



FCC PART 15.247 TEST REPORT

For

Shenzhen Belter Health Measurement and Analysis Technology Co., Ltd.

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Nanshan, Shenzhen, China

FCC ID: 2AAEEBBP2

Report Type: Original Report	Product Name: Blood Pressure Meter
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Report Number: <u>RDG161223801</u>	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The **Shenzhen Belter Health Measurement and Analysis Technology Co., Ltd.**'s product, model number: **BP2 (FCC ID: 2AAEEBBP2)** (the "EUT") in this report was a **Blood Pressure Meter**, which was measured approximately: 33.4 cm (L) x 8 cm (W) x 15 cm(H), rated input voltage: DC3.7V from battery or DC 5V from adapter.

**All measurement and test data in this report was gathered from final production sample, serial number: 161223801 (assigned by the BACL, Chengdu). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2016-12-23, and EUT conformed to test requirement.*

Objective

This report is prepared on behalf of **Shenzhen Belter Health Measurement and Analysis Technology 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 and 15.247 rules.

Related Submittal(s)/Grant(s)

No related submittal grant.

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 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 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 testing in testing mode, which was provided by manufacturer. The device support 802.11b/g/n ht20 and Bluetooth LE modes, for 802.11b/g/n ht20,11 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	/	/

Test performed with channel 1, 6 and 11.

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.

For Bluetooth LE mode, 40 channels are provided for testing:

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

EUT was tested with channel 0, 19 and 39.

Equipment Modifications

No modification was made to the EUT.

EUT Exercise Software

The worst condition (maximum power with maximum duty cycle) was setting by the Engineer Mode, which was provided by manufacturer.

For 802.11b/g/n mode, the maximum power was as below setting, the power setting was provided by the manufacturer:

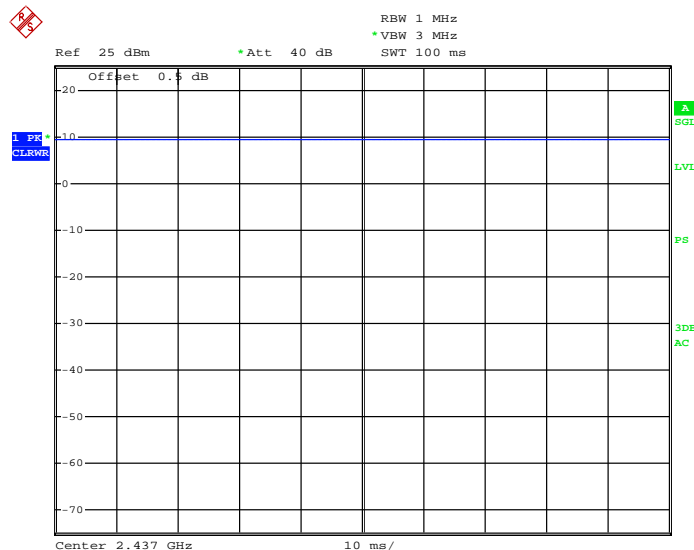
Test Mode	Test Software Version	Engineer Mode		
		2412MHz	2437MHz	2462MHz
802.11b	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	1Mbps	1Mbps	1Mbps
	Power Level Setting	5	5	5
802.11g	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting	5	5	5
802.11n ht20	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	5	5	5

Note: BLE mode configured as maximum power by the system default setting.

The maximum duty cycle as following table:

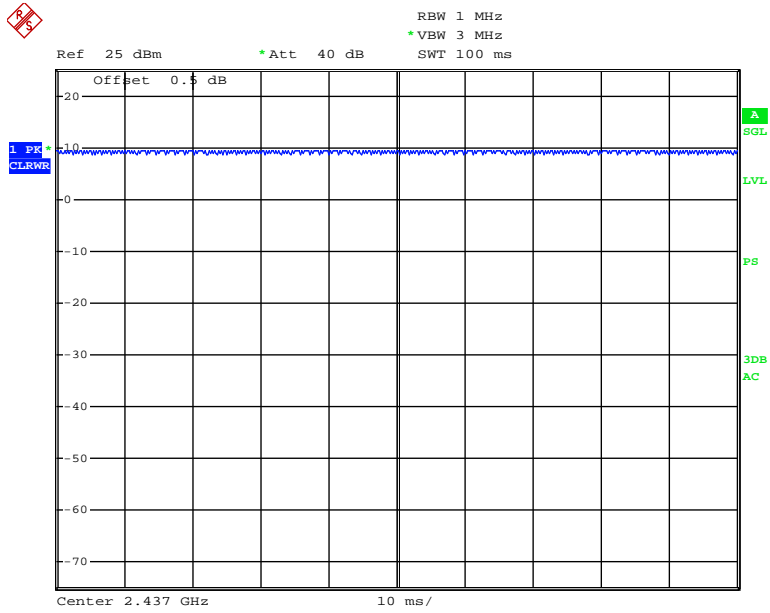
Test mode	T _{on} (ms)	T _{on+off} (ms)	Duty Cycle (%)
802.11b	100	100	100%
802.11g	100	100	100%
802.11n ht20	100	100	100%
BLE	100	100	100%

802.11b mode



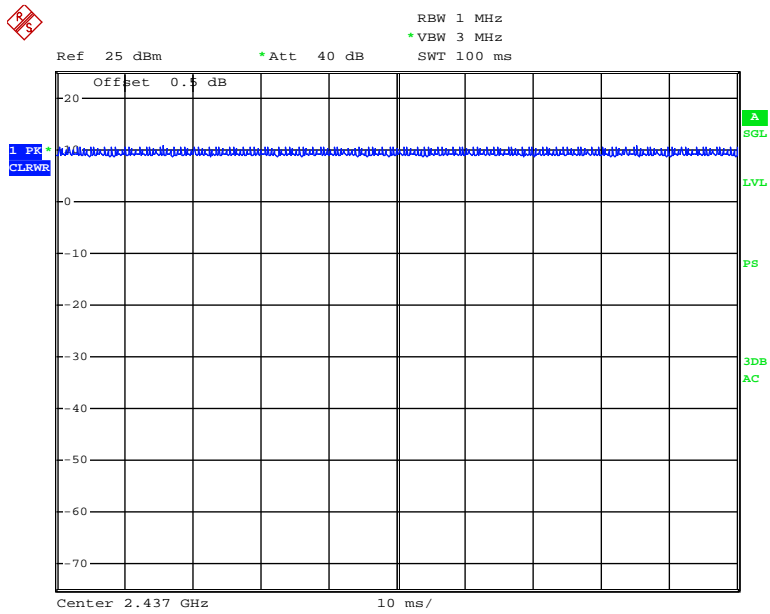
Date: 17.MAR.2017 23:22:18

802.11g mode



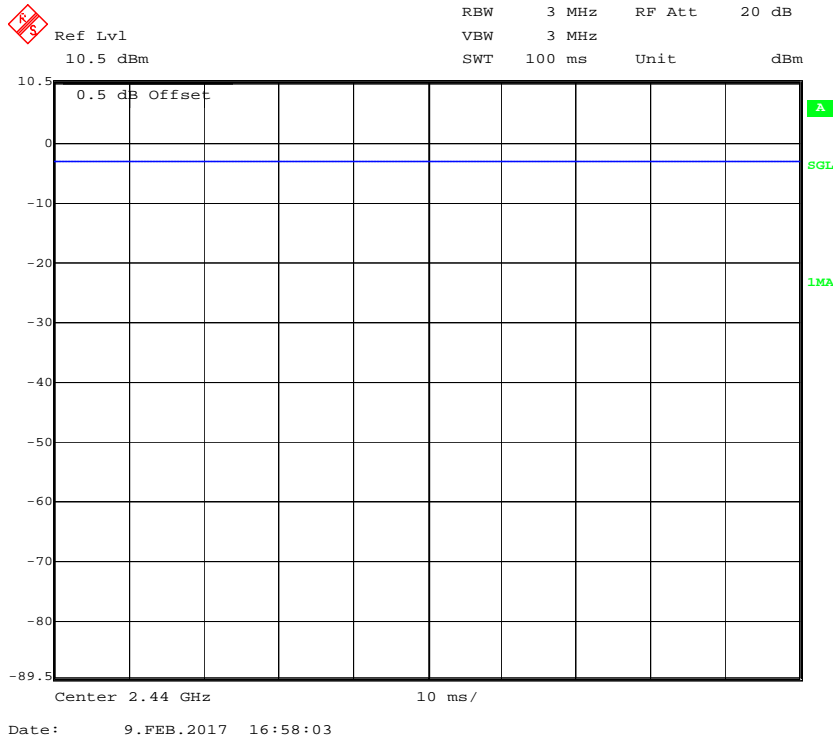
Date: 17.MAR.2017 23:20:55

802.11n ht20 mode



Date: 17.MAR.2017 23:20:12

BLE Mode



Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
MAXWEST	AC Adapter	P2123442	/

External Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB Cable	No	No	0.8	USB Port of EUT	Adapter

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.247 (i) & §1.1310 & §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Bandwidth	Compliance
§15.247(b)(3)	Maximum Peak Conducted Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

FCC §15.247 (i) & §1.1310 & §2.1093- RF EXPOSURE

Applicable Standard

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

According to KDB447498 D01 General RF Exposure Guidance v06:

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

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

- $f(\text{GHz})$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

Measurement Result

For WiFi mode

The max tune-up conducted power is 9.2 dBm (8.32 mW).

$$[(\text{max. power of channel, mW})/(\text{min. test separation distance, mm})][\sqrt{f(\text{GHz})}] = 8.32/5 \cdot (\sqrt{2.462}) = 2.6 \leq 3.0$$

For bluetooth LE mode

The max tune-up conducted power is -2.0 dBm (0.63 mW).

$$[(\text{max. power of channel, mW})/(\text{min. test separation distance, mm})][\sqrt{f(\text{GHz})}] = 0.63/5 \cdot (\sqrt{2.48}) = 0.2 < 3.0$$

Note: WiFi and Bluetooth LE can't transmission simultaneously

So the SAR evaluation is not necessary.

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.
- c. 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 an internal antenna arrangement, and the antenna gain is 2.19 dBi for Wifi and 2.0 dBi for Bluetooth, fulfill the requirement of this section. Please refer to the EUT photos.

