FCC PART 15.247

TEST REPORT

For

Autel Robotics Co., Ltd.

9th Floor, Bldg.B1, Zhiyuan, 1001 Xueyuan Rd., Xili, Nanshan, Shenzhen, China

FCC ID: 2AGNTEF8RC2409A

Report Type:	**Product Type:**
Original Report	EF8

Report Number:	RSZ190828004-00B
Report Date:	2019-11-25
Reviewed By:	Jacob Kong Engineer
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	EF8
Tested Model	EF8
Frequency Range	900MHz Band: 906~924 MHz@1.4MHz Mode 909~921 MHz@10MHz Mode 2.4GHz Band: 2403.5~2475.5MHz@1.4MHz Mode 2407.5~2471.5MHz@10MHz Mode
Conducted Peak Power	900MHz Band: 25.88dBm 2.4GHz Band:26.51dBm
Modulation Technique	OFDM
Antenna Specification	2.5 dBi for 2.4G 1.5 dBi for 900M
Voltage Range	Powered: DC 3.7V by battery Recharged: DC 5V/9V/12V by adapter
Date of Test	2019-09-16 to 2019-11-25
Sample serial number	19082800402 (Assigned by BACL, Shenzhen)
Received date	2019-08-28
Sample/EUT Status	Good condition
Adapter information	Model: XA3_1320 Input: AC 100-240V, 50/60Hz, 1.5A Output: DC 13.2V,3.83A (Main); DC 5.0V, 3.0A / DC 9V, 2A / DC 12V, 1.5A (USB)

Objective

This report is prepared on behalf of *Autel Robotics Co., Ltd.* in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commission's rules.

The tests were performed in order to determine compliance 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)

Submission with the plane unit of a system with FCC ID: 2AGNTMC2409A.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

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

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
RF Output Power with Power meter		±0.73dB
RF conducted test with spectrum		±1.6dB
AC Power Lines Conducted Emissions		±1.95dB
Emissions, Radiated	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB
Temperature		±1℃
Humidity		±6%
Supply voltages		±0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. 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. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, 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.: 342867, the FCC Designation No.: CN1221.

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

For 2.4GHz: 1.4MHz mode, 72channels are provided to testing

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2403.5	37	2440.5
2	2404.5	……	……
3	2405.5	……	……
……	……	……	……
……	……	……	……
……	……	70	2472.5
35	2438.5	71	2473.5
36	2439.5	72	2475.5

CH1, CH36, CH72 was tested.

10MHz mode, 65channels are provided to testing

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2407.5	33	2439.5
2	2408.5	……	……
3	2409.5	……	……
……	……	……	……
……	……	……	……
……	……	64	2470.5
32	2438.5	65	2471.5

CH1, CH33, CH65was tested.

For 900MHz: 1.4MHz mode, 19 channels are provided to testing

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	906	11	916
2	907	……	……
3	908	……	……
……	……	……	……
……	……	18	923
……	……	19	924
10	915	/	/

CH1, CH11, CH19 was tested.

10MHz mode, 13 channels are provided to testing

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	909	8	916
2	910	9	917
3	911	10	918
4	912	11	919
5	913	12	920
6	914	13	921
7	915	/	/

CH1, CH7, CH13 was tested.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

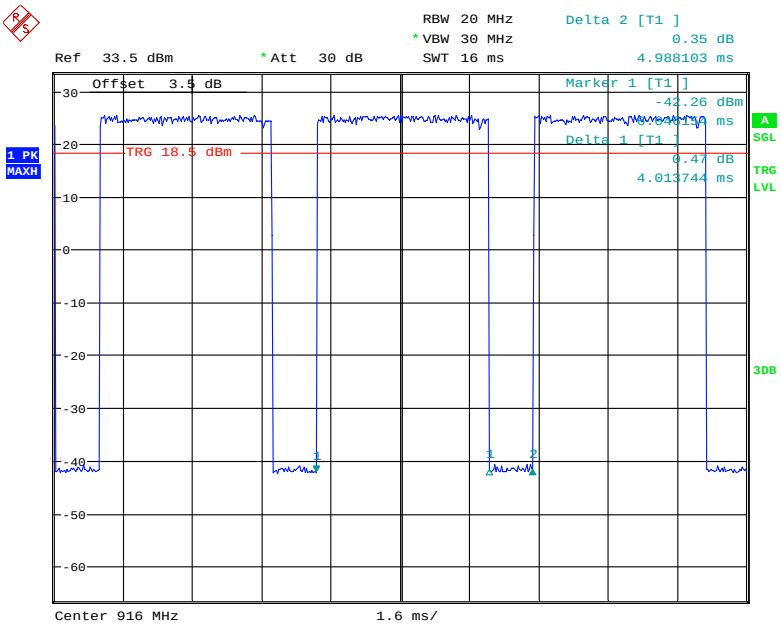
"SecureCRT" software was used during test, power level set is default.

Duty cycle

For 900MHz Antenna 0:

Item	Duty Cycle (%)	T(ms)	1/T(kHz)	VBW Setting	10log(1/x)
1.4M Mode	80.47	4.014	0.25	300Hz	0.94
10M Mode	80.06	4.000	0.25	300Hz	0.97

1.4M Mode



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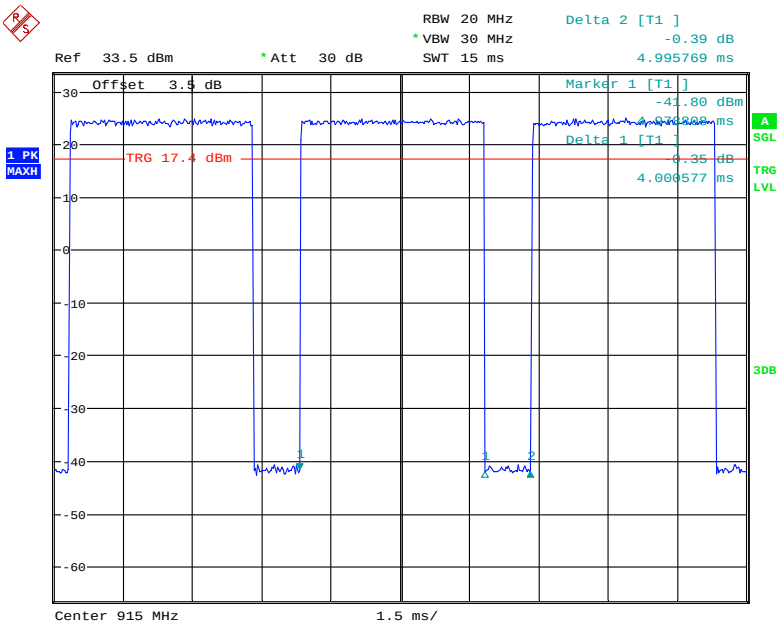
10M Mode



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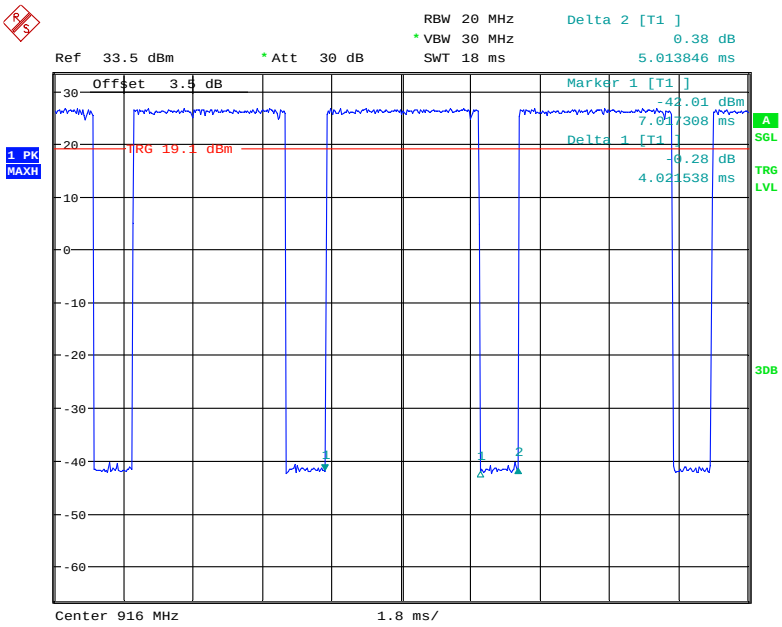
For 900MHz Antenna 1:

Item	Duty Cycle (%)	T(ms)	1/T(kHz)	VBW Setting	10log(1/x)
1.4M Mode	80.22	4.022	0.25	300Hz	0.96
10M Mode	79.73	4.011	0.25	300Hz	0.98

1.4M Mode



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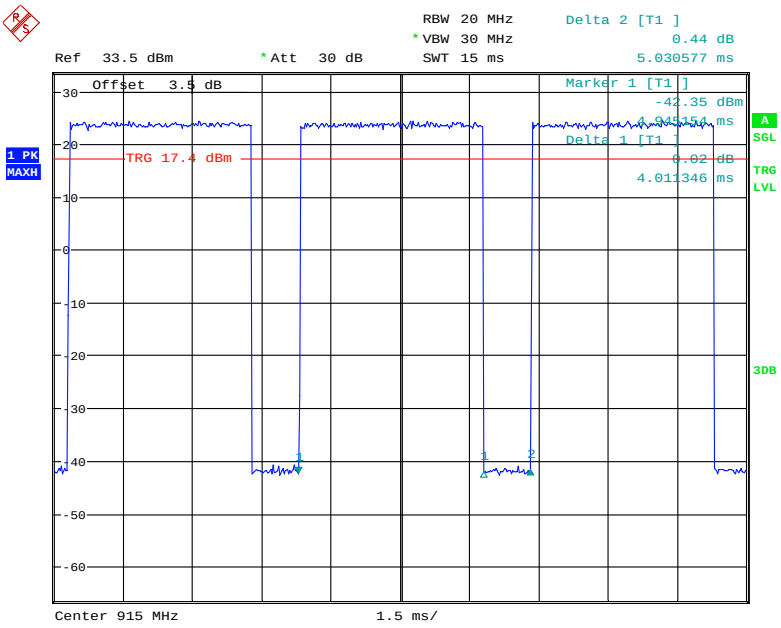
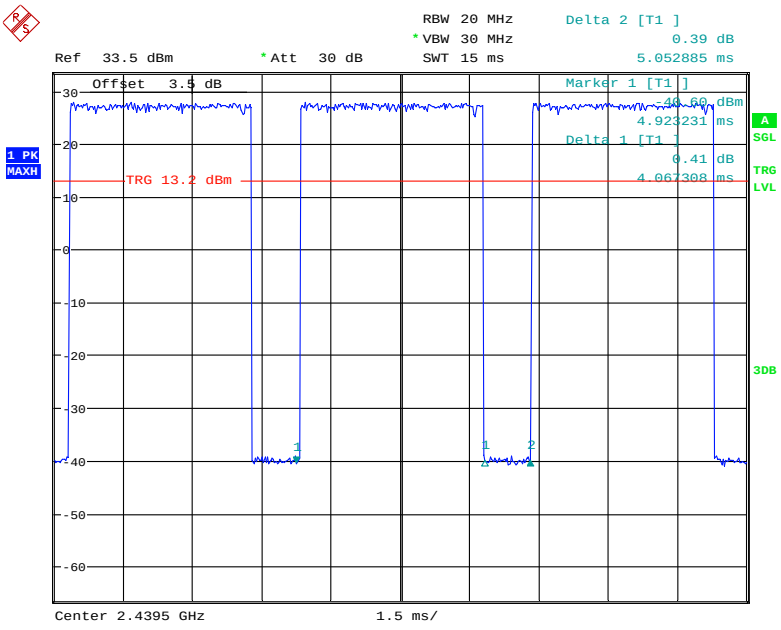
10M Mode



For 2.4 GHz Antenna 0:

Item	Duty Cycle (%)	T(ms)	1/T(kHz)	VBW Setting	10log(1/x)
1.4M Mode	80.49	4.067	0.25	300Hz	0.94
10M Mode	79.44	3.995	0.25	300Hz	1.00

1.4M Mode



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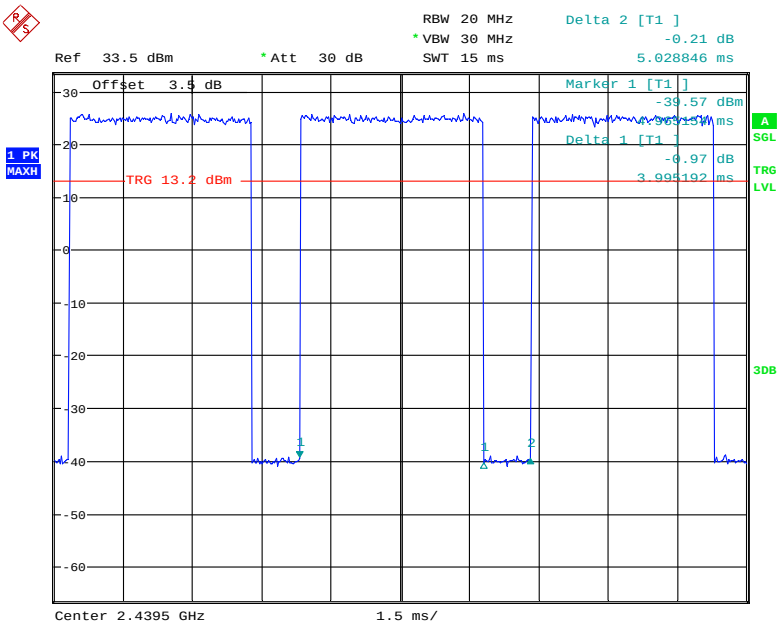
10M Mode



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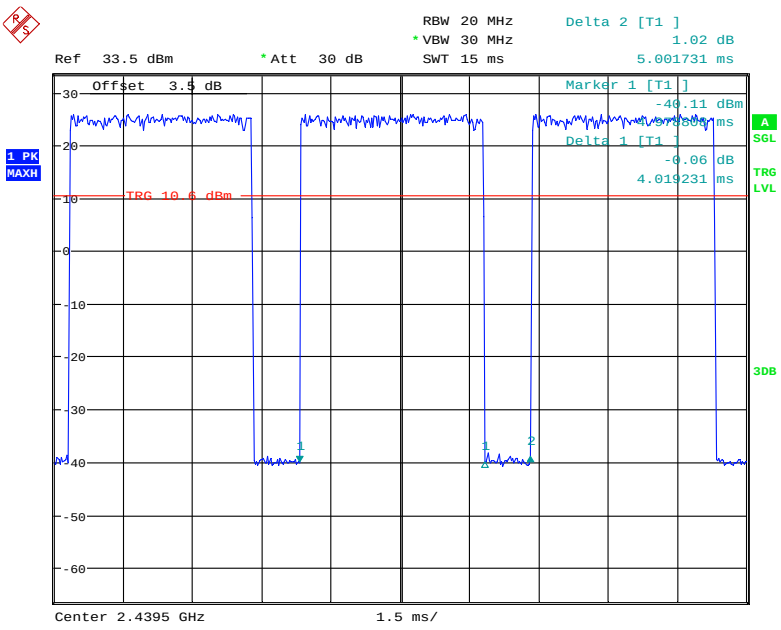
For 2.4GHz Antenna 1:

Item	Duty Cycle (%)	T(ms)	1/T(kHz)	VBW Setting	10log(1/x)
1.4M Mode	80.35	4.019	0.25	300Hz	0.95
10M Mode	79.39	3.971	0.25	300Hz	1.00

1.4M Mode



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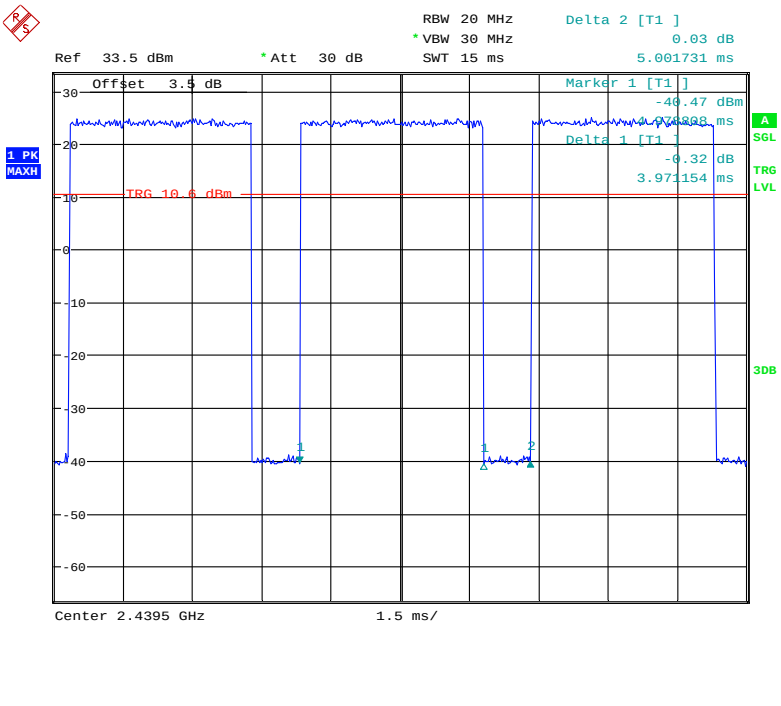
10M Mode



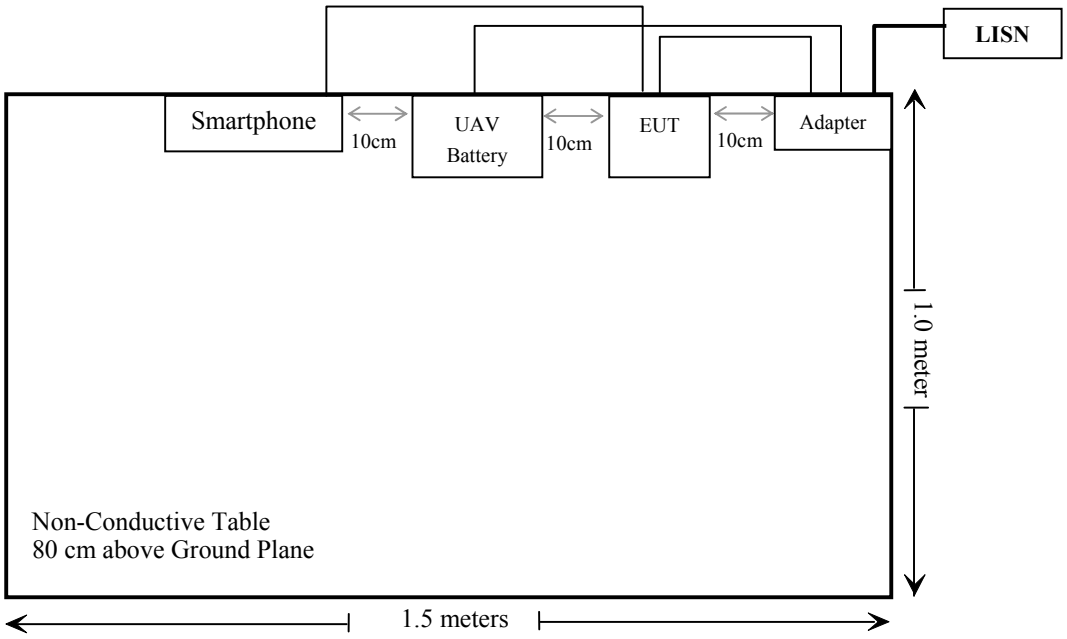
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Autel	UAV Battery	Unknown	Unknown
Unknown	Smartphone	Unknown	Unknown

External I/O Cable

Cable Description	Length (m)	From/Port	To
Shielded Detachable USB Cable with Ferrite Core	1.0	EUT	Adapter
Shielded Detachable USB Cable with Ferrite Core	1.0	EUT	Smartphone
Un-Shielded Detachable AC Cable	1.1	Adapter	LISN
Un-Shielded Un-Detachable DC Cable with Ferrite Core	0.55	Adapter	UAV Battery

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307, §2.1093	RF Exposure (SAR)	Compliance*
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliance
§15.247(b)(3)	Maximum Conducted Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

Compliance*: Please refer to SAR report released by BACL, report number: RSZ190828004-SA.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2019-07-11	2020-07-11
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2019-01-25	2020-01-25
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2019-03-02	2020-03-01
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
Un-known	Conducted Emission Cable	78652	UF A210B-1-0720-504504	2018-11-12	2019-11-12
Radiated Emission Test					
A.H. System	Horn Antenna	SAS-200/571	135	2018-09-01	2021-08-31
Rohde & Schwarz	Spectrum Analyzer	FSV40-N	102259	2019-07-22	2020-07-21
COM-POWER	Pre-amplifier	PA-122	181919	2018-11-12	2019-11-12
Sonoma Instrument	Amplifier	310N	186238	2018-11-12	2019-11-12
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017-12-22	2020-12-21
Rohde & Schwarz	EMI Test Receiver	ESR3	102455	2019-07-09	2020-07-08
UTiFLEX MICRO-C0AX	RF Cable	UFA147A-2362-100100	MFR64639 231029-003	2018-11-12	2019-11-12
Ducommun technologies	RF Cable	104PEA	218124002	2018-11-12	2019-11-12
Ducommun technologies	RF Cable	RG-214	1	2019-05-21	2019-11-19
Ducommun technologies	RF Cable	RG-214	2	2018-11-12	2019-11-12
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-04	2017-12-29	2020-12-28
Heatsink Required	Amplifier	QLW-18405536-J0	15964001002	2018-11-12	2019-11-12
Sinoscite	Notch Filter	BSF2402-2480MN-0898-001	99632	2018-11-12	2019-11-12
Rohde & Schwarz	Auto test software	EMC 32	V9.10	NCR	NCR
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSU26	200120	2019-03-02	2020-03-01
Agilent	USB wideband power meter	U2021XA	MY54250003	2019-07-10	2020-07-09
Ducommun technologies	RF Cable	RG-214	3	Each Time	
WEINSCHEL	3dB Attenuator	6231	666	Each Time	

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

FCC §1.1307(b) & §2.1093 - RF EXPOSURE INFORMATION

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliance, please refer to the SAR report: RSZ190828004-SA.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.
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 two internal antennas arrangement, which is permanently attached, the antenna gain is 2.5dBi for 2.4GHz and 1.5dBi for 900MHz, fulfill the requirement of this section. The 900MHz and 2.4GHz share these two antennas, please refer to the EUT photos.

The antennas use MISO mode, one antenna is used for transmitting signals and two antennas are used for receiving signals. The two antennas cannot transmit simultaneously.

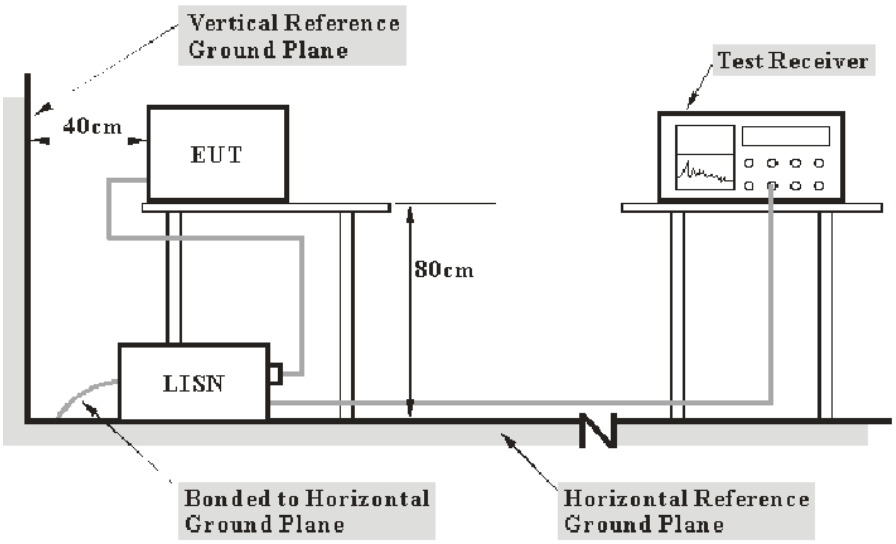
Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

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 & Margin 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:

Correction Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

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

Margin = Limit – Corrected Amplitude

Test Results Summary

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

Test Data

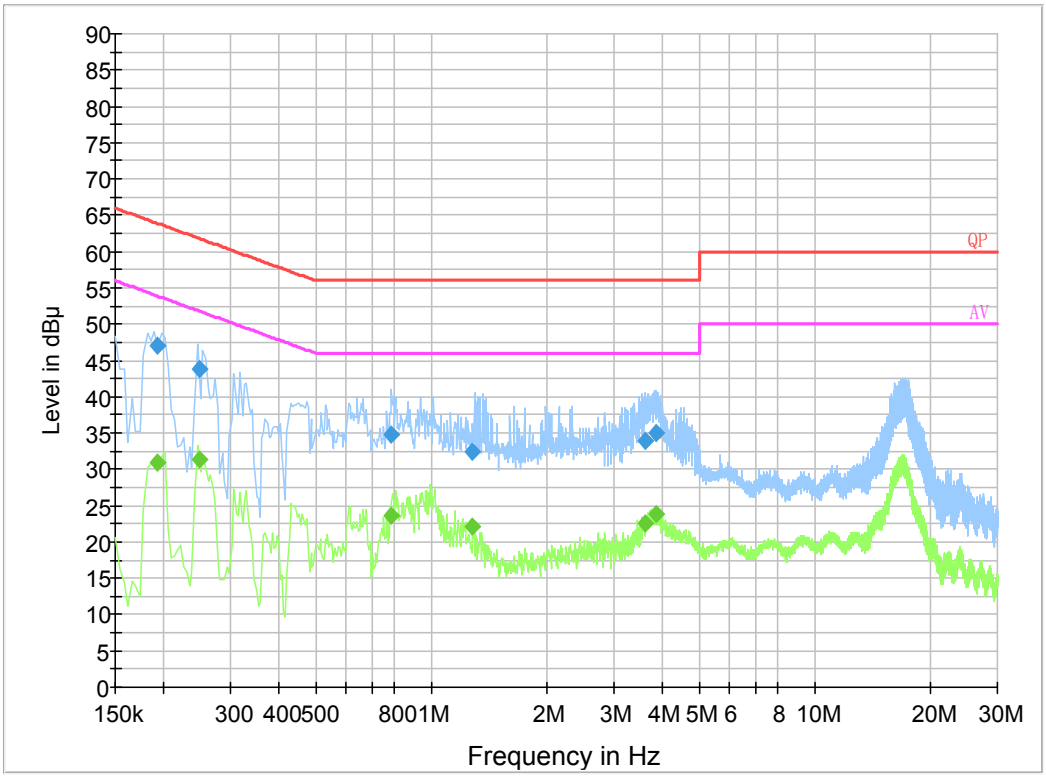
Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Kiki Geng on 2019-10-24.

