



FCC PART 15.247

TEST REPORT

For

Shenzhen Genvict Technologies Co.,Ltd

12th Floor, Block A, Tsinghua Hi-tech Park, Nanshan District, Shenzhen,
Guangdong, China

FCC ID: 2AL59WB-L20B

Report Type: Original Report	Product Name: DSRC
Lorin Bian Test Engineer: Lorin Bian	
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Henry Ding Reviewed By: EMC Leader	
Bay Area Compliance Laboratories Corp. (Chengdu) No.5040, Huilongwan Plaza, No.1, Shawan Road, Jinniu District, Chengdu, Sichuan, China Tel: 028-65525123, Fax: 028-65525125 www.baclcorp.com Test Laboratory:	

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The **Shenzhen Genvict Technologies Co.,Ltd** 's product, model number: **WB-L20B (FCC ID: 2AL59WB-L20B)** or the "EUT" in this report was a **DSRC**, which was measured approximately: 17.5 cm (L) x 14.5 cm (W) x 3 cm (H), rated input voltage: DC 9-16V.

**All measurement and test data in this report was gathered from final production sample, serial number: 170516801 (assigned by the BACL, Chengdu). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2017-05-17, and EUT conformed to test requirement.*

Objective

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

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

Related Submittal(s)/Grant(s)

FCC Part 95 submissions with FCC ID: 2AL59WB-L20B.

FCC Part 15C DSS submissions with FCC ID: 2AL59WB-L20B.

Test Methodology

All measurements detailed in this Test Report were performed in accordance with ANSI C63.10-2013 "American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices".

All of the measurements detailed in this Test Report were performed by Bay Area Compliance Laboratories Corp. (Chengdu).

The Bay Area Compliance Laboratories Corp. Chengdu's measurement Uncertainties (calculated for a k=2 Coverage Factor corresponding to approximately 95% Coverage) were as follows:

-For all of the AC Line Conducted Emissions Tests reported herein: ± 3.17 dB.

-For of all of the Direct Antenna Conducted Emissions Tests reported herein: ± 0.56 dB.

-For of all of the direct Radiated Emissions Tests reported herein are:

30 MHz to 200 MHz: ± 4.7 dB;

200 MHz to 1 GHz: ± 6.0 dB;

1 GHz to 6 GHz: ± 5.13 dB; and,

6 GHz to 40 GHz: ± 5.47 dB.

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 No.5040, Huilongwan Plaza, No.1, Shawan Road, Jinniu District, Chengdu, Sichuan, China.

Test site at BACL has been fully described in reports submitted to the Federal Communication Commission (FCC). 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 testing in testing mode, which was provided by manufacturer.

The device employed 802.11b/g/n20/n40 modes, and 11 channels are provided:

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	/	/

802.11b, 802.11g, 802.11n20 modes were test with channel 1,6,11; 802.11n40 mode was test with 3,6,9.

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.

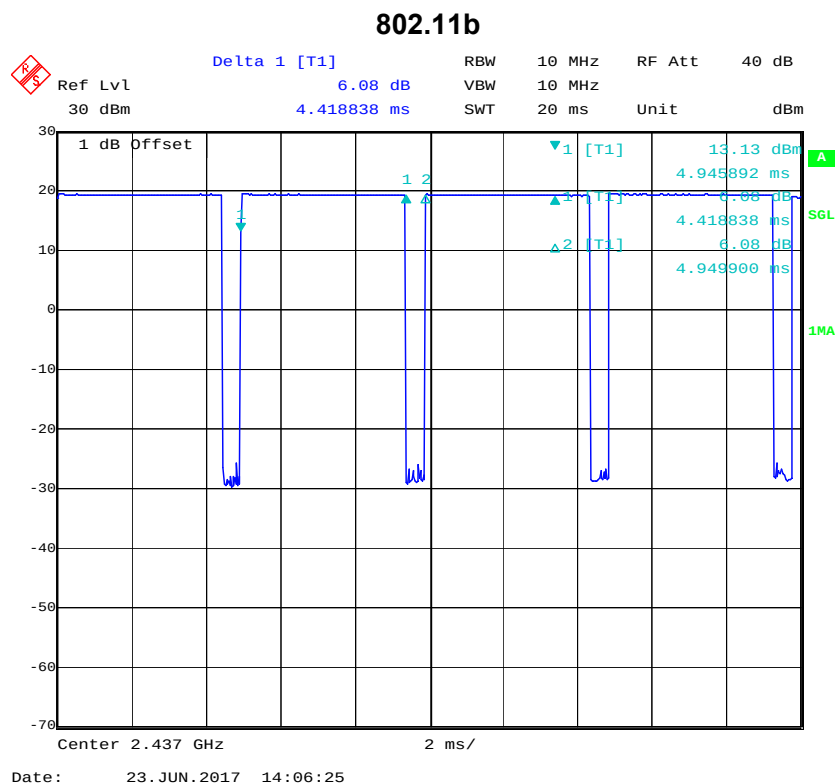
EUT Exercise Software

The software "SecureCRT" was used for testing, and the commands were provided by manufacturer. The maximum power and duty cycle was set by commands as following table:

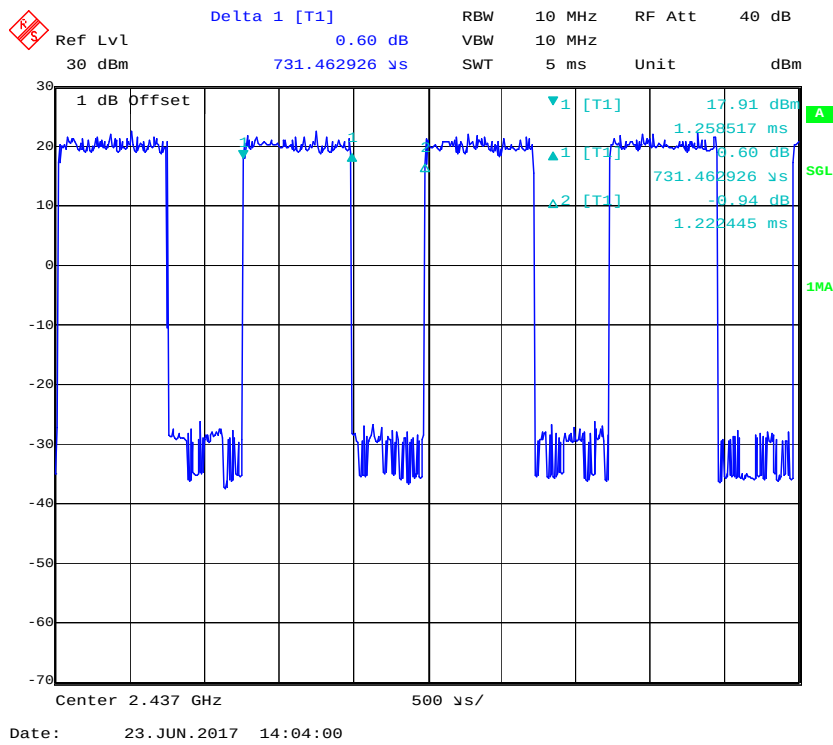
Test Mode	Test Software Version	SecureCRT		
802.11b	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	1Mbps	1Mbps	1Mbps
	Power Level Setting	0C	0C	0C
802.11g	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting	04	03	03
802.11n20	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	1Mbps	1Mbps	1Mbps
	Power Level Setting	0C	0C	0C
802.11n40	Test Frequency	2422MHz	2437MHz	2452MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting	04	03	03

The duty cycle as below:

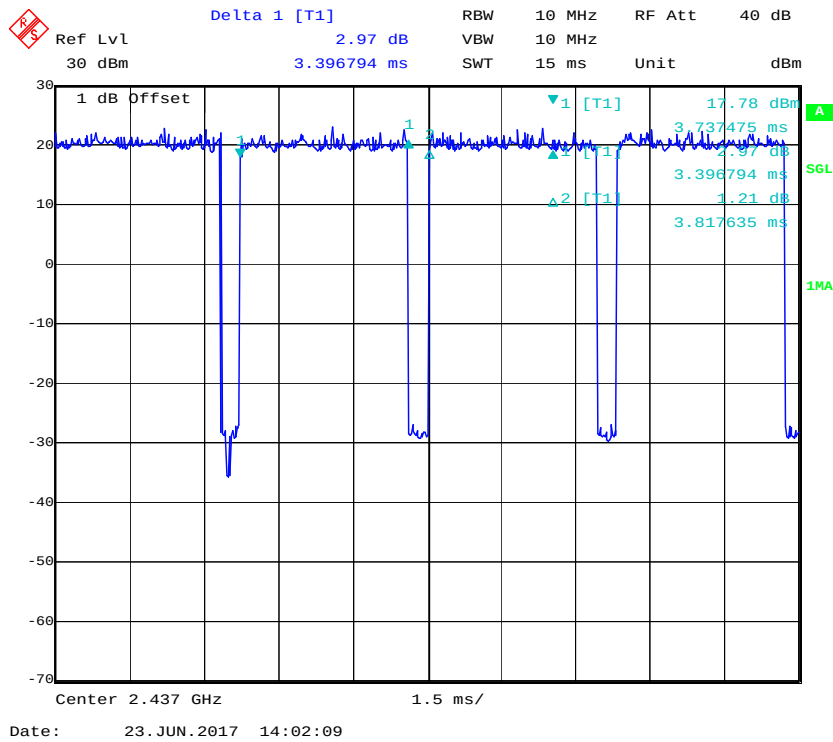
Mode	T _{on} (ms)	T _{on+off} (ms)	Duty Cycle (%)
802.11b	4.42	4.95	89.29
802.11g	0.731	1.222	59.82
802.11n20	3.818	3.397	88.97
802.11n40	2.176	2.493	87.28



