



FCC PART 15.407 TEST REPORT

For

Useful Corporation

411 1st Street SE, Suite 1900, Calgary, Alberta, Canada T2G 4Y5

FCC ID: 2AX5R-W100A

Report Type: Original Report	Product Type: Useful uClient Adapter
Report Number: RSZ201027801-00C	
Report Date: 2020-12-24	
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TABLE OF CONTENTS

GENERAL INFORMATION.....	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	4
OBJECTIVE	4
TEST METHODOLOGY	4
MEASUREMENT UNCERTAINTY.....	5
TEST FACILITY	5
SYSTEM TEST CONFIGURATION.....	6
DESCRIPTION OF TEST CONFIGURATION	6
EUT EXERCISE SOFTWARE	7
DUTY CYCLE.....	8
EQUIPMENT MODIFICATIONS	8
SUPPORT EQUIPMENT LIST AND DETAILS	8
EXTERNAL I/O CABLE.....	9
BLOCK DIAGRAM OF TEST SETUP	10
SUMMARY OF TEST RESULTS	11
TEST EQUIPMENT LIST	12
FCC §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE).....	14
APPLICABLE STANDARD	14
RESULT	14
FCC §15.203 – ANTENNA REQUIREMENT.....	16
APPLICABLE STANDARD	16
ANTENNA CONNECTOR CONSTRUCTION	16
FCC §15.407 (b) (8) §15.207 (a) – CONDUCTED EMISSIONS	17
APPLICABLE STANDARD	17
EUT SETUP	17
EMI TEST RECEIVER SETUP.....	17
TEST PROCEDURE	17
TEST DATA	18
§15.205 & §15.209 & §15.407(B) (1), (4), (8) ,(9)– UNDESIRABLE EMISSION	21
APPLICABLE STANDARD	21
EUT SETUP	21
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP	22
TEST PROCEDURE	22
CORRECTED AMPLITUDE & MARGIN CALCULATION	23
TEST DATA	23
FCC §15.407(a)(12), (e)– 26 dB & 6dB EMISSION BANDWIDTH.....	37
APPLICABLE STANDARD	37
TEST PROCEDURE	37
TEST DATA	38
FCC §15.407(a) (1) (3) – CONDUCTED TRANSMITTER OUTPUT POWER	39
APPLICABLE STANDARD	39
TEST PROCEDURE	39
TEST DATA	40
FCC §15.407(a) (1) (3) - POWER SPECTRAL DENSITY.....	41

APPLICABLE STANDARD	41
TEST PROCEDURE	41
TEST DATA	42
APPENDIX	43
APPENDIX A1: EMISSION BANDWIDTH	43
APPENDIX A2: OCCUPIED CHANNEL BANDWIDTH	49
APPENDIX A3: MIN EMISSION BANDWIDTH.....	60
APPENDIX B: MAXIMUM CONDUCTED OUTPUT POWER	66
APPENDIX C: MAXIMUM POWER SPECTRAL DENSITY	67
APPENDIX D: DUTY CYCLE.....	78

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Useful uClient Adapter
Tested Model	W100A
Multiple Model	W100X (where "X" stands for A-Z, a-z, 0-9 or blank)
Model Differences	Refer to the DoS letter
Frequency Range	5G Wi-Fi: 5150-5250 MHz; 5725-5850 MHz
Maximum conducted output power	Wi-Fi: 5150-5250 MHz: 11.61dBm (802.11a), 9.98dBm(802.11n20), 11.31dBm(802.11n40) 10.18dBm (802.11ac20), 10.08dBm(802.11 ac40), 8.01dBm(802.11 ac80) 5725-5850 MHz: 11.02dBm (802.11a), 9.46dBm(802.11n20), 10.28dBm(802.11n40) 9.66dBm (802.11ac20), 9.38dBm(802.11 ac40), 7.07dBm(802.11 ac80)
Modulation Technique	OFDM
Antenna Specification*	0.8 dBi (It is provided by the applicant)
Voltage Range	DC 12.0V from adapter
Date of Test	2020-11-19 to 2020-12-16
Sample serial number	RSZ201027801-RF-S1(Assigned by BAACL, Shenzhen)
Received date	2020-10-27
Sample/EUT Status	Good condition
Adapter information	Model: JHD-AD024D-120200BA-A Input: AC 100-240V, 50/60Hz, 0.55A Output: DC 12.0V, 2.0A

Objective

This test report is in accordance with Part 2-Subpart J, Part 15-Subparts A and E of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart E, section 15.203, 15.205, 15.207, 15.209 and 15.407 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 KDB789033D02 General U-NII Test Procedures New Rules v02r01.

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

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
RF Output Power with Power meter		±0.73dB
RF conducted test with spectrum		±1.6dB
AC Power Lines Conducted Emissions		±1.95dB
Emissions, Radiated	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB
Temperature		±1°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 Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 342867, the FCC Designation No.: CN1221.

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode, which was provided by manufacturer.

The EUT can operate in 802.11a/n20/n40/ac20/ac40/ac80 modes.

For 5150-5250MHz Band, 7 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220
38	5190	46	5230
40	5200	48	5240
42	5210	/	/

For 802.11a, 802.11n20, 802.11ac20 channel 36, 40, 48 were tested; For 802.11n40, 802.11ac40 channel 38, 46 were tested; For 802.11ac80, channel 42 was tested.

For 5725-5850MHz Band, 8 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	157	5785
151	5755	159	5795
153	5765	161	5805
155	5775	165	5825

For 802.11a, 802.11n20, 802.11ac20 channel 149, 157, 165 were tested; For 802.11n40, 802.11ac40 channel 151, 159 were tested; For 802.11ac80, channel 155 was tested.

EUT Exercise Software

“Command windows&ADB Command”* was use to the EUT tested.

Test frequencies and power level were configured as below:

U-NII	Mode	Frequency (MHz)	Rate (Mbps)	Power Level*
5150 – 5250MHz	802.11 a	5180	6	Default
		5200	6	Default
		5240	6	Default
	802.11 n20	5180	MCS0	Default
		5200	MCS0	Default
		5240	MCS0	Default
	802.11 n40	5190	MCS0	Default
		5230	MCS0	Default
	802.11 ac20	5180	MCS0	Default
		5200	MCS0	Default
		5240	MCS0	Default
	802.11 ac40	5190	MCS0	Default
5230		MCS0	Default	
802.11 ac8	5210	MCS0	Default	
5725 – 5850MHz	802.11 a	5745	6	Default
		5785	6	Default
		5825	6	Default
	802.11 n20	5745	MCS0	Default
		5785	MCS0	Default
		5825	MCS0	Default
	802.11 n40	5755	MCS0	Default
		5795	MCS0	Default
	802.11 ac20	5745	MCS0	Default
		5785	MCS0	Default
		5825	MCS0	Default
	802.11 ac40	5755	MCS0	Default
		5795	MCS0	Default
	802.11 ac80	5775	MCS0	Default

Note 1: The worse-case data rates are determined to be as follows for each mode based upon investigations by measuring the output power and PSD across all data rated bandwidths, and modulations.

Note 2: The power level was provided by the applicant.

Duty cycle

Test Result: Pass. Please refer to the Appendix.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

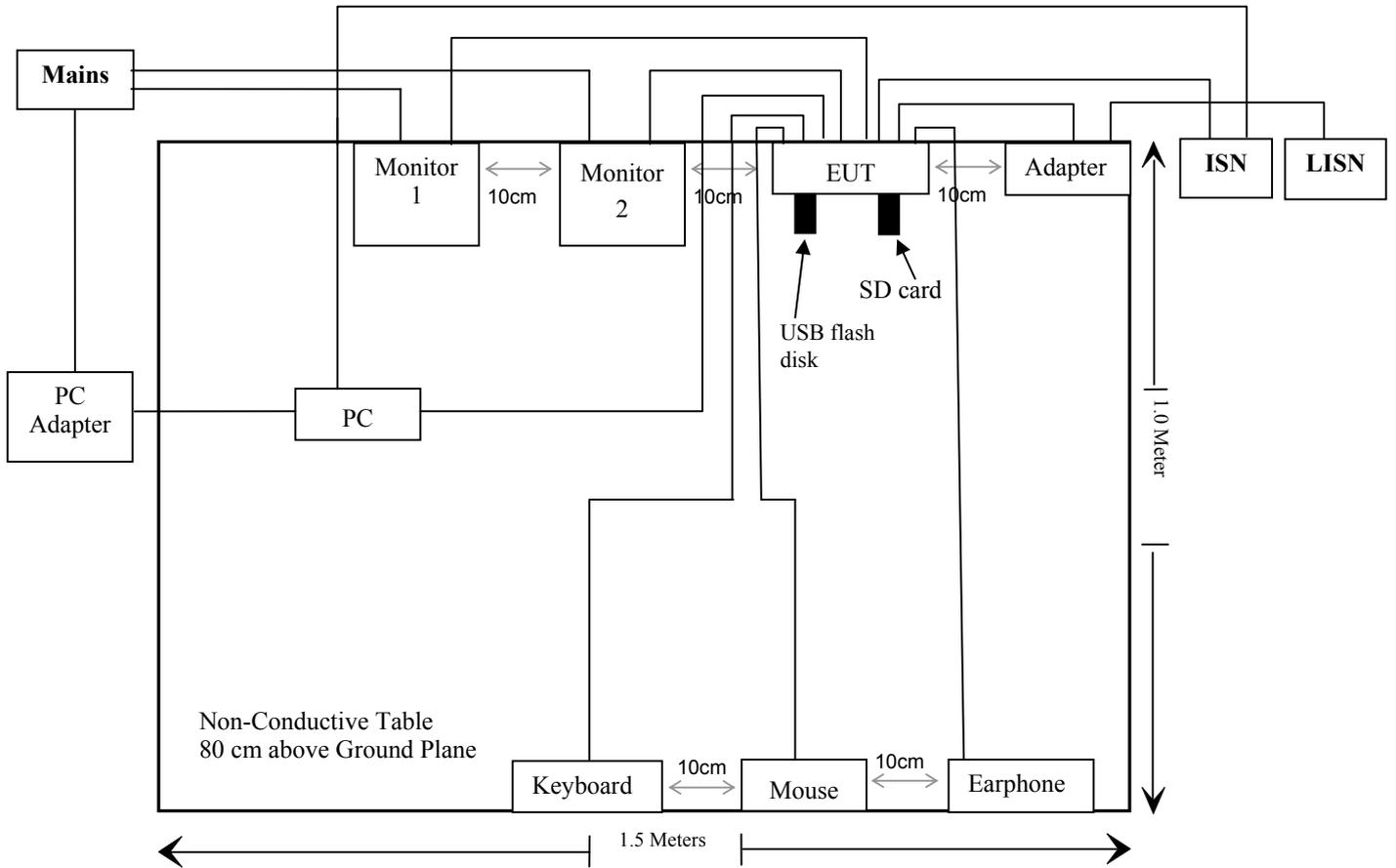
Manufacturer	Description	Model	Serial Number
DELL	PC	Latitude E5430	JG3NLV1
DELL	PC Adapter	PA-10	PA-10
Unknown	Earphone	Unknown	Earphone
BaoJiaLe	USB flash disk	M105	M105
SanDisk	SD card	Unknown	SD card
SAMSUNG	Monitor 1	S24E390HL	ZZFRH4ZN303357K
Dell	Monitor 2	U2515Hc	U2515Hc
NEWMEN	Keyboard	KM201	150700337
DELL	Mouse	MOC5UO	MOC5UO
TOSHIBA	PC	C600	C600
TOSHIBA	PC Adapter	PA3715E-1AC3	PA3715E-1AC3

External I/O Cable

Cable Description	Length (m)	From Port	To
Un-shielded Un-detachable Audio cable	1.2	Earphone	EUT
Un-shielded Un-detachable AC cable	1.0	Adapter	LISN
Shielded detachable DC cable	1.0	Adapter	EUT
Un-shielded detachable RJ45 cable	2.0	PC	EUT
Un-shielded un-detachable DC cable	1.2	Adapter	PC
Un-shielded Un-detachable USB cable	1.0	Keyboard	EUT
shielded detachable USB cable	1.5	Mouse	EUT
shielded detachable HDMI cable	1.0	Monitor 1	EUT
shielded detachable display cable	1.0	Monitor 2	EUT
Un-shielded Un-detachable AC cable	1.0	Monitor 1	Mains
Un-shielded Un-detachable AC cable	1.0	Monitor 2	Mains

Block Diagram of Test Setup

For conducted emission:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§2.1091	Maximum Permissible Exposure(MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.407(b)(8)& §15.207(a)	Conducted Emissions	Compliance
§15.205& §15.209 &§15.407(b) (1), (4), (8),(9)	Undesirable Emission& Restricted Bands	Compliance
§15.407(a) (12) (e)	26 dB Emission Bandwidth & 6dB Bandwidth	Compliance
§15.407(a)(1),(3)	Conducted Transmitter Output Power	Compliance
§15.407 (a)(1),(3)	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	ESCI	101120	2020/08/04	2021/08/03
Rohde & Schwarz	LISN	ENV216	101613	2020/08/04	2021/08/03
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2020/11/29	2021/11/28
Unknown	CE Cable	CE Cable	UF A210B-1-0720-504504	2020/11/29	2021/11/28
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
Radiated Emission Test (Below 1G)					
R&S	EMI Test Receiver	ESR3	102455	2020/08/04	2021/08/03
Sonoma instrument	Pre-amplifier	310 N	186238	2020/08/04	2021/08/03
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017/12/22	2020/12/21
Unknown	Cable 2	RF Cable 2	F-03-EM197	2020/11/29	2021/11/28
Unknown	Cable	Chamber Cable 1	F-03-EM236	2020/11/29	2021/11/28
Rohde & Schwarz	Auto test software	EMC 32	V9.10	NCR	NCR
Radiated Emission Test (Above 1G)					
Rohde & Schwarz	Spectrum Analyzer	FSV40-N	102259	2020/08/04	2021/08/03
COM-POWER	Pre-amplifier	PA-122	181919	2019/11/29	2020/11/28
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2019/11/29	2020/11/28
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017/12/22	2020/12/21
Insulted Wire Inc.	RF Cable	SPS-2503-3150	02222010	2019/11/29	2020/11/28
Unknown	RF Cable	W1101-EQ1 OUT	F-19-EM005	2019/11/29	2020/11/28
Ducommun technologies	RF Cable	RG-214	1	2020/11/12	2021/11/12
Ducommun technologies	RF Cable	RG-214	2	2020/11/12	2021/11/12
SNSD	Band Reject filter	BSF5150-5850MN-0899-004	5G filter	2020/04/20	2021/04/20
Ducommun Technologies	Horn antenna	ARH-4223-02	1007726-02 1304	2017/12/06	2020/12/05
Ducommun Technologies	Horn Antenna	ARH-2823-02	1007726-03	2017/12/06	2020/12/05

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Tonscend Corporation	RF control Unit	JS0806-2	19D8060154	2020/08/04	2021/08/03
Rohde & Schwarz	Signal and Spectrum Analyzer	FSV40	101473	2020/08/04	2021/08/03
Unknown	RF Cable	Unknown	2301 276	2019/11/29	2020/11/28

* **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 §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

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

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

Mode	Frequency (MHz)	Antenna Gain		Tune up conducted power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
Bluetooth	2402-2480	0.8	1.20	6.2	4.17	20	0.0010	1
BLE	2402-2480	0.8	1.20	6.0	3.98	20	0.0010	1
2.4G Wi-Fi	2412-2462	0.8	1.20	21.0	125.89	20	0.0301	1
5G Wi-Fi	5150-5250	0.8	1.20	12.0	15.85	20	0.0038	1
	5725-5850	0.8	1.20	11.5	14.13	20	0.0034	1

Note: 1. the tune up conducted power was declared by the applicant
 2. the Bluetooth, 2.4G Wi-Fi and 5G Wi-Fi can transmit at the same time.

Simultaneous transmitting consideration:

The ratio= $MPE_{Bluetooth}/limit + MPE_{2.4G\ wifi}/limit + MPE_{5G\ wifi}/limit = 0.001 + 0.0301 + 0.0038 = 0.0349 < 1.0$

So simultaneous exposure comply with the limit.

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 15.407 (a), if the transmitting antennas of directional gain greater than 6dBi are used, the transmit power and power spectral density 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 for 5G Wi-Fi, which was permanently attached and the antenna gain is 0.8dBi, fulfill the requirement of this section. Please refer to the EUT photos.

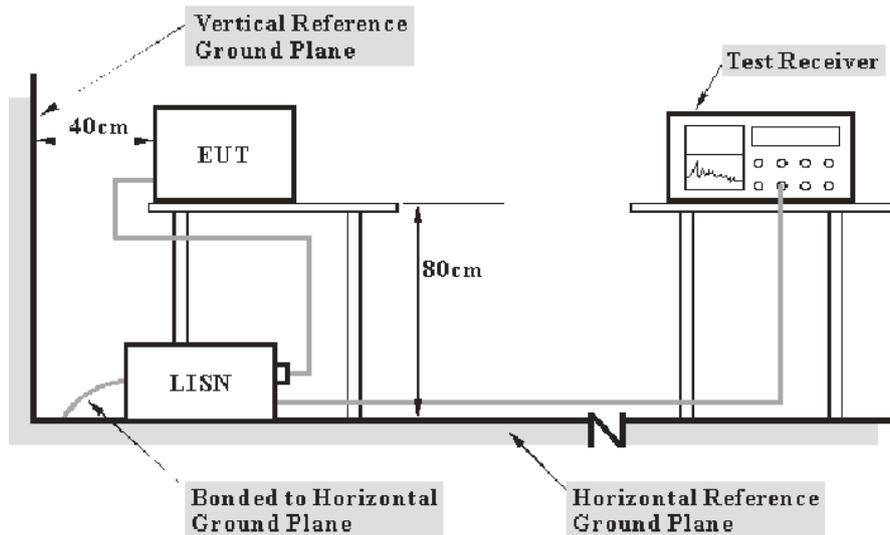
Result: Pass

FCC §15.407 (b) (8) §15.207 (a) – CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207, §15.407(b) (8)

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 LISN.

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

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

Test Data

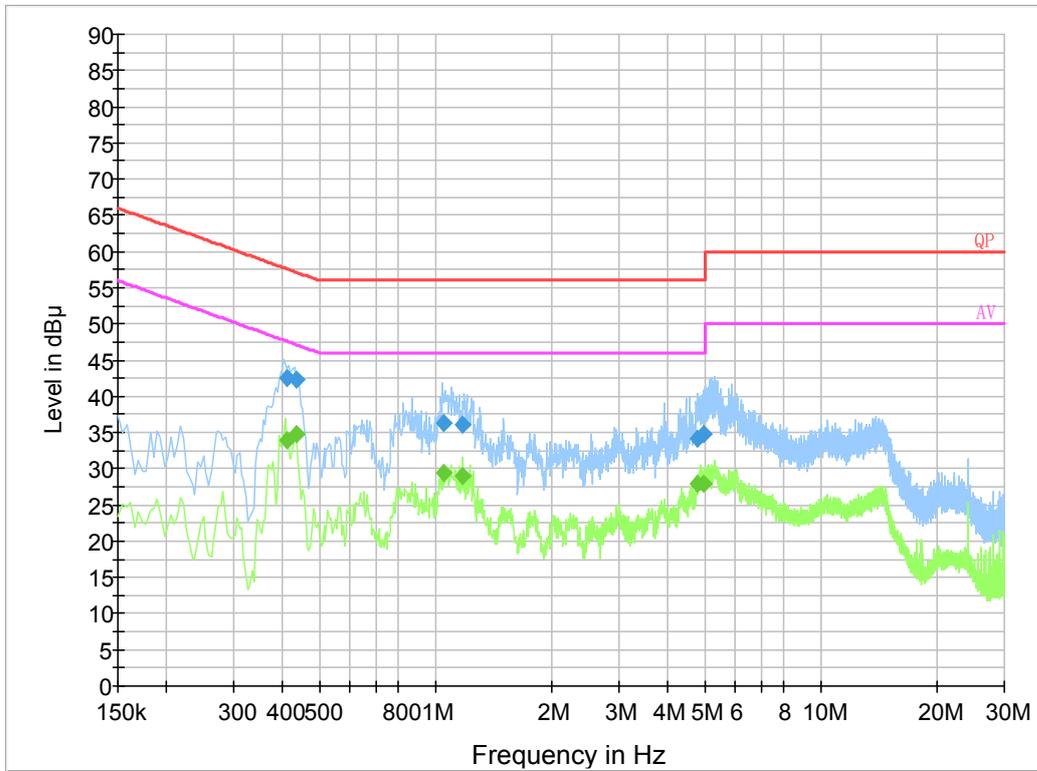
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	65 %
ATM Pressure:	101.0 kPa

The testing was performed by Haiguo Li on 2020-12-07.

EUT operation mode: Transmitting (the worst case is 802.11a Mode, 5240MHz)

AC 120V/60 Hz, Line:



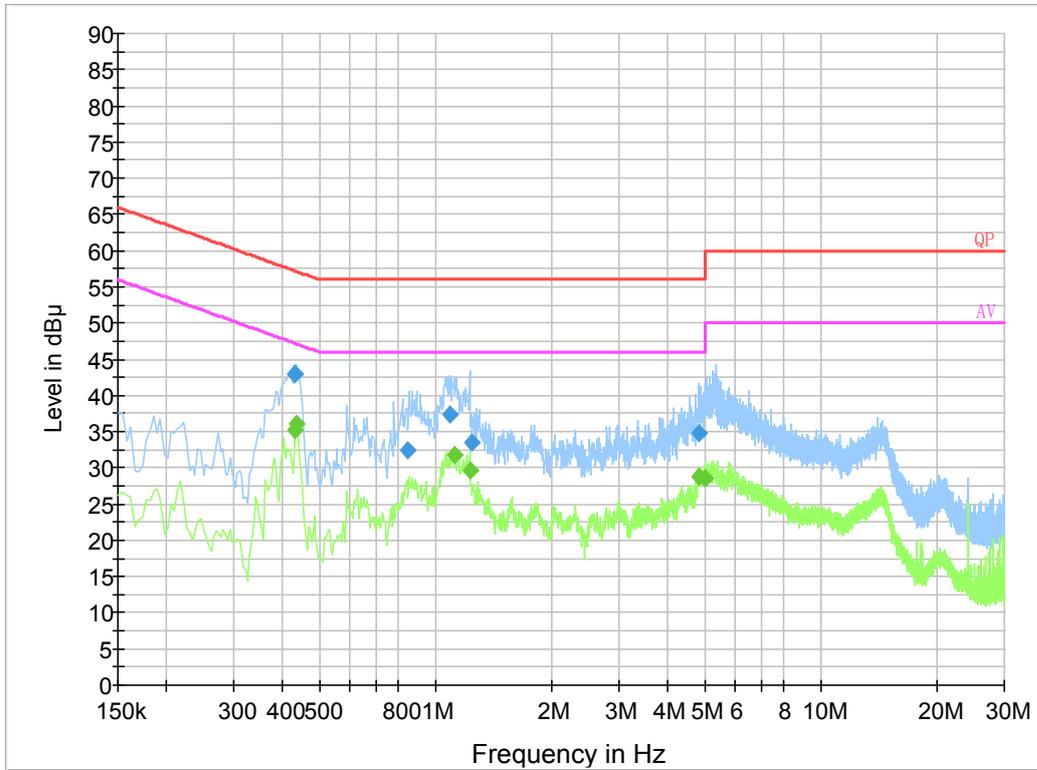
Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.412090	42.6	9.000	L1	19.9	15.0	57.6
0.435430	42.3	9.000	L1	19.8	14.8	57.1
1.054310	36.3	9.000	L1	19.9	19.7	56.0
1.180150	36.0	9.000	L1	19.8	20.0	56.0
4.794150	34.1	9.000	L1	19.9	21.9	56.0
4.967630	34.8	9.000	L1	19.9	21.2	56.0

Final Result 2

Frequency (MHz)	Average (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.412090	33.9	9.000	L1	19.9	13.7	47.6
0.435430	34.8	9.000	L1	19.8	12.3	47.1
1.054310	29.4	9.000	L1	19.9	16.6	46.0
1.180150	29.0	9.000	L1	19.8	17.0	46.0
4.794150	27.8	9.000	L1	19.9	18.2	46.0
4.967630	27.9	9.000	L1	19.9	18.1	46.0

AC120V, 60 Hz, Neutral:



Final Result 1

Frequency (MHz)	QuasiPeak (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.431430	42.9	9.000	N	19.8	14.3	57.2
0.431550	43.0	9.000	N	19.8	14.2	57.2
0.849190	32.5	9.000	N	19.8	23.5	56.0
1.089650	37.5	9.000	N	19.8	18.5	56.0
1.248450	33.6	9.000	N	19.8	22.4	56.0
4.833550	34.9	9.000	N	19.9	21.1	56.0

Final Result 2

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.430000	35.2	9.000	N	19.8	12.1	47.3
0.438000	36.1	9.000	N	19.8	11.0	47.1
1.122000	31.8	9.000	N	19.8	14.2	46.0
1.230000	29.6	9.000	N	19.8	16.4	46.0
4.830000	28.8	9.000	N	19.9	17.2	46.0
4.998000	28.5	9.000	N	19.9	17.5	46.0

§15.205 & §15.209 & §15.407(B) (1), (4), (8) ,(9)– UNDESIRABLE EMISSION

Applicable Standard

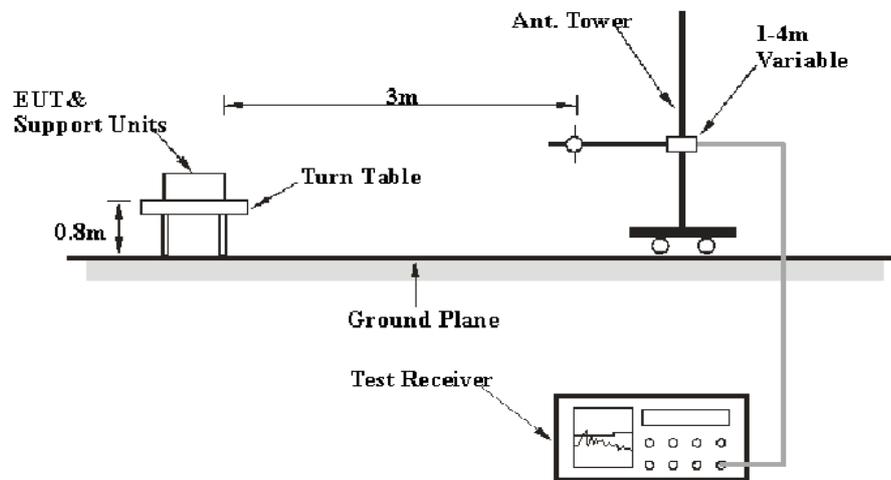
FCC §15.407 (b) (1), (4), (7), (8) , (9); §15.209; §15.205;

(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

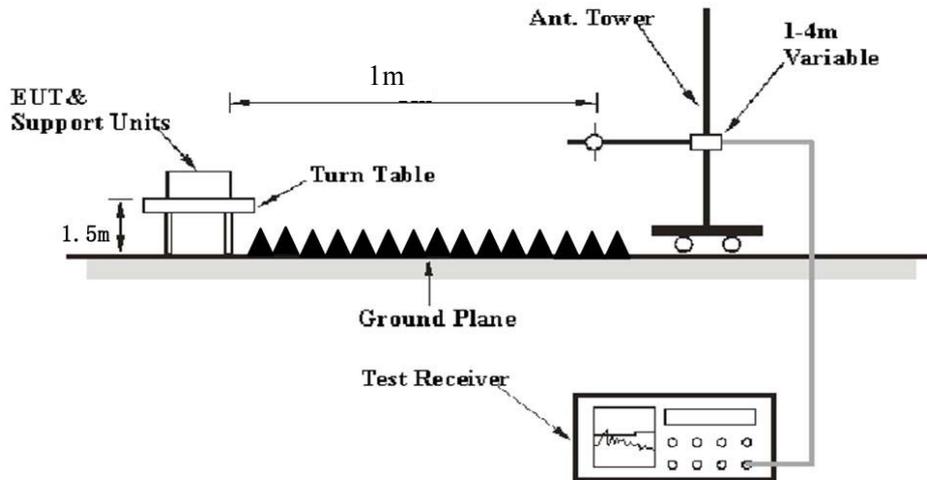
- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band:
 - (i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
- (8) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.
- (9) The provisions of §15.205 apply to intentional radiators operating under this section.

