FCC PART 15.247

TEST REPORT

For

SHENZHEN TENDA TECHNOLOGY CO., LTD.

6-8 Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China. 518052

FCC ID: V7TD151V3

Report Type:	**Product Name:**
Original Report	150Mbps Wireless N ADSL2+ Modem Router

Test Engineer:	*Liron Bian*
Report Number:	RDG170626003
Report Date:	2017-07-12
Reviewed By:	Henry Ding EMC Leader
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Chengdu) No.5040, Huilongwan Plaza, No.1, Shawan Road, Jinniu District, Chengdu, Sichuan, China Tel: 028-65523123, Fax: 028-65525125 www.baclcorp.com

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The ***SHENZHEN TENDA TECHNOLOGY CO., LTD.***'s product, model number: ***D151 v3(FCC ID: V7TD151V3)*** (the "EUT") in this report was a ***150Mbps Wireless N ADSL2+ Modem Router***, which was measured approximately: 19 cm (L) × 12.5 cm (W) × 4 cm (H), rated input voltage: DC9V from adapter.

Adapter information:
Model: BN049-A05009U
Input: 100-240V~50/60Hz 0.3A
Output: DC 9V, 600mA

**All measurement and test data in this report was gathered from final production sample, serial number: 170626003 (assigned by the BACL, Chengdu). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2017-06-26, and EUT conformed to test requirement.*

Objective

This report is prepared on behalf of ***SHENZHEN TENDA 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, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

No Related Submittal(s)/Grant(s)

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: ±5.13dB; and,
6 GHz to 40 GHz: ±5.47dB.

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

Test Facility

The test site used by BACL to collect test data is located in the 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.
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 were tested with Channel 3, 6 and 9.

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

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

The worst condition (maximum power) was setting by the software as following table:

Test Mode	Test Software Version	MP_TSET		
802.11b	Test Frequency	2412MHz	2442MHz	2472MHz
	Data Rate	1Mbps	1Mbps	1Mbps
	Power Level Setting	47	42	37
802.11g	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting	56	56	53
802.11n ht20	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	56	56	52
802.11n ht40	Test Frequency	2422MHz	2437MHz	2452MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	51	51	48

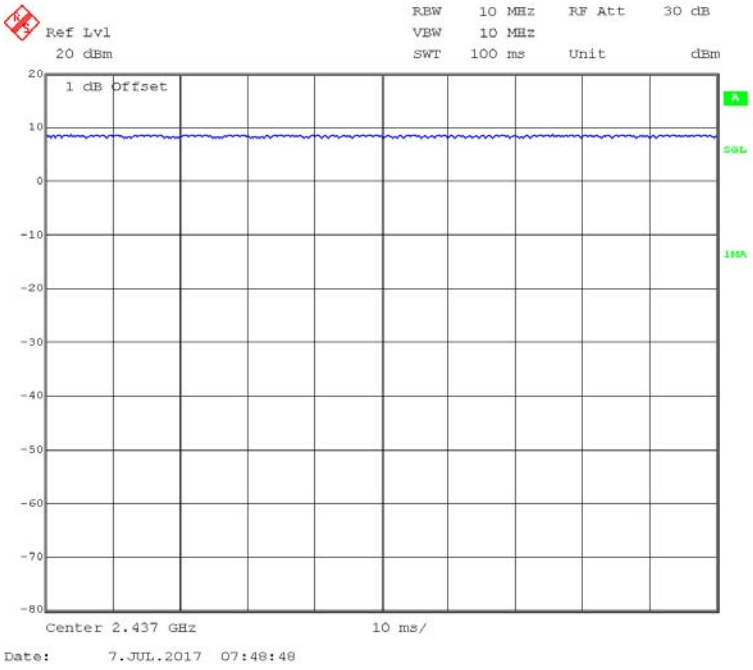
The maximum duty cycle as following table:

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
802.11n ht40	100	100	100

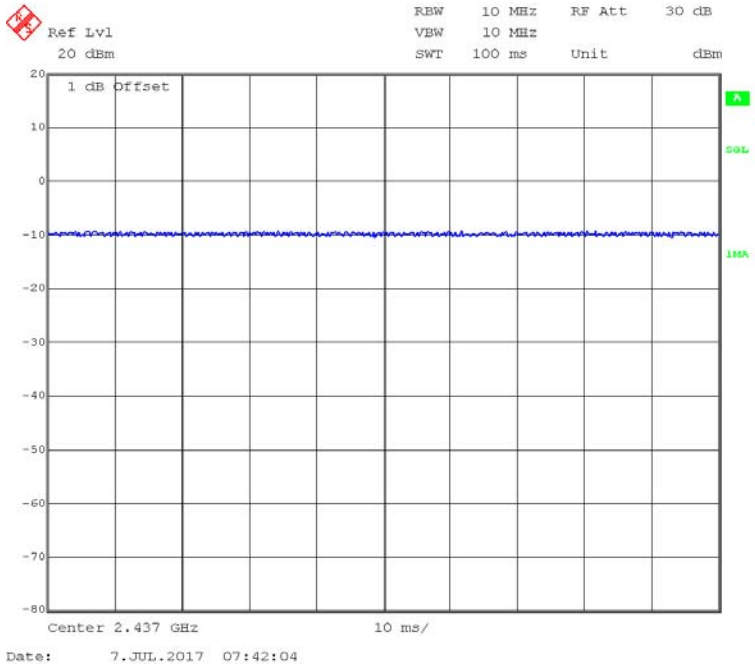
802.11b

802.11g

802.11n ht20



802.11n ht40



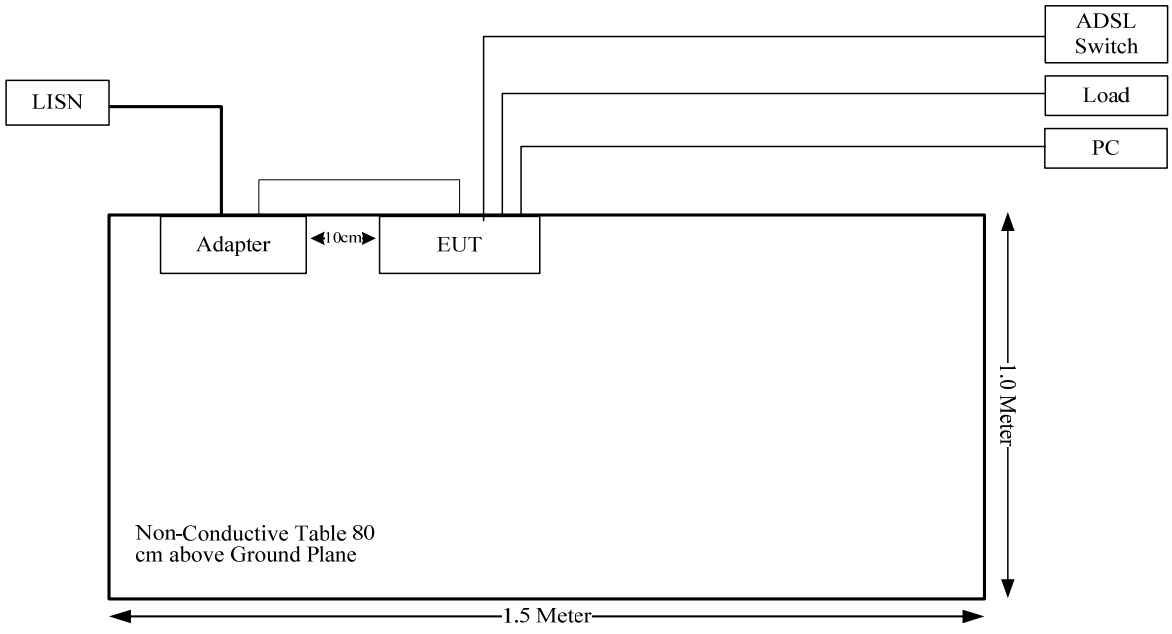
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
IBM	PC	8176	99Y7315
I.T.E	ADSL Switch	C0548B-480-050	N/A

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
RJ45 cable	No	No	10	EUT	PC
RJ45 cable*3	No	No	10	EUT	Load
RJ11 cable	No	No	10	EUT	ADSL Switch
Adapter Cable	No	No	1.3	Adapter	EUT

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.247 (i) & §1.1310 & §2.1091	Maximum Permissible Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliance
§15.247(b)(3)	Maximum conducted output power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

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

Applicable Standard

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

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

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

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

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

Calculated Formulary:

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

Calculated Data:

Frequency (MHz)	**Antenna Gain**		**Tune-up Power**		**Evaluation Distance (cm)**	**Power Density (mW/cm^2)**	**MPE Limit (mW/cm^2)**
	(dBi)	**(numeric)**	**(dBm)**	**(mW)**			
2412-2462	5	3.16	25	316.23	20.00	0.1990	1.0

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

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 external antenna permanently attached to the unit, and the antenna gain is 5.0 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

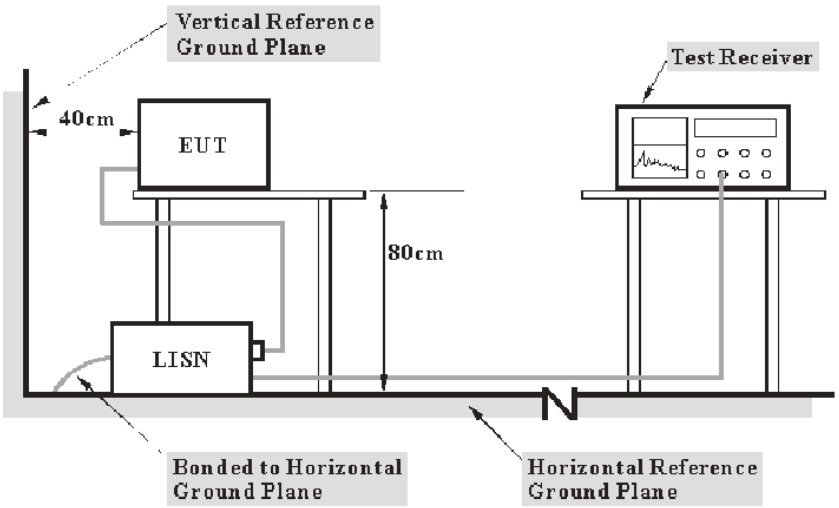
Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207(a)

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:

Margin = Limit – 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	100018	2016-12-02	2017-12-01
Unknown	Conducted Cable	Unknown	NO.5	2016-11-10	2017-11-09
Rohde & Schwarz	PULSE LIMITER	ESH3Z2	DE14781	2016-10-31	2017-10-30
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A

*** 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

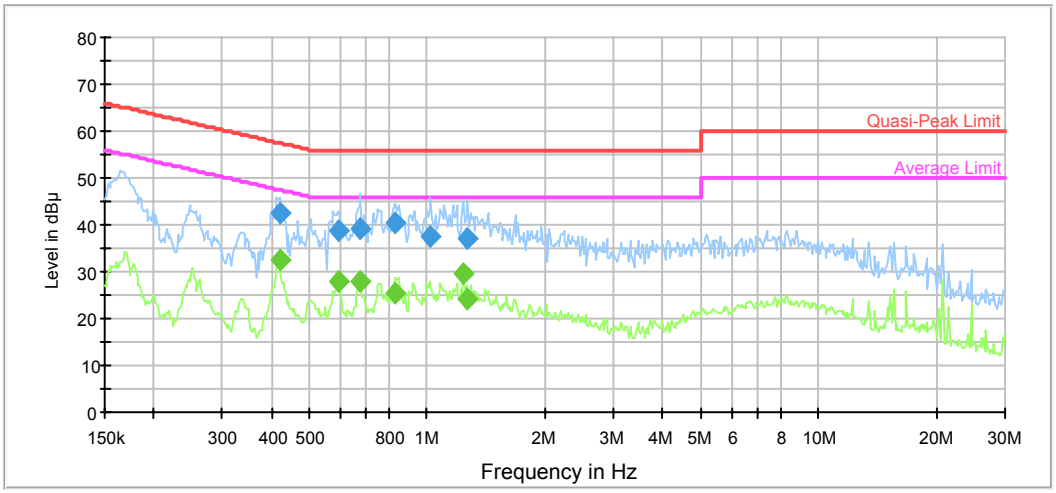
Environmental Conditions

Temperature:	25.8°C
Relative Humidity:	58.6 %
ATM Pressure:	100.1 kPa

The testing was performed by Liron Bian on 2017-07-05.

