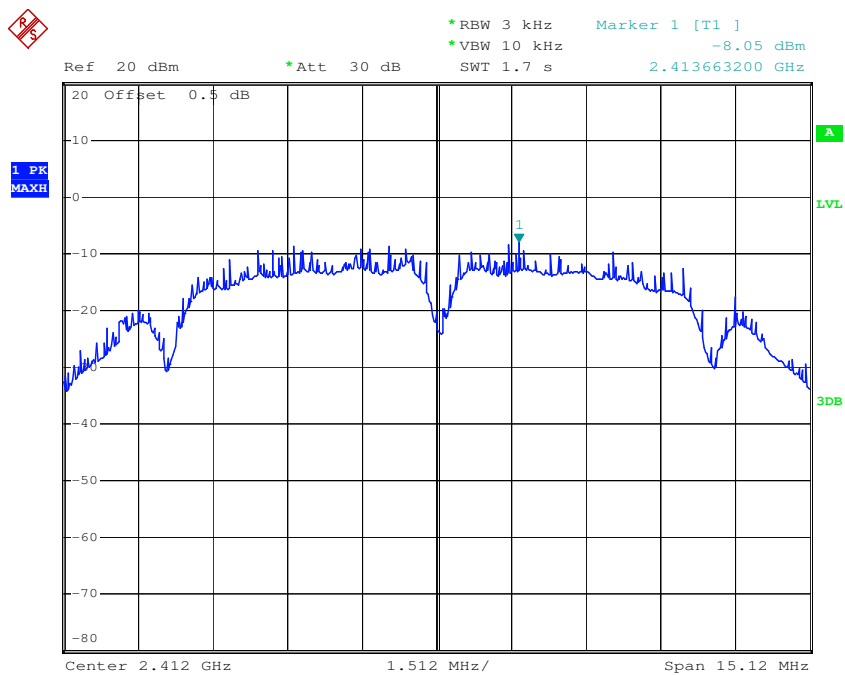
* The testing was performed by Sun Zhong on 2016-09-26.

Test Mode: Transmitting

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

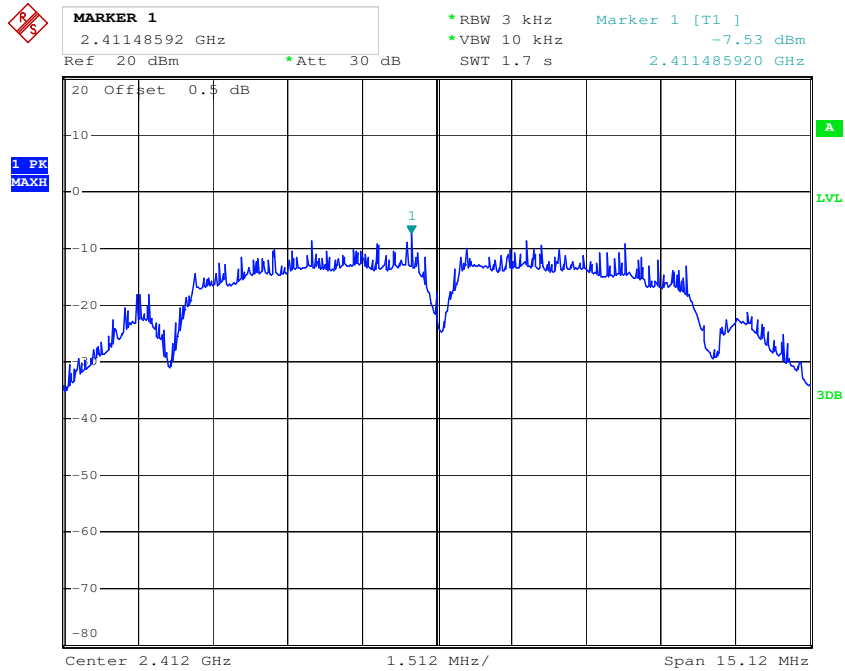
Test mode	Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
802.11b	Low	2412	-8.05	≤8
	Middle	2437	-7.53	≤8
	High	2462	-12.05	≤8
802.11g	Low	2412	-14.35	≤8
	Middle	2437	-14.61	≤8
	High	2462	-15.31	≤8
802.11n20	Low	2412	-16.01	≤8
	Middle	2437	-16.71	≤8
	High	2462	-17.6	≤8
802.11n40	Low	2422	-17.01	≤8
	Middle	2437	-18.82	≤8
	High	2452	-20.14	≤8