EUT Setup

Below 1 GHz:



Above 1 GHz:



The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC 15.209 and FCC 15.407 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 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	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	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

Radiated Spurious Emission

During the radiated emission test, the adapter was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all the installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1GHz, peak and Average detection modes for frequencies above 1GHz.

Corrected Amplitude & Margin Calculation

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

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

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

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

Test Data

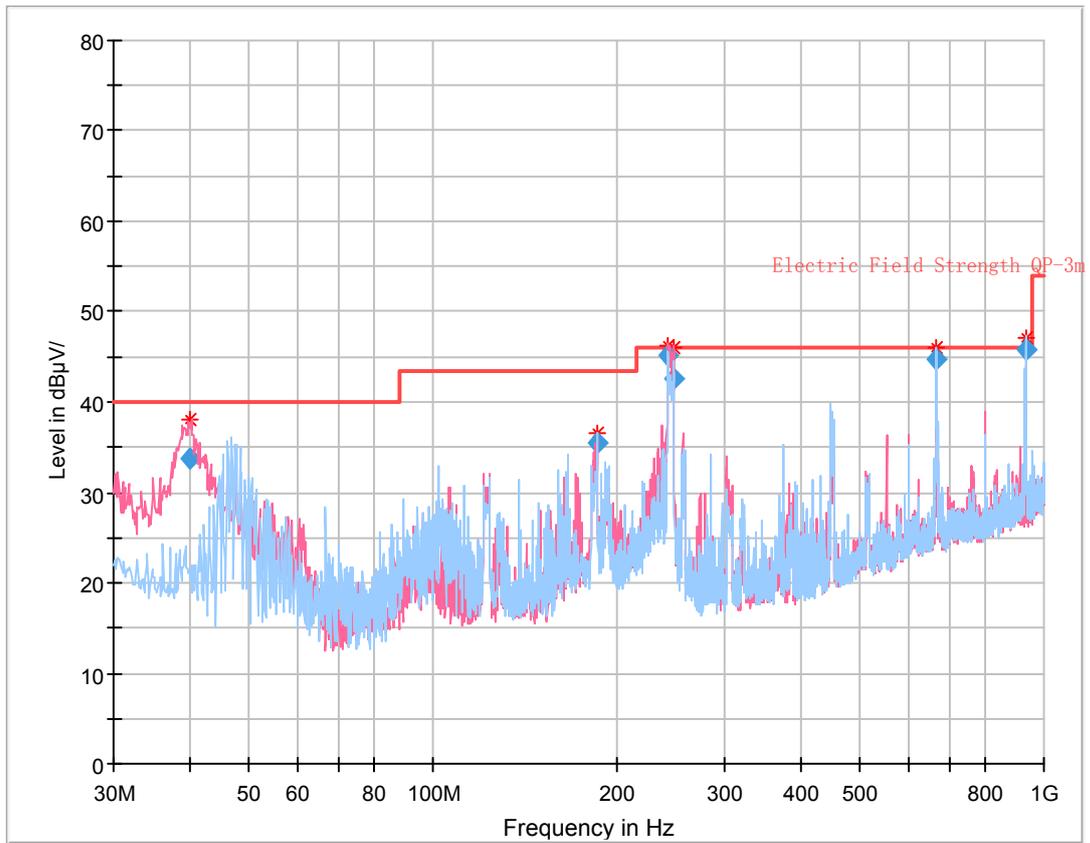
Environmental Conditions

Temperature:	26~32.1 °C
Relative Humidity:	52 %
ATM Pressure:	101.0~101.1 kPa

The testing was performed by Holland Yang on 2020-12-16 for below 1GHz and by Alan He on 2020-11-19 for above 1GHz.

EUT operation mode: Transmitting

30 MHz~1 GHz: (the worst case is 802.11a Mode, 5240MHz)



Final Result

Frequency (MHz)	QuasiPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
39.990250	33.66	40.00	6.34	107.0	V	102.0	-10.5
185.685000	35.49	43.50	8.01	208.0	H	341.0	-11.3
242.016875	45.09	46.00	0.91	258.0	V	0.0	-10.8
247.618375	42.61	46.00	3.39	260.0	V	0.0	-10.8
667.092875	44.73	46.00	1.27	164.0	H	79.0	-1.8
933.111625	45.78	46.00	0.22	129.0	H	203.0	1.8

1 ~ 40 GHz:

Note: The test distance is 1m, so the correct factor from 3m to 1m is $20\log(3/1)=9.5\text{dB}$ which was added into the final limit.

5150-5250 MHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11a									
5180 MHz									
5149.1	34.78	PK	49	2.1	H	38.36	73.14	83.5	10.36
5149.1	21.12	Ave.	49	2.1	H	38.36	59.48	63.5	4.02
5380.48	31.66	PK	273	1.8	H	39.09	70.75	83.5	12.75
5380.48	19.79	Ave.	273	1.8	H	39.09	58.88	63.5	4.62
10360.00	42.33	PK	93	1.5	H	17.42	59.75	77.7	17.95
5200 MHz									
10400.00	42.52	PK	129	2.5	H	17.52	60.04	77.7	17.66
5240 MHz									
5100.69	31.96	PK	291	2.0	H	38.26	70.22	83.5	13.28
5100.69	19.58	Ave.	291	2.0	H	38.26	57.84	63.5	5.66
5443.36	31.89	PK	281	1.9	H	39.29	71.18	83.5	12.32
5443.36	19.61	Ave.	281	1.9	H	39.29	58.90	63.5	4.60
10480.00	42.46	PK	20	1.9	H	17.25	59.71	77.7	17.99
802.11n20									
5180 MHz									
5149.67	38.64	PK	33	1.5	H	38.36	77.00	83.5	6.50
5149.67	21.53	Ave.	33	1.5	H	38.36	59.89	63.5	3.61
5417.58	32.28	PK	103	1.2	H	39.19	71.47	83.5	12.03
5417.58	19.75	Ave.	103	1.2	H	39.19	58.94	63.5	4.56
10360.00	42.31	PK	355	2.0	H	17.42	59.73	77.7	17.97
5200 MHz									
10400.00	42.48	PK	133	2.4	H	17.52	60.00	77.7	17.70
5240 MHz									
5108.94	31.67	PK	295	2.0	H	38.26	69.93	83.5	13.57
5108.94	19.79	Ave.	295	2.0	H	38.26	58.05	63.5	5.45
5435.72	31.94	PK	180	2.3	H	39.29	71.23	83.5	12.27
5435.72	19.64	Ave.	180	2.3	H	39.29	58.93	63.5	4.57
10480.00	42.41	PK	270	1.4	H	17.25	59.66	77.7	18.04

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
802.11n40									
5190 MHz									
5145.55	38.96	PK	350	1.5	H	38.36	77.32	83.5	6.18
5145.55	23.33	Ave.	350	1.5	H	38.36	61.69	63.5	1.81
5368.39	32.1	PK	124	2.4	H	39.09	71.19	83.5	12.31
5368.39	20.69	Ave.	124	2.4	H	39.09	59.78	63.5	3.72
10380.00	42.28	PK	167	1.5	H	17.42	59.70	77.7	18.00
5230 MHz									
5142.29	31.61	PK	229	1.6	H	38.36	69.97	83.5	13.53
5142.29	20.84	Ave.	229	1.6	H	38.36	59.20	63.5	4.30
5432.54	31.69	PK	48	1.9	H	39.29	70.98	83.5	12.52
5432.54	20.5	Ave.	48	1.9	H	39.29	59.79	63.5	3.71
10480.00	42.03	PK	111	1.7	H	17.25	59.28	77.7	18.42
802.11ac20									
5180 MHz									
5149.75	37.95	PK	93	1.6	H	38.36	76.31	83.5	7.19
5149.75	20.95	Ave.	93	1.6	H	38.36	59.31	63.5	4.19
5419.96	31.78	PK	123	1.7	H	39.19	70.97	83.5	12.53
5419.96	19.7	Ave.	123	1.7	H	39.19	58.89	63.5	4.61
10360.00	42.71	PK	36	1.5	H	17.42	60.13	77.7	17.57
5200 MHz									
10400.00	42.56	PK	25	1.5	H	17.52	60.08	77.7	17.62
5240 MHz									
5113.06	33.01	PK	22	1.2	H	38.26	71.27	83.5	12.23
5113.06	19.63	Ave.	22	1.2	H	38.26	57.89	63.5	5.61
5420.92	31.97	PK	93	1.1	H	39.19	71.16	83.5	12.34
5420.92	19.73	Ave.	93	1.1	H	39.19	58.92	63.5	4.58
10480.00	42.63	PK	337	2.3	H	17.25	59.88	77.7	17.82
802.11ac40									
5190 MHz									
5140.70	39.3	PK	334	1.5	H	38.36	77.66	83.5	5.84
5140.70	22.23	Ave.	334	1.5	H	38.36	60.59	63.5	2.91
5393.70	31.67	PK	231	1.7	H	39.19	70.86	83.5	12.64
5393.70	20.53	Ave.	231	1.7	H	39.19	59.72	63.5	3.78
10380.00	41.84	PK	144	1.5	H	17.42	59.26	77.7	18.44
5230 MHz									
5132.09	31.26	PK	177	2.0	H	38.36	69.62	83.5	13.88
5132.09	20.46	Ave.	177	2.0	H	38.36	58.82	63.5	4.68
5393.06	32.51	PK	6	1.4	H	39.19	71.70	83.5	11.80
5393.06	20.46	Ave.	6	1.4	H	39.19	59.65	63.5	3.85
10460.00	41.73	PK	137	2.1	H	17.15	58.88	77.7	18.82

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11ac80									
5210 MHz									
5128.18	32.12	PK	229	1.3	H	38.36	70.48	83.5	13.02
5128.18	20.53	Ave.	229	1.3	H	38.36	58.89	63.5	4.61
5395.29	31.43	PK	331	1.8	H	39.19	70.62	83.5	12.88
5395.29	20.47	Ave.	331	1.8	H	39.19	59.66	63.5	3.84
10420.00	41.49	PK	278	2.5	H	17.52	59.01	77.7	18.69

5725-5850 MHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
802.11a									
5745 MHz									
5639.18	31.65	Ave.	335	2.1	H	39.46	71.11	77.7	6.59
5694.39	32.57	PK	233	1.4	H	39.49	72.06	110.55	38.49
5718.28	39.29	Ave.	233	1.4	H	39.49	78.78	119.82	41.04
5724.69	42.37	PK	335	2.1	H	39.49	81.86	130.99	49.13
11490.00	43.13	PK	21	2.0	H	17.47	60.60	83.5	22.90
11490.00	30.21	Ave.	21	2.0	H	17.47	47.68	63.5	15.82
5785 MHz									
11570.00	43.25	PK	13	2.4	H	17.51	60.76	83.5	22.74
11570.00	30.36	Ave.	13	2.4	H	17.51	47.87	63.5	15.63
5825 MHz									
5852.64	39.89	PK	314	1.0	H	39.87	79.76	125.68	45.92
5855.25	38.6	Ave.	314	1.0	H	39.87	78.47	120.23	41.76
5895.88	33.9	PK	93	1.9	H	39.87	73.77	99.25	25.48
5948.61	34.18	Ave.	93	1.9	H	39.97	74.15	77.7	3.55
11650.00	43.27	PK	50	2.5	H	16.18	59.45	83.5	24.05
11650.00	30.34	Ave.	50	2.5	H	16.18	46.52	63.5	16.98
802.11n20									
5745 MHz									
5633.54	31.88	Ave.	289	1.5	H	39.46	71.34	77.7	6.36
5697.07	32.6	PK	260	2.0	H	39.49	72.09	112.53	40.44
5719.84	38.54	Ave.	260	2.0	H	39.49	78.03	120.26	42.23
5724.37	40.59	PK	289	1.5	H	39.49	80.08	130.26	50.18
11490.00	43.71	PK	51	2.1	H	17.47	61.18	83.5	22.32
11490.00	30.15	Ave.	51	2.1	H	17.47	47.62	63.5	15.88
5785 MHz									
11570.00	43.92	PK	205	1.9	H	17.51	61.43	83.5	22.07
11570.00	30.24	Ave.	205	1.9	H	17.51	47.75	63.5	15.75
5825 MHz									
5850.50	39.58	PK	356	1.8	H	39.87	79.45	130.56	51.11
5855.45	36.22	Ave.	356	1.8	H	39.87	76.09	120.17	44.08
5913.82	33.76	PK	280	2.0	H	39.87	73.63	85.97	12.34
5934.06	34.3	Ave.	280	2.0	H	39.97	74.27	77.7	3.43
11650.00	43.86	PK	120	1.7	H	16.18	60.04	83.5	23.46
11650.00	30.19	Ave.	120	1.7	H	16.18	46.37	63.5	17.13

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
802.11n40									
5755 MHz									
5641.50	32.16	Ave.	38	1.8	H	39.46	71.62	77.7	6.08
5699.31	36.68	PK	68	2.5	H	39.49	76.17	114.19	38.02
5717.53	40.89	Ave.	68	2.5	H	39.49	80.38	119.61	39.23
5724.93	40.85	PK	38	1.8	H	39.49	80.34	131.54	51.20
11510.00	42.91	PK	287	1.5	H	17.47	60.38	83.5	23.12
11510.00	31.11	Ave.	287	1.5	H	17.47	48.58	63.5	14.92
5795 MHz									
5852.83	36.89	PK	83	2.4	H	39.87	76.76	125.25	48.49
5855.62	36.19	Ave.	83	2.4	H	39.87	76.06	120.13	44.07
5908.47	34.77	PK	328	1.3	H	39.87	74.64	89.93	15.29
5942.75	34.07	Ave.	328	1.3	H	39.97	74.04	77.7	3.66
11590.00	42.85	PK	210	2.2	H	17.51	60.36	83.5	23.14
11590.00	31.03	Ave.	210	2.2	H	17.51	48.54	63.5	14.96
802.11ac20									
5745 MHz									
5647.94	32.84	Ave.	226	1.5	H	39.46	72.30	77.7	5.40
5693.96	32.44	PK	305	1.7	H	39.49	71.93	110.23	38.30
5719.99	39.52	Ave.	305	1.7	H	39.49	79.01	120.3	41.29
5720.66	41.17	PK	226	1.5	H	39.49	80.66	121.8	41.14
11490.00	42.56	PK	161	2.0	H	17.47	60.03	83.5	23.47
11490.00	30.03	Ave.	161	2.0	H	17.47	47.50	63.5	16.00
5785 MHz									
11570.00	42.57	PK	136	2.4	H	17.51	60.08	83.5	23.42
11570.00	30.08	Ave.	136	2.4	H	17.51	47.59	63.5	15.91
5825 MHz									
5850.21	40.08	PK	12	2.2	H	39.87	79.95	131.22	51.27
5855.45	38.1	Ave.	12	2.2	H	39.87	77.97	120.17	42.20
5882.13	35.01	PK	263	2.0	H	39.87	74.88	109.42	34.54
5952.95	33.7	Ave.	263	2.0	H	39.84	73.54	77.7	4.16
11650.00	42.46	PK	301	2.3	H	16.18	58.64	83.5	24.86
11650.00	29.96	Ave.	301	2.3	H	16.18	46.14	63.5	17.36

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
802.11ac40									
5755 MHz									
5628.40	32.23	Ave.	54	1.9	H	39.46	71.69	77.7	6.01
5697.58	37.67	PK	119	2.4	H	39.49	77.16	112.91	35.75
5717.18	41.23	Ave.	119	2.4	H	39.49	80.72	119.51	38.79
5724.16	40.36	PK	54	1.9	H	39.49	79.85	129.78	49.93
11510.00	42.73	PK	217	1.3	H	17.47	60.20	83.5	23.30
11510.00	31.14	Ave.	217	1.3	H	17.47	48.61	63.5	14.89
5795 MHz									
5852.76	37.55	PK	192	2.4	H	39.87	77.42	125.41	47.99
5857.99	36.11	Ave.	192	2.4	H	39.87	75.98	119.46	43.48
5886.76	34.47	PK	201	1.4	H	39.87	74.34	106	31.66
5964.78	34.79	Ave.	201	1.4	H	39.84	74.63	77.7	3.07
11590.00	42.66	PK	29	1.2	H	17.51	60.17	83.5	23.33
11590.00	31.06	Ave.	29	1.2	H	17.51	48.57	63.5	14.93
802.11ac80									
5775 MHz									
5646.56	32.62	Ave.	213	2.2	H	39.46	72.08	77.7	5.62
5695.98	33.29	PK	224	1.4	H	39.49	72.78	111.73	38.95
5719.18	34.87	Ave.	224	1.4	H	39.49	74.36	120.07	45.71
5720.94	34.91	PK	213	2.2	H	39.49	74.40	122.44	48.04
5852.59	35.05	PK	290	2.5	H	39.87	74.92	125.79	50.87
5871.57	34.22	Ave.	290	2.5	H	39.87	74.09	115.66	41.57
5890.16	33.89	PK	102	2.2	H	39.87	73.76	103.48	29.72
5955.66	34.64	Ave.	102	2.2	H	39.84	74.48	77.7	3.22
11550.00	42.37	PK	175	2.0	H	17.51	59.88	83.5	23.62
11550.00	31.13	Ave.	175	2.0	H	17.51	48.64	63.5	14.86

Note:

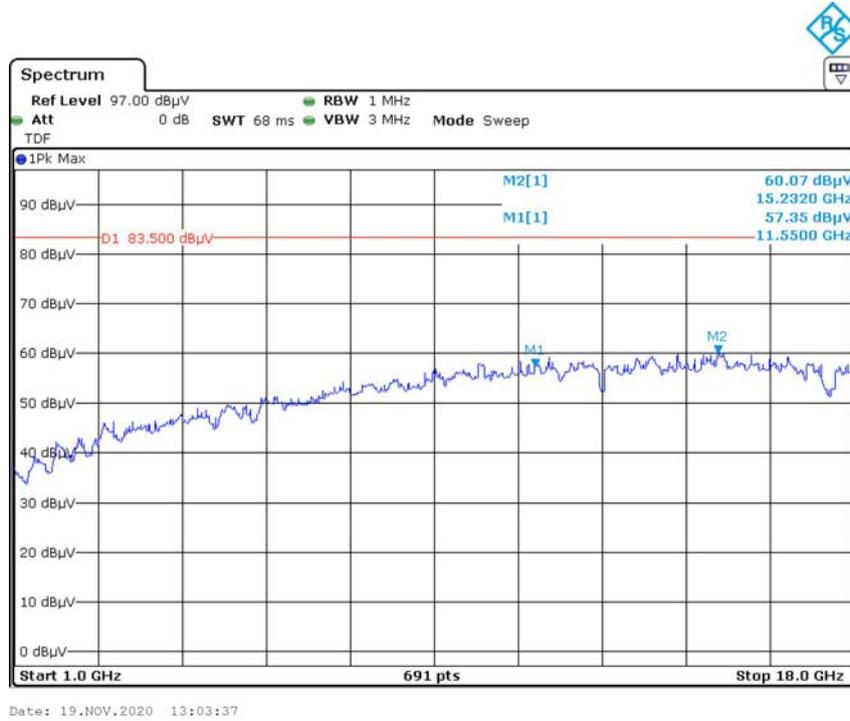
Corrected Amplitude = Corrected Factor + Reading

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

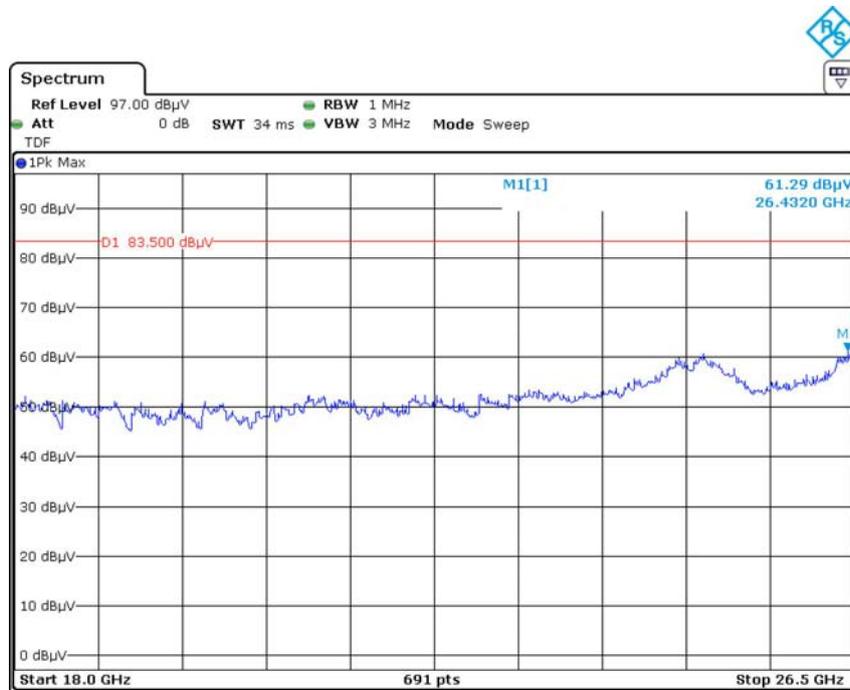
Margin = Limit- Corr. Amplitude

All other spurious emissions are 20 dB below the limit or are on the system noise floor level.

