



FCC PART 15.247

TEST REPORT

For

JEM ACCESSORIES INC.

32 Brunswick Avenue, Edison, New Jersey, United States 08817

FCC ID: 2AHAS-MLB71068

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Studio
Tested Model	MLB7-1068-RGB
Multiple Models	MLB7-1068-WW,MLB7-1068-CAN
Model Differences	Refer to the DoS letter
Frequency Range	Wi-Fi: 2412-2472MHz
Maximum Conducted Peak Output Power	15.31dBm(802.11b), 18.69dBm(802.11g) 17.86dBm(802.11n-HT20),15.71dBm(802.11n-HT40)
Modulation Technique	Wi-Fi: DSSS, OFDM
Antenna Specification*	1.3dBi(It is provided by the applicant)
Voltage Range	DC 5V form USB Port
Date of Test	2021-07-27 to 2021-10-23
Sample serial number	SZ3210701-26510E-RF-S1(Assigned by BACL, Shenzhen)
Received date	2021-07-01
Sample/EUT Status	Good condition

Objective

This test report is 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.

Test Methodology

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

And KDB 558074 D01 15.247 Meas Guidance v05r02.

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. 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		0.73dB
Unwanted Emission, conducted		1.6dB
Emissions, Radiated	30MHz - 1GHz	4.28dB
	1GHz- 18GHz	4.98dB
	18GHz- 26.5GHz	5.06dB
Temperature		1°C
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 Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. 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.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 429 7.01.

Listed by Innovation, Science and Economic Development Canada (ISED), the Registration Number is 5077A.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

For 802.11b, 802.11g and 802.11n20 mode, EUT was tested with Channel 1, 7 and 13.

For 802.11n40 mode, EUT was tested with Channel 3, 7 and 11.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

“Wifi Test Tool v1.6.0”* software was used to test the EUT and power level is default. The software and power level were provided by the applicant.

The device was tested with the worst case as performed as below:

Mode	Data rate	Power level*		
		Low channel	Middle channel	High channel
802.11b	1 Mbps	default	default	default
802.11g	6 Mbps	default	default	default
802.11n-HT20	MCS0	default	default	default
802.11n-HT40	MCS0	default	default	default

Support Equipment List and Details

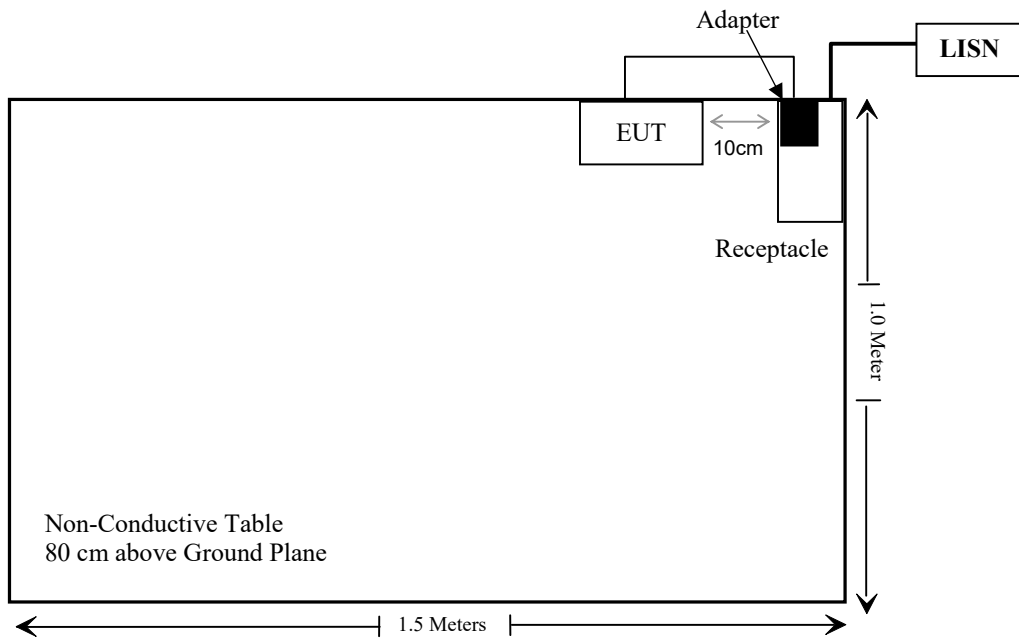
Manufacturer	Description	Model	Serial Number
Dongguan Aohai Power Technology Co., Ltd.	Adapter	A8-501000	A1906034835
BULL	Receptacle	GN-415K	5503290068073

External I/O Cable

Cable Description	Length (m)	From Port	To
Un-shielded detachable DC cable	1.6	adapter	EUT

Block Diagram of Test Setup

For conducted emission:



SUMMARY OF TEST RESULTS

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

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde& Schwarz	Test Receiver	ESPI3	100396	2020/12/24	2021/12/23
R & S	L.I.S.N.	ENV216	101314	2020/12/25	2021/12/24
Anritsu Corp	50ΩCoaxial Switch	MP59B	6200506474	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-2m	No.2	2020/12/25	2021/12/24
Conducted Emission Test Software: ES-K1 V1.71					
Radiated Emissions Test					
Rohde& Schwarz	Test Receiver	ESR	101817	2020/12/24	2021/12/23
Rohde&Schwarz	Spectrum Analyzer	FSV40	101495	2020/12/24	2021/12/23
SONOMA INSTRUMENT	Amplifier	310 N	186131	2020/12/25	2021/12/24
A.H. Systems, inc.	Preamplifier	PAM-0118P	531	2021/07/08	2022/07/07
Quinstar	Amplifier	QLW-184055 36-J0	15964001002	2020/11/28	2021/11/27
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2020/12/25	2021/12/24
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2020/01/05	2023/01/04
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
Schwarzbeck	HORN ANTENNA	BBHA9170	9170-359	2020/01/05	2023/01/04
OREGON SCIENTIFIC	Temperature & Humidity Meter	JB913R	GZ-WS004	2020/01/02	2023/01/01
Unknown	RF Coaxial Cable	N-5m	No.3	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-5m	No.4	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-1m	No.5	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-1m	No.6	2020/12/25	2021/12/24
Wainwright	High Pass Filter	WHKX3.6/18 G-10SS	5	2020/12/25	2021/12/24
Radiated Emission Test Software: EZ_EMV V 1.1.4.2					
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSV-40	101495	2020/12/24	2021/12/23
Tonscend	RF Control Unit	JS0806-2	19G8060182	2021/07/06	2022/07/05

* **Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. 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) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247 (i) and subpart 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

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

f = frequency in MHz

* = Plane-wave equivalent power density

Result

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm²)

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

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

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

For worst case:

Frequency (MHz)	Maximum Antenna Gain		Tune up conducted power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
	(dBi)	(numeric)	(dBm)	(mW)			
2412-2472	1.3	1.35	19	79.43	20	0.021	1

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliance

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 one internal antenna arrangement, which was permanently attached and the antenna gain is 1.3 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

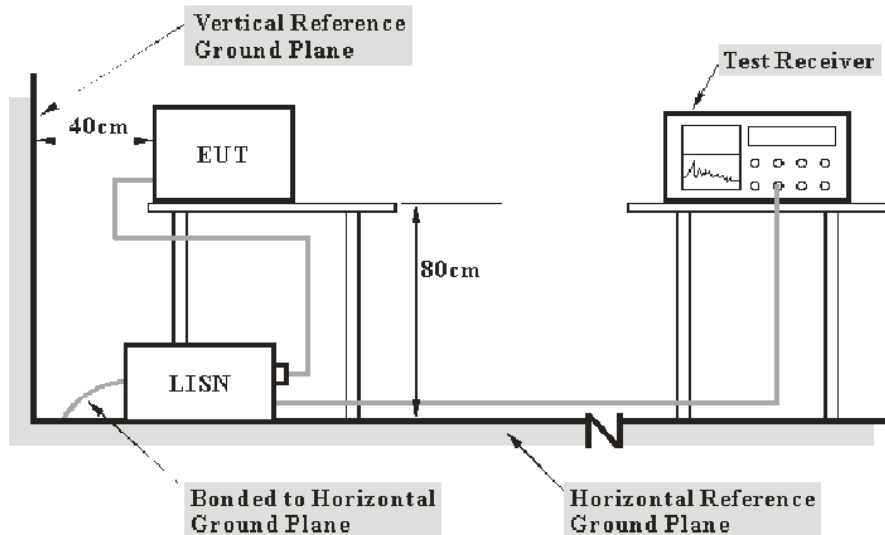
Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

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.

Transd Factor & Margin Calculation

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

$$\text{Transd Factor} = \text{LISN VDF} + \text{Cable Loss}$$

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:

$$\begin{aligned} \text{Margin} &= \text{Limit} - \text{level} \\ \text{Level} &= \text{reading level} + \text{Transd Factor} \end{aligned}$$

Test Data

Environmental Conditions

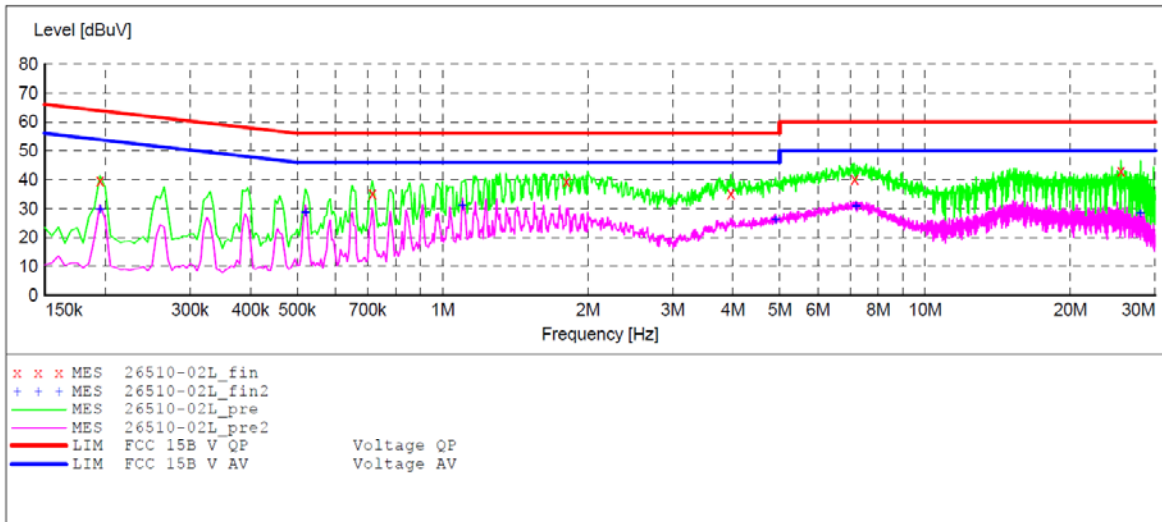
Temperature:	24 °C
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Anny on 2021-10-19.

EUT operation mode: Transmitting (Worst case as below)

Wi-Fi: 802.11B mode, low Channel

AC 120V/60 Hz, Line



MEASUREMENT RESULT: "26510-02L_fin"

2021-10-19 03:48

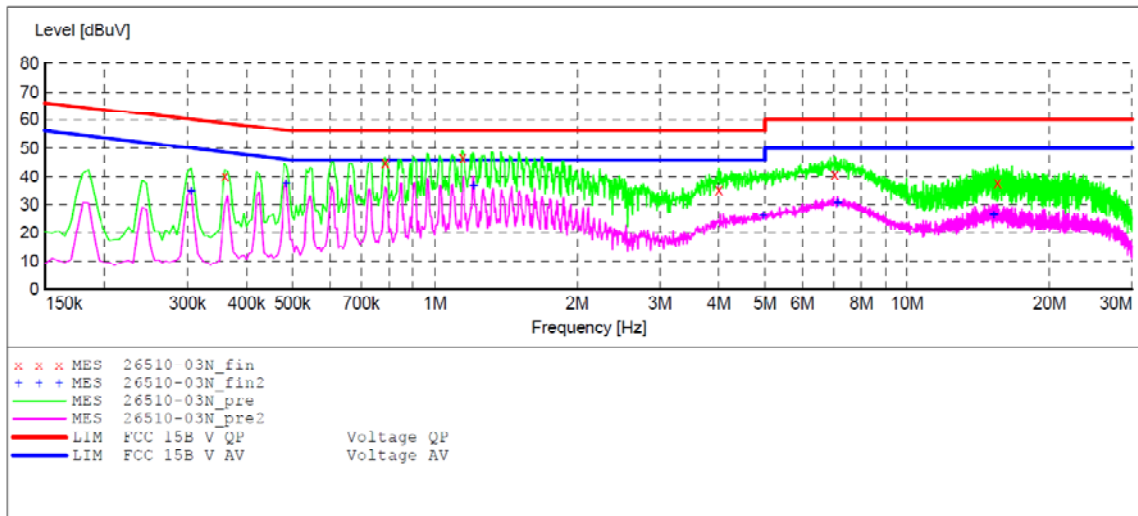
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.195000	40.00	10.8	64	24.0	QP	L1	GND
0.715000	35.20	11.1	56	20.8	QP	L1	GND
1.805000	39.30	11.2	56	16.7	QP	L1	GND
3.960000	35.20	11.4	56	20.8	QP	L1	GND
7.140000	40.20	11.5	60	19.8	QP	L1	GND
25.475000	43.00	11.7	60	17.0	QP	L1	GND

MEASUREMENT RESULT: "26510-02L_fin2"

2021-10-19 03:47

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.195000	29.70	10.8	54	24.3	AV	L1	GND
0.520000	28.60	11.0	46	17.4	AV	L1	GND
1.100000	31.00	11.1	46	15.0	AV	L1	GND
4.900000	26.00	11.4	46	20.0	AV	L1	GND
7.200000	30.70	11.5	50	19.3	AV	L1	GND
27.975000	28.30	11.8	50	21.7	AV	L1	GND

AC 120V/60 Hz, Neutral



MEASUREMENT RESULT: "26510-03N_fin"

2021-10-19 03:54

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.360000	40.70	10.9	59	18.3	QP	N	GND
0.785000	44.90	11.1	56	11.1	QP	N	GND
1.145000	46.80	11.2	56	9.2	QP	N	GND
4.000000	35.10	11.4	56	20.9	QP	N	GND
7.040000	40.70	11.5	60	19.3	QP	N	GND
15.525000	37.70	11.7	60	22.3	QP	N	GND

MEASUREMENT RESULT: "26510-03N_fin2"

2021-10-19 03:54

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.305000	34.70	10.9	50	15.3	AV	N	GND
0.485000	37.40	11.0	46	8.6	AV	N	GND
1.210000	36.50	11.2	46	9.5	AV	N	GND
4.950000	25.90	11.4	46	20.1	AV	N	GND
7.140000	30.60	11.5	50	19.4	AV	N	GND
15.225000	26.30	11.6	50	23.7	AV	N	GND

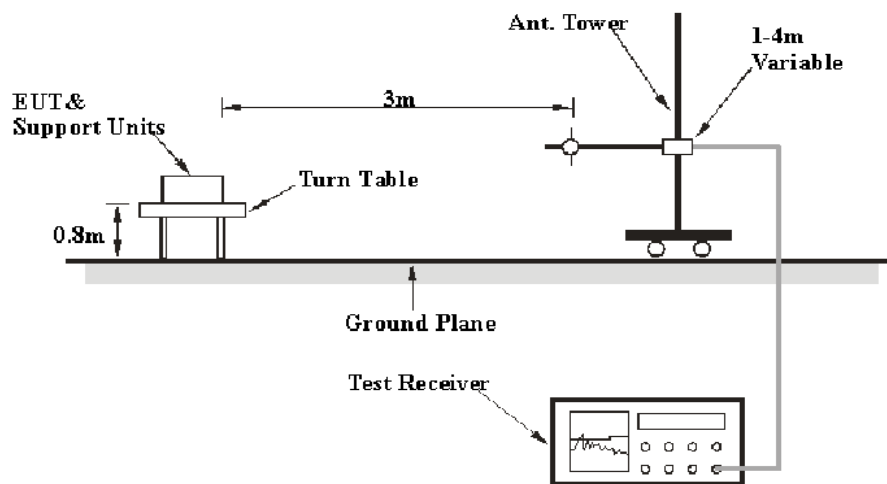
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

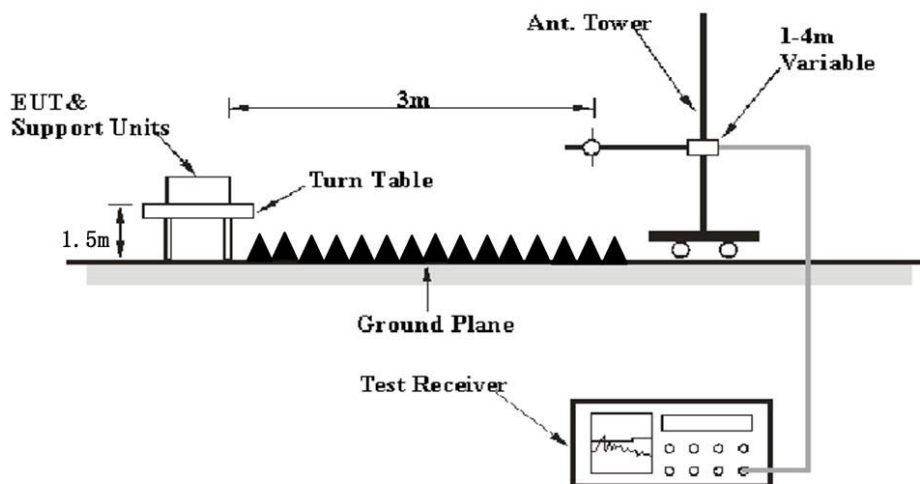
FCC §15.247 (d); §15.209; §15.205;

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

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	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz ^{Note 1}	/	Average
	1MHz	> 1/T ^{Note 2}	/	Average

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.

Factor & Margin Calculation

The Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

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

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

$$\begin{aligned} \text{Margin} &= \text{Result} - \text{Limit} \\ \text{Result} &= \text{Reading} + \text{Factor} \end{aligned}$$

Test Data

Environmental Conditions

Temperature:	23~27.5 °C
Relative Humidity:	48~56 %
ATM Pressure:	101.0 kPa

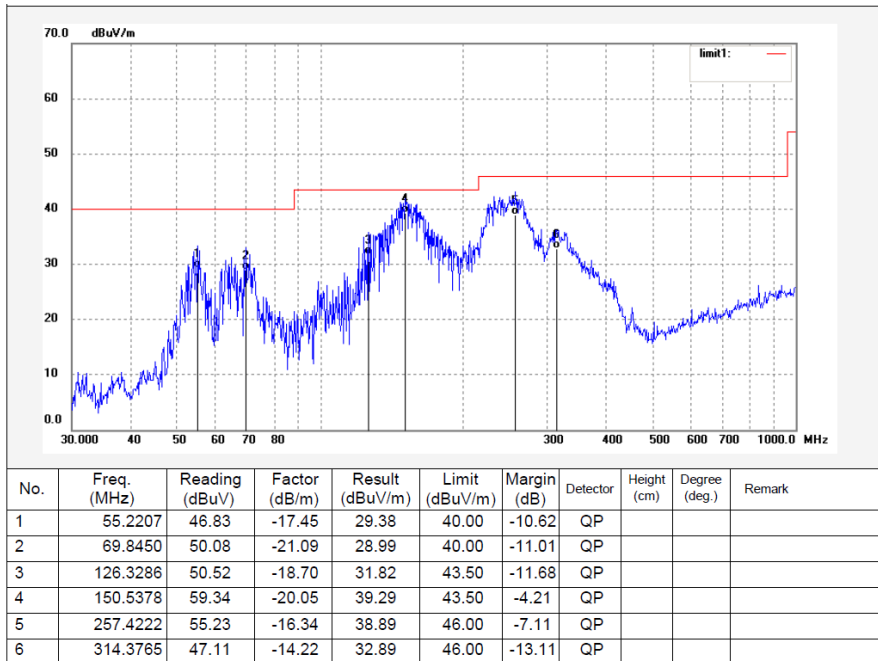
The testing was performed by Caro hu on 2021-10-22 and 2021-10-23.

