



TESTING LABORATORY
CERTIFICATE #4820.01



FCC PART 15.247 TEST REPORT

For

Ingenico Inc.

101 Federal St, Suite 700, 7th flr , Boston, Massachusetts, United States

FCC ID: 2ABY6-MOBC150RPA

Report Type: Original Report	Product Name: Smart Cash Register
Report Number: RXM180827050-00B	
Report Date: 2018-10-24	
Reviewed By:	Dean Lau RF Supervisor 
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		Smart Cash Register
EUT Model:		Moby C150
FCC ID:		2ABY6-MOBC150RPA
Rated Input Voltage:		DC19/19.5V from adapter
Adapter #1 Information	Model:	PA-1650-90
	Input:	100-240V~50/60Hz 1.6A
	Output:	DC19V,3.42A
Adapter #2 Information	Model:	A14-065N1A
	Input:	100-240V~1.7A 50-60Hz
	Output:	DC 19.5V, 3.33A
External Dimension:		Dual screen:403mm(L)*225mm(W)*390mm(H) Single screen:403mm(L)*225mm(W)*380mm(H)
Serial Number:		180827050
EUT Received Date:		2018.08.28

Objective

This report is prepared on behalf of **Ingenico Inc.** 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, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15C DSS submissions with FCC ID: 2ABY6-MOBC150RPA.

FCC Part 15E NII submissions with FCC ID: 2ABY6-MOBC150RPA.

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. And 558074 D01 15.247 Meas Guidance v05.

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

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Power Spectral Density, conducted	±0.61 dB
Unwanted Emissions, radiated	30M~200MHz: 4.55 dB, 200M~1GHz: 5.92 dB, 1G~6GHz: 4.98 dB, 6G~18GHz: 5.89 dB, 18G~26.5G: 5.47 dB, 26.5G~40G: 5.63 dB
Unwanted Emissions, conducted	±1.5 dB
Temperature	±1 °C
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

Test Facility

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

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218, the FCC Designation No. : CN1220.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062D.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in Software and version: QRCT V2.0.244.0, which was provided by the manufacturer.

For 2.4GHz band, total 13 channels are provided:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432	12	2467
6	2437	13	2472
7	2442		

For 802.11b was test with channel 1, 6, 12, 13. For 802.11g, and 802.11n ht20 modes were test with channel 1, 6, 11, 12, 13. For 802.11n ht40 mode was tested with channel 3, 6, 9, 10, 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.

EUT Exercise Software

The software “QRCT V2.0.244.0” was used for testing, which was provided by manufacturer. The maximum power was configured as below table, that provided by the manufacturer:

Mode	Frequency (MHz)	Data Rate	Power level
802.11b	2412	1Mbps	18.0
	2437	1Mbps	17.5
	2467	1Mbps	16.5
	2472	1Mbps	15.5
802.11g	2412	6Mbps	18.0
	2437	6Mbps	17.0
	2462	6Mbps	16.5
	2467	6Mbps	12.5
	2472	6Mbps	9.0
802.11n ht20	2412	6.5Mbps	17.5
	2437	6.5Mbps	17.5
	2462	6.5Mbps	16.0
	2467	6.5Mbps	12.0
	2472	6.5Mbps	7.0
802.11n ht40	2422	13.5Mbps	15
	2437	13.5Mbps	16.5
	2452	13.5Mbps	14
	2457	13.5Mbps	13
	2462	13.5Mbps	9

Mode	Channel	Frequency (MHz)	Data rate (Mbps)	Power level
BLE	Low	2402	1	default
	Middle	2440	1	default
	High	2480	1	default

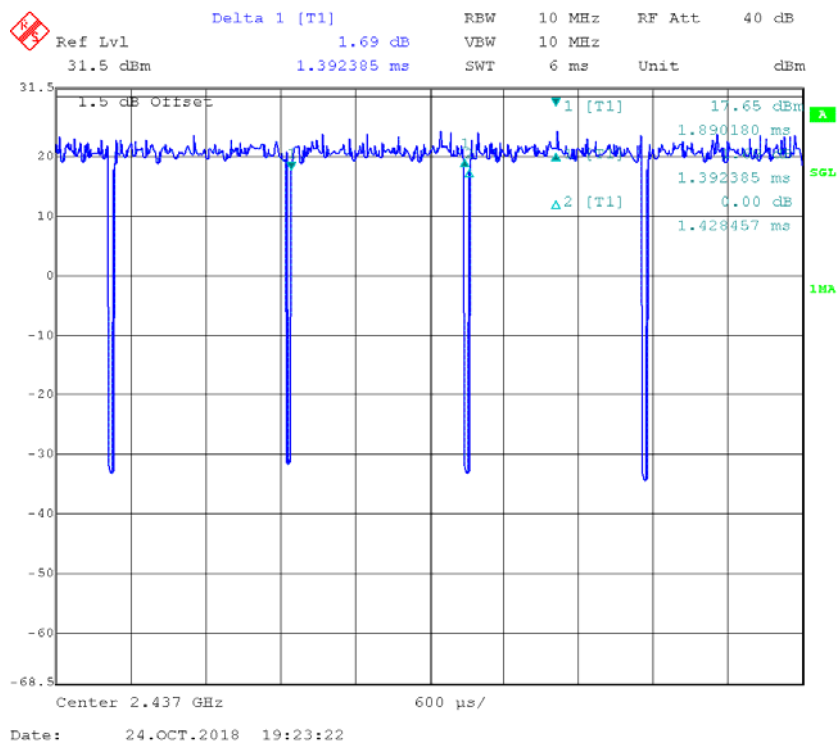
The maximum duty cycle as following table:

Test mode	T _{on} (ms)	T _{on+off} (ms)	Duty Cycle (%)
802.11b	100	100	100
802.11g	1.392	1.428	97.48
802.11n ht20	1.296	1.344	96.43
802.11n ht40	0.654	0.690	94.78
BLE	0.382	0.623	61.32

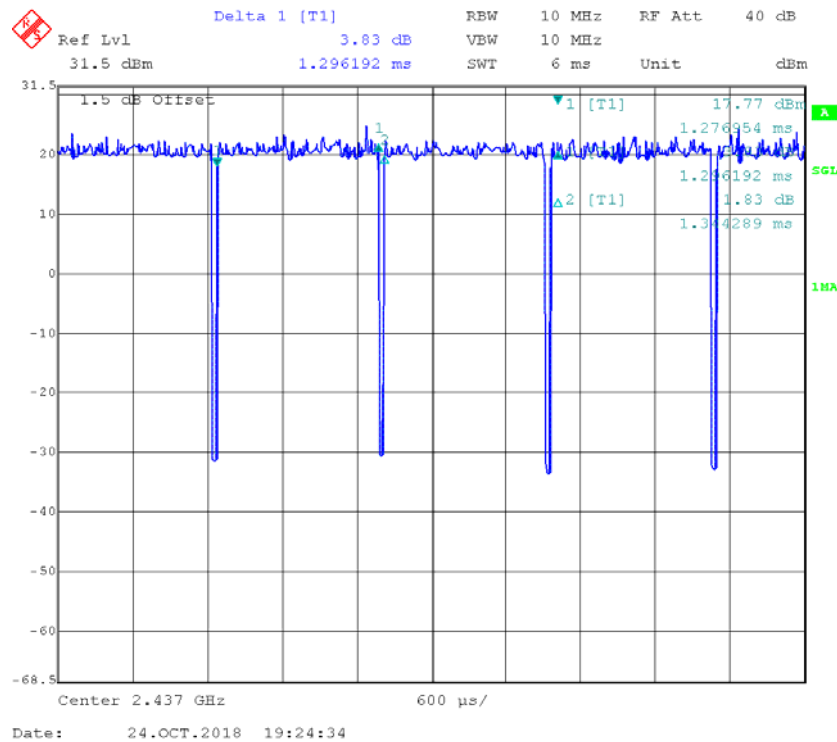
802.11b



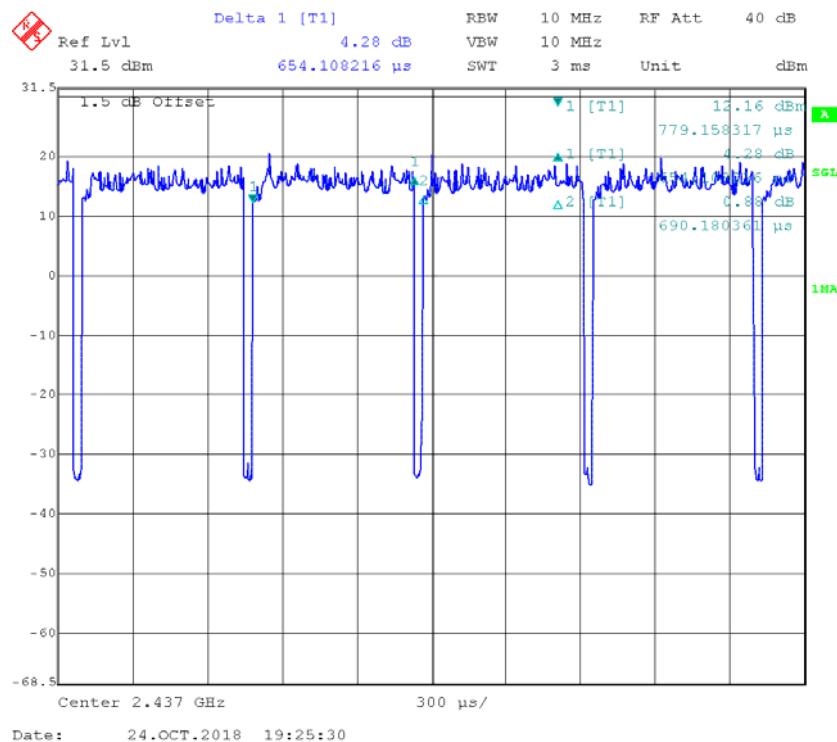
802.11g

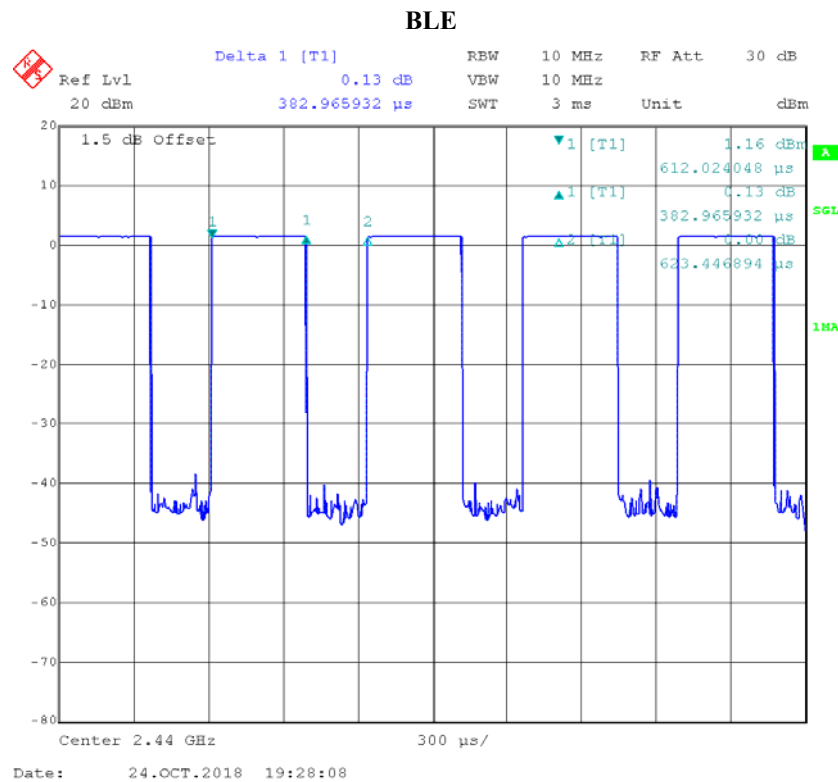


802.11n ht20



802.11n ht40





Equipment Modifications

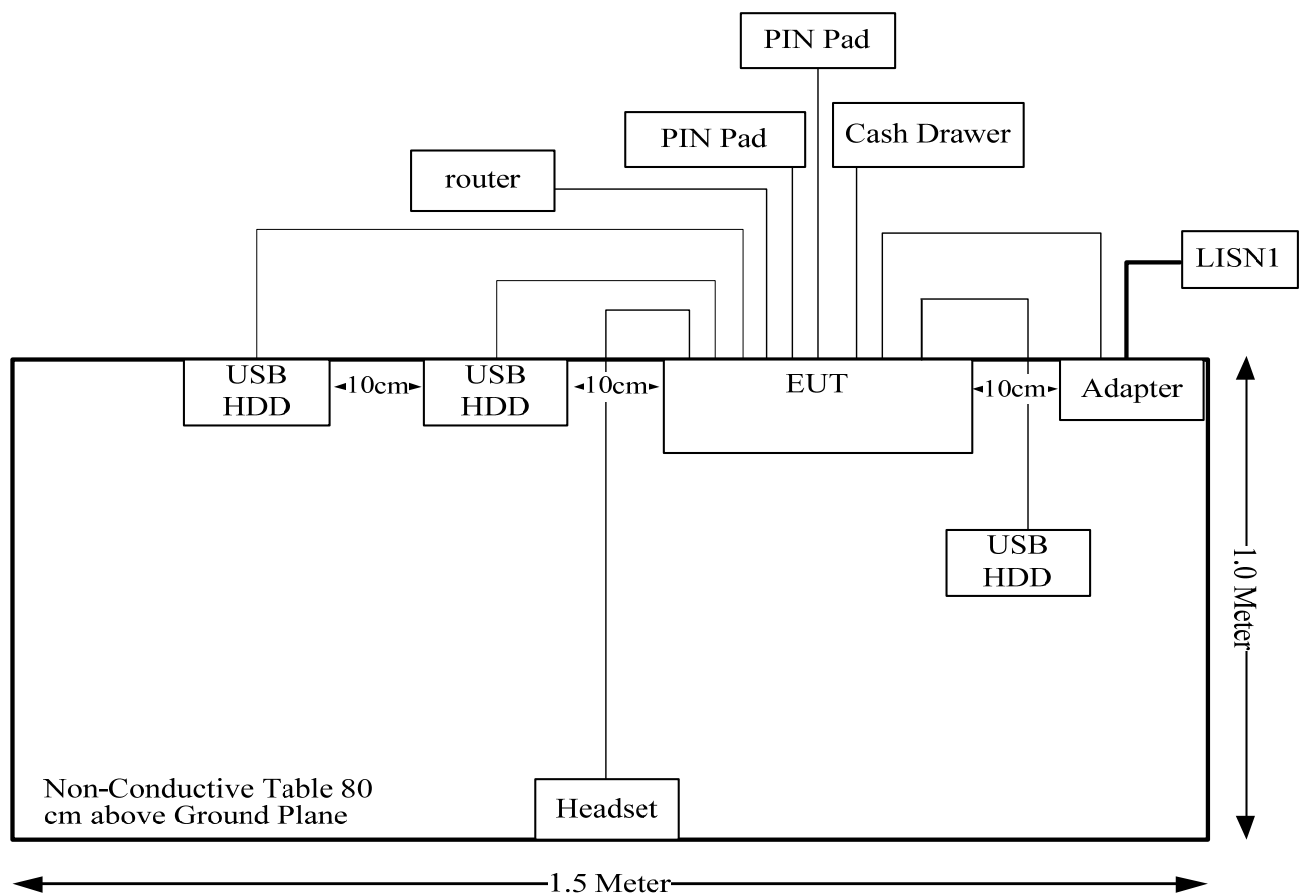
No modification was made to the EUT.

Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
YOUBAI	Headset	Y028	/
TOSHIBA	USB HDD	v63700-A	7271TGZ1TTSJ2
TOSHIBA	USB HDD	v63700-A	7283T8CUTSJ2
TOSHIBA	USB HDD	DTP105	248HS1Z1SRE8
Tenda	Router	D301	/
MAKEN	Cash Drawer	MT-350T	/
YD	PIN Pad	YD511DA-RJ	/

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB Cable	Yes	No	0.45	EUT USB Port	USB HDD
Headset Cable	Yes	No	1.5	EUT	Headset
Adapter Cable	No	No	1.02	EUT	Adapter
RJ45 Cable	No	No	5.00	Router	EUT
RJ11 Cable	No	No	5.00	Cash Drawer	EUT
RS232 Cable*2	No	No	5.00	PIN Pad	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 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/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

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

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

Calculation formula:

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

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

Frequency (MHz)	Antenna Gain		Conducted output power including Tune-up Tolerance		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
	(dBi)	(numeric)	(dBm)	(mW)			
2402-2480	3.6	2.29	24	251.19	20.00	0.1145	1.0
2412-2472	3.6	2.29	3	2.00	20.00	0.0009	1.0

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.
- 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 one internal antenna arrangement for BT and WIFI, and the antenna gain is 3.6dBi, fulfill the requirement of this section. Please refer to the EUT photos.

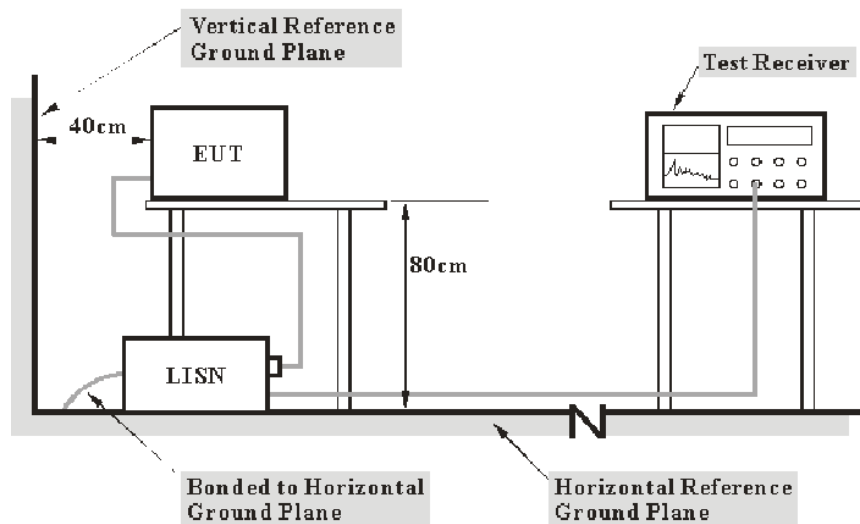
Result: Compliance.

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.

The spacing between the peripherals was 10 cm.

The adapter was connected to the main lisn with 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 limit. The equation for margin calculation is as follows:

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2017-12-11	2018-12-11
N/A	Coaxial Cable	C-NJNJ-50	C-0200-01	2018-09-05	2019-09-05
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
R&S	Two-line V-network	ENV 216	101614	2017-12-08	2018-12-08

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

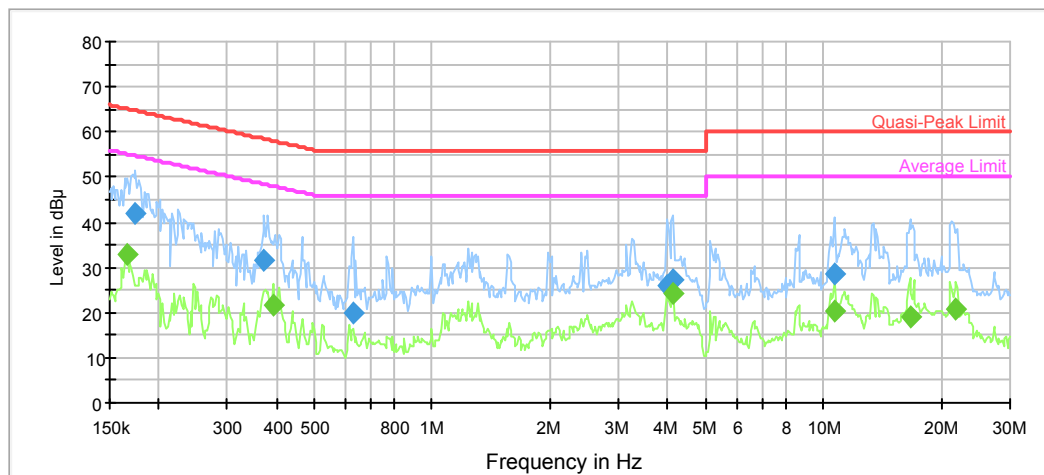
Test Data**Environmental Conditions**

Temperature:	27.1°C
Relative Humidity:	51 %
ATM Pressure:	100.3 kPa

The testing was performed by Alex You on 2018-10-23.

