



TESTING LABORATORY
CERTIFICATE#4323.01



FCC PART 15.247

TEST REPORT

For

Shanghai Sunmi Technology Co.,Ltd.

Room 605, Block 7, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai 200433 China

FCC ID: 2AH25BL010

Report Type: Original Report	Product Type: Electronic Shelf Label AP
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	Shanghai Sunmi Technology Co.,Ltd.
Tested Model	BL010
Product Type	Electronic Shelf Label AP
Dimension	156mm(L)* 156mm(W)*26.3mm(H)
Power Supply	DC 5V from Adapter or PoE

Adapter information:

Model: CYAP05-050100U

Input: AC 100-240V, 50/60Hz 0.25AMax

Output: DC 5.0V, 1.0A

**All measurement and test data in this report was gathered from production sample serial number: 20190904001.
(Assigned by the BACL. The EUT supplied by the applicant was received on 2019-09-04)*

Objective

This report is prepared on behalf of *Shanghai Sunmi Technology Co.,Ltd.* in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commissions' rules.

The tests were performed in order to determine Compliant with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS submissions with FCC ID: 2AH25BL201.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliant Testing of Unlicensed Wireless Devices and FCC 558074 D01 15.247 Meas Guidance v05r02.

All emissions measurement was performed at Bay Area Compliant Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6GHz~18GHz	5.23dB
	18GHz~40GHz	5.65dB
Occupied Bandwidth		0.5kHz
Temperature		1.0°C
Humidity		6%

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01 and CAB identifier CN0004 under the ISED requirement. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

Test channel list is as below:

EUT was tested with channel 0, 19 and 39.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404
...
...
18	2438	38	2478
19	2440	39	2480

Equipment Modifications

No modification was made to the EUT tested.

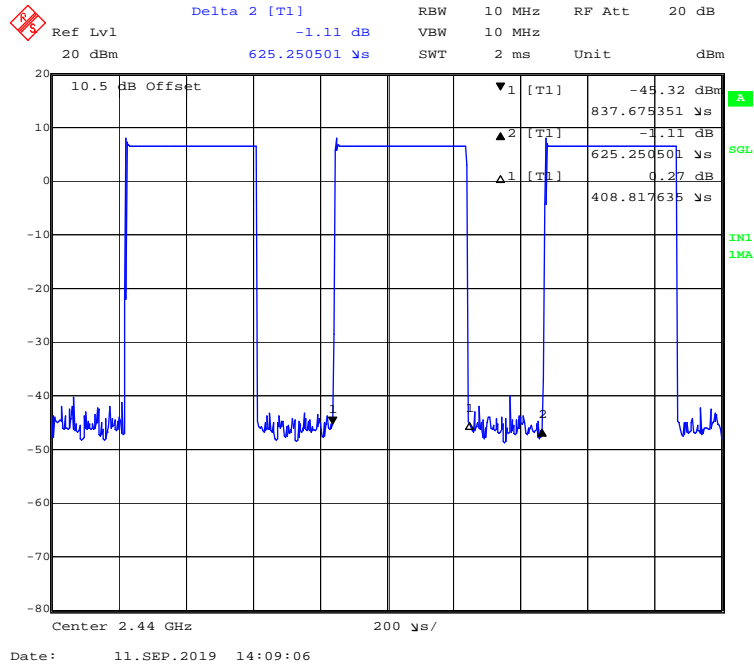
EUT Exercise Software

RF test tool: SecureCRT

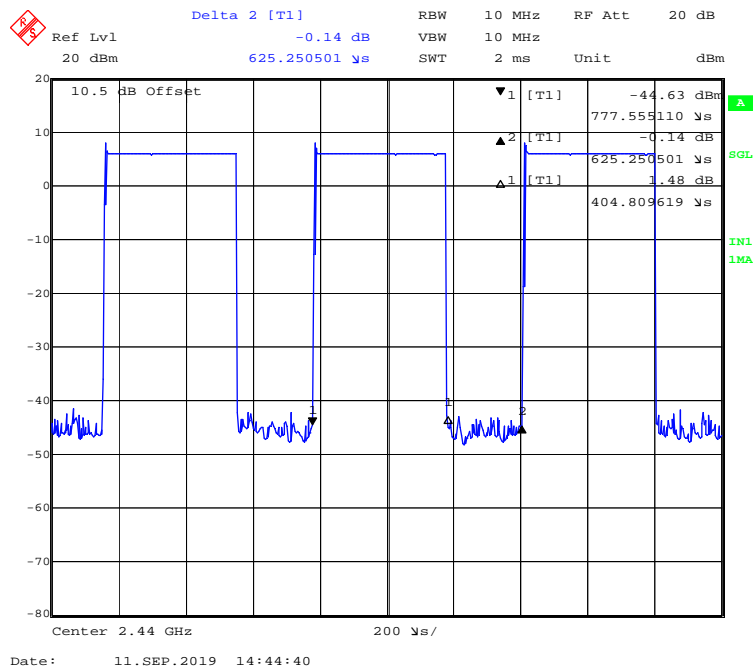
Mode	Data Rate	Power Setting
BLE	1Mbps	Default

Duty Cycle:

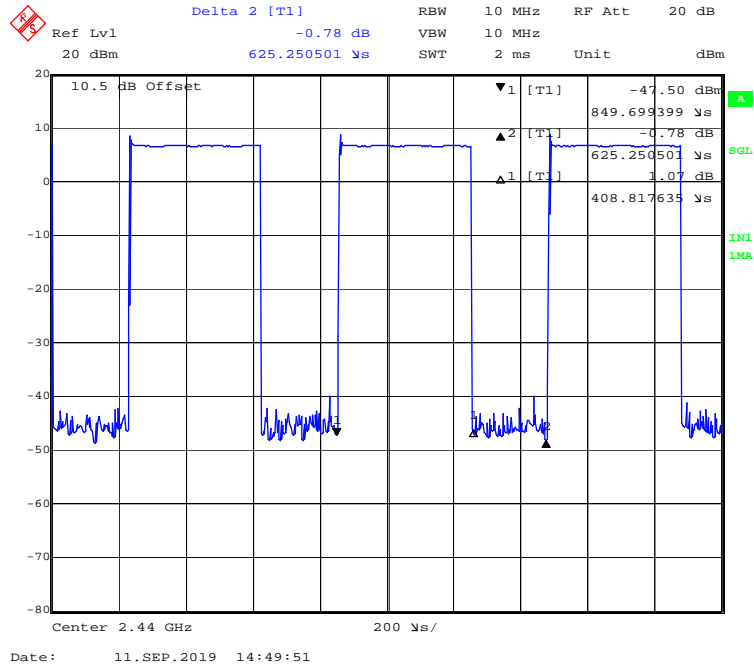
Middle Channel – ANT 1



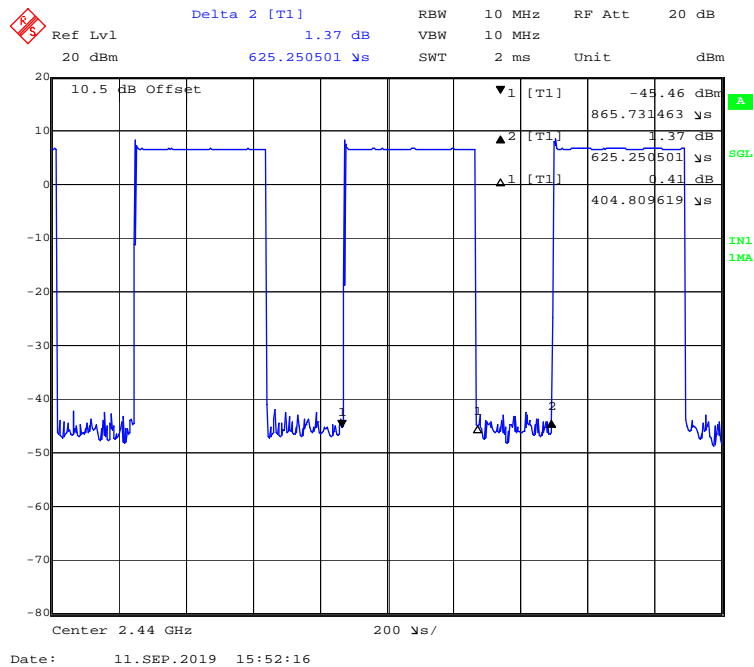
Middle Channel – ANT 2



Middle Channel – ANT 3



Middle Channel – ANT 4



ANT	Duty Cycle (%)	T(ms)	1/T(kHz)	10log(1/x)
1	65.44%	0.409	2.44	1.84
2	64.80%	0.405	2.47	1.88
3	65.44%	0.409	2.44	1.84
4	64.80%	0.405	2.47	1.88

Note: “x” means the Duty Cycle.

Support Equipment List and Details

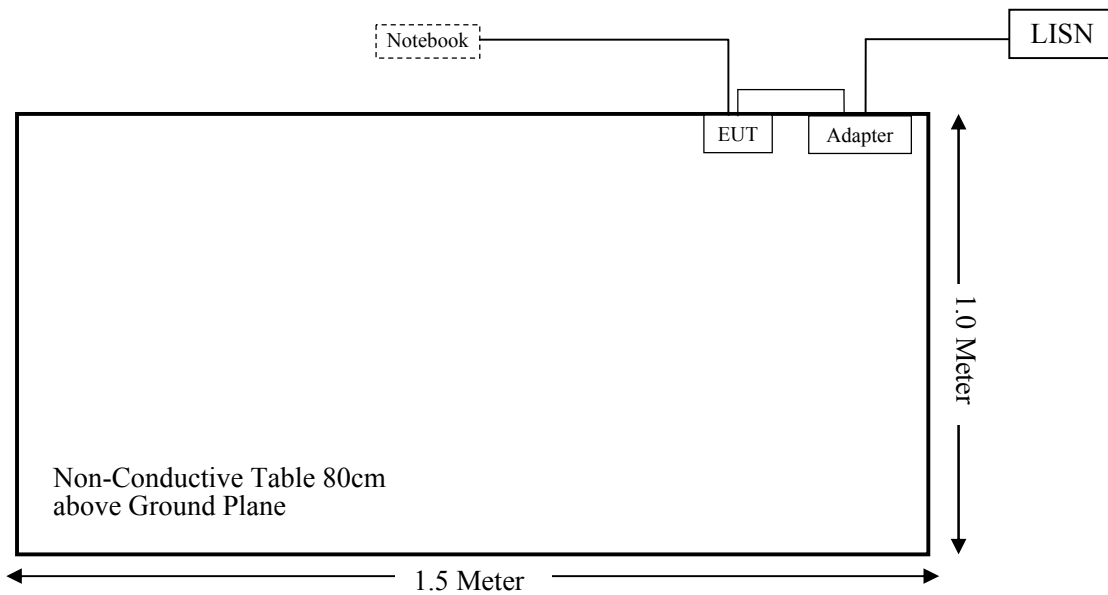
Manufacturer	Description	Model	Serial Number
NETGEAR	PoE	GS308P	4F217B5000891
NETGEAR	Adapter1	2ABF060R	332-10771-01
DELL	Notebook	GX620	D65874152

External I/O Cable

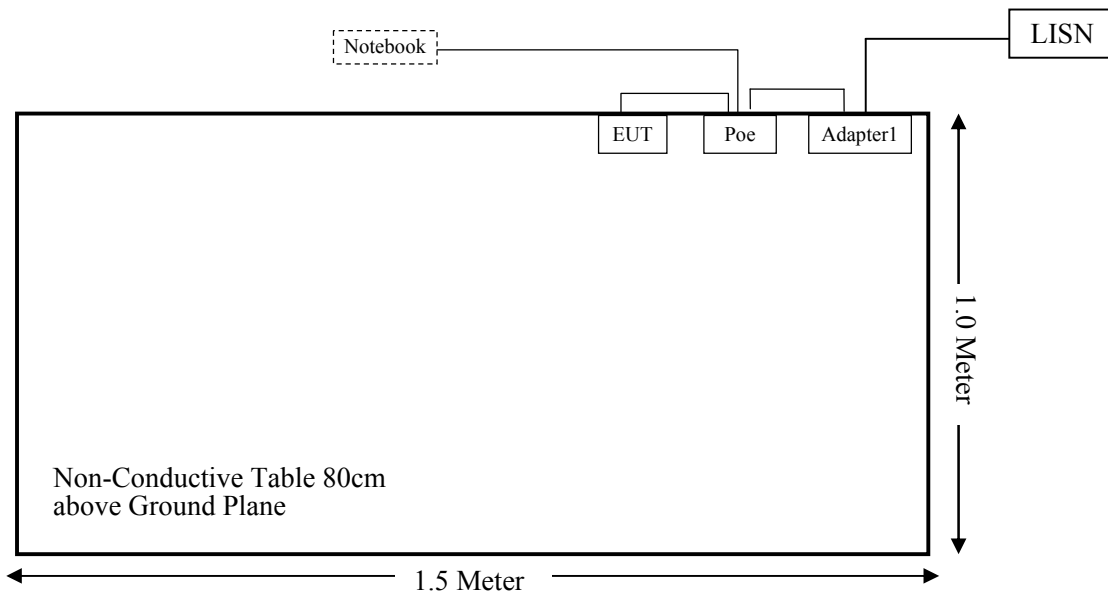
Cable Description	Length (m)	From Port	To
Power Cable	1.2	EUT	Adapter
RJ45 Cable	3.0	EUT	Notebook
RJ45 Cable	1.2	EUT	PoE
Power Cable	1.5	PoE	Adapter1
RJ45 Cable	3.0	PoE	Notebook

Block Diagram of Test Setup

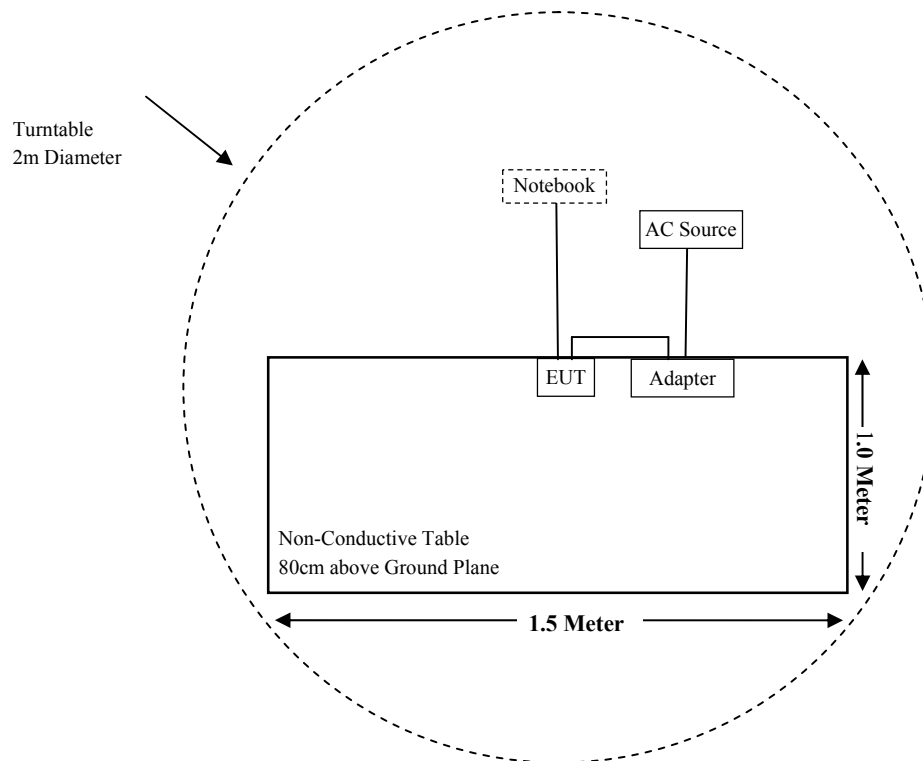
For Conducted Emissions - Adapter:



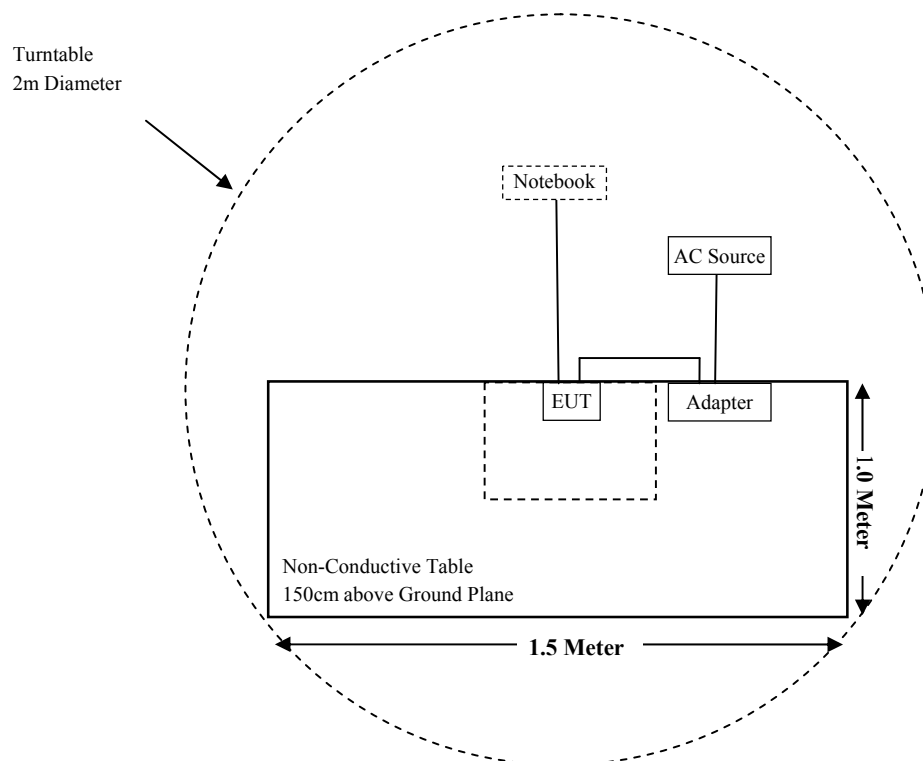
For Conducted Emissions - PoE:



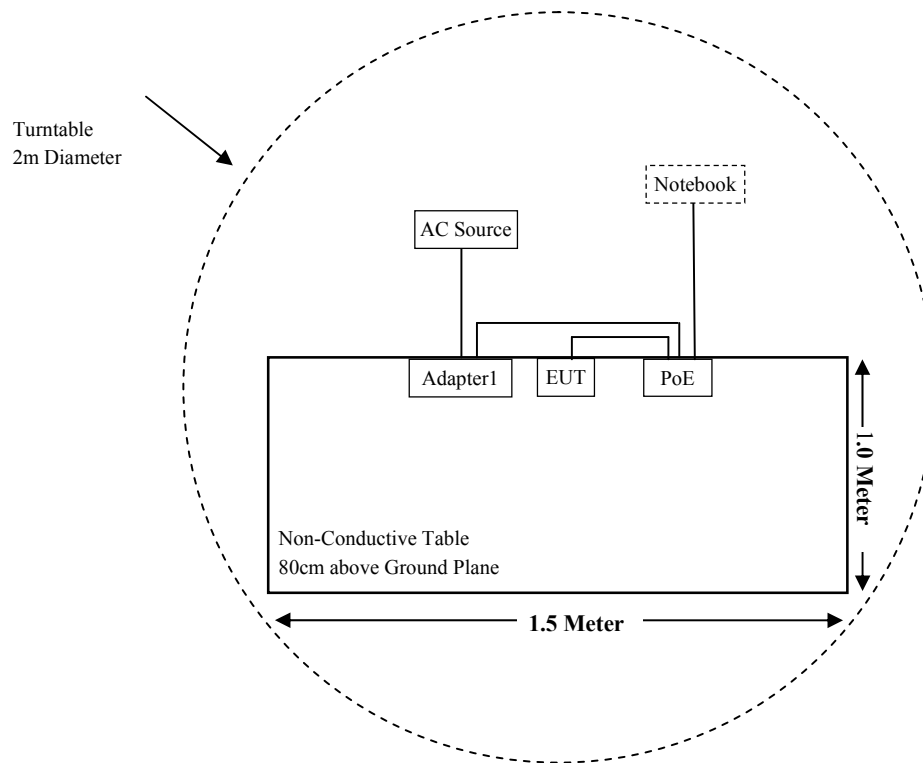
For Radiated Emissions (Below 1GHz) - Adapter:



For Radiated Emissions (Above 1GHz) - Adapter:



For Radiated Emissions (Below 1GHz) - PoE:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.407(f) & §2.1091	Maximum Permissible Exposure (MPE)	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 (a)	AC Line Conducted Emissions	Compliant
§15.247(d)	Spurious Emissions at Antenna Port	Compliant
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliant
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliant
§15.247(b)(3)	Maximum Conducted Output Power	Compliant
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliant
§15.247(e)	Power Spectral Density	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test (Chamber 1#)					
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2019-07-11	2020-07-10
Sunol Sciences	Broadband Antenna	JB3	A090413-1	2016-12-26	2019-12-25
Sonoma Instrument	Pre-amplifier	310N	171205	2019-08-14	2020-08-13
Audix	Test Software	e3	V9	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-8	008	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2019-08-15	2020-08-14
Radiated Emission Test (Chamber 2#)					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2019-08-27	2020-08-26
ETS-LINDGREN	Horn Antenna	3115	9207-3900	2017-07-15	2020-07-14
ETS-LINDGREN	Horn Antenna	3116	00084159	2016-12-12	2019-12-11
A.H.Systems, inc	Amplifier	2641-1	491	2019-02-20	2020-02-19
SELECTOR	Amplifier	EM18G40G	060726	2019-03-22	2020-03-21
MICRO-TRONICS	Band Reject Filter	BRM50702	G024	2019-08-05	2020-08-04
Narda	Attenuator	10dB	010	2019-08-15	2020-08-14
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-6	006	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-11	011	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2019-08-15	2020-08-14
RF Conducted Test					
Rohde & Schwarz	EMI Test Receiver	ESIB26	100146	2018-11-30	2019-11-29
Narda	Attenuator	10dB	010	2019-08-15	2020-08-14
Sunmi	RF Cable	Sunmi C01	C01	Each Time	N/A
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2019-07-11	2020-07-10
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2018-11-12	2019-11-11
Audix	Test Software	e3	V9	/	/
Narda	Attenuator/6dB	10690812-2	26850-6	2019-01-10	2020-01-09
MICRO-COAX	Coaxial Cable	Cable-15	015	2019-08-15	2020-08-14

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

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

Applicable Standard

According to §2.1091 and §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

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/cm²)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

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

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

Calculated Formulary:

Predication of MPE limit at a given distance

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

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

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

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

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

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

Calculated Data:

ANT	Frequency Range (MHz)	Antenna Gain		Tune-up Output Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)	MPE Ratio
		(dBi)	(numeric)	(dBm)	(mW)				
1	2402-2480	2.5	1.78	9.00	7.94	20	0.0028	1.00	0.0028
2	2402-2480	2.5	1.78	8.50	7.08	20	0.0025	1.0	0.0025
3	2402-2480	2.5	1.78	9.00	7.94	20	0.0028	1.00	0.0028
4	2402-2480	2.5	1.78	9.00	7.94	20	0.0028	1.00	0.0028

Note:

- (1) The tune-up output powers are all declared by the Manufacturer.
- (2) ANT 1, ANT 2, ANT 3 and ANT 4 can transmit simultaneously, the worst condition as below:

$$\sum_i \frac{S_i}{S_{Limit,i}} = 0.0028 + 0.0025 + 0.0028 + 0.0028 = 0.0109 < 1.0$$

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 Compliant 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.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has four internal PCB antennas for Bluetooth, and the antenna gain is 2.5 dBi for each, which is permanently attached to the unit, fulfill the requirement of this section. Please refer to the EUT photos.

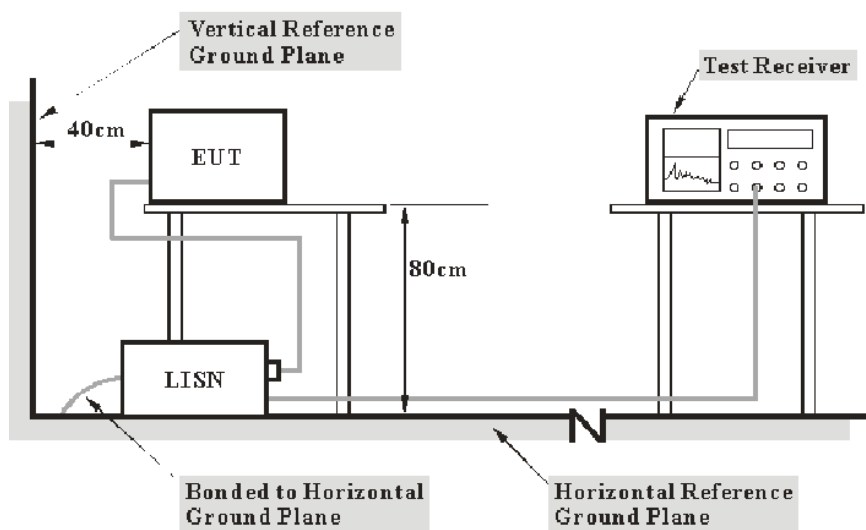
Result: Compliant.

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 measurement procedure of EUT setup is according with ANSI C63.10-2013. The related limit was specified in FCC Part 15.207.

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 outlet of the LISN.

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

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

Corrected Factor & Over Limit Calculation

The Corrected factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Factor (dB)} = \text{LISN VDF (dB)} + \text{Cable Loss (dB)} + \text{Transient Limiter Attenuation (dB)}$$

The “**Over Limit**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit of 7dB means the emission is 7 dB above the limit. The equation for Over Limit calculation is as follows:

$$\text{Over Limit (dB)} = \text{Read level (dB}\mu\text{V)} + \text{Factor (dB)} - \text{Limit (dB}\mu\text{V)}$$

Test Results Summary

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

Test Data

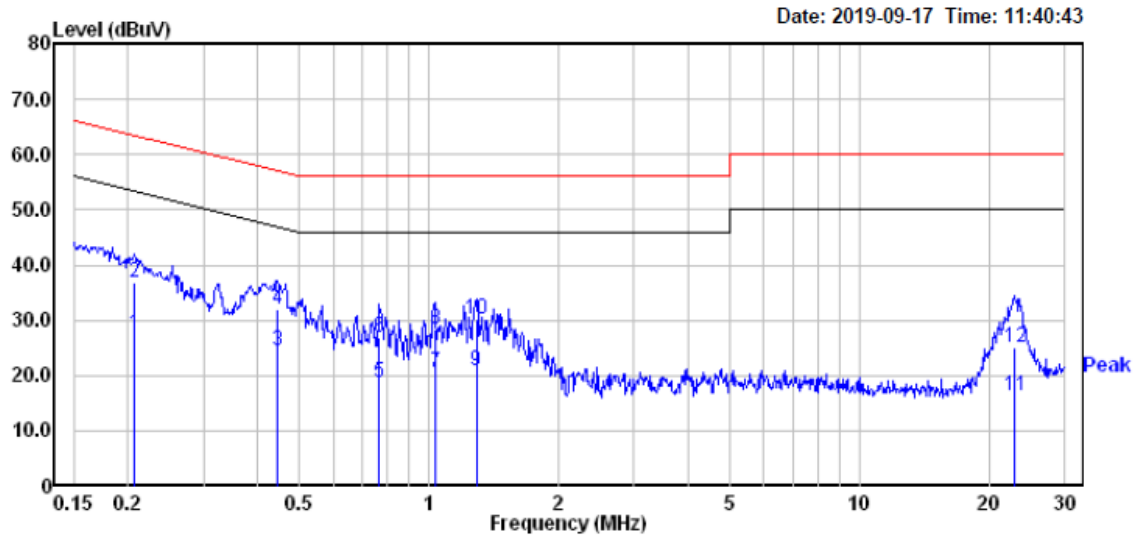
Environmental Conditions

Temperature:	24.3-25.4 °C
Relative Humidity:	49-51 %
ATM Pressure:	101.0-101.2 kPa

The testing was performed by Andy Liu from 2019-09-17 to 2019-09-28.