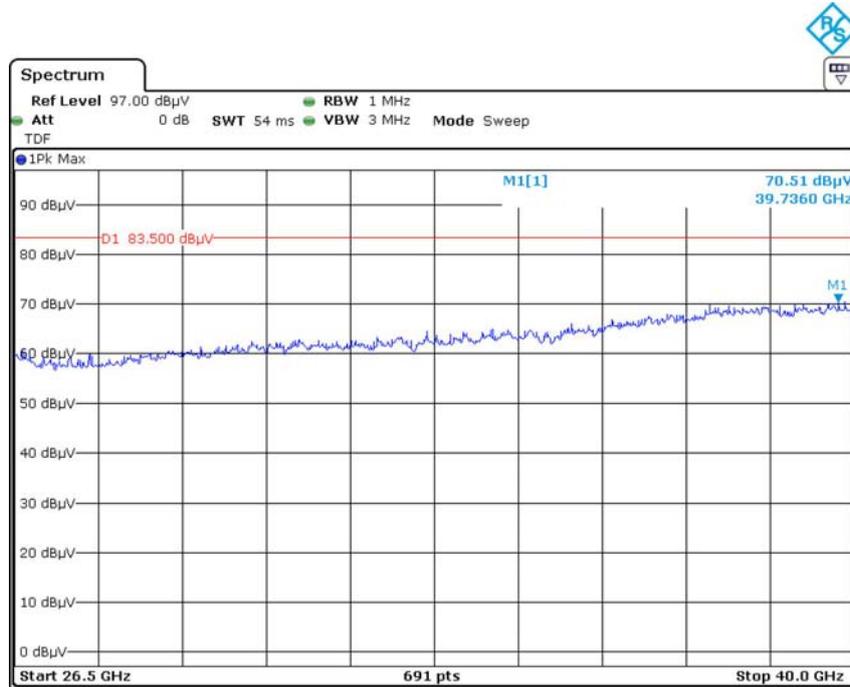
Peak
Pre-scan with 802.11ac80 5775MHz
Horizontal



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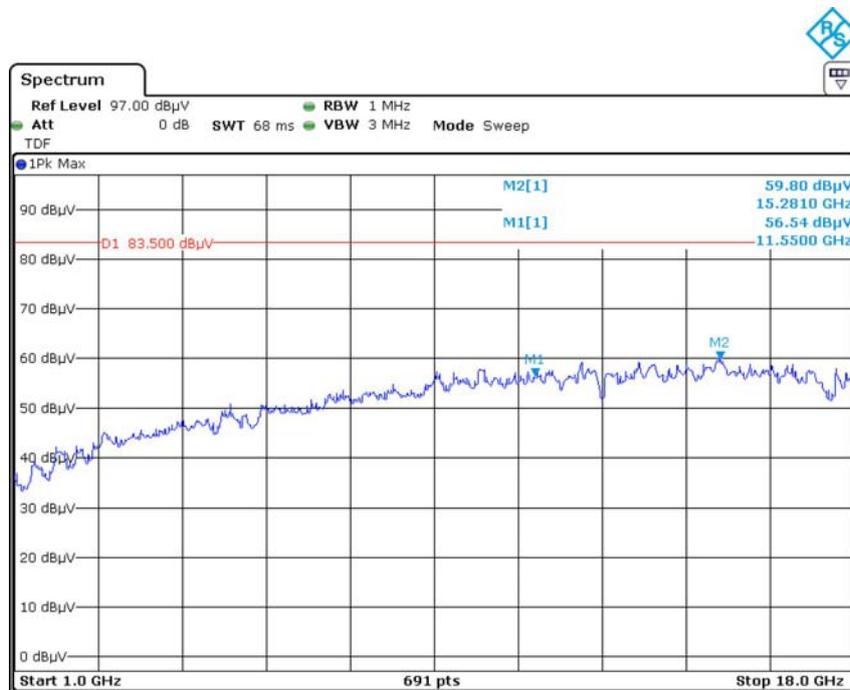


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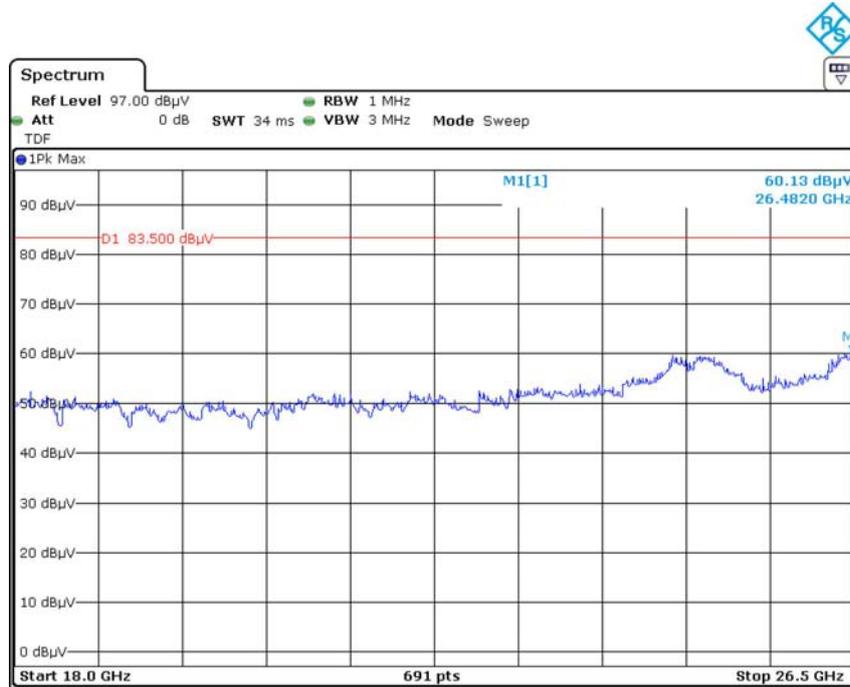


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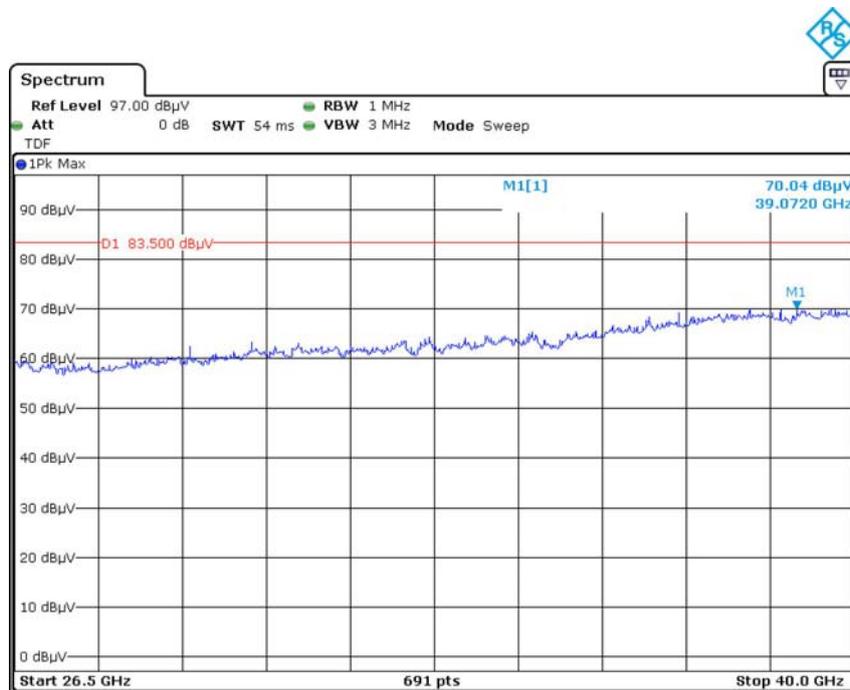
Vertical



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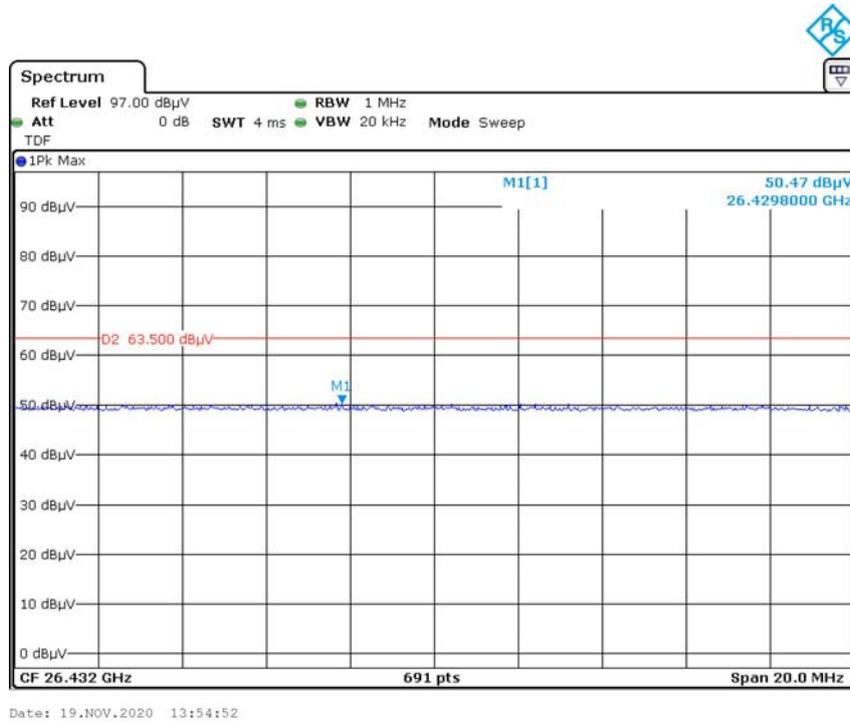
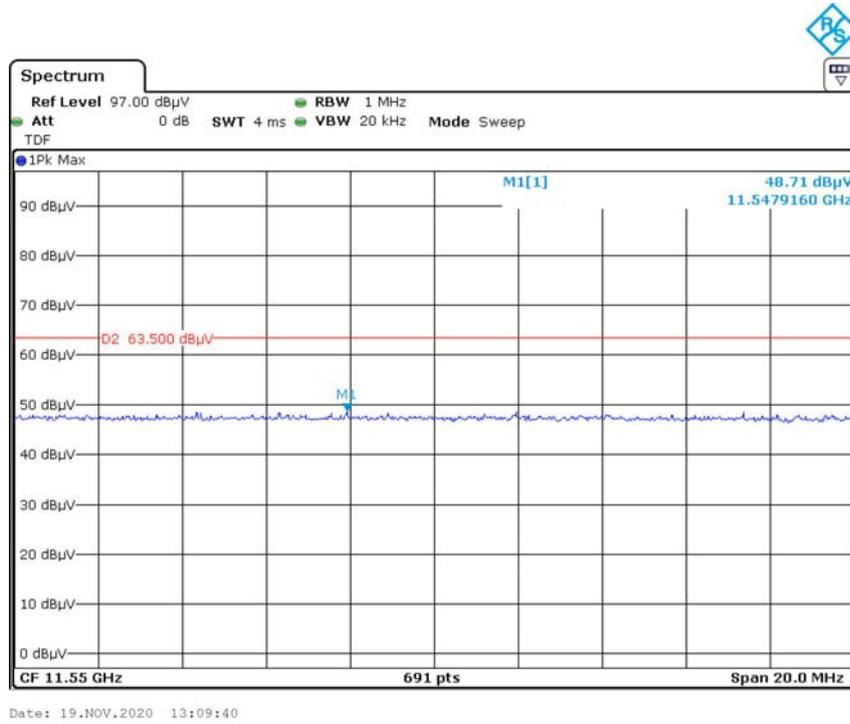


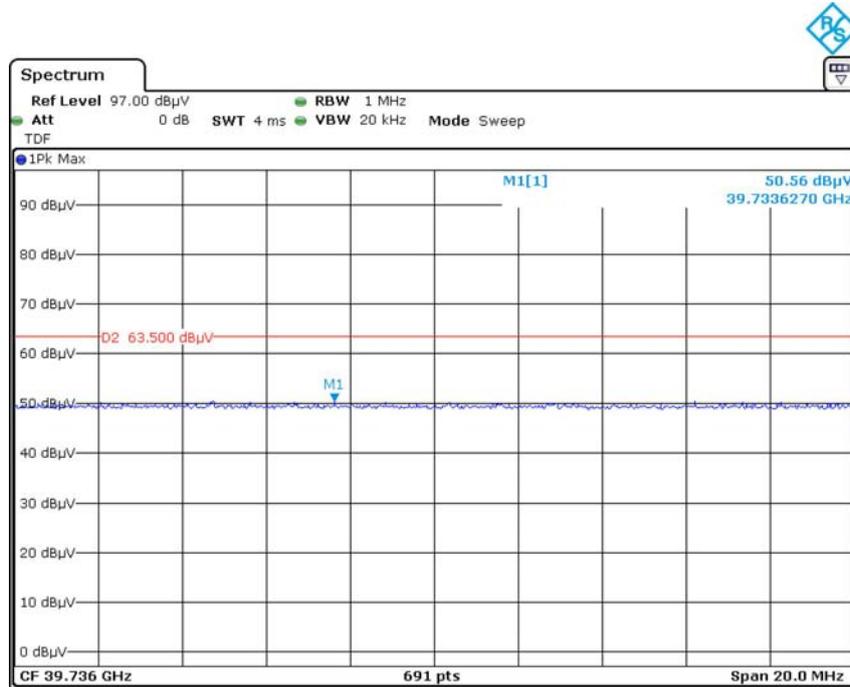
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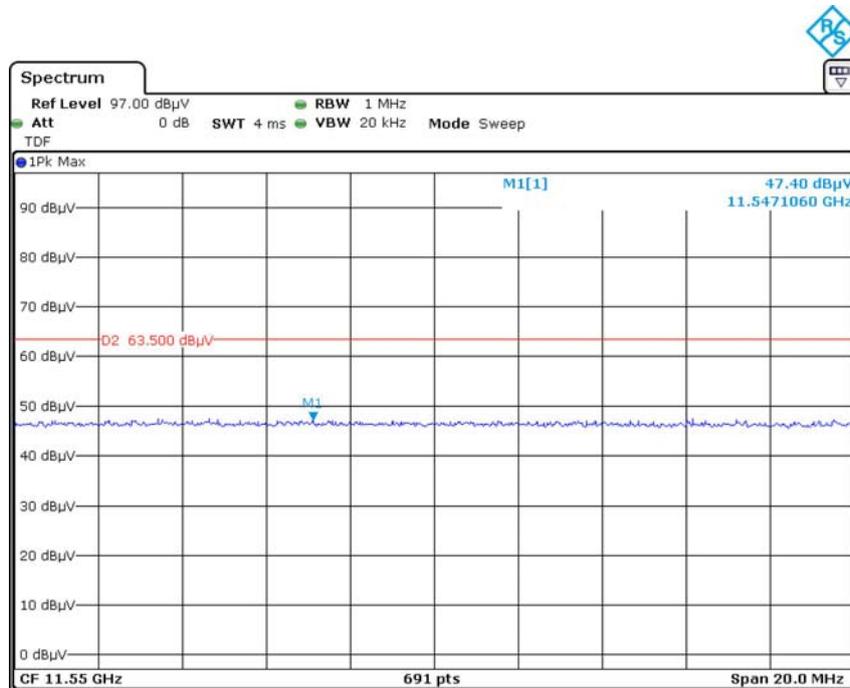
Average Horizontal



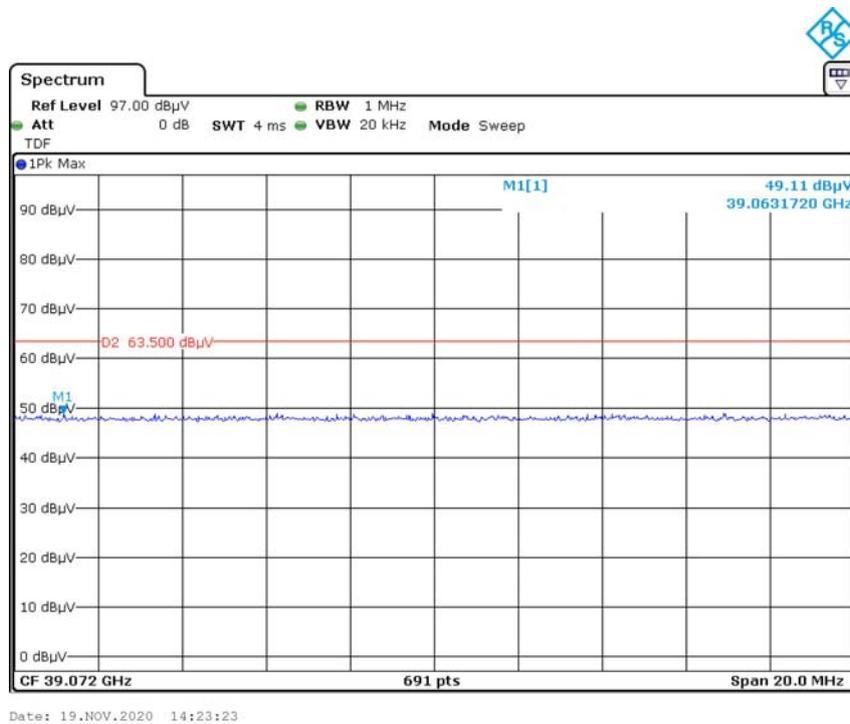
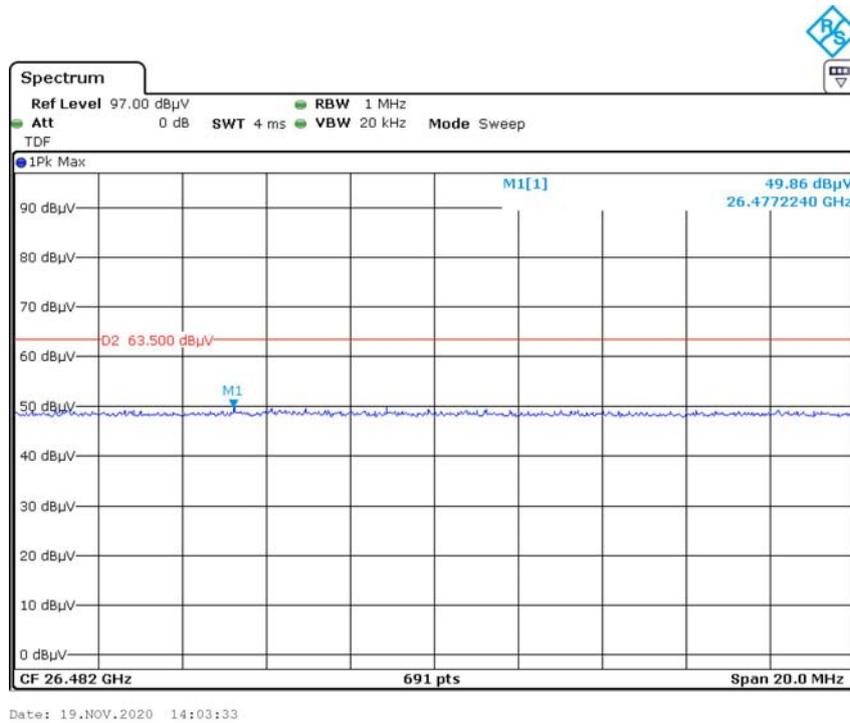


Date: 19.NOV.2020 14:13:14

Vertical



Date: 19.NOV.2020 13:19:13



FCC §15.407(a)(12), (e)– 26 dB & 6dB EMISSION BANDWIDTH

Applicable Standard

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure

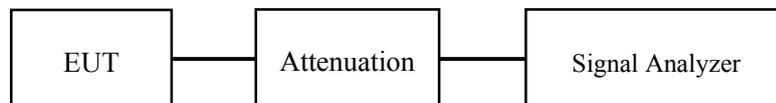
1. Emission Bandwidth (EBW)

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

2. Minimum Emission Bandwidth for the band 5.725-5.85 GHz

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



Test Data

Environmental Conditions

Temperature:	22~24 °C
Relative Humidity:	50~52 %
ATM Pressure:	101.0 kPa

The testing was performed by Bravos Zhao on 2020-11-20.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the Appendix

FCC §15.407(a) (1) (3) – CONDUCTED TRANSMITTER OUTPUT POWER

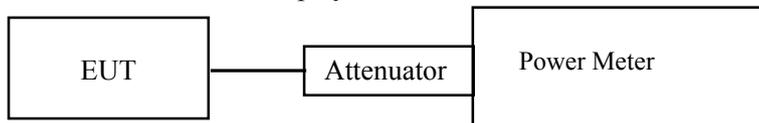
Applicable Standard

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

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:	22~24 °C
Relative Humidity:	50~52 %
ATM Pressure:	101.0 kPa

The testing was performed by Bravos Zhao on 2020-11-20.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the Appendix

FCC §15.407(a) (1) (3) - POWER SPECTRAL DENSITY

Applicable Standard

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:

- a) Set $RBW \geq 1/T$, where T is defined in section II.B.1.a).
- b) Set $VBW \geq 3 RBW$.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10 \log(500 \text{ kHz}/RBW)$ to the measured result, whereas $RBW (< 500 \text{ kHz})$ is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
- d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add $10 \log(1\text{MHz}/RBW)$ to the measured result, whereas $RBW (< 1 \text{ MHz})$ is the reduced resolution bandwidth of spectrum analyzer set during measurement.
- e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Test Data

Environmental Conditions

Temperature:	22~24 °C
Relative Humidity:	50~52 %
ATM Pressure:	101.0 kPa

The testing was performed by Bravos Zhao on 2020-11-20.

