

# TEST REPORT

Applicant Name : F5CS LTD  
Address : 19C Trolley Sq. Wilmington Delaware. United States. 19806  
Report Number : SZNS210726-57869E-RF-00C  
FCC ID: 2AIKX-T90

## Test Standard (s)

FCC PART 15.407

## Sample Description

Product Type: LAPTOP  
Model No.: T90B+ PRO 128GB  
Multiple Model(s) No.: A90B+PRO 128GB,S14+,S15,S15 N2,T90B+, A90B+,  
S16, A7  
Trade Mark: Fusion5  
Date Received: 2021/07/26  
Date of Test: 2021/08/06~2021/12/21  
Report Date: 2021/12/22

Test Result:	Pass*
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\* In the configuration tested, the EUT complied with the standards above.

## Prepared and Checked By:



Black Ding  
EMC Engineer

## Approved By:



Robert Li  
EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "\*" .

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## TABLE OF CONTENTS

<b>GENERAL INFORMATION</b> .....	<b>4</b>
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	4
OBJECTIVE .....	4
TEST METHODOLOGY .....	4
MEASUREMENT UNCERTAINTY.....	5
TEST FACILITY .....	5
<b>SYSTEM TEST CONFIGURATION</b> .....	<b>6</b>
DESCRIPTION OF TEST CONFIGURATION .....	6
EUT EXERCISE SOFTWARE .....	7
DUTY CYCLE .....	7
EQUIPMENT MODIFICATIONS .....	7
<b>SUMMARY OF TEST RESULTS</b> .....	<b>10</b>
<b>TEST EQUIPMENT LIST</b> .....	<b>11</b>
<b>FCC §1.1307(B)&amp;§2.1093 - RF EXPOSURE INFORMATION</b> .....	<b>12</b>
<b>FCC §15.203 – ANTENNA REQUIREMENT</b> .....	<b>13</b>
APPLICABLE STANDARD .....	13
ANTENNA CONNECTOR CONSTRUCTION .....	13
<b>FCC §15.407 (B) (6) §15.207 (A) – CONDUCTED EMISSIONS</b> .....	<b>14</b>
APPLICABLE STANDARD .....	14
EUT SETUP .....	14
EMI TEST RECEIVER SETUP.....	14
TEST PROCEDURE .....	14
TRANSD FACTOR & MARGIN CALCULATION.....	15
TEST DATA .....	15
<b>§15.205 &amp; §15.209 &amp; §15.407(B)– UNDESIRABLE EMISSION</b> .....	<b>18</b>
APPLICABLE STANDARD .....	18
EUT SETUP .....	18
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP .....	19
TEST PROCEDURE .....	19
CORRECTED FACTOR & MARGIN CALCULATION .....	20
TEST DATA .....	20
<b>FCC §15.407(A),(E) – 26 DB &amp; 6DB EMISSION BANDWIDTH</b> .....	<b>37</b>
APPLICABLE STANDARD .....	37
TEST PROCEDURE .....	37
TEST DATA .....	38
<b>FCC §15.407(A) – CONDUCTED TRANSMITTER OUTPUT POWER</b> .....	<b>39</b>
APPLICABLE STANDARD .....	39
TEST PROCEDURE .....	39
TEST DATA .....	40
<b>FCC §15.407(A) - POWER SPECTRAL DENSITY</b> .....	<b>41</b>
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.....87

## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

Frequency Range	5G Wi-Fi: 5150-5250MHz; 5725-5850MHz
Mode	802.11a/n20/n40/ac20/ac40/ac80
Maximum Conducted Average Output Power	5150-5250 MHz: 13.69dBm 5725-5850 MHz: 13.78dBm
Modulation Technique	OFDM
Antenna Specification*	Antenna gain:2.1 dBi (It is provided by the manufacturer)
Voltage Range	DC 7.6V from battery or DC12.0V from adapter
Sample serial number	SZNS210726-57869E-RF-S1 for Conducted and Radiated Emissions SZNS210726-57869E-RF-S2 for RF Conducted Test (Assigned by ATC)
Sample/EUT Status	Good condition
Adapter information	Model: FJ-SW248G1203000N Input: AC 100-240V, 50/60Hz,1.5A Output: DC12.0V, 3.0A,36.0W

### 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 KDB789033 D02 General U-NII Test Procedures New Rules v02r01.

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.

Each test item follows test standards and with no deviation.

## Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF Frequency		$0.082 \times 10^{-7}$
RF output power, conducted		0.73dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions		2.72dB
Emissions, Radiated	9kHz - 30MHz	2.66dB
	30MHz - 1GHz	4.28dB
	1GHz - 18GHz	4.98dB
	18GHz - 26.5GHz	5.06dB
	26.5GHz - 40GHz	4.72dB
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

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

The device supports 5G Wi-Fi 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/n20/ac20 mode: channel 36, 40, 48 were tested;

For 802.11n40/ac40 mode: channel 38, 46 were tested.

For 802.11ac80 mode: 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/n20/ac20 mode: channel 149, 157, 165 were tested;

For 802.11n40/ac40 mode: channel 151, 159 were tested.

For 802.11ac80 mode: channel 155 was tested.

## EUT Exercise Software

“DRTU \*\*” software was used to test. The software and power level was provided by the applicant.

The worst case was performed under:

U-NII	Mode	Data rate	Power Level*		
			Low Channel	Middle Channel	High Channel
5150 – 5250MHz	802.11a	6Mbps	14	14	14
	802.11n-HT20	MCS0	14	14	14
	802.11n-HT40	MCS0	14	/	14
	802.11ac20	MCS0	14	14	14
	802.11ac40	MCS0	14	/	14
	802.11ac80	MCS0	/	14	/
5725 – 5850MHz	802.11a	6Mbps	14	14	14
	802.11n-HT20	MCS0	14	14	14
	802.11n-HT40	MCS0	14	/	14
	802.11ac20	MCS0	14	14	14
	802.11ac40	MCS0	14	/	14
	802.11ac80	MCS0	/	14	/

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.

EUT have two antennas, but only support SISO transmitting.

## 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

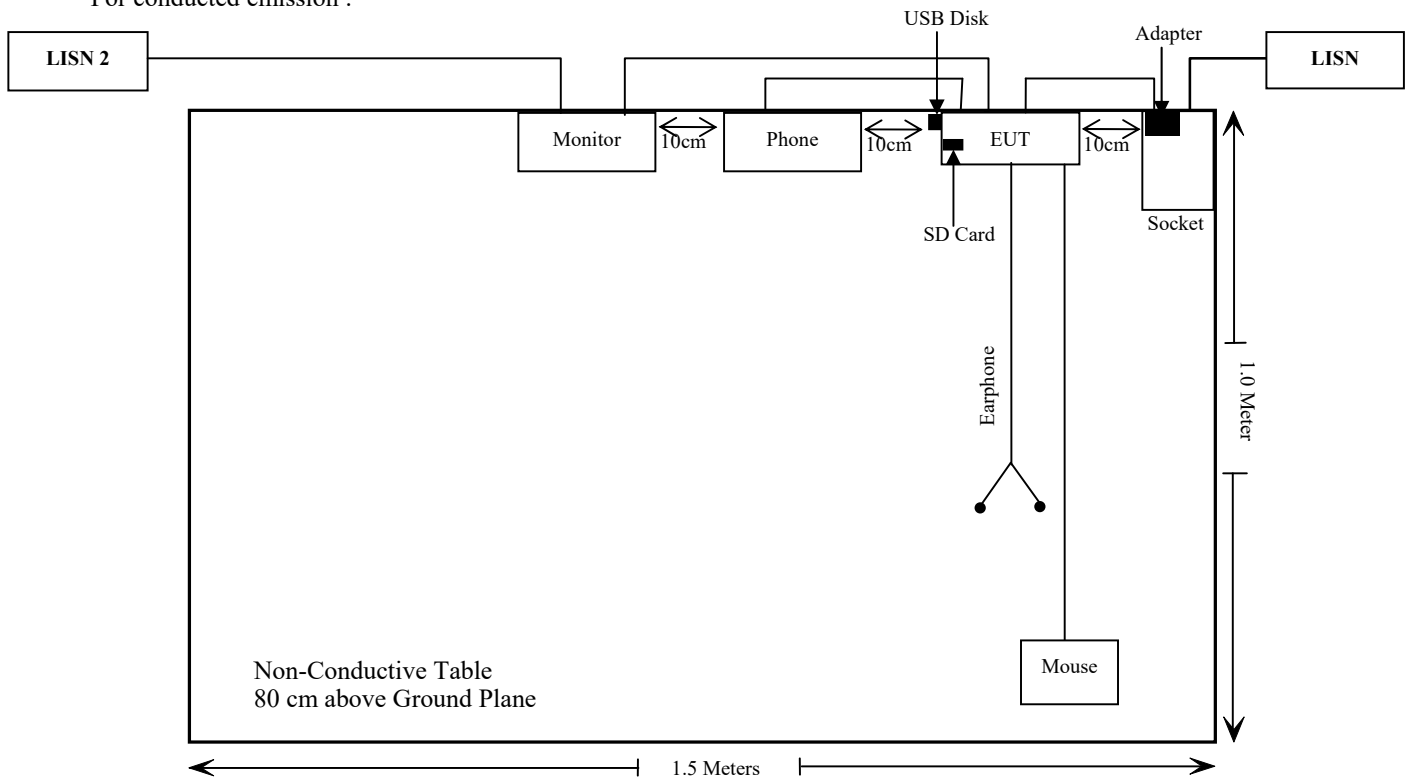
Manufacturer	Description	Model	Serial Number
DELL	Monitor	RVE A00	506250042400R
LUOJI	mouse	MS111-L	CN-09RRC7-48729-38F-0H8S
Sandisk	SD Card	SDSDUNG-128G-ZN61N	SD012463
Kingston	USB Disk	DTSE9G2 32G	DTSE9G2
Huawei	Phone	Nova 7	Unknown
Unknown	Earphone	Unknown	Unknown

**External I/O Cable**

Cable Description	Length (m)	From/Port	To
Un-shielding Detachable DC Cable	1.2	Adapter	EUT
Un-Shielding Detachable HDMI Cable	1.2	EUT	Monitor
Un-shielding Un-Detachable AC Cable	1.2	Monitor	LISN 2
Un-shielding Detachable USB Cable	1.0	EUT	Phone
Un-shielding Detachable USB Cable	1.2	EUT	Mouse

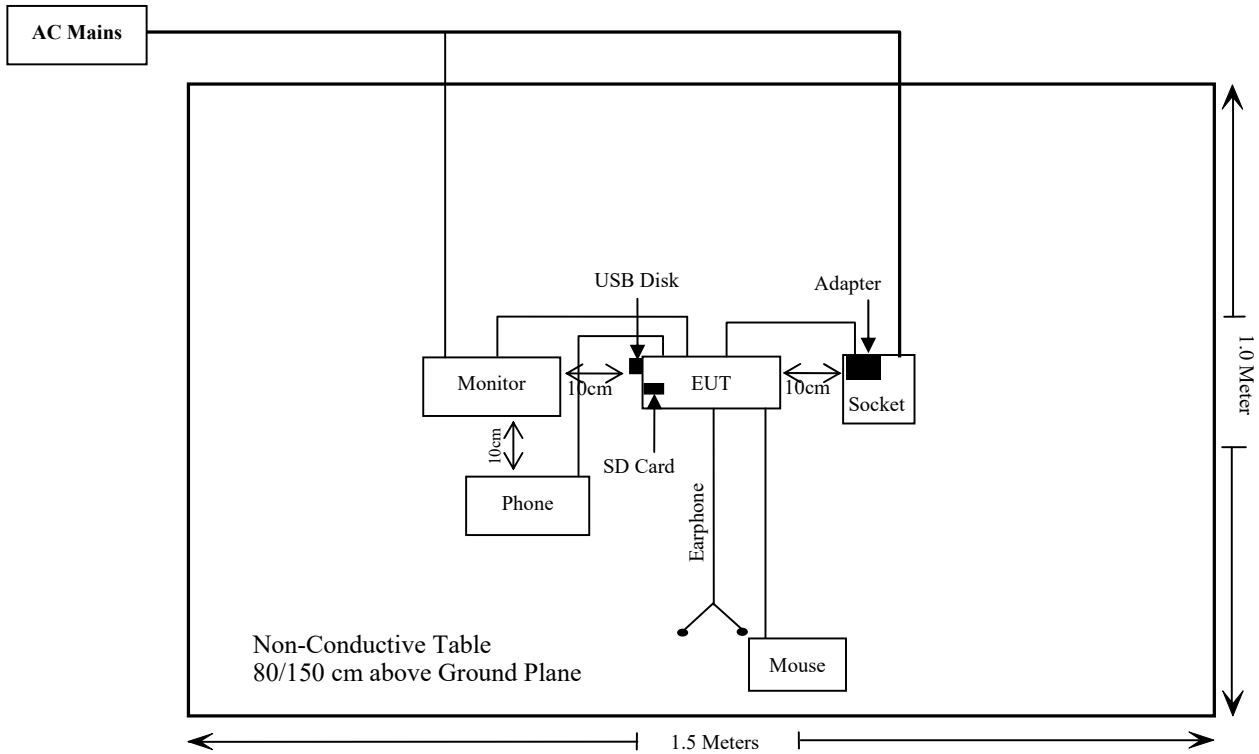
**Block Diagram of Test Setup**

For conducted emission :





For radiated emission:



## SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§ 1.1307 ,§2.1093	RF Exposure (SAR)	Compliant*
§15.203	Antenna Requirement	Compliant
§15.407(b)(9)& §15.207(a)	Conducted Emissions	Compliant
§15.205& §15.209 &§15.407(b)	Undesirable Emission& Restricted Bands	Compliant
§15.407(a) (e)	26 dB Emission Bandwidth & 6dB Bandwidth	Compliant
§15.407(a)	Conducted Transmitter Output Power	Compliant
§15.407 (a)	Power Spectral Density	Compliant
§15.407 (h)	Transmit Power Control (TPC)	Not Applicable
§15.407 (h)	Dynamic Frequency Selection (DFS)	Not Applicable*

Not Applicable: the EUT has no TPC function which was declared by the applicant.

Not Applicable\*: EUT not operate within frequency range of 5250-5350MHz and 5470-5725MHz.

Compliant\*: please refer to the SAR report: SZNS210726-65841E-SA

**TEST EQUIPMENT LIST**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	100784	2021/02/03	2022/02/02
R & S	L.I.S.N.	ENV216	101314	2020/12/25	2021/12/24
Anritsu Corp	50Ω Coaxial 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: e3 19821b (V9)					
Radiated Emissions Test					
Rohde & Schwarz	Test Receiver	ESR	102725	2020/12/25	2021/12/24
Rohde & Schwarz	Spectrum Analyzer	FSV40	101949	2021/5/18	2022/5/17
SONOMA INSTRUMENT	Amplifier	310 N	186131	2020/12/25	2021/12/24
A.H. Systems, inc.	Preamplifier	PAM-0118P	531	2021/11/09	2022/11/08
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2021/11/11	2022/11/10
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
Unknown	RF Coaxial Cable	N-5m	No.3	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-10m	No.7	2021/11/09	2022/11/08
Unknown	RF Coaxial Cable	N-2m	No.8	2021/11/09	2022/11/08
CD	Band Reject Filter	BRM-5.15/5.35g-45	075	2020/12/25	2021/12/24
CD	Band Reject Filter	BRM-5.47/5.725G-45	075	2020/12/25	2021/12/24
Radiated Emission Test Software: e3 19821b (V9)					
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).

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

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### **Applicable Standard**

FCC§1.1310 and §2.1093.

### **Test Result**

Compliant, please refer to the SAR report: SZNS210726-65841E-SA.

## **FCC §15.203 – ANTENNA REQUIREMENT**

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### **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 have two internal Antennas arrangement which was permanently attached for Wi-Fi and the antenna gain is 2.1dBi fulfill the requirement of this section. Please refer to the EUT photos.

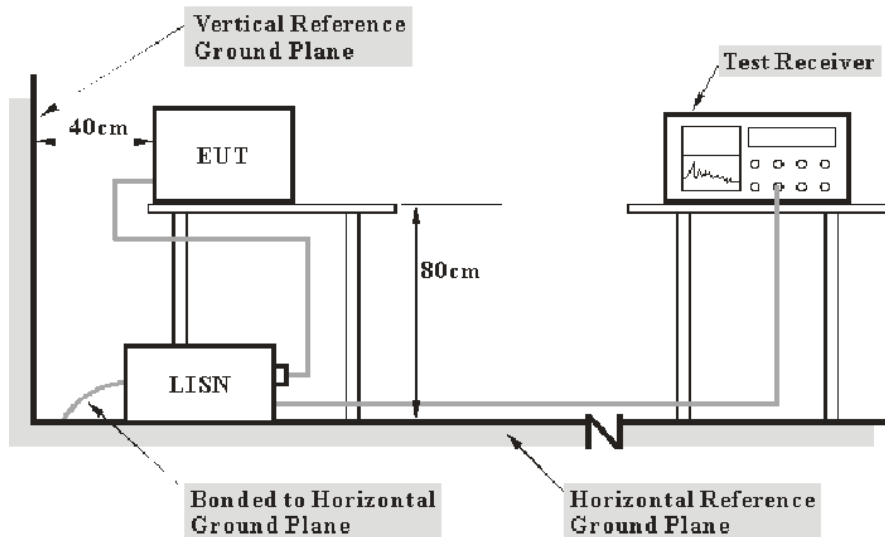
**Result:** Compliant.