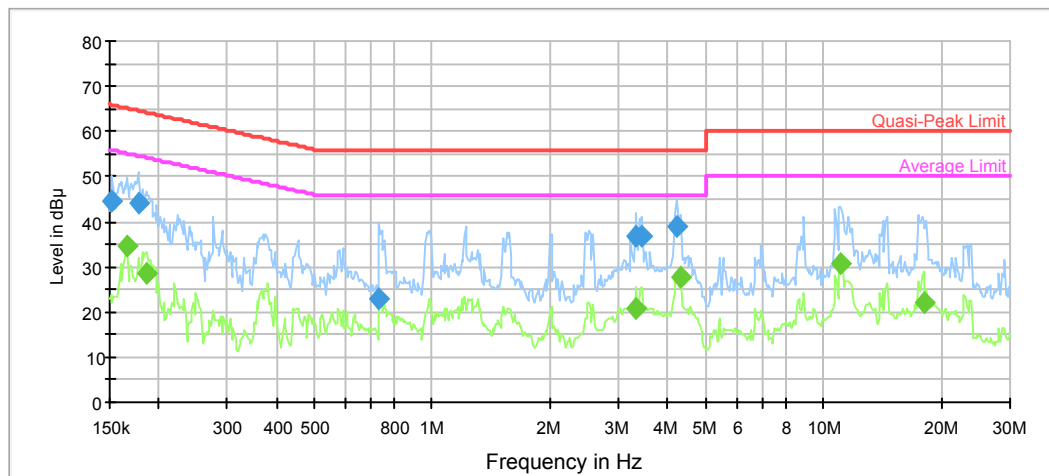
Test Mode: Transmitting (per pretest, dual screen+Adapter #1 was the worst)

Wi-Fi mode 802.11b 2412MHz was the worst

AC120 V, 60 Hz, Line:

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174519	42.0	9.000	L1	10.9	22.7	64.7	Compliance
0.372042	31.6	9.000	L1	10.0	26.9	58.5	Compliance
0.629488	20.1	9.000	L1	9.8	35.9	56.0	Compliance
3.997889	26.1	9.000	L1	9.8	29.9	56.0	Compliance
4.127365	27.1	9.000	L1	9.8	28.9	56.0	Compliance
10.653105	28.7	9.000	L1	9.8	31.3	60.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.166371	32.8	9.000	L1	11.0	22.3	55.1	Compliance
0.393383	21.7	9.000	L1	10.0	26.3	48.0	Compliance
4.127365	24.3	9.000	L1	9.8	21.7	46.0	Compliance
10.738330	20.2	9.000	L1	9.8	29.8	50.0	Compliance
16.644319	19.2	9.000	L1	10.0	30.8	50.0	Compliance
21.823486	21.0	9.000	L1	10.1	29.0	50.0	Compliance

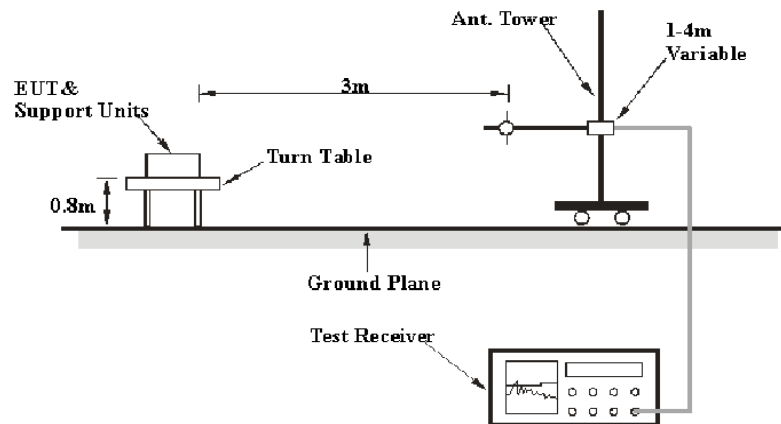
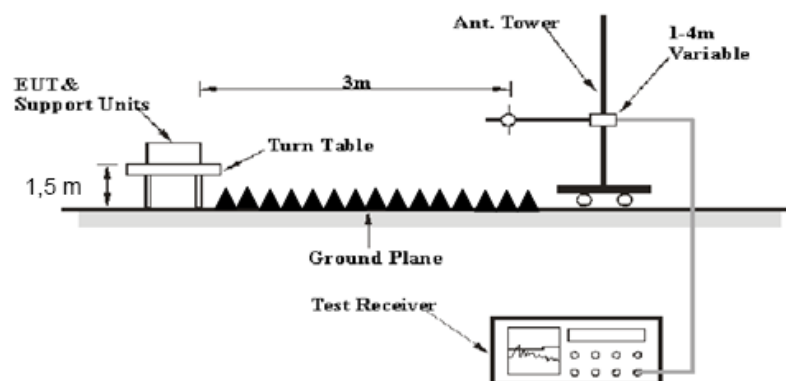
AC120 V, 60 Hz, Neutral:

Frequency (MHz)	QuasiPeak (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)	Comment
0.152410	44.5	9.000	N	11.1	21.4	65.9	Compliance
0.177322	44.0	9.000	N	10.8	20.6	64.6	Compliance
0.732382	23.1	9.000	N	9.8	32.9	56.0	Compliance
3.328423	36.9	9.000	N	9.8	19.1	56.0	Compliance
3.436218	37.0	9.000	N	9.8	19.0	56.0	Compliance
4.227217	38.8	9.000	N	9.8	17.2	56.0	Compliance

Frequency (MHz)	Average (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)	Comment
0.166371	34.6	9.000	N	10.9	20.5	55.1	Compliance
0.187494	28.6	9.000	N	10.7	25.5	54.1	Compliance
3.328423	20.8	9.000	N	9.8	25.2	46.0	Compliance
4.329484	27.7	9.000	N	9.8	18.3	46.0	Compliance
11.086102	30.8	9.000	N	9.8	19.2	50.0	Compliance
18.024837	21.9	9.000	N	10.0	28.1	50.0	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 Below 1GHz tests were performed in the 3 meters chamber test site A, above 1GHz tests were performed in the 3 meters chamber test site B, 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 26.5 GHz.

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

30MHz-1000MHz:

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

1GHz- 25GHz:

Measurement	Duty cycle	RBW	Video B/W
PK	Any	1MHz	3 MHz
AV	>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 Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

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

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-12-11	2018-12-11
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2018-09-05	2019-09-05
HP	Amplifier	8447D	2727A05902	2018-09-05	2019-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2018-01-04	2019-01-04
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2018-06-27	2019-06-27
MITEQ	Amplifier	AFS42-00101800- 25-S-42	2001271	2018-09-05	2019-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2018-06-27	2019-06-27
E-Microwave	Band-stop Filters	OBSF-2400-2483.5- S	OE01601525	2018-06-16	2019-06-16
Micro-tronics	High Pass Filter	HPM50111	S/N-G217	2018-06-16	2019-06-16

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

Test Data**Environmental Conditions**

Temperature:	25.1~27.5 °C
Relative Humidity:	34~37 %
ATM Pressure:	100.1~100.9 kPa

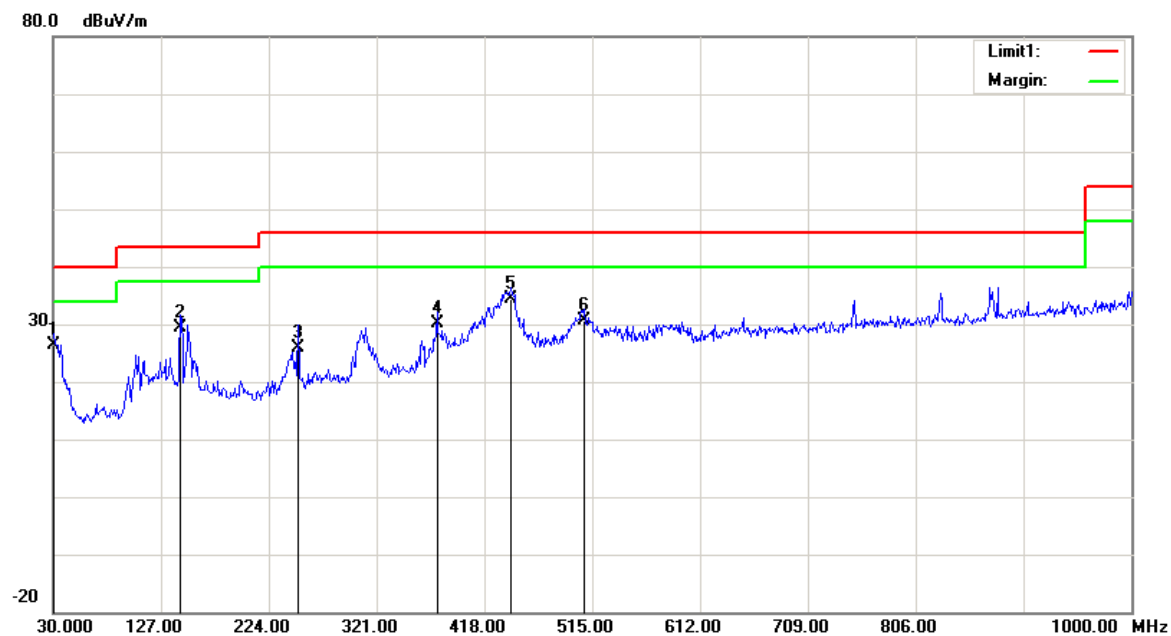
* The testing was performed by Sunny Cen & Tyler Pan on 2018-09-09.

Test Result: Compliance, please Refer to the following data

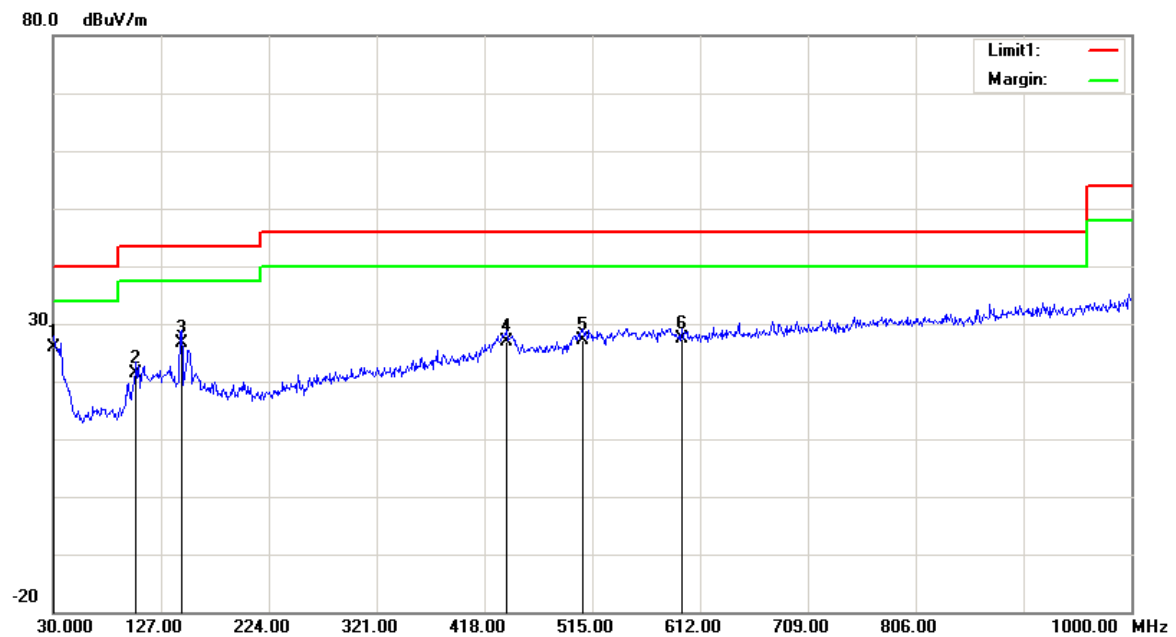
Test Mode: Transmitting (per pretest, dual screen +Adapter #1 was the worst)

1) 30MHz-1GHz (802.11b mode 2412MHz was the worst)

Horizontal:



Frequency (MHz)	Receiver Reading (dBuV)	Remark	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
30.0000	24.64	QP	1.76	26.40	40.00	13.60
144.4600	35.46	QP	-5.96	29.50	43.50	14.00
250.1900	31.83	QP	-6.03	25.80	46.00	20.20
375.3200	32.83	QP	-2.73	30.10	46.00	15.90
442.2500	35.57	QP	-1.17	34.40	46.00	11.60
507.2400	30.85	QP	-0.25	30.60	46.00	15.40

Vertical:

Frequency (MHz)	Receiver Reading (dBuV)	Remark	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
30.9700	24.85	QP	0.95	25.80	40.00	14.20
104.6900	28.87	QP	-7.57	21.30	43.50	22.20
145.4300	32.69	QP	-5.99	26.70	43.50	16.80
438.3700	28.00	QP	-1.20	26.80	46.00	19.20
506.2700	27.45	QP	-0.25	27.20	46.00	18.80
595.5100	26.64	QP	0.86	27.50	46.00	18.50

2) 1-26.5GHz:
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)	Remark	Polar (H/V)	Factor (dB/m)					
2412 MHz									
2412.00	72.21	PK	H	28.12	1.81	0.00	102.14	N/A	N/A
2412.00	68.94	AV	H	28.12	1.81	0.00	98.87	N/A	N/A
2412.00	72.39	PK	V	28.12	1.81	0.00	102.32	N/A	N/A
2412.00	69.14	AV	V	28.12	1.81	0.00	99.07	N/A	N/A
2390.00	25.53	PK	V	28.08	1.80	0.00	55.41	74.00	18.59
2390.00	13.44	AV	V	28.08	1.80	0.00	43.32	54.00	10.68
4824.00	47.39	PK	V	32.95	3.19	37.20	46.33	74.00	27.67
4824.00	34.79	AV	V	32.95	3.19	37.20	33.73	54.00	20.27
7236.00	45.71	PK	V	35.81	4.77	37.27	49.02	74.00	24.98
7236.00	33.26	AV	V	35.81	4.77	37.27	36.57	54.00	17.43
2437 MHz									
2437.00	74.25	PK	H	28.17	1.82	0.00	104.24	N/A	N/A
2437.00	71.12	AV	H	28.17	1.82	0.00	101.11	N/A	N/A
2437.00	74.36	PK	V	28.17	1.82	0.00	104.35	N/A	N/A
2437.00	71.41	AV	V	28.17	1.82	0.00	101.40	N/A	N/A
4874.00	47.67	PK	V	33.05	3.26	37.21	46.77	74.00	27.23
4874.00	35.20	AV	V	33.05	3.26	37.21	34.30	54.00	19.70
7311.00	46.03	PK	V	36.01	4.64	37.36	49.32	74.00	24.68
7311.00	33.54	AV	V	36.01	4.64	37.36	36.83	54.00	17.17
2467 MHz									
2467.00	70.58	PK	H	28.23	1.83	0.00	100.64	N/A	N/A
2467.00	67.52	AV	H	28.23	1.83	0.00	97.58	N/A	N/A
2467.00	70.71	PK	V	28.23	1.83	0.00	100.77	N/A	N/A
2467.00	67.63	AV	V	28.23	1.83	0.00	97.69	N/A	N/A
2483.50	29.47	PK	V	28.27	1.84	0.00	59.58	74.00	14.42
2483.50	19.70	AV	V	28.27	1.84	0.00	49.81	54.00	4.19
4934.00	47.50	PK	V	33.17	3.26	37.23	46.70	74.00	27.30
4934.00	35.02	AV	V	33.17	3.26	37.23	34.22	54.00	19.78
7401.00	46.10	PK	V	36.24	4.48	37.48	49.34	74.00	24.66
7401.00	33.65	AV	V	36.24	4.48	37.48	36.89	54.00	17.11
2472 MHz									
2472.00	70.58	PK	H	28.24	1.84	0.00	100.66	N/A	N/A
2472.00	67.52	AV	H	28.24	1.84	0.00	97.60	N/A	N/A
2472.00	70.86	PK	V	28.24	1.84	0.00	100.94	N/A	N/A
2472.00	67.79	AV	V	28.24	1.84	0.00	97.87	N/A	N/A
2483.50	28.42	PK	V	28.27	1.84	0.00	58.53	74.00	15.47
2483.50	20.03	AV	V	28.27	1.84	0.00	50.14	54.00	3.86
4944.00	47.40	PK	V	33.19	3.25	37.24	46.60	74.00	27.40
4944.00	34.87	AV	V	33.19	3.25	37.24	34.07	54.00	19.93
7416.00	45.88	PK	V	36.28	4.46	37.49	49.13	74.00	24.87
7416.00	33.36	AV	V	36.28	4.46	37.49	36.61	54.00	17.39

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)	Remark	Polar (H/V)	Factor (dB/m)					
2412 MHz									
2412.00	74.63	PK	H	28.12	1.81	0.00	104.56	N/A	N/A
2412.00	65.28	AV	H	28.12	1.81	0.00	95.21	N/A	N/A
2412.00	75.02	PK	V	28.12	1.81	0.00	104.95	N/A	N/A
2412.00	65.77	AV	V	28.12	1.81	0.00	95.70	N/A	N/A
2390.00	39.93	PK	V	28.08	1.80	0.00	69.81	74.00	4.19
2390.00	20.11	AV	V	28.08	1.80	0.00	49.99	54.00	4.01
4824.00	47.41	PK	V	32.95	3.19	37.20	46.35	74.00	27.65
4824.00	34.96	AV	V	32.95	3.19	37.20	33.90	54.00	20.10
7236.00	45.71	PK	V	35.81	4.77	37.27	49.02	74.00	24.98
7236.00	33.25	AV	V	35.81	4.77	37.27	36.56	54.00	17.44
2437 MHz									
2437.00	75.45	PK	H	28.17	1.82	0.00	105.44	N/A	N/A
2437.00	66.14	AV	H	28.17	1.82	0.00	96.13	N/A	N/A
2437.00	75.99	PK	V	28.17	1.82	0.00	105.98	N/A	N/A
2437.00	66.58	AV	V	28.17	1.82	0.00	96.57	N/A	N/A
4874.00	47.35	PK	V	33.05	3.26	37.21	46.45	74.00	27.55
4874.00	34.87	AV	V	33.05	3.26	37.21	33.97	54.00	20.03
7311.00	45.67	PK	V	36.01	4.64	37.36	48.96	74.00	25.04
7311.00	33.24	AV	V	36.01	4.64	37.36	36.53	54.00	17.47
2462 MHz									
2462.00	72.59	PK	H	28.22	1.83	0.00	102.64	N/A	N/A
2462.00	63.02	AV	H	28.22	1.83	0.00	93.07	N/A	N/A
2462.00	73.34	PK	V	28.22	1.83	0.00	103.39	N/A	N/A
2462.00	63.89	AV	V	28.22	1.83	0.00	93.94	N/A	N/A
2483.50	38.75	PK	V	28.27	1.84	0.00	68.86	74.00	5.14
2483.50	20.04	AV	V	28.27	1.84	0.00	50.15	54.00	3.85
4924.00	47.13	PK	V	33.15	3.27	37.22	46.33	74.00	27.67
4924.00	34.75	AV	V	33.15	3.27	37.22	33.95	54.00	20.05
7386.00	45.68	PK	V	36.20	4.51	37.46	48.93	74.00	25.07
7386.00	33.15	AV	V	36.20	4.51	37.46	36.40	54.00	17.60
2467 MHz									
2467.00	69.34	PK	H	28.23	1.83	0.00	99.40	N/A	N/A
2467.00	58.88	AV	H	28.23	1.83	0.00	88.94	N/A	N/A
2467.00	69.93	PK	V	28.23	1.83	0.00	99.99	N/A	N/A
2467.00	60.42	AV	V	28.23	1.83	0.00	90.48	N/A	N/A
2483.50	40.11	PK	V	28.27	1.84	0.00	70.22	74.00	3.78
2483.50	20.77	AV	V	28.27	1.84	0.00	50.88	54.00	3.12
4934.00	46.99	PK	V	33.17	3.26	37.23	46.19	74.00	27.81
4934.00	34.65	AV	V	33.17	3.26	37.23	33.85	54.00	20.15
7401.00	45.49	PK	V	36.24	4.48	37.48	48.73	74.00	25.27
7401.00	32.88	AV	V	36.24	4.48	37.48	36.12	54.00	17.88

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Remark	Polar (H/V)	Factor (dB/m)					
2472 MHz									
2472.00	66.57	PK	H	28.24	1.84	0.00	96.65	N/A	N/A
2472.00	57.21	AV	H	28.24	1.84	0.00	87.29	N/A	N/A
2472.00	67.12	PK	V	28.24	1.84	0.00	97.20	N/A	N/A
2472.00	57.61	AV	V	28.24	1.84	0.00	87.69	N/A	N/A
2483.50	40.35	PK	V	28.27	1.84	0.00	70.46	74.00	3.54
2483.50	20.36	AV	V	28.27	1.84	0.00	50.47	54.00	3.53
4944.00	46.98	PK	V	33.19	3.25	37.24	46.18	74.00	27.82
4944.00	34.46	AV	V	33.19	3.25	37.24	33.66	54.00	20.34
7416.00	45.39	PK	V	36.28	4.46	37.49	48.64	74.00	25.36
7416.00	32.78	AV	V	36.28	4.46	37.49	36.03	54.00	17.97

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)	Remark	Polar (H/V)	Factor (dB/m)					
2412 MHz									
2412.00	73.58	PK	H	28.12	1.81	0.00	103.51	N/A	N/A
2412.00	63.16	AV	H	28.12	1.81	0.00	93.09	N/A	N/A
2412.00	74.31	PK	V	28.12	1.81	0.00	104.24	N/A	N/A
2412.00	64.02	AV	V	28.12	1.81	0.00	93.95	N/A	N/A
2390.00	40.01	PK	V	28.08	1.80	0.00	69.89	74.00	4.11
2390.00	20.64	AV	V	28.08	1.80	0.00	50.52	54.00	3.48
4824.00	47.52	PK	V	32.95	3.19	37.20	46.46	74.00	27.54
4824.00	34.89	AV	V	32.95	3.19	37.20	33.83	54.00	20.17
7236.00	45.58	PK	V	35.81	4.77	37.27	48.89	74.00	25.11
7236.00	33.13	AV	V	35.81	4.77	37.27	36.44	54.00	17.56
2437 MHz									
2437.00	75.23	PK	H	28.17	1.82	0.00	105.22	N/A	N/A
2437.00	64.82	AV	H	28.17	1.82	0.00	94.81	N/A	N/A
2437.00	76.01	PK	V	28.17	1.82	0.00	106.00	N/A	N/A
2437.00	65.63	AV	V	28.17	1.82	0.00	95.62	N/A	N/A
4874.00	47.65	PK	V	33.05	3.26	37.21	46.75	74.00	27.25
4874.00	35.20	AV	V	33.05	3.26	37.21	34.30	54.00	19.70
7311.00	45.63	PK	V	36.01	4.64	37.36	48.92	74.00	25.08
7311.00	33.16	AV	V	36.01	4.64	37.36	36.45	54.00	17.55
2462 MHz									
2462.00	71.41	PK	H	28.22	1.83	0.00	101.46	N/A	N/A
2462.00	61.05	AV	H	28.22	1.83	0.00	91.10	N/A	N/A
2462.00	72.12	PK	V	28.22	1.83	0.00	102.17	N/A	N/A
2462.00	61.78	AV	V	28.22	1.83	0.00	91.83	N/A	N/A
2483.50	39.26	PK	V	28.27	1.84	0.00	69.37	74.00	4.63
2483.50	20.11	AV	V	28.27	1.84	0.00	50.22	54.00	3.78
4924.00	47.55	PK	V	33.15	3.27	37.22	46.75	74.00	27.25
4924.00	35.10	AV	V	33.15	3.27	37.22	34.30	54.00	19.70
7386.00	45.40	PK	V	36.20	4.51	37.46	48.65	74.00	25.35
7386.00	32.98	AV	V	36.20	4.51	37.46	36.23	54.00	17.77
2467 MHz									
2467.00	68.26	PK	H	28.23	1.83	0.00	98.32	N/A	N/A
2467.00	57.73	AV	H	28.23	1.83	0.00	87.79	N/A	N/A
2467.00	69.42	PK	V	28.23	1.83	0.00	99.48	N/A	N/A
2467.00	59.05	AV	V	28.23	1.83	0.00	89.11	N/A	N/A
2483.50	38.12	PK	V	28.27	1.84	0.00	68.23	74.00	5.77
2483.50	20.79	AV	V	28.27	1.84	0.00	50.90	54.00	3.10
4934.00	47.54	PK	V	33.17	3.26	37.23	46.74	74.00	27.26
4934.00	35.08	AV	V	33.17	3.26	37.23	34.28	54.00	19.72
7401.00	45.50	PK	V	36.24	4.48	37.48	48.74	74.00	25.26
7401.00	33.07	AV	V	36.24	4.48	37.48	36.31	54.00	17.69