EUT operation mode: Transmitting

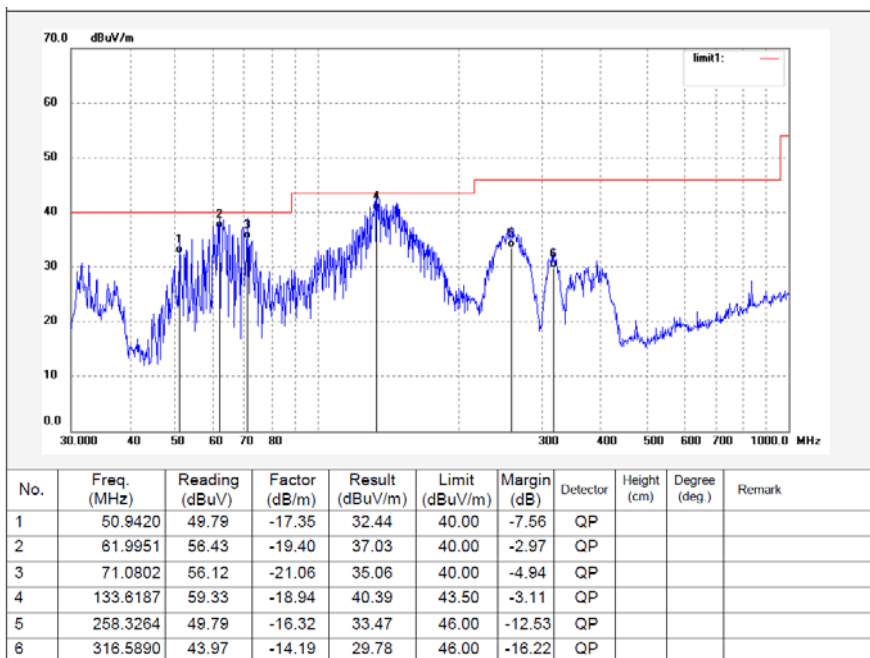
30MHz-1GHz: (Worst case)

Wi-Fi: 802.11B mode, Low Channel

Horizontal



Vertical



1-25GHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/QP/AV		Height (m)	Polar (H/V)				
802.11b, Low Channel									
2310	68.59	PK	147	1.5	H	-6.84	61.75	74	-12.25
2310	54.63	Ave	147	1.5	H	-6.84	47.79	54	-6.21
2310	67.22	PK	133	1.3	V	-6.84	60.38	74	-13.62
2310	53.39	AV	133	1.3	V	-6.84	46.55	54	-7.45
2390	68.28	PK	189	1.2	H	-6.44	61.84	74	-12.16
2390	54.33	Ave	189	1.2	H	-6.44	47.89	54	-6.11
2390	66.88	PK	314	1.7	V	-6.44	60.44	74	-13.56
2390	53.07	Ave	314	1.7	V	-6.44	46.63	54	-7.37
4824	48.68	PK	24	2.3	H	2.87	51.55	74	-22.45
4824	43.74	Ave	24	2.3	H	2.87	46.61	54	-7.39
4824	46.12	PK	27	1.2	V	2.87	48.99	74	-25.01
4824	40.14	Ave	27	1.2	V	2.87	43.01	54	-10.99
802.11b, Middle Channel									
4884	48.99	PK	224	1.3	H	3.04	52.03	74	-21.97
4884	42.19	Ave	224	1.3	H	3.04	45.23	54	-8.77
4884	46.1	PK	291	2.2	V	3.04	49.14	74	-24.86
4884	39.42	Ave	244	2.2	V	3.04	42.46	54	-11.54
802.11b, High Channel									
2483.5	66.76	PK	178	2.4	H	-5.96	60.8	74	-13.2
2483.5	53.63	Ave	178	2.4	H	-5.96	47.67	54	-6.33
2483.5	65.07	PK	150	1.1	V	-5.96	59.11	74	-14.89
2483.5	51.88	Ave	150	1.1	V	-5.96	45.92	54	-8.08
2500	67.57	PK	135	1.2	H	-5.88	61.69	74	-12.31
2500	53.99	Ave	135	1.2	H	-5.88	48.11	54	-5.89
2500	66.1	PK	183	1.6	V	-5.88	60.22	74	-13.78
2500	52.64	Ave	183	1.6	V	-5.88	46.76	54	-7.24
4944	48.32	PK	199	1.7	H	3.23	51.55	74	-22.45
4944	40.5	Ave	199	1.7	H	3.23	43.73	54	-10.27
4944	46.24	PK	285	2.4	V	3.23	49.47	74	-24.53
4944	38.21	Ave	285	2.4	V	3.23	41.44	54	-12.56

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
	Reading (dB μ V)	PK/QP/AV		Height (m)	Polar (H/V)				
802.11g, Low Channel									
2310	68.14	PK	111	1.5	H	-6.84	61.3	74	-12.7
2310	54.45	Ave	111	1.5	H	-6.84	47.61	54	-6.39
2310	66.34	PK	295	1.7	V	-6.84	59.5	74	-14.5
2310	52.65	Ave	295	1.7	V	-6.84	45.81	54	-8.19
2390	68.3	PK	213	1	H	-6.44	61.86	74	-12.14
2390	54.35	Ave	213	1	H	-6.44	47.91	54	-6.09
2390	68.3	PK	251	1.7	V	-6.44	61.86	74	-12.14
2390	54.35	Ave	251	1.7	V	-6.44	47.91	54	-6.09
4824	48.42	PK	213	1.8	H	2.87	51.29	74	-22.71
4824	41.32	Ave	213	1.8	H	2.87	44.19	54	-9.81
4824	46.52	PK	152	2.4	V	2.87	49.39	74	-24.61
4824	39.62	Ave	152	2.4	V	2.87	42.49	54	-11.51
802.11g, Middle Channel									
4884	48.29	PK	51	2.3	H	3.04	51.33	74	-22.67
4884	40.3	Ave	51	2.3	H	3.04	43.34	54	-10.66
4884	46.27	PK	203	1.7	V	3.04	49.31	74	-24.69
4884	38.18	Ave	244	1.7	V	3.04	41.22	54	-12.78
802.11g, High Channel									
2483.5	67.2	PK	282	2.3	H	-5.96	61.24	74	-12.76
2483.5	53.8	Ave	282	2.3	H	-5.96	47.84	54	-6.16
2483.5	65.08	PK	236	2.2	V	-5.96	59.12	74	-14.88
2483.5	51.64	Ave	236	2.2	V	-5.96	45.68	54	-8.32
2500	67.3	PK	37	1.1	H	-5.88	61.42	74	-12.58
2500	53.95	Ave	37	1.1	H	-5.88	48.07	54	-5.93
2500	65.23	PK	339	2	V	-5.88	59.35	74	-14.65
2500	51.77	Ave	339	2	V	-5.88	45.89	54	-8.11
4944	48.81	PK	342	1.6	H	3.23	52.04	74	-21.96
4944	41.22	Ave	342	1.6	H	3.23	44.45	54	-9.55
4944	46.31	PK	325	1.5	V	3.23	49.54	74	-24.46
4944	38.99	Ave	325	1.5	V	3.23	42.22	54	-11.78

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
	Reading (dB μ V)	PK/QP/AV		Height (m)	Polar (H/V)				
802.11n20, Low Channel									
2310	68.25	PK	335	1.6	H	-6.84	61.41	74	-12.59
2310	54.7	Ave	335	1.6	H	-6.84	47.86	54	-6.14
2310	66.12	PK	349	2.1	V	-6.84	59.28	74	-14.72
2310	52.48	Ave	349	2.1	V	-6.84	45.64	54	-8.36
2390	67.73	PK	192	1.2	H	-6.44	61.29	74	-12.71
2390	54.55	Ave	192	1.2	H	-6.44	48.11	54	-5.89
2390	65.55	PK	56	1.1	V	-6.44	59.11	74	-14.89
2390	51.79	Ave	56	1.1	V	-6.44	45.35	54	-8.65
4824	50.79	PK	164	2.2	H	2.87	53.66	74	-20.34
4824	38.1	Ave	164	2.2	H	2.87	40.97	54	-13.03
4824	48.7	PK	137	1.9	V	2.87	51.57	74	-22.43
4824	36.01	Ave	137	1.9	V	2.87	38.88	54	-15.12
802.11n20, Middle Channel									
4884	47.46	PK	33	2.1	H	3.04	50.5	74	-23.5
4884	35.04	Ave	33	2.1	H	3.04	38.08	54	-15.92
4884	45.28	PK	246	1.7	V	3.04	48.32	74	-25.68
4884	32.73	Ave	244	1.7	V	3.04	35.77	54	-18.23
802.11n20, High Channel									
2483.5	66.82	PK	61	1.6	H	-5.96	60.86	74	-13.14
2483.5	53.78	Ave	61	1.6	H	-5.96	47.82	54	-6.18
2483.5	64.61	PK	244	1.7	V	-5.96	58.65	74	-15.35
2483.5	51.74	Ave	244	1.7	V	-5.96	45.78	54	-8.22
2500	66.98	PK	334	1.2	H	-5.88	61.1	74	-12.9
2500	53.79	Ave	334	1.2	H	-5.88	47.91	54	-6.09
2500	64.77	PK	29	1.6	V	-5.88	58.89	74	-15.11
2500	51.87	Ave	29	1.6	V	-5.88	45.99	54	-8.01
4944	47.37	PK	119	1.3	H	3.23	50.6	74	-23.4
4944	34.15	Ave	119	1.3	H	3.23	37.38	54	-16.62
4944	47.49	PK	85	1.6	V	3.23	50.72	74	-23.28
4944	32.23	Ave	85	1.6	V	3.23	35.46	54	-18.54

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
	Reading (dB μ V)	PK/QP/AV		Height (m)	Polar (H/V)				
802.11n40, Low Channel									
2310	68.43	PK	164	2.1	H	-6.84	61.59	74	-12.41
2310	54.42	Ave	164	2.1	H	-6.84	47.58	54	-6.42
2310	66.28	PK	308	1.8	V	-6.84	59.44	74	-14.56
2310	52.06	Ave	308	1.8	V	-6.84	45.22	54	-8.78
2390	68.34	PK	318	1.7	H	-6.44	61.9	74	-12.1
2390	54.43	Ave	318	1.7	H	-6.44	47.99	54	-6.01
2390	66.07	PK	94	2.2	V	-6.44	59.63	74	-14.37
2390	51.79	Ave	94	2.2	V	-6.44	45.35	54	-8.65
4844	49.6	PK	129	1.8	H	2.92	52.52	74	-21.48
4844	34.53	Ave	129	1.8	H	2.92	37.45	54	-16.55
4844	47.63	PK	48	2.1	V	2.92	50.55	74	-23.45
4844	32.69	Ave	48	2.1	V	2.92	35.61	54	-18.39
802.11n40, Middle Channel									
4884	48.87	PK	62	1.3	H	3.04	51.91	74	-22.09
4884	34.19	Ave	62	1.3	H	3.04	37.23	54	-16.77
4884	46.51	PK	91	2	V	3.04	49.55	74	-24.45
4884	32.27	Ave	244	2	V	3.04	35.31	54	-18.69
802.11n40, High Channel									
2483.5	67.15	PK	186	2.1	H	-5.96	61.19	74	-12.81
2483.5	53.69	Ave	186	2.1	H	-5.96	47.73	54	-6.27
2483.5	65	PK	121	1.9	V	-5.96	59.04	74	-14.96
2483.5	51.44	Ave	121	1.9	V	-5.96	45.48	54	-8.52
2500	67.21	PK	204	1.5	H	-5.88	61.33	74	-12.67
2500	53.75	Ave	204	1.5	H	-5.88	47.87	54	-6.13
2500	65	PK	181	1.7	V	-5.88	59.12	74	-14.88
2500	51.45	Ave	181	1.7	V	-5.88	45.57	54	-8.43
4924	49.17	PK	33	2.3	H	3.17	52.34	74	-21.66
4924	33.96	Ave	33	2.3	H	3.17	37.13	54	-16.87
4924	46.96	PK	98	2.3	V	3.17	50.13	74	-23.87
4924	32.18	Ave	98	2.3	V	3.17	35.35	54	-18.65

Note:

Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

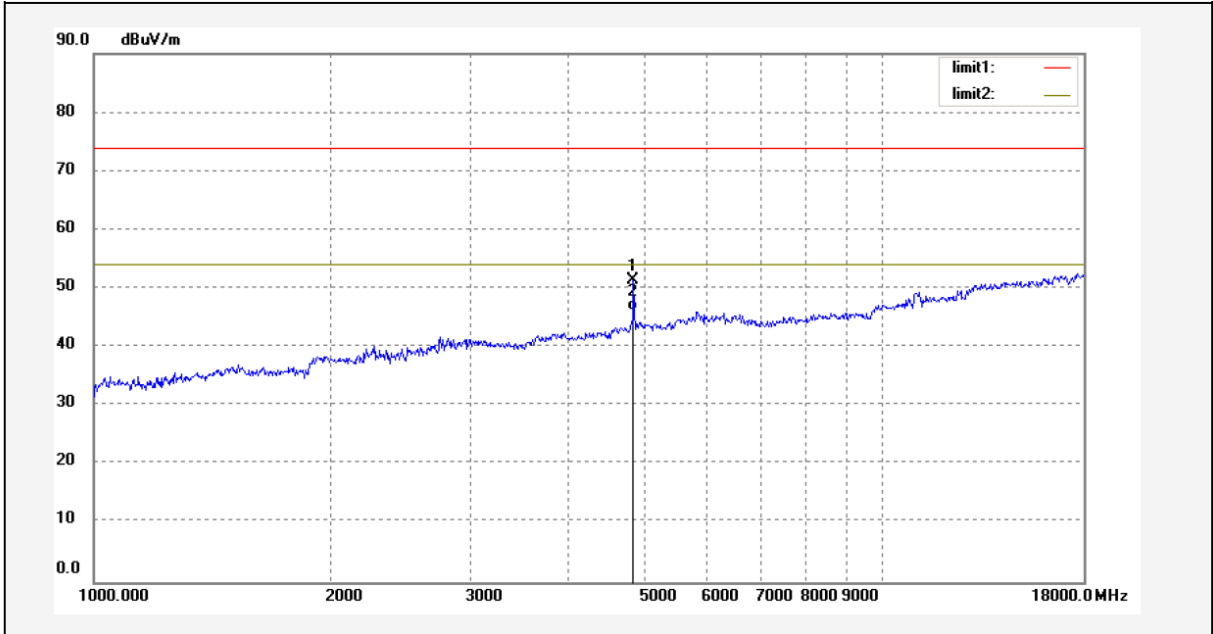
Corrected Amplitude = Corrected Factor + Reading

Margin = Corrected. Amplitude - Limit

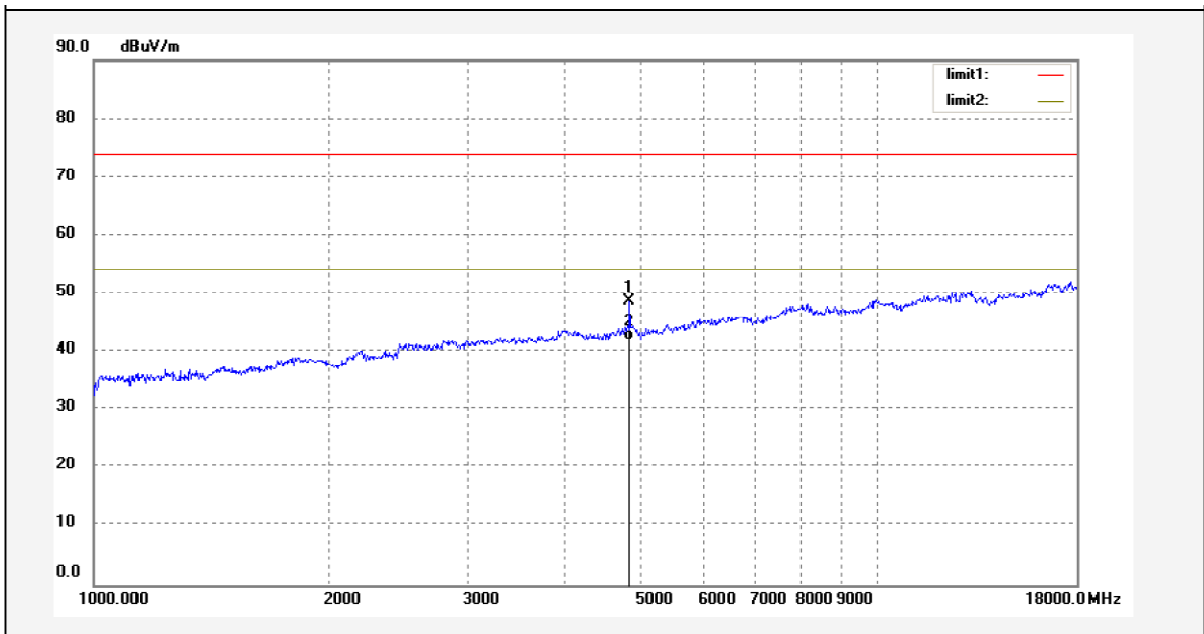
The other spurious emission which is 20dB to the limit was not recorded.

1-18 GHz:

Pre-scan
802.11 b Low Channel
Horizontal

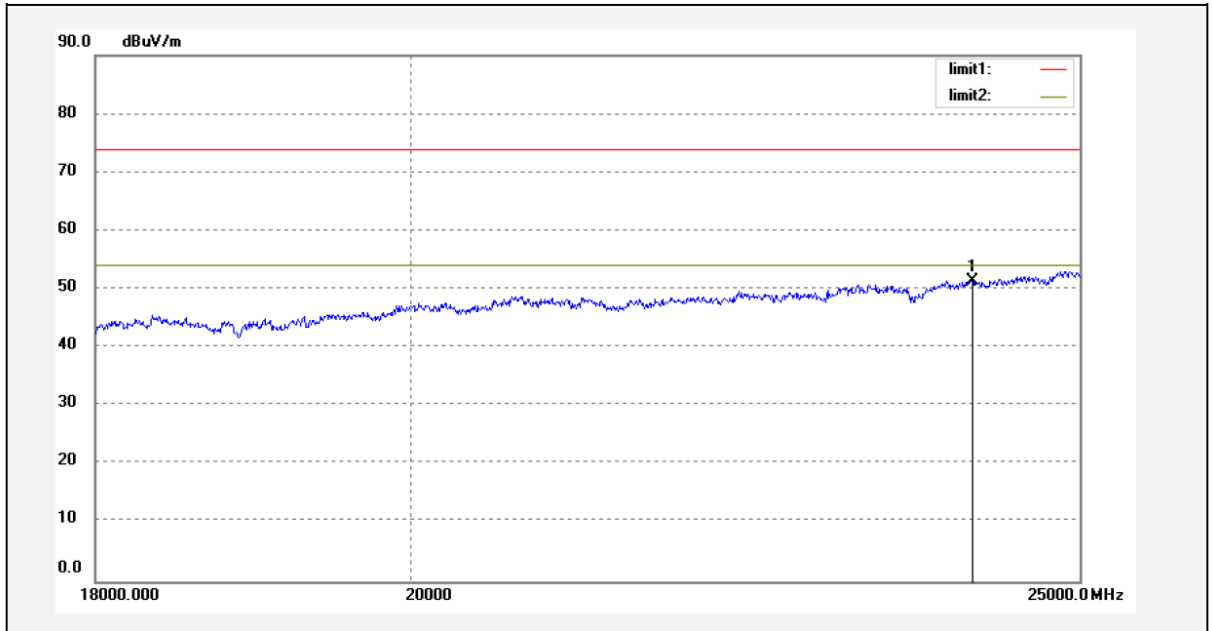


Vertical

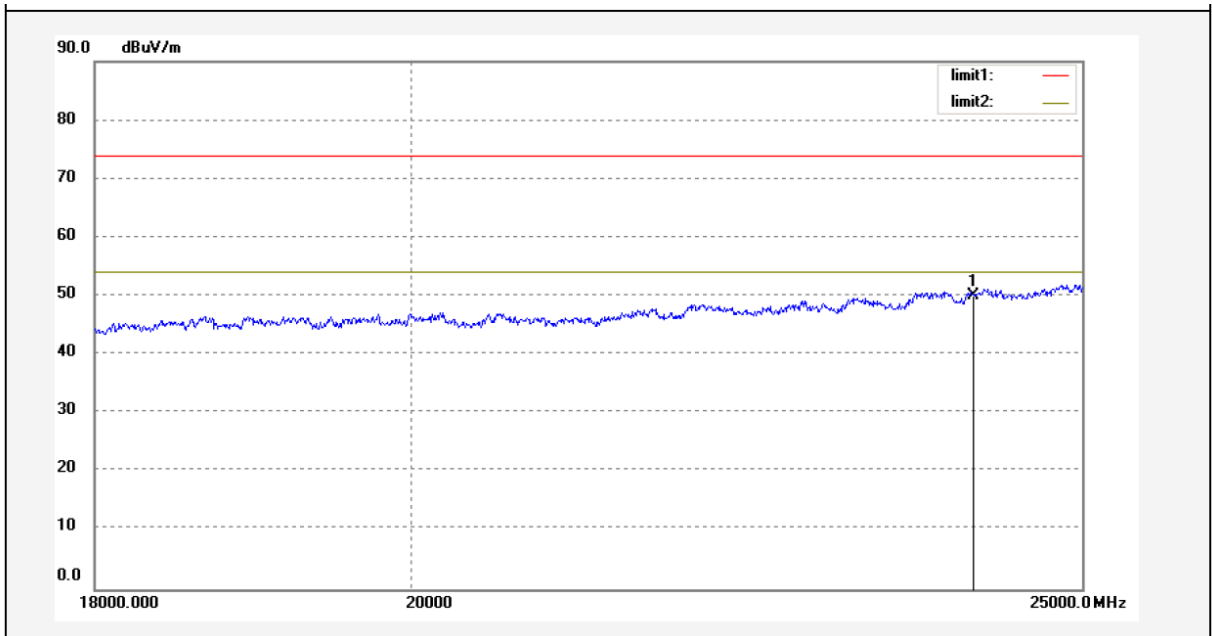


18 -25GHz:

**Pre-scan
802.11 b Low Channel
Horizontal**



Vertical



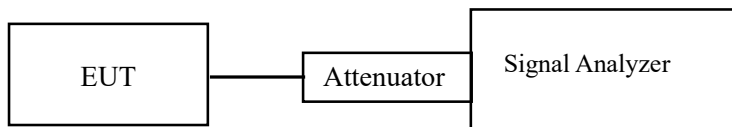
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH & OCCUPIED BANDWIDTH

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:	27°C
Relative Humidity:	57 %
ATM Pressure:	101.0 kPa

The testing was performed by Paul on 2021-07-27.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the Appendix Wi-Fi

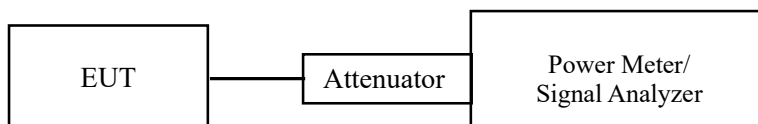
FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

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:	27°C
Relative Humidity:	57 %
ATM Pressure:	101.0 kPa

The testing was performed by Paul on 2021-07-27.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the Appendix Wi-Fi

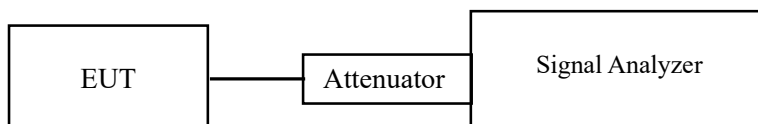
FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

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:	27°C
Relative Humidity:	57 %
ATM Pressure:	101.0 kPa

The testing was performed by Paul on 2021-07-27.

EUT operation mode: Transmitting

Test Result: Compliant.

Conducted Band Edge Result:

Test Result: Compliant. Please refer to the Appendix Wi-Fi

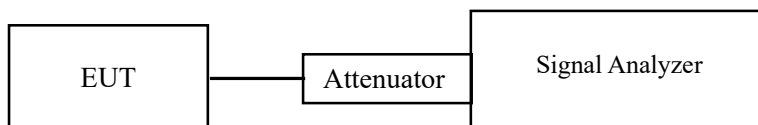
FCC §15.247(e) - POWER SPECTRAL DENSITY

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: $3\text{kHz} \leq \text{RBW} \leq 100\text{ kHz}$.
3. Set the VBW $\geq 3 \times \text{RBW}$.
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:	27°C
Relative Humidity:	57 %
ATM Pressure:	101.0 kPa

The testing was performed by Paul on 2021-07-27.

EUT operation mode: Transmitting

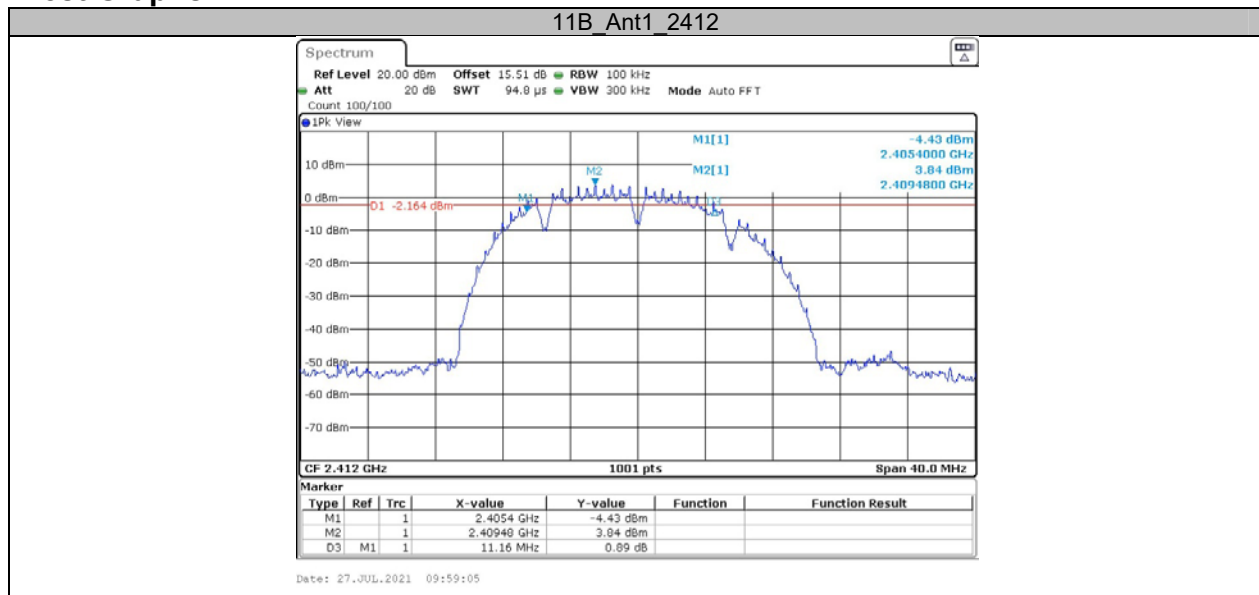
Test Result: Compliant. Please refer to the Appendix Wi-Fi

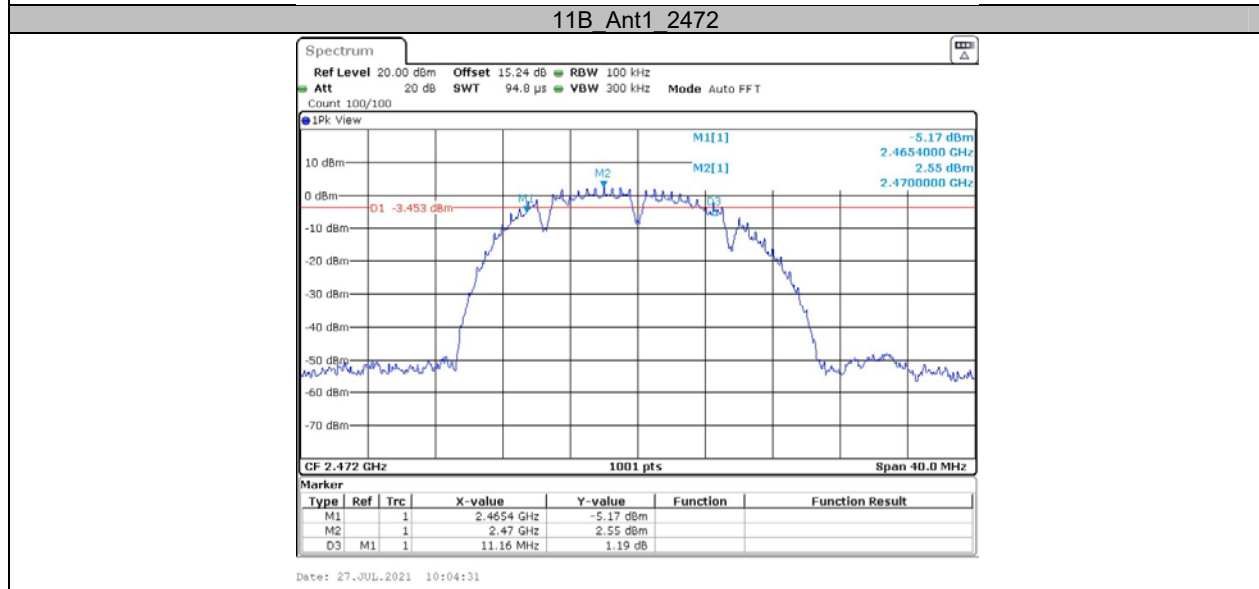
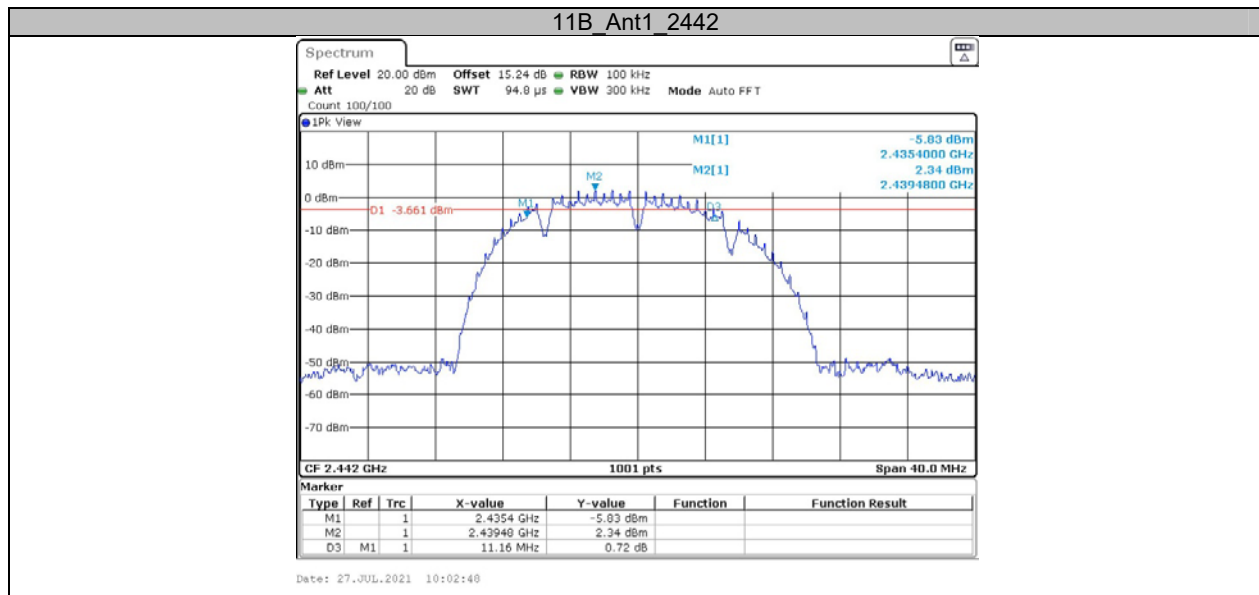
APPENDIX Wi-Fi

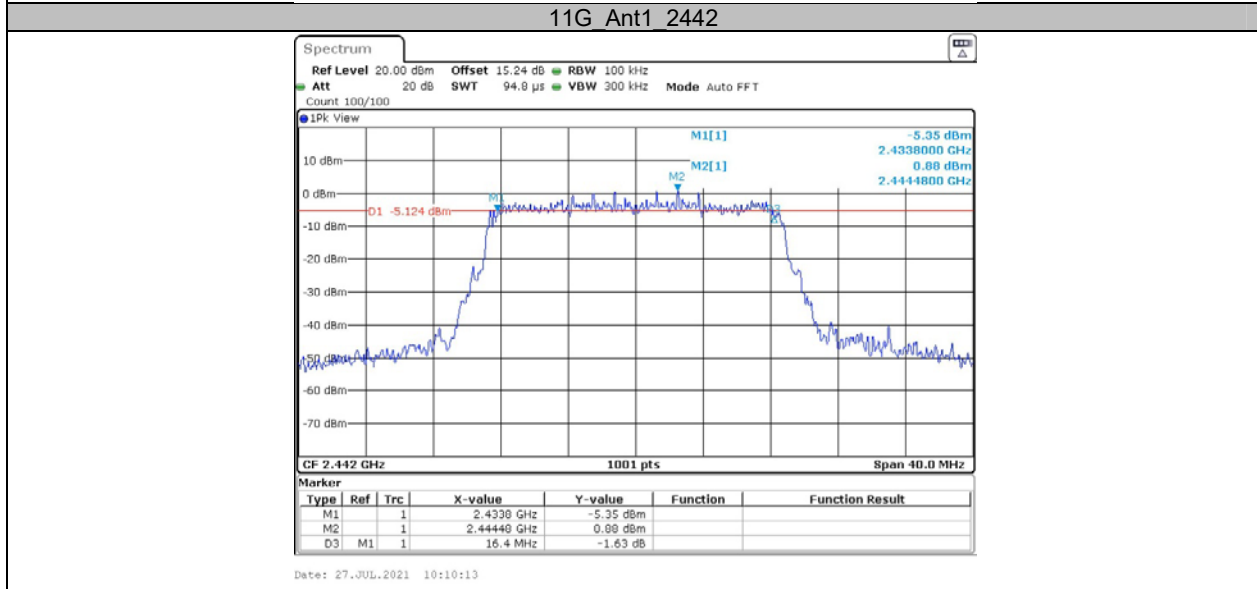
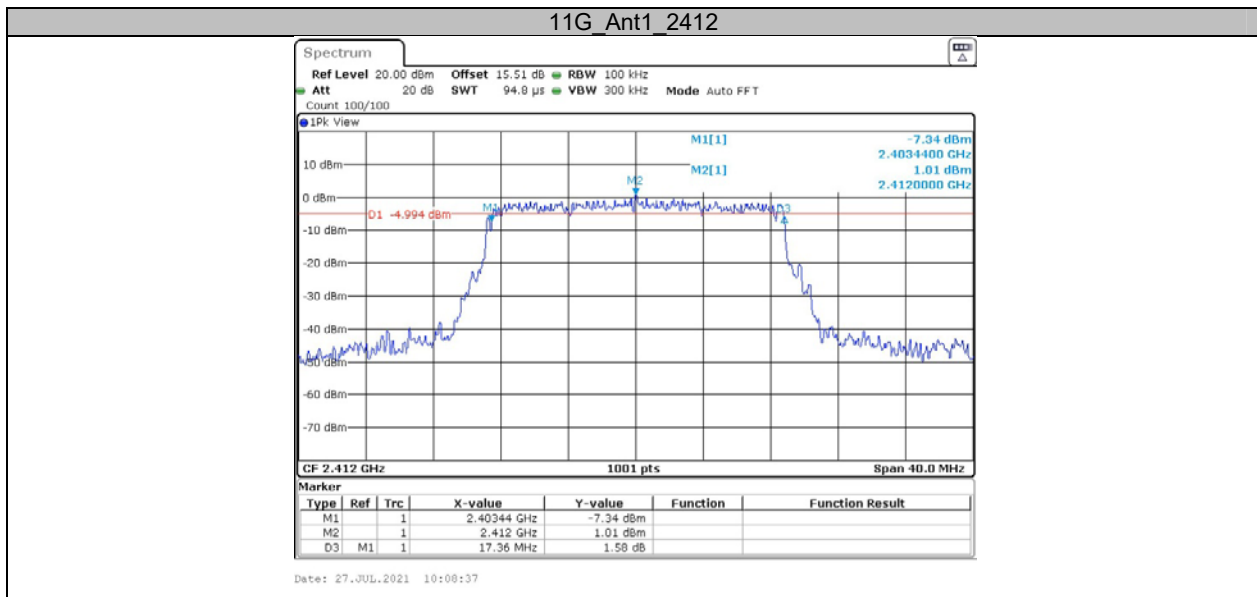
Appendix A: DTS Bandwidth Test Result

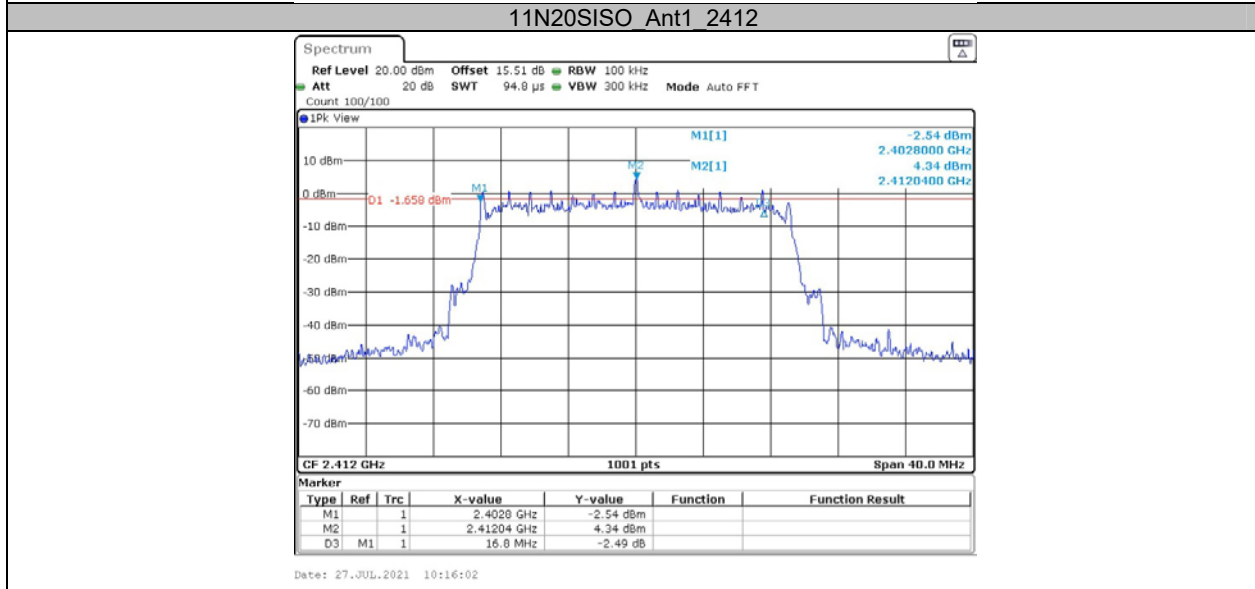
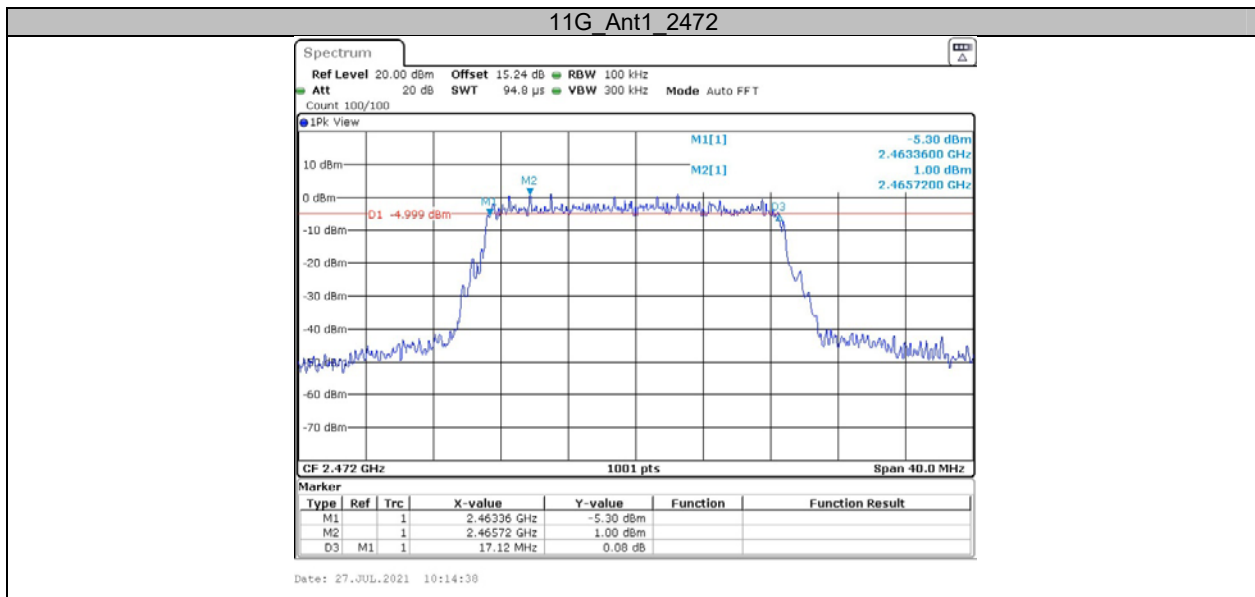
Test Mode	Antenna	Channel	DTS BW [MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	11.160	0.5	PASS
		2442	11.160	0.5	PASS
		2472	11.160	0.5	PASS
11G	Ant1	2412	17.360	0.5	PASS
		2442	16.400	0.5	PASS
		2472	17.120	0.5	PASS
11N20SISO	Ant1	2412	16.800	0.5	PASS
		2442	17.680	0.5	PASS
		2472	18.320	0.5	PASS
11N40SISO	Ant1	2422	35.280	0.5	PASS
		2442	35.280	0.5	PASS
		2462	35.280	0.5	PASS