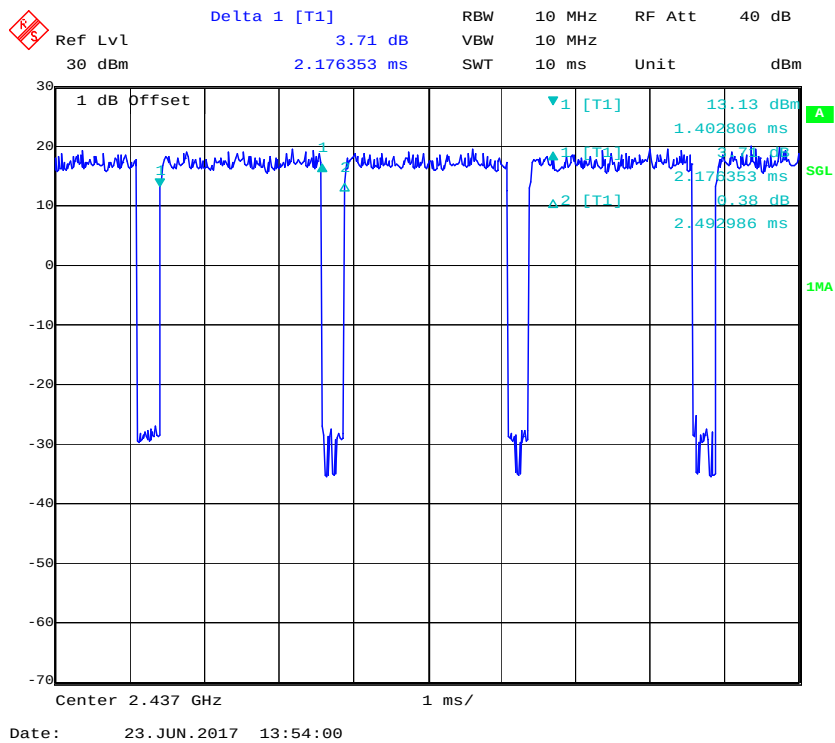
802.11g



802.11n20

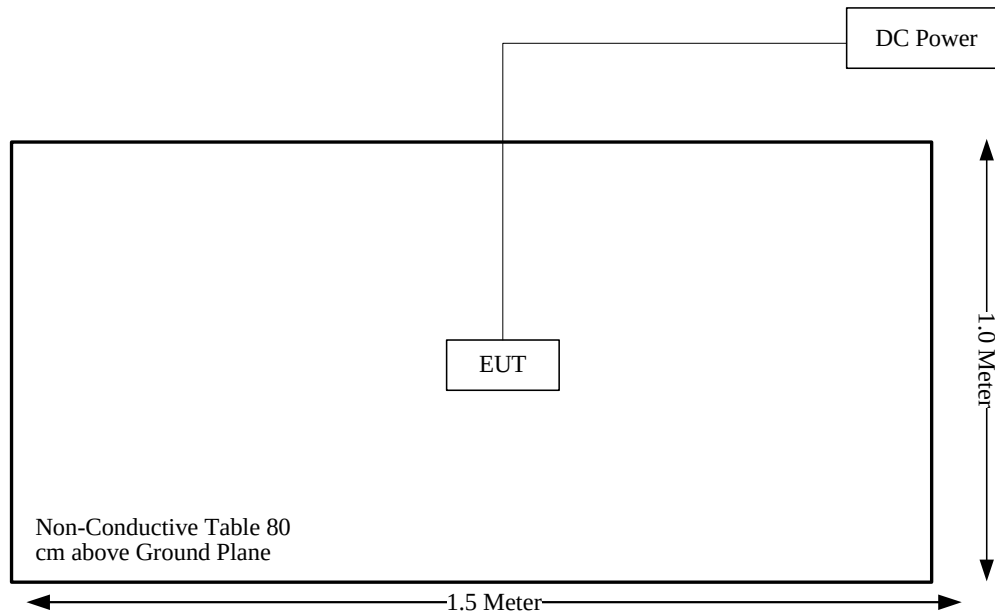


802.11n40

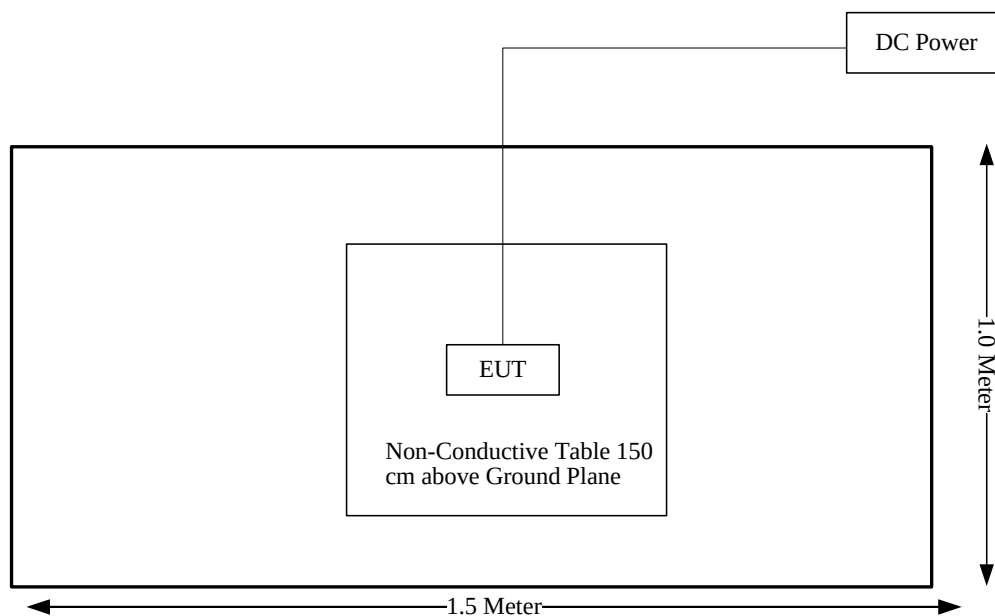


Block Diagram of Test Setup

Below 1GHz:



Above 1GHz:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.247 (i) & §1.1310 & §2.1091	Maximum Permissible Exposure (MPE)	Compliance
FCC§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Not Applicable
§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

Note:

Not Applicable: The EUT is powered by vehicle battery

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

Applicable Standard

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

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

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

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

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

Calculation Formula:

Prediction of power density at the distance of the applicable MPE limit:

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

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Calculated Data:

Module	Frequency (MHz)	Antenna Gain		Tune-up Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
2.4G	2402-2480	3	2.00	15	31.62	20.00	0.0126	1.0
	2412-2462	3	2.00	15	31.62	20.00	0.0126	1.0
DSRC	5860-5920	5	3.14	0	1.0	20.00	0.0006	1.0

Note: The maximum tune-up power including tolerance was declared by manufacturer.

The WLAN or Bluetooth can transmit simultaneously with DSRC:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$$\begin{aligned}
 &= S_{2.4} / S_{limit-2.4} + S_{DSRC} / S_{limit-DSRC} \\
 &= 0.0126 / 1 + 0.0006 / 1 \\
 &= 0.0132 \\
 &< 1.0
 \end{aligned}$$

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 Information And Connector Construction

Result: The EUT has one external antenna with a unique connector coupling to the EUT, and the antenna gain is 3.0 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

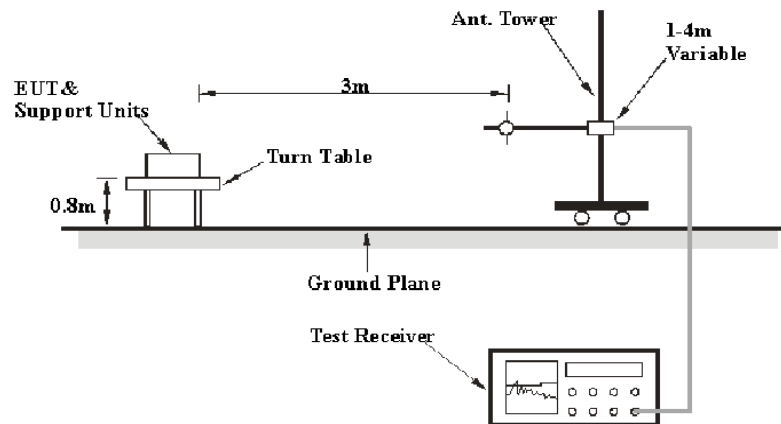
FCC §15.209, §15.205 , §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

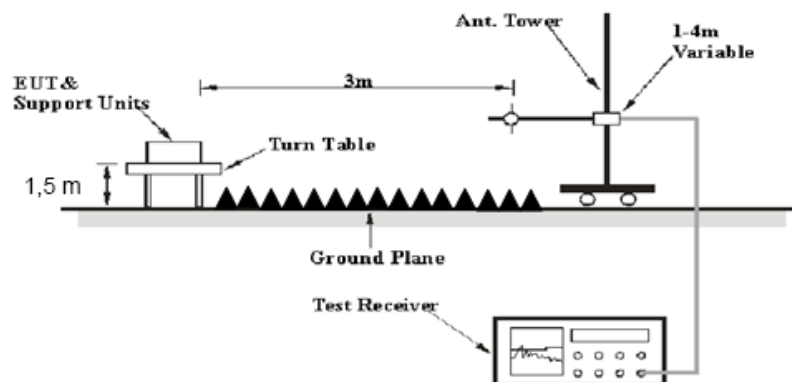
FCC §15.247 (d); §15.209; §15.205

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:

30-1000MHz:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP

1GHz- 25GHz:

Detector	Duty cycle	RBW	Video B/W
PK	Any	1MHz	3 MHz
Ave.	>98%	1MHz	10 Hz
	<98%	1MHz	1/T

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:

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

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
Agilent	Amplifier	8447D	2944A10442	2016-12-02	2017-12-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2016-12-02	2017-12-01
Sunol Sciences	Broadband Antenna	JB3	A121808	2016-04-10	2019-04-09
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2016-12-02	2017-12-01
ETS	Horn Antenna	3115	003-6076	2016-12-02	2017-12-01
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-0113024	2017-06-16	2020-06-15
Mini-circuits	Amplifier	ZVA-183-S+	771001215	2017-05-20	2018-05-19
HP	Amplifier	8449B	3008A00277	2016-12-02	2017-12-01
EMCT	Semi-Anechoic Chamber	966	966-1	2015-04-24	2018-04-23
Unknown	RF Cable (below 1GHz)	Unknown	NO.1	2016-11-10	2017-11-09
Unknown	RF Cable (below 1GHz)	Unknown	NO.4	2016-11-10	2017-11-09
Unknown	RF Cable (above 1GHz)	Unknown	NO.2	2016-11-10	2017-11-09

*** Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

Test Data

Environmental Conditions

Temperature:	27.6 °C
Relative Humidity:	56 %
ATM Pressure:	100.1 kPa

* The testing was performed by Lorin Bian on 2017-07-12.

Test Mode: Transmitting

30MHz-25GHz:802.11b

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)					
Frequency: 2412 MHz									
2412	68.96	PK	H	23.50	3.00	0.00	95.46	N/A	N/A
2412	63.73	AV	H	23.50	3.00	0.00	90.23	N/A	N/A
2412	82.21	PK	V	23.50	3.00	0.00	108.71	N/A	N/A
2412	76.06	AV	V	23.50	3.00	0.00	102.56	N/A	N/A
2390	33.21	PK	V	23.57	3.00	0.00	59.78	74	14.22
2390	19.84	AV	V	23.57	3.00	0.00	46.41	54	7.59
4824	43.10	PK	V	30.84	5.11	26.87	52.18	74	21.82
4824	34.96	AV	V	30.84	5.11	26.87	44.04	54	9.96
4844	42.06	PK	V	30.90	5.10	26.87	51.19	74	22.81
4844	33.28	AV	V	30.90	5.10	26.87	42.41	54	11.59
2773	46.89	PK	V	23.75	3.23	26.63	47.24	74	26.76
2773	37.22	AV	V	23.75	3.23	26.63	37.57	54	16.43
500.45	40.12	QP	H	18.10	1.61	28.82	31.01	46.00	14.99
625.58	42.06	QP	H	19.91	1.90	28.85	35.02	46.00	10.98
Frequency: 2437 MHz									
2437	69.89	PK	H	23.41	3.00	0.00	96.3	N/A	N/A
2437	64.52	AV	H	23.41	3.00	0.00	90.93	N/A	N/A
2437	82.66	PK	V	23.41	3.00	0.00	109.07	N/A	N/A
2437	77.27	AV	V	23.41	3.00	0.00	103.68	N/A	N/A
4874	40.65	PK	V	31.00	5.09	26.87	49.87	74	24.13
4874	33.73	AV	V	31.00	5.09	26.87	42.95	54	11.05
7311	37.41	PK	V	34.92	6.21	26.40	52.14	74	21.86
7311	29.58	AV	V	34.92	6.21	26.40	44.31	54	9.69
2164	41.78	PK	V	24.34	3.03	26.84	42.31	74	31.69
2164	34.21	AV	V	24.34	3.03	26.84	34.74	54	19.26
3488	46.73	PK	V	26.93	4.16	26.59	51.23	74	22.77
3488	38.56	AV	V	26.93	4.16	26.59	43.06	54	10.94
500.45	40.39	QP	H	18.10	1.61	28.82	31.28	46.00	14.72
625.58	42.2	QP	H	19.91	1.90	28.85	35.16	46.00	10.84
Frequency: 2462 MHz									
2462	68.02	PK	H	23.33	2.99	0.00	94.34	N/A	N/A
2462	62.45	AV	H	23.33	2.99	0.00	88.77	N/A	N/A
2462	81.92	PK	V	23.33	2.99	0.00	108.24	N/A	N/A
2462	76.81	AV	V	23.33	2.99	0.00	103.13	N/A	N/A
2483.5	34.18	PK	V	23.26	2.99	0.00	60.43	74	13.57
2483.5	22.69	AV	V	23.26	2.99	0.00	48.94	54	5.06
4924	42.39	PK	V	31.16	5.07	26.88	51.74	74	22.26
4924	35.20	AV	V	31.16	5.07	26.88	44.55	54	9.45
7386	38.15	PK	V	35.07	6.25	26.43	53.04	74	20.96
7386	31.42	AV	V	35.07	6.25	26.43	46.31	54	7.69
2348	44.44	PK	V	23.72	3.01	26.87	44.3	74	29.7
2348	37.87	AV	V	23.72	3.01	26.87	37.73	54	16.27
500.45	41.23	QP	H	18.10	1.61	28.82	32.12	46.00	13.88
625.58	42.62	QP	H	19.91	1.90	28.85	35.58	46.00	10.42