Power Spectral Density, 802.11b Low Channel



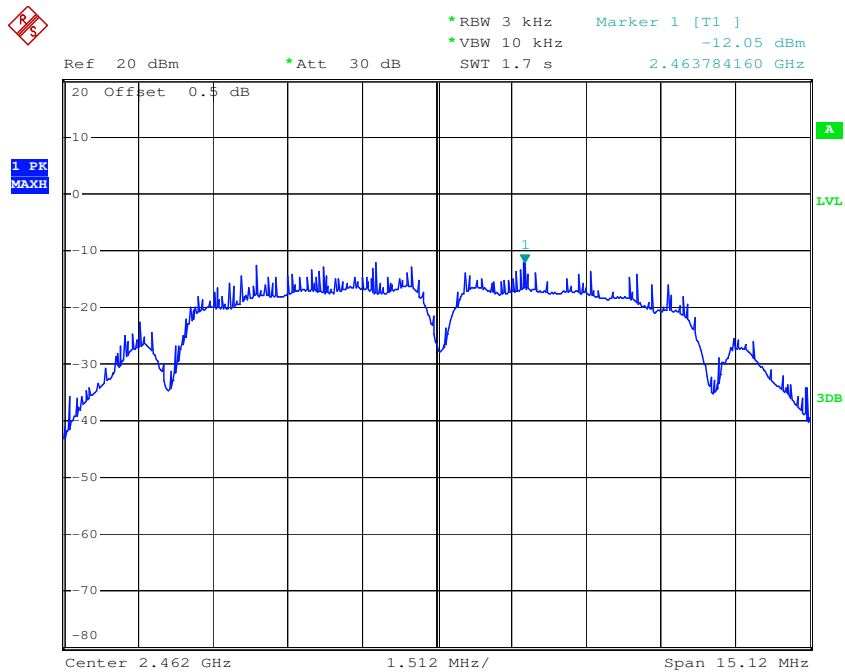
Date: 26.SEP.2016 21:41:20

Power Spectral Density, 802.11b Middle Channel



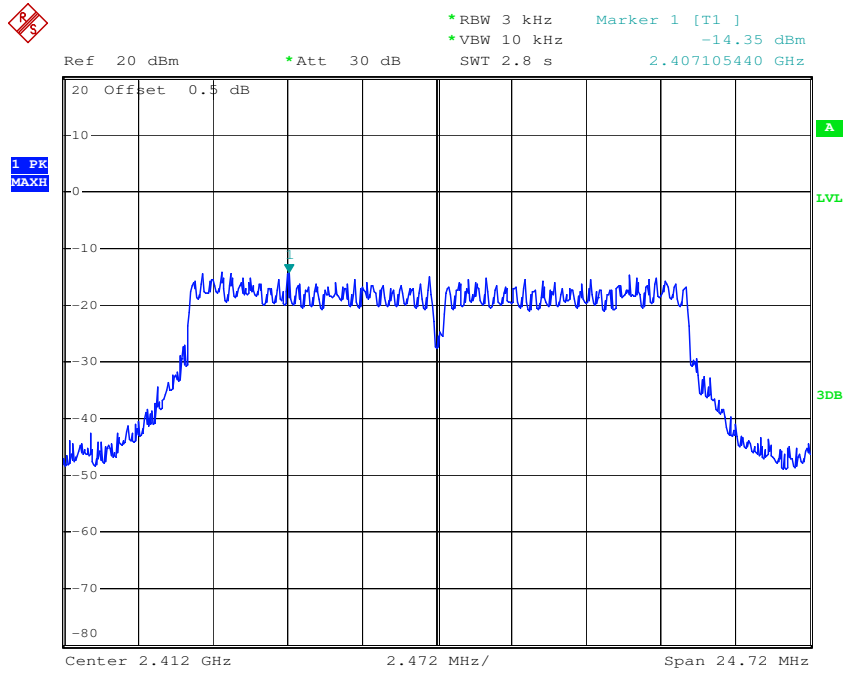
Date: 26.SEP.2016 21:42:22

Power Spectral Density, 802.11b High Channel