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Remark	Polar (H/V)	Factor (dB/m)					
2472 MHz									
2472.00	64.31	PK	H	28.24	1.84	0.00	94.39	N/A	N/A
2472.00	54.03	AV	H	28.24	1.84	0.00	84.11	N/A	N/A
2472.00	65.21	PK	V	28.24	1.84	0.00	95.29	N/A	N/A
2472.00	54.87	AV	V	28.24	1.84	0.00	84.95	N/A	N/A
2483.50	38.97	PK	V	28.27	1.84	0.00	69.08	74.00	4.92
2483.50	20.41	AV	V	28.27	1.84	0.00	50.52	54.00	3.48
4944.00	47.52	PK	V	33.19	3.25	37.24	46.72	74.00	27.28
4944.00	35.06	AV	V	33.19	3.25	37.24	34.26	54.00	19.74
7416.00	45.46	PK	V	36.28	4.46	37.49	48.71	74.00	25.29
7416.00	32.90	AV	V	36.28	4.46	37.49	36.15	54.00	17.85

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)	Remark	Polar (H/V)	Factor (dB/m)					
2422 MHz									
2422.00	70.21	PK	H	28.14	1.81	0.00	100.16	N/A	N/A
2422.00	60.65	AV	H	28.14	1.81	0.00	90.60	N/A	N/A
2422.00	71.02	PK	V	28.14	1.81	0.00	100.97	N/A	N/A
2422.00	61.42	AV	V	28.14	1.81	0.00	91.37	N/A	N/A
2390.00	36.69	PK	V	28.08	1.80	0.00	66.57	74.00	7.43
2390.00	20.03	AV	V	28.08	1.80	0.00	49.91	54.00	4.09
4844.00	47.13	PK	V	32.99	3.22	37.20	46.14	74.00	27.86
4844.00	34.72	AV	V	32.99	3.22	37.20	33.73	54.00	20.27
7266.00	45.58	PK	V	35.89	4.72	37.31	48.88	74.00	25.12
7266.00	33.10	AV	V	35.89	4.72	37.31	36.40	54.00	17.60
2437 MHz									
2437.00	71.88	PK	H	28.17	1.82	0.00	101.87	N/A	N/A
2437.00	61.35	AV	H	28.17	1.82	0.00	91.34	N/A	N/A
2437.00	72.79	PK	V	28.17	1.82	0.00	102.78	N/A	N/A
2437.00	63.14	AV	V	28.17	1.82	0.00	93.13	N/A	N/A
4874.00	47.12	PK	V	33.05	3.26	37.21	46.22	74.00	27.78
4874.00	34.65	AV	V	33.05	3.26	37.21	33.75	54.00	20.25
7311.00	45.98	PK	V	36.01	4.64	37.36	49.27	74.00	24.73
7311.00	33.57	AV	V	36.01	4.64	37.36	36.86	54.00	17.14
2447 MHz									
2447.00	70.05	PK	H	28.19	1.82	0.00	100.06	N/A	N/A
2447.00	61.33	AV	H	28.19	1.82	0.00	91.34	N/A	N/A
2447.00	70.99	PK	V	28.19	1.82	0.00	101.00	N/A	N/A
2447.00	61.36	AV	V	28.19	1.82	0.00	91.37	N/A	N/A
2483.50	36.28	PK	V	28.27	1.84	0.00	66.39	74.00	7.61
2483.50	20.46	AV	V	28.27	1.84	0.00	50.57	54.00	3.43
4894.00	47.10	PK	V	33.09	3.29	37.21	46.27	74.00	27.73
4894.00	34.59	AV	V	33.09	3.29	37.21	33.76	54.00	20.24
7341.00	35.78	PK	V	36.09	4.59	37.40	39.06	74.00	34.94
7341.00	33.42	AV	V	36.09	4.59	37.40	36.70	54.00	17.30
2452 MHz									
2452.00	68.46	PK	H	28.20	1.83	0.00	98.49	N/A	N/A
2452.00	58.73	AV	H	28.20	1.83	0.00	88.76	N/A	N/A
2452.00	69.85	PK	V	28.20	1.83	0.00	99.88	N/A	N/A
2452.00	60.23	AV	V	28.20	1.83	0.00	90.26	N/A	N/A
2483.50	36.77	PK	V	28.27	1.84	0.00	66.88	74.00	7.12
2483.50	20.67	AV	V	28.27	1.84	0.00	50.78	54.00	3.22
4904.00	46.98	PK	V	33.11	3.30	37.21	46.18	74.00	27.82
4904.00	34.52	AV	V	33.11	3.30	37.21	33.72	54.00	20.28
7356.00	45.77	PK	V	36.13	4.56	37.42	49.04	74.00	24.96
7356.00	33.40	AV	V	36.13	4.56	37.42	36.67	54.00	17.33

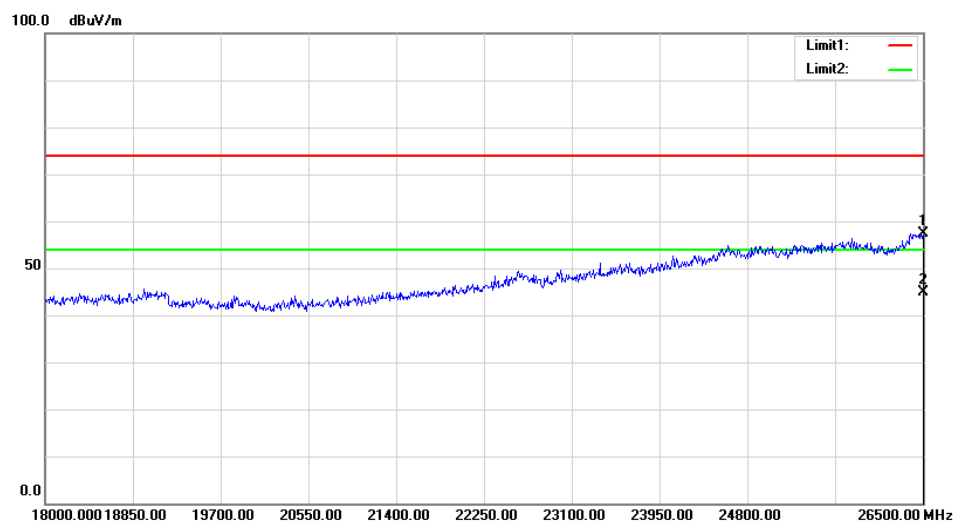
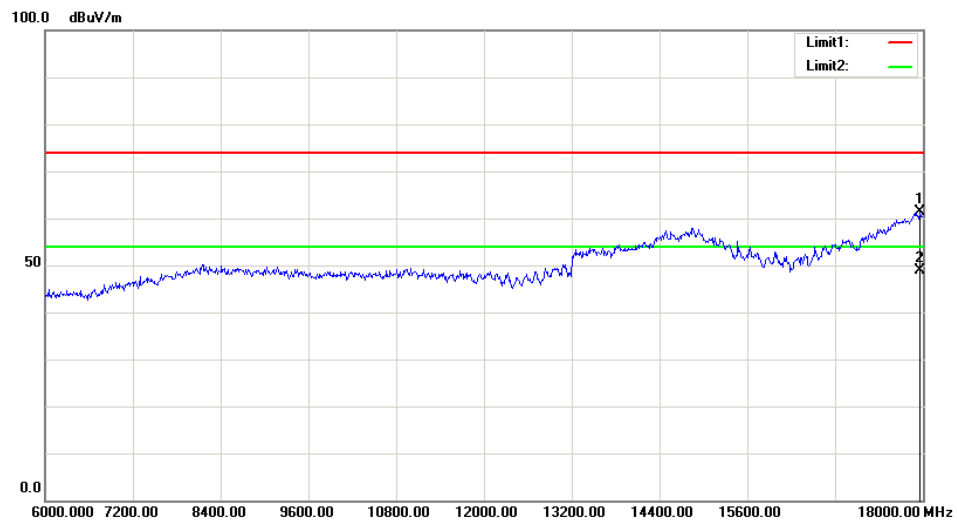
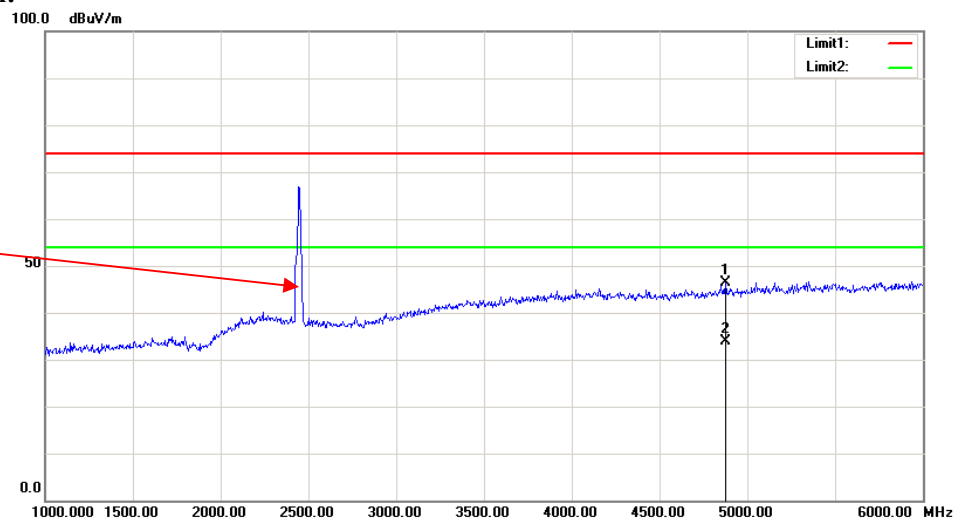
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Remark	Polar (H/V)	Factor (dB/m)					
2457 MHz									
2457.00	65.98	PK	H	28.21	1.83	0.00	96.02	N/A	N/A
2457.00	56.25	AV	H	28.21	1.83	0.00	86.29	N/A	N/A
2457.00	67.33	PK	V	28.21	1.83	0.00	97.37	N/A	N/A
2457.00	56.59	AV	V	28.21	1.83	0.00	86.63	N/A	N/A
2483.50	38.10	PK	V	28.27	1.84	0.00	68.21	74.00	5.79
2483.50	20.24	AV	V	28.27	1.84	0.00	50.35	54.00	3.65
4914.00	47.05	PK	V	33.13	3.28	37.22	46.24	74.00	27.76
4914.00	34.68	AV	V	33.13	3.28	37.22	33.87	54.00	20.13
7371.00	45.66	PK	V	36.16	4.53	37.44	48.91	74.00	25.09
7371.00	33.25	AV	V	36.16	4.53	37.44	36.50	54.00	17.50
2462 MHz									
2462.00	63.08	PK	H	28.22	1.83	0.00	93.13	N/A	N/A
2462.00	52.34	AV	H	28.22	1.83	0.00	82.39	N/A	N/A
2462.00	64.12	PK	V	28.22	1.83	0.00	94.17	N/A	N/A
2462.00	53.56	AV	V	28.22	1.83	0.00	83.61	N/A	N/A
2483.50	39.46	PK	V	28.27	1.84	0.00	69.57	74.00	4.43
2483.50	20.33	AV	V	28.27	1.84	0.00	50.44	54.00	3.56
4924.00	46.77	PK	V	33.15	3.27	37.22	45.97	74.00	28.03
4924.00	34.46	AV	V	33.15	3.27	37.22	33.66	54.00	20.34
7386.00	45.71	PK	V	36.20	4.51	37.46	48.96	74.00	25.04
7386.00	33.40	AV	V	36.20	4.51	37.46	36.65	54.00	17.35

BLE Mode:

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Remark	Polar (H/V)	Factor (dB/m)					
2402 MHz									
2402.00	63.87	PK	H	28.10	1.80	0.00	93.77	N/A	N/A
2402.00	59.04	AV	H	28.10	1.80	0.00	88.94	N/A	N/A
2402.00	66.39	PK	V	28.10	1.80	0.00	96.29	N/A	N/A
2402.00	61.62	AV	V	28.10	1.80	0.00	91.52	N/A	N/A
2390.00	25.89	PK	V	28.08	1.80	0.00	55.77	74.00	18.23
2390.00	13.02	AV	V	28.08	1.80	0.00	42.90	54.00	11.10
4804.00	48.50	PK	V	32.91	3.17	37.20	47.38	74.00	26.62
4804.00	36.05	AV	V	32.91	3.17	37.20	34.93	54.00	19.07
7206.00	45.69	PK	V	35.74	4.82	37.23	49.02	74.00	24.98
7206.00	33.10	AV	V	35.74	4.82	37.23	36.43	54.00	17.57
2440 MHz									
2440.00	63.54	PK	H	28.18	1.82	0.00	93.54	N/A	N/A
2440.00	58.81	AV	H	28.18	1.82	0.00	88.81	N/A	N/A
2440.00	65.86	PK	V	28.18	1.82	0.00	95.86	N/A	N/A
2440.00	61.17	AV	V	28.18	1.82	0.00	91.17	N/A	N/A
4880.00	48.25	PK	V	33.06	3.27	37.21	47.37	74.00	26.63
4880.00	35.78	AV	V	33.06	3.27	37.21	34.90	54.00	19.10
7320.00	45.53	PK	V	36.03	4.62	37.37	48.81	74.00	25.19
7320.00	33.06	AV	V	36.03	4.62	37.37	36.34	54.00	17.66
2480 MHz									
2480.00	62.96	PK	H	28.26	1.84	0.00	93.06	N/A	N/A
2480.00	58.23	AV	H	28.26	1.84	0.00	88.33	N/A	N/A
2480.00	65.59	PK	V	28.26	1.84	0.00	95.69	N/A	N/A
2480.00	60.78	AV	V	28.26	1.84	0.00	90.88	N/A	N/A
2483.50	26.10	PK	V	28.27	1.84	0.00	56.21	74.00	17.79
2483.50	13.54	AV	V	28.27	1.84	0.00	43.65	54.00	10.35
4960.00	48.33	PK	V	33.22	3.23	37.25	47.53	74.00	26.47
4960.00	35.81	AV	V	33.22	3.23	37.25	35.01	54.00	18.99
7440.00	45.58	PK	V	36.34	4.41	37.52	48.81	74.00	25.19
7440.00	33.15	AV	V	36.34	4.41	37.52	36.38	54.00	17.62

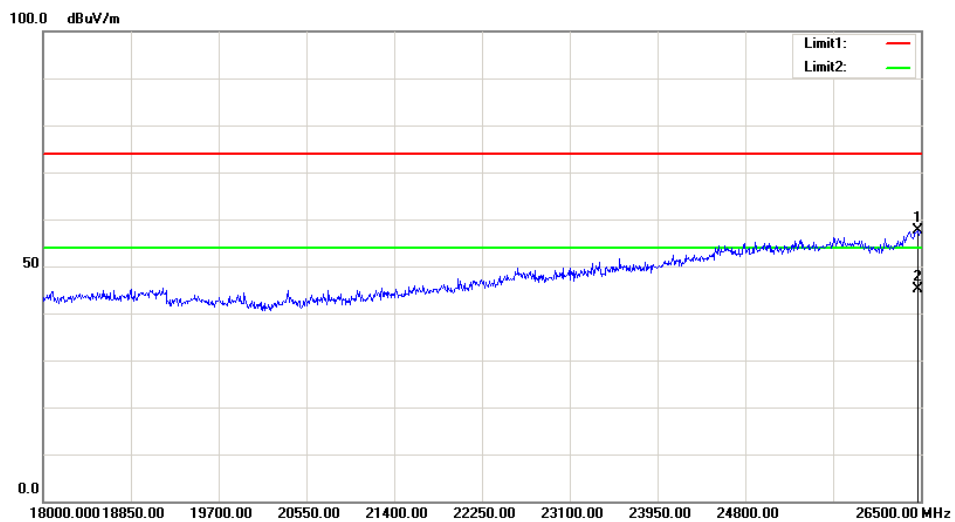
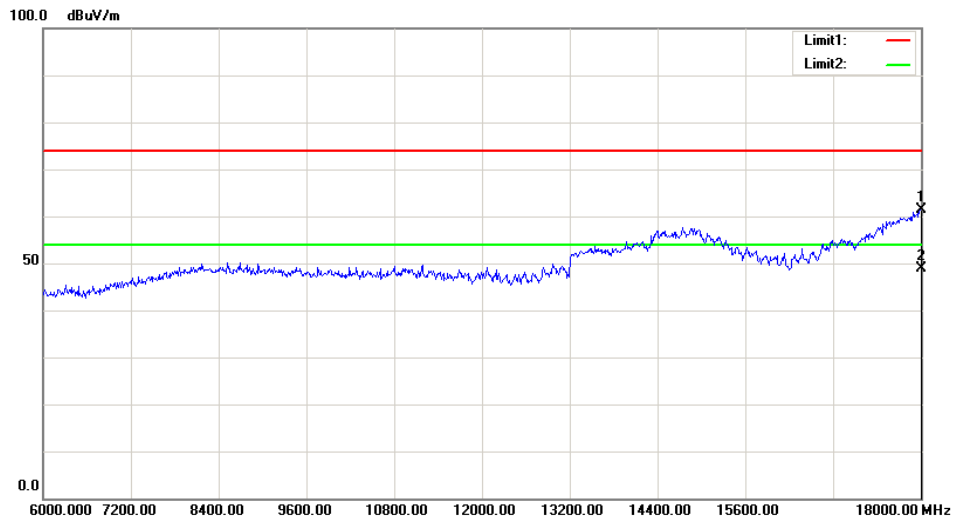
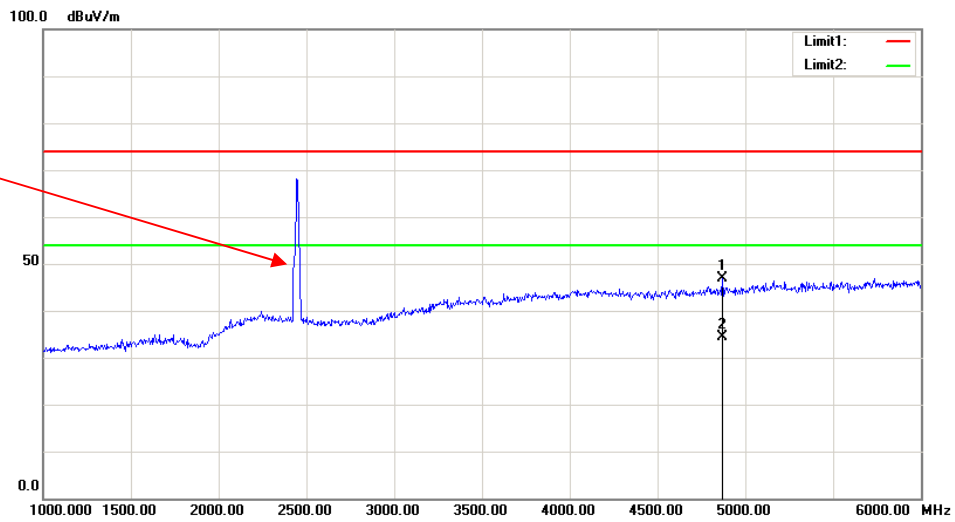
**Test plots(802.11 b mode 2462MHz was the worst)
Horizontal:**

Fundamental
Test with Band
Rejection Filter



Vertical:

Fundamental
Test with Band
Rejection Filter



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

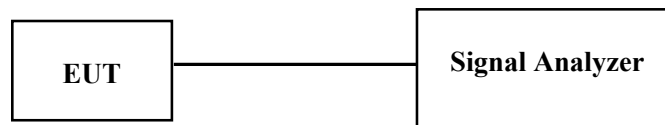
Applicable Standard

According to FCC §15.247(a) (2)

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

Test Procedure

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- 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	2018-08-03	2019-08-03
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
E-Microwave	Blocking Control	EMDCB-00036	0E01201047	2018-05-06	2019-05-06

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

Test Data

Environmental Conditions⁷

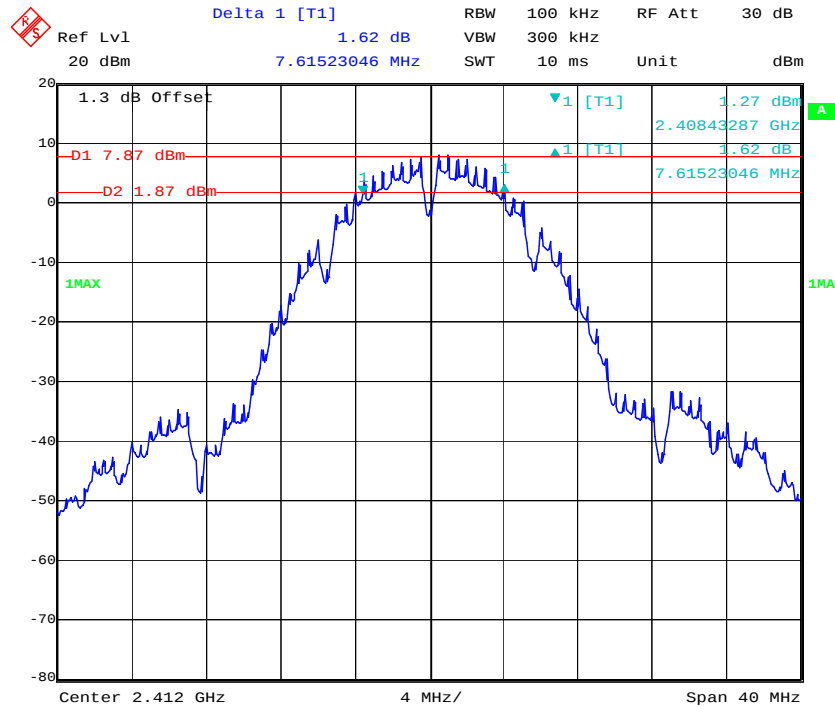
Temperature:	28.6~29.1°C
Relative Humidity:	57~61 %
ATM Pressure:	100.5~100.7 kPa

* The testing was performed by Swim Lv from 2018-09-07 to 2018-09-14.