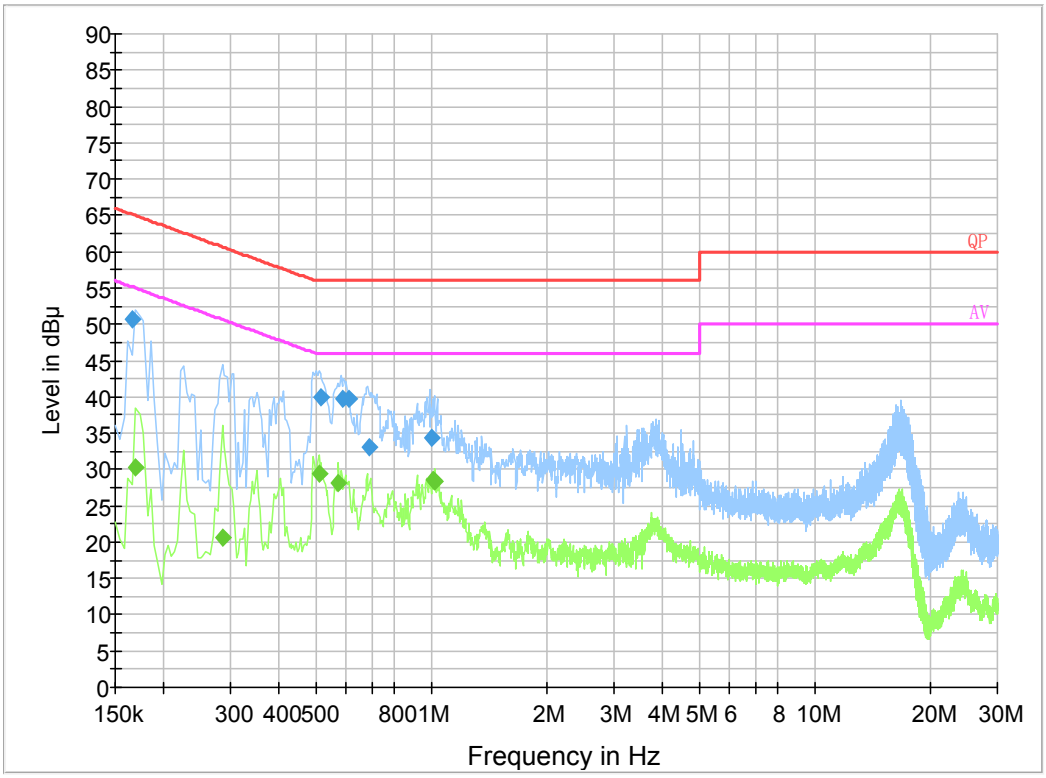
EUT operation mode: Transmitting (worst case is antenna 1, 2.4GHz, 1.4M mode, low channel)

AC 120V/60 Hz, Line



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.193500	47.0	19.8	63.9	16.9	QP
0.249500	43.7	19.8	61.8	18.1	QP
0.786150	34.8	19.8	56.0	21.2	QP
1.278530	32.4	19.8	56.0	23.6	QP
3.623970	34.0	19.9	56.0	22.0	QP
3.864070	35.0	19.9	56.0	21.0	QP
0.193500	30.9	19.8	53.9	23.0	Ave.
0.249500	31.3	19.8	51.8	20.5	Ave.
0.786150	23.7	19.8	46.0	22.3	Ave.
1.278530	22.1	19.8	46.0	23.9	Ave.
3.623970	22.6	19.9	46.0	23.4	Ave.
3.864070	23.8	19.9	46.0	22.2	Ave.

AC 120V/60 Hz, Neutral



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.165500	50.6	19.8	65.2	14.6	QP
0.514350	39.9	19.8	56.0	16.1	QP
0.590730	39.7	19.8	56.0	16.3	QP
0.608970	39.7	19.8	56.0	16.3	QP
0.687710	33.0	19.8	56.0	23.0	QP
1.004850	34.4	19.8	56.0	21.6	QP
0.170000	30.3	19.9	55.0	24.7	Ave.
0.286000	20.6	19.7	50.6	30.0	Ave.
0.510000	29.4	19.8	46.0	16.6	Ave.
0.574000	28.1	19.8	46.0	17.9	Ave.
1.010000	28.6	19.8	46.0	17.4	Ave.
1.022000	28.4	19.8	46.0	17.6	Ave.

Note:
1) Correction Factor =LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
2) Corrected Amplitude = Reading + Correction Factor
3) Margin = Limit – Corrected Amplitude

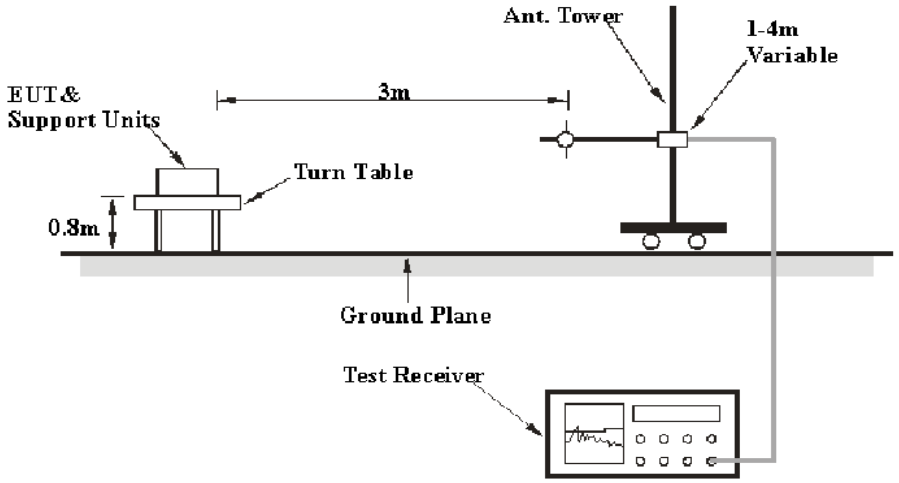
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

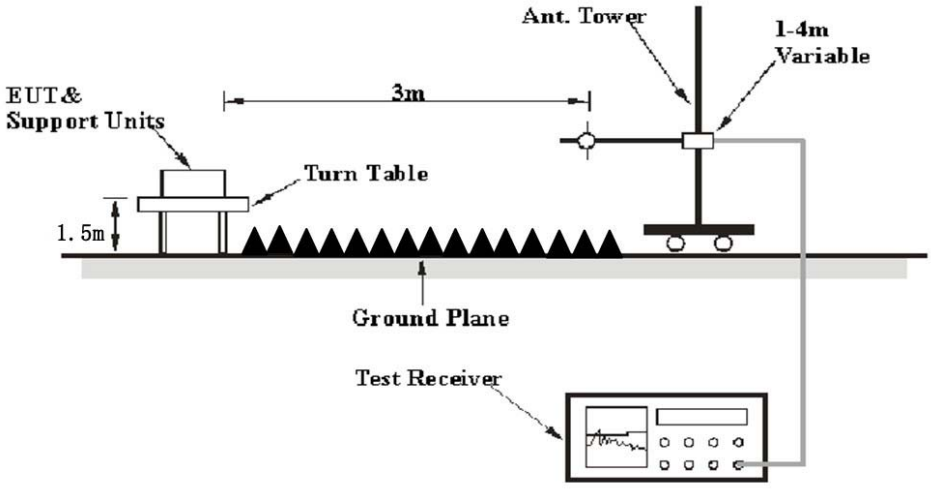
FCC §15.247 (d); §15.209; §15.205;

EUT Setup

Below 1 GHz:



Above 1GHz:



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 & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz Note 1	/	Ave.
	1MHz	＞1/T Note 2	/	Ave.

Note 1: when duty cycle is no less than 98%
Note 2: when duty cycle is less than 98%

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:

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

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

Margin = Limit – Corrected Amplitude

Test 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

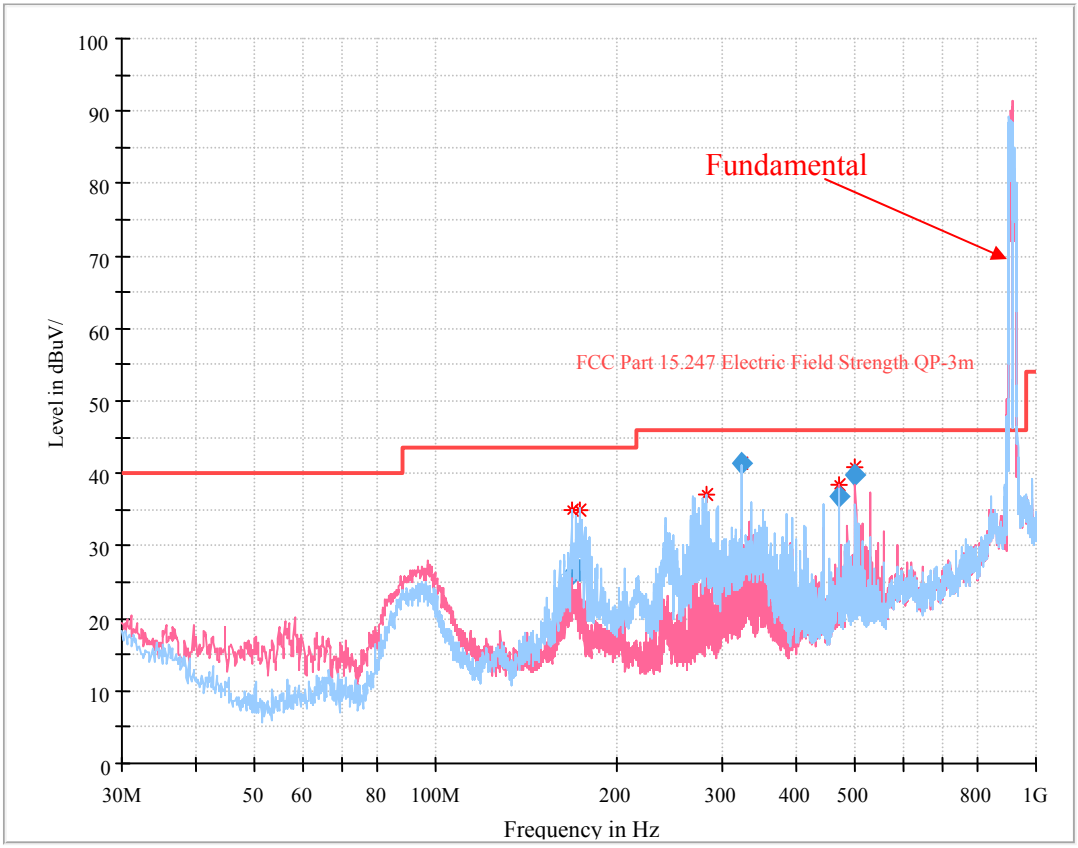
Temperature:	24~25 ℃
Relative Humidity:	52~56 %
ATM Pressure:	101.0 kPa

The testing was performed by Zero Yan on 2019-10-01 & 2019-10-25 for below 1G and by Alan He from 2019-10-21 to 2019-10-27 for above 1G.

EUT operation mode: Transmitting (Pre-scan with each antenna for 900MHz and 2.4GHz, worst case as below)

For 900MHz:

30 MHz~1 GHz: (worst case for Antenna 1, 1.4M Mode, High channel)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
168.566250	25.95	122.0	H	103.0	-14.8	43.50	17.55
173.749375	26.69	129.0	H	205.0	-15.0	43.50	16.81
281.871875	28.99	118.0	H	91.0	-11.9	46.00	17.01
323.989750	41.41	109.0	H	64.0	-10.7	46.00	4.59
471.260375	36.79	123.0	V	62.0	-7.8	46.00	9.21
500.703375	39.81	138.0	V	187.0	-7.2	46.00	6.19

1 GHz-10 GHz:

Antenna 0:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (909 MHz) 10M Mode									
1032.16	51.06	PK	12	2.2	V	13.13	64.19	74	9.81
1032.16	28.11	Ave.	12	2.2	V	13.13	41.24	54	12.76
1818.00	46.34	PK	192	1.2	V	-1.55	44.79	74	29.21
1818.00	31.88	Ave.	192	1.2	V	-1.55	30.33	54	23.67
6363.00	46.55	PK	48	1.9	V	13.43	59.98	74	14.02
6363.00	31.85	Ave.	48	1.9	V	13.43	45.28	54	8.72
Middle Channel (915 MHz) 10M Mode									
1032.16	51.16	PK	182	1.9	V	13.13	64.29	74	9.71
1032.16	28.19	Ave.	182	1.9	V	13.13	41.32	54	12.68
1830.00	45.83	PK	165	1.5	V	-1.55	44.28	74	29.72
1830.00	32.59	Ave.	165	1.5	V	-1.55	31.04	54	22.96
6405.00	47.09	PK	92	2.4	V	13.53	60.62	74	13.38
6405.00	31.80	Ave.	92	2.4	V	13.53	45.33	54	8.67
High Channel (921 MHz) 10M Mode									
1032.16	51.45	PK	312	1.3	V	13.13	64.58	74	9.42
1032.16	28.31	Ave.	312	1.3	V	13.13	41.44	54	12.56
1842.00	48.65	PK	293	1.5	V	-1.55	47.10	74	26.90
1842.00	33.96	Ave.	293	1.5	V	-1.55	32.41	54	21.59
6447.00	46.78	PK	244	2.1	V	13.53	60.31	74	13.69
6447.00	31.36	Ave.	244	2.1	V	13.53	44.89	54	9.11

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (906 MHz) 1.4M Mode									
1032.16	51.44	PK	62	2.2	V	13.13	64.57	74	9.43
1032.16	27.83	Ave.	62	2.2	V	13.13	40.96	54	13.04
1818.00	50.11	PK	287	2.4	H	-1.55	48.56	74	25.44
1818.00	35.73	Ave.	287	2.4	H	-1.55	34.18	54	19.82
6342.00	49.86	PK	252	1.7	H	13.43	63.29	74	10.71
6342.00	33.58	Ave.	252	1.7	H	13.43	47.01	54	6.99
Middle Channel (916 MHz)1.4M Mode									
1032.16	51	PK	260	1.5	V	13.13	64.13	74	9.87
1032.16	27.97	Ave.	260	1.5	V	13.13	41.10	54	12.90
1832.00	47.82	PK	63	2.1	V	-1.55	46.27	74	27.73
1832.00	32.50	Ave.	63	2.1	V	-1.55	30.95	54	23.05
6412.00	48.80	PK	339	1.7	V	13.53	62.33	74	11.67
6412.00	33.22	Ave.	339	1.7	V	13.53	46.75	54	7.25
High Channel (924 MHz)1.4M Mode									
1032.16	51.42	PK	154	2.0	V	13.13	64.55	74	9.45
1032.16	28.12	Ave.	154	2.0	V	13.13	41.25	54	12.75
1848.00	50.43	PK	217	1.0	H	-1.55	48.88	74	25.12
1848.00	36.00	Ave.	217	1.0	H	-1.55	34.45	54	19.55
6468.00	48.89	PK	140	1.5	H	12.39	61.28	74	12.72
6468.00	32.59	Ave.	140	1.5	H	12.39	44.98	54	9.02

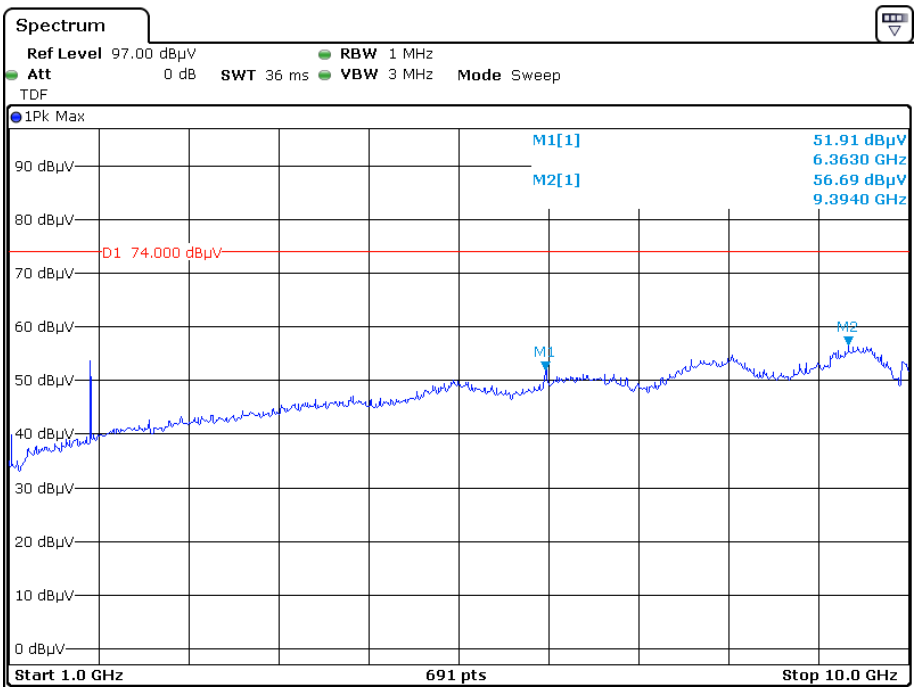
Antenna 1:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (909 MHz) 10M Mode									
1032.16	47.22	PK	159	1.8	V	13.13	60.35	74	13.65
1032.16	27.51	Ave.	159	1.8	V	13.13	40.64	54	13.36
1818.00	47.83	PK	328	1.9	V	-1.55	46.28	74	27.72
1818.00	33.98	Ave.	328	1.9	V	-1.55	32.43	54	21.57
6363.00	48.49	PK	129	1.3	V	13.43	61.92	74	12.08
6363.00	34.33	Ave.	129	1.3	V	13.43	47.76	54	6.24
Middle Channel (915 MHz) 10M Mode									
1032.16	45.42	PK	86	2.3	V	13.13	58.55	74	15.45
1032.16	27.42	Ave.	86	2.3	V	13.13	40.55	54	13.45
1830.00	47.48	PK	97	1.3	V	-1.55	45.93	74	28.07
1830.00	33.63	Ave.	97	1.3	V	-1.55	32.08	54	21.92
6405.00	48.36	PK	117	2.1	V	13.53	61.89	74	12.11
6405.00	32.51	Ave.	117	2.1	V	13.53	46.04	54	7.96
High Channel (921 MHz) 10M Mode									
1032.16	46.26	PK	139	1.8	V	13.13	59.39	74	14.61
1032.16	27.38	Ave.	139	1.8	V	13.13	40.51	54	13.49
1842.00	47.70	PK	239	1.3	V	-1.55	46.15	74	27.85
1842.00	33.14	Ave.	239	1.3	V	-1.55	31.59	54	22.41
6447.00	47.00	PK	226	1.9	V	13.53	60.53	74	13.47
6447.00	31.96	Ave.	226	1.9	V	13.53	45.49	54	8.51

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (906 MHz) 1.4M Mode									
1031.97	47.97	PK	345	1.7	V	13.13	61.10	74	12.90
1031.97	28.08	Ave.	345	1.7	V	13.13	41.21	54	12.79
1080.21	50.52	PK	15	2.3	V	1.85	52.37	74	21.63
1080.21	26.86	Ave.	15	2.3	V	1.85	28.71	54	25.29
1127.88	50.58	PK	81	1.2	V	2.15	52.73	74	21.27
1127.88	28.12	Ave.	81	1.2	V	2.15	30.27	54	23.73
1812.00	51.96	PK	319	1.7	V	-1.55	50.41	74	23.59
1812.00	37.50	Ave.	319	1.7	V	-1.55	35.95	54	18.05
6342.00	50.42	PK	85	2.0	V	13.43	63.85	74	10.15
6342.00	34.33	Ave.	85	2.0	V	13.43	47.76	54	6.24
Middle Channel (916 MHz) 1.4M Mode									
1032.00	46.87	PK	317	1.4	V	13.13	60.00	74	14.00
1032.00	27.82	Ave.	317	1.4	V	13.13	40.95	54	13.05
1080.18	50.24	PK	356	1.1	V	1.85	52.09	74	21.91
1080.18	26.88	Ave.	356	1.1	V	1.85	28.73	54	25.27
1127.96	51.99	PK	346	2.4	V	2.15	54.14	74	19.86
1127.96	28.61	Ave.	346	2.4	V	2.15	30.76	54	23.24
1832.00	50.15	PK	63	1.3	V	-1.55	48.60	74	25.40
1832.00	36.44	Ave.	63	1.3	V	-1.55	34.89	54	19.11
6412.00	51.10	PK	152	1.6	V	13.53	64.63	74	9.37
6412.00	33.97	Ave.	152	1.6	V	13.53	47.50	54	6.50
High Channel (924 MHz) 1.4M Mode									
1032.10	47.18	PK	154	2.4	V	13.13	60.31	74	13.69
1032.10	27.7	Ave.	154	2.4	V	13.13	40.83	54	13.17
1080.09	49.39	PK	316	2.4	V	1.85	51.24	74	22.76
1080.09	26.7	Ave.	316	2.4	V	1.85	28.55	54	25.45
1127.92	52.17	PK	183	1.8	V	2.15	54.32	74	19.68
1127.92	28.39	Ave.	183	1.8	V	2.15	30.54	54	23.46
1848.00	52.07	PK	13	1.3	H	-1.55	50.52	74	23.48
1848.00	36.92	Ave.	13	1.3	H	-1.55	35.37	54	18.63
6468.00	49.68	PK	203	2.5	H	12.39	62.07	74	11.93
6468.00	33.57	Ave.	203	2.5	H	12.39	45.96	54	8.04

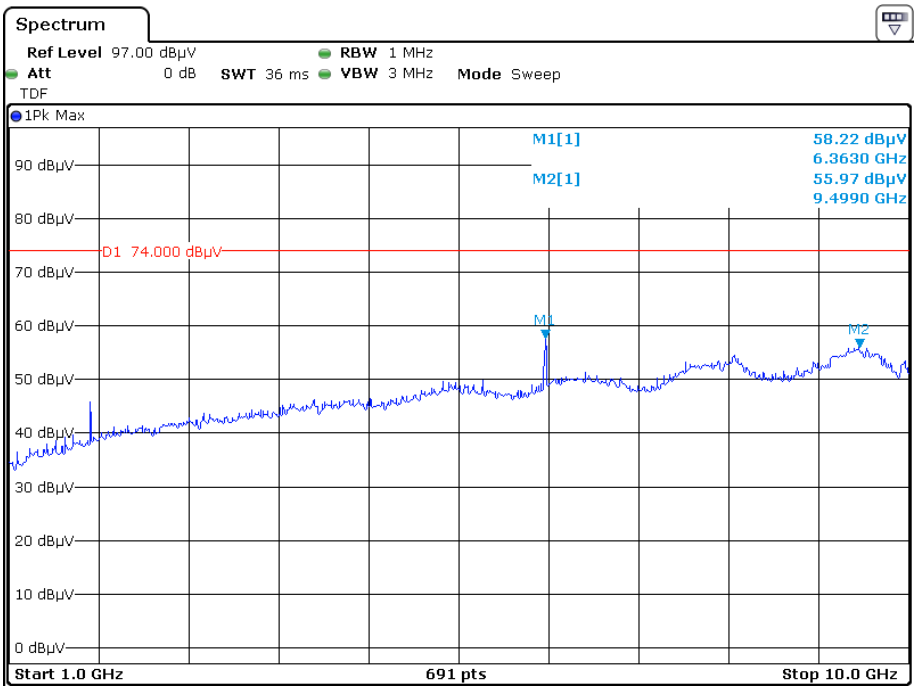
Note:
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude
The other spurious emission which is 20dB to the limit was not recorded.