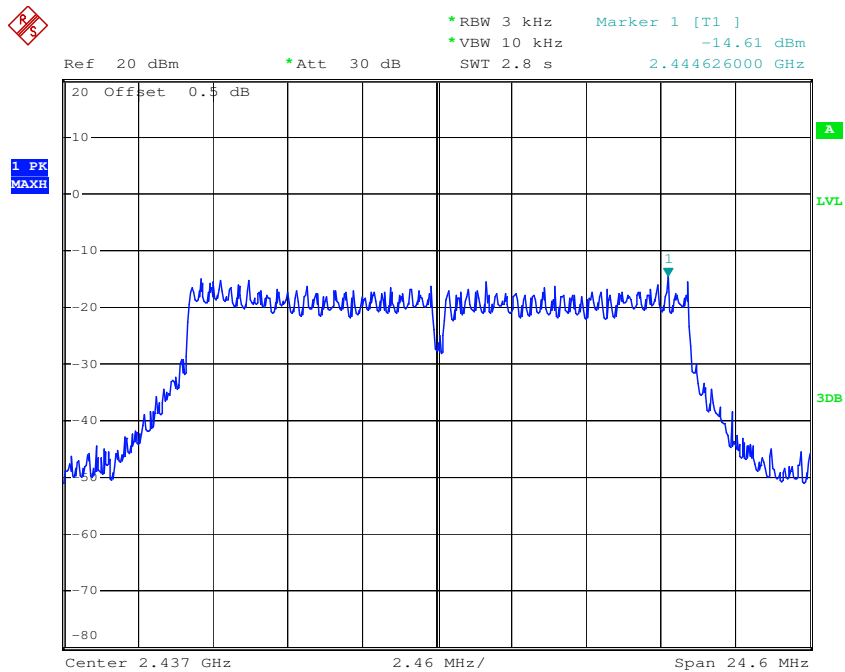
Date: 26.SEP.2016 21:32:25

Power Spectral Density, 802.11g Low Channel



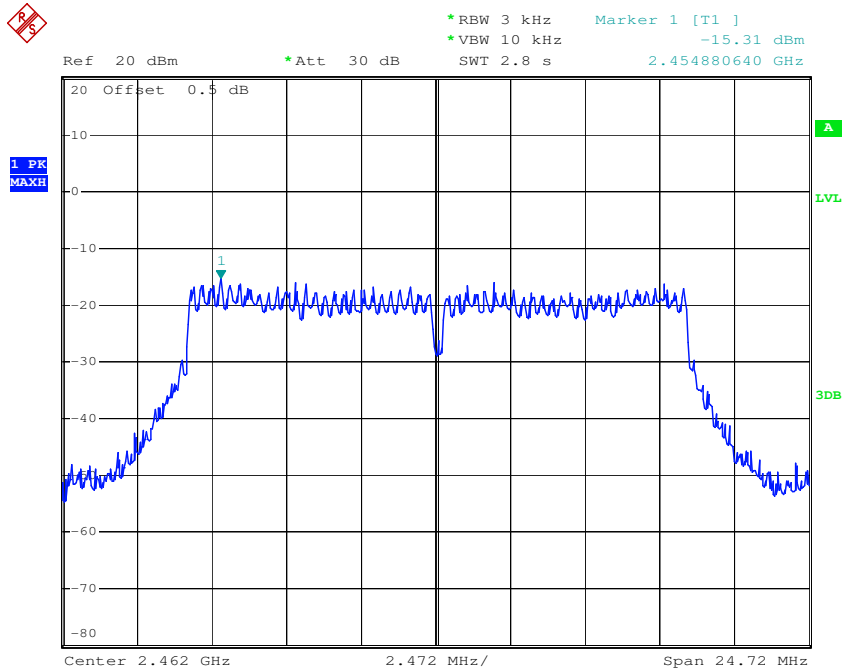
Date: 26.SEP.2016 16:44:09

Power Spectral Density, 802.11g Middle Channel



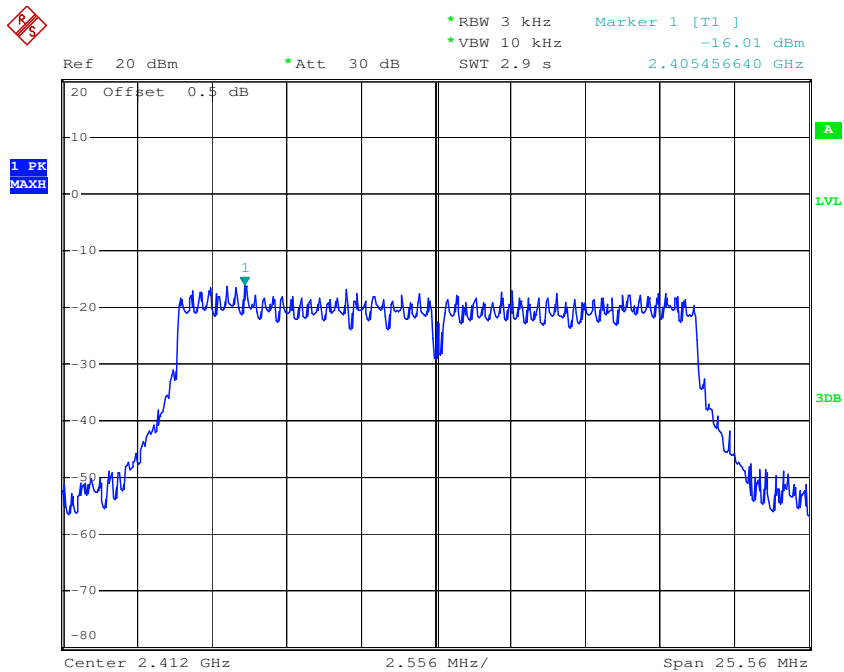
