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: 2AGNTEF7RC2409A

Report Type:	**Product Type:**
Original Report	EVO series

Report Number:	RSZ180104002-00B
Report Date:	2018-02-26
Reviewed By:	Candy Li RF Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

Note: This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP* or any agency of the Federal Government. * This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "*".

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Autel Robotics Co., Ltd.'s* product, model number: *EF7(FCC ID: 2AGNTEF7RC2409A)* or the "EUT" in this report was a *EVO series,* which was measured approximately: 190 mm (L) × 181 mm (W) × 60 mm (H), rated with input voltage: DC 3.6 V powered by battery.

**All measurement and test data in this report was gathered from production sample serial number: 1702939 (Assigned by BACL, shenzhen).The EUT supplied by the applicant was received on 2018-01-04.*

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)

Submissions with the plane unit of a system with FCC ID: 2AGNTEVORC582409A.

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, conducted		±1.5dB
Unwanted Emission, conducted		±1.5dB
Emissions, radiated	Below 1GHz	±4.70dB
	Above 1GHz	±4.80dB
Temperature		±1℃
Supply voltages		±0.4%

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. : 382179, the FCC Designation No. : CN5001.

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, 72 channels are provided to testing

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2403.5	36	2439.5
2	2404.5	……	……
3	2405.5	……	……
……	……	……	……
……	……	……	……
……	……	71	2474.5
35	2438.5	72	2475.5

CH1, CH36, CH72 was tested.

For 2.4GHz: 10MHz mode, 65 channels 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, CH65 was tested.

For 2.4GHz: 20MHz mode, 51 channels are provided to testing

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412.5	26	2437.5
2	2413.5	……	……
3	2414.5	……	……
……	……	……	……
……	……	……	……
……	……	50	2461.5
25	2436.5	51	2462.5

CH1, CH26, CH51 was tested.

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

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	906	11	916
2	907	12	917
3	908	13	918
4	909	14	919
5	910	15	920
6	911	16	921
7	912	17	922
8	913	18	923
9	914	19	924
10	915	/	/

CH1, CH11, CH19 was tested.

For 900MHz: 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, CH8, CH13 was tested.

For 900MHz: 20MHz mode, 3 channels are provided to testing

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	914	3	916
2	915	/	/

CH1, CH2, CH3 was tested.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

"secureCRT" software was used during test.

For 2.4GHz band:

Antenna 03 or Antenna 04: MISO mode

Item	Data rate	Power level		
		Low channel	Middle channel	High channel
1.4M Mode	0.3 Mbps	16	16	16
10M Mode	10 Mbps	16	15	16
20M Mode	20 Mbps	16	16	15

For 900MHz band:

Antenna 01 or Antenna 02: MISO mode

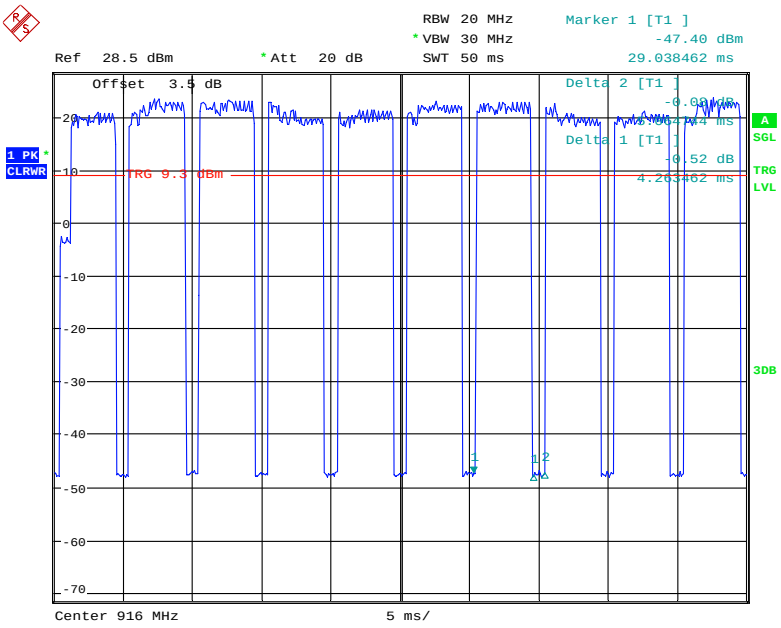
Item	Data rate	Power level		
		Low channel	Middle channel	High channel
1.4M Mode	0.3 Mbps	17	17	17
10M Mode	10 Mbps	17	17	17
20M Mode	20 Mbps	17	17	17

Duty cycle

For 900MHz Antenna 01 & 02:

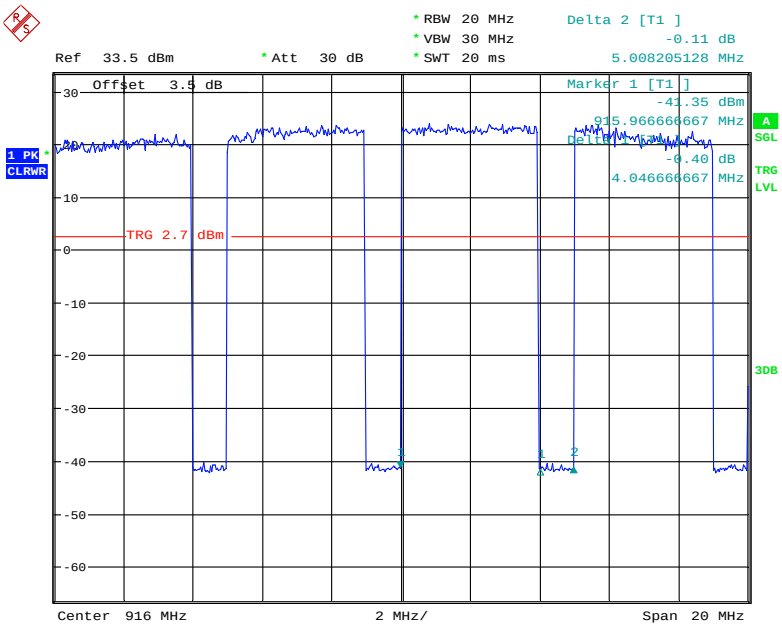
Item	Duty Cycle (%)	T(ms)	1/T(kHz)	VBW Setting	10log(1/x)
1.4M Mode	84.18	4.263	0.23	1kHz	0.75
10M Mode	80.81	4.047	0.25	1kHz	0.93
20M Mode	82.82	4.247	0.24	1kHz	0.82

1.4M Mode



Date: 16.JAN.2018 16:22:36

10M Mode



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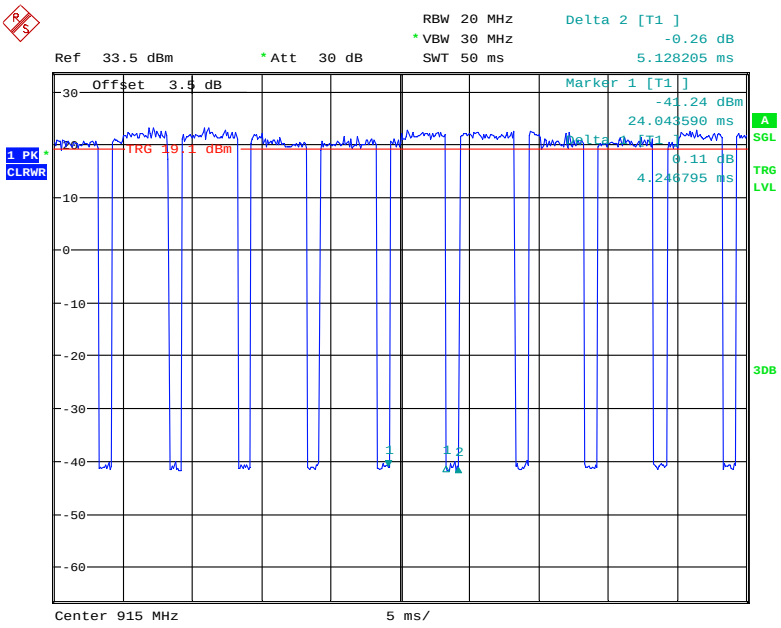
20M Mode

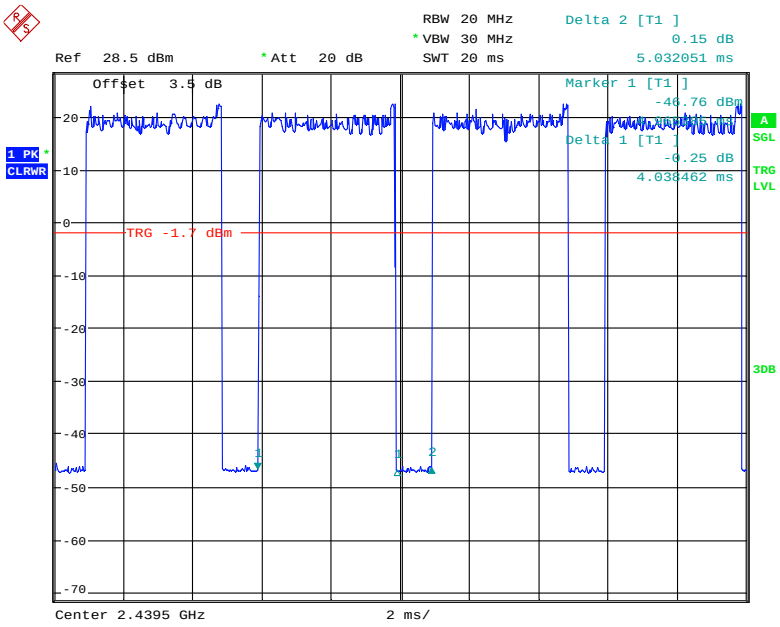


Date: 16.JAN.2018 16:51:47

For 2.4GHz Antenna 03 & 04:

Item	Duty Cycle (%)	T(ms)	1/T(kHz)	VBW Setting	10log(1/x)
1.4M Mode	80.25	4.038	0.25	1kHz	0.96
10M Mode	80.39	4.071	0.25	1kHz	0.95
20M Mode	80.58	4.071	0.25	1kHz	0.94

1.4M Mode



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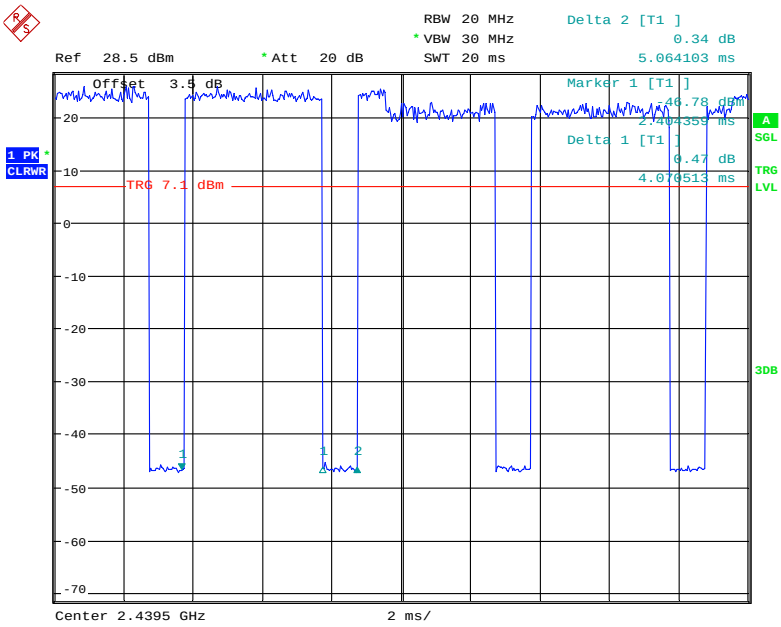
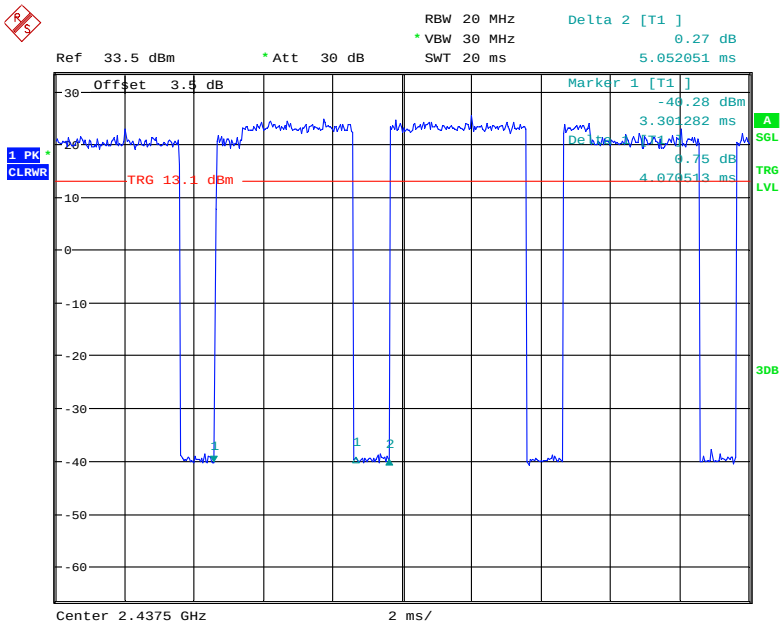
10M Mode



Date: 16.JAN.2018 13:44:32

20M Mode



Support Equipment List and Details

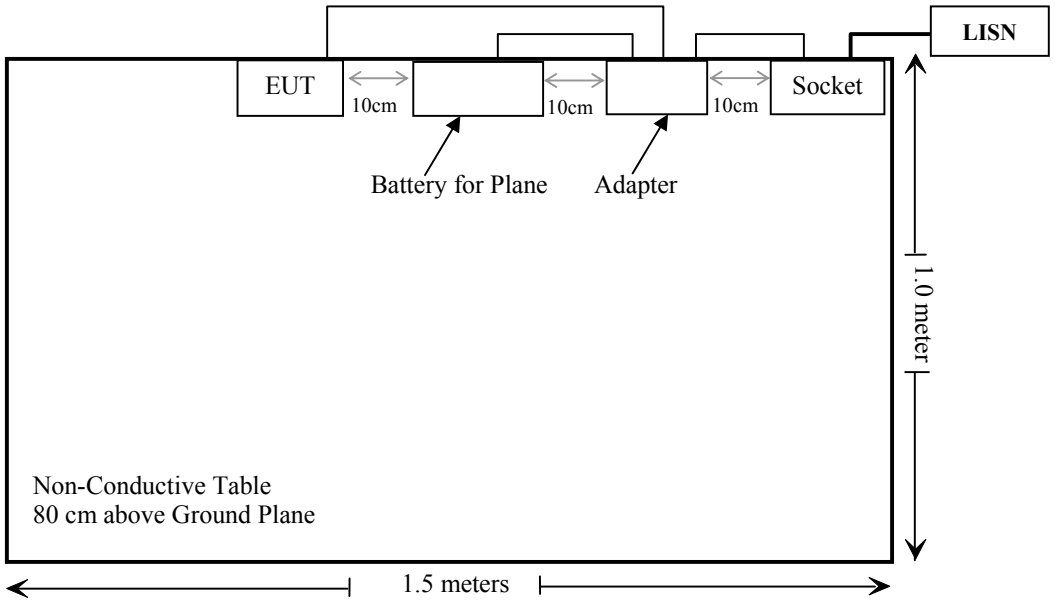
Manufacturer	Description	Model	Serial Number
Autel	Battery for Plane	/	/
Autel	Adapter	/	/
/	Load Terminal	/	/

External I/O Cable

Cable Description	Length (m)	From Port	To
Un-Shielding Detachable AC Cable	0.8	Adapter	Socket
Un-Shielding Un-detachable DC Cable With Ferrite Core	0.5	Adapter	Battery
Un-Shielding Detachable USB Cable	0.8	Adapter	EUT
Un-Shielding Un-detachable AC Cable	1.5	Socket	LISN

Block Diagram of Test Setup

For Conducted Emissions:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i) & §1.1307 (b) (1) & §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB 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

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2017-08-04	2018-08-04
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2017-12-07	2018-12-07
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2017-11-19	2018-05-21
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
N/A	Conducted Emission Cable	N/A	UF A210B-1-0720-504504	2017-11-12	2018-05-12
Radiated Emission Test					
A.H.System	Horn Antenna	SAS-200/571	135	2015-08-18	2018-08-17
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2017-04-24	2018-04-24
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2017-05-21	2018-05-21
HP	Amplifier	HP8447E	1937A01046	2017-11-19	2018-05-21
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2017-12-17	2020-12-16
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2017-12-07	2018-12-07
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369 223410-001	2017-11-19	2018-05-21
Ducommun technologies	RF Cable	104PEA	218124002	2017-11-19	2018-05-21
Ducommun technologies	RF Cable	RG-214	1	2017-11-19	2018-05-21
Ducommun technologies	RF Cable	RG-214	2	2017-11-19	2018-05-21
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-04	2017-12-29	2020-12-28
Ducommun Technologies	Pre-amplifier	ALN-22093530-01	991373-01	2017-08-03	2018-08-03
Sinoscite	Band Reject Filter	BSF2402-2480MN-0898-001	N/A	2017-05-21	2018-05-21
RF Conducted Test					
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200120	2017-12-05	2018-12-05
Ducommun technologies	RF Cable	RG-214	3	2017-11-22	2018-05-22
WEINSCHEL	10dB Attenuator	5324	AU 3842	2017-11-22	2018-05-22
WEINSCHEL	3dB Attenuator	N/A	N/A	2017-11-23	2018-05-22

*** 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§15.247 (i), §1.1307 (b) (1) & §2.1093 – RF EXPOSURE

Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where
1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

Measurement Result

Please refer to SAR test report: RSZ180104002-20.

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 external antennas arrangement for 2.4GHz, which is permanently attached and the antenna gain is 2.0dBi, fulfill the requirement of this section. And EUT has two internal antennas arrangement for 900MHz, which is permanently attached and the antenna gain is -3.0dBi. Please refer to the EUT photos.

For the four antennas, one pair for 900MHz RF signal and the other pair for 2.4GHz RF signal. The two pairs of antennas do not work at the same time. And antennas use MISO mode in a pair of antennas, one antenna is used for transmitting signals and two antennas are used for receiving signals.

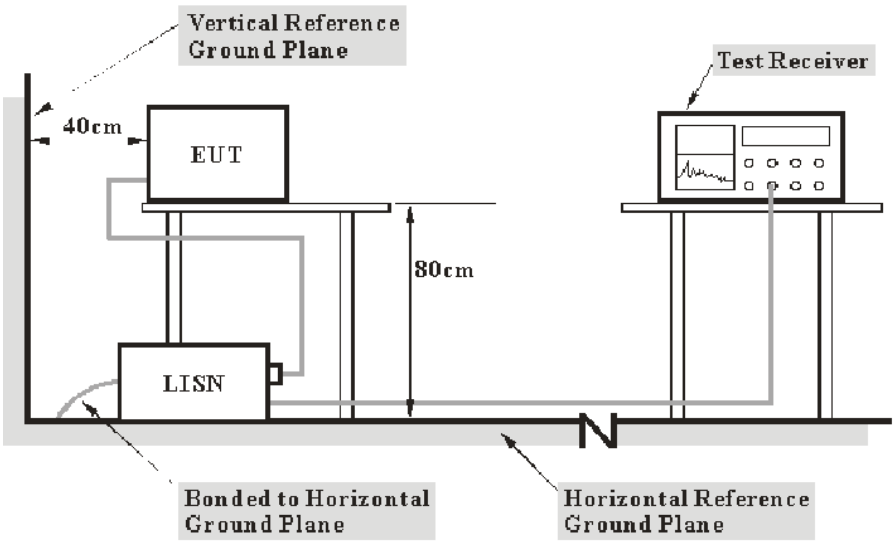
Result: Compliance.

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,

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

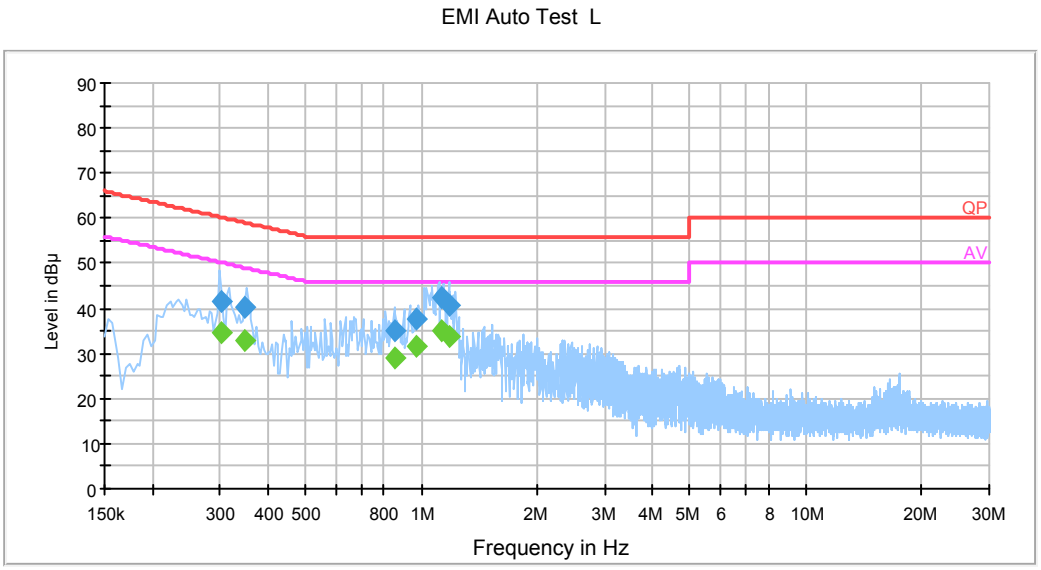
Environmental Conditions

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

The testing was performed by Vincent Zeng on 2018-01-30.

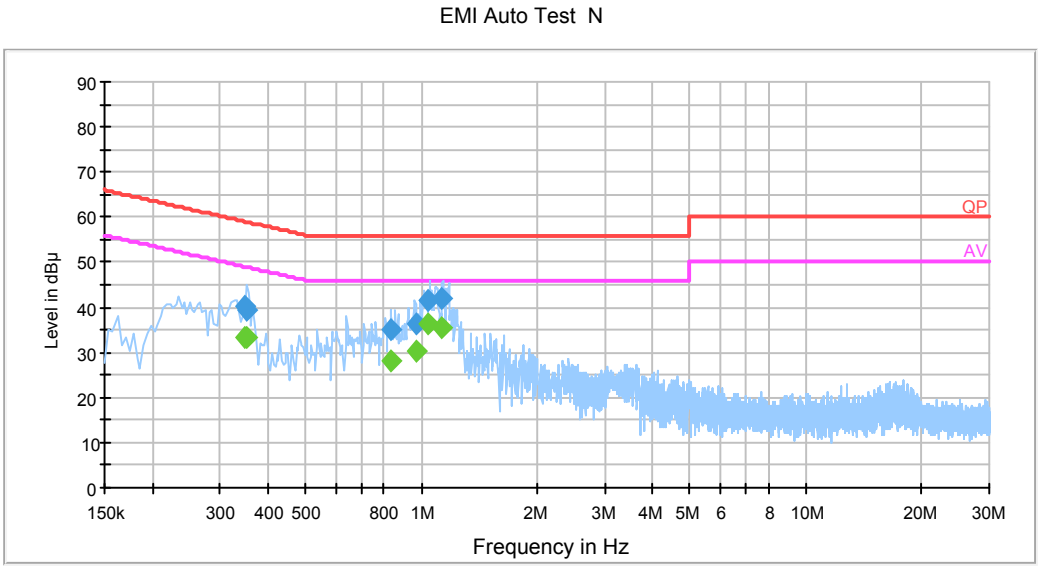
EUT operation mode: Transmitting (worst case for 2.4GHz, 1.4M mode, Low channel)

AC 120 V/60 Hz, Line:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.302500	41.4	19.9	60.2	18.8	QP
0.348750	40.4	19.9	59.0	18.6	QP
0.853250	35.3	19.7	56.0	20.7	QP
0.971210	37.7	19.8	56.0	18.3	QP
1.125350	42.4	19.8	56.0	13.6	QP
1.180330	40.9	19.8	56.0	15.1	QP
0.302500	34.7	19.9	50.2	15.5	Ave.
0.348750	32.8	19.9	49.0	16.2	Ave.
0.853250	29.1	19.7	46.0	16.9	Ave.
0.971210	31.6	19.8	46.0	14.4	Ave.
1.125350	35.2	19.8	46.0	10.8	Ave.
1.180330	33.8	19.8	46.0	12.2	Ave.

AC 120V/ 60 Hz, Neutral:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.348750	40.3	20.0	59.0	18.7	QP
0.352690	39.5	20.0	58.9	19.4	QP
0.837490	34.9	19.8	56.0	21.1	QP
0.975570	36.3	19.9	56.0	19.7	QP
1.042190	41.6	19.9	56.0	14.4	QP
1.128930	42.0	19.9	56.0	14.0	QP
0.348750	33.3	20.0	49.0	15.7	Ave.
0.352690	33.5	20.0	48.9	15.4	Ave.
0.837490	28.3	19.8	46.0	17.7	Ave.
0.975570	30.4	19.9	46.0	15.6	Ave.
1.042190	36.3	19.9	46.0	9.7	Ave.
1.128930	35.3	19.9	46.0	10.7	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

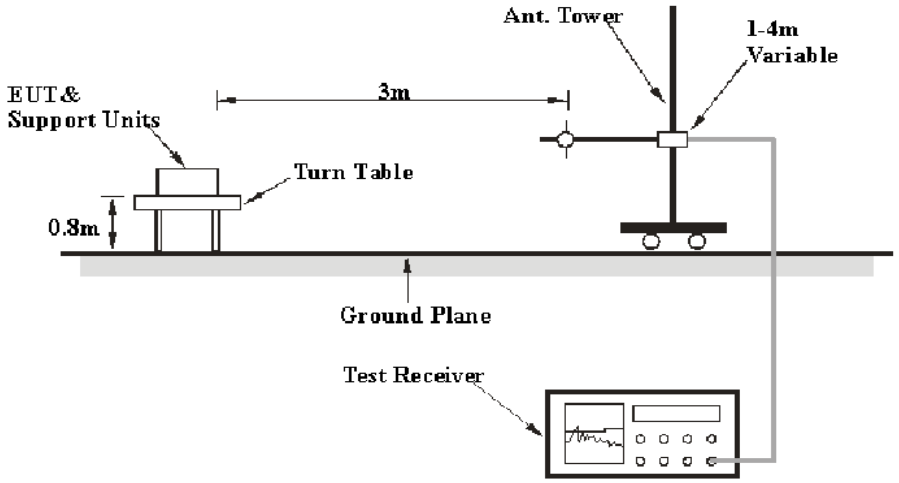
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

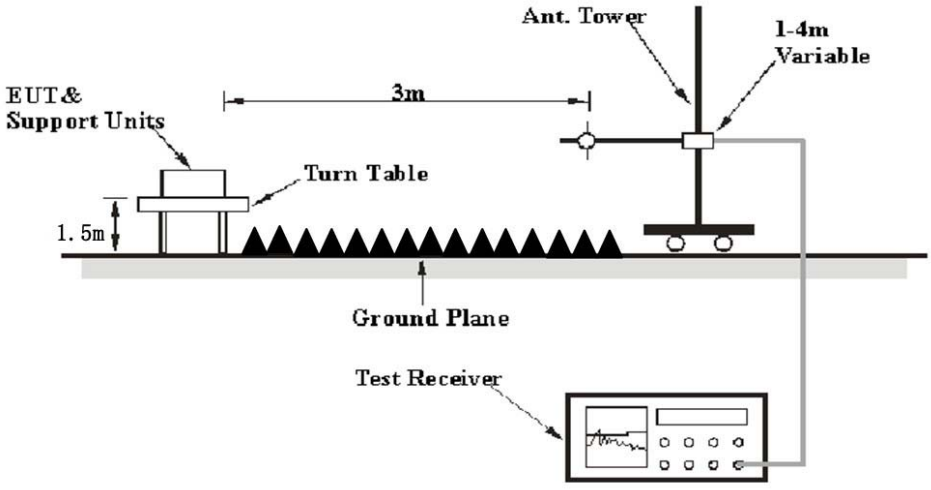
FCC §15.247 (d); §15.209; §15.205;

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.