Pre-scan with Antenna 10M Mode, Low channel, for Peak
Horizontal



Date: 27.OCT.2019 11:54:02

Vertical



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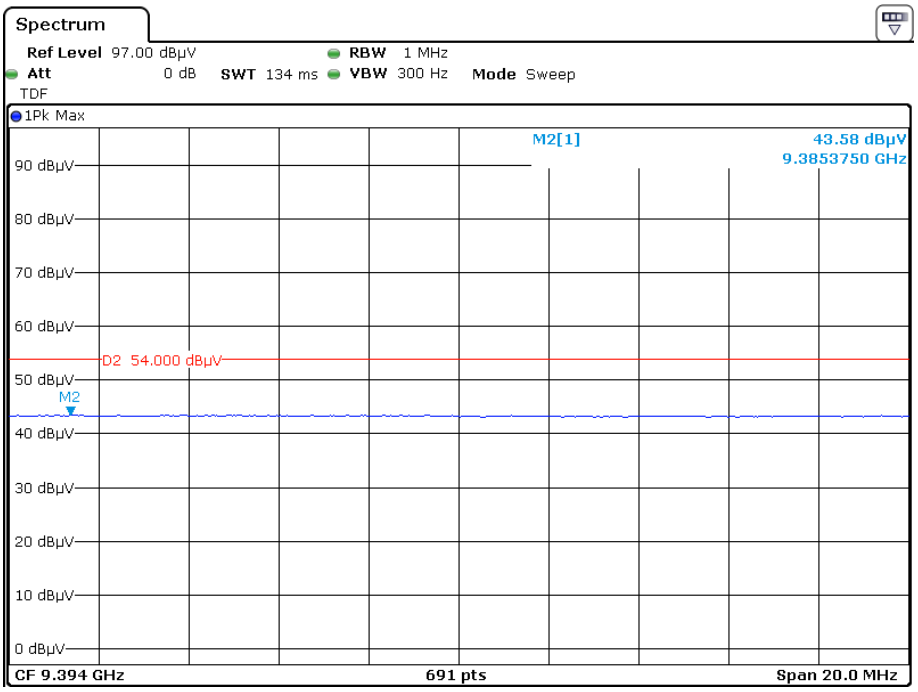
For Average
Horizontal



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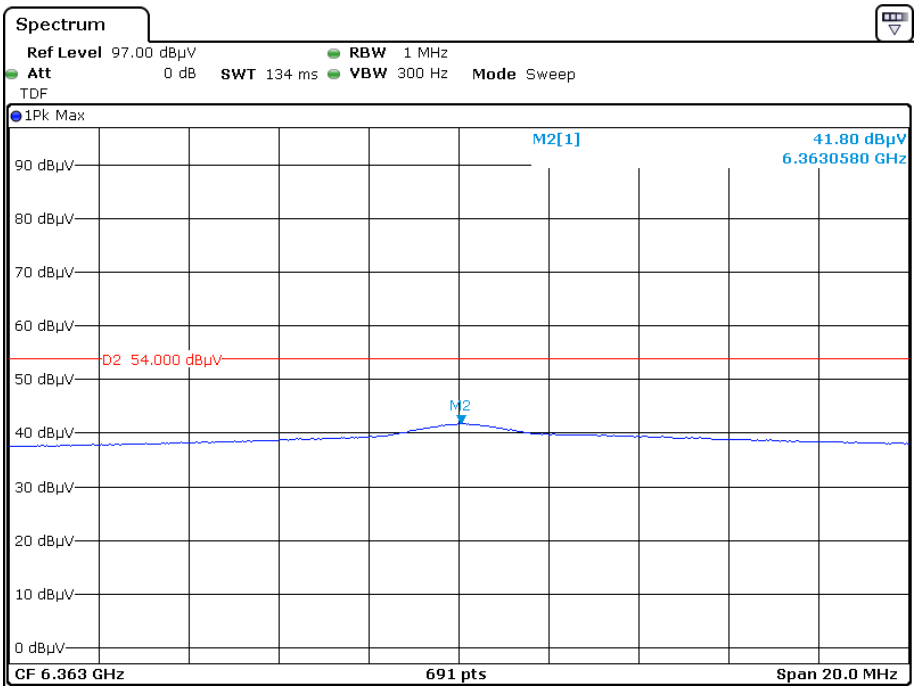

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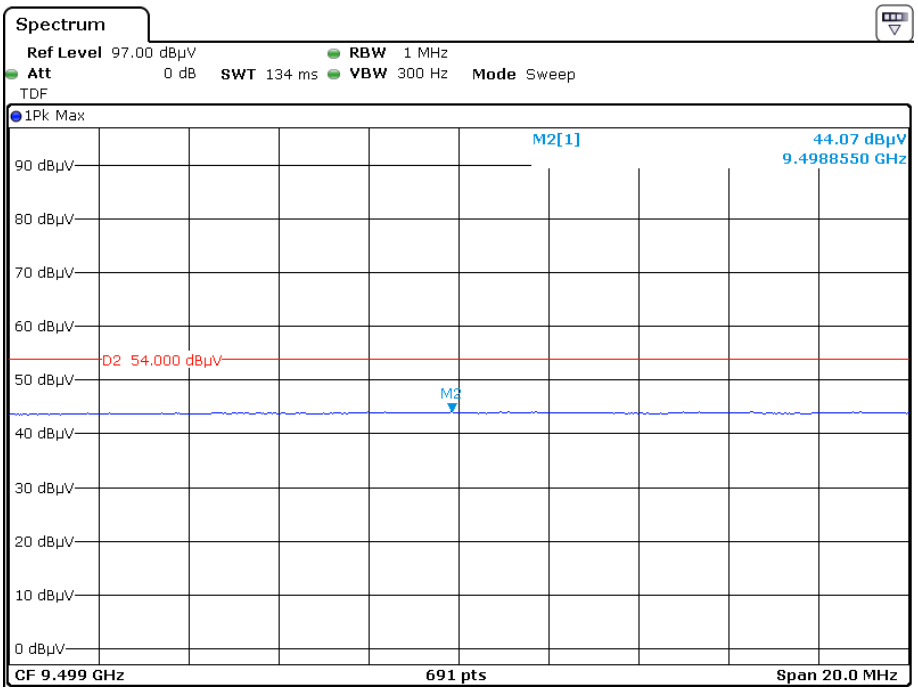
Vertical



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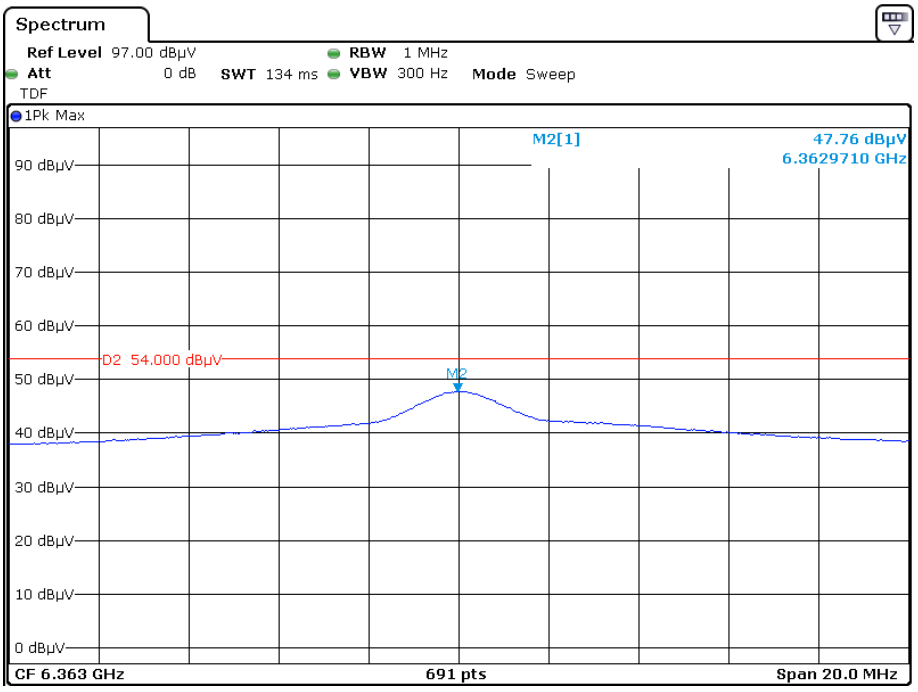
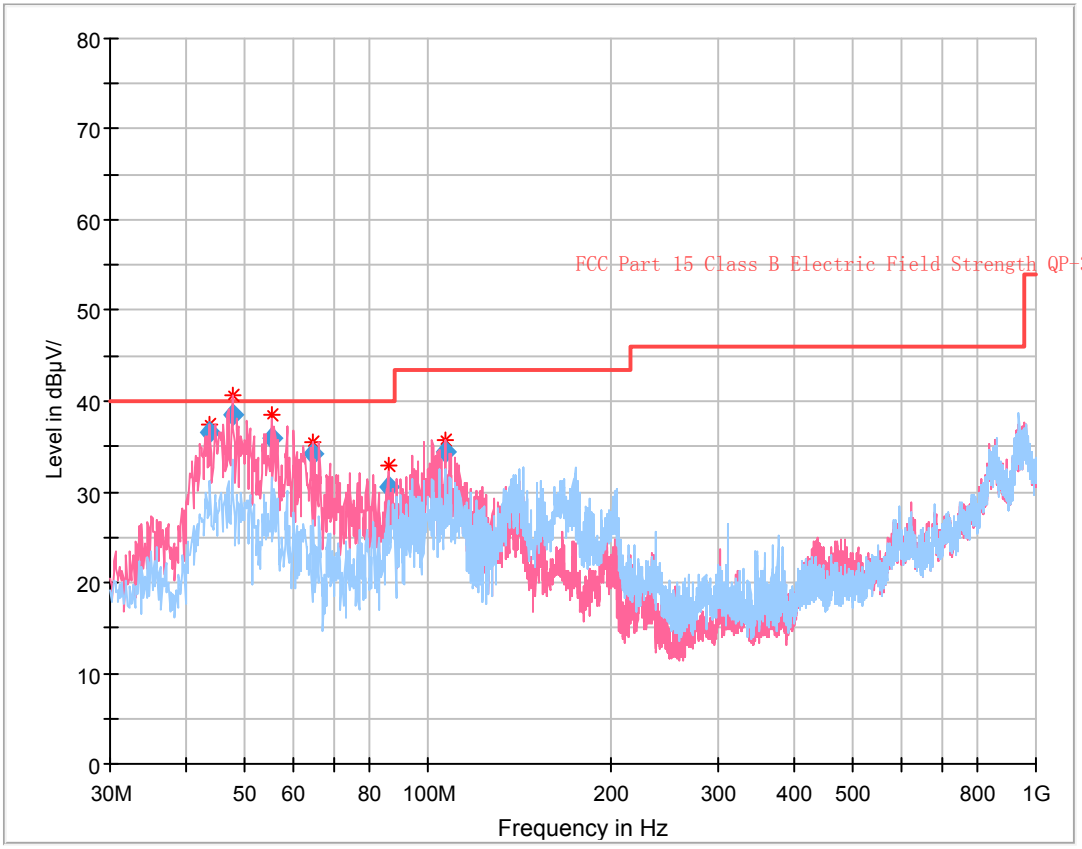


Date: 27.OCT.2019 11:47:32

For 2.4GHz:

30 MHz~1 GHz: (worst case is antenna 1, 1.4M mode, Middle channel)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
43.795000	36.51	102.0	V	357.0	-16.4	40.00	3.49
47.769500	38.44	110.0	V	107.0	-18.6	40.00	1.56
55.267625	35.81	116.0	V	27.0	-19.9	40.00	4.19
64.778625	34.22	102.0	V	77.0	-20.4	40.00	5.78
86.039375	30.60	122.0	V	13.0	-19.4	40.00	9.40
106.722875	34.38	111.0	V	148.0	-16.0	43.50	9.12

1 GHz-25 GHz:
Antenna 0:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
10M Mode									
Low Channel (2407.5 MHz)									
2389.83	33.57	PK	175	1.5	H	31.87	65.44	74	8.56
2389.83	18.12	Ave.	175	1.5	H	31.87	49.99	54	4.01
2499.89	28.77	PK	231	1.9	H	32.13	60.90	74	13.10
2499.89	15.24	Ave.	231	1.9	H	32.13	47.37	54	6.63
4815.00	49.62	PK	327	1.4	H	5.40	55.02	74	18.98
4815.00	41.63	Ave.	327	1.4	H	5.40	47.03	54	6.97
7222.50	48.00	PK	47	2.0	H	12.02	60.02	74	13.98
7222.50	33.20	Ave.	47	2.0	H	12.02	45.22	54	8.78
Middle Channel (2439.5MHz)									
1055.3	47.36	PK	176	1.8	H	-5.83	41.53	74	32.47
1055.3	38.89	Ave.	176	1.8	H	-5.83	33.06	54	20.94
4879.00	49.41	PK	321	2.5	H	6.43	55.84	74	18.16
4879.00	41.78	Ave.	321	2.5	H	6.43	48.21	54	5.79
7318.50	48.78	PK	247	1.8	H	11.17	59.95	74	14.05
7318.50	33.38	Ave.	247	1.8	H	11.17	44.55	54	9.45
High Channel (2471.5 MHz)									
2358.80	28.09	PK	5	1.5	H	31.77	59.86	74	14.14
2358.80	13.95	Ave.	5	1.5	H	31.77	45.72	54	8.28
2483.54	38.52	PK	355	2.2	H	32.13	70.65	74	3.35
2483.54	21.37	Ave.	355	2.2	H	32.13	53.50	54	0.50
1044.84	49.81	PK	17	2.0	H	-6.08	43.73	74	30.27
1044.84	33.85	Ave.	17	2.0	H	-6.08	27.77	54	26.23
2237.04	50.19	PK	69	2.0	H	-0.56	49.63	74	24.37
2237.04	35.20	Ave.	69	2.0	H	-0.56	34.64	54	19.36
4943.00	43.93	PK	267	2.4	H	6.43	50.36	74	23.64
4943.00	30.28	Ave.	267	2.4	H	6.43	36.71	54	17.29
7414.50	50.01	PK	258	2.4	H	12.31	62.32	74	11.68
7414.50	35.48	Ave.	255	2.4	H	12.31	47.79	54	6.21

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
1.4M Mode									
Low Channel (2403.5 MHz)									
2327.66	28.36	PK	318	1.4	H	31.64	60.00	74	14.00
2327.66	14.76	Ave.	318	1.4	H	31.64	46.40	54	7.60
2498.31	28.45	PK	168	1.3	H	32.13	60.58	74	13.42
2498.31	14.63	Ave.	168	1.3	H	32.13	46.76	54	7.24
1056.74	47.98	PK	81	1.2	H	-5.83	42.15	74	31.85
1056.74	40.28	Ave.	81	1.2	H	-5.83	34.45	54	19.55
4807.00	53.08	PK	292	1.1	H	5.40	58.48	74	15.52
4807.00	43.33	Ave.	292	1.1	H	5.40	48.73	54	5.27
7210.50	53.94	PK	177	1.2	H	12.02	65.96	74	8.04
7210.50	39.34	Ave.	177	1.2	H	12.02	51.36	54	2.64
Middle Channel (2439.5MHz)									
1056.19	48.37	PK	282	1.2	H	-5.83	42.54	74	31.46
1056.19	41.16	Ave.	282	1.2	H	-5.83	35.33	54	18.67
2231.41	51.19	PK	160	1.1	H	-0.56	50.63	74	23.37
2231.41	35.43	Ave.	160	1.1	H	-0.56	34.87	54	19.13
4879.00	52.29	PK	257	1.3	H	6.43	58.72	74	15.28
4879.00	42.72	Ave.	257	1.3	H	6.43	49.15	54	4.85
7318.50	54.23	PK	104	1.2	H	11.17	65.40	74	8.60
7318.50	40.08	Ave.	104	1.2	H	11.17	51.25	54	2.75
High Channel (2475.5 MHz)									
2356.80	28.42	PK	182	1.1	H	31.77	60.19	74	13.81
2356.80	14.03	Ave.	182	1.1	H	31.77	45.80	54	8.20
2484.09	31.82	PK	170	1.7	H	32.13	63.95	74	10.05
2484.09	14.72	Ave.	170	1.7	H	32.13	46.85	54	7.15
1056.66	49.52	PK	345	1.4	H	-5.83	43.69	74	30.31
1056.66	41.86	Ave.	345	1.4	H	-5.83	36.03	54	17.97
2239.63	52.75	PK	273	2.3	H	-0.56	52.19	74	21.81
2239.63	37.05	Ave.	273	2.3	H	-0.56	36.49	54	17.51
4951.00	52.83	PK	260	1.8	H	6.95	59.78	74	14.22
4951.00	41.08	Ave.	260	1.8	H	6.95	48.03	54	5.97
7426.50	53.56	PK	90	1.3	H	12.31	65.87	74	8.13
7426.50	38.20	Ave.	90	1.3	H	12.31	50.51	54	3.49

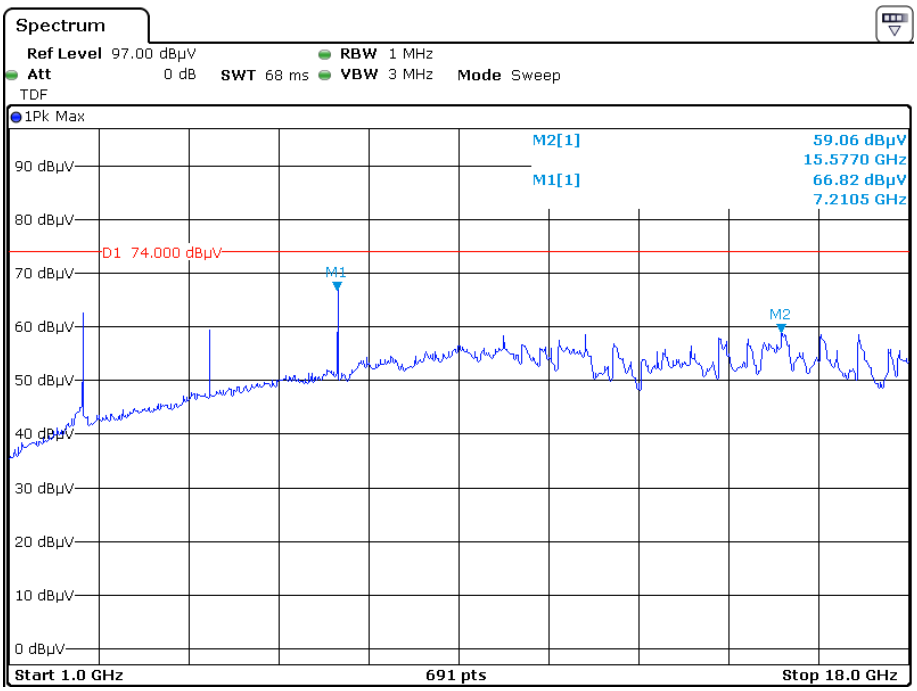
1 GHz-25 GHz:
Antenna 1:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
10M Mode									
Low Channel (2407.5 MHz)									
2389.94	31.31	PK	62	1.2	H	31.87	63.18	74	10.82
2389.94	17.32	Ave.	62	1.2	H	31.87	49.19	54	4.81
2491.20	28.05	PK	291	2.0	H	32.13	60.18	74	13.82
2491.20	15.32	Ave.	291	2.0	H	32.13	47.45	54	6.55
1058.89	48.63	PK	262	2.0	H	-5.83	42.80	74	31.20
1058.89	34.55	Ave.	262	2.0	H	-5.83	28.72	54	25.28
2347.7	45.89	PK	309	1.9	H	-1.05	44.84	74	29.16
2347.7	33.07	Ave.	309	1.9	H	-1.05	32.02	54	21.98
4815.00	50.37	PK	125	2.1	H	5.40	55.77	74	18.23
4815.00	42.09	Ave.	125	2.1	H	5.40	47.49	54	6.51
7222.50	48.28	PK	171	1.7	H	12.02	60.30	74	13.70
7222.50	35.18	Ave.	312	2.3	H	12.02	47.20	54	6.80
Middle Channel (2439.5MHz)									
1056.54	47.96	PK	64	1.3	H	-5.83	42.13	74	31.87
1056.54	34.25	Ave.	64	1.3	H	-5.83	28.42	54	25.58
2347.7	46.82	PK	178	2.5	H	-1.05	45.77	74	28.23
2347.7	33.16	Ave.	178	2.5	H	-1.05	32.11	54	21.89
4879.00	47.43	PK	37	1.1	H	6.43	53.86	74	20.14
4879.00	39.16	Ave.	37	1.1	H	6.43	45.59	54	8.41
7318.50	47.27	PK	234	1.5	H	11.17	58.44	74	15.56
7318.50	32.58	Ave.	234	1.5	H	11.17	43.75	54	10.25
High Channel (2471.5 MHz)									
2363.66	28.69	PK	32	1.7	H	31.87	60.56	74	13.44
2363.66	14.03	Ave.	32	1.7	H	31.87	45.90	54	8.10
2483.66	39.16	PK	60	2.3	H	32.13	71.29	74	2.71
2483.66	19.92	Ave.	60	2.3	H	32.13	52.05	54	1.95
1056.63	50.41	PK	332	1.8	H	-5.83	44.58	74	29.42
1056.63	38.20	Ave.	332	1.8	H	-5.83	32.37	54	21.63
2336.58	48.11	PK	159	1.2	H	-1.05	47.06	74	26.94
2336.58	33.97	Ave.	159	1.2	H	-1.05	32.92	54	21.08
4943.00	43.85	PK	82	2.5	H	6.43	50.28	74	23.72
4943.00	31.06	Ave.	82	2.5	H	6.43	37.49	54	16.51
7414.50	47.86	PK	141	1.6	H	12.31	60.17	74	13.83
7414.50	33.80	Ave.	141	1.6	H	12.31	46.11	54	7.89

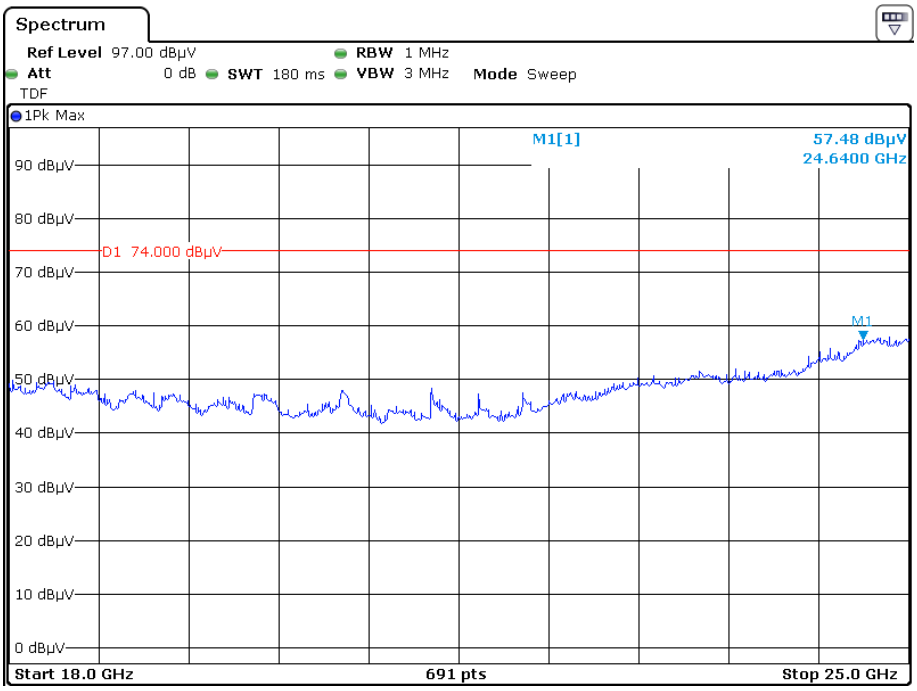
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
1.4M Mode									
Low Channel (2403.5 MHz)									
2347.22	28.34	PK	304	1.5	H	31.64	59.98	74	14.02
2347.22	15.21	Ave.	304	1.5	H	31.64	46.85	54	7.15
2496.24	28.29	PK	263	2.3	H	32.13	60.42	74	13.58
2496.24	15.22	Ave.	263	2.3	H	32.13	47.35	54	6.65
1056.33	48.71	PK	328	1.6	H	-5.66	43.05	74	30.95
1056.33	36.10	Ave.	328	1.6	H	-5.66	30.44	54	23.56
4807.00	54.84	PK	348	2.0	H	5.40	60.24	74	13.76
4807.00	45.00	Ave.	348	2.0	H	5.40	50.40	54	3.60
7210.50	53.72	PK	349	1.8	H	12.02	65.74	74	8.26
7210.50	38.11	Ave.	349	1.8	H	12.02	50.13	54	3.87
Middle Channel (2439.5MHz)									
1056.33	48.67	PK	310	2.3	H	-5.83	42.84	74	31.16
1056.33	35.88	Ave.	310	2.3	H	-5.83	30.05	54	23.95
4879.00	51.99	PK	143	1.4	H	6.43	58.42	74	15.58
4879.00	42.40	Ave.	143	1.4	H	6.43	48.83	54	5.17
7318.50	53.66	PK	325	2.1	H	11.17	64.83	74	9.17
7318.50	39.07	Ave.	325	2.1	H	11.17	50.24	54	3.76
High Channel (2475.5 MHz)									
2376.63	28.17	PK	158	1.1	H	31.87	60.04	74	13.96
2376.63	13.94	Ave.	158	1.1	H	31.87	45.81	54	8.19
2488.19	30.00	PK	34	1.6	H	32.13	62.13	74	11.87
2488.19	14.40	Ave.	34	1.6	H	32.13	46.53	54	7.47
1056.88	48.69	PK	258	2.0	H	-5.83	42.86	74	31.14
1056.88	35.52	Ave.	258	2.0	H	-5.83	29.69	54	24.31
4951.00	47.49	PK	76	1.3	H	6.95	54.44	74	19.56
4951.00	34.75	Ave.	76	1.3	H	6.95	41.70	54	12.30
7426.50	54.82	PK	79	2.1	H	12.31	67.13	74	6.87
7426.50	38.96	Ave.	79	2.1	H	12.31	51.27	54	2.73

Note:
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude
The other spurious emission which is 20dB to the limit was not recorded.
And for the pre-scan is performed with the 2400-2483.5MHz band filter.