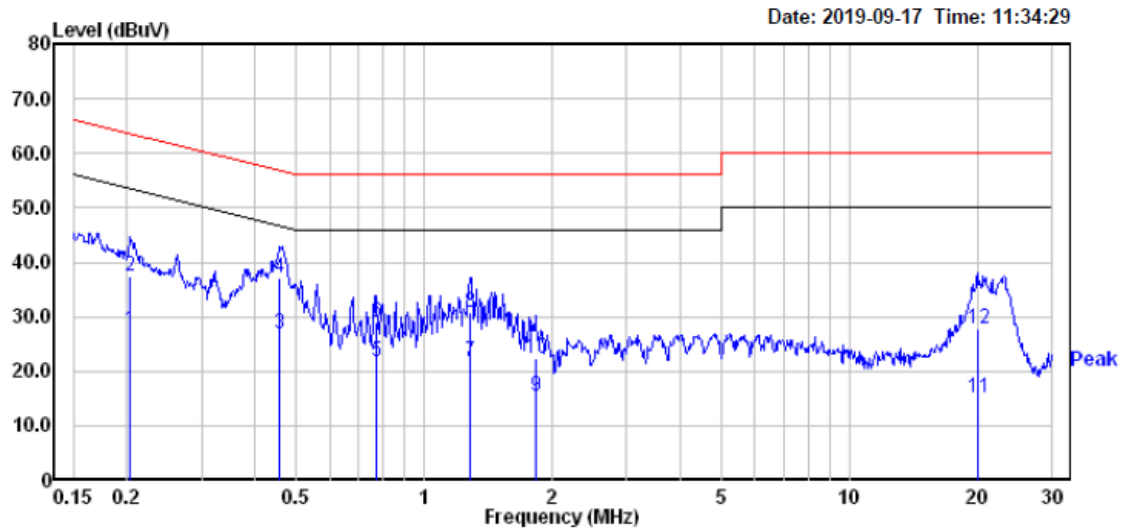
EUT operation mode: ANT 1, ANT 2, ANT 3 and ANT 4 transmitting simultaneously (Worst case)

AC 120V/60 Hz, Line - Adapter



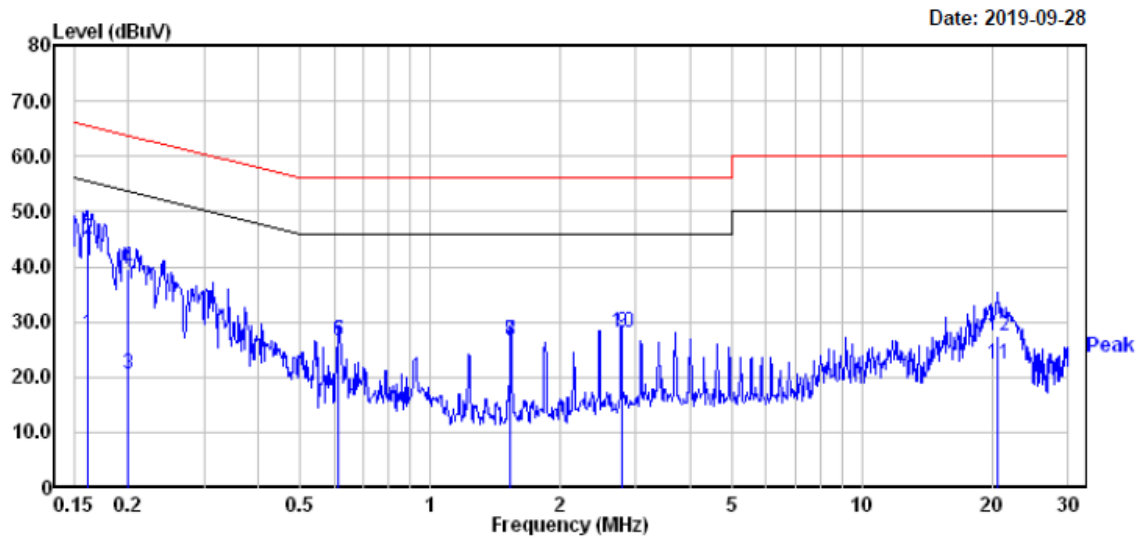
		Read		Limit	Over	
	Freq	Level	Factor	Level	Line	Limit Remark
	MHz	dBuV	dB	dBuV	dBuV	dB
1	0.207	7.60	19.82	27.42	53.32	-25.90 Average
2	0.207	16.90	19.82	36.72	63.32	-26.60 QP
3	0.444	4.70	19.75	24.45	46.98	-22.53 Average
4	0.444	12.10	19.75	31.85	56.98	-25.13 QP
5	0.767	-1.10	19.72	18.62	46.00	-27.38 Average
6	0.767	7.10	19.72	26.82	56.00	-29.18 QP
7	1.032	0.60	19.82	20.42	46.00	-25.58 Average
8	1.032	8.60	19.82	28.42	56.00	-27.58 QP
9	1.289	1.10	19.82	20.92	46.00	-25.08 Average
10	1.289	10.30	19.82	30.12	56.00	-25.88 QP
11	23.018	-3.39	19.78	16.39	50.00	-33.61 Average
12	23.018	5.21	19.78	24.99	60.00	-35.01 QP

AC 120V/60 Hz, Neutral - Adapter



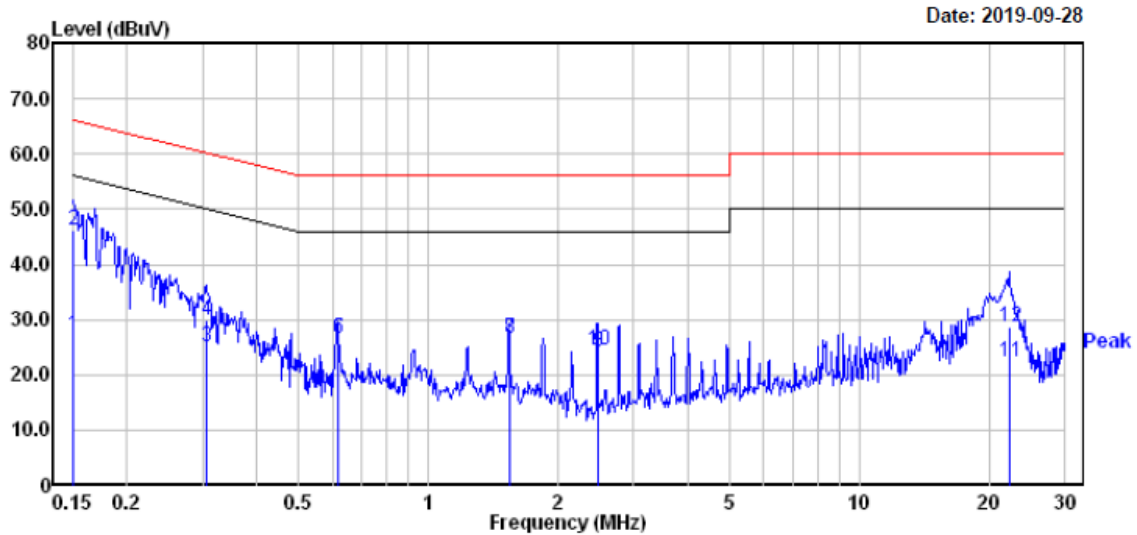
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.204	7.60	19.82	27.42	53.45	-26.03	Average
2	0.204	17.60	19.82	37.42	63.45	-26.03	QP
3	0.459	7.00	19.75	26.75	46.71	-19.96	Average
4	0.459	17.30	19.75	37.05	56.71	-19.66	QP
5	0.771	1.91	19.71	21.62	46.00	-24.38	Average
6	0.771	9.41	19.71	29.12	56.00	-26.88	QP
7	1.282	2.00	19.82	21.82	46.00	-24.18	Average
8	1.282	11.00	19.82	30.82	56.00	-25.18	QP
9	1.829	-4.51	19.84	15.33	46.00	-30.67	Average
10	1.829	2.59	19.84	22.43	56.00	-33.57	QP
11	20.056	-4.81	19.96	15.15	50.00	-34.85	Average
12	20.056	7.79	19.96	27.75	60.00	-32.25	QP

AC 120V/60 Hz, Line - PoE



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.161	8.00	19.83	27.83	55.43	-27.60	Average
2	0.161	25.30	19.83	45.13	65.43	-20.30	QP
3	0.200	0.80	19.82	20.62	53.62	-33.00	Average
4	0.200	19.60	19.82	39.42	63.62	-24.20	QP
5	0.614	6.80	19.75	26.55	46.00	-19.45	Average
6	0.614	6.90	19.75	26.65	56.00	-29.35	QP
7	1.535	6.69	19.85	26.54	46.00	-19.46	Average
8	1.535	6.79	19.85	26.64	56.00	-29.36	QP
9	2.779	8.60	19.47	28.07	46.00	-17.93	Average
10	2.779	8.70	19.47	28.17	56.00	-27.83	QP
11	20.704	2.31	19.91	22.22	50.00	-27.78	Average
12	20.704	7.71	19.91	27.62	60.00	-32.38	QP

AC 120V/60 Hz, Neutral - PoE



	Freq	Read		Limit	Over	
		Level	Factor	Level	Line	Limit Remark
	MHz	dBuV	dB	dBuV	dBuV	dB
1	0.150	7.40	19.82	27.22	56.00	-28.78 Average
2	0.150	26.40	19.82	46.22	66.00	-19.78 QP
3	0.305	5.29	19.83	25.12	50.11	-24.99 Average
4	0.305	9.99	19.83	29.82	60.11	-30.29 QP
5	0.617	6.80	19.75	26.55	46.00	-19.45 Average
6	0.617	6.90	19.75	26.65	56.00	-29.35 QP
7	1.544	6.59	19.85	26.44	46.00	-19.56 Average
8	1.544	6.79	19.85	26.64	56.00	-29.36 QP
9	2.474	4.70	19.49	24.19	46.00	-21.81 Average
10	2.474	4.90	19.49	24.39	56.00	-31.61 QP
11	22.298	2.50	19.83	22.33	50.00	-27.67 Average
12	22.298	8.80	19.83	28.63	60.00	-31.37 QP

Note:

- 1) Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)
- 2) Over Limit (dB) = Read level (dBUV) + Factor (dB) - Limit (dBUV)

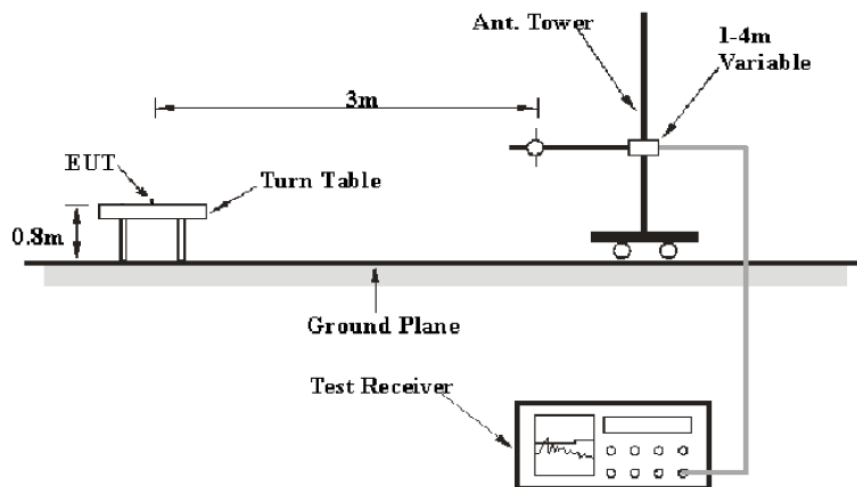
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

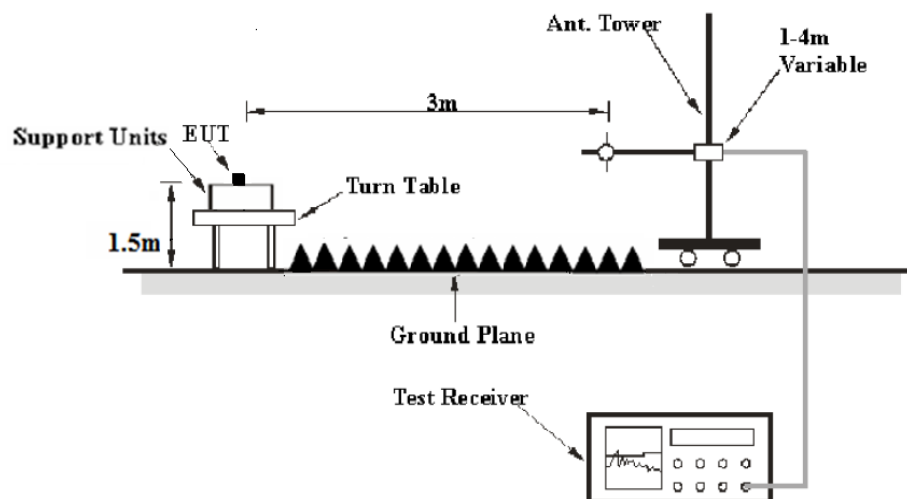
FCC §15.247 (d); §15.209; §15.205;

EUT Setup

Below 1 GHz:



Above 1 GHz:



The radiated emission tests were performed in the 3 meters 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.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 25 GHz.

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

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

Test Procedure

According to ANSI C63.10-2013 clause 6.5, 6.6 and 6.7.

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 30MHz - 1GHz, peak and Average detection mode for frequencies above 1 GHz.

Factor & Over Limit - Below 1 GHz

The factor is calculated by adding Antenna Factor, Cable Loss and Amplifier Gain. The basic equation is as follows:

$$\text{Factor (dB)} = \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Amplifier Gain (dB)}$$

The “**Over Limit**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit of 7dB means the emission is 7 dB above the limit. The equation for Over Limit calculation is as follows:

$$\text{Over Limit (dB)} = \text{Read level (dB}\mu\text{V)} + \text{Factor (dB)} - \text{Limit (dB}\mu\text{V)}$$

Corrected Amplitude & Margin Calculation - Above 1 GHz

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:

$$\text{Corrected Amplitude (dB}\mu\text{V /m)} = \text{Meter Reading (dB}\mu\text{V)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Amplifier Gain (dB)}$$

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:

$$\text{Margin (dB)} = \text{Limit (dB}\mu\text{V/m)} - \text{Corrected Amplitude (dB}\mu\text{V /m)}$$

Test Results Summary

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

Test Data

Environmental Conditions

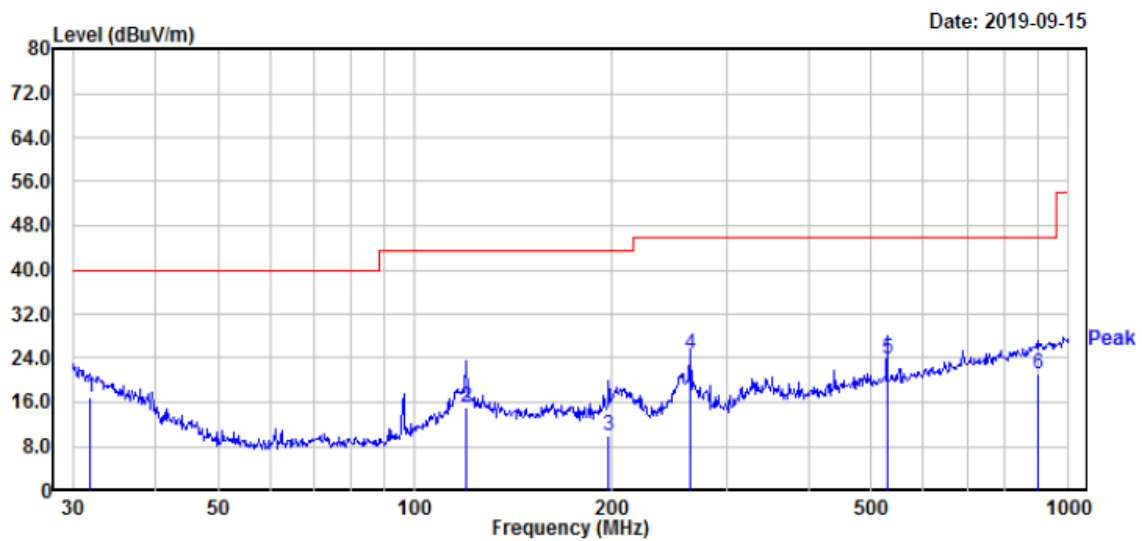
Temperature:	21.6~25.2 °C
Relative Humidity:	48~51 %
ATM Pressure:	101.1~101.2kPa

The testing was performed by Andy Liu from 2019-09-11 to 2019-09-29.

EUT operation mode: Transmitting

Spurious Emission Test**30MHz-1GHz - Adapter****ANT 1****Horizontal:**

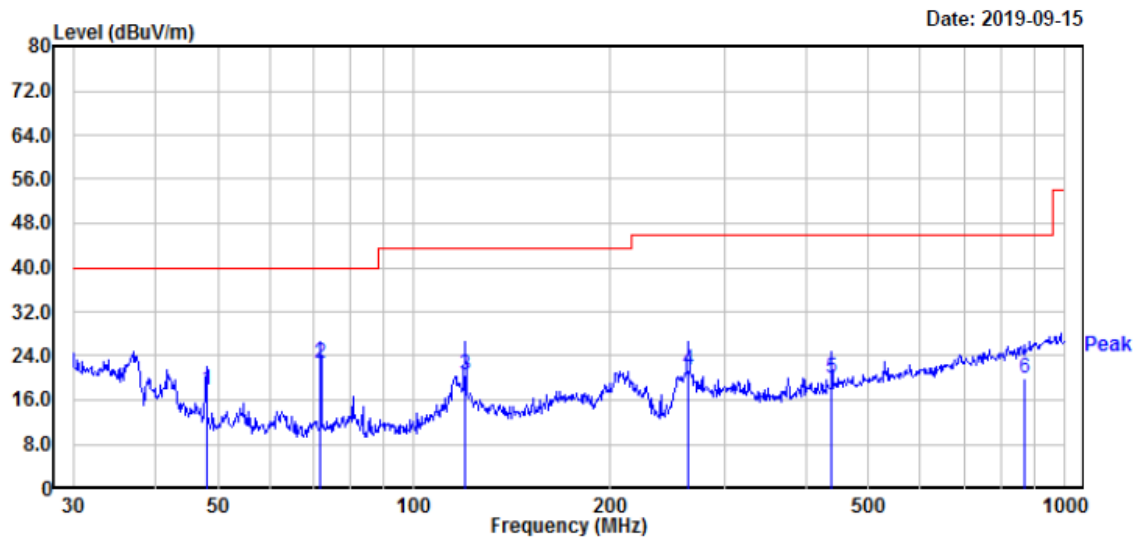
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high** channel of operation in the Z axis of orientation was recorded)



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	31.84	21.51	-4.67	16.84	40.00	-23.16	200	235	QP
2	119.86	25.70	-10.68	15.02	43.50	-28.48	100	3	QP
3	197.89	21.81	-11.77	10.04	43.50	-33.46	100	3	QP
4	263.82	36.09	-11.41	24.68	46.00	-21.32	200	360	QP
5	528.25	29.00	-5.08	23.92	46.00	-22.08	100	3	QP
6	897.00	20.01	0.97	20.98	46.00	-25.02	100	92	QP

Vertical:

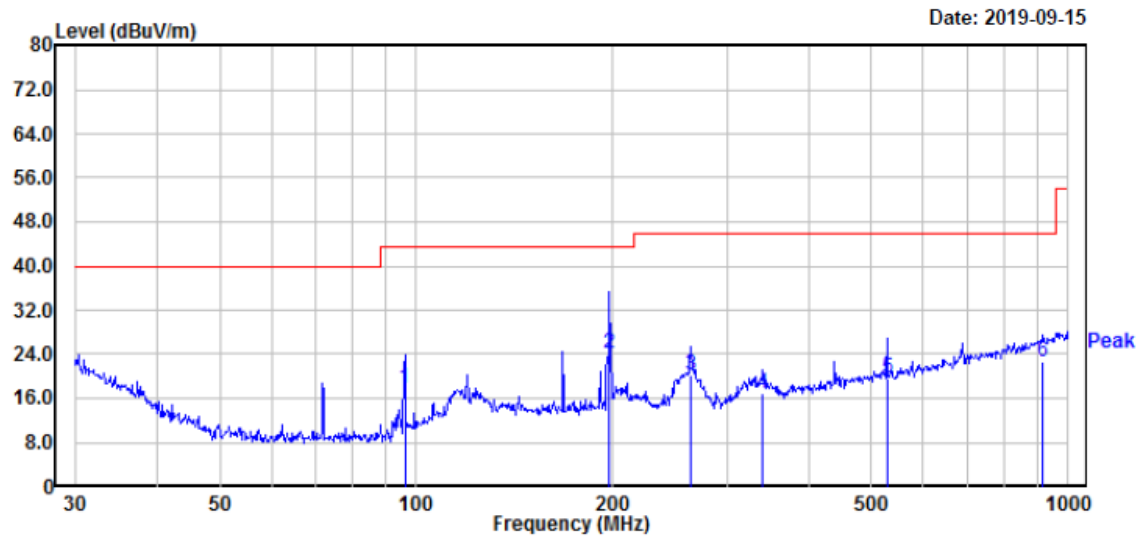
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high** channel of operation in the Z axis of orientation was recorded)



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	47.99	33.73	-15.84	17.89	40.00	-22.11	200	255	QP
2	71.83	39.50	-16.93	22.57	40.00	-17.43	200	255	QP
3	119.86	31.30	-10.68	20.62	43.50	-22.88	100	15	QP
4	263.82	32.79	-11.41	21.38	46.00	-24.62	100	15	QP
5	438.66	26.69	-6.85	19.84	46.00	-26.16	100	201	QP
6	869.13	19.65	0.40	20.05	46.00	-25.95	100	305	QP

ANT 2**Horizontal:**

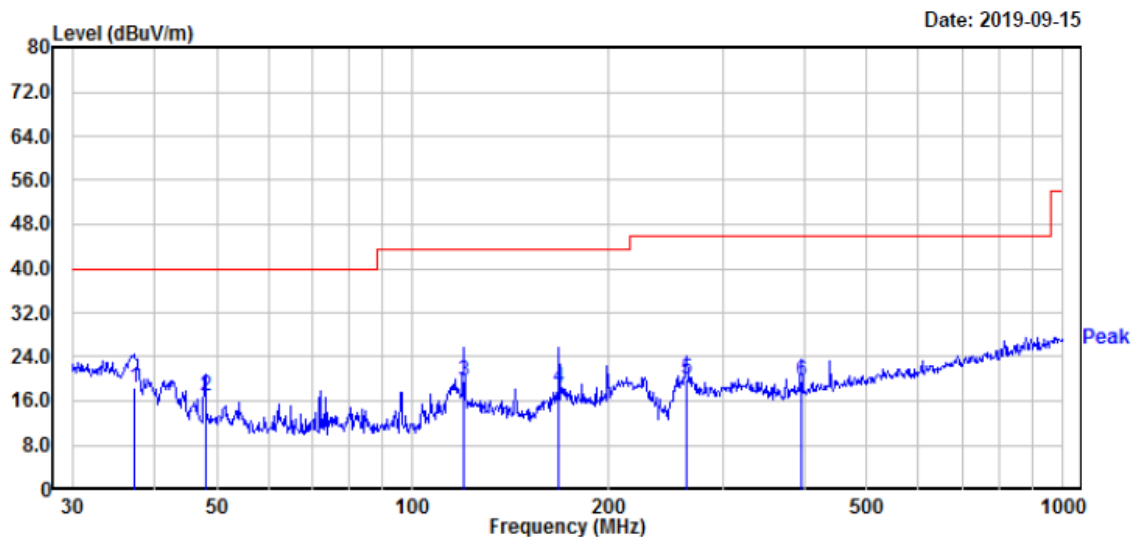
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **middle** channel of operation in the Z axis of orientation was recorded)



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	96.10	33.43	-15.65	17.78	43.50	-25.72	100	0	QP
2	197.89	36.01	-11.77	24.24	43.50	-19.26	100	144	QP
3	263.82	31.74	-11.41	20.33	46.00	-25.67	200	16	QP
4	340.78	26.33	-9.32	17.01	46.00	-28.99	100	0	QP
5	528.25	24.81	-5.08	19.73	46.00	-26.27	100	19	QP
6	912.86	21.29	1.30	22.59	46.00	-23.41	100	273	QP

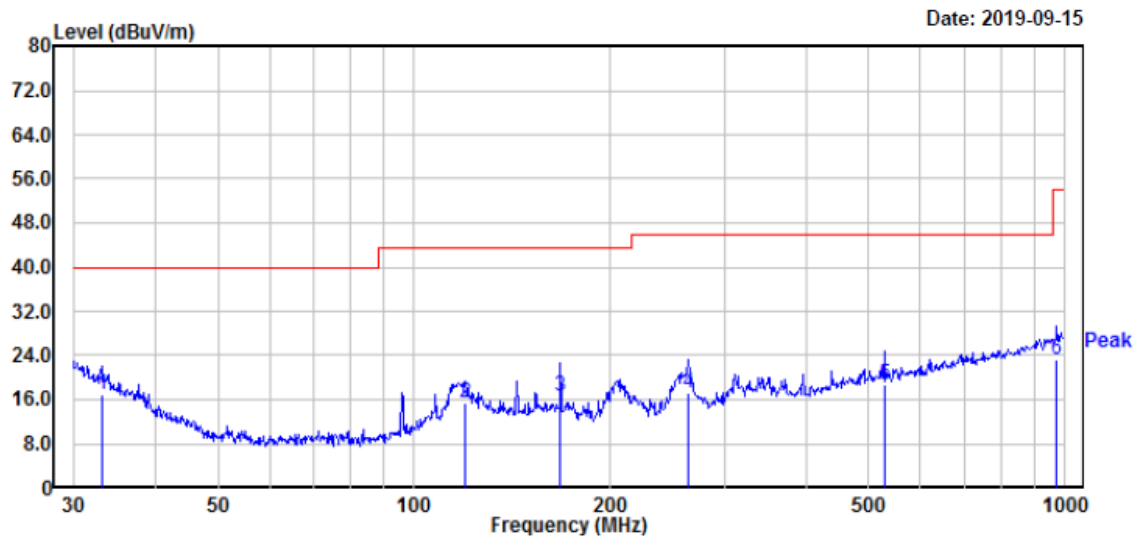
Vertical:

(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **middle channel of operation in the Z axis of orientation** was recorded)



ANT 3**Horizontal:**

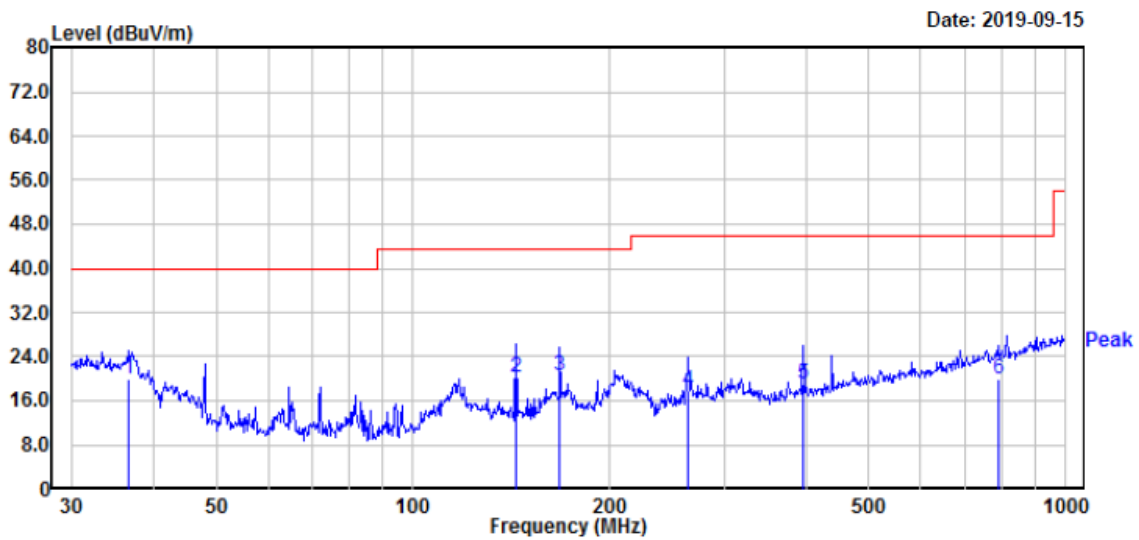
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high** channel of operation in the Z axis of orientation was recorded)



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	33.09	22.70	-5.70	17.00	40.00	-23.00	100	57	QP
2	119.86	26.06	-10.68	15.38	43.50	-28.12	200	109	QP
3	167.82	28.99	-12.43	16.56	43.50	-26.94	100	194	QP
4	263.82	28.71	-11.41	17.30	46.00	-28.70	200	31	QP
5	528.25	23.73	-5.08	18.65	46.00	-27.35	100	10	QP
6	972.34	20.71	2.49	23.20	54.00	-30.80	100	77	QP

Vertical:

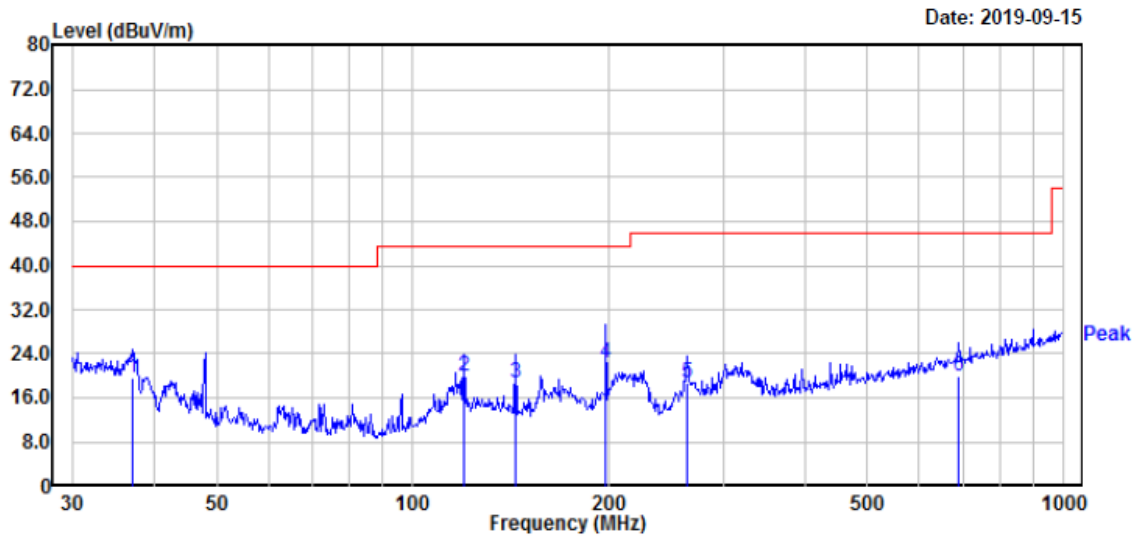
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high** channel of operation in the Z axis of orientation was recorded)



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	36.77	28.75	-8.76	19.99	40.00	-20.01	100	261	QP
2	143.83	31.95	-11.82	20.13	43.50	-23.37	100	209	QP
3	167.82	33.01	-12.43	20.58	43.50	-22.92	100	209	QP
4	263.82	29.35	-11.41	17.94	46.00	-28.06	200	140	QP
5	396.24	26.59	-7.70	18.89	46.00	-27.11	100	307	QP
6	787.85	20.78	-0.91	19.87	46.00	-26.13	200	285	QP