EUT operation mode: Transmitting

Test Result: Pass

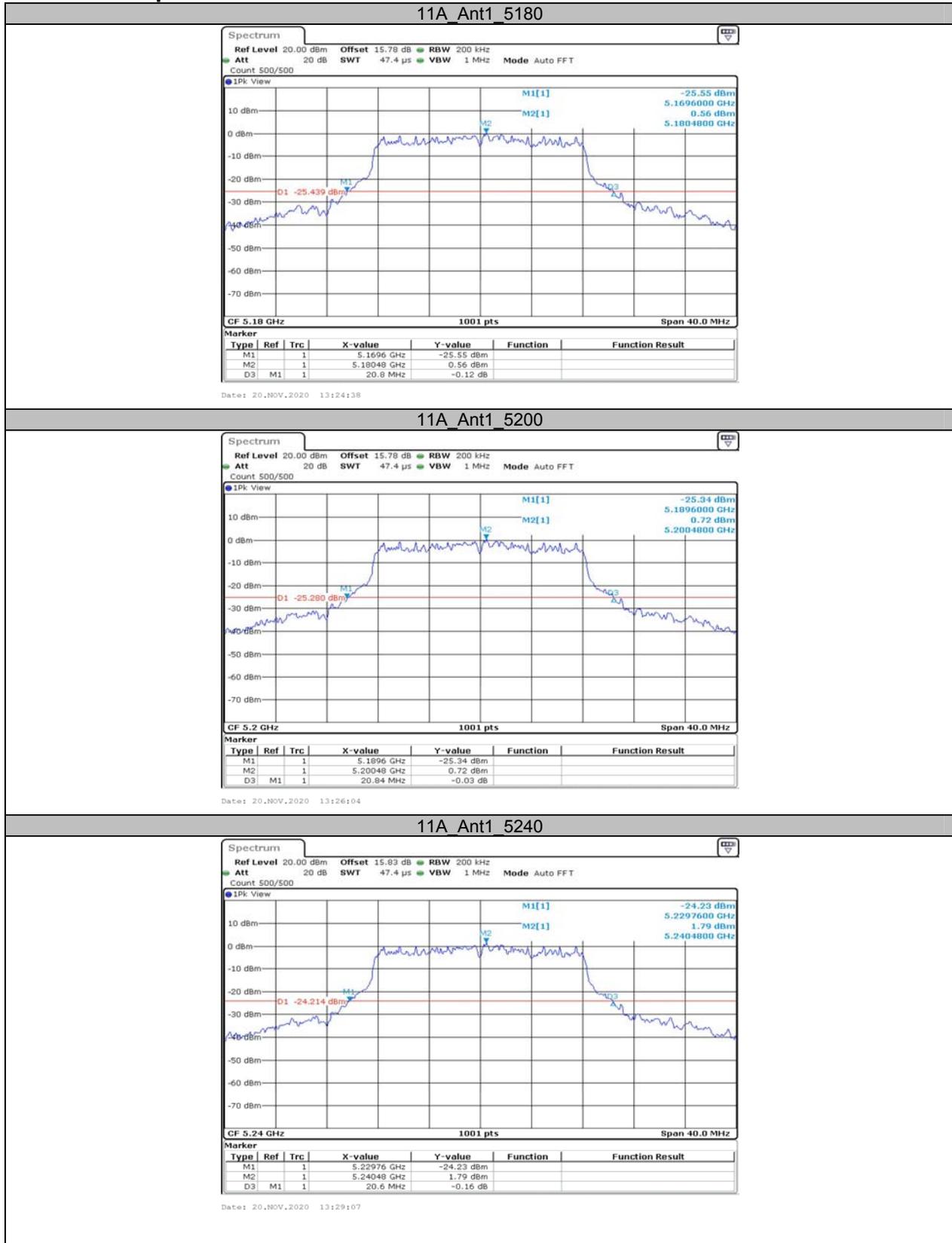
Please refer to the Appendix

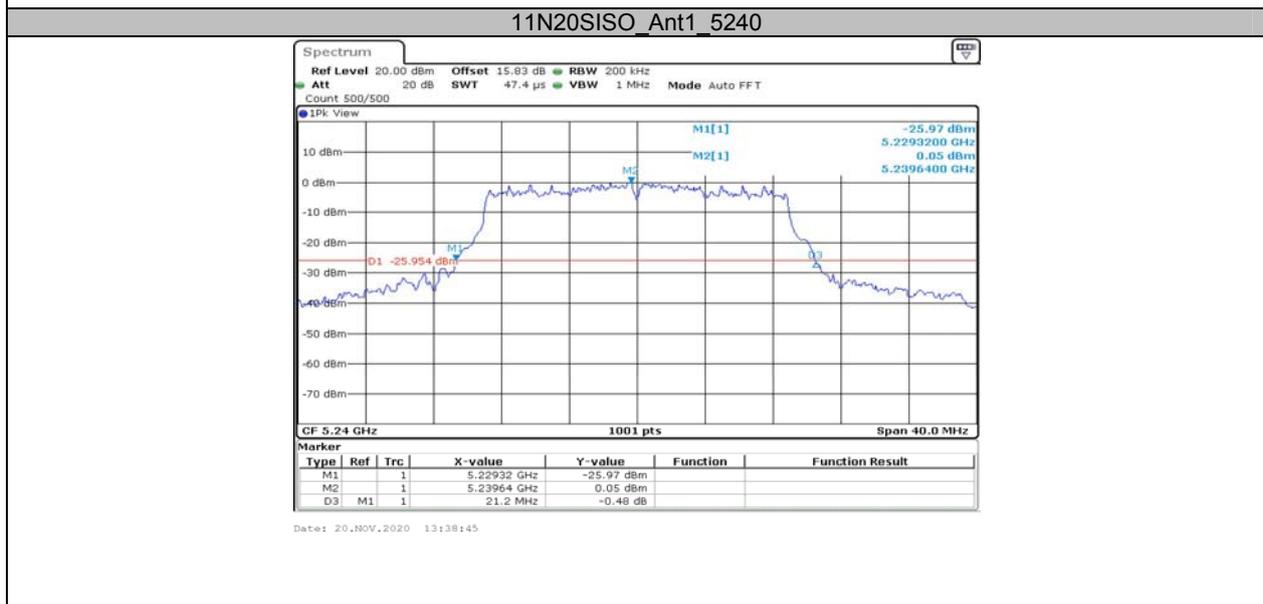
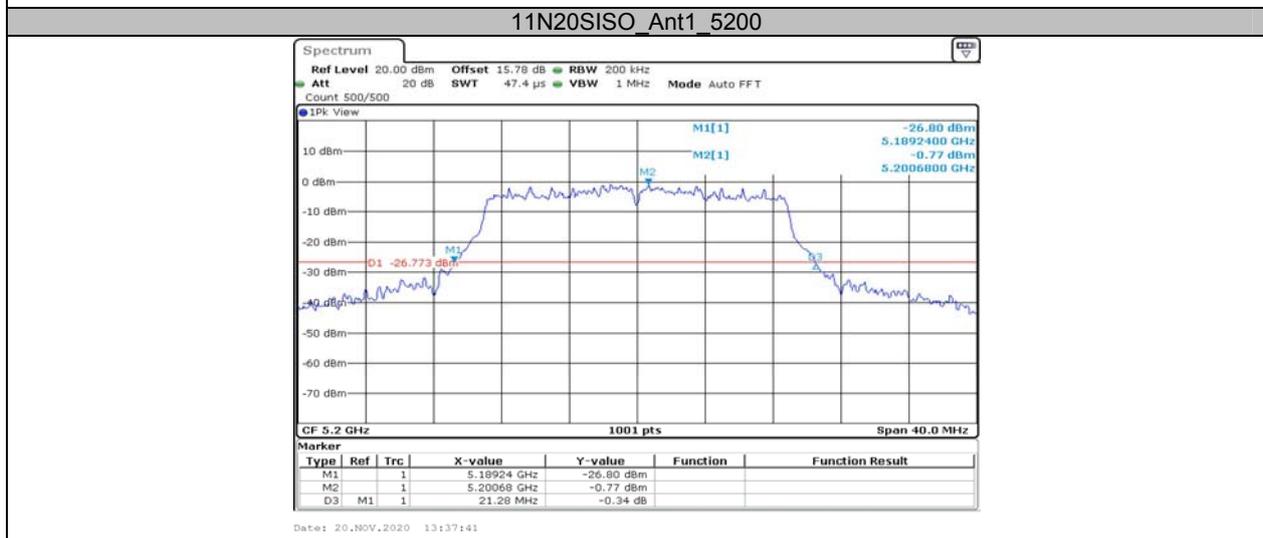
APPENDIX

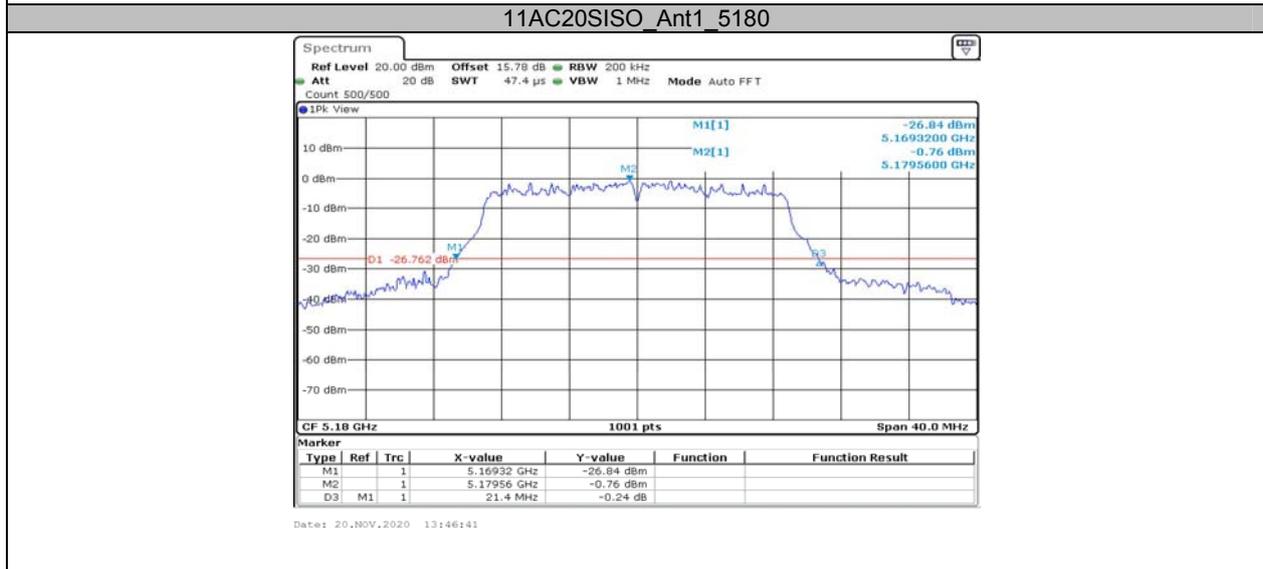
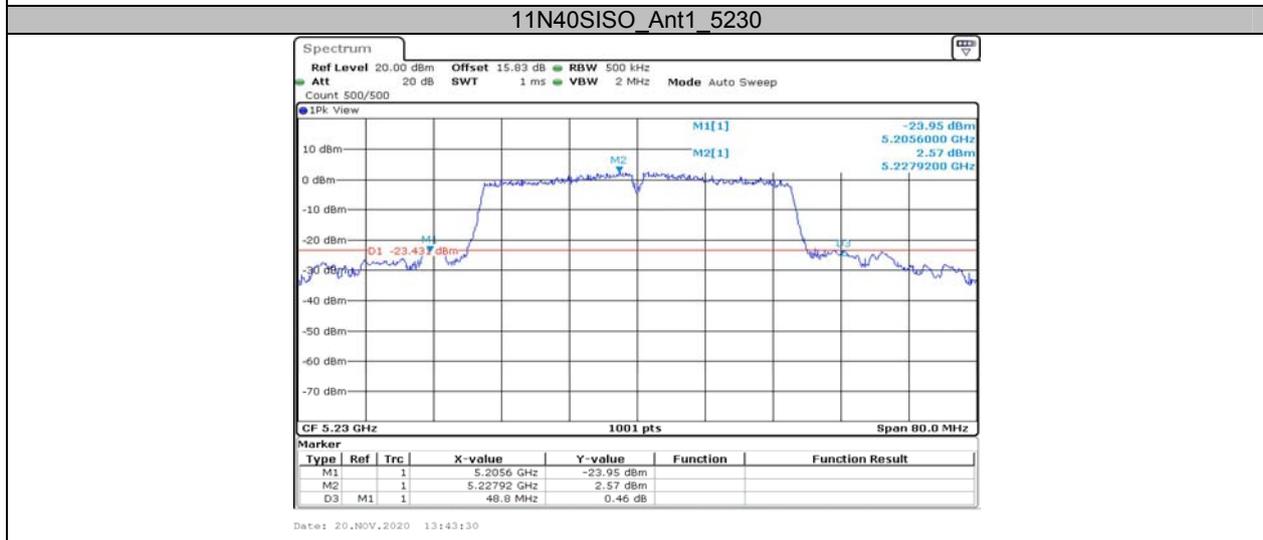
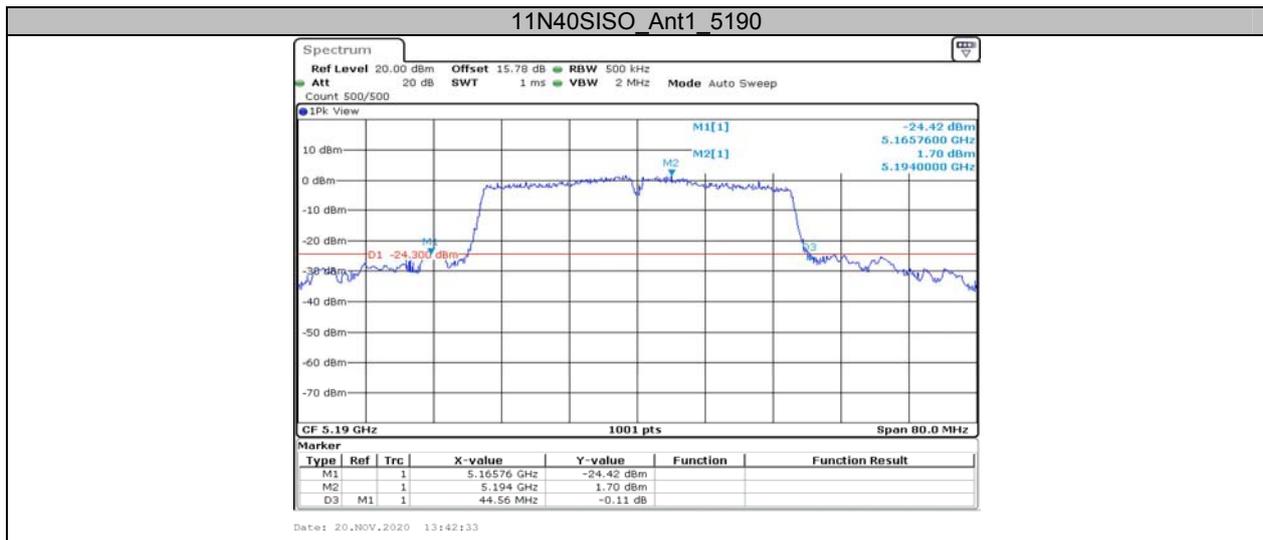
Appendix A1: Emission Bandwidth Test Result

TestMode	Antenna	Channel	26db EBW [MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	20.800	---	PASS
		5200	20.840	---	PASS
		5240	20.600	---	PASS
11N20SISO	Ant1	5180	21.360	---	PASS
		5200	21.280	---	PASS
		5240	21.200	---	PASS
11N40SISO	Ant1	5190	44.560	---	PASS
		5230	48.800	---	PASS
11AC20SISO	Ant1	5180	21.400	---	PASS
		5200	21.360	---	PASS
		5240	21.280	---	PASS
11AC40SISO	Ant1	5190	43.520	---	PASS
		5230	42.960	---	PASS
11AC80SISO	Ant1	5210	80.960	---	PASS

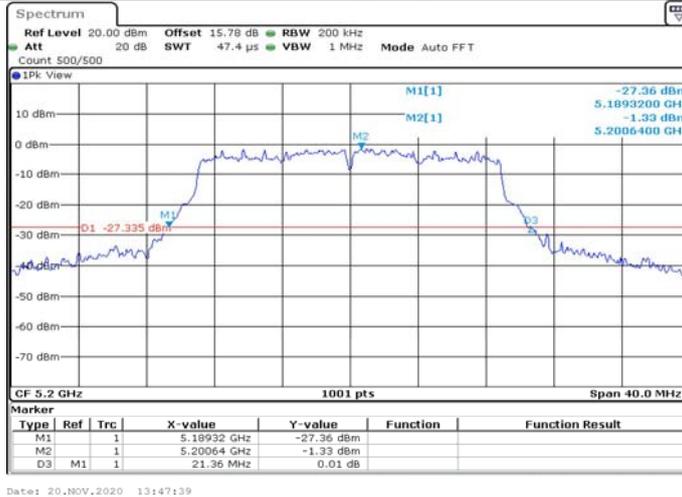
Test Graphs



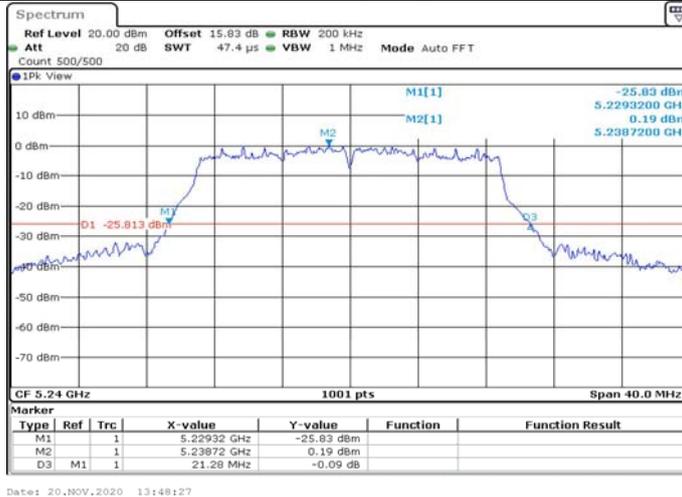




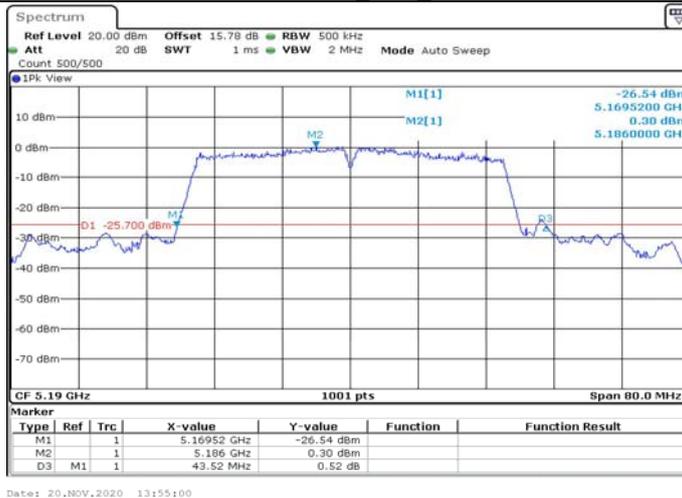
11AC20SISO_Ant1_5200

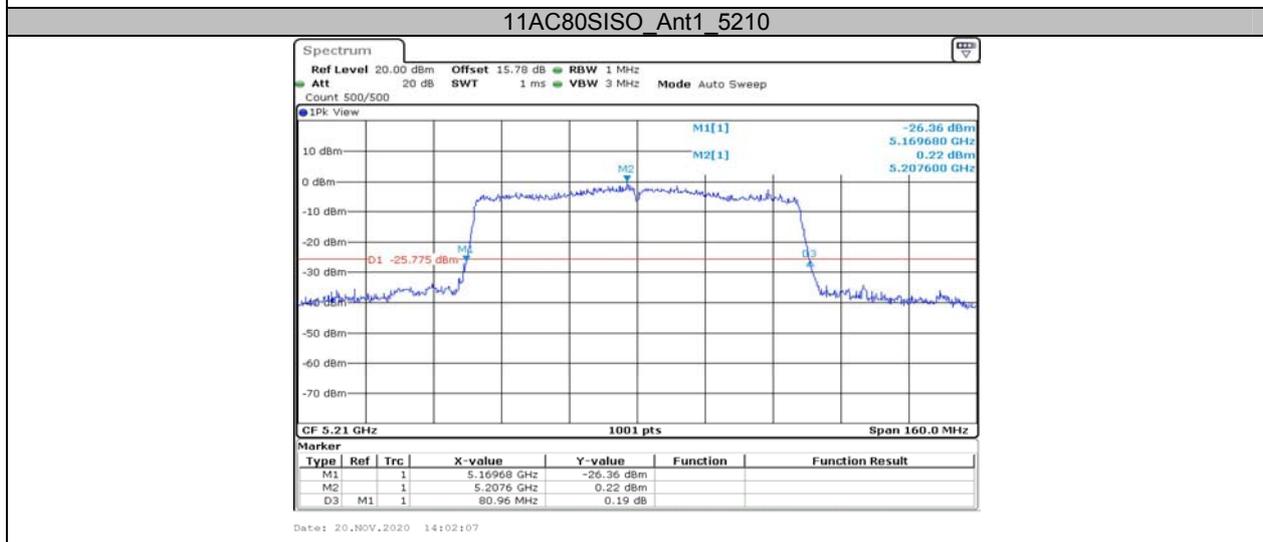
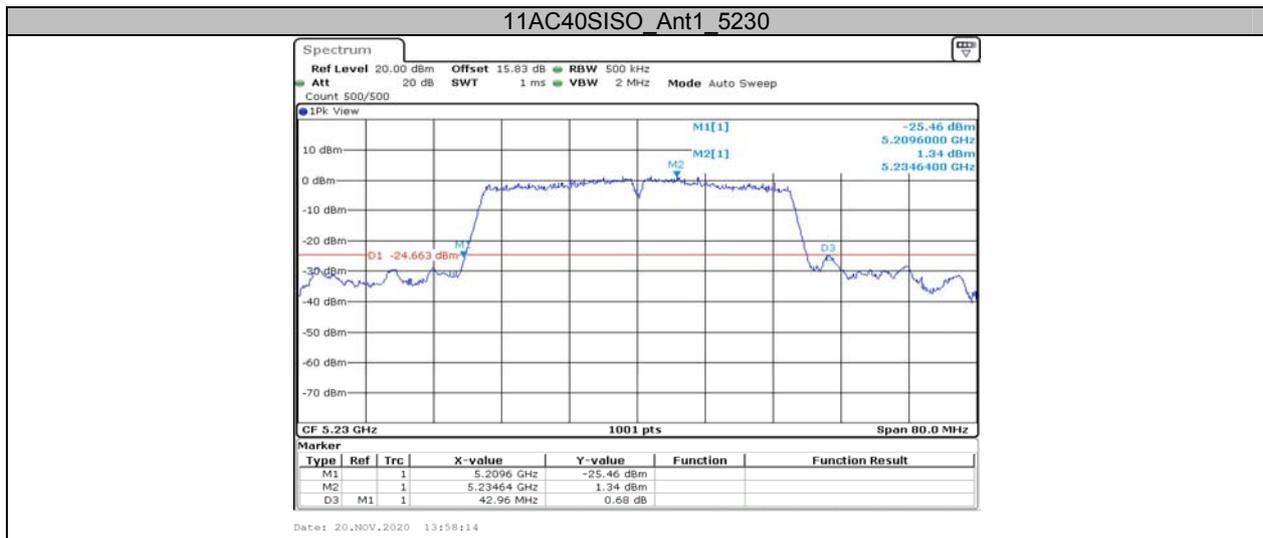