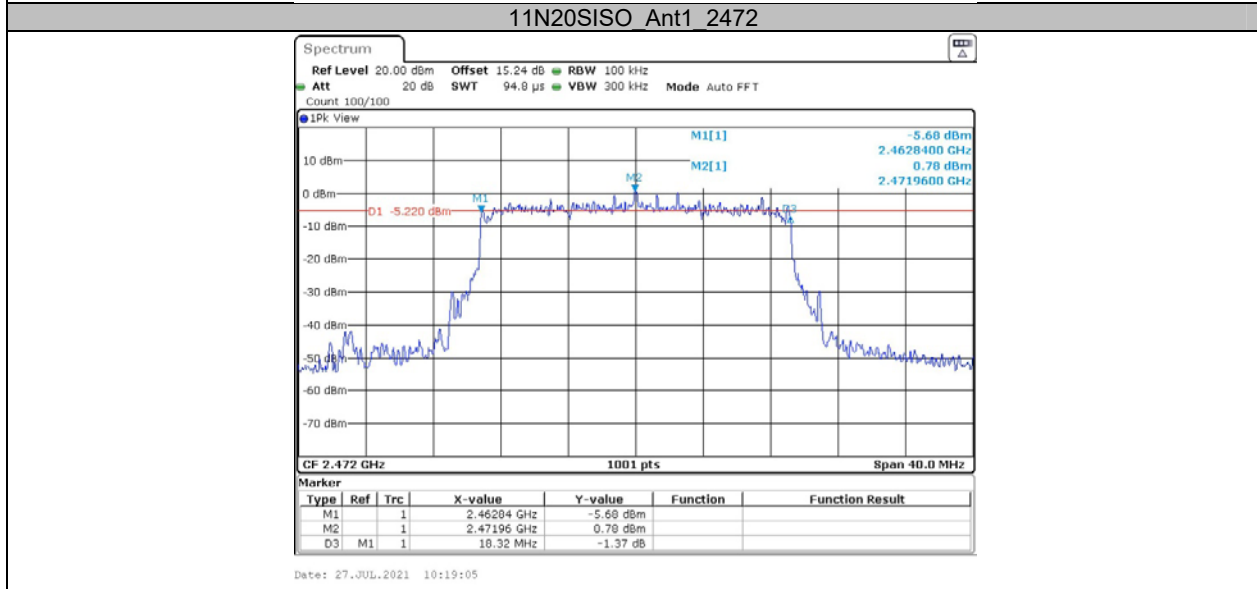
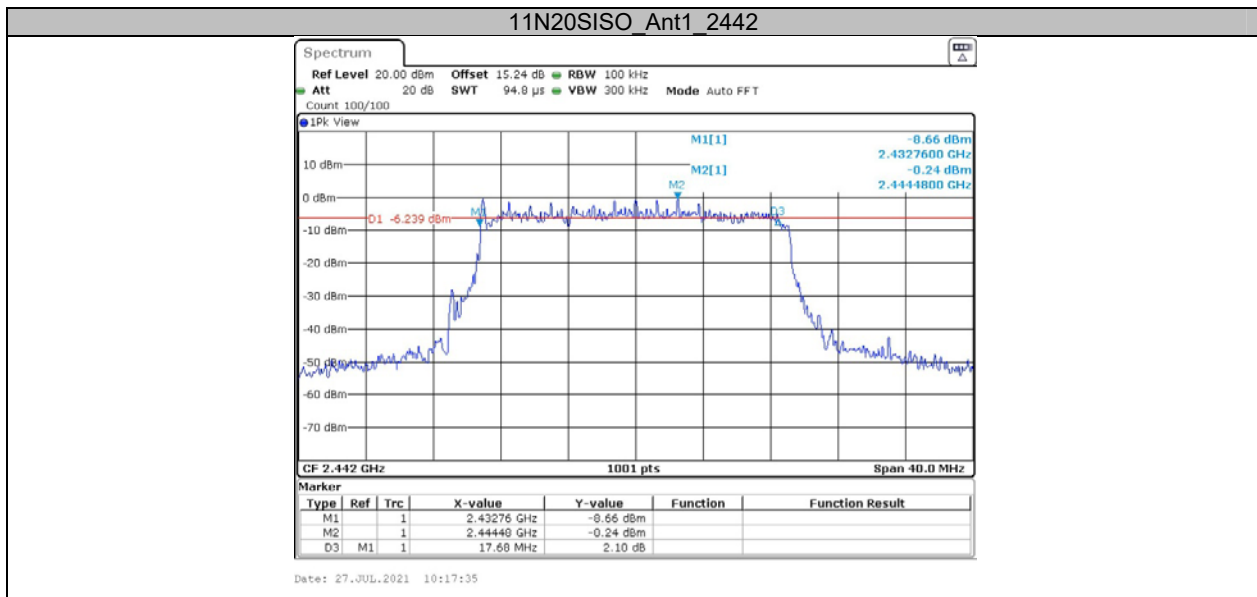
Test Graphs

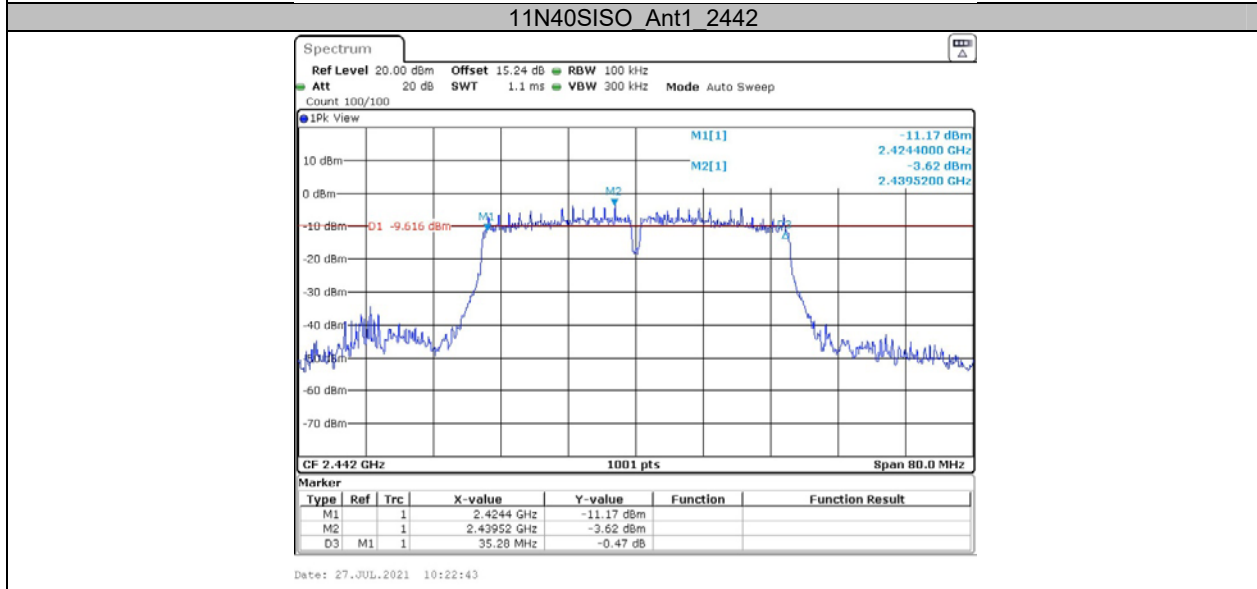
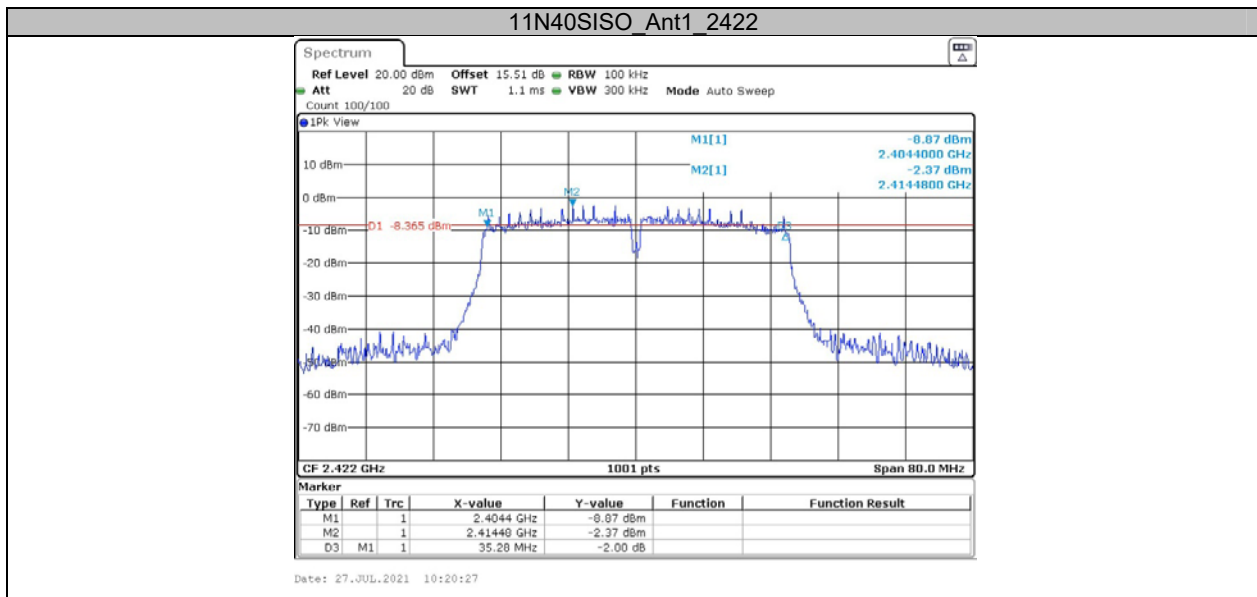


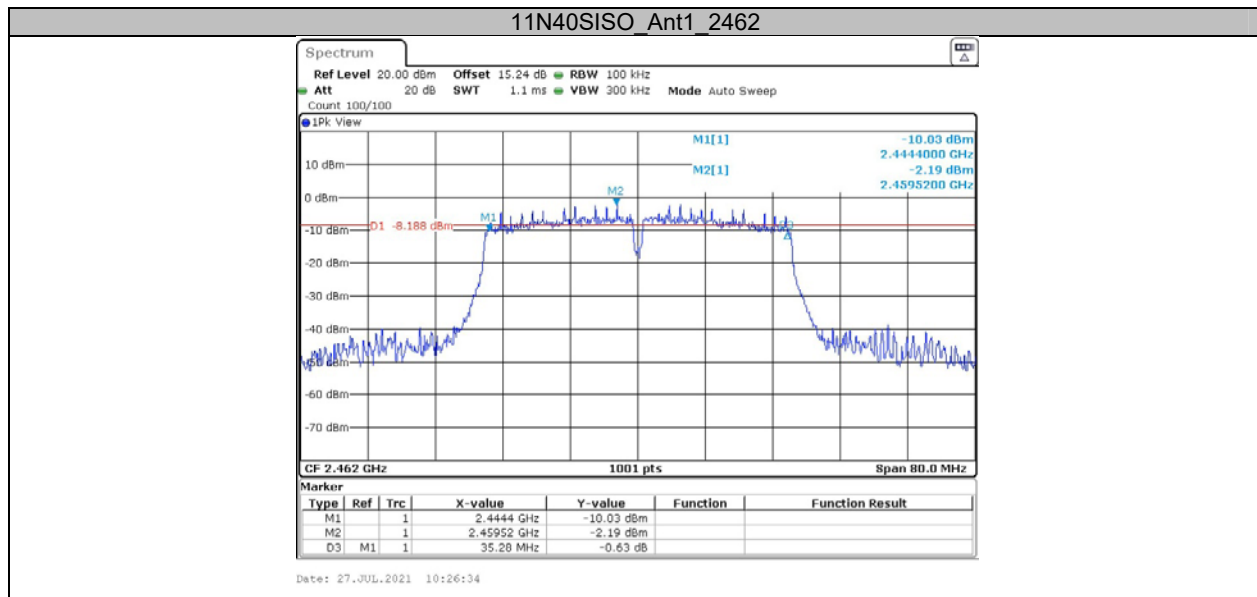








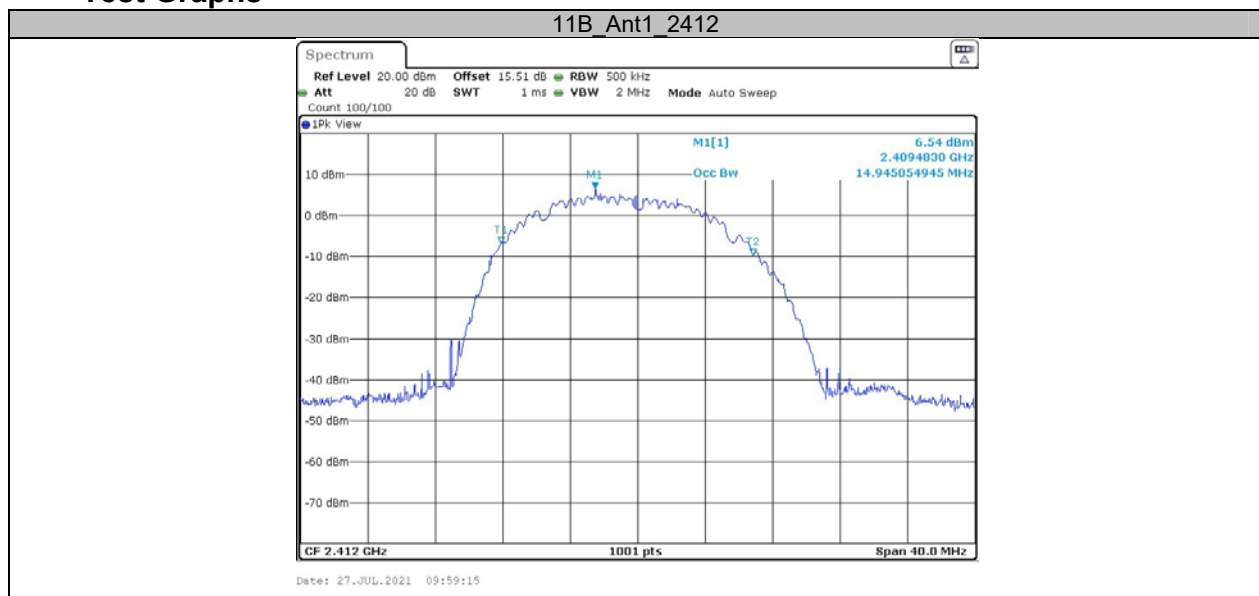


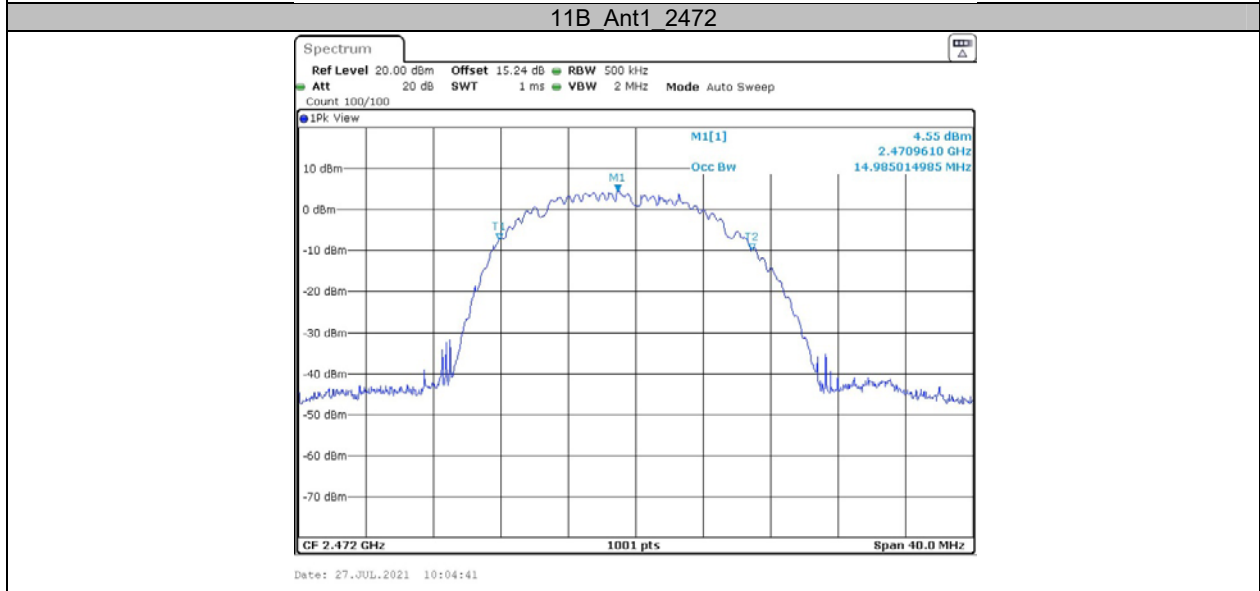
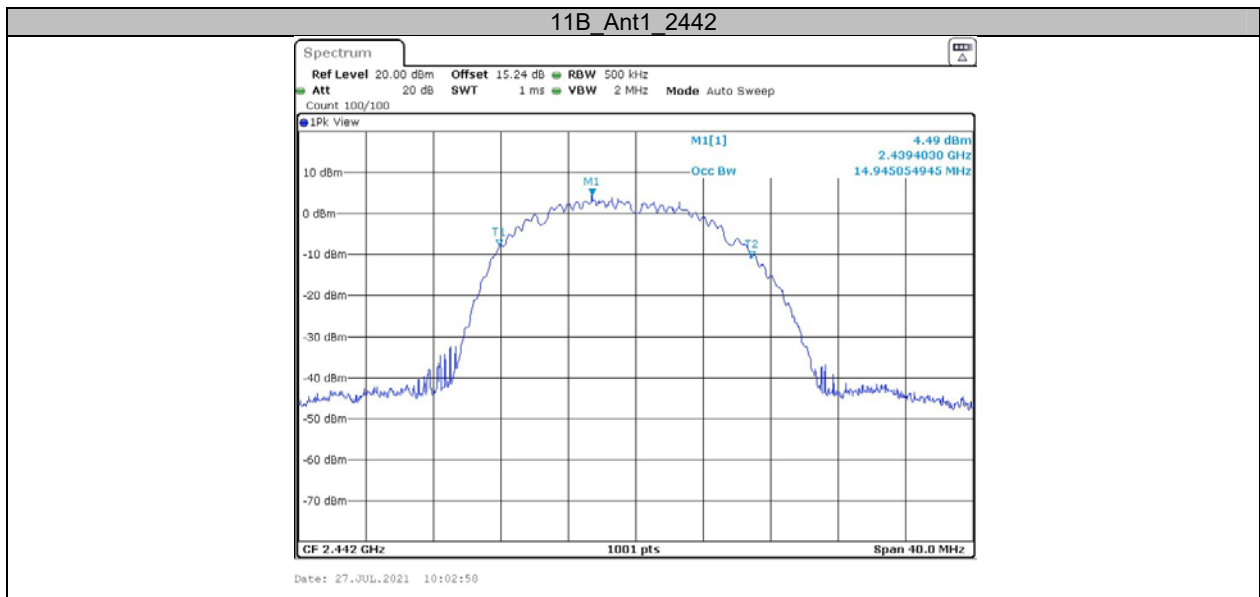