## FCC §15.407 (b) (6) §15.207 (a) – CONDUCTED EMISSIONS

### Applicable Standard

FCC §15.207, §15.407(b) (6)

### 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.

## Transd Factor & Margin Calculation

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

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

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

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

## Test Data

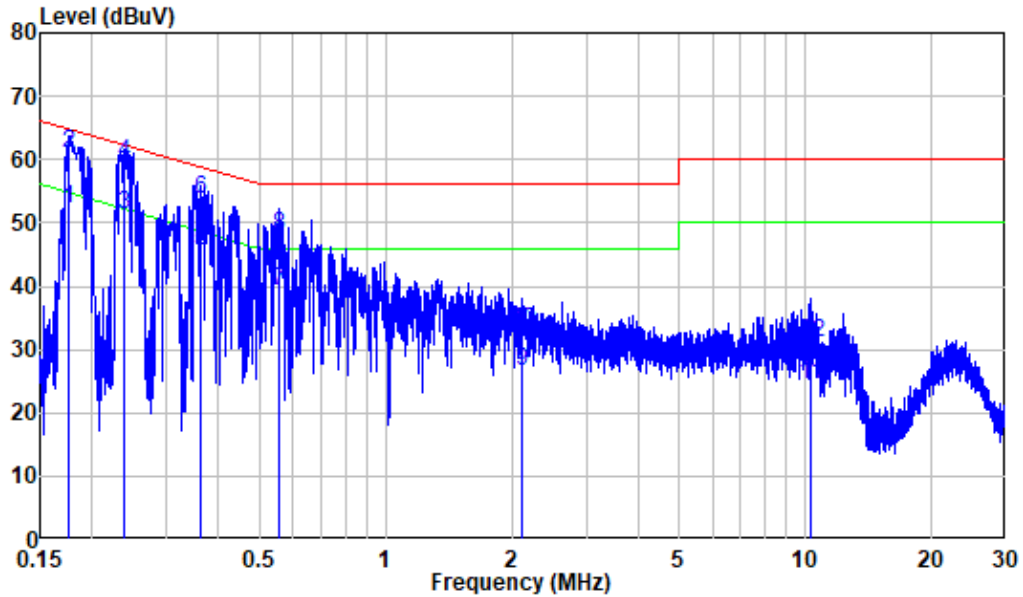
### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	64%
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Bin Deng on 2021-12-03.*

*EUT operation mode: Transmitting (worst case is 802.11 a mode, 5240MHz, ANT 1)*

AC 120V/60 Hz, Line:

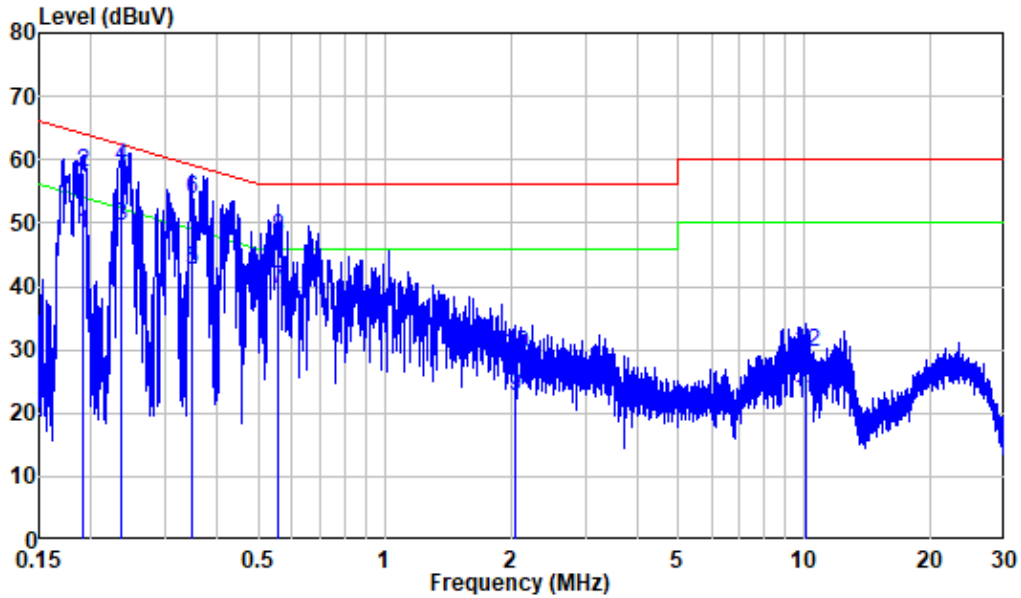


Site : Shielding Room  
 Condition: Line  
 Mode : 5G WIFI  
 Model : T90B+ Pro 128GB  
 Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.175	9.85	42.42	52.27	54.71	-2.44	Average
2	0.175	9.85	51.02	60.87	64.71	-3.84	QP
3	0.239	9.80	41.61	51.41	52.13	-0.72	Average
4	0.239	9.80	49.67	59.47	62.13	-2.66	QP
5	0.362	9.80	35.89	45.69	48.69	-3.00	Average
6	0.362	9.80	43.83	53.63	58.69	-5.06	QP
7	0.557	9.81	29.35	39.16	46.00	-6.84	Average
8	0.557	9.81	38.08	47.89	56.00	-8.11	QP
9	2.120	9.92	16.70	26.62	46.00	-19.38	Average
10	2.120	9.92	23.11	33.03	56.00	-22.97	QP
11	10.274	10.09	14.46	24.55	50.00	-25.45	Average
12	10.274	10.09	21.15	31.24	60.00	-28.76	QP



**AC 120V/60 Hz, Neutral:**



Site : Shielding Room  
 Condition: Neutral  
 Mode : 5G WIFI  
 Model : T90B+ Pro 128GB  
 Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.190	9.98	38.33	48.31	54.02	-5.71	Average
2	0.190	9.98	48.13	58.11	64.02	-5.91	QP
3	0.236	9.98	39.68	49.66	52.23	-2.57	Average
4	0.236	9.98	48.81	58.79	62.23	-3.44	QP
5	0.346	9.94	32.74	42.68	49.06	-6.38	Average
6	0.346	9.94	43.73	53.67	59.06	-5.39	QP
7	0.558	9.91	29.59	39.50	46.00	-6.50	Average
8	0.558	9.91	37.66	47.57	56.00	-8.43	QP
9	2.051	9.92	12.71	22.63	46.00	-23.37	Average
10	2.051	9.92	19.42	29.34	56.00	-26.66	QP
11	10.032	10.10	11.98	22.08	50.00	-27.92	Average
12	10.032	10.10	19.49	29.59	60.00	-30.41	QP

## §15.205 & §15.209 & §15.407(B)– UNDESIRABLE EMISSION

### Applicable Standard

FCC §15.407 (b); §15.209; §15.205;

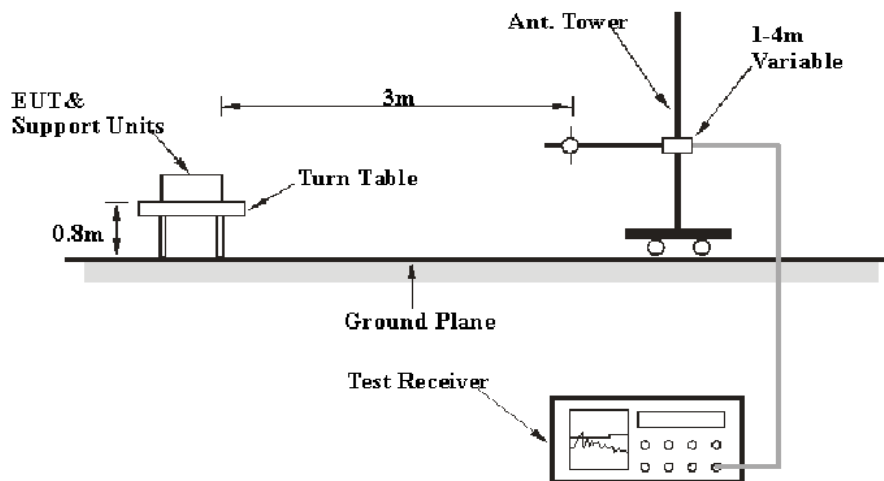
(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

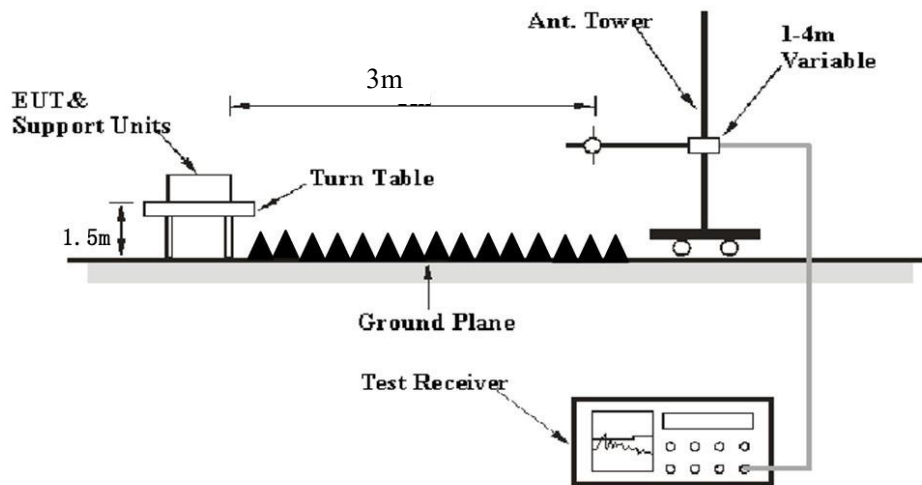
- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of  $-27$  dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of  $-27$  dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 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.

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

### 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 <sup>Note 1</sup>	/	Average
	1MHz	> 1/T <sup>Note 2</sup>	/	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 Factor & Margin Calculation

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

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

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

$$\begin{aligned} \text{Over limit/Margin} &= \text{Result/Corrected Amplitude-Limit} \\ \text{Result/Corrected Amplitude} &= \text{Reading} + \text{Corrected Factor} \end{aligned}$$

## Test Data

### Environmental Conditions

<b>Temperature:</b>	21~25°C
<b>Relative Humidity:</b>	53~64%
<b>ATM Pressure:</b>	100.9~101.0 kPa

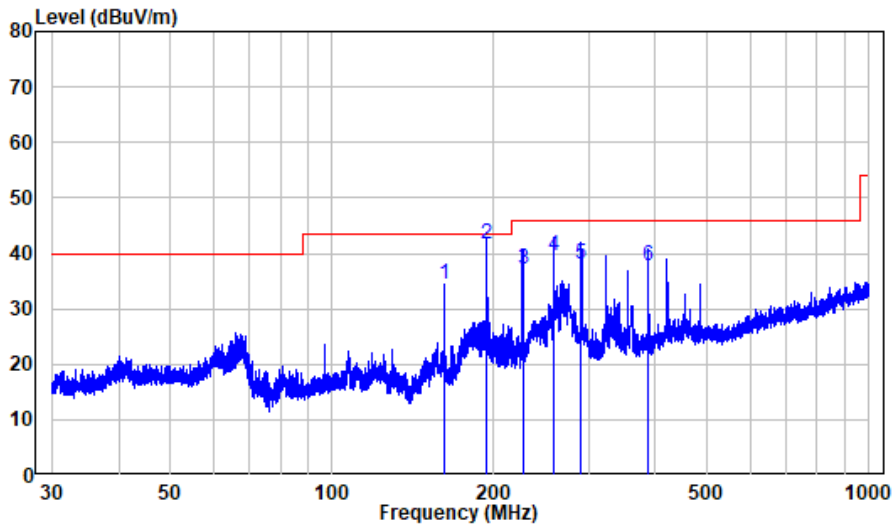
*The testing was performed by Chao Mo on 2021-12-06 for below 1GHz and Din Duan on 2021-12-03 for above 1GHz.*

*EUT operation mode: Transmitting*

*Note: The EUT can be used as portable device and mobile device, pre-scan portable device condition in the X,Y and Z axes of orientation and mobile device condition, the worst case mobile device condition was recorded.*

**30 MHz – 1 GHz:** (worst case is 802.11 A mode, 5240MHz, ANT 1)

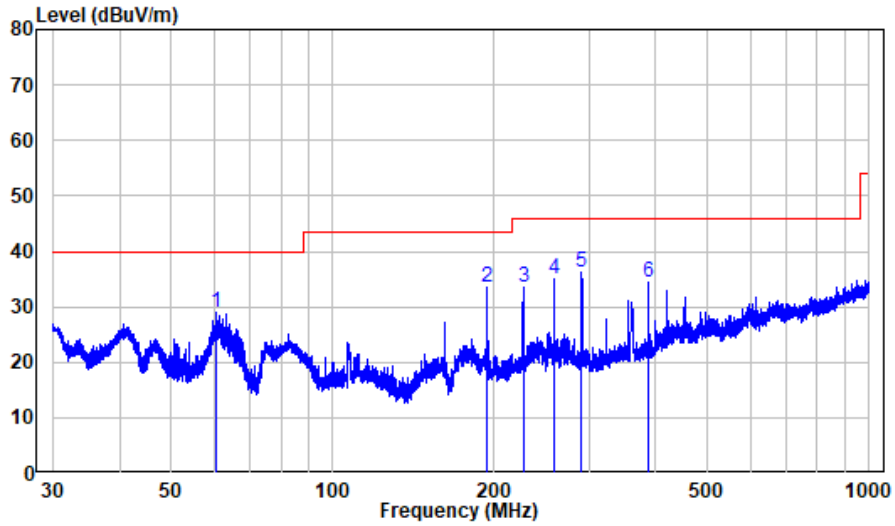
**Horizontal**



Site : chamber  
 Condition: 3m HORIZONTAL  
 Job NO : SZNS210726-57869E-RF  
 Test Mode: 5g WIFI

	Freq	Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB
1	161.76	-14.28	48.72	34.44	43.50	-9.06 Peak
2	194.20	-11.33	52.89	41.56	43.50	-1.94 QP
3	226.50	-11.21	48.22	37.01	46.00	-8.99 QP
4	259.01	-10.59	50.05	39.46	46.00	-6.54 QP
5	290.91	-9.30	47.21	37.91	46.00	-8.09 QP
6	388.33	-6.94	44.59	37.65	46.00	-8.35 QP

Vertical



Site : chamber  
 Condition: 3m VERTICAL  
 Job NO : SZNS210726-57869E-RF  
 Test Mode: 5g WIFI

	Freq	Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	60.52	-10.84	39.92	29.08	40.00	-10.92	Peak
2	194.03	-11.31	44.95	33.64	43.50	-9.86	Peak
3	226.50	-11.21	44.62	33.41	46.00	-12.59	Peak
4	258.78	-10.59	45.50	34.91	46.00	-11.09	Peak
5	291.29	-9.29	45.55	36.26	46.00	-9.74	Peak
6	388.33	-6.94	41.41	34.47	46.00	-11.53	Peak

**1GHz-40GHz:** (pre-scan two antennas, the worst case is ANT 2)

**5150-5250 MHz:**

Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB $\mu$ V/m)	FCC Part 15.407	
	Reading (dB $\mu$ V)	PK/QP/Ave.	Angle Degree	Height (m)	Polar (H / V)			Limit (dB $\mu$ V/m)	Margin (dB)
802.11a									
5180 MHz									
4500	62.96	PK	97	1.9	H	-4.72	58.24	74	-15.76
4500	49.57	Ave.	97	1.9	H	-4.72	44.85	54	-9.15
4500	65.03	PK	344	1.1	V	-4.72	60.31	74	-13.69
4500	51.01	Ave.	344	1.1	V	-4.72	46.29	54	-7.71
5150	62.39	PK	314	2.1	H	-2.73	59.66	74	-14.34
5150	47.97	Ave.	314	2.1	H	-2.73	45.24	54	-8.76
5150	64.59	PK	126	2.4	V	-2.73	61.86	74	-12.14
5150	50.10	Ave.	126	2.4	V	-2.73	47.37	54	-6.63
10360	41.96	PK	335	1.9	H	8.12	50.08	68.2	-18.12
10360	44.15	PK	160	1.9	V	8.12	52.27	68.2	-15.93
5200 MHz									
10400	41.53	PK	289	1.5	H	8.24	49.77	68.2	-18.43
10400	43.79	PK	9	1.5	V	8.24	52.03	68.2	-16.17
5240 MHz									
5350	60.37	PK	65	2.2	H	-2.33	58.04	74	-15.96
5350	46.44	Ave.	65	2.2	H	-2.33	44.11	54	-9.89
5350	62.62	PK	223	1.9	V	-2.33	60.29	74	-13.71
5350	48.66	Ave.	223	1.9	V	-2.33	46.33	54	-7.67
5460	61.91	PK	199	2	H	-2.26	59.65	74	-14.35
5460	47.48	Ave.	199	2	H	-2.26	45.22	54	-8.78
5460	64.01	PK	116	2.3	V	-2.26	61.75	74	-12.25
5460	49.68	Ave.	116	2.3	V	-2.26	47.42	54	-6.58
10480	40.90	PK	106	1.5	H	8.55	49.45	68.2	-18.75
10480	43.17	PK	43	2	V	8.55	51.72	68.2	-16.48