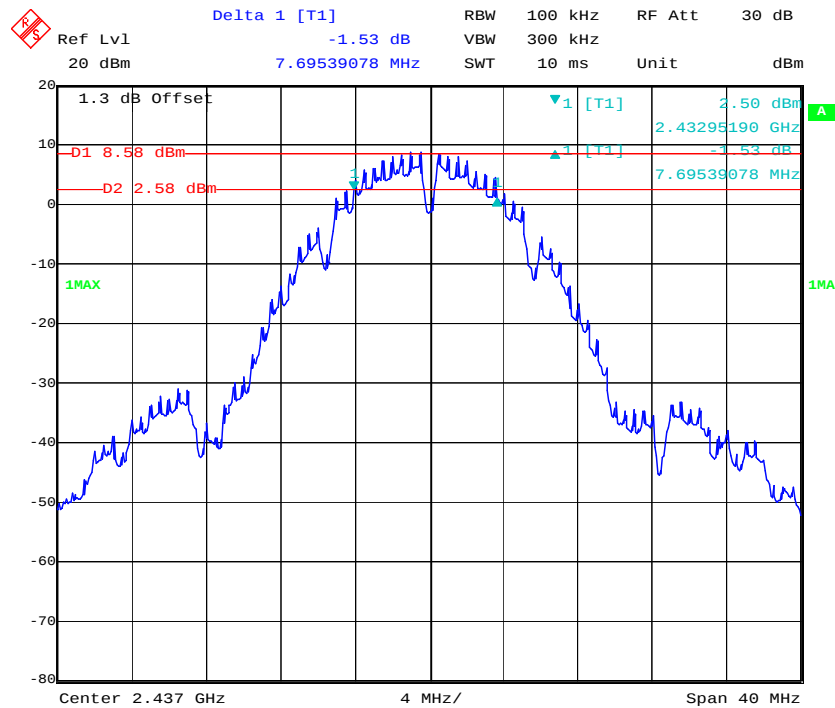
Test Mode: Transmitting

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

Test mode	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)
802.11b	2412	7.62	≥ 0.5
	2437	7.70	≥ 0.5
	2467	7.68	≥ 0.5
	2472	7.68	≥ 0.5
802.11g	2412	16.27	≥ 0.5
	2437	15.79	≥ 0.5
	2462	16.27	≥ 0.5
	2467	16.48	≥ 0.5
	2472	16.33	≥ 0.5
802.11n ht20	2412	17.47	≥ 0.5
	2437	16.59	≥ 0.5
	2462	17.31	≥ 0.5
	2467	17.29	≥ 0.5
	2472	17.43	≥ 0.5
802.11n ht40	2422	35.11	≥ 0.5
	2437	35.27	≥ 0.5
	2452	36.23	≥ 0.5
	2457	35.37	≥ 0.5
	2462	35.37	≥ 0.5
BLE	2402	0.73	≥ 0.5
	2440	0.73	≥ 0.5
	2480	0.73	≥ 0.5

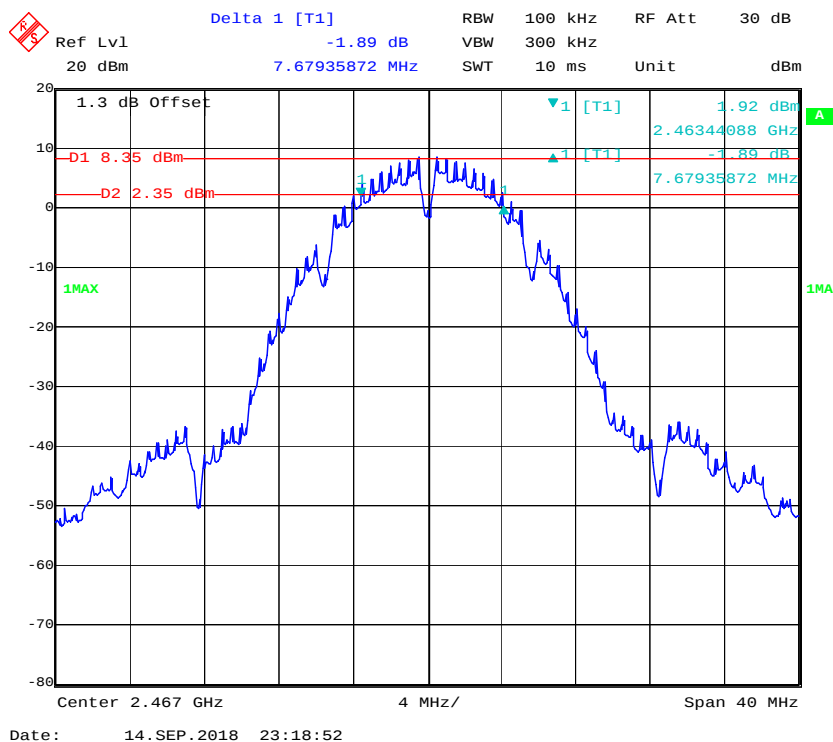
6dB bandwidth:**802.11b 2412MHz**

Date: 14.SEP.2018 22:33:31

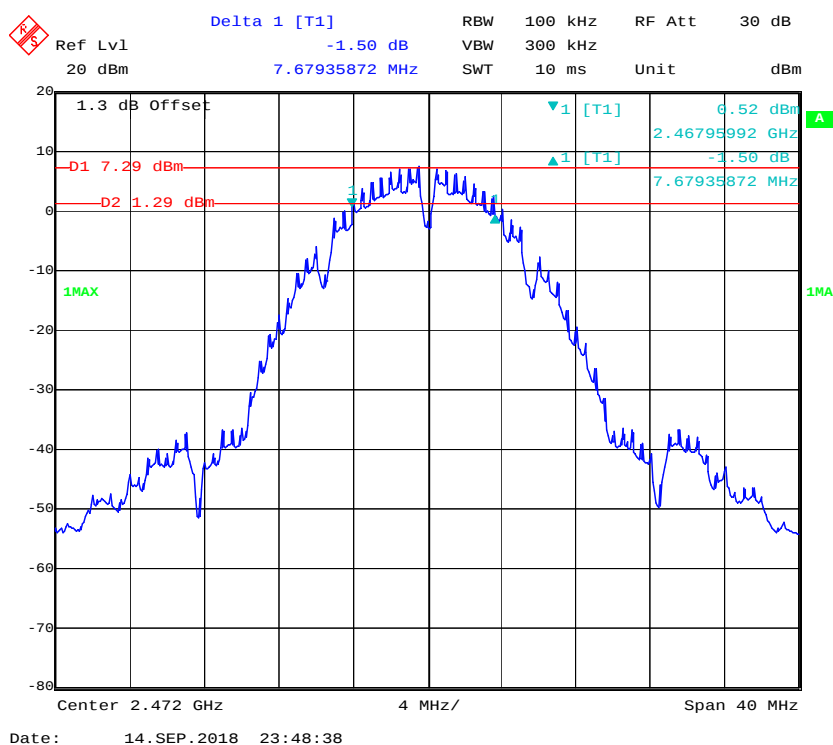
802.11b 2437MHz

Date: 14.SEP.2018 23:11:19

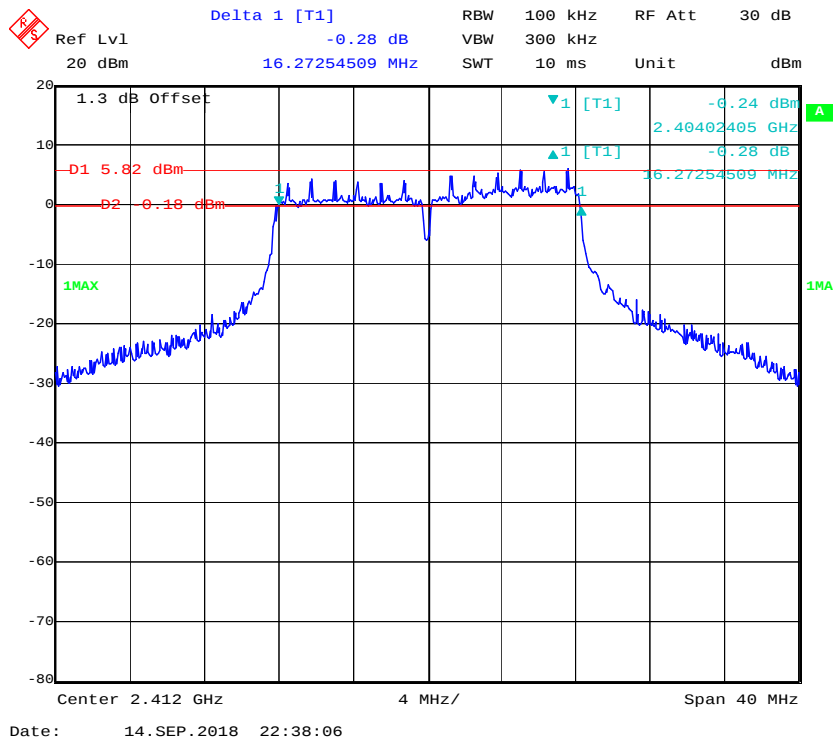
802.11b 2467MHz



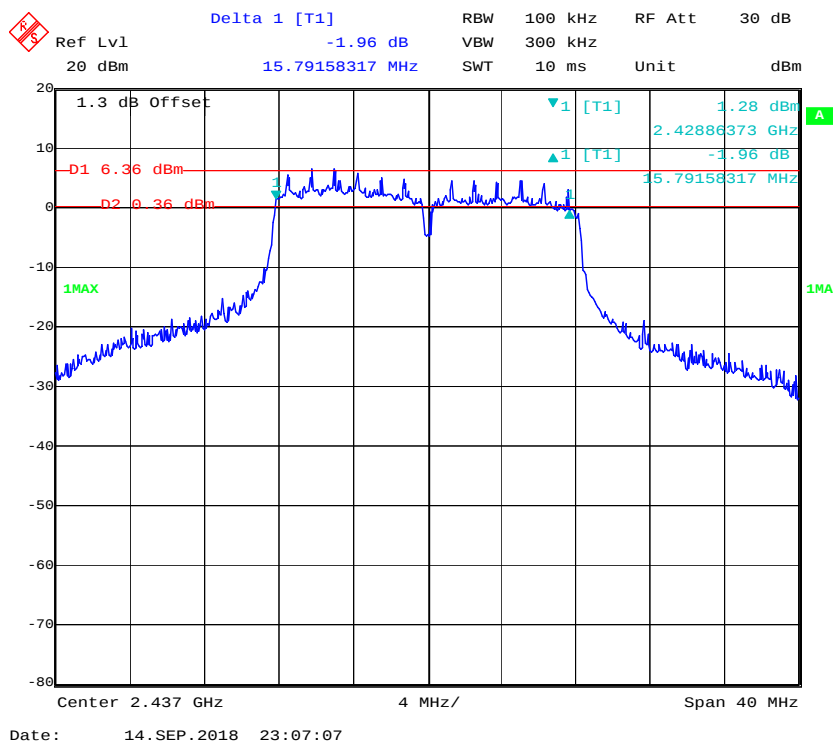
802.11b 2472MHz



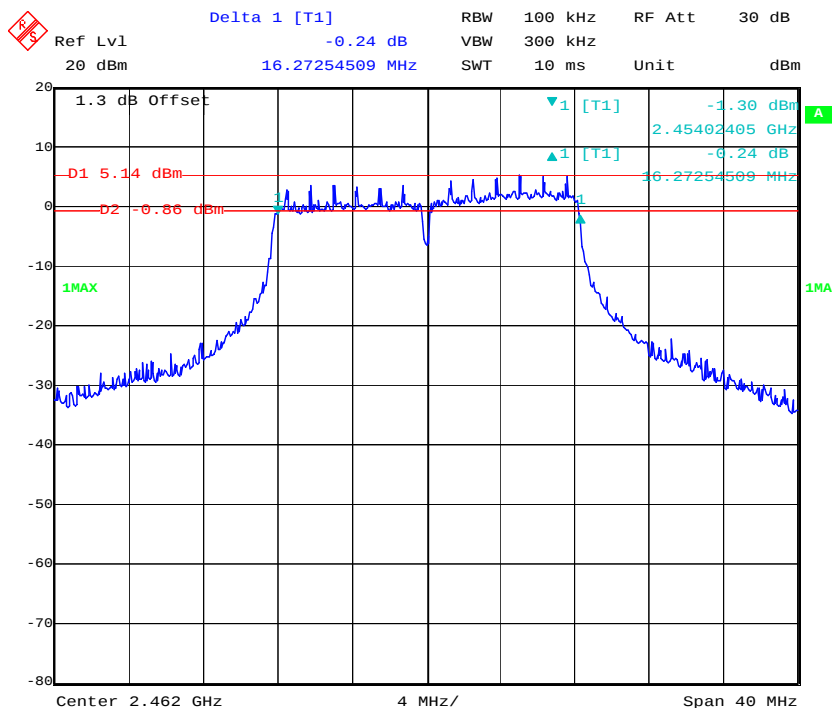
802.11g 2412MHz



802.11g 2437MHz

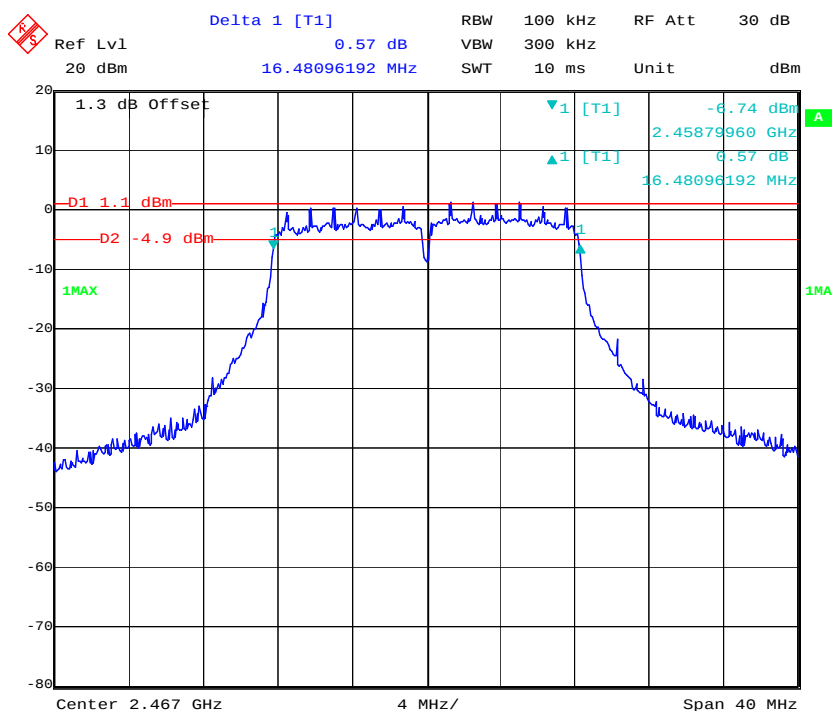


802.11g 2462MHz



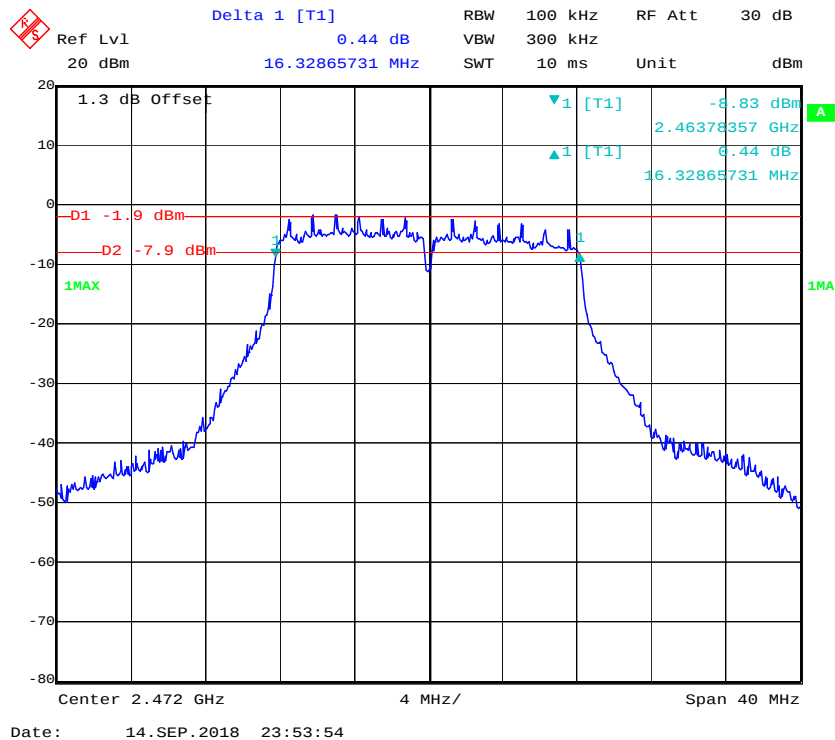
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802.11g 2467MHz