11AC20SISO_Ant1_5240



11AC40SISO_Ant1_5190

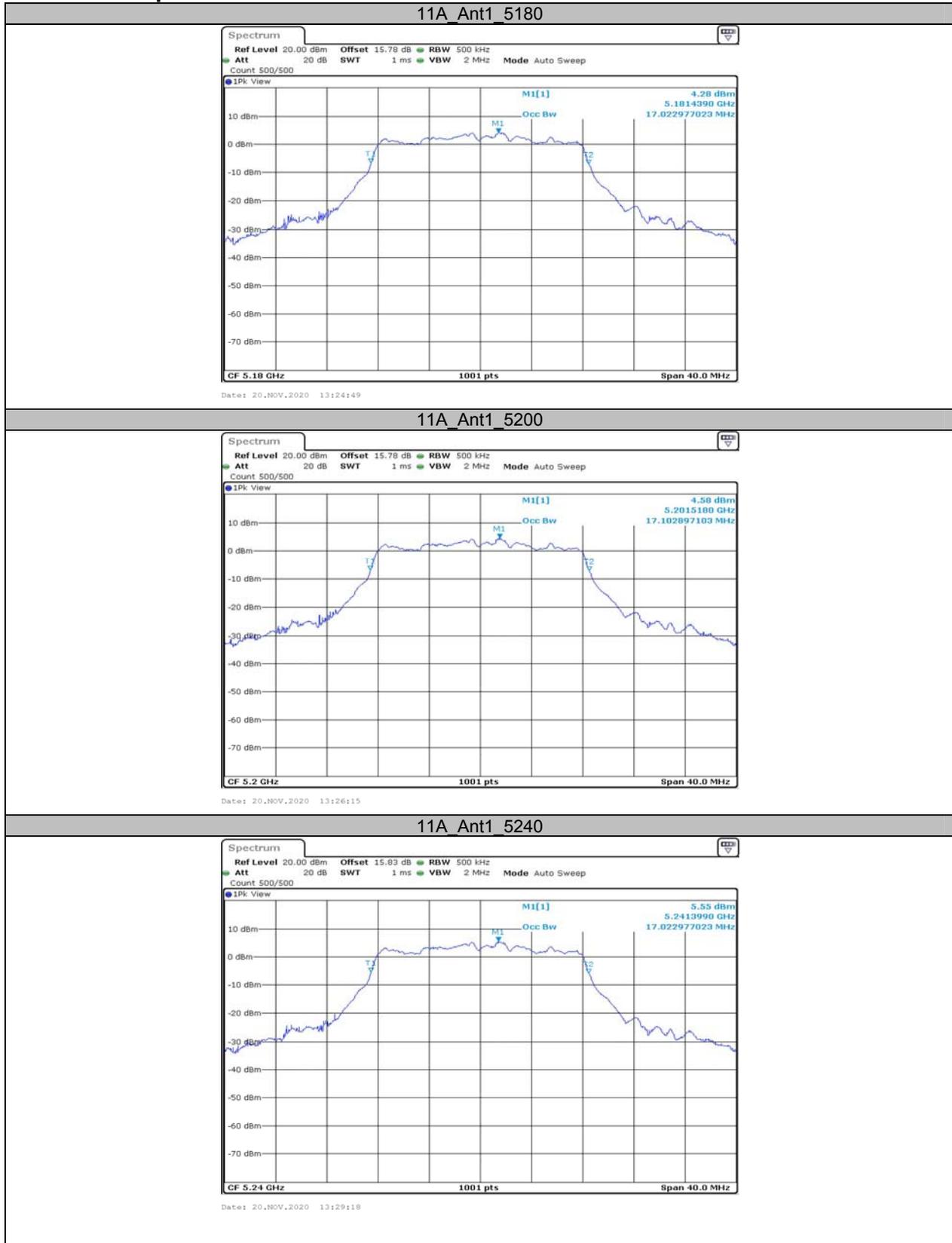


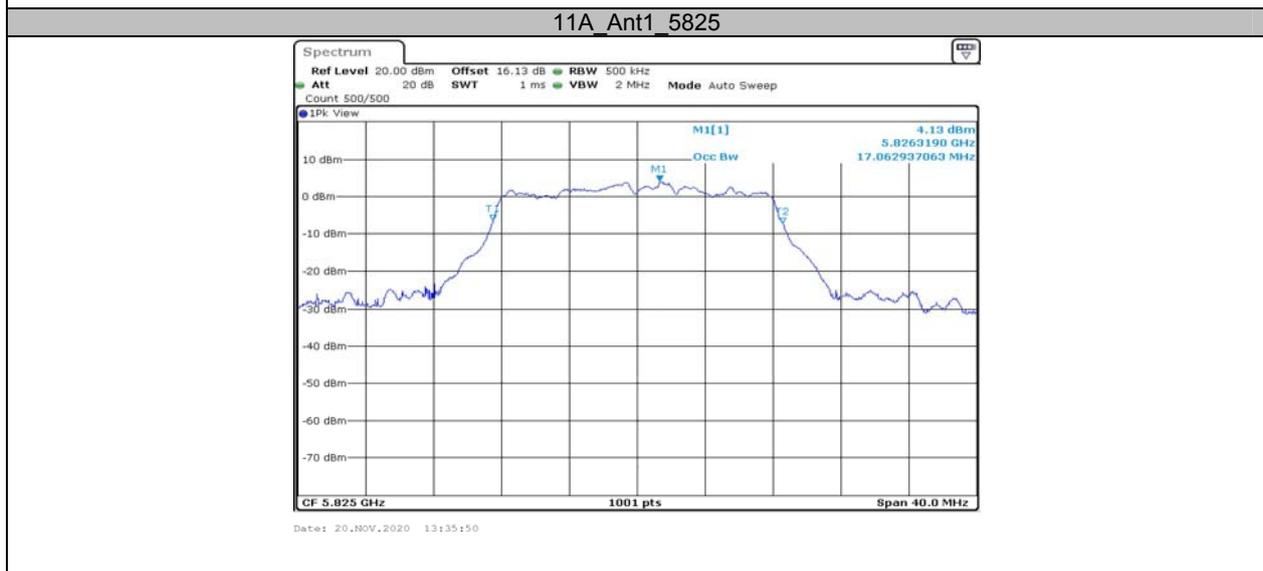


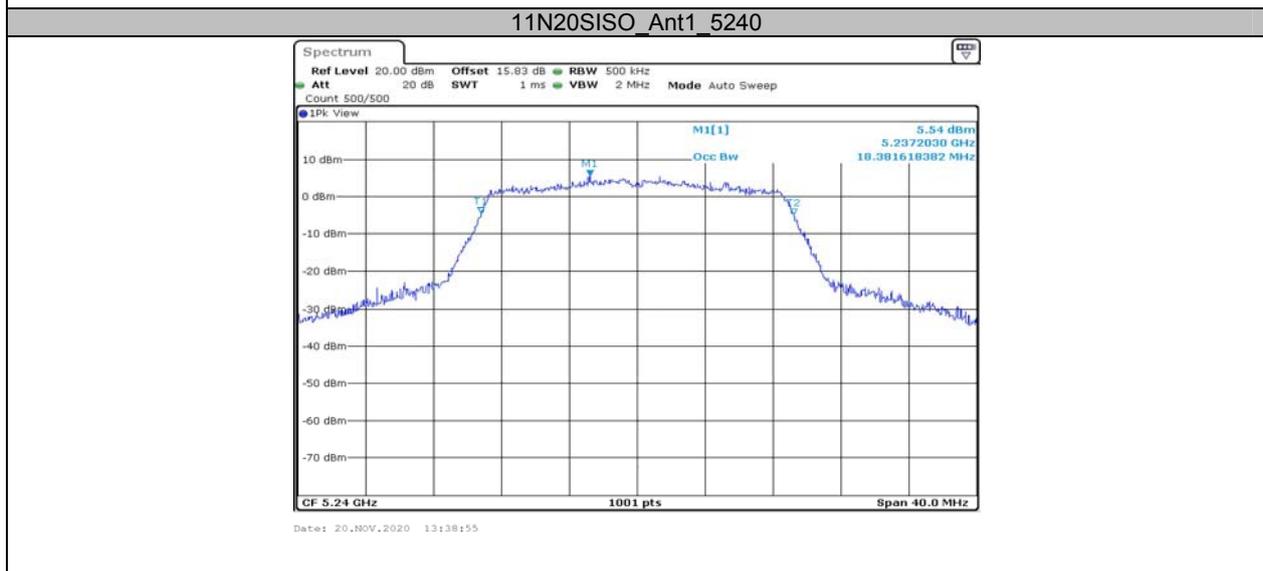
**Appendix A2: Occupied channel bandwidth
Test Result**

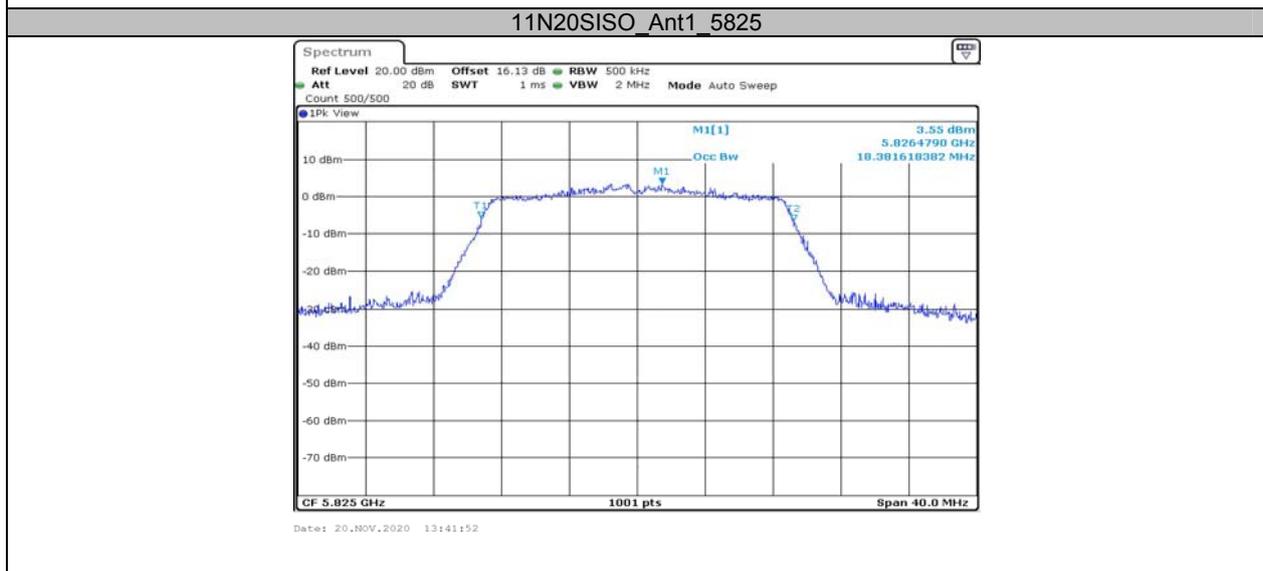
TestMode	Antenna	Channel	OCB [MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	17.023	---	PASS
		5200	17.103	---	PASS
		5240	17.023	---	PASS
		5745	16.983	---	PASS
		5785	16.983	---	PASS
		5825	17.063	---	PASS
11N20SISO	Ant1	5180	18.342	---	PASS
		5200	18.382	---	PASS
		5240	18.382	---	PASS
		5745	18.382	---	PASS
		5785	18.342	---	PASS
		5825	18.382	---	PASS
11N40SISO	Ant1	5190	36.843	---	PASS
		5230	36.763	---	PASS
		5755	36.763	---	PASS
		5795	36.763	---	PASS
11AC20SISO	Ant1	5180	18.422	---	PASS
		5200	18.462	---	PASS
		5240	18.462	---	PASS
		5745	18.422	---	PASS
		5785	18.382	---	PASS
		5825	18.462	---	PASS
11AC40SISO	Ant1	5190	37.003	---	PASS
		5230	36.923	---	PASS
		5755	37.003	---	PASS
		5795	37.083	---	PASS
11AC80SISO	Ant1	5210	75.764	---	PASS
		5775	75.924	---	PASS

Test Graphs

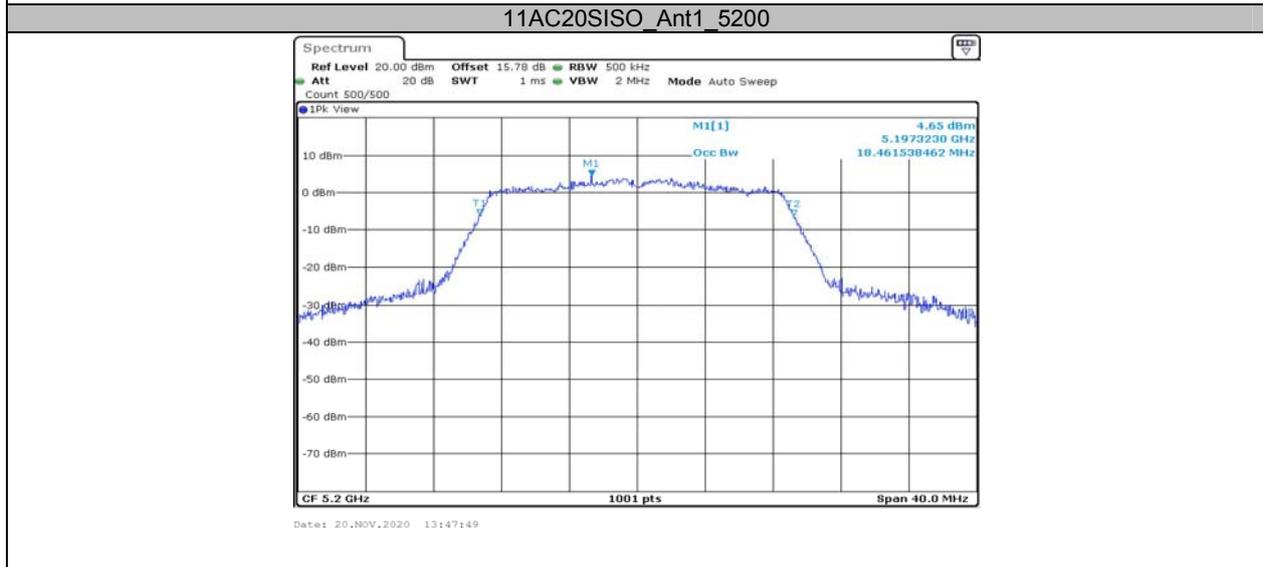
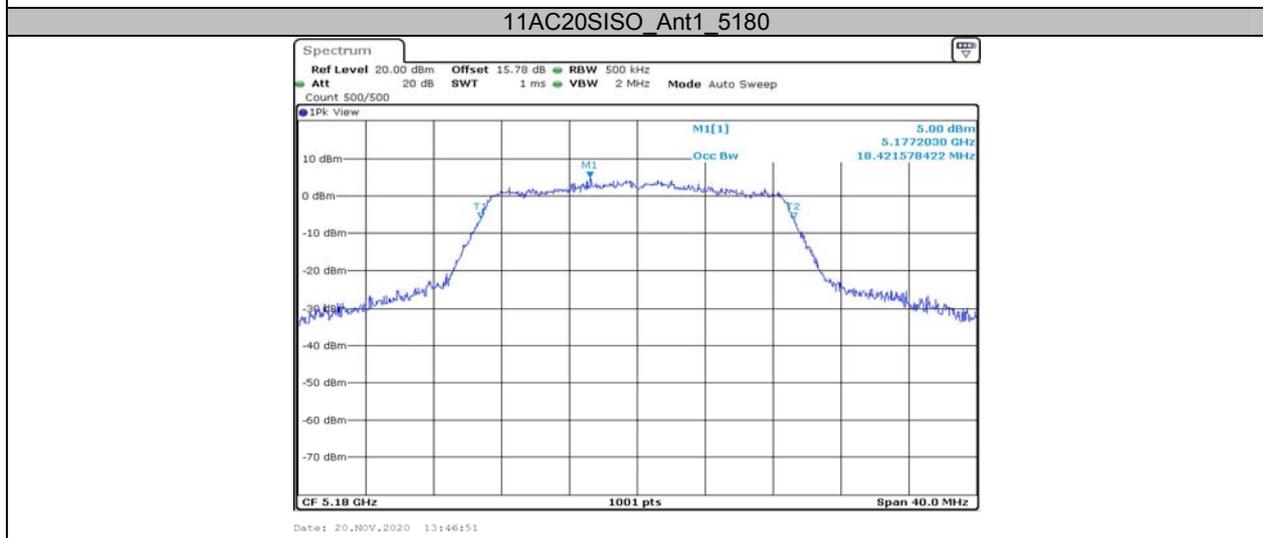


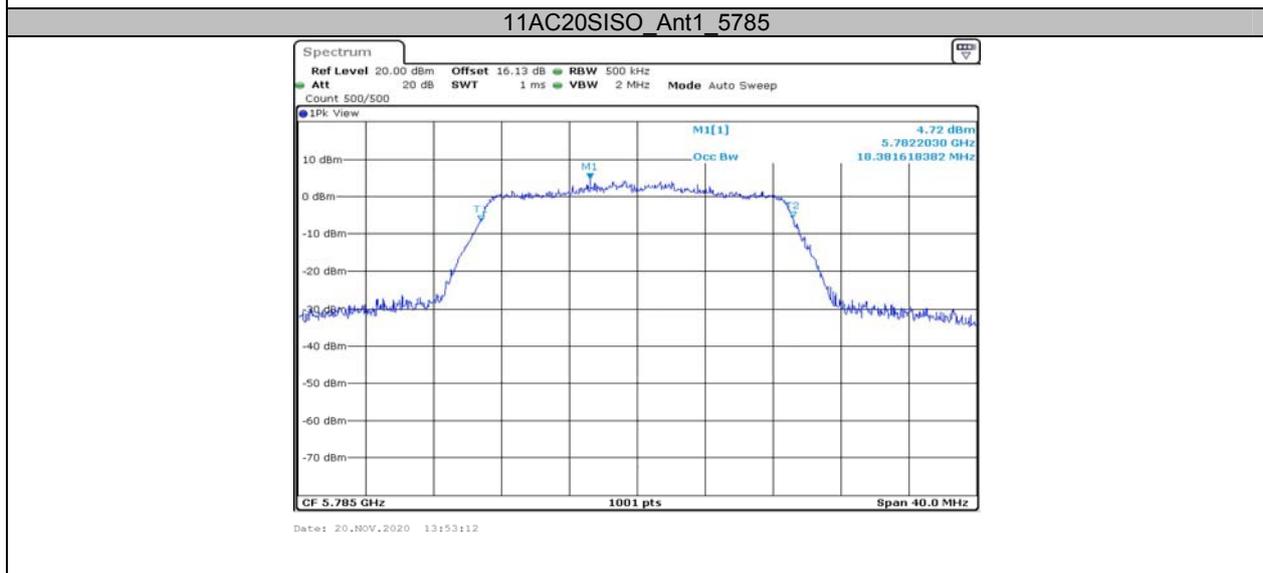
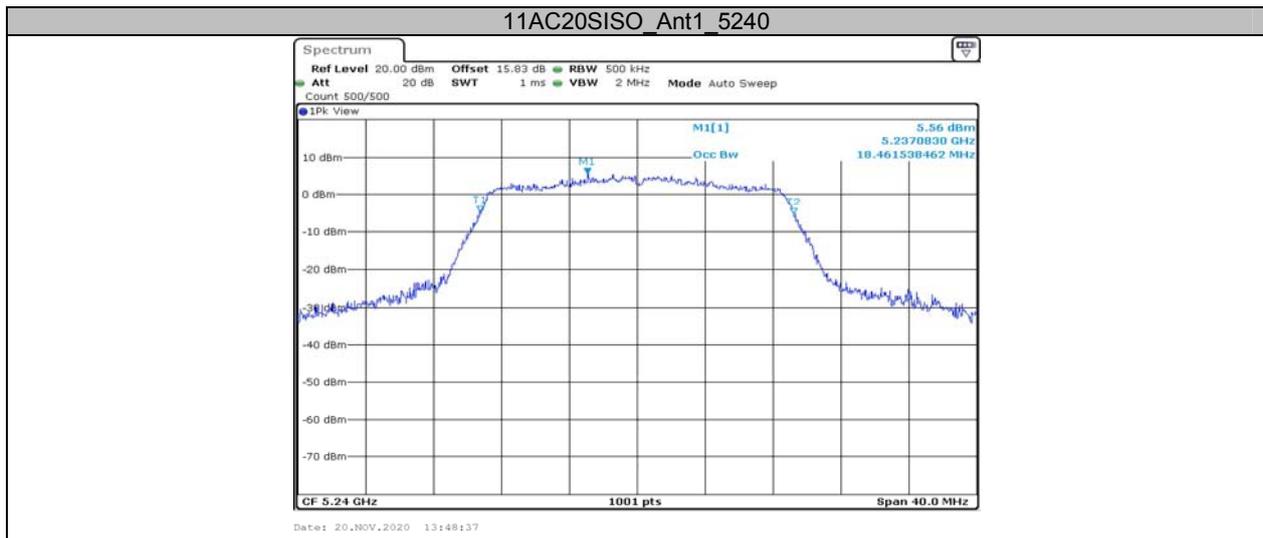


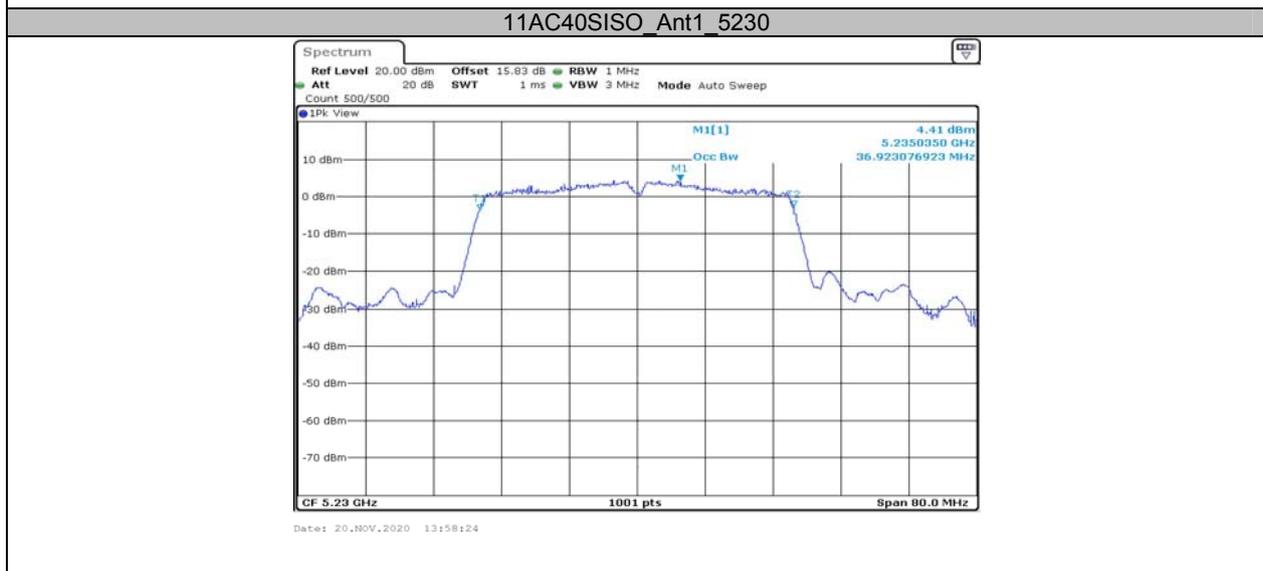
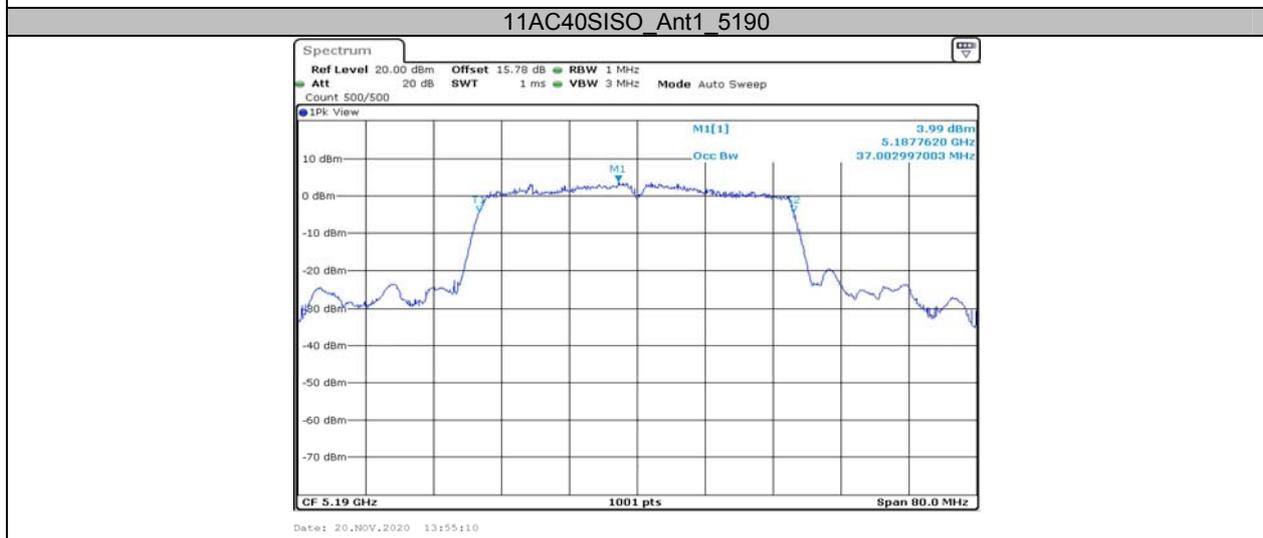
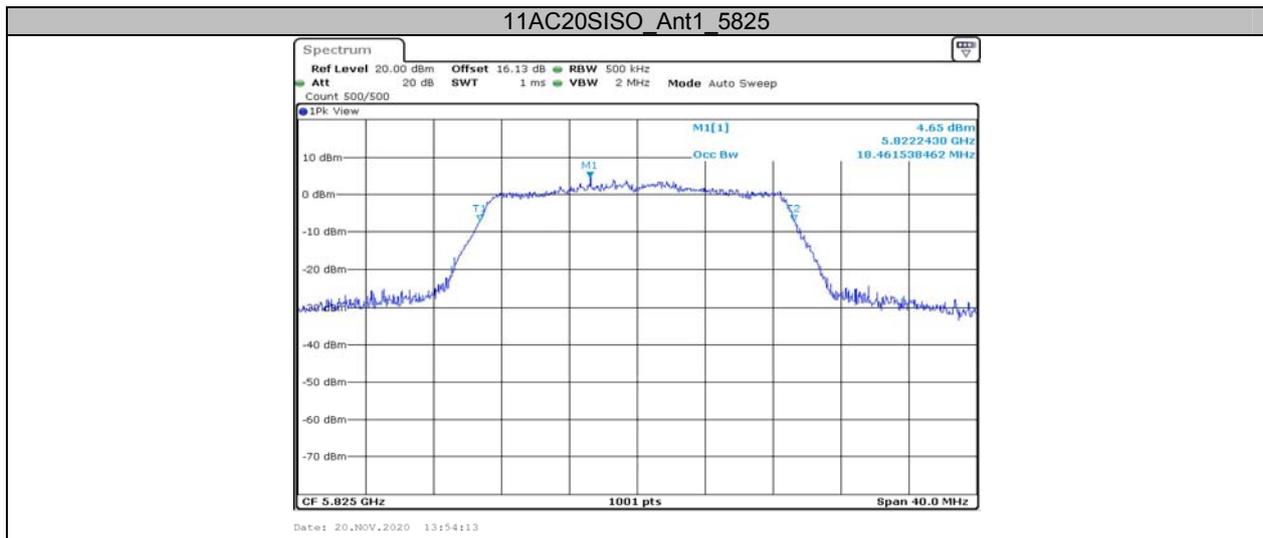