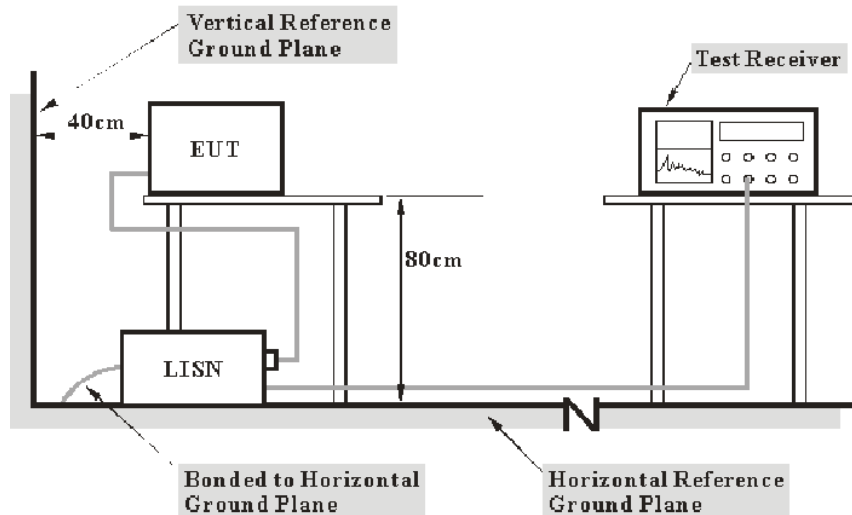
Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

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 V/60 Hz AC 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
Rohde & Schwarz	EMI Test Receiver	ESCS 30	836858/0016	2016-12-02	2017-12-01
Rohde & Schwarz	L.I.S.N.	ENV216	3560.6550.06	2016-12-02	2017-12-01
Rohde & Schwarz	PULSE LIMITER	ESH3Z2	357.8810.52	2016-10-31	2017-10-30
Unknown	Conducted Cable	NO.5	Unknown	2016-11-10	2017-11-09
R&S	Test Software	EMC32	Version8.53.0	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

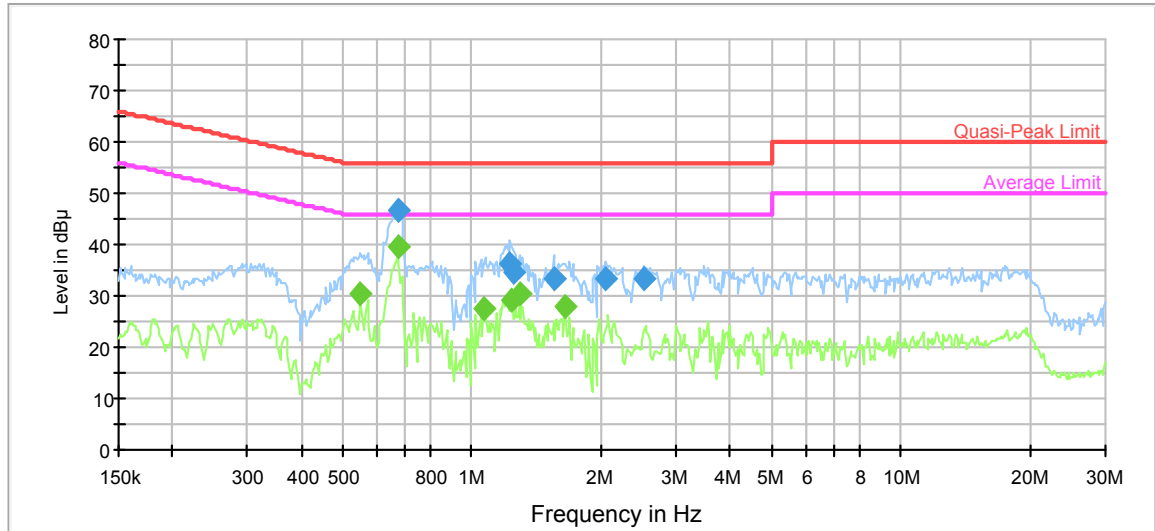
Environmental Conditions

Temperature:	19 °C
Relative Humidity:	44 %
ATM Pressure:	96.8 kPa

The testing was performed by Kevin Hu on 2017-02-10.

Test Mode: Transmitting(802.11b mode was the worst)

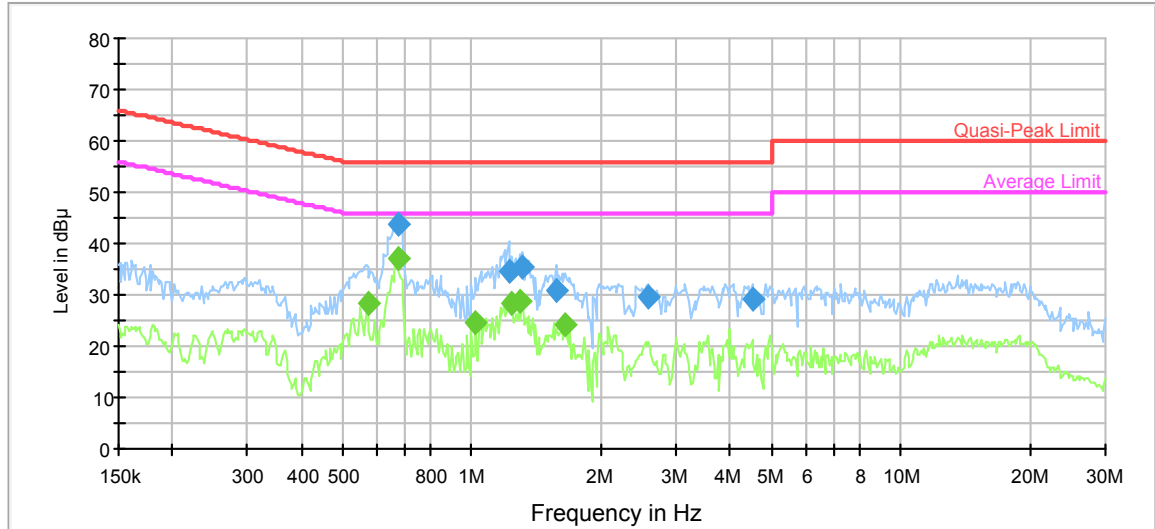
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.670921	46.9	9.000	L1	19.7	9.1	56.0	Compliance
1.229340	36.4	9.000	L1	19.7	19.6	56.0	Compliance
1.249088	34.7	9.000	L1	19.7	21.3	56.0	Compliance
1.548915	33.3	9.000	L1	19.7	22.7	56.0	Compliance
2.047133	33.4	9.000	L1	19.8	22.6	56.0	Compliance
2.518372	33.2	9.000	L1	19.7	22.8	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.549741	30.5	9.000	L1	19.7	15.5	46.0	Compliance
0.670921	39.4	9.000	L1	19.7	6.6	46.0	Compliance
1.065081	27.3	9.000	L1	19.7	18.7	46.0	Compliance
1.239175	29.4	9.000	L1	19.7	16.6	46.0	Compliance
1.289541	30.6	9.000	L1	19.7	15.4	46.0	Compliance
1.650866	28.0	9.000	L1	19.7	18.0	46.0	Compliance

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.670921	43.9	9.000	N	19.6	12.1	56.0	Compliance
1.219583	34.5	9.000	N	19.6	21.5	56.0	Compliance
1.310256	35.5	9.000	N	19.6	20.5	56.0	Compliance
1.573796	31.0	9.000	N	19.7	25.0	56.0	Compliance
2.579298	29.6	9.000	N	19.7	26.4	56.0	Compliance
4.505456	29.2	9.000	N	19.7	26.8	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.572086	28.4	9.000	N	19.6	17.6	46.0	Compliance
0.670921	36.9	9.000	N	19.6	9.1	46.0	Compliance
1.023481	24.5	9.000	N	19.7	21.5	46.0	Compliance
1.239175	28.3	9.000	N	19.6	17.7	46.0	Compliance
1.289541	28.9	9.000	N	19.6	17.1	46.0	Compliance
1.650866	24.0	9.000	N	19.7	22.0	46.0	Compliance

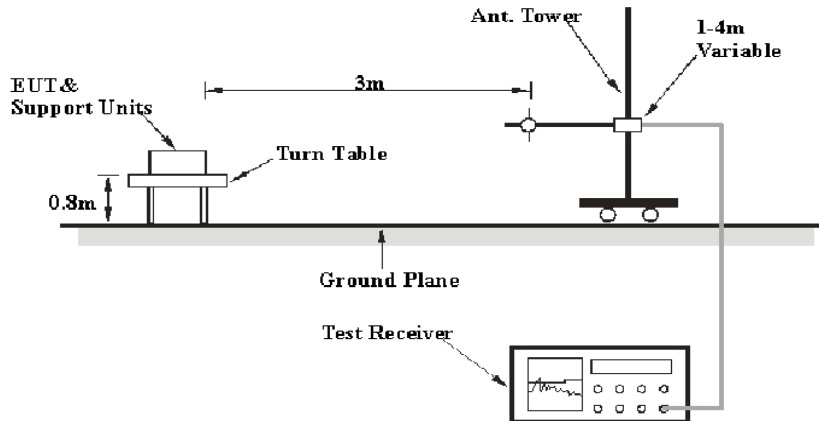
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

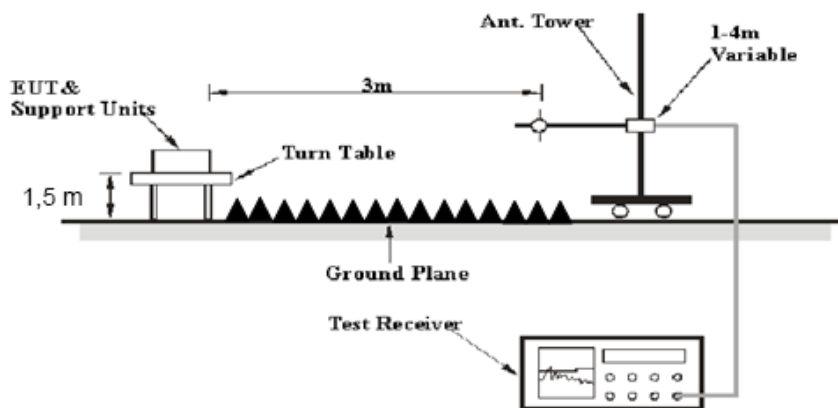
FCC §15.247 (d); §15.209; §15.205;

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 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:

30MHz-1000MHz:

Detector	RBW	Video B/W	IF B/W
QP	120 kHz	300 kHz	120kHz

1GHz- 25GHz:

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

Note: T is minimum transmission duration

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
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	A101808	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	1007726-0113028	2014-06-16	2017-06-15
Mini-circuits	Amplifier	ZVA-183-S+	771001215	2016-05-20	2017-05-19
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:	21~20 °C
Relative Humidity:	46~56 %
ATM Pressure:	96.7~96 kPa

The testing was performed by Kevin Hu from 2017-02-04 to 2017-03-14.

Test Result: Compliance, please Refer to the following data

Test Mode: Transmitting

30MHz-25GHz:

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	66.89	PK	H	23.50	3.00	0.00	93.39	N/A	N/A
2412	63.21	AV	H	23.50	3.00	0.00	89.71	N/A	N/A
2412	76.57	PK	V	23.50	3.00	0.00	103.07	N/A	N/A
2412	72.99	AV	V	23.50	3.00	0.00	99.49	N/A	N/A
2390	39.54	PK	V	23.57	3.00	0.00	66.11	74.00	7.89
2390	25.06	AV	V	23.57	3.00	0.00	51.63	54.00	2.37
4824	40.39	PK	V	30.84	5.11	26.87	49.47	74.00	24.53
4824	35.21	AV	V	30.84	5.11	26.87	44.29	54.00	9.71
7236	25.1	PK	V	34.77	6.18	26.36	39.69	74.00	34.31
7236	15.52	AV	V	34.77	6.18	26.36	30.11	54.00	23.89
1578	39.17	PK	V	24.22	2.73	26.41	39.71	74.00	34.29
1578	28.9	AV	V	24.22	2.73	26.41	29.44	54.00	24.56
70.74	48.7	QP	V	7.70	0.56	28.42	28.54	40.00	11.46
96.93	47.7	QP	V	9.88	0.49	28.32	29.75	43.50	13.75
Middle Channel: 2437 MHz									
2437	66.78	PK	H	23.41	3.00	0.00	93.19	N/A	N/A
2437	62.75	AV	H	23.41	3.00	0.00	89.16	N/A	N/A
2437	76.3	PK	V	23.41	3.00	0.00	102.71	N/A	N/A
2437	73.14	AV	V	23.41	3.00	0.00	99.55	N/A	N/A
4874	37.02	PK	V	31.00	5.09	26.87	46.24	74.00	27.76
4874	32.27	AV	V	31.00	5.09	26.87	41.49	54.00	12.51
7311	24.9	PK	V	34.92	6.21	26.40	39.63	74.00	34.37
7311	16.25	AV	V	34.92	6.21	26.40	30.98	54.00	23.02
1622	38.96	PK	V	24.30	2.76	26.45	39.57	74.00	34.43
1622	29.6	AV	V	24.30	2.76	26.45	30.21	54.00	23.79
2118	39.47	PK	V	24.50	3.04	26.84	40.17	74.00	33.83
2118	29.99	AV	V	24.50	3.04	26.84	30.69	54.00	23.31
70.74	49.1	QP	V	7.70	0.56	28.42	28.94	40.00	11.06
96.93	47.5	QP	V	9.88	0.49	28.32	29.55	43.50	13.95
High Channel: 2462 MHz									
2462	67.36	PK	H	23.33	2.99	0.00	93.68	N/A	N/A
2462	63.83	AV	H	23.33	2.99	0.00	90.15	N/A	N/A
2462	77.05	PK	V	23.33	2.99	0.00	103.37	N/A	N/A
2462	73.23	AV	V	23.33	2.99	0.00	99.55	N/A	N/A
2483.5	39.18	PK	V	23.26	2.99	0.00	65.43	74.00	8.57
2483.5	24.77	AV	V	23.26	2.99	0.00	51.02	54.00	2.98
4924	37.54	PK	V	31.16	5.07	26.88	46.89	74.00	27.11
4924	33.02	AV	V	31.16	5.07	26.88	42.37	54.00	11.63
7386	24.79	PK	V	35.07	6.25	26.43	39.68	74.00	34.32
7386	15.84	AV	V	35.07	6.25	26.43	30.73	54.00	23.27
1663	39.08	PK	V	24.36	2.79	26.49	39.74	74.00	34.26
1663	29.8	AV	V	24.36	2.79	26.49	30.46	54.00	23.54
70.74	48.8	QP	V	7.70	0.56	28.42	28.64	40.00	11.36
96.93	47.6	QP	V	9.88	0.49	28.32	29.65	43.50	13.85