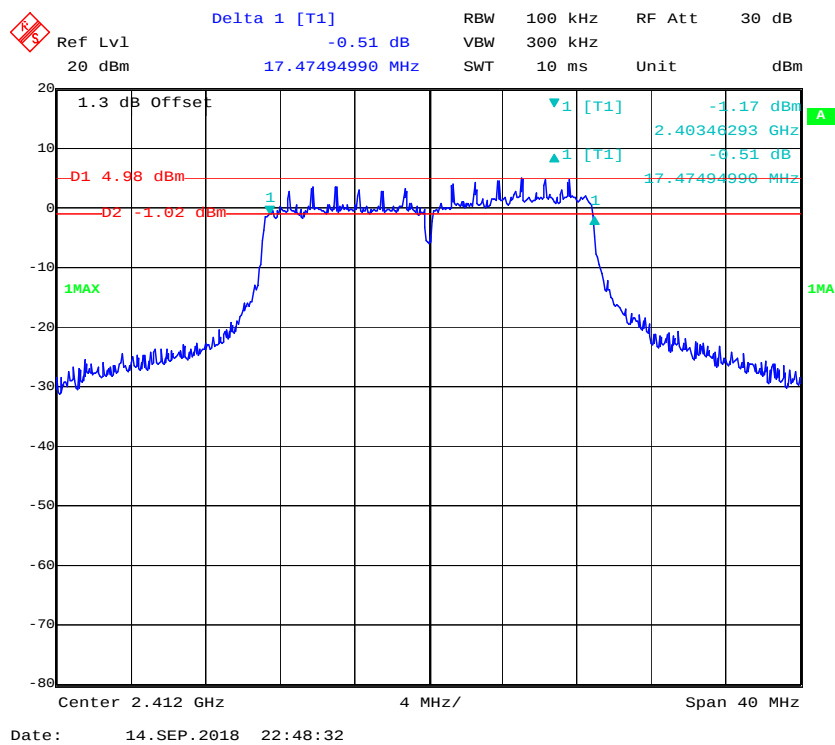


Date: 14.SEP.2018 23:28:43

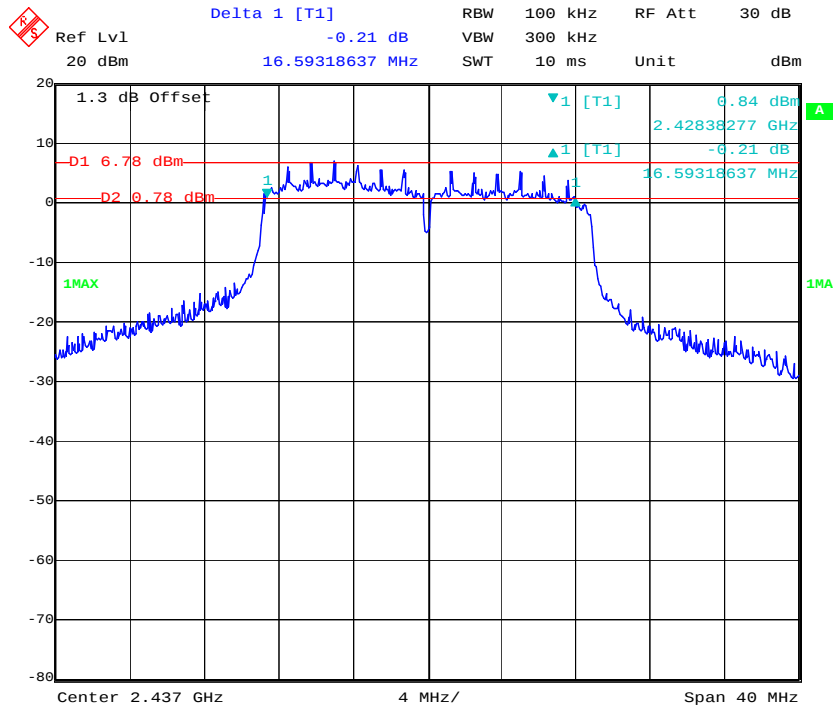
802.11g 2472MHz



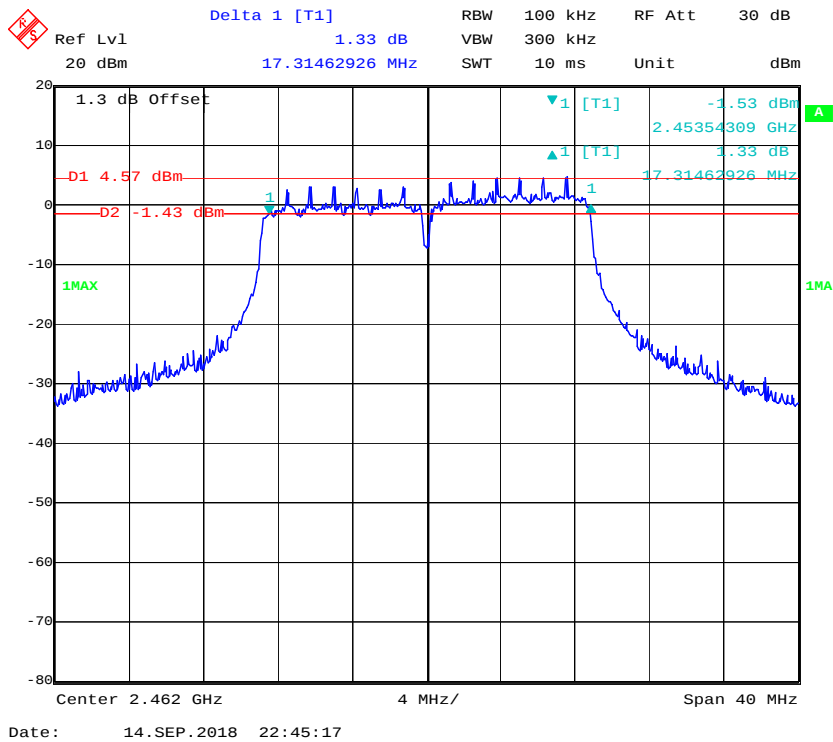
802.11n ht20 2412MHz



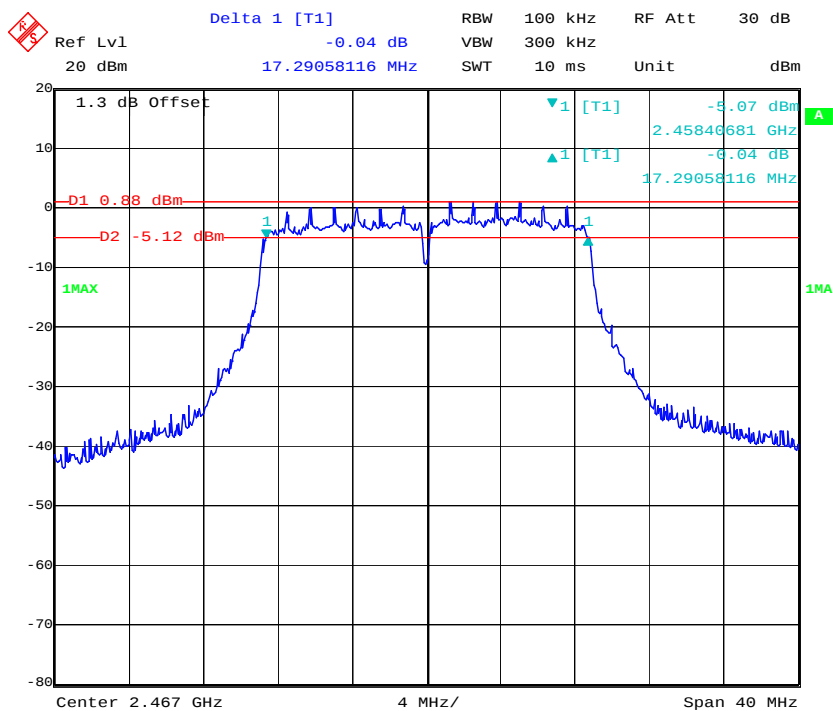
802.11n ht20 2437MHz



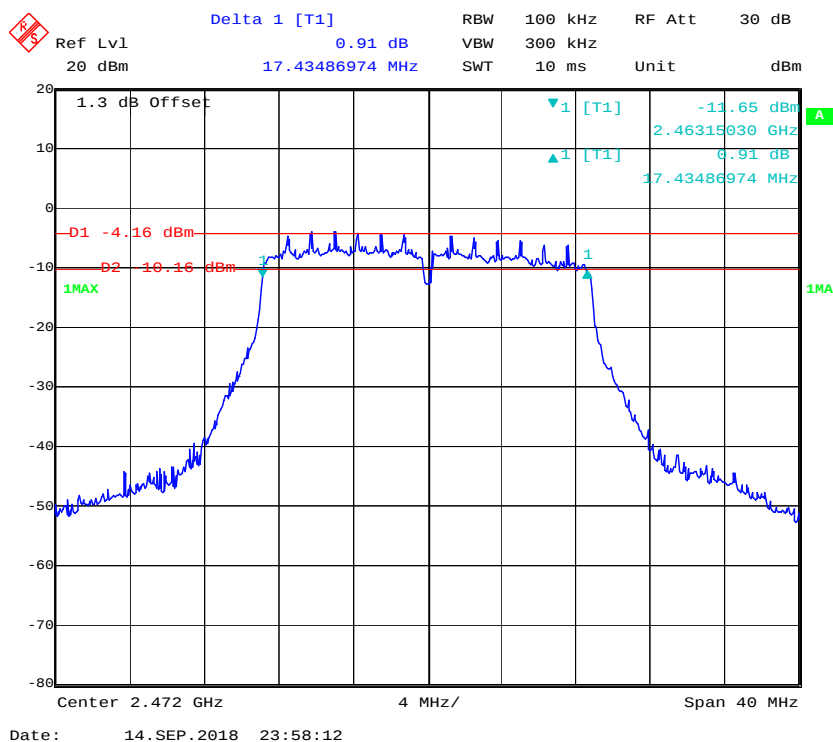
802.11n ht20 2462MHz



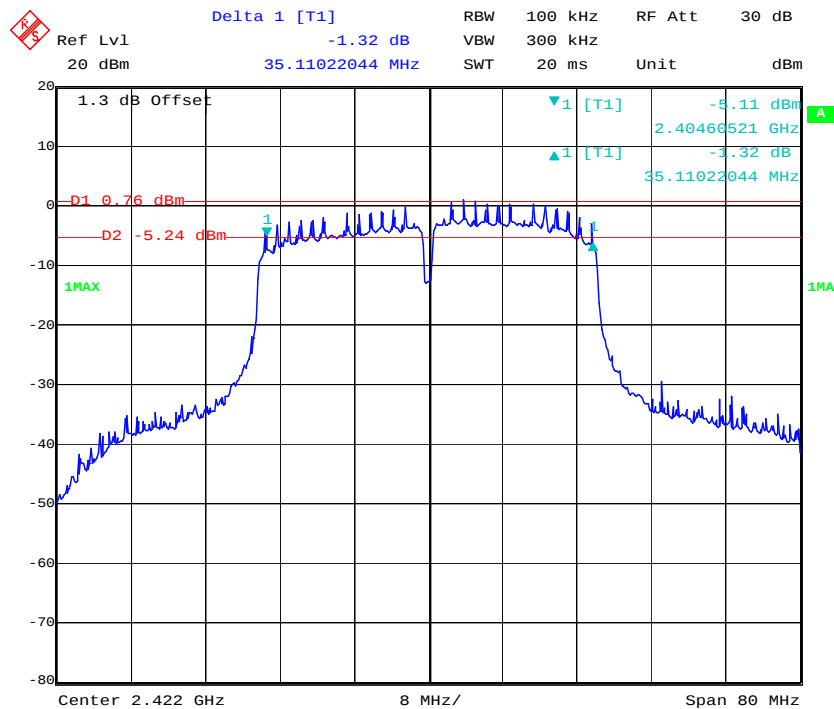
802.11n ht20 2467MHz



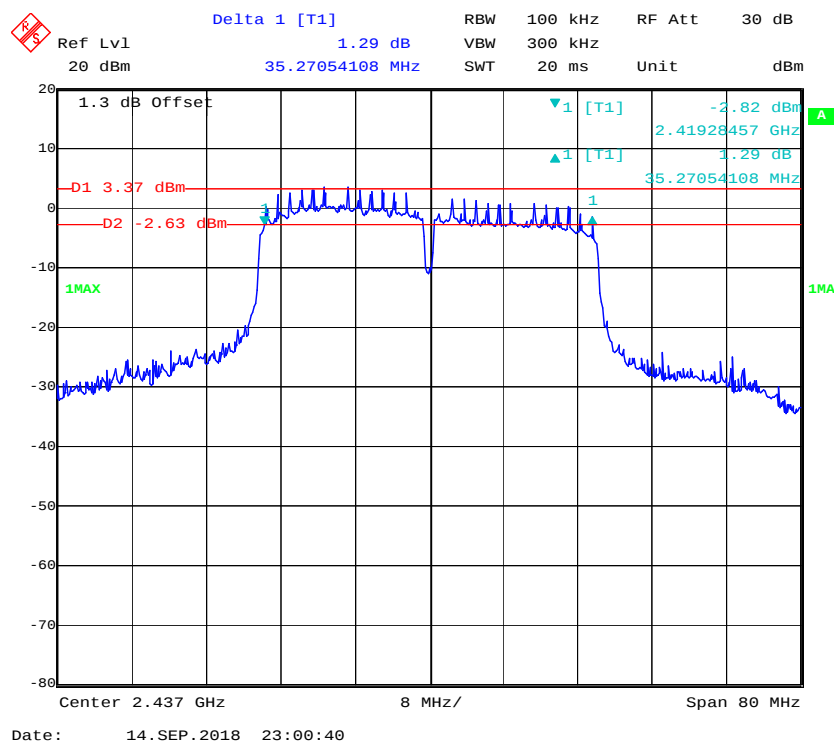
802.11n ht20 2472MHz



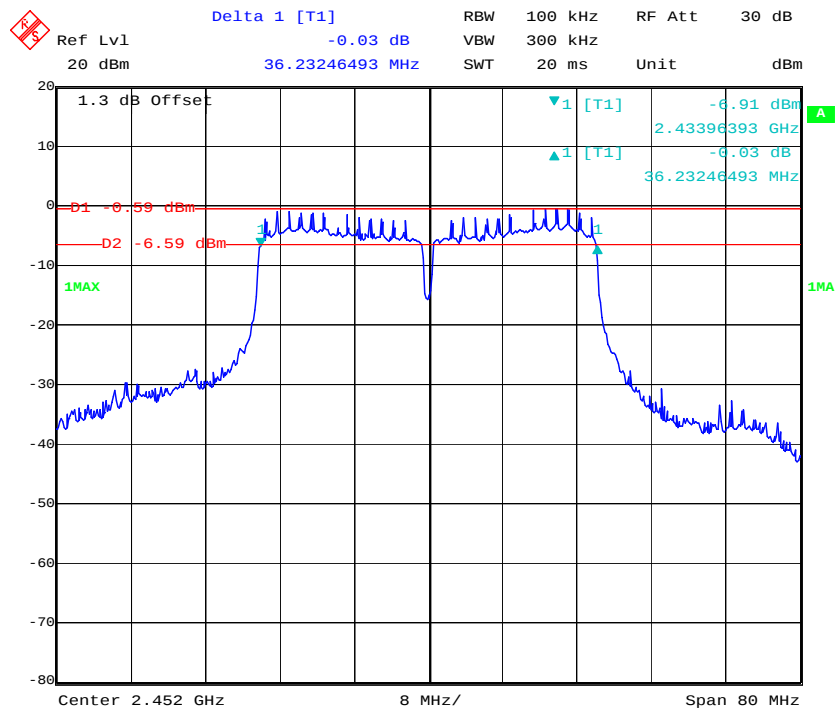
802.11n ht40 2422MHz



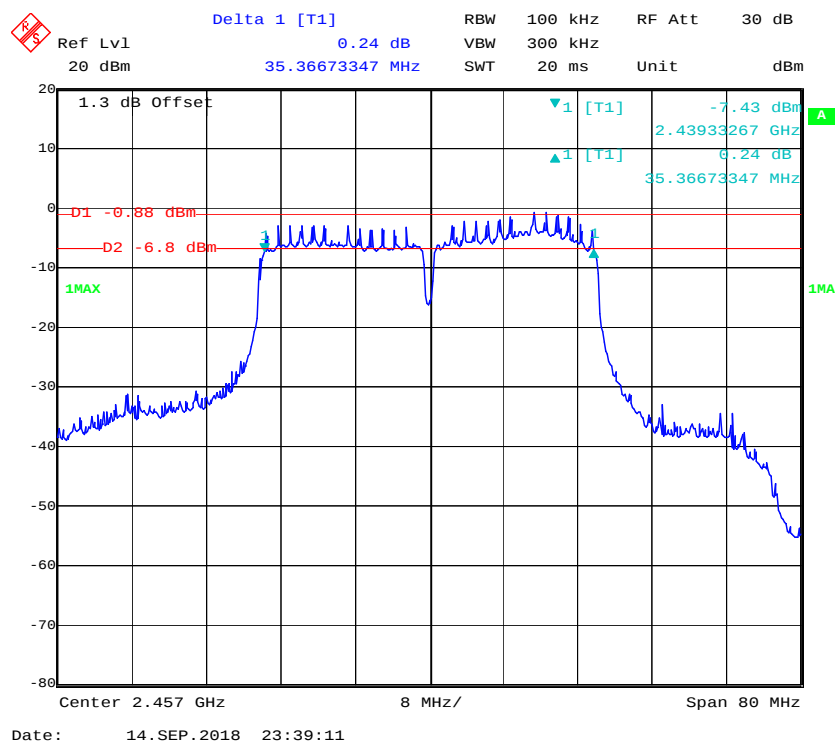
802.11n ht40 2437MHz



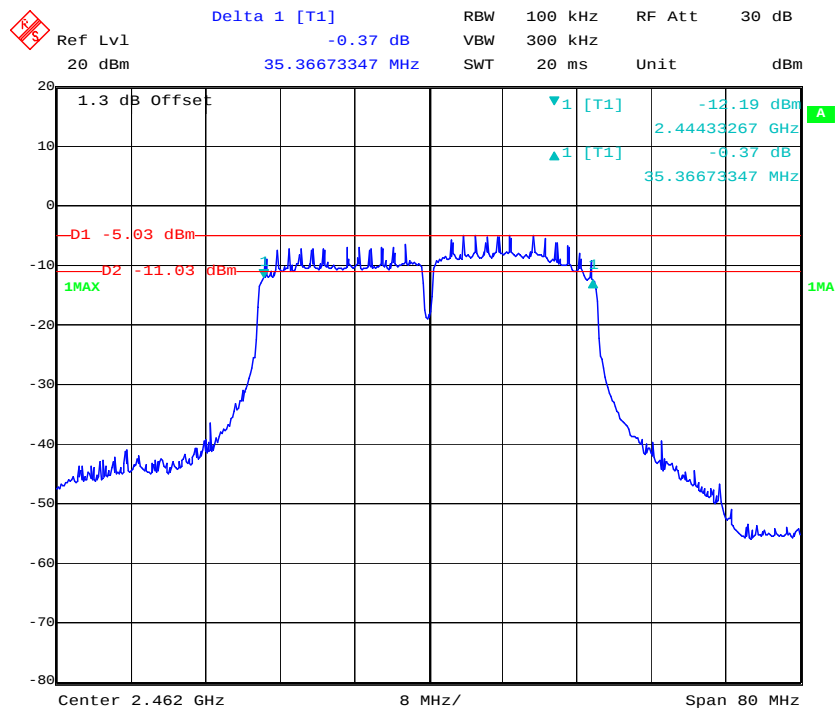
802.11n ht40 2452MHz



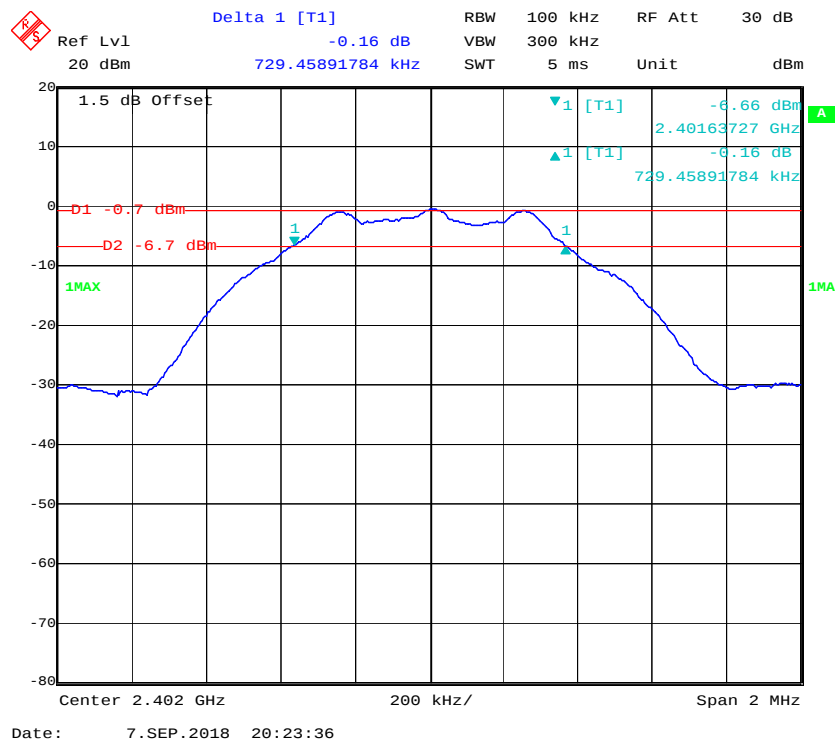
802.11n ht40 2457MHz



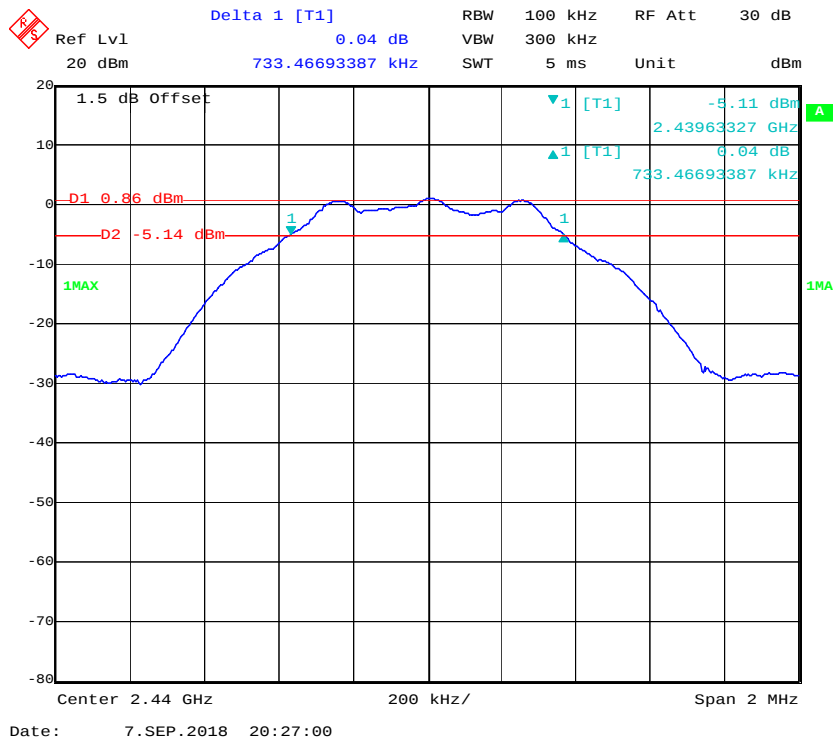
802.11n ht40 2462MHz



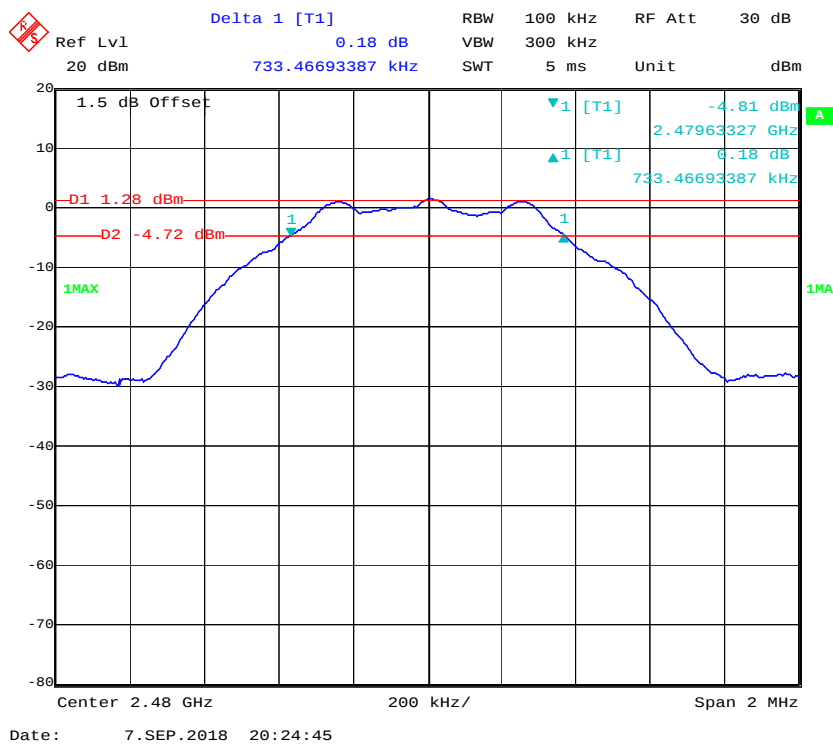
BLE 2402MHz



BLE 2440MHz



BLE 2480MHz

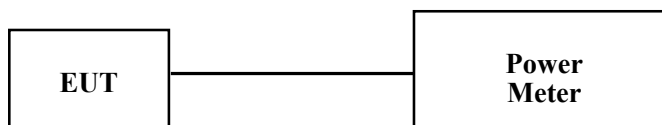


FCC §15.247(b) (3) - MAXIMUM PEAK CONDUCTED OUTPUT POWER**Applicable Standard**

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 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	USB Wideband Power Sensor	U2022XA	MY5417006	2017-12-11	2018-12-11
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
E-Microwave	Blocking Control	EMDCB-00036	0E01201047	2018-05-06	2019-05-06

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

Test Data**Environmental Conditions**

Temperature:	28.6°C
Relative Humidity:	57%
ATM Pressure:	100.5kPa

* The testing was performed by Swim Lv on 2018-09-14.