ANT 4**Horizontal:**

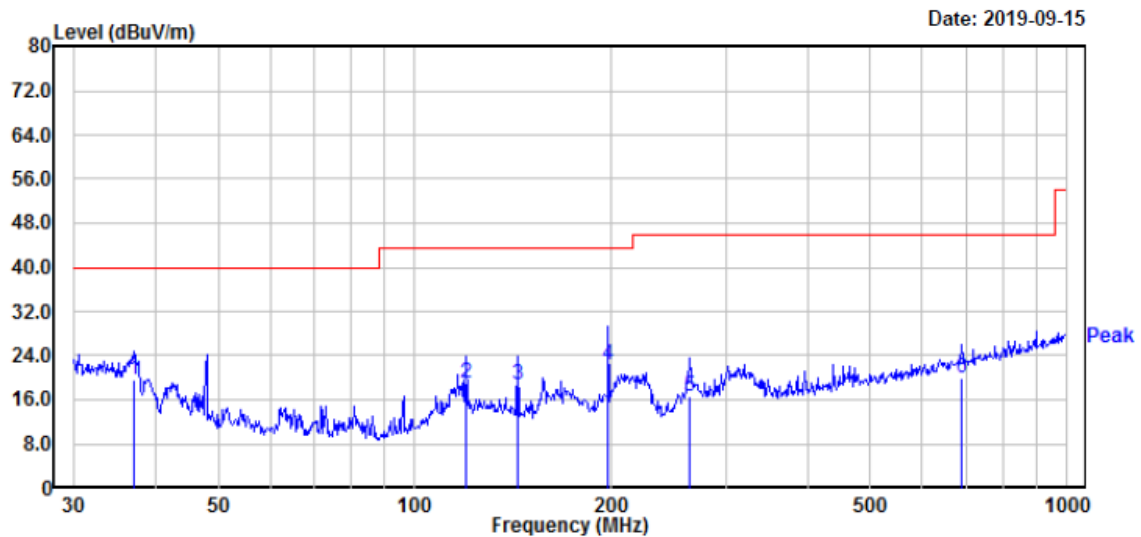
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high** channel of operation in the Z axis of orientation was recorded)



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	37.03	28.71	-8.97	19.74	40.00	-20.26	100	221	QP
2	119.86	30.59	-10.68	19.91	43.50	-23.59	100	14	QP
3	143.83	30.64	-11.82	18.82	43.50	-24.68	100	14	QP
4	197.89	34.12	-11.77	22.35	43.50	-21.15	100	311	QP
5	263.82	30.01	-11.41	18.60	46.00	-27.40	100	252	QP
6	689.57	22.12	-2.28	19.84	46.00	-26.16	200	360	QP

Vertical:

(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high** channel of operation in the Z axis of orientation was recorded)

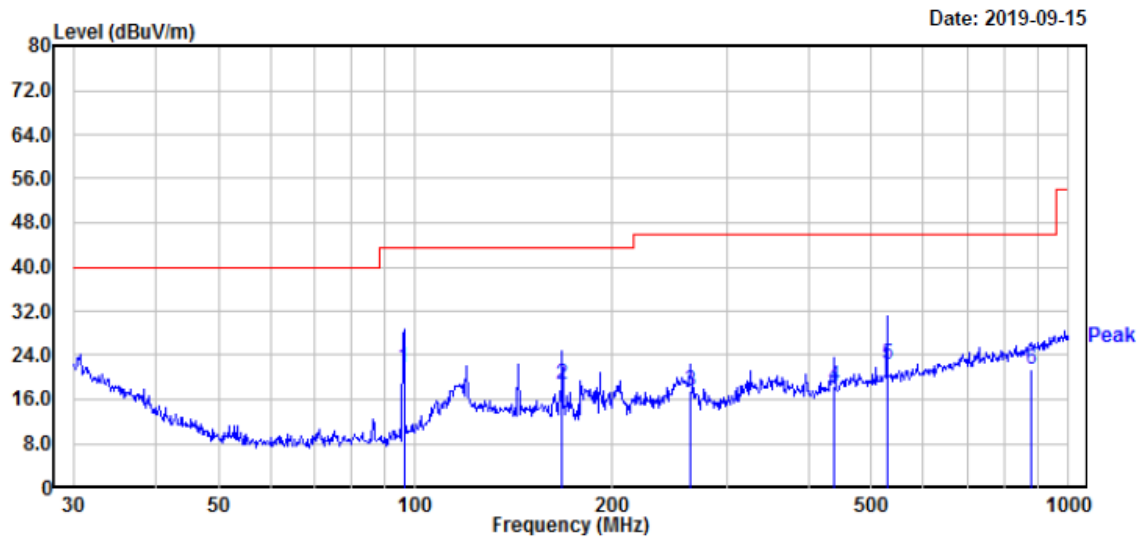


	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	37.03	28.71	-8.97	19.74	40.00	-20.26	100	221	QP
2	119.86	29.59	-10.68	18.91	43.50	-24.59	100	14	QP
3	143.83	30.64	-11.82	18.82	43.50	-24.68	100	14	QP
4	197.89	34.12	-11.77	22.35	43.50	-21.15	100	311	QP
5	263.82	28.01	-11.41	16.60	46.00	-29.40	100	252	QP
6	689.57	22.12	-2.28	19.84	46.00	-26.16	200	360	QP

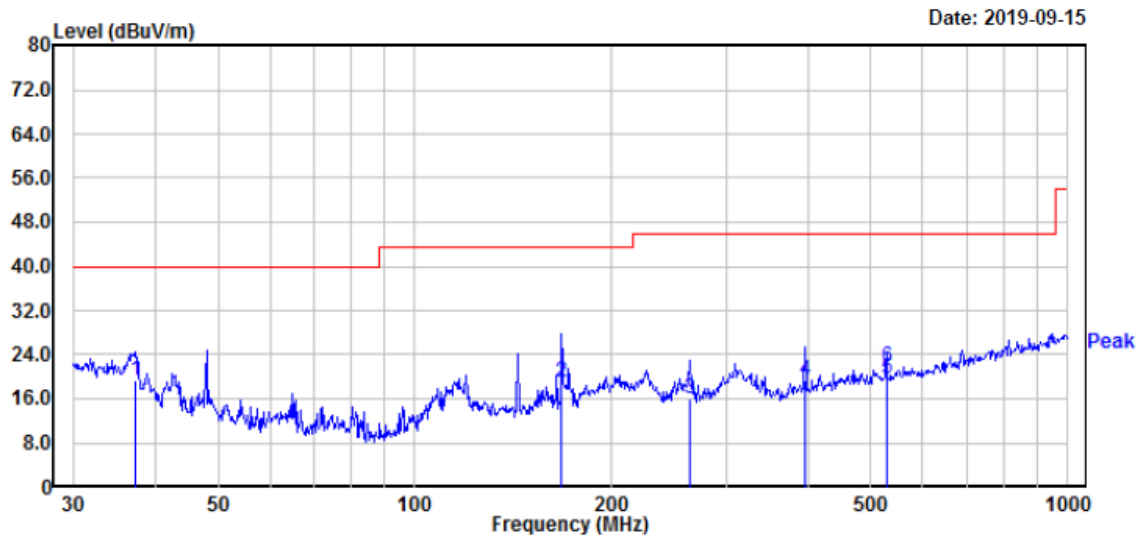
High channel of ANT 1, middle channel of ANT 2, high channel of ANT 3 and high channel of ANT 4 transmitting simultaneously

Horizontal:

(The worst case *in the Z axis of orientation* was recorded)



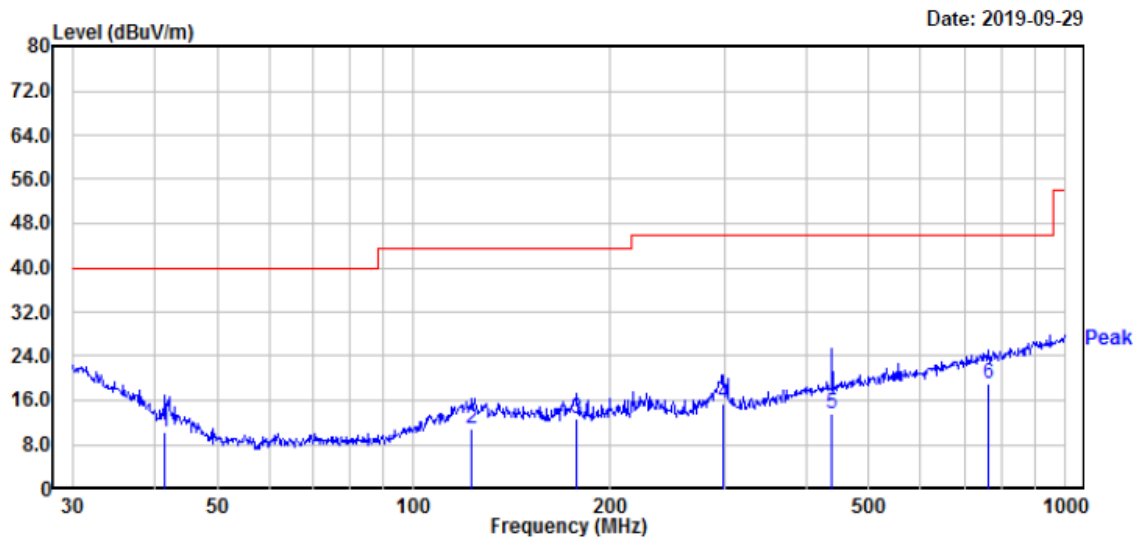
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	96.10	37.24	-15.65	21.59	43.50	-21.91	200	12	QP
2	167.82	31.18	-12.43	18.75	43.50	-24.75	100	12	QP
3	263.82	28.87	-11.41	17.46	46.00	-28.54	200	10	QP
4	438.66	25.40	-6.85	18.55	46.00	-27.45	200	32	QP
5	528.25	27.29	-5.08	22.21	46.00	-23.79	200	23	QP
6	878.32	20.75	0.60	21.35	46.00	-24.65	100	12	QP

Vertical:*(The worst case in the Z axis of orientation was recorded)*

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	37.29	28.61	-9.20	19.41	40.00	-20.59	100	21	QP
2	167.82	31.34	-12.43	18.91	43.50	-24.59	100	196	QP
3	263.82	27.38	-11.41	15.97	46.00	-30.03	200	21	QP
4	396.24	27.00	-7.70	19.30	46.00	-26.70	100	331	QP
5	528.25	24.68	-5.08	19.60	46.00	-26.40	100	187	QP
6	528.25	26.68	-5.08	21.60	46.00	-24.40	100	187	QP

30MHz-1GHz - PoE**ANT 1****Horizontal:**

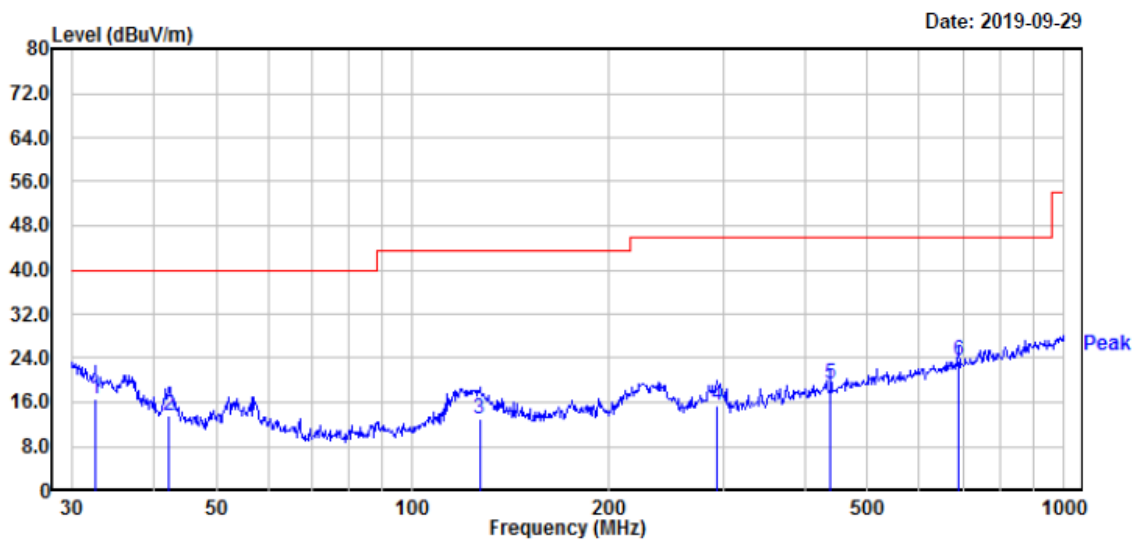
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high** channel of operation in the Z axis of orientation was recorded)



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	41.57	22.59	-12.30	10.29	40.00	-29.71	100	359	QP
2	122.83	21.60	-10.81	10.79	43.50	-32.71	200	6	QP
3	178.13	25.51	-12.93	12.58	43.50	-30.92	200	270	QP
4	298.27	25.80	-10.31	15.49	46.00	-30.51	100	253	QP
5	438.66	20.51	-6.85	13.66	46.00	-32.34	100	359	QP
6	760.70	20.40	-1.24	19.16	46.00	-26.84	200	37	QP

Vertical:

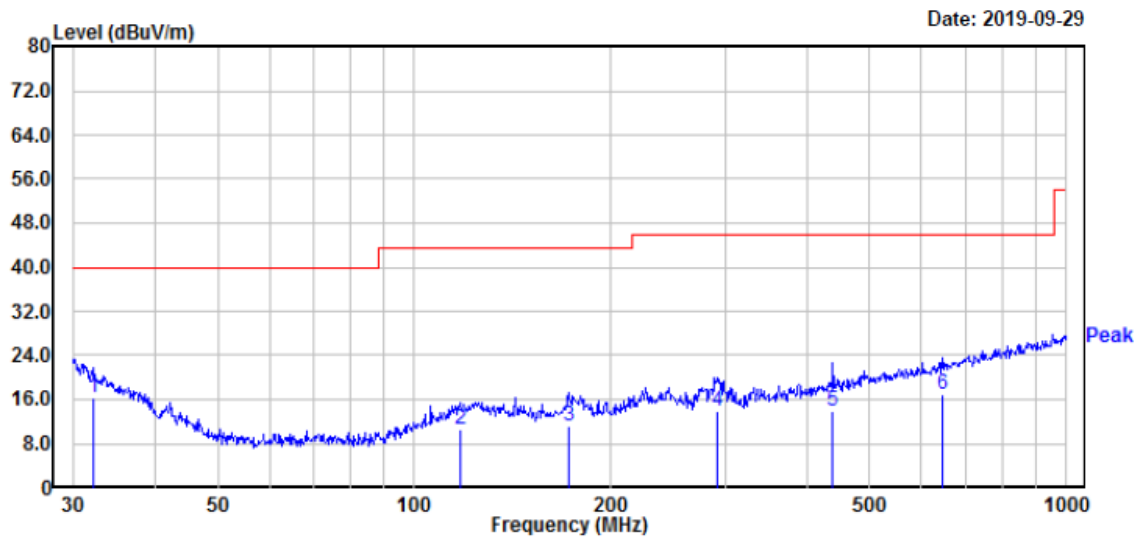
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high** channel of operation in the Z axis of orientation was recorded)



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	32.63	21.80	-5.32	16.48	40.00	-23.52	100	255	QP
2	42.15	26.09	-12.62	13.47	40.00	-26.53	100	8	QP
3	126.77	24.11	-11.05	13.06	43.50	-30.44	100	237	QP
4	293.08	25.80	-10.37	15.43	46.00	-30.57	100	236	QP
5	438.66	26.21	-6.85	19.36	46.00	-26.64	100	122	QP
6	689.57	25.70	-2.28	23.42	46.00	-22.58	200	144	QP

ANT 2**Horizontal:**

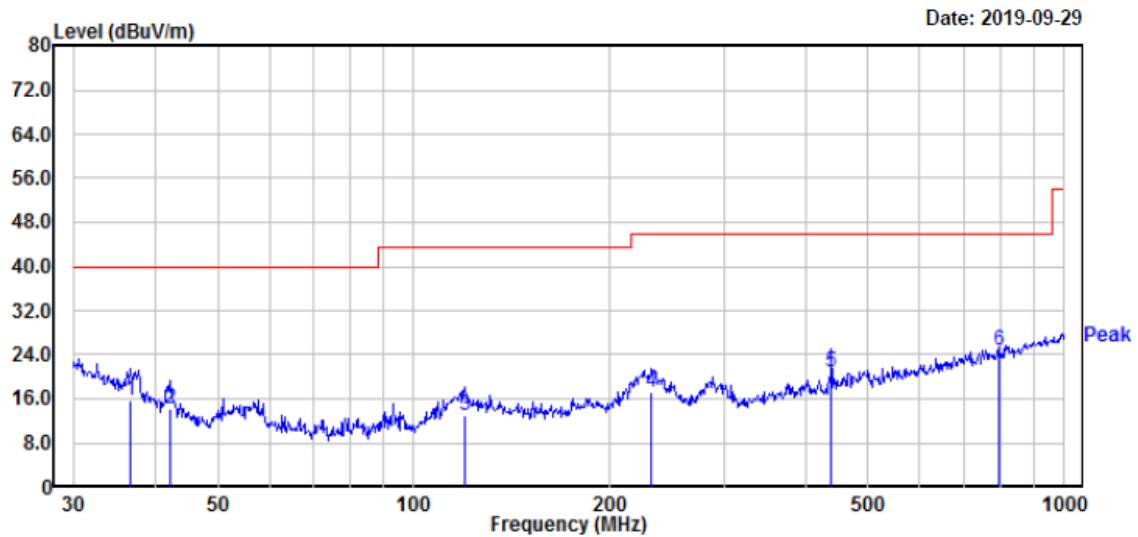
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **middle** channel of operation in the Z axis of orientation was recorded)



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	32.29	21.30	-5.04	16.26	40.00	-23.74	100	335	QP
2	117.77	21.69	-11.08	10.61	43.50	-32.89	200	109	QP
3	172.60	23.90	-12.66	11.24	43.50	-32.26	200	61	QP
4	291.04	24.39	-10.39	14.00	46.00	-32.00	100	256	QP
5	438.66	20.71	-6.85	13.86	46.00	-32.14	100	356	QP
6	645.12	20.20	-3.16	17.04	46.00	-28.96	100	201	QP

Vertical:

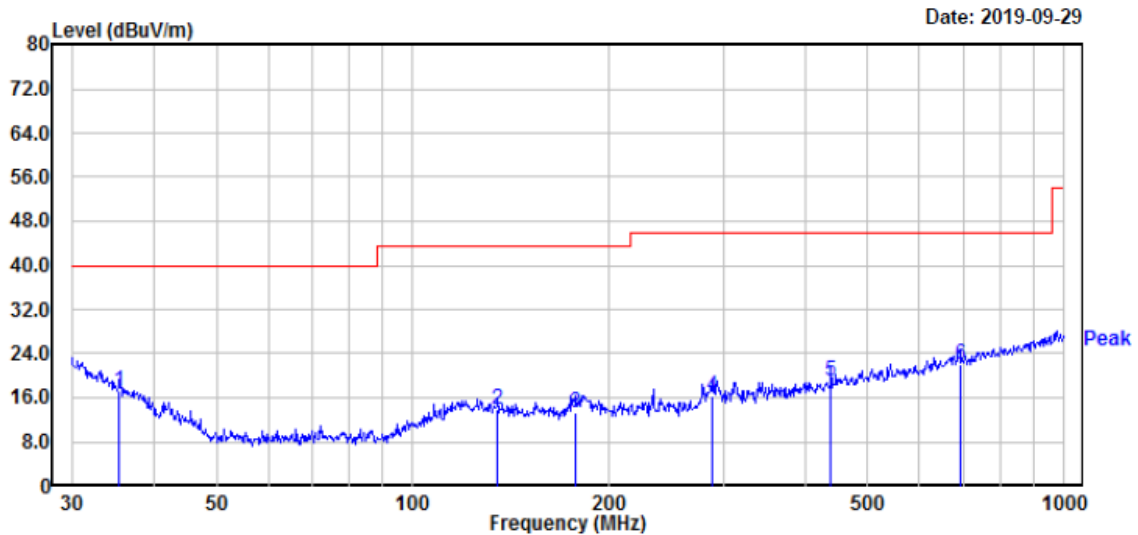
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **middle channel of operation in the Z axis of orientation** was recorded)



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	36.64	24.40	-8.65	15.75	40.00	-24.25	100	156	QP
2	42.15	26.79	-12.62	14.17	40.00	-25.83	100	4	QP
3	119.86	23.60	-10.68	12.92	43.50	-30.58	100	253	QP
4	232.53	30.09	-13.03	17.06	46.00	-28.94	100	12	QP
5	438.66	27.71	-6.85	20.86	46.00	-25.14	100	3	QP
6	796.18	25.69	-0.81	24.88	46.00	-21.12	100	277	QP

ANT 3**Horizontal:**

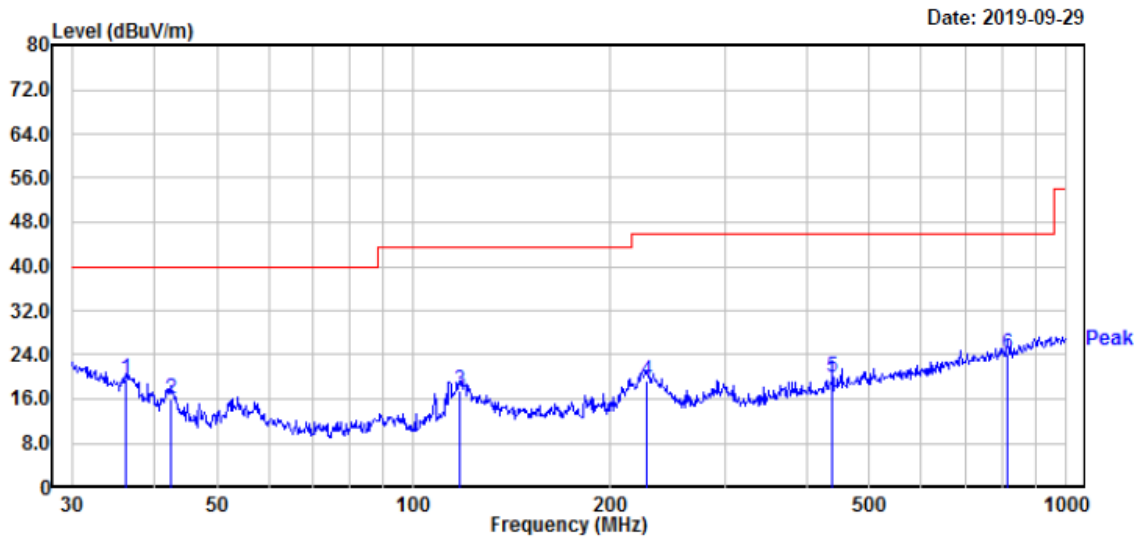
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high** channel of operation in the Z axis of orientation was recorded)



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	35.50	25.05	-7.70	17.35	40.00	-22.65	200	354	QP
2	135.03	25.43	-11.49	13.94	43.50	-29.56	100	354	QP
3	177.51	26.03	-12.89	13.14	43.50	-30.36	100	245	QP
4	289.00	26.80	-10.42	16.38	46.00	-29.62	100	91	QP
5	438.66	25.98	-6.85	19.13	46.00	-26.87	200	354	QP
6	691.99	24.30	-2.24	22.06	46.00	-23.94	200	75	QP

Vertical:

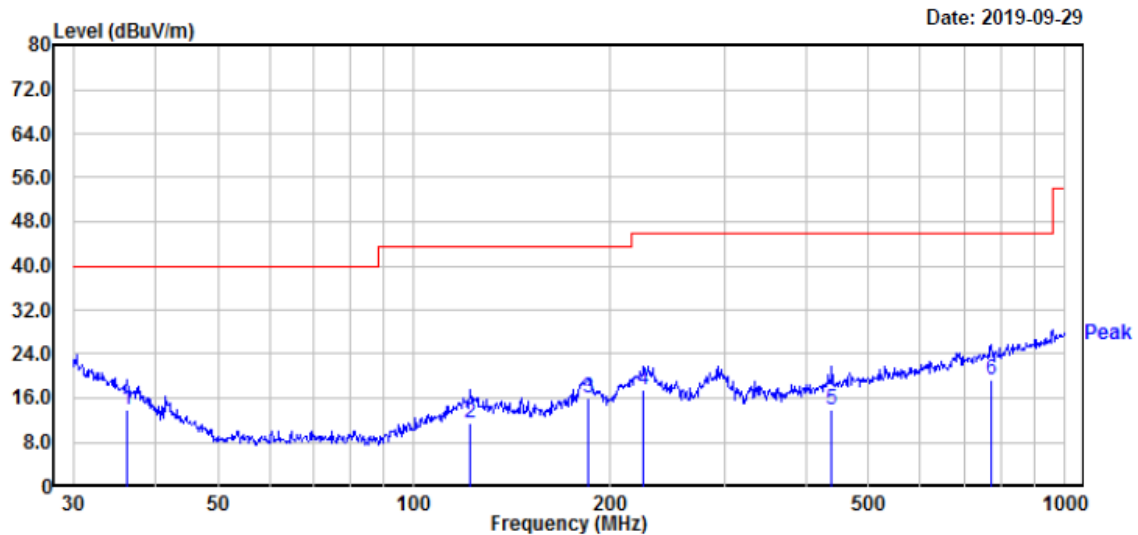
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high** channel of operation in the Z axis of orientation was recorded)



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	36.25	27.83	-8.33	19.50	40.00	-20.50	100	193	QP
2	42.60	29.02	-12.87	16.15	40.00	-23.85	100	310	QP
3	117.77	28.45	-11.08	17.37	43.50	-26.13	100	155	QP
4	227.69	32.61	-13.22	19.39	46.00	-26.61	100	34	QP
5	438.66	26.89	-6.85	20.04	46.00	-25.96	100	111	QP
6	813.11	24.80	-0.57	24.23	46.00	-21.77	100	205	QP

ANT 4**Horizontal:**

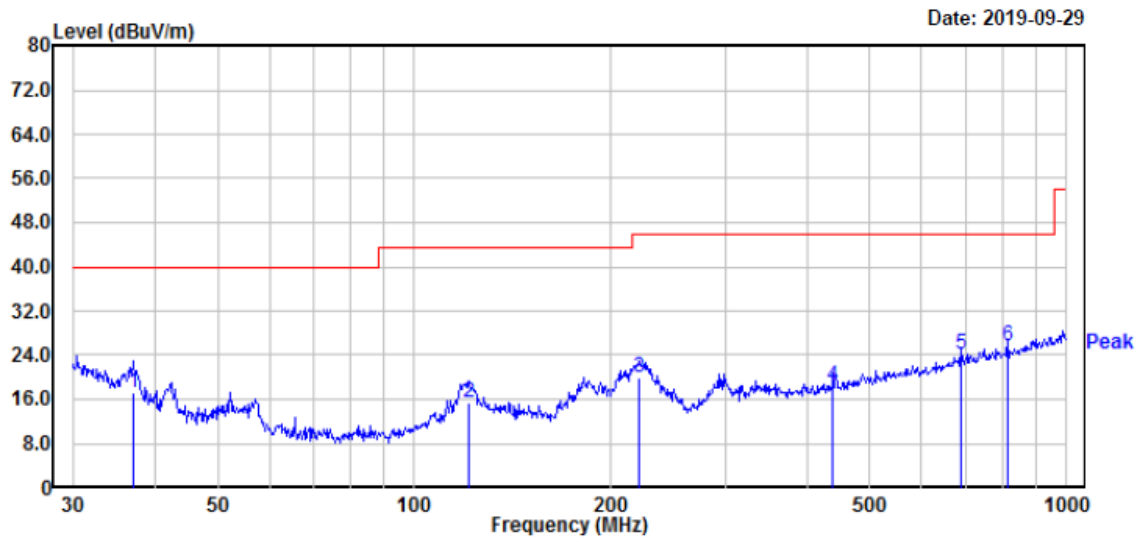
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high** channel of operation in the Z axis of orientation was recorded)



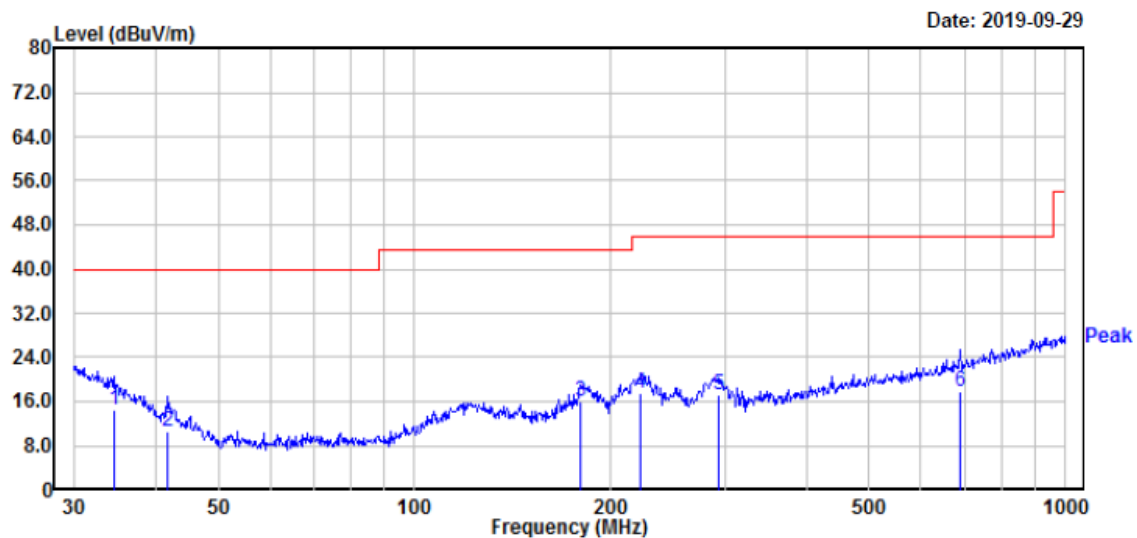
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	36.25	22.20	-8.33	13.87	40.00	-26.13	200	0	QP
2	121.98	22.31	-10.77	11.54	43.50	-31.96	200	0	QP
3	185.79	28.59	-12.59	16.00	43.50	-27.50	200	220	QP
4	225.31	30.81	-13.30	17.51	46.00	-28.49	100	204	QP
5	438.66	20.61	-6.85	13.76	46.00	-32.24	200	0	QP
6	771.45	20.40	-1.11	19.29	46.00	-26.71	200	114	QP