Date: 26.SEP.2016 16:41:35

Power Spectral Density, 802.11g High Channel



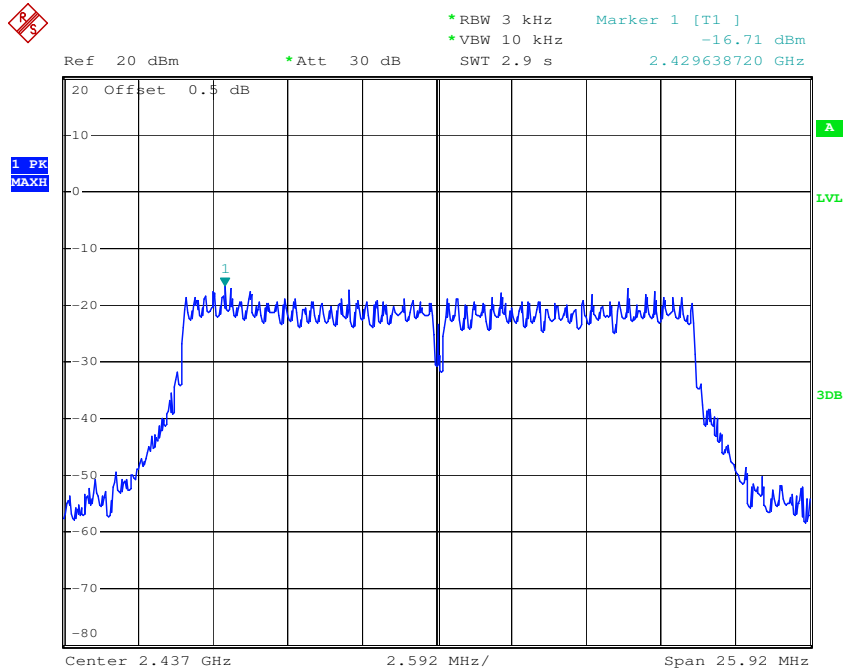
Date: 26.SEP.2016 21:27:31

Power Spectral Density, 802.11n ht20 Low Channel



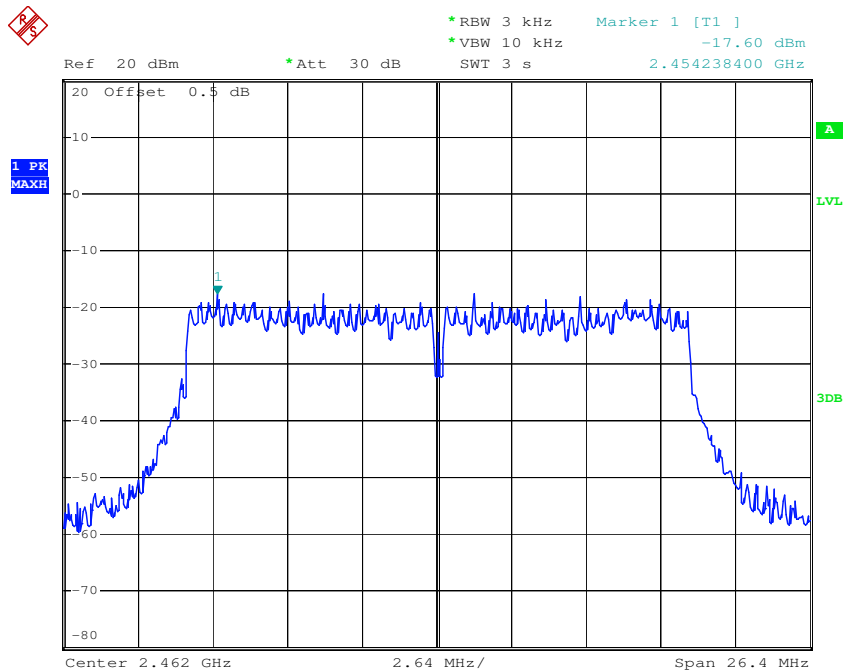
Date: 26.SEP.2016 16:47:45