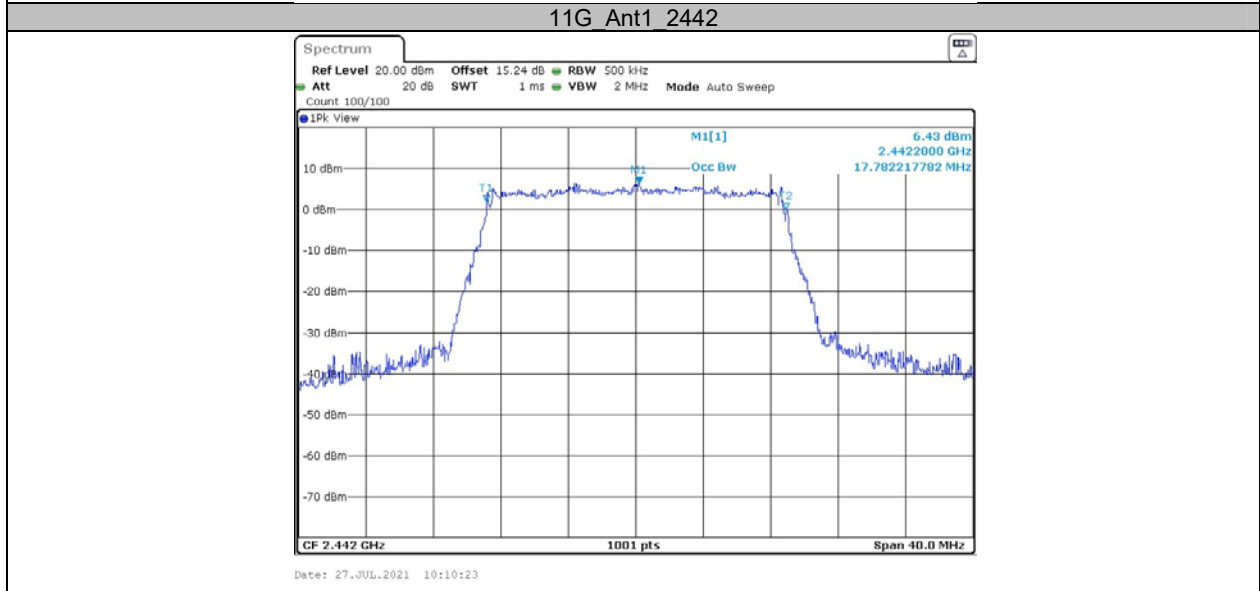
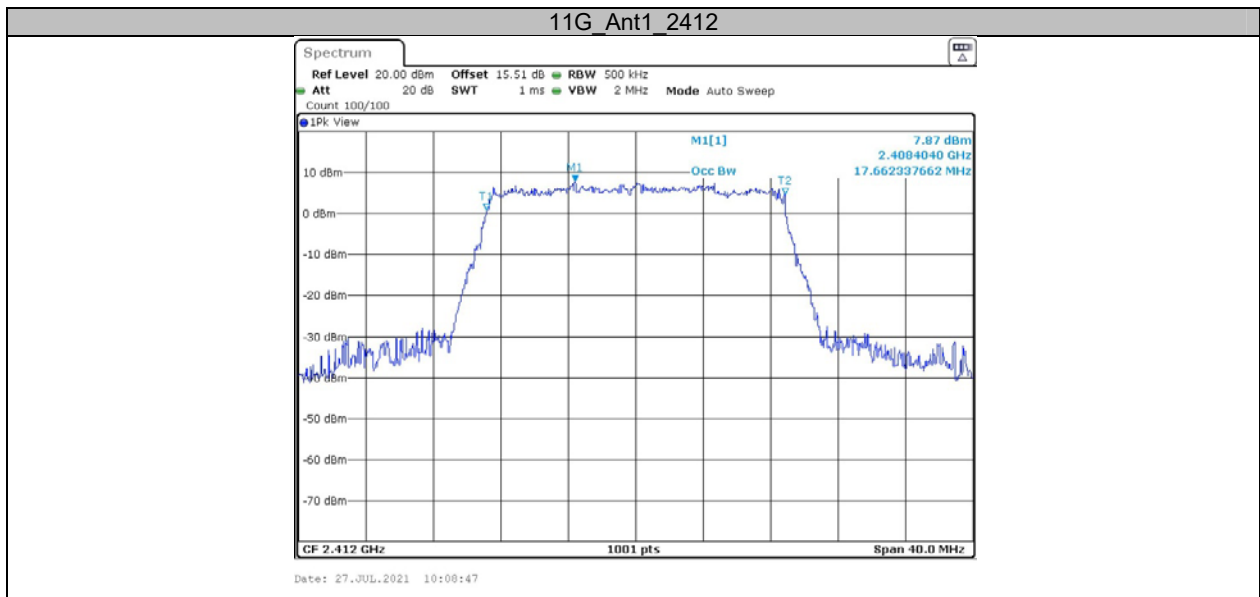
Appendix B: Occupied Channel Bandwidth Test Result

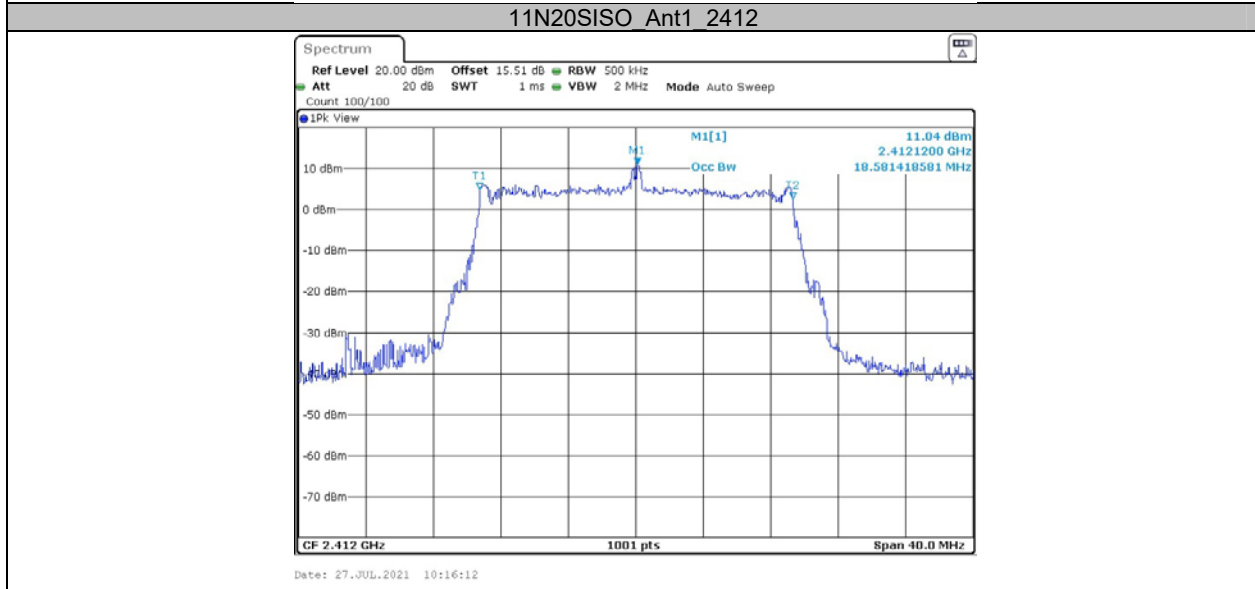
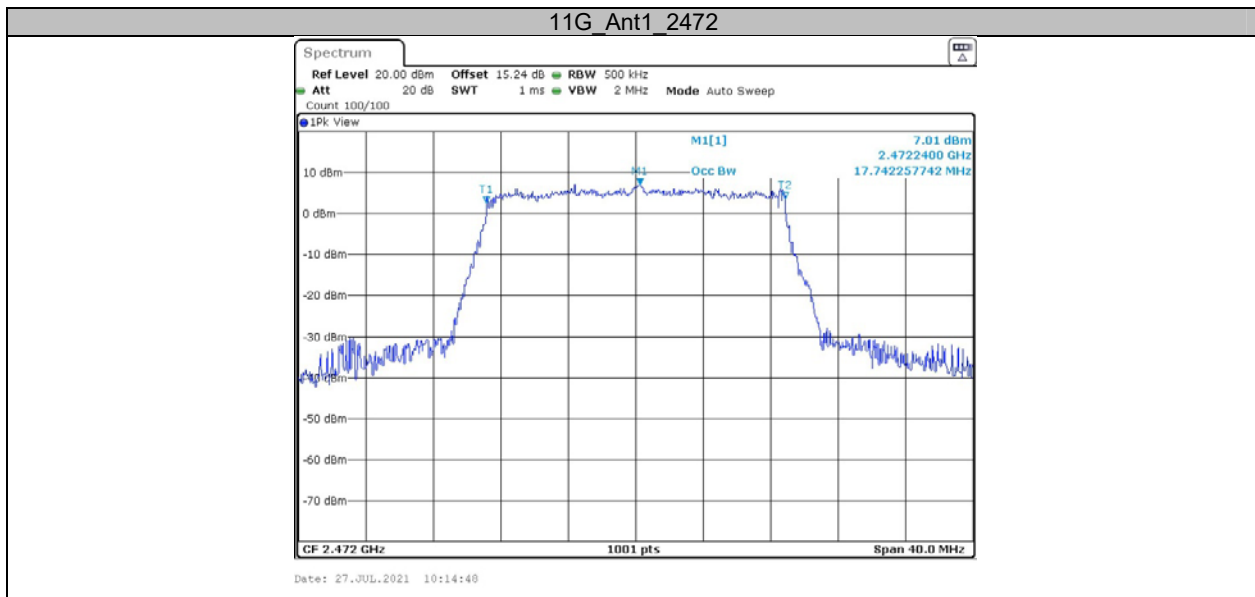
Test Mode	Antenna	Channel	OCB [MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	14.945	---	PASS
		2442	14.945	---	PASS
		2472	14.985	---	PASS
11G	Ant1	2412	17.662	---	PASS
		2442	17.782	---	PASS
		2472	17.742	---	PASS
11N20SISO	Ant1	2412	18.581	---	PASS
		2442	18.701	---	PASS
		2472	18.781	---	PASS
11N40SISO	Ant1	2422	36.444	---	PASS
		2442	36.444	---	PASS
		2462	36.444	---	PASS

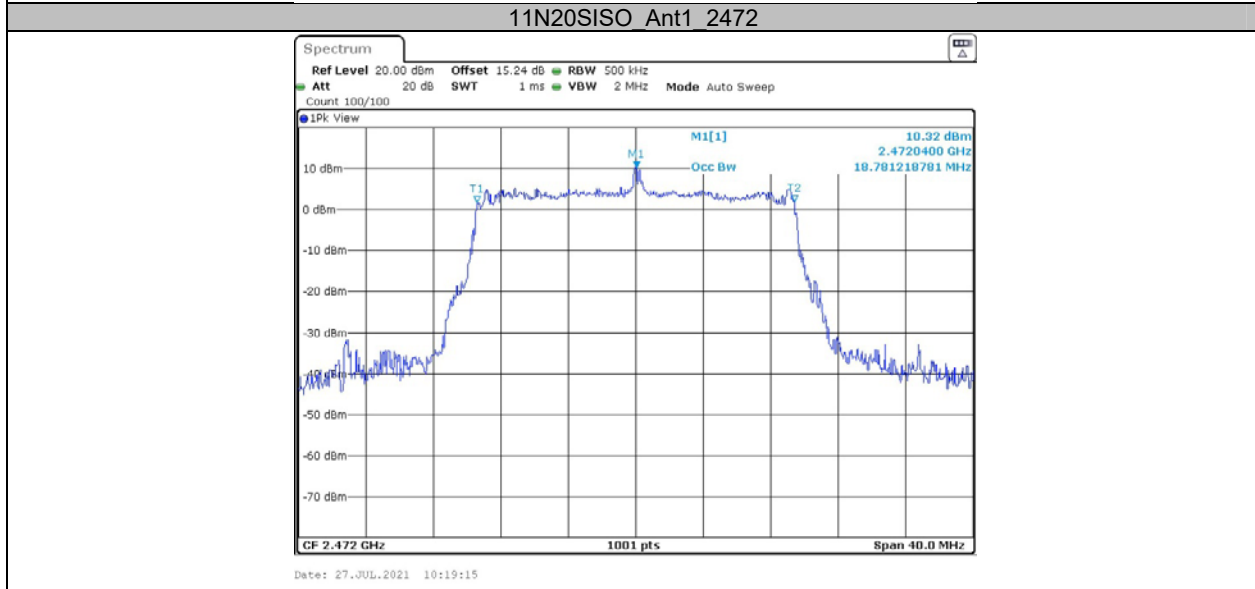
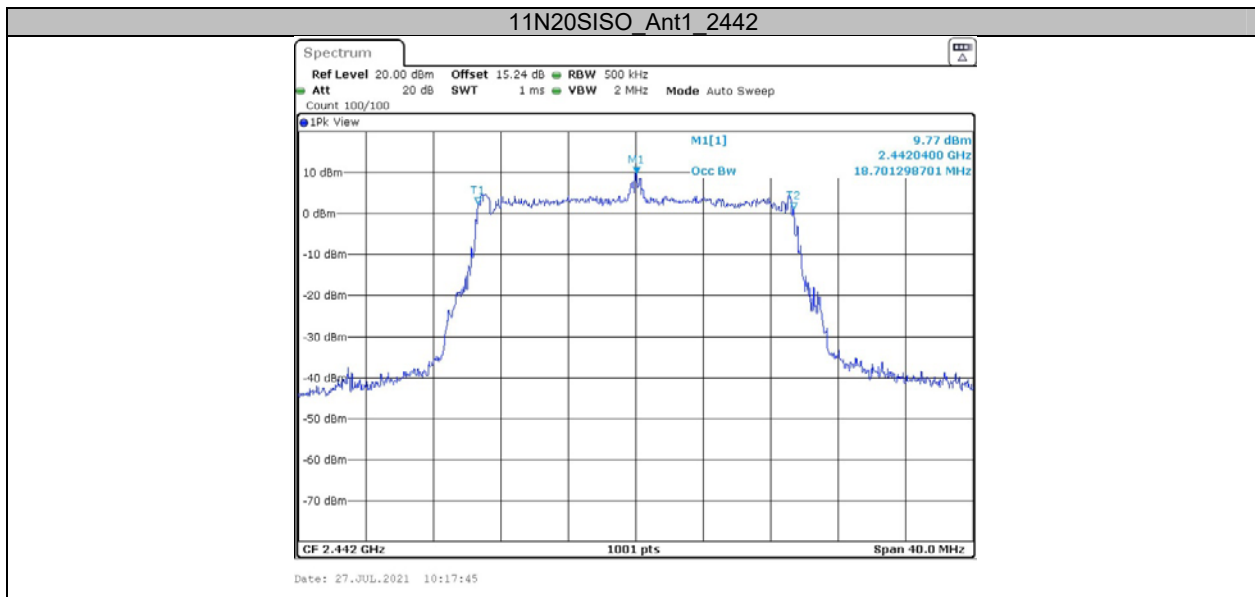
Test Graphs

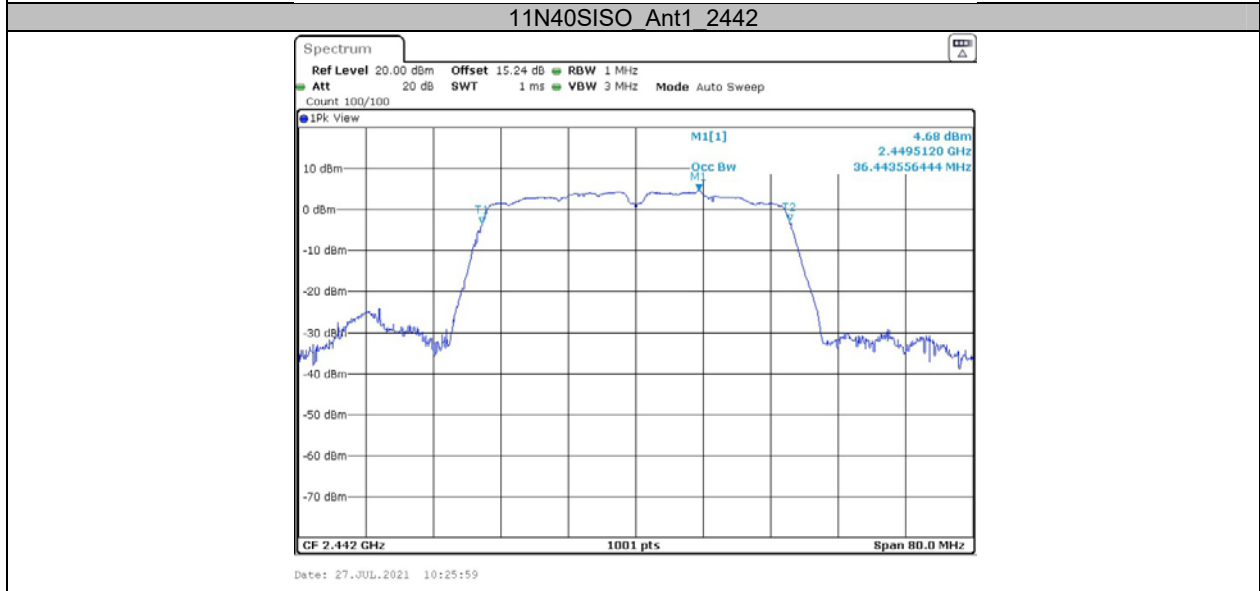
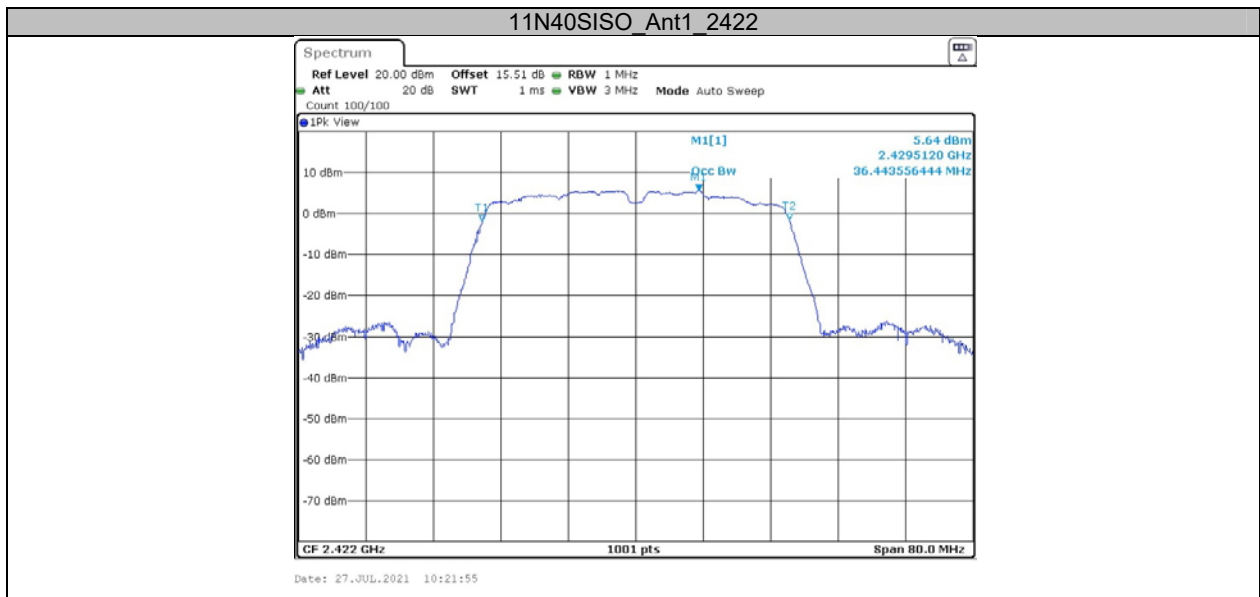