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

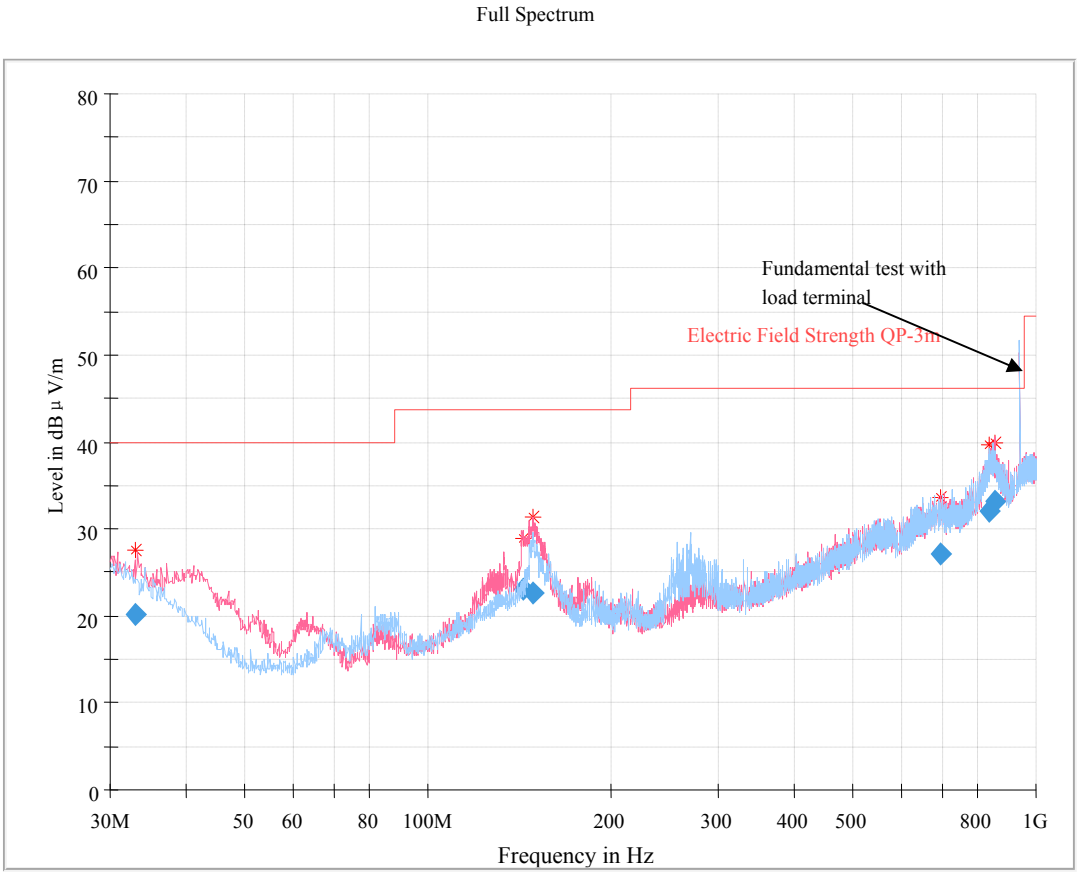
Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Vincent Zeng on 2018-01-18 and 2018-02-02.

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 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)
32.954250	20.06	108.0	V	107.0	-3.4	40.00	19.94
143.366750	23.05	101.0	V	280.0	-6.4	43.50	20.45
148.978500	22.60	142.0	V	267.0	-6.6	43.50	20.9
698.612125	27.16	121.0	V	324.0	4.6	46.00	18.84
834.654250	32.10	105.0	V	141.0	9.7	46.00	13.90
853.517750	33.19	107.0	V	114.0	10.9	46.00	12.81

1 GHz-10 GHz:

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									
906	95.89	QP	125	1.2	H	9.4	105.29	/	/
906	94.82	QP	163	1.0	V	9.4	104.22	/	/
901.52	32.31	QP	163	1.0	H	9.6	41.91	85.29	43.38
901.52	32.72	QP	360	1.0	V	9.6	42.32	84.22	41.90
1812	76.02	PK	263	1.4	H	-4.87	71.15	74	2.85
1812	56.74	Ave.	263	1.4	H	-4.87	51.87	54	2.13
1812	76.24	PK	191	1.4	V	-4.87	71.37	74	2.63
1812	57.02	Ave.	191	1.4	V	-4.87	52.15	54	1.85
2718	49.54	PK	197	1.6	H	-0.01	49.53	74	24.47
2718	31.65	Ave.	197	1.6	H	-0.01	31.64	54	22.36
2718	52.16	PK	266	1.3	V	-0.01	52.15	74	21.85
2718	34.21	Ave.	266	1.3	V	-0.01	34.20	54	19.80
Middle Channel (916 MHz) 1.4M Mode									
916	95.34	QP	312	1.0	H	9.1	104.44	/	/
916	95.20	QP	312	1.2	V	9.1	104.30	/	/
1832	75.69	PK	291	2.3	H	-4.87	70.82	74	3.18
1832	56.12	Ave.	291	2.3	H	-4.87	51.25	54	2.75
1832	76.12	PK	178	1.7	V	-4.87	71.25	74	2.75
1832	56.64	Ave.	178	1.7	V	-4.87	51.77	54	2.23
1832	75.69	PK	291	2.3	H	-4.87	70.82	74	3.18
High Channel (924 MHz) 1.4M Mode									
924	94.69	QP	125	1.0	H	8.9	103.59	/	/
924	93.53	QP	196	1.0	V	8.9	102.43	/	/
928.46	32.71	QP	360	1.1	H	9.6	42.31	83.59	41.28
928.46	33.32	QP	10	1.3	V	9.6	42.92	82.43	39.51
1848	75.84	PK	158	1.6	H	-4.87	70.97	74	3.03
1848	56.71	Ave.	158	1.6	H	-4.87	51.84	54	2.16
1848	75.63	PK	65	1.8	V	-4.87	70.76	74	3.24
1848	56.38	Ave.	65	1.8	V	-4.87	51.51	54	2.49
Low Channel (909 MHz) 10M Mode									
909	89.84	QP	0	1.1	H	9.4	99.24	/	/
909	88.84	QP	136	1.1	V	9.4	98.24	/	/
901.65	54.07	QP	180	1.2	H	9.6	63.67	79.24	15.57
901.65	54.56	QP	360	1.0	V	9.6	64.16	78.24	14.08
1818	74.32	PK	13	2.3	H	-4.87	69.45	74	4.55
1818	53.24	Ave.	13	2.3	H	-4.87	48.37	54	5.63
1818	74.84	PK	214	2.4	V	-4.87	69.97	74	4.03
1818	53.45	Ave.	214	2.4	V	-4.87	48.58	54	5.42

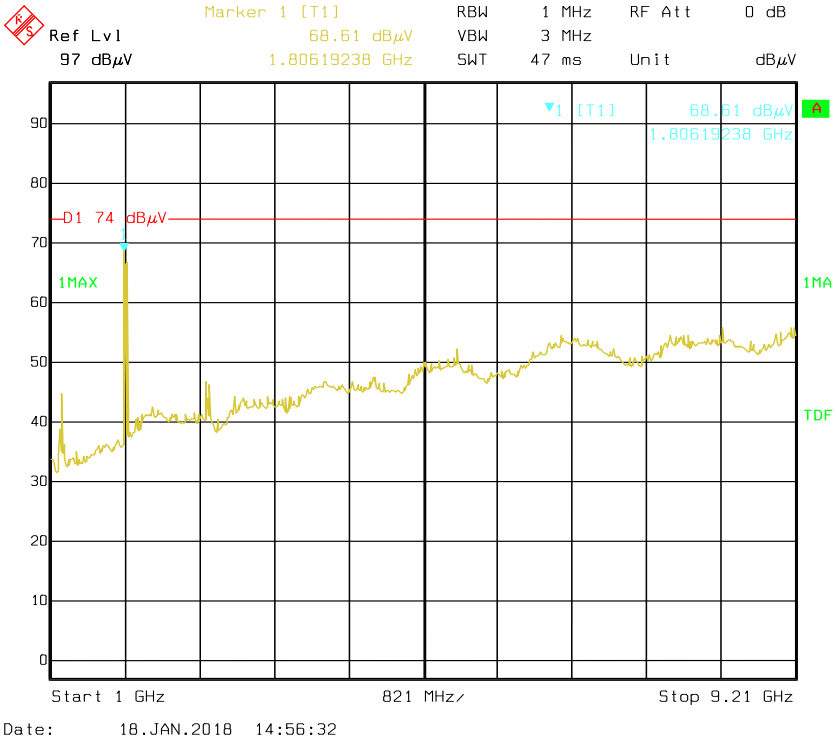
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel (916 MHz) 10M Mode									
916	89.43	QP	360	1.1	H	9.1	99.72	/	/
916	88.79	QP	360	1.2	V	9.1	99.49	/	/
1832	75.34	PK	337	1.8	H	-4.87	70.47	74	3.53
1832	52.11	Ave.	337	1.8	H	-4.87	47.24	54	6.76
1832	75.6	PK	318	2.4	V	-4.87	70.73	74	3.27
1832	53.04	Ave.	318	2.4	V	-4.87	48.17	54	5.83
High Channel (921 MHz) 10M Mode									
921	89.32	QP	235	1.2	H	8.9	98.22	/	/
921	89.38	QP	1	1.6	V	8.9	98.28	/	/
928	54.3	QP	155	1.8	H	9.6	63.90	78.22	14.32
928	53.86	QP	131	2.2	V	9.6	63.46	78.28	14.82
1842	71.98	PK	43	2.0	H	-4.87	67.11	74	6.89
1842	52.16	Ave.	43	2.0	H	-4.87	47.29	54	6.71
1842	73.53	PK	151	1.8	V	-4.87	68.66	74	5.34
1842	53.44	Ave.	151	1.8	V	-4.87	48.57	54	5.43
Low Channel (914 MHz) 20M Mode									
914	87.27	QP	240	1.2	H	9.1	96.37	/	/
914	86.34	QP	37	1.9	V	9.1	95.44	/	/
902	52.88	QP	186	2.6	H	9.6	62.48	76.37	13.89
902	51.8	QP	184	2.4	V	9.6	61.40	75.44	14.04
1828	69.67	PK	218	1.7	H	-4.87	64.80	74	9.20
1828	50.67	Ave.	218	1.7	H	-4.87	45.80	54	8.20
1828	71.67	PK	242	2.1	V	-4.87	66.80	74	7.20
1828	52.15	Ave.	242	2.1	V	-4.87	47.28	54	6.72
Middle Channel (915 MHz) 20M Mode									
915	88.04	QP	149	1.8	H	9.1	97.14	/	/
915	87.6	QP	189	2.1	V	9.1	96.70	/	/
1830.00	69.97	PK	319	2.0	H	-4.87	65.10	74	8.90
1830.00	50.26	Ave.	319	2.0	H	-4.87	45.39	54	8.61
1830.00	72.05	PK	242	2.2	V	-4.87	67.18	74	6.82
1830.00	52.16	Ave.	242	2.2	V	-4.87	47.29	54	6.71

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)
High Channel (916 MHz) 20M Mode									
916	87.97	QP	187	1.3	H	9.1	97.07	/	/
916	86.88	QP	180	1.2	V	9.1	95.98	/	/
928	56.52	QP	196	1.1	H	9.6	66.12	77.07	10.95
928	56.85	QP	30	1.2	V	9.6	66.45	75.98	9.53
1832	73.52	PK	50	1.8	H	-4.87	68.65	74	5.35
1832	52.03	Ave.	50	1.8	H	-4.87	47.16	54	6.84
1832	70.96	PK	86	2.3	V	-4.87	66.09	74	7.91
1832	52.81	Ave.	86	2.3	V	-4.87	47.94	54	6.06

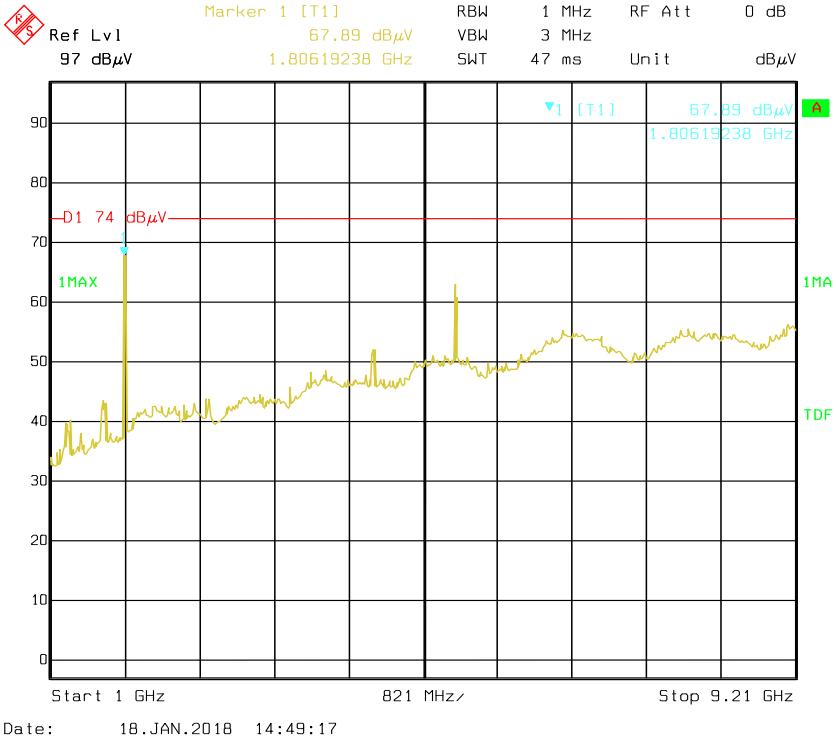
Note:
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude
The other spurious emission which is 20dB to the limit was not recorded.

Pre-scan with 10M Mode, High channel for Peak

Horizontal

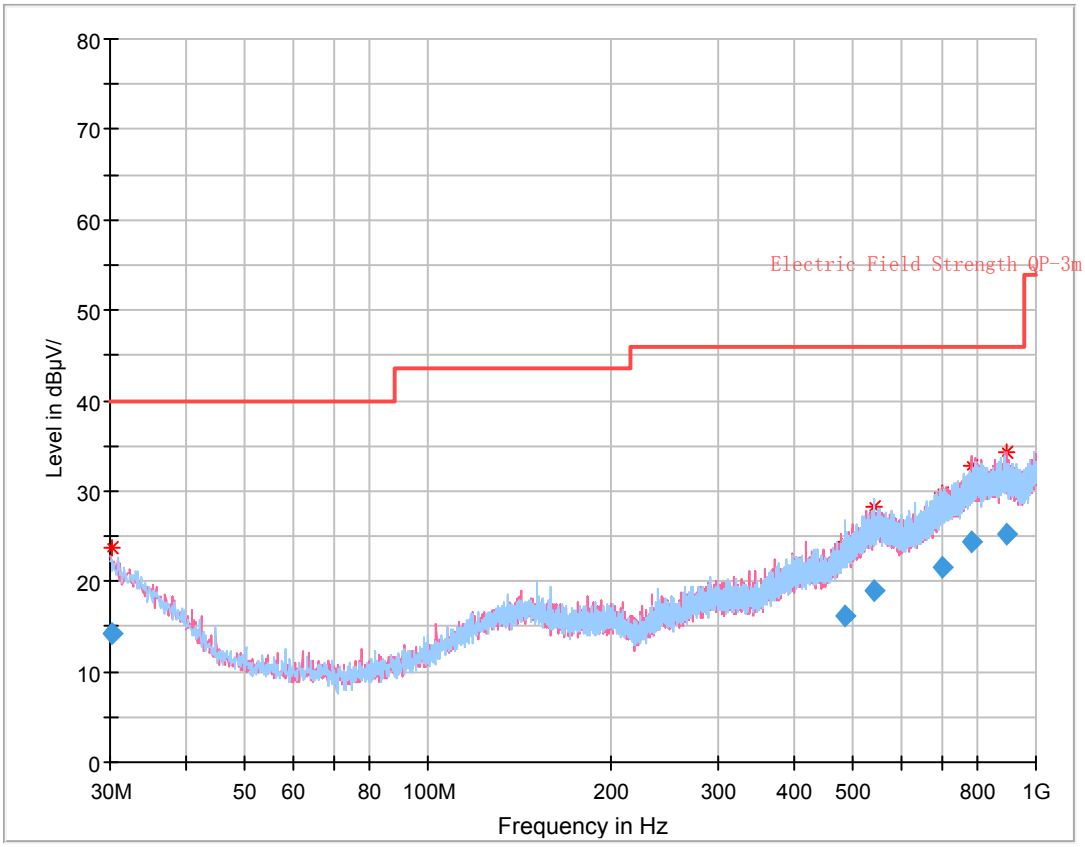


Vertical



For 2.4GHz:

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



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
30.307812	14.20	149.0	V	265.0	0.1	40.00	25.80
484.810000	16.07	231.0	H	226.0	2.1	46.00	29.93
541.933500	18.90	238.0	H	34.0	4.6	46.00	27.10
700.186375	21.55	390.0	V	171.0	6.7	46.00	24.45
785.373625	24.26	399.0	V	202.0	8.6	46.00	21.74
898.228375	25.16	287.0	V	34.0	9.7	46.00	20.84

1 GHz-25 GHz:

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)									
2403.50	82.26	PK	338	1.2	H	33.92	116.18	/	/
2403.50	71.09	Ave.	338	1.2	H	33.92	105.01	/	/
2403.50	86.52	PK	275	1.3	V	33.92	120.44	/	/
2403.50	74.45	Ave.	275	1.3	V	33.92	108.37	/	/
2343.56	28.12	PK	309	2.3	V	33.83	61.95	74	12.05
2343.56	13.87	Ave.	309	2.3	V	33.83	47.70	54	6.30
2485.62	27.23	PK	202	1.6	V	34.08	61.31	74	12.69
2485.62	13.48	Ave.	202	1.6	V	34.08	47.56	54	6.44
4807.00	47.41	PK	60	1.7	V	5.84	53.25	74	20.75
4807.00	33.56	Ave.	60	1.7	V	5.84	39.40	54	14.60
7210.50	58.39	PK	321	1.0	V	14.00	72.39	74	1.61
7210.50	38.52	Ave.	321	1.0	V	14.00	52.52	54	1.48
Middle Channel (2439.5MHz)									
2439.50	82.77	PK	59	1.5	H	33.92	116.69	/	/
2439.50	72.36	Ave.	59	1.5	H	33.92	106.28	/	/
2439.50	87.29	PK	232	2.1	V	33.92	121.21	/	/
2439.50	77.79	Ave.	232	2.1	V	33.92	111.71	/	/
4879.00	47.75	PK	46	1.3	V	6.21	53.96	74	20.04
4879.00	34.68	Ave.	46	1.3	V	6.21	40.89	54	13.11
7318.50	54.27	PK	63	1.4	V	13.60	67.87	74	6.13
7318.50	38.72	Ave.	63	1.4	V	13.60	52.32	54	1.68
High Channel (2475.5 MHz)									
2475.50	84.45	PK	300	2.4	H	34.08	118.53	/	/
2475.50	69.87	Ave.	300	2.4	H	34.08	103.95	/	/
2475.50	90.89	PK	172	1.8	V	34.08	124.97	/	/
2475.50	76.12	Ave.	172	1.8	V	34.08	110.20	/	/
2358.64	27.34	PK	145	2.3	V	33.92	61.26	74	12.74
2358.64	13.58	Ave.	145	2.3	V	33.92	47.50	54	6.50
2484.39	37.79	PK	33	1.7	V	34.08	71.87	74	2.13
2484.39	14.12	Ave.	33	1.7	V	34.08	48.20	54	5.80
4951.00	53.24	PK	210	1.5	V	7.82	61.06	74	12.94
4951.00	33.12	Ave.	210	1.5	V	7.82	40.94	54	13.06
7426.50	56.71	PK	358	2.0	V	13.02	69.73	74	4.27
7426.50	35.34	Ave.	358	2.0	V	13.02	48.36	54	5.64

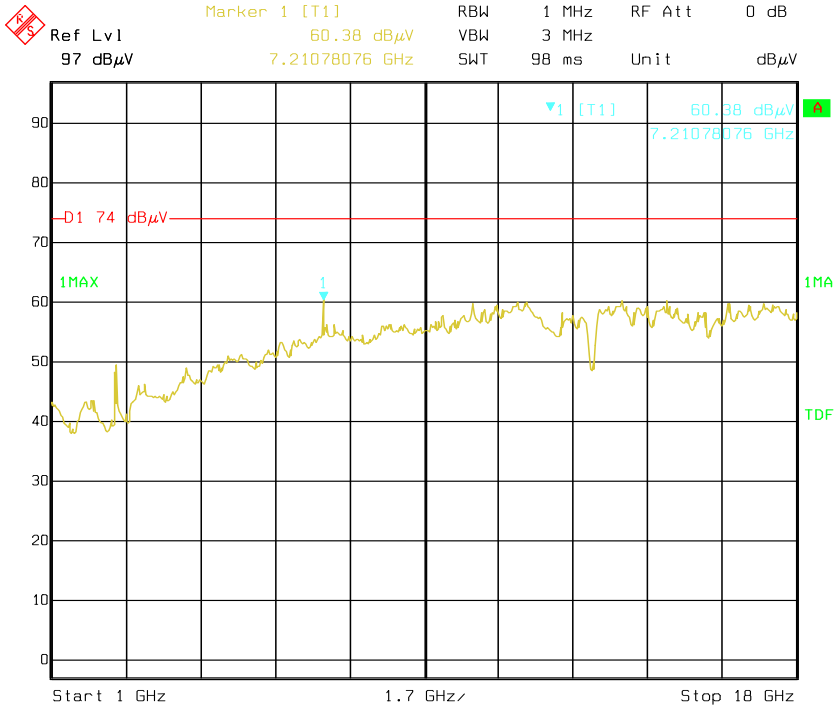
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
10M Mode									
Low Channel (2407.5 MHz)									
2407.50	79.22	PK	296	1.7	H	33.92	113.14	/	/
2407.50	66.47	Ave.	296	1.7	H	33.92	100.39	/	/
2407.50	83.12	PK	182	1.3	V	33.92	117.04	/	/
2407.50	69.24	Ave.	182	1.3	V	33.92	103.16	/	/
2389.67	38.88	PK	21	1.7	V	33.92	72.80	74	1.20
2389.67	15.14	Ave.	21	1.7	V	33.92	49.06	54	4.94
2485.67	27.31	PK	119	1.8	V	34.08	61.39	74	12.61
2485.67	13.68	Ave.	119	1.8	V	34.08	47.76	54	6.24
4815.00	46.35	PK	359	1.5	V	5.84	52.19	74	21.81
4815.00	31.55	Ave.	359	1.5	V	5.84	37.39	54	16.61
7222.50	55.20	PK	54	1.7	V	14.00	69.20	74	4.80
7222.50	34.75	Ave.	54	1.7	V	14.00	48.75	54	5.25
Middle Channel (2439.5MHz)									
2439.50	75.68	PK	333	1.8	H	33.92	109.60	/	/
2439.50	64.74	Ave.	333	1.8	H	33.92	100.66	/	/
2439.50	80.63	PK	128	1.5	V	33.92	114.55	/	/
2439.50	68.02	Ave.	128	1.5	V	33.92	101.94	/	/
4879.00	63.01	PK	3	1.1	V	6.21	69.22	74	4.78
4879.00	46.74	Ave.	3	1.1	V	6.21	52.95	54	1.05
7318.50	46.52	PK	262	1.6	V	13.60	60.12	74	13.88
7318.50	33.58	Ave.	262	1.6	V	13.60	47.18	54	6.82
High Channel (2471.5 MHz)									
2471.50	76.61	PK	198	1.2	H	34.08	110.69	/	/
2471.50	64.09	Ave.	198	1.2	H	34.08	98.17	/	/
2471.50	81.26	PK	154	1.7	V	34.08	115.34	/	/
2471.50	68.64	Ave.	154	1.7	V	34.08	102.72	/	/
2319.61	27.04	PK	80	2.3	V	33.83	60.87	74	13.13
2319.61	13.22	Ave.	80	2.3	V	33.83	47.05	54	6.95
2483.50	37.26	PK	48	2.4	V	34.08	71.34	74	2.66
2483.50	17.78	Ave.	48	2.4	V	34.08	51.86	54	2.14
4943.00	62.64	PK	347	1.8	V	6.21	68.85	74	5.15
4943.00	46.65	Ave.	347	1.8	V	6.21	52.86	54	1.14

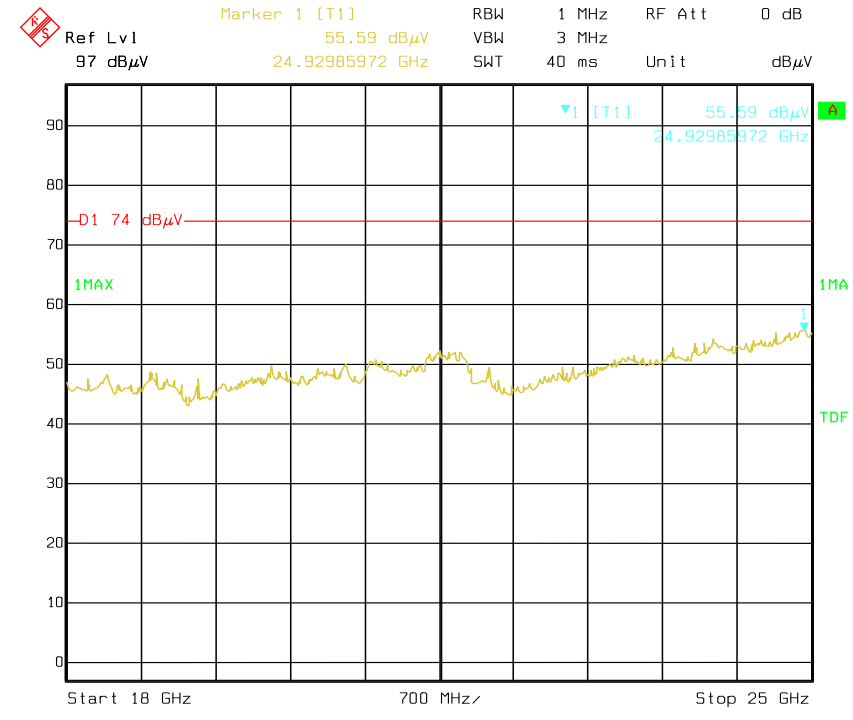
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
20M Mode									
Low Channel (2412.5 MHz)									
2412.50	78.11	PK	300	2.0	H	33.92	112.03	/	/
2412.50	65.21	Ave.	300	2.0	H	33.92	99.13	/	/
2412.50	81.85	PK	150	2.2	V	33.92	115.77	/	/
2412.50	68.12	Ave.	150	2.2	V	33.92	102.04	/	/
2389.91	37.68	PK	357	1.1	V	33.92	71.60	74	2.40
2389.91	18.87	Ave.	357	1.1	V	33.92	52.79	54	1.21
2485.28	27.13	PK	2	1.2	V	34.08	61.21	74	12.79
2485.28	13.36	Ave.	2	1.2	V	34.08	47.44	54	6.56
4825.00	60.15	PK	330	2.5	V	5.84	65.99	74	8.01
4825.00	44.31	Ave.	330	2.5	V	5.84	50.15	54	3.85
Middle Channel (2437.5MHz)									
2437.50	75.78	PK	55	2.2	H	33.92	109.70	/	/
2437.50	64.35	Ave.	55	2.2	H	33.92	98.27	/	/
2437.50	82.86	PK	29	1.1	V	33.92	116.78	/	/
2437.50	69.01	Ave.	29	1.1	V	33.92	102.93	/	/
4875.00	62.10	PK	168	1.0	V	6.21	68.31	74	5.69
4875.00	45.67	Ave.	168	1.0	V	6.21	51.88	54	2.12
High Channel (2462.5 MHz)									
2462.50	78.64	PK	299	1.7	H	34.08	112.72	/	/
2462.50	65.13	Ave.	299	1.7	H	34.08	99.21	/	/
2462.50	80.12	PK	144	2.1	V	34.08	114.20	/	/
2462.50	66.48	Ave.	144	2.1	V	34.08	100.56	/	/
2346.58	27.13	PK	94	2.4	V	33.83	60.96	74	13.04
2346.58	13.36	Ave.	94	2.4	V	33.83	47.19	54	6.81
2483.79	32.48	PK	209	2.2	V	34.08	66.56	74	7.44
2483.79	18.60	Ave.	209	2.2	V	34.08	52.68	54	1.32
4925.00	60.67	PK	163	1.2	V	6.21	66.88	74	7.12
4925.00	42.35	Ave.	163	1.2	V	6.21	48.56	54	5.44

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.