Vertical:

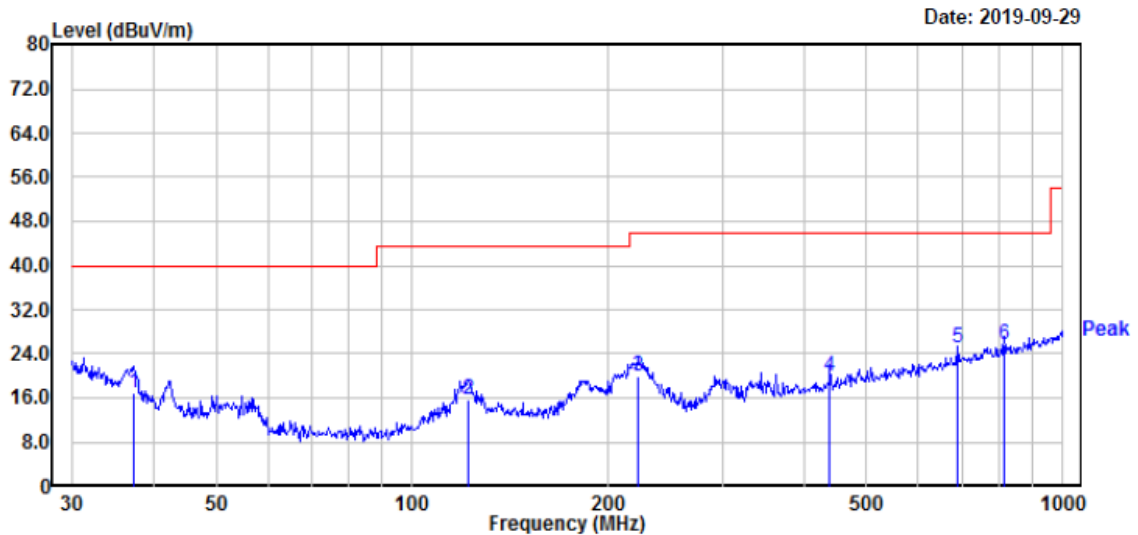
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high** channel of operation in the Z axis of orientation was recorded)



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	37.03	26.10	-8.97	17.13	40.00	-22.87	100	322	QP
2	121.12	25.99	-10.71	15.28	43.50	-28.22	100	146	QP
3	220.62	33.40	-13.45	19.95	46.00	-26.05	100	215	QP
4	438.66	25.31	-6.85	18.46	46.00	-27.54	100	309	QP
5	689.57	26.30	-2.28	24.02	46.00	-21.98	100	353	QP
6	813.11	26.10	-0.57	25.53	46.00	-20.47	100	328	QP

ANT 1, ANT 2, ANT 3 and ANT 4 transmitting simultaneously**Horizontal:***(The worst case in the Z axis of orientation was recorded)*

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	34.64	21.60	-6.99	14.61	40.00	-25.39	100	171	QP
2	41.86	23.09	-12.46	10.63	40.00	-29.37	100	71	QP
3	180.02	29.00	-13.01	15.99	43.50	-27.51	200	37	QP
4	222.95	30.80	-13.37	17.43	46.00	-28.57	100	188	QP
5	294.11	27.60	-10.36	17.24	46.00	-28.76	100	176	QP
6	689.57	20.20	-2.28	17.92	46.00	-28.08	100	0	QP

Vertical:(The worst case *in the Z axis of orientation* was recorded)

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	37.42	26.31	-9.31	17.00	40.00	-23.00	100	359	QP
2	121.98	26.61	-10.77	15.84	43.50	-27.66	100	315	QP
3	222.17	33.19	-13.39	19.80	46.00	-26.20	100	178	QP
4	438.66	26.91	-6.85	20.06	46.00	-25.94	100	303	QP
5	689.57	27.20	-2.28	24.92	46.00	-21.08	100	328	QP
6	813.11	26.30	-0.57	25.73	46.00	-20.27	100	228	QP

Note:

- 1) Factor (dB) = Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB)
- 2) Over Limit (dB) = Read level (dBμV) + Factor (dB) - Limit (dBμV)

1GHz-18GHz:**ANT 1**

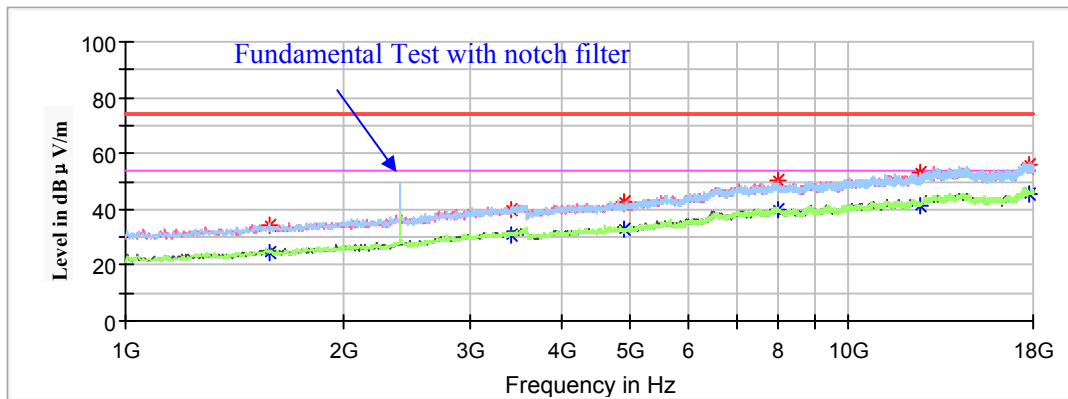
(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
 Corrected Amplitude (dB μ V /m) = Corrected Factor (dB/m) + Reading (dB μ V)
 Margin (dB) = Limit (dB μ V/m) – Corrected Amplitude (dB μ V /m)

Low Channel: 2402MHz

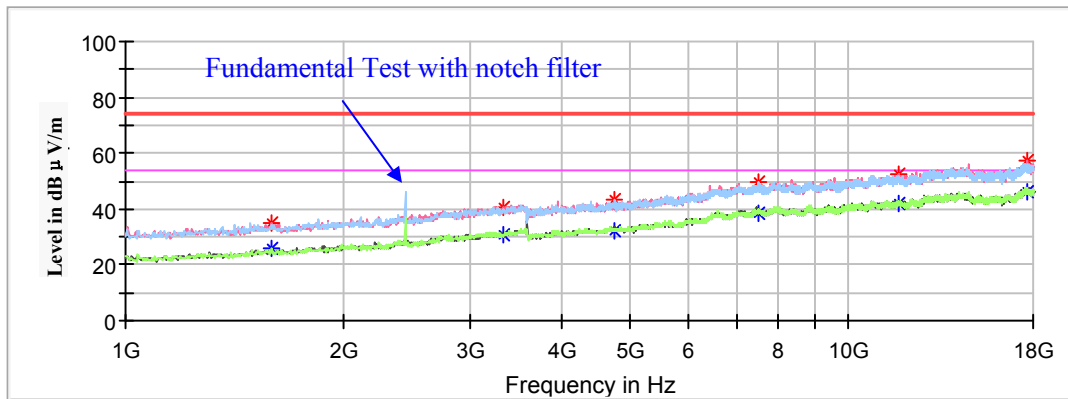
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V /m)	Average (dB μ V /m)	Height (cm)	Polar (H/V)				
1584.80	---	24.54	150.0	V	160.0	-9.6	54.00	29.46
1584.80	34.58	---	150.0	V	160.0	-9.6	74.00	39.42
3407.20	---	31.08	150.0	H	293.0	-3.7	54.00	22.92
3407.20	40.15	---	150.0	H	293.0	-3.7	74.00	33.85
4804.00	---	32.53	150.0	V	102.0	-0.4	54.00	21.47
4804.00	42.65	---	150.0	V	102.0	-0.4	74.00	31.35
8000.60	---	39.87	150.0	V	137.0	7.1	54.00	14.13
8000.60	50.21	---	150.0	V	137.0	7.1	74.00	23.79
12563.40	---	41.18	100.0	H	229.0	10.5	54.00	12.82
12563.40	53.00	---	100.0	H	229.0	10.5	74.00	21.00
17819.80	---	45.27	100.0	H	100.0	13.8	54.00	8.73
17819.80	55.92	---	100.0	H	100.0	13.8	74.00	18.08

Middle Channel: 2440MHz

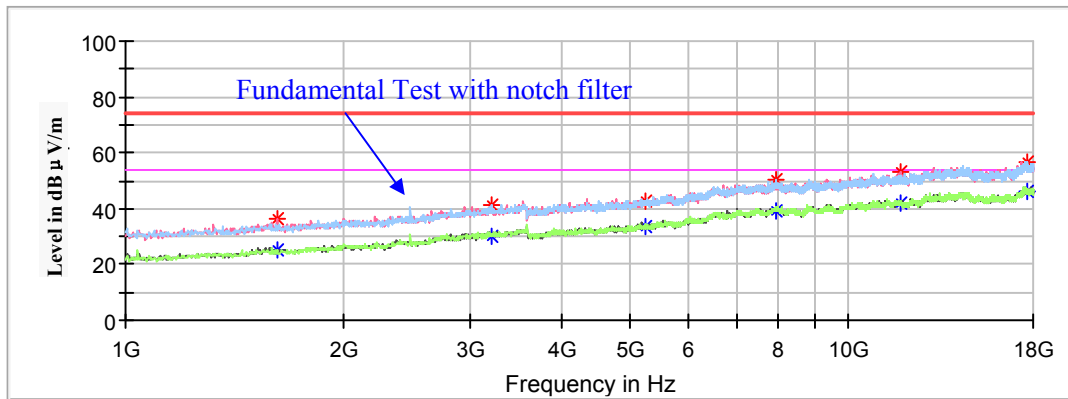
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V /m)	Average (dB μ V /m)	Height (cm)	Polar (H/V)				
1591.60	---	26.11	150.0	V	358.0	-9.6	54.00	27.89
1591.60	34.62	---	150.0	V	358.0	-9.6	74.00	39.38
3335.80	---	30.61	150.0	V	115.0	-3.8	54.00	23.39
3335.80	40.40	---	150.0	V	115.0	-3.8	74.00	33.60
4880.00	---	32.47	200.0	H	78.0	-0.6	54.00	21.53
4880.00	43.26	---	200.0	H	78.0	-0.6	74.00	30.74
7320.00	---	38.81	100.0	H	136.0	6.1	54.00	15.19
7320.00	49.53	---	100.0	H	136.0	6.1	74.00	24.47
11761.00	---	41.81	150.0	V	104.0	9.9	54.00	12.19
11761.00	52.47	---	150.0	V	104.0	9.9	74.00	21.53
17632.80	---	45.83	100.0	V	186.0	14.1	54.00	8.17
17632.80	57.06	---	100.0	V	186.0	14.1	74.00	16.94

High Channel: 2480MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1618.80	---	25.29	100.0	V	107.0	-9.5	54.00	28.71
1618.80	36.31	---	100.0	V	107.0	-9.5	74.00	37.69
3216.80	---	30.13	150.0	V	353.0	-4.0	54.00	23.87
3216.80	40.92	---	150.0	V	353.0	-4.0	74.00	33.08
5226.20	---	33.23	150.0	H	178.0	0.5	54.00	20.77
5226.20	42.82	---	150.0	H	178.0	0.5	74.00	31.18
7956.40	---	39.18	150.0	H	271.0	7.0	54.00	14.82
7956.40	50.35	---	150.0	H	271.0	7.0	74.00	23.65
11788.20	---	41.88	200.0	V	317.0	10.0	54.00	12.12
11788.20	52.93	---	200.0	V	317.0	10.0	74.00	21.07
17666.80	---	46.09	150.0	H	190.0	14.0	54.00	7.91
17666.80	56.66	---	150.0	H	190.0	14.0	74.00	17.34

ANT 2

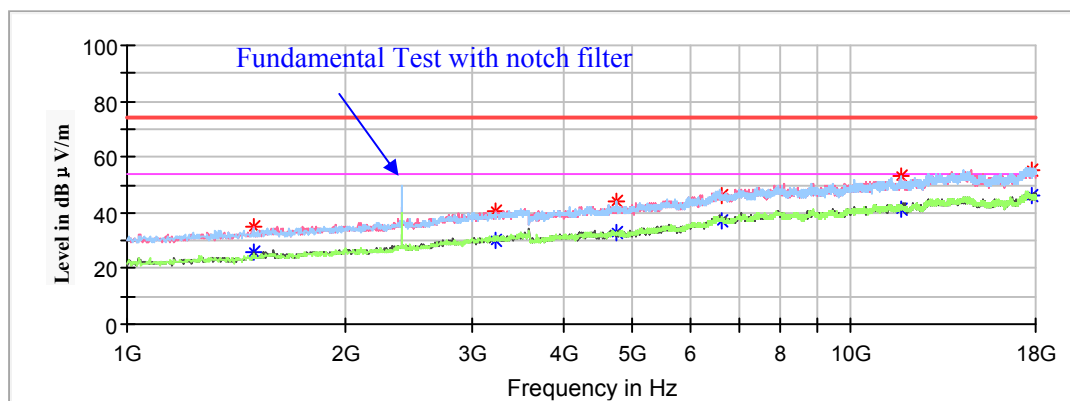
(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
 Corrected Amplitude (dB μ V /m) = Corrected Factor (dB/m) + Reading (dB μ V)
 Margin (dB) = Limit (dB μ V/m) – Corrected Amplitude (dB μ V /m)

Low Channel: 2402MHz

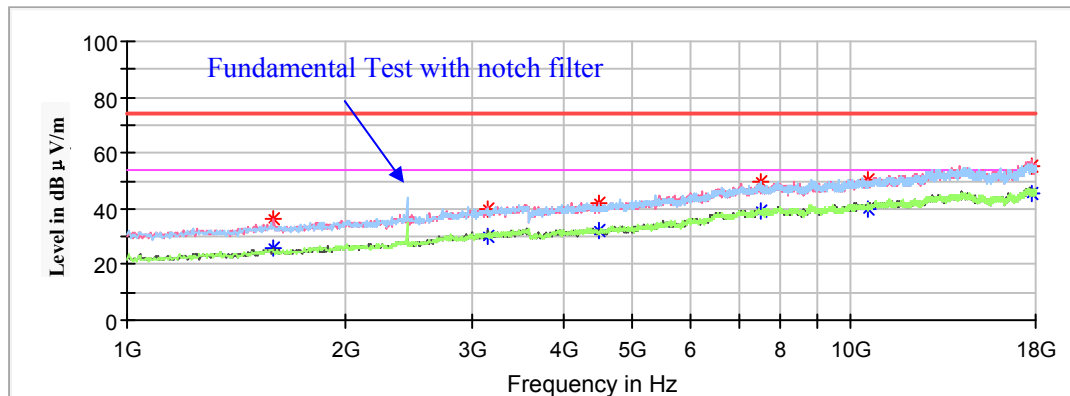
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V /m)	Average (dB μ V /m)	Height (cm)	Polar (H/V)				
1493.00	---	25.91	200.0	V	269.0	-10.0	54.00	28.09
1493.00	35.17	---	200.0	V	269.0	-10.0	74.00	38.83
3237.20	---	29.83	150.0	V	311.0	-4.0	54.00	24.17
3237.20	40.28	---	150.0	V	311.0	-4.0	74.00	33.72
4804.00	---	32.66	150.0	H	141.0	-0.4	54.00	21.34
4804.00	43.81	---	150.0	H	141.0	-0.4	74.00	30.19
6623.60	---	36.92	150.0	H	246.0	4.6	54.00	17.08
6623.60	46.19	---	150.0	H	246.0	4.6	74.00	27.81
11699.80	---	41.32	150.0	H	94.0	9.9	54.00	12.68
11699.80	52.98	---	150.0	H	94.0	9.9	74.00	21.02
17751.80	---	46.20	150.0	V	323.0	13.9	54.00	7.80
17751.80	55.50	---	150.0	V	323.0	13.9	74.00	18.50

Middle Channel: 2440MHz

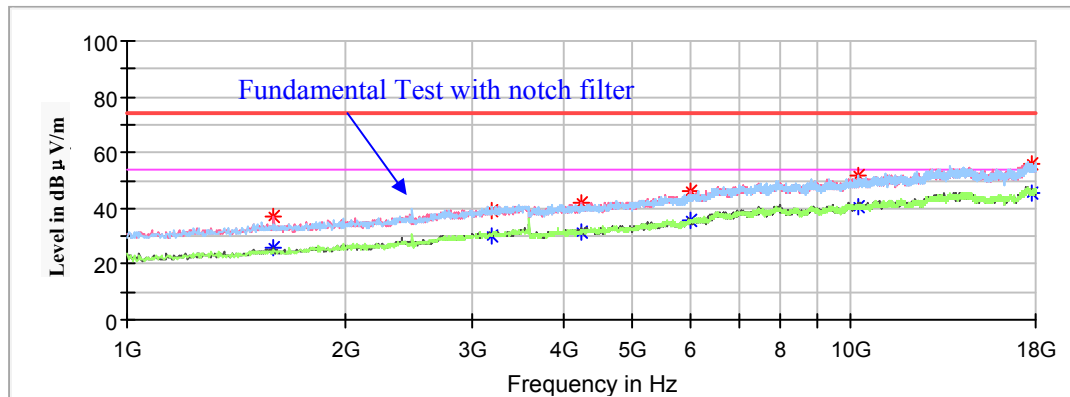
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V /m)	Average (dB μ V /m)	Height (cm)	Polar (H/V)				
1595.00	---	25.68	200.0	V	0.0	-9.6	54.00	28.32
1595.00	36.04	---	200.0	V	0.0	-9.6	74.00	37.96
3145.40	---	29.92	200.0	H	352.0	-4.1	54.00	24.08
3145.40	39.64	---	200.0	H	352.0	-4.1	74.00	34.36
4478.20	---	31.83	200.0	V	223.0	-1.0	54.00	22.17
4478.20	42.25	---	200.0	V	223.0	-1.0	74.00	31.75
7320.00	---	39.04	200.0	H	273.0	6.1	54.00	14.96
7320.00	49.81	---	200.0	H	273.0	6.1	74.00	24.19
10543.80	---	40.13	200.0	V	271.0	9.0	54.00	13.87
10543.80	50.25	---	200.0	V	271.0	9.0	74.00	23.75
17758.60	---	45.62	150.0	H	0.0	13.9	54.00	8.38
17758.60	55.44	---	150.0	H	0.0	13.9	74.00	18.56

High Channel: 2480MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V /m)	Average (dB μ V /m)	Height (cm)	Polar (H/V)				
1595.00	---	25.74	200.0	V	347.0	-9.6	54.00	28.26
1595.00	37.11	---	200.0	V	347.0	-9.6	74.00	36.89
3186.20	---	30.38	150.0	H	0.0	-4.1	54.00	23.62
3186.20	39.27	---	150.0	H	0.0	-4.1	74.00	34.73
4250.40	---	31.68	150.0	V	71.0	-1.4	54.00	22.32
4250.40	41.98	---	150.0	V	71.0	-1.4	74.00	32.02
6018.40	---	35.89	200.0	V	47.0	2.4	54.00	18.11
6018.40	46.13	---	200.0	V	47.0	2.4	74.00	27.87
10241.20	---	40.90	150.0	H	200.0	8.6	54.00	13.10
10241.20	52.05	---	150.0	H	200.0	8.6	74.00	21.95
17802.80	---	45.35	200.0	H	77.0	13.8	54.00	8.65
17802.80	56.21	---	200.0	H	77.0	13.8	74.00	17.79

ANT 3

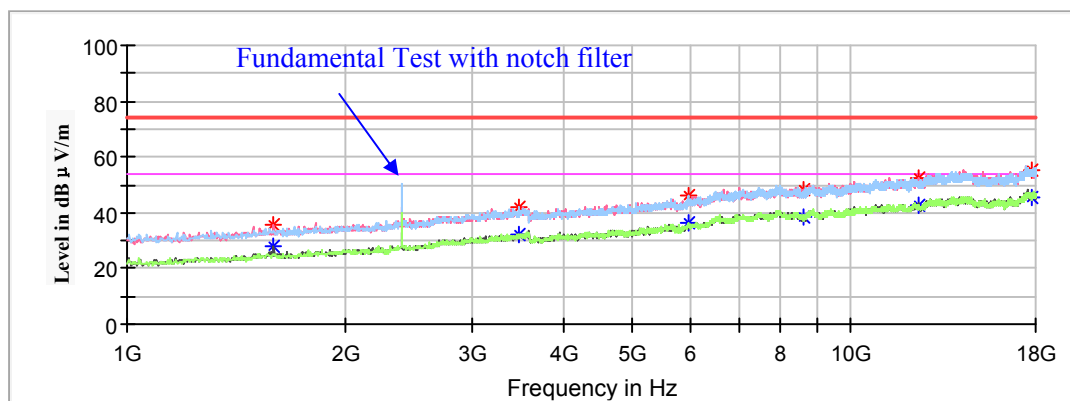
(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
 Corrected Amplitude (dBμV /m) = Corrected Factor (dB/m) + Reading (dBμV)
 Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV /m)

Low Channel: 2402MHz

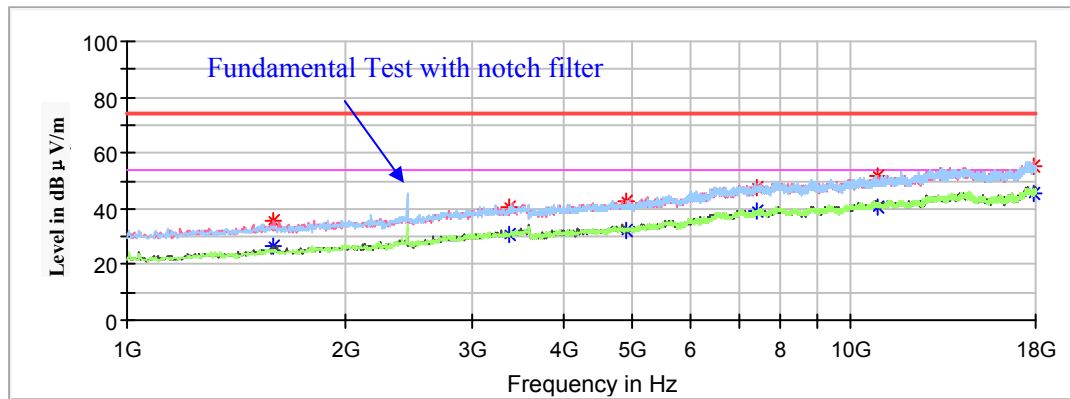
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1595.00	---	27.64	200.0	V	198.0	-9.6	54.00	26.36
1595.00	35.97	---	200.0	V	198.0	-9.6	74.00	38.03
3482.00	---	31.85	150.0	H	339.0	-3.6	54.00	22.15
3482.00	41.95	---	150.0	H	339.0	-3.6	74.00	32.05
5950.40	---	36.24	150.0	H	117.0	2.2	54.00	17.76
5950.40	46.02	---	150.0	H	117.0	2.2	74.00	27.98
8612.60	---	38.13	200.0	V	0.0	6.6	54.00	15.87
8612.60	48.32	---	200.0	V	0.0	6.6	74.00	25.68
12376.40	---	42.31	200.0	V	198.0	10.3	54.00	11.69
12376.40	52.14	---	200.0	V	198.0	10.3	74.00	21.86
17830.00	---	45.65	150.0	H	187.0	13.8	54.00	8.35
17830.00	55.12	---	150.0	H	187.0	13.8	74.00	18.88

Middle Channel: 2440MHz

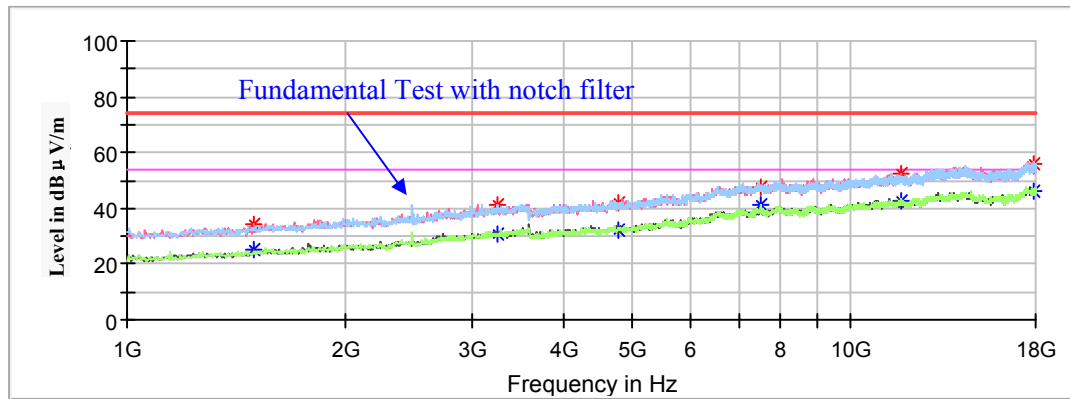
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V /m)	Average (dB μ V /m)	Height (cm)	Polar (H/V)				
1595.00	---	26.32	150.0	V	0.0	-9.6	54.00	27.68
1595.00	35.66	---	150.0	V	0.0	-9.6	74.00	38.34
3366.40	---	30.58	200.0	H	266.0	-3.8	54.00	23.42
3366.40	40.60	---	200.0	H	266.0	-3.8	74.00	33.40
4880.00	---	31.98	150.0	V	299.0	-0.6	54.00	22.02
4880.00	42.45	---	150.0	V	299.0	-0.6	74.00	31.55
7320.00	---	38.82	200.0	V	172.0	6.1	54.00	15.18
7320.00	47.64	---	200.0	V	172.0	6.1	74.00	26.36
10873.60	---	40.90	150.0	V	356.0	9.6	54.00	13.10
10873.60	51.91	---	150.0	V	356.0	9.6	74.00	22.09
17925.20	---	45.80	200.0	H	161.0	13.6	54.00	8.20
17925.20	55.58	---	200.0	H	161.0	13.6	74.00	18.42

High Channel: 2480MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V /m)	Average (dB μ V /m)	Height (cm)	Polar (H/V)				
1496.40	---	24.93	150.0	V	271.0	-9.9	54.00	29.07
1496.40	34.25	---	150.0	V	271.0	-9.9	74.00	39.75
3244.00	---	30.80	200.0	H	108.0	-4.0	54.00	23.20
3244.00	41.42	---	200.0	H	108.0	-4.0	74.00	32.58
4960.00	---	31.89	200.0	V	71.0	-0.5	54.00	22.11
4960.00	42.16	---	200.0	V	71.0	-0.5	74.00	31.84
7440.00	---	40.91	150.0	V	18.0	6.0	54.00	13.09
7440.00	47.70	---	150.0	V	18.0	6.0	74.00	26.30
11737.20	---	42.38	150.0	V	65.0	9.9	54.00	11.62
11737.20	52.49	---	150.0	V	65.0	9.9	74.00	21.51
17925.20	---	46.09	200.0	H	318.0	13.6	54.00	7.91
17925.20	55.87	---	200.0	H	318.0	13.6	74.00	18.13

ANT 4

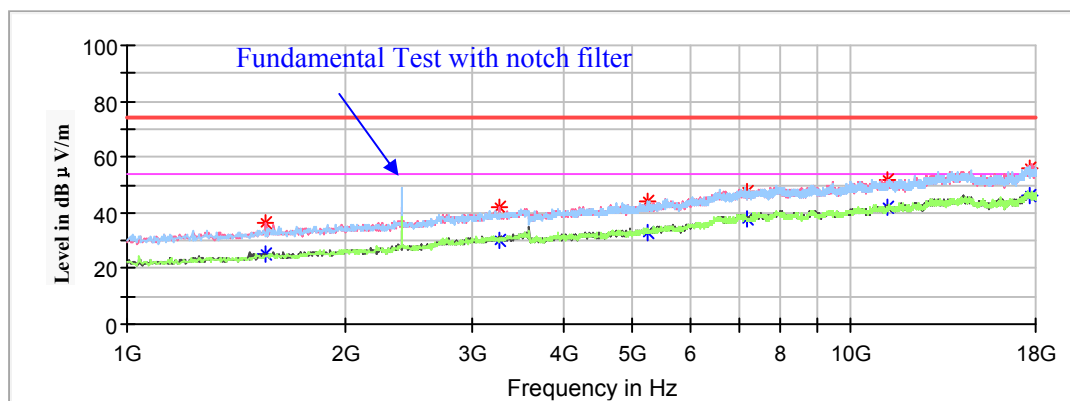
(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
 Corrected Amplitude (dB μ V /m) = Corrected Factor (dB/m) + Reading (dB μ V)
 Margin (dB) = Limit (dB μ V/m) – Corrected Amplitude (dB μ V /m)

Low Channel: 2402MHz

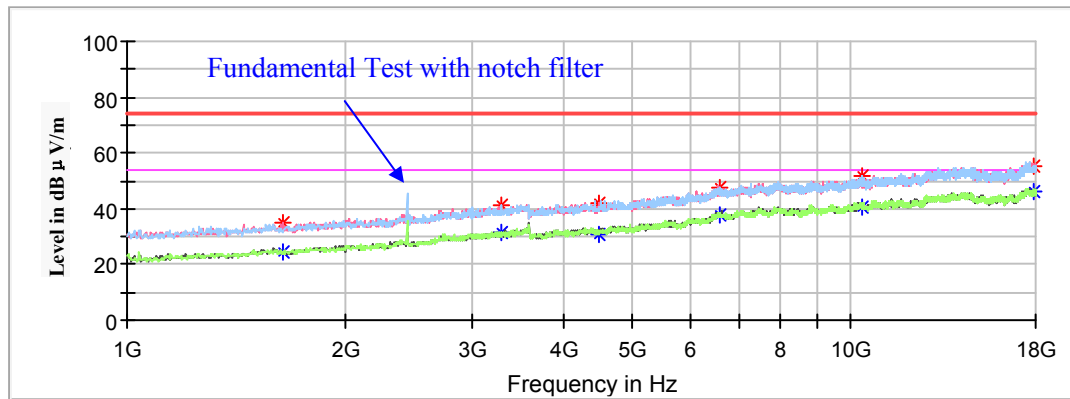
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V /m)	Average (dB μ V /m)	Height (cm)	Polar (H/V)				
1557.60	---	25.40	150.0	V	297.0	-9.7	54.00	28.60
1557.60	36.51	---	150.0	V	297.0	-9.7	74.00	37.49
3274.60	---	29.83	150.0	V	227.0	-3.9	54.00	24.17
3274.60	41.68	---	150.0	V	227.0	-3.9	74.00	32.32
5226.20	---	33.04	200.0	H	33.0	0.5	54.00	20.96
5226.20	43.92	---	200.0	H	33.0	0.5	74.00	30.08
7206.00	---	38.10	200.0	H	200.0	5.9	54.00	15.90
7206.00	47.25	---	200.0	H	200.0	5.9	74.00	26.75
11234.00	---	42.06	150.0	V	273.0	9.8	54.00	11.94
11234.00	51.76	---	150.0	V	273.0	9.8	74.00	22.24
17717.80	---	46.03	200.0	H	177.0	13.9	54.00	7.97
17717.80	55.64	---	200.0	H	177.0	13.9	74.00	18.36