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB $\mu$ V/m)	FCC Part15.407	
	Reading (dB $\mu$ V)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dB $\mu$ V/m)	Margin (dB)
802.11n20									
5180 MHz									
4500	63.04	PK	345	1.9	H	-4.72	58.32	74	-15.68
4500	49.87	Ave.	345	1.9	H	-4.72	45.15	54	-8.85
4500	65.33	PK	85	2.2	V	-4.72	60.61	74	-13.39
4500	52.14	Ave.	85	2.2	V	-4.72	47.42	54	-6.58
5150	61.96	PK	320	2	H	-2.73	59.23	74	-14.77
5150	48.57	Ave.	320	2	H	-2.73	45.84	54	-8.16
5150	64.13	PK	206	2.2	V	-2.73	61.40	74	-12.6
5150	50.82	Ave.	206	2.2	V	-2.73	48.09	54	-5.91
10360	39.50	PK	1	2.4	H	8.12	47.62	68.2	-20.58
10360	41.68	PK	70	2.2	V	8.12	49.80	68.2	-18.4
5200 MHz									
10400	38.99	PK	40	1.4	H	8.24	47.23	68.2	-20.97
10400	41.09	PK	50	1.4	V	8.24	49.33	68.2	-18.87
5240 MHz									
5350	60.78	PK	161	1	H	-2.33	58.45	74	-15.55
5350	47.50	Ave.	161	1	H	-2.33	45.17	54	-8.83
5350	62.93	PK	314	1.3	V	-2.33	60.6	74	-13.4
5350	49.73	Ave.	314	1.3	V	-2.33	47.4	54	-6.6
5460	61.70	PK	24	1.7	H	-2.26	59.44	74	-14.56
5460	48.28	Ave.	24	1.7	H	-2.26	46.02	54	-7.98
5460	63.92	PK	104	2.3	V	-2.26	61.66	74	-12.34
5460	50.39	Ave.	104	2.3	V	-2.26	48.13	54	-5.87
10480	38.71	PK	173	2.4	H	8.55	47.26	68.2	-20.94
10480	40.82	PK	340	1.7	V	8.55	49.37	68.2	-18.83



Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB $\mu$ V/m)	FCC Part15.407	
	Reading (dB $\mu$ V)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dB $\mu$ V/m)	Margin (dB)
802.11n40									
5190 MHz									
4500	63.24	PK	212	2.1	H	-4.72	58.52	74	-15.48
4500	50.19	Ave.	212	2.1	H	-4.72	45.47	54	-8.53
4500	65.34	PK	114	1.6	V	-4.72	60.62	74	-13.38
4500	52.34	Ave.	114	1.6	V	-4.72	47.62	54	-6.38
5150	61.78	PK	268	2	H	-2.73	59.05	74	-14.95
5150	49.08	Ave.	268	2	H	-2.73	46.35	54	-7.65
5150	63.91	PK	233	1.5	V	-2.73	61.18	74	-12.82
5150	51.33	Ave.	233	1.5	V	-2.73	48.60	54	-5.4
10380	39.26	PK	273	1.2	H	8.18	47.44	68.2	-20.76
10380	41.49	PK	128	1.2	V	8.18	49.67	68.2	-18.53
5230 MHz									
5350	60.38	PK	283	2.4	H	-2.33	58.05	74	-15.95
5350	47.87	Ave.	283	2.4	H	-2.33	45.54	54	-8.46
5350	62.45	PK	189	2.1	V	-2.33	60.12	74	-13.88
5350	50.01	Ave.	189	2.1	V	-2.33	47.68	54	-6.32
5460	61.83	PK	128	2.1	H	-2.26	59.57	74	-14.43
5460	48.61	Ave.	128	2.1	H	-2.26	46.35	54	-7.65
5460	63.96	PK	216	2.2	V	-2.26	61.7	74	-12.3
5460	51.05	Ave.	216	2.2	V	-2.26	48.79	54	-5.21
10460	38.70	PK	169	1.7	H	8.47	47.17	68.2	-21.03
10460	40.86	PK	356	1.7	V	8.47	49.33	68.2	-18.87

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB $\mu$ V/m)	FCC Part15.407	
	Reading (dB $\mu$ V)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dB $\mu$ V/m)	Margin (dB)
802.11ac20									
5180 MHz									
4500	62.60	PK	279	2.3	H	-4.72	57.88	74	-16.12
4500	48.93	Ave.	279	2.3	H	-4.72	44.21	54	-9.79
4500	64.75	PK	252	1.6	V	-4.72	60.03	74	-13.97
4500	51.24	Ave.	252	1.6	V	-4.72	46.52	54	-7.48
5150	62.11	PK	112	1.2	H	-2.73	59.38	74	-14.62
5150	47.97	Ave.	112	1.2	H	-2.73	45.24	54	-8.76
5150	64.45	PK	104	1.3	V	-2.73	61.72	74	-12.28
5150	50.14	Ave.	104	1.3	V	-2.73	47.41	54	-6.59
10360	39.60	PK	162	1.3	H	8.12	47.72	68.2	-20.48
10360	41.87	PK	238	1.1	V	8.12	49.99	68.2	-18.21
5200 MHz									
10400	38.98	PK	325	1.7	H	8.24	47.22	68.2	-20.98
10400	41.25	PK	122	1.7	V	8.24	49.49	68.2	-18.71
5240 MHz									
5350	60.69	PK	68	2.3	H	-2.33	58.36	74	-15.64
5350	46.57	Ave.	68	2.3	H	-2.33	44.24	54	-9.76
5350	63.00	PK	156	1.1	V	-2.33	60.67	74	-13.33
5350	48.77	Ave.	156	1.1	V	-2.33	46.44	54	-7.56
5460	61.44	PK	263	1.5	H	-2.26	59.18	74	-14.82
5460	47.35	Ave.	263	1.5	H	-2.26	45.09	54	-8.91
5460	63.71	PK	79	2	V	-2.26	61.45	74	-12.55
5460	49.62	Ave.	79	2	V	-2.26	47.36	54	-6.64
10480	39.27	PK	125	2.1	H	8.55	47.82	68.2	-20.38
10480	41.53	PK	352	1.2	V	8.55	50.08	68.2	-18.12

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB $\mu$ V/m)	FCC Part15.407	
	Reading (dB $\mu$ V)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dB $\mu$ V/m)	Margin (dB)
802.11ac40									
5190 MHz									
4500	62.40	PK	137	1.4	H	-4.72	57.68	74	-16.32
4500	49.97	Ave.	137	1.4	H	-4.72	45.25	54	-8.75
4500	64.54	PK	77	2.2	V	-4.72	59.82	74	-14.18
4500	52.22	Ave.	77	2.2	V	-4.72	47.50	54	-6.5
5150	62.31	PK	360	2.3	H	-2.73	59.58	74	-14.42
5150	49.02	Ave.	360	2.3	H	-2.73	46.29	54	-7.71
5150	64.44	PK	329	1.7	V	-2.73	61.71	74	-12.29
5150	51.30	Ave.	329	1.7	V	-2.73	48.57	54	-5.43
10380	39.46	PK	294	1.8	H	8.18	47.64	68.2	-20.56
10380	41.67	PK	316	1.8	V	8.18	49.85	68.2	-18.35
5230 MHz									
5350	60.65	PK	210	1.8	H	-2.33	58.32	74	-15.68
5350	48.02	Ave.	210	1.8	H	-2.33	45.69	54	-8.31
5350	62.86	PK	92	2.2	V	-2.33	60.53	74	-13.47
5350	50.33	Ave.	92	2.2	V	-2.33	48	54	-6
5460	61.29	PK	98	1.7	H	-2.26	59.03	74	-14.97
5460	48.77	Ave.	98	1.7	H	-2.26	46.51	54	-7.49
5460	63.62	PK	158	1.8	V	-2.26	61.36	74	-12.64
5460	50.93	Ave.	158	1.8	V	-2.26	48.67	54	-5.33
10460	38.87	PK	122	1.7	H	8.47	47.34	68.2	-20.86
10460	41.06	PK	96	1.7	V	8.47	49.53	68.2	-18.67

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB $\mu$ V/m)	FCC Part15.407	
	Reading (dB $\mu$ V)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dB $\mu$ V/m)	Margin (dB)
802.11ac80									
5210 MHz									
4500	64.51	PK	29	2.4	H	-4.72	59.79	74	-14.21
4500	53.60	Ave.	29	2.4	H	-4.72	48.88	54	-5.12
4500	66.63	PK	193	2.3	V	-4.72	61.91	74	-12.09
4500	55.41	Ave.	193	2.3	V	-4.72	50.69	54	-3.31
5150	61.71	PK	306	2.4	H	-2.73	58.98	74	-15.02
5150	51.39	Ave.	306	2.4	H	-2.73	48.66	54	-5.34
5150	63.84	PK	84	1.7	V	-2.73	61.11	74	-12.89
5150	53.24	Ave.	84	1.7	V	-2.73	50.51	54	-3.49
5350	61.01	PK	329	1.6	H	-2.33	58.68	74	-15.32
5350	48.98	Ave.	329	1.6	H	-2.33	46.65	54	-7.35
5350	63.31	PK	357	2.3	V	-2.33	60.98	74	-13.02
5350	51.07	Ave.	357	2.3	V	-2.33	48.74	54	-5.26
5460	61.10	PK	317	2.4	H	-2.26	58.84	74	-15.16
5460	49.02	Ave.	317	2.4	H	-2.26	46.76	54	-7.24
5460	63.34	PK	83	1.8	V	-2.26	61.08	74	-12.92
5460	51.14	Ave.	83	1.8	V	-2.26	48.88	54	-5.12
10420	38.86	PK	163	1.1	H	8.31	47.17	68.2	-21.03
10420	41.01	PK	193	1.1	V	8.31	49.32	68.2	-18.88

**5725-5850 MHz:**

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part15.407	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11a									
5745 MHz									
5650	62.03	PK	123	2.4	H	-1.95	60.08	68.2	-8.12
5650	64.32	PK	195	2.4	V	-1.95	62.37	68.2	-5.83
5700	63.76	PK	101	2.1	H	-2.02	61.74	105.2	-43.46
5700	65.94	PK	290	1.1	V	-2.02	63.92	105.2	-41.28
5720	63.65	PK	288	2	H	-1.97	61.68	110.8	-49.12
5720	65.85	PK	254	1	V	-1.97	63.88	110.8	-46.92
5725	68.44	PK	46	1.7	H	-1.96	66.48	122.2	-55.72
5725	70.64	PK	242	2.3	V	-1.96	68.68	122.2	-53.52
11490	42.21	PK	91	1.7	H	6.63	48.84	74	-25.16
11490	44.44	PK	248	1.2	V	6.63	51.07	74	-22.93
5785 MHz									
11570	42.42	PK	179	1.6	H	6.59	49.01	74	-24.99
11570	44.53	PK	283	2.3	V	6.59	51.12	74	-22.88
5825 MHz									
5850	68.00	PK	87	1.5	H	-1.81	66.19	122.2	-56.01
5850	70.11	PK	45	1.9	V	-1.81	68.30	122.2	-53.9
5855	66.97	PK	47	2.4	H	-1.82	65.15	110.8	-45.65
5855	69.21	PK	16	2.1	V	-1.82	67.39	110.8	-43.41
5875	96.32	PK	92	2.5	H	-1.84	94.48	105.2	-10.72
5875	98.50	PK	10	1.3	V	-1.84	96.66	105.2	-8.54
5925	64.56	PK	65	1.7	H	-1.82	62.74	68.2	-5.46
5925	66.68	PK	91	1.6	V	-1.82	64.86	68.2	-3.34
11650	40.35	PK	252	2.2	H	6.77	47.12	74	-26.88
11650	42.50	PK	86	1.7	V	6.77	49.27	74	-24.73

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB $\mu$ V/m)	FCC Part15.407	
	Reading (dB $\mu$ V)	Detector (PK/QP/Ave.)		Height (m)	Polar (H / V)			Limit (dB $\mu$ V/m)	Margin (dB)
802.11n20									
5745 MHz									
5650	62.04	PK	290	2	H	-1.95	60.09	68.2	-8.11
5650	64.17	PK	78	2.1	V	-1.95	62.22	68.2	-5.98
5700	64.49	PK	196	2.2	H	-2.02	62.47	105.2	-42.73
5700	66.65	PK	188	2	V	-2.02	64.63	105.2	-40.57
5720	63.19	PK	273	1.9	H	-1.97	61.22	110.8	-49.58
5720	65.32	PK	91	1.8	V	-1.97	63.35	110.8	-47.45
5725	68.82	PK	2	2	H	-1.96	66.86	122.2	-55.34
5725	71.00	PK	103	1.8	V	-1.96	69.04	122.2	-53.16
11490	42.39	PK	4	1.6	H	6.63	49.02	74	-24.98
11490	44.53	PK	258	2.5	V	6.63	51.16	74	-22.84
5785 MHz									
11570	42.53	PK	39	2.4	H	6.59	49.12	74	-24.88
11570	44.65	PK	138	1.1	V	6.59	51.24	74	-22.76
5825 MHz									
5850	64.44	PK	159	1.3	H	-1.81	62.63	122.2	-59.57
5850	66.87	PK	255	2.4	V	-1.81	65.06	122.2	-57.14
5855	67.26	PK	74	1.5	H	-1.82	65.44	110.8	-45.36
5855	69.48	PK	360	2	V	-1.82	67.66	110.8	-43.14
5875	68.06	PK	15	1.5	H	-1.84	66.22	105.2	-38.98
5875	70.25	PK	319	1.8	V	-1.84	68.41	105.2	-36.79
5925	64.06	PK	88	1.2	H	-1.82	62.24	68.2	-5.96
5925	66.16	PK	44	1.5	V	-1.82	64.34	68.2	-3.86
11650	40.37	PK	99	2.2	H	6.77	47.14	74	-26.86
11650	42.52	PK	285	2.1	V	6.77	49.29	74	-24.71

Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB $\mu$ V/m)	FCC Part15.407	
	Reading (dB $\mu$ V)	PK/QP/Ave.	Angle Degree	Height (m)	Polar (H / V)			Limit (dB $\mu$ V/m)	Margin (dB)
802.11n40									
5755 MHz									
5650	62.64	PK	39	1.9	H	-1.95	60.69	68.2	-7.51
5650	65.04	PK	7	2.2	V	-1.95	63.09	68.2	-5.11
5700	69.80	PK	314	1.7	H	-2.02	67.78	105.2	-37.42
5700	72.00	PK	9	2	V	-2.02	69.98	105.2	-35.22
5720	67.10	PK	328	2	H	-1.97	65.13	110.8	-45.67
5720	69.37	PK	147	2.1	V	-1.97	67.40	110.8	-43.40
5725	72.00	PK	61	2	H	-1.96	70.04	122.2	-52.16
5725	73.83	PK	327	2.1	V	-1.96	71.87	122.2	-50.33
11510	42.68	PK	138	1.5	H	6.59	49.27	74	-24.73
11510	44.80	PK	280	1.4	V	6.59	51.39	74	-22.61
5795 MHz									
5850	65.49	PK	120	1.9	H	-1.81	63.68	122.2	-58.52
5850	67.39	PK	55	1.7	V	-1.81	65.58	122.2	-56.62
5855	64.76	PK	16	1.5	H	-1.82	62.94	110.8	-47.86
5855	67.07	PK	115	1.7	V	-1.82	65.25	110.8	-45.55
5875	96.58	PK	31	1.2	H	-1.84	94.74	105.2	-10.46
5875	98.77	PK	67	1.6	V	-1.84	96.93	105.2	-8.27
5925	63.67	PK	248	2.3	H	-1.82	61.85	68.2	-6.35
5925	65.92	PK	344	2.2	V	-1.82	64.10	68.2	-4.1
11590	42.56	PK	63	1.3	H	6.57	49.13	74	-24.87
11590	44.80	PK	258	2.1	V	6.57	51.37	74	-22.63