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	63.07	PK	H	23.50	3.00	0.00	89.57	N/A	N/A
2412	54.49	AV	H	23.50	3.00	0.00	80.99	N/A	N/A
2412	69.68	PK	V	23.50	3.00	0.00	96.18	N/A	N/A
2412	61.26	AV	V	23.50	3.00	0.00	87.76	N/A	N/A
2390	31.66	PK	V	23.57	3.00	0.00	58.23	74.00	15.77
2390	19.03	AV	V	23.57	3.00	0.00	45.60	54.00	8.40
4824	37.79	PK	V	30.84	5.11	26.87	46.87	74.00	27.13
4824	29.1	AV	V	30.84	5.11	26.87	38.18	54.00	15.82
7236	26.38	PK	V	34.77	6.18	26.36	40.97	74.00	33.03
7236	16.95	AV	V	34.77	6.18	26.36	31.54	54.00	22.46
1578	37.93	PK	V	24.22	2.73	26.41	38.47	74.00	35.53
1578	29.06	AV	V	24.22	2.73	26.41	29.60	54.00	24.40
70.74	48.7	QP	V	7.70	0.56	28.42	28.54	40.00	11.46
96.93	47.8	QP	V	9.88	0.49	28.32	29.85	43.50	13.65
Middle Channel: 2437 MHz									
2437	62.62	PK	H	23.41	3.00	0.00	89.03	N/A	N/A
2437	55.12	AV	H	23.41	3.00	0.00	81.53	N/A	N/A
2437	70.23	PK	V	23.41	3.00	0.00	96.64	N/A	N/A
2437	61.59	AV	V	23.41	3.00	0.00	88.00	N/A	N/A
4874	33.8	PK	V	31.00	5.09	26.87	43.02	74.00	30.98
4874	24.96	AV	V	31.00	5.09	26.87	34.18	54.00	19.82
7311	25.3	PK	V	34.92	6.21	26.40	40.03	74.00	33.97
7311	16.21	AV	V	34.92	6.21	26.40	30.94	54.00	23.06
1622	38.35	PK	V	24.30	2.76	26.45	38.96	74.00	35.04
1622	28.97	AV	V	24.30	2.76	26.45	29.58	54.00	24.42
2118	39.39	PK	V	24.50	3.04	26.84	40.09	74.00	33.91
2118	30.23	AV	V	24.50	3.04	26.84	30.93	54.00	23.07
70.74	48.5	QP	V	7.70	0.56	28.42	28.34	40.00	11.66
96.93	48	QP	V	9.88	0.49	28.32	30.05	43.50	13.45
High Channel: 2462 MHz									
2462	63.06	PK	H	23.33	2.99	0.00	89.38	N/A	N/A
2462	54.13	AV	H	23.33	2.99	0.00	80.45	N/A	N/A
2462	70.37	PK	V	23.33	2.99	0.00	96.69	N/A	N/A
2462	61.2	AV	V	23.33	2.99	0.00	87.52	N/A	N/A
2483.5	32.41	PK	V	23.26	2.99	0.00	58.66	74.00	15.34
2483.5	18.53	AV	V	23.26	2.99	0.00	44.78	54.00	9.22
4924	34.56	PK	V	31.16	5.07	26.88	43.91	74.00	30.09
4924	25.81	AV	V	31.16	5.07	26.88	35.16	54.00	18.84
7386	23.6	PK	V	35.07	6.25	26.43	38.49	74.00	35.51
7386	15.17	AV	V	35.07	6.25	26.43	30.06	54.00	23.94
1663	38.56	PK	V	24.36	2.79	26.49	39.22	74.00	34.78
1663	29.95	AV	V	24.36	2.79	26.49	30.61	54.00	23.39
70.74	49	QP	V	7.70	0.56	28.42	28.84	40.00	11.16
96.93	47.6	QP	V	9.88	0.49	28.32	29.65	43.50	13.85

802.11 n ht20 Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	62.93	PK	H	23.50	3.00	0.00	89.43	N/A	N/A
2412	54.51	AV	H	23.50	3.00	0.00	81.01	N/A	N/A
2412	70	PK	V	23.50	3.00	0.00	96.50	N/A	N/A
2412	61.18	AV	V	23.50	3.00	0.00	87.68	N/A	N/A
2390	31.35	PK	V	23.57	3.00	0.00	57.92	74.00	16.08
2390	18.83	AV	V	23.57	3.00	0.00	45.40	54.00	8.60
4824	38.15	PK	V	30.84	5.11	26.87	47.23	74.00	26.77
4824	29.31	AV	V	30.84	5.11	26.87	38.39	54.00	15.61
7236	25.69	PK	V	34.77	6.18	26.36	40.28	74.00	33.72
7236	16.52	AV	V	34.77	6.18	26.36	31.11	54.00	22.89
1578	37.74	PK	V	24.22	2.73	26.41	38.28	74.00	35.72
1578	28.97	AV	V	24.22	2.73	26.41	29.51	54.00	24.49
70.74	48.6	QP	V	7.70	0.56	28.42	28.44	40.00	11.56
96.93	47.9	QP	V	9.88	0.49	28.32	29.95	43.50	13.55
2412	62.93	PK	H	23.50	3.00	0.00	89.43	N/A	N/A
2412	54.51	AV	H	23.50	3.00	0.00	81.01	N/A	N/A
Middle Channel: 2437 MHz									
2437	62.53	PK	H	23.41	3.00	0.00	88.94	N/A	N/A
2437	54.92	AV	H	23.41	3.00	0.00	81.33	N/A	N/A
2437	70.12	PK	V	23.41	3.00	0.00	96.53	N/A	N/A
2437	61.53	AV	V	23.41	3.00	0.00	87.94	N/A	N/A
4874	33.46	PK	V	31.00	5.09	26.87	42.68	74.00	31.32
4874	23.89	AV	V	31.00	5.09	26.87	33.11	54.00	20.89
7311	26.04	PK	V	34.92	6.21	26.40	40.77	74.00	33.23
7311	16.41	AV	V	34.92	6.21	26.40	31.14	54.00	22.86
1622	37.16	PK	V	24.30	2.76	26.45	37.77	74.00	36.23
1622	28.53	AV	V	24.30	2.76	26.45	29.14	54.00	24.86
2118	39.21	PK	V	24.50	3.04	26.84	39.91	74.00	34.09
2118	30.13	AV	V	24.50	3.04	26.84	30.83	54.00	23.17
70.74	48.6	QP	V	7.70	0.56	28.42	28.44	40.00	11.56
96.93	47.6	QP	V	9.88	0.49	28.32	29.65	43.50	13.85
High Channel: 2462 MHz									
2462	62.21	PK	H	23.33	2.99	0.00	88.53	N/A	N/A
2462	54.53	AV	H	23.33	2.99	0.00	80.85	N/A	N/A
2462	70.16	PK	V	23.33	2.99	0.00	96.48	N/A	N/A
2462	61.02	AV	V	23.33	2.99	0.00	87.34	N/A	N/A
2483.5	31.96	PK	V	23.26	2.99	0.00	58.21	74.00	15.79
2483.5	18.85	AV	V	23.26	2.99	0.00	45.10	54.00	8.90
4924	35.02	PK	V	31.16	5.07	26.88	44.37	74.00	29.63
4924	25.6	AV	V	31.16	5.07	26.88	34.95	54.00	19.05
7386	25.09	PK	V	35.07	6.25	26.43	39.98	74.00	34.02
7386	16.5	AV	V	35.07	6.25	26.43	31.39	54.00	22.61
1663	38.42	PK	V	24.36	2.79	26.49	39.08	74.00	34.92
1663	29.56	AV	V	24.36	2.79	26.49	30.22	54.00	23.78
70.74	48.5	QP	V	7.70	0.56	28.42	28.34	40.00	11.66
96.93	47.6	QP	V	9.88	0.49	28.32	29.65	43.50	13.85

BLE Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector	Polar (H/V)	Factor (dB)					
Low Channel: 2402 MHz									
2402	67.54	PK	H	23.53	3.00	0.00	94.07	N/A	N/A
2402	62.68	AV	H	23.53	3.00	0.00	89.21	N/A	N/A
2402	64.83	PK	V	23.53	3.00	0.00	91.36	N/A	N/A
2402	60.2	AV	V	23.53	3.00	0.00	86.73	N/A	N/A
2390	29.39	PK	H	23.57	3.00	0.00	55.96	74.00	18.04
2390	15.9	AV	H	23.57	3.00	0.00	42.47	54.00	11.53
4804	33.79	PK	H	30.77	5.12	26.87	42.81	74.00	31.19
4804	25.86	AV	H	30.77	5.12	26.87	34.88	54.00	19.12
7206	32.45	PK	H	34.71	6.16	26.35	46.97	74.00	27.03
7206	25.02	AV	H	34.71	6.16	26.35	39.54	54.00	14.46
1663	32.74	PK	H	24.36	2.79	26.49	33.40	74.00	40.60
1663	21.61	AV	H	24.36	2.79	26.49	22.27	54.00	31.73
147.37	43.08	QP	H	12.87	0.73	28.08	28.60	43.50	14.90
163.86	43.25	QP	H	12.19	0.96	28.00	28.40	43.50	15.10
Middle Channel: 2440 MHz									
2440	68.28	PK	H	23.40	3.00	0.00	94.68	N/A	N/A
2440	63.44	AV	H	23.40	3.00	0.00	89.84	N/A	N/A
2440	65.16	PK	V	23.40	3.00	0.00	91.56	N/A	N/A
2440	60.39	AV	V	23.40	3.00	0.00	86.79	N/A	N/A
4880	34.33	PK	H	31.02	5.09	26.87	43.57	74.00	30.43
4880	25.86	AV	H	31.02	5.09	26.87	35.10	54.00	18.90
7320	32.39	PK	H	34.94	6.22	26.40	47.15	74.00	26.85
7320	25.2	AV	H	34.94	6.22	26.40	39.96	54.00	14.04
1687	31.77	PK	H	24.40	2.81	26.51	32.47	74.00	41.53
1687	23.5	AV	H	24.40	2.81	26.51	24.20	54.00	29.80
2118	32.64	PK	H	24.50	3.04	26.84	33.34	74.00	40.66
2118	21.46	AV	H	24.50	3.04	26.84	22.16	54.00	31.84
147.37	42.89	QP	H	12.87	0.73	28.08	28.41	43.50	15.09
163.86	43.42	QP	H	12.19	0.96	28.00	28.57	43.50	14.93
High Channel: 2480 MHz									
2480	67.62	PK	H	23.27	2.99	0.00	93.88	N/A	N/A
2480	62.74	AV	H	23.27	2.99	0.00	89.00	N/A	N/A
2480	65.53	PK	V	23.27	2.99	0.00	91.79	N/A	N/A
2480	60.75	AV	V	23.27	2.99	0.00	87.01	N/A	N/A
2483.5	30.67	PK	H	23.26	2.99	0.00	56.92	74.00	17.08
2483.5	16.08	AV	H	23.26	2.99	0.00	42.33	54.00	11.67
4960	33.98	PK	H	31.27	5.05	26.88	43.42	74.00	30.58
4960	26	AV	H	31.27	5.05	26.88	35.44	54.00	18.56
7440	32.22	PK	H	35.18	6.27	26.45	47.22	74.00	26.78
7440	25.73	AV	H	35.18	6.27	26.45	40.73	54.00	13.27
1711	32.56	PK	H	24.44	2.83	26.54	33.29	74.00	40.71
1711	21.39	AV	H	24.44	2.83	26.54	22.12	54.00	31.88
147.37	43.16	QP	H	12.87	0.73	28.08	28.68	43.50	14.82
163.86	43.37	QP	H	12.19	0.96	28.00	28.52	43.50	14.98