802.11g

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)					
Frequency: 2412 MHz									
2412	69.59	PK	H	23.50	3.00	0.00	96.09	N/A	N/A
2412	63.37	AV	H	23.50	3.00	0.00	89.87	N/A	N/A
2412	82.27	PK	V	23.50	3.00	0.00	108.77	N/A	N/A
2412	75.60	AV	V	23.50	3.00	0.00	102.1	N/A	N/A
2390	33.76	PK	V	23.57	3.00	0.00	60.33	74	13.67
2390	19.97	AV	V	23.57	3.00	0.00	46.54	54	7.46
4824	42.87	PK	V	30.84	5.11	26.87	51.95	74	22.05
4824	34.49	AV	V	30.84	5.11	26.87	43.57	54	10.43
7236	36.36	PK	V	34.77	6.18	26.36	50.95	74	23.05
7236	28.11	AV	V	34.77	6.18	26.36	42.7	54	11.3
3258	46.22	PK	V	25.64	3.82	26.50	49.18	74	24.82
3258	37.42	AV	V	25.64	3.82	26.50	40.38	54	13.62
500.45	40.76	QP	H	18.10	1.61	28.82	31.65	46.00	14.35
625.58	43.06	QP	H	19.91	1.90	28.85	36.02	46.00	9.98
Frequency: 2437 MHz									
2437	70.08	PK	H	23.41	3.00	0.00	96.49	N/A	N/A
2437	64.54	AV	H	23.41	3.00	0.00	90.95	N/A	N/A
2437	82.20	PK	V	23.41	3.00	0.00	108.61	N/A	N/A
2437	77.38	AV	V	23.41	3.00	0.00	103.79	N/A	N/A
4874	41.34	PK	V	31.00	5.09	26.87	50.56	74	23.44
4874	34.36	AV	V	31.00	5.09	26.87	43.58	54	10.42
7311	37.60	PK	V	34.92	6.21	26.40	52.33	74	21.67
7311	29.59	AV	V	34.92	6.21	26.40	44.32	54	9.68
2342	43.38	PK	V	23.74	3.01	26.87	43.26	74	30.74
2342	34.83	AV	V	23.74	3.01	26.87	34.71	54	19.29
3248	47.08	PK	V	25.59	3.80	26.50	49.97	74	24.03
3248	38.88	AV	V	25.59	3.80	26.50	41.77	54	12.23
500.45	40.29	QP	H	18.10	1.61	28.82	31.18	46.00	14.82
625.58	43.5	QP	H	19.91	1.90	28.85	36.46	46.00	9.54
Frequency: 2462 MHz									
2462	68.62	PK	H	23.33	2.99	0.00	94.94	N/A	N/A
2462	62.81	AV	H	23.33	2.99	0.00	89.13	N/A	N/A
2462	82.27	PK	V	23.33	2.99	0.00	108.59	N/A	N/A
2462	76.60	AV	V	23.33	2.99	0.00	102.92	N/A	N/A
2483.5	34.08	PK	V	23.26	2.99	0.00	60.33	74	13.67
2483.5	22.41	AV	V	23.26	2.99	0.00	48.66	54	5.34
4924	42.47	PK	V	31.16	5.07	26.88	51.82	74	22.18
4924	35.32	AV	V	31.16	5.07	26.88	44.67	54	9.33
7386	38.75	PK	V	35.07	6.25	26.43	53.64	74	20.36
7386	32.00	AV	V	35.07	6.25	26.43	46.89	54	7.11
2288	43.75	PK	V	23.92	3.02	26.86	43.83	74	30.17
2288	37.30	AV	V	23.92	3.02	26.86	37.38	54	16.62
500.45	41.05	QP	H	18.10	1.61	28.82	31.94	46.00	14.06
625.58	41.66	QP	H	19.91	1.90	28.85	34.62	46.00	11.38

802.11n20

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)					
Frequency: 2412 MHz									
2412	69.28	PK	H	23.50	3.00	0.00	95.78	N/A	N/A
2412	63.46	AV	H	23.50	3.00	0.00	89.96	N/A	N/A
2412	81.73	PK	V	23.50	3.00	0.00	108.23	N/A	N/A
2412	76.57	AV	V	23.50	3.00	0.00	103.07	N/A	N/A
2390	33.20	PK	V	23.57	3.00	0.00	59.77	74	14.23
2390	19.48	AV	V	23.57	3.00	0.00	46.05	54	7.95
4824	42.82	PK	V	30.84	5.11	26.87	51.9	74	22.1
4824	35.25	AV	V	30.84	5.11	26.87	44.33	54	9.67
7236	37.35	PK	V	34.77	6.18	26.36	51.94	74	22.06
7236	28.28	AV	V	34.77	6.18	26.36	42.87	54	11.13
2675	46.72	PK	V	23.55	3.14	26.72	46.69	74	27.31
2675	37.01	AV	V	23.55	3.14	26.72	36.98	54	17.02
500.45	41.32	QP	H	18.10	1.61	28.82	32.21	46.00	13.79
625.58	41.8	QP	H	19.91	1.90	28.85	34.76	46.00	11.24
Frequency: 2437 MHz									
2437	69.66	PK	H	23.41	3.00	0.00	96.07	N/A	N/A
2437	65.05	AV	H	23.41	3.00	0.00	91.46	N/A	N/A
2437	82.94	PK	V	23.41	3.00	0.00	109.35	N/A	N/A
2437	76.78	AV	V	23.41	3.00	0.00	103.19	N/A	N/A
4874	40.80	PK	V	31.00	5.09	26.87	50.02	74	23.98
4874	33.59	AV	V	31.00	5.09	26.87	42.81	54	11.19
7311	36.92	PK	V	34.92	6.21	26.40	51.65	74	22.35
7311	29.56	AV	V	34.92	6.21	26.40	44.29	54	9.71
2377	43.09	PK	V	23.62	3.00	26.87	42.84	74	31.16
2377	35.18	AV	V	23.62	3.00	26.87	34.93	54	19.07
2364	46.93	PK	V	23.66	3.01	26.87	46.73	74	27.27
2364	38.15	AV	V	23.66	3.01	26.87	37.95	54	16.05
500.45	42.16	QP	H	18.10	1.61	28.82	33.05	46.00	12.95
625.58	42.22	QP	H	19.91	1.90	28.85	35.18	46.00	10.82
Frequency: 2462 MHz									
2462	67.59	PK	H	23.33	2.99	0.00	93.91	N/A	N/A
2462	62.56	AV	H	23.33	2.99	0.00	88.88	N/A	N/A
2462	82.53	PK	V	23.33	2.99	0.00	108.85	N/A	N/A
2462	76.60	AV	V	23.33	2.99	0.00	102.92	N/A	N/A
2483.5	34.35	PK	V	23.26	2.99	0.00	60.6	74	13.4
2483.5	22.81	AV	V	23.26	2.99	0.00	49.06	54	4.94
4924	42.22	PK	V	31.16	5.07	26.88	51.57	74	22.43
4924	35.87	AV	V	31.16	5.07	26.88	45.22	54	8.78
7386	38.56	PK	V	35.07	6.25	26.43	53.45	74	20.55
7386	31.05	AV	V	35.07	6.25	26.43	45.94	54	8.06
2643	44.66	PK	V	23.49	3.12	26.75	44.52	74	29.48
2643	38.29	AV	V	23.49	3.12	26.75	38.15	54	15.85
500.45	41.69	QP	H	18.10	1.61	28.82	32.58	46.00	13.42
625.58	42.66	QP	H	19.91	1.90	28.85	35.62	46.00	10.38

802.11n40

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)					
Frequency: 2422 MHz									
2422	69.69	PK	H	23.47	3.00	0.00	96.16	N/A	N/A
2422	63.74	AV	H	23.47	3.00	0.00	90.21	N/A	N/A
2422	81.82	PK	V	23.47	3.00	0.00	108.29	N/A	N/A
2422	76.25	AV	V	23.47	3.00	0.00	102.72	N/A	N/A
2390	33.08	PK	V	23.57	3.00	0.00	59.65	74	14.35
2390	20.05	AV	V	23.57	3.00	0.00	46.62	54	7.38
4824	43.02	PK	V	30.84	5.11	26.87	52.1	74	21.9
4824	34.65	AV	V	30.84	5.11	26.87	43.73	54	10.27
7266	36.46	PK	V	34.83	6.19	26.38	51.1	74	22.9
7266	28.06	AV	V	34.83	6.19	26.38	42.7	54	11.3
2355	46.37	PK	V	23.69	3.01	26.87	46.2	74	27.8
2355	37.40	AV	V	23.69	3.01	26.87	37.23	54	16.77
500.45	41.22	QP	H	18.10	1.61	28.82	32.11	46.00	13.89
625.58	43.1	QP	H	19.91	1.90	28.85	36.06	46.00	9.94
Frequency: 2437 MHz									
2437	69.74	PK	H	23.41	3.00	0.00	96.15	N/A	N/A
2437	64.78	AV	H	23.41	3.00	0.00	91.19	N/A	N/A
2437	83.26	PK	V	23.41	3.00	0.00	109.67	N/A	N/A
2437	77.52	AV	V	23.41	3.00	0.00	103.93	N/A	N/A
4874	40.33	PK	V	31.00	5.09	26.87	49.55	74	24.45
4874	33.40	AV	V	31.00	5.09	26.87	42.62	54	11.38
7311	37.24	PK	V	34.92	6.21	26.40	51.97	74	22.03
7311	29.72	AV	V	34.92	6.21	26.40	44.45	54	9.55
1588	40.94	PK	V	24.24	2.74	26.42	41.5	74	32.5
1588	33.28	AV	V	24.24	2.74	26.42	33.84	54	20.16
2706	47.73	PK	V	23.61	3.17	26.69	47.82	74	26.18
2706	38.57	AV	V	23.61	3.17	26.69	38.66	54	15.34
500.45	41.69	QP	H	18.10	1.61	28.82	32.58	46.00	13.42
625.58	42.05	QP	H	19.91	1.90	28.85	35.01	46.00	10.99
Frequency: 2452 MHz									
2452	68.45	PK	H	23.36	3.00	0.00	94.81	N/A	N/A
2452	62.29	AV	H	23.36	3.00	0.00	88.65	N/A	N/A
2452	81.59	PK	V	23.36	3.00	0.00	107.95	N/A	N/A
2452	77.44	AV	V	23.36	3.00	0.00	103.8	N/A	N/A
2483.5	34.46	PK	V	23.26	2.99	0.00	60.71	74	13.29
2483.5	22.83	AV	V	23.26	2.99	0.00	49.08	54	4.92
4904	42.71	PK	V	31.09	5.08	26.87	52.01	74	21.99
4904	35.53	AV	V	31.09	5.08	26.87	44.83	54	9.17
7356	37.81	PK	V	35.01	6.23	26.42	52.63	74	21.37
7356	31.60	AV	V	35.01	6.23	26.42	46.42	54	7.58
2342	45.02	PK	V	23.74	3.01	26.87	44.9	74	29.1
2342	37.93	AV	V	23.74	3.01	26.87	37.81	54	16.19
500.45	41.96	QP	H	18.10	1.61	28.82	32.85	46.00	13.15
625.58	42.19	QP	H	19.91	1.90	28.85	35.15	46.00	10.85

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

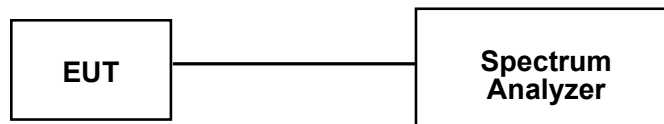
Applicable Standard

According to FCC §15.247(a) (2)

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
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
Unknown	RF Cable	Unknown	C-2	Each Time	/

* **Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B “Implementation of traceability policy in accredited laboratories”.

Test Data

Environmental Conditions

Temperature:	28.2 °C
Relative Humidity:	56 %
ATM Pressure:	100.1 kPa

* The testing was performed by Lorin Bian on 2017-06-23.