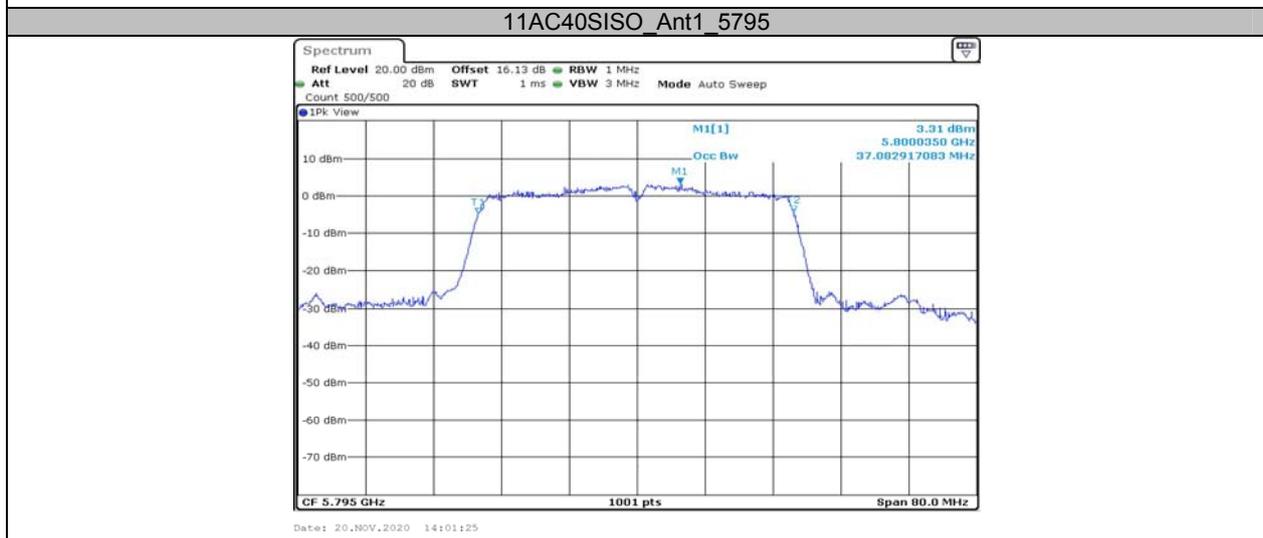
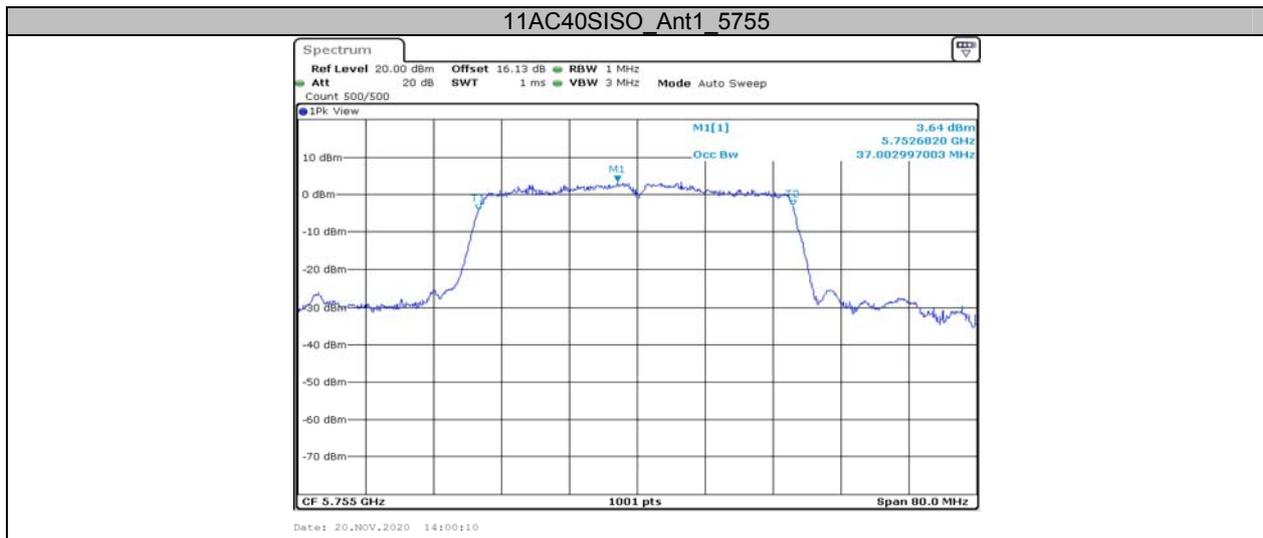


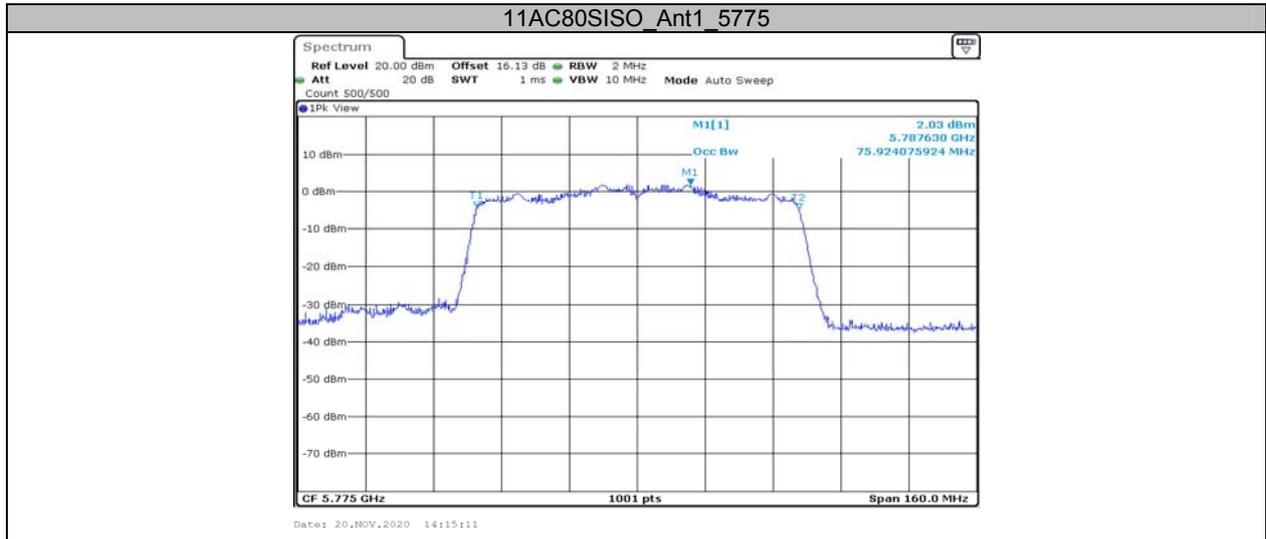








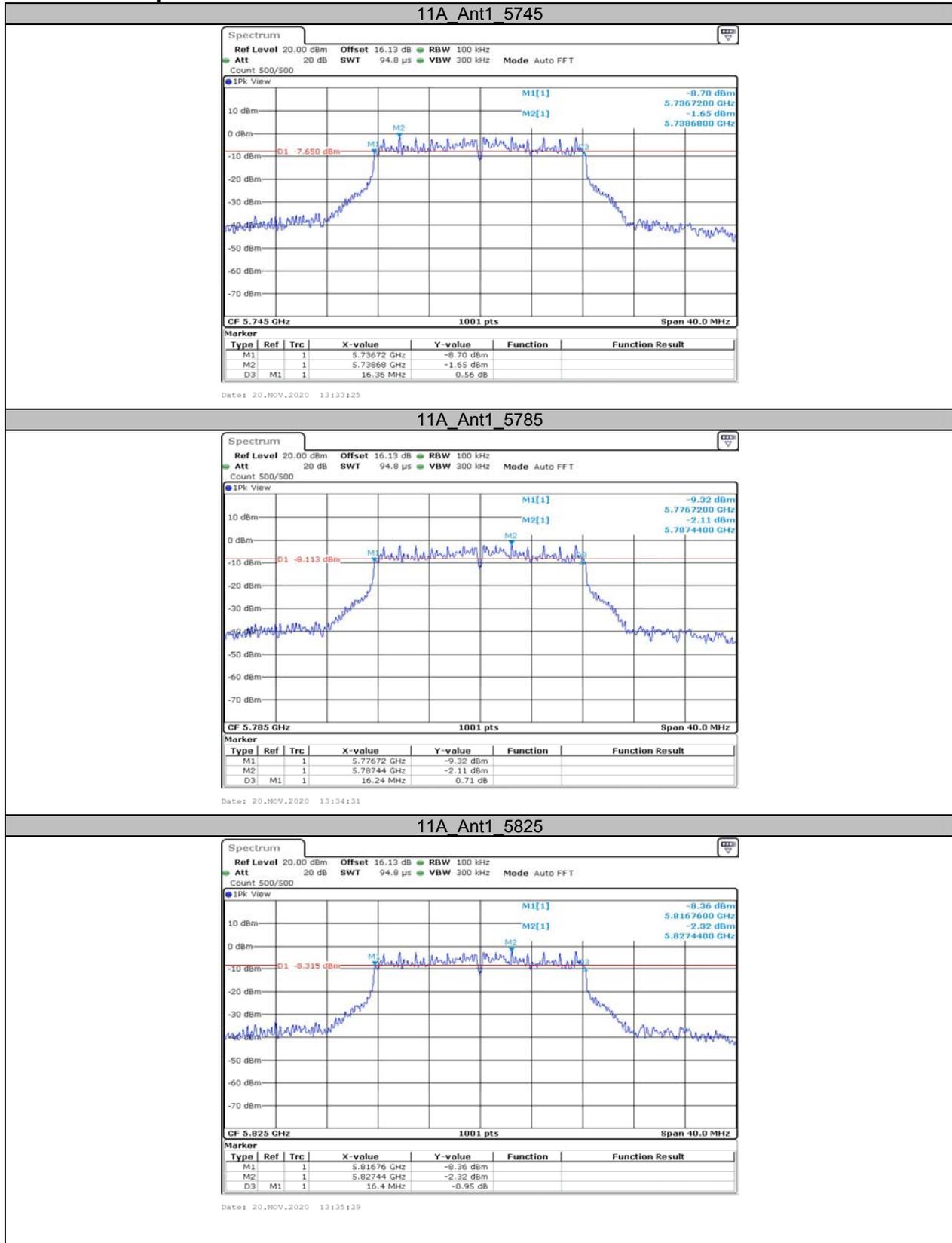


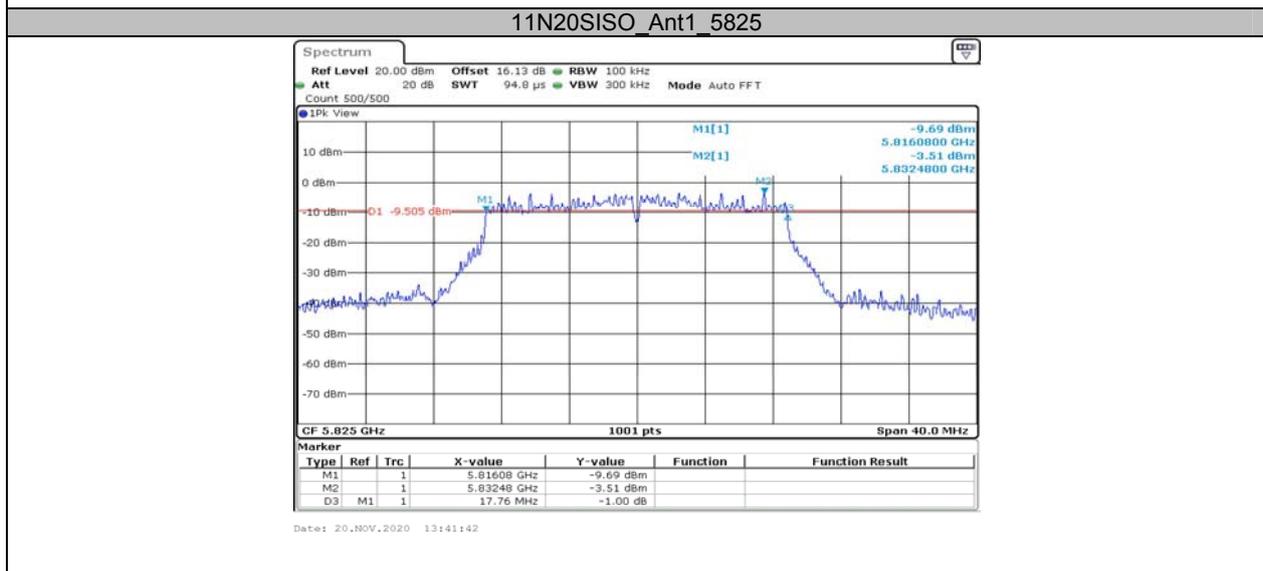
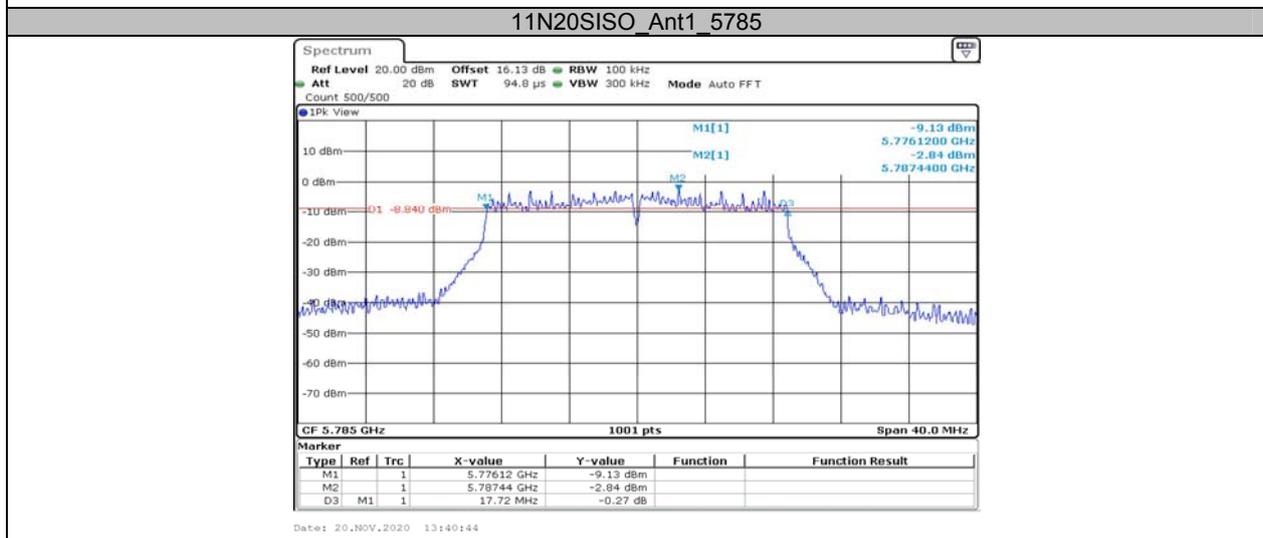
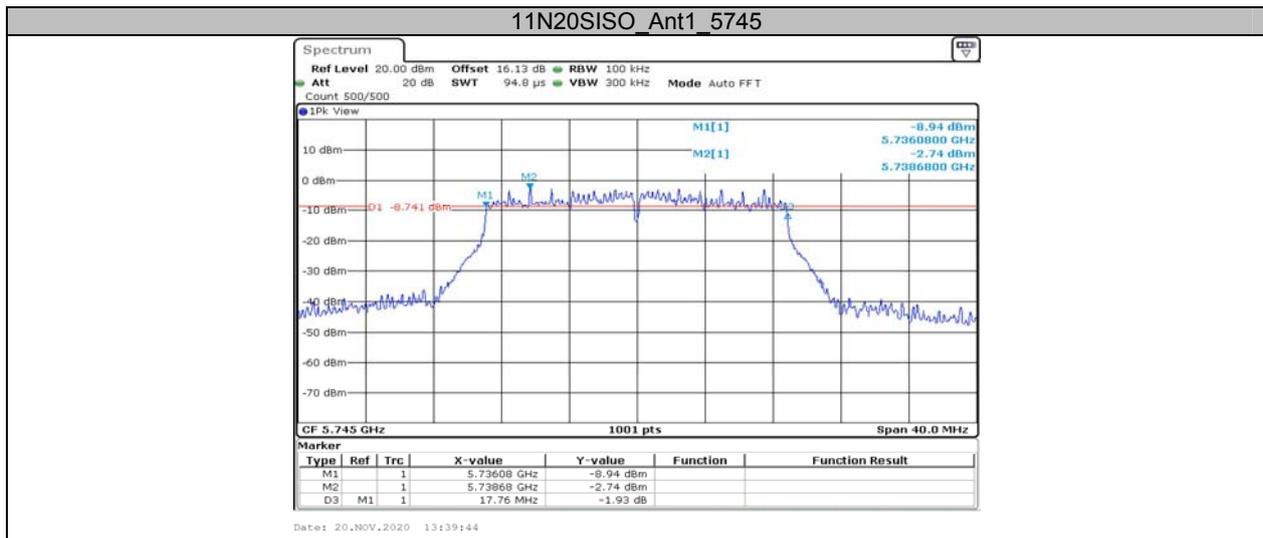


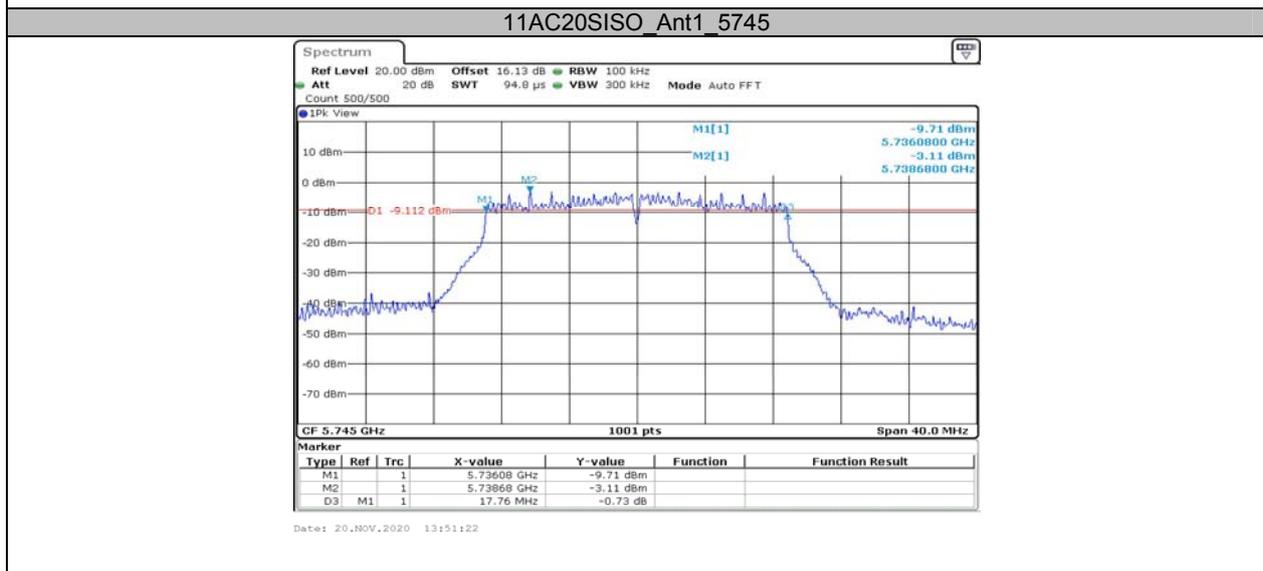
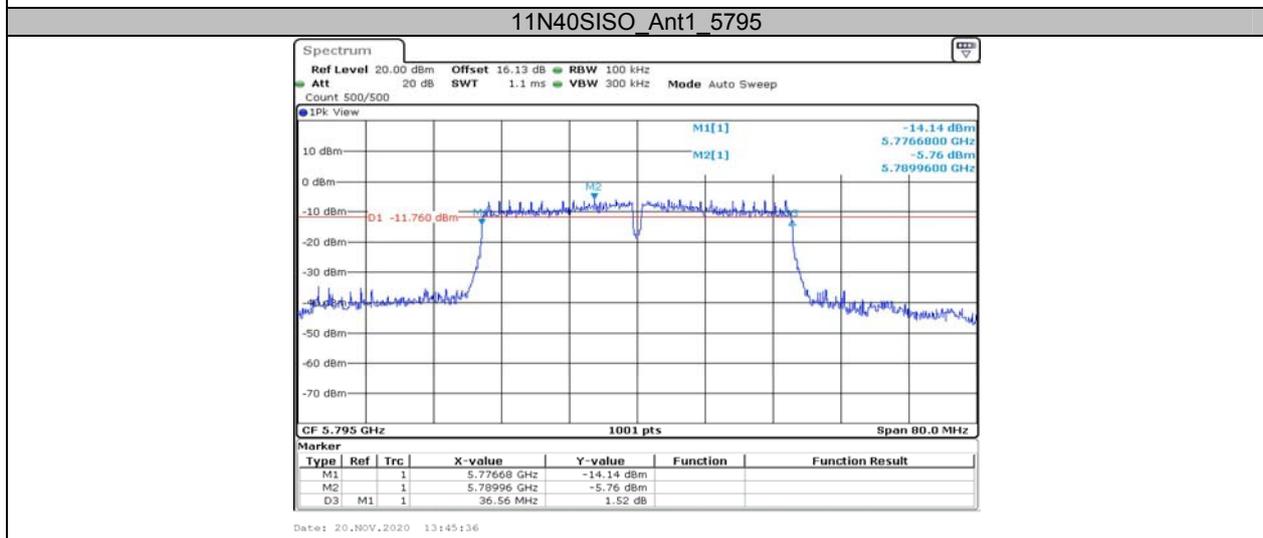
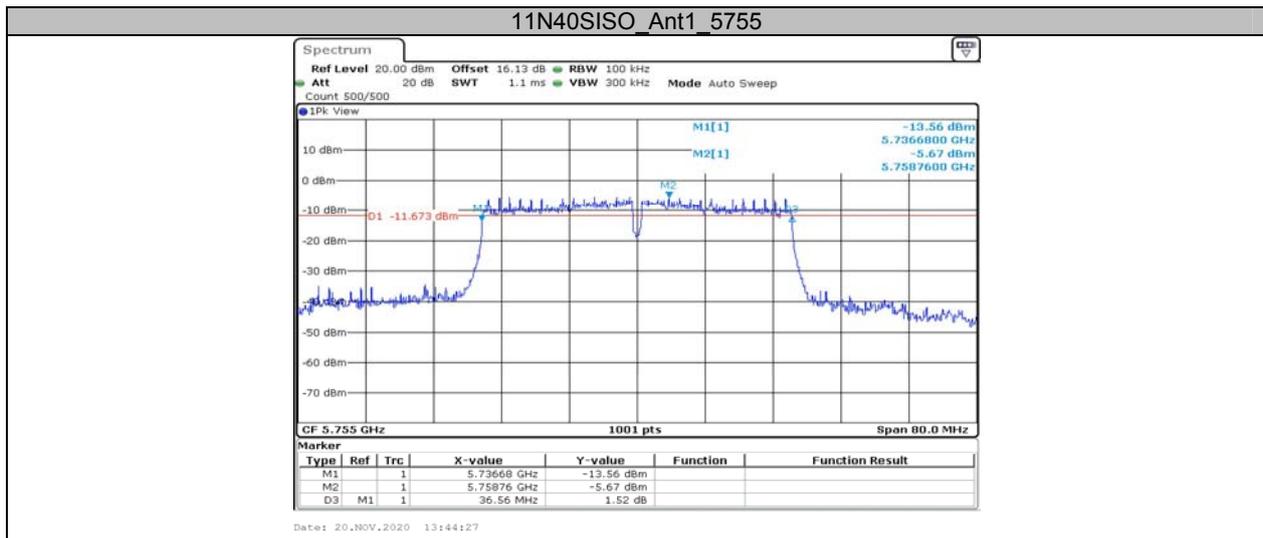
Appendix A3: Min emission bandwidth Test Result