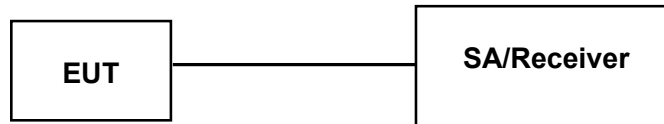
FCC §15.247(a) (2) – 6dB BANDWIDTH

Applicable Standard

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

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2016-12-02	2017-12-01
Unknown	RF Cable	Unknown	N/A	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:	21.3~21.2 °C
Relative Humidity:	44~54 %
ATM Pressure:	96.2~96kPa

The testing was performed by Kevin Hu from 2017-02-09 to 2017-03-17.

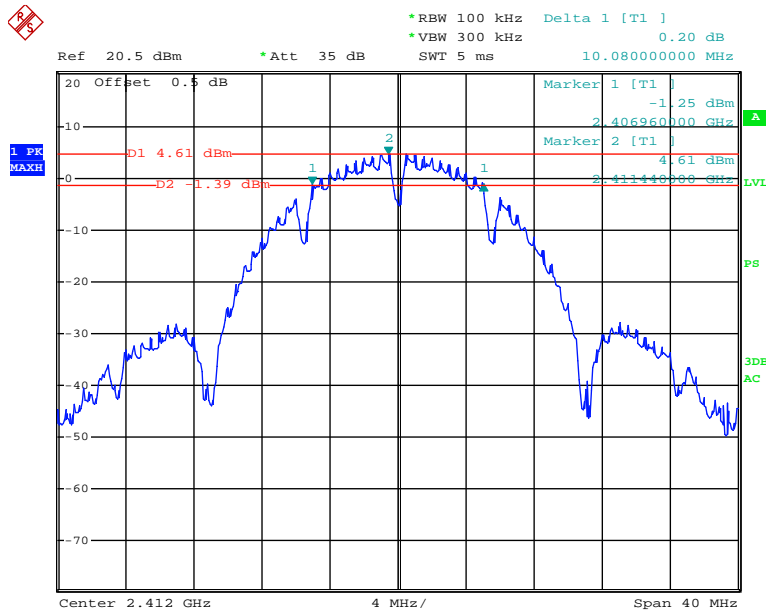
Test Result: Compliance.

Please refer to the following tables and plots.

Test Mode: Transmitting

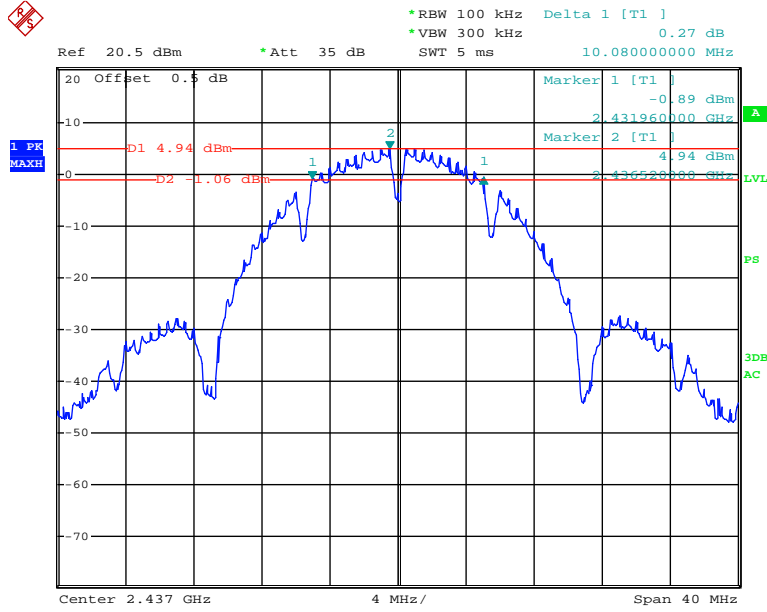
Test mode	Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (MHz)
802.11b	Low	2412	10.08	≥0.5
	Middle	2437	10.08	≥0.5
	High	2462	10.08	≥0.5
802.11g	Low	2412	16.48	≥0.5
	Middle	2437	16.32	≥0.5
	High	2462	16.4	≥0.5
802.11n20	Low	2412	17.76	≥0.5
	Middle	2437	17.76	≥0.5
	High	2462	17.68	≥0.5
BLE	Low	2402	0.73	≥0.5
	Middle	2440	0.72	≥0.5
	High	2480	0.72	≥0.5