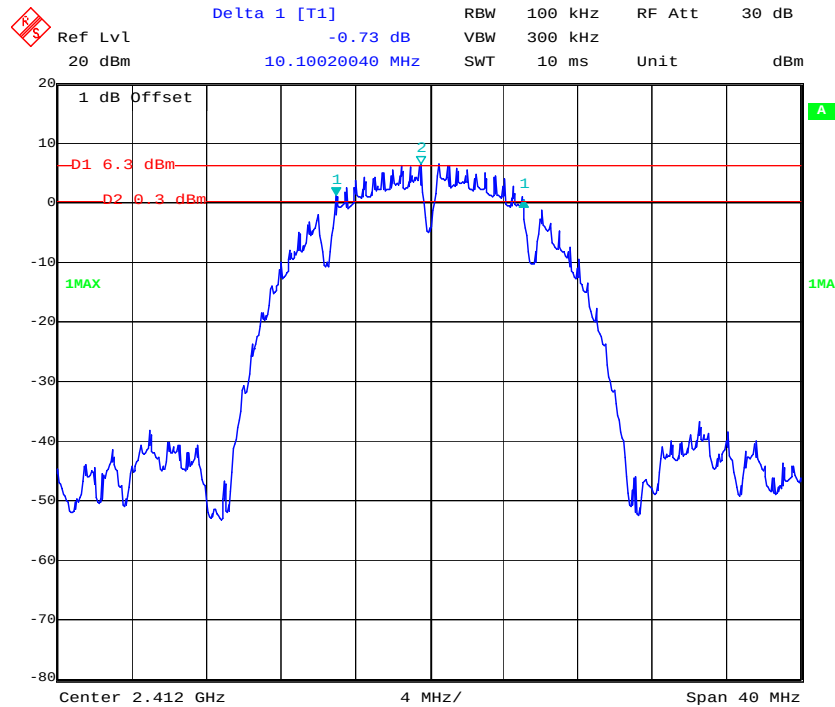
Test Mode: Transmitting

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

Test mode	Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (MHz)
802.11b	Low	2412	10.1	≥0.5
	Middle	2437	9.7	≥0.5
	High	2462	10.1	≥0.5
802.11g	Low	2412	15.23	≥0.5
	Middle	2437	15.15	≥0.5
	High	2462	15.15	≥0.5
802.11n20	Low	2412	14.19	≥0.5
	Middle	2437	14.43	≥0.5
	High	2462	15.07	≥0.5
802.11n40	Low	2422	35.11	≥0.5
	Middle	2437	32.71	≥0.5
	High	2452	33.83	≥0.5

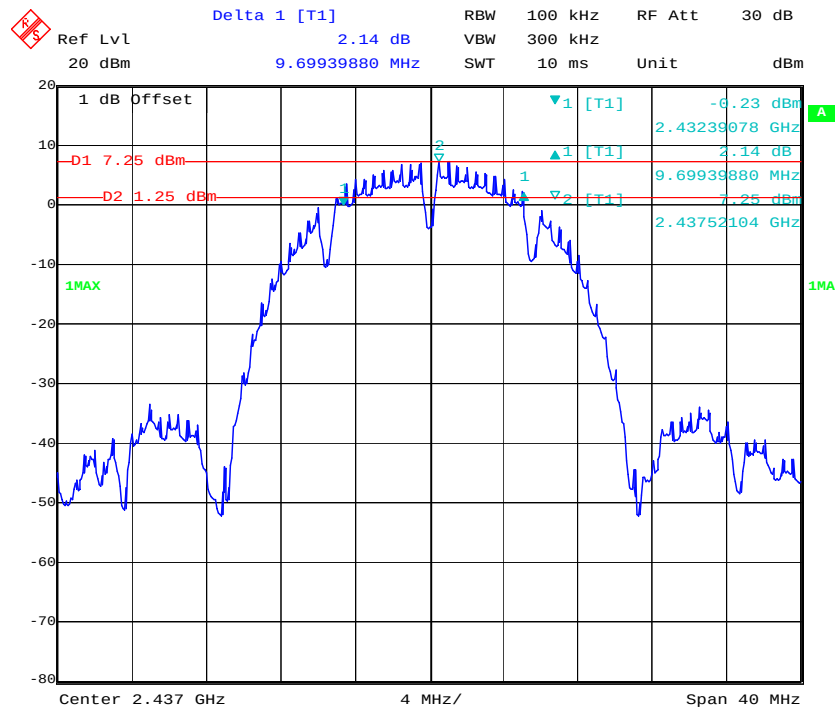
6dB Bandwidth:

802.11b Low Channel



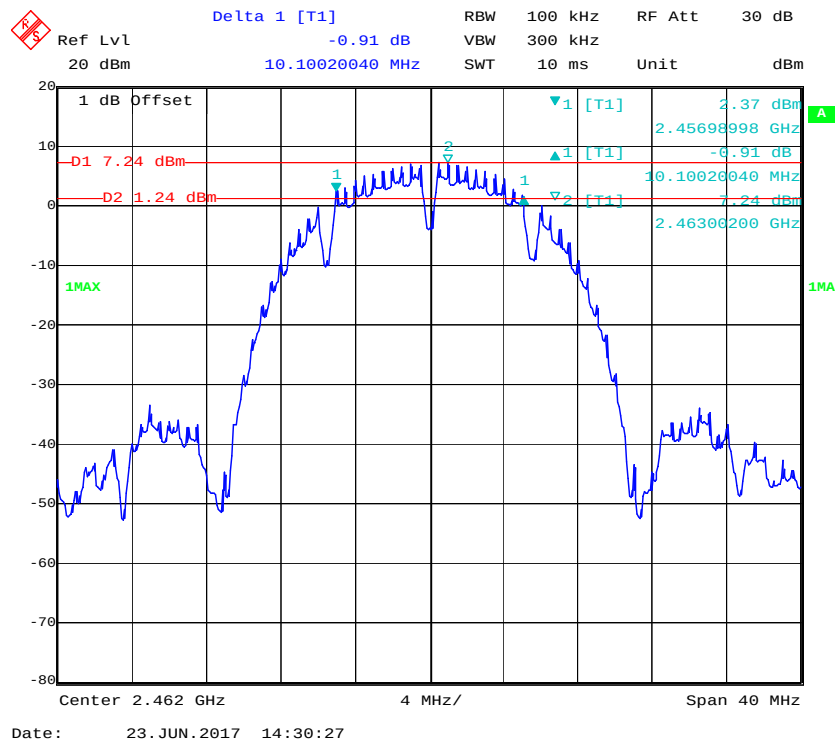
Date: 23.JUN.2017 14:19:16

802.11b Middle Channel

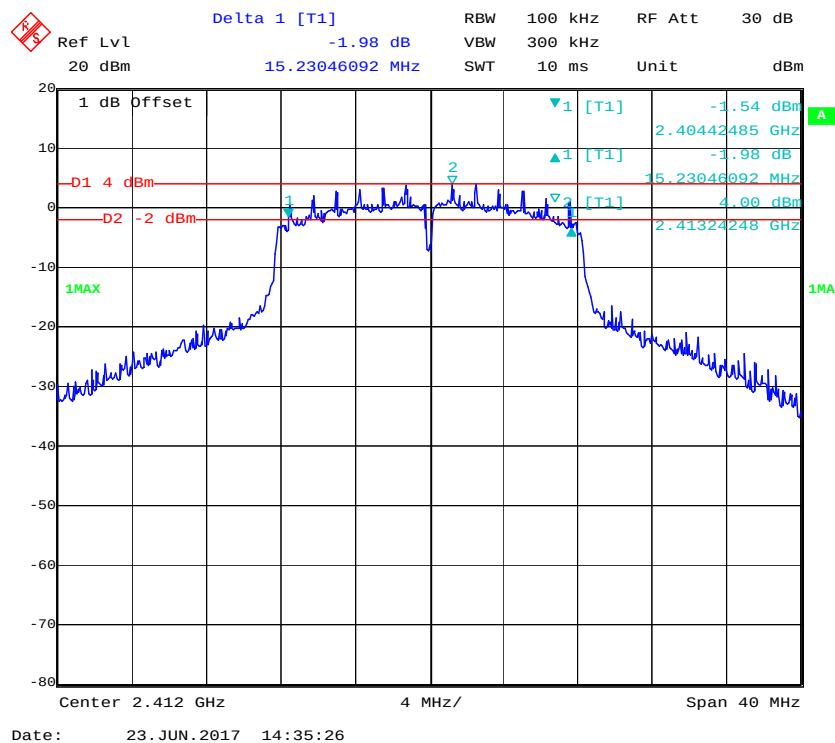


Date: 23.JUN.2017 14:28:23

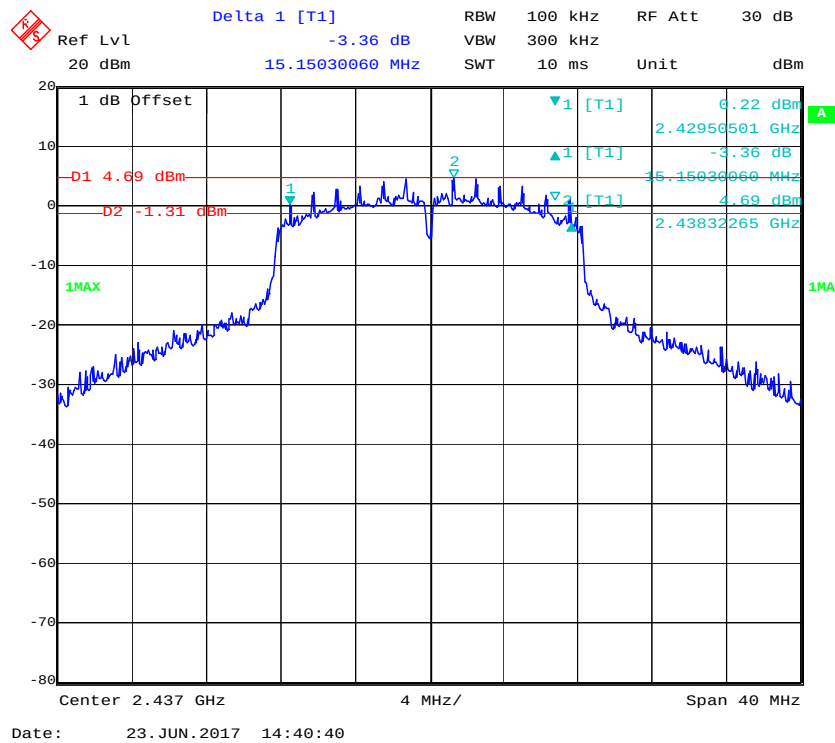
802.11b High Channel



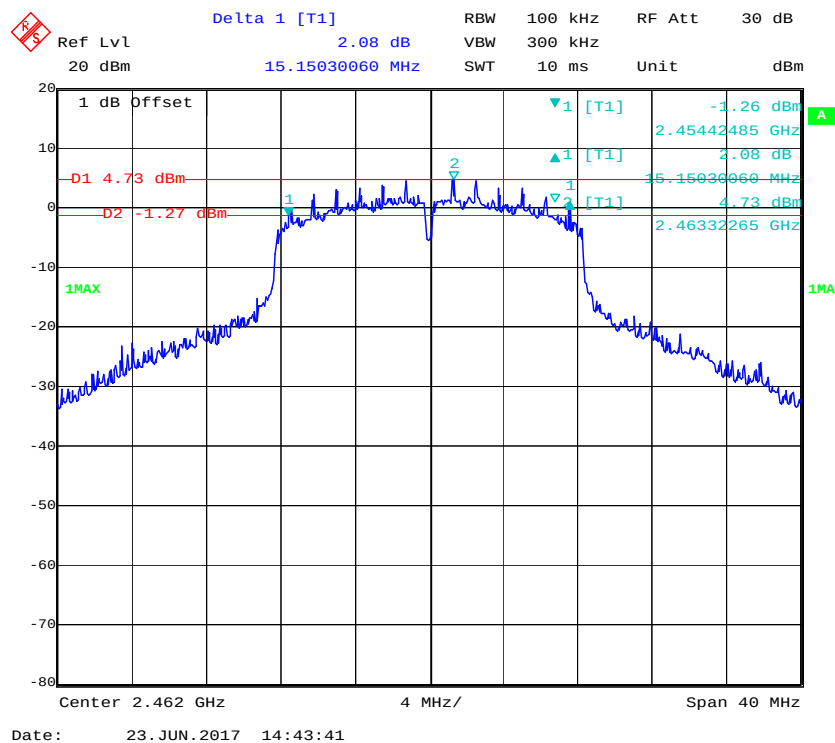
802.11g Low Channel



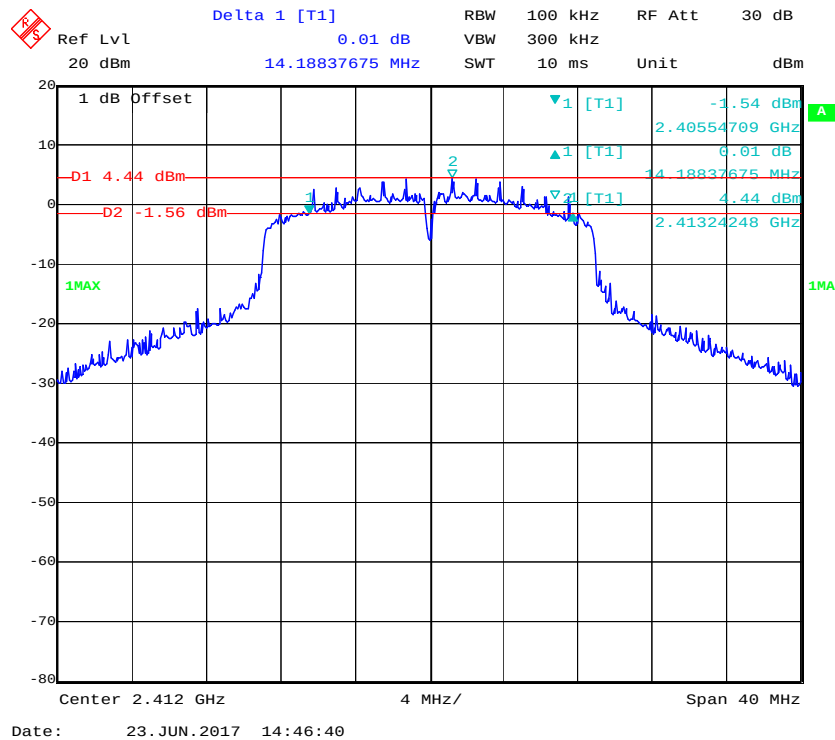
802.11g Middle Channel



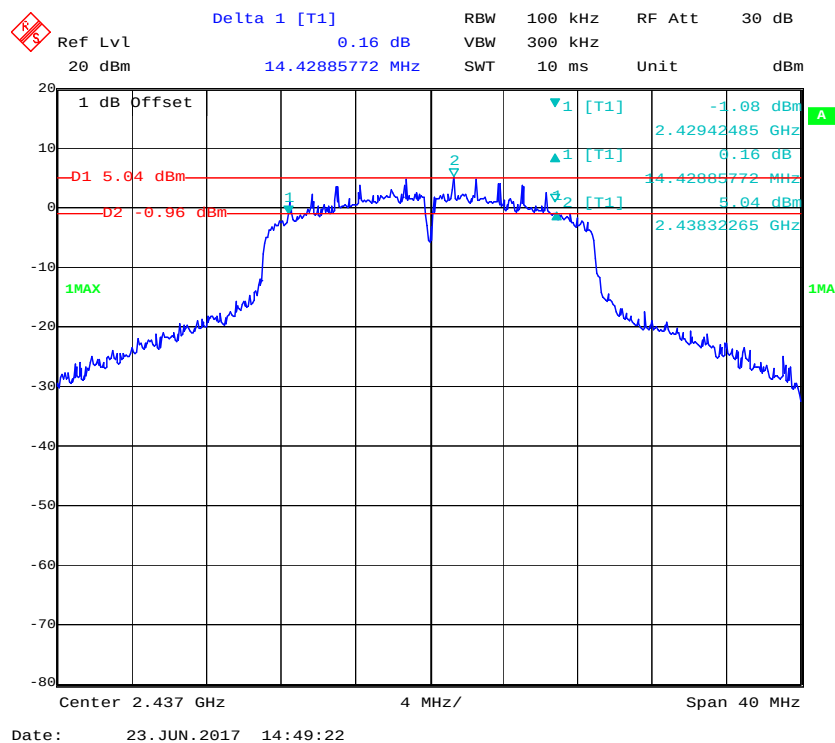
802.11g High Channel



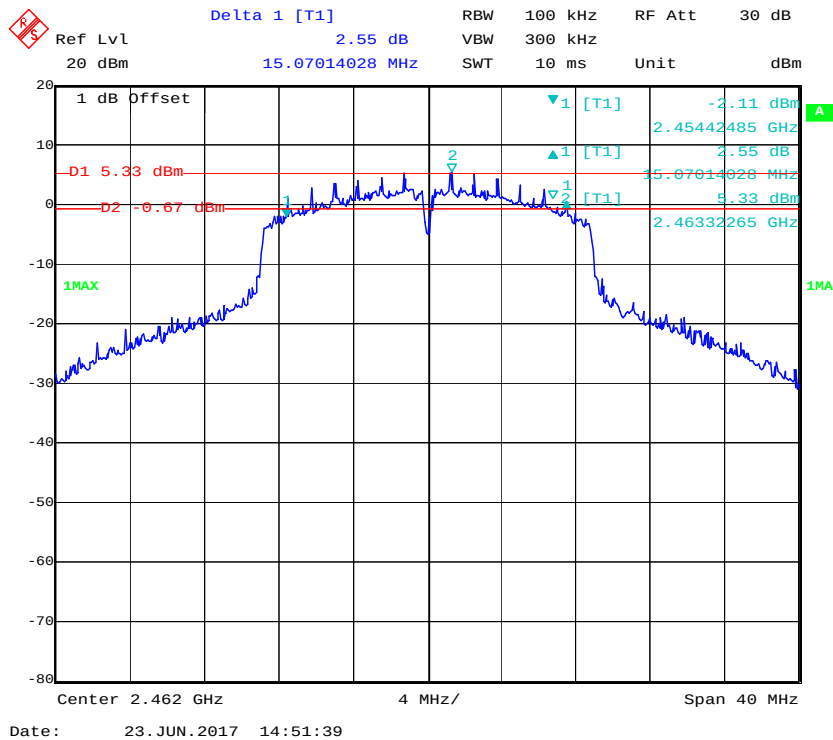
802.11n20 Low Channel



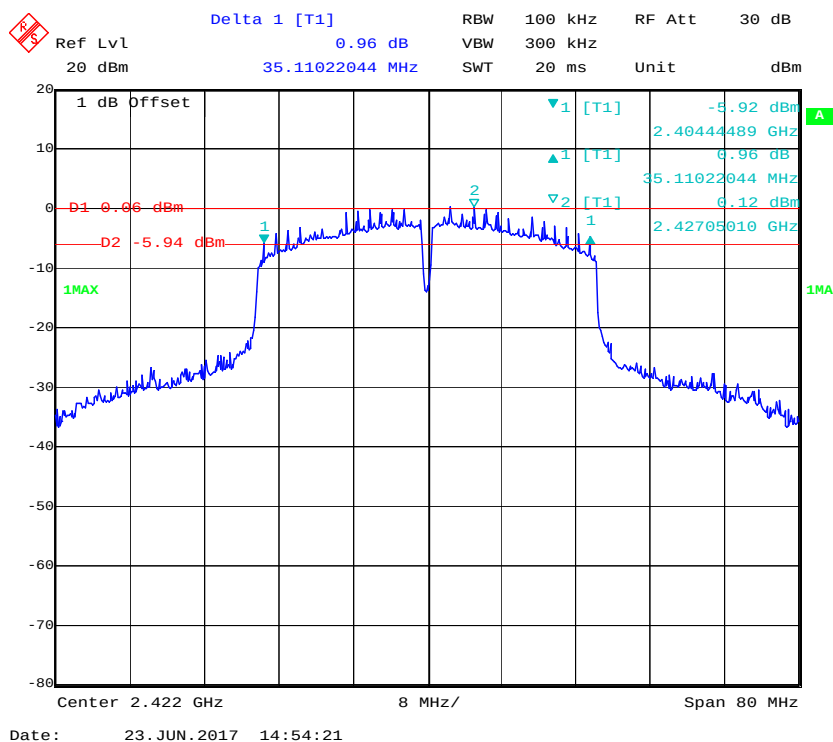
802.11n20 Middle Channel



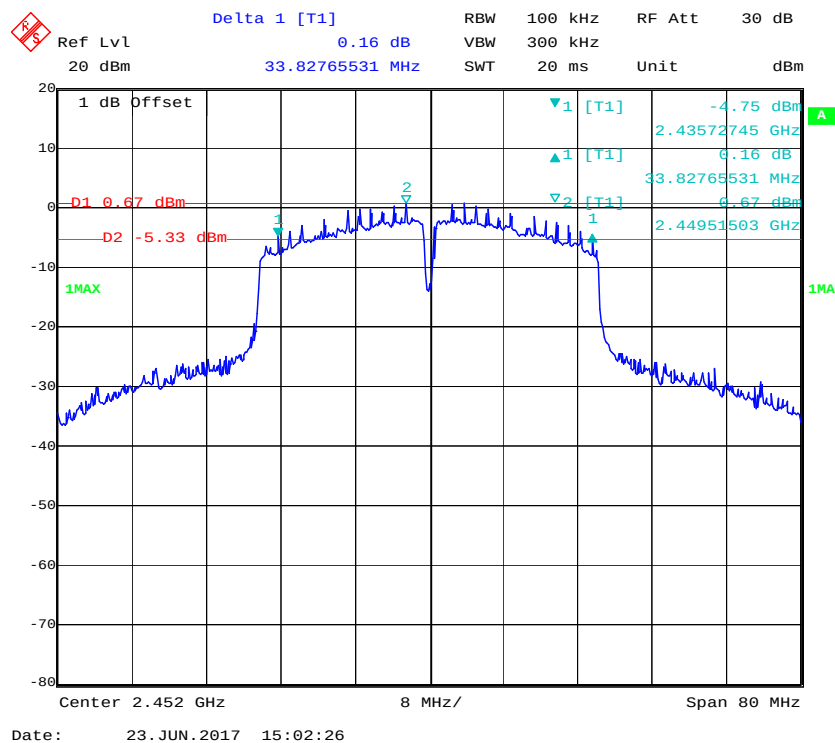
802.11n20 High Channel



802.11n40 Low Channel



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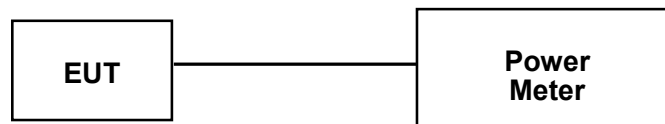
FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

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	MY54170074	2017-01-03	2018-01-02
Agilent	P-Series Power Meter	N1912A	MY5000798	2017-01-03	2018-01-02
Unknown	RF Cable	Unknown	C-2	Each Time	/

* **Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

Test Data

Environmental Conditions

Temperature:	28.2 °C
Relative Humidity:	56 %
ATM Pressure:	100.1 kPa

* The testing was performed by Lorin Bian on 2017-06-23.

Test Mode: Transmitting

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

Test mode	Channel	Frequency (MHz)	Max Peak Conducted Output Power (dBm)	Limit (dBm)
802.11b	Low	2412	12.65	30
	Middle	2437	13.82	30
	High	2462	14.26	30
802.11g	Low	2412	11.04	30
	Middle	2437	12.06	30
	High	2462	12.72	30
802.11n20	Low	2412	11.62	30
	Middle	2437	12.44	30
	High	2462	13.11	30
802.11n40	Low	2422	10.42	30
	Middle	2437	10.99	30
	High	2452	11.48	30

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

Applicable Standard

According to FCC§15.247(d):In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

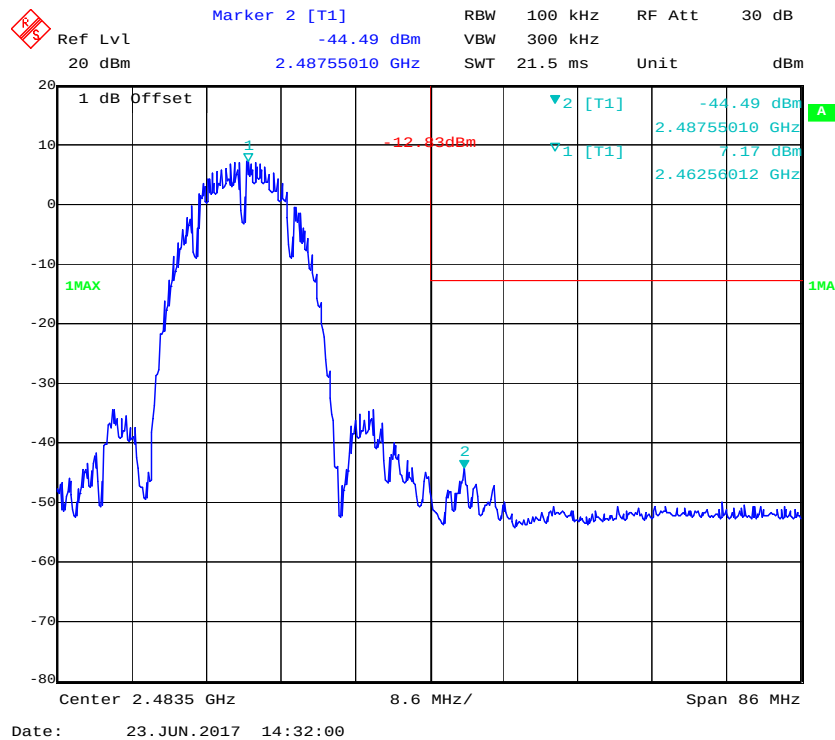
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then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