Test Mode: Transmitting

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

Test mode	Frequency (MHz)	Max Peak Conducted Output Power (dBm)	Limit (dBm)
802.11b	2412	16.99	30
	2437	17.85	30
	2467	17.25	30
	2472	16.19	30
802.11g	2412	22.36	30
	2437	22.77	30
	2462	21.93	30
	2467	18.64	30
	2472	15.23	30
802.11n ht20	2412	21.85	30
	2437	23.16	30
	2462	21.61	30
	2467	18.24	30
	2472	13.4	30
802.11n ht40	2422	20.27	30
	2437	22.83	30
	2452	19.52	30
	2457	18.64	30
	2462	14.91	30
BLE	2402	1.16	30
	2440	2.04	30
	2480	1.54	30

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

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

Test Procedure

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2018-08-03	2019-08-03
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
E-Microwave	Blocking Control	EMDCB-00036	0E01201047	2018-05-06	2019-05-06

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

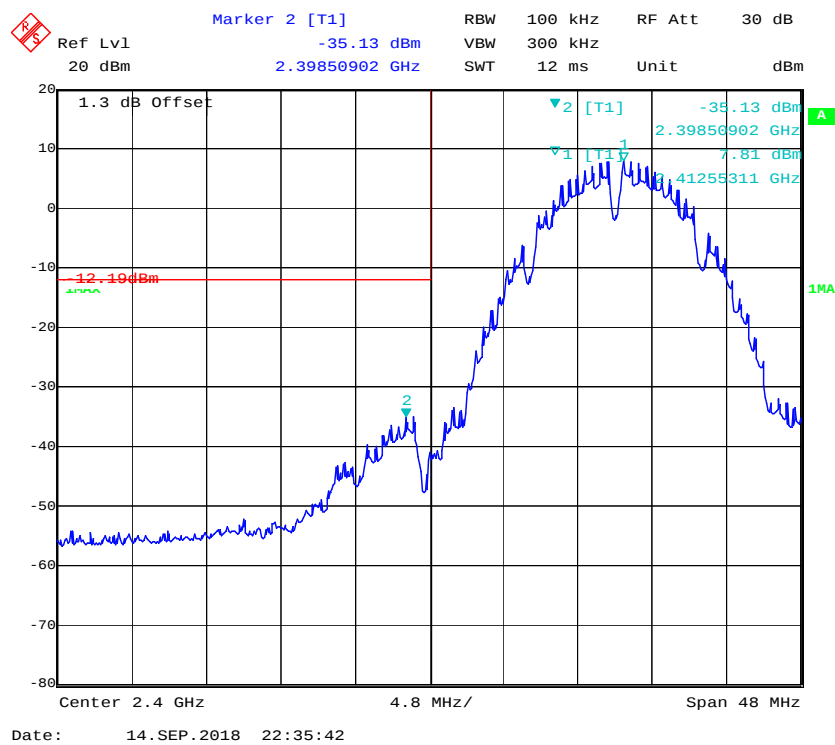
Test Data**Environmental Conditions**

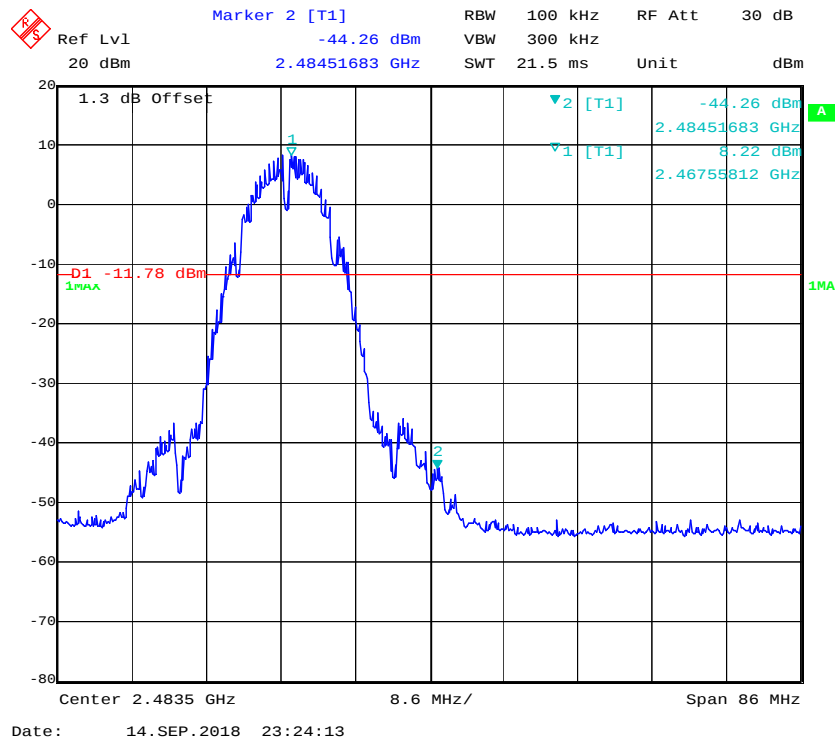
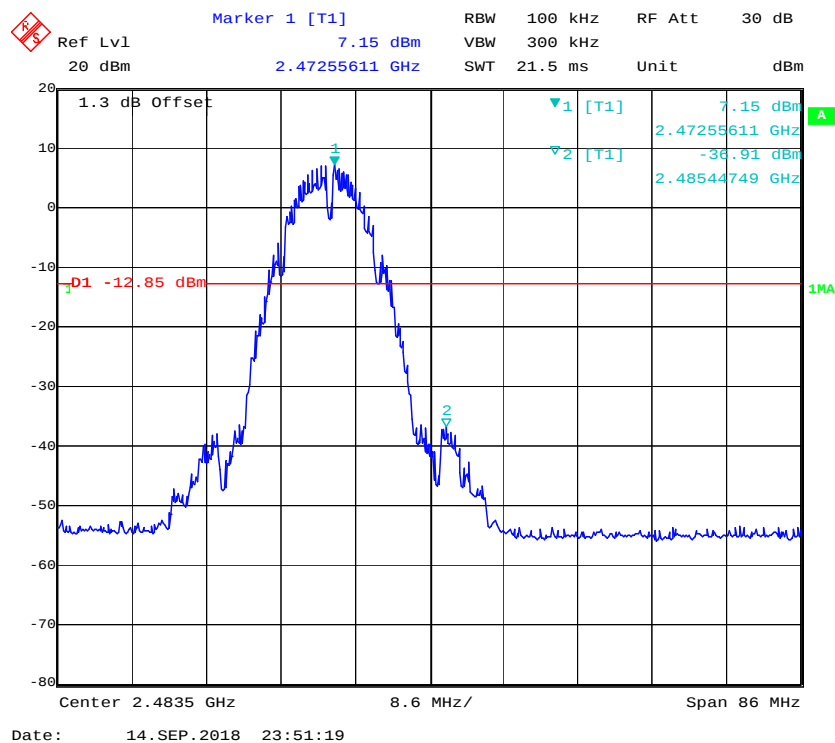
Temperature:	27.4~28.6°C
Relative Humidity:	57~60 %
ATM Pressure:	100.5~100.6 kPa

* The testing was performed by Swim Lv from 2018-09-07 to 2018-09-15.

Test mode: Transmitting

Test Result: Compliant. Please refer to following plots.

802.11b: Band Edge, Left Side

802.11b: Band Edge, Right Side(2467MHz)**802.11b: Band Edge, Right Side(2472MHz)**

The screenshot displays a spectrum analyzer interface with the following details:

- Top Bar Parameters:**
 - Ref Lvl: 20 dBm
 - Marker 2 [T1]: -20.58 dBm
 - RBW: 100 kHz
 - RF Att: 30 dB
 - SWT: 12 ms
 - Unit: dBm
- Main Plot Area:**
 - A blue signal trace is shown against a grid.
 - A red horizontal line indicates a level at -14.06 dBm.
 - Two vertical green dashed lines are present, labeled "1" and "2".
 - Text labels on the plot include "1.3 dB Offset" and "A".
- Bottom Status Bar:**
 - Center 2.4 GHz
 - 4.8 MHz/
 - Span 48 MHz
- Date and Time:** 14.SEP.2018 22:41:16

Ref Lvl 20 dBm

Marker 2 [T1] -36.00 dBm

RBW 100 kHz RF Att 30 dB

VBW 300 kHz

SWT 21.5 ms Unit dBm

1.3 dB Offset

1MAX

Marker 1 [T1] -14.97 dBm

Marker 2 [T1] -36.00 dBm

2.48358617 GHz

2.46794108 GHz

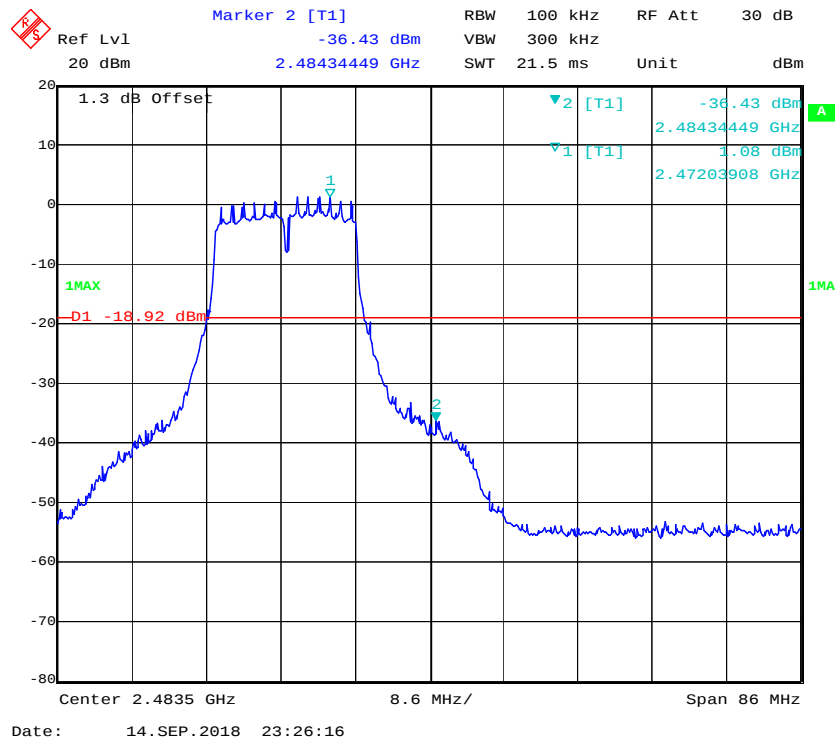
Center 2.4835 GHz

8.6 MHz/

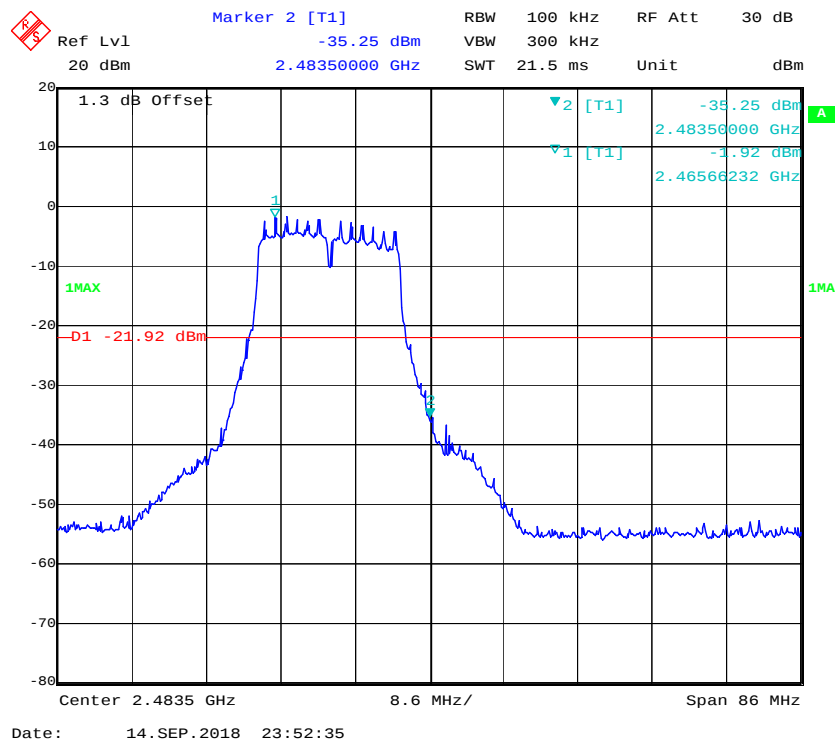
Span 86 MHz

Date: 14.SEP.2018 22:44:23

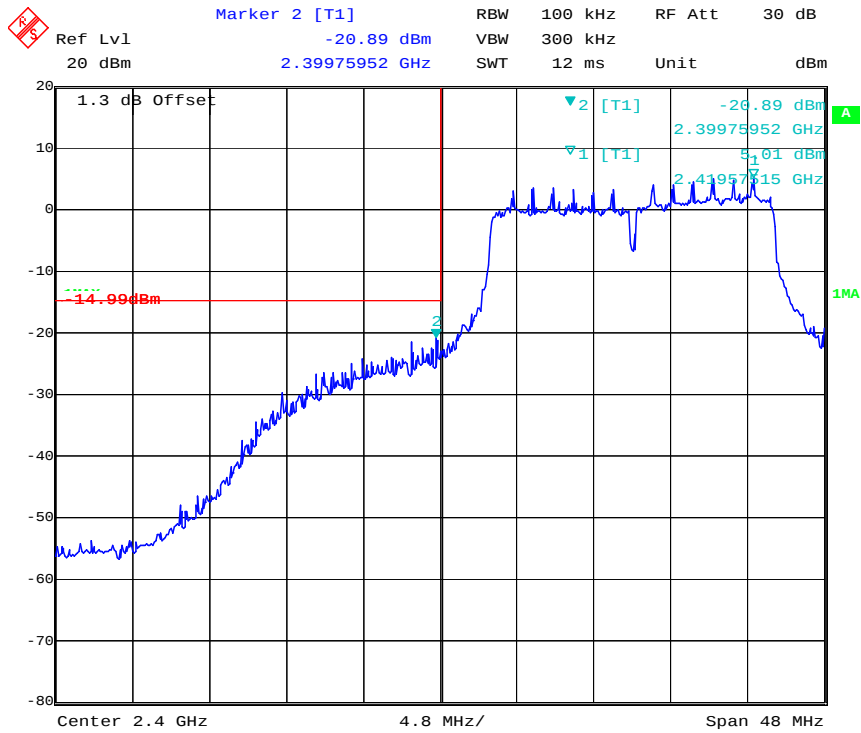
802.11g: Band Edge, Right Side(2467MHz)



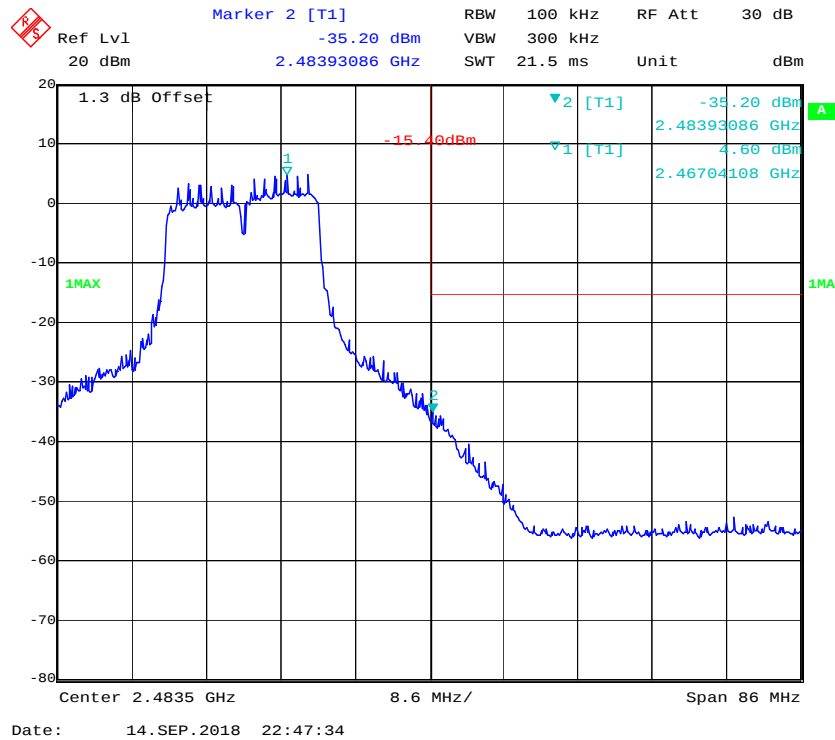
802.11g: Band Edge, Right Side(2472MHz)



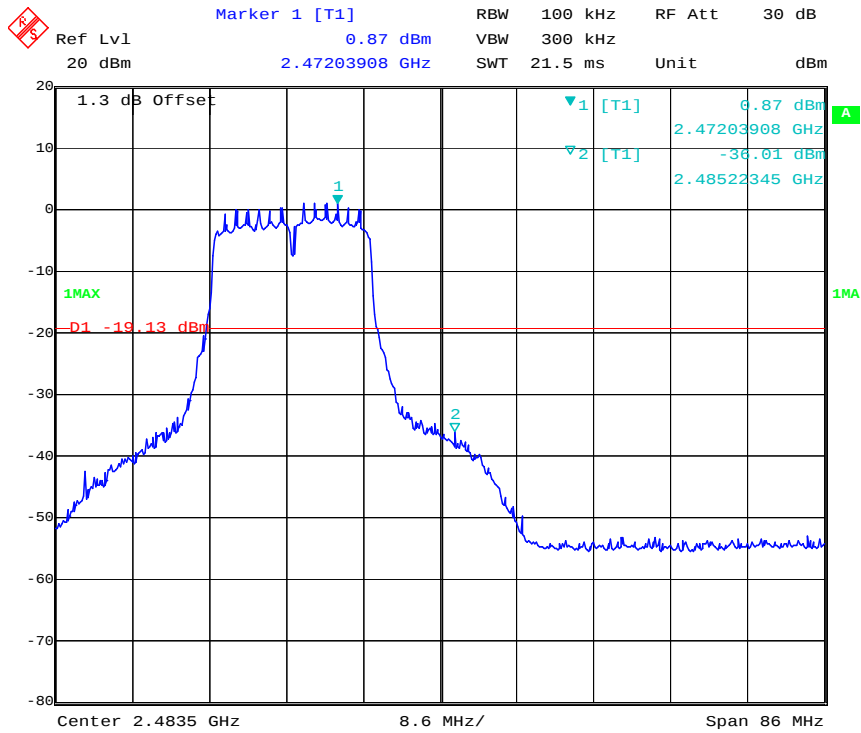
802.11n ht20 Band Edge, Left Side



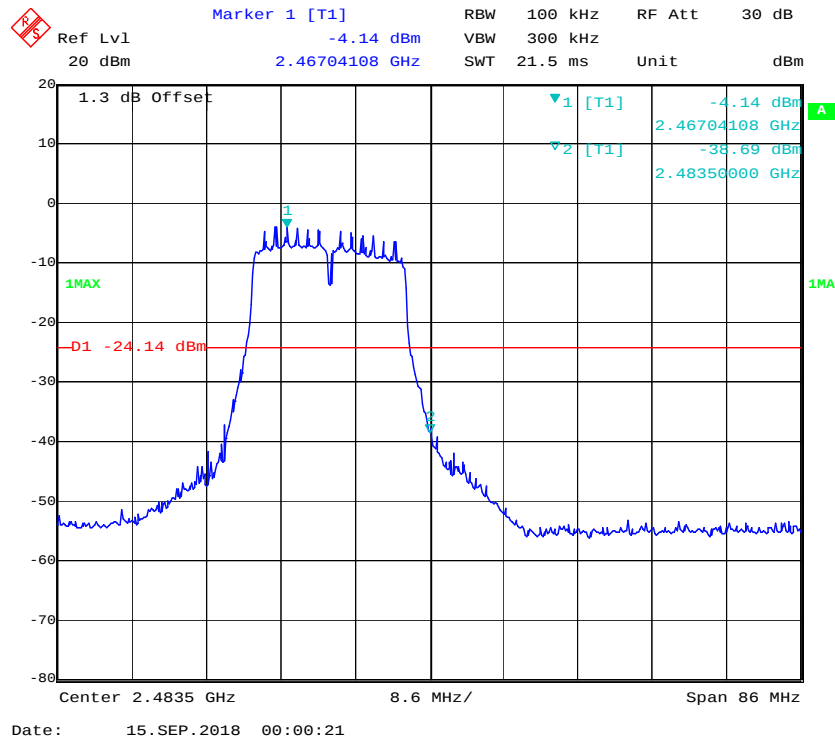
802.11n ht20 Band Edge, Right Side(2462MHz)



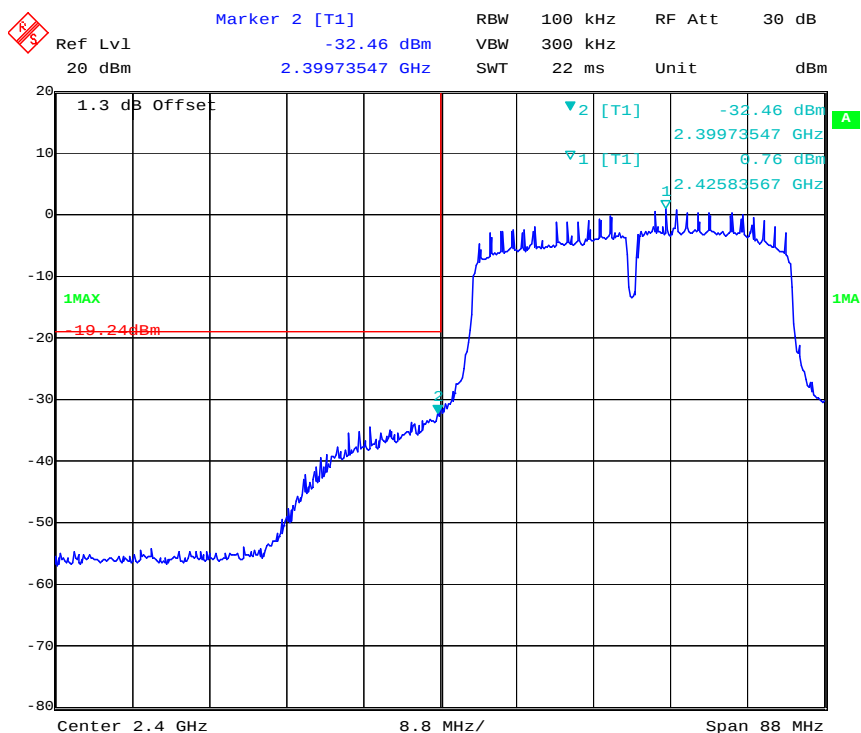
802.11n ht20 Band Edge,Right Side(2467MHz)



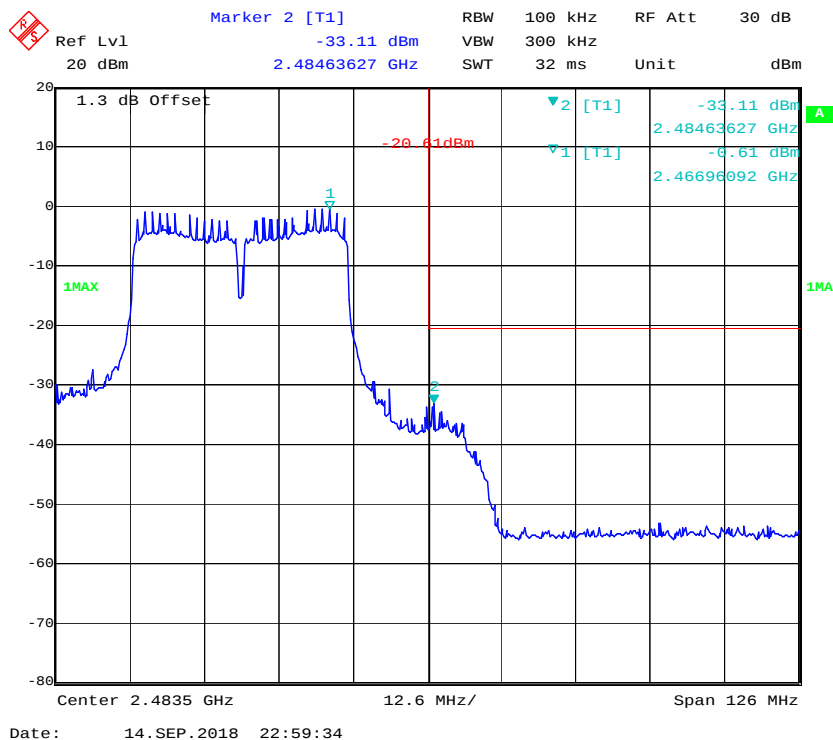
802.11n ht20 Band Edge,Right Side(2472MHz)



802.11n ht40 Band Edge, Left Side



802.11n ht40 Band Edge, Right Side(2452MHz)



802.11n ht40 Band Edge,Right Side(2457MHz)