Pre-scan with Antenna0 1.4M Mode, Low channel, for Peak Horizontal

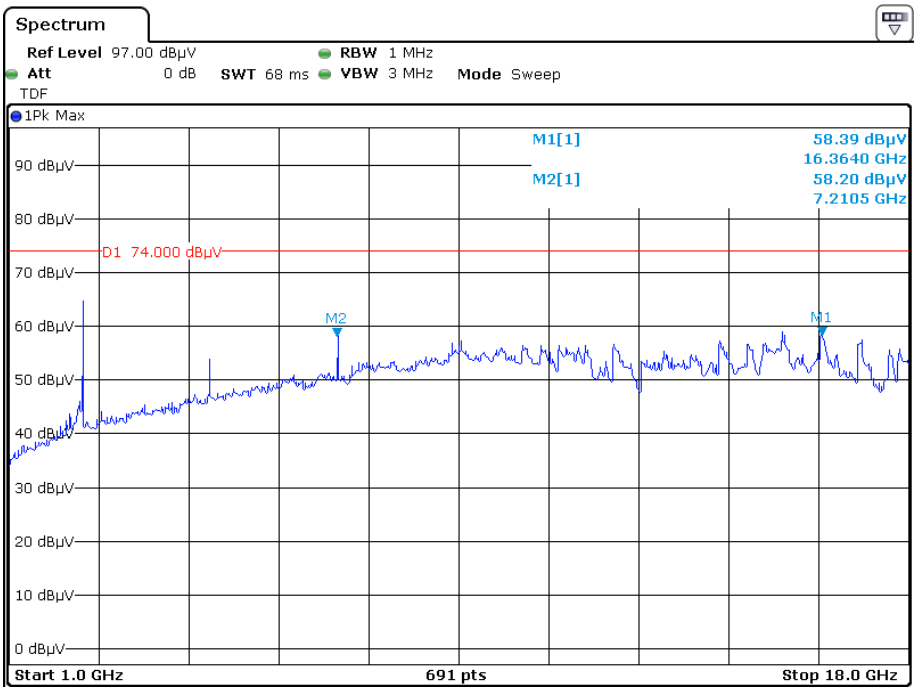


Date: 21.OCT.2019 08:01:40

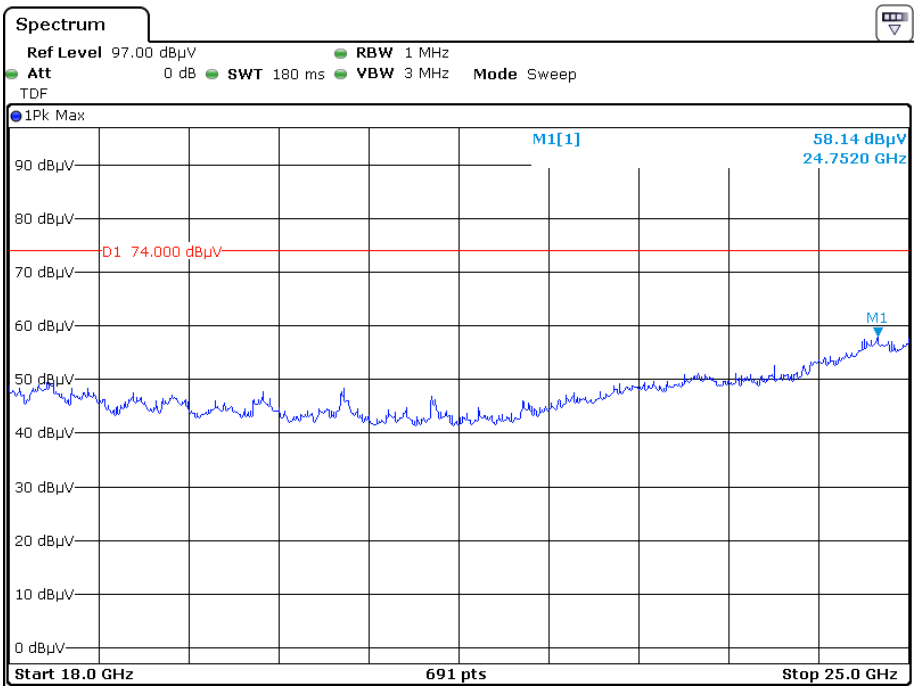


Date: 21.OCT.2019 09:04:44

Vertical

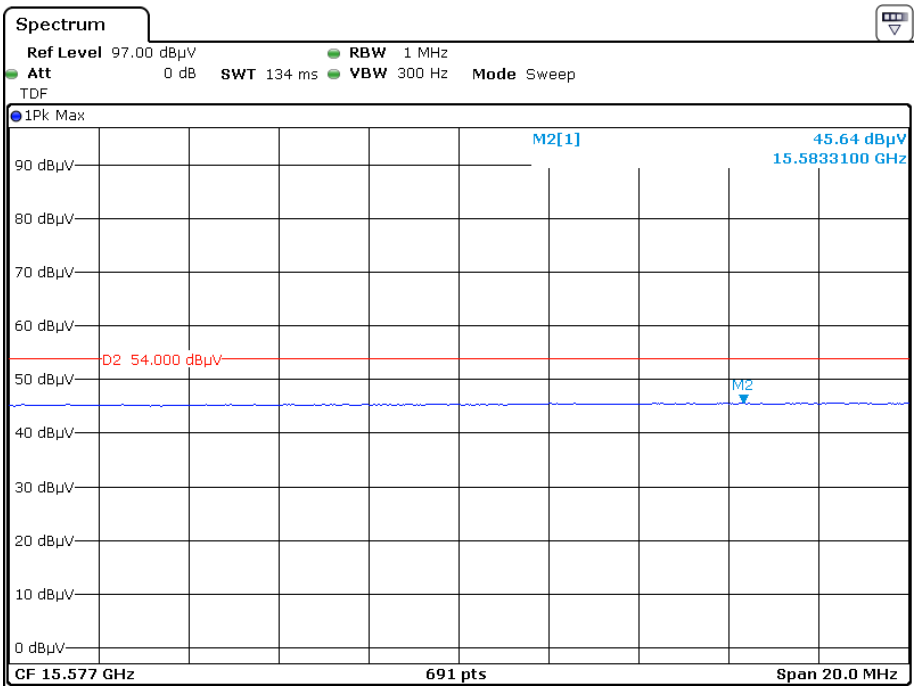


Date: 21.OCT.2019 08:21:26

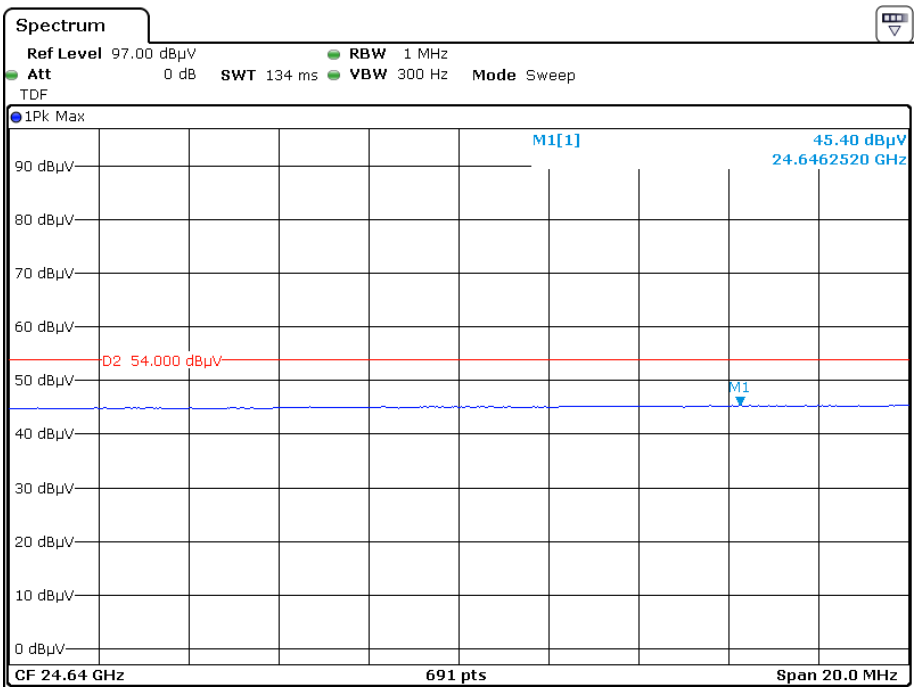


Date: 21.OCT.2019 09:16:32

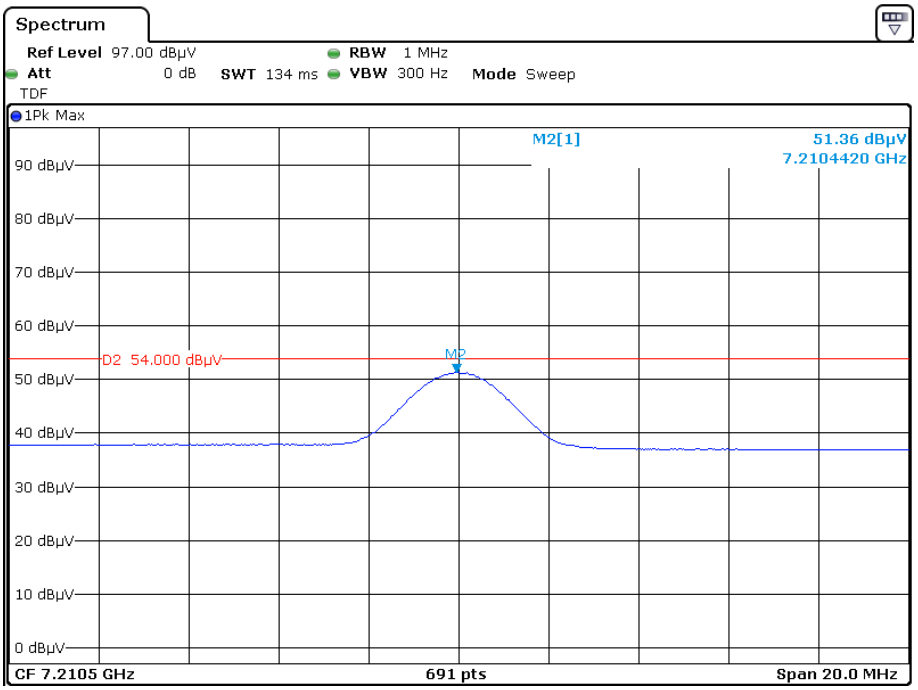
For Average
Horizontal



Date: 21.OCT.2019 08:09:01

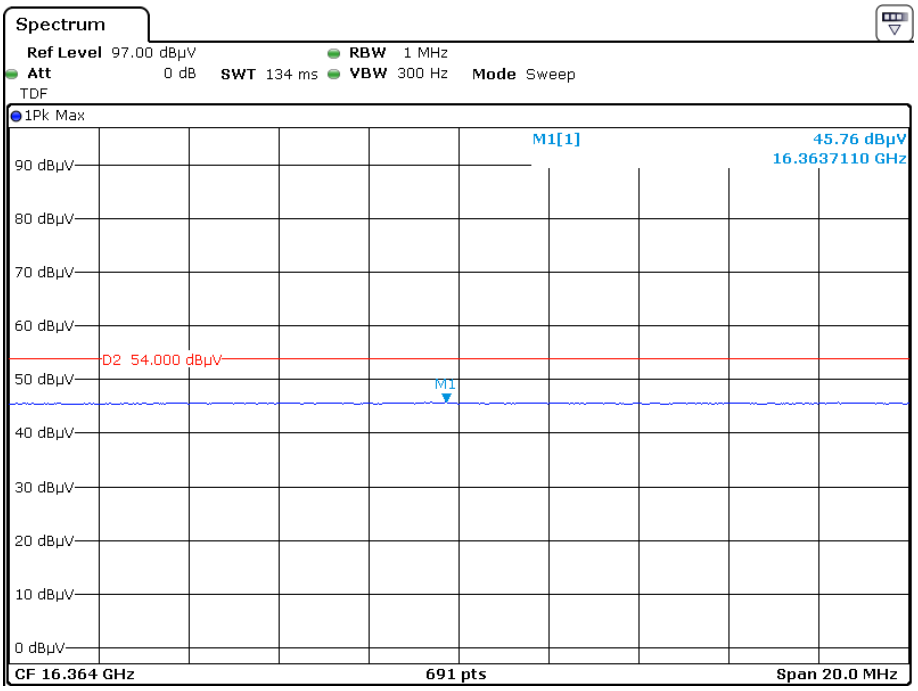


Date: 21.OCT.2019 09:10:59

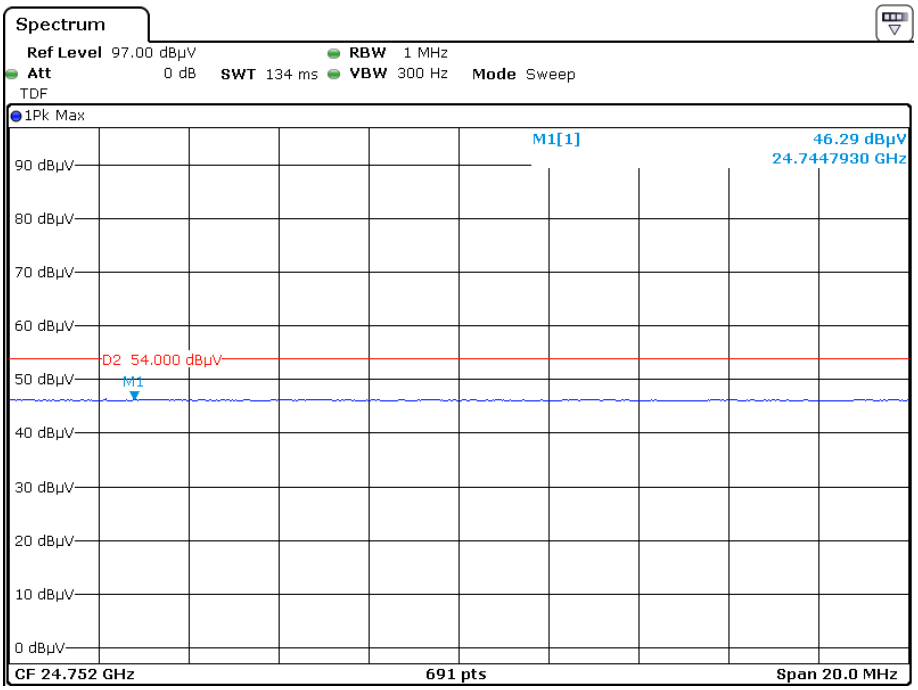


Date: 21.OCT.2019 08:15:11

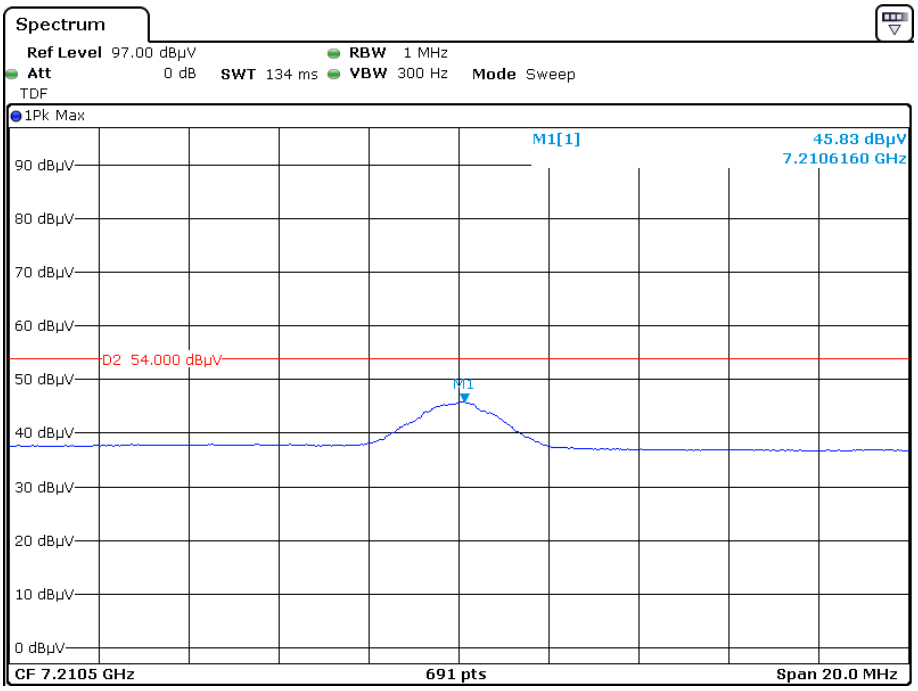
Vertical



Date: 21.OCT.2019 08:27:25



Date: 21.OCT.2019 09:22:29



Date: 21.OCT.2019 08:33:10

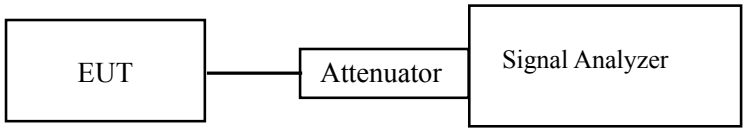
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

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

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



Test Data

Environmental Conditions

Temperature:	24~25 ℃
Relative Humidity:	54~56 %
ATM Pressure:	101.0 kPa

The testing was performed by Leo Huang from 2019-09-16 to 2019-09-17.

Test Result: Pass.

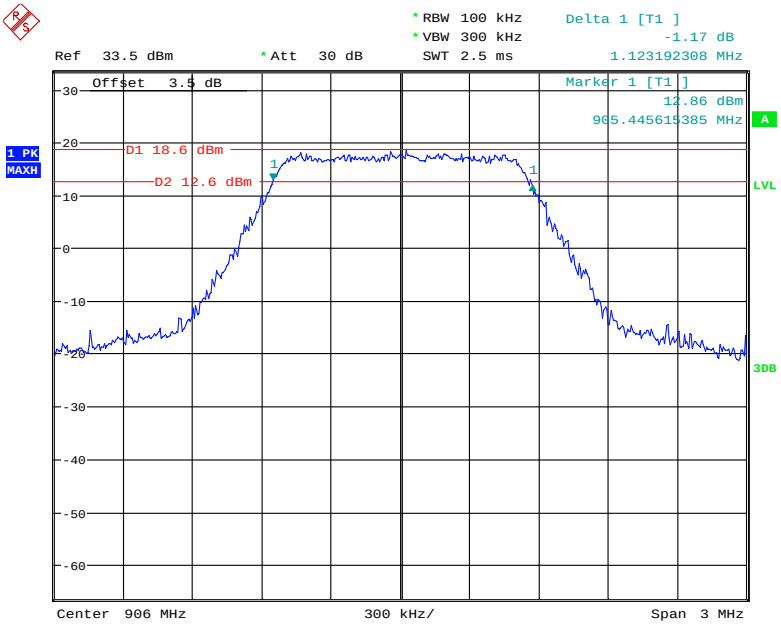
Please refer to the following table and plots.

EUT operation mode: Transmitting

For 900MHz Antenna 0:

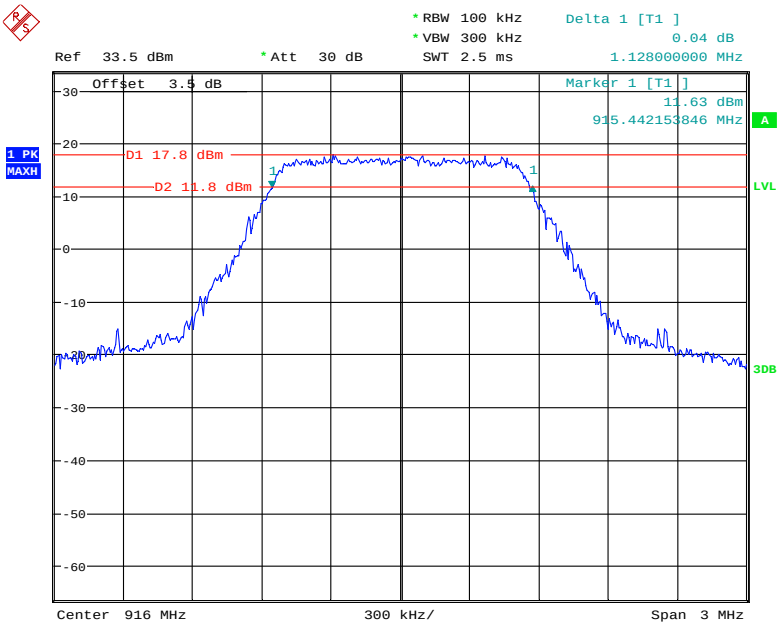
Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (kHz)
1.4M Mode			
Low	906	1.123	≥500
Middle	916	1.128	≥500
High	924	1.119	≥500
10M Mode			
Low	909	9.045	⩾500
Middle	915	8.994	⩾500
High	921	8.929	⩾500

1.4M Mode
Low Channel



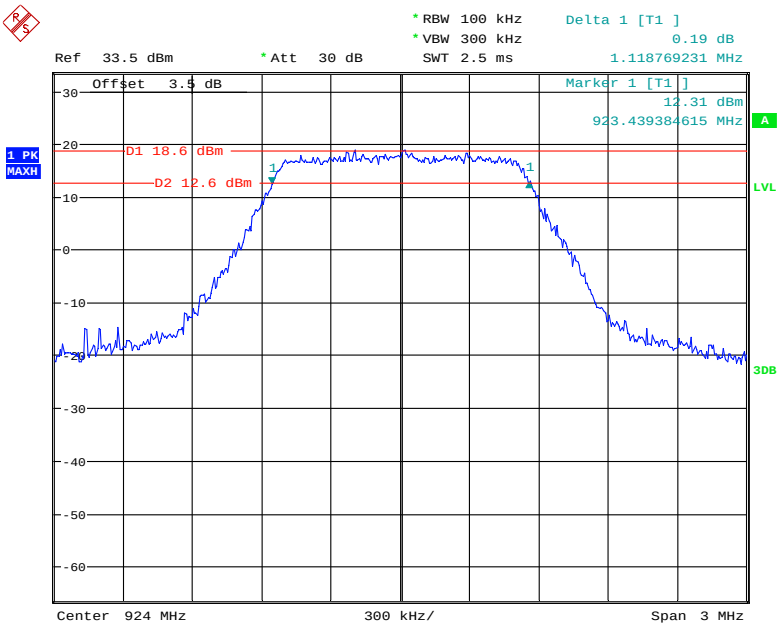
Date: 17.SEP.2019 09:04:21

Middle Channel



Date: 17.SEP.2019 09:03:10

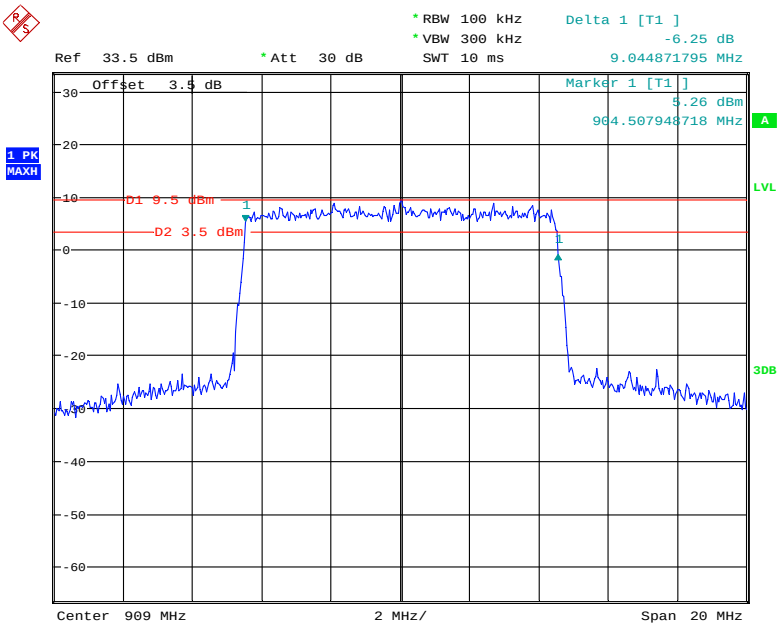
High Channel



Date: 17.SEP.2019 09:00:49

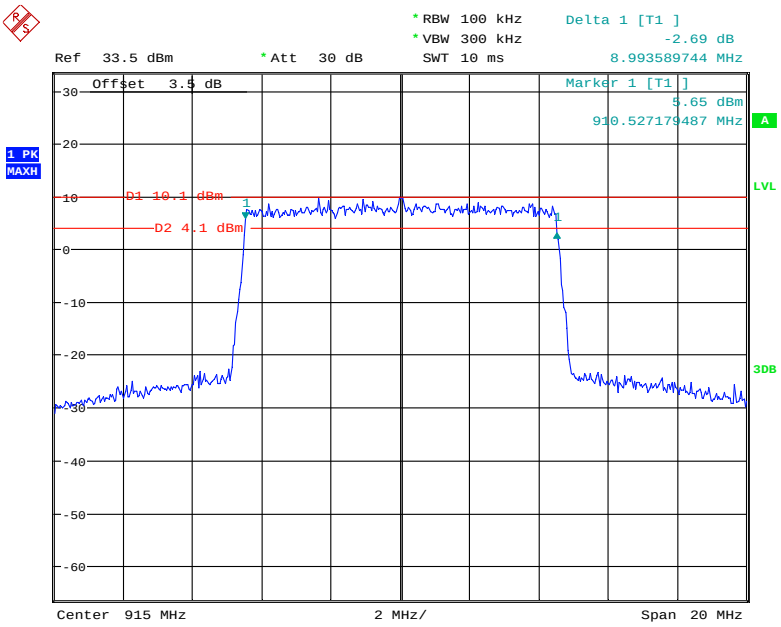
10M Mode

Low Channel



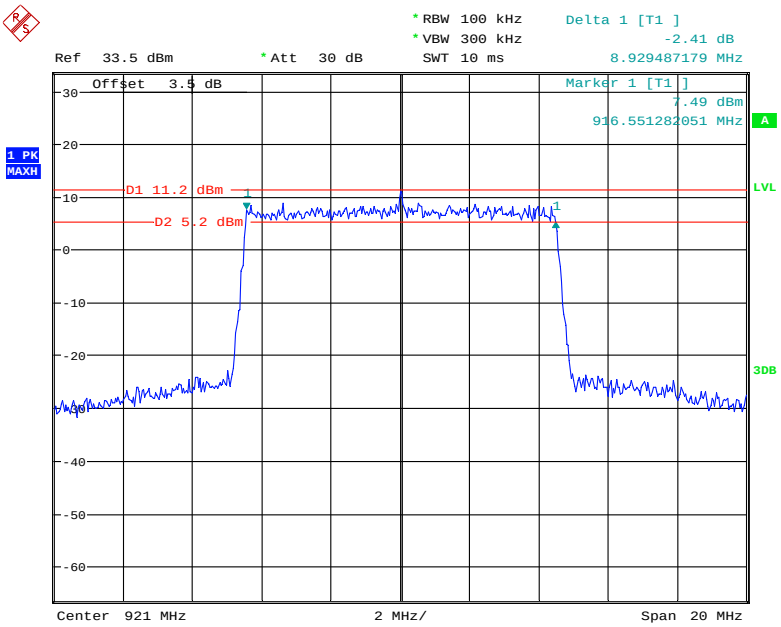
Date: 16.SEP.2019 11:25:00

Middle Channel



Date: 16.SEP.2019 11:23:17

High Channel



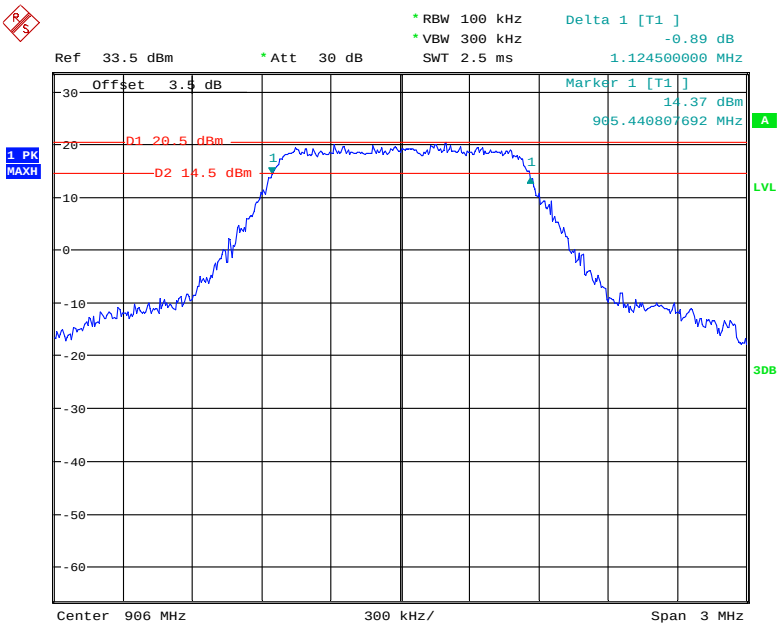
Date: 16.SEP.2019 11:20:55

For 900MHz Antenna 1:

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (kHz)
1.4M Mode			
Low	906	1.125	≥500
Middle	916	1.112	≥500
High	924	1.113	≥500
10M Mode			
Low	909	9.026	⩾500
Middle	915	8.994	⩾500
High	921	8.994	⩾500

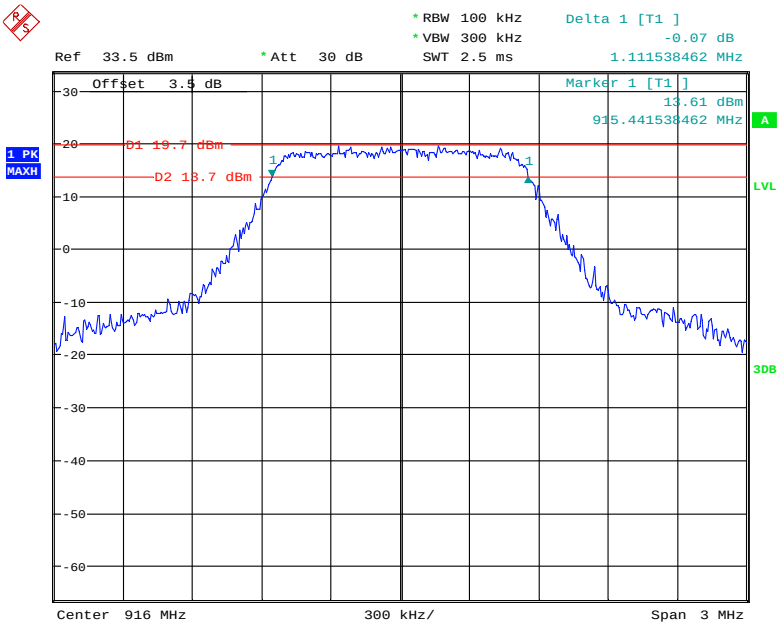
1.4M Mode

Low Channel



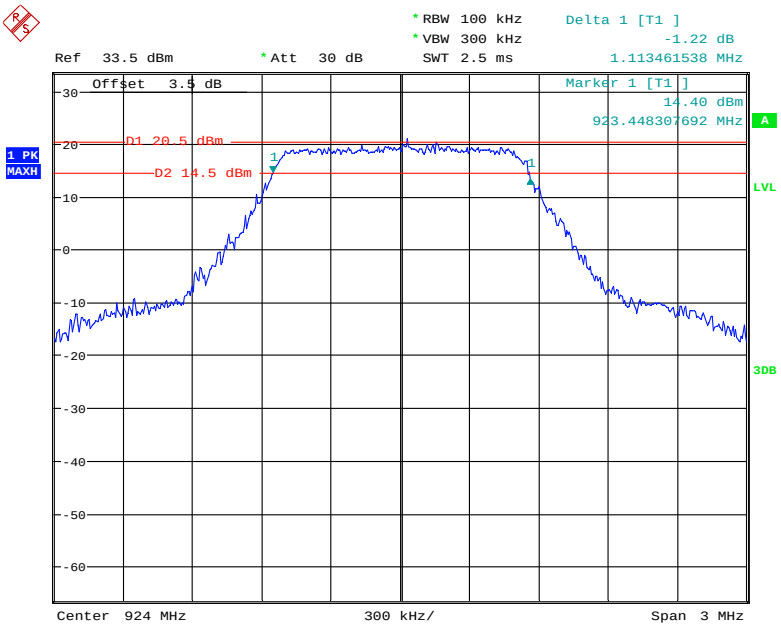
Date: 17.SEP.2019 09:33:50

Middle Channel



Date: 17.SEP.2019 09:32:32

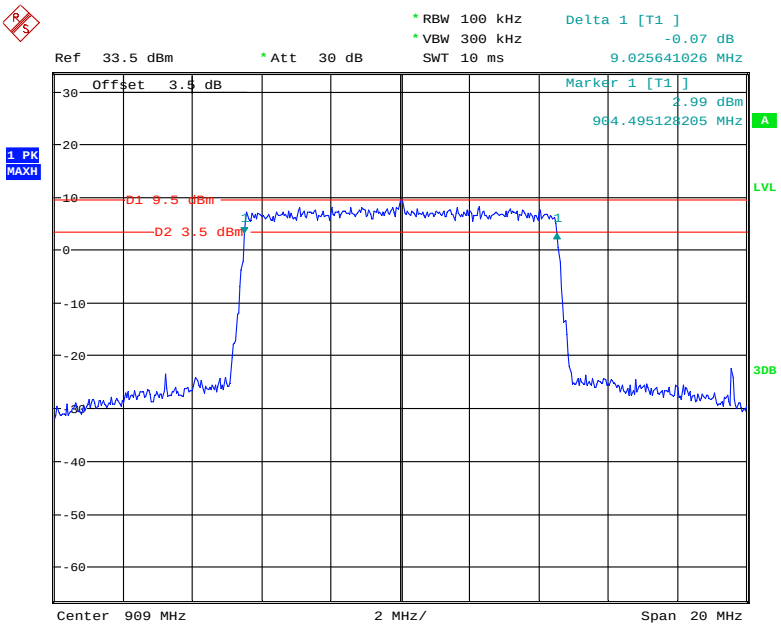
High Channel



Date: 17.SEP.2019 09:31:20

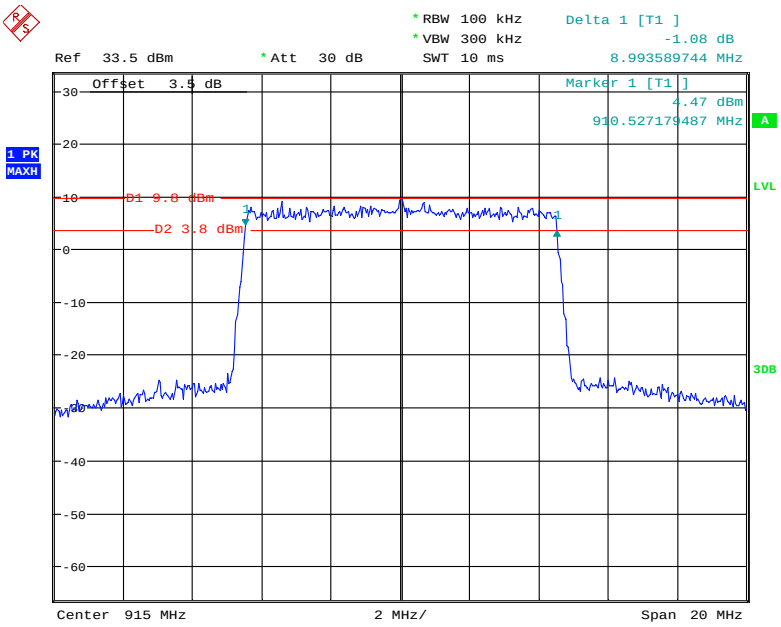
10M Mode

Low Channel



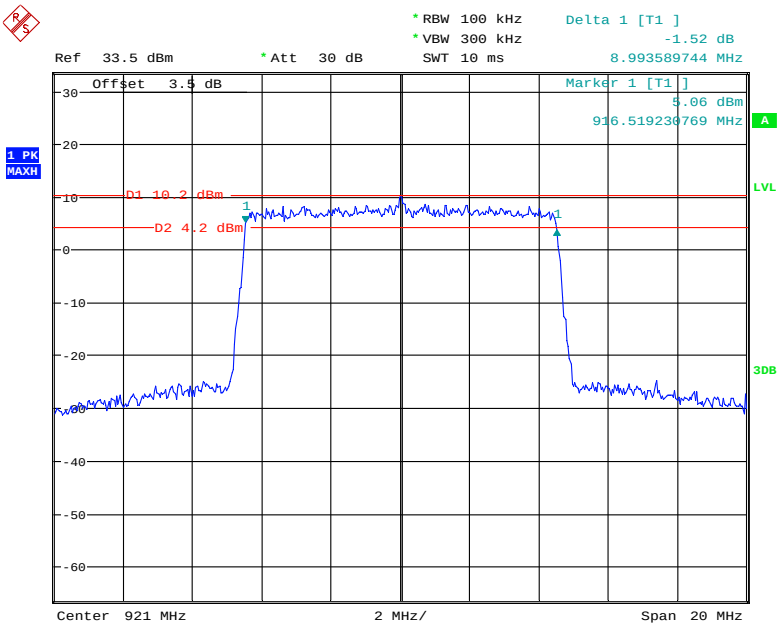
Date: 16.SEP.2019 13:22:05

Middle Channel



Date: 16.SEP.2019 13:17:59

High Channel

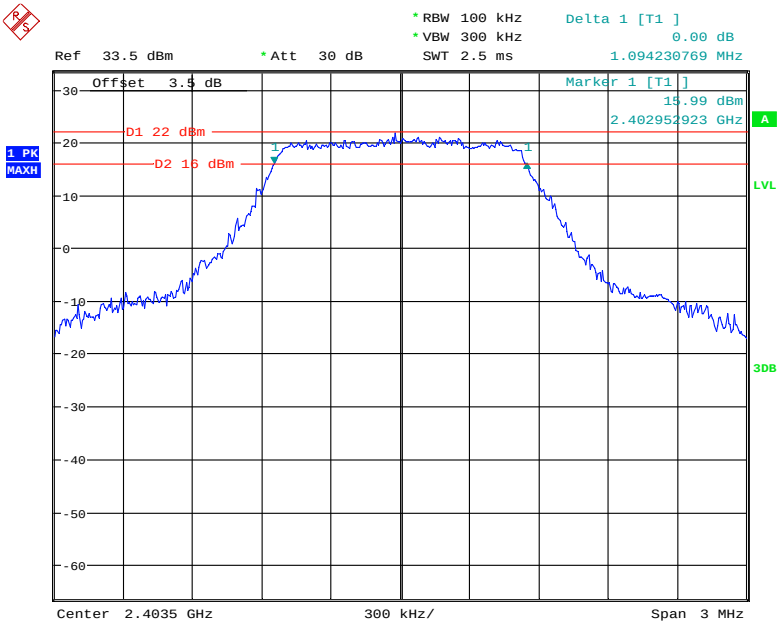


Date: 16.SEP.2019 13:20:43

For 2.4GHz Antenna 0:

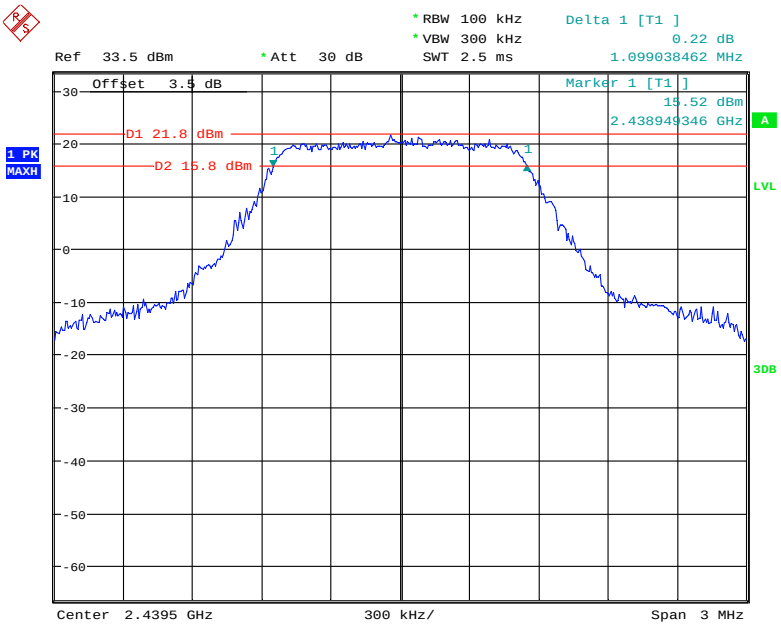
Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (kHz)
1.4M Mode			
Low	2403.5	1.094	≥500
Middle	2439.5	1.099	≥500
High	2475.5	1.105	≥500
10M Mode			
Low	2407.5	8.925	≥500
Middle	2439.5	8.977	≥500
High	2471.5	8.962	≥500

1.4M Mode
Low Channel



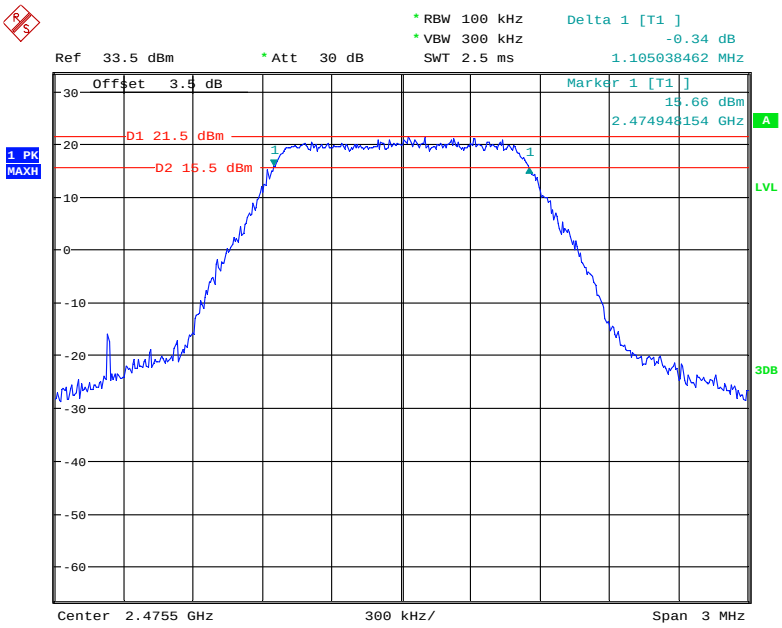
Date: 16.SEP.2019 09:51:11

Middle Channel



Date: 16.SEP.2019 09:49:08

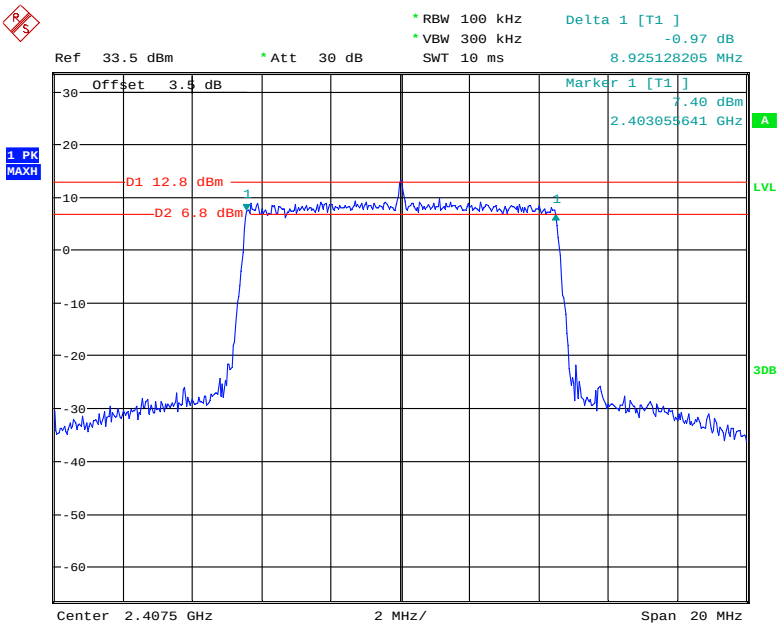
High Channel



Date: 6.NOV.2019 17:05:00

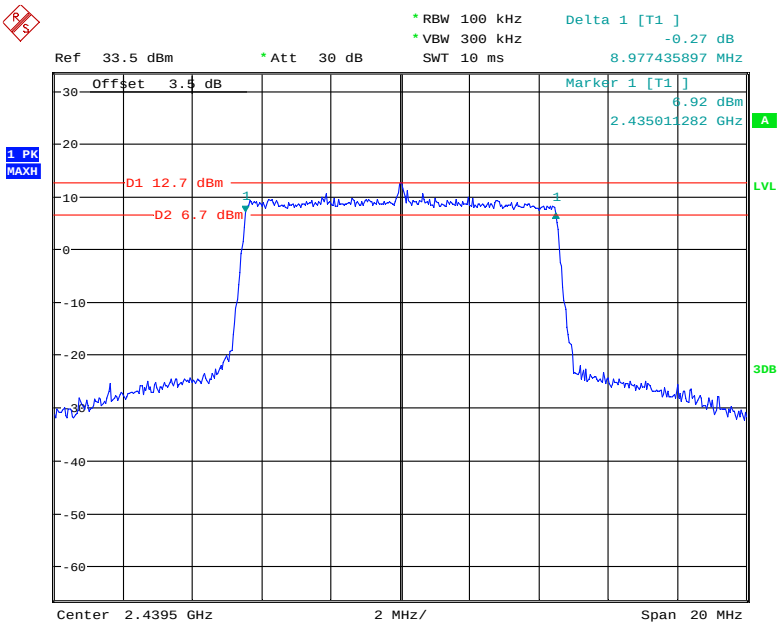
10M Mode

Low Channel



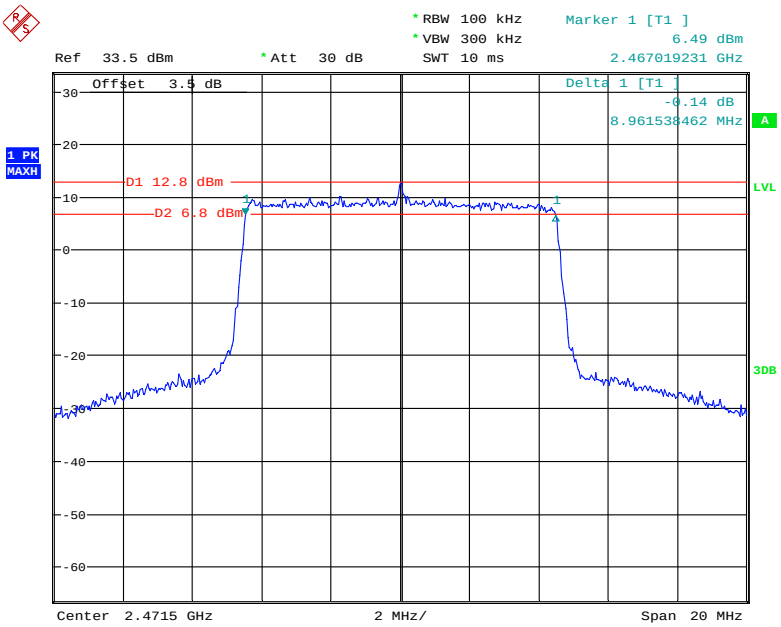
Date: 16.SEP.2019 09:44:35

Middle Channel



Date: 16.SEP.2019 09:46:39

High Channel



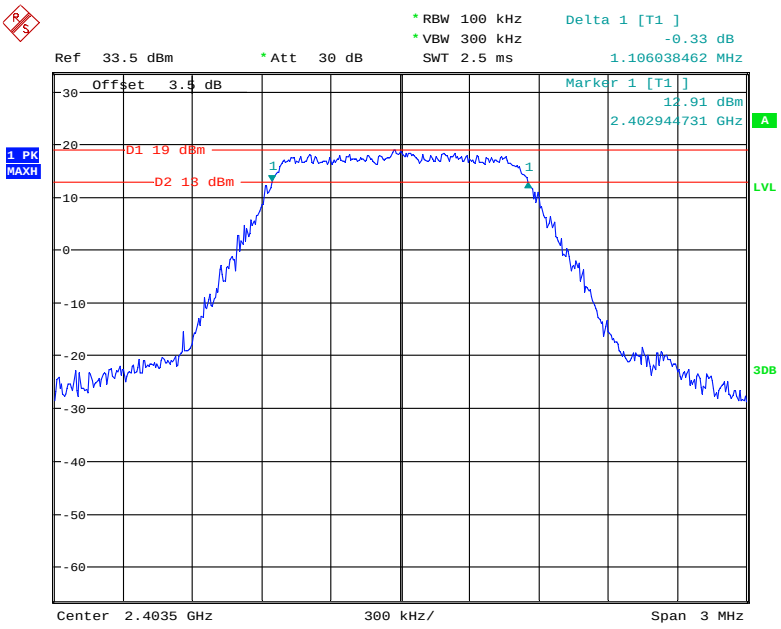
Date: 16.SEP.2019 09:37:55

For 2.4GHz Antenna 1:

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (kHz)
1.4M Mode			
Low	2403.5	1.106	≥500
Middle	2439.5	1.109	≥500
High	2475.5	1.112	≥500
10M Mode			
Low	2407.5	8.937	≥500
Middle	2439.5	8.929	≥500
High	2471.5	8.962	≥500