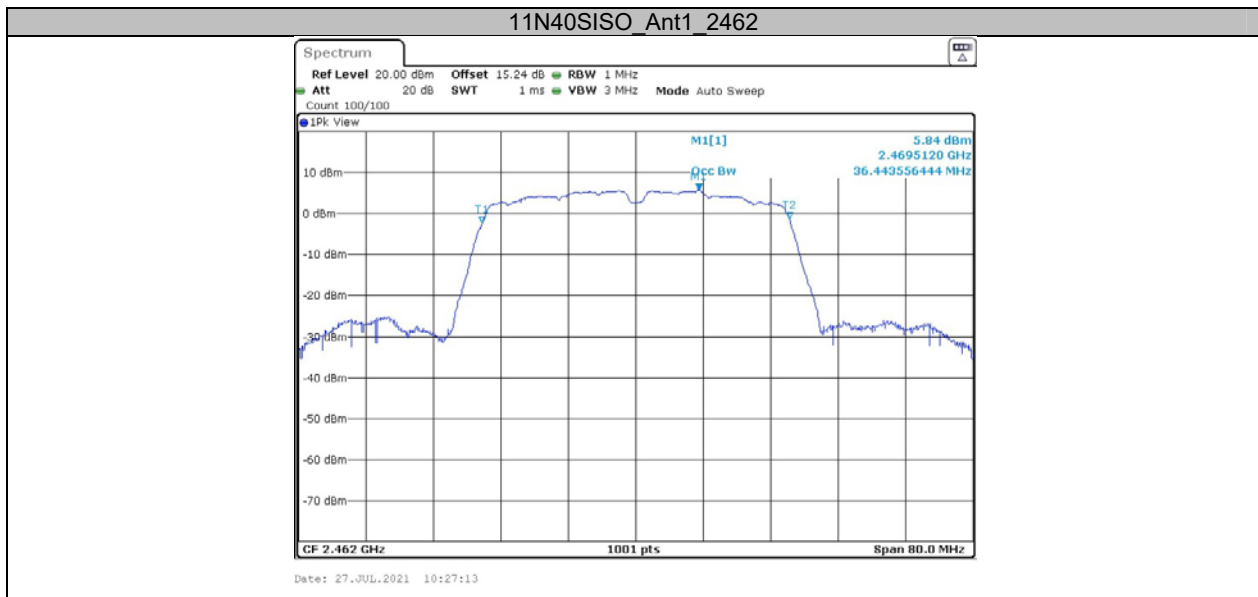












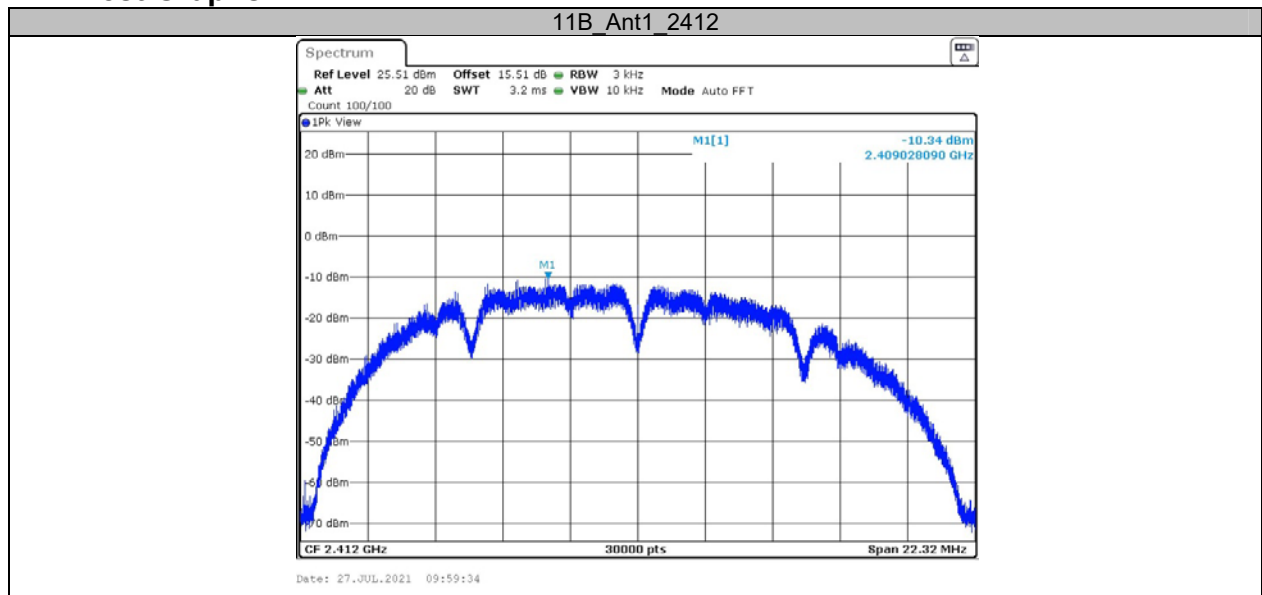
**Appendix C: Maximum conducted Peak output power
Test Result**

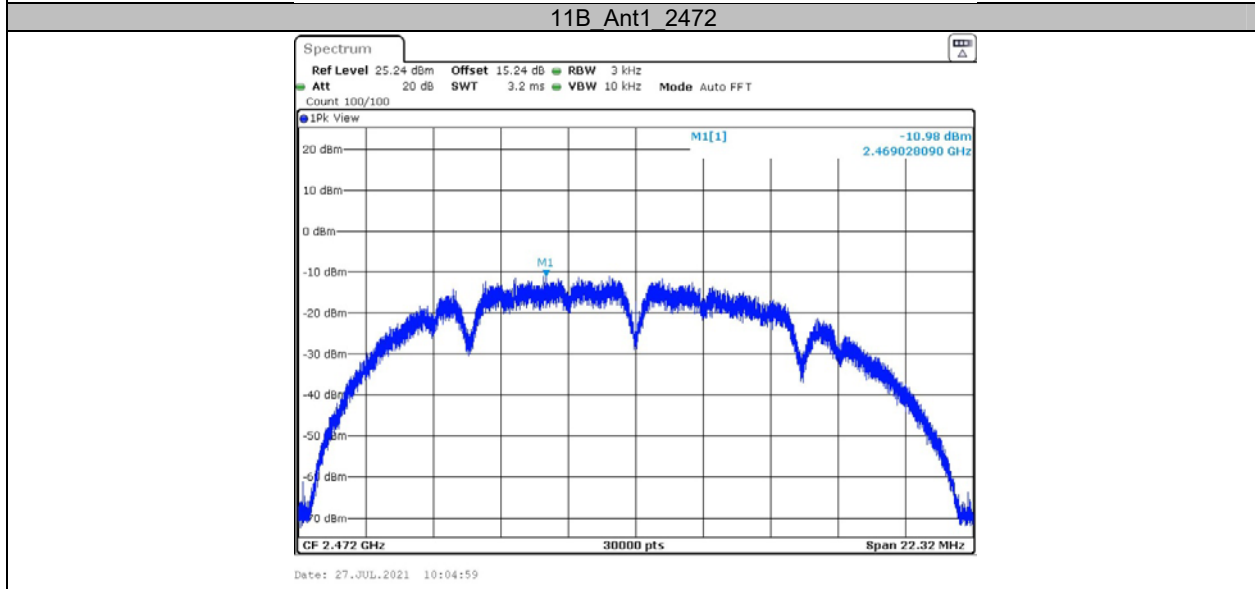
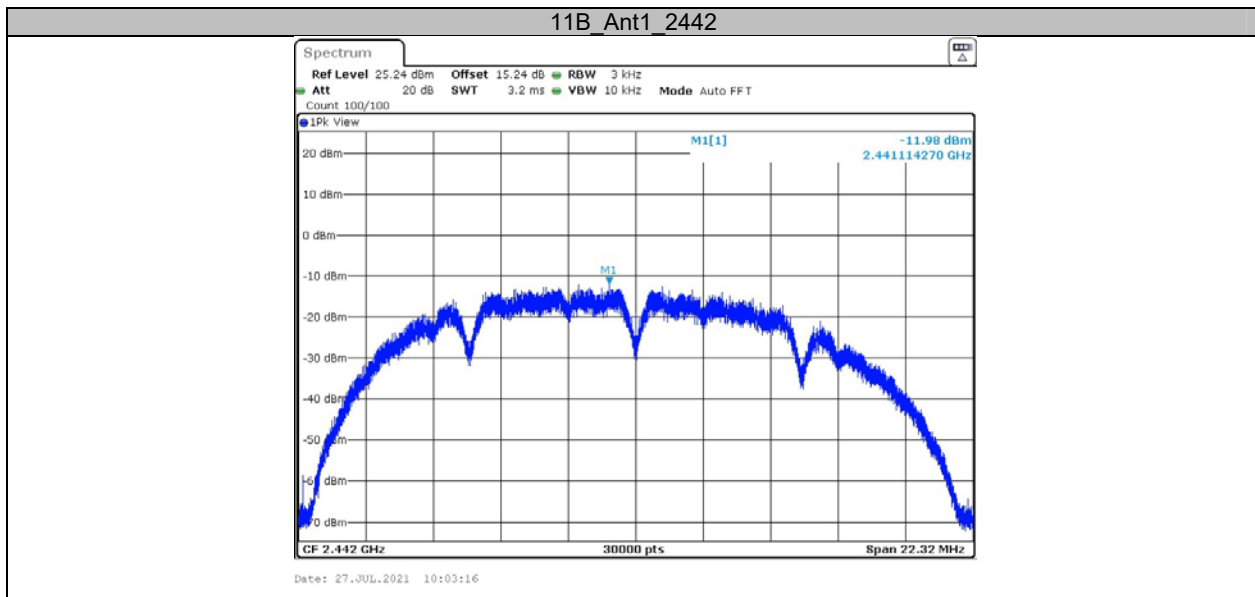
Test Mode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	2412	15.31	≤30	PASS
		2442	14.17	≤30	PASS
		2472	14.83	≤30	PASS
11G	Ant1	2412	18.69	≤30	PASS
		2442	17.79	≤30	PASS
		2472	18.44	≤30	PASS
11N20SISO	Ant1	2412	17.86	≤30	PASS
		2442	17.65	≤30	PASS
		2472	17.30	≤30	PASS
11N40SISO	Ant1	2422	15.57	≤30	PASS
		2442	14.87	≤30	PASS
		2462	15.71	≤30	PASS

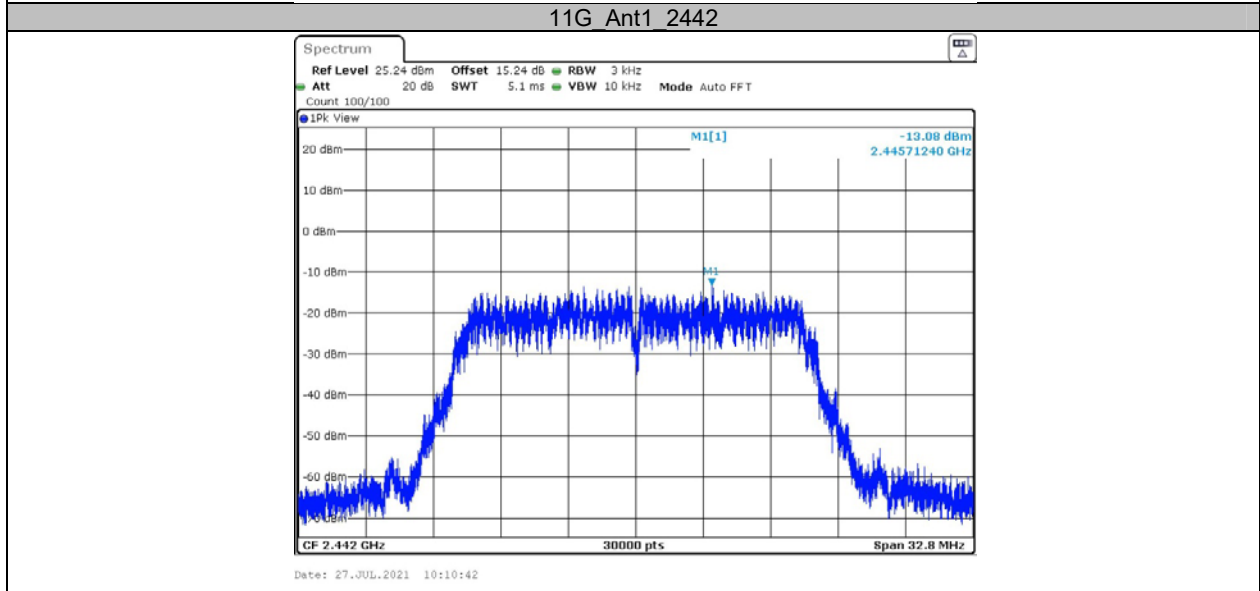
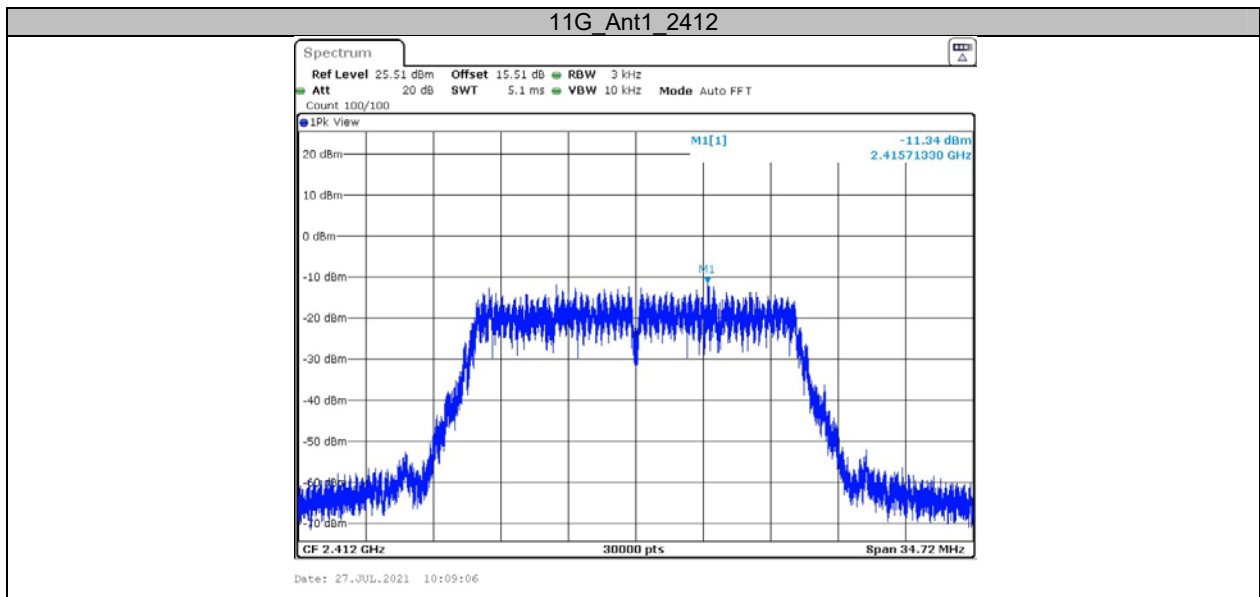
**Appendix D: Maximum power spectral density
Test Result**

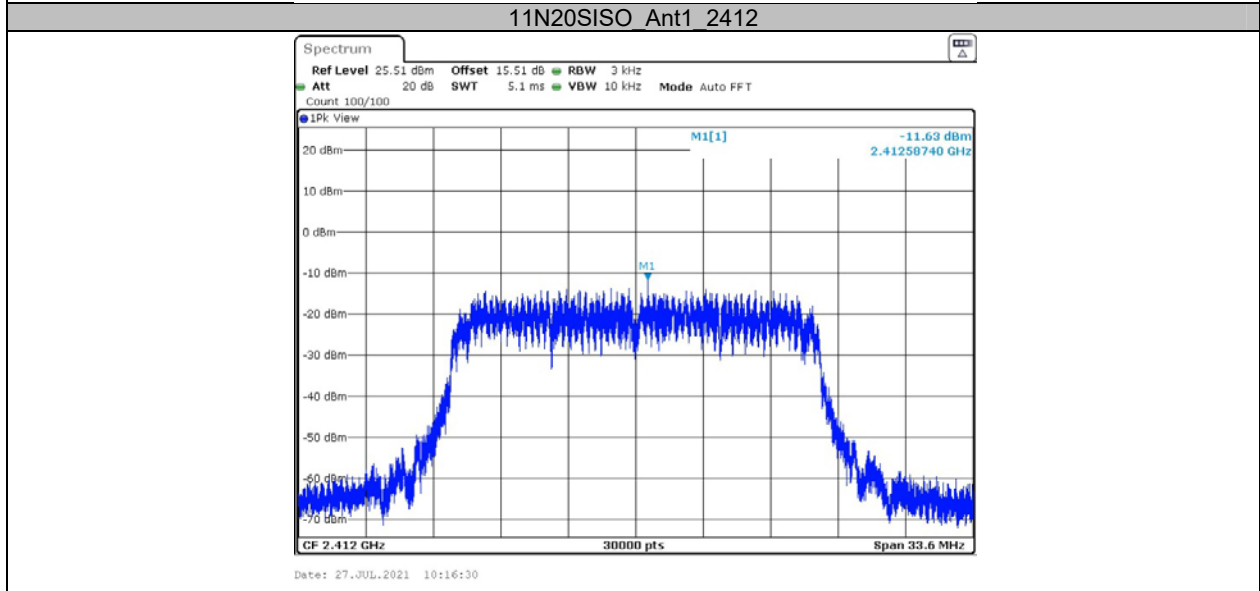
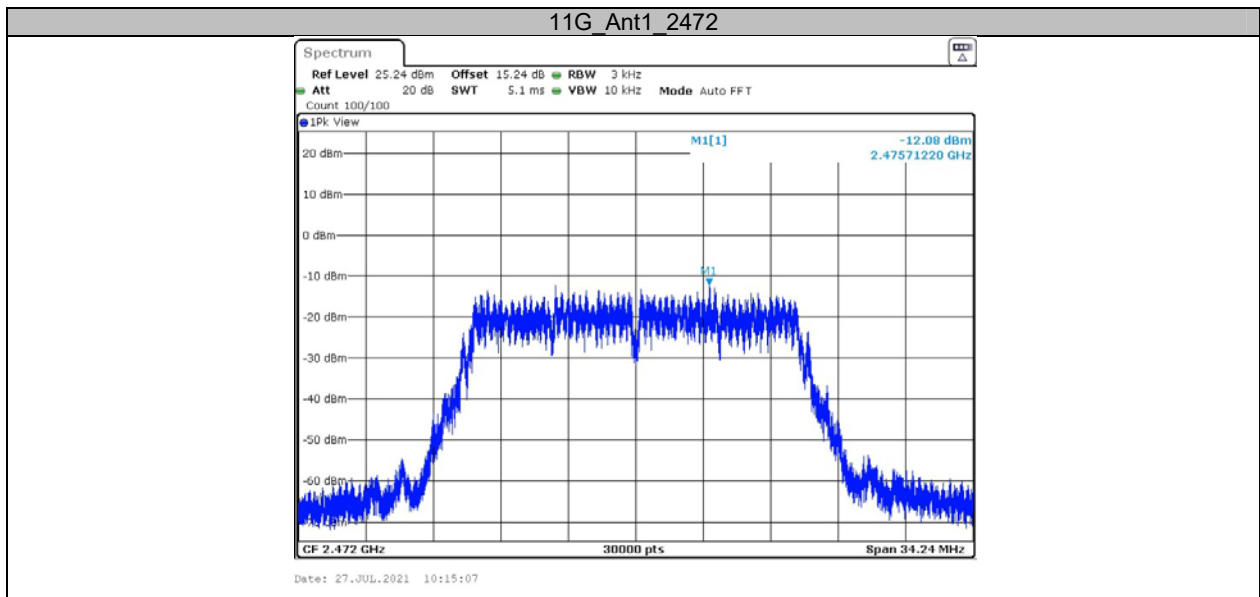
Test Mode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-10.34	≤8	PASS
		2442	-11.98	≤8	PASS
		2472	-10.98	≤8	PASS
11G	Ant1	2412	-11.34	≤8	PASS
		2442	-13.08	≤8	PASS
		2472	-12.08	≤8	PASS
11N20SISO	Ant1	2412	-11.63	≤8	PASS
		2442	-13.08	≤8	PASS
		2472	-13.26	≤8	PASS
11N40SISO	Ant1	2422	-16.22	≤8	PASS
		2442	-18.36	≤8	PASS
		2462	-16.18	≤8	PASS