Test Mode: Operating

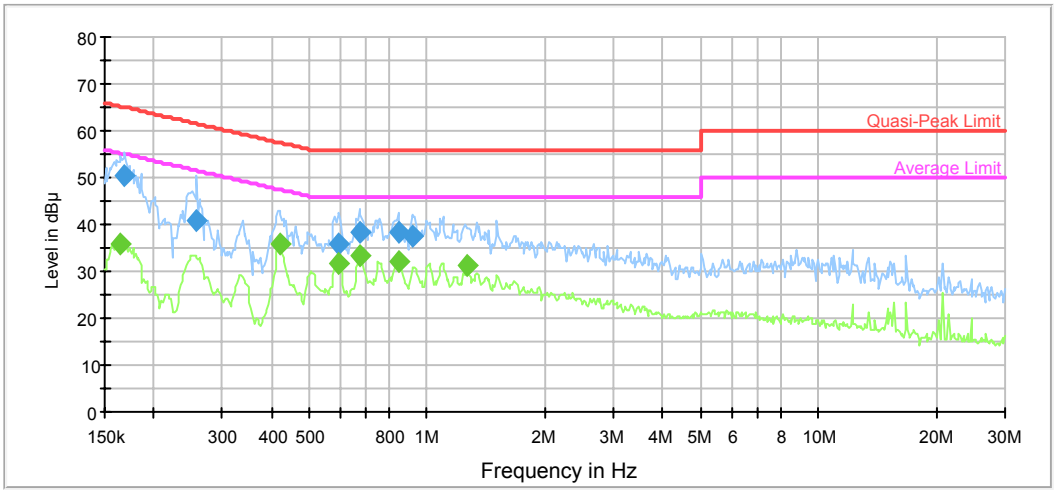
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.419276	42.7	9.000	L1	19.8	14.8	57.5	Compliance
0.590613	38.9	9.000	L1	19.8	17.1	56.0	Compliance
0.676289	39.0	9.000	L1	19.7	17.0	56.0	Compliance
0.831967	40.5	9.000	L1	19.7	15.5	56.0	Compliance
1.023481	37.5	9.000	L1	19.7	18.5	56.0	Compliance
1.269154	37.2	9.000	L1	19.7	18.8	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.419276	32.5	9.000	L1	19.8	15.0	47.5	Compliance
0.590613	27.7	9.000	L1	19.8	18.3	46.0	Compliance
0.676289	27.8	9.000	L1	19.7	18.2	46.0	Compliance
0.825364	25.3	9.000	L1	19.7	20.7	46.0	Compliance
1.239175	29.8	9.000	L1	19.7	16.2	46.0	Compliance
1.259081	24.0	9.000	L1	19.7	22.0	46.0	Compliance

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.169044	50.3	9.000	N	19.7	14.7	65.0	Compliance
0.257874	41.0	9.000	N	19.6	20.5	61.5	Compliance
0.595338	36.0	9.000	N	19.6	20.0	56.0	Compliance
0.670921	38.2	9.000	N	19.6	17.8	56.0	Compliance
0.845331	38.2	9.000	N	19.6	17.8	56.0	Compliance
0.915445	37.7	9.000	N	19.7	18.3	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.165051	35.8	9.000	N	19.7	19.4	55.2	Compliance
0.419276	35.9	9.000	N	19.6	11.6	47.5	Compliance
0.590613	31.5	9.000	N	19.6	14.5	46.0	Compliance
0.676289	33.5	9.000	N	19.6	12.5	46.0	Compliance
0.845331	32.2	9.000	N	19.6	13.8	46.0	Compliance
1.259081	31.2	9.000	N	19.6	14.8	46.0	Compliance

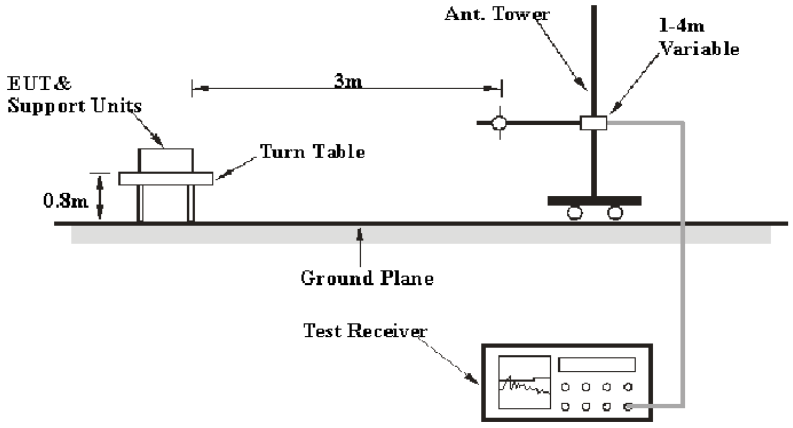
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

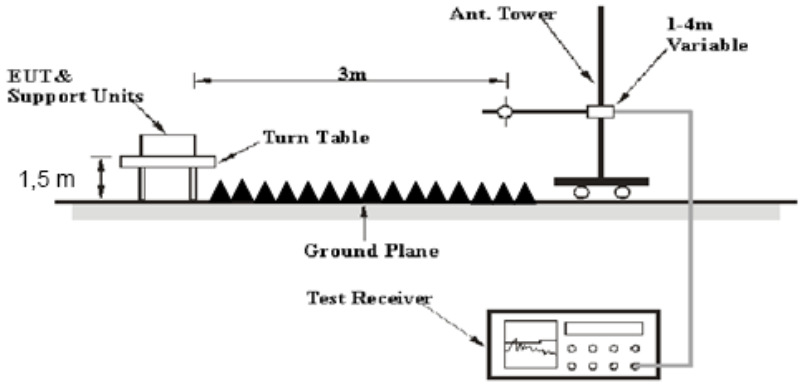
FCC §15.247 (d); §15.209; §15.205;

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 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:

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:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

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

Margin = Limit –Corrected Amplitude

Test 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	N/A	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:	29.3 °C
Relative Humidity:	55.3 %
ATM Pressure:	100.1 kPa

** The testing was performed by Liron Bian on 2017-07-06.*

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	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	73.40	PK	H	23.50	3.00	0.00	99.9	N/A	N/A
2412	68.95	AV	H	23.50	3.00	0.00	95.45	N/A	N/A
2412	84.56	PK	V	23.50	3.00	0.00	111.06	N/A	N/A
2412	80.78	AV	V	23.50	3.00	0.00	107.28	N/A	N/A
2387	32.42	PK	V	23.58	3.00	0.00	59	74	15
2387	19.05	AV	V	23.58	3.00	0.00	45.63	54	8.37
4824	46.07	PK	V	30.84	5.11	26.87	55.15	74	18.85
4824	41.86	AV	V	30.84	5.11	26.87	50.94	54	3.06
7236	40.04	PK	V	34.77	6.18	26.36	54.63	74	19.37
7236	28.23	AV	V	34.77	6.18	26.36	42.82	54	11.18
3652	36.80	PK	V	27.61	4.40	26.58	42.23	74	31.77
3652	25.64	AV	V	27.61	4.40	26.58	31.07	54	22.93
450.01	41.59	QP	H	17.15	1.52	28.52	31.74	46.00	14.26
700.27	39.72	QP	H	20.80	1.93	28.72	33.73	46.00	12.27
Middle Channel: 2437 MHz									
2437	69.73	PK	H	23.41	3.00	0.00	96.14	N/A	N/A
2437	65.84	AV	H	23.41	3.00	0.00	92.25	N/A	N/A
2437	82.13	PK	V	23.41	3.00	0.00	108.54	N/A	N/A
2437	78.72	AV	V	23.41	3.00	0.00	105.13	N/A	N/A
4874	45.77	PK	V	31.00	5.09	26.87	54.99	74	19.01
4874	41.35	AV	V	31.00	5.09	26.87	50.57	54	3.43
7311	38.35	PK	V	34.92	6.21	26.40	53.08	74	20.92
7311	26.45	AV	V	34.92	6.21	26.40	41.18	54	12.82
3258	42.65	PK	V	25.64	3.82	26.50	45.61	74	28.39
3258	30.34	AV	V	25.64	3.82	26.50	33.3	54	20.7
1652	32.14	PK	V	24.34	2.79	26.48	32.79	74	41.21
1652	22.43	AV	V	24.34	2.79	26.48	23.08	54	30.92
450.01	41.86	QP	H	17.15	1.52	28.52	32.01	46.00	13.99
700.27	39.86	QP	H	20.80	1.93	28.72	33.87	46.00	12.13
High Channel: 2462 MHz									
2462	66.03	PK	H	23.33	2.99	0.00	92.35	N/A	N/A
2462	62.59	AV	H	23.33	2.99	0.00	88.91	N/A	N/A
2462	80.65	PK	V	23.33	2.99	0.00	106.97	N/A	N/A
2462	77.19	AV	V	23.33	2.99	0.00	103.51	N/A	N/A
2483.5	33.00	PK	V	23.26	2.99	0.00	59.25	74	14.75
2483.5	20.89	AV	V	23.26	2.99	0.00	47.14	54	6.86
4924	45.29	PK	V	31.16	5.07	26.88	54.64	74	19.36
4924	41.48	AV	V	31.16	5.07	26.88	50.83	54	3.17
7386	38.46	PK	V	35.07	6.25	26.43	53.35	74	20.65
7386	26.76	AV	V	35.07	6.25	26.43	41.65	54	12.35
3614	40.15	PK	V	27.46	4.35	26.58	45.38	74	28.62
3614	27.68	AV	V	27.46	4.35	26.58	32.91	54	21.09
450.01	42.7	QP	H	17.15	1.52	28.52	32.85	46.00	13.15
700.27	40.28	QP	H	20.80	1.93	28.72	34.29	46.00	11.71

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	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	73.31	PK	H	23.50	3.00	0.00	99.81	N/A	N/A
2412	64.94	AV	H	23.50	3.00	0.00	91.44	N/A	N/A
2412	84.06	PK	V	23.50	3.00	0.00	110.56	N/A	N/A
2412	75.65	AV	V	23.50	3.00	0.00	102.15	N/A	N/A
2390	41.68	PK	V	23.57	3.00	0.00	68.25	74	5.75
2390	23.98	AV	V	23.57	3.00	0.00	50.55	54	3.45
4824	44.22	PK	V	30.84	5.11	26.87	53.3	74	20.7
4824	35.97	AV	V	30.84	5.11	26.87	45.05	54	8.95
7236	40.31	PK	V	34.77	6.18	26.36	54.9	74	19.1
7236	33.63	AV	V	34.77	6.18	26.36	48.22	54	5.78
3320	45.43	PK	V	25.99	3.91	26.53	48.8	74	25.2
3320	29.89	AV	V	25.99	3.91	26.53	33.26	54	20.74
450.01	42.23	QP	H	17.15	1.52	28.52	32.38	46.00	13.62
700.27	40.72	QP	H	20.80	1.93	28.72	34.73	46.00	11.27
Middle Channel: 2437 MHz									
2437	72.38	PK	H	23.41	3.00	0.00	98.79	N/A	N/A
2437	63.65	AV	H	23.41	3.00	0.00	90.06	N/A	N/A
2437	85.38	PK	V	23.41	3.00	0.00	111.79	N/A	N/A
2437	76.80	AV	V	23.41	3.00	0.00	103.21	N/A	N/A
4874	44.73	PK	V	31.00	5.09	26.87	53.95	74	20.05
4874	37.00	AV	V	31.00	5.09	26.87	46.22	54	7.78
7311	43.88	PK	V	34.92	6.21	26.40	58.61	74	15.39
7311	36.52	AV	V	34.92	6.21	26.40	51.25	54	2.75
3696	39.86	PK	V	27.78	4.47	26.57	45.54	74	28.46
3696	27.02	AV	V	27.78	4.47	26.57	32.7	54	21.3
1475	33.09	PK	V	24.04	2.64	26.35	33.42	74	40.58
1475	21.97	AV	V	24.04	2.64	26.35	22.3	54	31.7
450.01	41.76	QP	H	17.15	1.52	28.52	31.91	46.00	14.09
700.27	41.16	QP	H	20.80	1.93	28.72	35.17	46.00	10.83
High Channel: 2462 MHz									
2462	71.09	PK	H	23.33	2.99	0.00	97.41	N/A	N/A
2462	62.17	AV	H	23.33	2.99	0.00	88.49	N/A	N/A
2462	84.81	PK	V	23.33	2.99	0.00	111.13	N/A	N/A
2462	76.48	AV	V	23.33	2.99	0.00	102.8	N/A	N/A
2483.5	40.28	PK	V	23.26	2.99	0.00	66.53	74	7.47
2483.5	24.05	AV	V	23.26	2.99	0.00	50.3	54	3.7
4924	44.17	PK	V	31.16	5.07	26.88	53.52	74	20.48
4924	36.34	AV	V	31.16	5.07	26.88	45.69	54	8.31
7386	43.81	PK	V	35.07	6.25	26.43	58.7	74	15.3
7386	35.71	AV	V	35.07	6.25	26.43	50.6	54	3.4
3147	45.45	PK	V	25.02	3.65	26.46	47.66	74	26.34
3147	34.00	AV	V	25.02	3.65	26.46	36.21	54	17.79
450.01	42.11	QP	H	17.15	1.52	28.52	32.26	46.00	13.74
700.27	40.36	QP	H	20.80	1.93	28.72	34.37	46.00	11.63