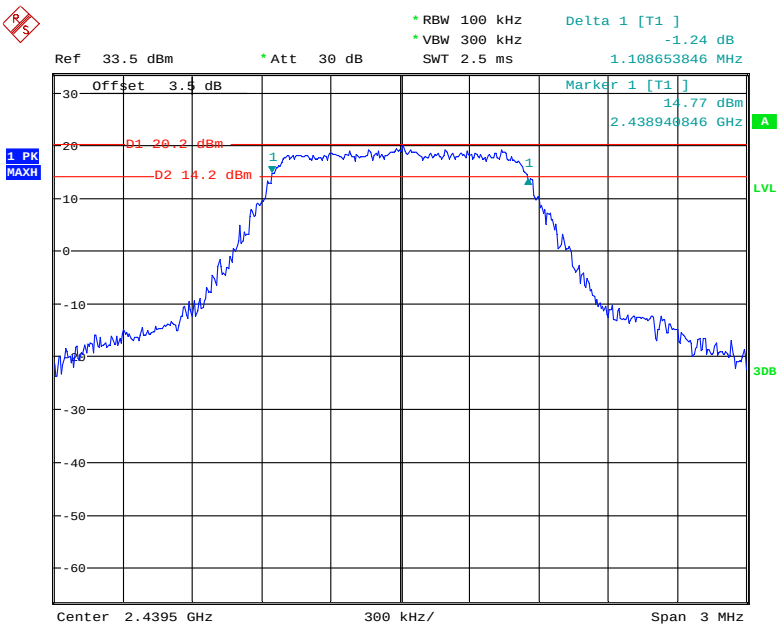
1.4M Mode

Low Channel



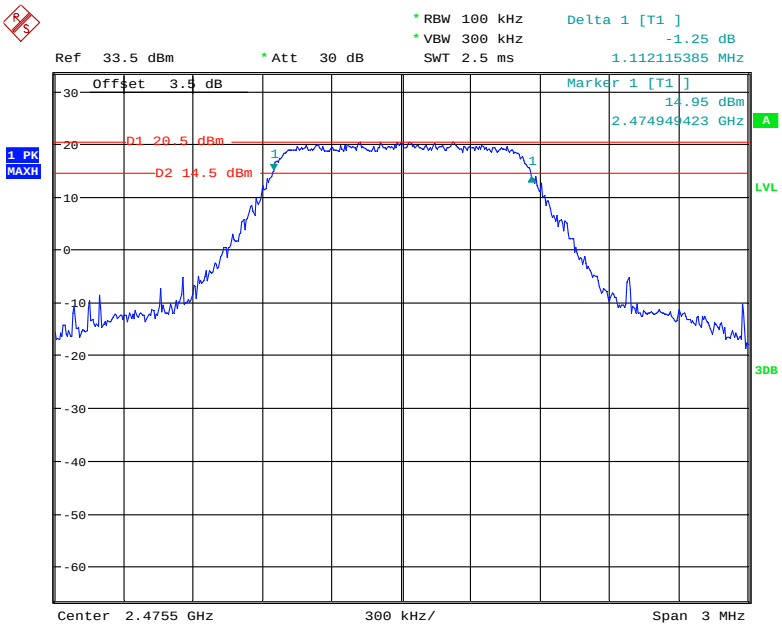
Date: 16.SEP.2019 14:18:07

Middle Channel



Date: 16.SEP.2019 14:22:11

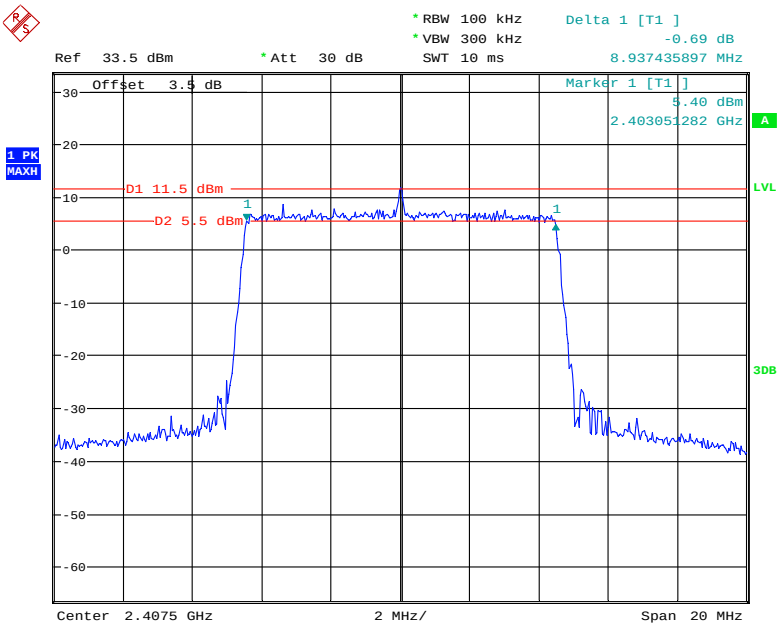
High Channel



Date: 6.NOV.2019 16:54:15

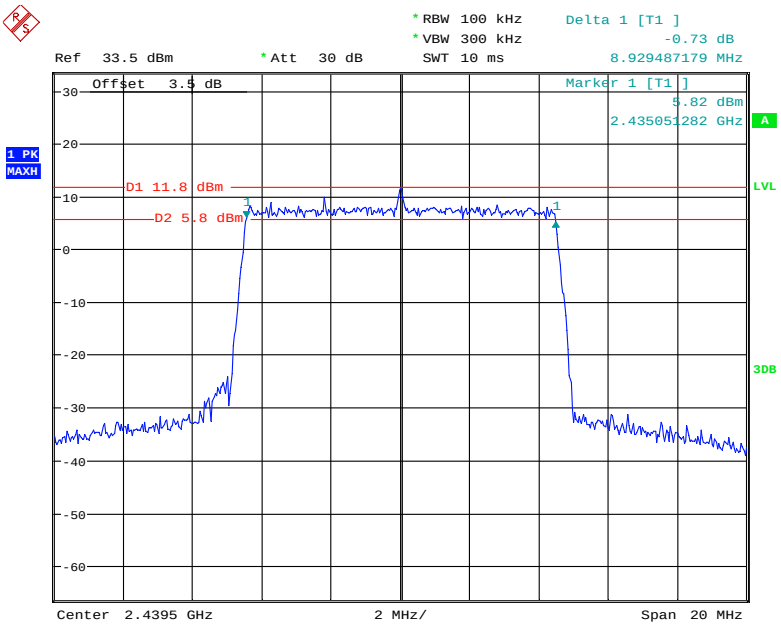
10M Mode

Low Channel



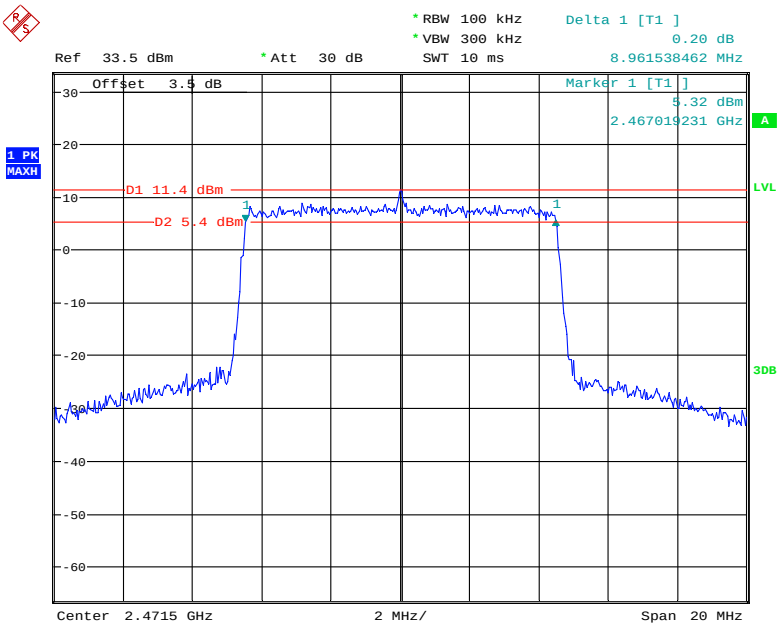
Date: 16.SEP.2019 14:35:16

Middle Channel



Date: 16.SEP.2019 14:28:36

High Channel



Date: 16.SEP.2019 14:27:08

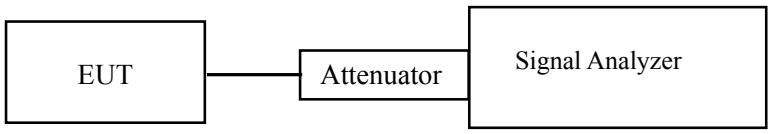
FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.



Test Data

Environmental Conditions

Temperature:	24~25 ℃
Relative Humidity:	54~56 %
ATM Pressure:	101.0 kPa

The testing was performed by Leo Huang from 2019-09-16 to 2019-09-17.

EUT operation mode: Transmitting

Antenna 0:

For 900MHz:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Max Average Output Power (dBm)	Limit (dBm)
1.4M Mode				
Low	906	24.74	22.96	30
Middle	916	24.54	22.12	30
High	924	24.82	22.78	30
10M Mode				
Low	909	25.11	19.53	30
Middle	915	25.20	19.27	30
High	921	25.11	19.55	30

For 2.4GHz:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Max Average Output Power (dBm)	Limit (dBm)
1.4M Mode				
Low	2403.5	25.88	23.97	30
Middle	2439.5	25.53	23.26	30
High	2475.5	25.08	23.13	30
10M Mode				
Low	2407.5	25.98	20.06	30
Middle	2439.5	25.69	20.06	30
High	2471.5	25.26	19.70	30

Antenna 1:

For 900MHz:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Max Average Output Power (dBm)	Limit (dBm)
1.4M Mode				
Low	906	25.80	24.32	30
Middle	916	25.74	23.90	30
High	924	25.88	23.93	30
10M Mode				
Low	909	24.69	19.60	30
Middle	915	24.79	19.05	30
High	921	24.73	19.08	30

For 2.4GHz:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Max Average Output Power (dBm)	Limit (dBm)
1.4M Mode				
Low	2403.5	26.22	24.11	30
Middle	2439.5	26.51	24.36	30
High	2475.5	26.07	24.59	30
10M Mode				
Low	2407.5	24.58	18.63	30
Middle	2439.5	25.11	19.52	30
High	2471.5	25.08	19.59	30

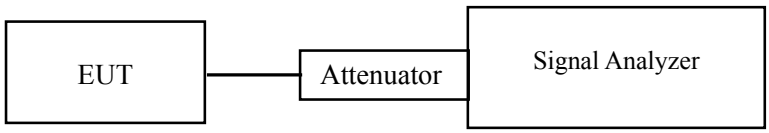
FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

Applicable Standard

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

Test Procedure

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



Test Data

Environmental Conditions

Temperature:	24~25 ℃
Relative Humidity:	54~56 %
ATM Pressure:	101.0 kPa

The testing was performed by Leo Huang from 2019-09-16 to 2019-11-06.

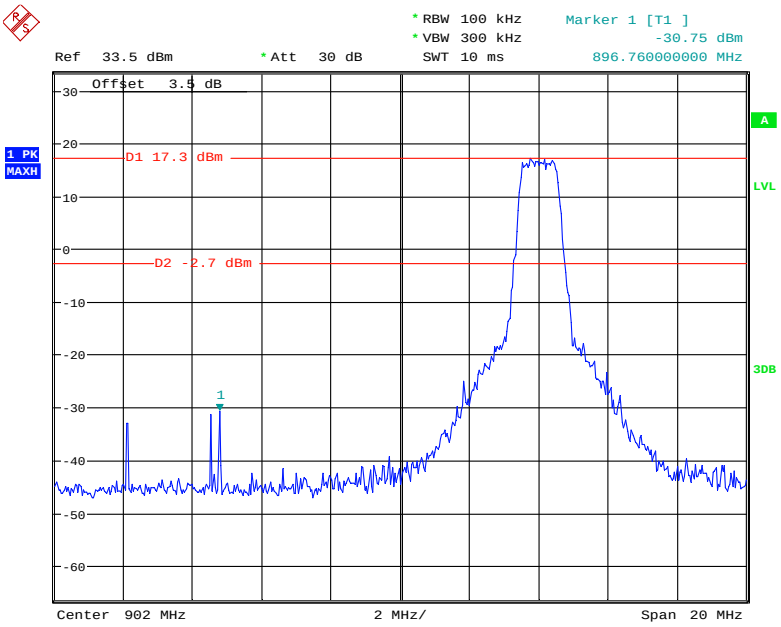
EUT operation mode: Transmitting

Test Result: Compliance

Please refer to the following plots.