802.11b Low Channel



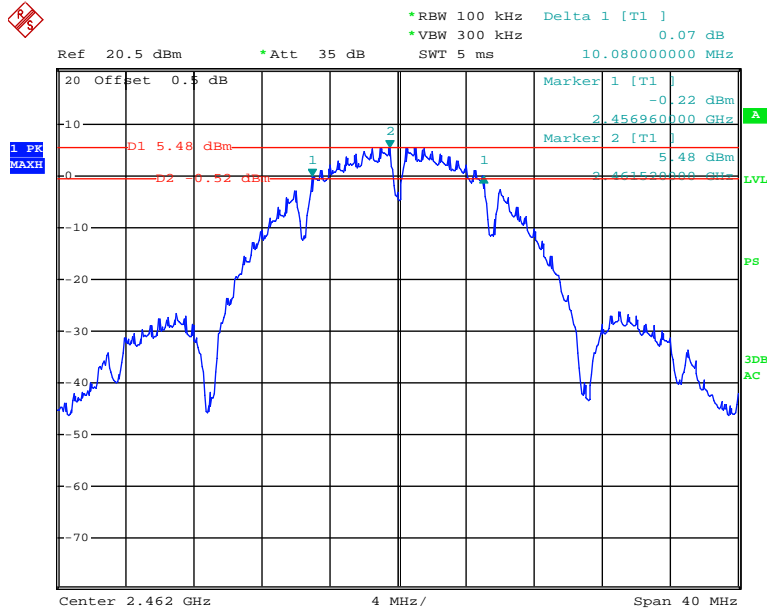
Date: 16.MAR.2017 23:51:54

802.11b Middle Channel



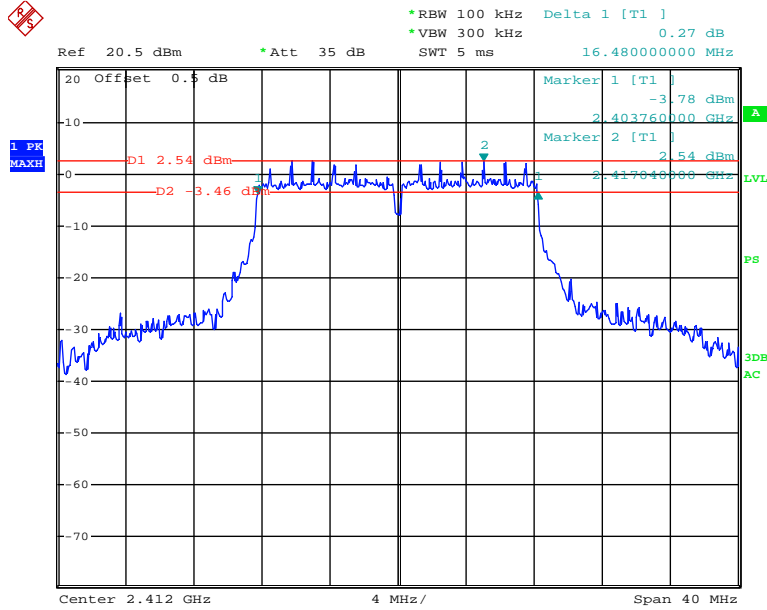
Date: 16.MAR.2017 23:54:16

802.11b High Channel



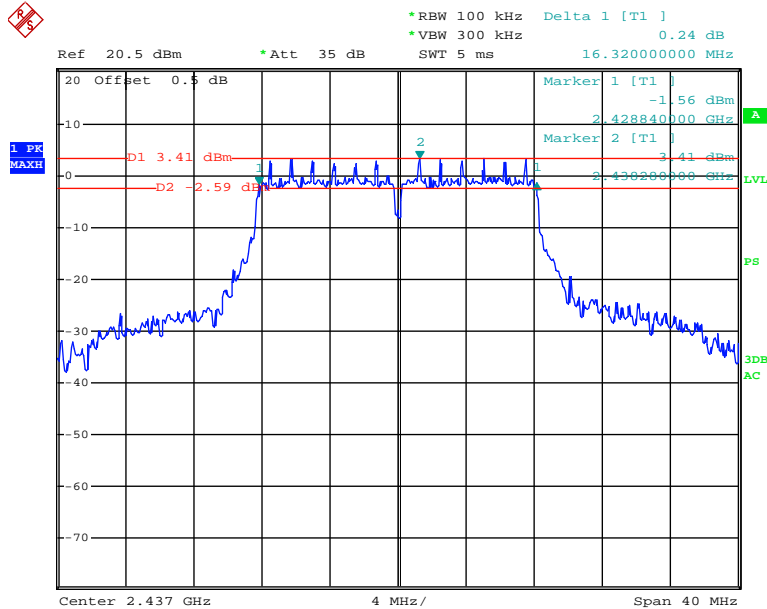
Date: 16.MAR.2017 23:56:36

802.11g Low Channel



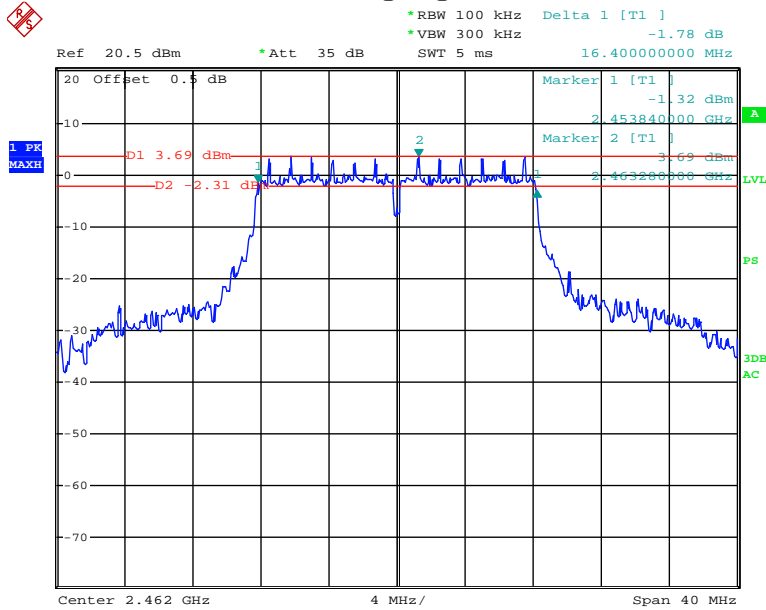
Date: 17.MAR.2017 00:38:40

802.11g Middle Channel



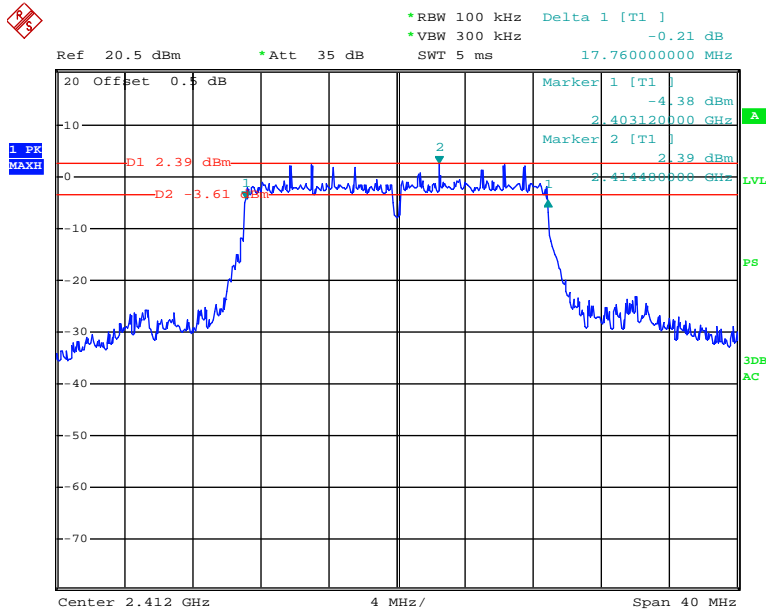
Date: 17.MAR.2017 00:36:22

802.11g High Channel



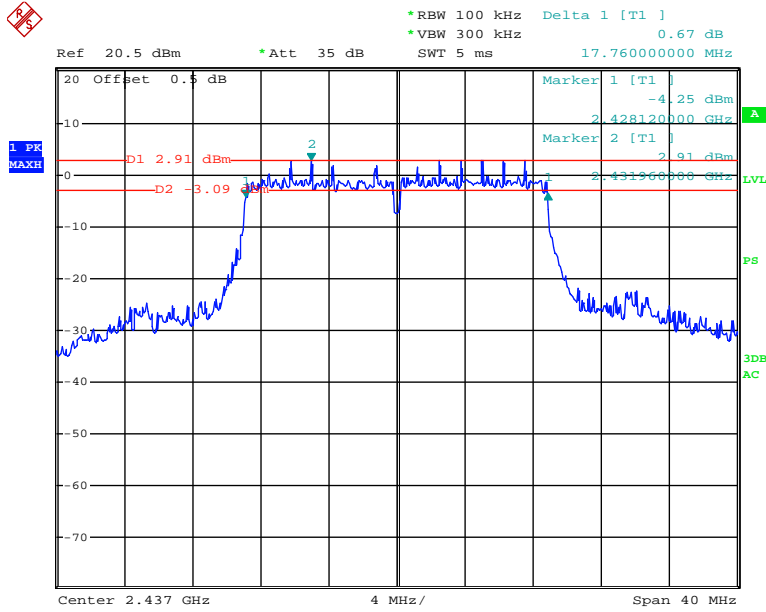
Date: 17.MAR.2017 00:30:28

802.11n ht20 Low Channel



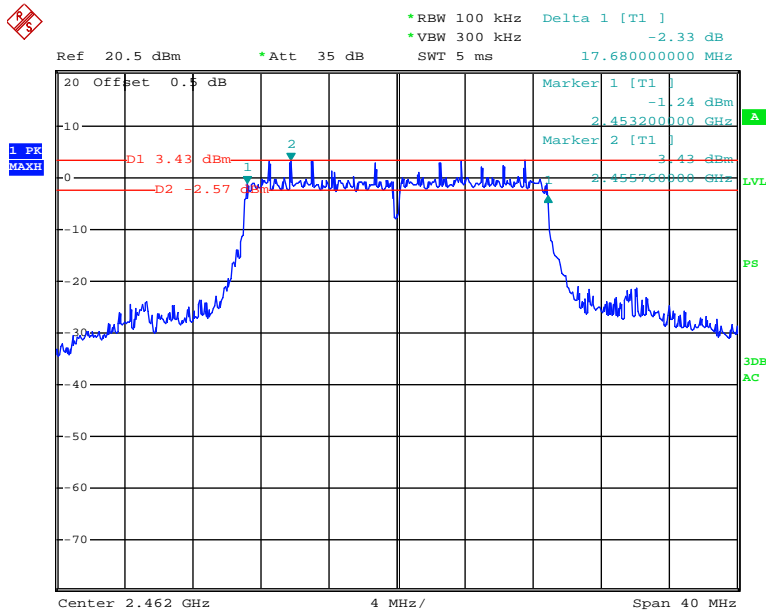
Date: 17.MAR.2017 00:43:51

802.11n ht20 Middle Channel



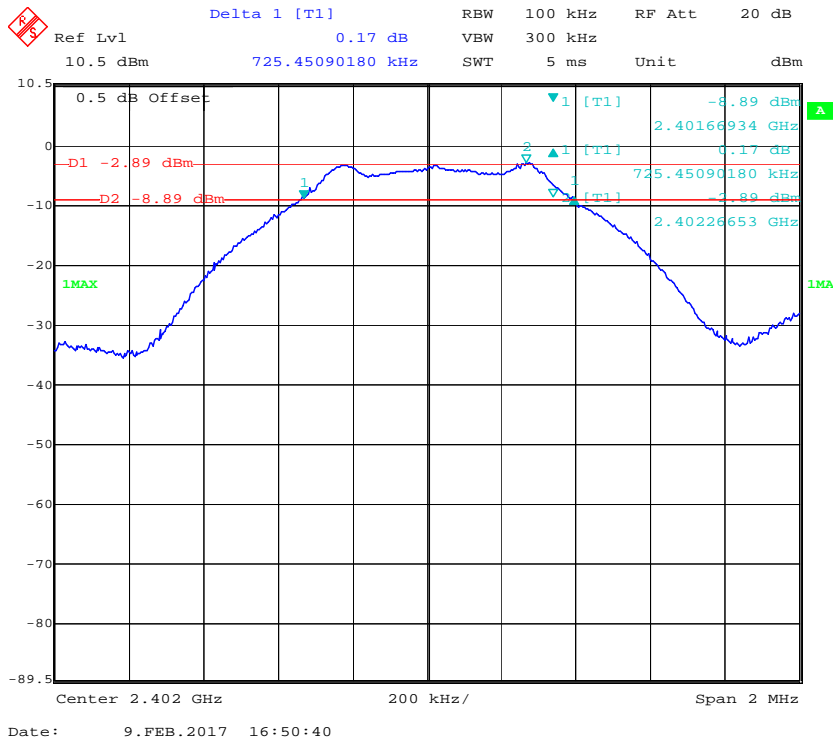
Date: 17.MAR.2017 00:53:57

802.11n ht20 High Channel

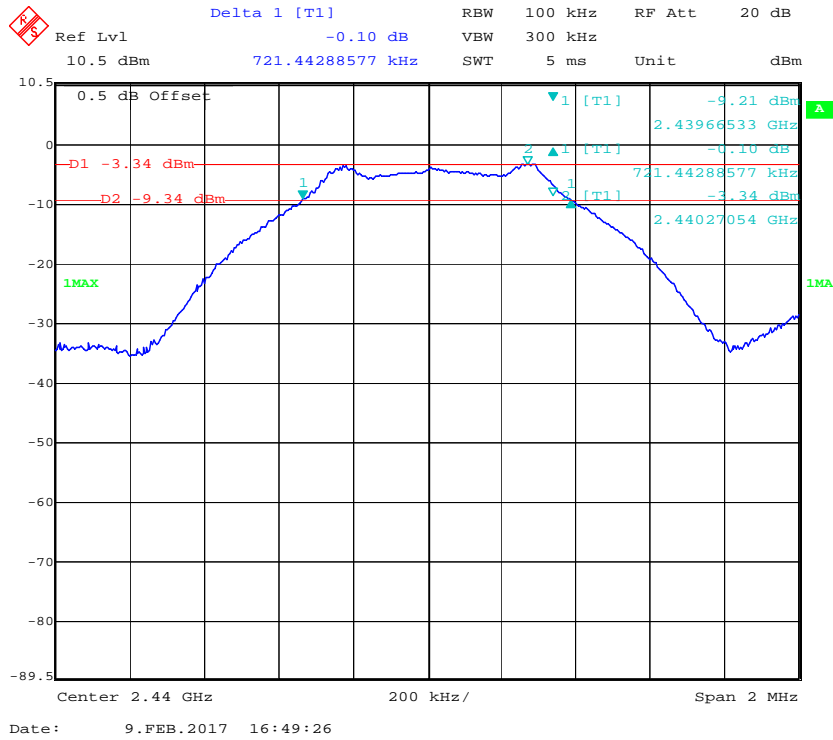


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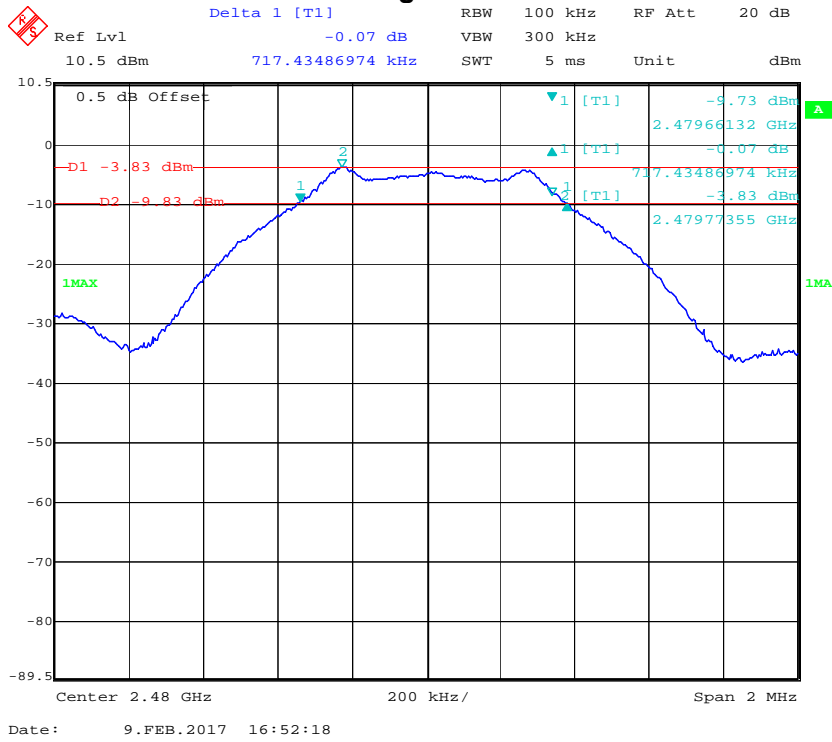
BLE Low Channel



BLE Middle Channel



BLE High Channel



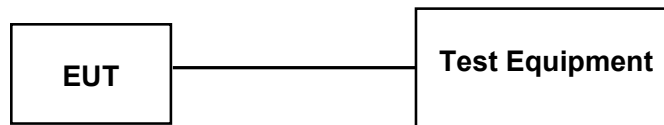
FCC §15.247(b) (3) - MAXIMUM PEAK CONDUCTED OUTPUT POWER

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 a Test Equipment.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Wideband Power Sensor	N1921A	MY54170074	2017-01-03	2018-01-03
Agilent	P-Series Power Meter	N1912A	MY5000798	2017-01-03	2018-01-03
Unknown	RF Cable	Unknown	C-5	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:	21.3~21.2 °C
Relative Humidity:	44~54 %
ATM Pressure:	96.2~96kPa

The testing was performed by Kevin Hu from 2017-02-09 to 2017-03-17.