Middle Channel: 2440MHz

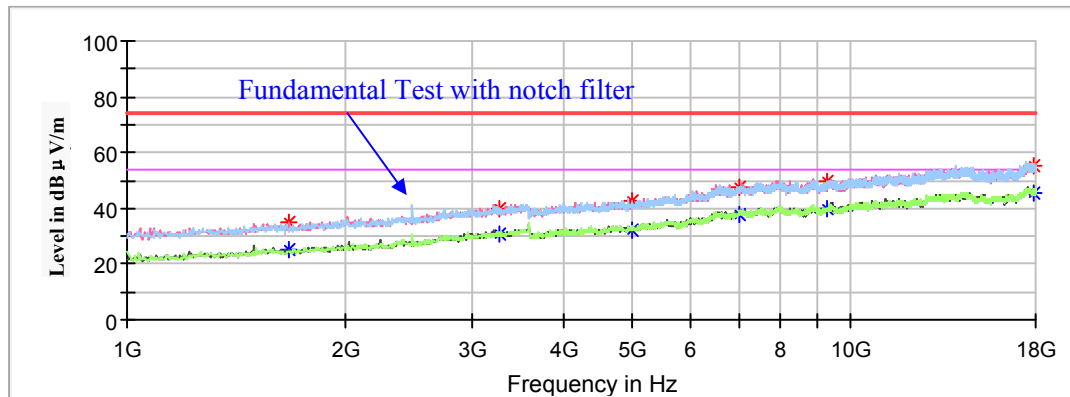
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V /m)	Average (dB μ V /m)	Height (cm)	Polar (H/V)				
1642.60	---	24.76	200.0	V	23.0	-9.4	54.00	29.24
1642.60	34.84	---	200.0	V	23.0	-9.4	74.00	39.16
3295.00	---	31.47	150.0	H	152.0	-3.9	54.00	22.53
3295.00	41.14	---	150.0	H	152.0	-3.9	74.00	32.86
4495.20	---	31.10	150.0	V	90.0	-1.0	54.00	22.90
4495.20	41.77	---	150.0	V	90.0	-1.0	74.00	32.23
6579.40	---	37.96	200.0	H	357.0	4.6	54.00	16.04
6579.40	47.44	---	200.0	H	357.0	4.6	74.00	26.56
10360.20	---	40.21	150.0	H	35.0	8.8	54.00	13.79
10360.20	52.00	---	150.0	H	35.0	8.8	74.00	22.00
17908.20	---	46.09	200.0	V	13.0	13.6	54.00	7.91
17908.20	55.54	---	200.0	V	13.0	13.6	74.00	18.46

High Channel: 2480MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V /m)	Average (dB μ V /m)	Height (cm)	Polar (H/V)				
1676.60	---	24.86	150.0	V	353.0	-9.3	54.00	29.14
1676.60	34.75	---	150.0	V	353.0	-9.3	74.00	39.25
3264.40	---	30.83	150.0	H	318.0	-3.9	54.00	23.17
3264.40	39.90	---	150.0	H	318.0	-3.9	74.00	34.10
4960.00	---	32.36	200.0	V	30.0	-0.5	54.00	21.64
4960.00	42.58	---	200.0	V	30.0	-0.5	74.00	31.42
7001.00	---	37.86	200.0	H	144.0	5.3	54.00	16.14
7001.00	47.72	---	200.0	H	144.0	5.3	74.00	26.28
9296.00	---	39.77	150.0	H	30.0	7.7	54.00	14.23
9296.00	49.42	---	150.0	H	30.0	7.7	74.00	24.58
17860.60	---	45.45	200.0	V	9.0	13.7	54.00	8.55
17860.60	55.29	---	200.0	V	9.0	13.7	74.00	18.71

ANT 1, ANT 2, ANT 3 and ANT 4 transmitting simultaneously

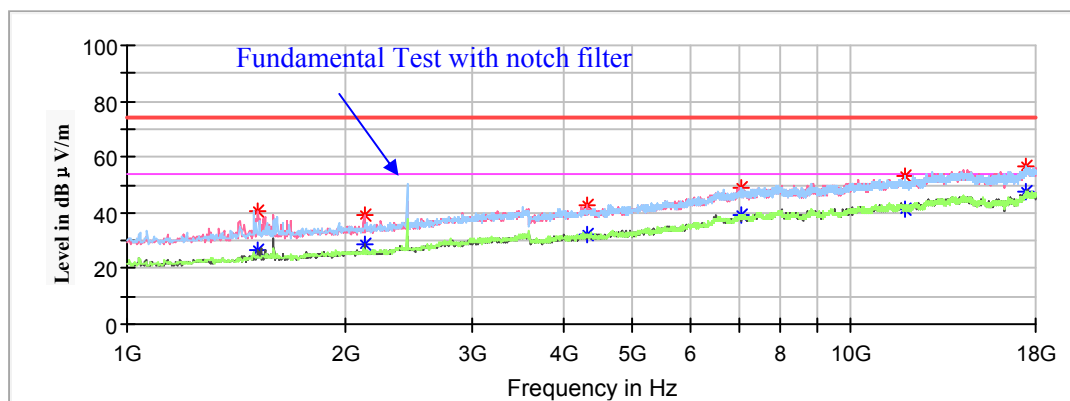
(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
 Corrected Amplitude (dB μ V /m) = Corrected Factor (dB/m) + Reading (dB μ V)
 Margin (dB) = Limit (dB μ V/m) – Corrected Amplitude (dB μ V /m)

Middle Channel: 2440MHz

Full Spectrum



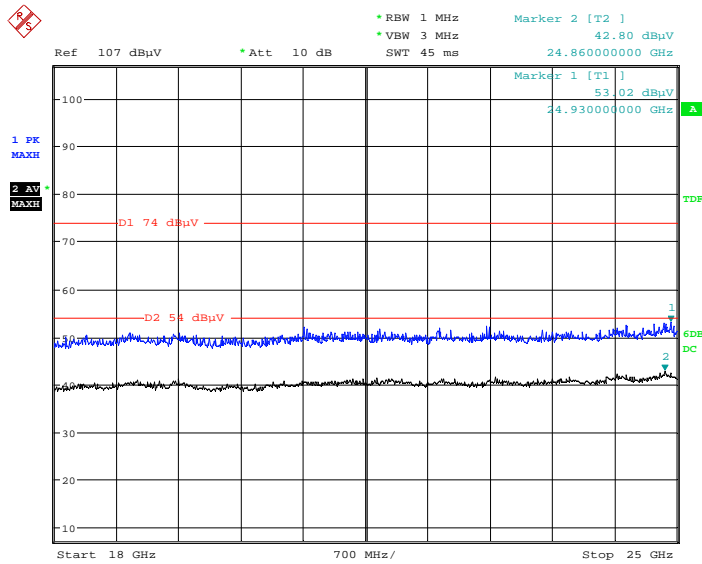
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V /m)	Average (dB μ V /m)	Height (cm)	Polar (H/V)				
1516.80	---	26.73	200.0	V	145.0	-9.9	54.00	27.27
1516.80	40.67	---	200.0	V	145.0	-9.9	74.00	33.33
2125.40	39.21	---	200.0	V	180.0	-7.9	74.00	34.79
2125.40	---	28.50	200.0	V	180.0	-7.9	54.00	25.50
4315.00	---	32.38	150.0	V	295.0	-1.3	54.00	21.62
4315.00	42.75	---	150.0	V	295.0	-1.3	74.00	31.25
7045.20	---	39.06	100.0	H	0.0	5.4	54.00	14.94
7045.20	48.78	---	100.0	H	0.0	5.4	74.00	25.22
11863.00	---	41.48	150.0	H	262.0	10.0	54.00	12.52
11863.00	53.21	---	150.0	H	262.0	10.0	74.00	20.79
17500.20	---	47.59	150.0	H	60.0	14.3	54.00	6.41
17500.20	56.37	---	150.0	H	60.0	14.3	74.00	17.63

18GHz-25GHz

ANT 1

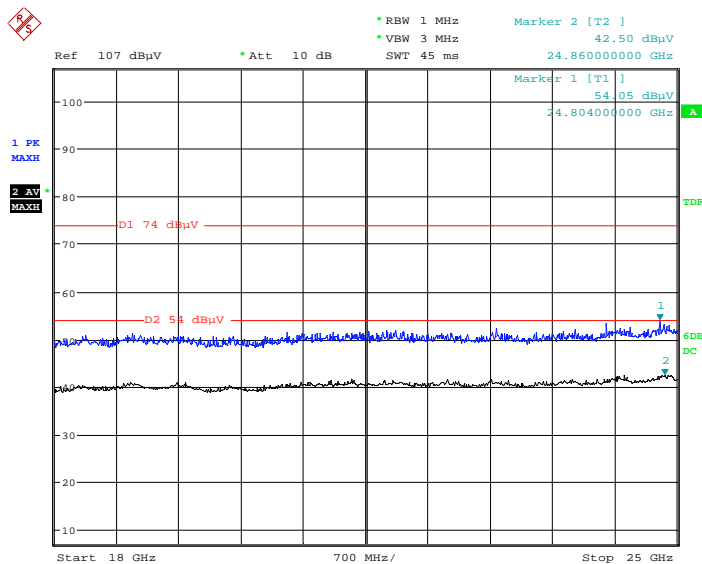
(The worst case **high channel of operation in the Z axis of orientation** was recorded)

Horizontal



Date: 22.SEP.2019 05:58:09

Vertical

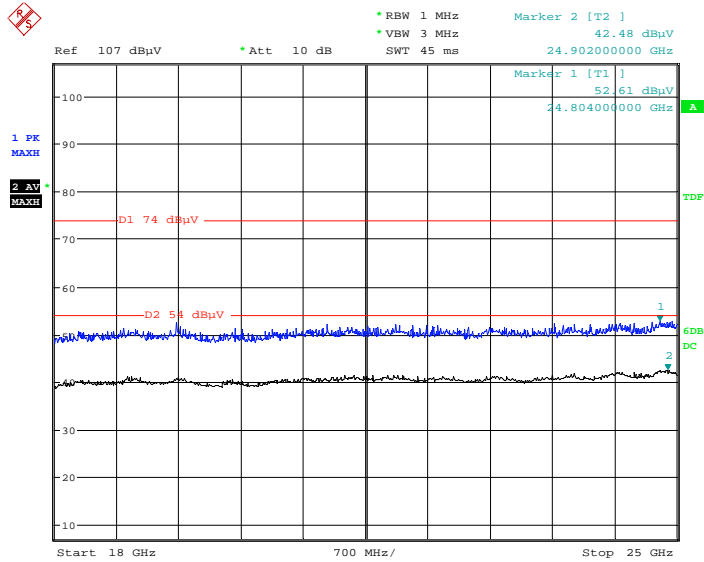


Date: 22.SEP.2019 06:31:11

ANT 2

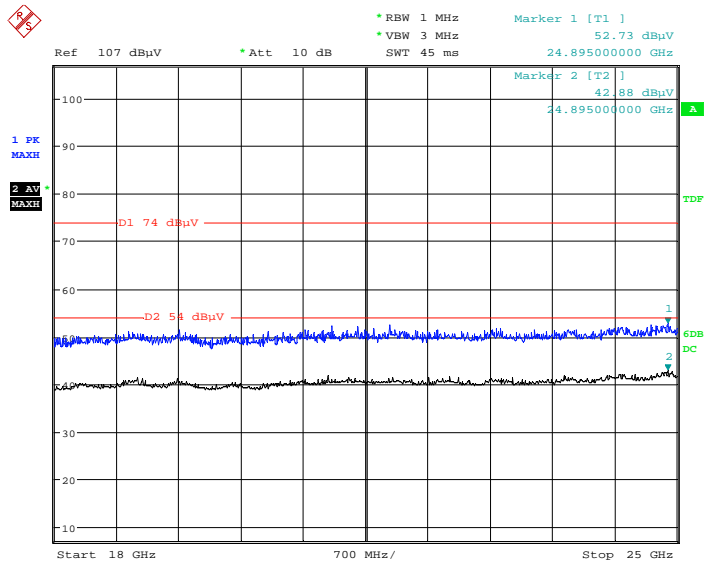
(The worst case *middle channel of operation in the Z axis of orientation* was recorded)

Horizontal



Date: 22.SEP.2019 06:52:47

Vertical

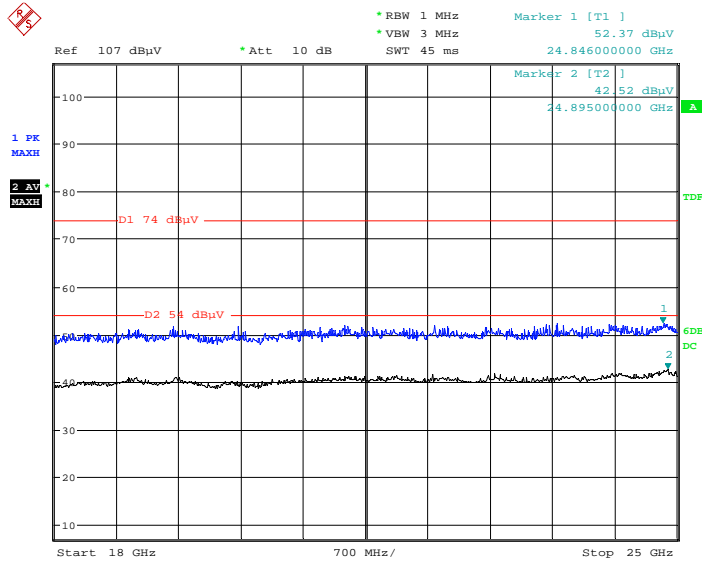


Date: 22.SEP.2019 07:10:42

ANT 3

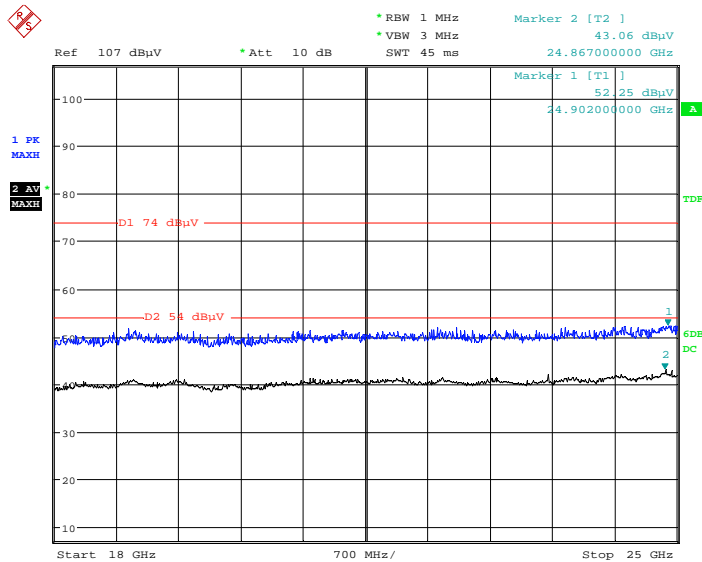
(The worst case **high channel of operation in the Z axis of orientation** was recorded)

Horizontal



Date: 22.SEP.2019 07:31:41

Vertical

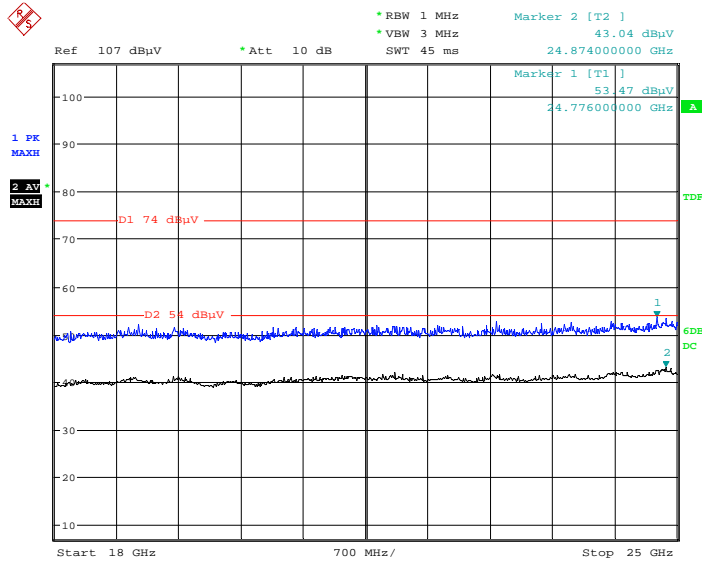


Date: 22.SEP.2019 07:45:36

ANT 4

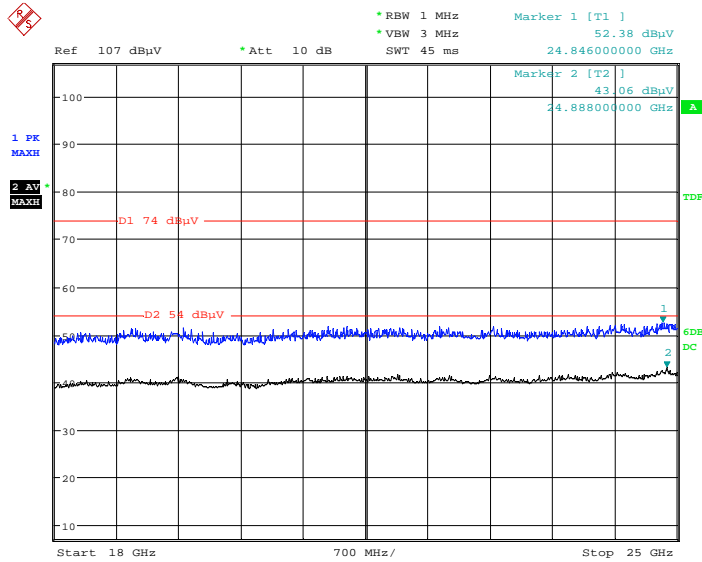
(The worst case **high channel of operation in the Z axis of orientation** was recorded)

Horizontal



Date: 22.SEP.2019 08:06:16

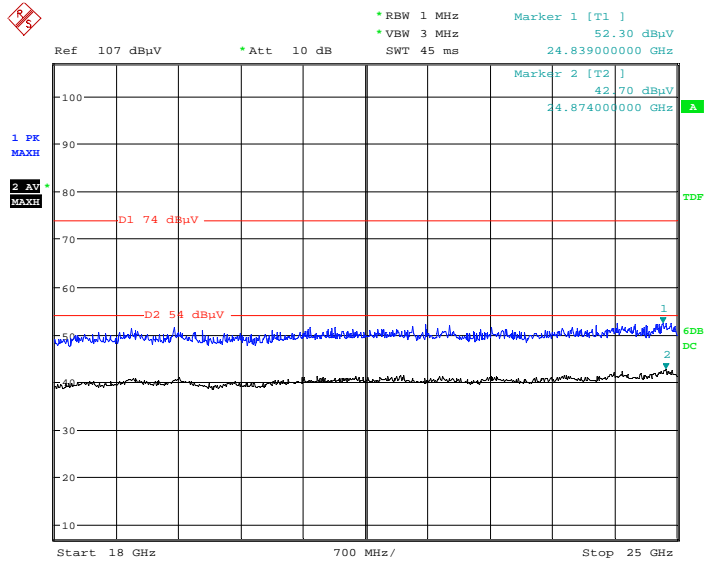
Vertical



Date: 22.SEP.2019 08:27:01

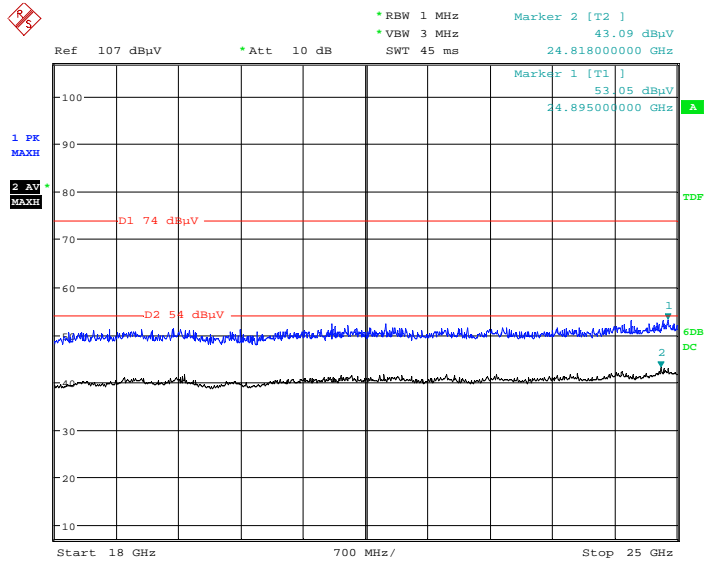
ANT 1, ANT 2, ANT 3 and ANT 4 transmitting simultaneously
(The worst case in the Z axis of orientation was recorded)

Horizontal



Date: 22.SEP.2019 08:47:34

Vertical



Date: 22.SEP.2019 09:15:13

Restricted Bands Emissions Test – ANT 1:*(Pre-scan in the X,Y and Z axes of orientation, the worst case Z-axis of orientation was recorded)*

Note:

1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
 Corrected Amplitude (dB μ V /m) = Corrected Factor (dB/m) + Reading (dB μ V)
 Margin (dB) = Limit (dB μ V/m) – Corrected Amplitude (dB μ V /m)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
Low Channel: 2402MHz								
2390.00	62.10	---	200.0	H	37.0	2.8	74.00	11.90
2390.00	---	40.99	200.0	H	37.0	2.8	54.00	13.01
2390.00	60.89	---	100.0	V	74.0	2.8	74.00	13.11
2390.00	---	38.28	100.0	V	74.0	2.8	54.00	15.72
High Channel: 2480MHz								
2483.50	---	48.13	200.0	H	96.0	3.0	54.00	5.87
2483.50	71.16	---	200.0	H	96.0	3.0	74.00	2.84
2483.50	---	46.33	150.0	V	45.0	3.0	54.00	7.67
2483.50	68.52	---	150.0	V	45.0	3.0	74.00	5.48

Restricted Bands Emissions Test – ANT 2:*(Pre-scan in the X,Y and Z axes of orientation, the worst case Z-axis of orientation was recorded)*

Note:

1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
 Corrected Amplitude (dB μ V /m) = Corrected Factor (dB/m) + Reading (dB μ V)
 Margin (dB) = Limit (dB μ V/m) – Corrected Amplitude (dB μ V /m)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
Low Channel: 2402MHz								
2390.00	63.74	---	200.0	H	74.0	2.8	74.00	10.26
2390.00	---	41.87	200.0	H	74.0	2.8	54.00	12.13
2390.00	61.25	---	100.0	V	115.0	2.8	74.00	12.75
2390.00	---	40.06	100.0	V	115.0	2.8	54.00	13.94
High Channel: 2480MHz								
2483.50	72.79	---	150.0	H	56.0	3.0	74.00	1.21
2483.50	---	49.52	150.0	H	56.0	3.0	54.00	4.48
2483.50	---	47.67	150.0	V	210.0	3.0	54.00	6.33
2483.50	71.16	---	150.0	V	210.0	3.0	74.00	2.84

Restricted Bands Emissions Test – ANT 3:*(Pre-scan in the X,Y and Z axes of orientation, the worst case Z-axis of orientation was recorded)*

Note:

1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
 Corrected Amplitude (dB μ V /m) = Corrected Factor (dB/m) + Reading (dB μ V)
 Margin (dB) = Limit (dB μ V/m) – Corrected Amplitude (dB μ V /m)

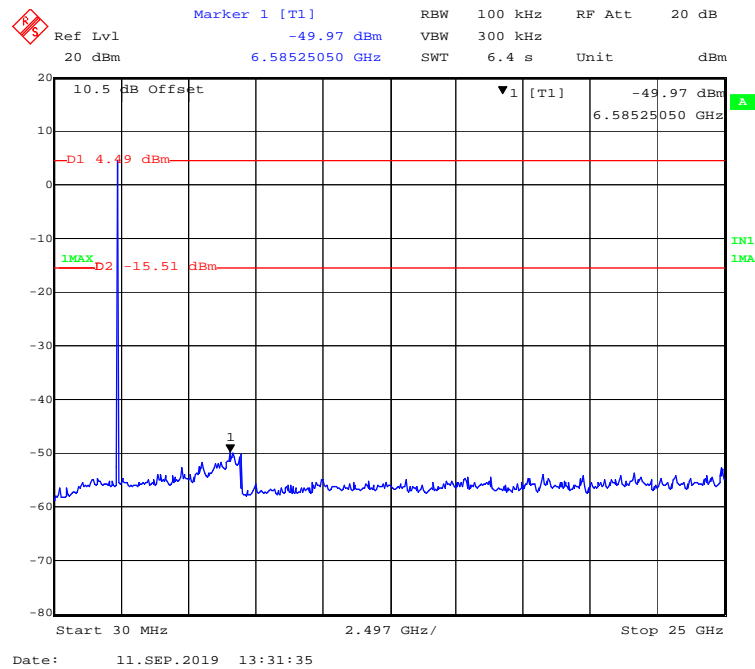
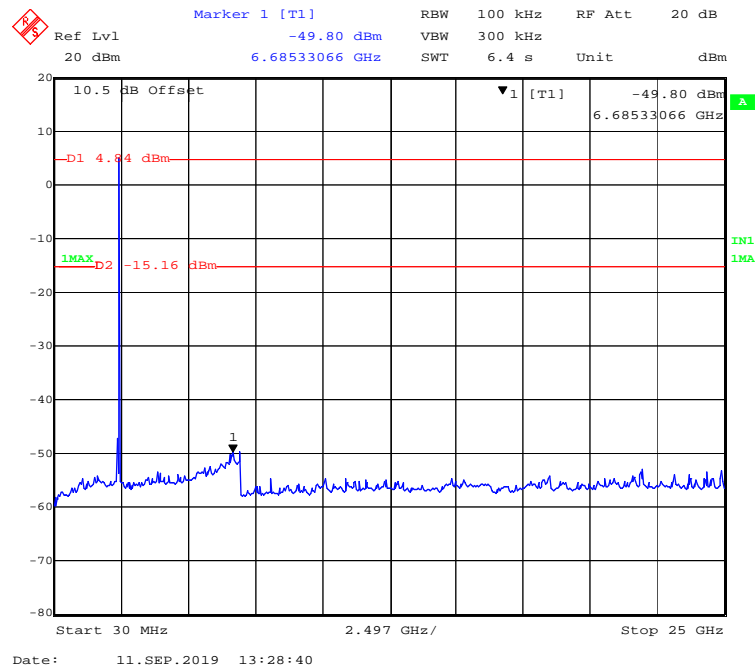
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
Low Channel: 2402MHz								
2390.00	---	41.12	200.0	H	74.0	2.8	54.00	12.88
2390.00	64.27	---	200.0	H	74.0	2.8	74.00	9.73
2390.00	62.81	---	100.0	V	21.0	2.8	74.00	11.19
2390.00	---	39.44	100.0	V	21.0	2.8	54.00	14.56
High Channel: 2480MHz								
2483.50	72.33	---	200.0	H	62.0	3.0	74.00	1.67
2483.50	---	48.64	200.0	H	62.0	3.0	54.00	5.36
2483.50	---	46.58	150.0	V	326.0	3.0	54.00	7.42
2483.50	70.69	---	150.0	V	326.0	3.0	74.00	3.31

Restricted Bands Emissions Test – ANT 4:*(Pre-scan in the X,Y and Z axes of orientation, the worst case Z-axis of orientation was recorded)*

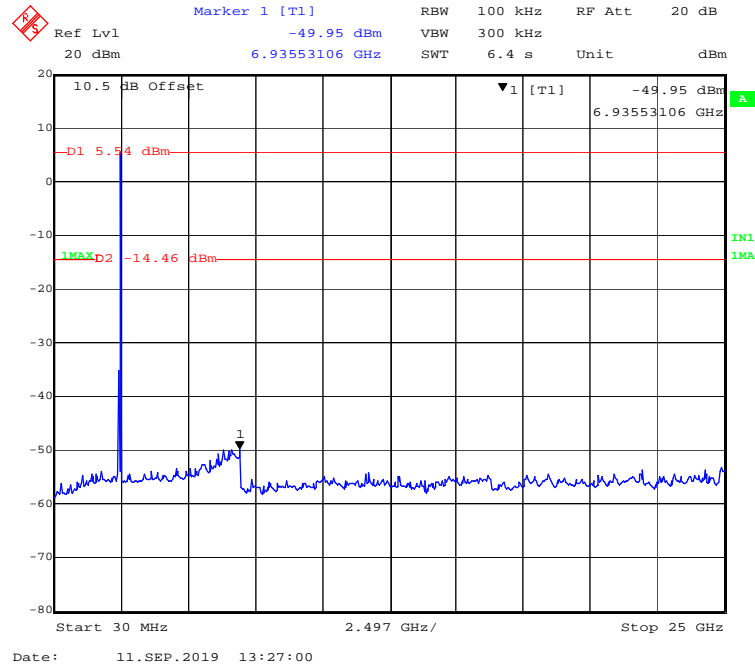
Note:

1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
 Corrected Amplitude (dB μ V /m) = Corrected Factor (dB/m) + Reading (dB μ V)
 Margin (dB) = Limit (dB μ V/m) – Corrected Amplitude (dB μ V /m)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
Low Channel: 2402MHz								
2390.00	63.30	---	200.0	H	68.0	2.8	74.00	10.70
2390.00	---	41.11	200.0	H	68.0	2.8	54.00	12.89
2390.00	61.29	---	100.0	V	53.0	2.8	74.00	12.71
2390.00	---	39.40	100.0	V	53.0	2.8	54.00	14.60
High Channel: 2480MHz								
2483.50	71.48	---	100.0	H	80.0	3.0	74.00	2.52
2483.50	---	48.12	100.0	H	80.0	3.0	54.00	5.88
2483.50	---	46.08	150.0	V	66.0	3.0	54.00	7.92
2483.50	69.64	---	150.0	V	66.0	3.0	74.00	4.36

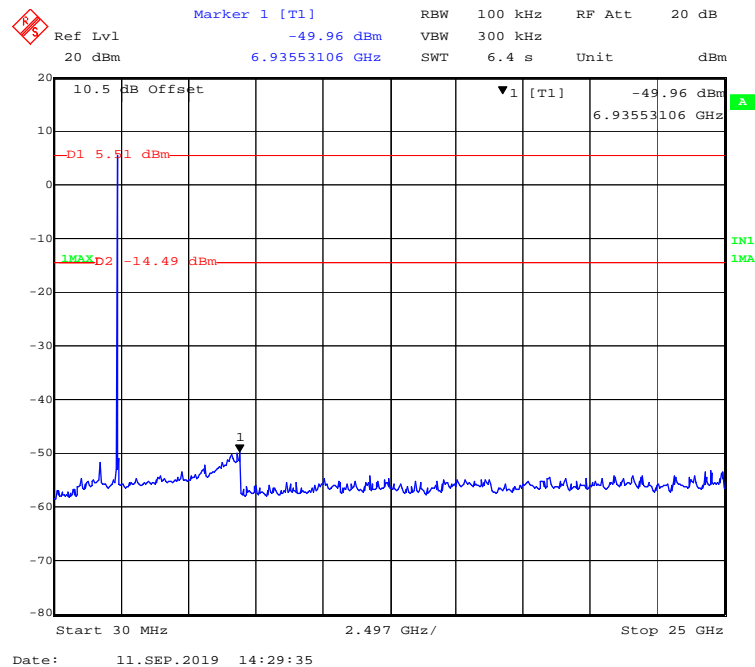
Conducted Spurious Emissions at Antenna Port**ANT 1****Low Channel****Middle Channel**

High Channel

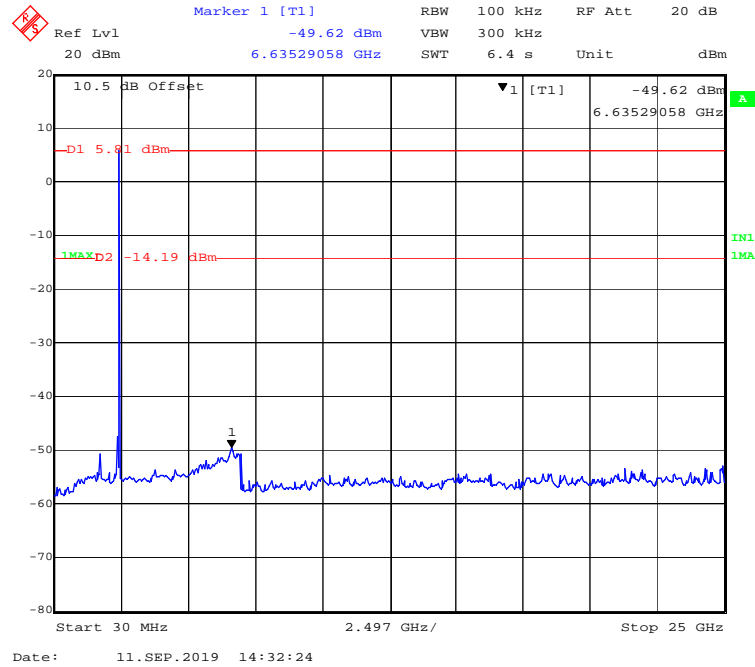


ANT 2

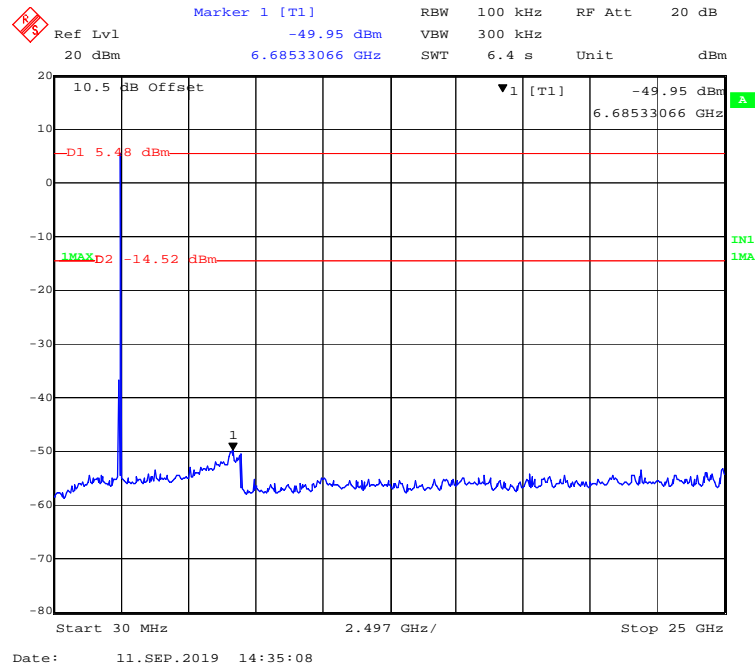
Low Channel



Middle Channel

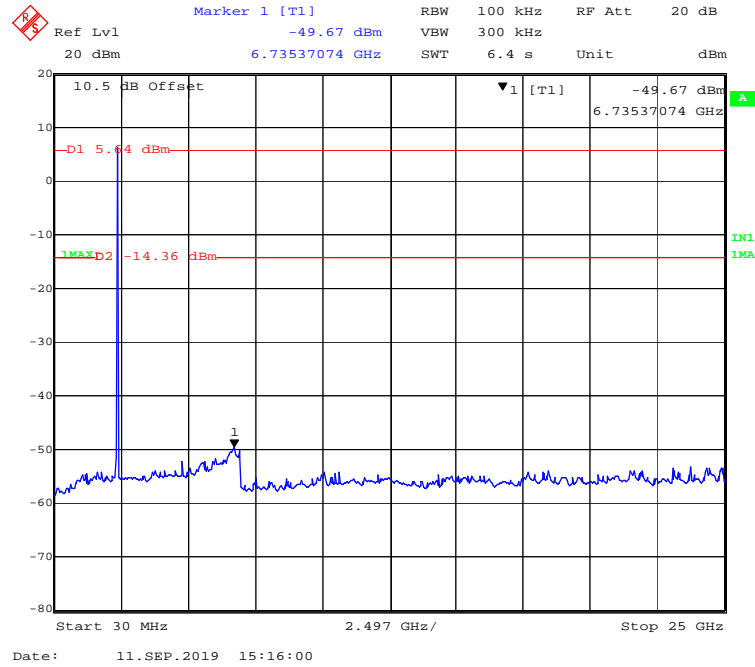


High Channel

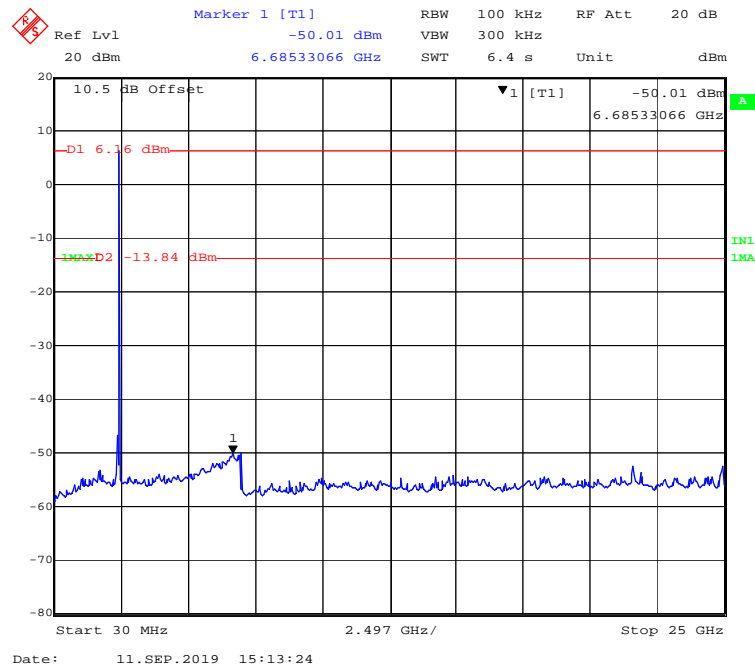


ANT 3

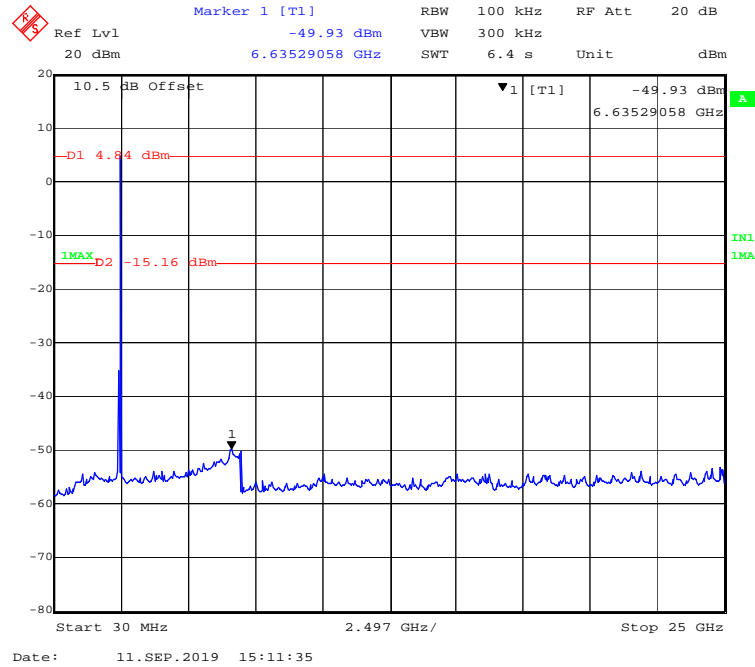
Low Channel



Middle Channel

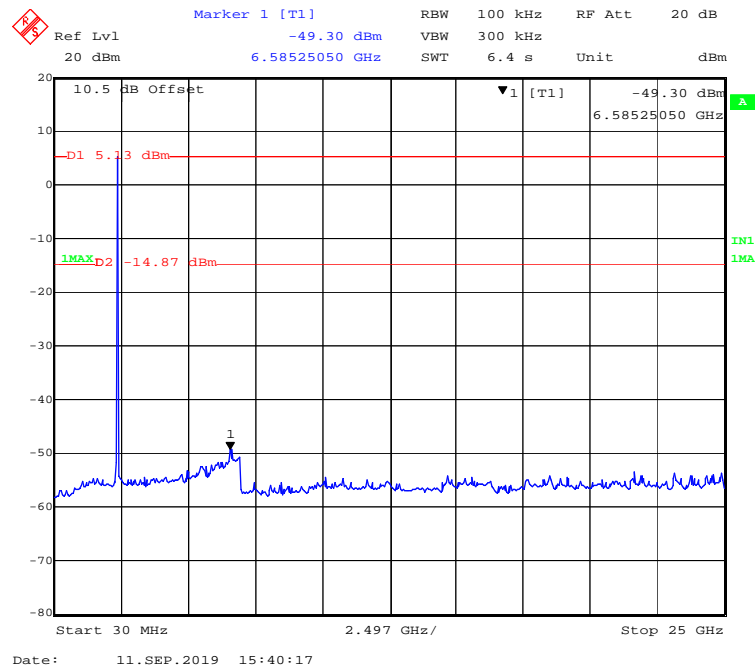


High Channel

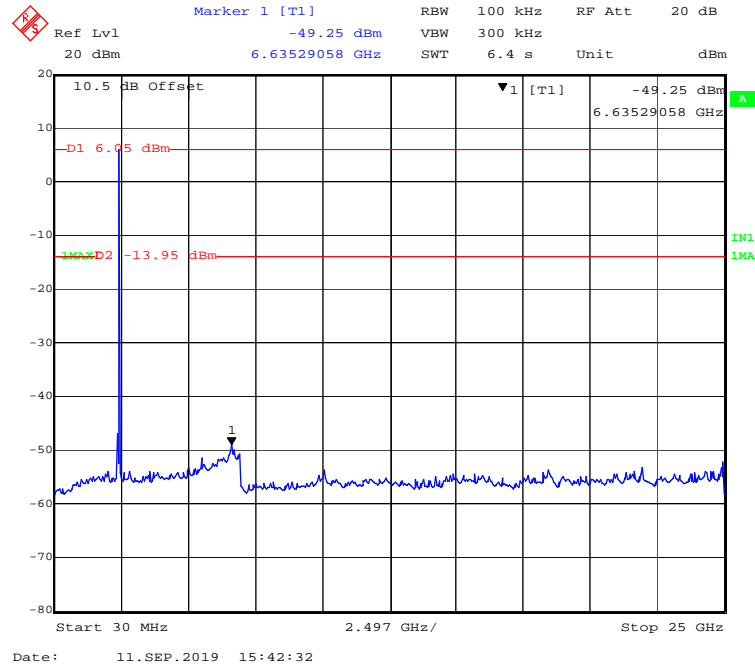


ANT 4

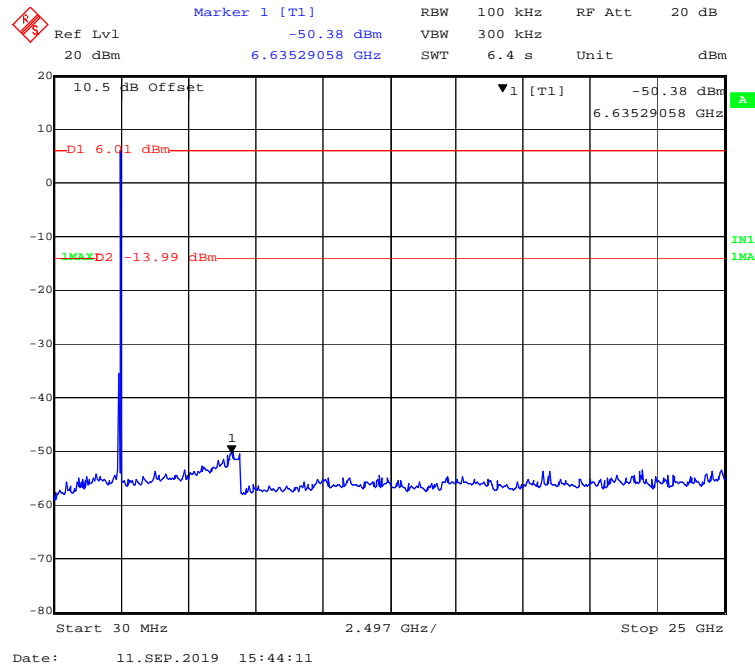
Low Channel



Middle Channel



High Channel



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

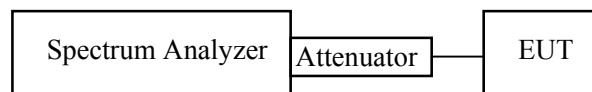
Applicable Standard

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

According to ANSI C63.10-2013 sub-clause 11.8.1

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 * \text{RBW}$.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. 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 Data

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	51 %
ATM Pressure:	101.3 kPa

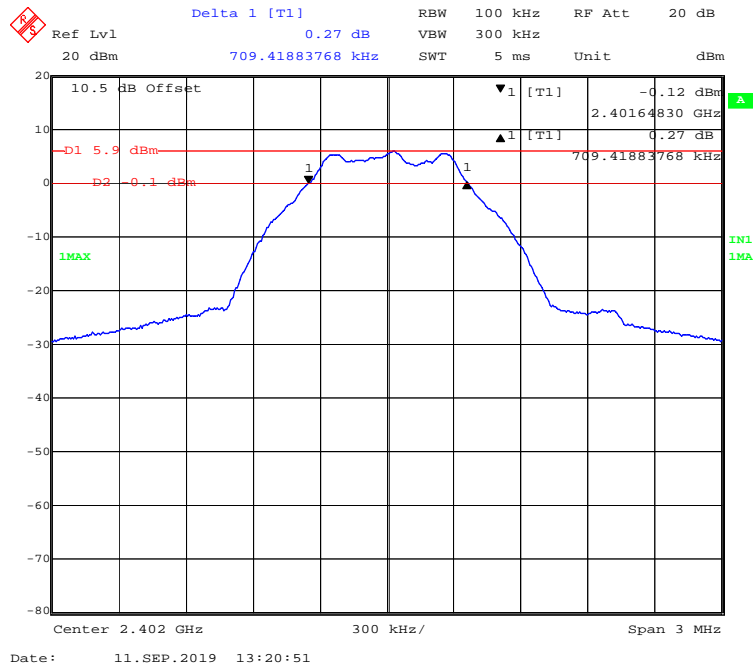
The testing was performed by Andy Liu on 2019-09-11.

EUT operation mode: Transmitting

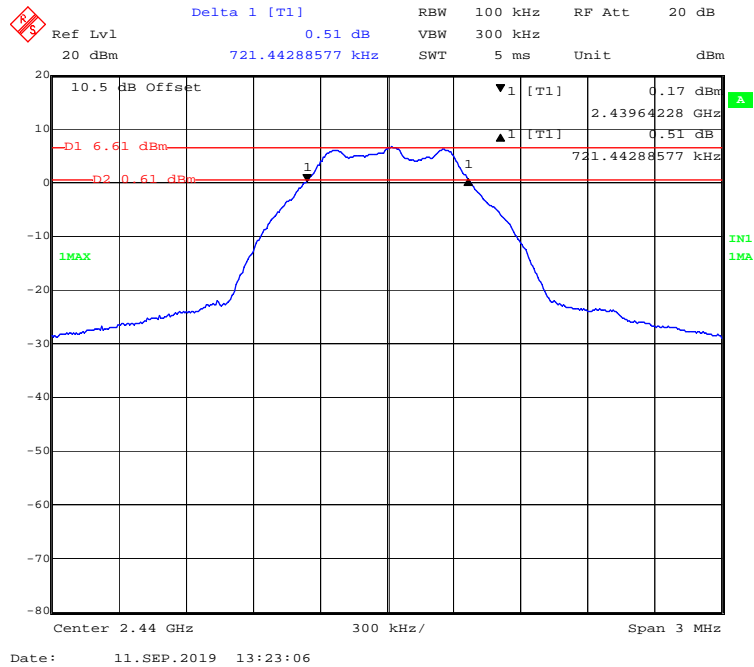
Test Result: Pass

ANT	Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (MHz)
1	Low	2402	0.709	≥ 0.5
	Middle	2440	0.721	≥ 0.5
	High	2480	0.715	≥ 0.5

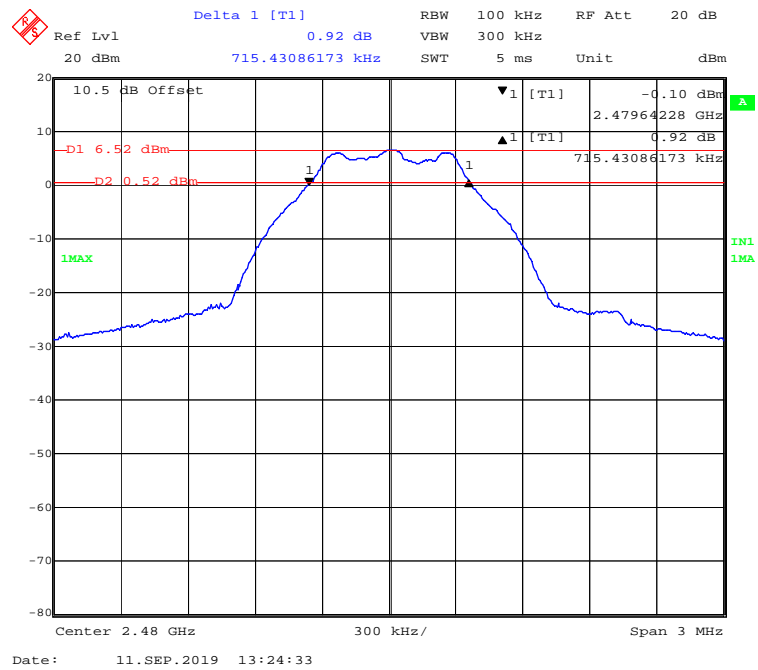
Low Channel



Middle Channel

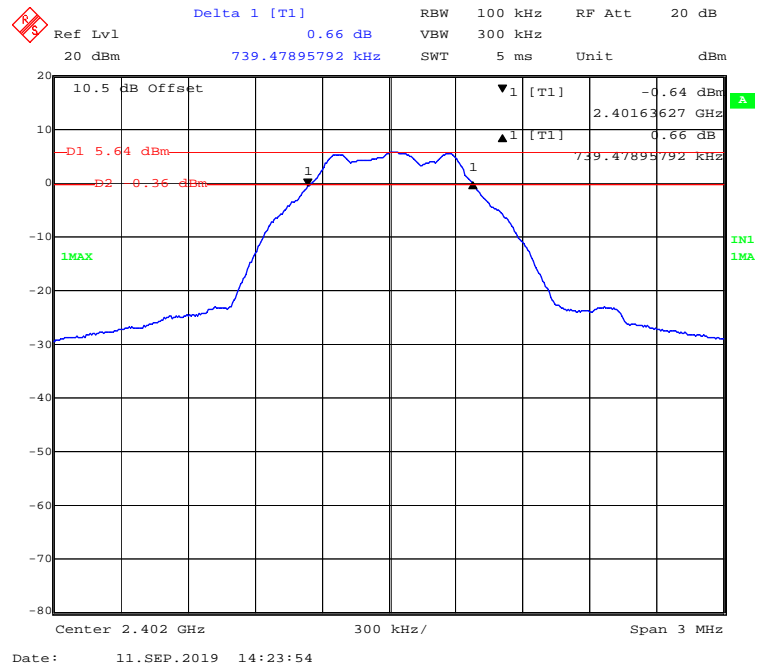


High Channel

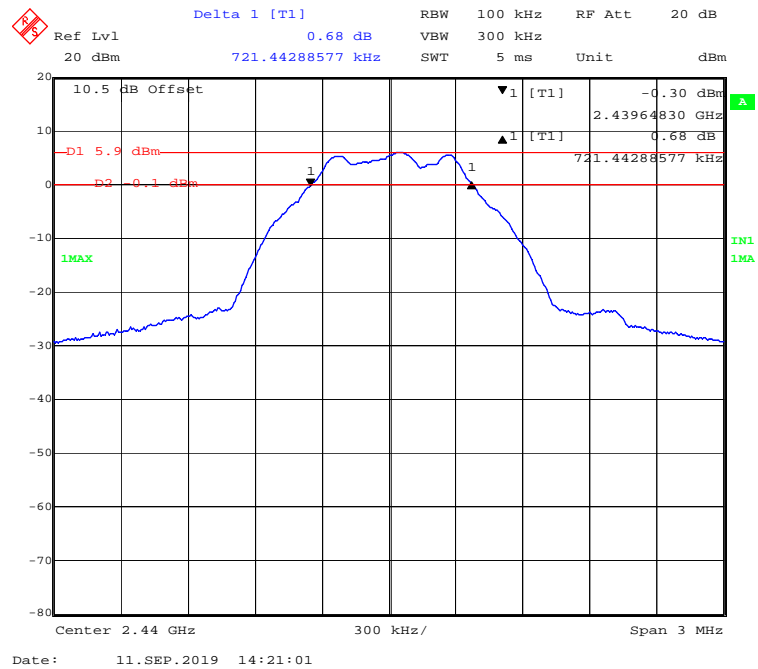


ANT	Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (MHz)
2	Low	2402	0.739	≥ 0.5
	Middle	2440	0.721	≥ 0.5
	High	2480	0.709	≥ 0.5

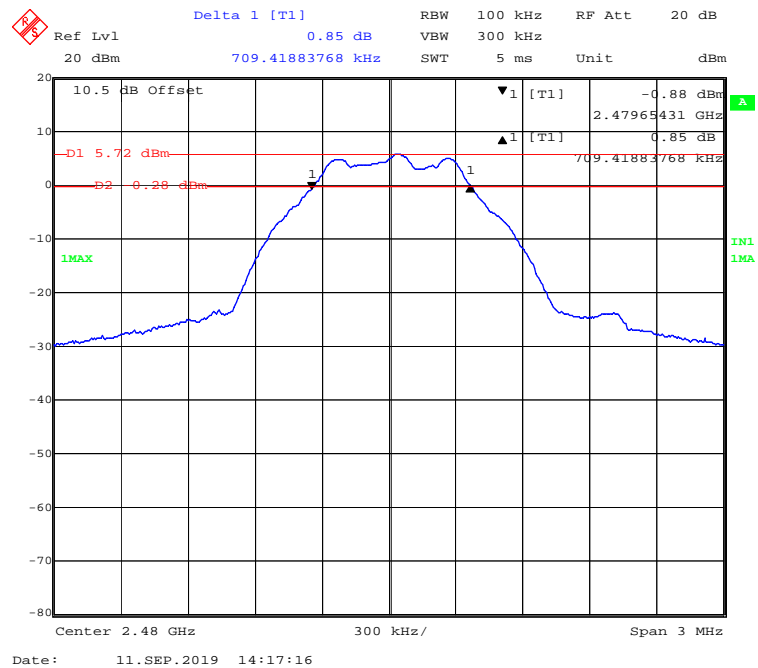
Low Channel



Middle Channel

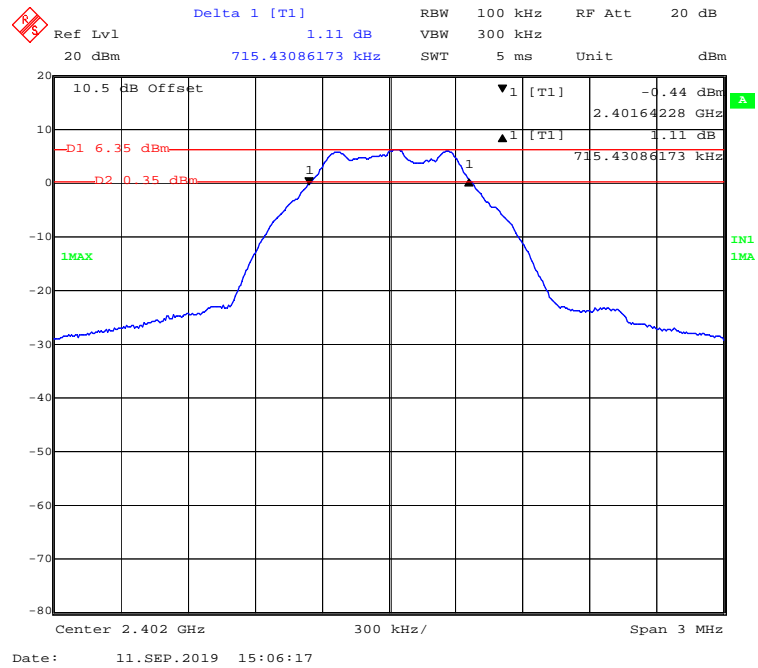


High Channel

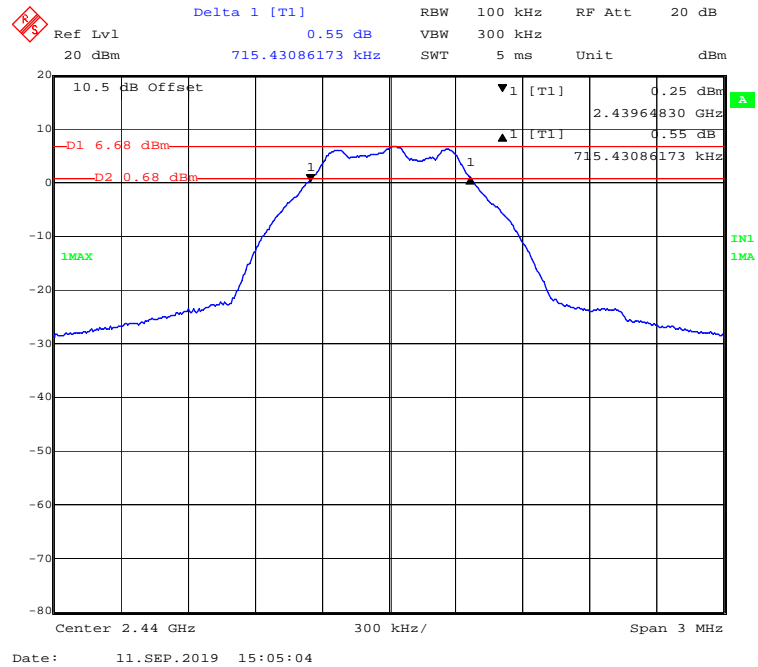


ANT	Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (MHz)
3	Low	2402	0.715	≥ 0.5
	Middle	2440	0.715	≥ 0.5
	High	2480	0.709	≥ 0.5