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	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	73.12	PK	H	23.50	3.00	0.00	99.62	N/A	N/A
2412	64.24	AV	H	23.50	3.00	0.00	90.74	N/A	N/A
2412	84.18	PK	V	23.50	3.00	0.00	110.68	N/A	N/A
2412	75.79	AV	V	23.50	3.00	0.00	102.29	N/A	N/A
2390	43.85	PK	V	23.57	3.00	0.00	70.42	74	3.58
2390	23.12	AV	V	23.57	3.00	0.00	49.69	54	4.31
4824	46.44	PK	V	30.84	5.11	26.87	55.52	74	18.48
4824	38.33	AV	V	30.84	5.11	26.87	47.41	54	6.59
7236	40.08	PK	V	34.77	6.18	26.36	54.67	74	19.33
7236	32.88	AV	V	34.77	6.18	26.36	47.47	54	6.53
3201	45.60	PK	V	25.33	3.73	26.48	48.18	74	25.82
3201	33.33	AV	V	25.33	3.73	26.48	35.91	54	18.09
450.01	42.38	QP	H	17.15	1.52	28.52	32.53	46.00	13.47
700.27	40.5	QP	H	20.80	1.93	28.72	34.51	46.00	11.49
Middle Channel: 2437 MHz									
2437	71.92	PK	H	23.41	3.00	0.00	98.33	N/A	N/A
2437	63.50	AV	H	23.41	3.00	0.00	89.91	N/A	N/A
2437	84.95	PK	V	23.41	3.00	0.00	111.36	N/A	N/A
2437	76.13	AV	V	23.41	3.00	0.00	102.54	N/A	N/A
4874	45.00	PK	V	31.00	5.09	26.87	54.22	74	19.78
4874	37.08	AV	V	31.00	5.09	26.87	46.3	54	7.7
7311	44.65	PK	V	34.92	6.21	26.40	59.38	74	14.62
7311	36.46	AV	V	34.92	6.21	26.40	51.19	54	2.81
3658	44.30	PK	V	27.63	4.41	26.58	49.76	74	24.24
3658	32.92	AV	V	27.63	4.41	26.58	38.38	54	15.62
1502	32.85	PK	V	24.10	2.67	26.33	33.29	74	40.71
1502	22.05	AV	V	24.10	2.67	26.33	22.49	54	31.51
450.01	43.22	QP	H	17.15	1.52	28.52	33.37	46.00	12.63
700.27	40.92	QP	H	20.80	1.93	28.72	34.93	46.00	11.07
High Channel: 2462 MHz									
2462	70.74	PK	H	23.33	2.99	0.00	97.06	N/A	N/A
2462	61.61	AV	H	23.33	2.99	0.00	87.93	N/A	N/A
2462	83.43	PK	V	23.33	2.99	0.00	109.75	N/A	N/A
2462	74.79	AV	V	23.33	2.99	0.00	101.11	N/A	N/A
2483.5	41.78	PK	V	23.26	2.99	0.00	68.03	74	5.97
2483.5	23.57	AV	V	23.26	2.99	0.00	49.82	54	4.18
4924	42.92	PK	V	31.16	5.07	26.88	52.27	74	21.73
4924	34.84	AV	V	31.16	5.07	26.88	44.19	54	9.81
7386	43.63	PK	V	35.07	6.25	26.43	58.52	74	15.48
7386	35.41	AV	V	35.07	6.25	26.43	50.3	54	3.7
3085	45.61	PK	V	24.68	3.56	26.44	47.41	74	26.59
3085	33.21	AV	V	24.68	3.56	26.44	35.01	54	18.99
450.01	42.75	QP	H	17.15	1.52	28.52	32.90	46.00	13.10
700.27	41.36	QP	H	20.80	1.93	28.72	35.37	46.00	10.63

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	Polar (H/V)	Factor (dB)					
Low Channel: 2422 MHz									
2422	67.59	PK	H	23.47	3.00	0.00	94.06	N/A	N/A
2422	58.89	AV	H	23.47	3.00	0.00	85.36	N/A	N/A
2422	79.17	PK	V	23.47	3.00	0.00	105.64	N/A	N/A
2422	70.93	AV	V	23.47	3.00	0.00	97.4	N/A	N/A
2390	38.32	PK	V	23.57	3.00	0.00	64.89	74	9.11
2390	24.14	AV	V	23.57	3.00	0.00	50.71	54	3.29
4844	42.01	PK	V	30.90	5.10	26.87	51.14	74	22.86
4844	33.95	AV	V	30.90	5.10	26.87	43.08	54	10.92
7266	36.39	PK	V	34.83	6.19	26.38	51.03	74	22.97
7266	29.38	AV	V	34.83	6.19	26.38	44.02	54	9.98
3147	46.34	PK	V	25.02	3.65	26.46	48.55	74	25.45
3147	33.63	AV	V	25.02	3.65	26.46	35.84	54	18.16
450.01	42.28	QP	H	17.15	1.52	28.52	32.43	46.00	13.57
700.27	41.8	QP	H	20.80	1.93	28.72	35.81	46.00	10.19
Middle Channel: 2437 MHz									
2437	66.68	PK	H	23.41	3.00	0.00	93.09	N/A	N/A
2437	58.20	AV	H	23.41	3.00	0.00	84.61	N/A	N/A
2437	79.75	PK	V	23.41	3.00	0.00	106.16	N/A	N/A
2437	70.86	AV	V	23.41	3.00	0.00	97.27	N/A	N/A
4874	43.20	PK	V	31.00	5.09	26.87	52.42	74	21.58
4874	34.95	AV	V	31.00	5.09	26.87	44.17	54	9.83
7311	35.96	PK	V	34.92	6.21	26.40	50.69	74	23.31
7311	28.74	AV	V	34.92	6.21	26.40	43.47	54	10.53
3025	46.74	PK	V	24.34	3.47	26.42	48.13	74	25.87
3025	33.88	AV	V	24.34	3.47	26.42	35.27	54	18.73
1258	37.00	PK	V	23.47	2.34	26.56	36.25	74	37.75
1258	24.13	AV	V	23.47	2.34	26.56	23.38	54	30.62
450.01	42.58	QP	H	17.15	1.52	28.52	32.73	46.00	13.27
700.27	41.69	QP	H	20.80	1.93	28.72	35.70	46.00	10.30
High Channel: 2452 MHz									
2452	65.47	PK	H	23.36	3.00	0.00	91.83	N/A	N/A
2452	56.76	AV	H	23.36	3.00	0.00	83.12	N/A	N/A
2452	78.25	PK	V	23.36	3.00	0.00	104.61	N/A	N/A
2452	69.66	AV	V	23.36	3.00	0.00	96.02	N/A	N/A
2483.5	37.64	PK	V	23.26	2.99	0.00	63.89	74	10.11
2483.5	24.24	AV	V	23.26	2.99	0.00	50.49	54	3.51
4904	43.79	PK	V	31.09	5.08	26.87	53.09	74	20.91
4904	36.28	AV	V	31.09	5.08	26.87	45.58	54	8.42
7356	35.97	PK	V	35.01	6.23	26.42	50.79	74	23.21
7356	28.83	AV	V	35.01	6.23	26.42	43.65	54	10.35
3524	43.98	PK	V	27.10	4.22	26.59	48.71	74	25.29
3524	31.46	AV	V	27.10	4.22	26.59	36.19	54	17.81
450.01	42.85	QP	H	17.15	1.52	28.52	33.00	46.00	13.00
700.27	41.83	QP	H	20.80	1.93	28.72	35.84	46.00	10.16

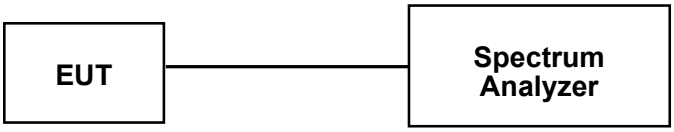
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

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) ≥ 3×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:	28.7 °C
Relative Humidity:	49.2 %
ATM Pressure:	100.1 kPa

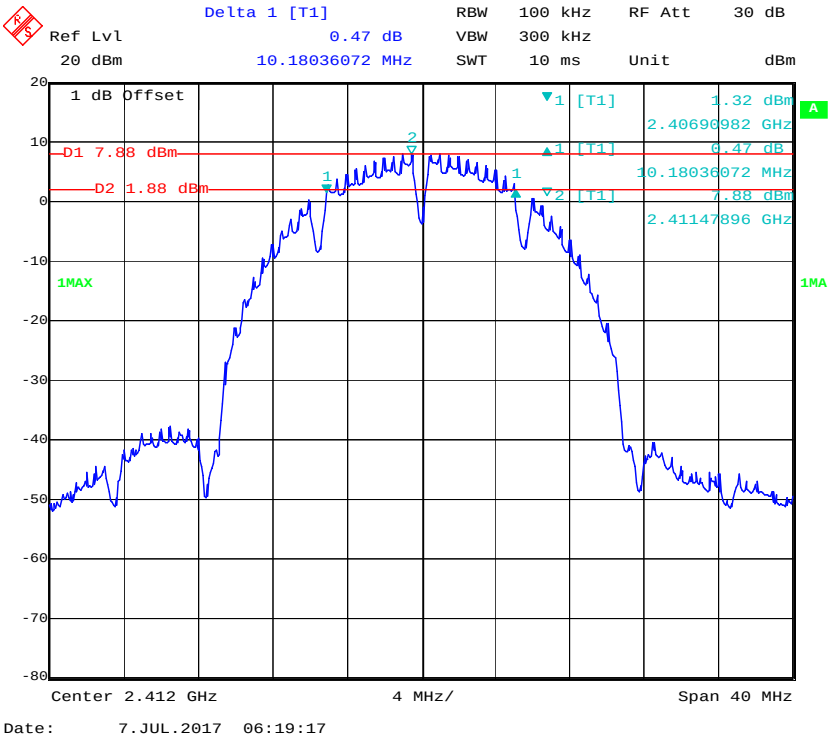
** The testing was performed by Liron Bian on 2017-07-07.*

Test Mode: Transmitting

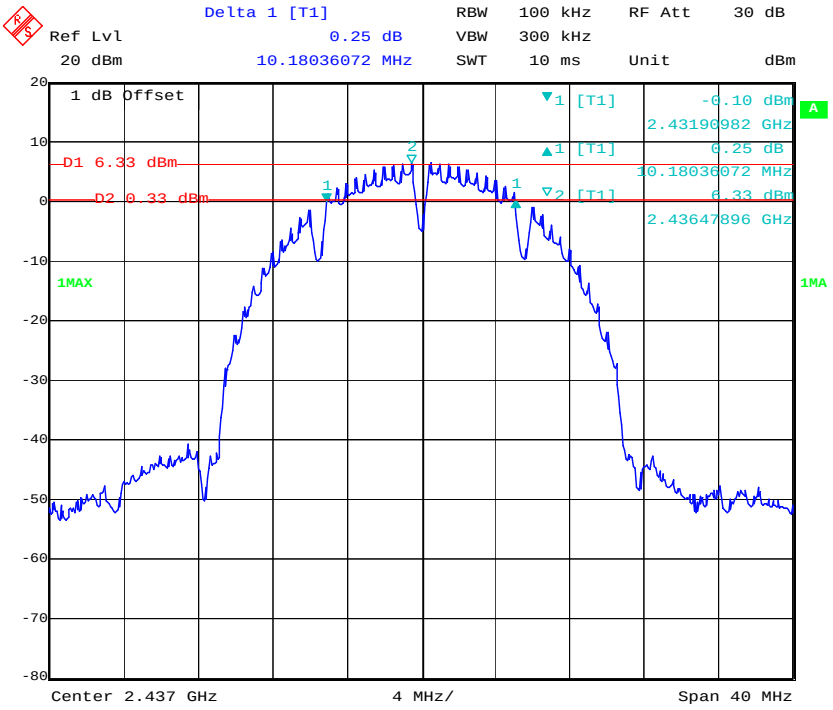
Test Result: Compliant. Please refer to the following table and plots.