Test Equipment List and Details

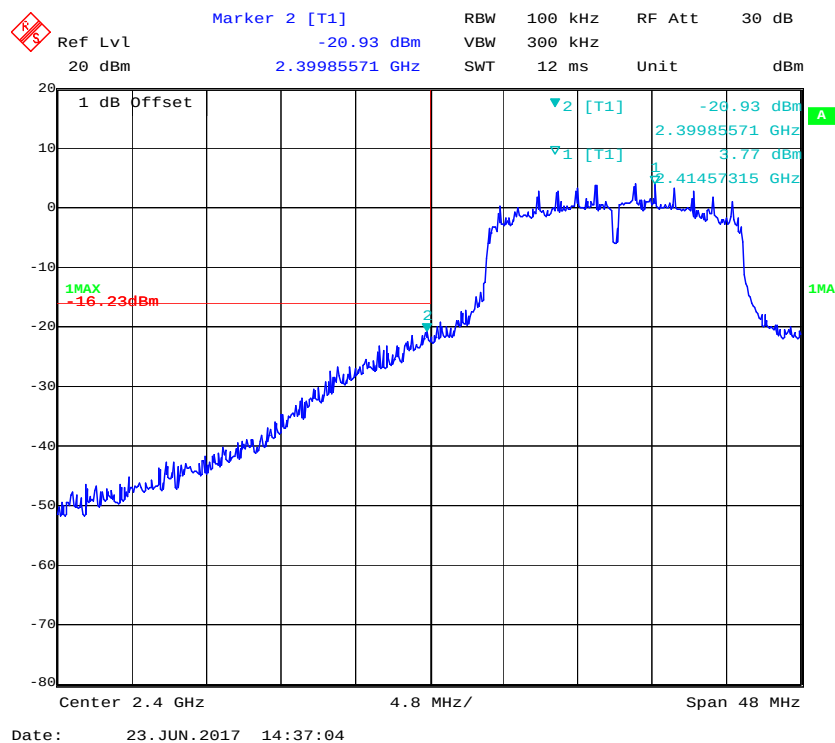
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
Unknown	RF Cable	Unknown	C-2	Each Time	/

*** Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B “Implementation of traceability policy in accredited laboratories”.

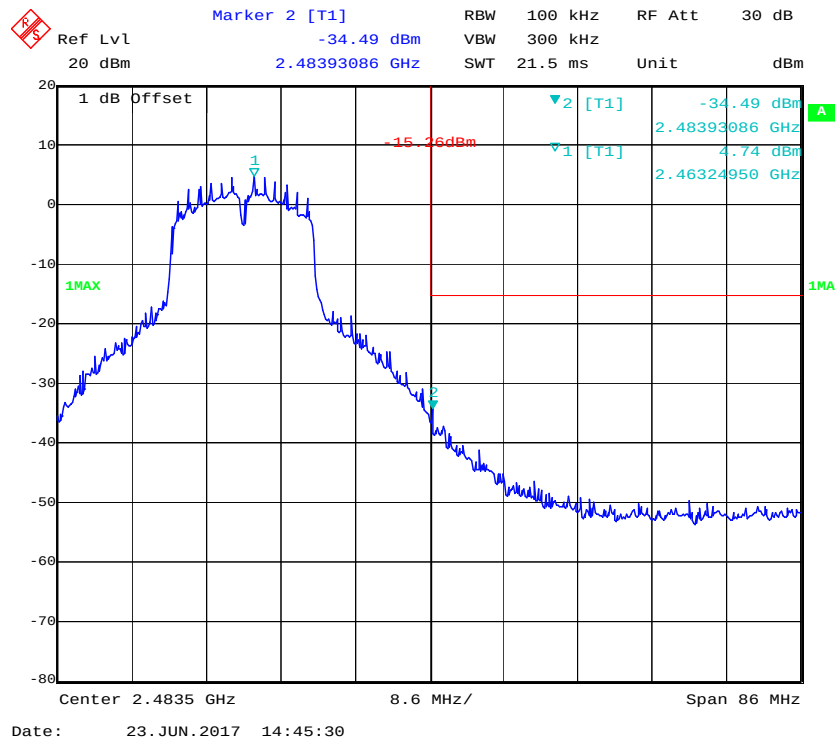
802.11b: Band Edge, Right Side



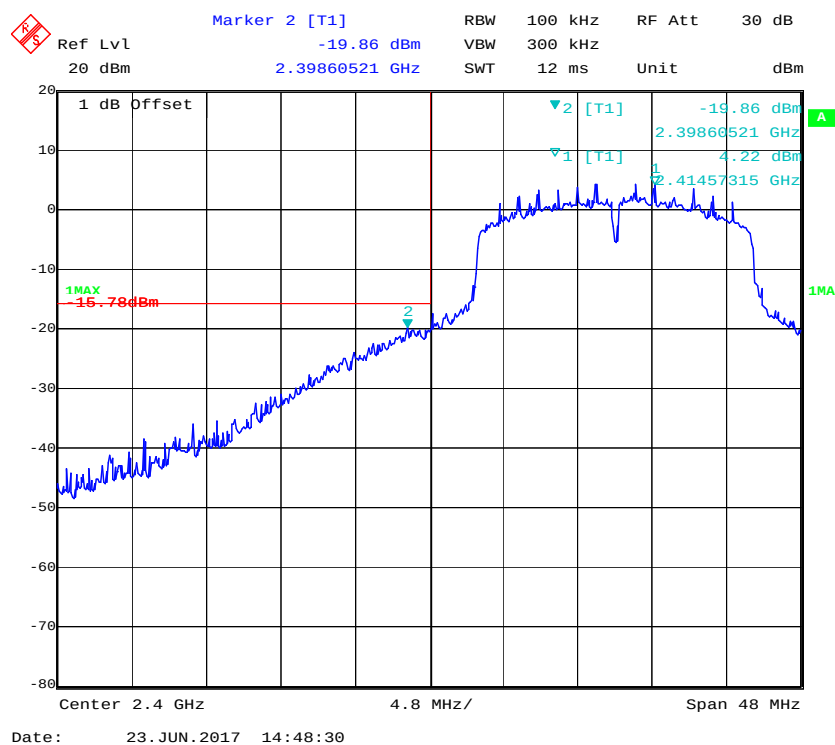
802.11g: Band Edge, Left Side



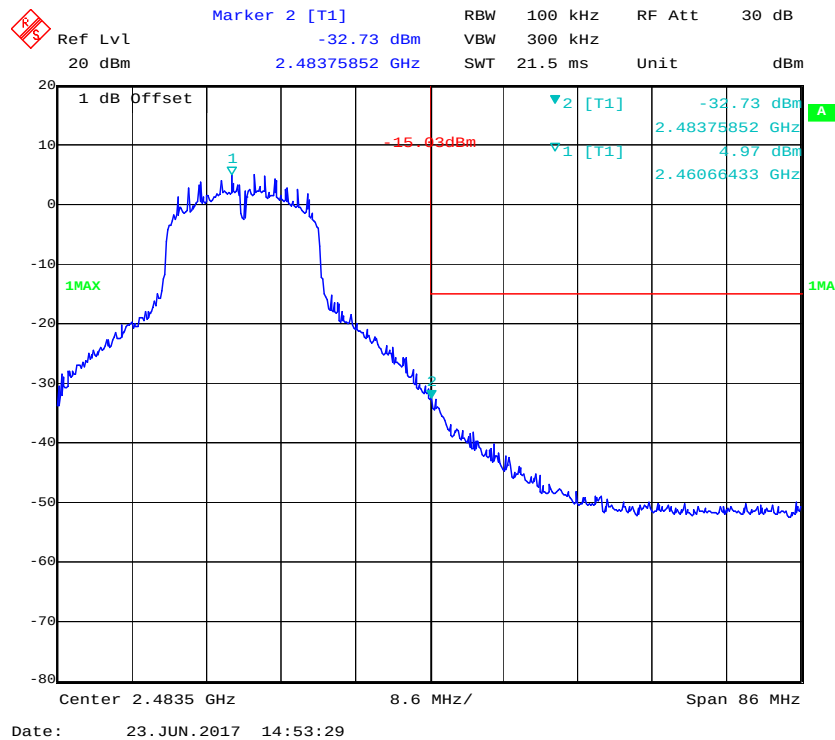
802.11g: Band Edge, Right Side



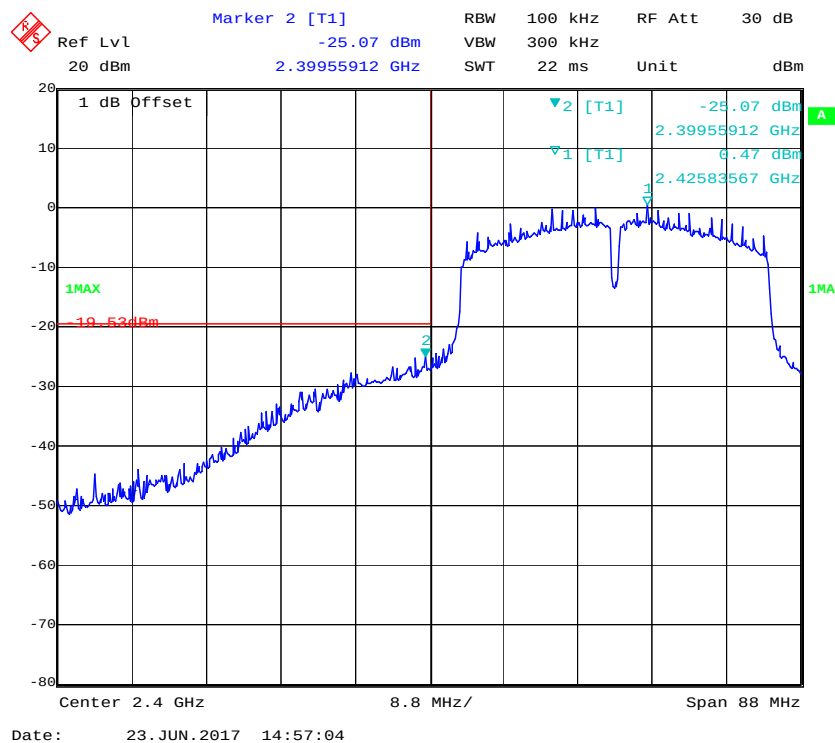
802.11n20: Band Edge, Left Side



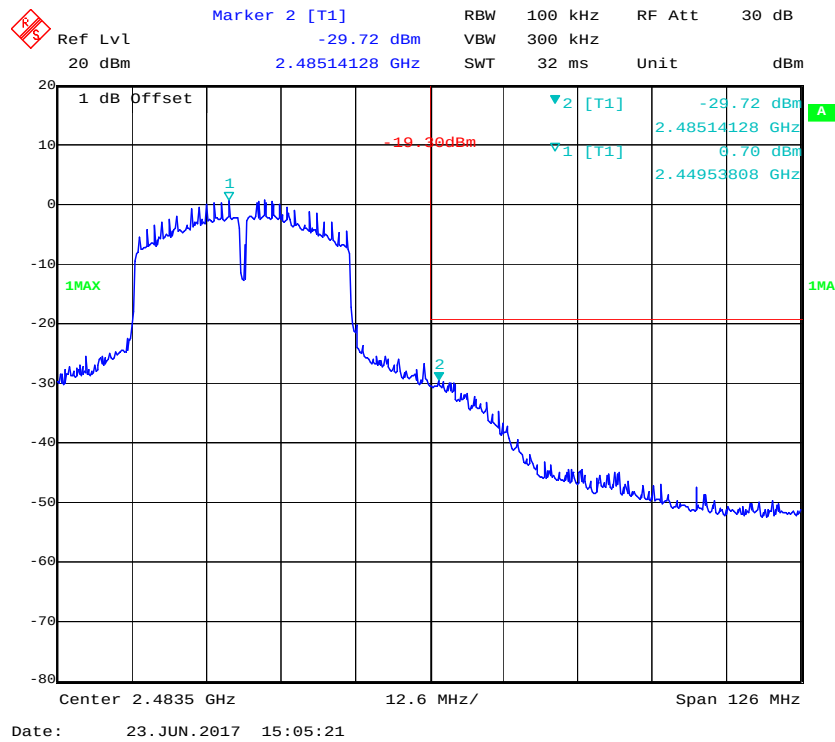
802.11n20: Band Edge, Right Side



802.11n40: Band Edge, Left Side



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FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

According to FCC§15.247(e):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
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
Unknown	RF Cable	Unknown	C-2	Each Time	/

*** Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

Test Data

Environmental Conditions

Temperature:	28.2 °C
Relative Humidity:	56 %
ATM Pressure:	100.1 kPa

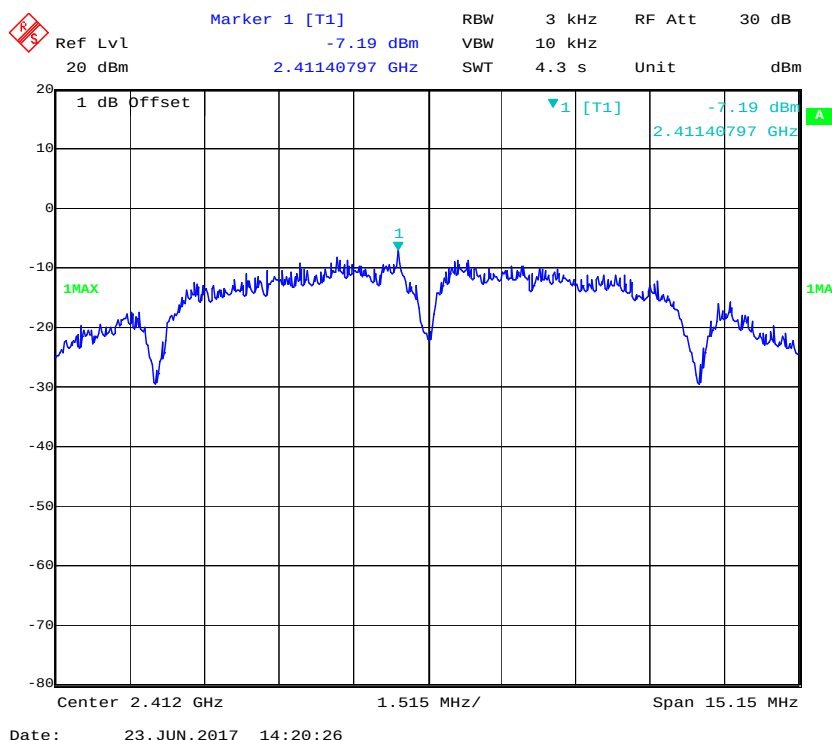
** The testing was performed by Lorin Bian on 2017-06-23.*

Test Mode: Transmitting

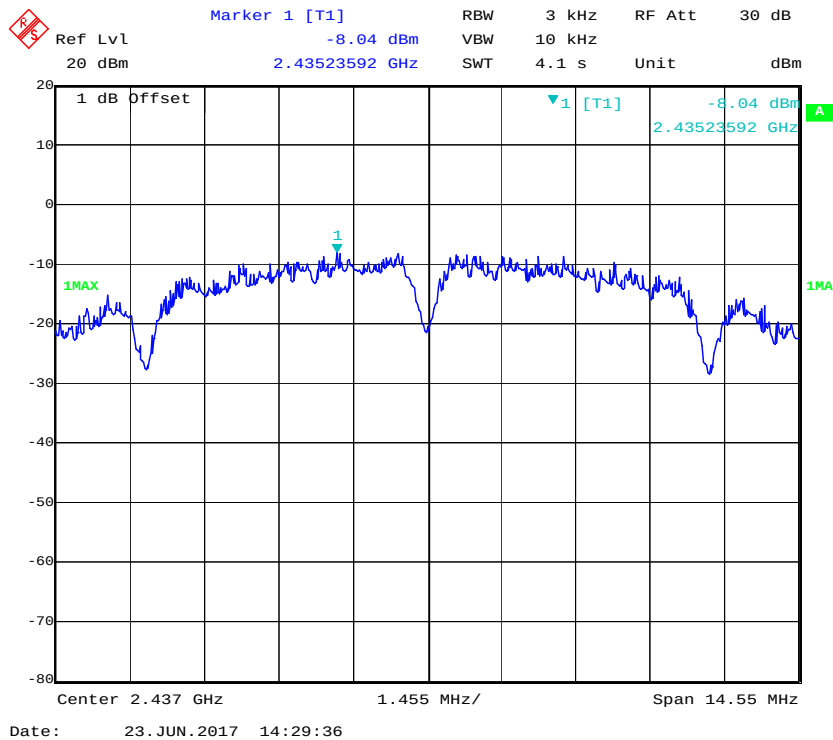
Test Result: Compliant. Please refer to the following table and plots

Test mode	Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
802.11b	Low	2412	-7.19	≤8
	Middle	2437	-8.04	≤8
	High	2462	-7.44	≤8
802.11g	Low	2412	-11.99	≤8
	Middle	2437	-10.53	≤8
	High	2462	-8.91	≤8
802.11n20	Low	2412	-11.3	≤8
	Middle	2437	-10.04	≤8
	High	2462	-9.98	≤8
802.11n40	Low	2422	-14.55	≤8
	Middle	2437	-14.71	≤8
	High	2452	-14.2	≤8

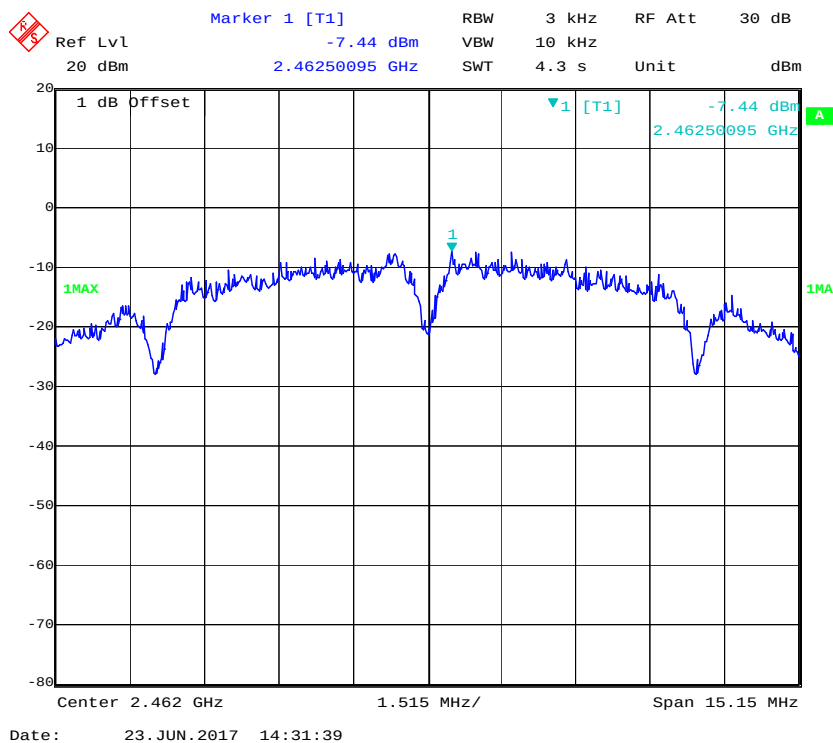
Power Spectral Density, 802.11b Low Channel



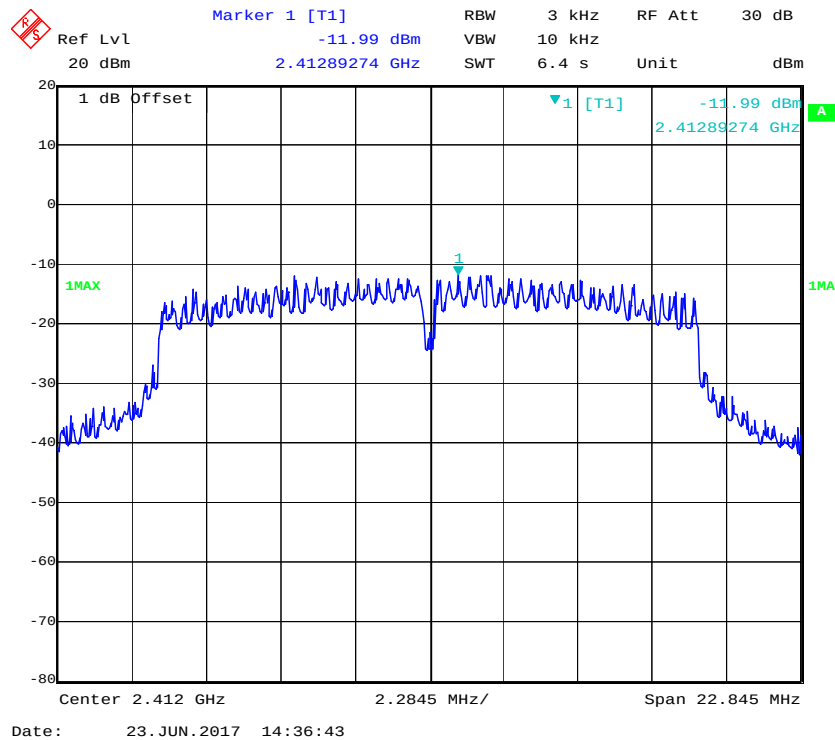
Power Spectral Density, 802.11b Middle Channel



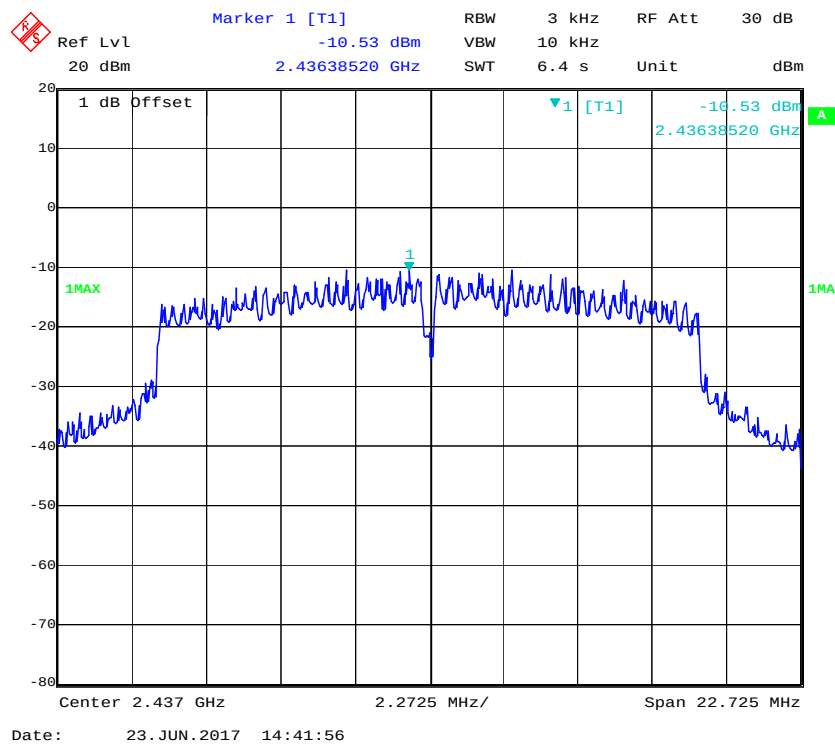
Power Spectral Density, 802.11b High Channel



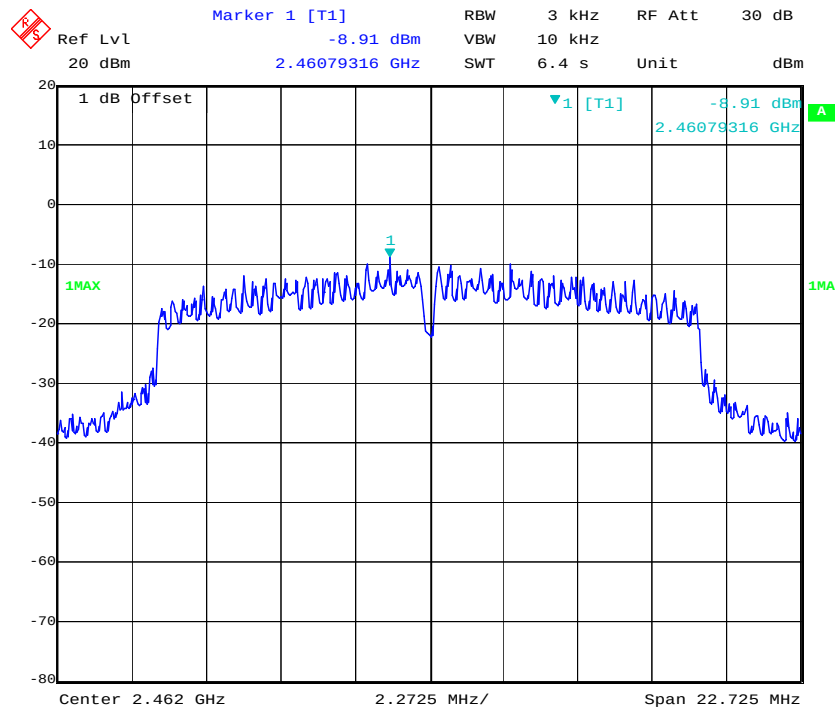
Power Spectral Density, 802.11g Low Channel