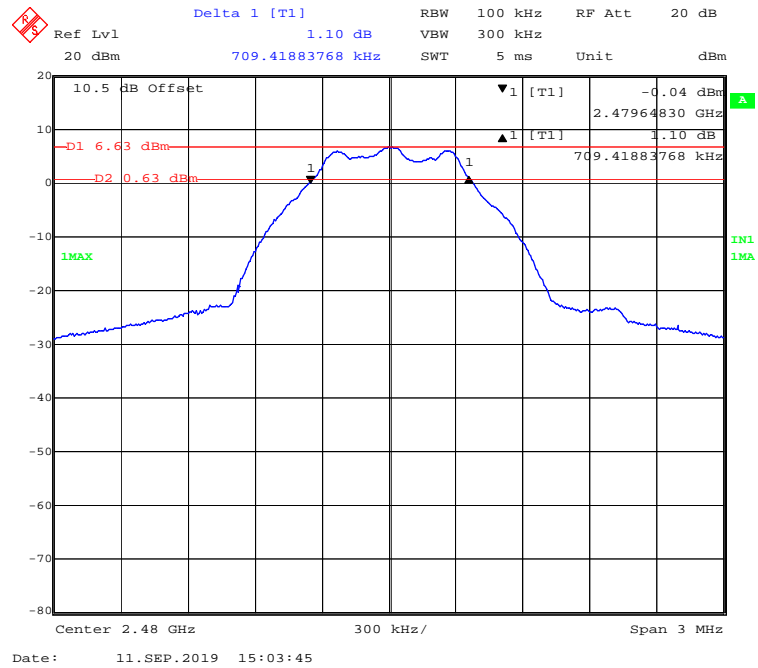
Low Channel



Middle Channel

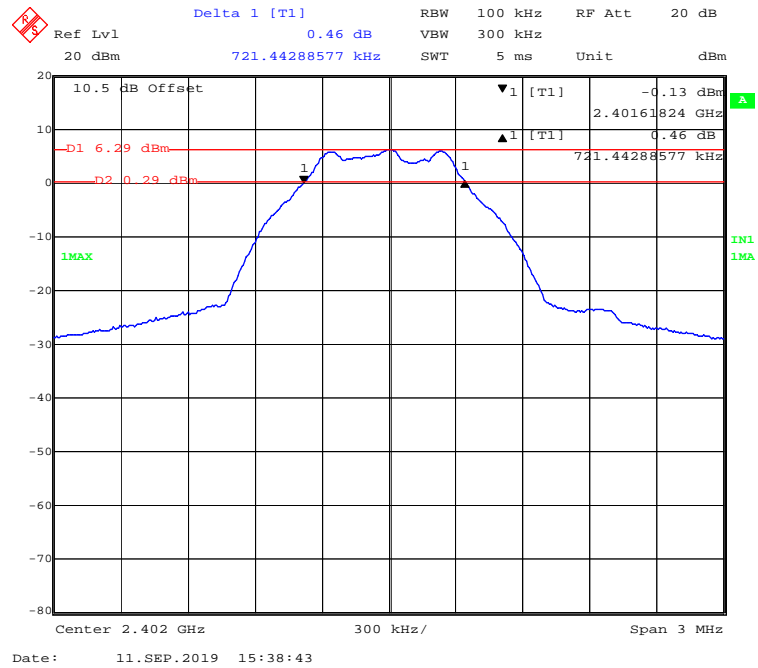


High Channel

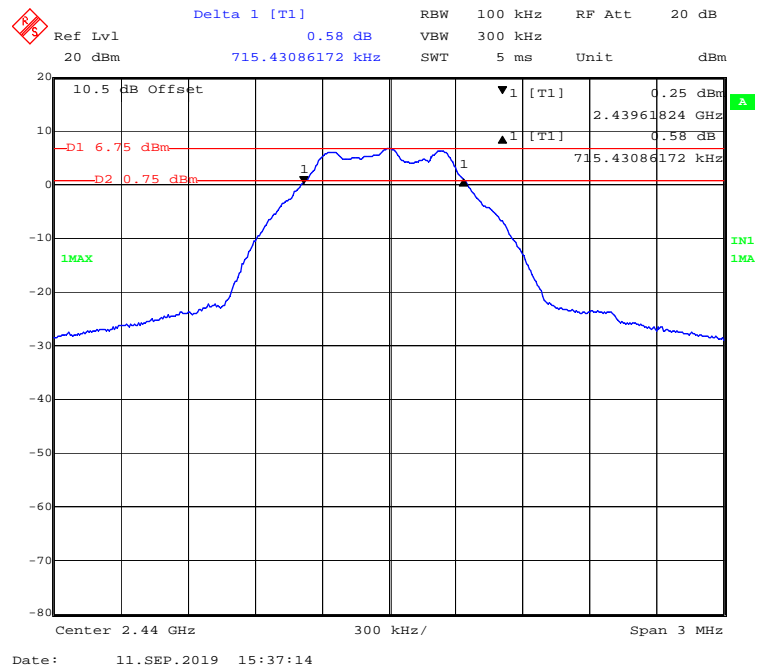


ANT	Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (MHz)
4	Low	2402	0.721	≥ 0.5
	Middle	2440	0.715	≥ 0.5
	High	2480	0.703	≥ 0.5

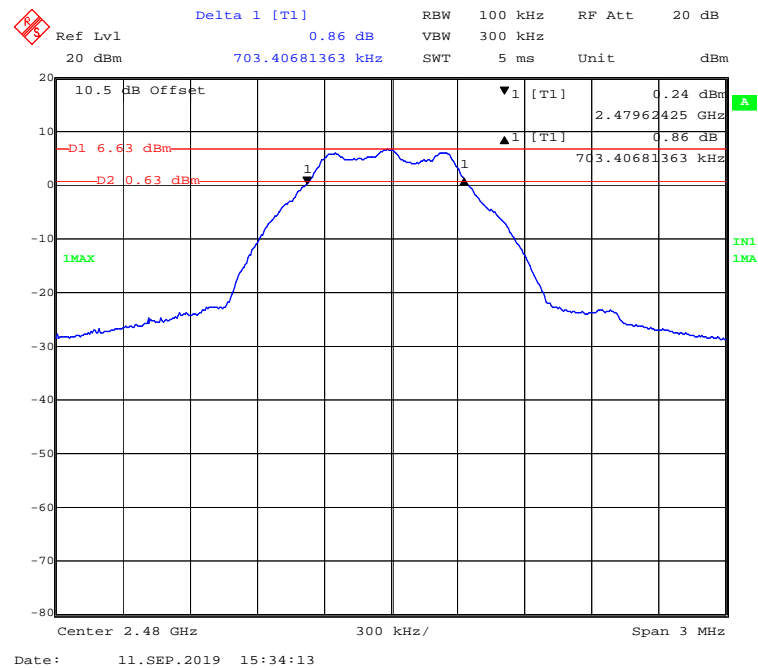
Low Channel



Middle Channel



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, Compliant 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

According to ANSI C63.10-2013 sub-clause 11.9.1.1

1. Set the RBW \geq DTS bandwidth.
2. Set VBW $\geq 3 \times$ RBW.
3. Set span $\geq 3 \times$ RBW
4. Sweep time = auto couple.
5. Detector = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use peak marker function to determine the peak amplitude level.



Test Data

Environmental Conditions

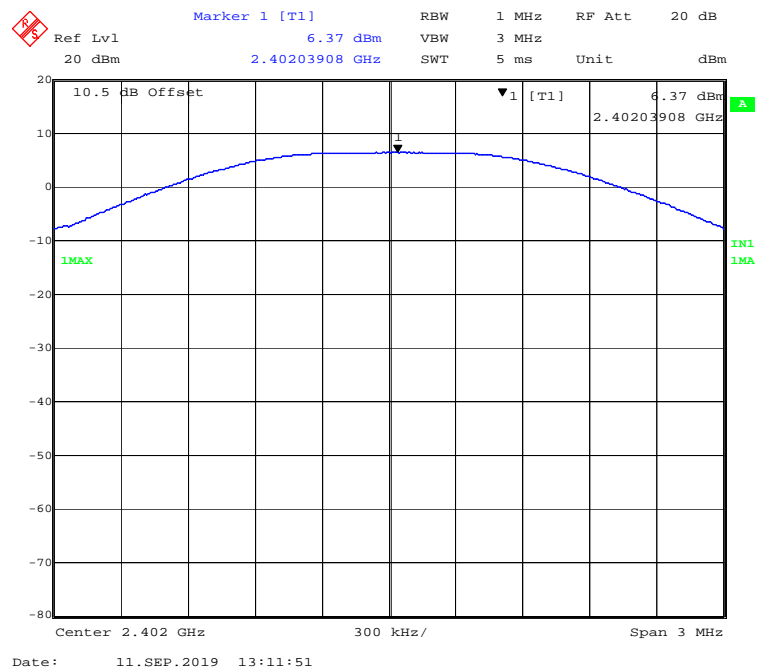
Temperature:	23.8°C
Relative Humidity:	54 %
ATM Pressure:	101.2 kPa

The testing was performed by Andy Liu on 2019-09-11.

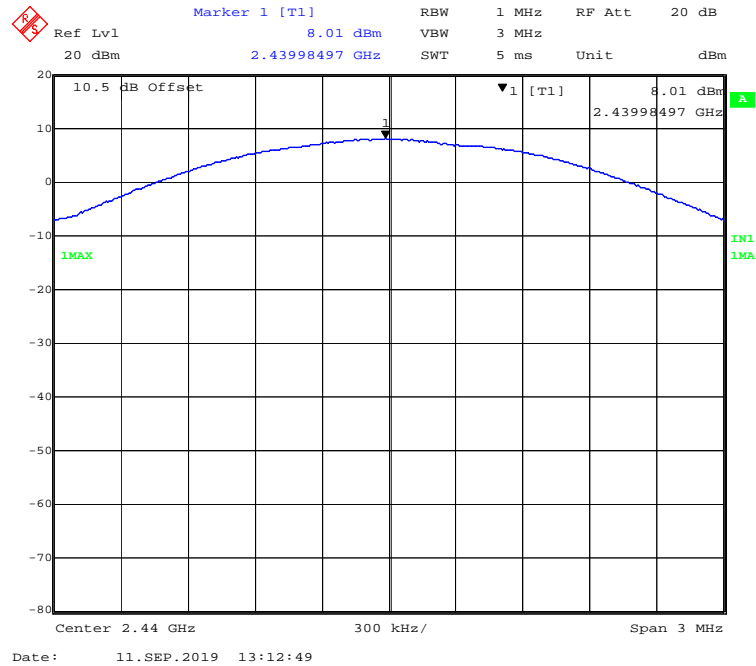
EUT operation mode: Transmitting

ANT	Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Limit (dBm)	Result
1	Low	2402	6.37	30	Pass
	Middle	2440	8.01	30	Pass
	High	2480	8.70	30	Pass

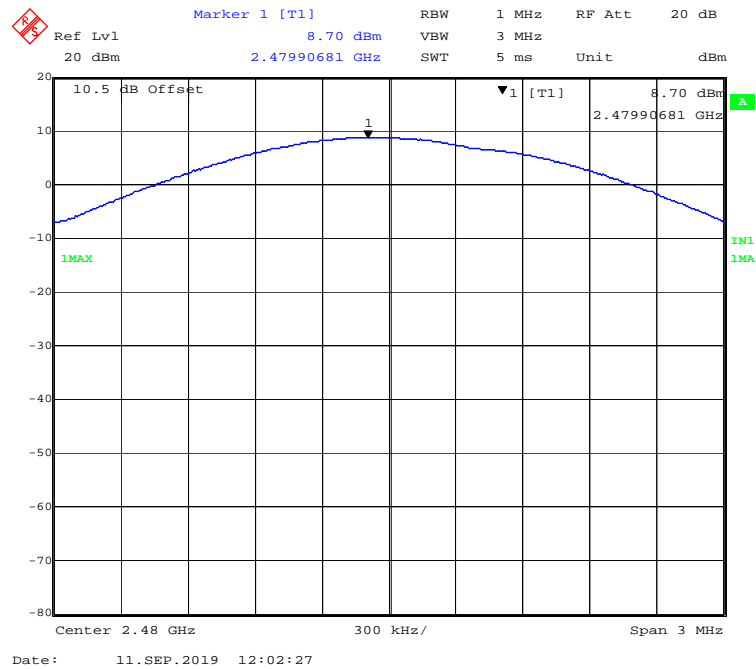
Low Channel



Middle Channel

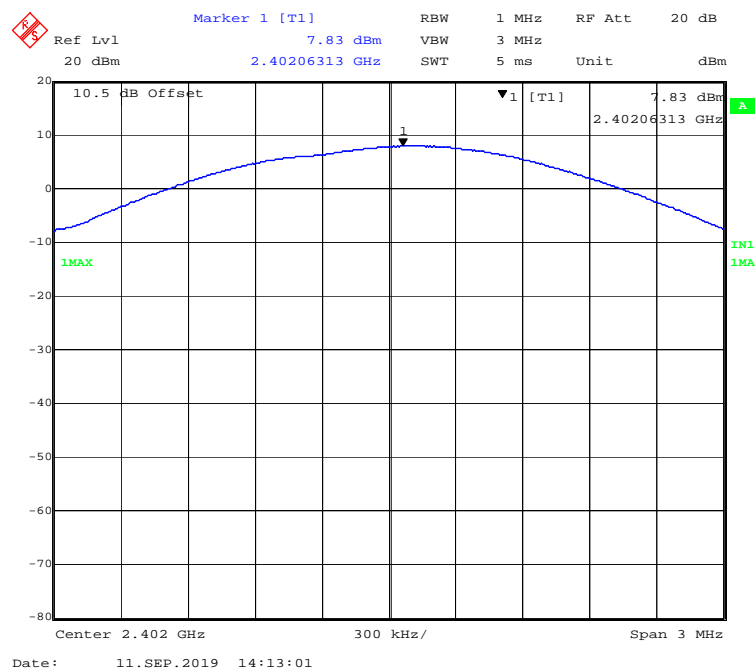


High Channel

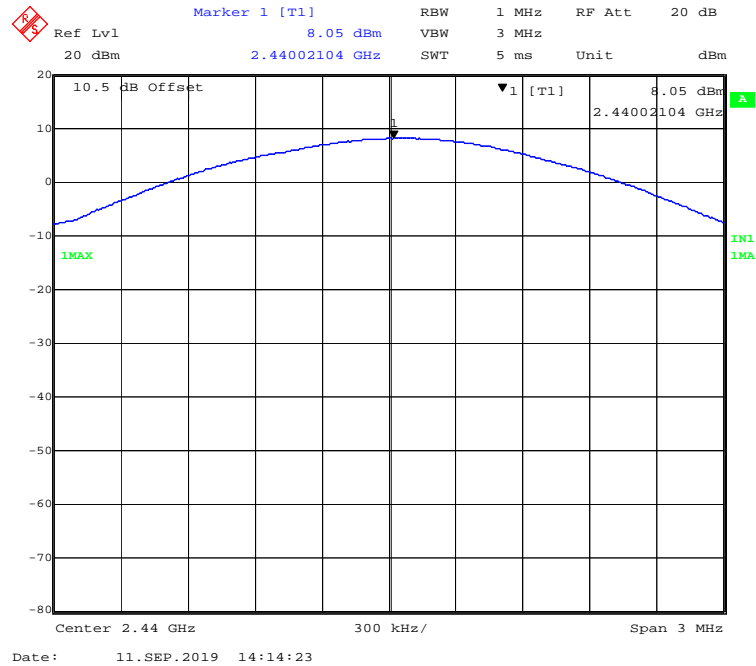


ANT	Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Limit (dBm)	Result
2	Low	2402	7.83	30	Pass
	Middle	2440	8.05	30	Pass
	High	2480	7.96	30	Pass

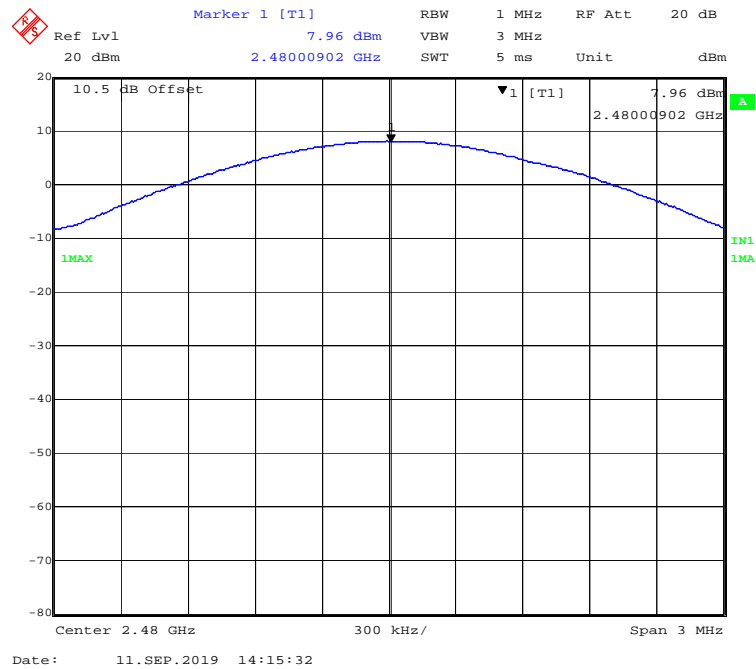
Low Channel



Middle Channel

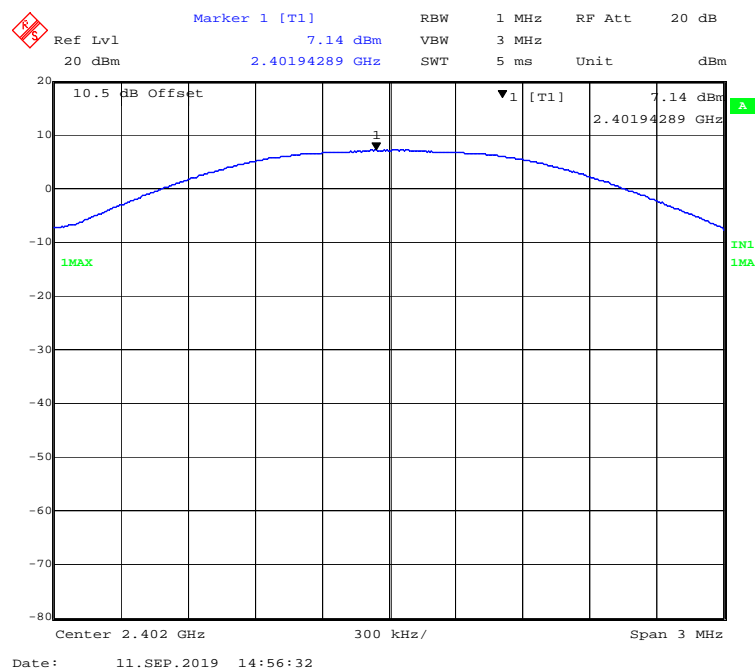


High Channel

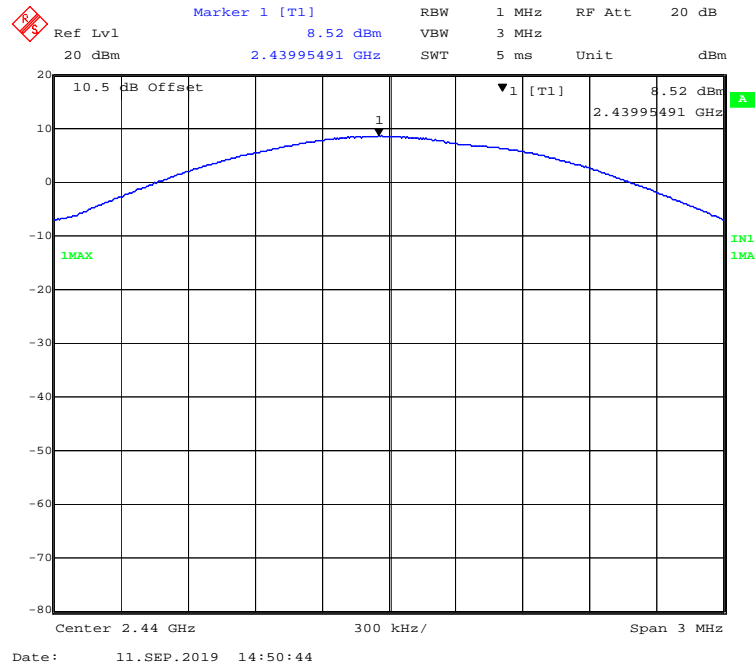


ANT	Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Limit (dBm)	Result
3	Low	2402	7.14	30	Pass
	Middle	2440	8.52	30	Pass
	High	2480	8.91	30	Pass

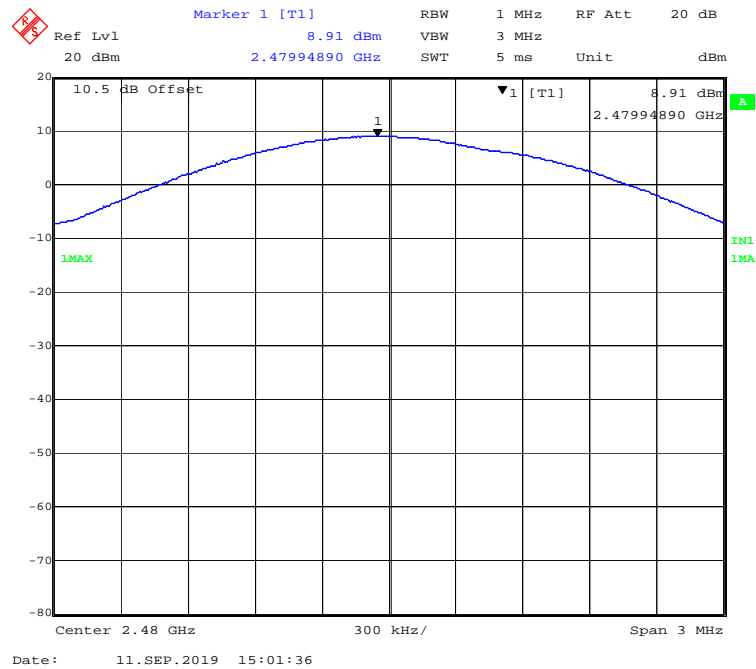
Low Channel



Middle Channel

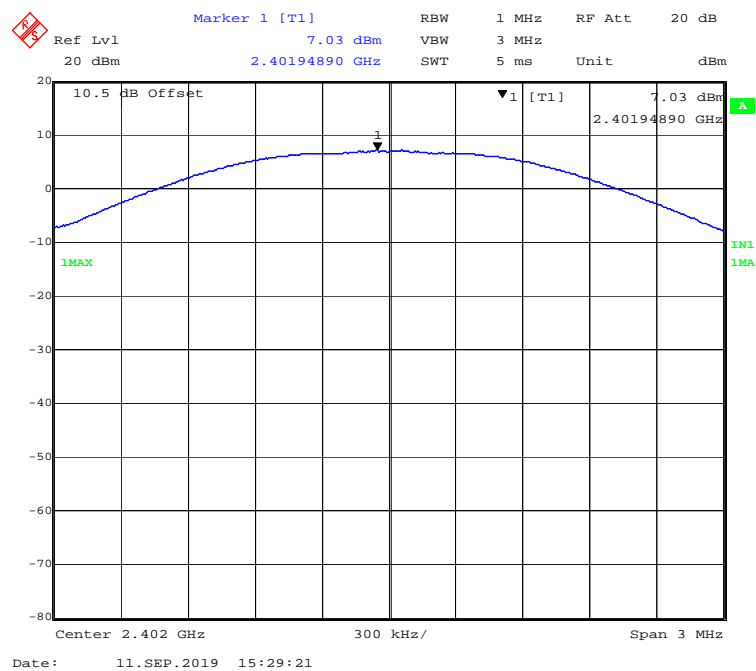


High Channel

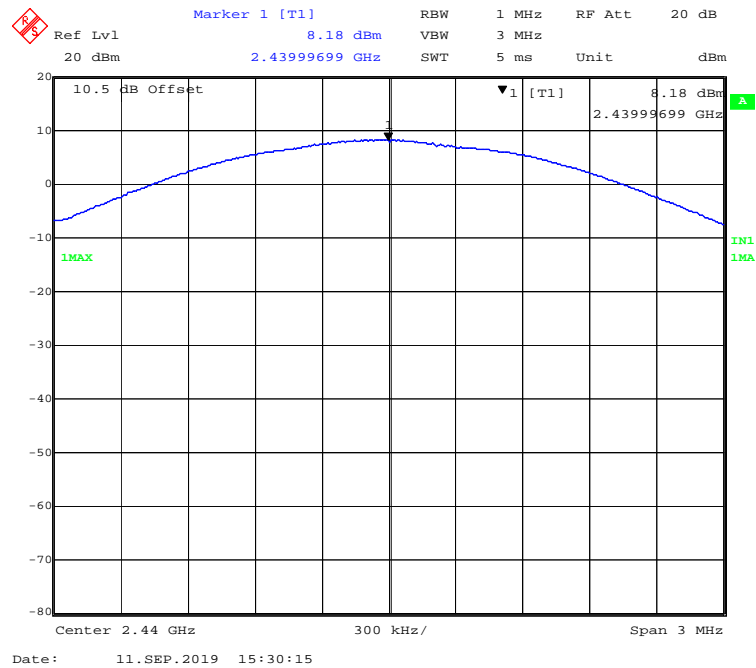


ANT	Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Limit (dBm)	Result
4	Low	2402	7.03	30	Pass
	Middle	2440	8.18	30	Pass
	High	2480	8.58	30	Pass

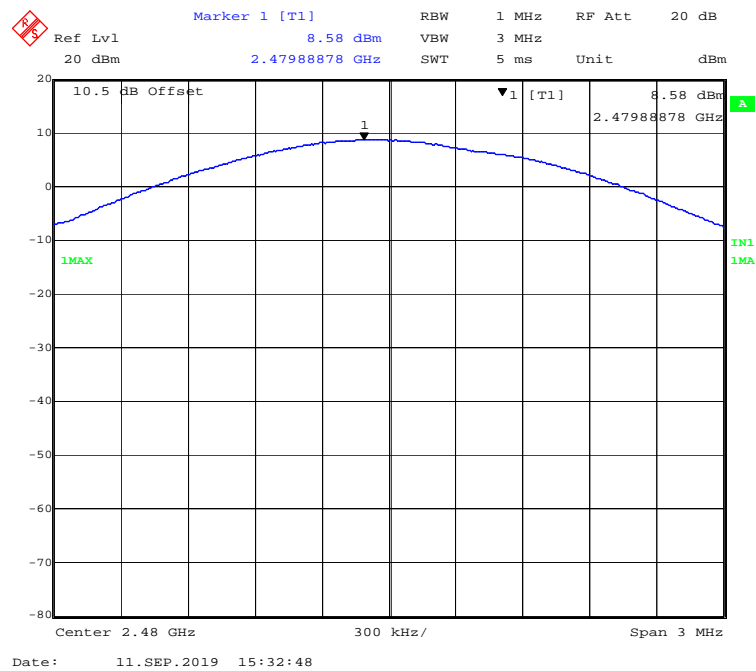
Low Channel



Middle Channel



High Channel



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 Compliant 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

According to ANSI C63.10-2013 sub-clause 6.10.

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 Data**Environmental Conditions**

Temperature:	25.2 °C
Relative Humidity:	50 %
ATM Pressure:	101.3 kPa

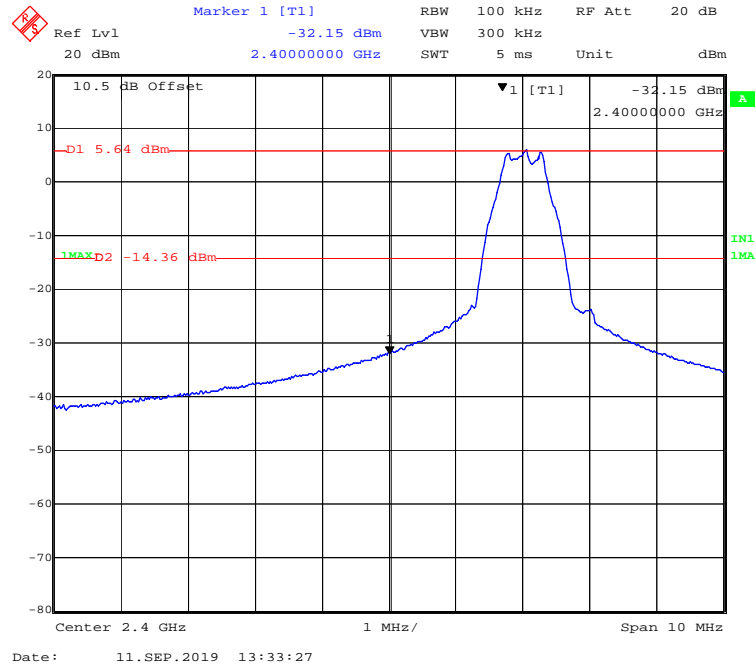
The testing was performed by Andy Liu on 2019-09-11.