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dB $\mu$ V/m)	FCC Part15.407	
	Reading (dB $\mu$ V)	Detector (PK/QP/Ave.)		Height (m)	Polar (H / V)			Limit (dB $\mu$ V/m)	Margin (dB)
802.11ac20									
5745 MHz									
5650	62.26	PK	37	1.3	H	-1.95	60.31	68.2	-7.89
5650	64.54	PK	275	1.1	V	-1.95	62.59	68.2	-5.61
5700	84.47	PK	86	2	H	-2.02	82.45	105.2	-22.75
5700	86.53	PK	167	1.8	V	-2.02	84.51	105.2	-20.69
5720	64.91	PK	121	1.4	H	-1.97	62.94	110.8	-47.86
5720	67.24	PK	231	1.6	V	-1.97	65.27	110.8	-45.53
5725	72.51	PK	280	1.3	H	-1.96	70.55	122.2	-51.65
5725	74.79	PK	333	1.6	V	-1.96	72.83	122.2	-49.37
11490	42.53	PK	192	1.1	H	6.63	49.16	74	-24.84
11490	44.71	PK	136	1.2	V	6.63	51.34	74	-22.66
5785 MHz									
11570	42.35	PK	203	1.3	H	6.59	48.94	74	-25.06
11570	44.51	PK	311	1	V	6.59	51.10	74	-22.9
5825 MHz									
5850	66.49	PK	148	1.8	H	-1.81	64.68	122.2	-57.52
5850	68.81	PK	90	1.9	V	-1.81	67.00	122.2	-55.2
5855	66.28	PK	300	2	H	-1.82	64.46	110.8	-46.34
5855	68.33	PK	353	1.2	V	-1.82	66.51	110.8	-44.29
5875	91.58	PK	275	1.7	H	-1.84	89.74	105.2	-15.46
5875	93.80	PK	155	1.5	V	-1.84	91.96	105.2	-13.24
5925	64.04	PK	271	2.1	H	-1.82	62.22	68.2	-5.98
5925	66.17	PK	296	1.3	V	-1.82	64.35	68.2	-3.85
11650	41.31	PK	119	1.3	H	6.77	48.08	74	-25.92
11650	43.43	PK	32	1.3	V	6.77	50.20	74	-23.8



Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part15.407	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11ac40									
5755 MHz									
5650	62.41	PK	28	1.1	H	-1.95	60.46	68.2	-7.74
5650	64.29	PK	325	1.7	V	-1.95	62.34	68.2	-5.86
5700	65.33	PK	187	2.4	H	-2.02	63.31	105.2	-41.89
5700	67.47	PK	15	2	V	-2.02	65.45	105.2	-39.75
5720	68.94	PK	91	1.8	H	-1.97	66.97	110.8	-43.83
5720	71.04	PK	128	1.2	V	-1.97	69.07	110.8	-41.73
5725	71.85	PK	211	1.1	H	-1.96	69.89	122.2	-52.31
5725	73.97	PK	138	1.4	V	-1.96	72.01	122.2	-50.19
11510	42.29	PK	111	2.1	H	6.59	48.88	74	-25.12
11510	44.42	PK	334	2.5	V	6.59	51.01	74	-22.99
5795 MHz									
5850	67.45	PK	87	1.6	H	-1.81	65.64	122.2	-56.56
5850	69.41	PK	349	1.2	V	-1.81	67.60	122.2	-54.6
5855	66.41	PK	94	2.4	H	-1.82	64.59	110.8	-46.21
5855	68.55	PK	16	2	V	-1.82	66.73	110.8	-44.07
5875	84.88	PK	145	2.1	H	-1.84	83.04	105.2	-22.16
5875	87.02	PK	14	1.7	V	-1.84	85.18	105.2	-20.02
5925	64.26	PK	255	1.6	H	-1.82	62.44	68.2	-5.76
5925	66.44	PK	268	2	V	-1.82	64.62	68.2	-3.58
11590	42.90	PK	110	1.7	H	6.57	49.47	74	-24.53
11590	45.11	PK	13	1.7	V	6.57	51.68	74	-22.32

Frequency (MHz)	Receiver		Turn-Table Angle Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part15.407	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11AC80									
5775MHz									
5650	64.19	PK	192	1.2	H	-1.95	62.24	68.2	-5.96
5650	66.28	PK	173	2.3	V	-1.95	64.33	68.2	-3.87
5700	72.26	PK	257	2.3	H	-2.02	70.24	105.2	-34.96
5700	74.35	PK	33	1.2	V	-2.02	72.33	105.2	-32.87
5720	74.51	PK	259	1.6	H	-1.97	72.54	110.8	-38.26
5720	76.84	PK	301	1.7	V	-1.97	74.87	110.8	-35.93
5725	75.49	PK	311	2.1	H	-1.96	73.53	122.2	-48.67
5725	77.97	PK	186	2.1	V	-1.96	76.01	122.2	-46.19
5850	73.16	PK	60	1.1	H	-1.81	71.35	122.2	-50.85
5850	75.32	PK	57	2.3	V	-1.81	73.51	122.2	-48.69
5855	67.30	PK	156	1	H	-1.82	65.48	110.8	-45.32
5855	69.71	PK	329	1.1	V	-1.82	67.89	110.8	-42.91
5875	92.26	PK	269	1.1	H	-1.84	90.42	105.2	-14.78
5875	94.68	PK	254	1	V	-1.84	92.84	105.2	-12.36
5925	63.45	PK	124	2	H	-1.82	61.63	68.2	-6.57
5925	65.60	PK	68	2.3	V	-1.82	63.78	68.2	-4.42
11550	43.07	PK	57	1.5	H	6.61	49.68	74	-24.32
11550	45.20	PK	149	1.1	V	6.61	51.81	74	-22.19

**Note:**

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

Corrected Amplitude = Corrected Factor + Reading

Margin = Corrected. Amplitude - Limit

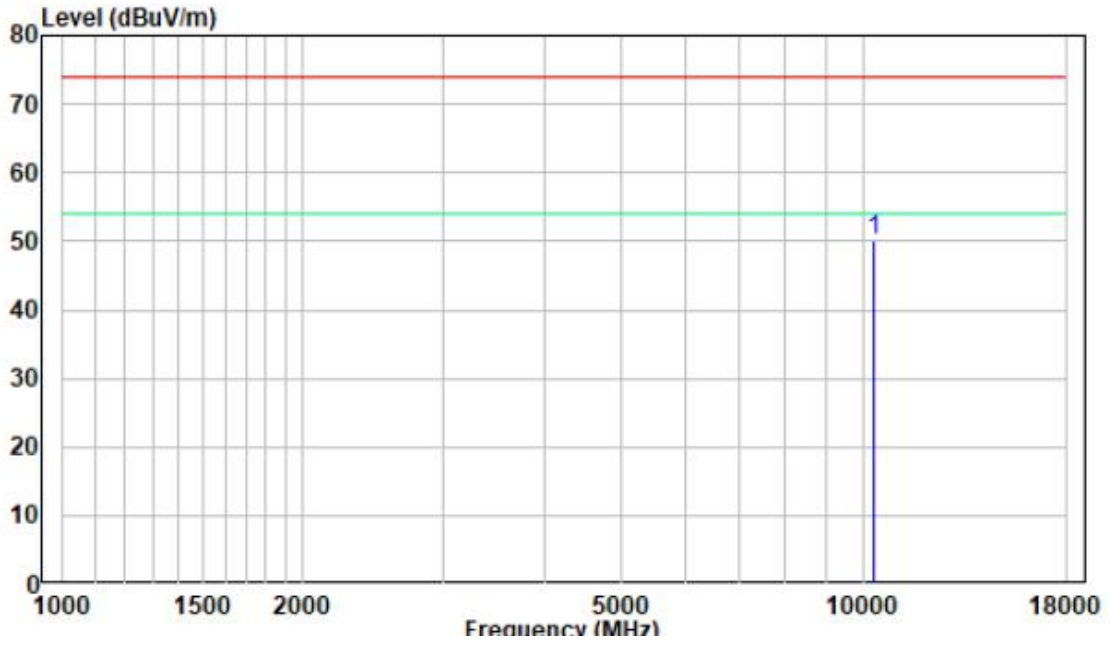
The other spurious emission which is in the noise floor level was not recorded.

The test result of peak was less than the limit of average, so just peak values were recorded.

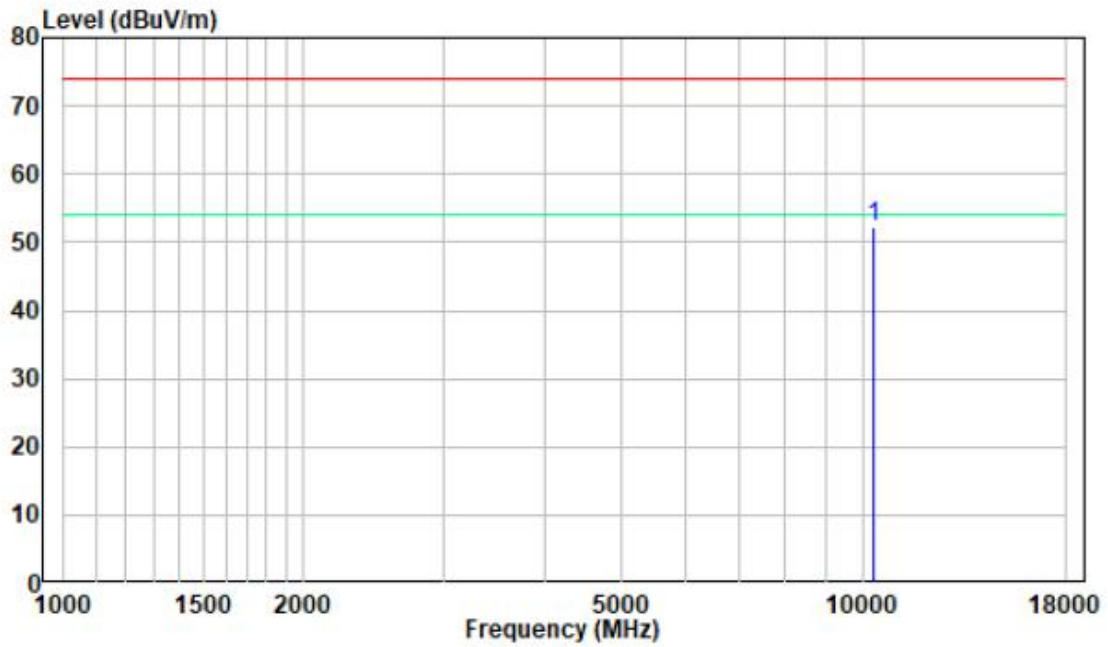
**1-18GHz**

Pre-scan for 802.11a, 5180MHz

**Horizontal:**



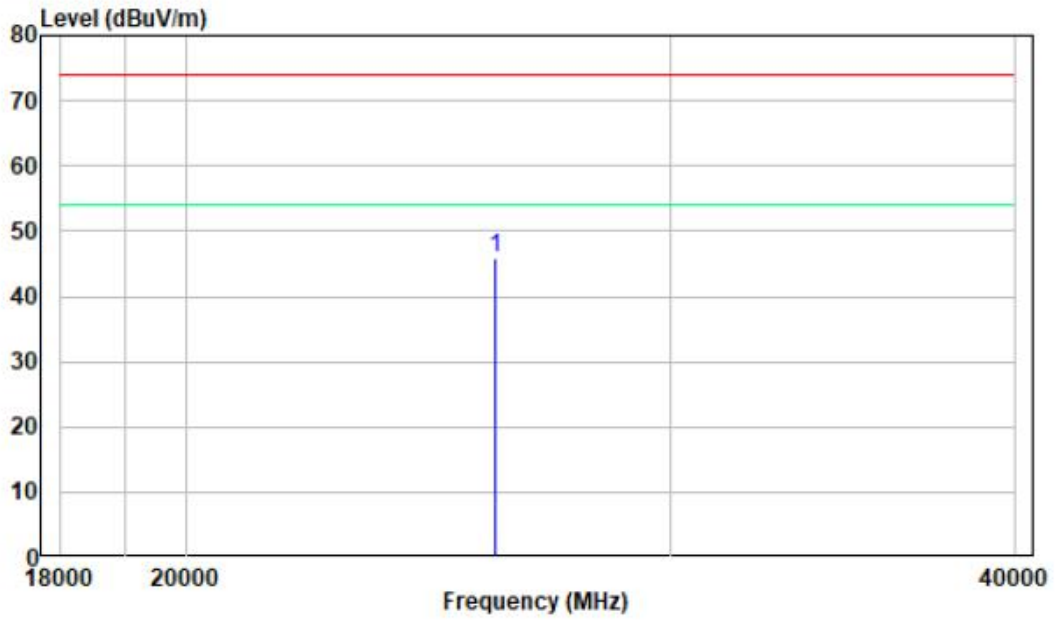
**Vertical:**



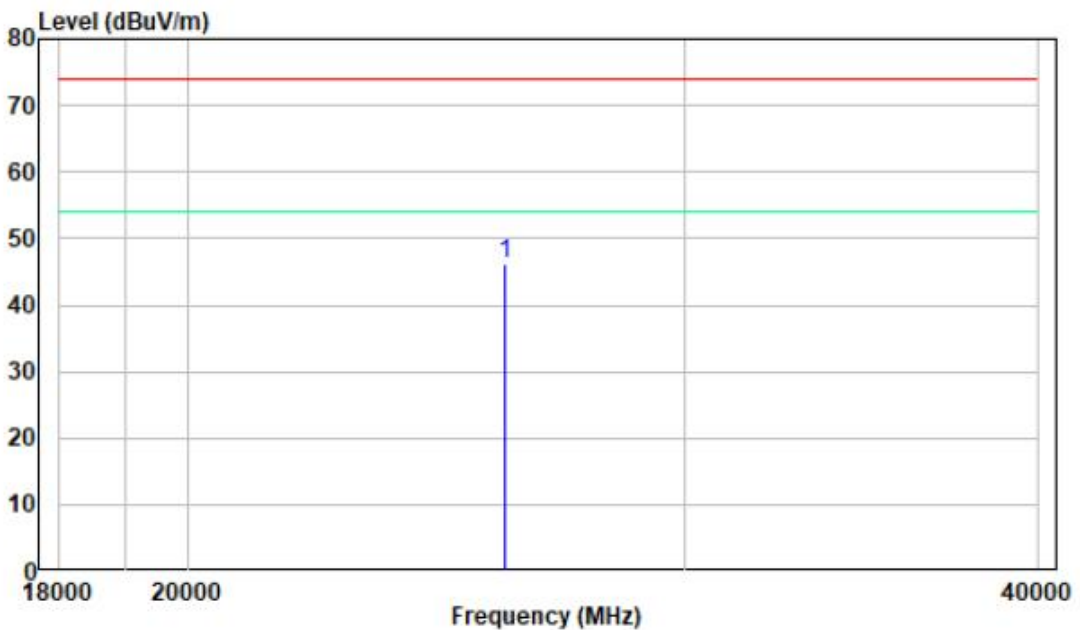
**18-40GHz**

Pre-scan for 802.11a, 5180MHz

Horizontal:



Vertical:



## **FCC §15.407(a),(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**

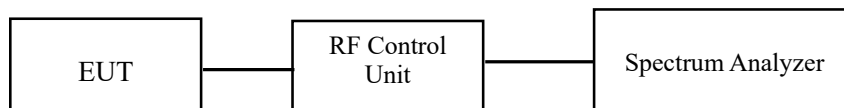
#### **1. Emission Bandwidth (EBW)**

- 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 5.725-5.85 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**

<b>Temperature:</b>	26.1-27°C
<b>Relative Humidity:</b>	51-57%
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Black Ding from 2021-08-06 to 2021-12-12.*

*EUT operation mode: Transmitting*

**Test Result: Pass**

*Note: Pre-scan two antenna port, the worst case ANT 1 was tested.*

*Please refer to the Appendix.*

## **FCC §15.407(a) – CONDUCTED TRANSMITTER OUTPUT POWER**

### **Applicable Standard**

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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.

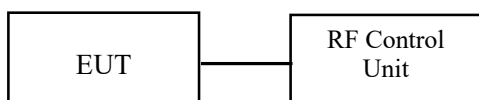
For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting 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 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. 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**

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



Note: the RF Control Unit has a built-in power sensor.

**Test Data****Environmental Conditions**

<b>Temperature:</b>	26.1-27°C
<b>Relative Humidity:</b>	51-57%
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Black Ding from 2021-08-06 to 2021-12-12.*

*EUT operation mode: Transmitting*

**Test Result: Pass**

*Please refer to the Appendix.*



## **FCC §15.407(a) - POWER SPECTRAL DENSITY**

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.