Test Mode: Transmitting

Test Mode	Channel	Frequency (MHz)	Conducted Peak Output Power (dBm)	Conducted RMS Output Power (dBm)	Limit (dBm)
802.11b	Low	2412	11.48	9.05	30
	Middle	2437	11.78	9.14	30
	High	2462	11.46	9.19	30
802.11g	Low	2412	14.8	8.79	30
	Middle	2437	15.13	8.92	30
	High	2462	15.43	9.26	30
802.11n 20	Low	2412	15.2	8.67	30
	Middle	2437	15.3	8.87	30
	High	2462	15.74	9.01	30
BLE	Low	2402	-2.36	/	30
	Middle	2440	-2.88	/	30
	High	2480	-3.23	/	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
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2016-12-02	2017-12-01
Unknown	RF Cable	Unknown	C-5	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

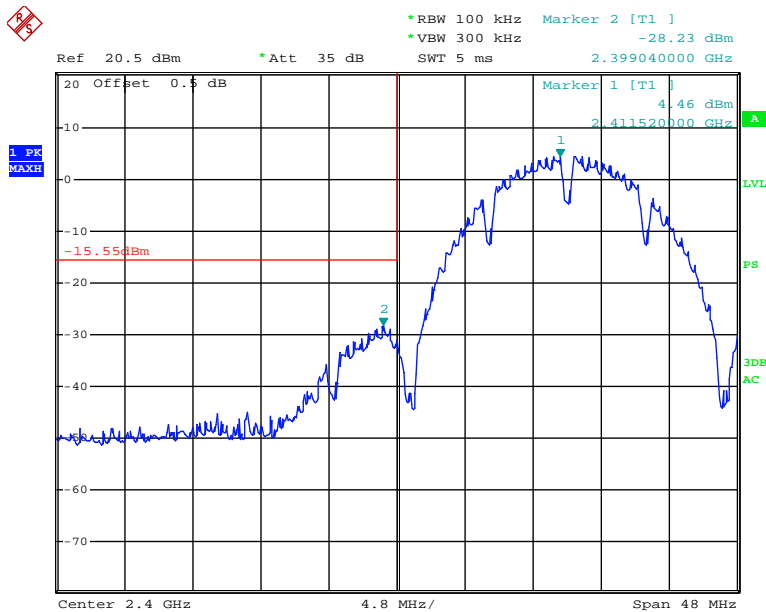
Temperature:	21.3~21.2 °C
Relative Humidity:	44~54 %
ATM Pressure:	96.2~96kPa

The testing was performed by Kevin Hu from 2017-02-09 to 2017-03-17.

Test mode: Transmitting

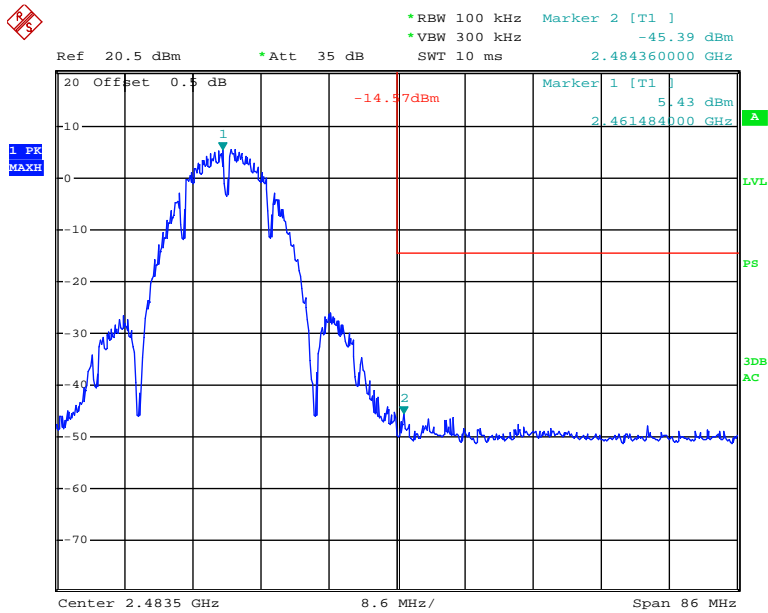
Test Result: Compliant. Please refer to following plots.

802.11b Band Edge, Left Side



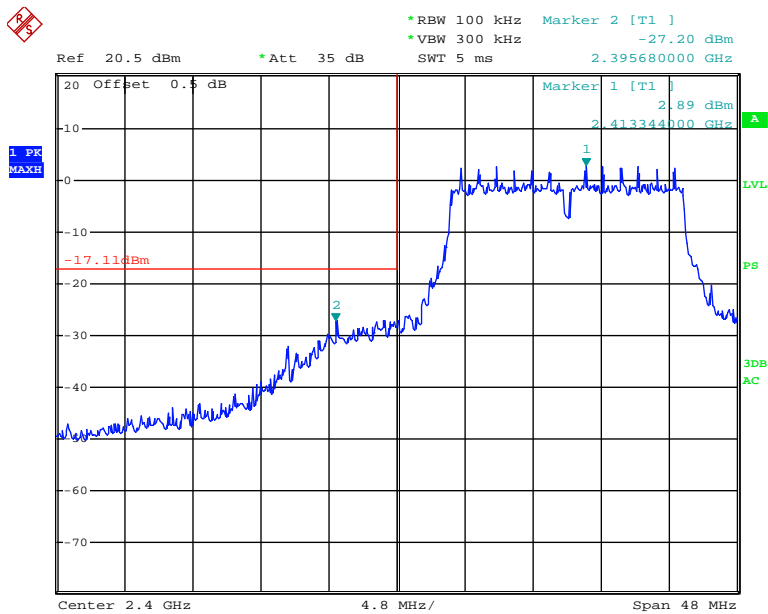
Date: 16.MAR.2017 23:53:42

802.11b Band Edge, Right Side



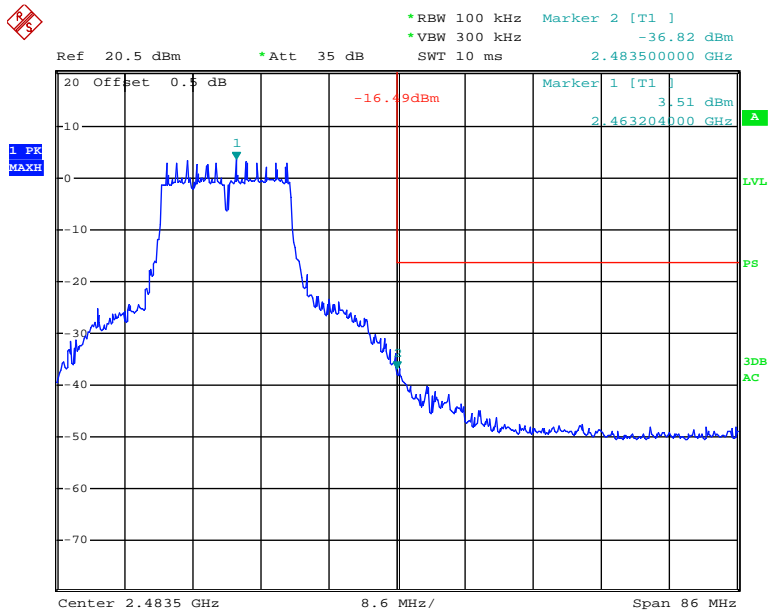
Date: 17.MAR.2017 00:00:53

802.11g Band Edge, Left Side



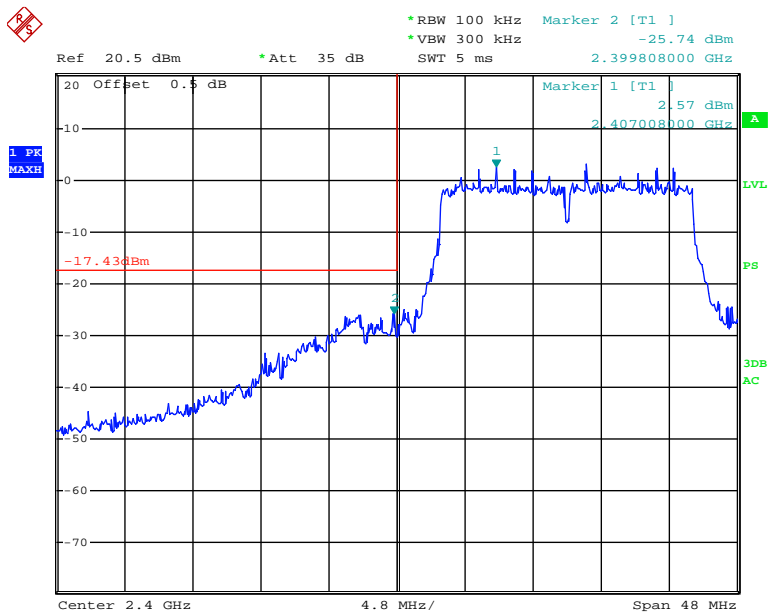
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802.11g Band Edge, Right Side