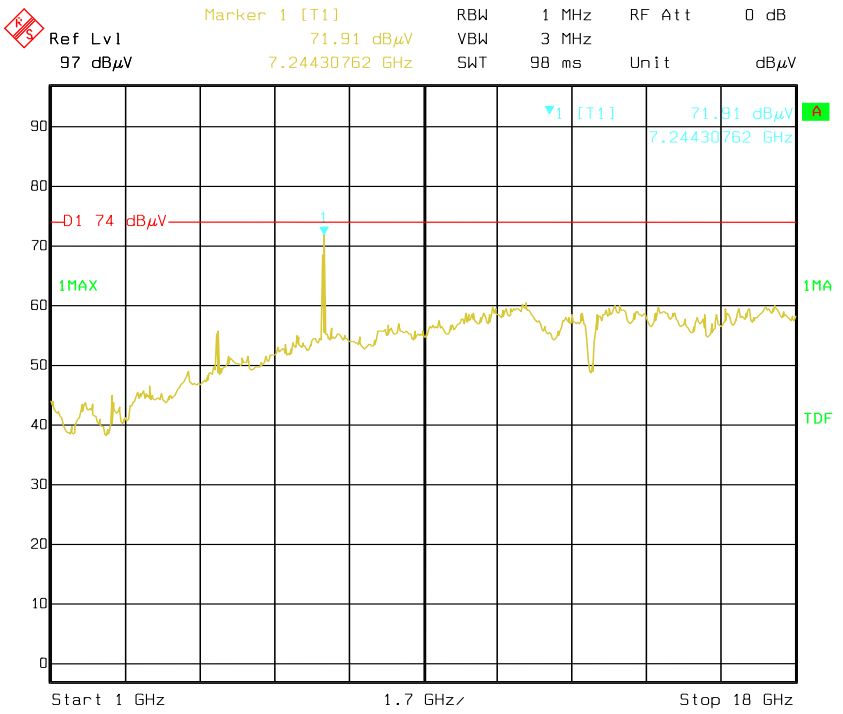
Pre-scan with 1.4M Mode, Low channel, for Peak

Horizontal





Vertical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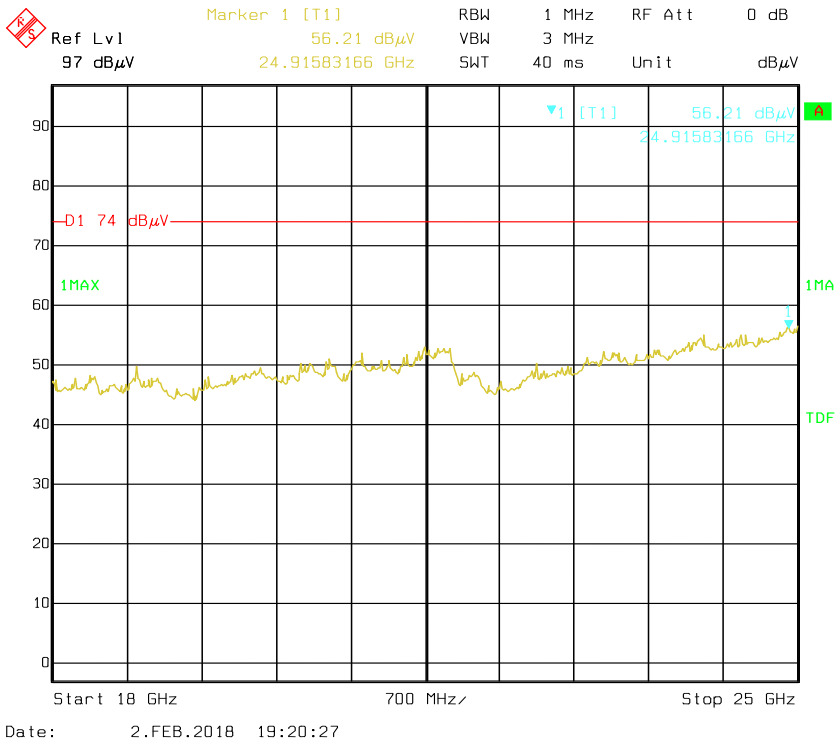
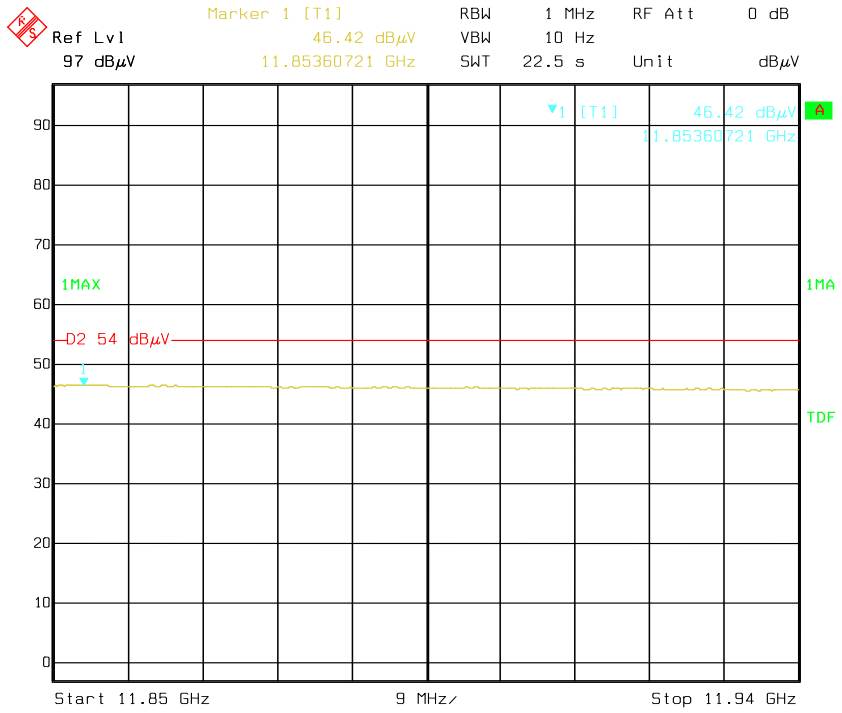
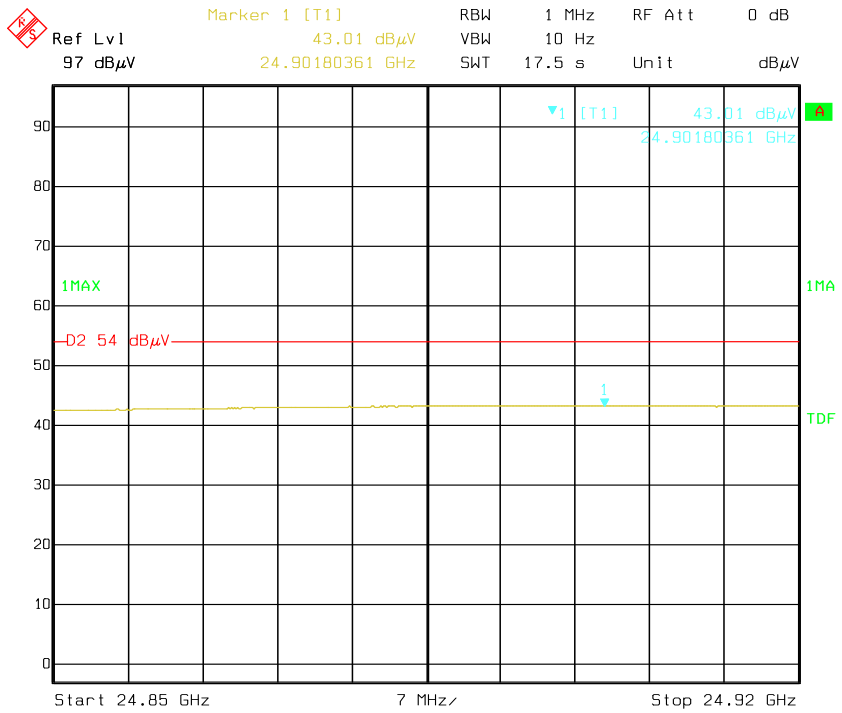
Ref Lvl
97 dBµV
71.91 dBµV
7.24430762 GHz
RBW 1 MHz
VBW 3 MHz
SWT 98 ms
RF Att 0 dB
Unit dBµV
1 [T1] 71.91 dBµV
7.24430762 GHz
D1 74 dBµV
1MAX
1MA
TDF
Start 1 GHz
1.7 GHz/
Stop 18 GHz
Date: 25.JAN.2018 17:21:35


Marker 1 [T1]
Ref Lvl
97 dBµV
56.21 dBµV
24.91583166 GHz
RBW 1 MHz
VBW 3 MHz
SWT 40 ms
RF Att 0 dB
Unit dBµV
1 [T1] 56.21 dBµV
24.91583166 GHz
D1 74 dBµV
1MAX
1MA
TDF
Start 18 GHz
700 MHz/
Stop 25 GHz
Date: 2.FEB.2018 19:20:27

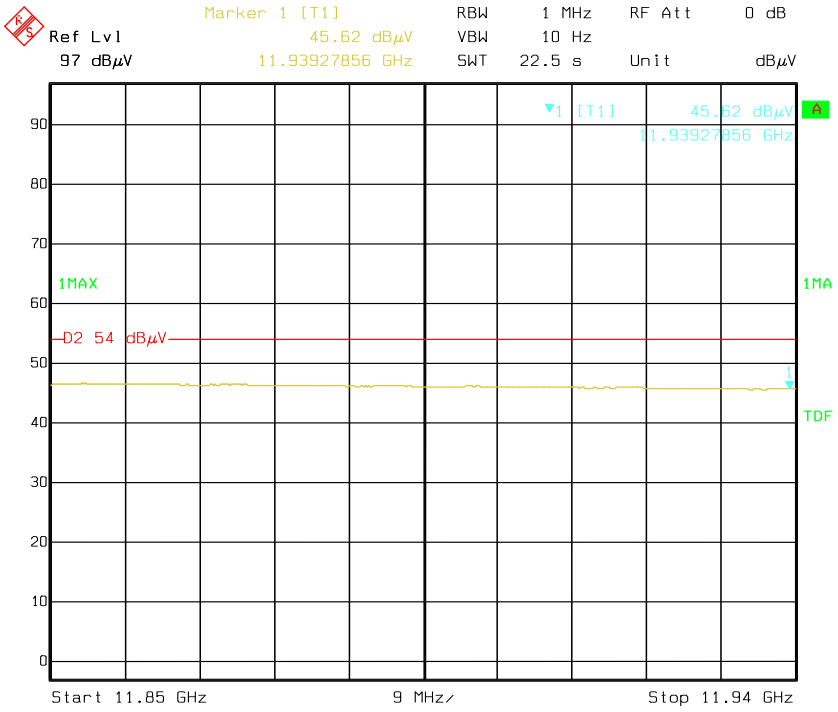
For Average

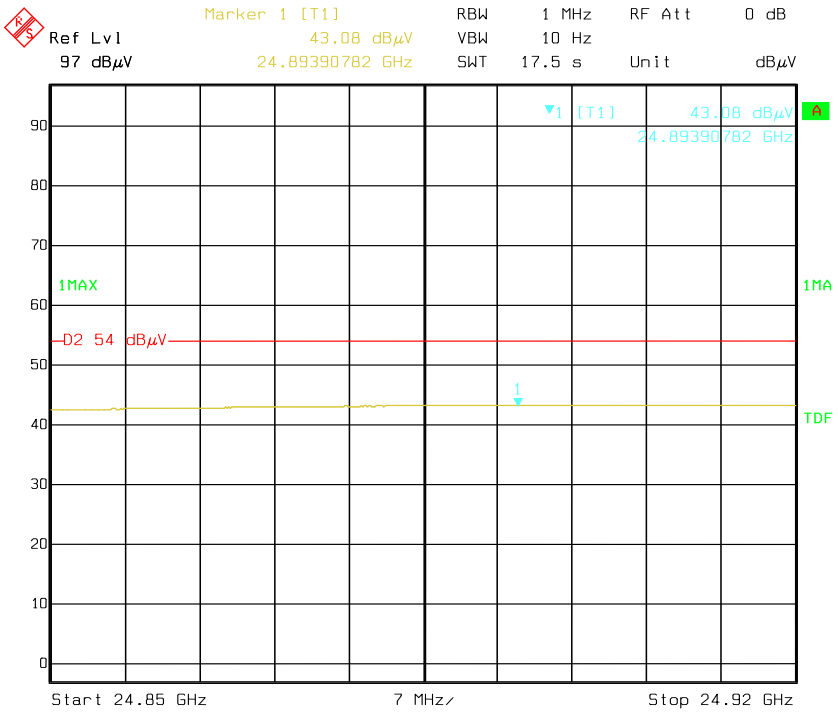
Horizontal





Vertical


Marker 1 [T1]
RBW 1 MHz
RF Att 0 dB
Ref Lvl
45.62 dBµV
VBW 10 Hz
97 dBµV
11.93927856 GHz
SWT 22.5 s
Unit dBµV
1 [T1] 45.62 dBµV
11.93927856 GHz
A
1MAX
1MA
D2 54 dBµV
TDF
Start 11.85 GHz
9 MHz/
Stop 11.94 GHz


Marker 1 [T1]
RBW 1 MHz
RF Att 0 dB
Ref Lvl
43.08 dBµV
VBW 10 Hz
97 dBµV
24.89390782 GHz
SWT 17.5 s
Unit dBµV
1 [T1] 43.08 dBµV
24.89390782 GHz
A
1MAX
1MA
D2 54 dBµV
TDF
Start 24.85 GHz
7 MHz/
Stop 24.92 GHz

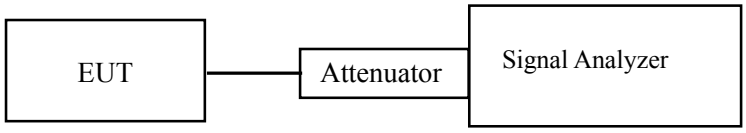
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

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:	50~56 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Vincent Zeng from 2018-01-16 to 2018-02-26.

Test Result: Pass.

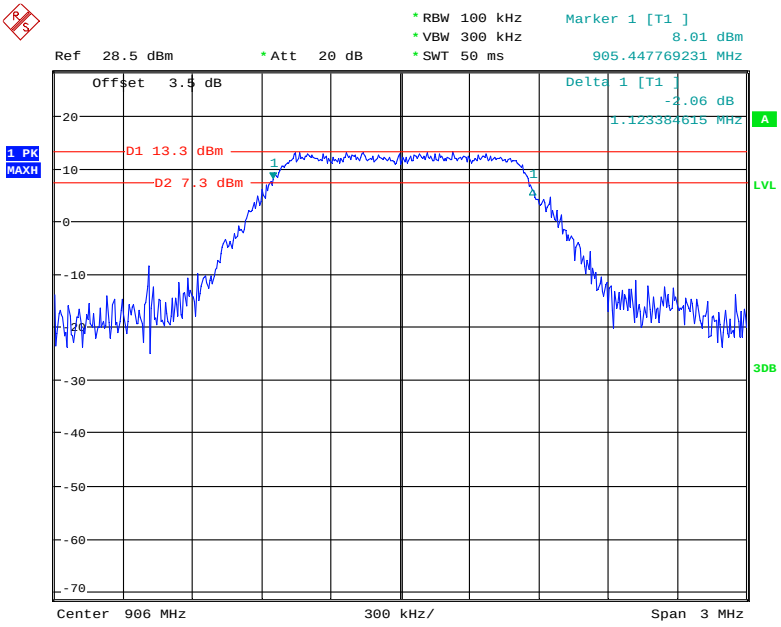
Please refer to the following table and plots.

EUT operation mode: Transmitting

For 900MHz Antenna 01:

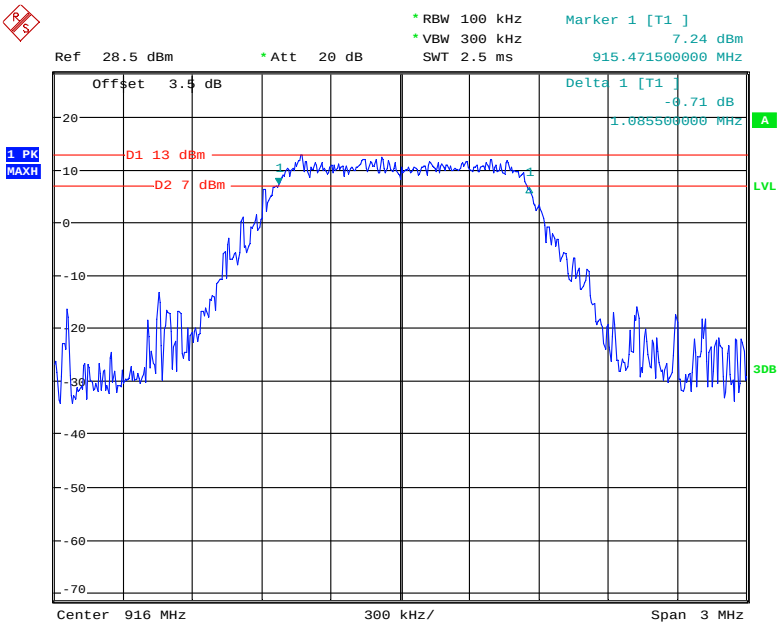
Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (kHz)
1.4M Mode			
Low	906	1.123	≥500
Middle	916	1.086	≥500
High	924	1.128	≥500
10M Mode			
Low	909	9.036	≥500
Middle	916	9.055	≥500
High	921	9.023	≥500
20M Mode			
Low	914	18.096	⩾500
Middle	915	18.077	⩾500
High	916	18.095	⩾500

1.4M Mode
Low Channel



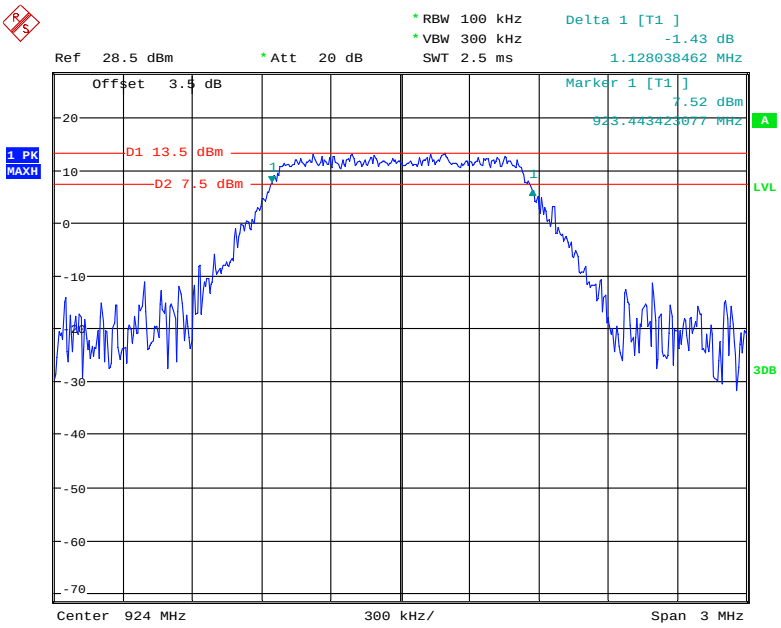
Date: 16.JAN.2018 16:14:06

Middle Channel



Date: 16.JAN.2018 16:07:16

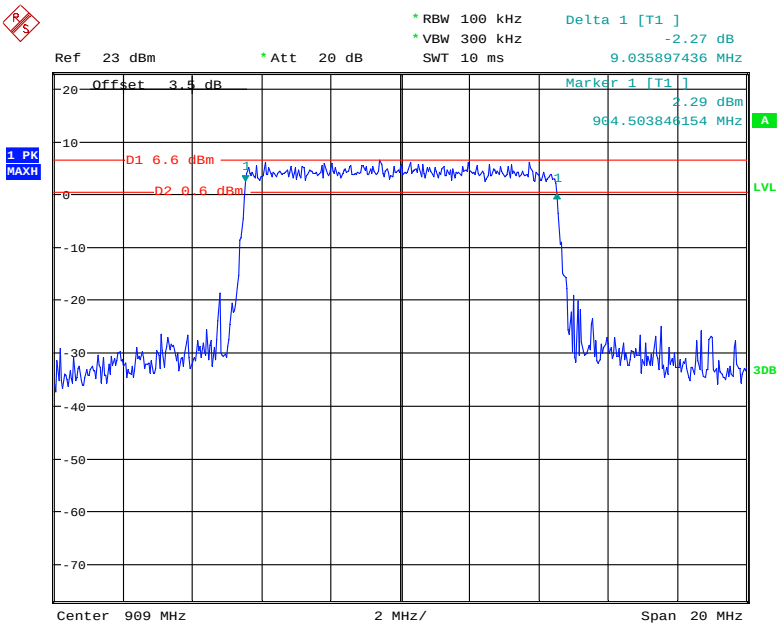
High Channel



Date: 16.JAN.2018 16:02:43

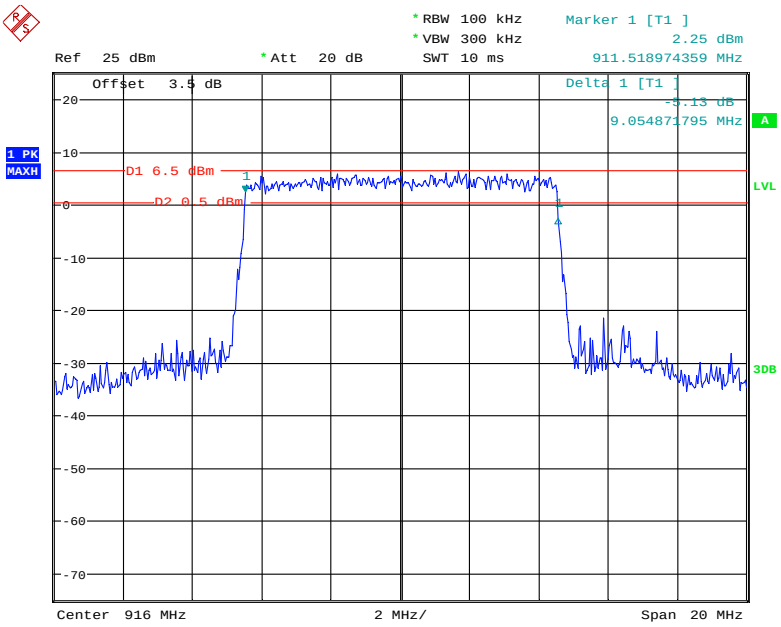
10M Mode

Low Channel



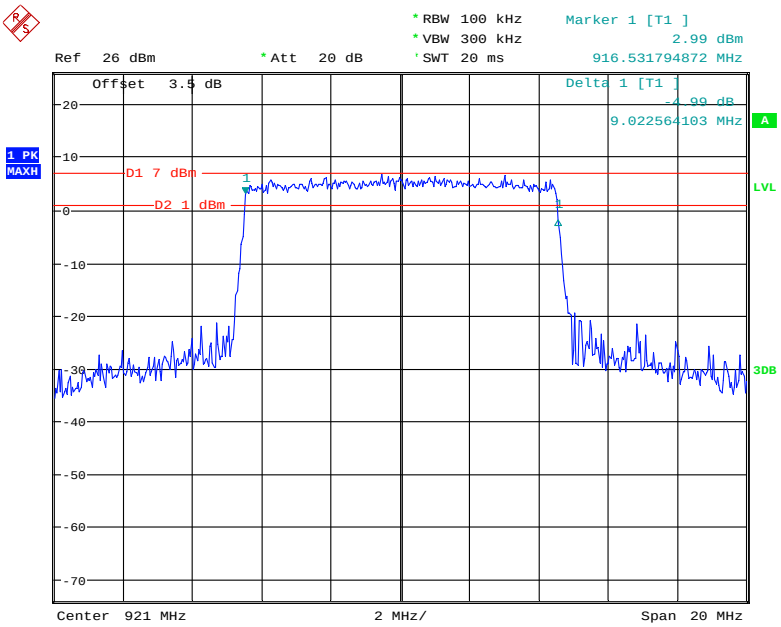
Date: 16.JAN.2018 15:17:48

Middle Channel



Date: 16.JAN.2018 15:30:37

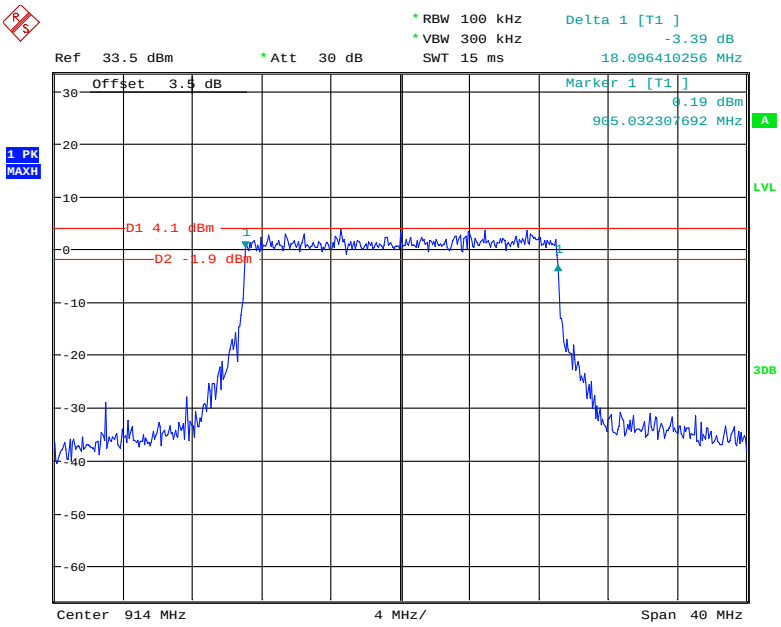
High Channel



Date: 16.JAN.2018 15:38:02

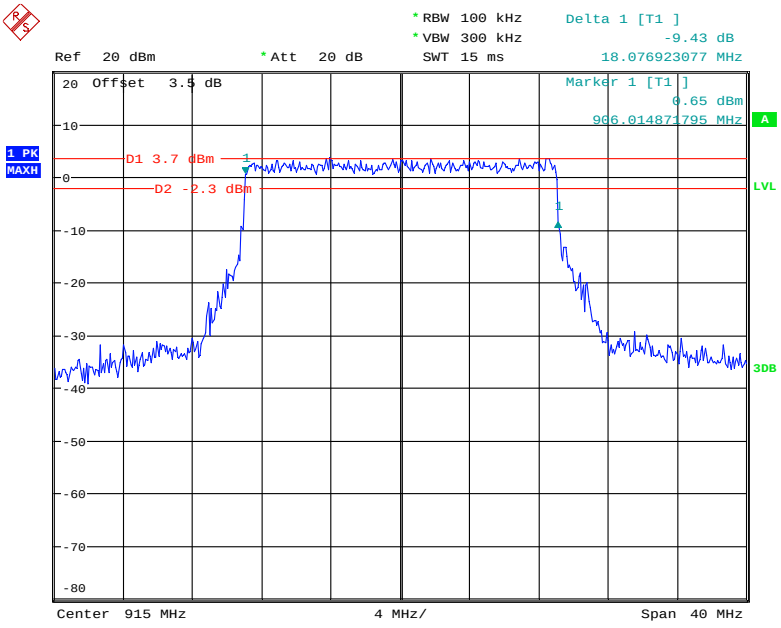
20M Mode

Low Channel



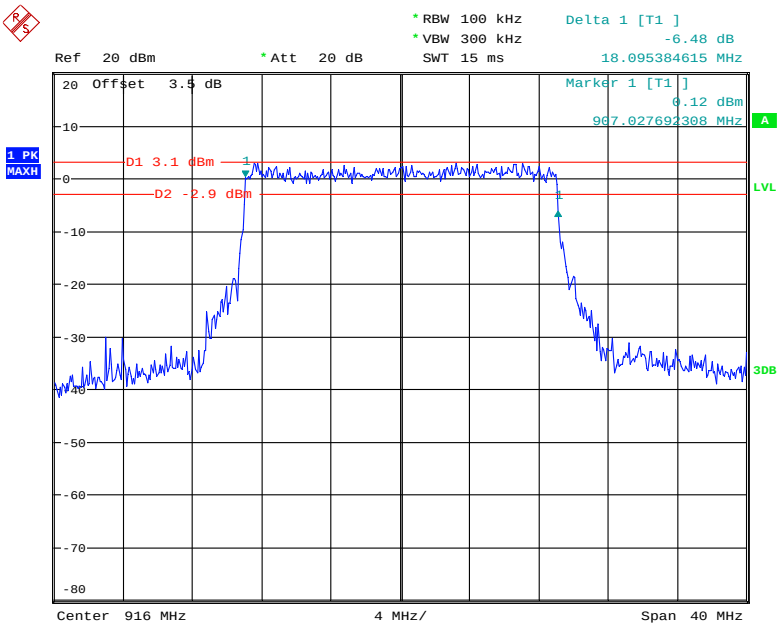
Date: 16.JAN.2018 16:39:55

Middle Channel



Date: 16.JAN.2018 16:50:01

High Channel



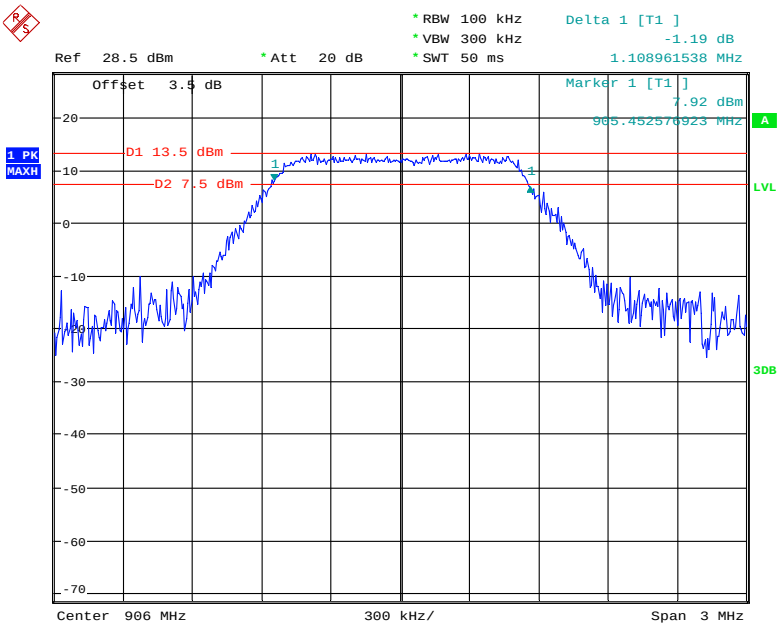
Date: 16.JAN.2018 16:45:01

For 900MHz Antenna 02:

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (kHz)
1.4M Mode			
Low	906	1.109	≥500
Middle	916	1.100	≥500
High	924	1.114	≥500
10M Mode			
Low	909	9.068	≥500
Middle	916	9.055	≥500
High	921	9.023	≥500
20M Mode			
Low	914	18.096	⩾500
Middle	915	18.077	⩾500
High	916	18.095	⩾500