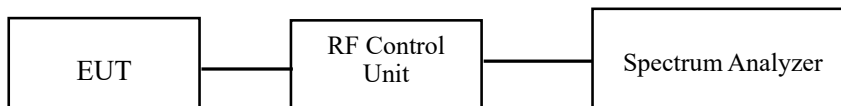
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall 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  $VBW \geq 3 \text{ RBW}$ .
- 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**

<b>Temperature:</b>	26.1-27°C
<b>Relative Humidity:</b>	51-57%
<b>ATM Pressure:</b>	101.0 kPa

*he testing was performed by Black Ding on 2021-12-21.*

*EUT operation mode: Transmitting*

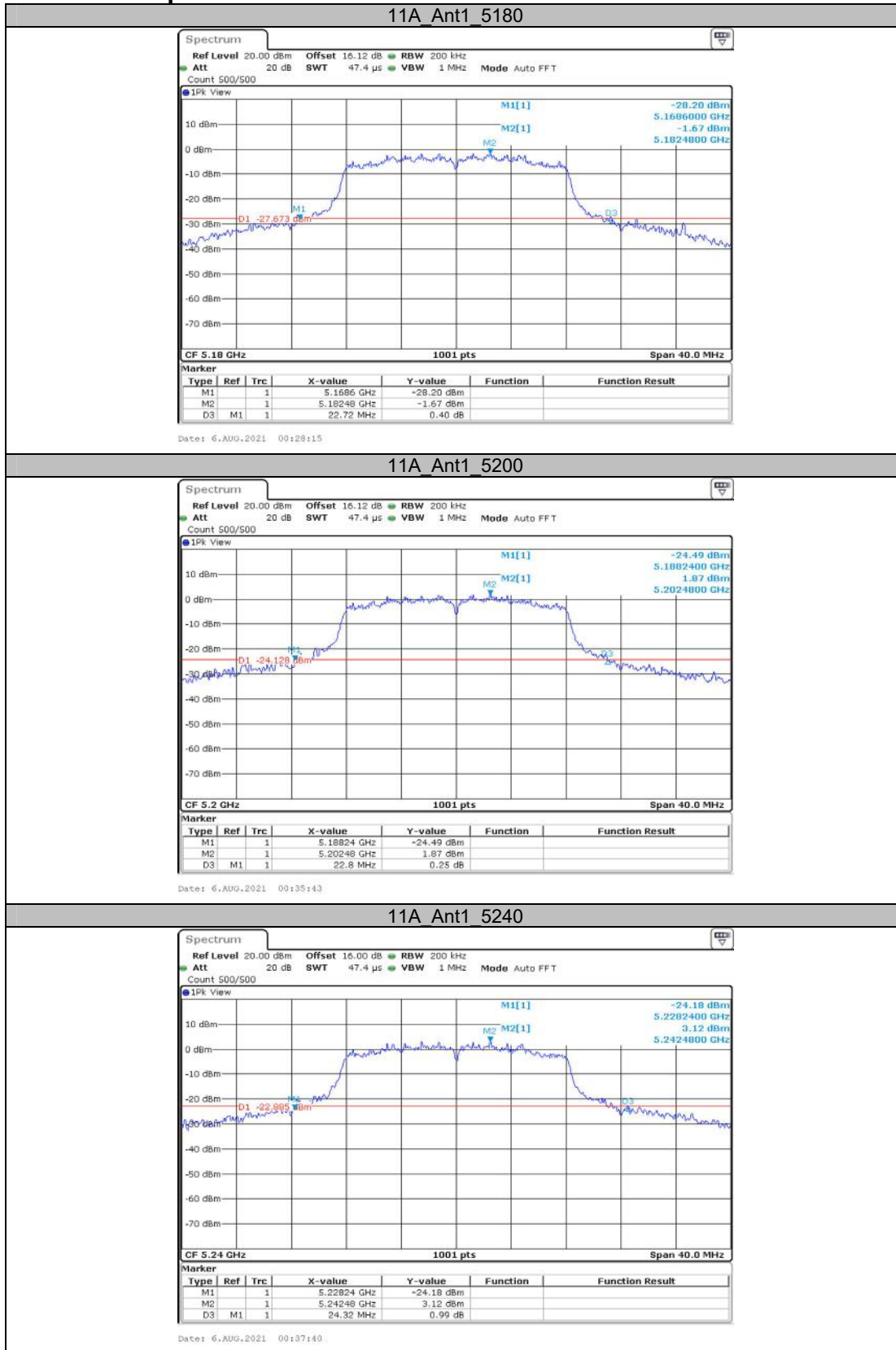
**Test Result: Pass**

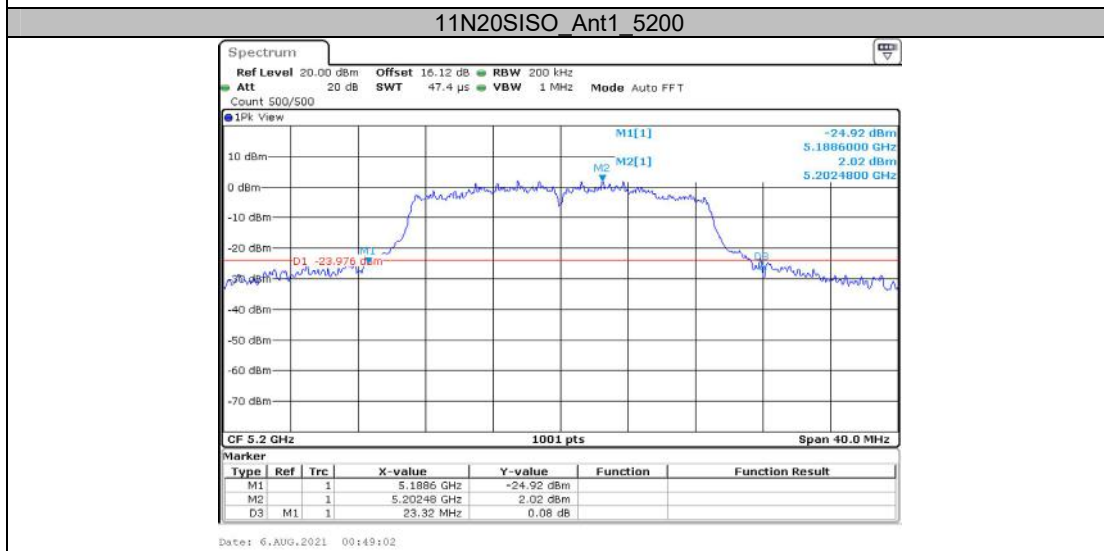
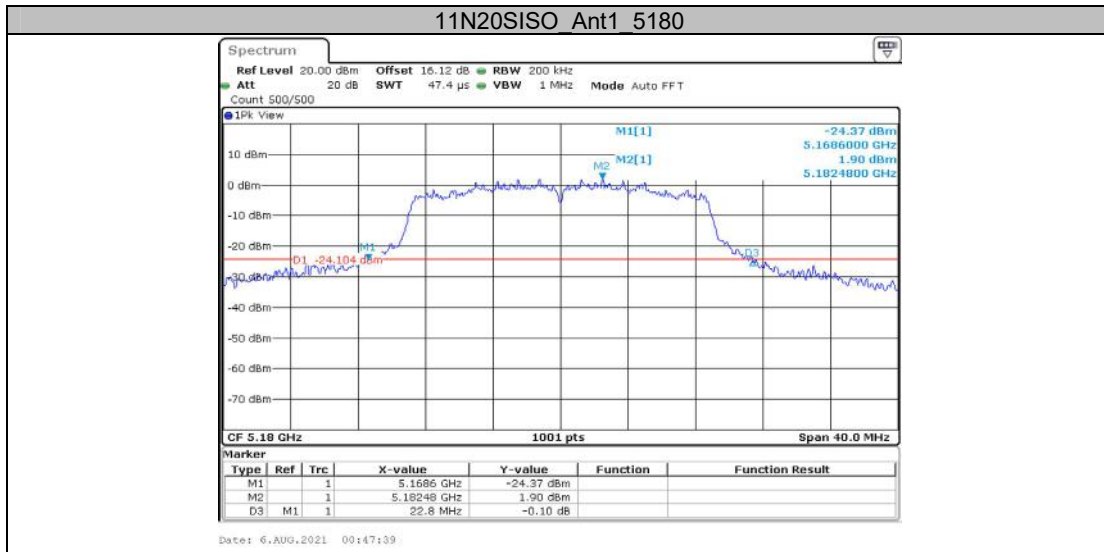
*Please refer to the Appendix.*

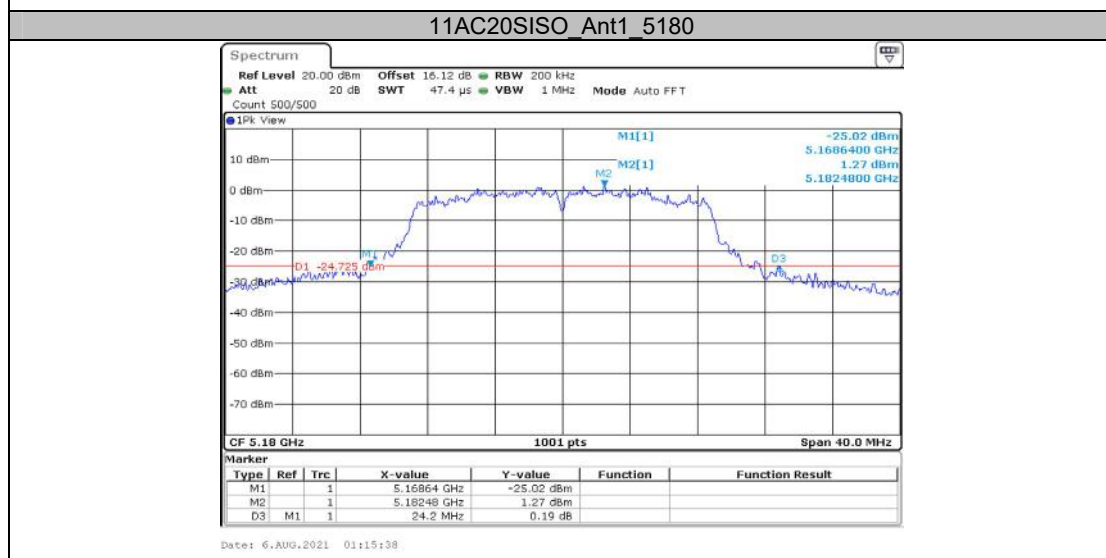
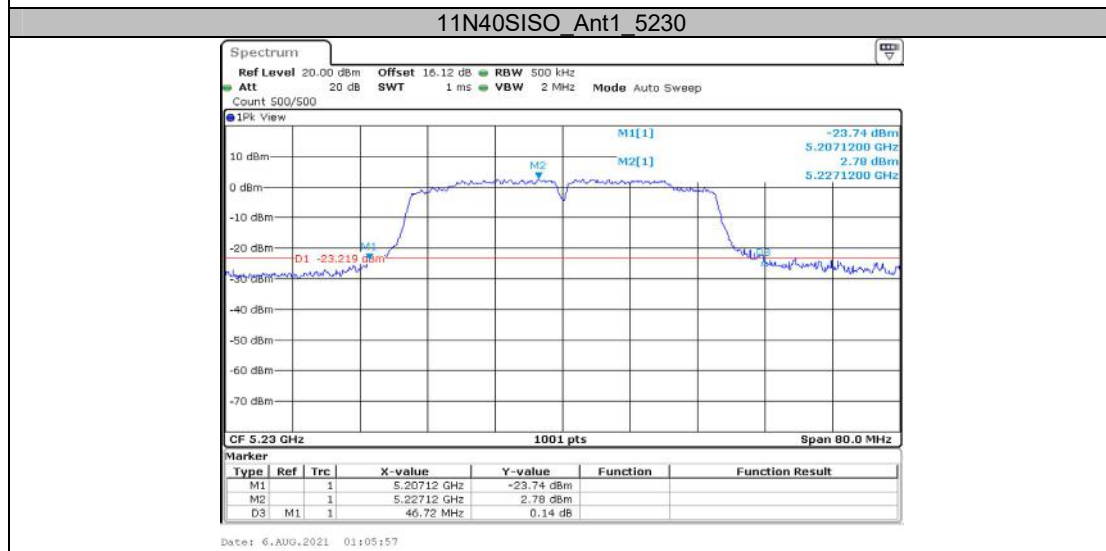
**APPENDIX****Appendix A1: Emission Bandwidth  
Test Result**

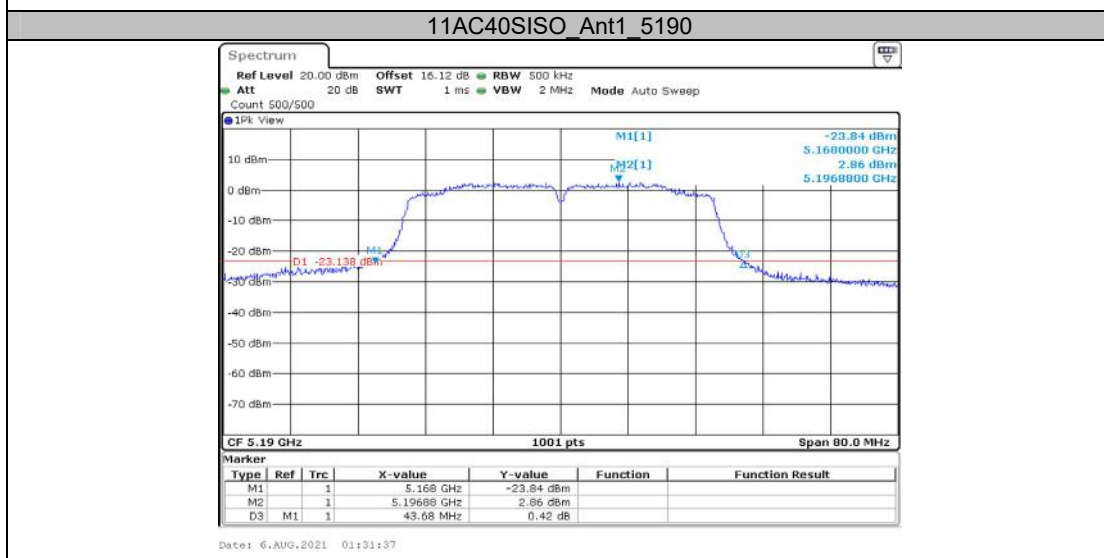
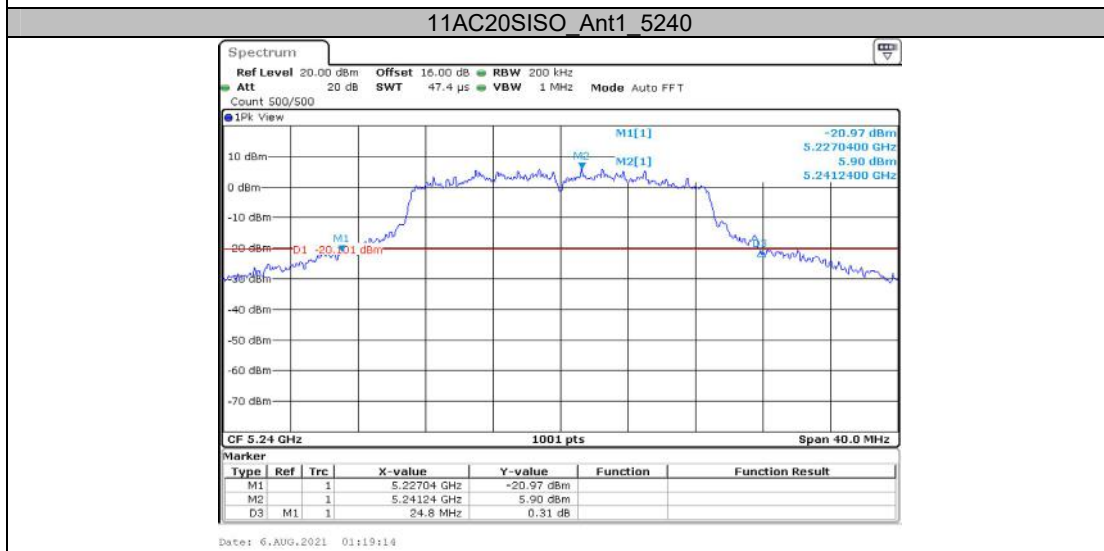
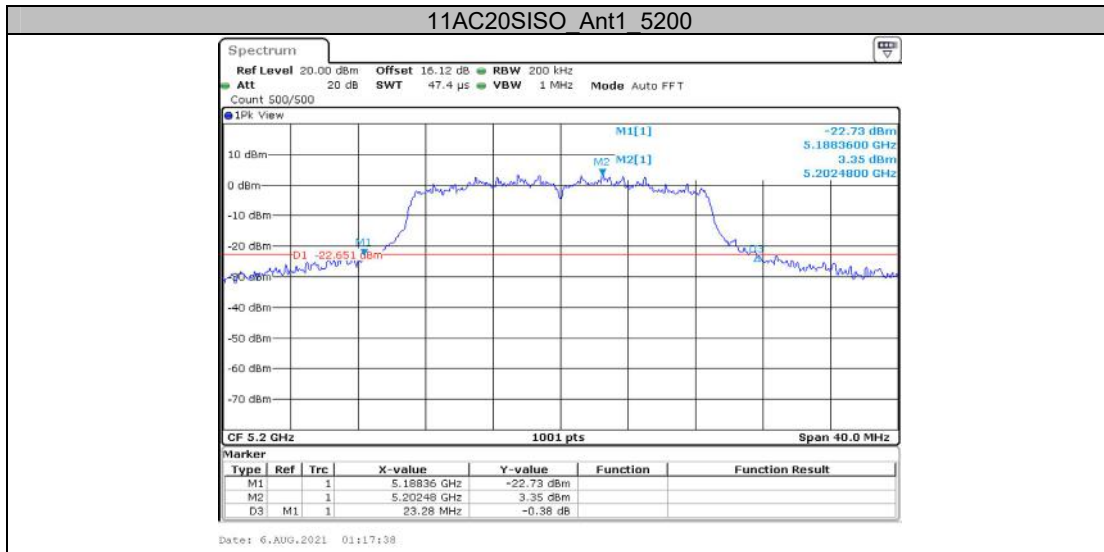
Test Mode	Antenna	Channel	26db EBW [MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	22.720	---	PASS
		5200	22.800	---	PASS
		5240	24.320	---	PASS
11N20SISO	Ant1	5180	22.800	---	PASS
		5200	23.320	---	PASS
		5240	24.840	---	PASS
11N40SISO	Ant1	5190	48.960	---	PASS
		5230	46.720	---	PASS
11AC20SISO	Ant1	5180	24.200	---	PASS
		5200	23.280	---	PASS
		5240	24.800	---	PASS
11AC40SISO	Ant1	5190	43.680	---	PASS
		5230	59.920	---	PASS
11AC80SISO	Ant1	5210	138.240	---	PASS