Power Spectral Density, 802.11n ht20 Middle Channel



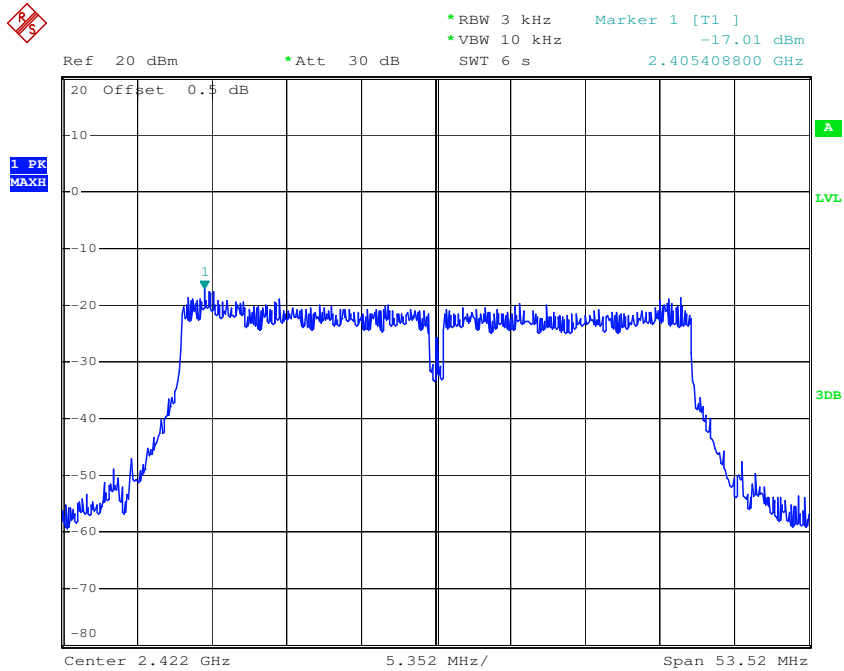
Date: 26.SEP.2016 16:50:33

Power Spectral Density, 802.11n ht20 High Channel



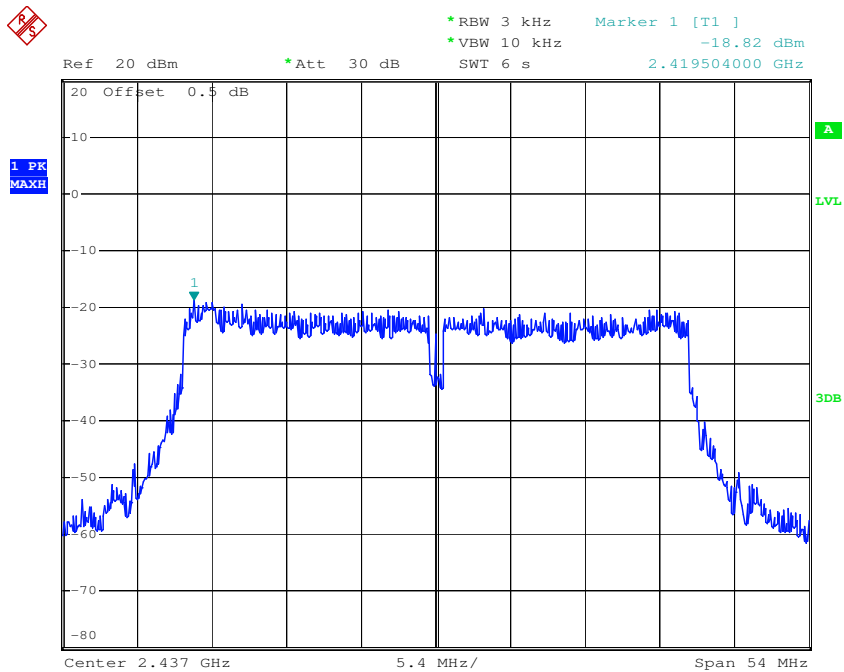
Date: 26.SEP.2016 16:53:13

Power Spectral Density, 802.11n ht40 Low Channel