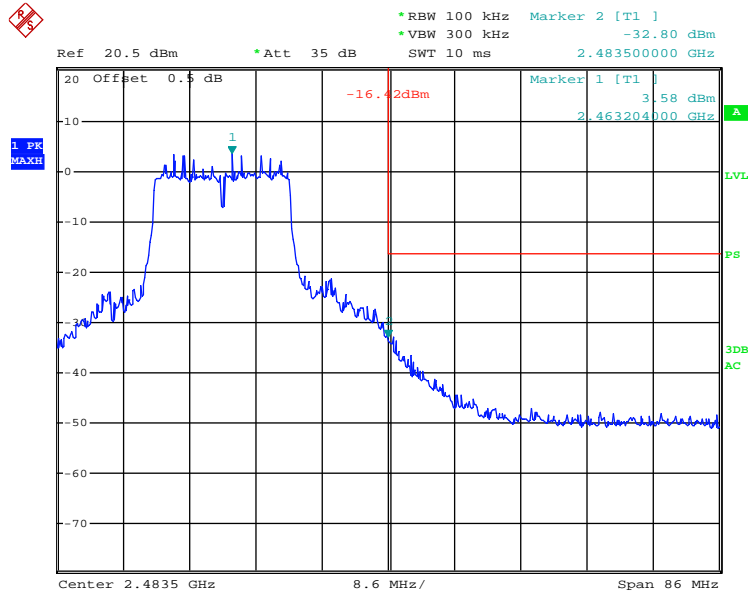
Date: 17.MAR.2017 00:32:31

802.11n ht20 Band Edge, Left Side



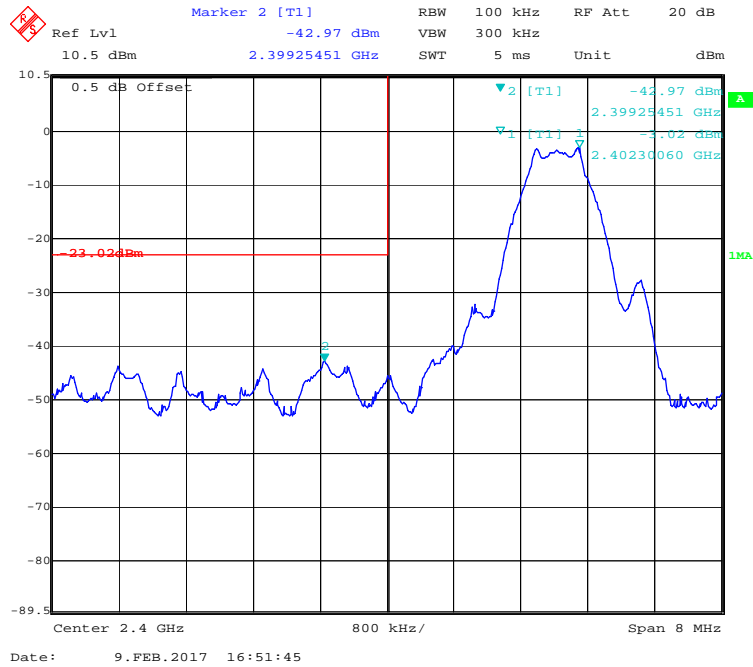
Date: 17.MAR.2017 00:51:11

802.11n ht20 Band Edge, Right Side



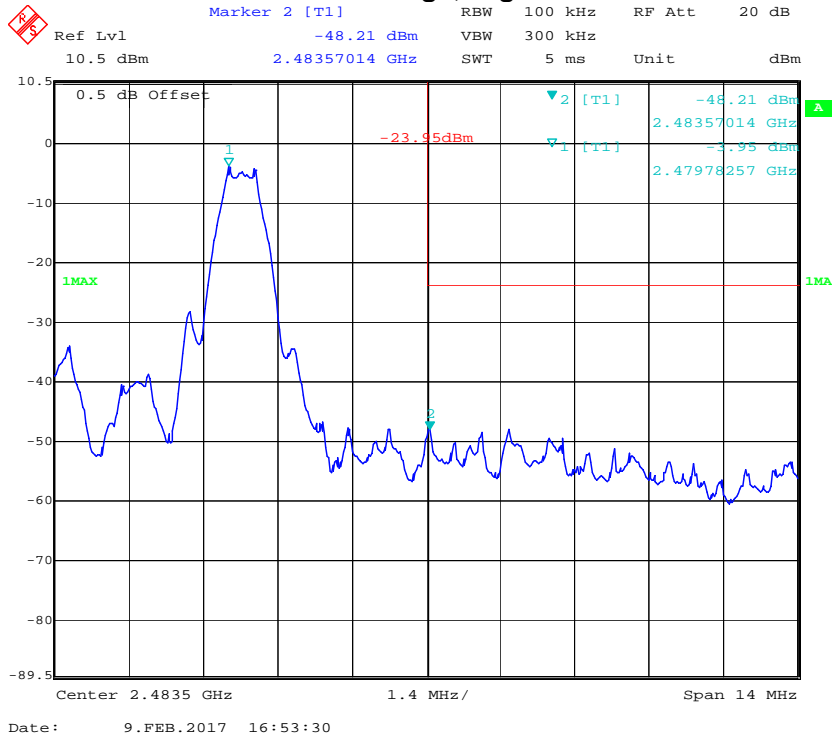
Date: 17.MAR.2017 01:02:27

BLE Band Edge, Left Side



Date: 9.FEB.2017 16:51:45

BLE Band Edge, Right Side



FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

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

Test Procedure

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. Set the RBW = 3 kHz, VBW = 10 kHz, Set the span to 1.5 times the DTS bandwidth.
4. Use the peak marker function to determine the maximum amplitude level.

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
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2016-12-02	2017-12-01
Unknown	RF Cable	Unknown	C-5	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:	21.3~21.2 °C
Relative Humidity:	44~54 %
ATM Pressure:	96.2~96kPa

The testing was performed by Kevin Hu from 2017-02-09 to 2017-03-17.

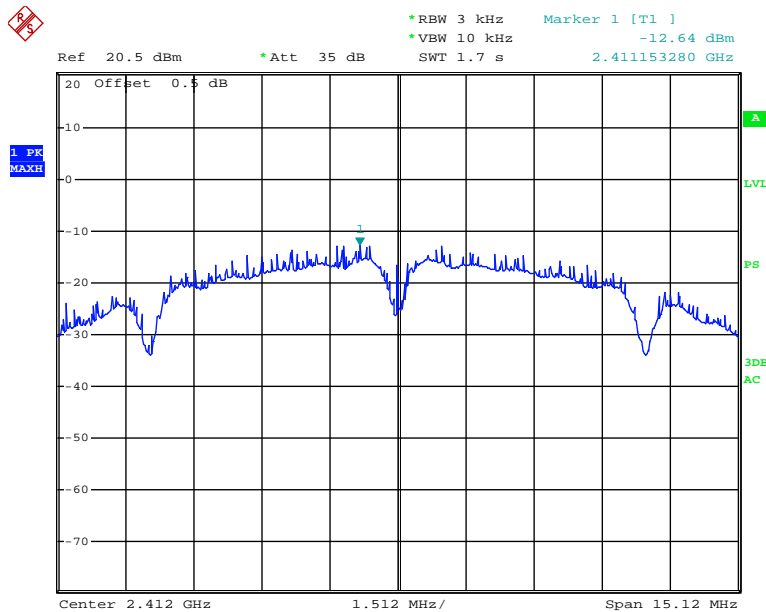
Test Result: Compliance

Test Mode: Transmitting

Test Mode	Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
802.11b	Low	2412	-12.64	8
	Middle	2437	-11.11	8
	High	2462	-10.98	8
802.11g	Low	2412	-14.11	8
	Middle	2437	-13.9	8
	High	2462	-12.54	8
802.11n20	Low	2412	-13.55	8
	Middle	2437	-13.76	8
	High	2462	-12.58	8
BLE	Low	2402	-15.18	8
	Middle	2440	-15.9	8
	High	2480	-17.13	8

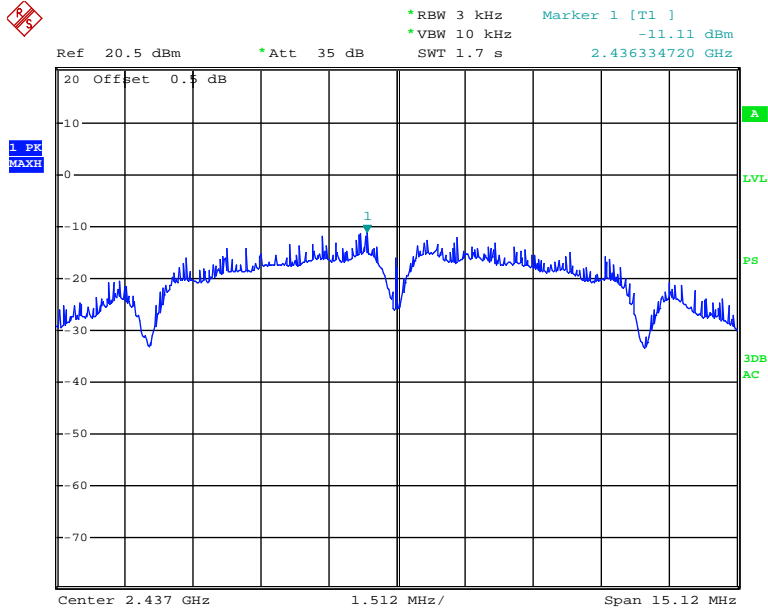
Please refer to the following plots

802.11b Low Channel



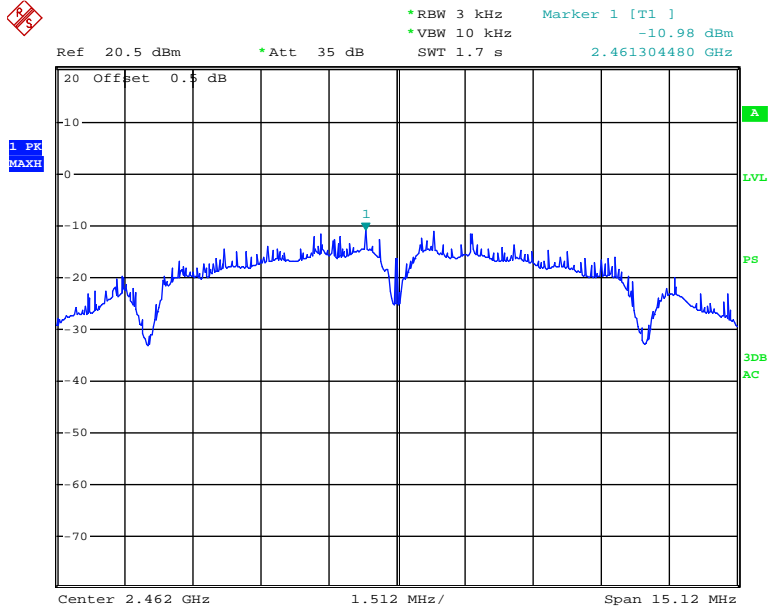
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802.11b Middle Channel



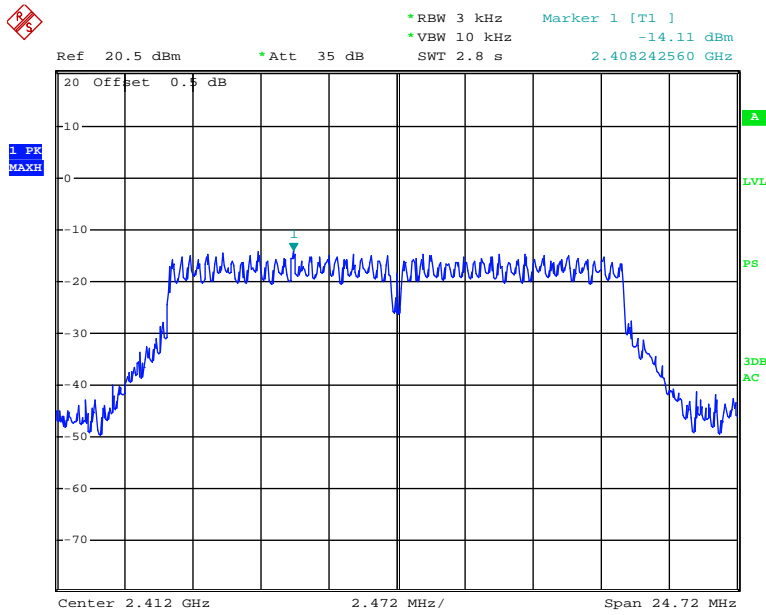
Date: 16.MAR.2017 23:55:48

802.11b High Channel



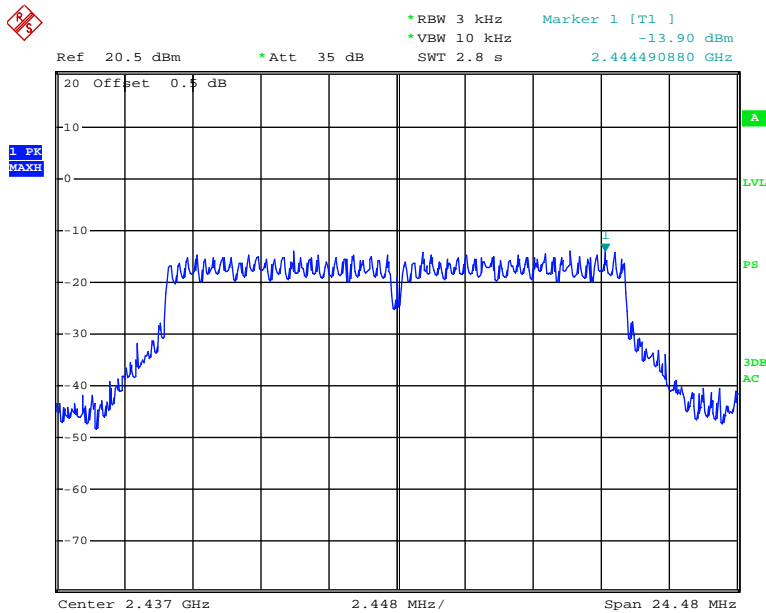
Date: 17.MAR.2017 00:00:33

802.11g Low Channel



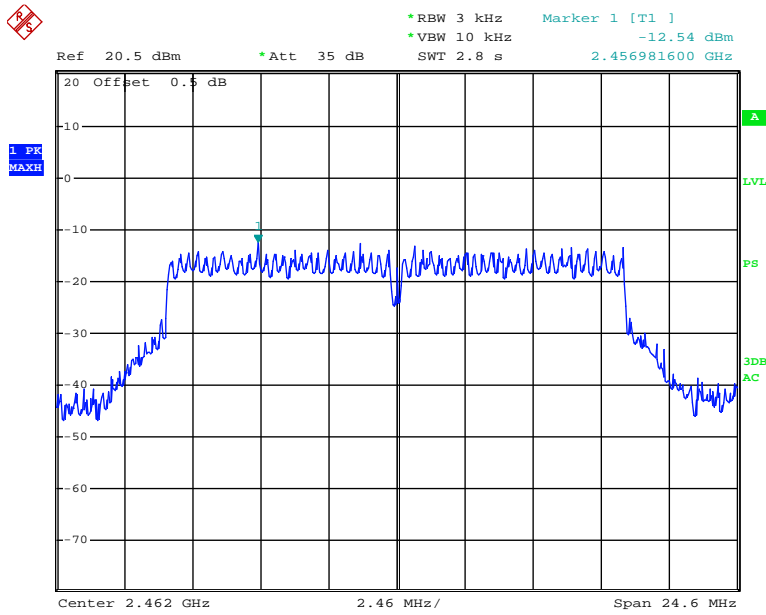
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802.11g Middle Channel