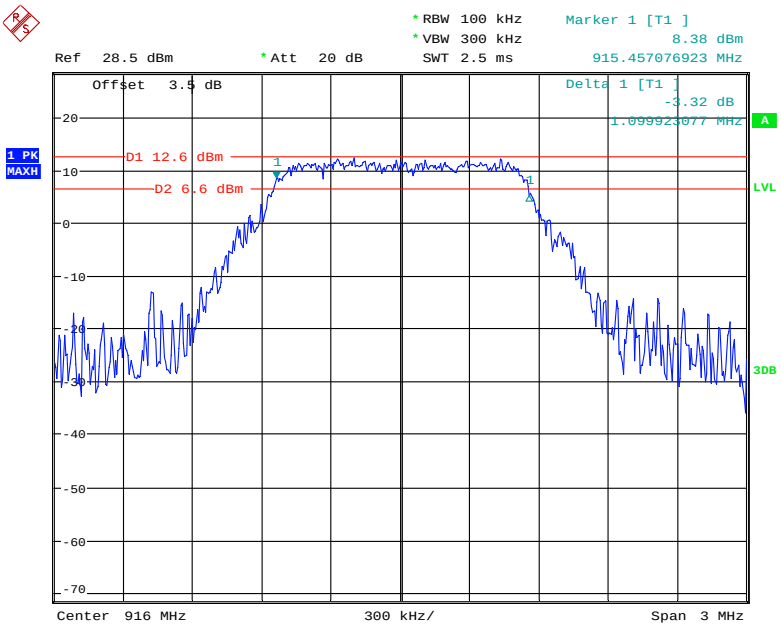
1.4M Mode

Low Channel



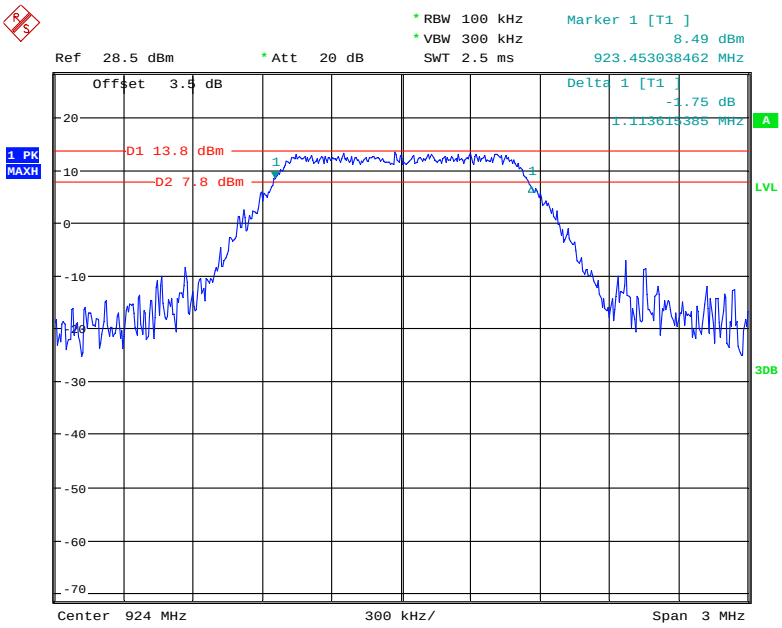
Date: 16.JAN.2018 16:13:07

Middle Channel



Date: 16.JAN.2018 16:06:34

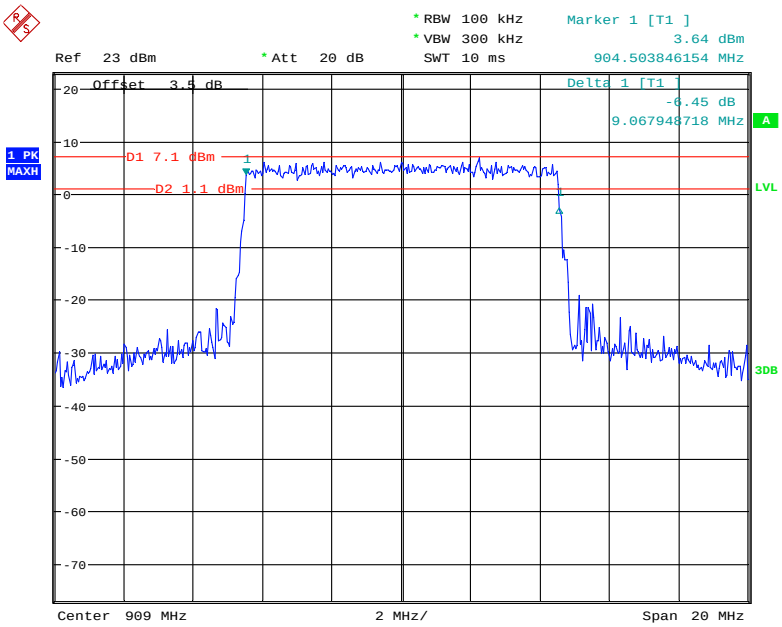
High Channel



Date: 16.JAN.2018 16:01:53

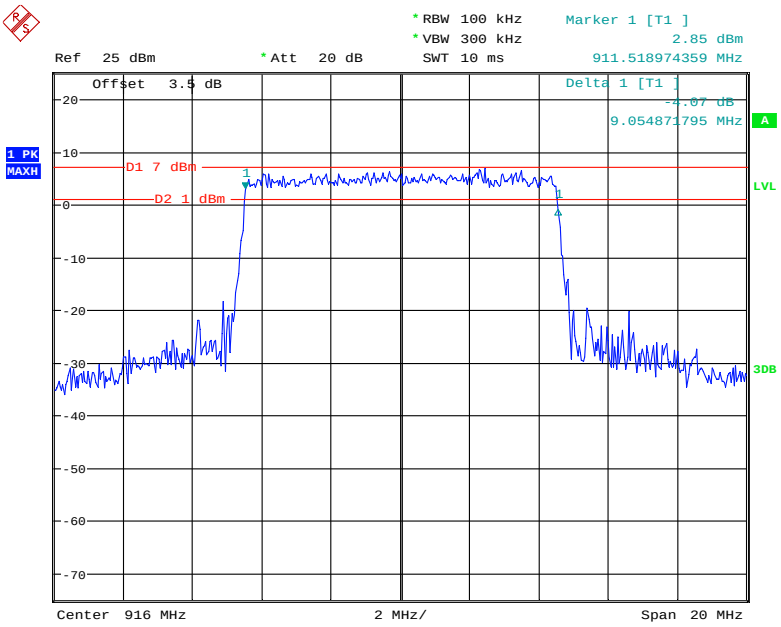
10M Mode

Low Channel



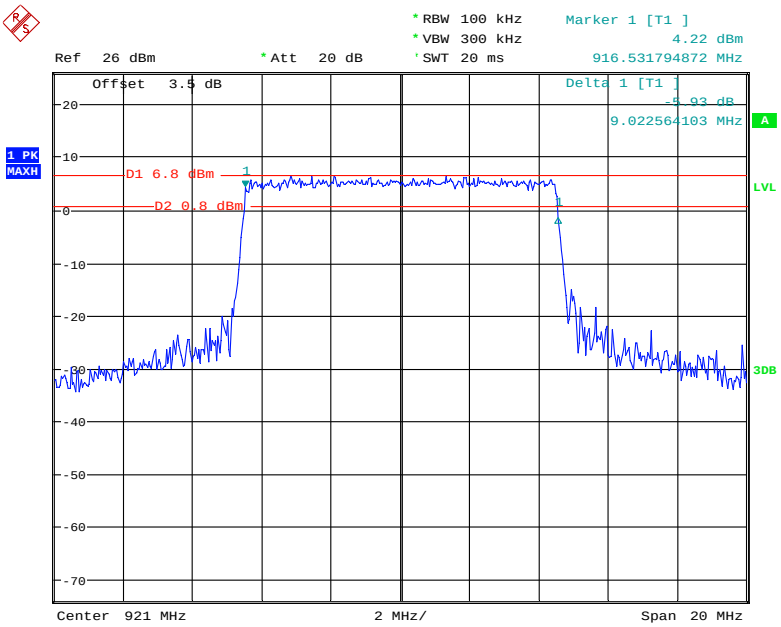
Date: 16.JAN.2018 15:17:06

Middle Channel



Date: 16.JAN.2018 15:29:59

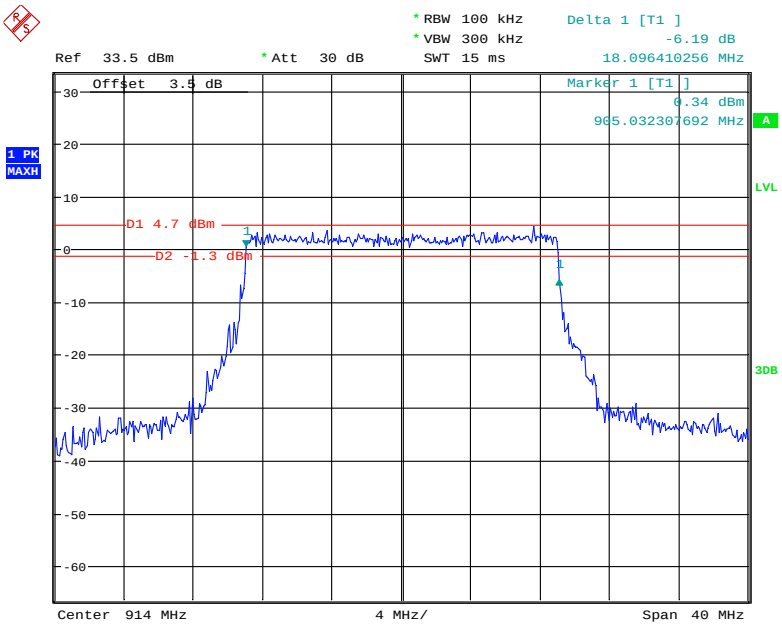
High Channel



Date: 16.JAN.2018 15:37:09

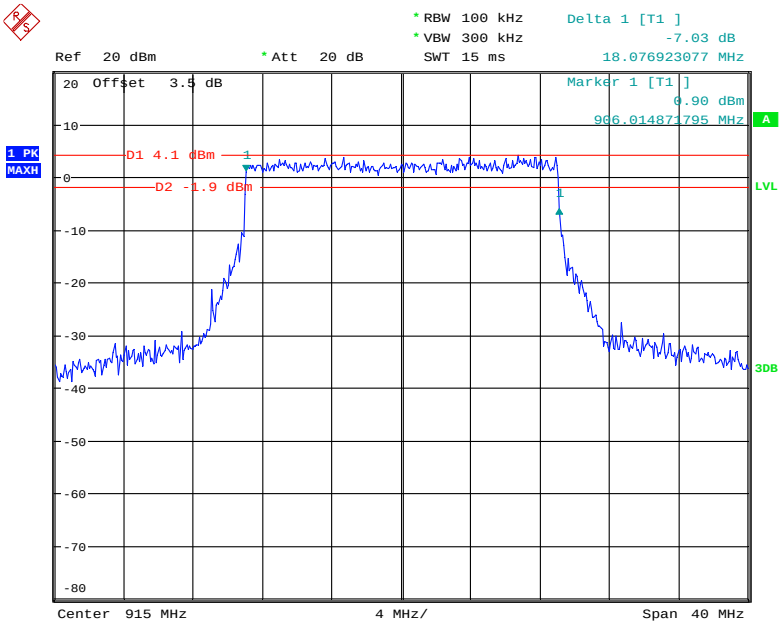
20M Mode

Low Channel



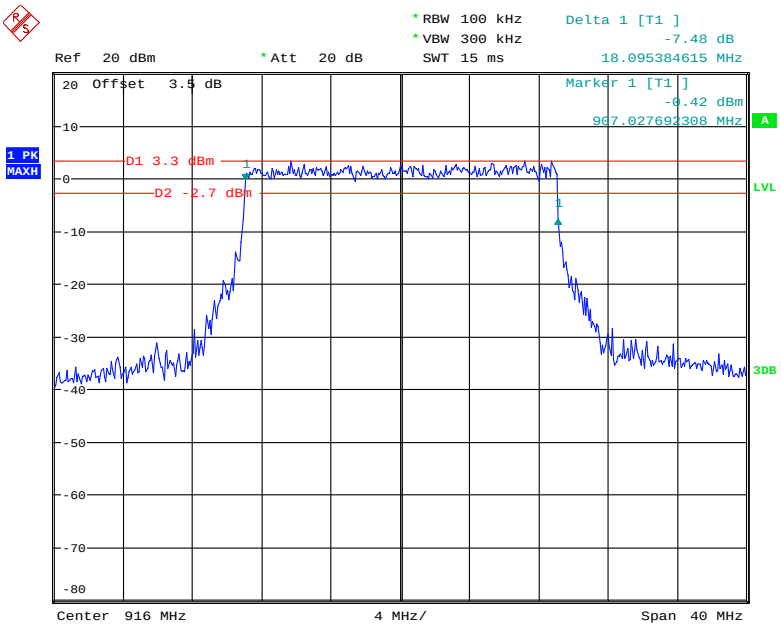
Date: 16.JAN.2018 16:39:20

Middle Channel



Date: 16.JAN.2018 16:49:04

High Channel



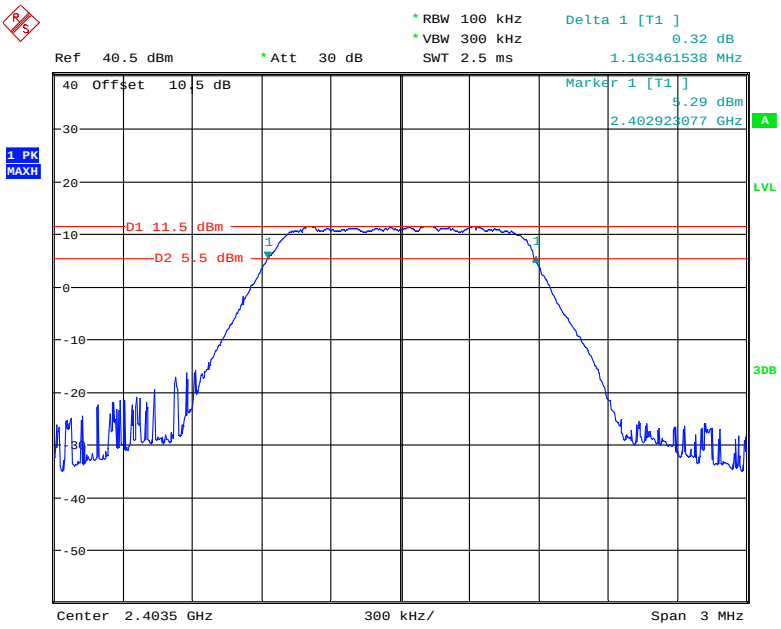
Date: 16.JAN.2018 16:44:28

For 2.4GHz Antenna 03:

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (kHz)
1.4M Mode			
Low	2403.5	1.163	≥500
Middle	2439.5	1.163	≥500
High	2475.5	1.075	≥500
10M Mode			
Low	2407.5	9.006	≥500
Middle	2439.5	9.034	≥500
High	2471.5	9.013	≥500
20M Mode			
Low	2412.5	18.084	⩾500
Middle	2437.5	18.187	⩾500
High	2462.5	18.100	⩾500

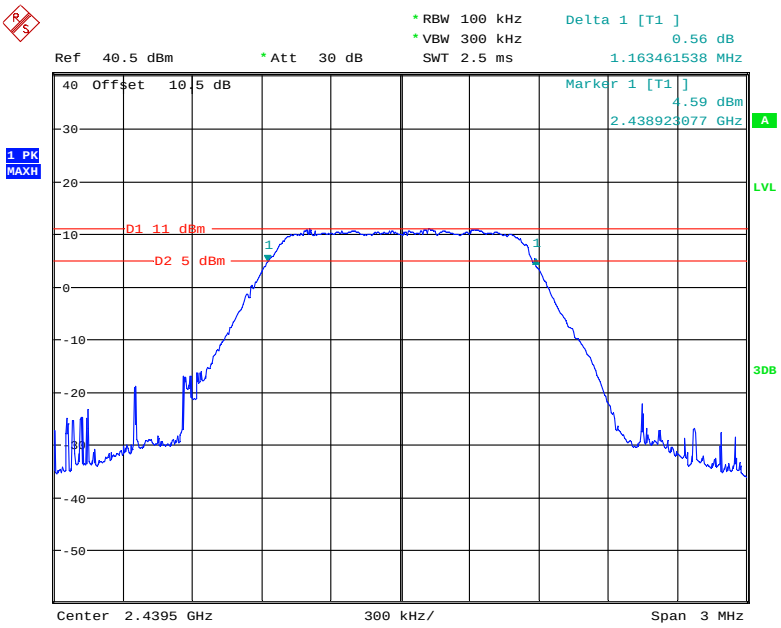
1.4M Mode

Low Channel



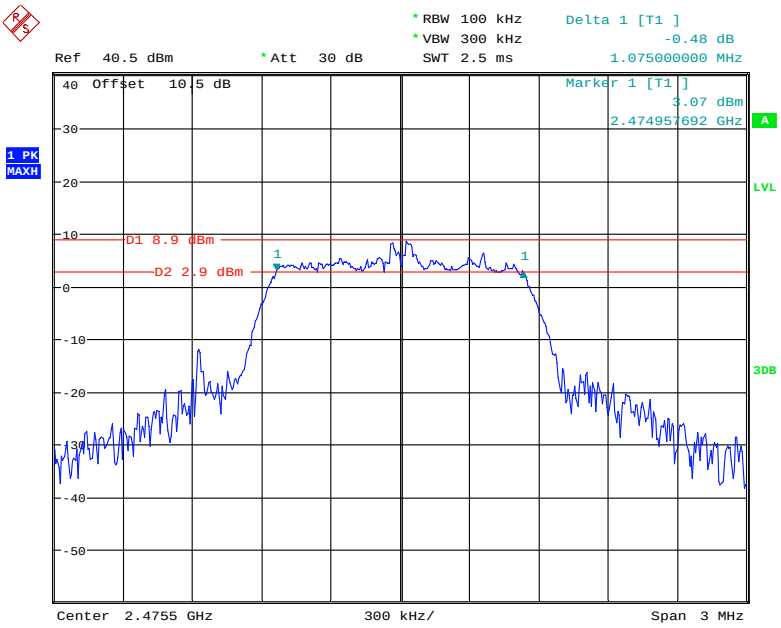
Date: 26.FEB.2018 21:23:53

Middle Channel



Date: 26.FEB.2018 21:37:52

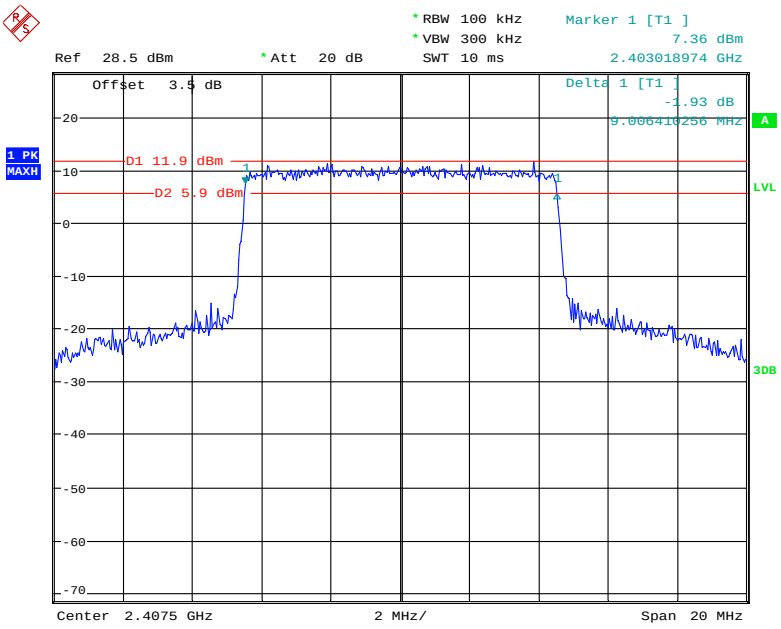
High Channel



Date: 27.JAN.2018 20:09:46

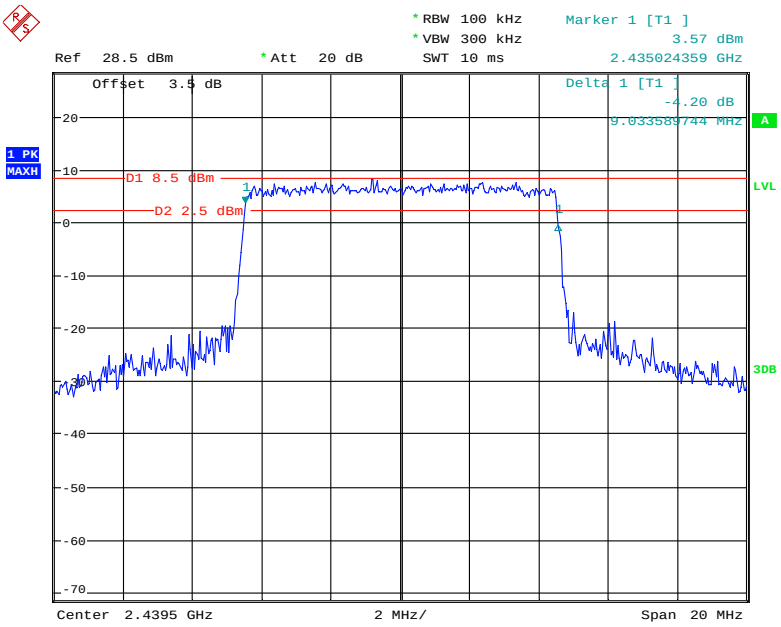
10M Mode

Low Channel



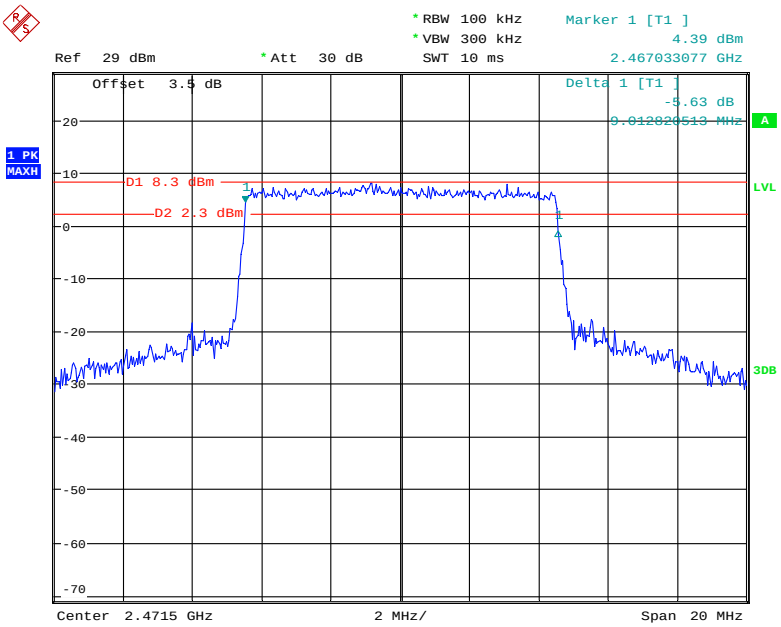
Date: 16.JAN.2018 13:36:47

Middle Channel



Date: 16.JAN.2018 13:42:29

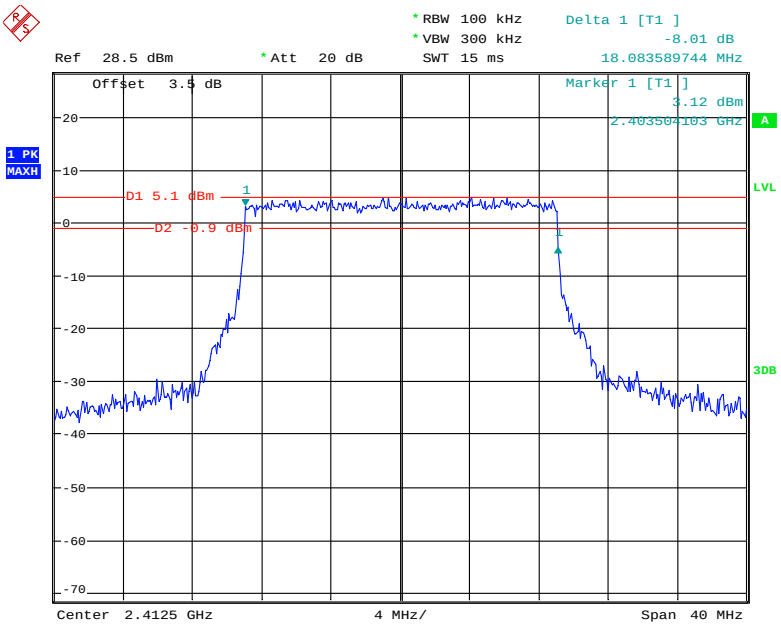
High Channel



Date: 16.JAN.2018 13:49:20

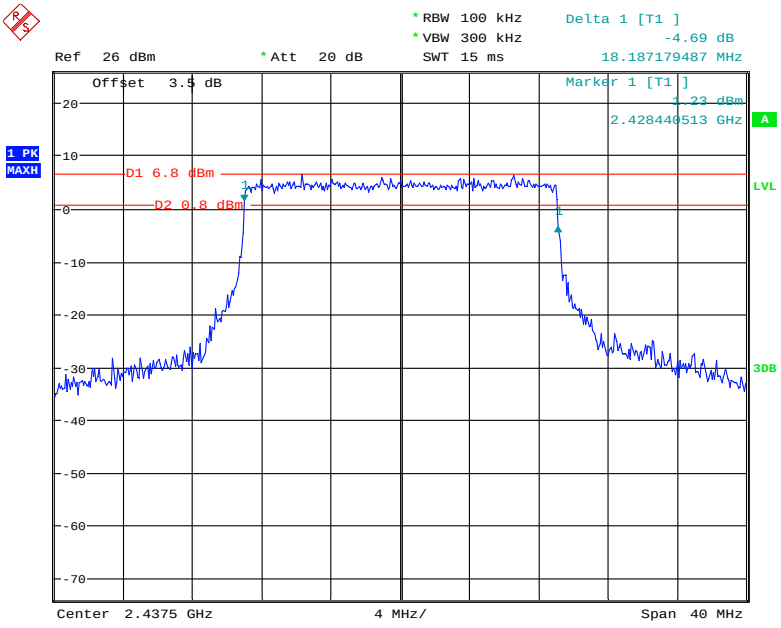
20M Mode

Low Channel



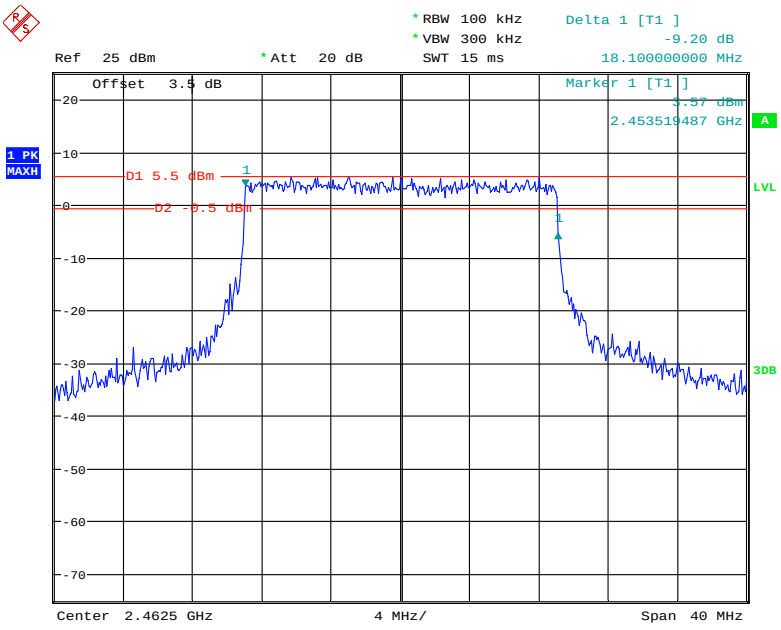
Date: 16.JAN.2018 14:03:59

Middle Channel



Date: 16.JAN.2018 14:10:39

High Channel



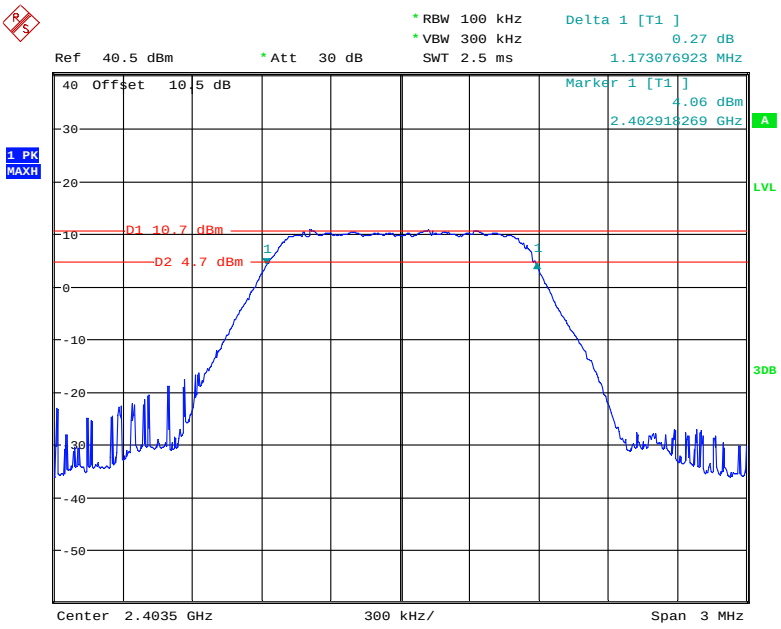
Date: 16.JAN.2018 14:18:08

For 2.4GHz Antenna 04:

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (kHz)
1.4M Mode			
Low	2403.5	1.173	≥500
Middle	2439.5	1.163	≥500
High	2475.5	1.094	≥500
10M Mode			
Low	2407.5	9.071	≥500
Middle	2439.5	9.034	≥500
High	2471.5	9.045	≥500
20M Mode			
Low	2412.5	18.084	⩾500
Middle	2437.5	18.123	⩾500
High	2462.5	18.100	⩾500