Power Spectral Density, 802.11g Middle Channel

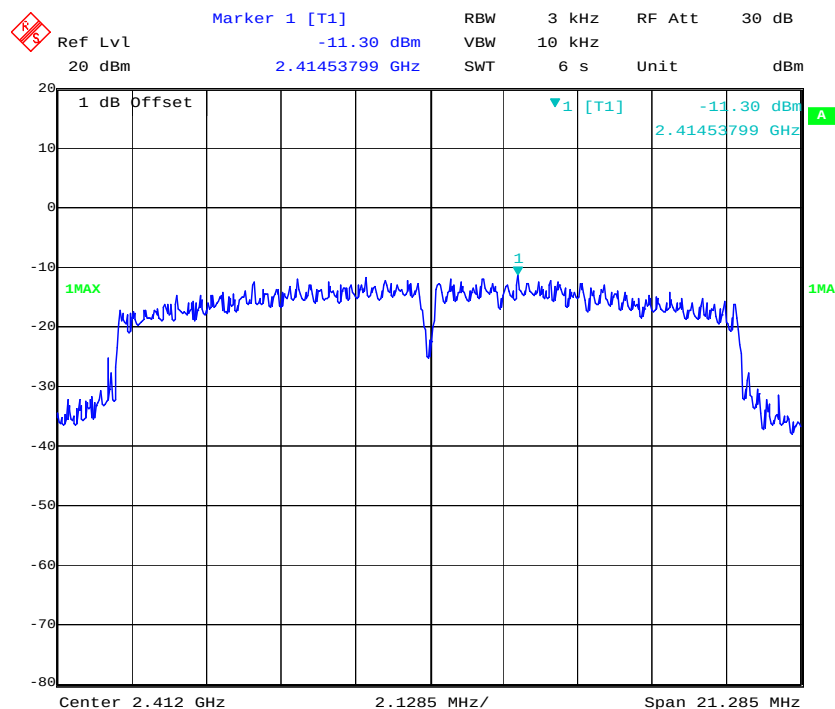


Power Spectral Density, 802.11g High Channel



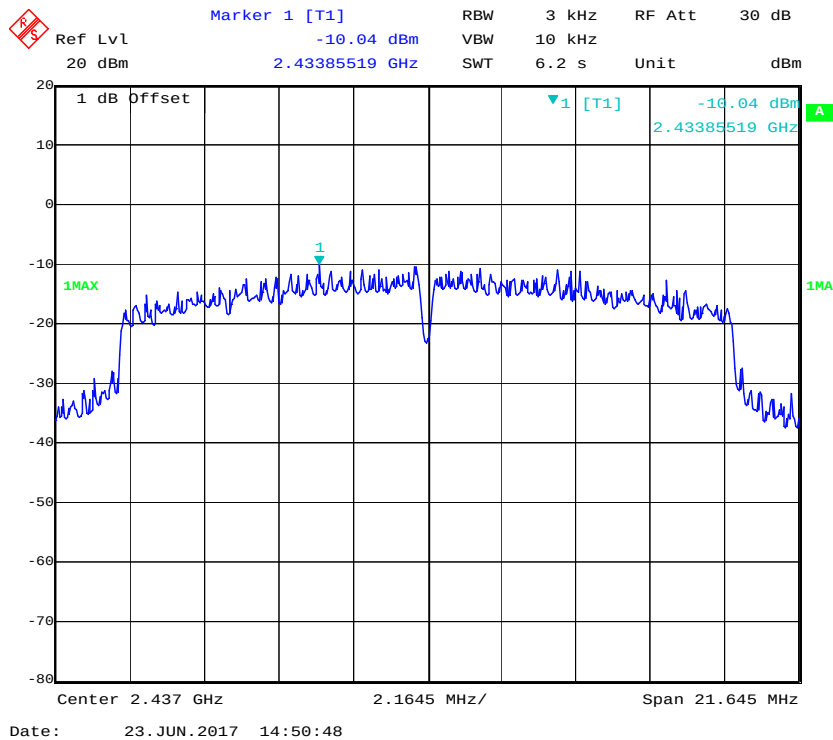
Date: 23.JUN.2017 14:45:09

Power Spectral Density, 802.11n20 Low Channel

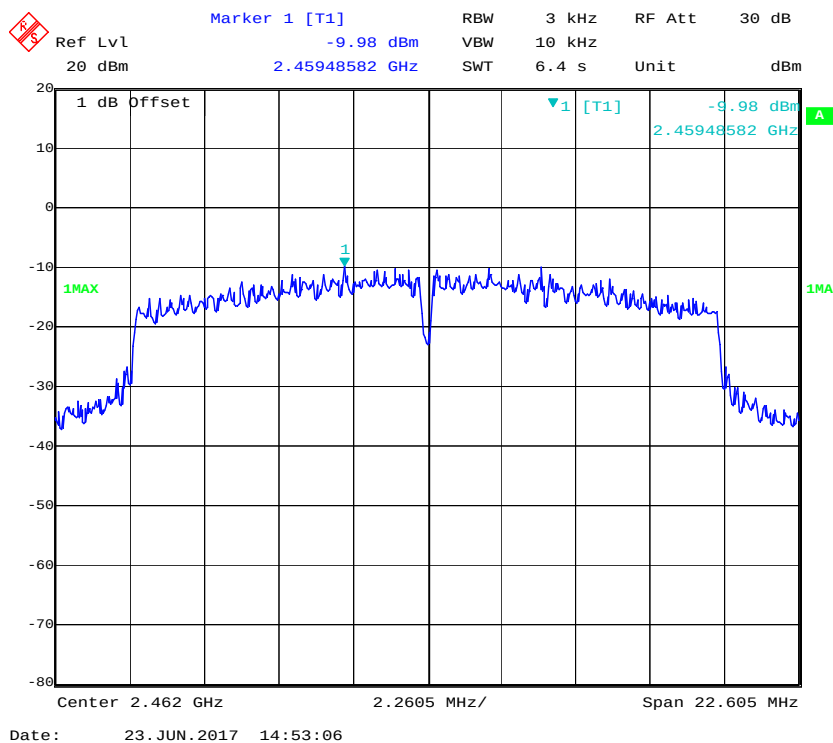


Date: 23.JUN.2017 14:47:56

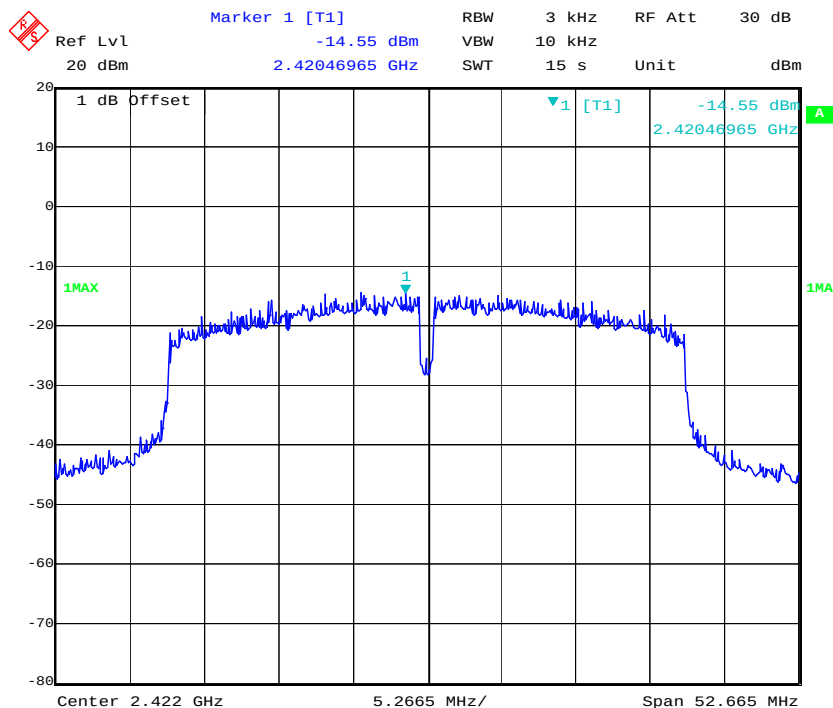
Power Spectral Density, 802.11n20 Middle Channel



Power Spectral Density, 802.11n20 High Channel

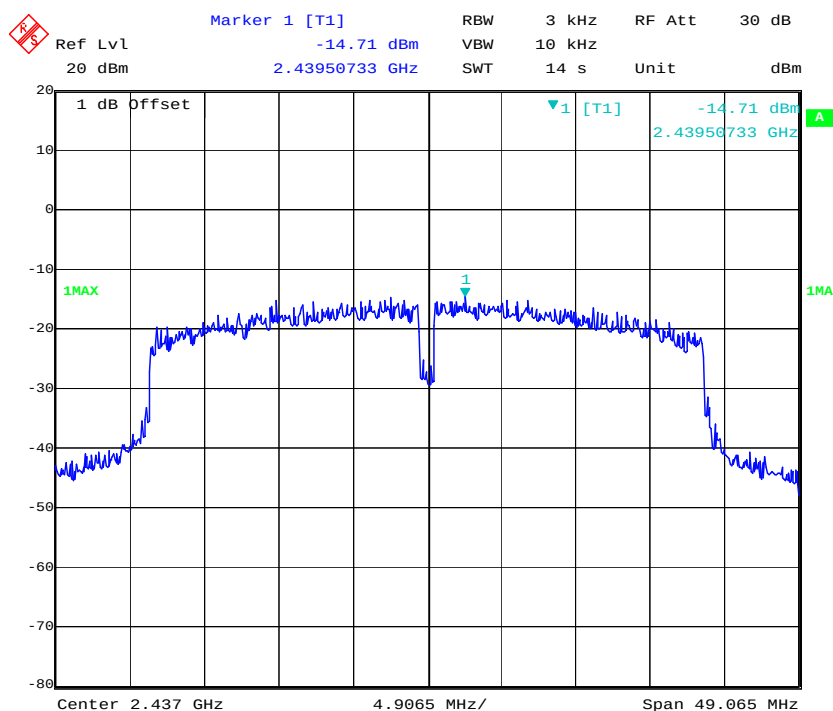


Power Spectral Density, 802.11n40 Low Channel

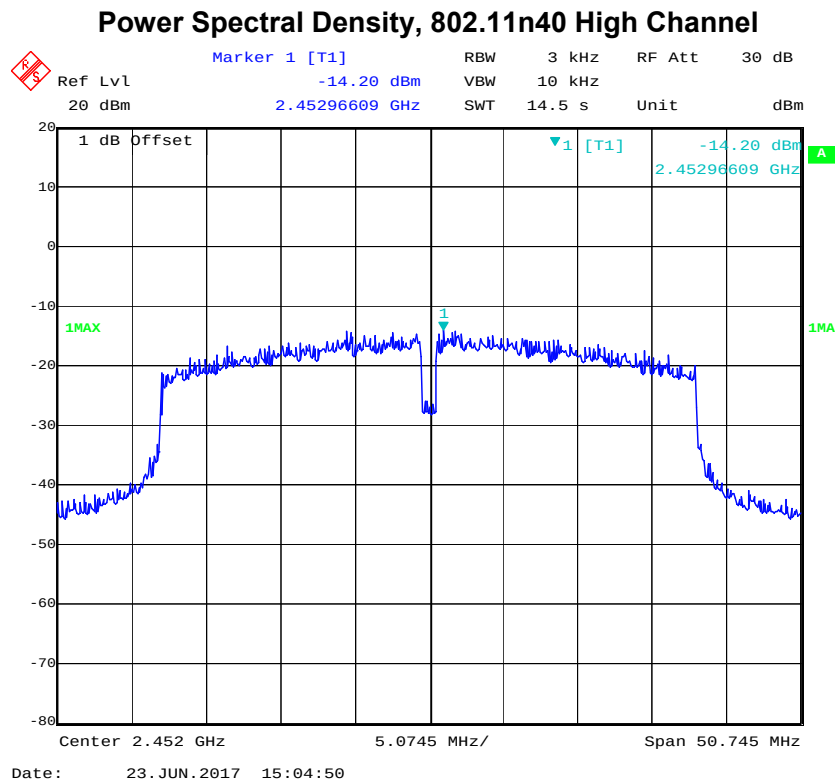


Date: 23.JUN.2017 14:56:42

Power Spectral Density, 802.11n40 Middle Channel



Date: 23.JUN.2017 14:59:51



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