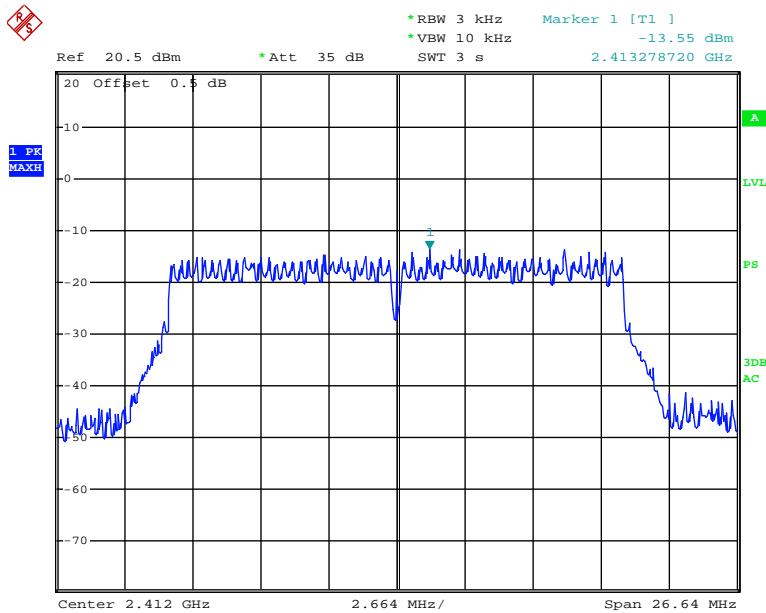
Date: 17.MAR.2017 00:37:55

802.11g High Channel



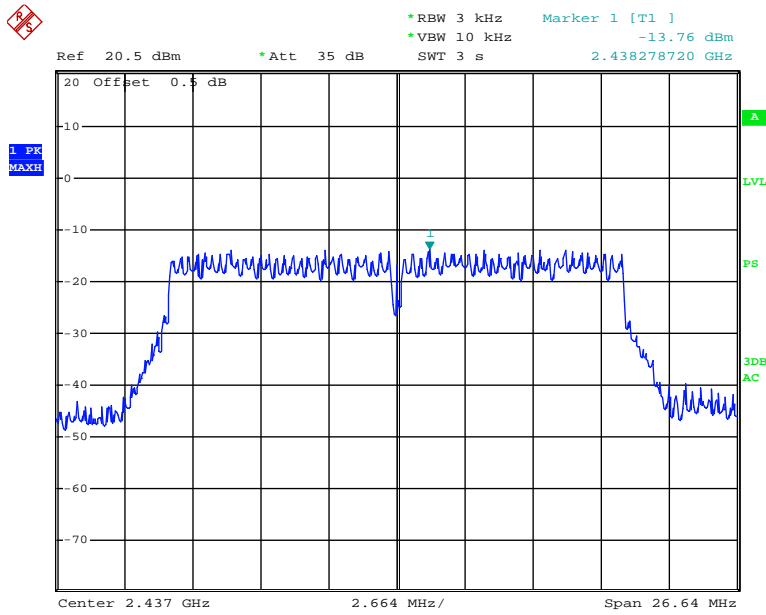
Date: 17.MAR.2017 00:32:04

802.11n ht20 Low Channel



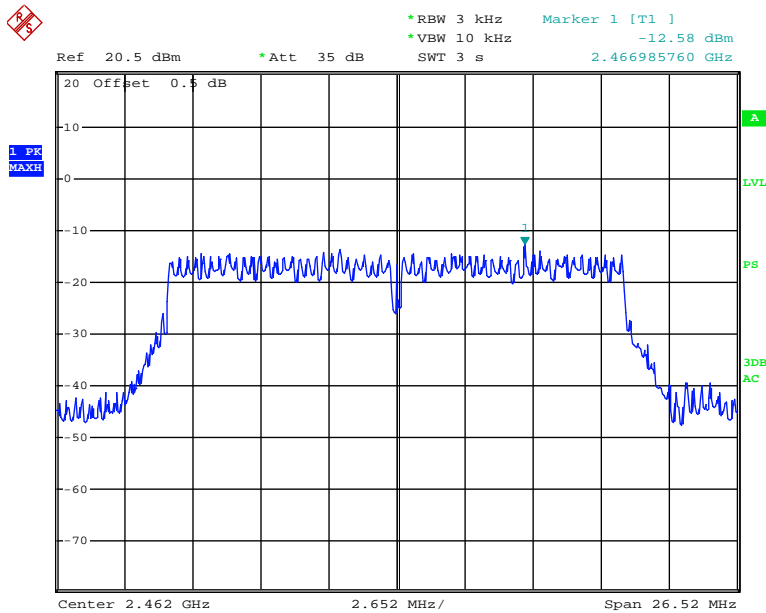
Date: 17.MAR.2017 00:50:44

802.11n ht20 Middle Channel



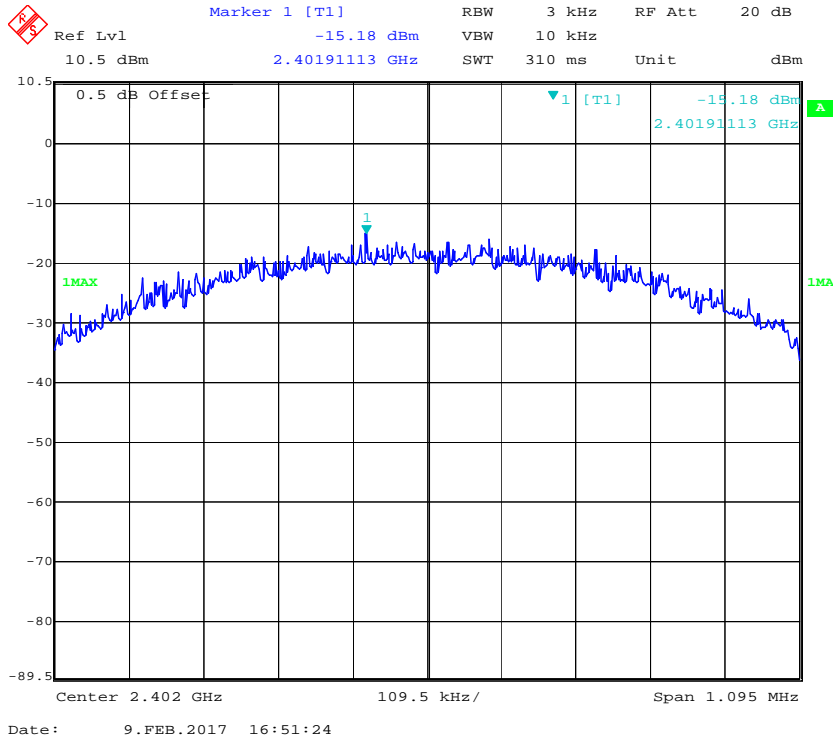
Date: 17.MAR.2017 00:59:27

802.11n ht20 High Channel

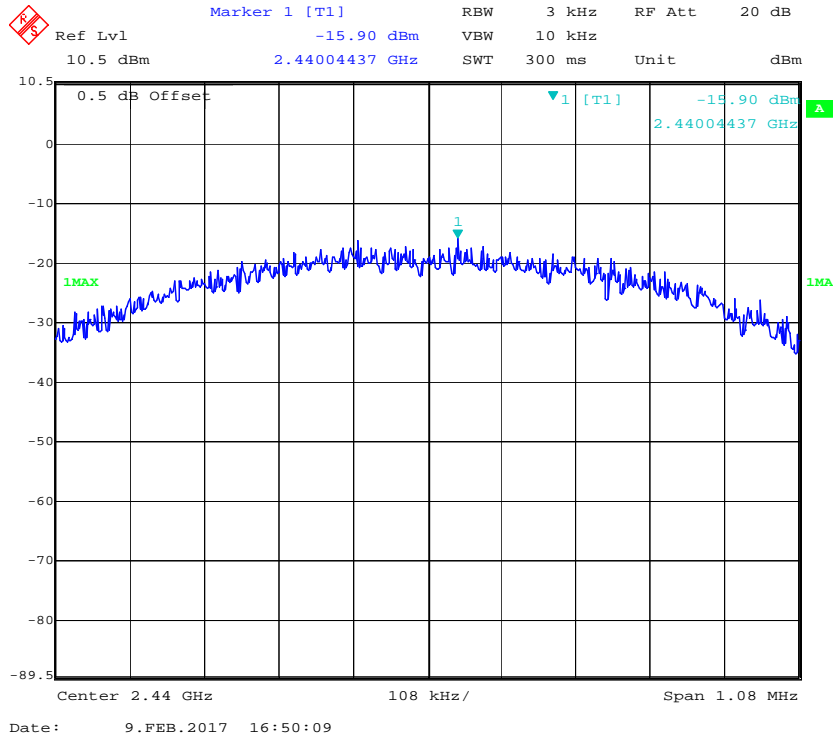


Date: 17.MAR.2017 01:02:01

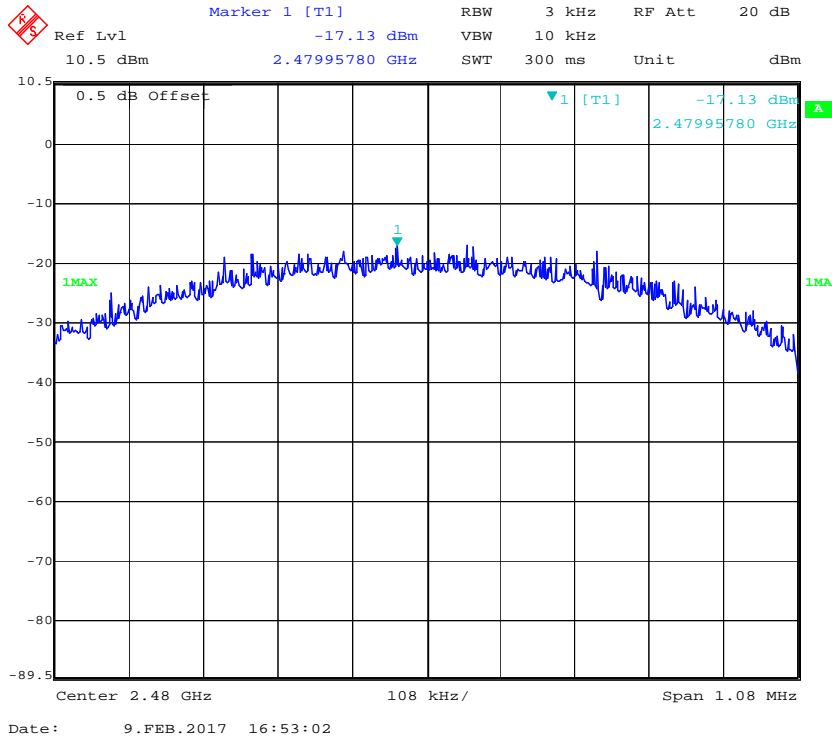
BLE Low Channel



BLE Middle Channel



BLE High Channel



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