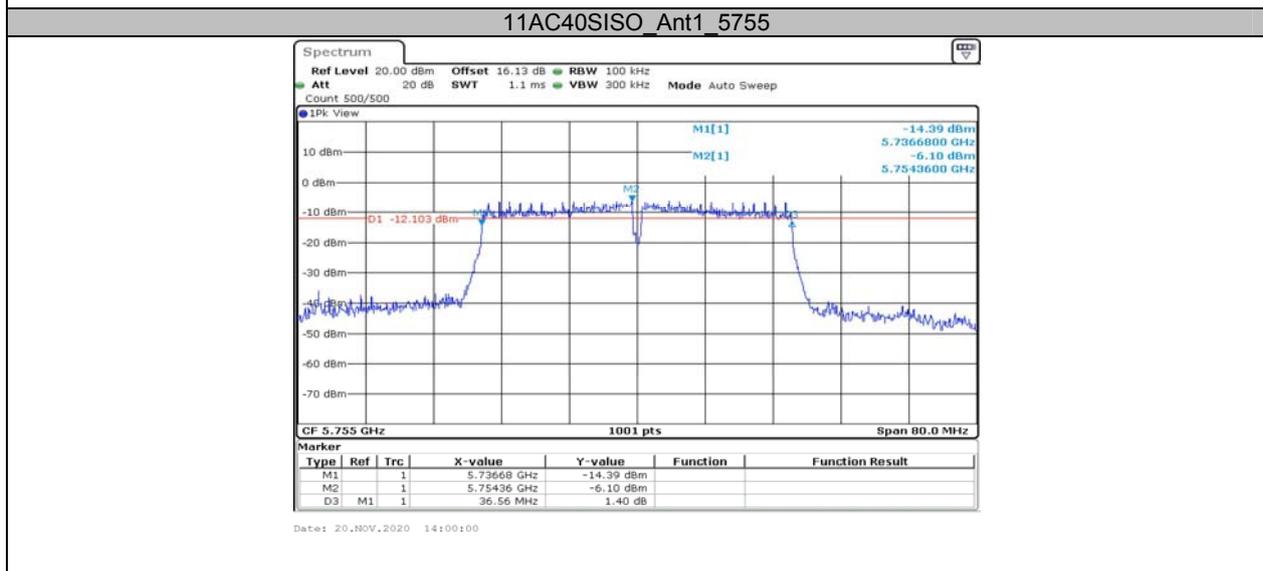
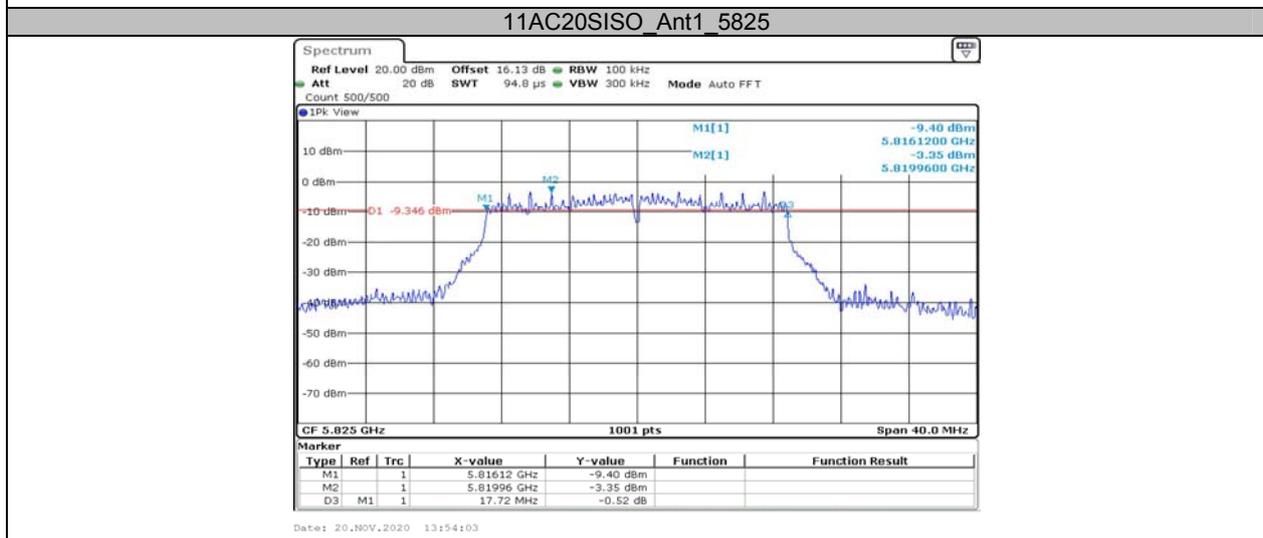
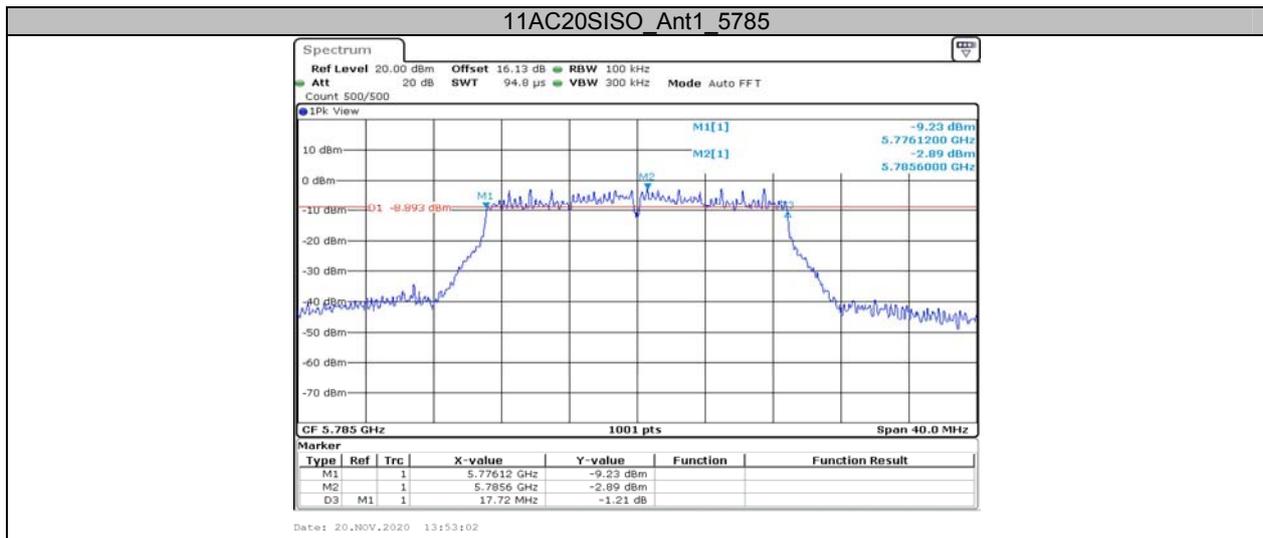
TestMode	Antenna	Channel	6db EBW [MHz]	Limit[MHz]	Verdict
11A	Ant1	5745	16.360	0.5	PASS
		5785	16.240	0.5	PASS
		5825	16.400	0.5	PASS
11N20SISO	Ant1	5745	17.760	0.5	PASS
		5785	17.720	0.5	PASS
		5825	17.760	0.5	PASS
11N40SISO	Ant1	5755	36.560	0.5	PASS
		5795	36.560	0.5	PASS
11AC20SISO	Ant1	5745	17.760	0.5	PASS
		5785	17.720	0.5	PASS
		5825	17.720	0.5	PASS
11AC40SISO	Ant1	5755	36.560	0.5	PASS
		5795	36.560	0.5	PASS
11AC80SISO	Ant1	5775	75.520	0.5	PASS

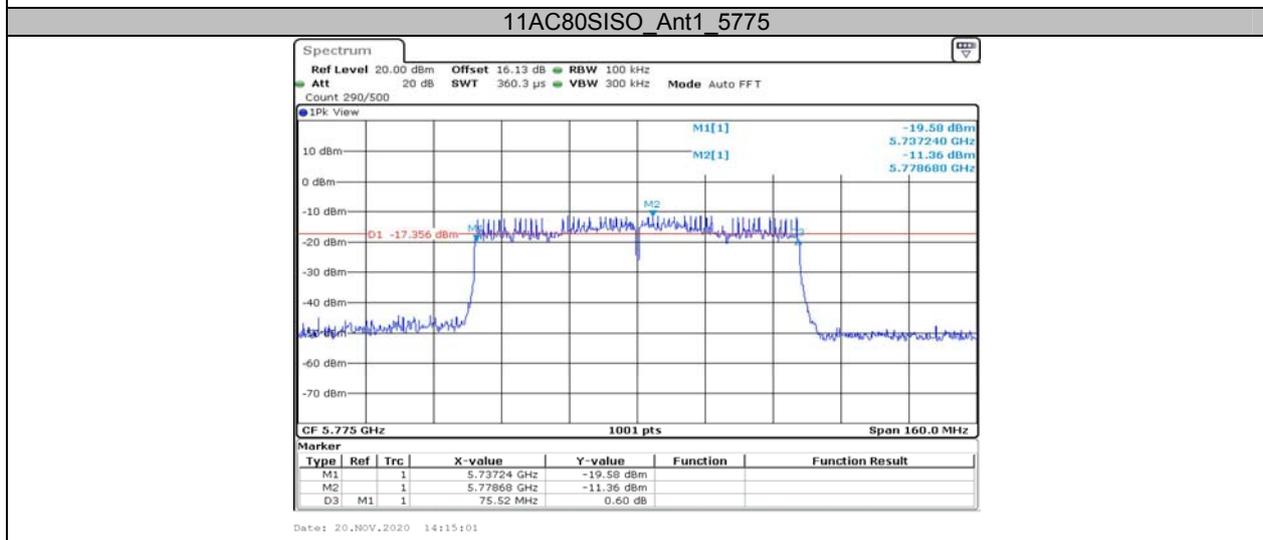
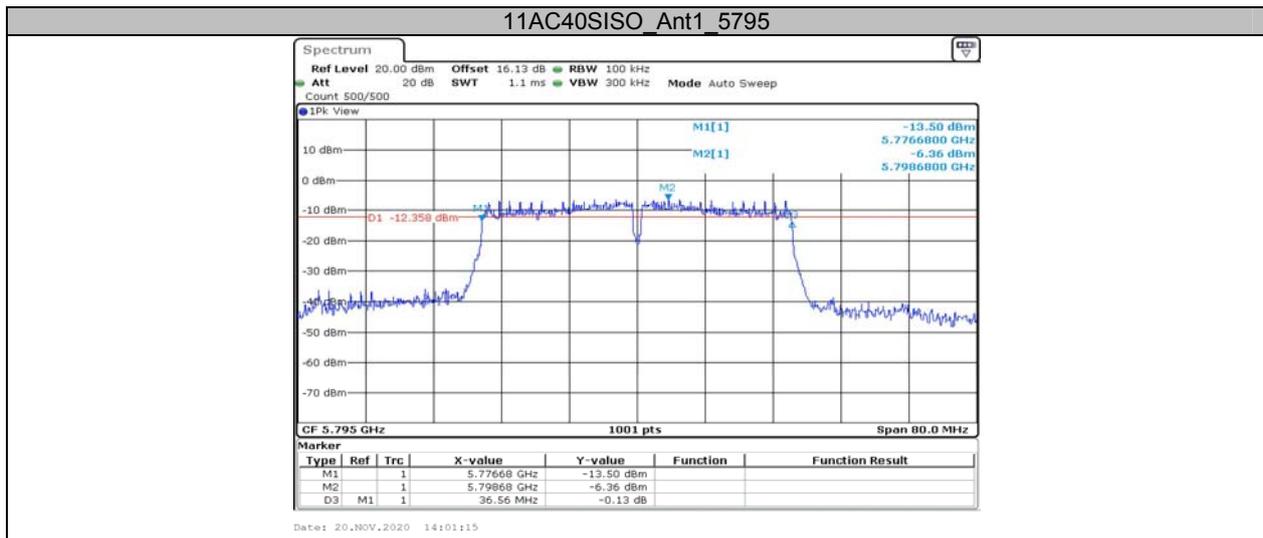
Test Graphs











Appendix B: Maximum conducted output power Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
11A	Ant1	5180	10.53	<=23.98	PASS
		5200	10.90	<=23.98	PASS
		5240	11.61	<=23.98	PASS
		5745	11.02	<=30	PASS
		5785	10.75	<=30	PASS
		5825	10.48	<=30	PASS
11N20SISO	Ant1	5180	9.56	<=23.98	PASS
		5200	9.55	<=23.98	PASS
		5240	9.98	<=23.98	PASS
		5745	9.46	<=30	PASS
		5785	9.05	<=30	PASS
		5825	8.53	<=30	PASS
11N40SISO	Ant1	5190	10.66	<=23.98	PASS
		5230	11.31	<=23.98	PASS
		5755	10.28	<=30	PASS
		5795	9.56	<=30	PASS
11AC20SISO	Ant1	5180	9.76	<=23.98	PASS
		5200	10.18	<=23.98	PASS
		5240	10.08	<=23.98	PASS
		5745	9.66	<=30	PASS
		5785	9.05	<=30	PASS
		5825	8.43	<=30	PASS
11AC40SISO	Ant1	5190	10.08	<=23.98	PASS
		5230	9.36	<=23.98	PASS
		5755	9.38	<=30	PASS
		5795	8.67	<=30	PASS
11AC80SISO	Ant1	5210	8.01	<=23.98	PASS
		5775	7.07	<=30	PASS

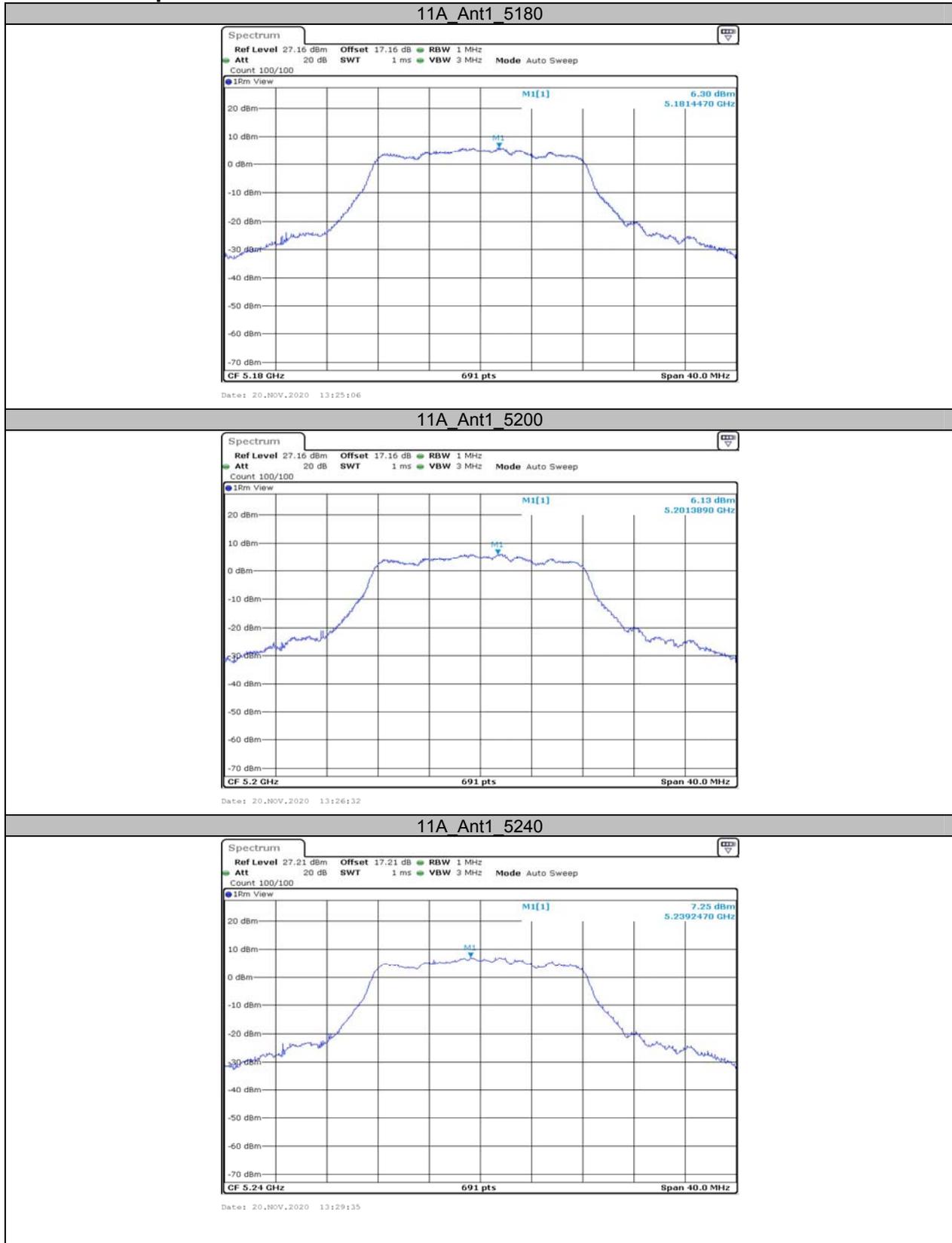
Note: EUT is client.

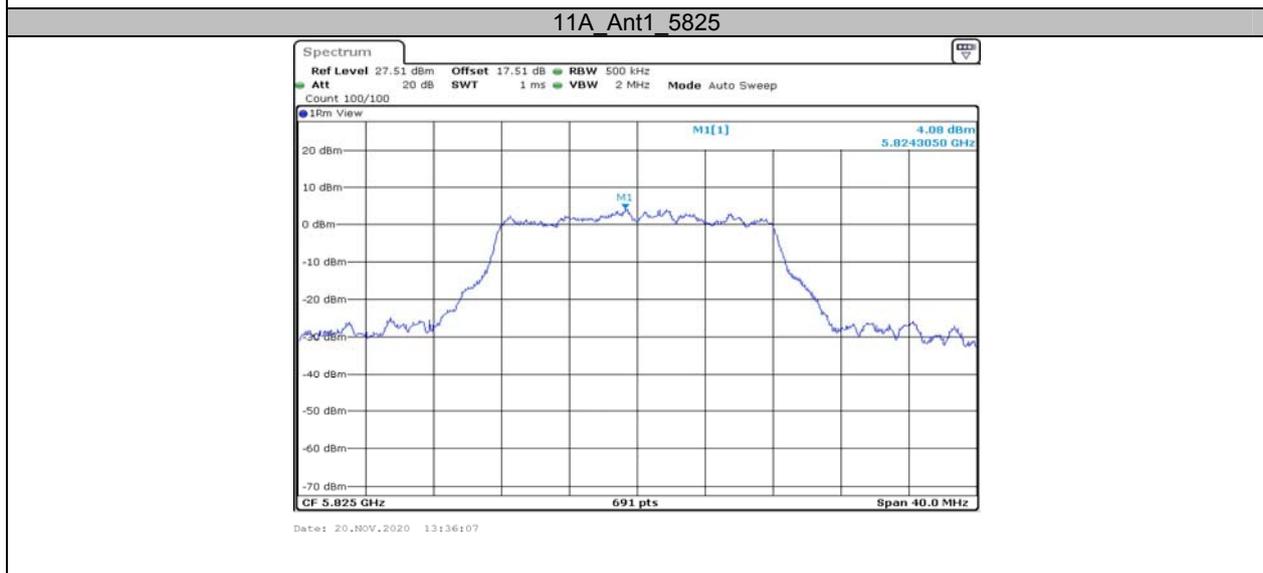
**Appendix C: Maximum power spectral density
Test Result**

TestMode	Antenna	Channel	Result [dBm/MHz]	Limit[dBm/MHz]	Verdict
11A	Ant1	5180	6.30	<=11	PASS
		5200	6.13	<=11	PASS
		5240	7.25	<=11	PASS
		5745	4.80	<=30	PASS
		5785	4.06	<=30	PASS
		5825	4.08	<=30	PASS
11N20SISO	Ant1	5180	5.89	<=11	PASS
		5200	5.51	<=11	PASS
		5240	6.44	<=11	PASS
		5745	4.26	<=30	PASS
		5785	3.66	<=30	PASS
		5825	3.84	<=30	PASS
11N40SISO	Ant1	5190	4.42	<=11	PASS
		5230	4.86	<=11	PASS
		5755	1.58	<=30	PASS
		5795	1.18	<=30	PASS
11AC20SISO	Ant1	5180	6.25	<=11	PASS
		5200	4.50	<=11	PASS
		5240	6.36	<=11	PASS
		5745	4.89	<=30	PASS
		5785	3.65	<=30	PASS
		5825	2.90	<=30	PASS
11AC40SISO	Ant1	5190	2.71	<=11	PASS
		5230	3.38	<=11	PASS
		5755	1.75	<=30	PASS
		5795	0.48	<=30	PASS
11AC80SISO	Ant1	5210	-0.55	<=11	PASS
		5775	-2.35	<=30	PASS

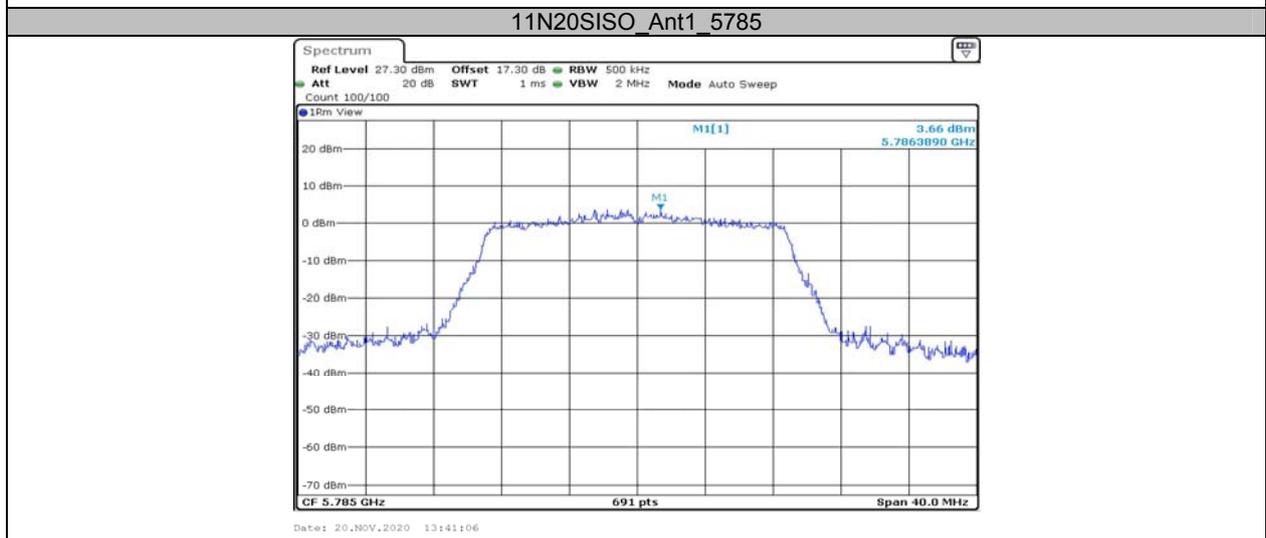
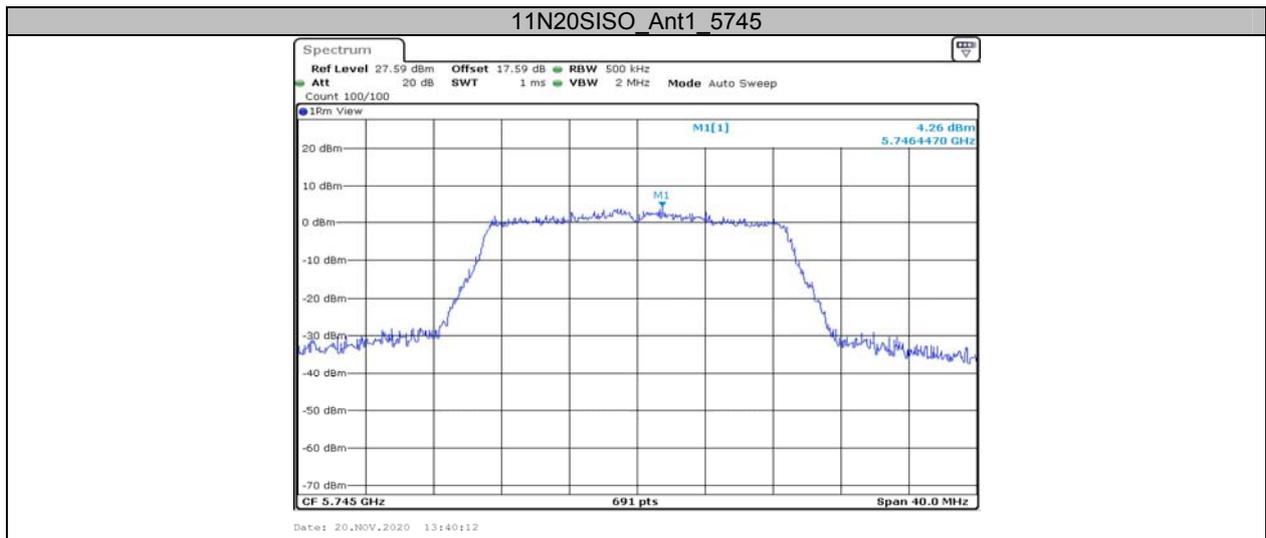
Note: 1. The Result and LimitUnit is dBm/500 kHz in the band 5.725–5.85 GHz.
 2. The Duty Cycle Factor and RBW Factor is compensated in the graph.