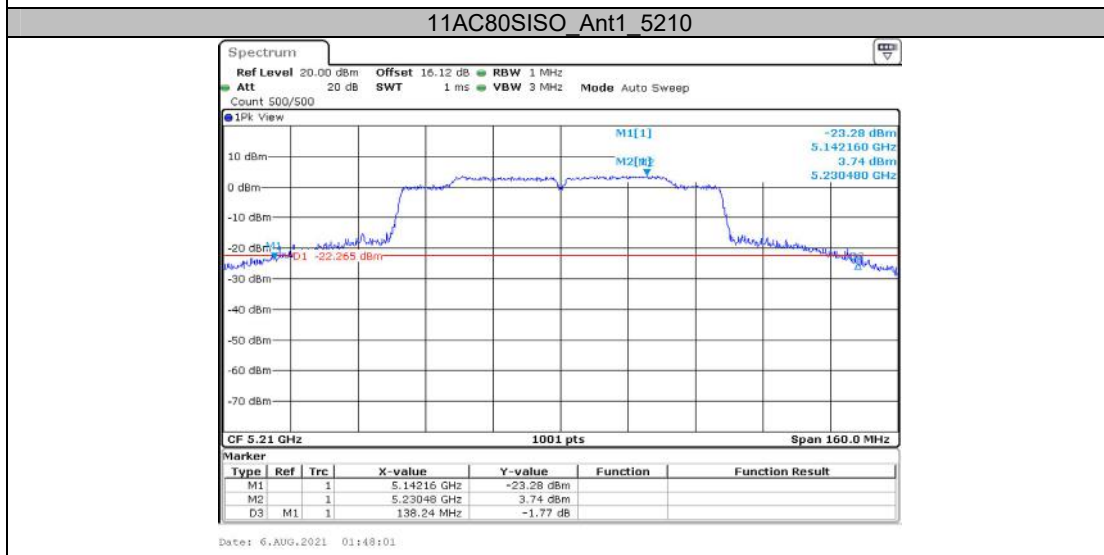
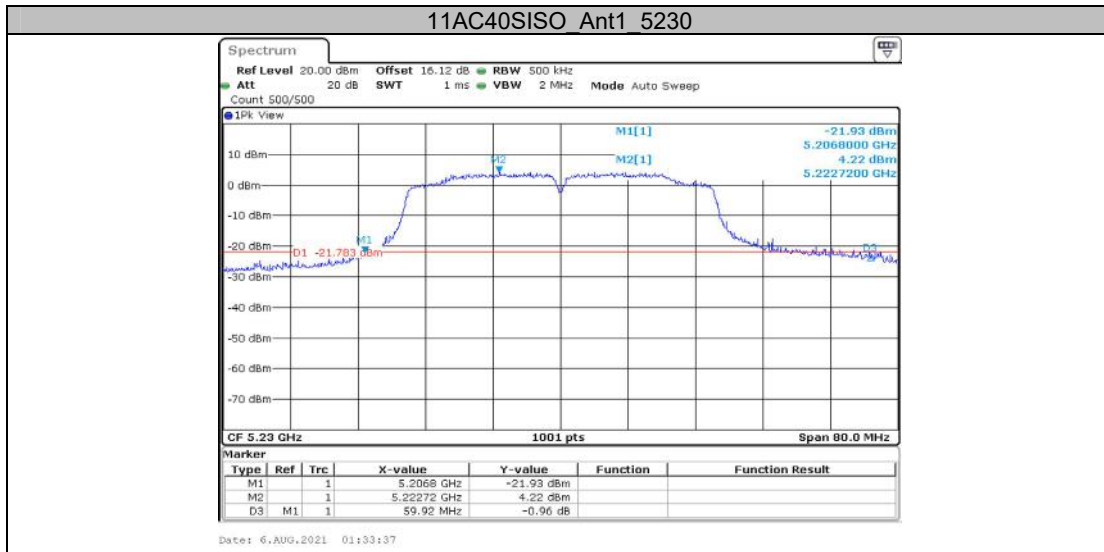
### Test Graphs











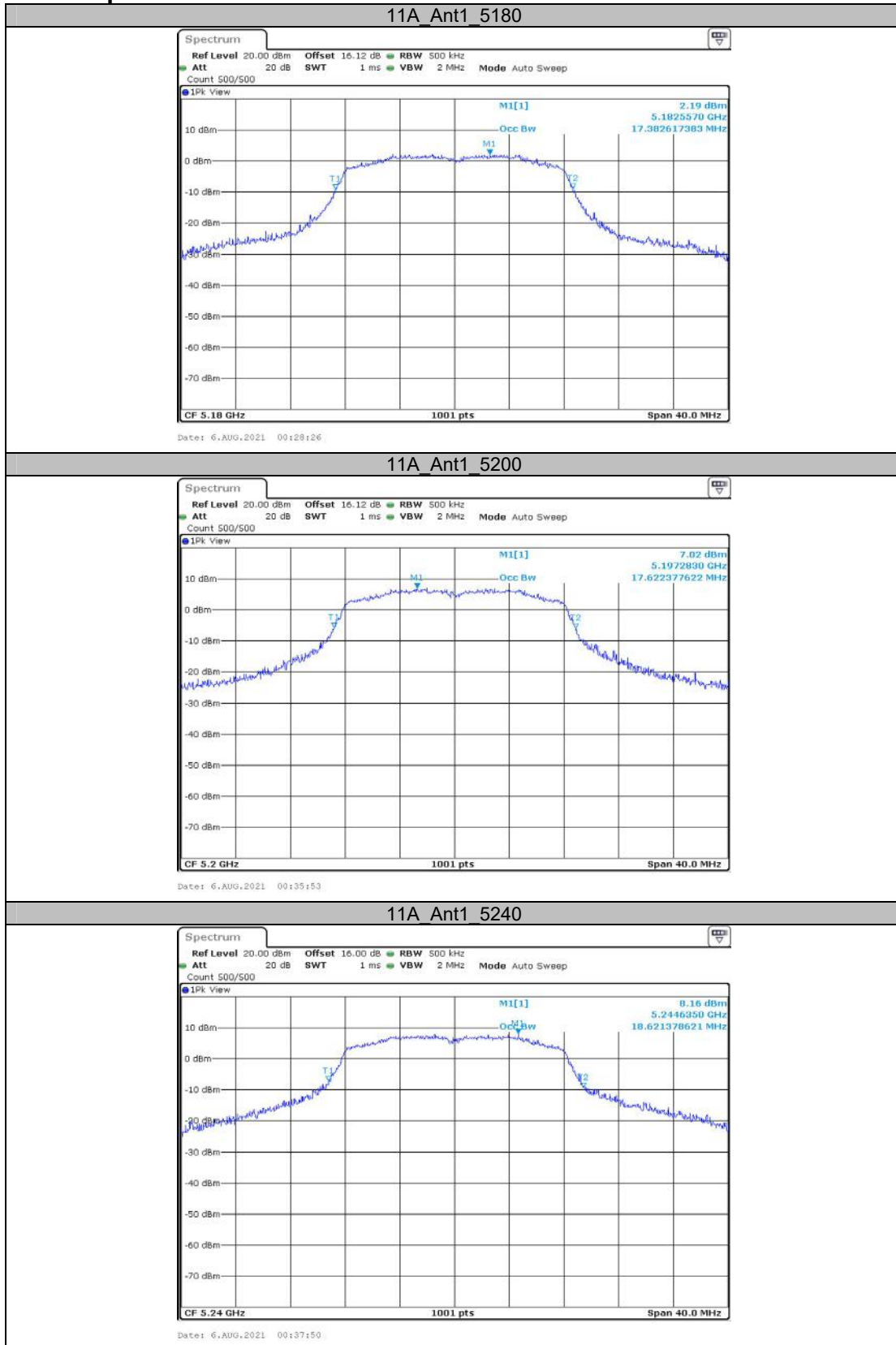


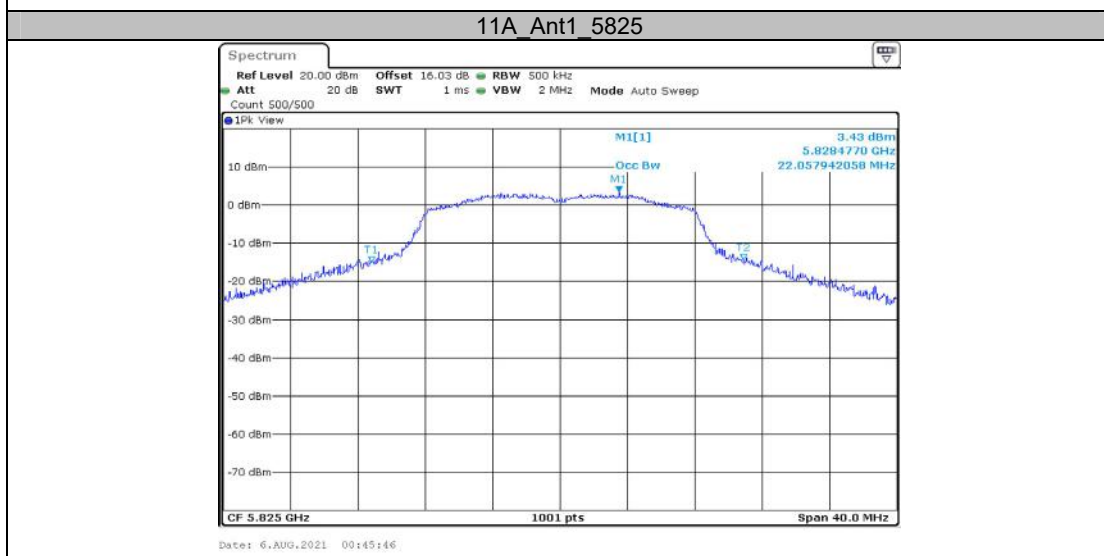
## Appendix A2: Occupied channel bandwidth Test Result

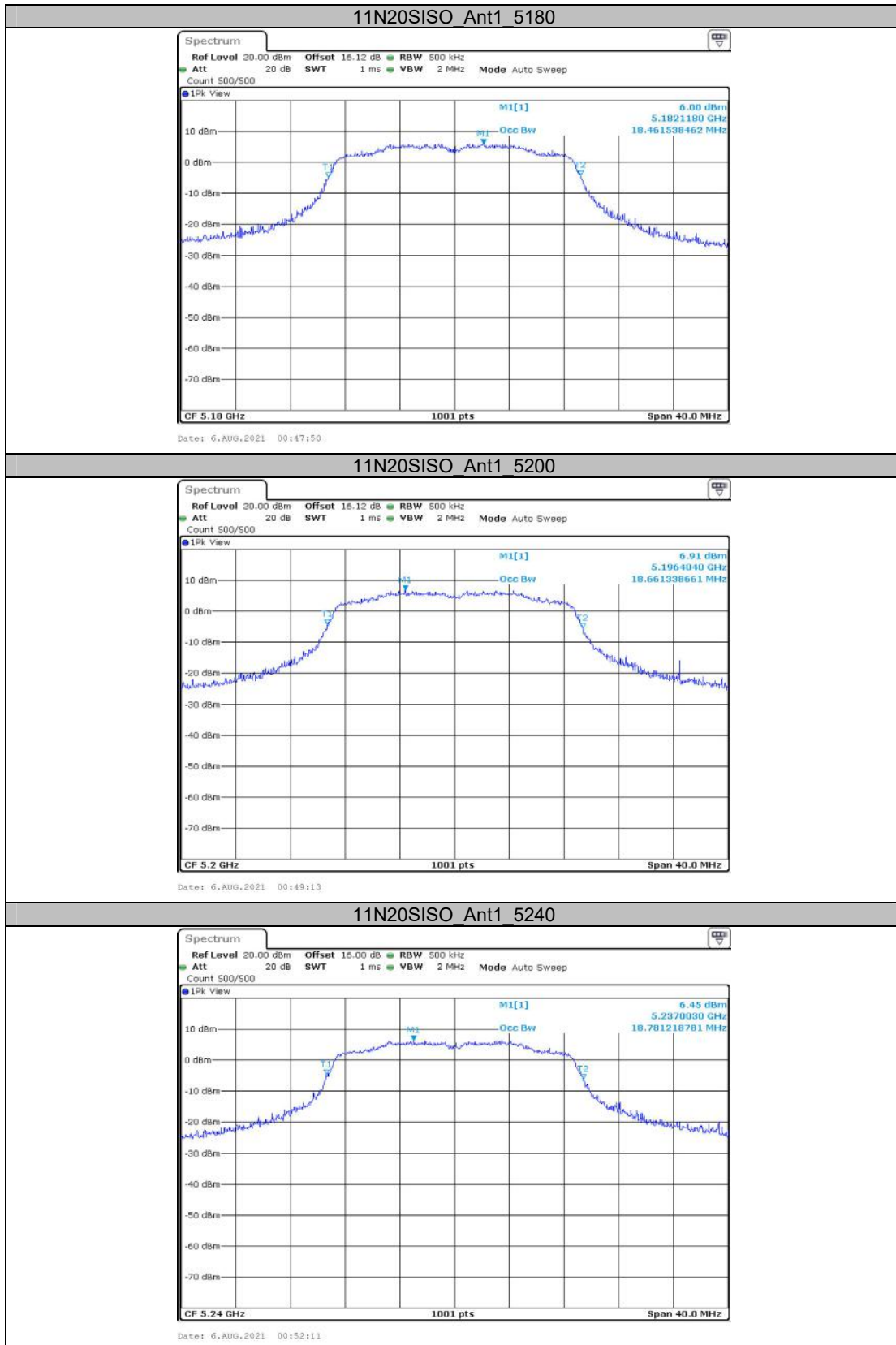
Test Mode	Antenna	Channel	OCB [MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	17.383	---	PASS
		5200	17.622	---	PASS
		5240	18.621	---	PASS
		5745	23.337	---	PASS
		5785	22.697	---	PASS
		5825	22.058	---	PASS
11N20SISO	Ant1	5180	18.462	---	PASS
		5200	18.661	---	PASS
		5240	18.781	---	PASS
		5745	24.416	---	PASS
		5785	23.457	---	PASS
		5825	22.697	---	PASS
11N40SISO	Ant1	5190	36.603	---	PASS
		5230	36.763	---	PASS
		5755	40.519	---	PASS
		5795	39.96	---	PASS
11AC20SISO	Ant1	5180	18.541	---	PASS
		5200	18.661	---	PASS
		5240	19.78	---	PASS
		5745	24.456	---	PASS
		5785	24.056	---	PASS
		5825	22.737	---	PASS
11AC40SISO	Ant1	5190	36.523	---	PASS
		5230	36.843	---	PASS
		5755	41.479	---	PASS
		5795	40.919	---	PASS
11AC80SISO	Ant1	5210	75.285	---	PASS
		5775	75.604	---	PASS