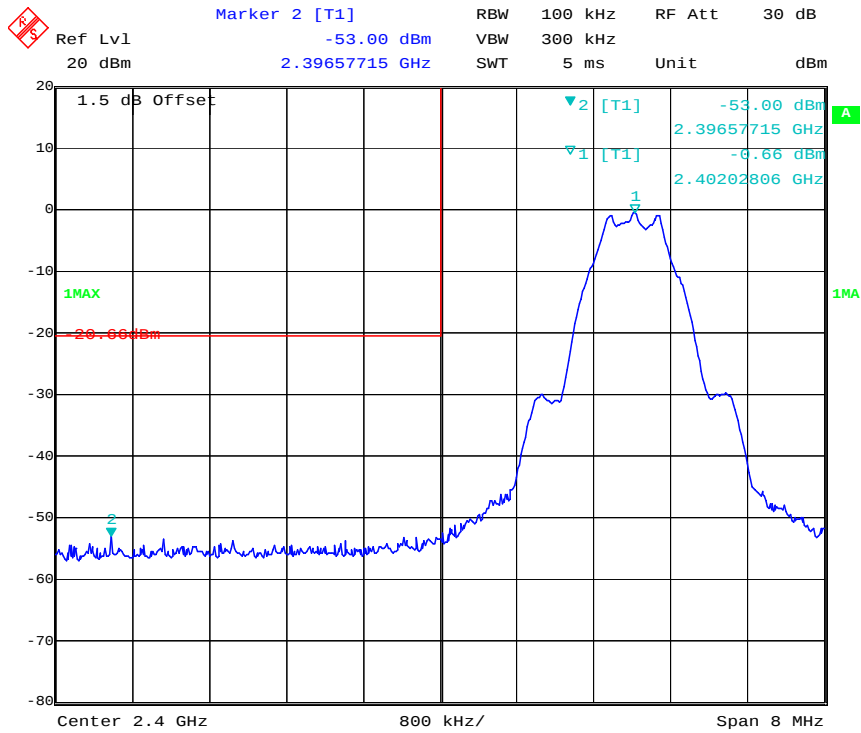
Date: 14.SEP.2018 23:41:25

802.11n ht40 Band Edge,Right Side(2462MHz)

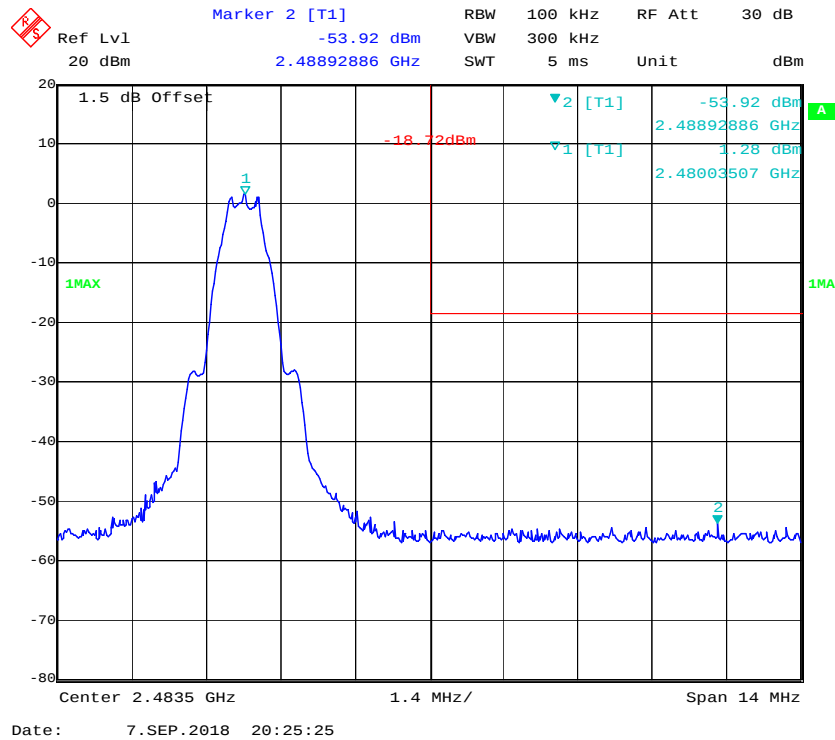


Date: 14.SEP.2018 23:43:08

BLE Band Edge, Left Side



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	2018-08-03	2019-08-03
E-Microwave	Blocking Control	EMDCB-00036	0E01201047	2018-05-06	2019-05-06
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

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

Test Data

Environmental Conditions

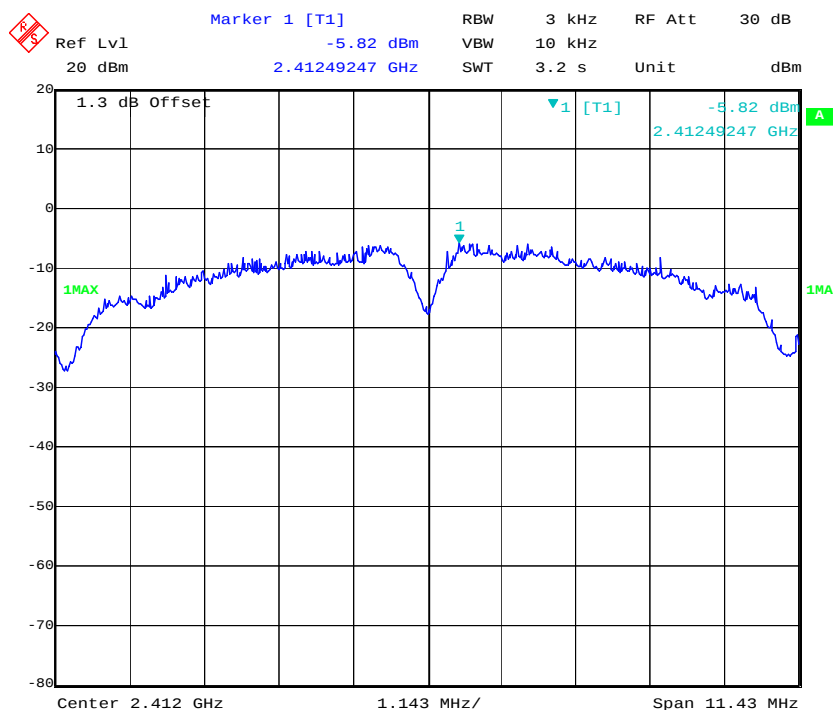
Temperature:	28.6~29.1°C
Relative Humidity:	57~61 %
ATM Pressure:	100.5~100.7 kPa

* The testing was performed by Swim Lv from 2018-09-07 to 2018-09-14.

Test Result: Compliance*Test Mode: Transmitting**Test Result: Compliant. Please refer to the following table and plots*

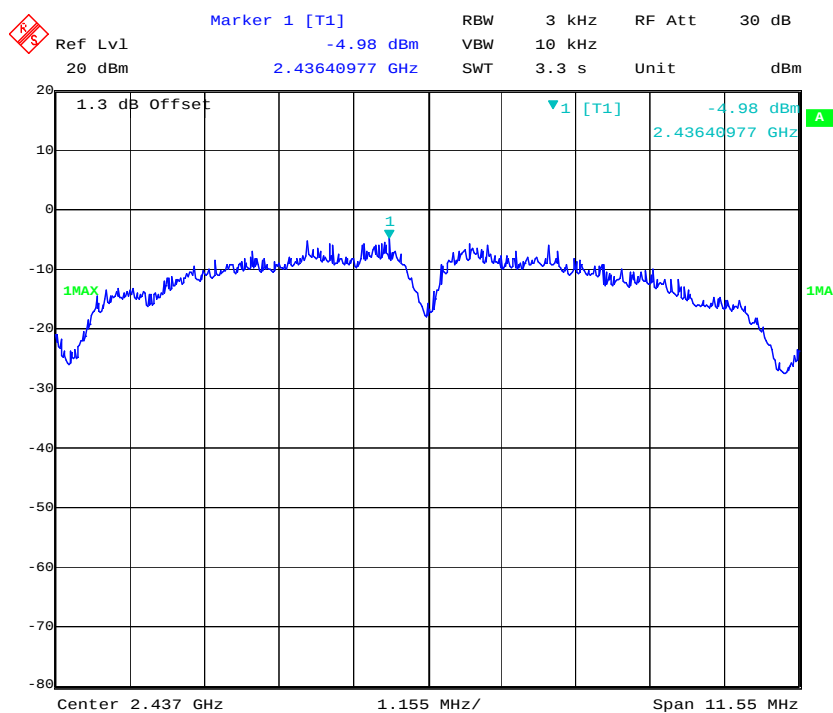
Test mode	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
802.11b	2412	-5.82	≤8
	2437	-4.98	≤8
	2467	-5.32	≤8
	2472	-6.46	≤8
802.11g	2412	-8.49	≤8
	2437	-7.85	≤8
	2462	-9.11	≤8
	2467	-12.15	≤8
	2472	-16.32	≤8
802.11n ht20	2412	-9.17	≤8
	2437	-7.75	≤8
	2462	-8.93	≤8
	2467	-12.61	≤8
	2472	-18.80	≤8
802.11n ht40	2422	-13.99	≤8
	2437	-10.12	≤8
	2452	-15.10	≤8
	2457	-15.45	≤8
	2462	-19.44	≤8
BLE	2402	-15.51	≤8
	2440	-13.92	≤8
	2480	-13.56	≤8

Power Spectral Density, 802.11b 2412MHz



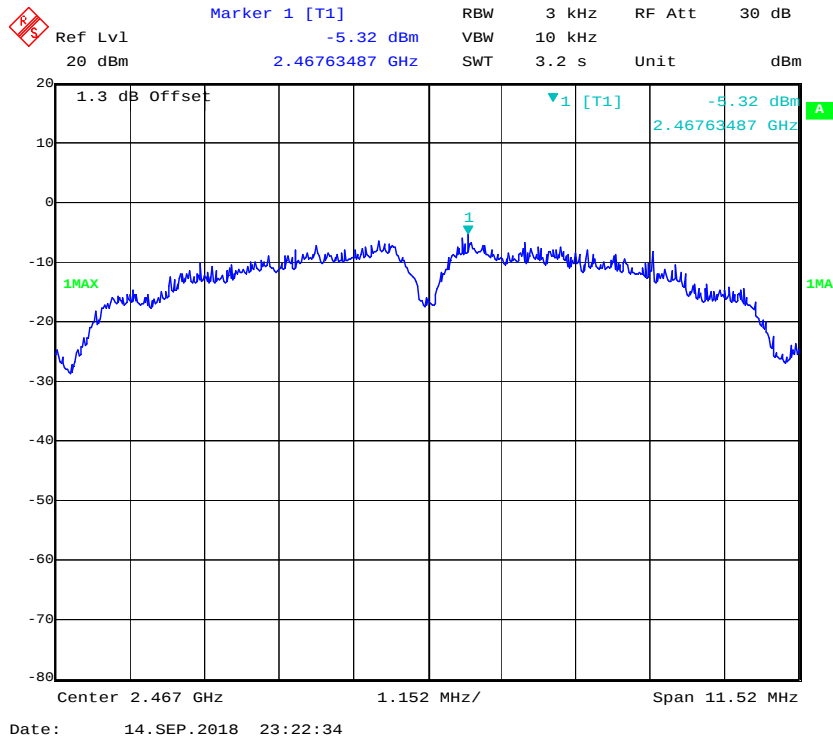
Date: 14.SEP.2018 22:35:22

Power Spectral Density, 802.11b 2437MHz

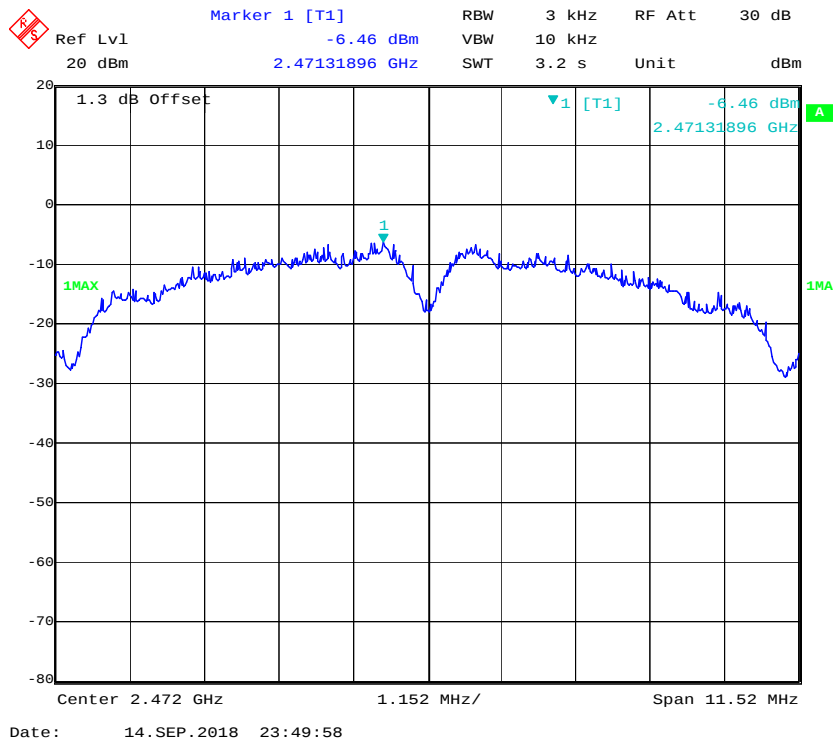


Date: 14.SEP.2018 23:12:20

Power Spectral Density, 802.11b 2467MHz



Power Spectral Density, 802.11b 2472MHz



Ref Lvl 20 dBm

Marker 1 [T1] -8.49 dBm

RBW 3 kHz

VBW 10 kHz

SWT 6.8 s

RF Att 30 dB

Unit dBm

1.3 dB Offset

1 [T1] -8.49 dBm

2.4085855 GHz

1MAX

Center 2.412 GHz

2.4405 MHz/

Span 24.405 MHz

Date: 14.SEP.2018 22:40:35

Ref Lvl 20 dBm

Marker 1 [T1] -7.85 dBm

RBW 3 kHz

VBW 10 kHz

SWT 6.6 s

RF Att 30 dB

Unit dBm

1.3 dB Offset

▼1 [T1] -7.85 dBm

2.43137541 GHz

1MAX

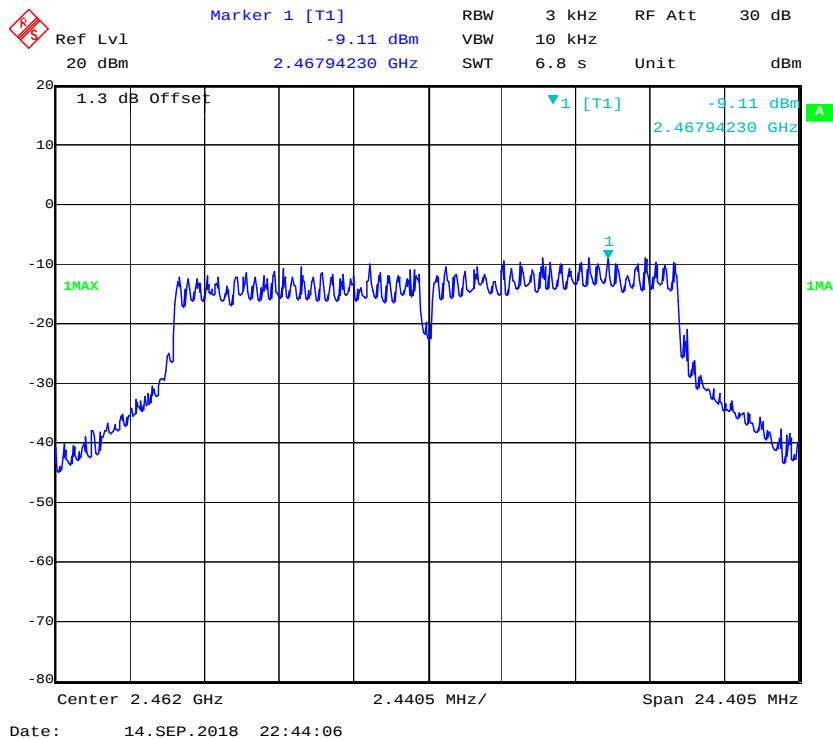
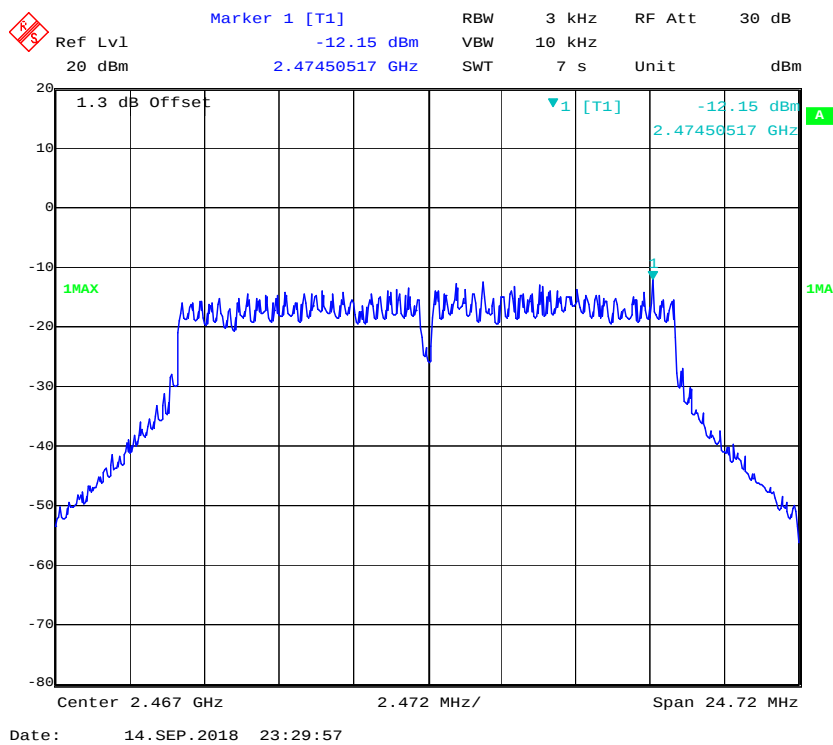
1MA

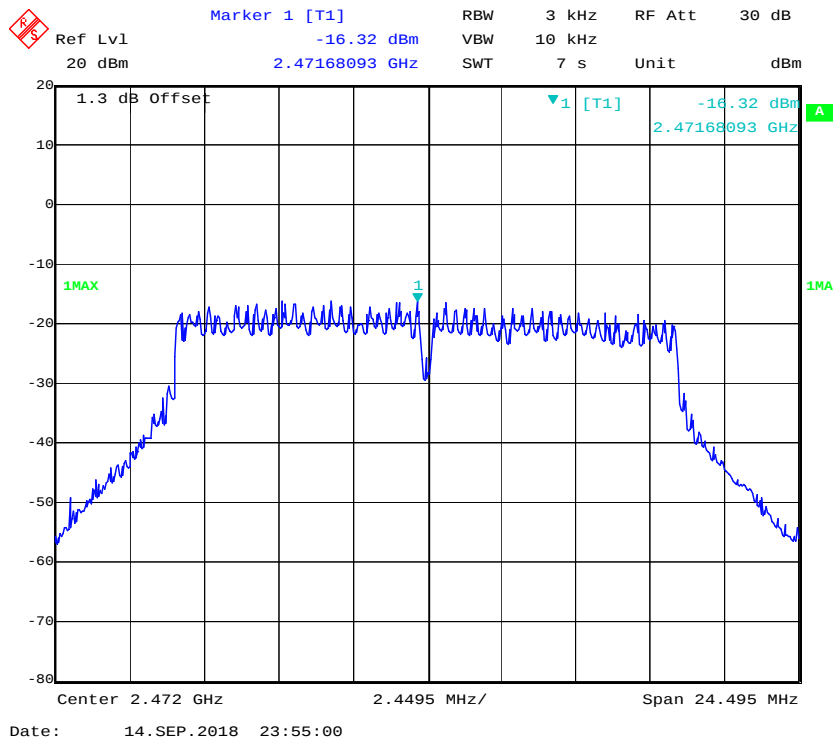
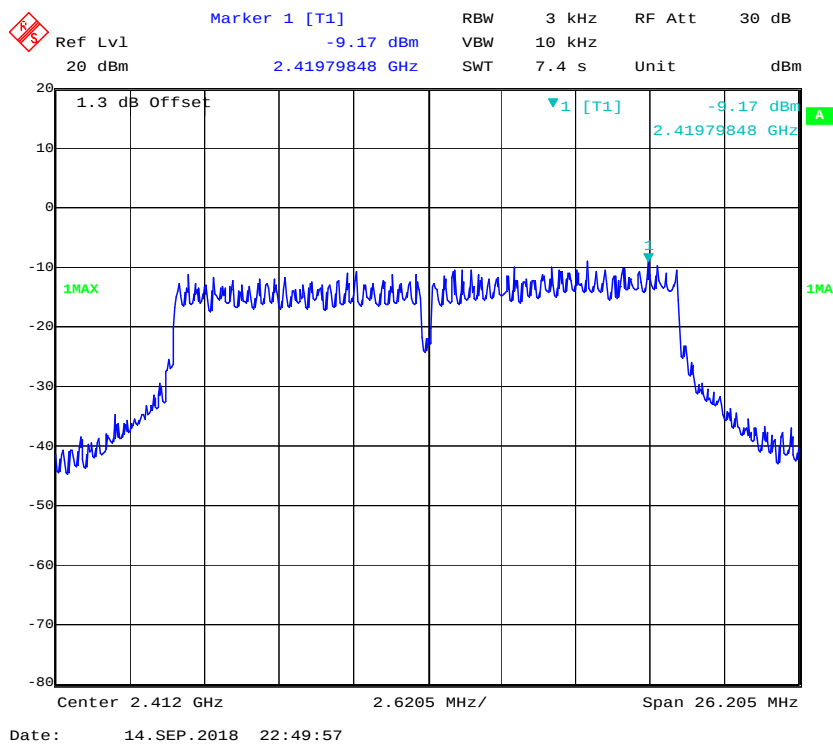
Center 2.437 GHz

2.3685 MHz/

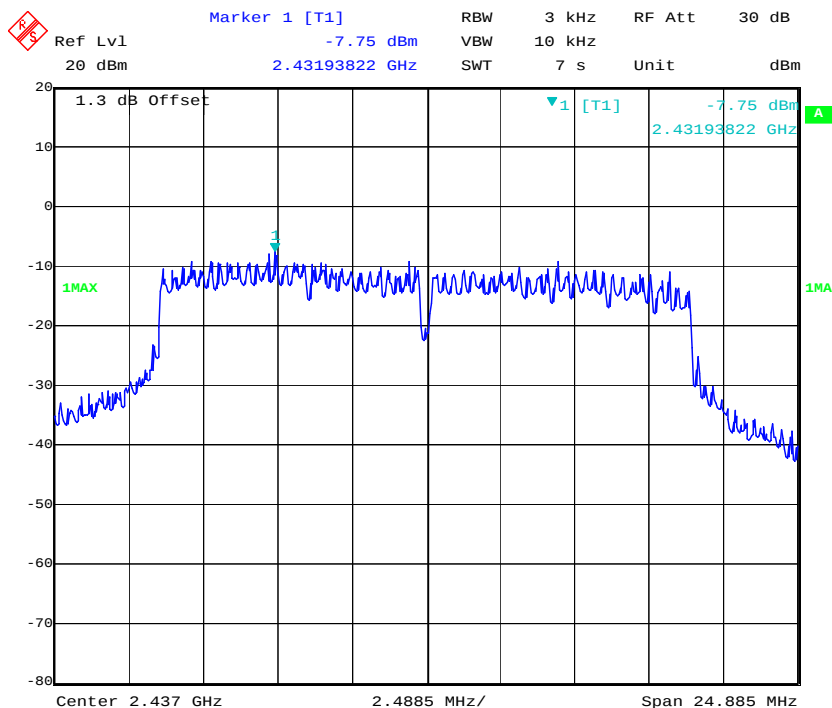
Span 23.685 MHz

Date: 14.SEP.2018 23:09:43

Power Spectral Density, 802.11g 2462MHz**Power Spectral Density, 802.11g 2467MHz**