EUT operation mode: Transmitting

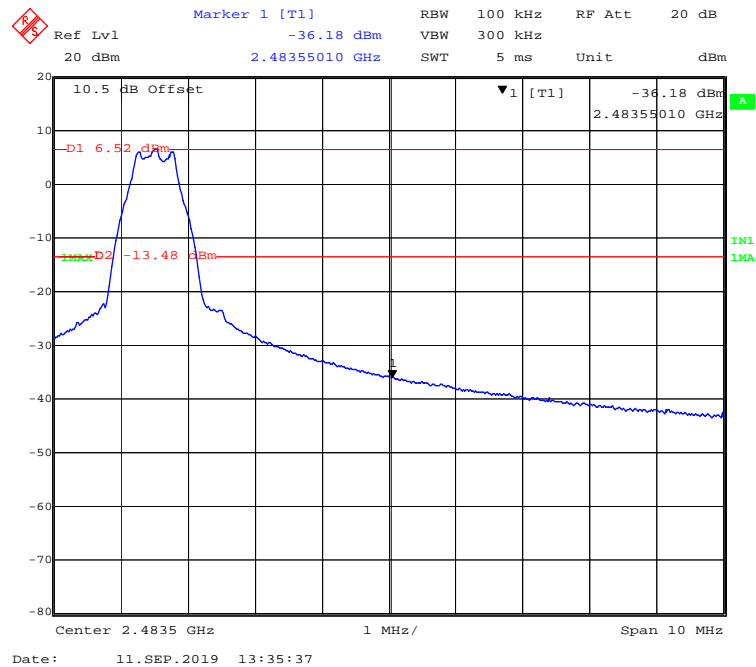
Test Result: Compliant

ANT 1

Left Side

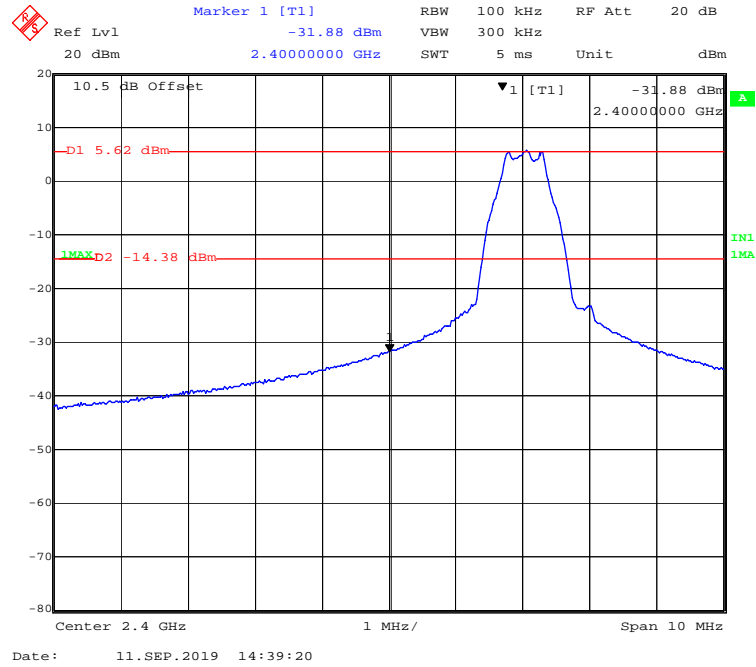


Right Side

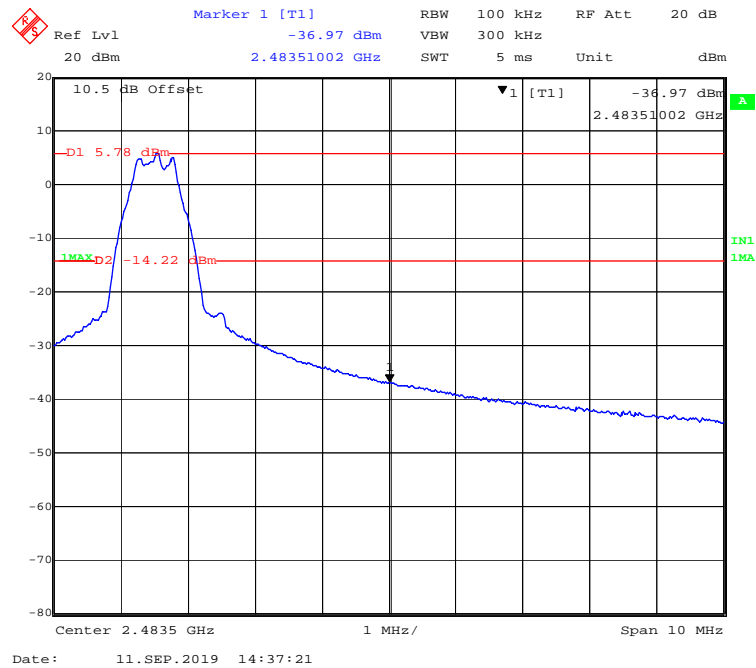


ANT 2

Left Side

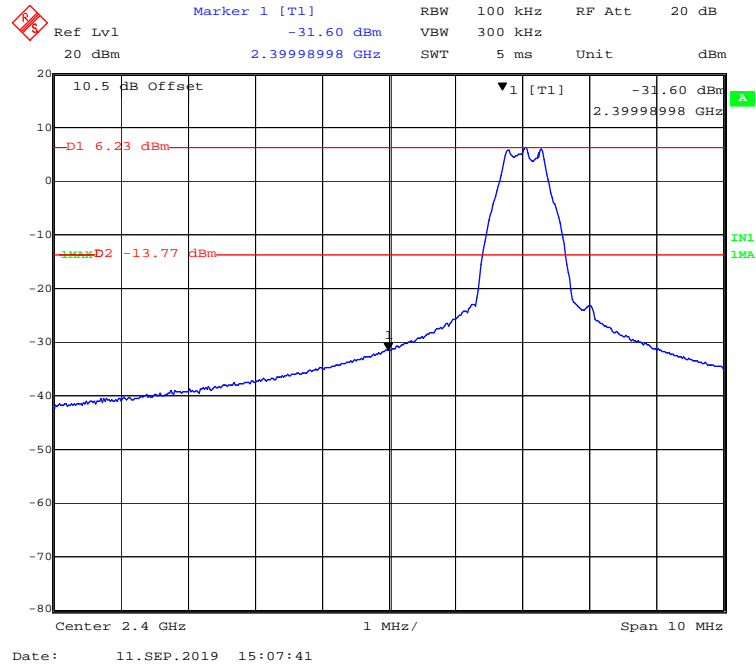


Right Side

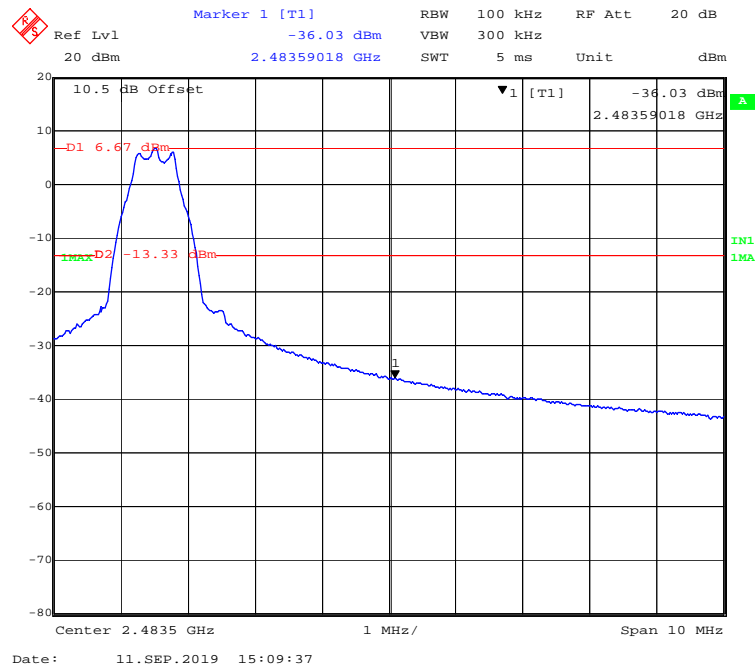


ANT 3

Left Side

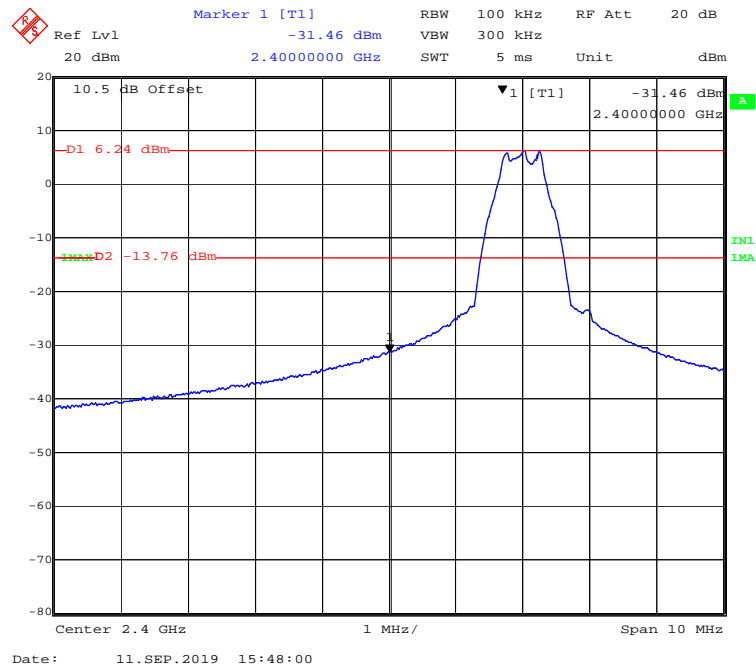


Right Side

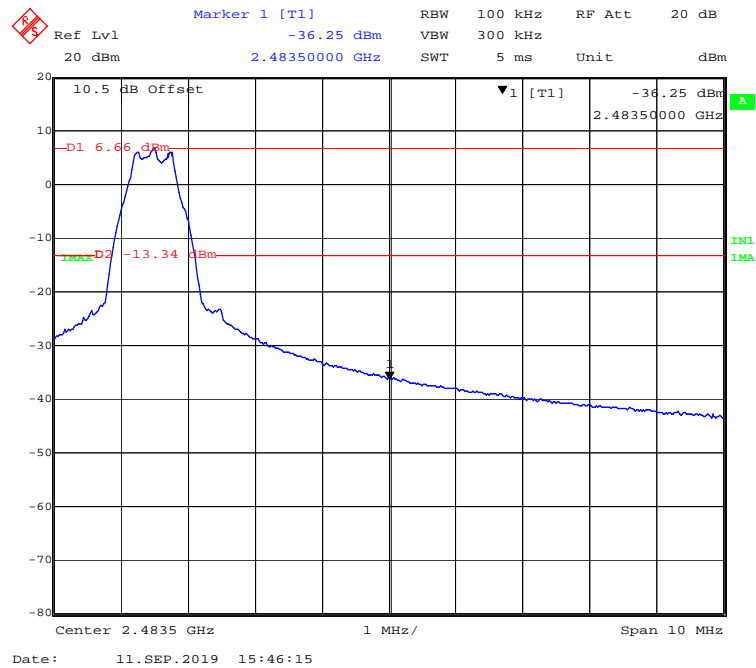


ANT 4

Left Side



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

According to ANSI C63.10-2013 sub-clause 11.10.2

The following procedure shall be used if maximum peak conducted output power was used to determine Compliant, and it is optional if the maximum conducted (average) output power was used to determine Compliant:

1. Set the RBW to: $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$.
2. Set the VBW $\geq 3 \times \text{RBW}$.
3. Set the span to 1.5 times the DTS bandwidth.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum amplitude level within the RBW.
9. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Test Data

Environmental Conditions

Temperature:	24.3 °C
Relative Humidity:	52 %
ATM Pressure:	101.5 kPa

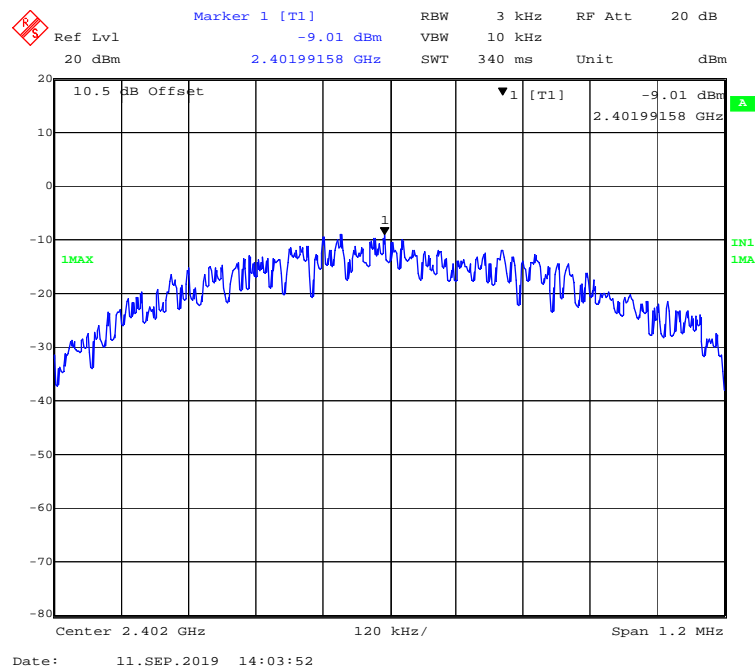
The testing was performed by Andy Liu on 2019-09-11.

EUT operation mode: Transmitting

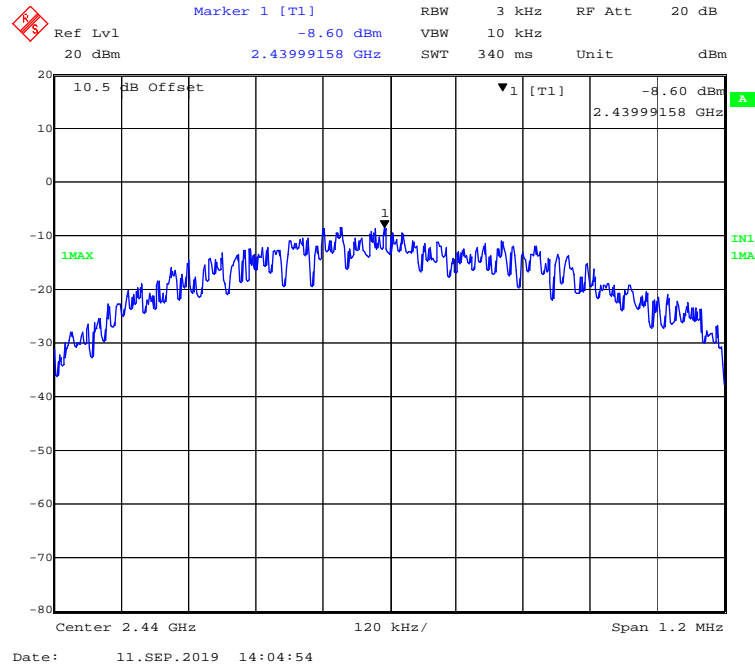
Test Result: Pass

ANT	Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
1	Low	2402	-9.01	≤8
	Middle	2440	-8.60	≤8
	High	2480	-7.95	≤8

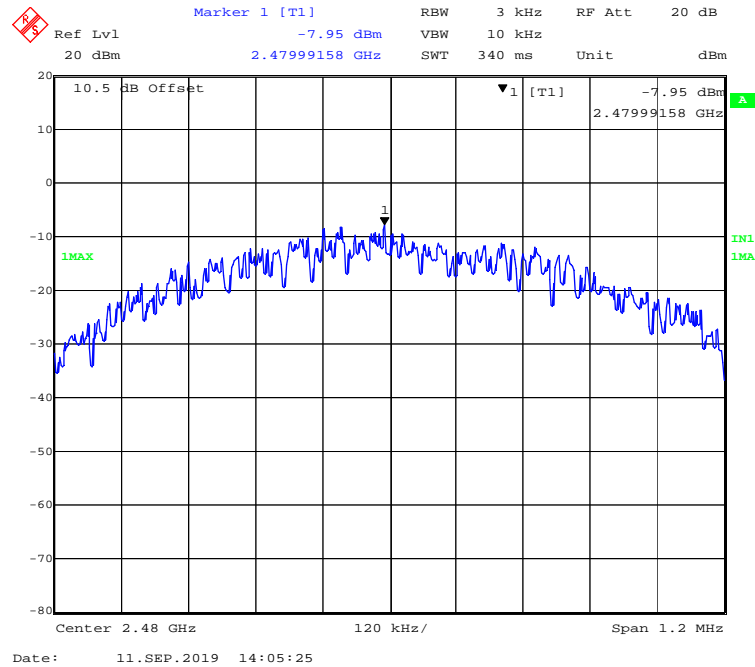
Low Channel



Middle Channel

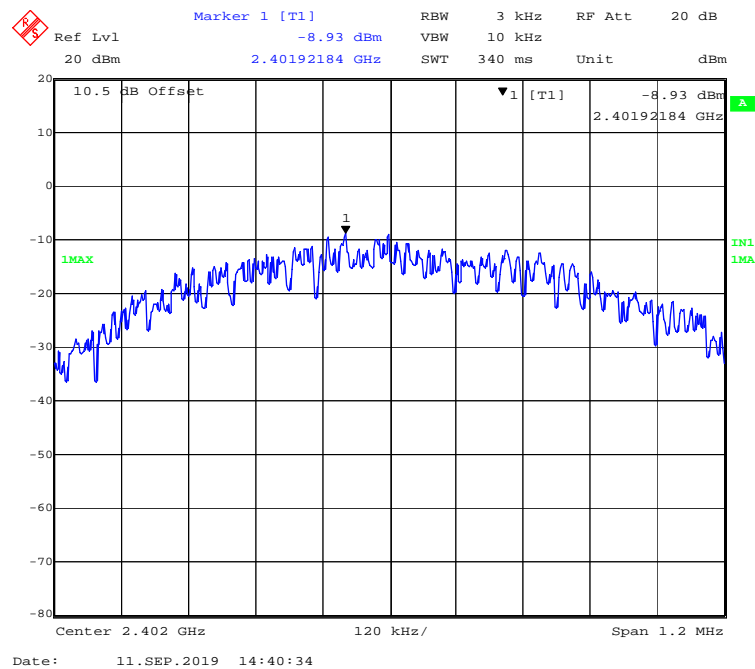


High Channel

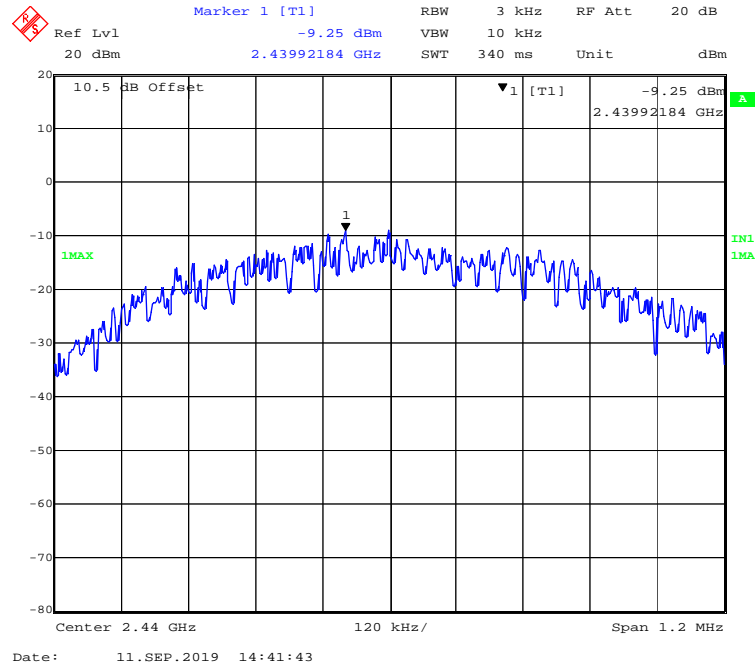


ANT	Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
2	Low	2402	-8.93	≤8
	Middle	2440	-9.25	≤8
	High	2480	-9.25	≤8

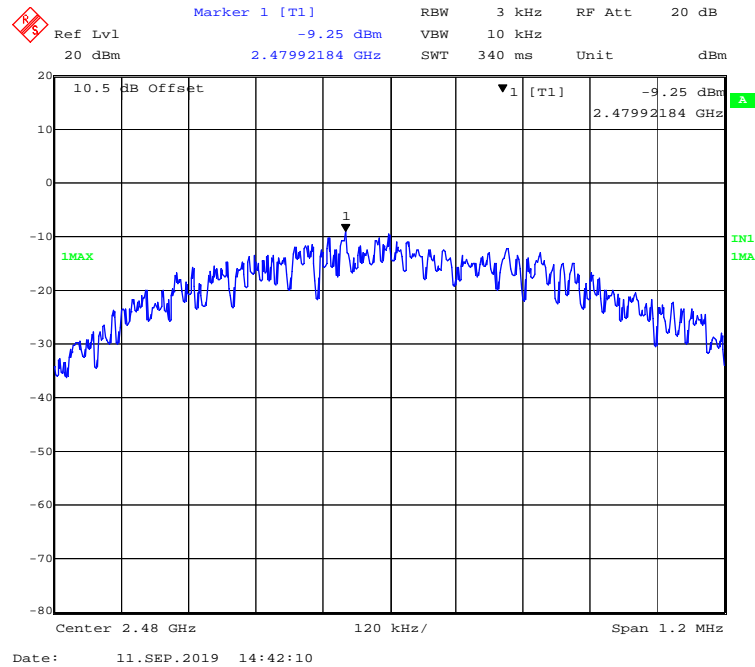
Low Channel



Middle Channel

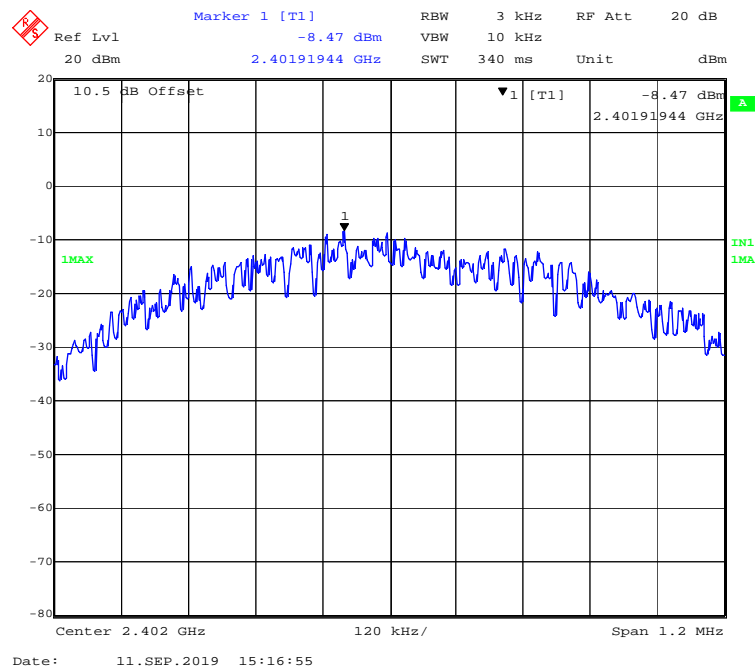


High Channel

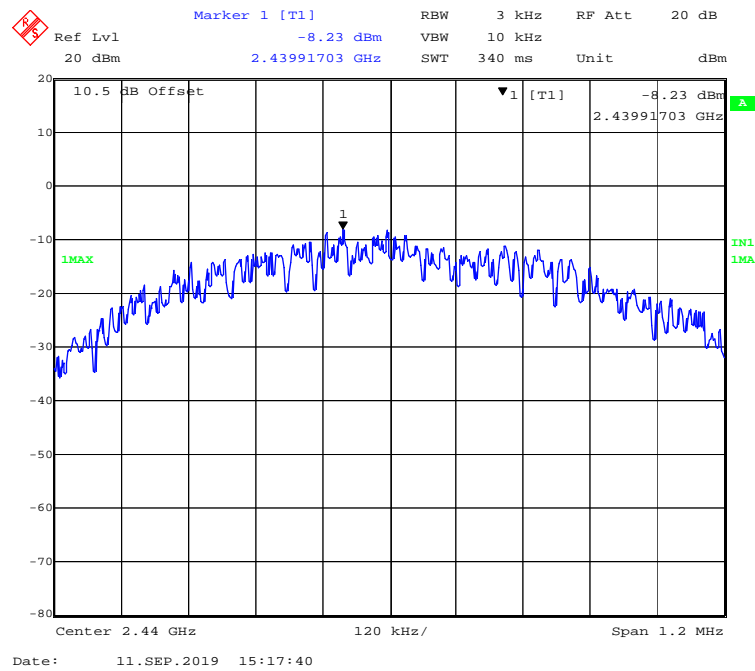


ANT	Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
3	Low	2402	-8.47	≤8
	Middle	2440	-8.23	≤8
	High	2480	-8.06	≤8

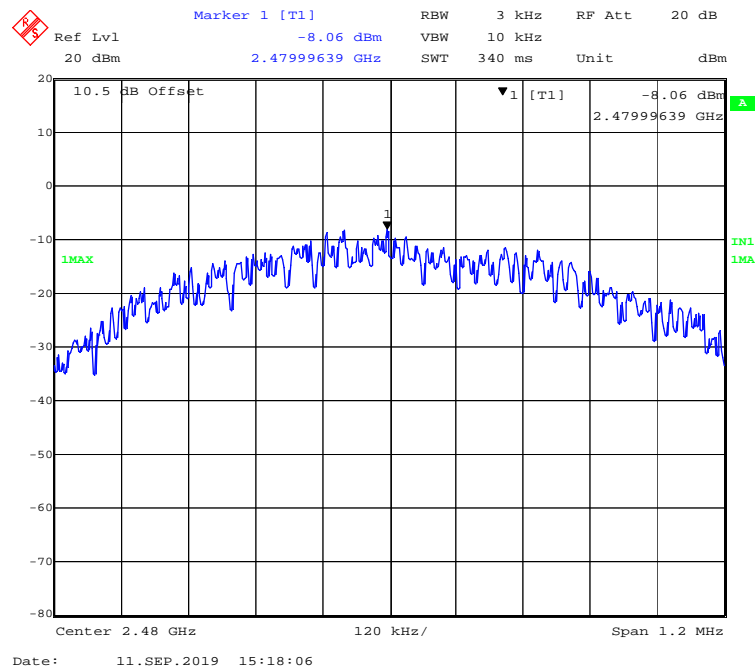
Low Channel



Middle Channel

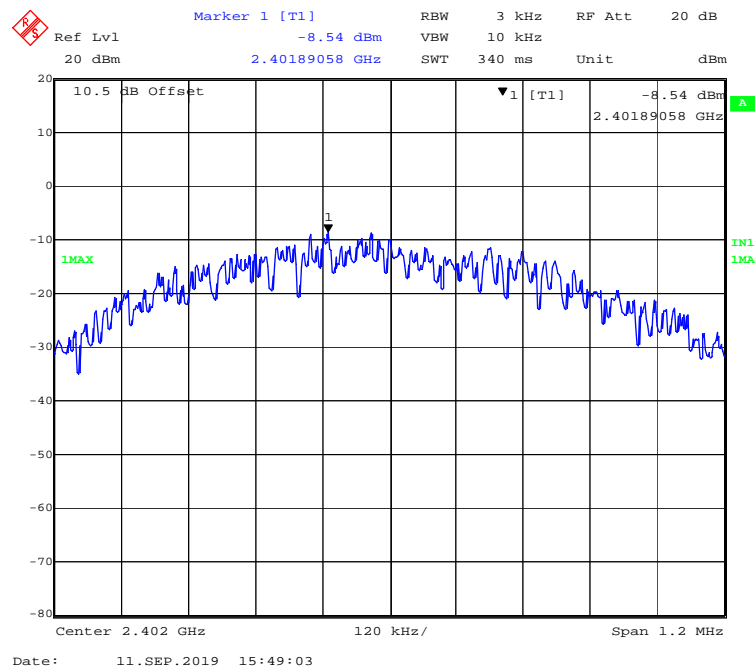


High Channel

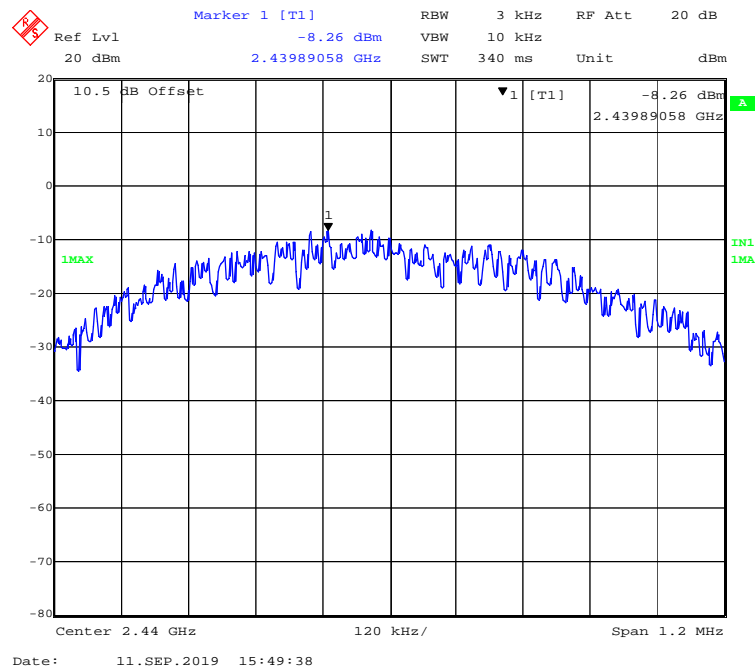


ANT	Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
4	Low	2402	-8.54	≤8
	Middle	2440	-8.26	≤8
	High	2480	-8.28	≤8

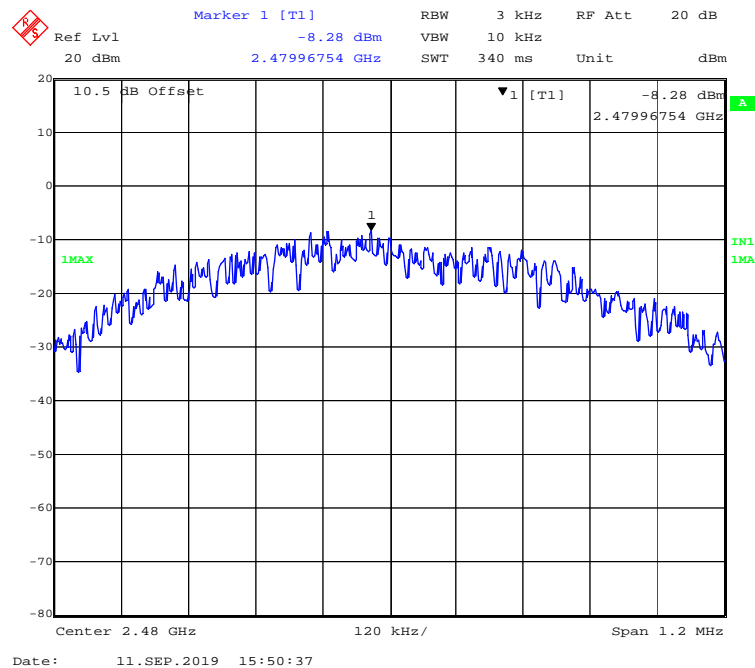
Low Channel



Middle Channel



High Channel



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