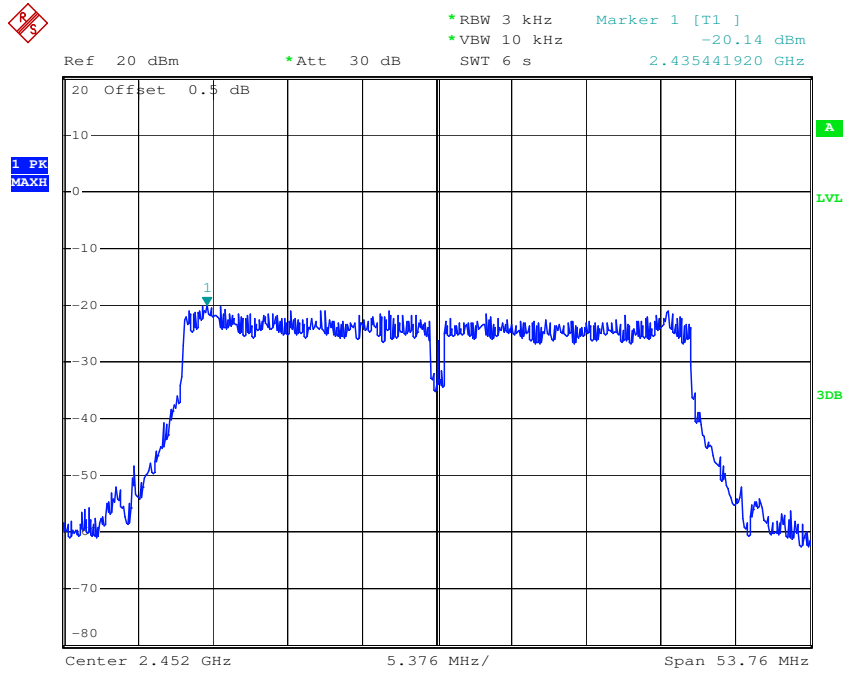
Date: 26.SEP.2016 17:05:10

Power Spectral Density, 802.11n ht40 Middle Channel



Date: 26.SEP.2016 16:59:42

Power Spectral Density, 802.11n ht40 High Channel



Date: 26.SEP.2016 16:56:39

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