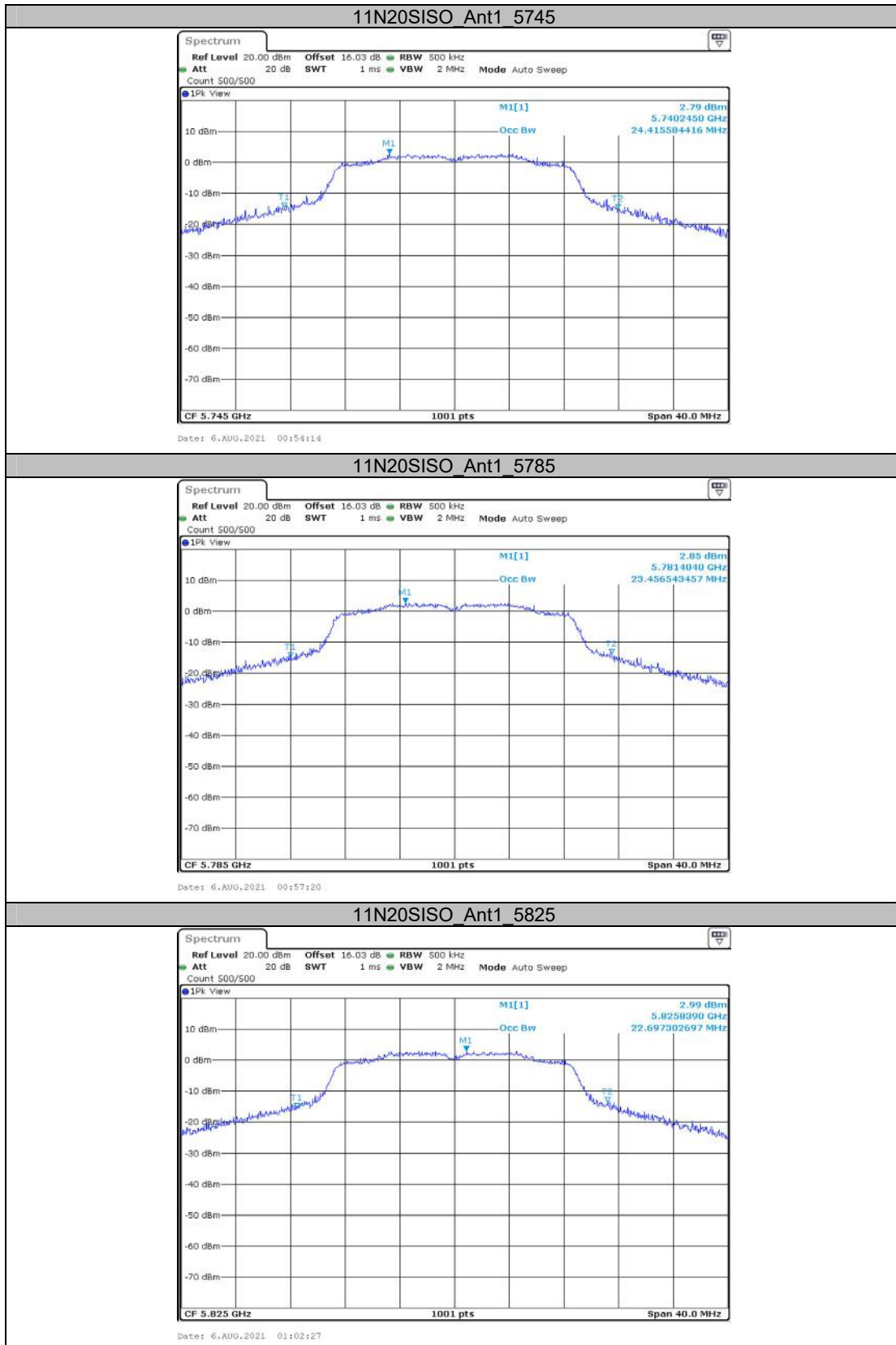
Note: For 5150-5250MHz bands, EUT not with any part of OBW fall within 5250-5350MHz range.  
For 5725-5850MHz bands, EUT not with any part of OBW fall within 5470-5725MHz range.