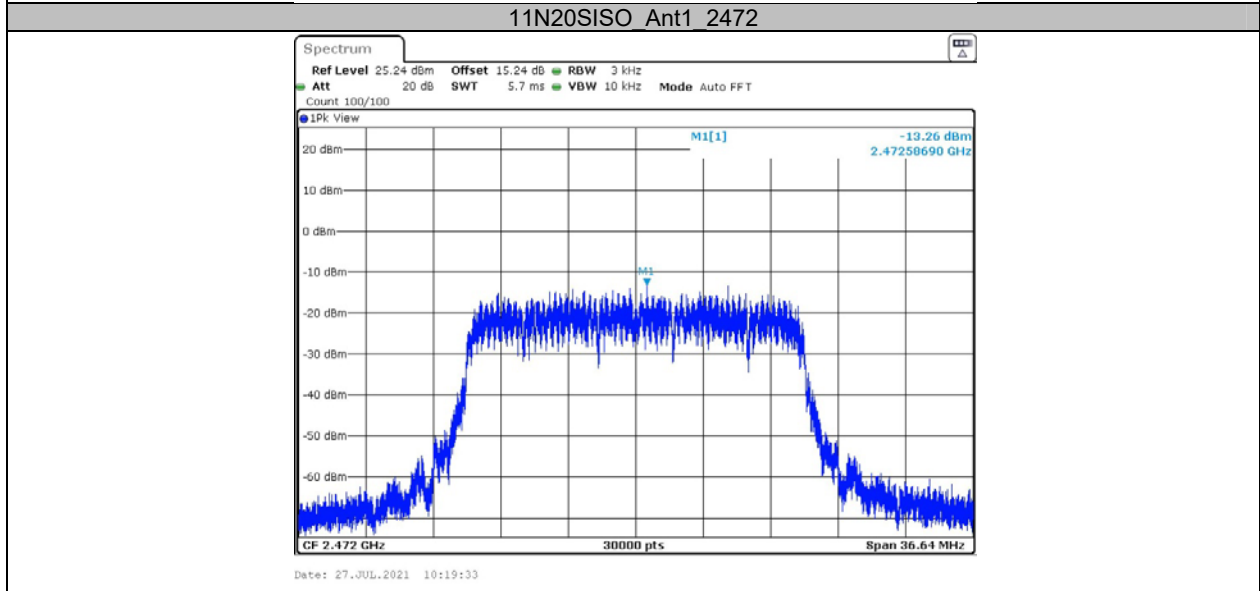
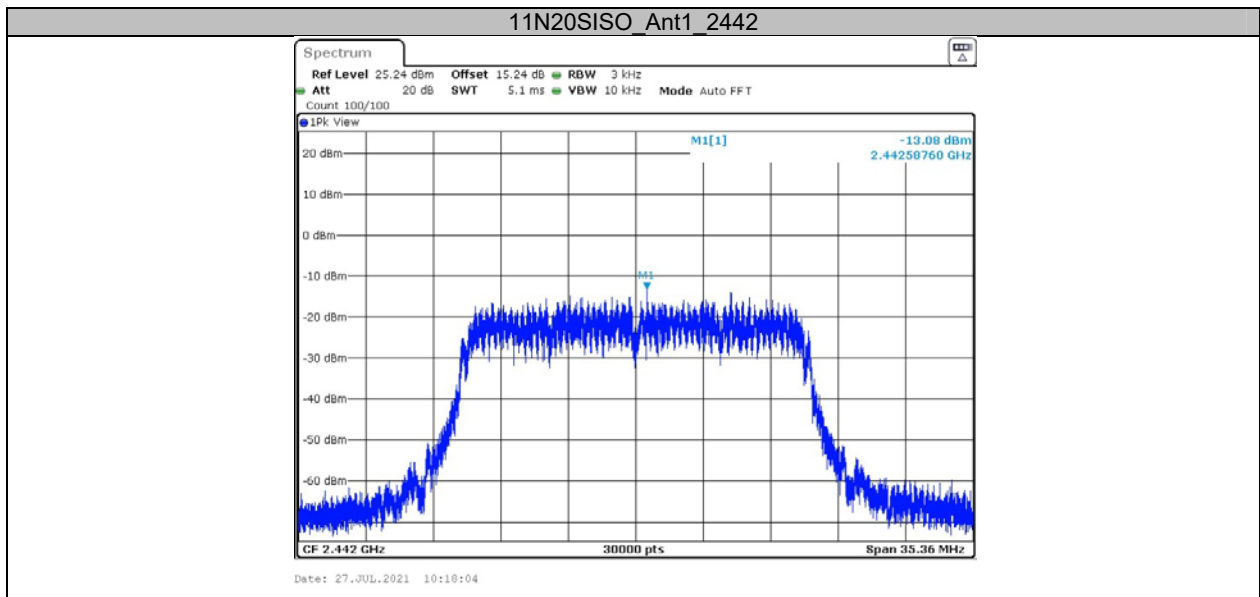
Test Graphs

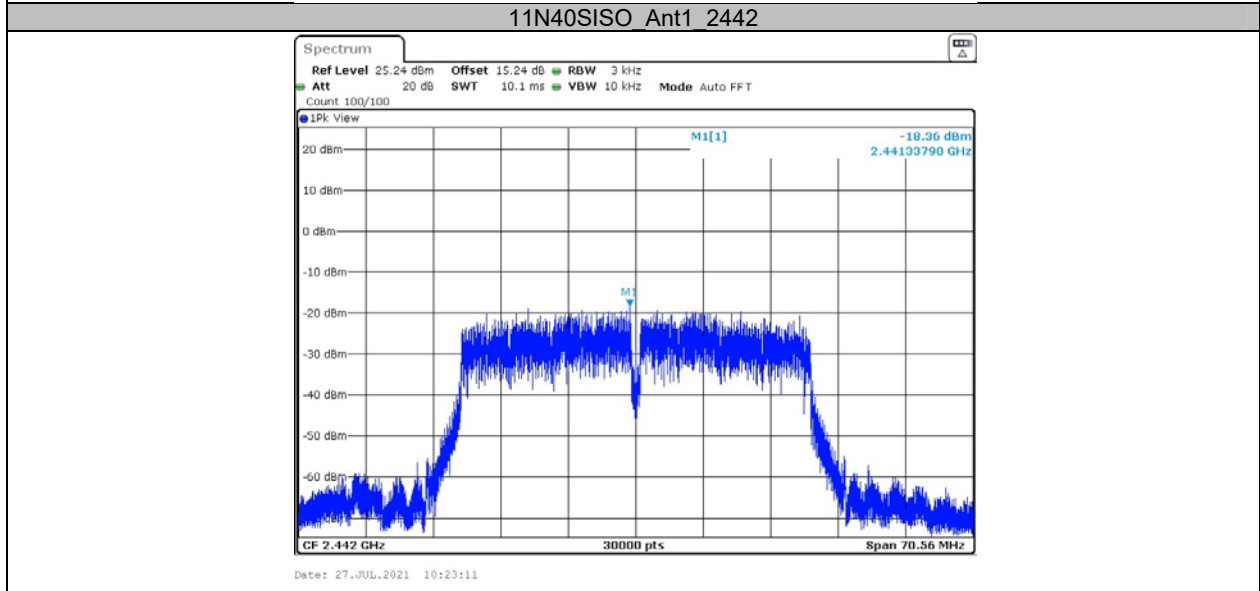
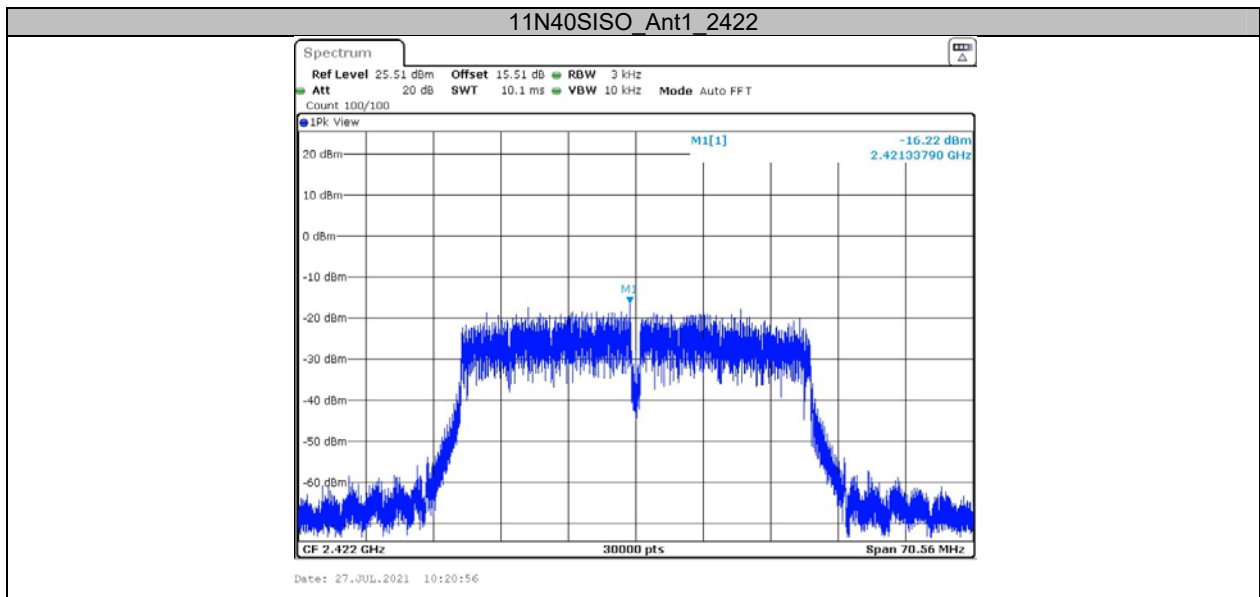


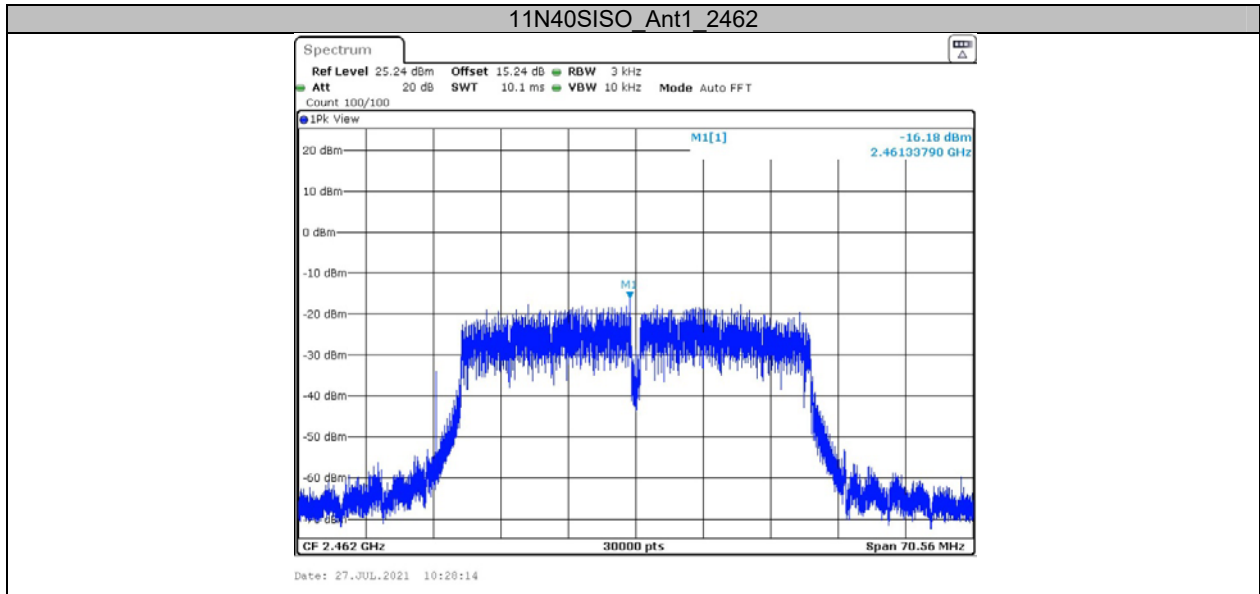




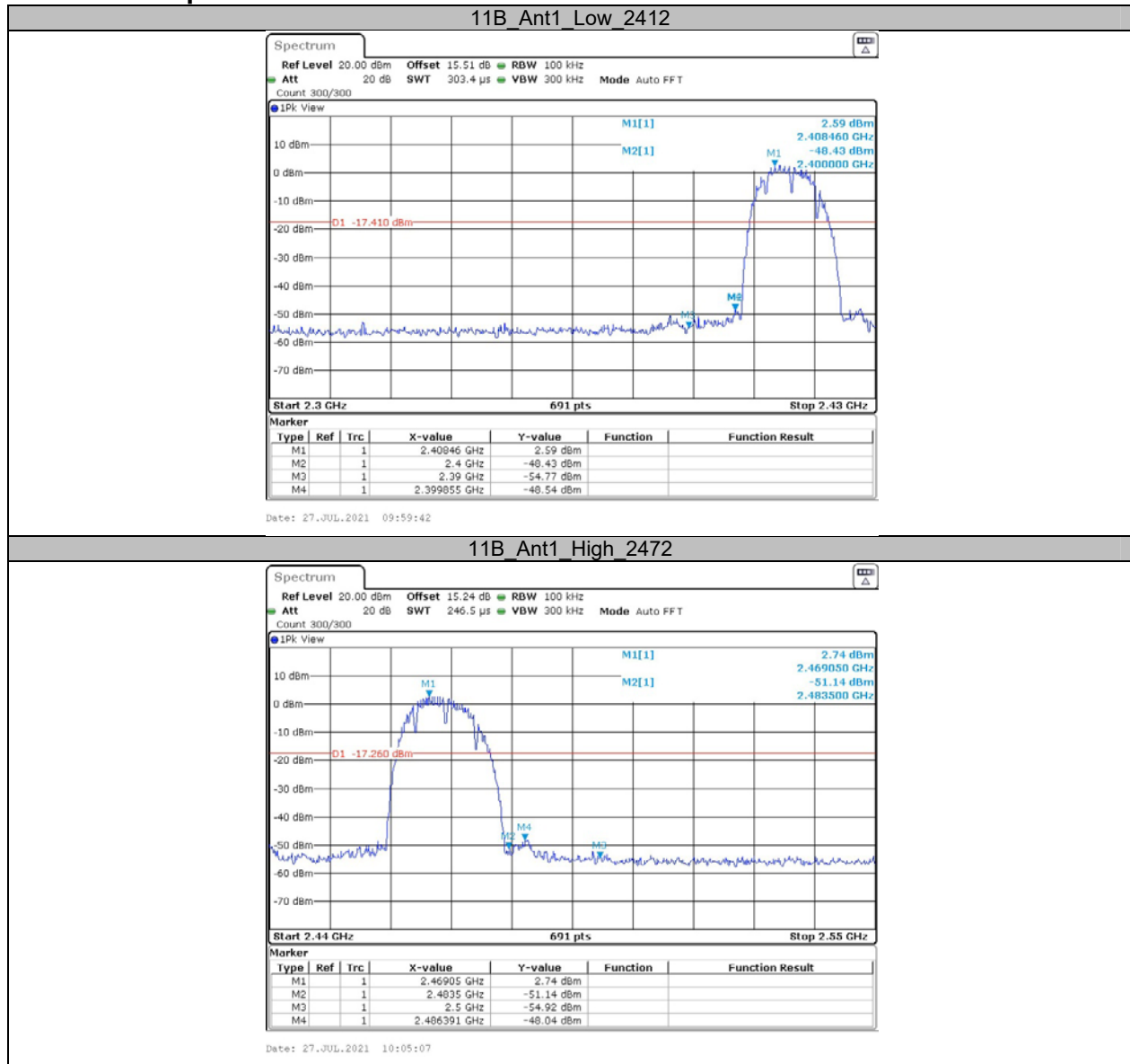


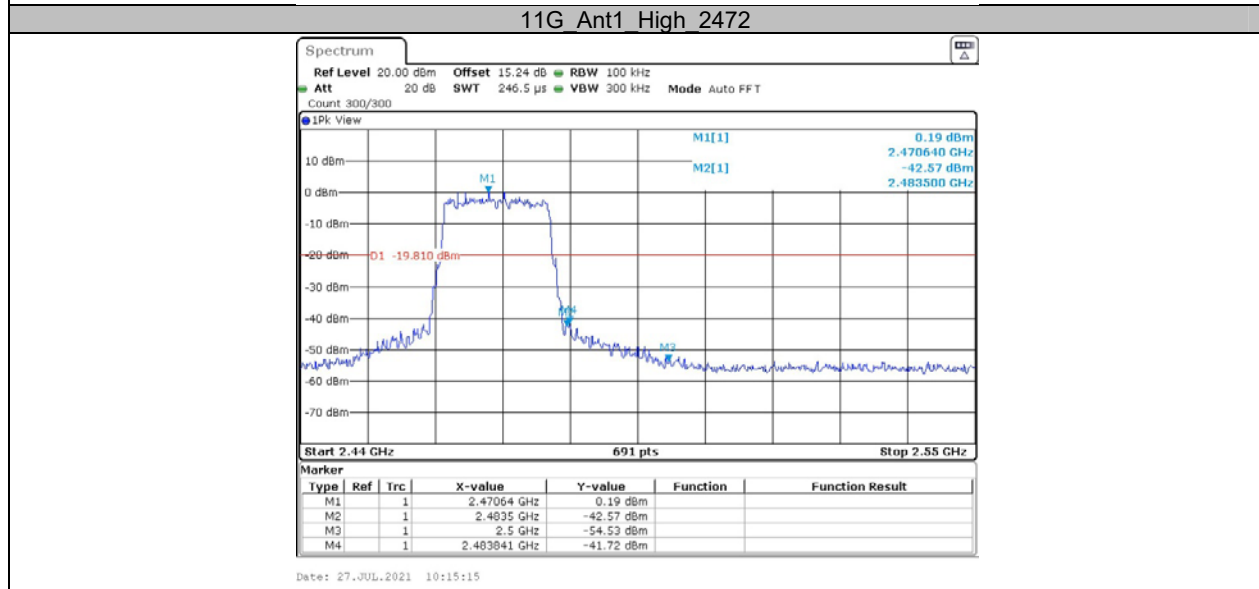
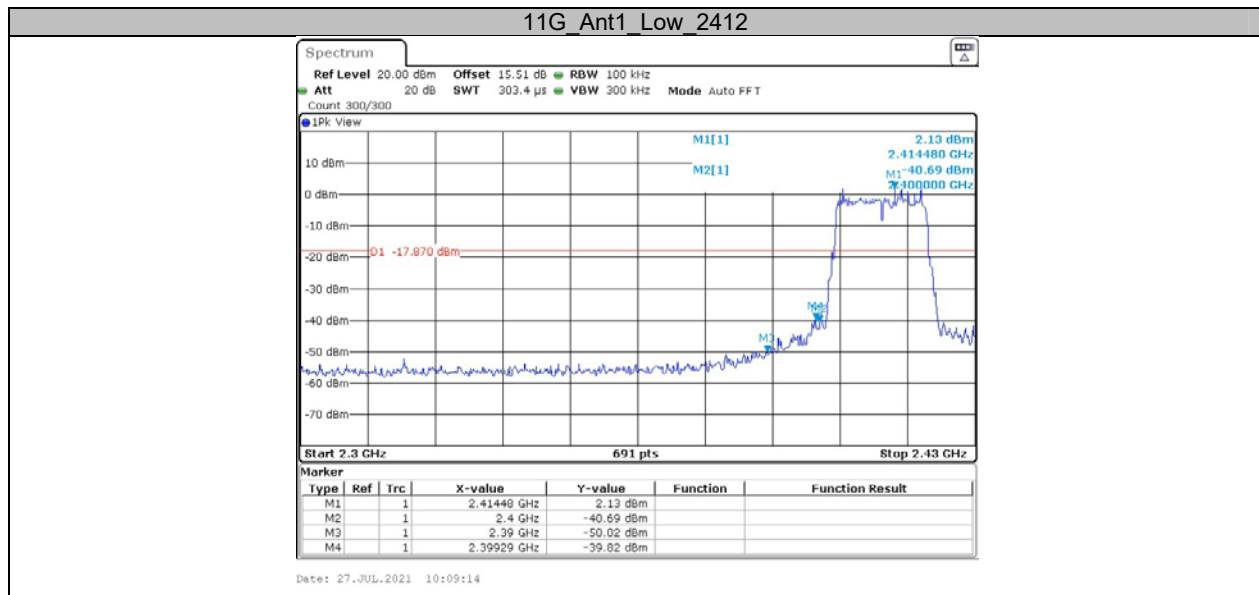