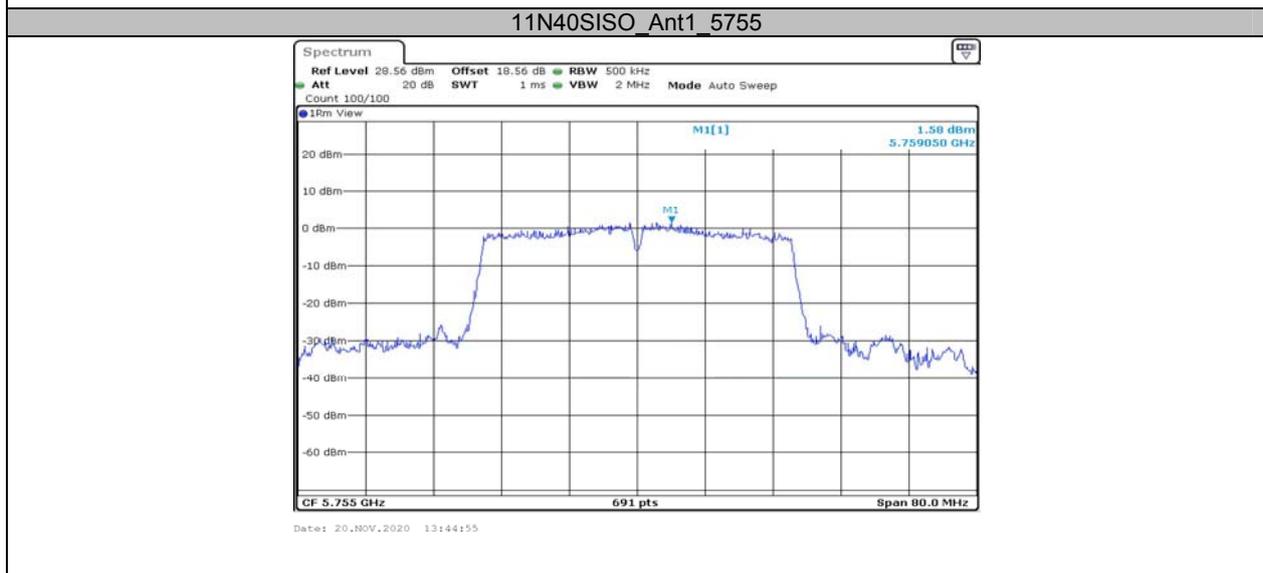
Test Graphs

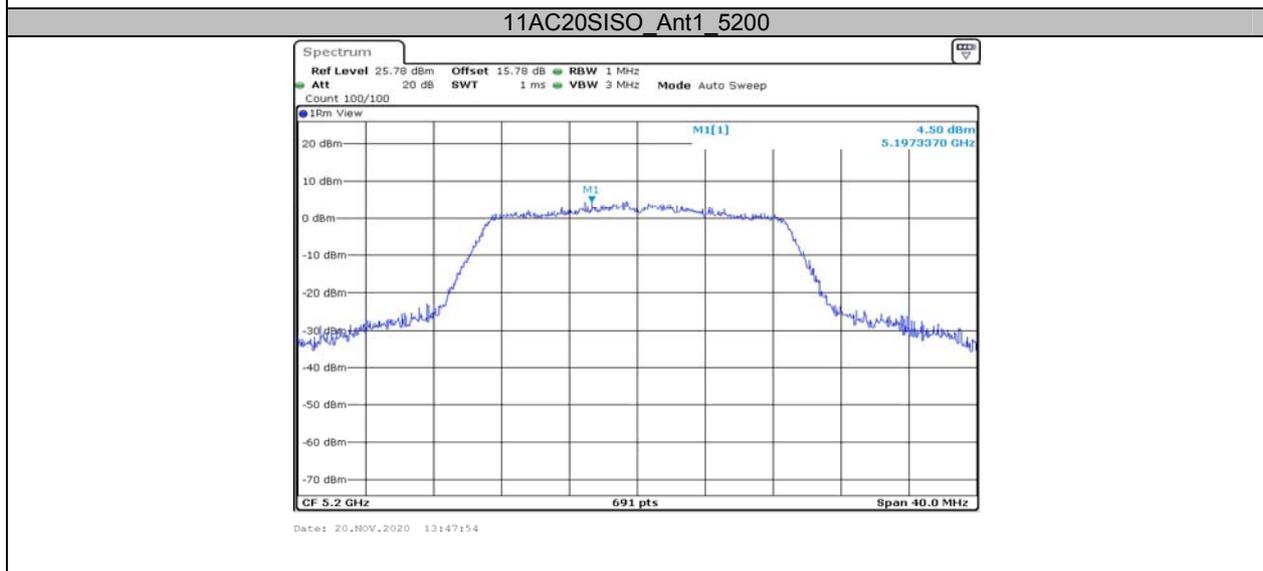
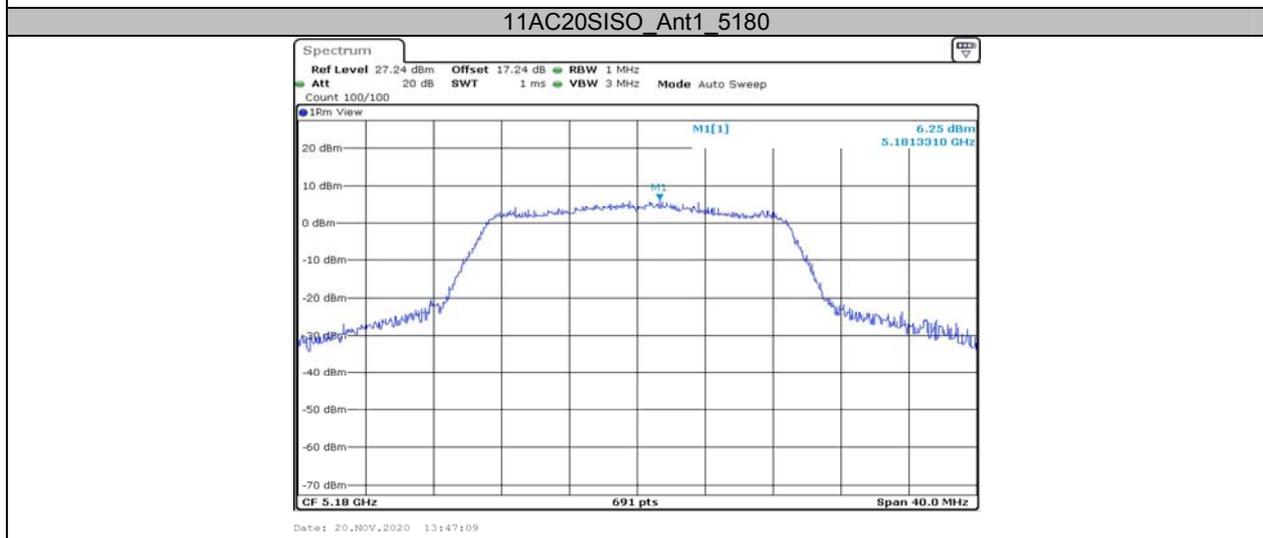




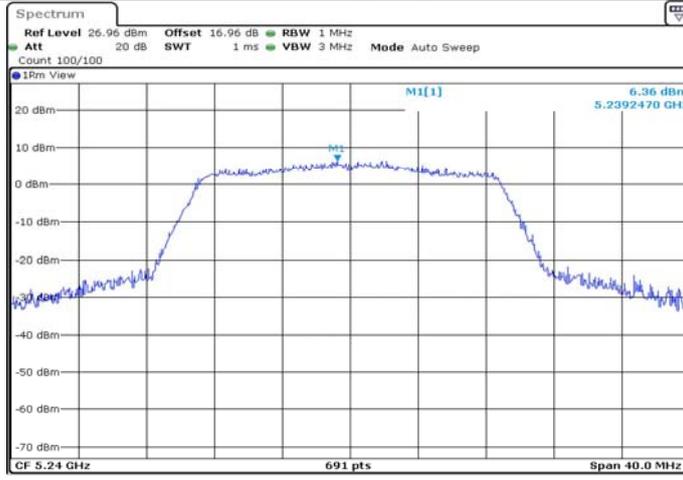








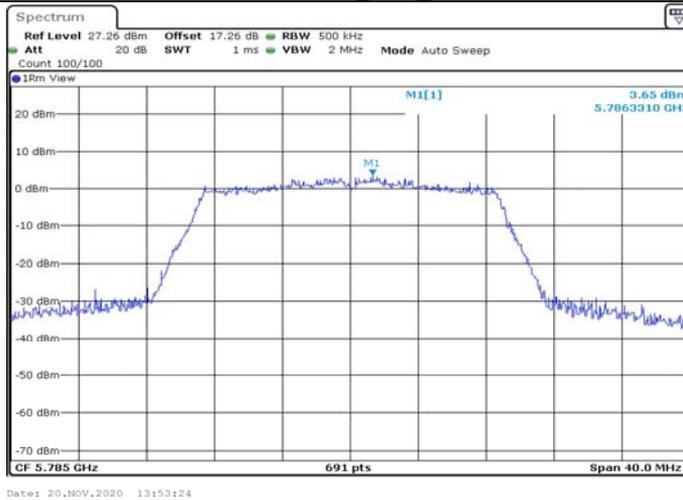
11AC20SISO_Ant1_5240

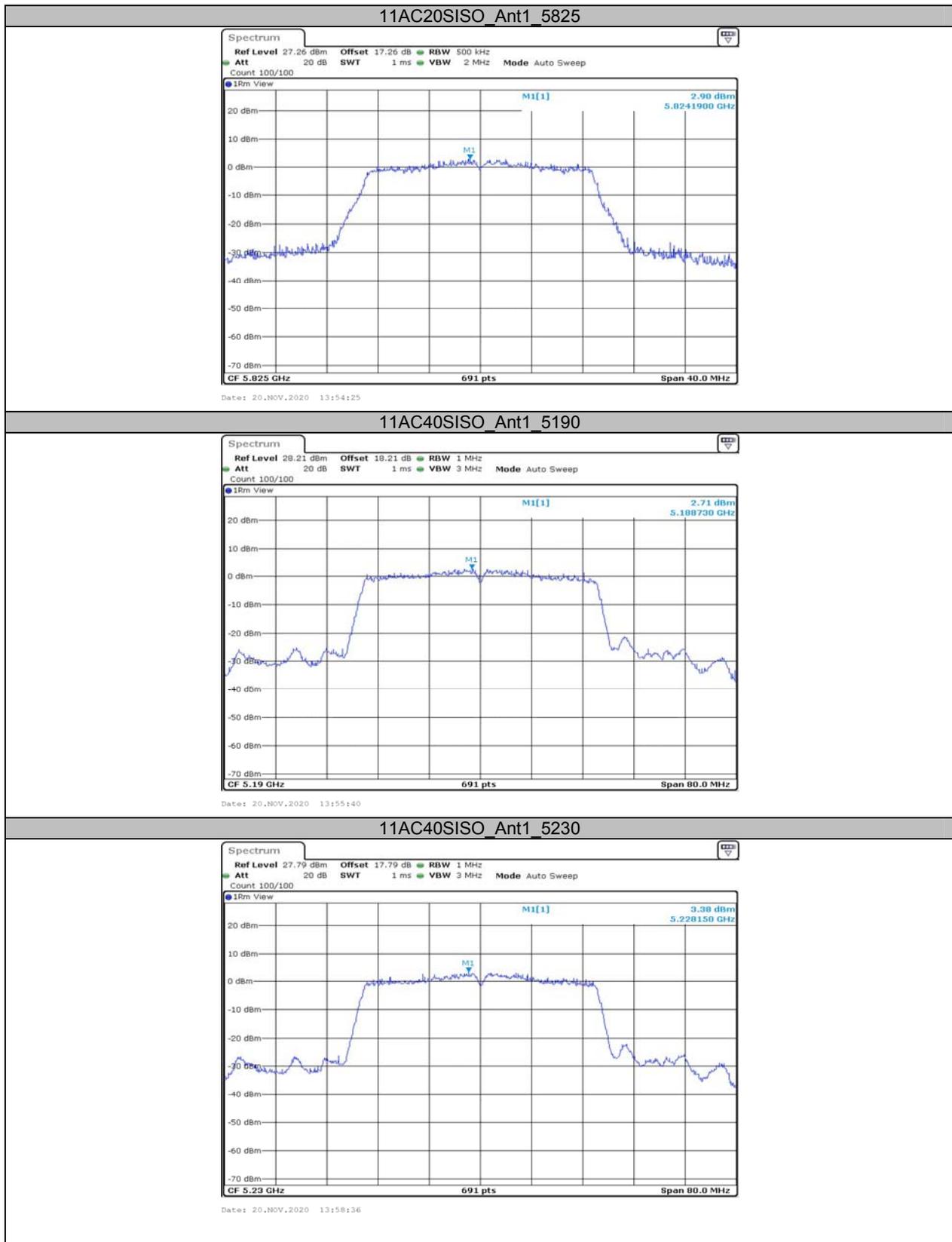


11AC20SISO_Ant1_5745

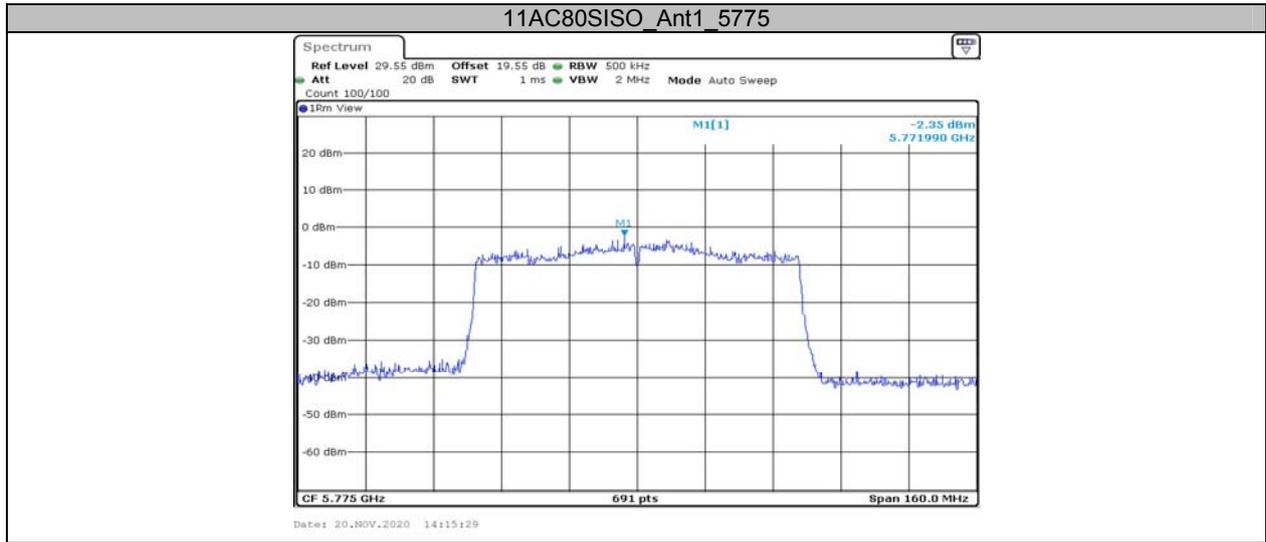


11AC20SISO_Ant1_5785









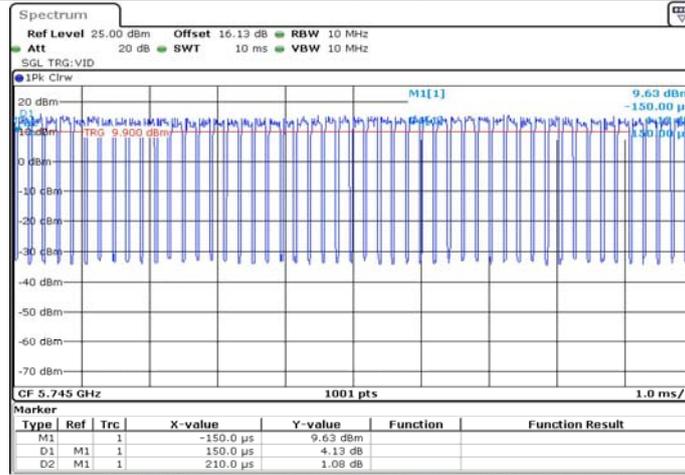
**Appendix D: Duty Cycle
Test Result**

TestMode	Antenna	Channel	TransmissionDuration [ms]	Transmission Period [ms]	Duty Cycle [%]
11A	Ant1	5180	0.16	0.22	72.73
		5745	0.15	0.21	71.43
11N20SISO	Ant1	5180	0.14	0.21	66.67
		5745	0.15	0.21	71.43
11N40SISO	Ant1	5190	0.08	0.14	57.14
		5755	0.08	0.14	57.14
11AC20SISO	Ant1	5180	0.15	0.21	71.43
		5745	0.14	0.21	66.67
11AC40SISO	Ant1	5190	0.08	0.14	57.14
		5755	0.07	0.13	53.85
11AC80SISO	Ant1	5210	0.05	0.11	45.45
		5775	0.05	0.11	45.45

Test Graphs

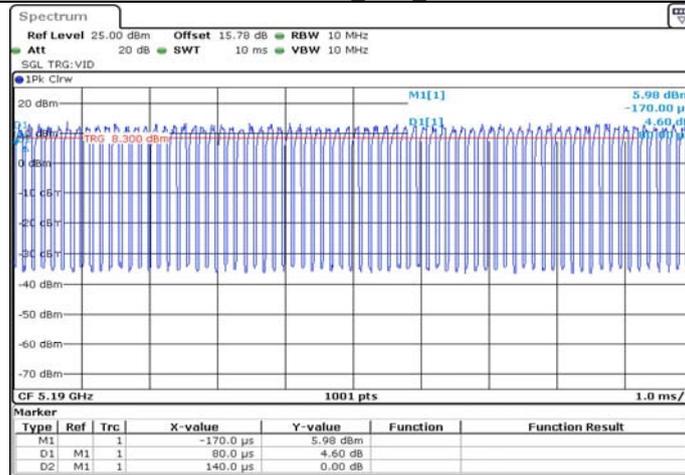


11N20SISO Ant1 5745



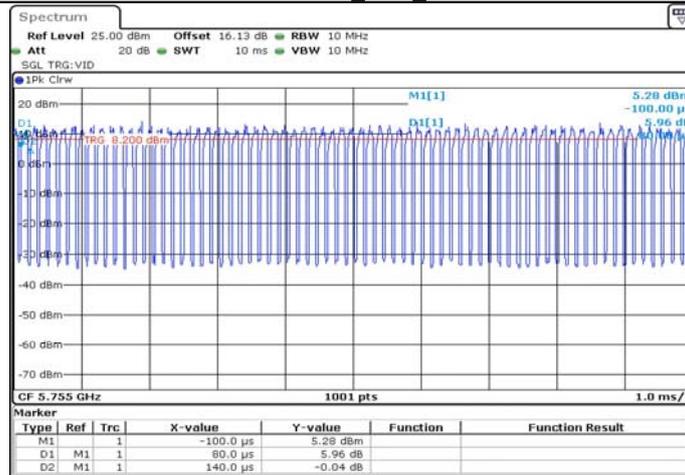
Date: 20.NOV.2020 13:40:07

11N40SISO Ant1 5190



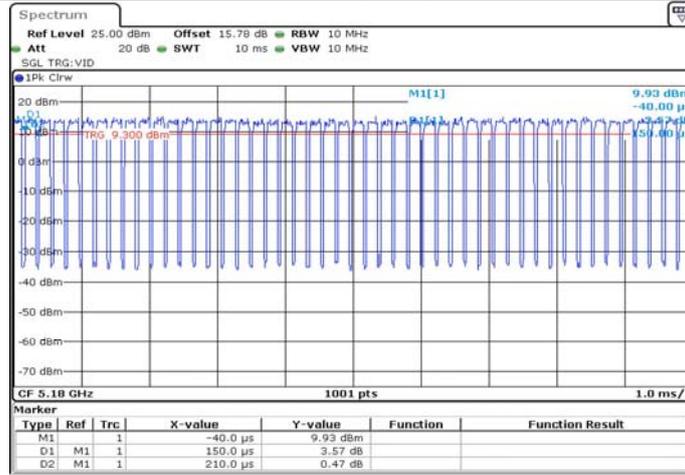
Date: 20.NOV.2020 13:42:56

11N40SISO Ant1 5755



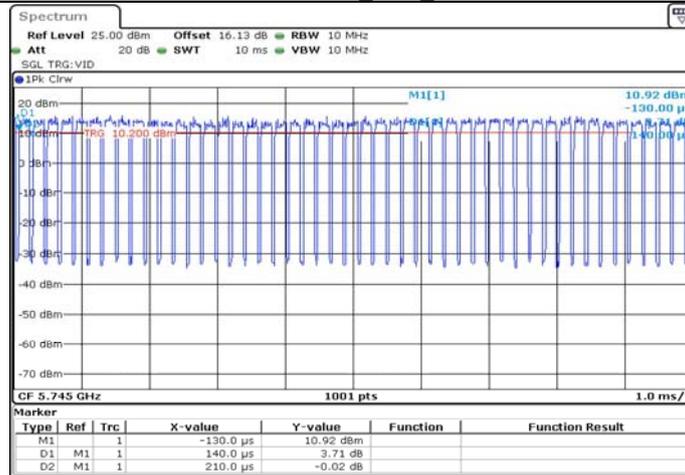
Date: 20.NOV.2020 13:44:50

11AC20SISO Ant1_5180



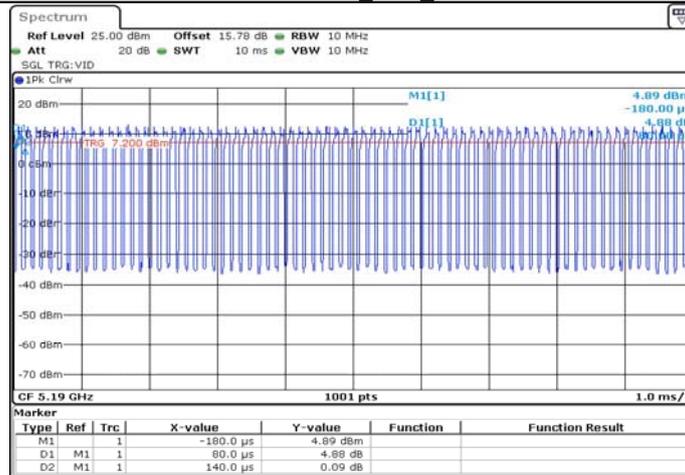
Date: 20.NOV.2020 13:47:03

11AC20SISO Ant1_5745



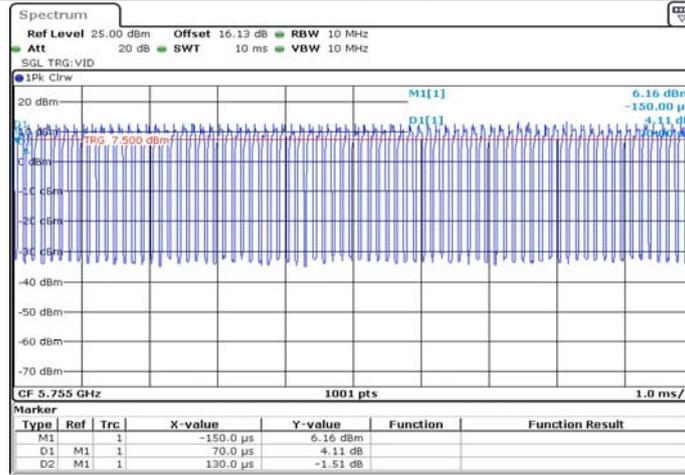
Date: 20.NOV.2020 13:51:45

11AC40SISO Ant1_5190

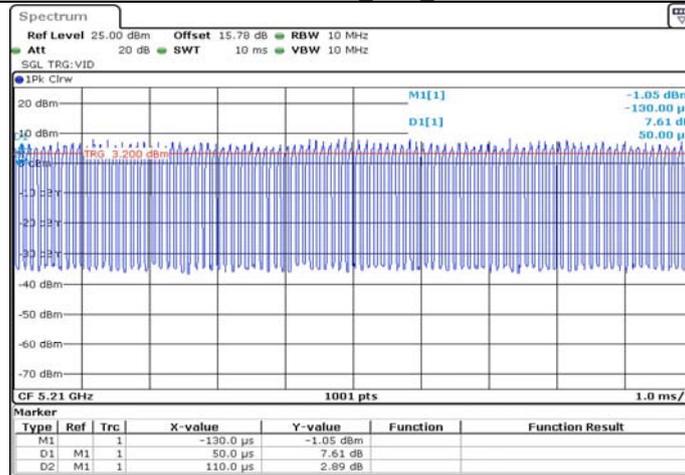


Date: 20.NOV.2020 13:55:22

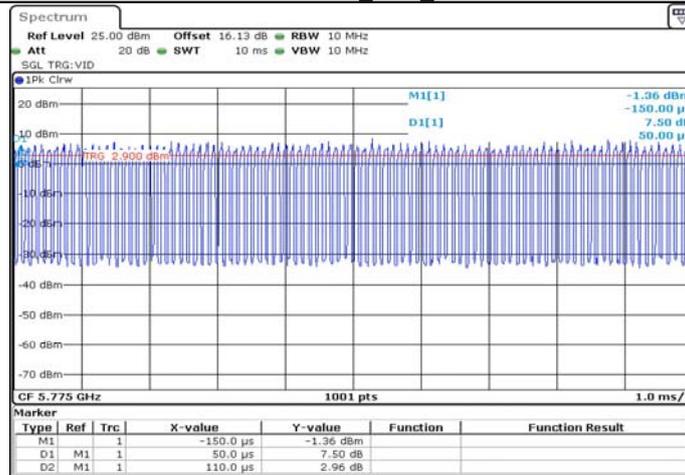
11AC40SISO Ant1_5755



11AC80SISO Ant1_5210



11AC80SISO Ant1_5775



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