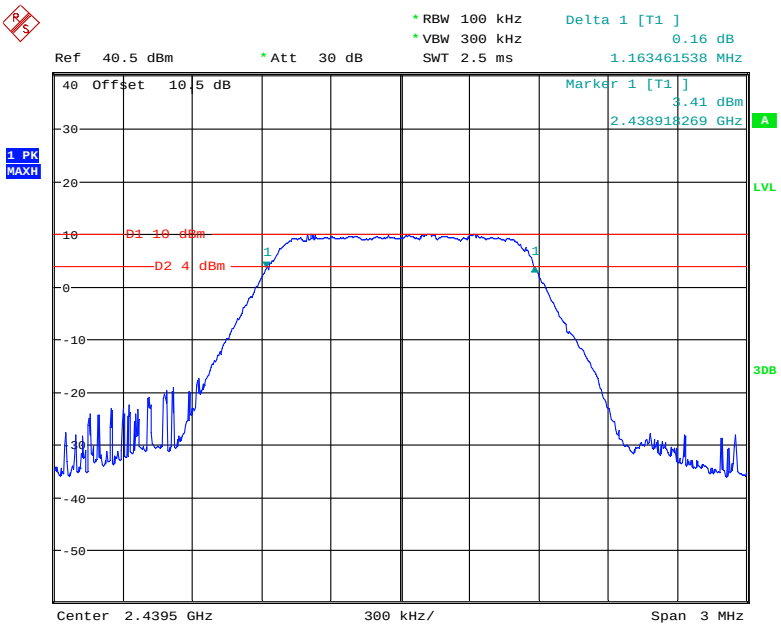
1.4M Mode

Low Channel



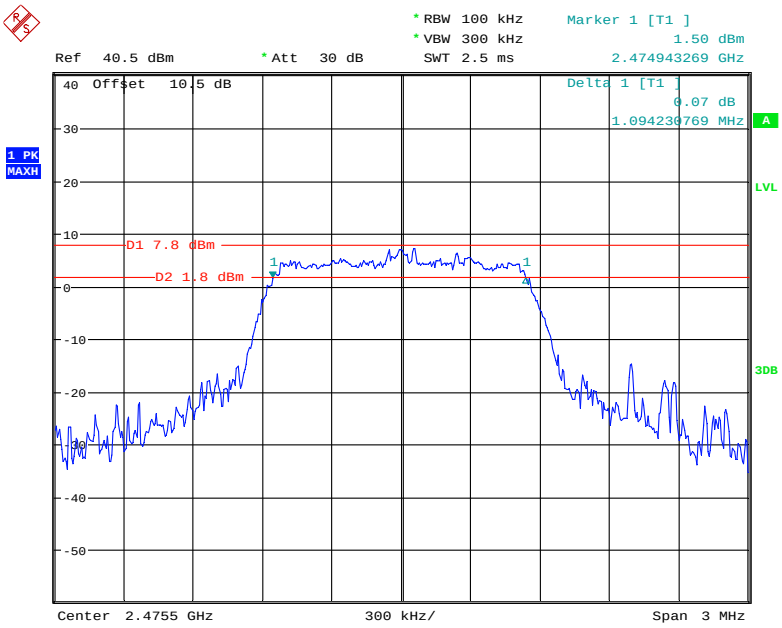
Date: 26.FEB.2018 21:28:59

Middle Channel



Date: 26.FEB.2018 21:32:13

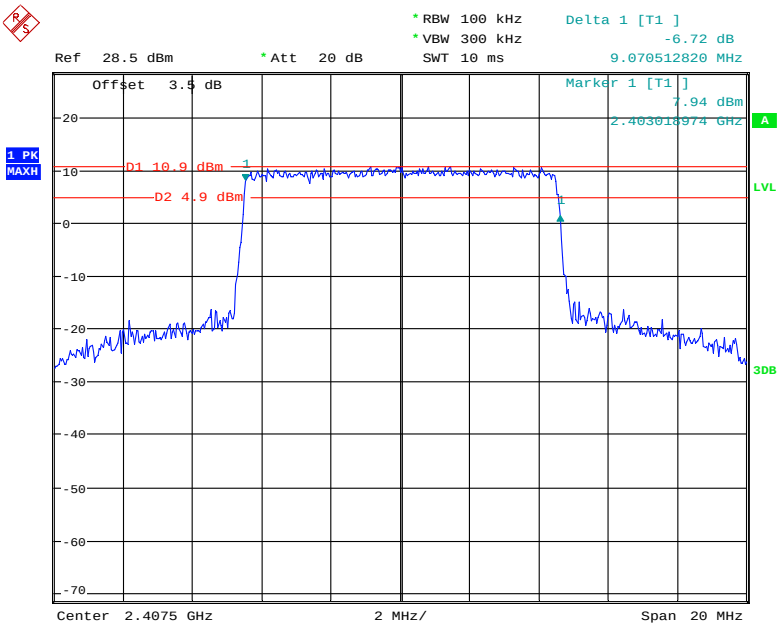
High Channel



Date: 27.JAN.2018 20:10:42

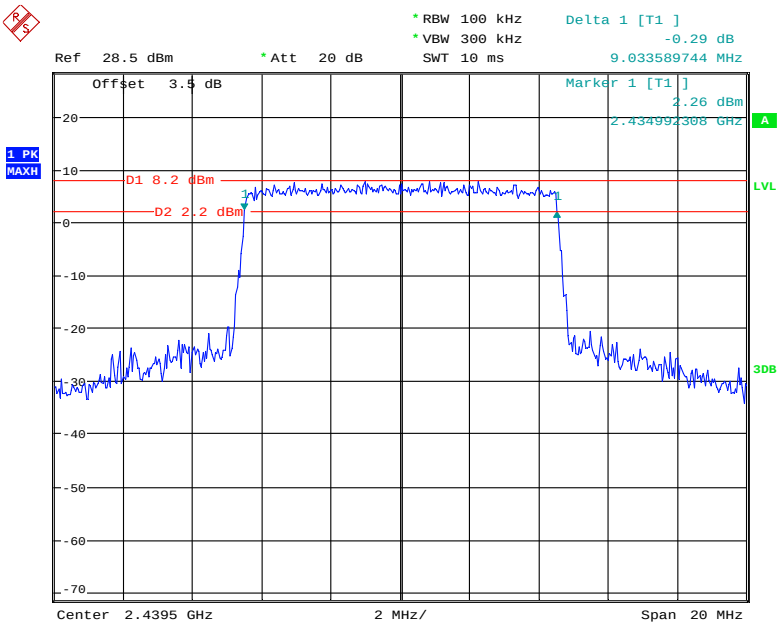
10M Mode

Low Channel



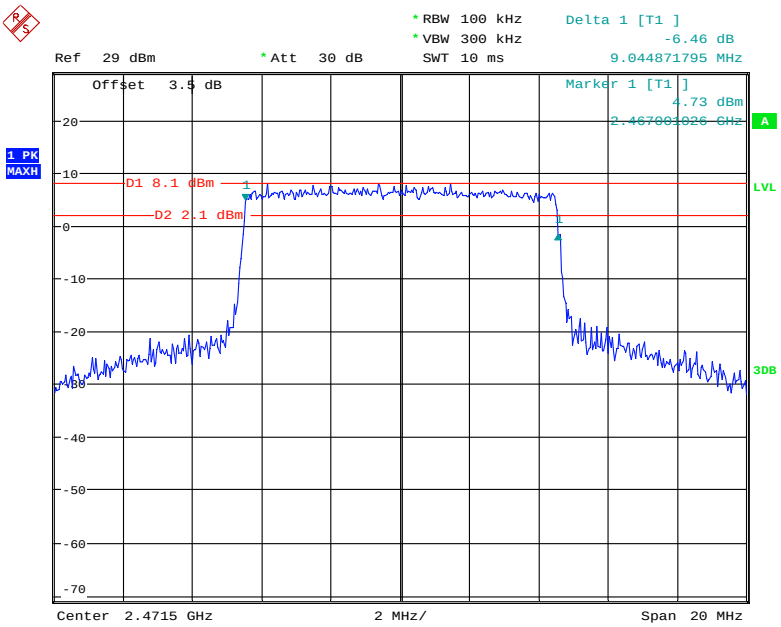
Date: 16.JAN.2018 13:38:55

Middle Channel



Date: 16.JAN.2018 13:43:15

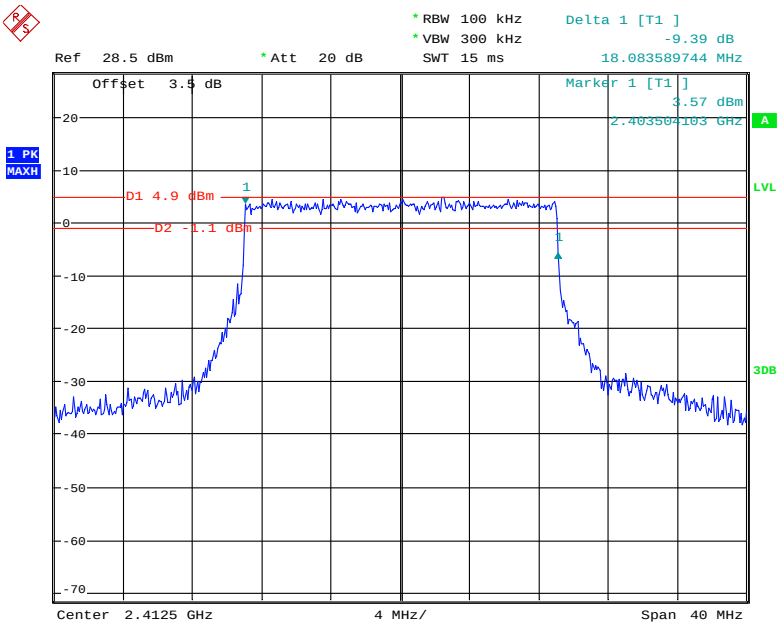
High Channel



Date: 16.JAN.2018 13:50:13

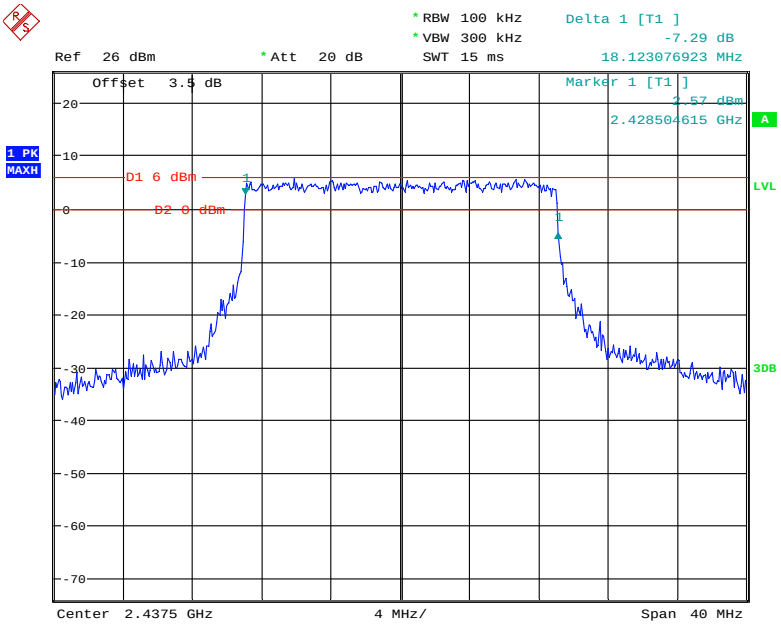
20M Mode

Low Channel



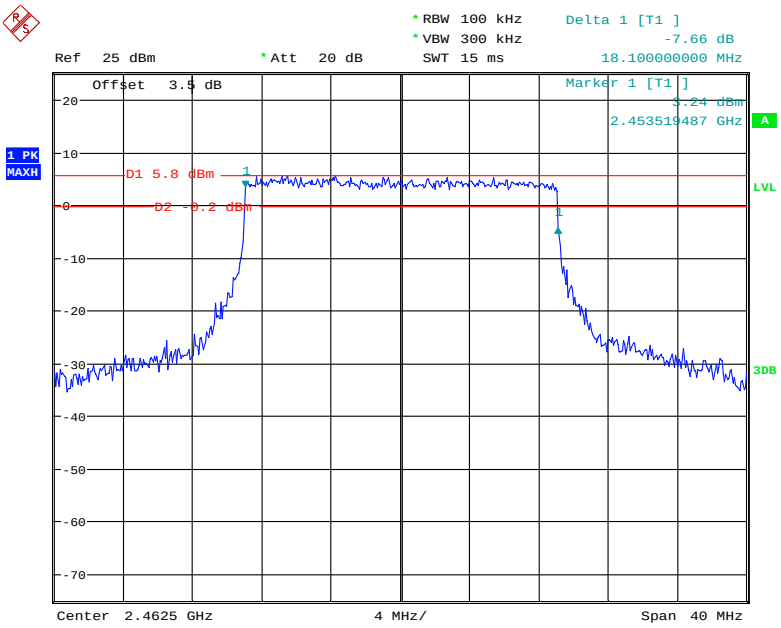
Date: 16.JAN.2018 14:04:49

Middle Channel



Date: 16.JAN.2018 14:11:38

High Channel



Date: 16.JAN.2018 14:19:19

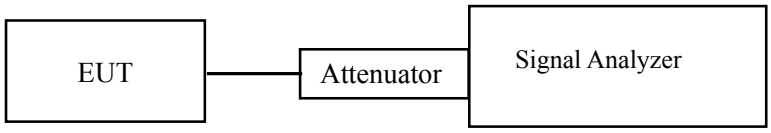
FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

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:	25 ℃
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

The testing was performed by Vincent Zeng on 2018-01-16.

EUT operation mode: Transmitting

For 900MHz:

Channel	Frequency (MHz)	Max Conducted Peak Output Power	Max Conducted Peak Output Power	Limit (dBm)
		Antenna 01 (dBm)	Antenna 02 (dBm)	
1.4M Mode				
Low	906	25.23	25.42	30
Middle	916	25.33	25.45	30
High	924	25.48	25.46	30
10M Mode				
Low	909	23.39	23.53	30
Middle	916	23.80	23.72	30
High	921	23.75	23.84	30
20M Mode				
Low	914	23.43	23.35	30
Middle	915	23.31	23.37	30
High	916	23.46	23.36	30

Channel	Frequency (MHz)	Max Conducted Average Output Power	Max Conducted Average Output Power	Limit (dBm)
		Antenna 01 (dBm)	Antenna 02 (dBm)	
1.4M Mode				
Low	906	16.83	16.77	30
Middle	916	16.79	16.75	30
High	924	16.74	16.79	30
10M Mode				
Low	909	16.51	16.56	30
Middle	916	16.53	16.75	30
High	921	16.66	16.52	30
20M Mode				
Low	914	16.55	16.57	30
Middle	915	16.67	16.61	30
High	916	16.68	16.56	30

For 2.4GHz:

Channel	Frequency (MHz)	Max Conducted Peak Output Power	Max Conducted Peak Output Power	Limit (dBm)
		Antenna 03 (dBm)	Antenna 04 (dBm)	
1.4M Mode				
Low	2403.5	29.91	29.70	30
Middle	2439.5	29.57	29.43	30
High	2475.5	28.60	29.07	30
10M Mode				
Low	2407.5	26.59	26.55	30
Middle	2439.5	25.34	25.36	30
High	2471.5	24.13	24.09	30
20M Mode				
Low	2412.5	21.01	20.99	30
Middle	2437.5	21.25	21.47	30
High	2462.5	21.02	21.02	30

Channel	Frequency (MHz)	Max Conducted Average Output Power	Max Conducted Average Output Power	Limit (dBm)
		Antenna 03 (dBm)	Antenna 04 (dBm)	
1.4M Mode				
Low	2403.5	15.79	15.89	30
Middle	2439.5	15.75	15.91	30
High	2475.5	15.86	15.85	30
10M Mode				
Low	2407.5	15.64	15.64	30
Middle	2439.5	15.67	15.85	30
High	2471.5	15.69	15.87	30
20M Mode				
Low	2412.5	15.53	15.51	30
Middle	2437.5	15.58	15.68	30
High	2462.5	15.61	15.69	30

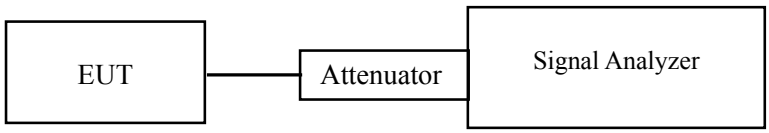
FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

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:	50~56 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Vincent Zeng from 2018-02-09 to 2018-02-11.

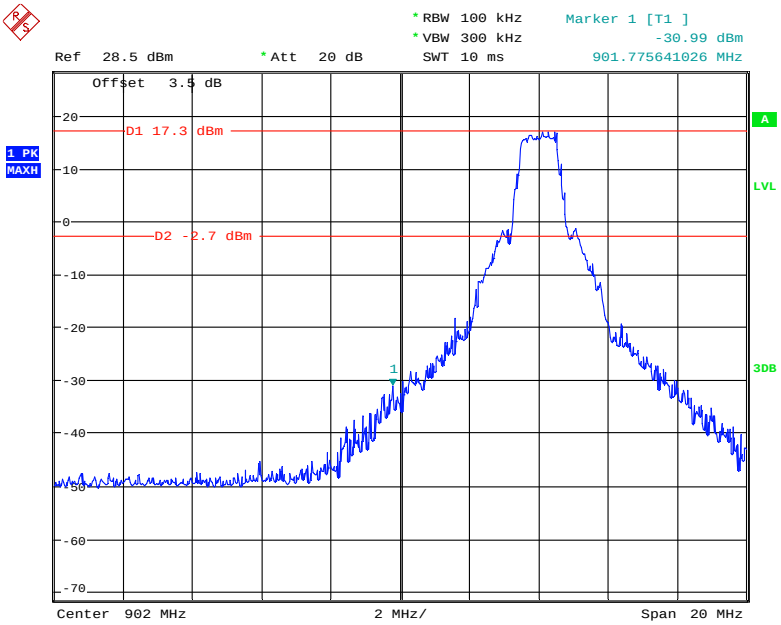
EUT operation mode: Transmitting

Test Result: Compliance

Please refer to the following plots.