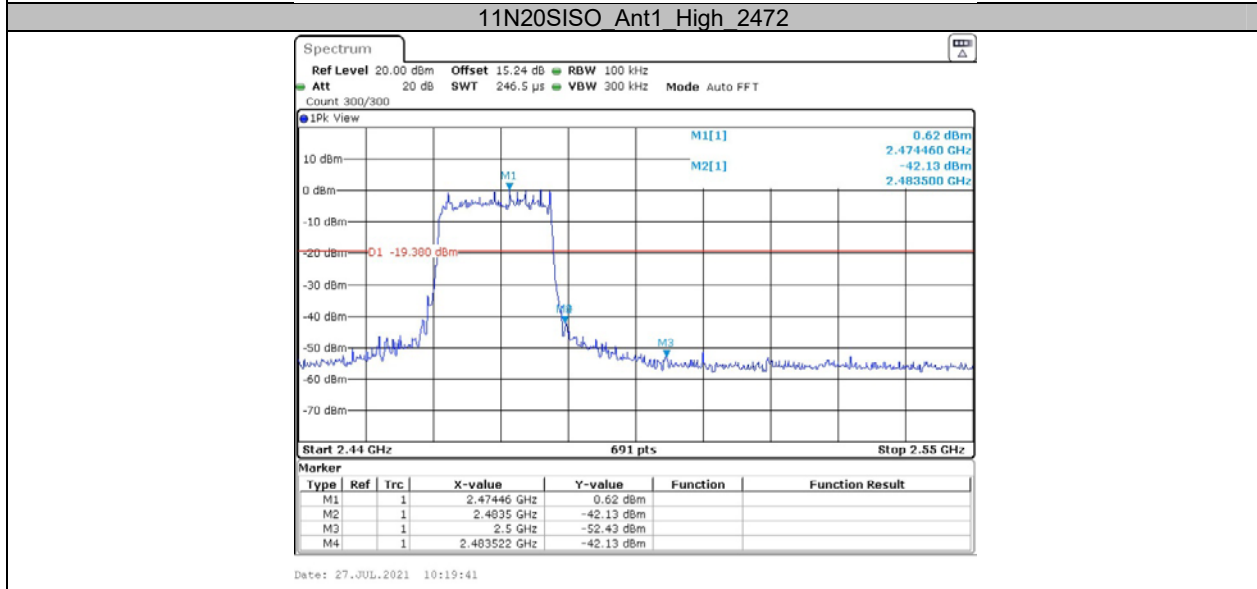
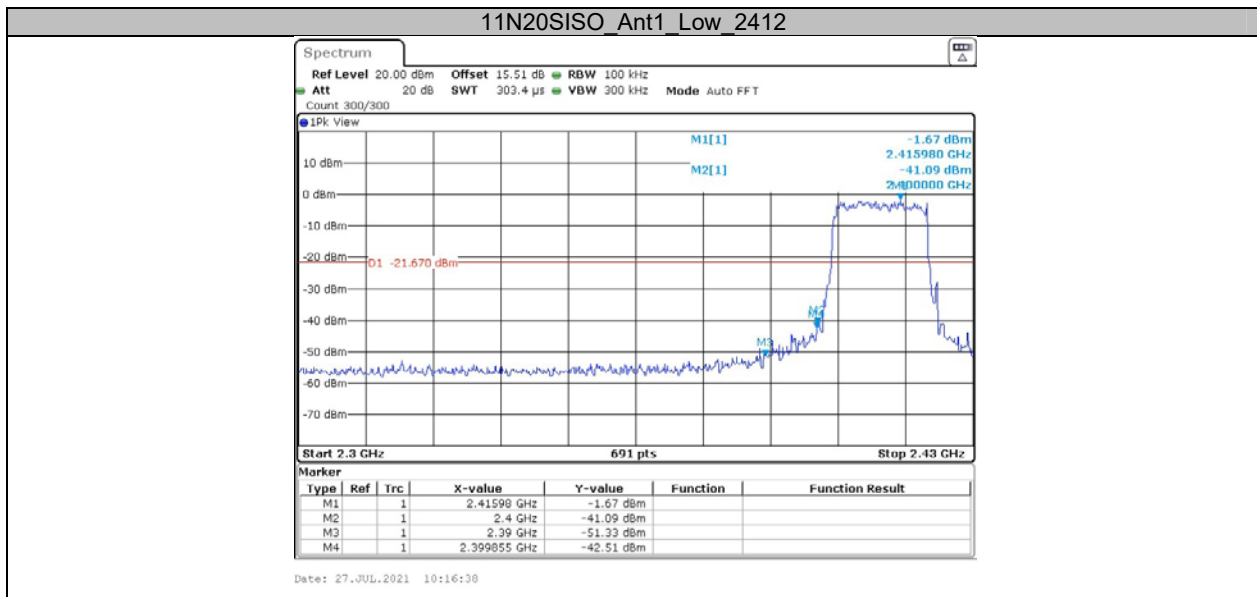


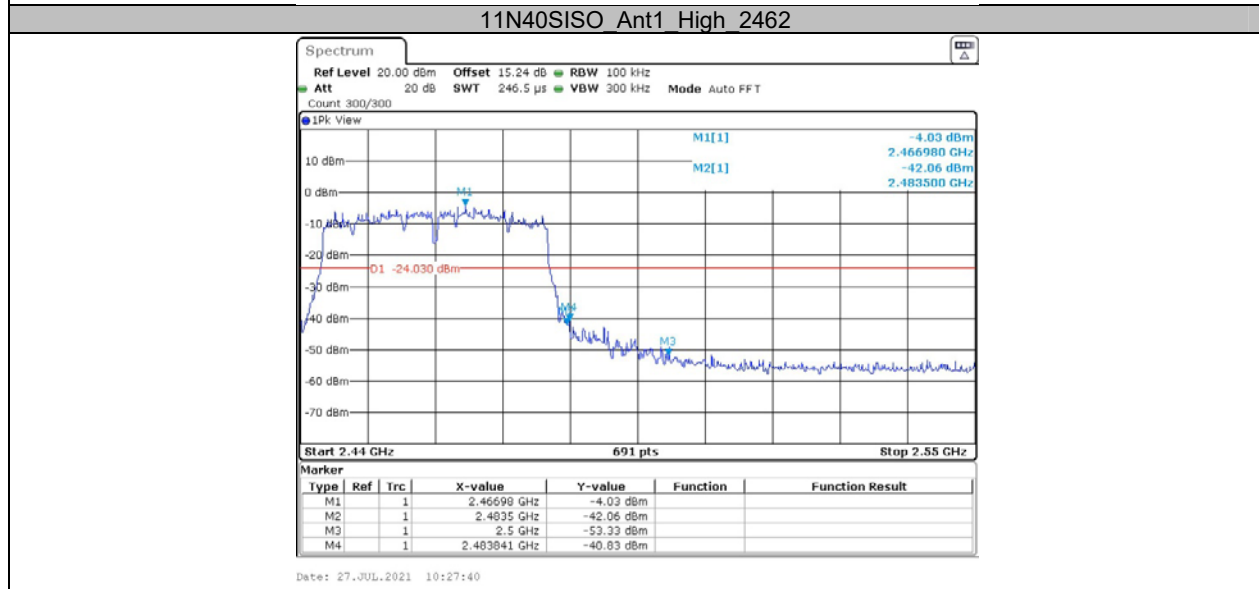
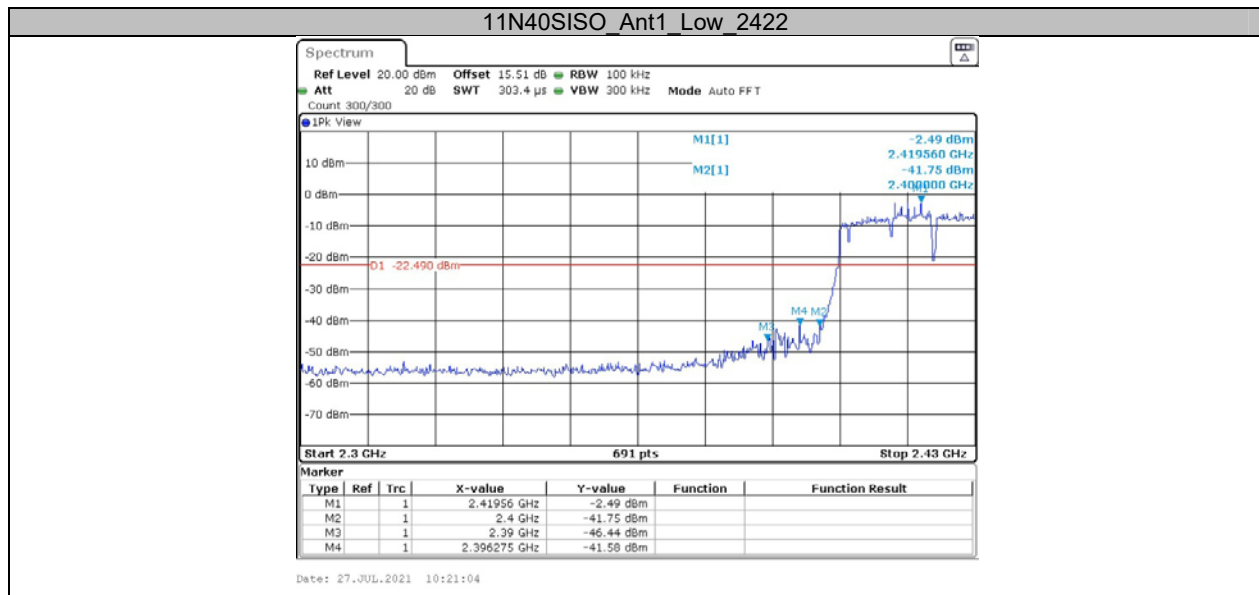


Appendix E: Band edge measurements Test Graphs





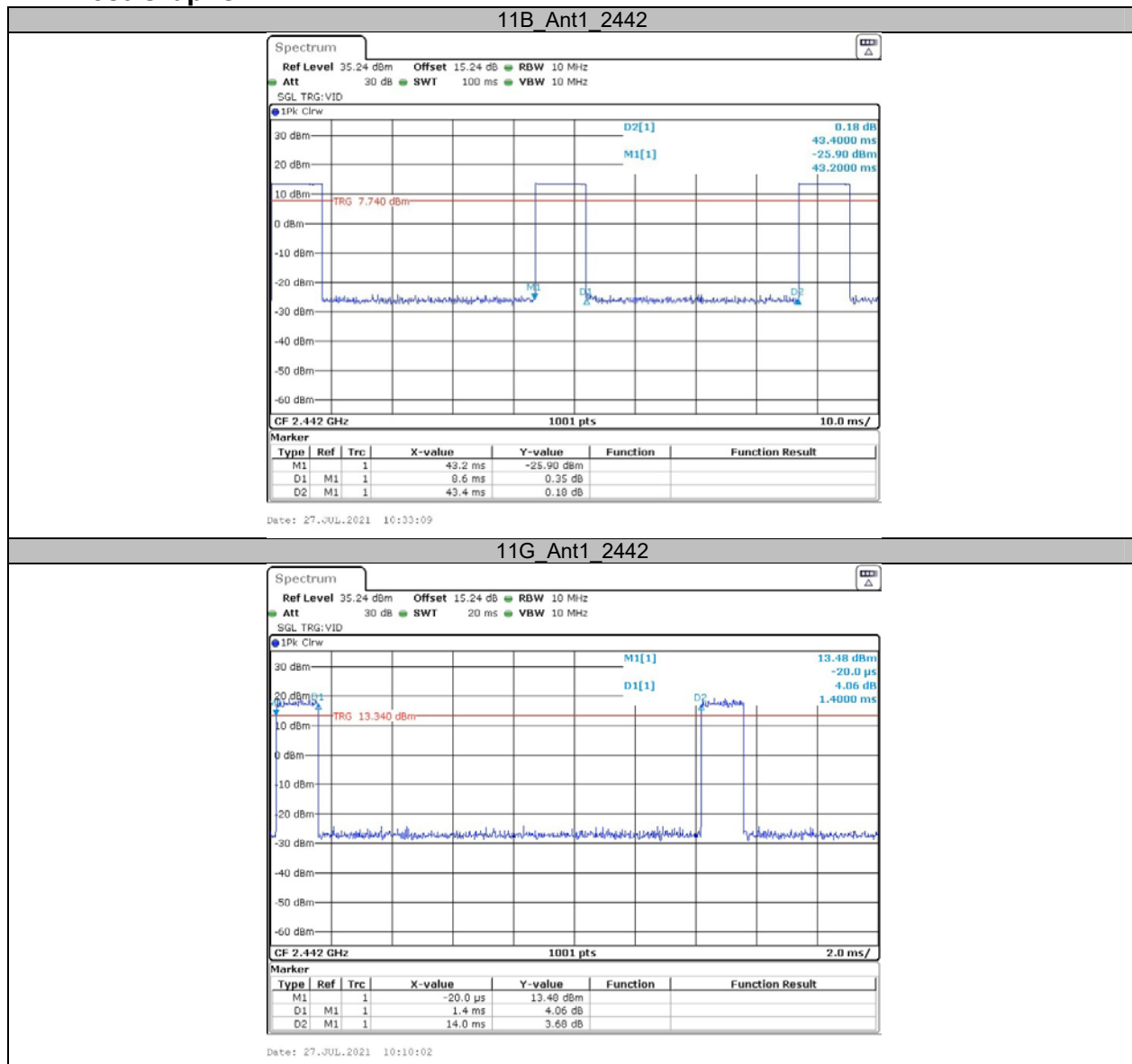


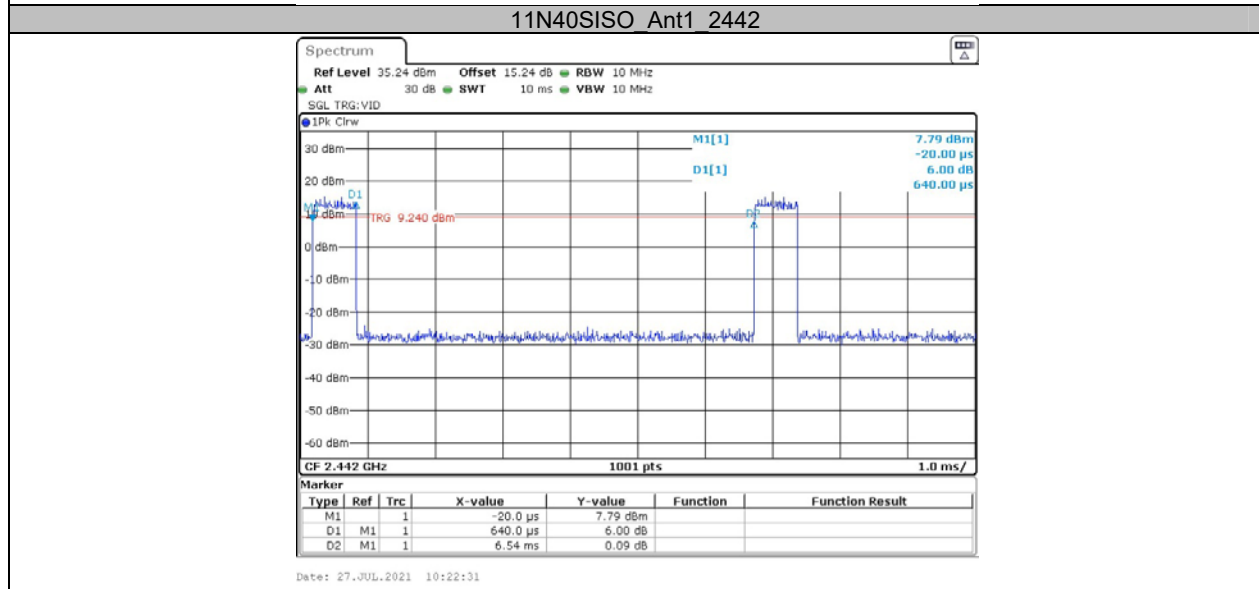
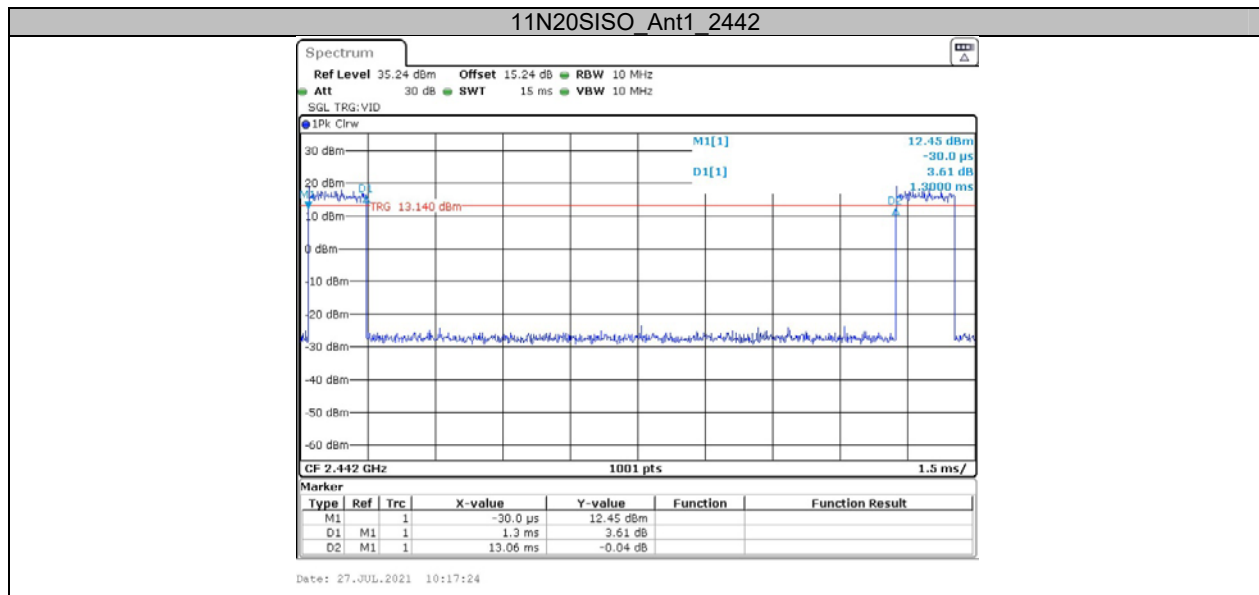


Appendix F: Duty Cycle Test Result

Test Mode	Antenna	Channel	TransmissionDuration [ms]	Transmission Period [ms]	Duty Cycle [%]
11B	Ant1	2442	8.6	43.4	19.82
11G	Ant1	2442	1.40	14.00	10.00
11N20SISO	Ant1	2442	1.30	13.06	9.95
11N40SISO	Ant1	2442	0.64	6.54	9.79

Test Graphs





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