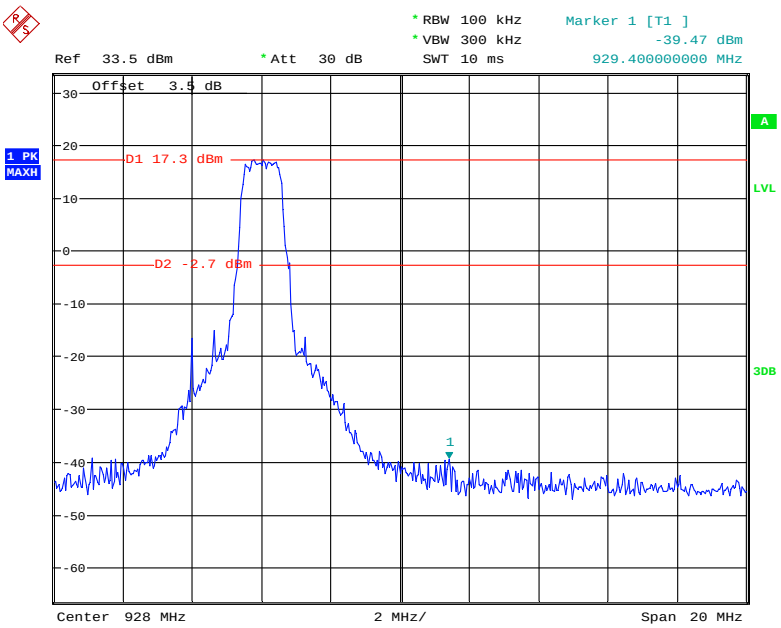
For 900MHz Antenna 0

1.4M Mode: Band Edge, Left Side



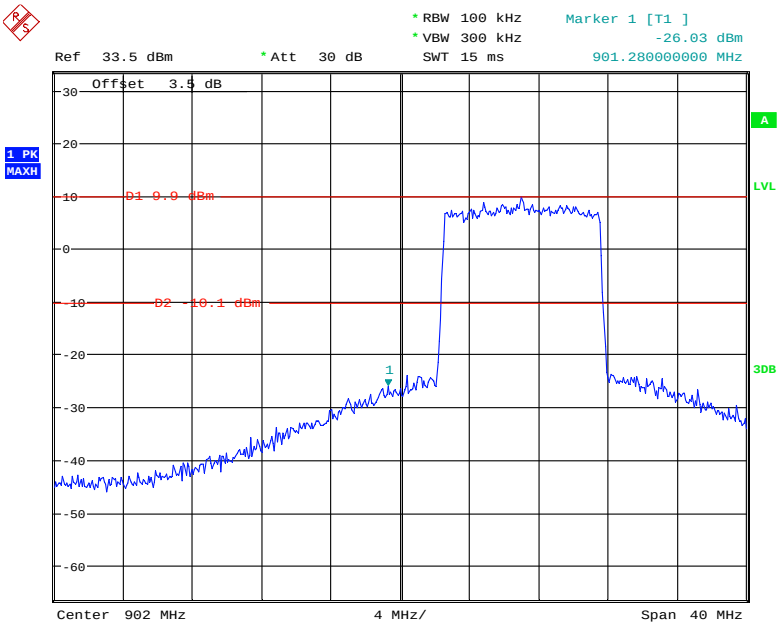
Date: 17.SEP.2019 09:08:32

1.4M Mode: Band Edge, Right Side



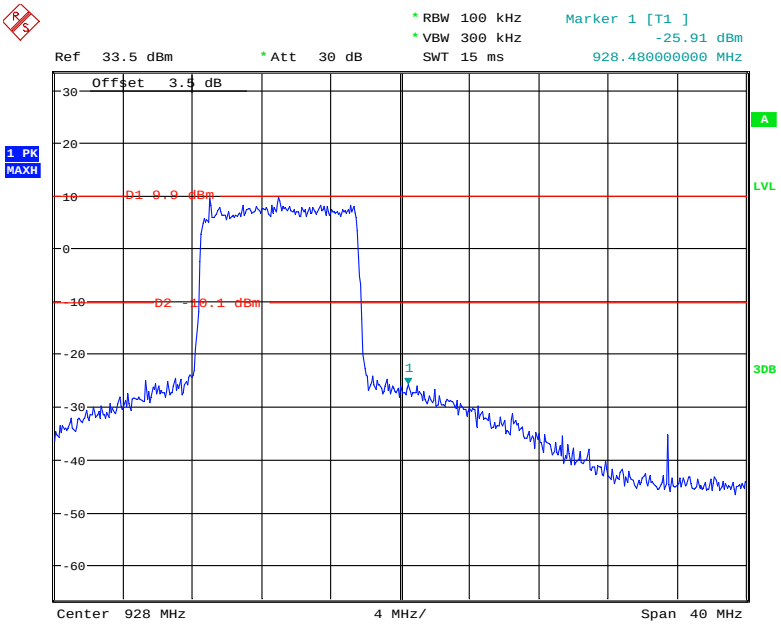
Date: 17.SEP.2019 09:09:34

10M Mode: Band Edge, Left Side



Date: 16.SEP.2019 11:27:56

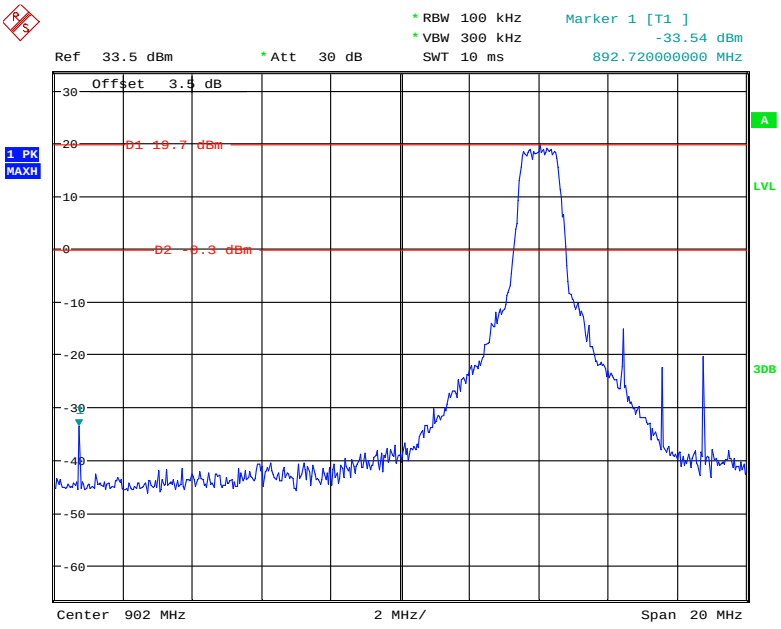
10M Mode: Band Edge, Right Side



Date: 16.SEP.2019 11:30:22

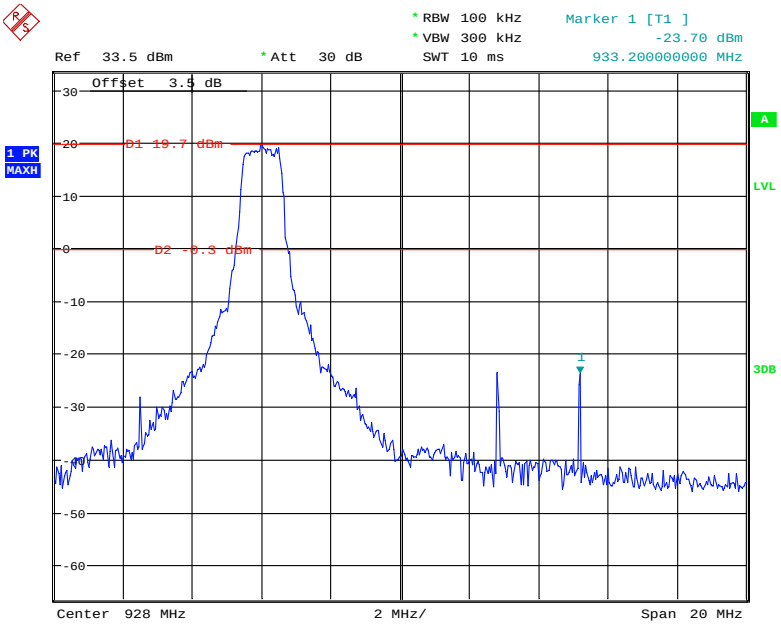
For 900MHz Antenna 1

1.4M Mode: Band Edge, Left Side



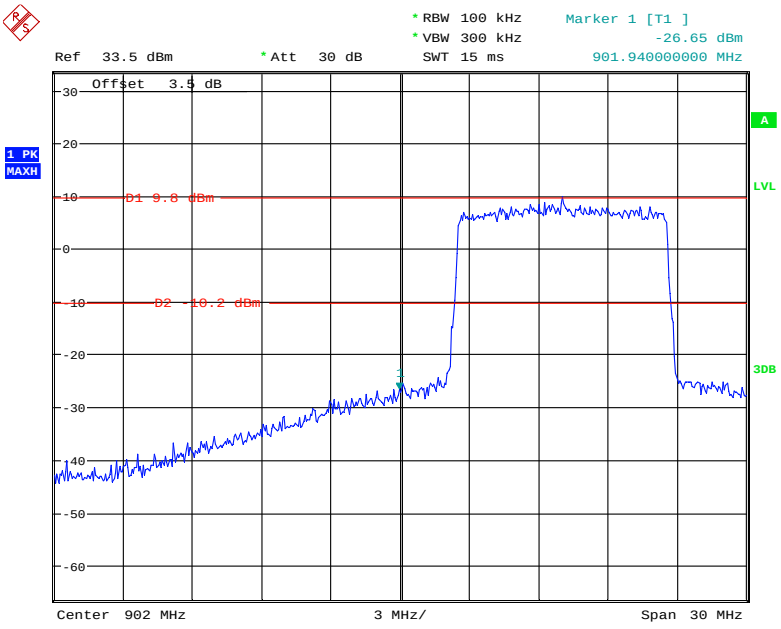
Date: 17.SEP.2019 09:36:28

1.4M Mode: Band Edge, Right Side



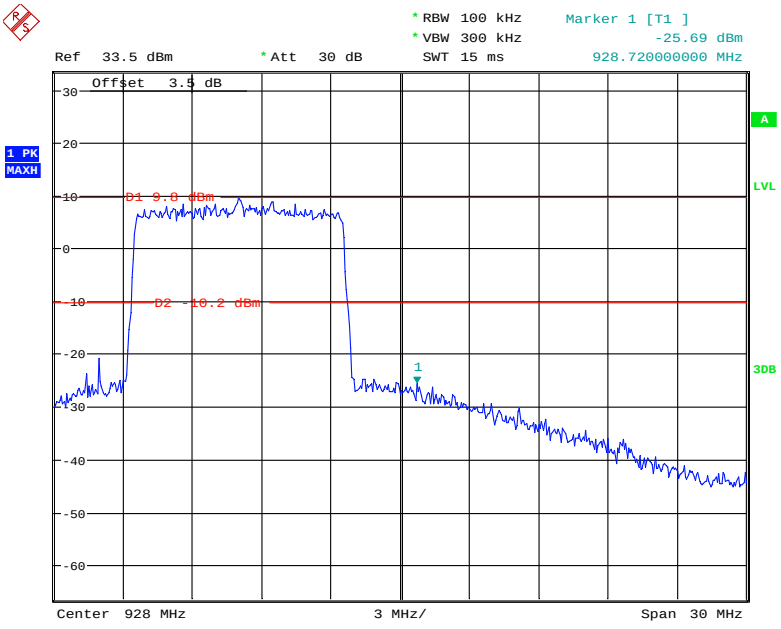
Date: 17.SEP.2019 09:38:39

10M Mode: Band Edge, Left Side



Date: 16.SEP.2019 13:23:59

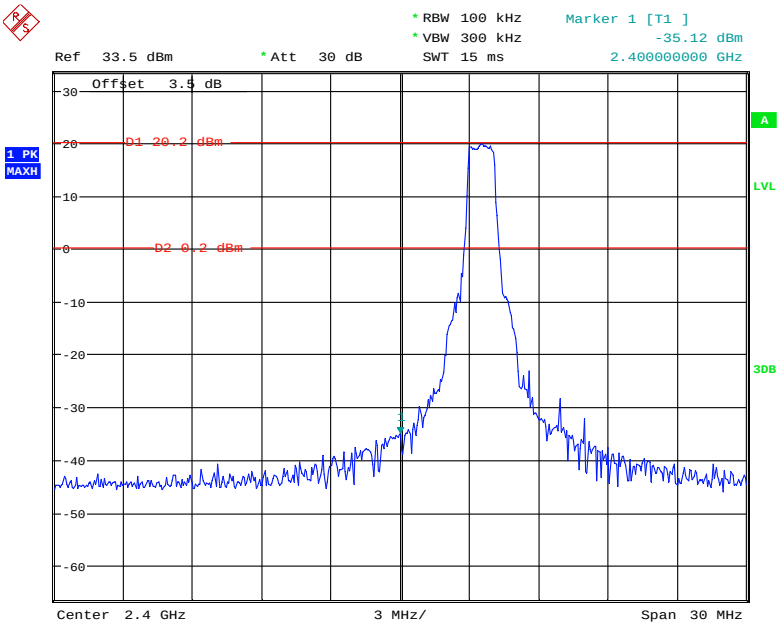
10M Mode: Band Edge, Right Side



Date: 16.SEP.2019 13:25:48

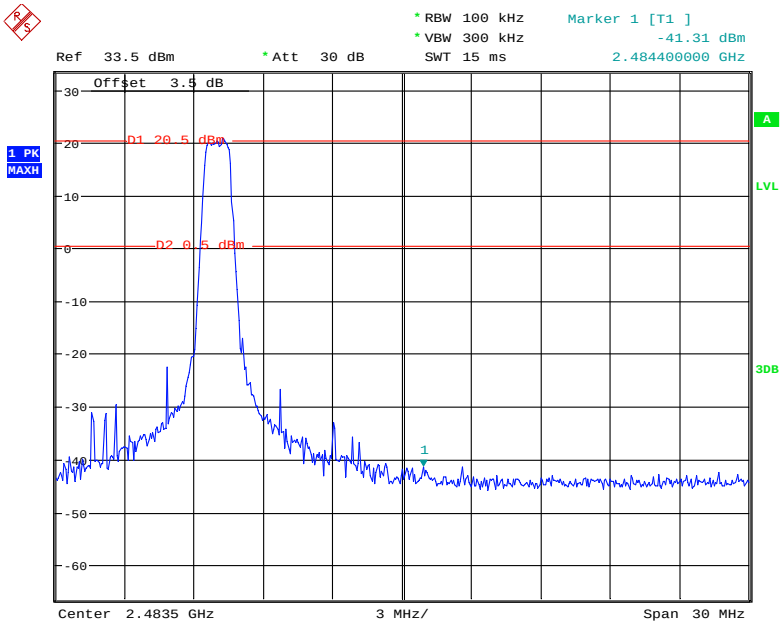
For 2.4GHz Antenna 0

1.4M Mode: Band Edge, Left Side



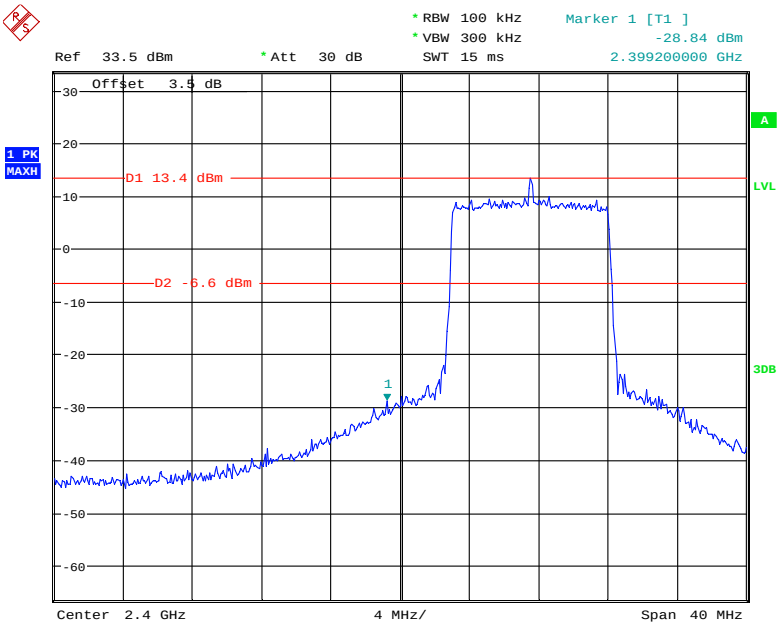
Date: 16.SEP.2019 10:19:35

1.4M Mode: Band Edge, Right Side



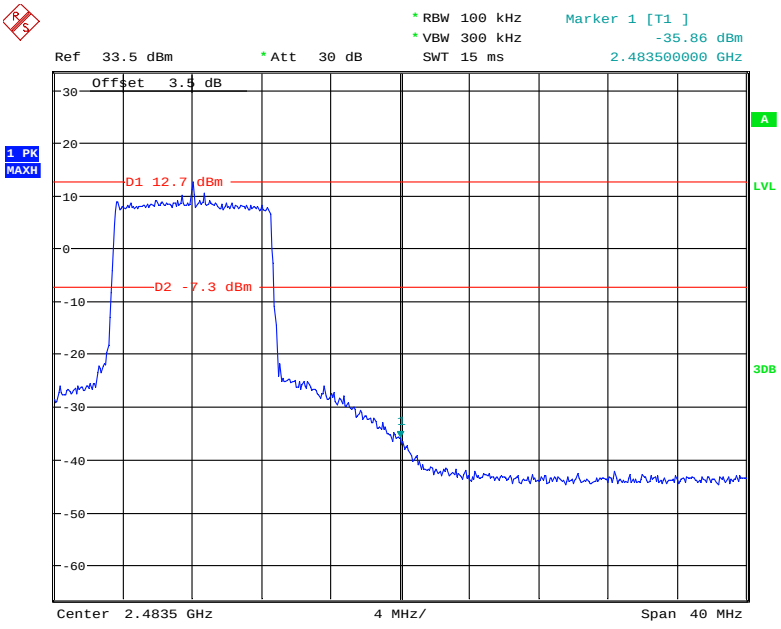
Date: 6.NOV.2019 17:16:53

10M Mode: Band Edge, Left Side



Date: 16.SEP.2019 10:24:43

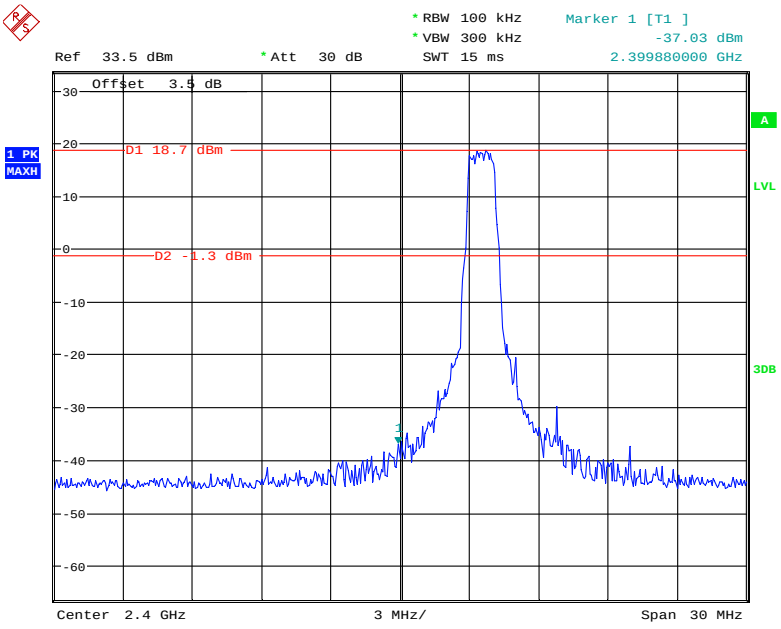
10M Mode: Band Edge, Right Side



Date: 16.SEP.2019 10:23:30

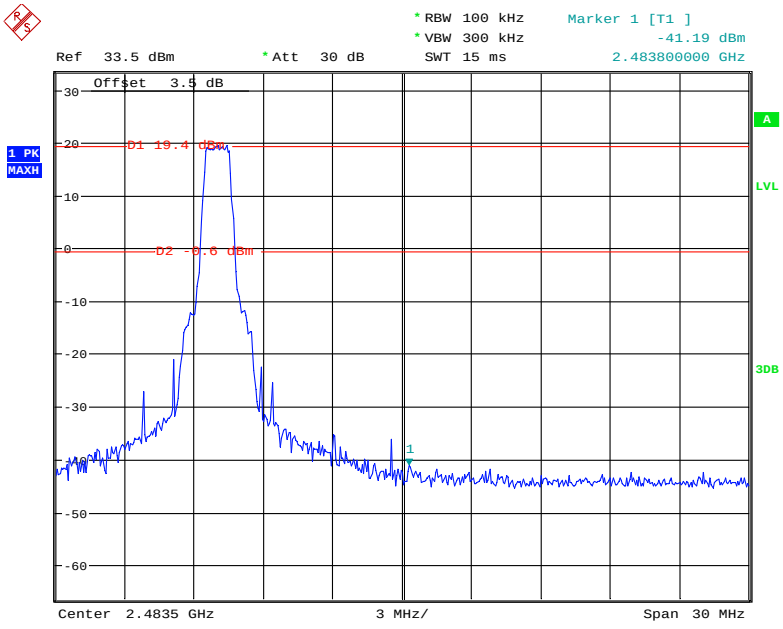
For 2.4GHz Antenna 1

1.4M Mode: Band Edge, Left Side



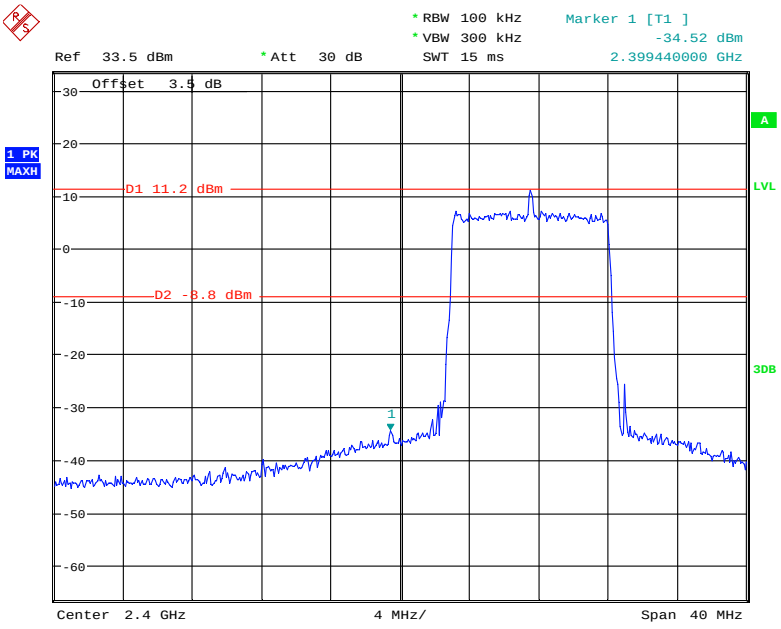
Date: 16.SEP.2019 14:46:58

1.4M Mode: Band Edge, Right Side



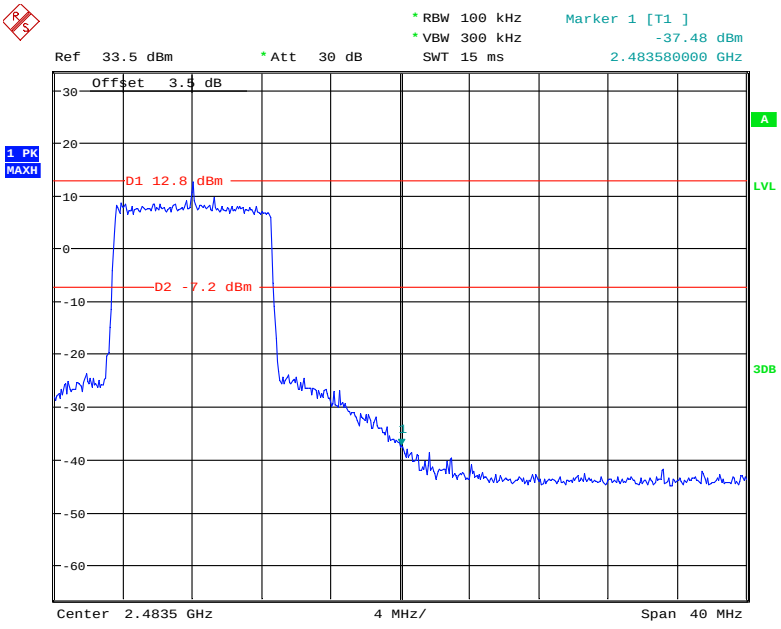
Date: 6.NOV.2019 17:14:58

10M Mode: Band Edge, Left Side



Date: 16.SEP.2019 14:42:38

10M Mode: Band Edge, Right Side



Date: 16.SEP.2019 14:40:56

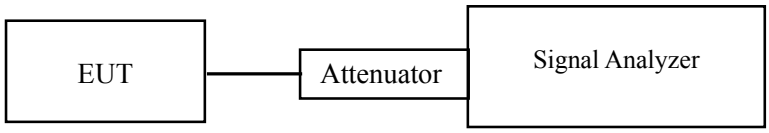
FCC §15.247(e) - POWER SPECTRAL DENSITY

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. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW to: 3kHz≤ RBW≤100 kHz.
3. Set the VBW ≥ 3×RBW.
4. Set the span to 1.5 times the DTS bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.



Test Data

Environmental Conditions

Temperature:	24~25 ℃
Relative Humidity:	54~56 %
ATM Pressure:	101.0 kPa

The testing was performed by Leo Huang from 2019-09-16 to 2019-11-25.

EUT operation mode: Transmitting

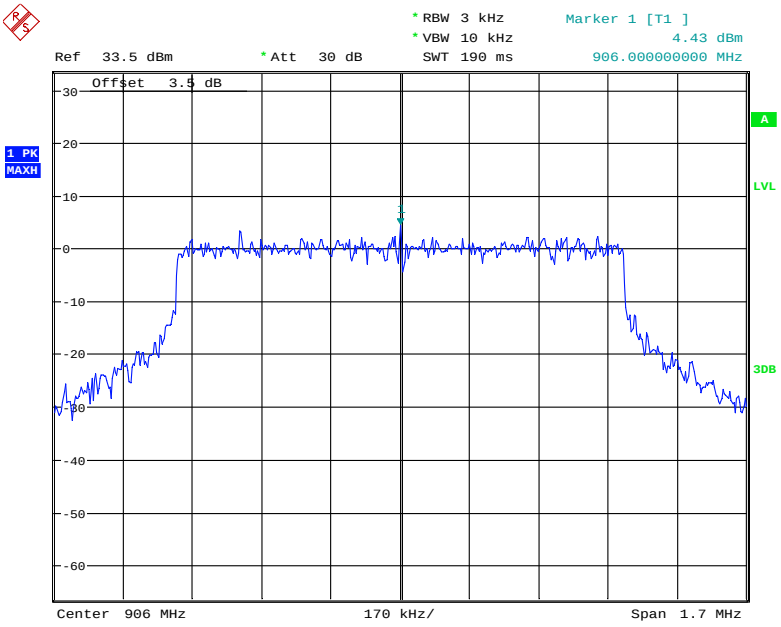
Test Result: Pass

For 900MHz:

Channel	Frequency (MHz)	Antenna 0 (dBm/3kHz)	Antenna 1 (dBm/3kHz)	Limit (dBm/3kHz)
1.4M Mode				
Low	906	4.43	5.85	≤8
Middle	916	3.99	6.05	≤8
High	924	3.72	5.92	≤8
10M Mode				
Low	909	2.92	2.60	≤8
Middle	915	3.40	2.74	≤8
High	921	3.26	3.15	≤8

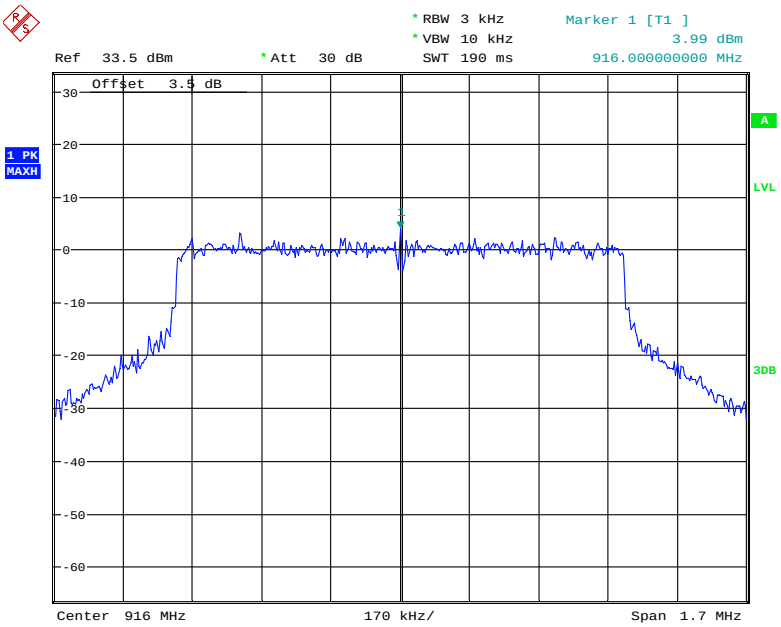
Antenna 0

Power Spectral Density, 1.4M Mode Low Channel



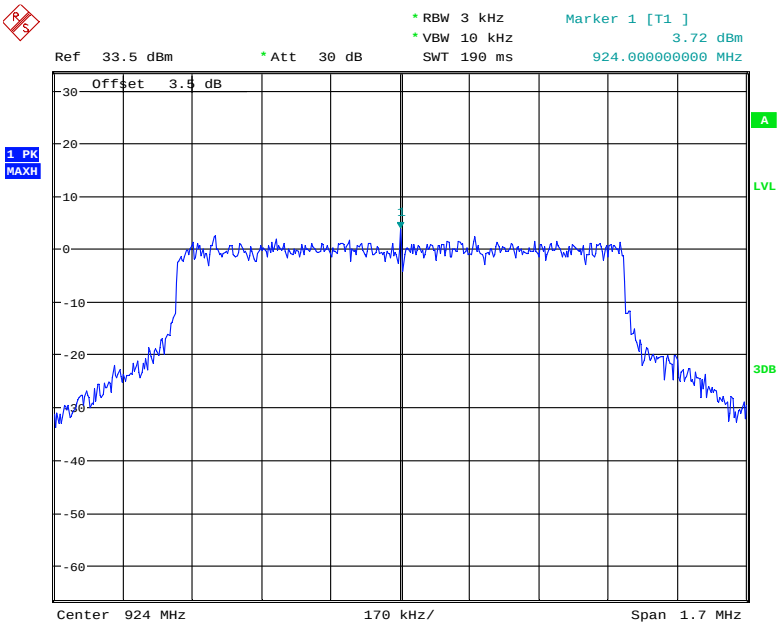
Date: 17.SEP.2019 09:48:55

Power Spectral Density, 1.4M Mode Middle Channel



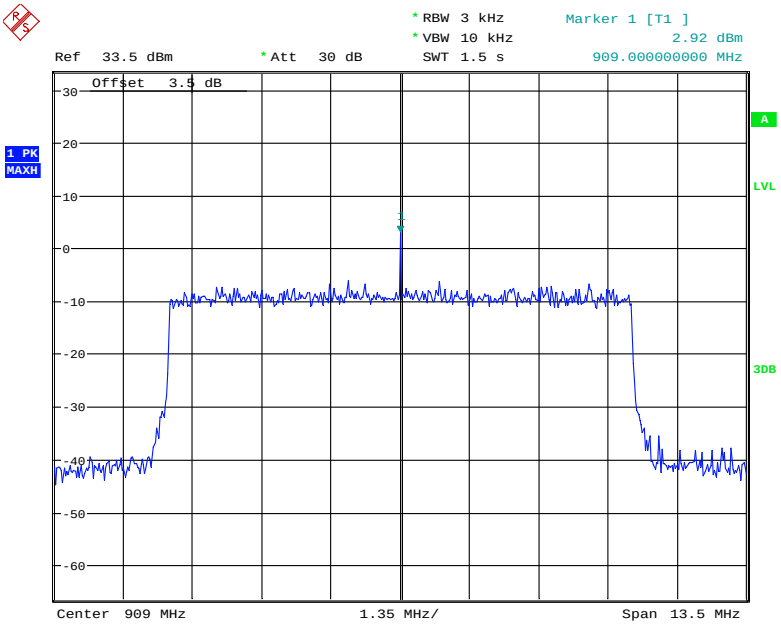
Date: 17.SEP.2019 09:48:20

Power Spectral Density, 1.4M Mode High Channel



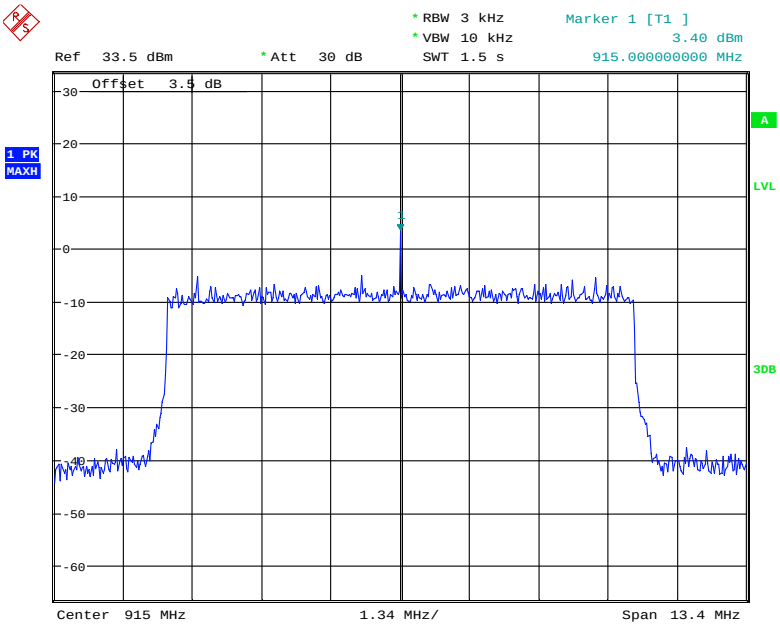
Date: 17.SEP.2019 09:47:08

Power Spectral Density, 10M Mode Low Channel



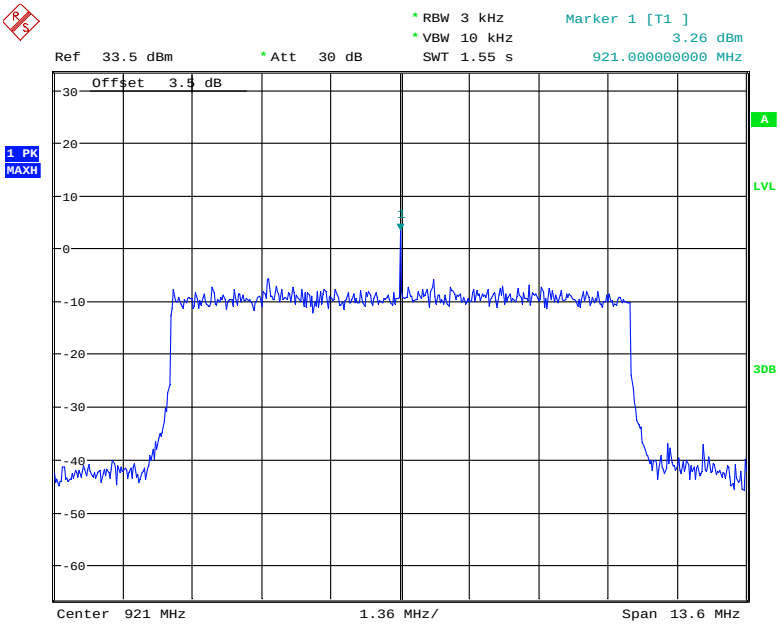
Date: 16.SEP.2019 11:38:47

Power Spectral Density, 10M Mode Middle Channel



Date: 16.SEP.2019 11:36:02

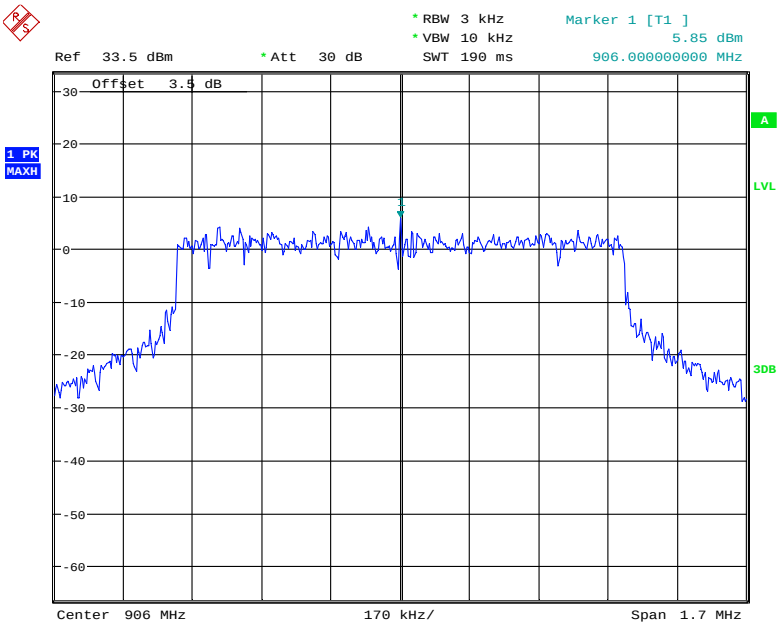
Power Spectral Density, 10M Mode High Channel