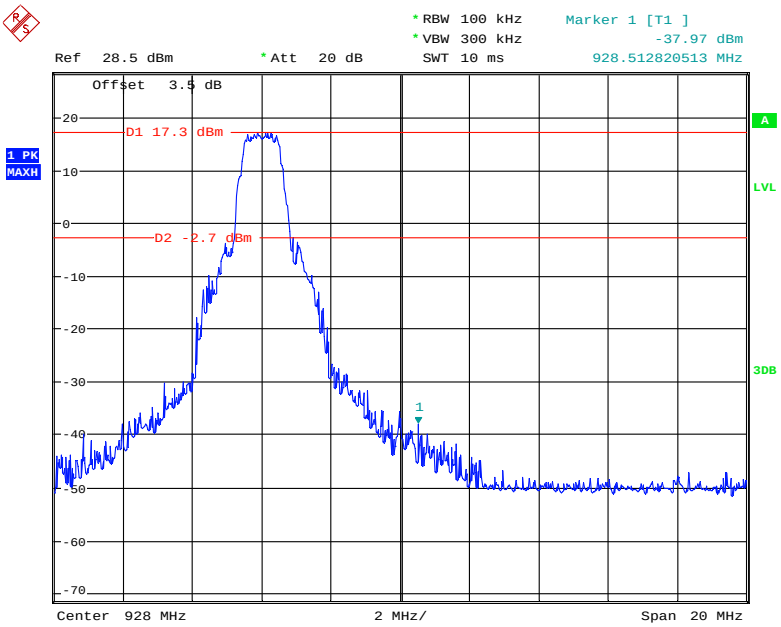
For 900MHz Antenna 01

1.4M Mode: Band Edge, Left Side



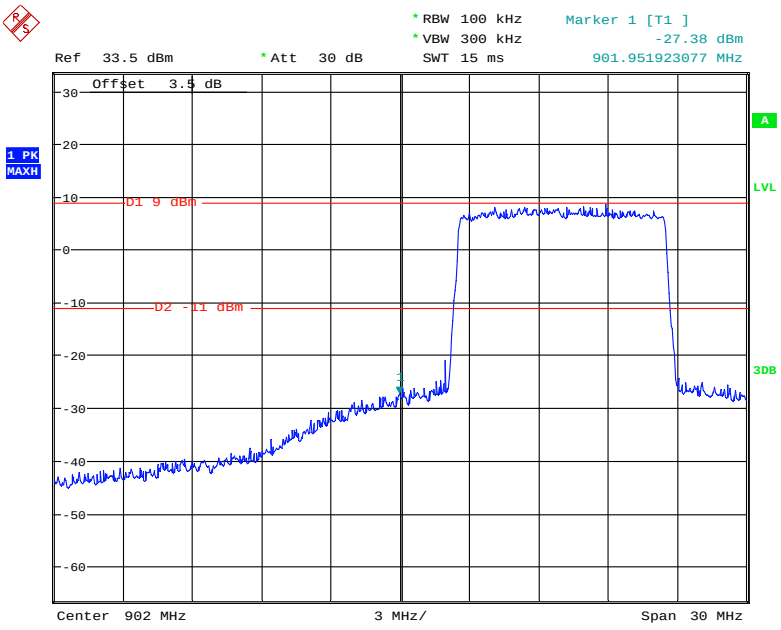
Date: 10.FEB.2018 14:21:10

1.4M Mode: Band Edge, Right Side



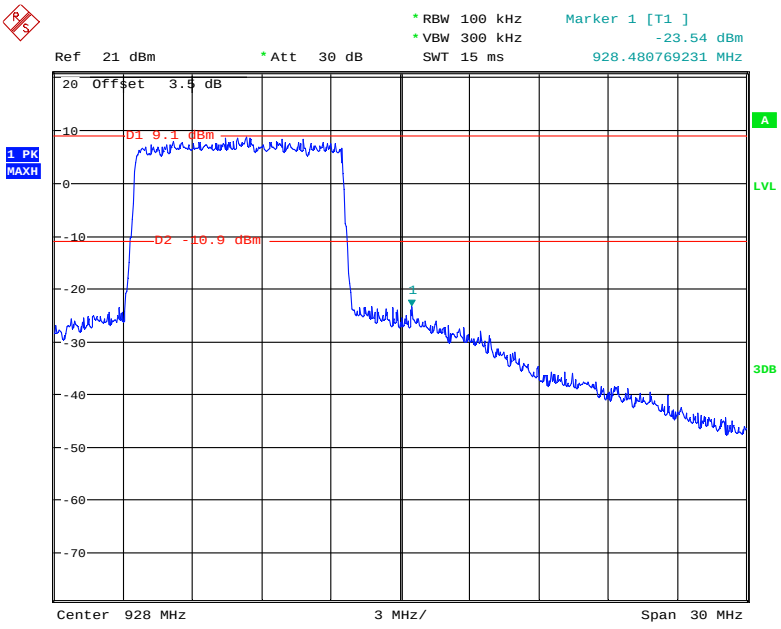
Date: 10.FEB.2018 14:23:22

10M Mode: Band Edge, Left Side



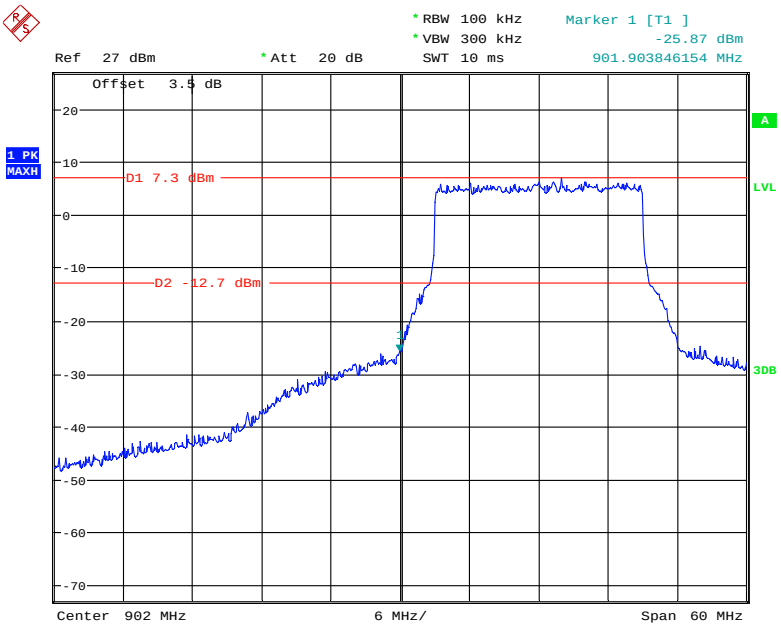
Date: 10.FEB.2018 15:17:42

10M Mode: Band Edge, Right Side



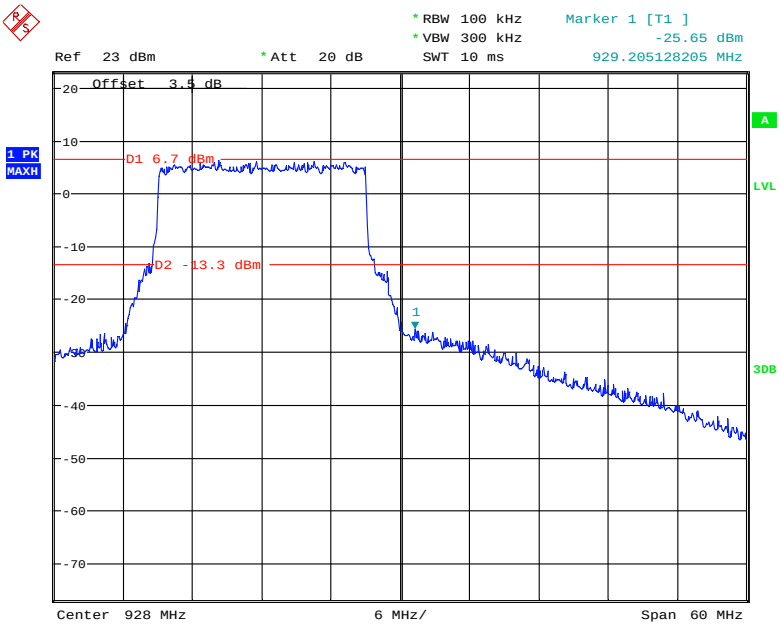
Date: 10.FEB.2018 15:35:22

20M Mode: Band Edge, Left Side



Date: 10.FEB.2018 15:53:08

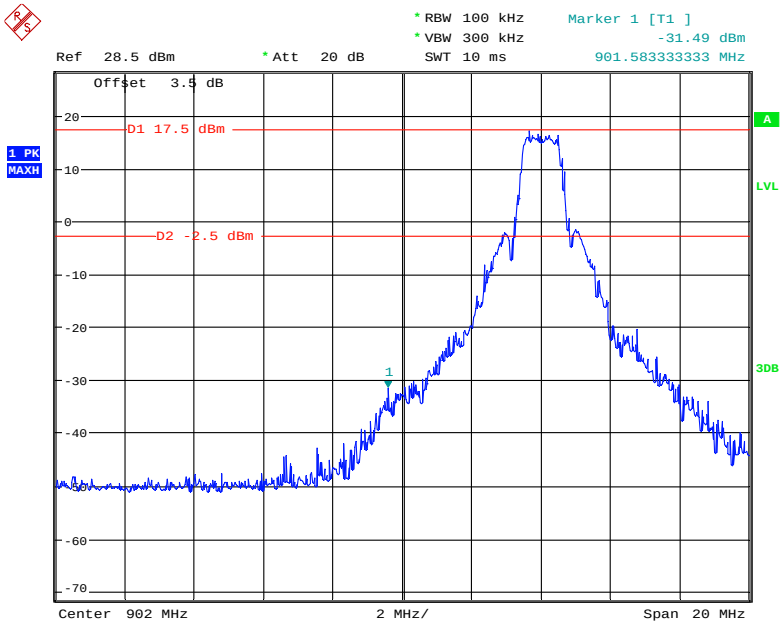
20M Mode: Band Edge, Right Side



Date: 10.FEB.2018 16:07:38

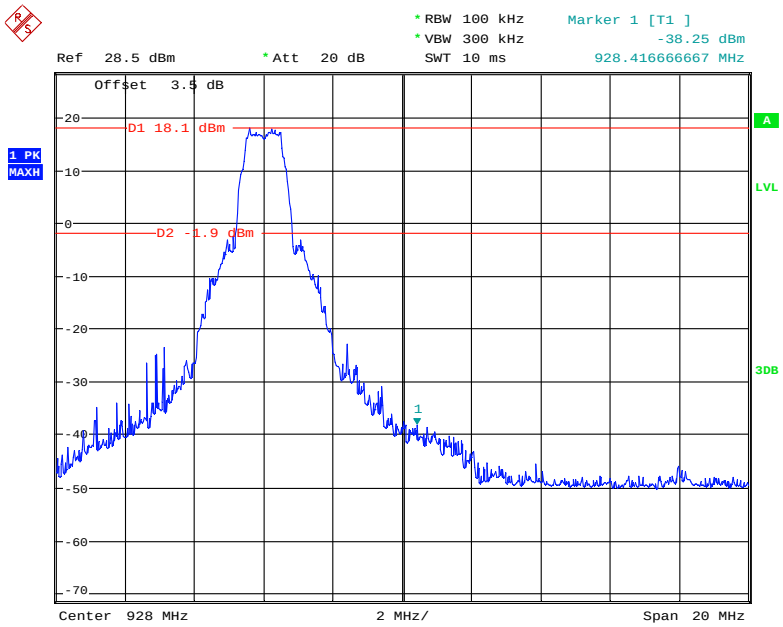
For 900MHz Antenna 02

1.4M Mode: Band Edge, Left Side



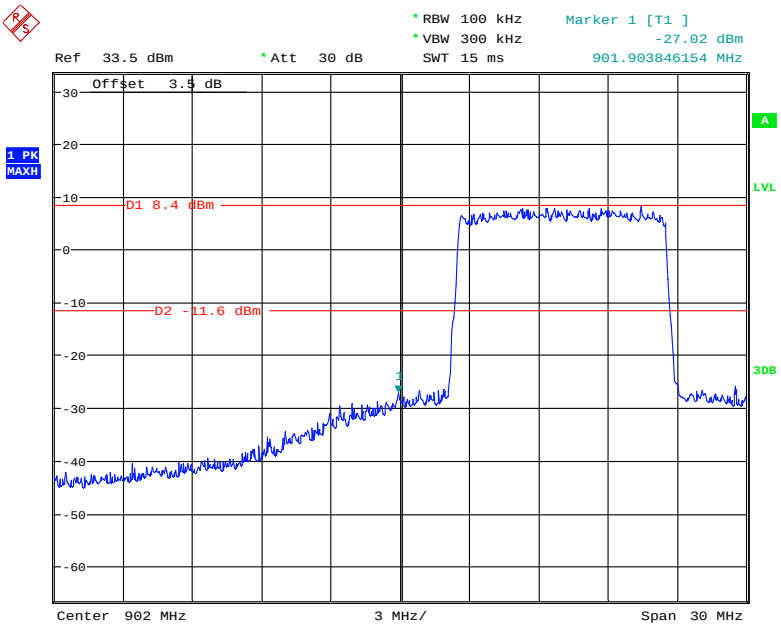
Date: 10.FEB.2018 14:21:43

1.4M Mode: Band Edge, Right Side



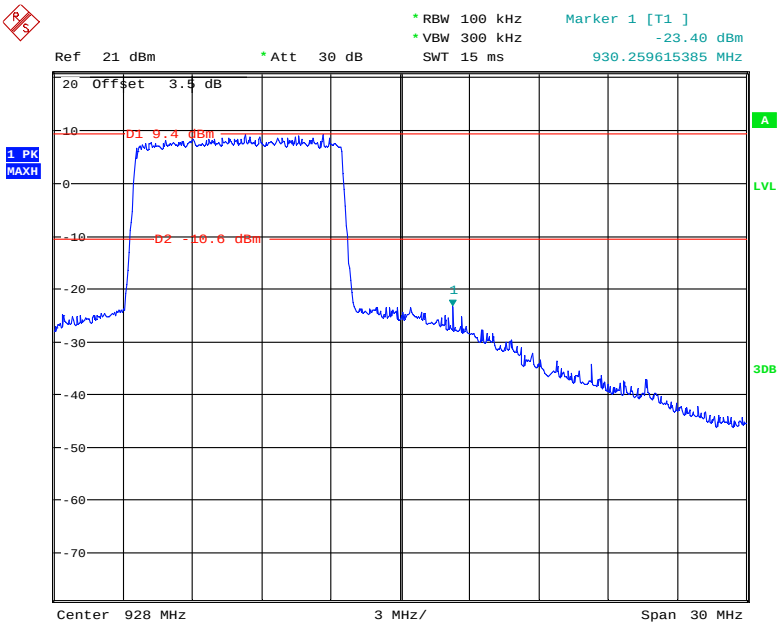
Date: 10.FEB.2018 14:26:28

10M Mode: Band Edge, Left Side



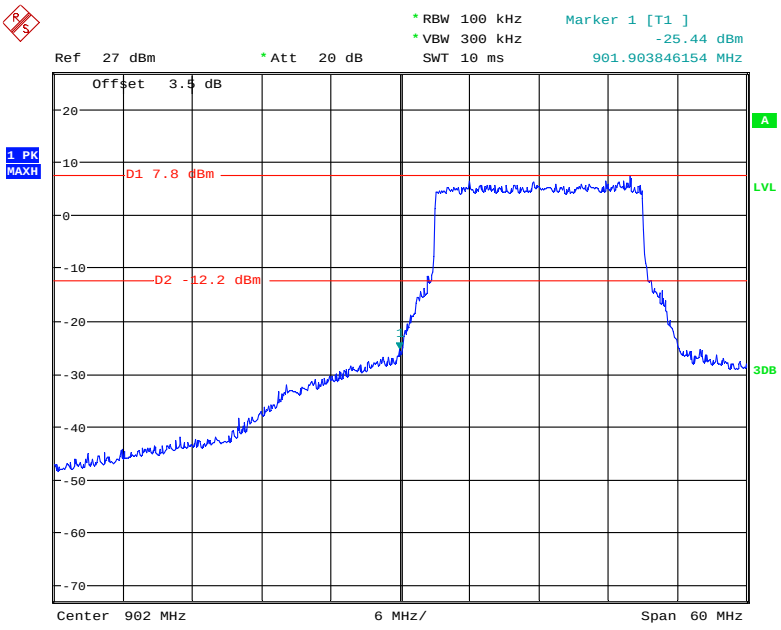
Date: 10.FEB.2018 15:16:35

10M Mode: Band Edge, Right Side



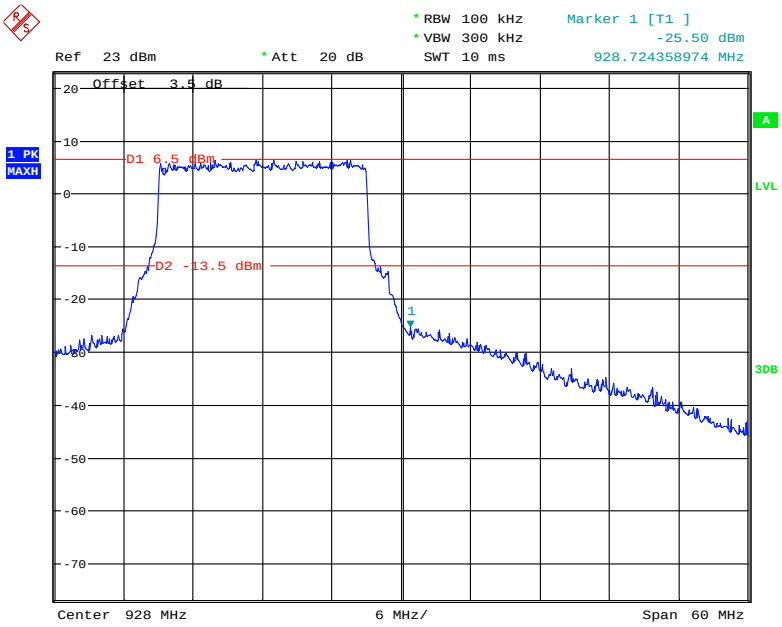
Date: 10.FEB.2018 15:37:57

20M Mode: Band Edge, Left Side



Date: 10.FEB.2018 15:51:06

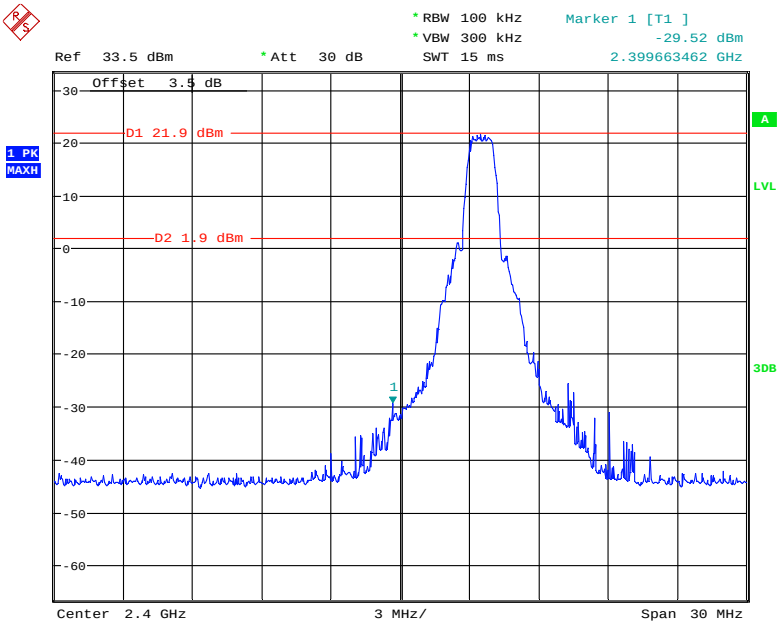
20M Mode: Band Edge, Right Side



Date: 10.FEB.2018 16:09:21

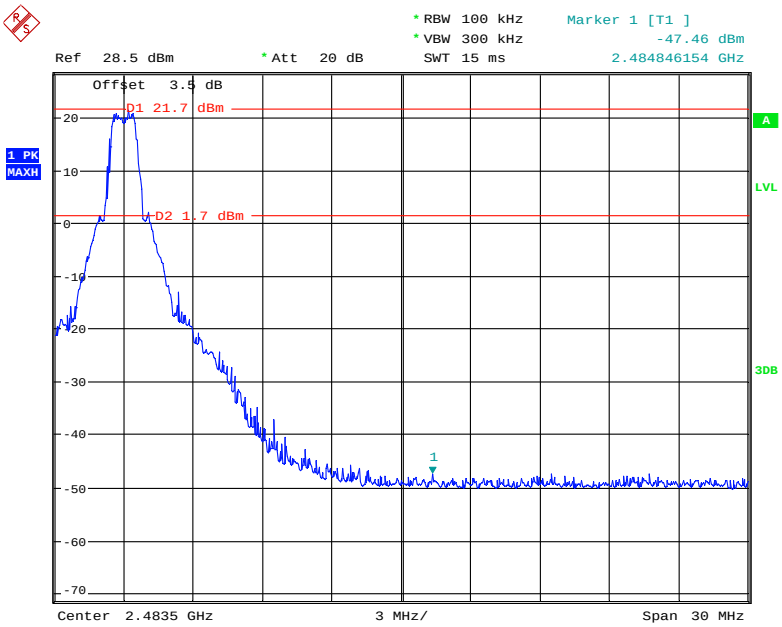
For 2.4GHz Antenna 03

1.4M Mode: Band Edge, Left Side



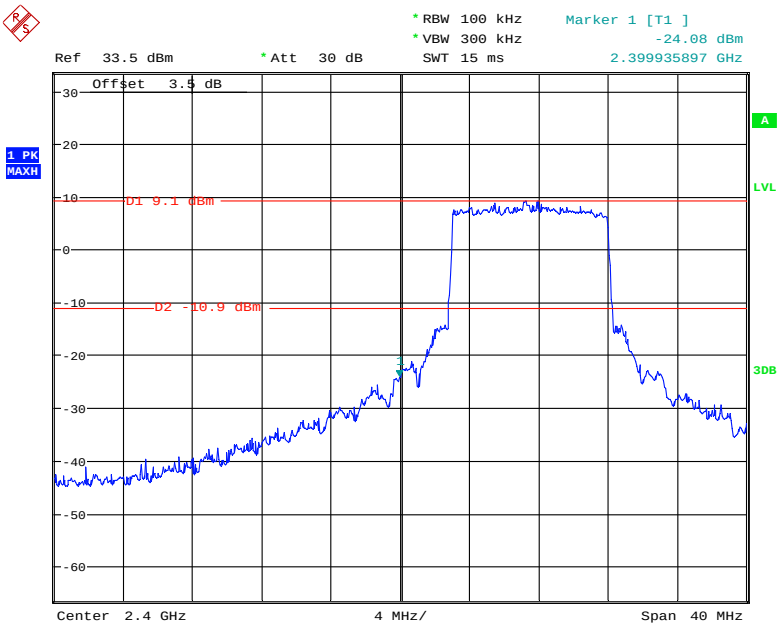
Date: 9.FEB.2018 09:23:42

1.4M Mode: Band Edge, Right Side



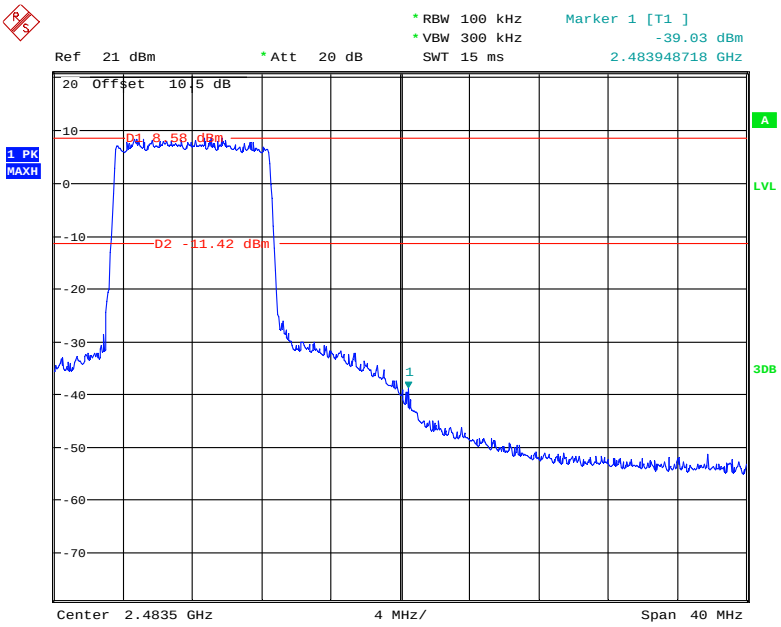
Date: 9.FEB.2018 10:11:03

10M Mode: Band Edge, Left Side



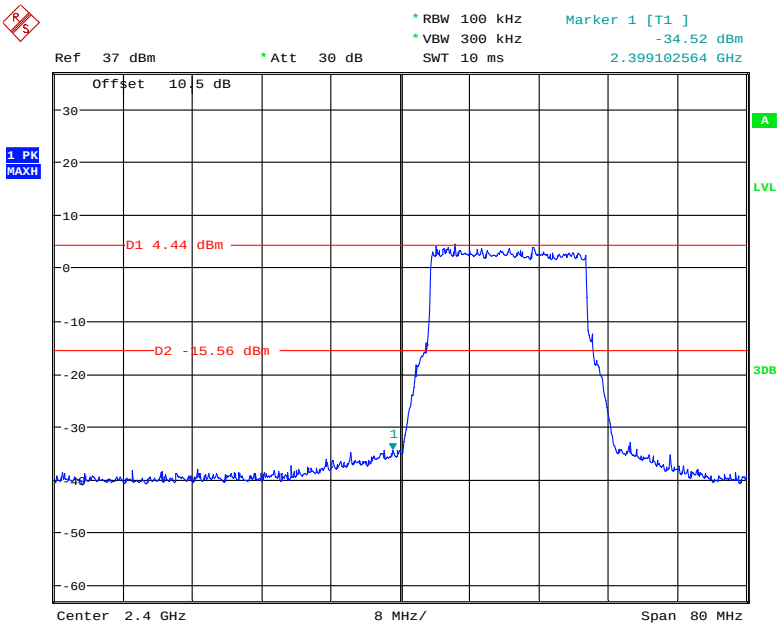
Date: 9.FEB.2018 09:33:13

10M Mode: Band Edge, Right Side



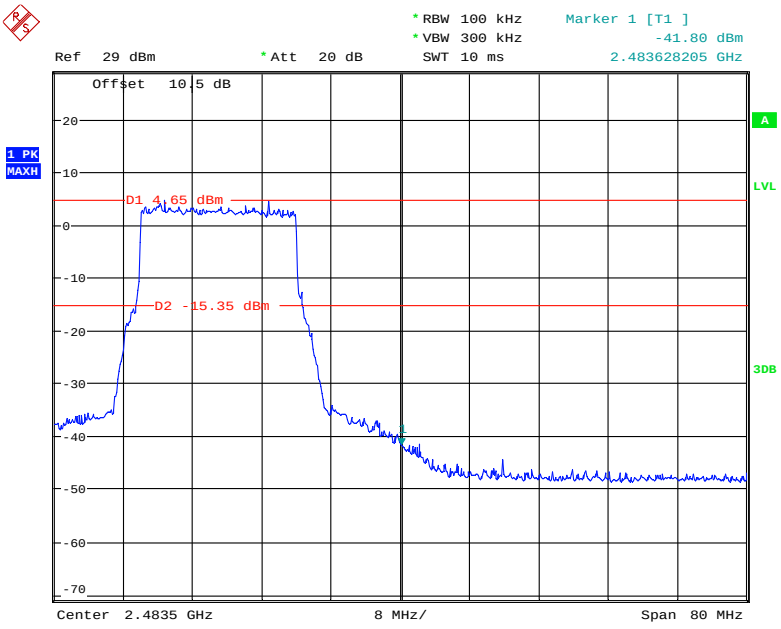
Date: 11.FEB.2018 19:31:59

20M Mode: Band Edge, Left Side



Date: 11.FEB.2018 19:38:34

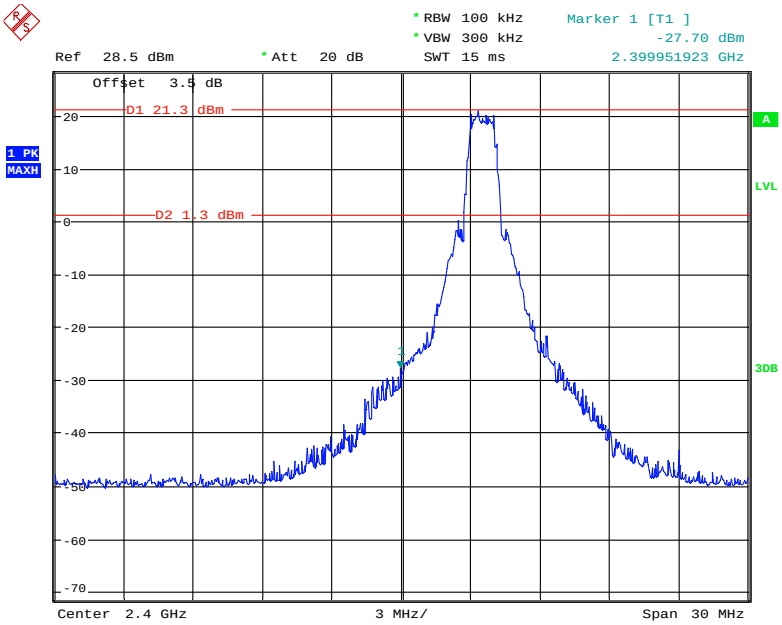
20M Mode: Band Edge, Right Side



Date: 11.FEB.2018 19:56:22

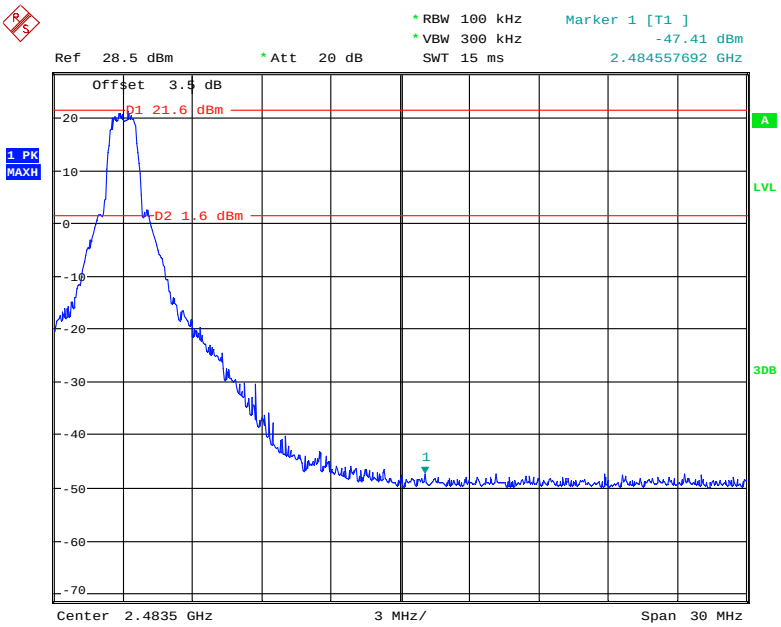
For 2.4GHz Antenna 04

1.4M Mode: Band Edge, Left Side



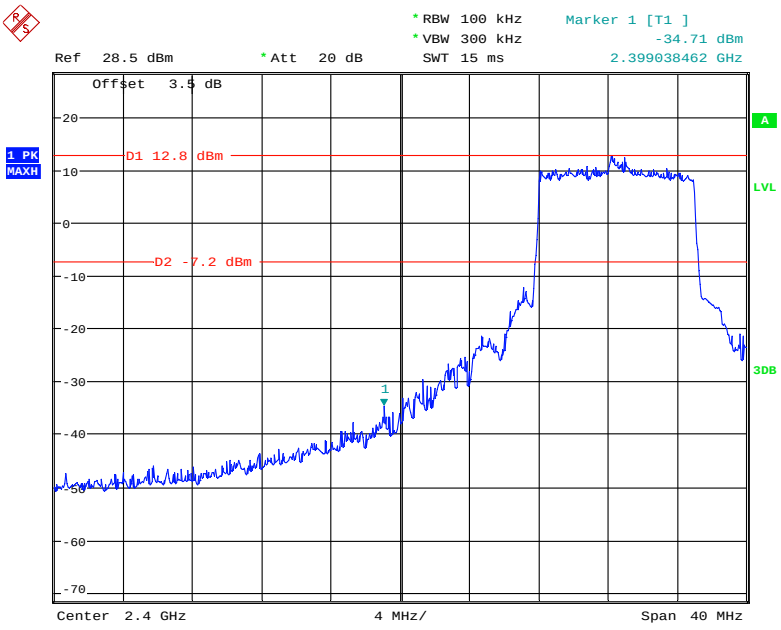
Date: 9.FEB.2018 10:12:31

1.4M Mode: Band Edge, Right Side



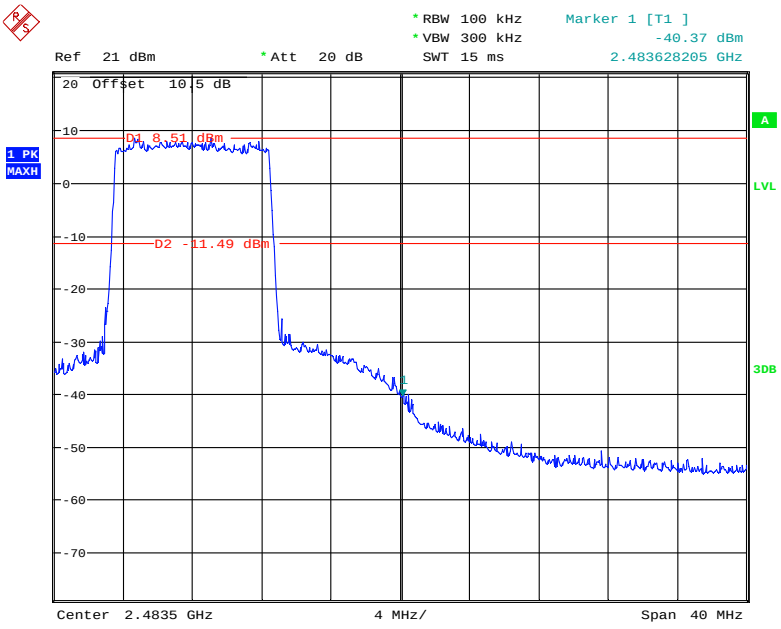
Date: 9.FEB.2018 10:08:23

10M Mode: Band Edge, Left Side



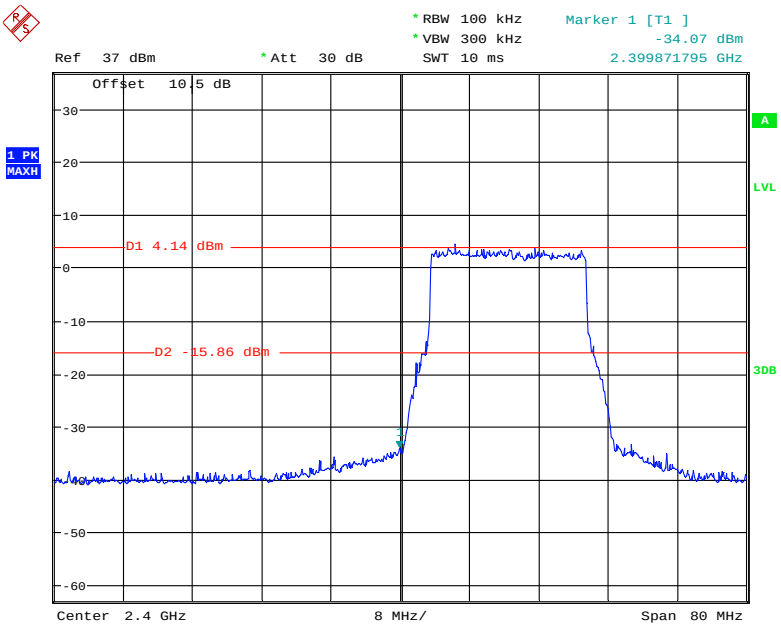
Date: 9.FEB.2018 09:59:36

10M Mode: Band Edge, Right Side



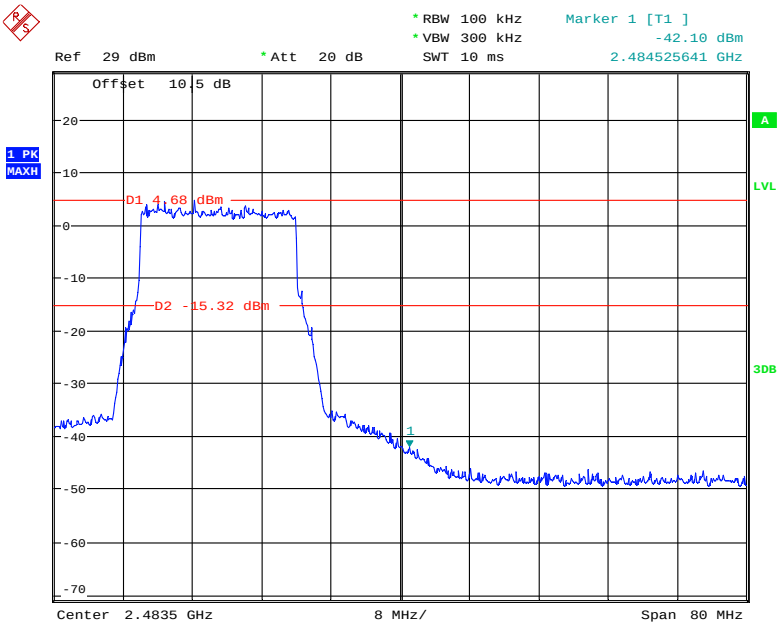
Date: 11.FEB.2018 19:33:49

20M Mode: Band Edge, Left Side



Date: 11.FEB.2018 19:40:03

20M Mode: Band Edge, Right Side



Date: 11.FEB.2018 19:57:59

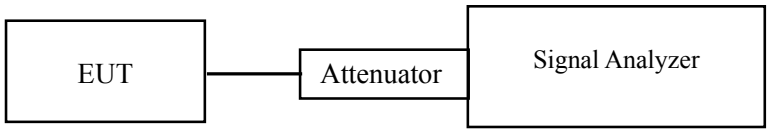
FCC §15.247(e) - POWER SPECTRAL DENSITY

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:	50~56 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Vincent Zeng from 2018-02-10 to 2018-02-11.