Test mode	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)
802.11b	Low	2412	10.18	≥0.5
	Middle	2437	10.18	≥0.5
	High	2462	10.1	≥0.5
802.11g	Low	2412	16.59	≥0.5
	Middle	2437	16.59	≥0.5
	High	2462	16.59	≥0.5
802.11n20	Low	2412	17.8	≥0.5
	Middle	2437	17.88	≥0.5
	High	2462	17.88	≥0.5
802.11n40	Low	2422	36.39	≥0.5
	Middle	2437	36.39	≥0.5
	High	2452	36.39	≥0.5

802.11b Low Channel

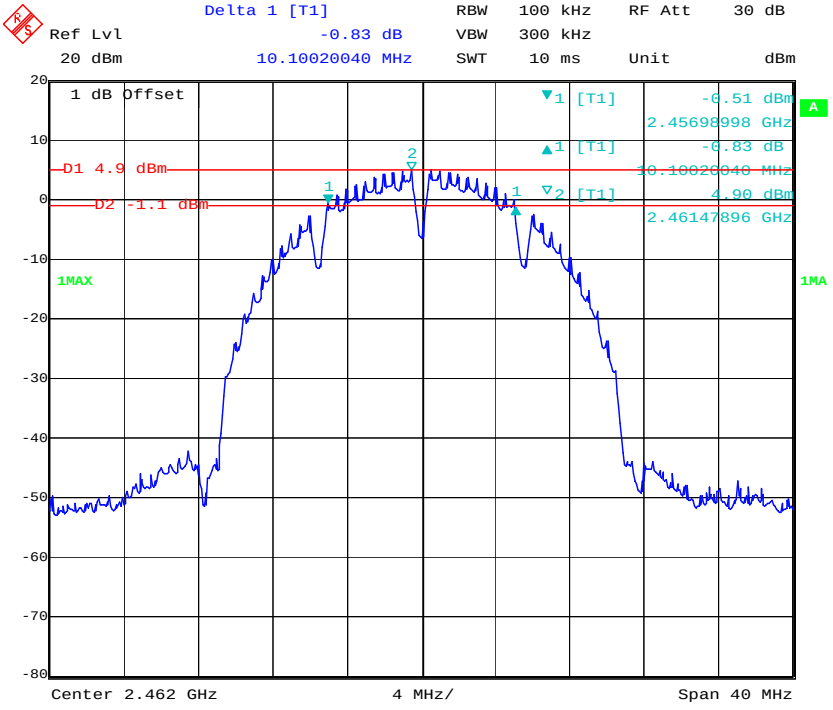


802.11b Middle Channel



Date: 7.JUL.2017 06:24:06

802.11b High Channel



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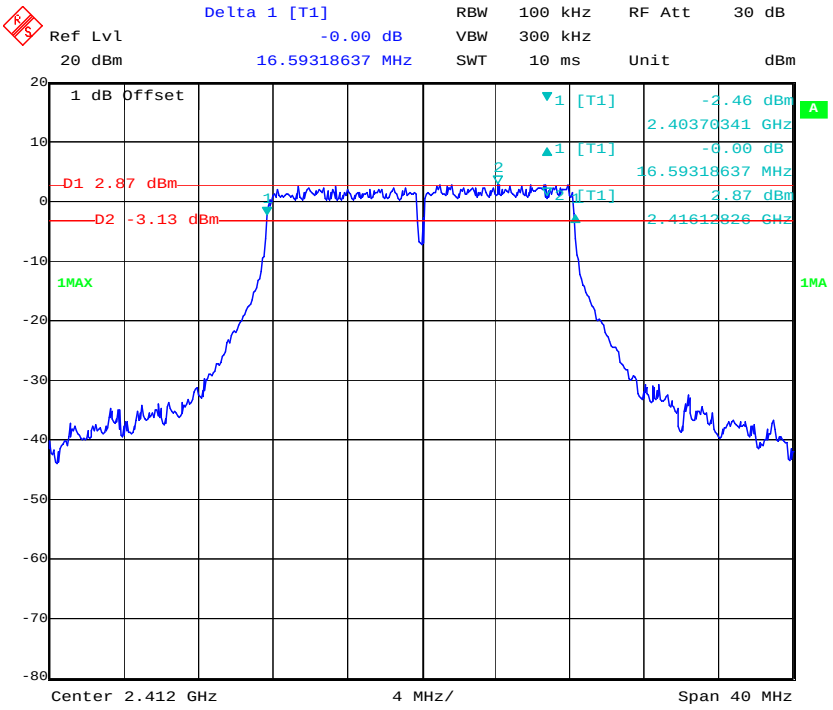
802.11g Low Channel



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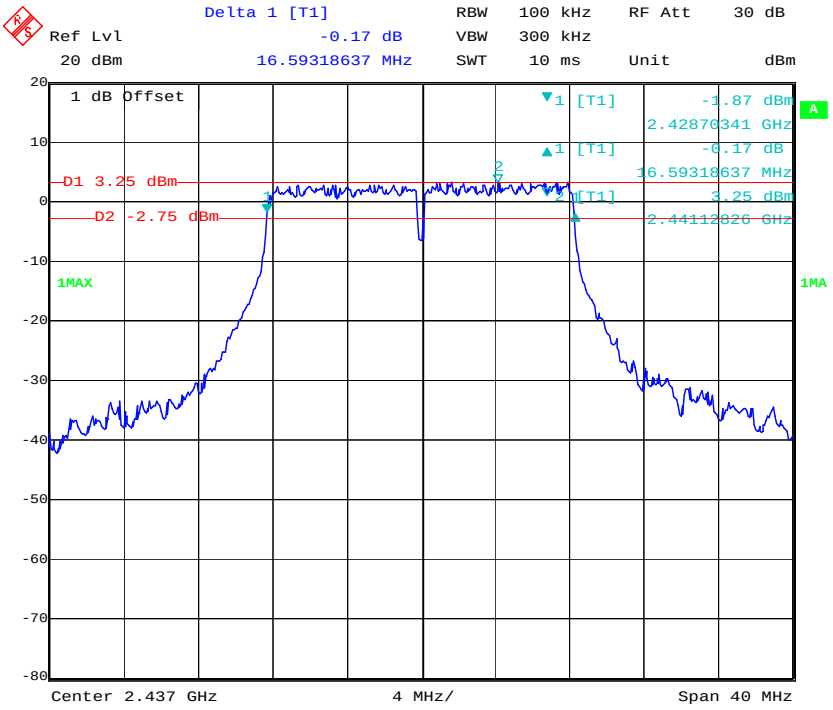
802.11g Middle Channel



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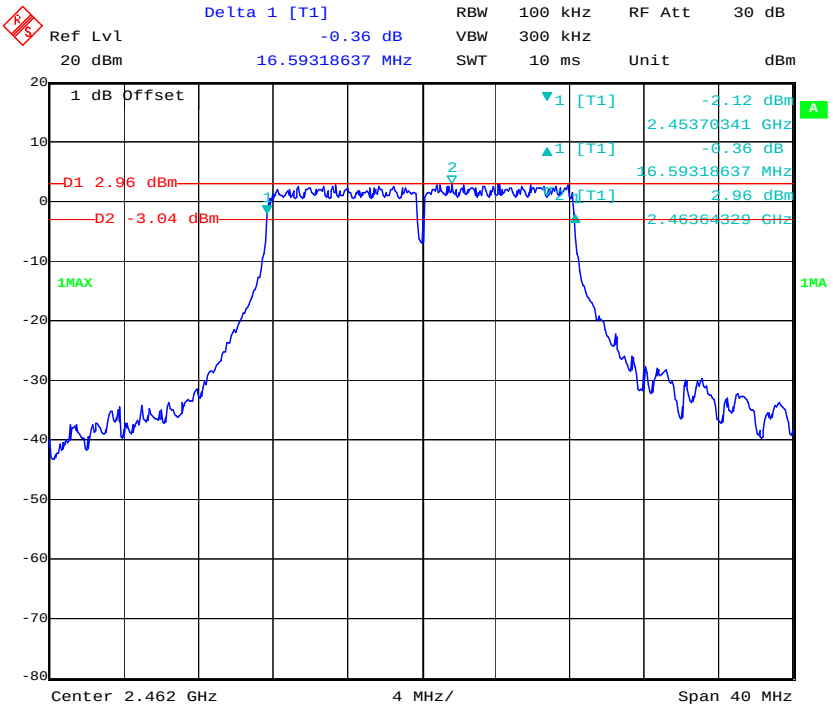
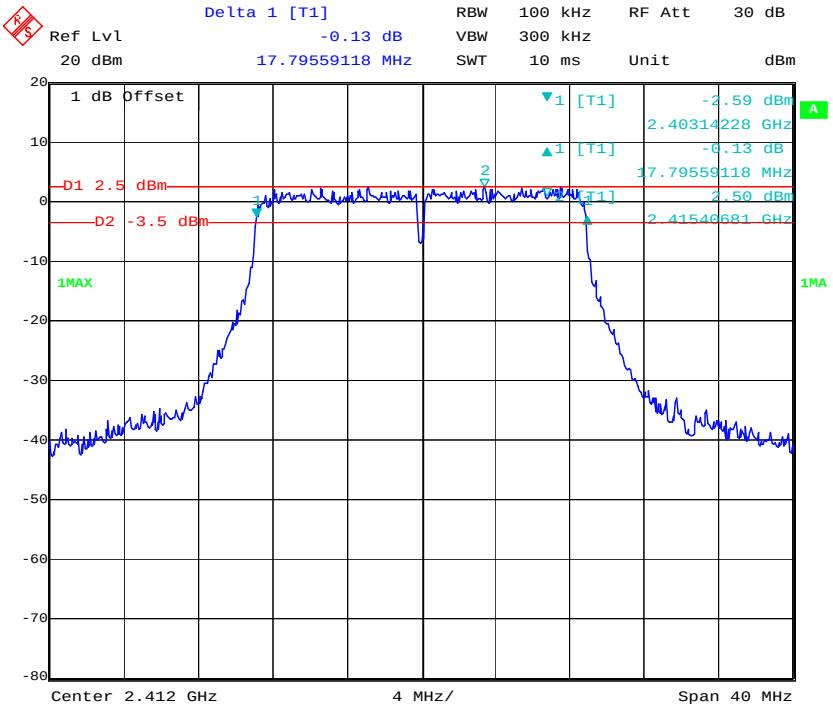
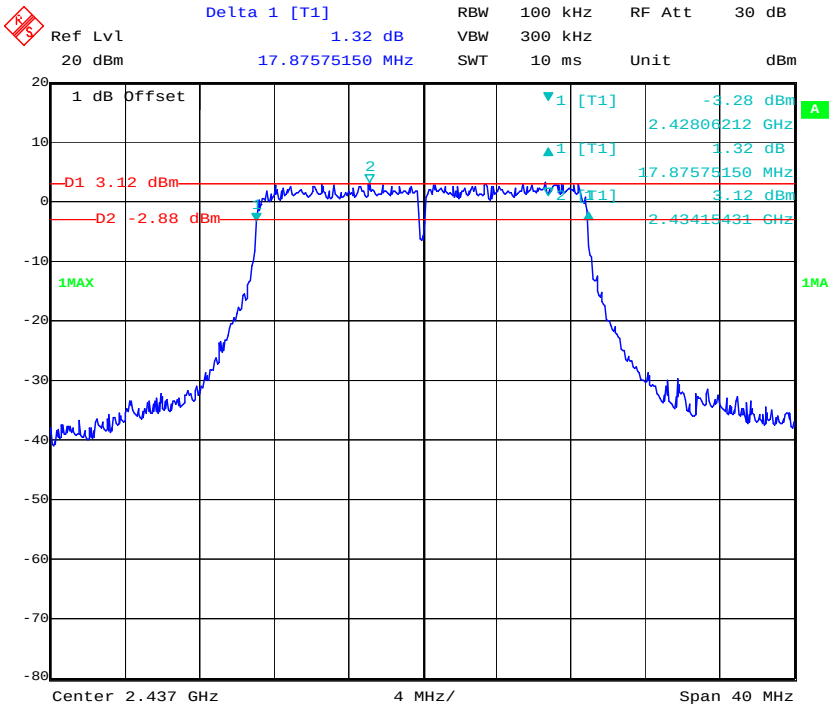
802.11g High Channel