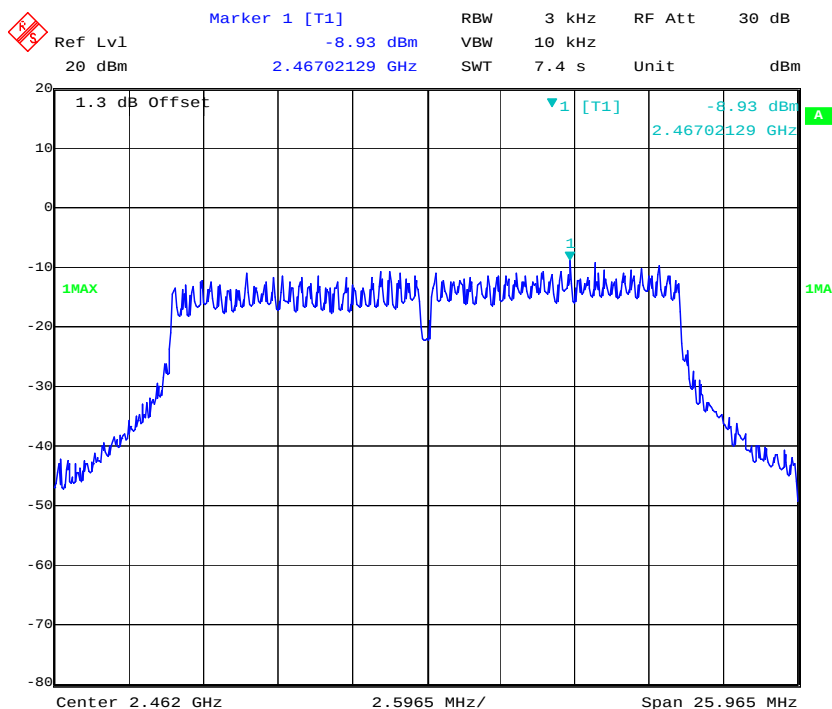
Power Spectral Density, 802.11g 2472MHz**Power Spectral Density, 802.11n ht20 2412MHz**

Power Spectral Density, 802.11n ht20 2437MHz



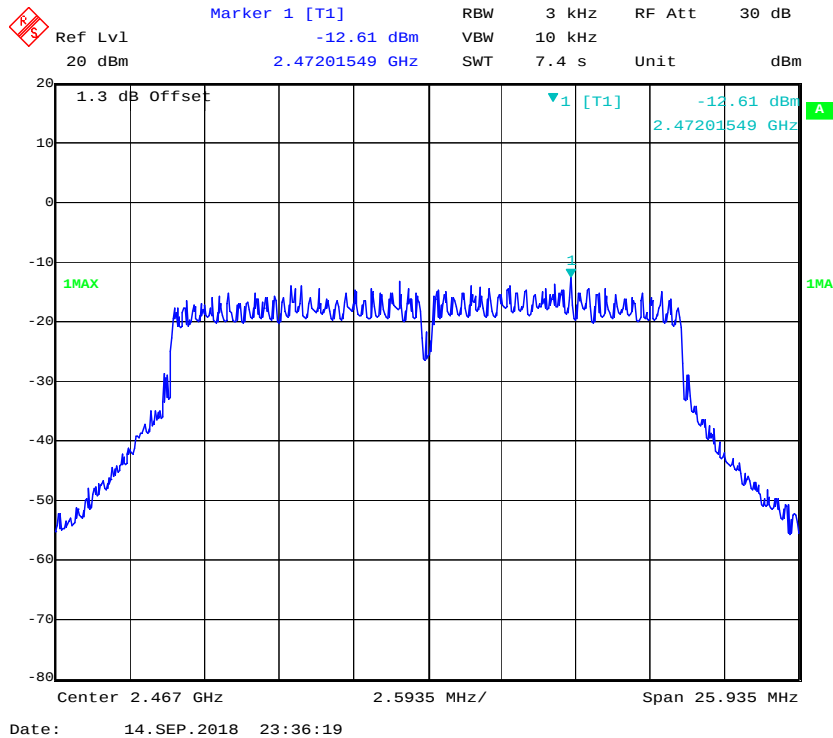
Date: 14.SEP.2018 23:06:02

Power Spectral Density, 802.11n ht20 2462MHz

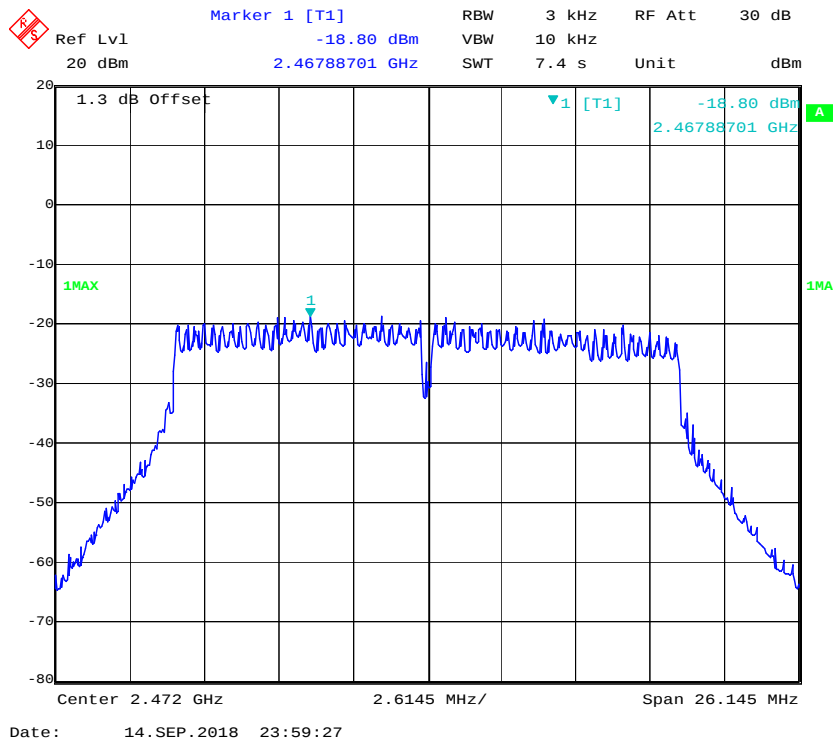


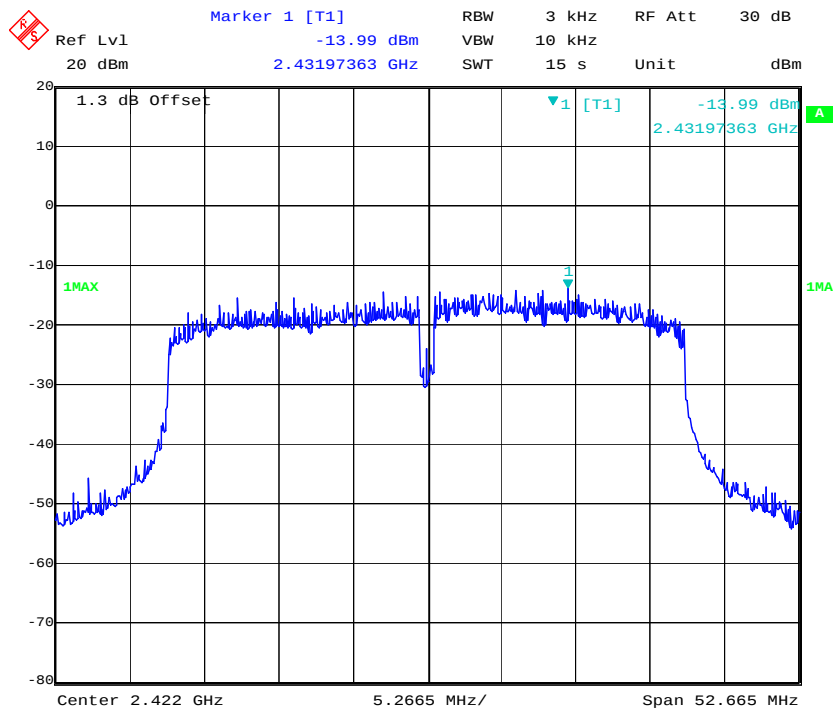
Date: 14.SEP.2018 22:47:07

Power Spectral Density, 802.11n ht20 2467MHz

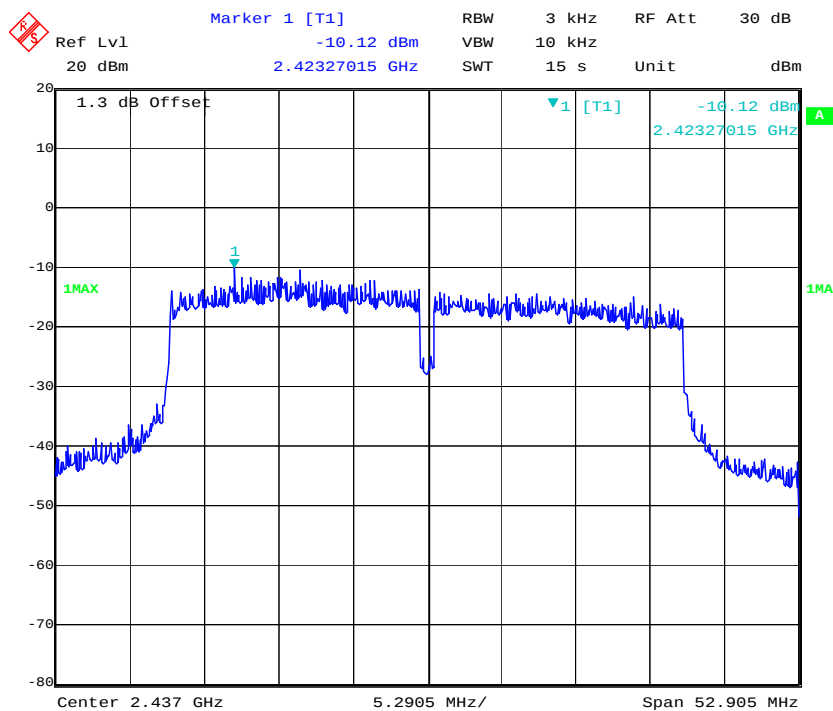


Power Spectral Density, 802.11n ht20 2472MHz



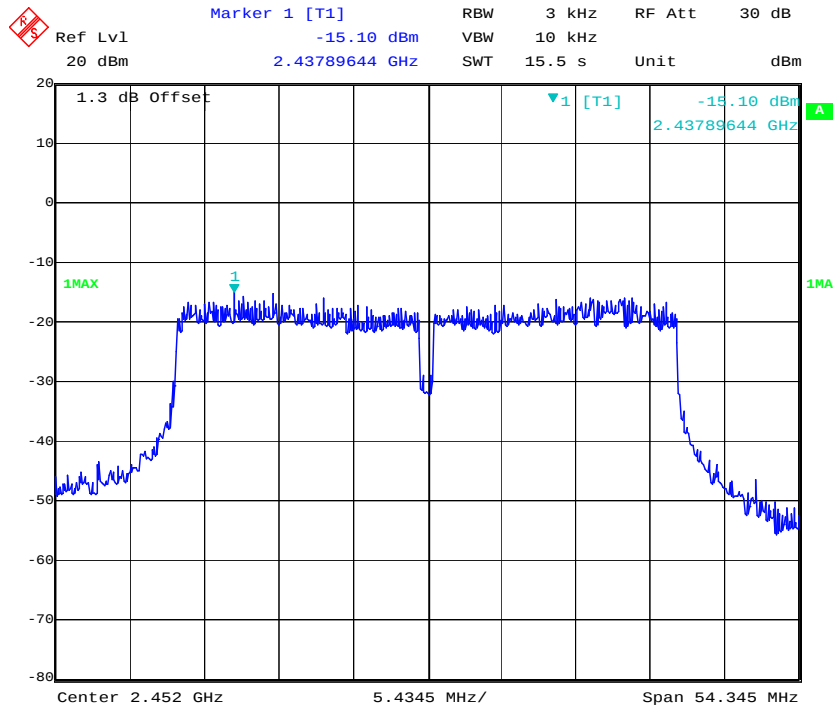
Power Spectral Density, 802.11n ht40 2422MHz

Date: 14.SEP.2018 22:53:36

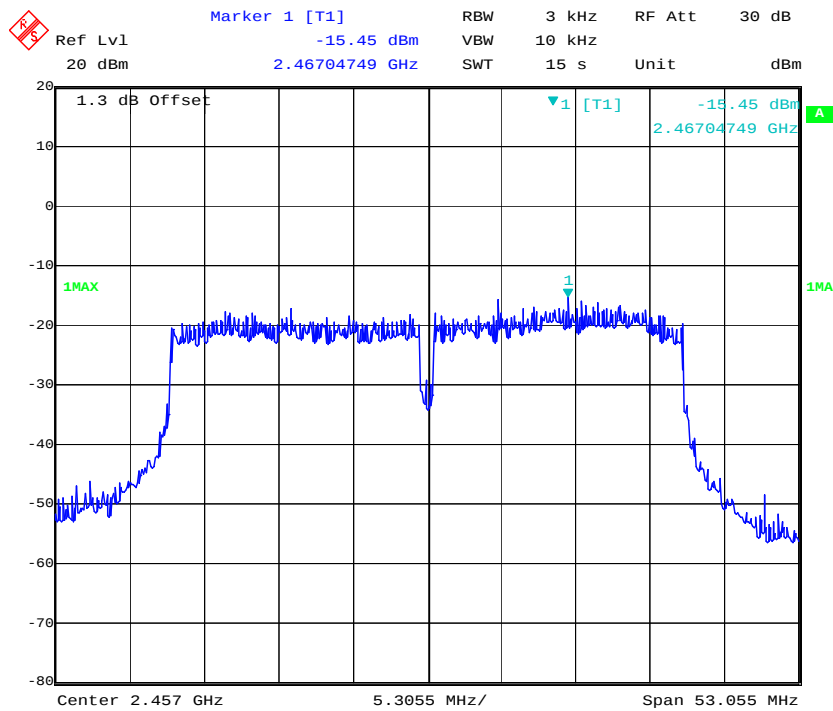
Power Spectral Density, 802.11n ht40 2437MHz

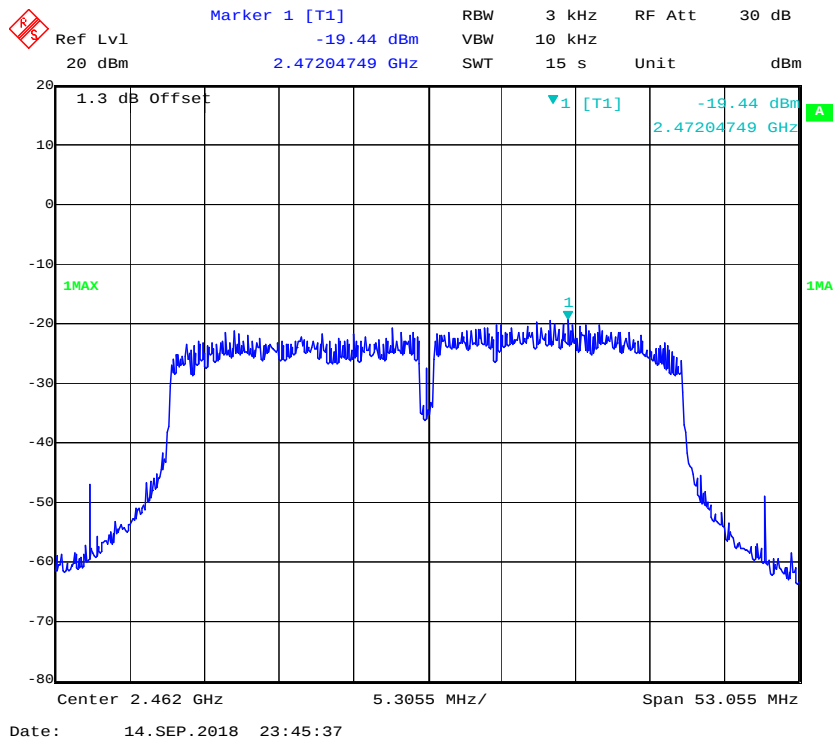
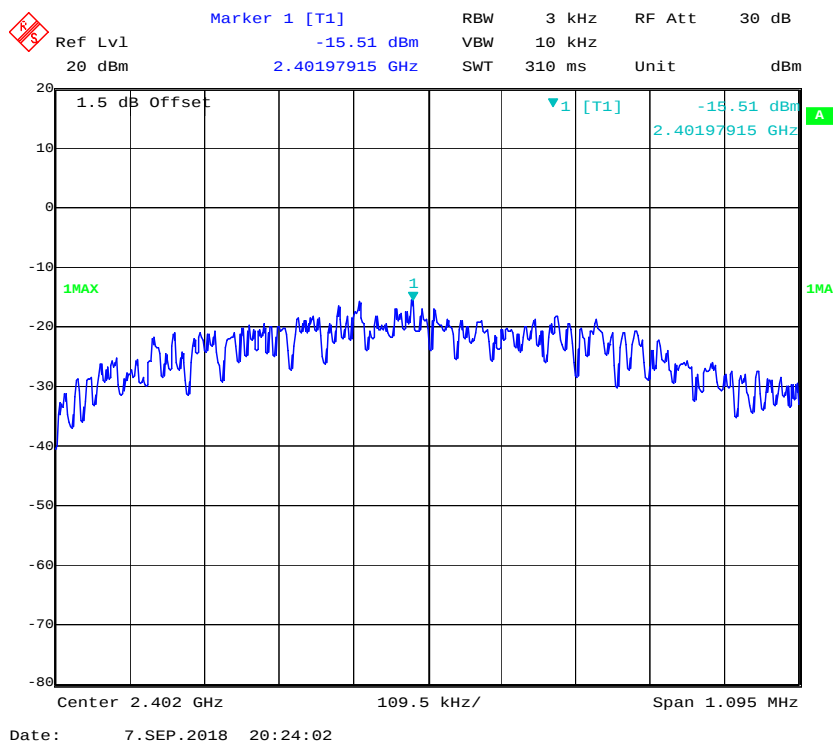
Date: 14.SEP.2018 23:02:54

Power Spectral Density, 802.11n ht40 2452MHz

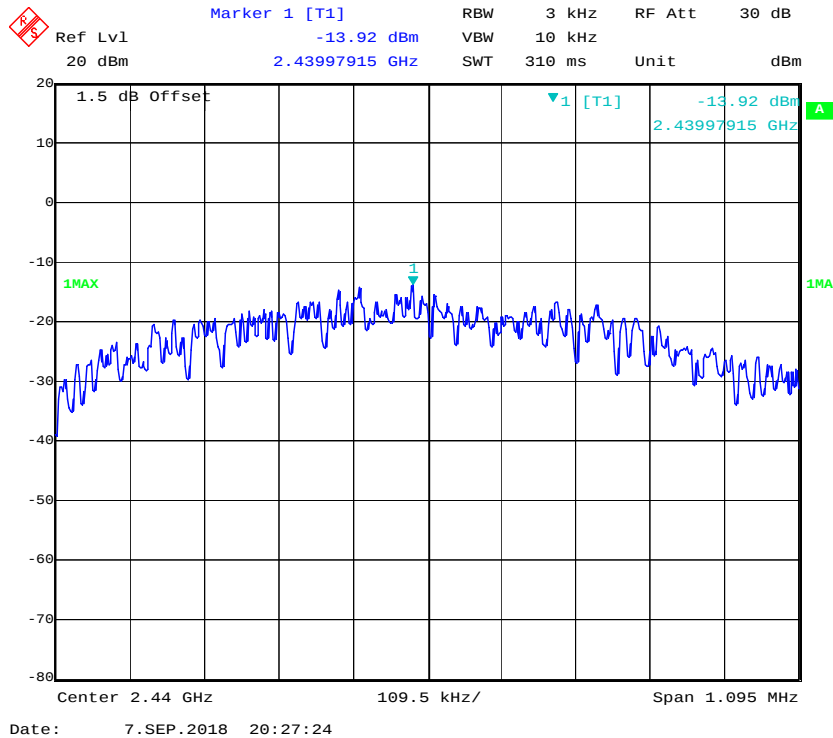


Power Spectral Density, 802.11n ht40 2457MHz

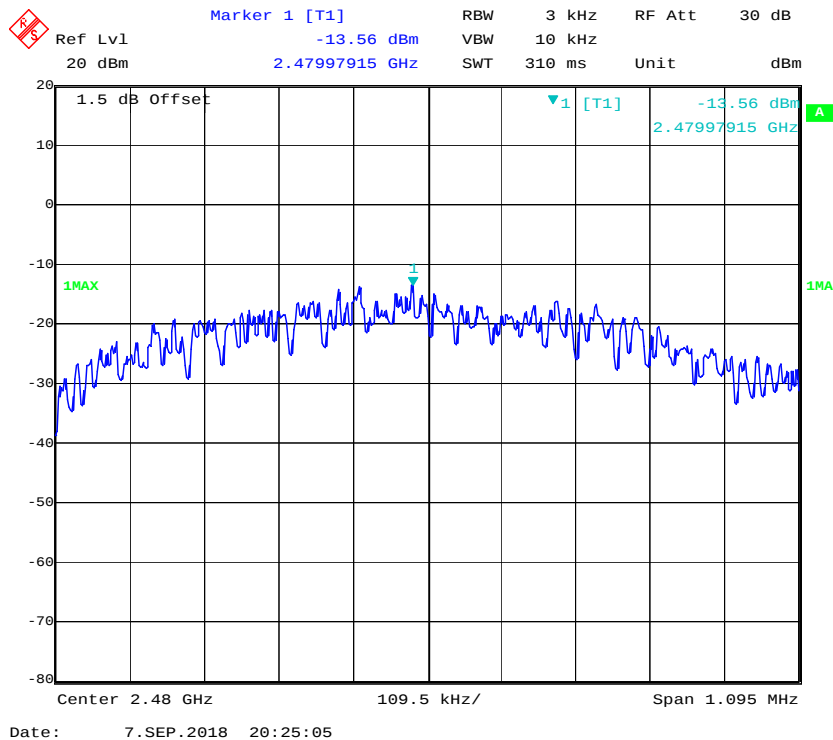


Power Spectral Density, 802.11n ht40 2462MHz**Power Spectral Density, BLE 2402MHz**

Power Spectral Density, BLE 2440MHz



Power Spectral Density, BLE 2480MHz



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