EUT operation mode: Transmitting

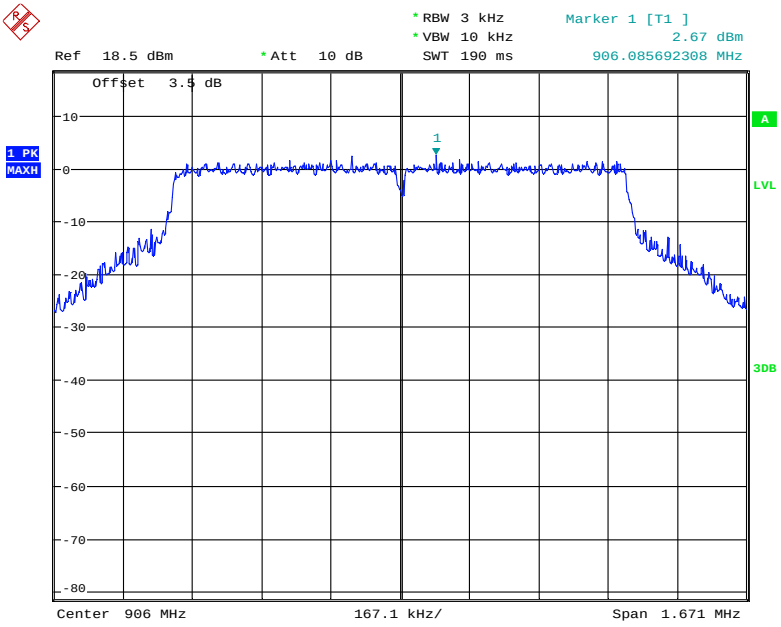
Test Result: Pass

For 900MHz:

Channel	Frequency (MHz)	Antenna 01 (dBm/3kHz)	Antenna 02 (dBm/3kHz)	Limit (dBm/3kHz)
1.4M Mode				
Low	906	2.67	3.50	≤8
Middle	916	3.04	3.00	≤8
High	924	2.80	2.88	≤8
10M Mode				
Low	909	-5.58	-6.72	≤8
Middle	916	-4.23	-5.69	≤8
High	921	-4.94	-5.69	≤8
20M Mode				
Low	914	-8.34	-8.37	≤8
Middle	915	-8.38	-9.70	≤8
High	916	-8.62	-8.27	≤8

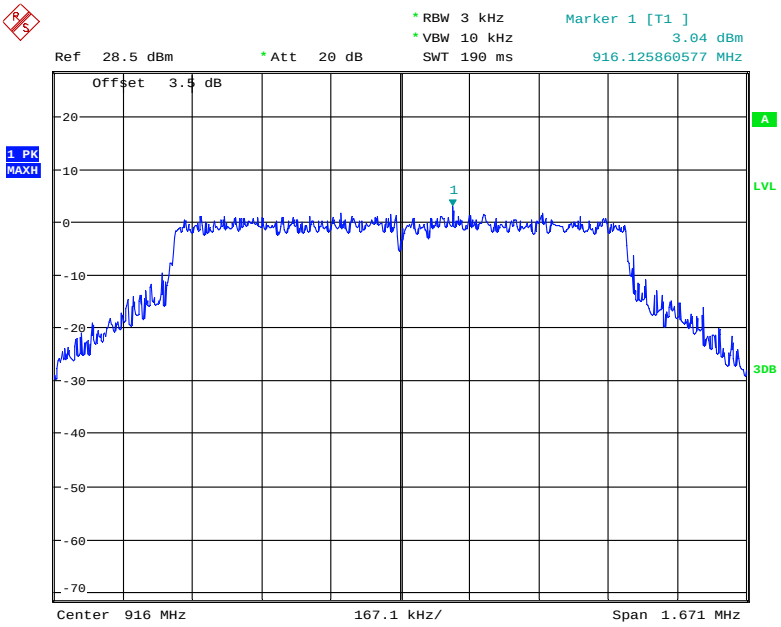
Antenna 01

Power Spectral Density, 1.4M Mode Low Channel



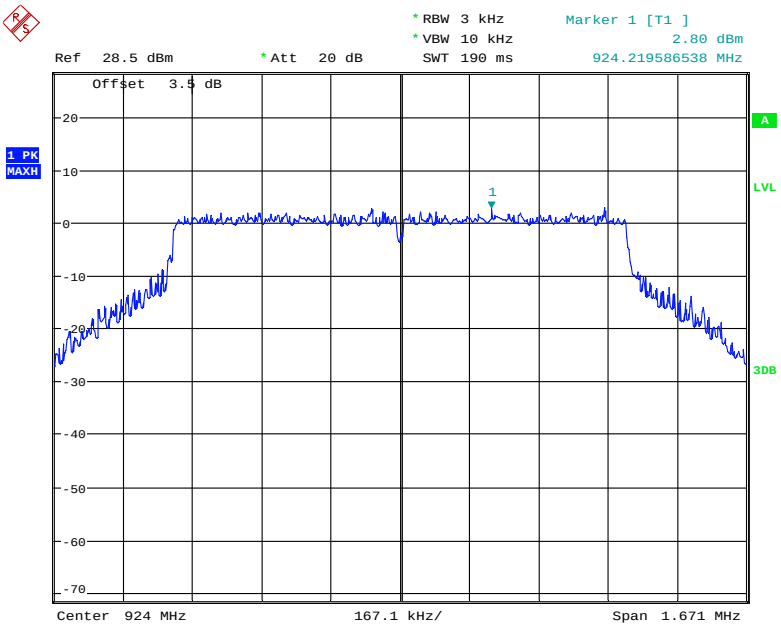
Date: 10.FEB.2018 14:03:15

Power Spectral Density, 1.4M Mode Middle Channel



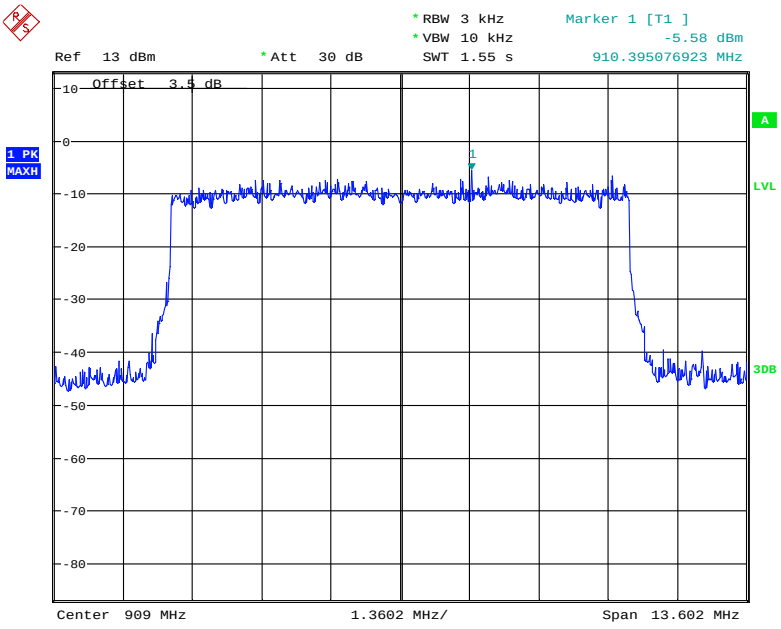
Date: 10.FEB.2018 14:15:42

Power Spectral Density, 1.4M Mode High Channel



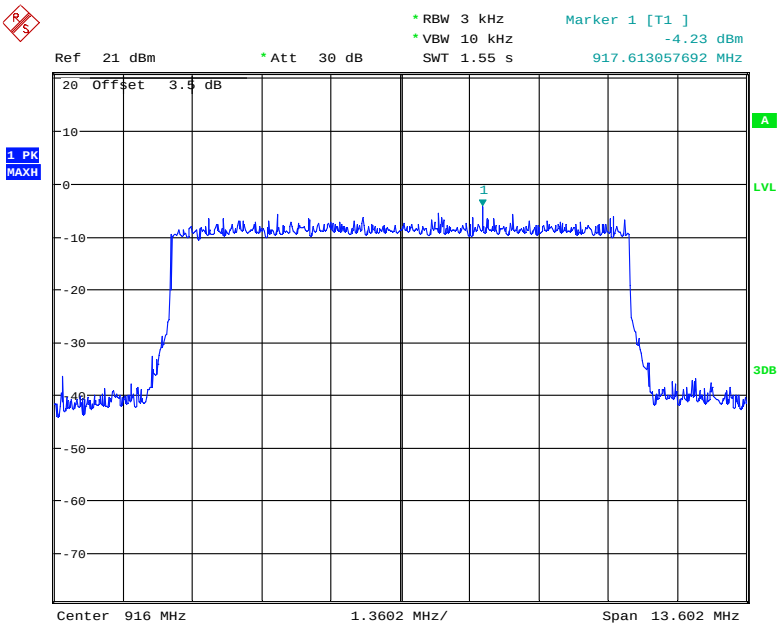
Date: 10.FEB.2018 14:29:32

Power Spectral Density, 10M Mode Low Channel



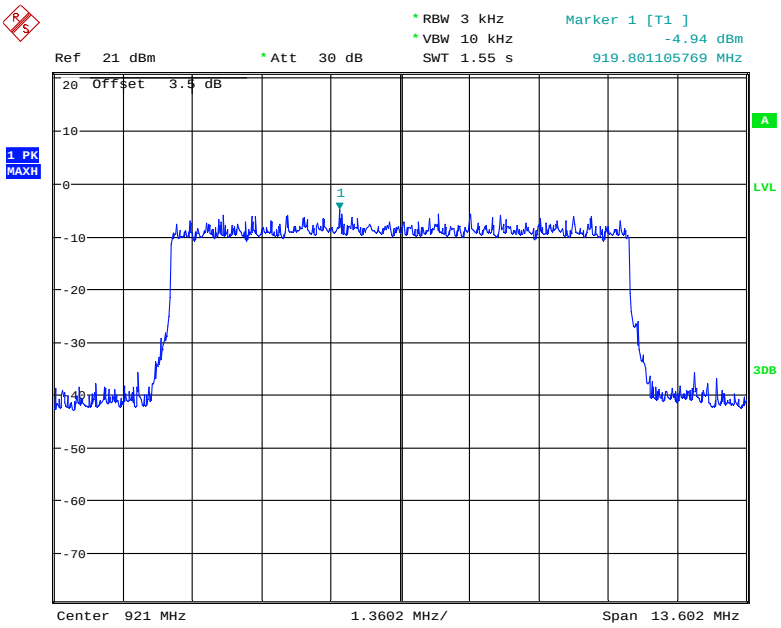
Date: 10.FEB.2018 15:13:01

Power Spectral Density, 10M Mode Middle Channel



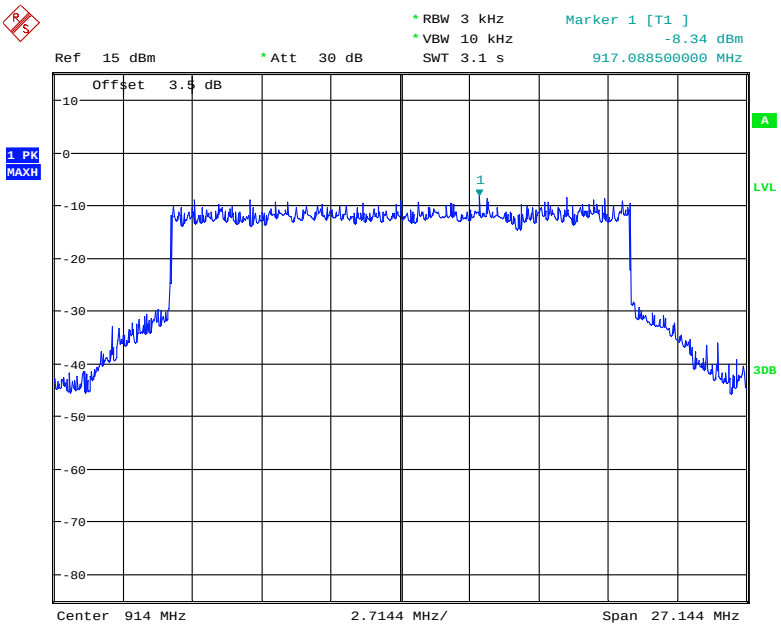
Date: 10.FEB.2018 15:32:13

Power Spectral Density, 10M Mode High Channel



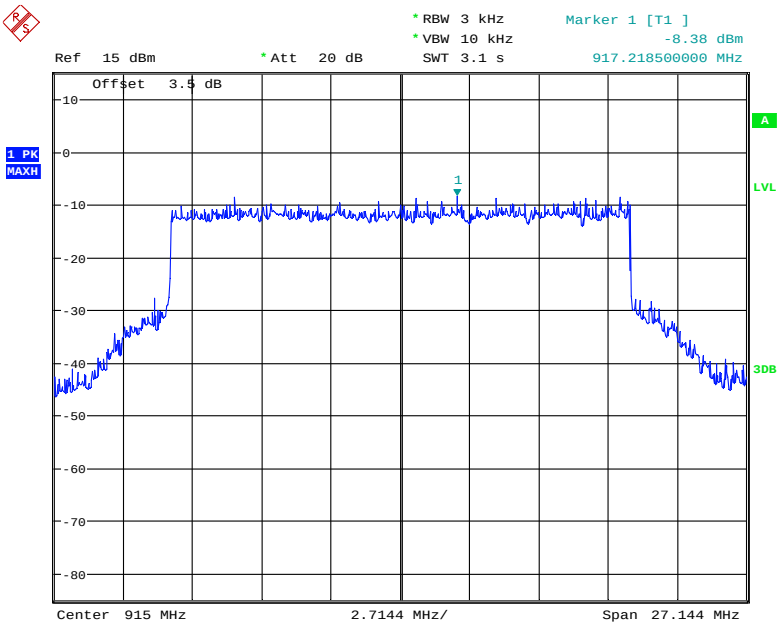
Date: 10.FEB.2018 15:40:11

Power Spectral Density, 20M Mode Low Channel



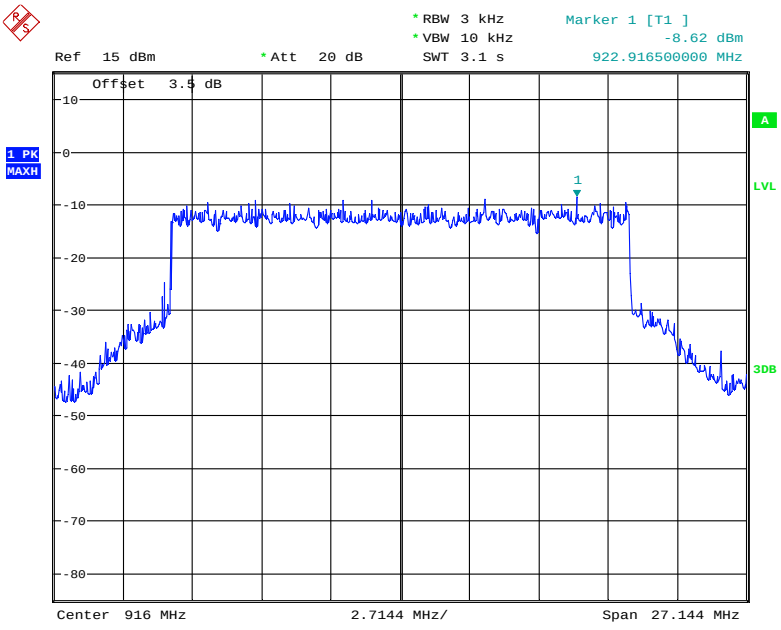
Date: 10.FEB.2018 15:47:13

Power Spectral Density, 20M Mode Middle Channel



Date: 10.FEB.2018 15:59:04

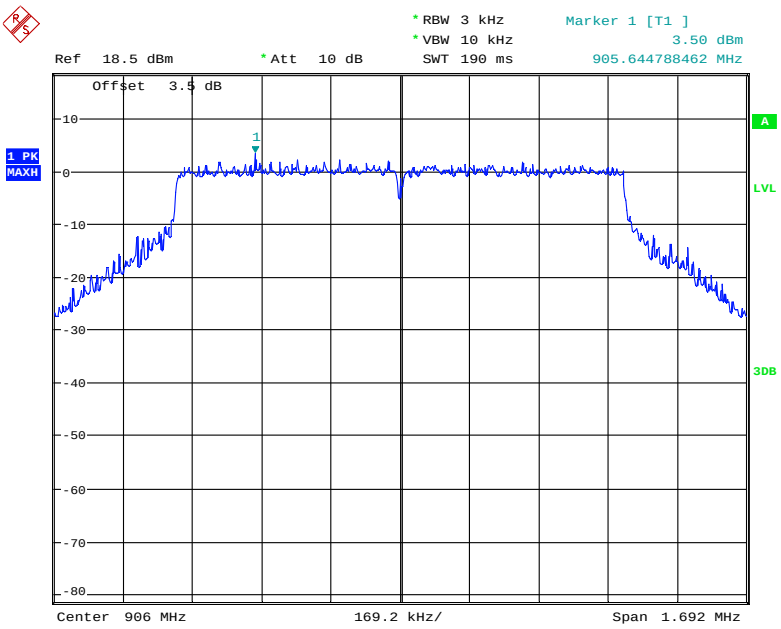
Power Spectral Density, 20M High Channel



Date: 10.FEB.2018 16:00:45

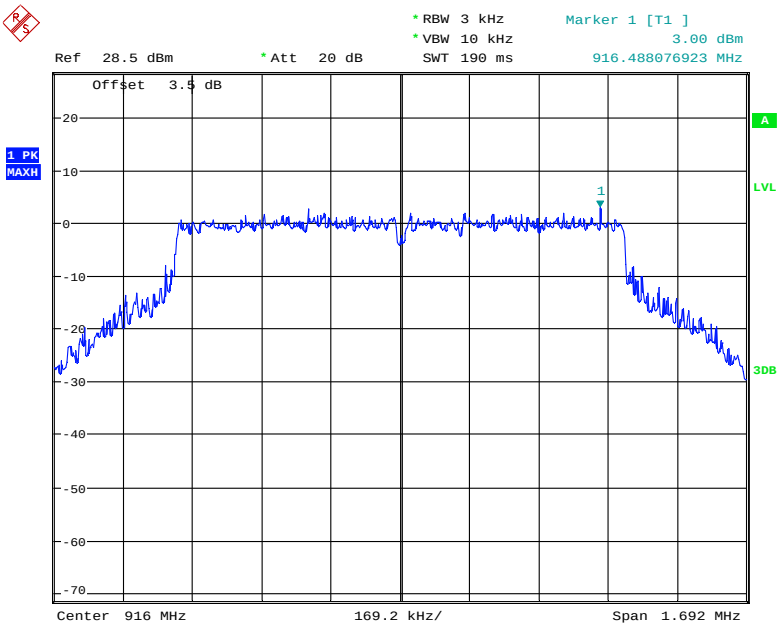
Antenna 02

Power Spectral Density, 1.4M Mode Low Channel



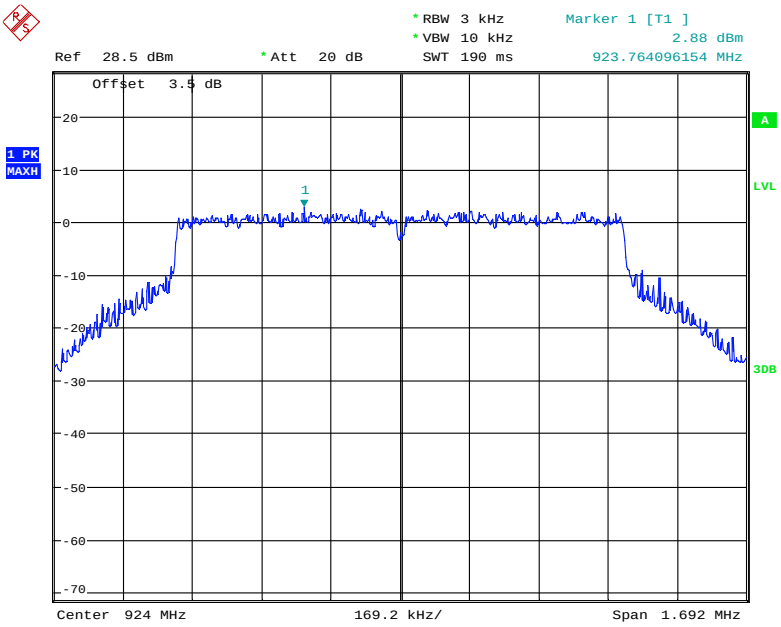
Date: 10.FEB.2018 14:01:20

Power Spectral Density, 1.4M Mode Middle Channel



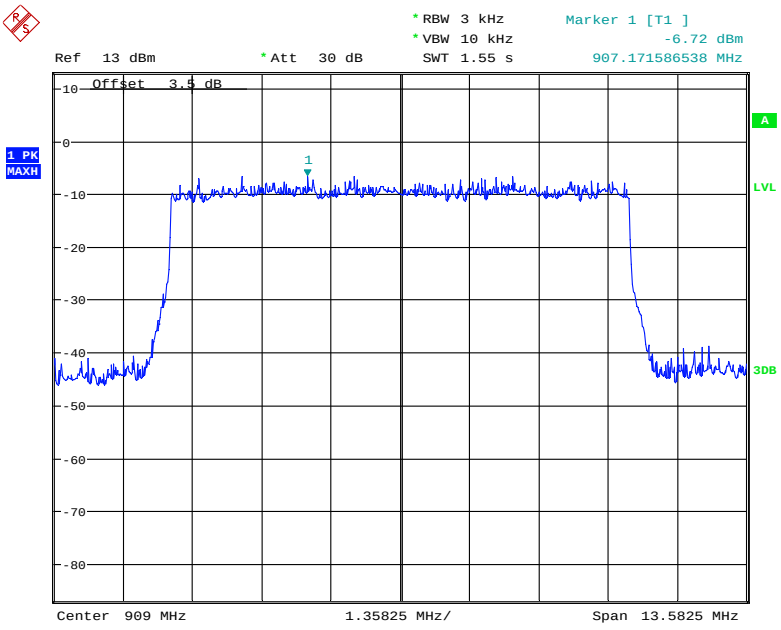
Date: 10.FEB.2018 14:18:34

Power Spectral Density, 1.4M Mode High Channel



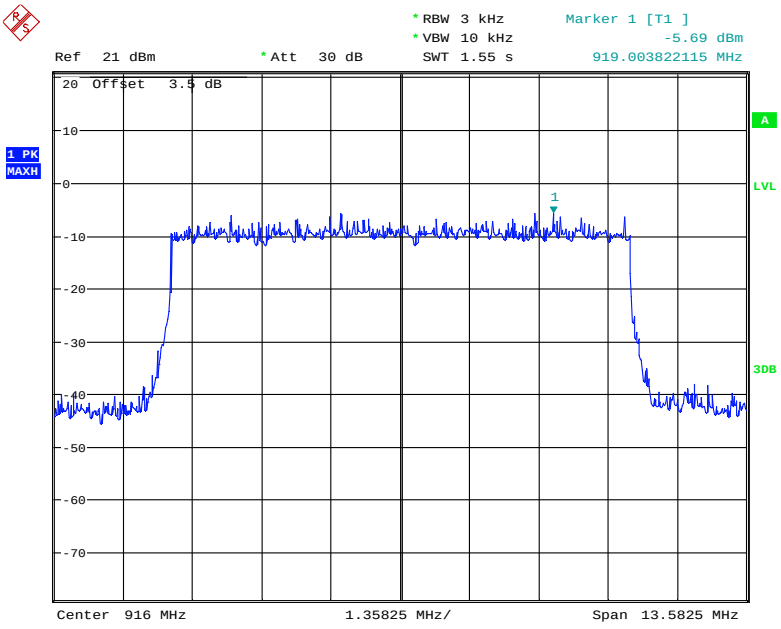
Date: 10.FEB.2018 14:30:43

Power Spectral Density, 10M Mode Low Channel



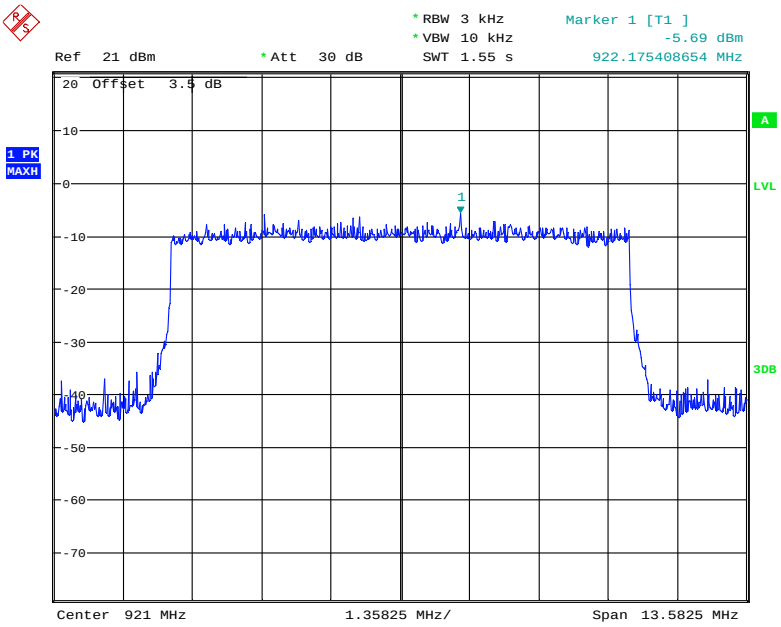
Date: 10.FEB.2018 15:15:02

Power Spectral Density, 10M Mode Middle Channel



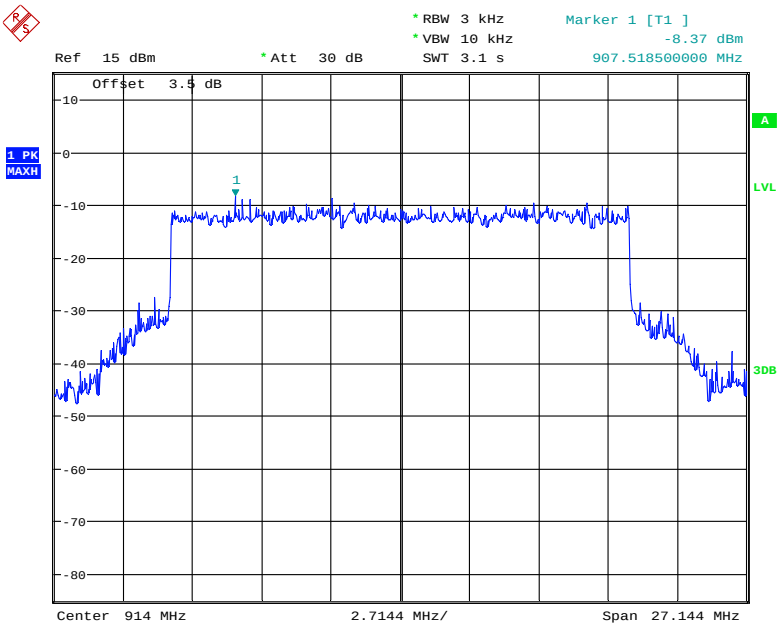
Date: 10.FEB.2018 15:30:20

Power Spectral Density, 10M Mode High Channel



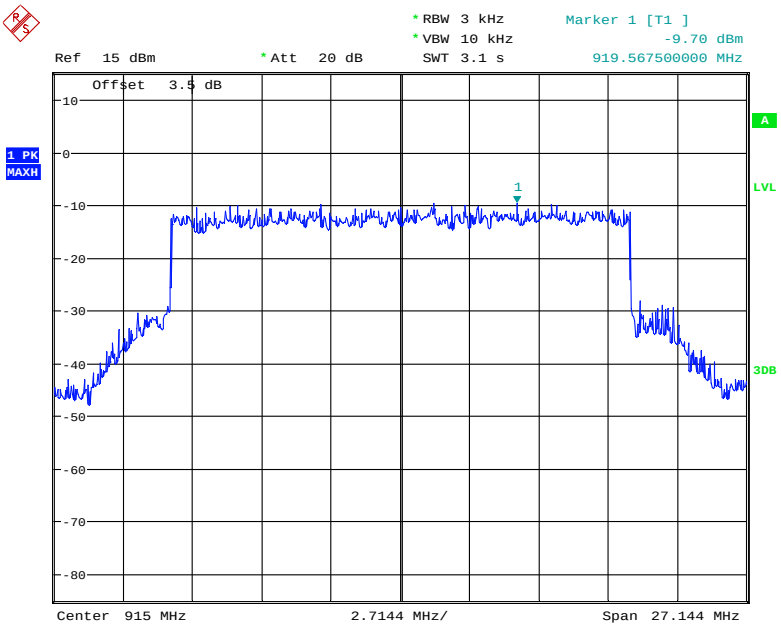
Date: 10.FEB.2018 15:38:52

Power Spectral Density, 20M Mode Low Channel



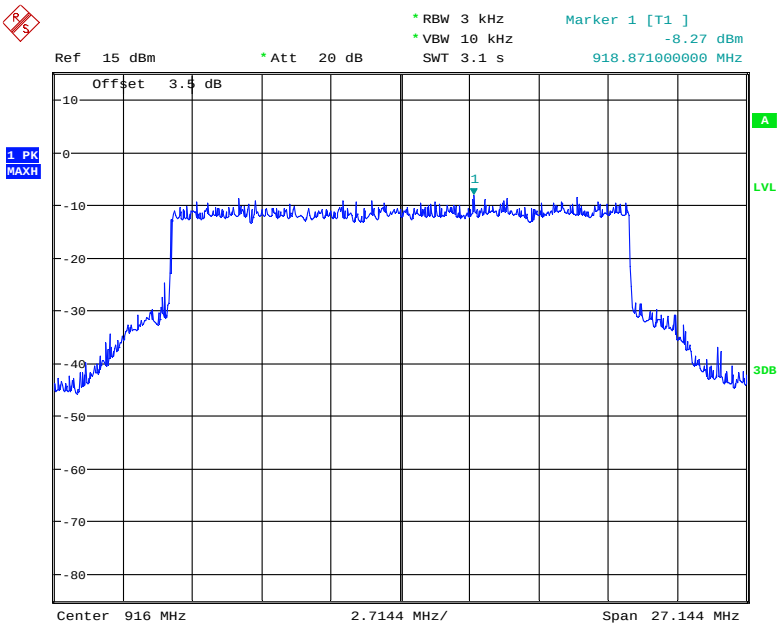
Date: 10.FEB.2018 15:49:06

Power Spectral Density, 20M Mode Middle Channel



Date: 10.FEB.2018 15:57:10

Power Spectral Density, 20M Mode High Channel



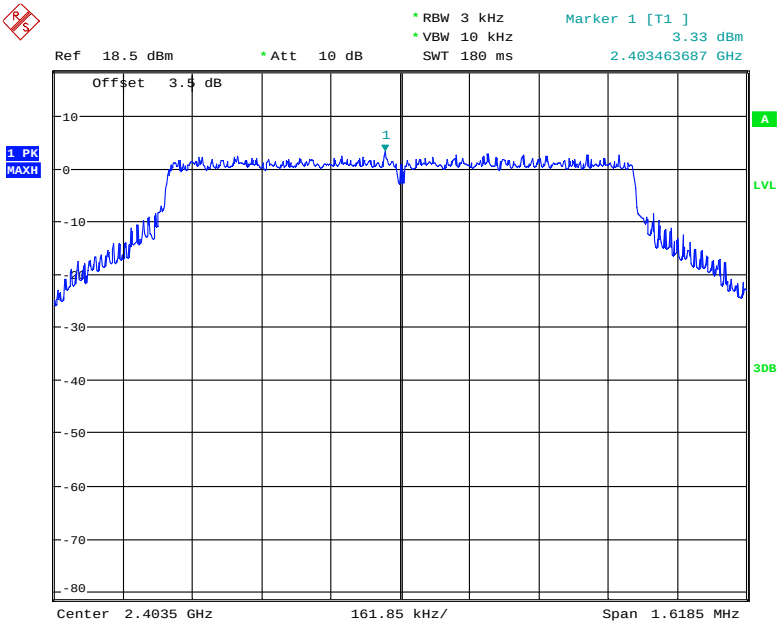
Date: 10.FEB.2018 16:02:11

For 2.4GHz:

Channel	Frequency (MHz)	Antenna 03 (dBm/3kHz)	Antenna 04 (dBm/3kHz)	Limit (dBm/3kHz)
1.4M Mode				
Low	2403.5	3.33	2.44	≤8
Middle	2439.5	2.27	2.71	≤8
High	2475.5	1.28	1.98	≤8
10M Mode				
Low	2407.5	-6.78	-6.07	≤8
Middle	2439.5	-7.90	-8.61	≤8
High	2471.5	-7.34	-7.22	≤8
20M Mode				
Low	2412.5	-10.38	-10.69	≤8
Middle	2437.5	-10.06	-10.51	≤8
High	2462.5	-11.88	-11.00	≤8

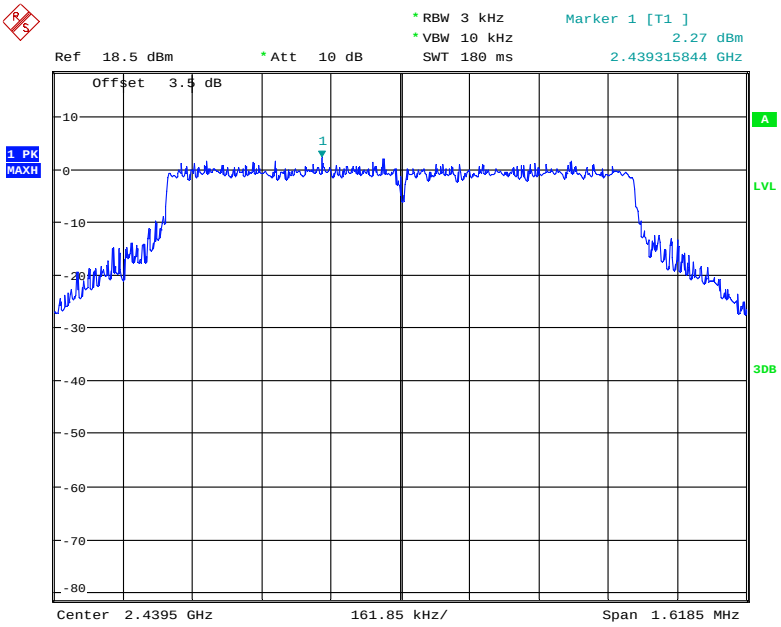
Antenna 03

Power Spectral Density, 1.4M Mode Low Channel



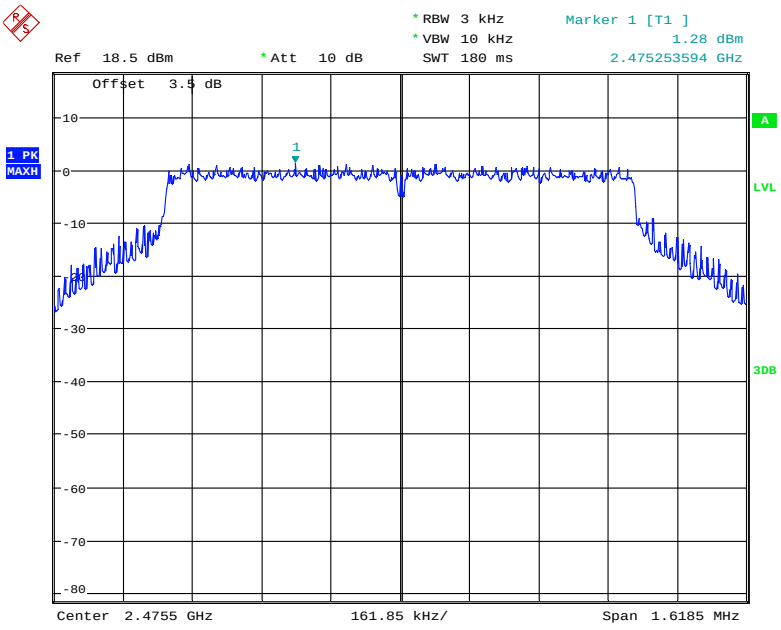
Date: 10.FEB.2018 13:40:21

Power Spectral Density, 1.4M Mode Middle Channel



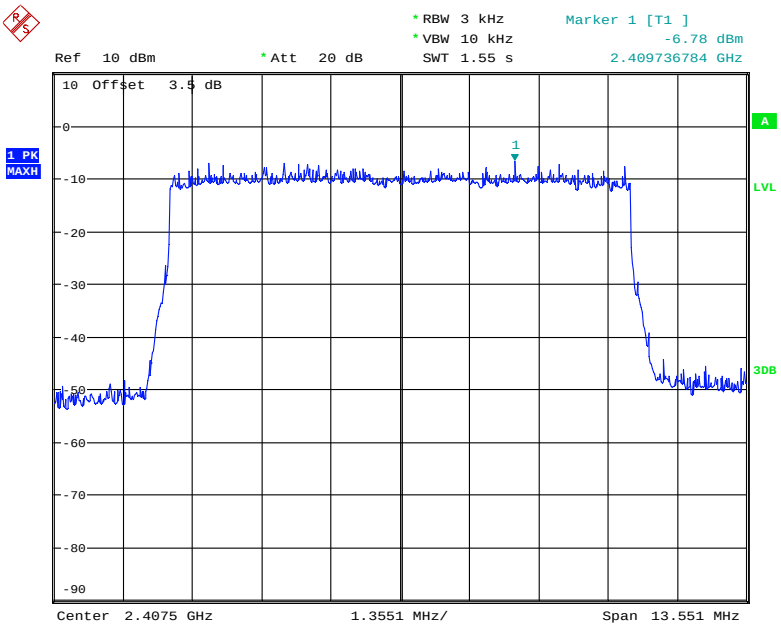
Date: 10.FEB.2018 13:45:38

Power Spectral Density, 1.4M Mode High Channel



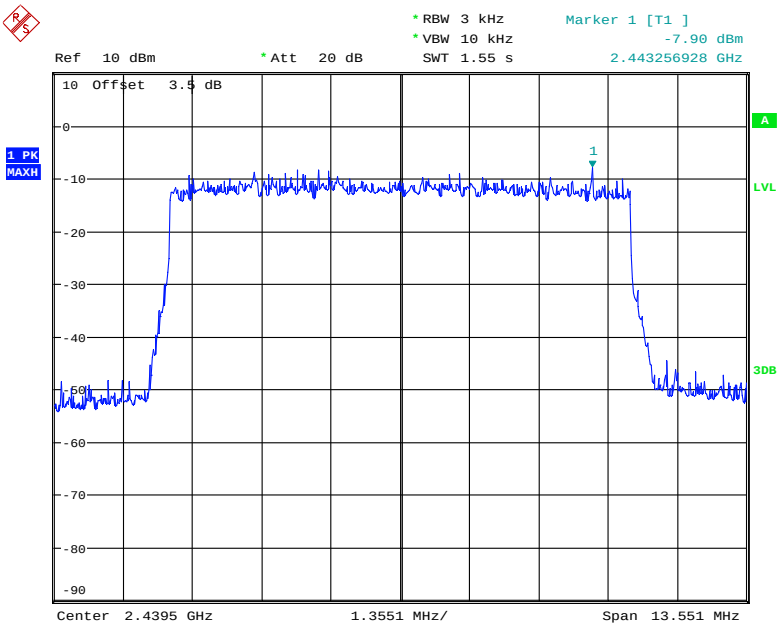
Date: 10.FEB.2018 13:53:17

Power Spectral Density, 10M Mode Low Channel



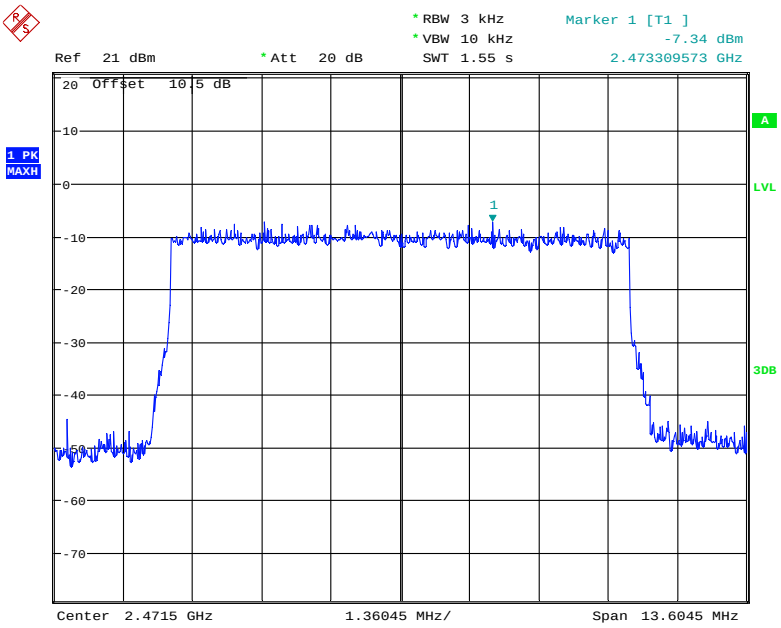
Date: 10.FEB.2018 13:16:05

Power Spectral Density, 10M Mode Middle Channel



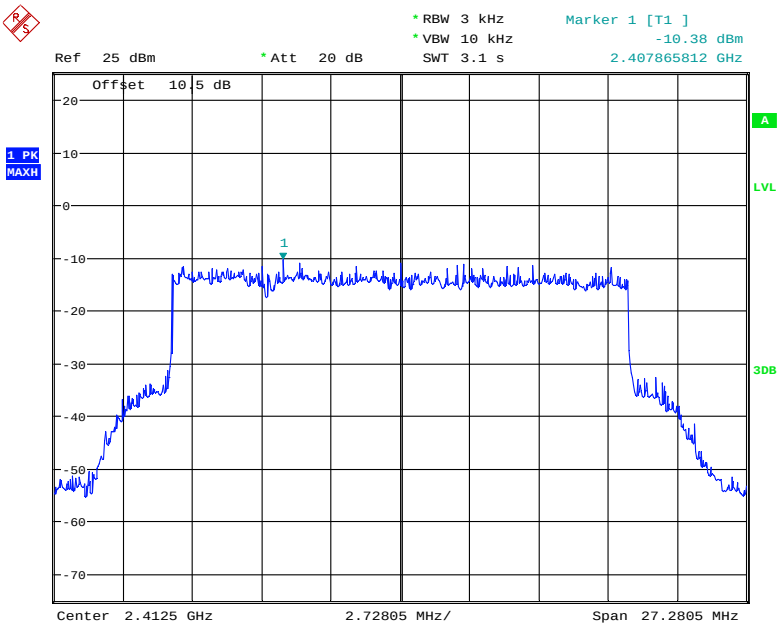
Date: 10.FEB.2018 13:18:05

Power Spectral Density, 10M Mode High Channel



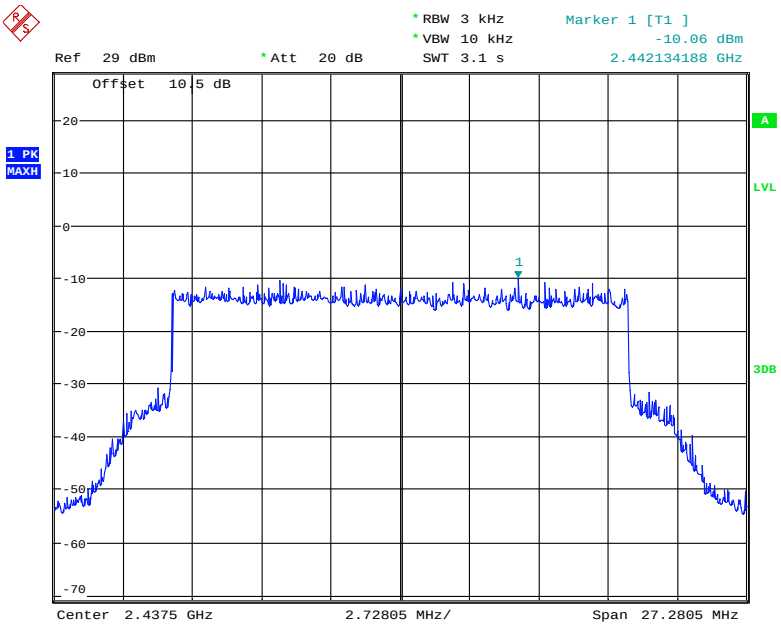
Date: 11.FEB.2018 19:29:34

Power Spectral Density, 20M Mode Low Channel



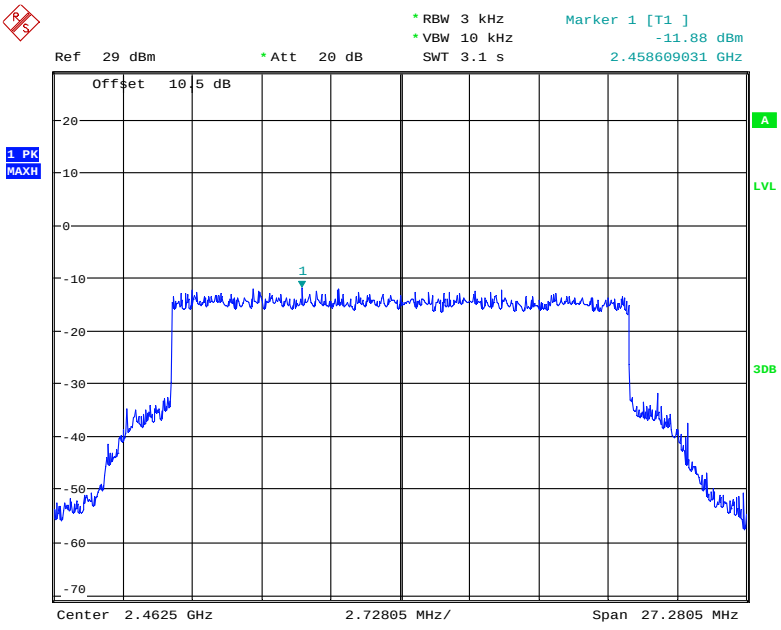
Date: 11.FEB.2018 19:42:49

Power Spectral Density, 20M Mode Middle Channel



Date: 11.FEB.2018 19:48:30

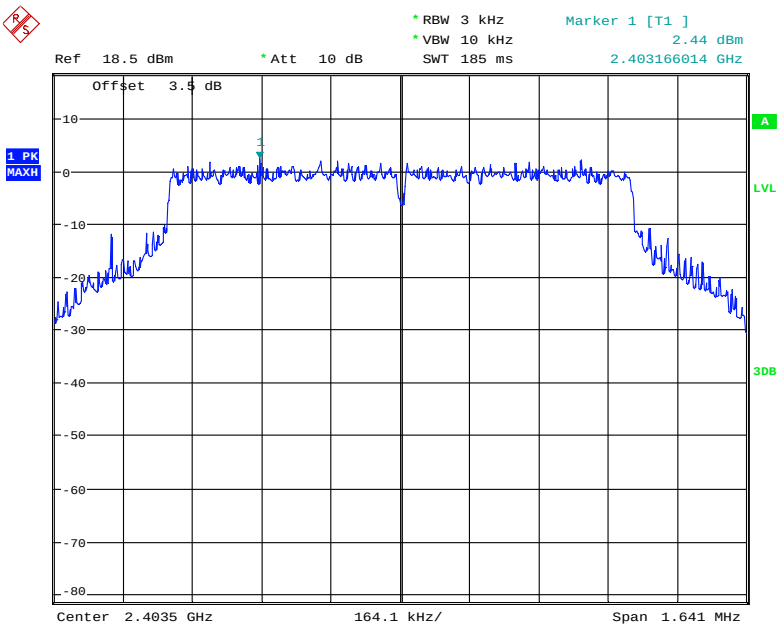
Power Spectral Density, 20M Mode High Channel



Date: 11.FEB.2018 19:51:06

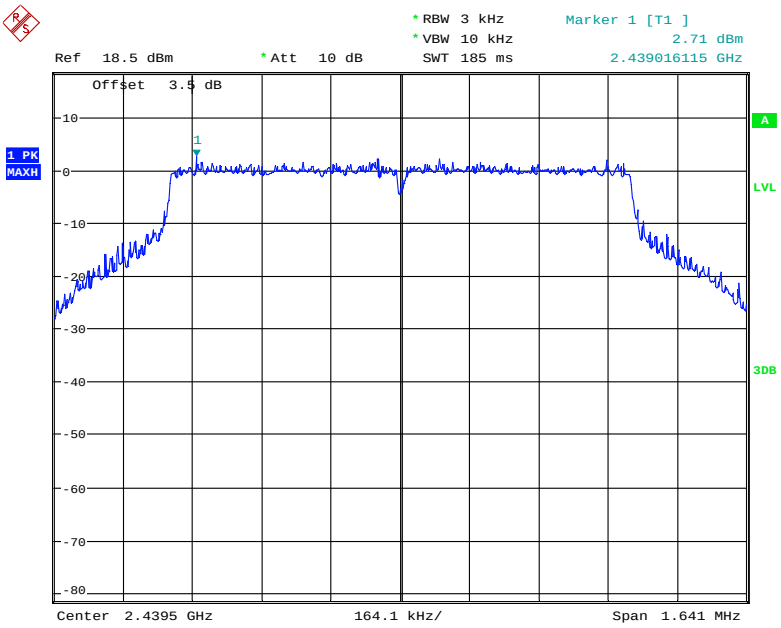
Antenna 04

Power Spectral Density, 1.4M Mode Low Channel



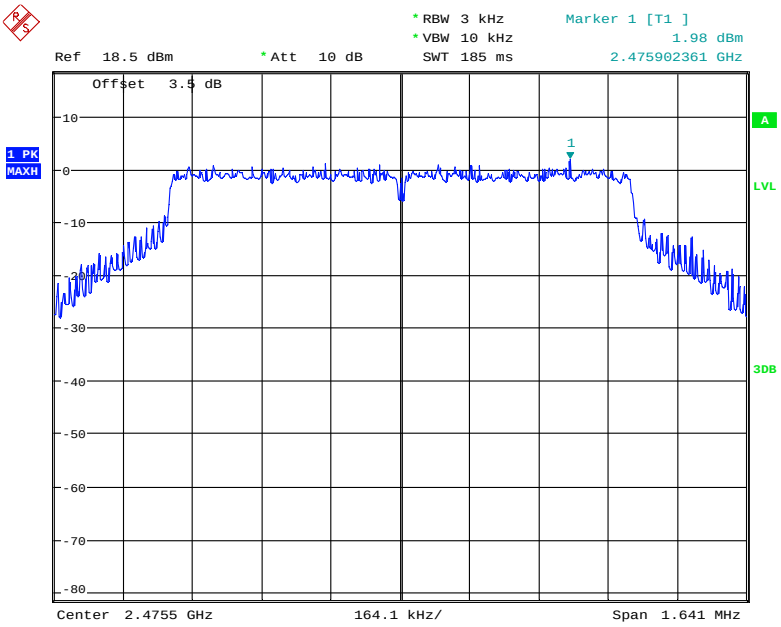
Date: 10.FEB.2018 13:37:27

Power Spectral Density, 1.4M Mode Middle Channel



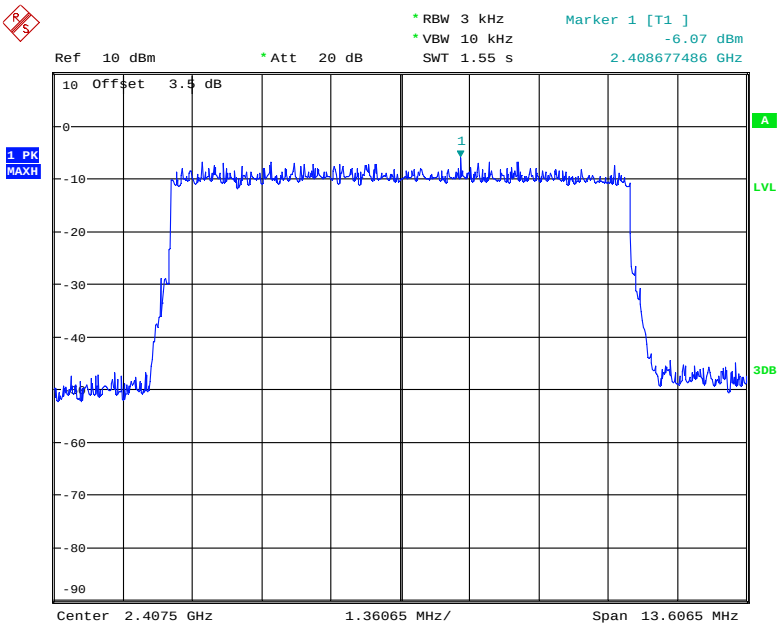
Date: 10.FEB.2018 13:48:20

Power Spectral Density, 1.4M Mode High Channel



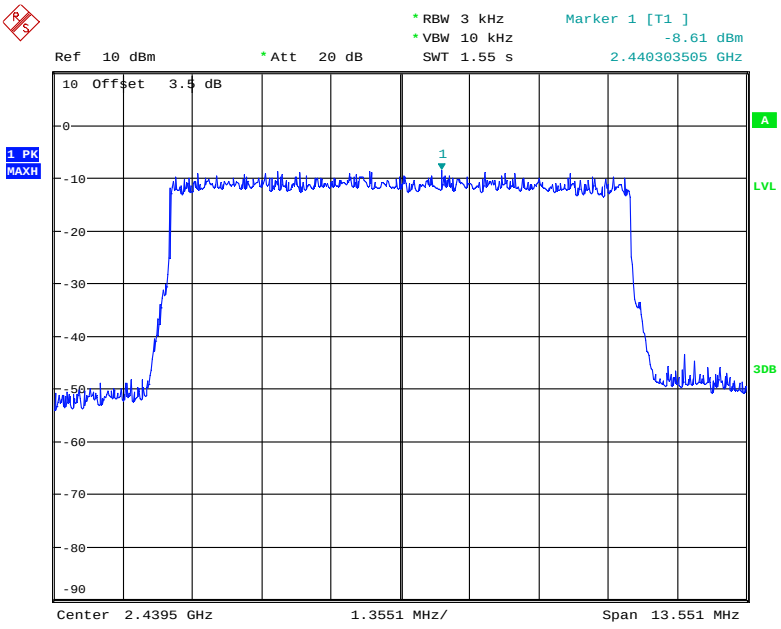
Date: 10.FEB.2018 13:50:19

Power Spectral Density, 10M Mode Low Channel



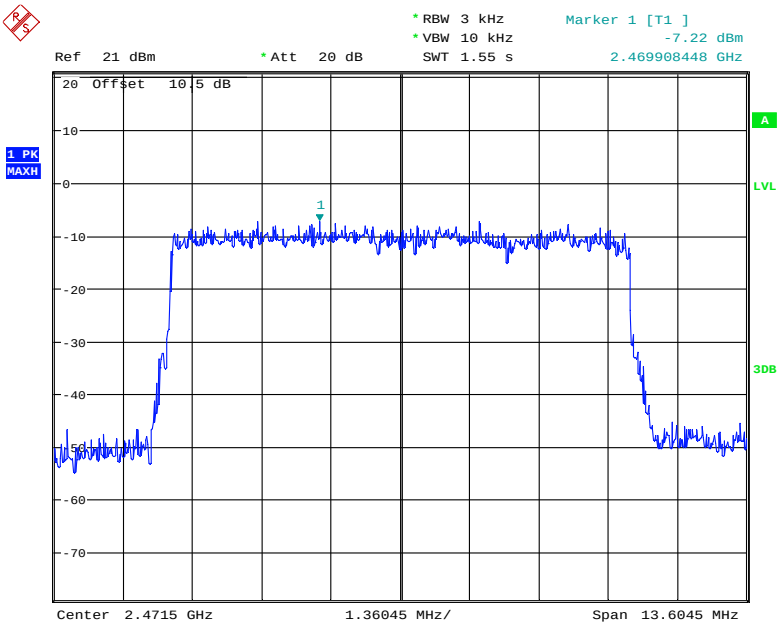
Date: 10.FEB.2018 13:35:31

Power Spectral Density, 10M Mode Middle Channel



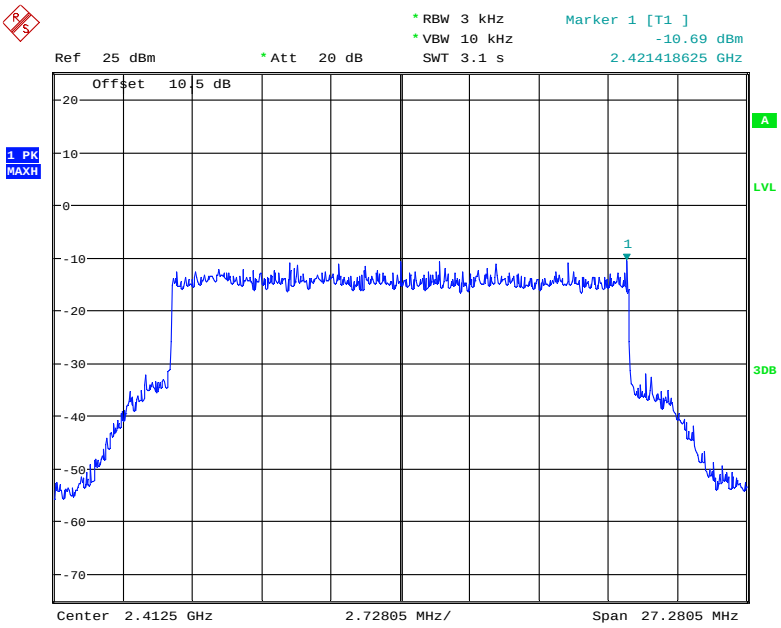
Date: 10.FEB.2018 13:21:02

Power Spectral Density, 10M Mode High Channel



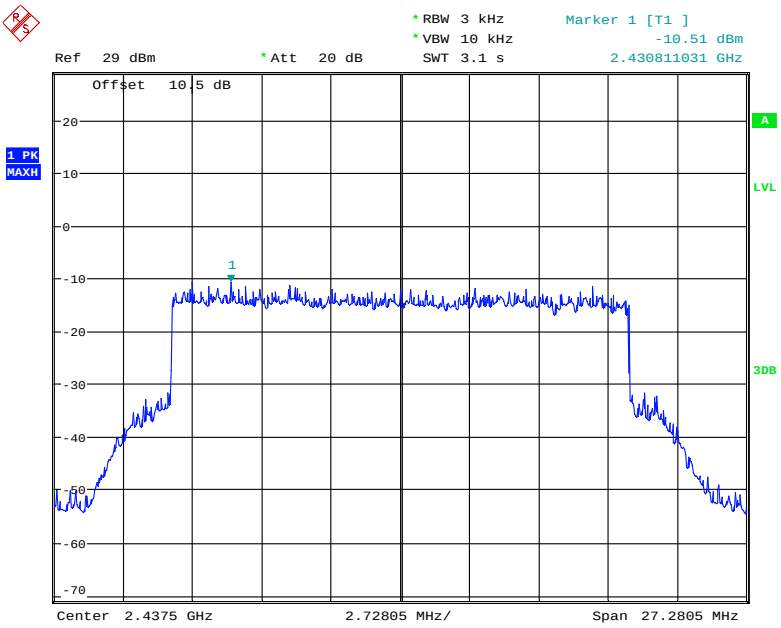
Date: 11.FEB.2018 19:30:12

Power Spectral Density, 20M Mode Low Channel



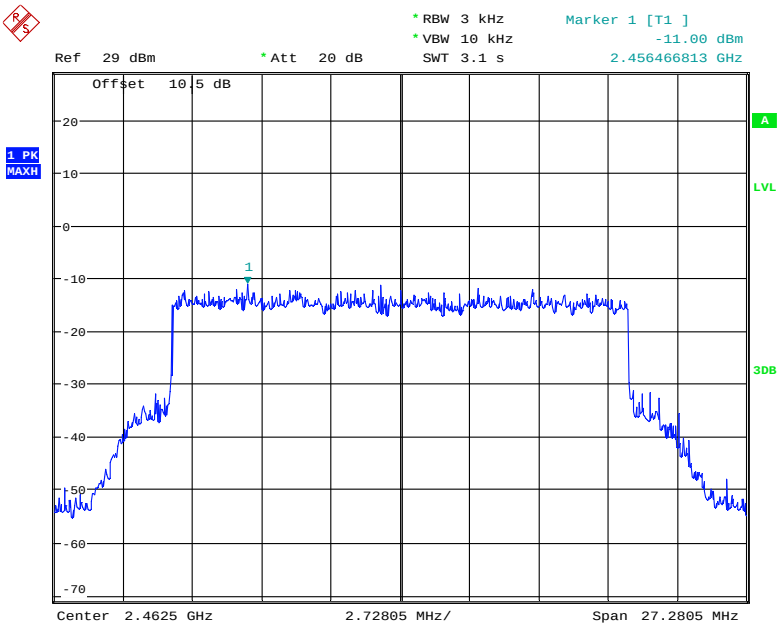
Date: 11.FEB.2018 19:43:48

Power Spectral Density, 20M Mode Middle Channel



Date: 11.FEB.2018 19:49:18

Power Spectral Density, 20M Mode High Channel



Date: 11.FEB.2018 19:52:46

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