802.11n ht20 Low Channel



802.11n ht20 Middle Channel



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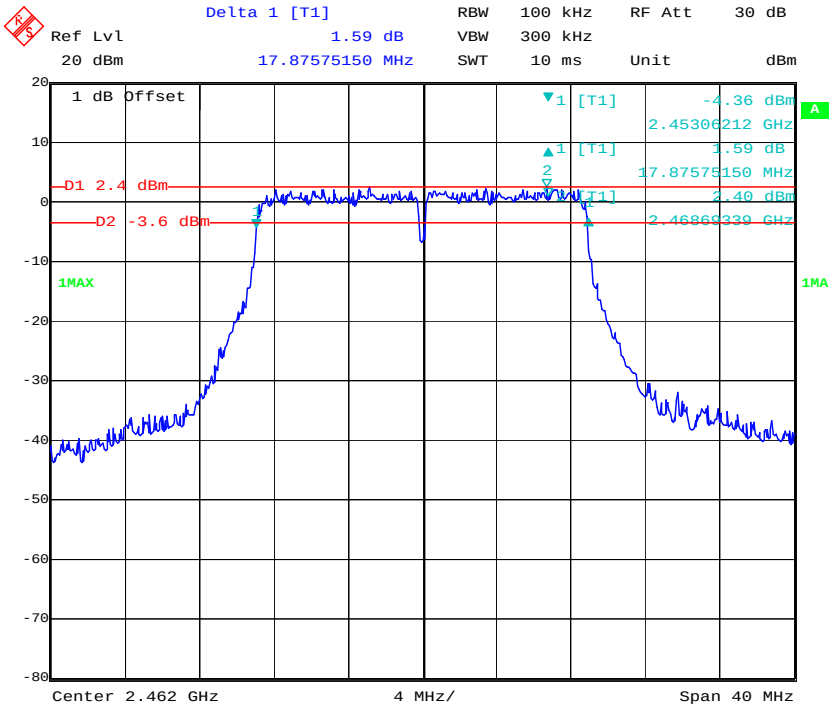
802.11n ht20 High Channel



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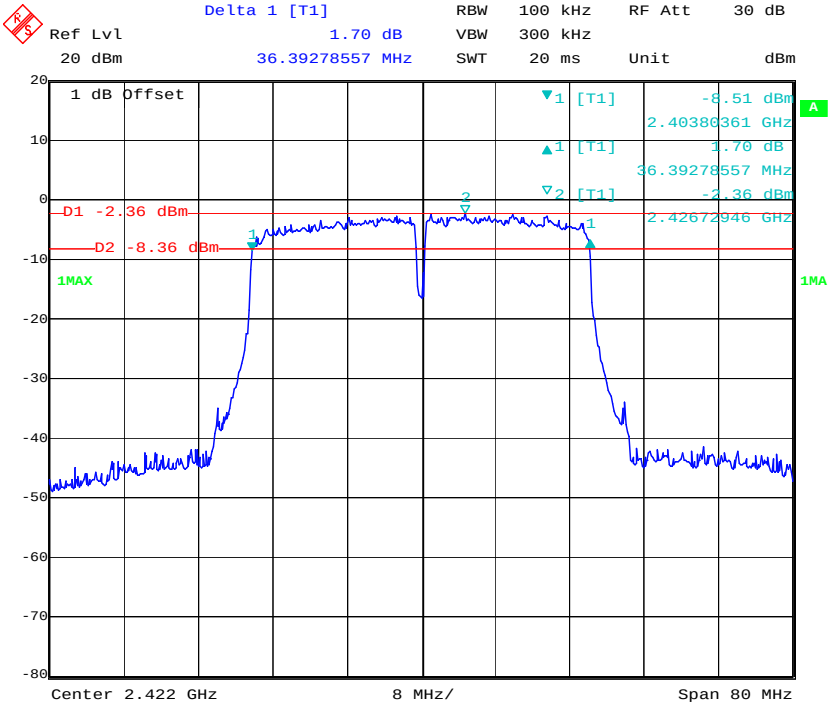
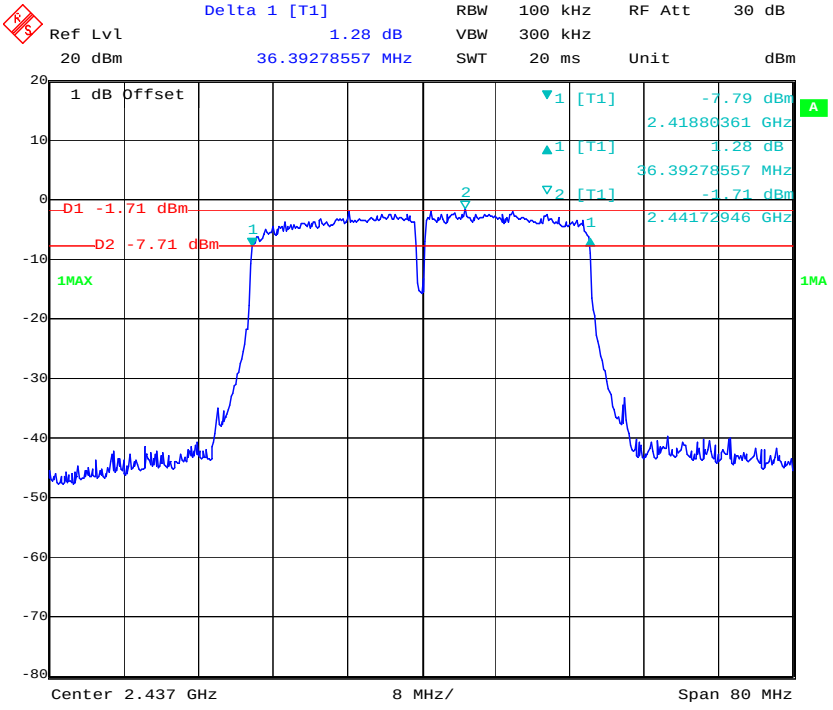
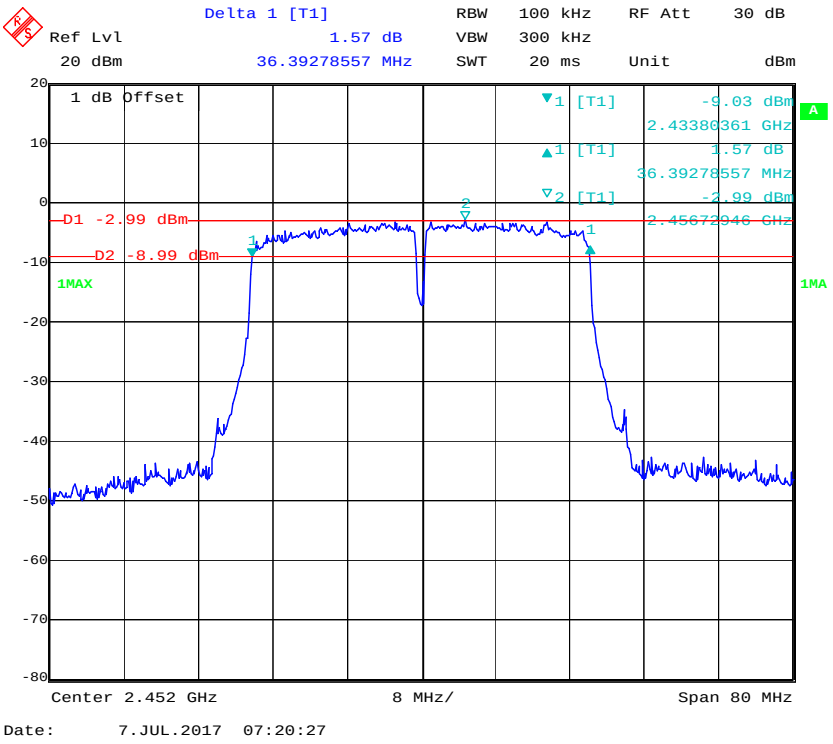
802.11n ht40 Low Channel



802.11n ht40 Middle Channel



802.11n ht40 High Channel



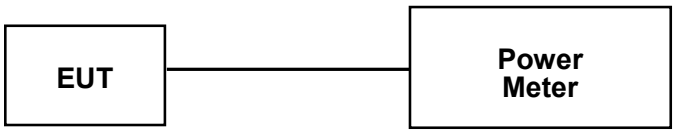
FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

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.
4. Set the power Meter to test Peak output power, record the result as peak power.
5. Set the power meter to test average output power, record the result as average power.



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:	28.7 °C
Relative Humidity:	49.2 %
ATM Pressure:	100.1 kPa

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

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	20.27	30
	Middle	2437	18.61	30
	High	2462	17.08	30
802.11g	Low	2412	23.82	30
	Middle	2437	24.53	30
	High	2462	24.16	30
802.11n20	Low	2412	23.93	30
	Middle	2437	24.7	30
	High	2462	23.92	30
802.11n40	Low	2422	21.63	30
	Middle	2437	22.1	30
	High	2452	21.19	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
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

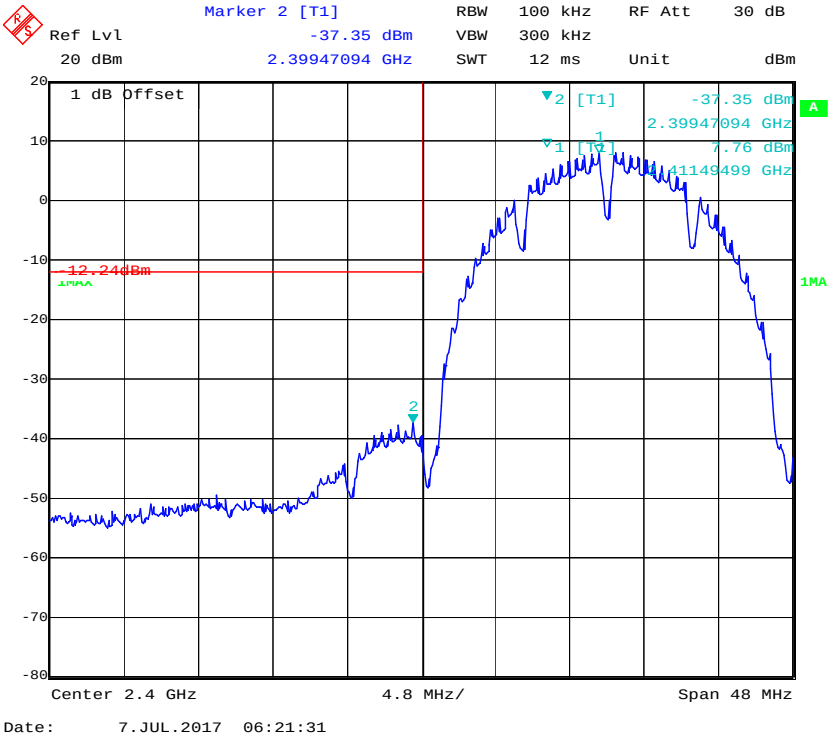
Environmental Conditions

Temperature:	28.7 °C
Relative Humidity:	49.2 %
ATM Pressure:	100.1 kPa

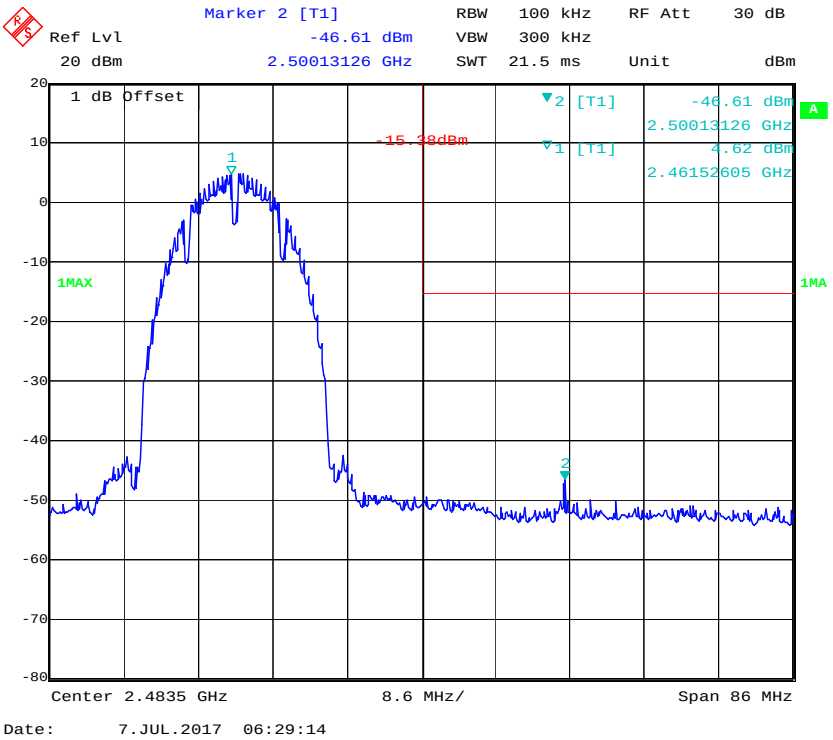
** The testing was performed by Liron Bian on 2017-07-07.*

Test mode: Transmitting
Test Result: Compliant. Please refer to following plots.