Date: 16.SEP.2019 11:39:50

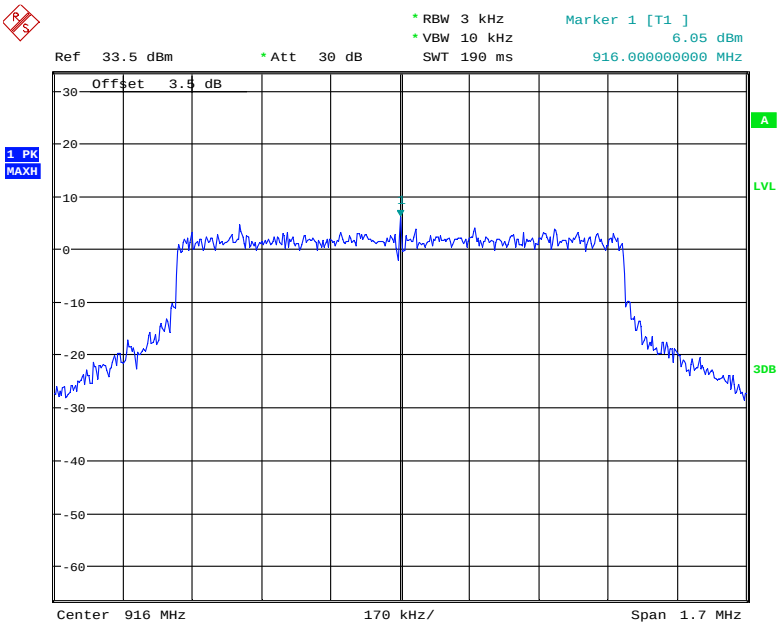
Antenna 1

Power Spectral Density, 1.4M Mode Low Channel



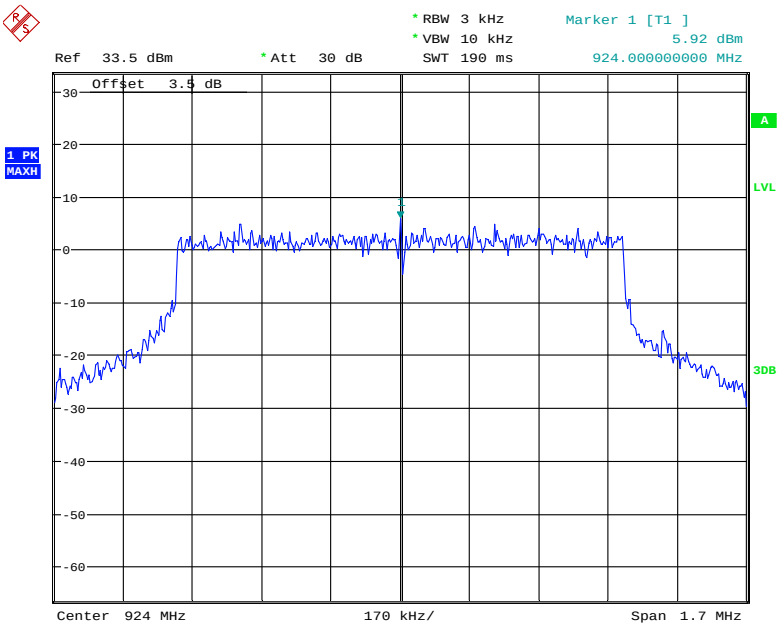
Date: 17.SEP.2019 09:43:15

Power Spectral Density, 1.4M Mode Middle Channel



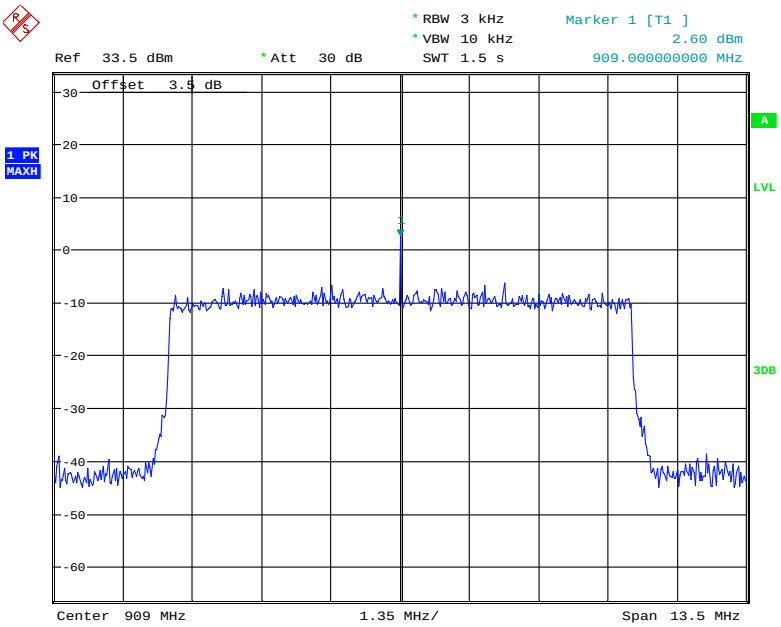
Date: 17.SEP.2019 09:42:35

Power Spectral Density, 1.4M Mode High Channel



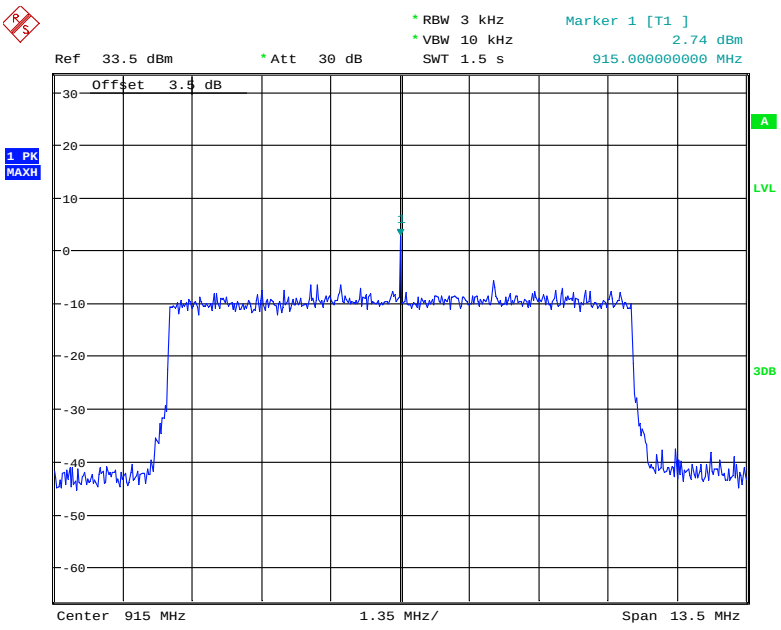
Date: 17.SEP.2019 09:43:53

Power Spectral Density, 10M Mode Low Channel



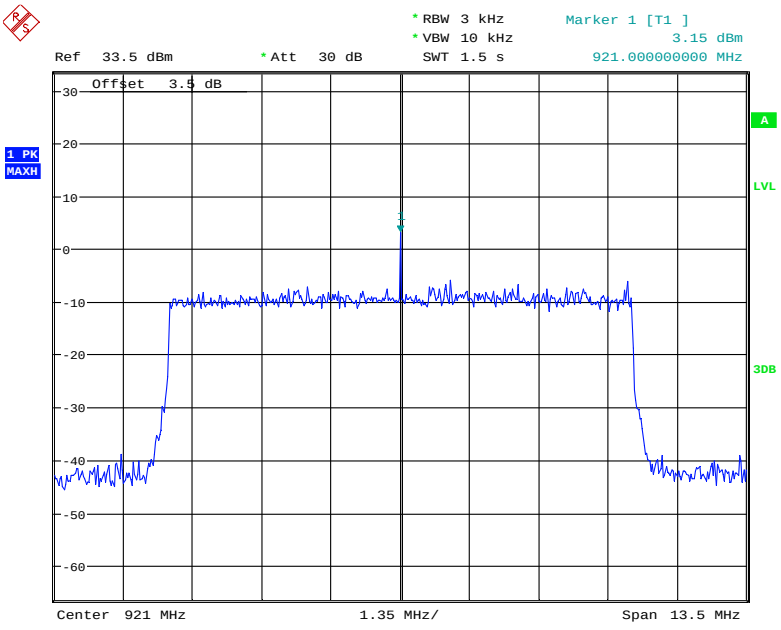
Date: 16.SEP.2019 13:35:12

Power Spectral Density, 10M Mode Middle Channel



Date: 16.SEP.2019 13:32:53

Power Spectral Density, 10M Mode High Channel



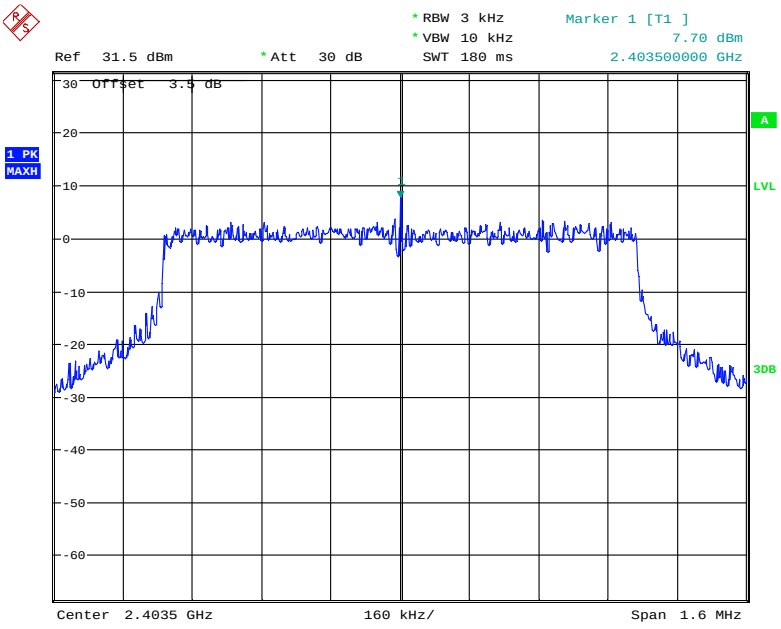
Date: 16.SEP.2019 13:34:00

For 2.4GHz:

Channel	Frequency (MHz)	Antenna 0 (dBm/3kHz)	Antenna 1 (dBm/3kHz)	Limit (dBm/3kHz)
1.4M Mode				
Low	2403.5	7.70	6.84	≤8
Middle	2439.5	7.73	6.85	≤8
High	2475.5	6.26	6.41	≤8
10M Mode				
Low	2407.5	7.69	6.42	≤8
Middle	2439.5	7.24	6.61	≤8
High	2471.5	5.61	6.02	≤8

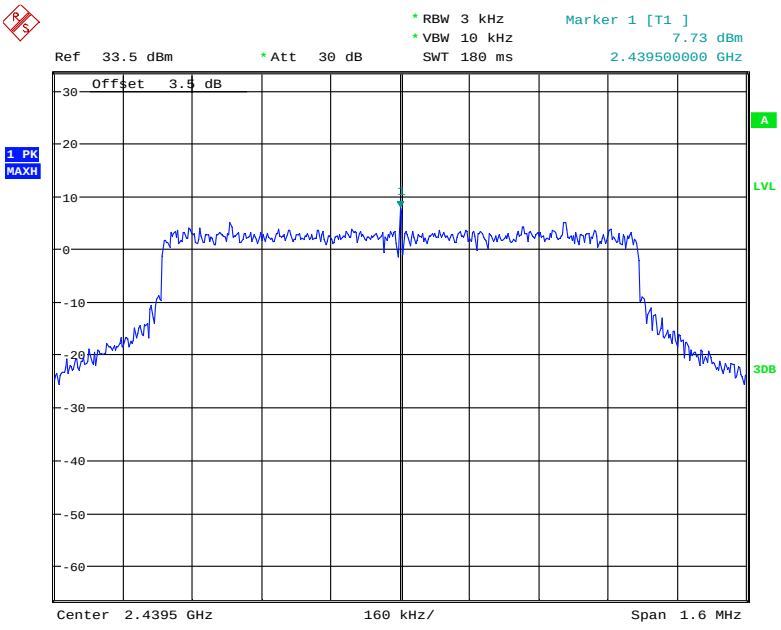
Antenna 0

Power Spectral Density, 1.4M Mode Low Channel



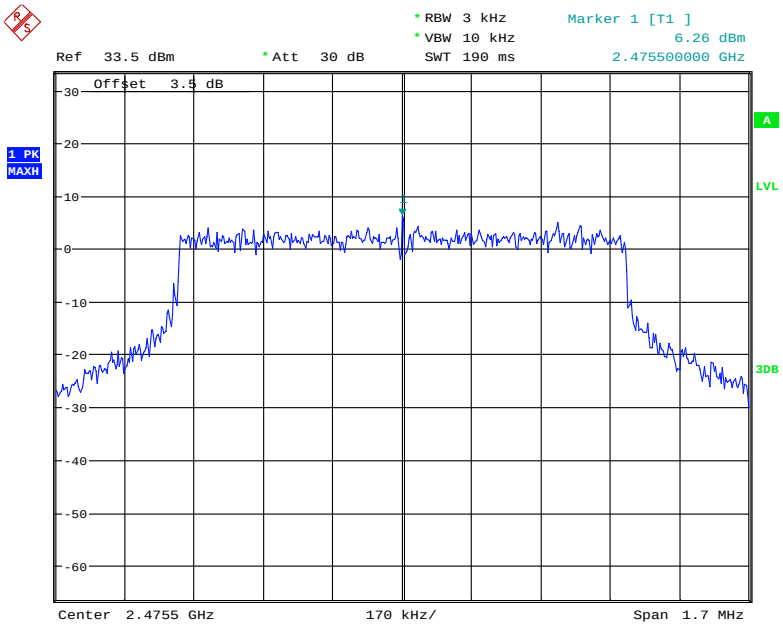
Date: 25.NOV.2019 13:39:48

Power Spectral Density, 1.4M Mode Middle Channel



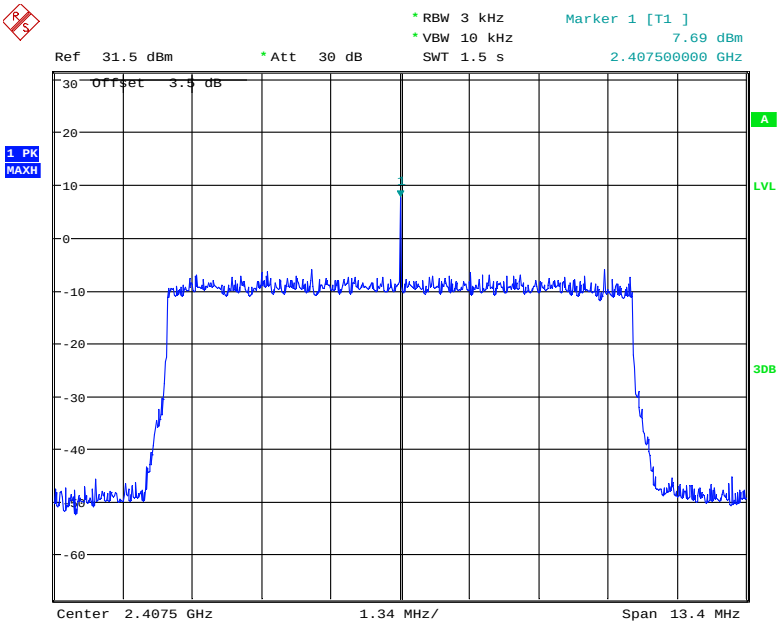
Date: 16.SEP.2019 10:43:18

Power Spectral Density, 1.4M Mode High Channel



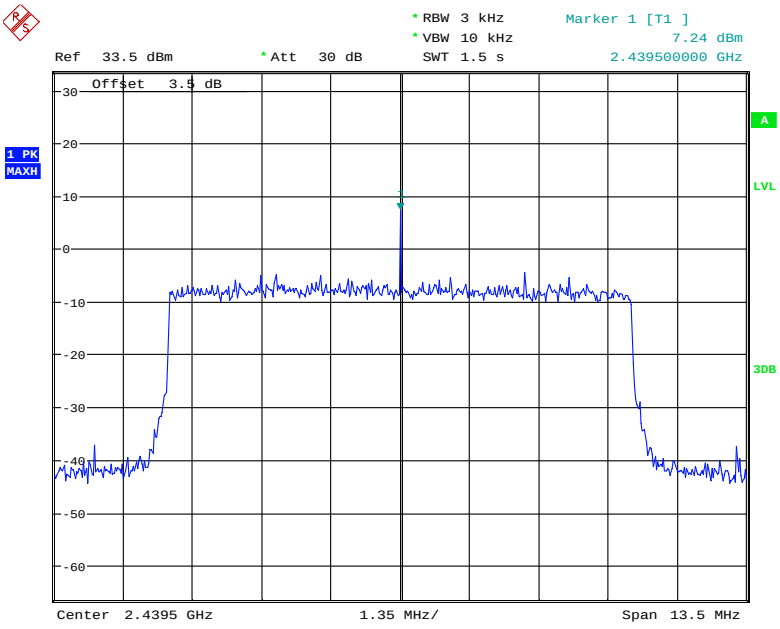
Date: 6.NOV.2019 17:13:43

Power Spectral Density, 10M Mode Low Channel



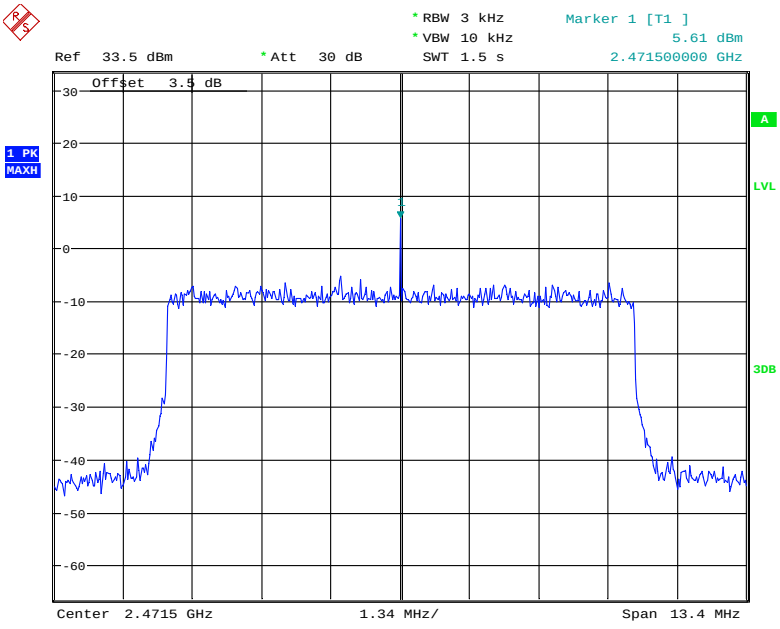
Date: 25.NOV.2019 13:35:41

Power Spectral Density, 10M Mode Middle Channel



Date: 16.SEP.2019 10:50:15

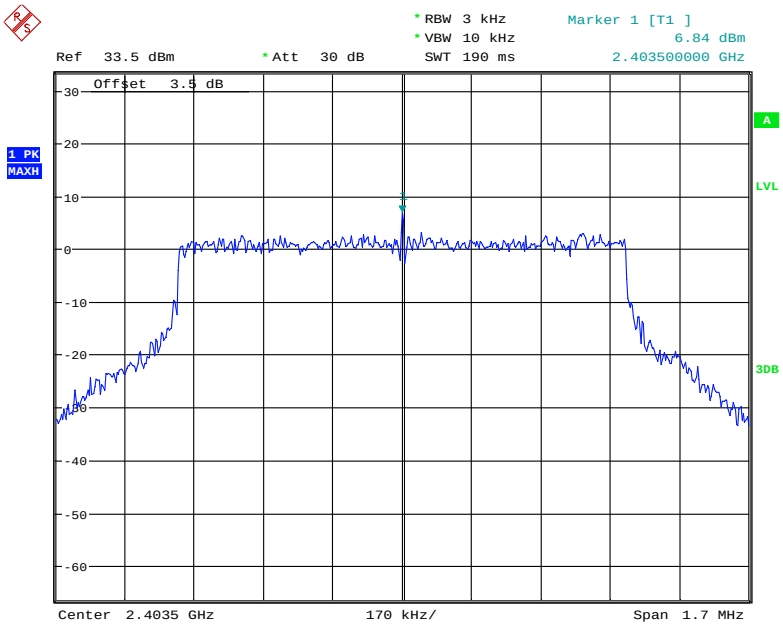
Power Spectral Density, 10M Mode High Channel



Date: 16.SEP.2019 10:50:59

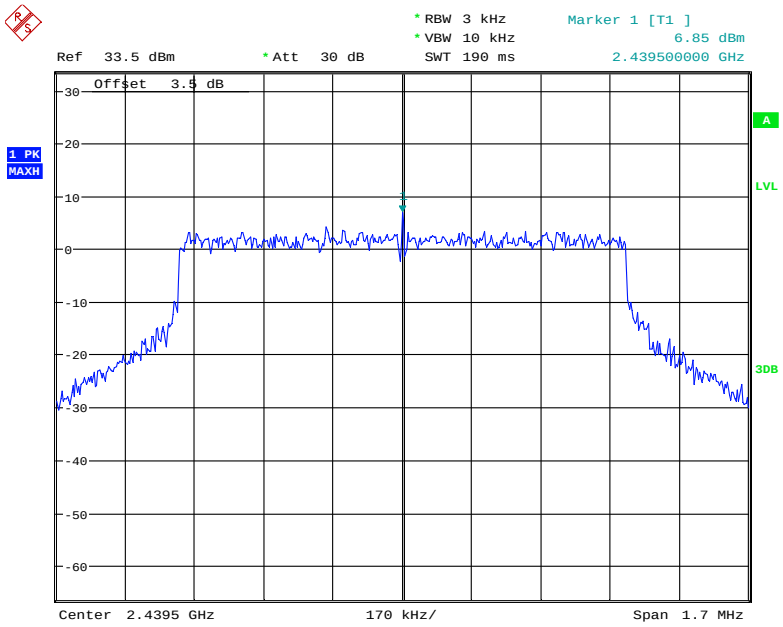
Antenna 1

Power Spectral Density, 1.4M Mode Low Channel



Date: 16.SEP.2019 15:20:13

Power Spectral Density, 1.4M Mode Middle Channel



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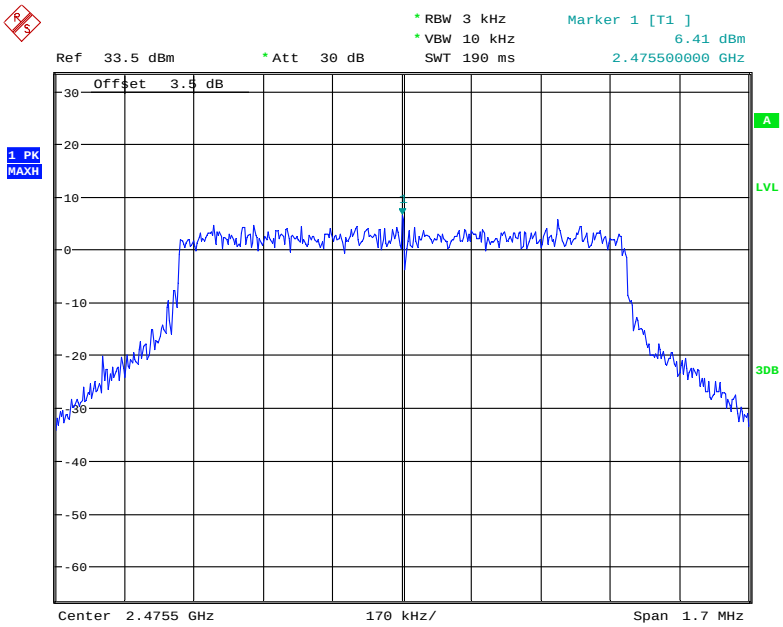
Power Spectral Density, 1.4M Mode High Channel



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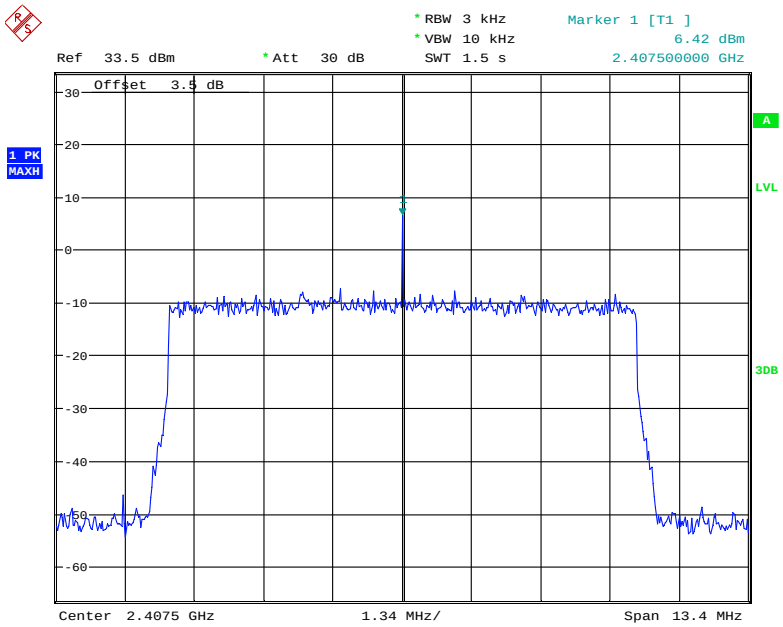
Power Spectral Density, 10M Mode Low Channel



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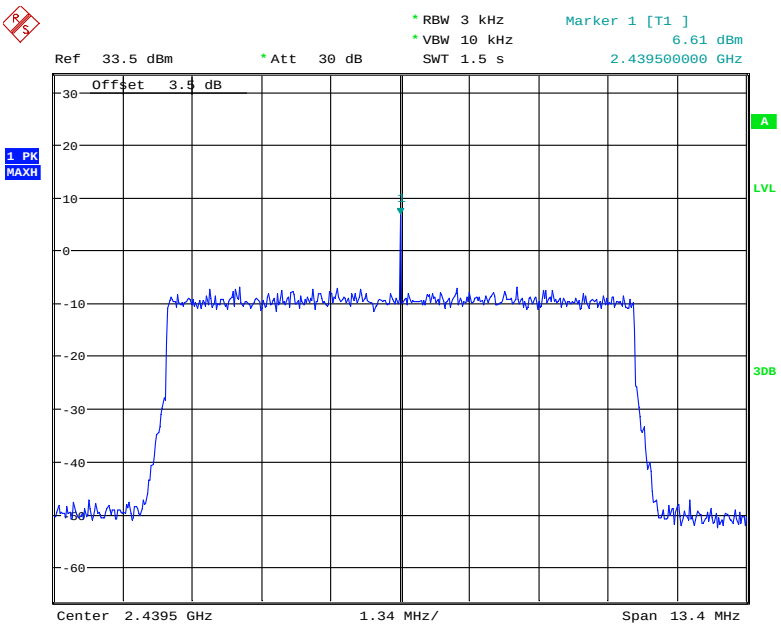
Power Spectral Density, 10M Mode Middle Channel



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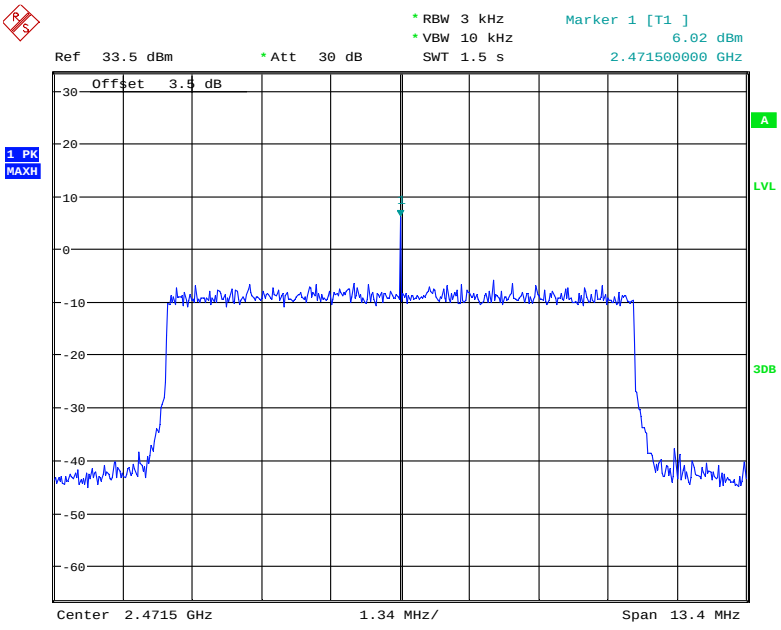
Power Spectral Density, 10M Mode High Channel



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