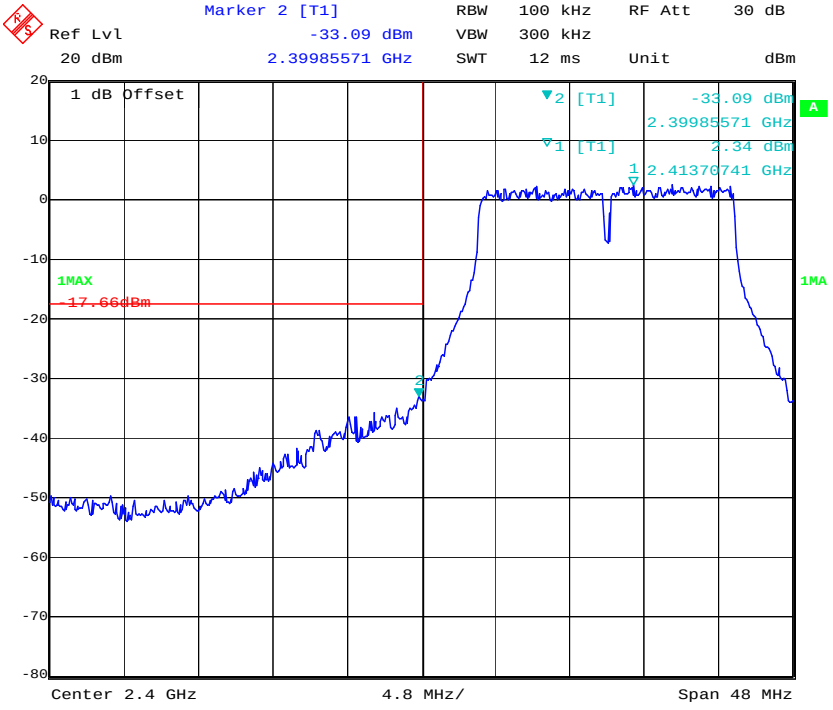
802.11b: Band Edge, Left Side



802.11b: Bnd Edge, Right Side



802.11g: Band Edge, Left Side



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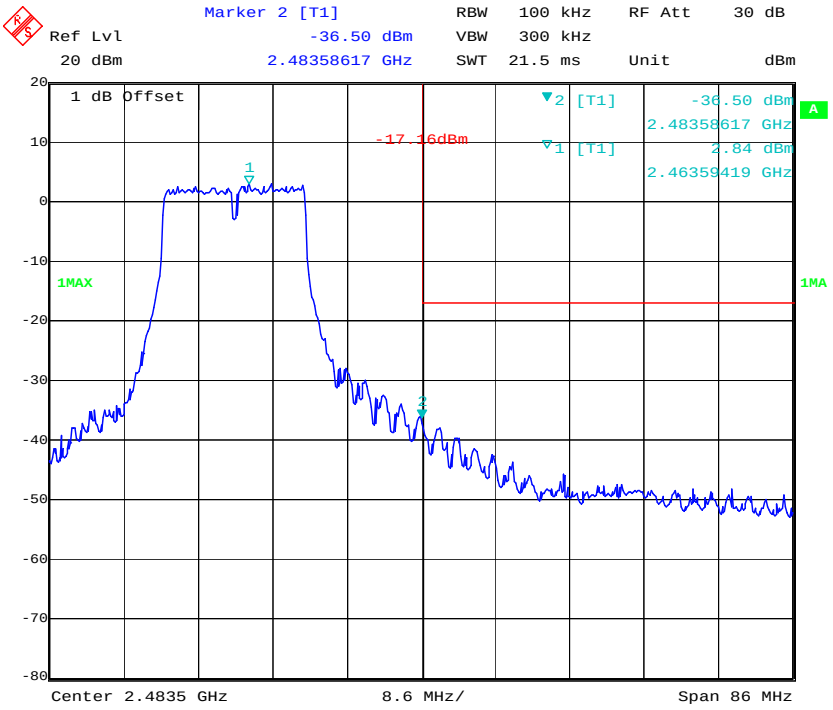
802.11g: Band Edge, Right Side



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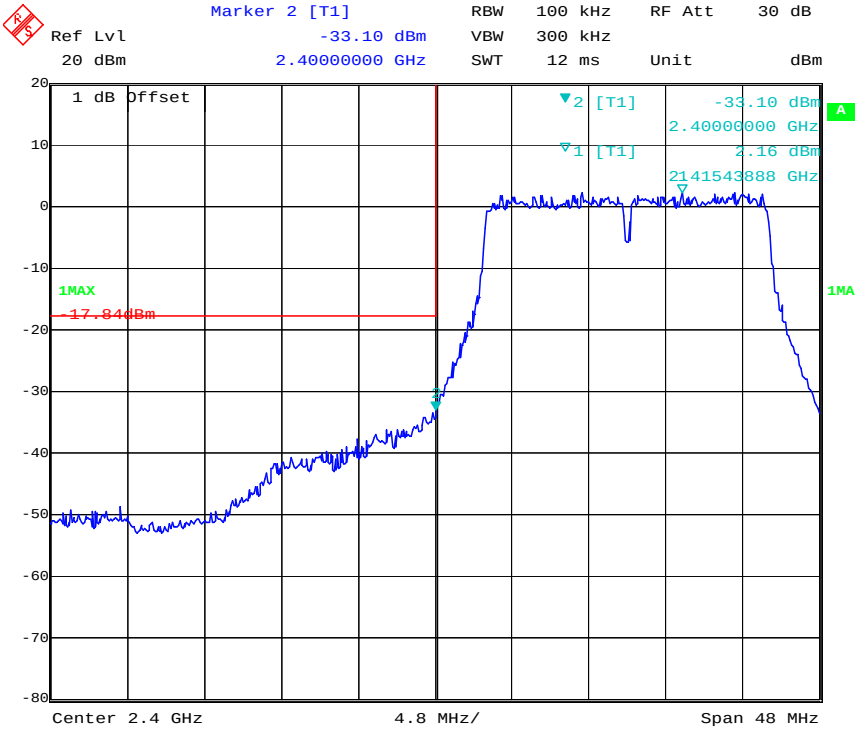
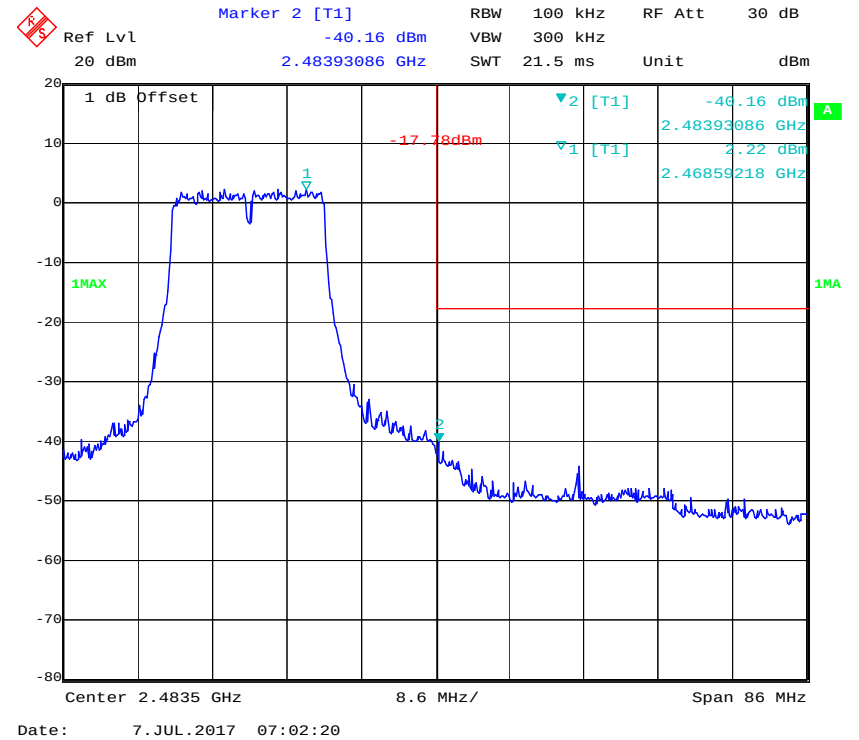
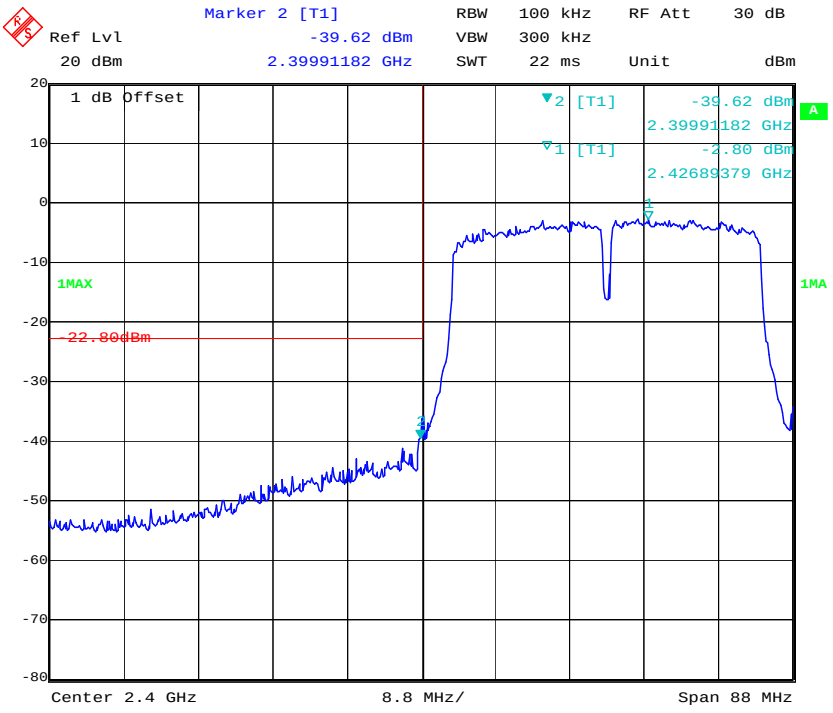
802.11n ht20 Band Edge, Left Side



802.11n ht20 Band Edge, Right Side

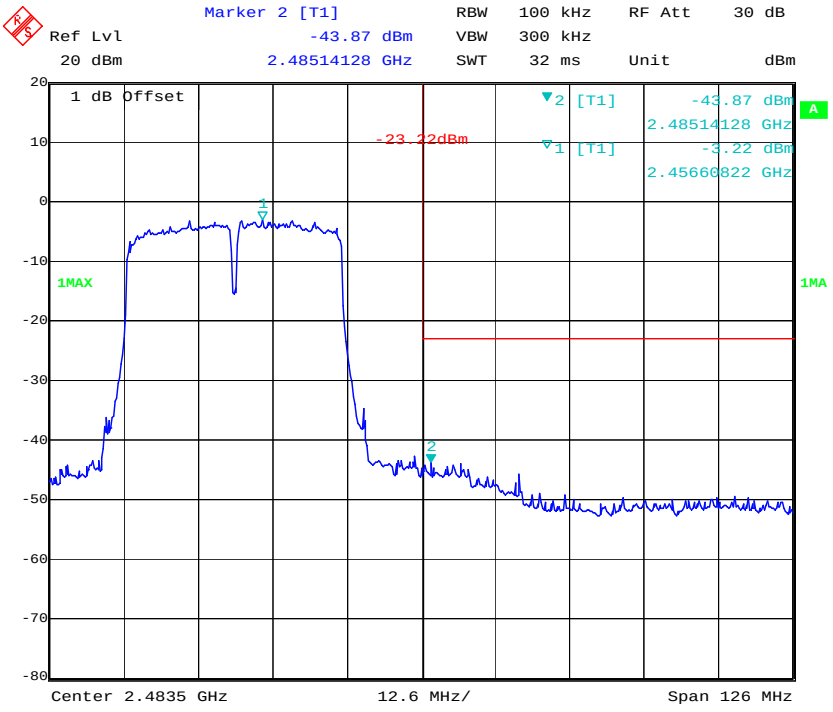


802.11n ht40 Band Edge, Left Side



Date: 7.JUL.2017 07:13:15

802.11n ht40 Band Edge, Right Side



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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 kHz ≤ RBW ≤ 100 kHz.
d) Set the VBW ≥ 3×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:	28.7 °C
Relative Humidity:	49.2 %
ATM Pressure:	100.1 kPa

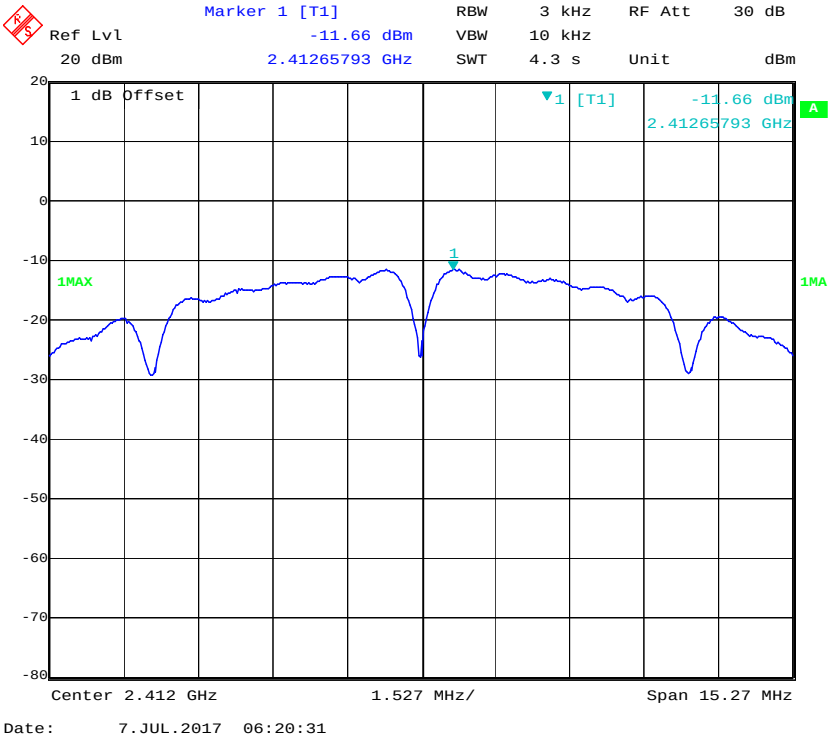
** The testing was performed by Liron Bian on 2017-07-07.*

Test Mode: Transmitting

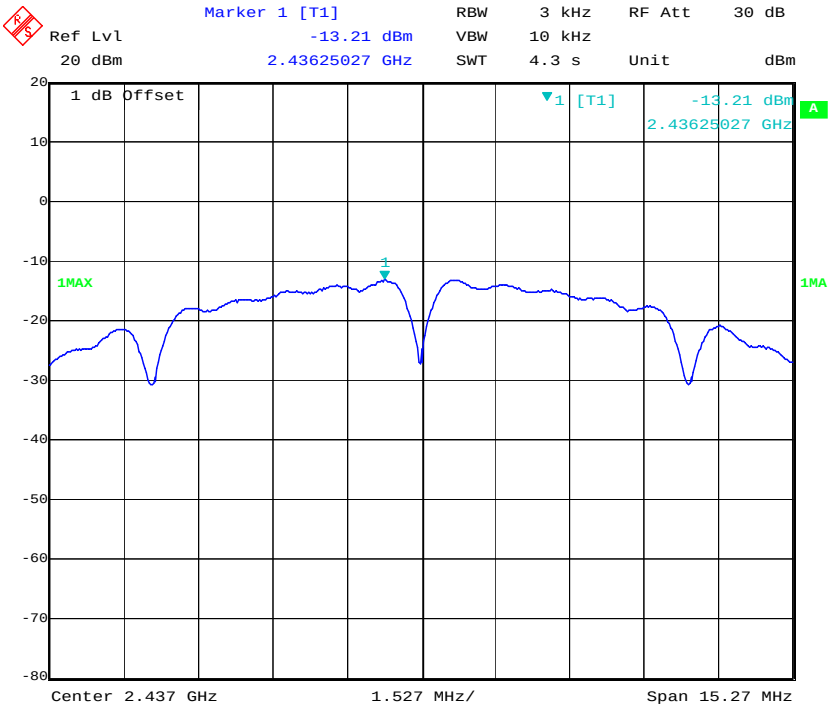
Test Result: Compliant. Please refer to the following table and plots

Test mode	Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
802.11b	Low	2412	-11.66	≤8
	Middle	2437	-13.21	≤8
	High	2462	-14.79	≤8
802.11g	Low	2412	-12.03	≤8
	Middle	2437	-11.29	≤8
	High	2462	-11.7	≤8
802.11n20	Low	2412	-11.54	≤8
	Middle	2437	-10.9	≤8
	High	2462	-11.49	≤8
802.11n40	Low	2422	-13.79	≤8
	Middle	2437	-13.28	≤8
	High	2452	-14.7	≤8

Power Spectral Density, 802.11b Low Channel



Power Spectral Density, 802.11b Middle Channel



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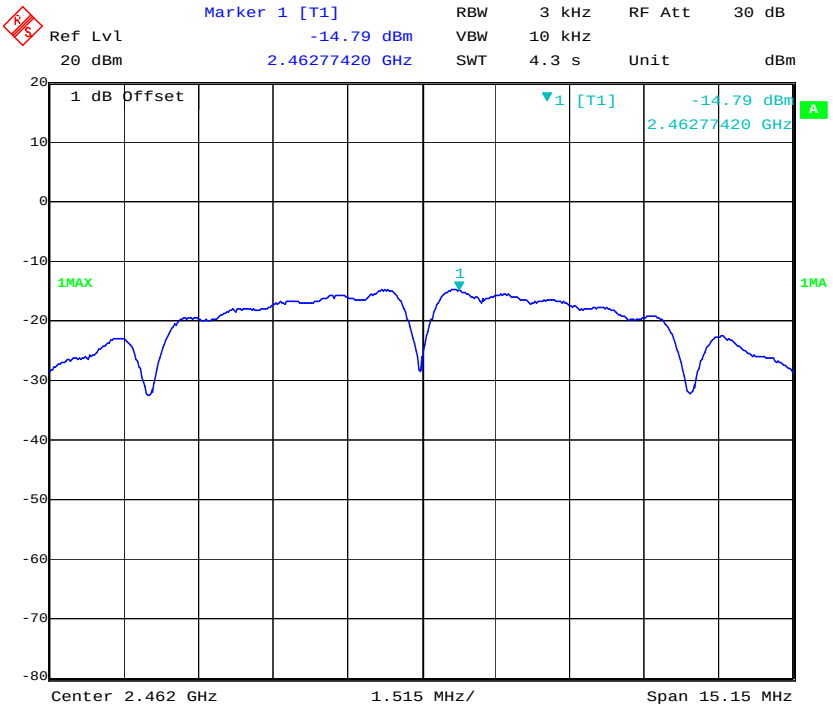
Power Spectral Density, 802.11b High Channel



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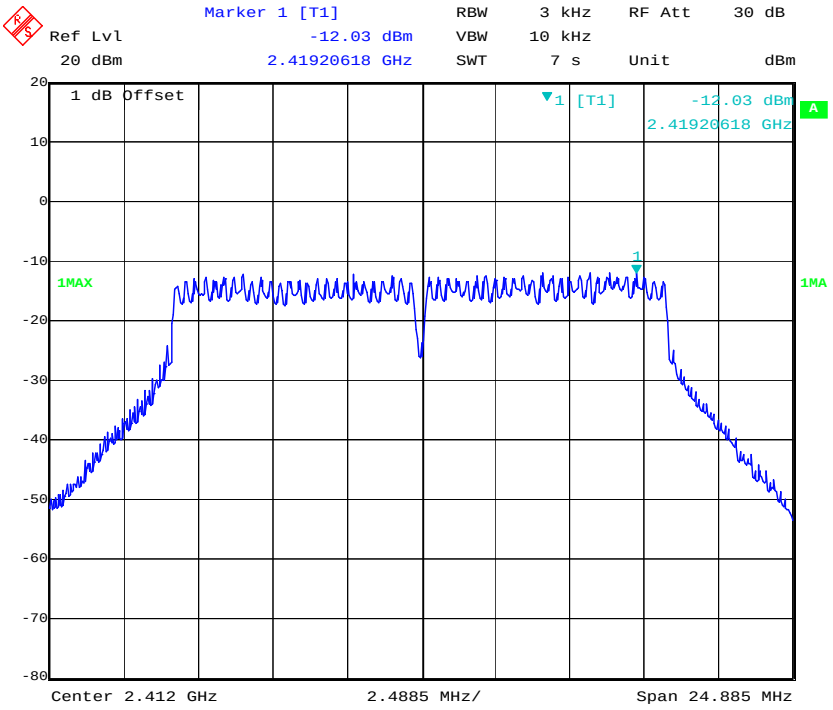
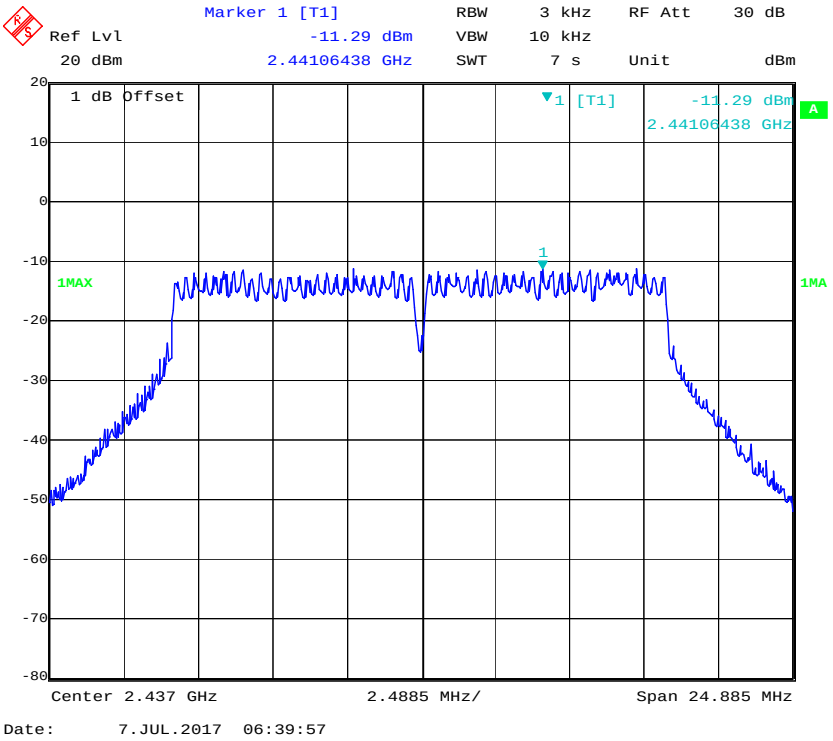
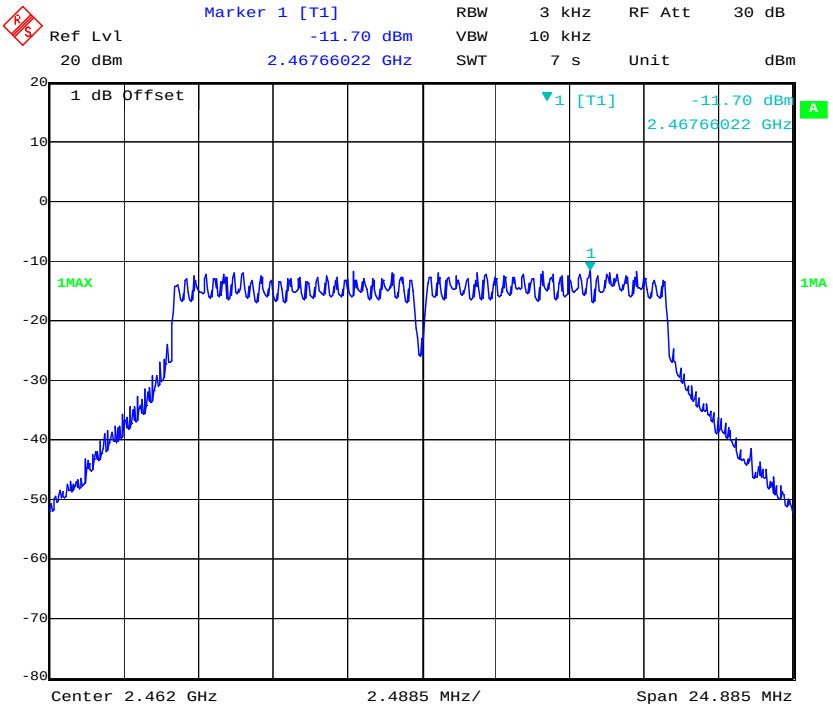
Power Spectral Density, 802.11g Low Channel



Power Spectral Density, 802.11g Middle Channel



Power Spectral Density, 802.11g High Channel



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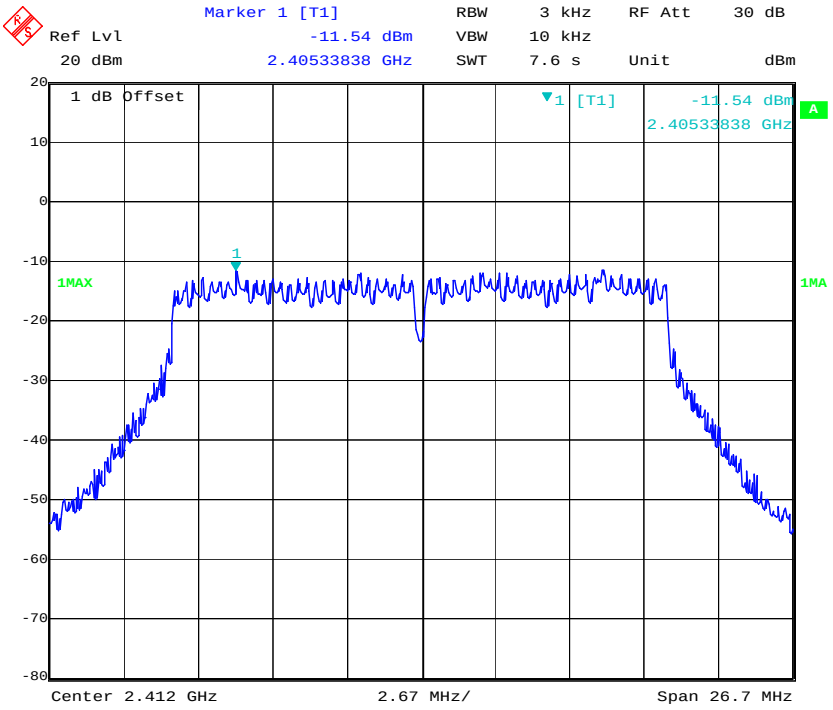
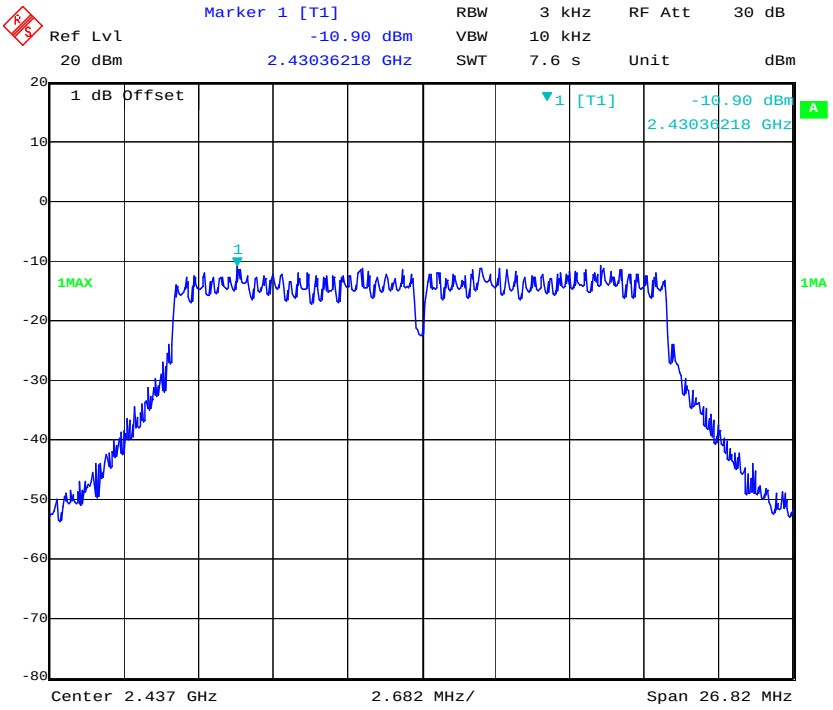
Power Spectral Density, 802.11n ht20 Low Channel



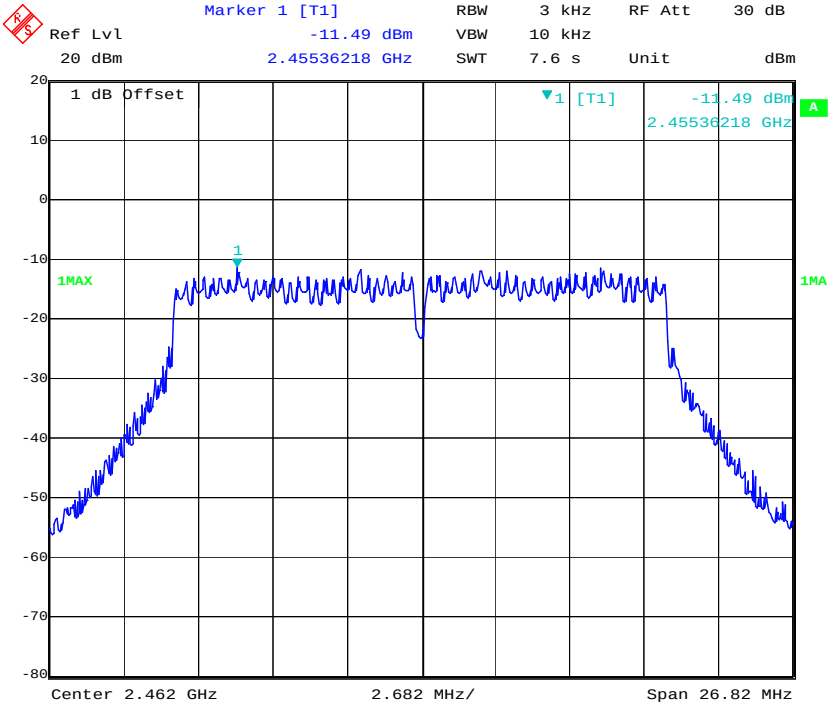
Date: 7.JUL.2017 06:51:23

Power Spectral Density, 802.11n ht20 Middle Channel



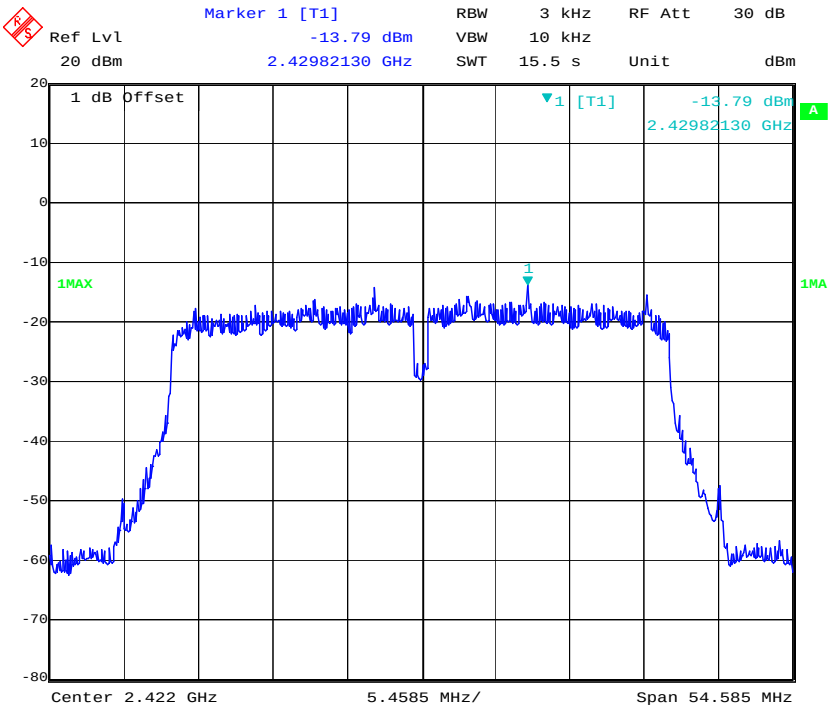
Date: 7.JUL.2017 06:55:01

Power Spectral Density, 802.11n ht20 High Channel



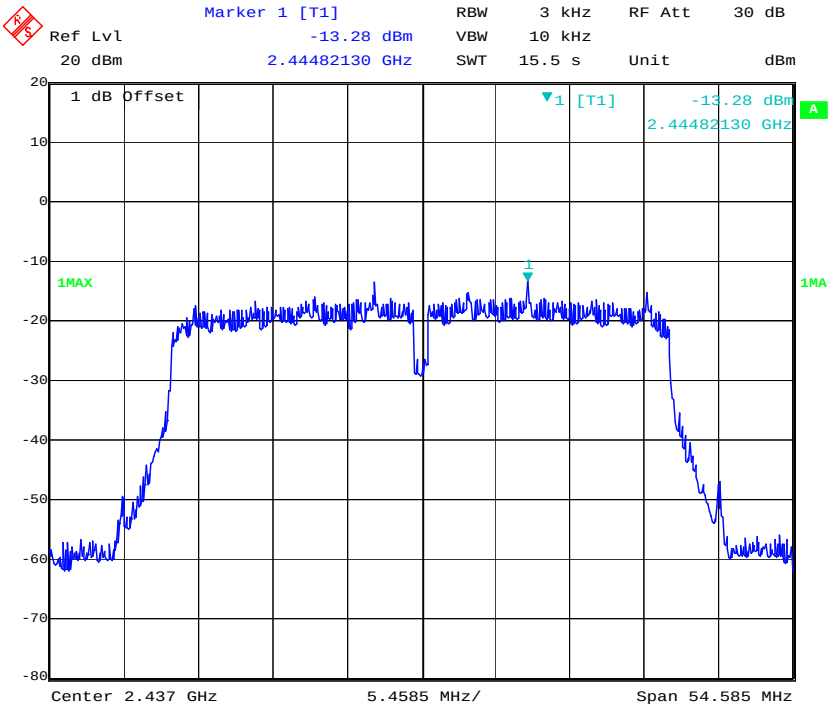
Date: 7.JUL.2017 07:01:22

Power Spectral Density, 802.11n ht40 Low Channel



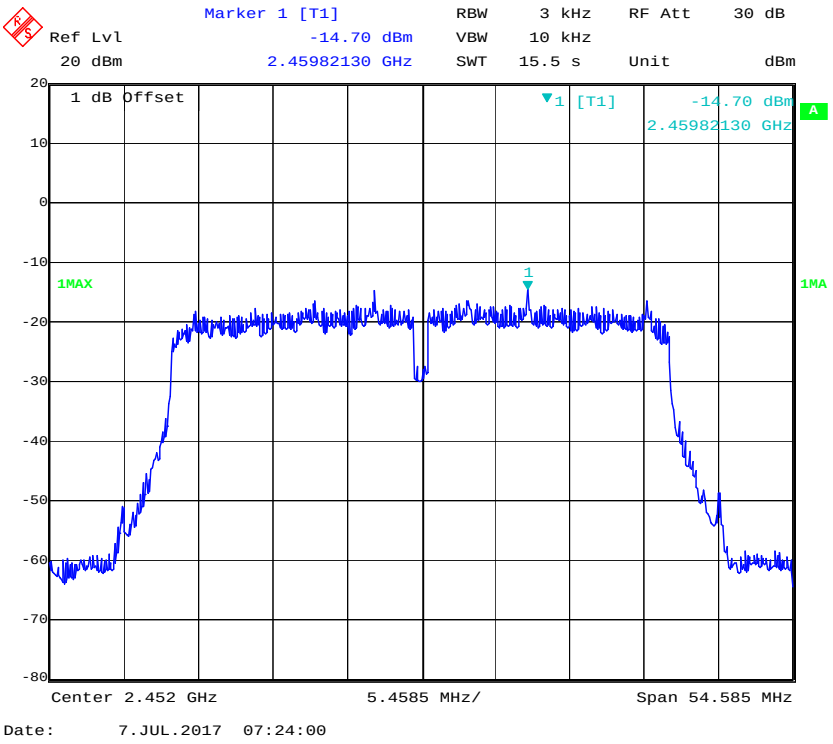
Date: 7.JUL.2017 07:12:27

Power Spectral Density, 802.11n ht40 Middle Channel



Date: 7.JUL.2017 07:17:46

Power Spectral Density, 802.11n ht40 High Channel



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