### Test Graphs

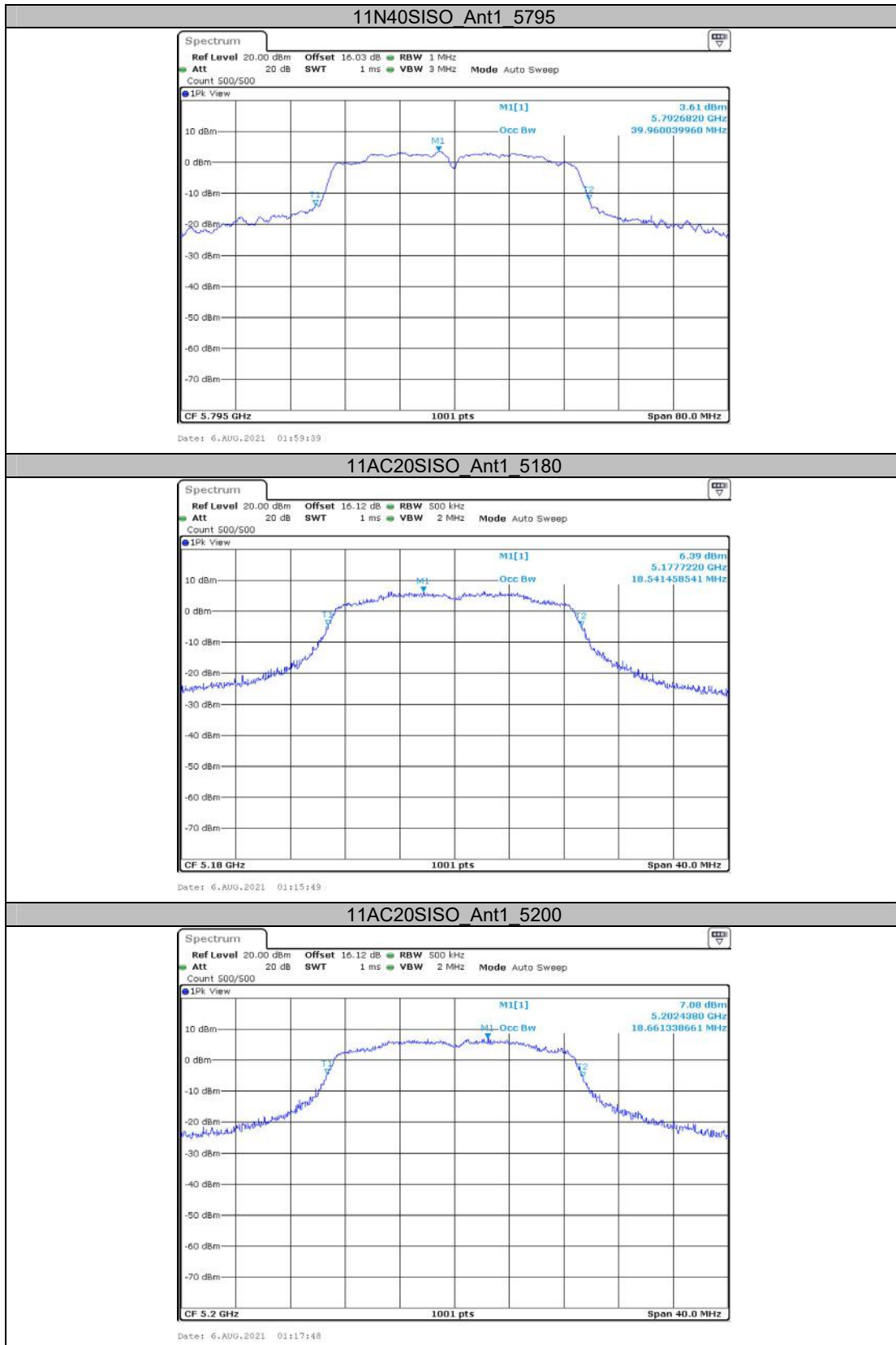


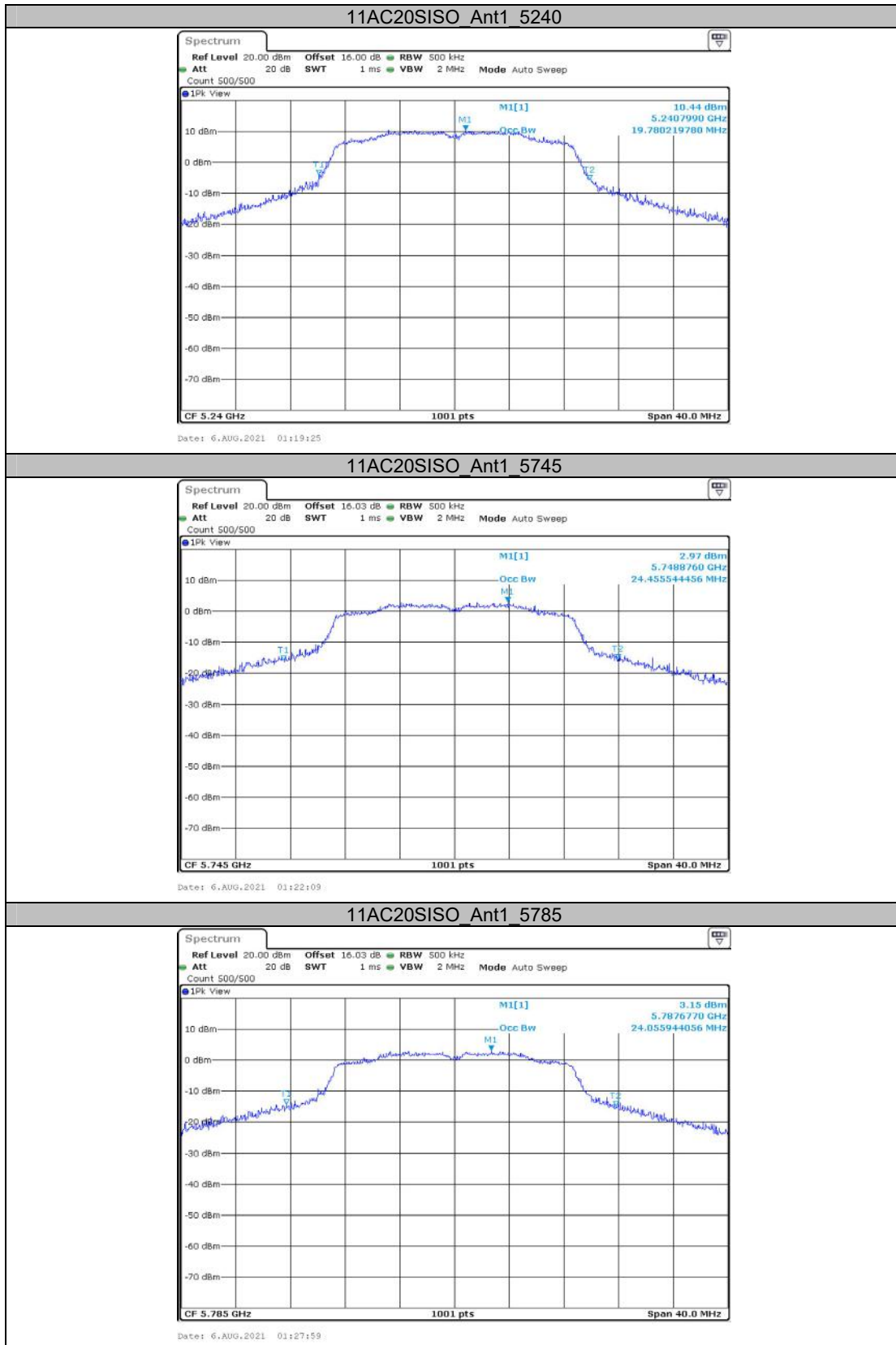




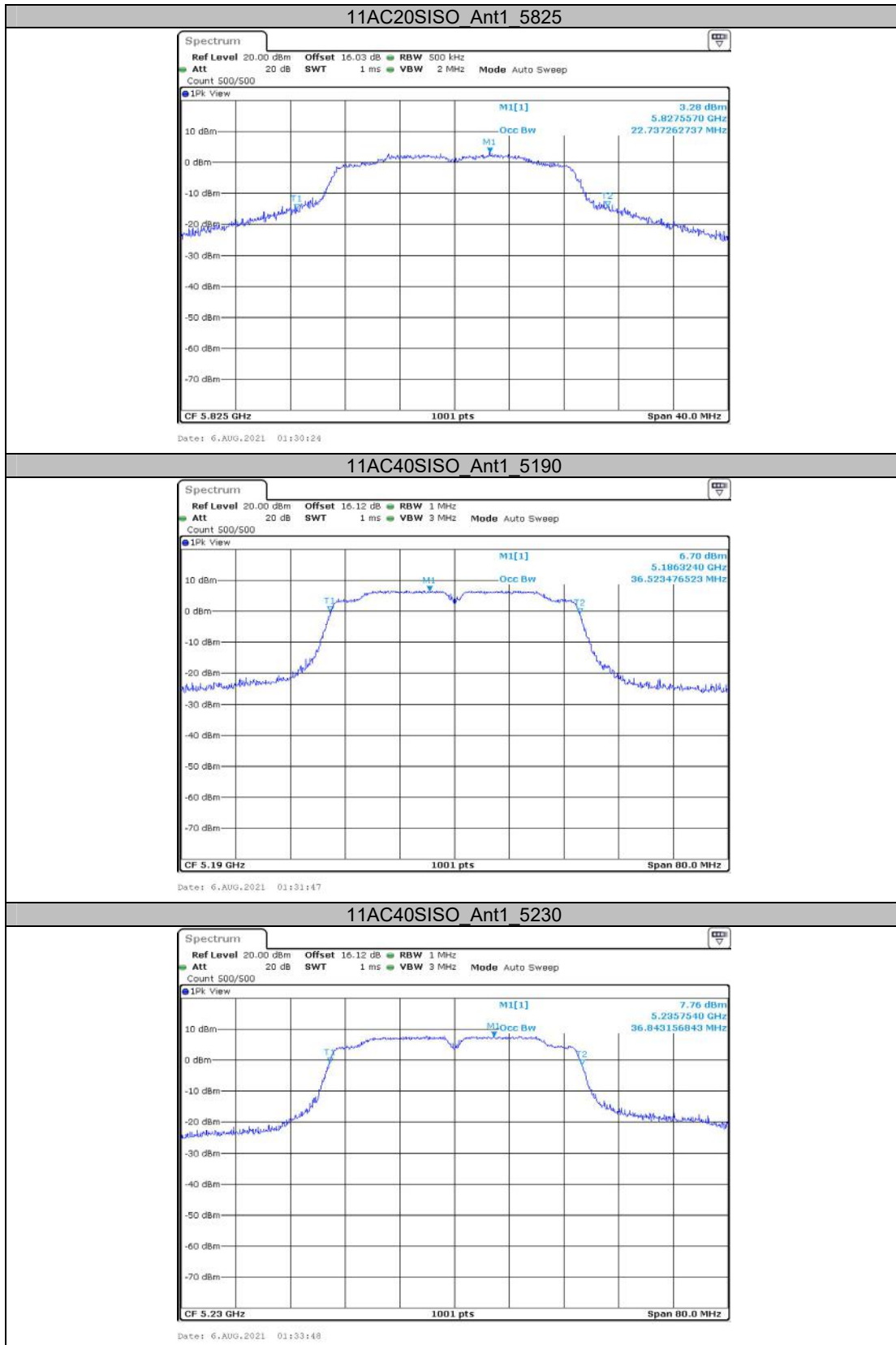


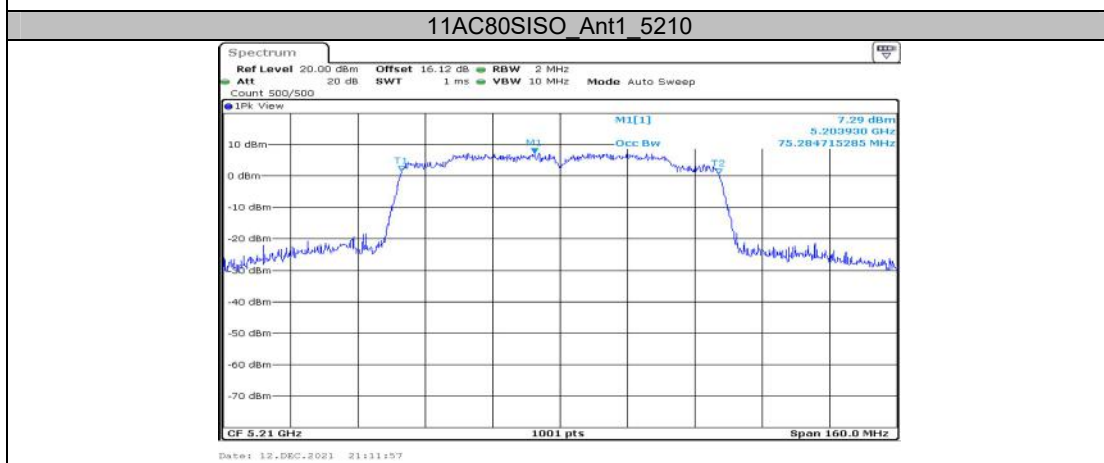
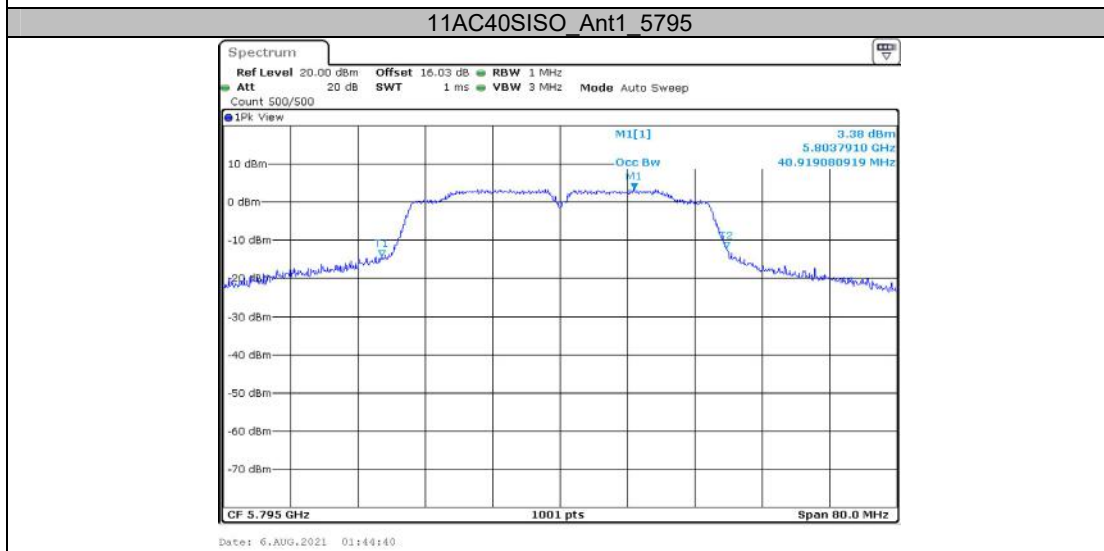
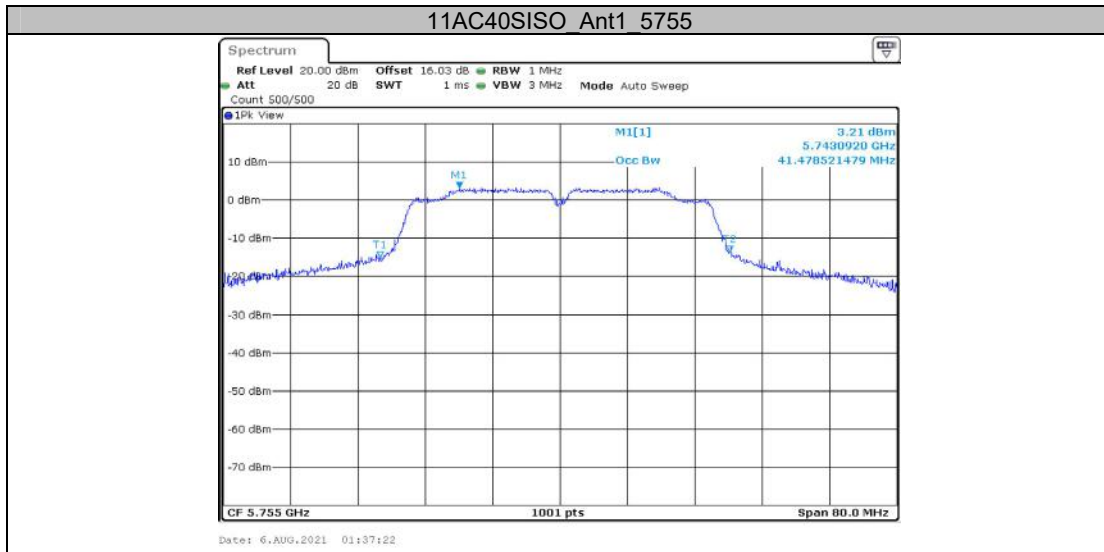










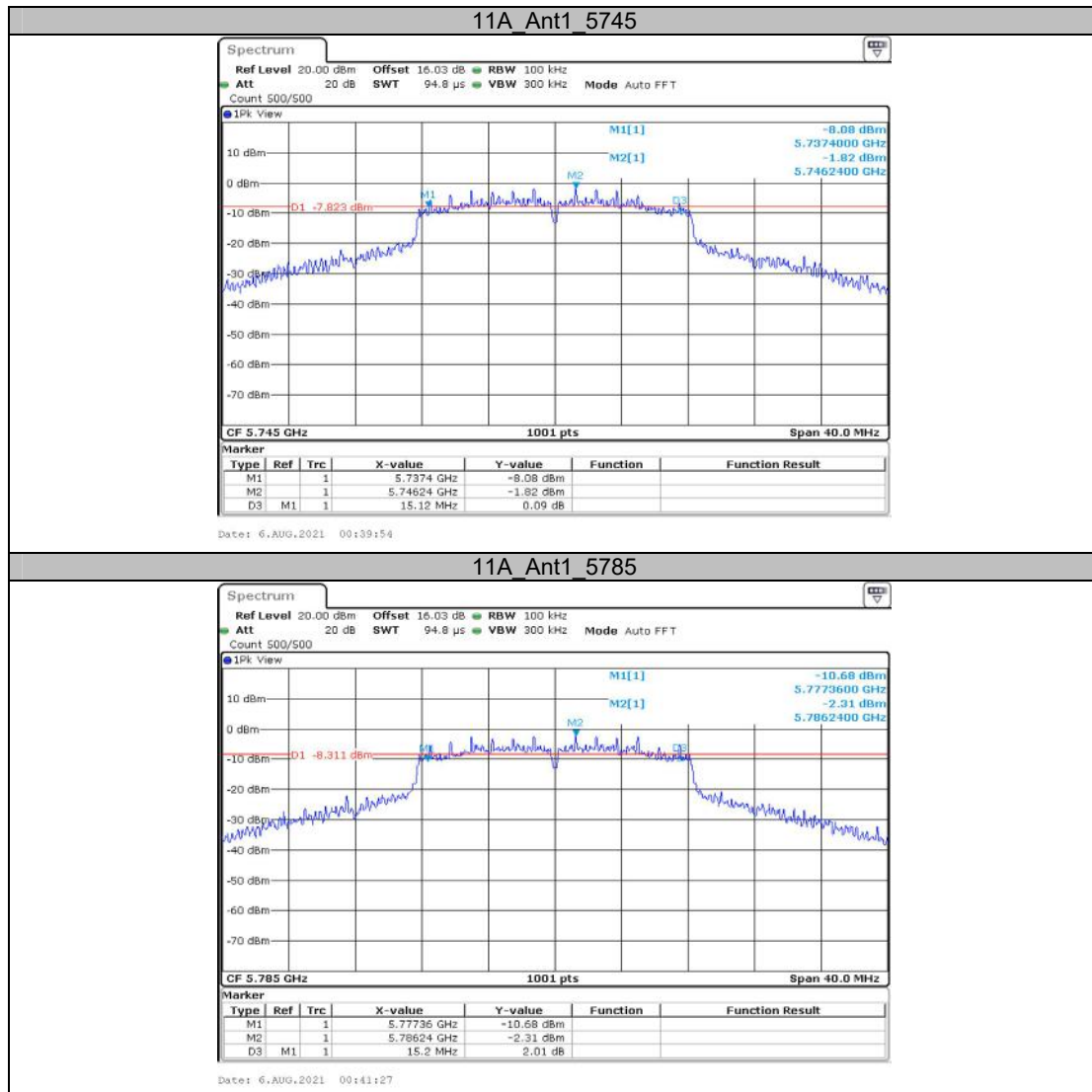


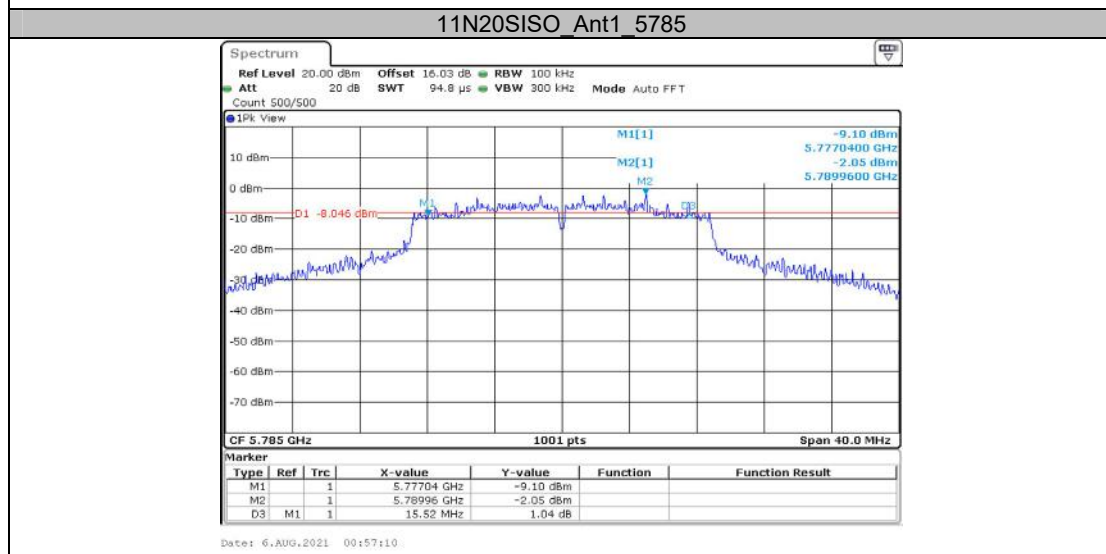
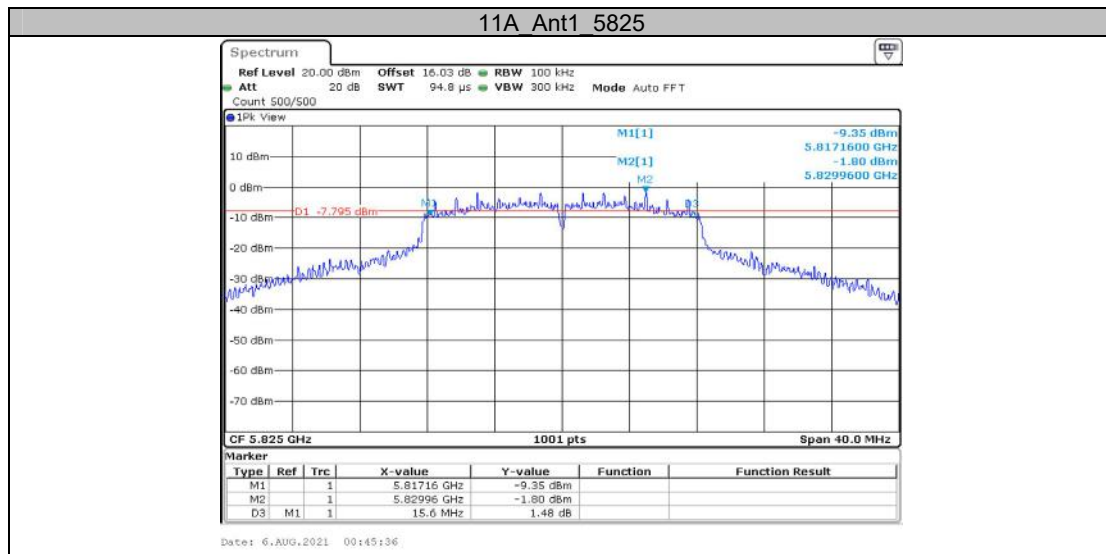


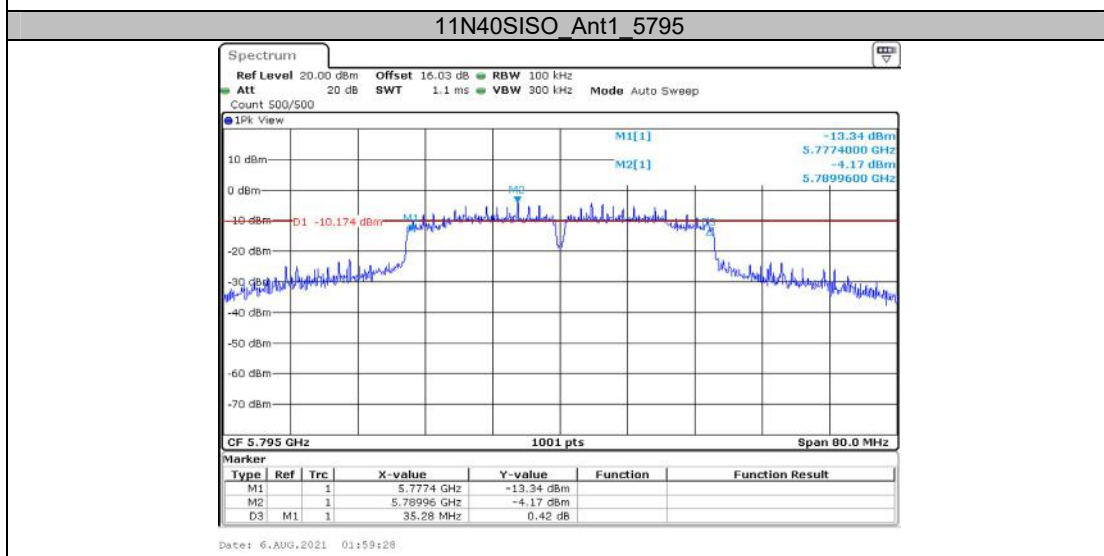
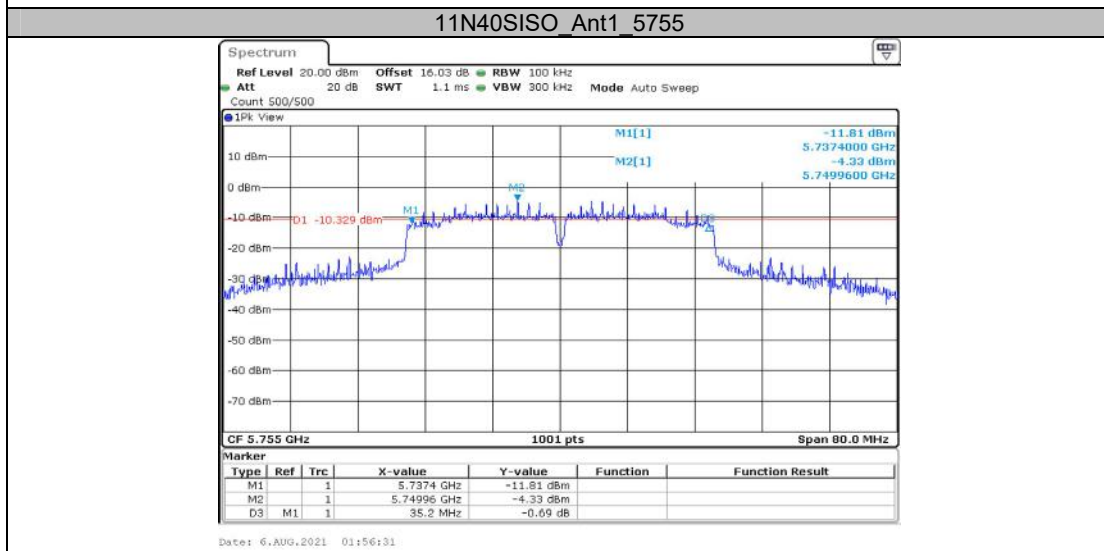
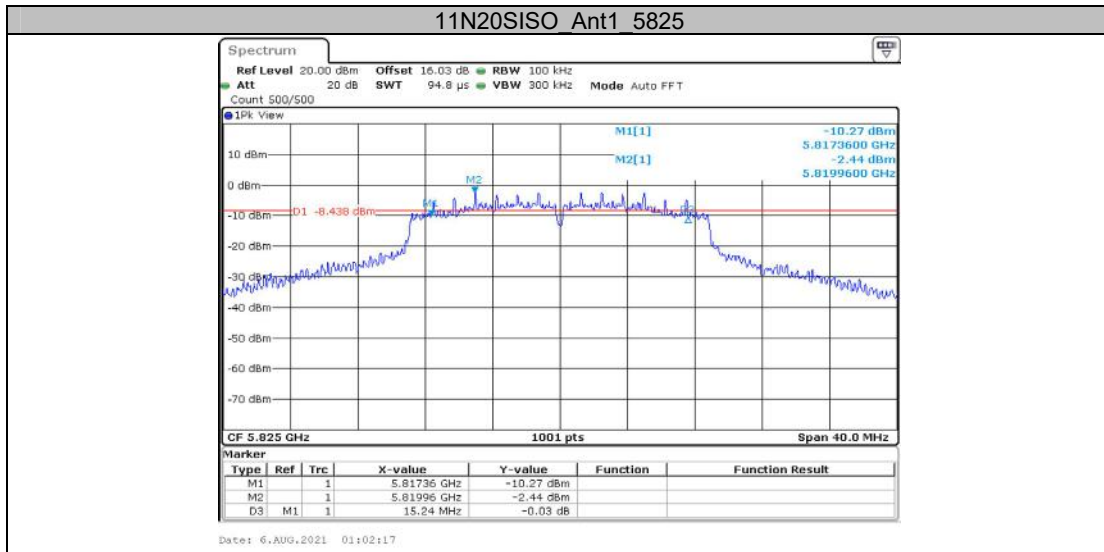
**Appendix A3: Min emission bandwidth  
Test Result**

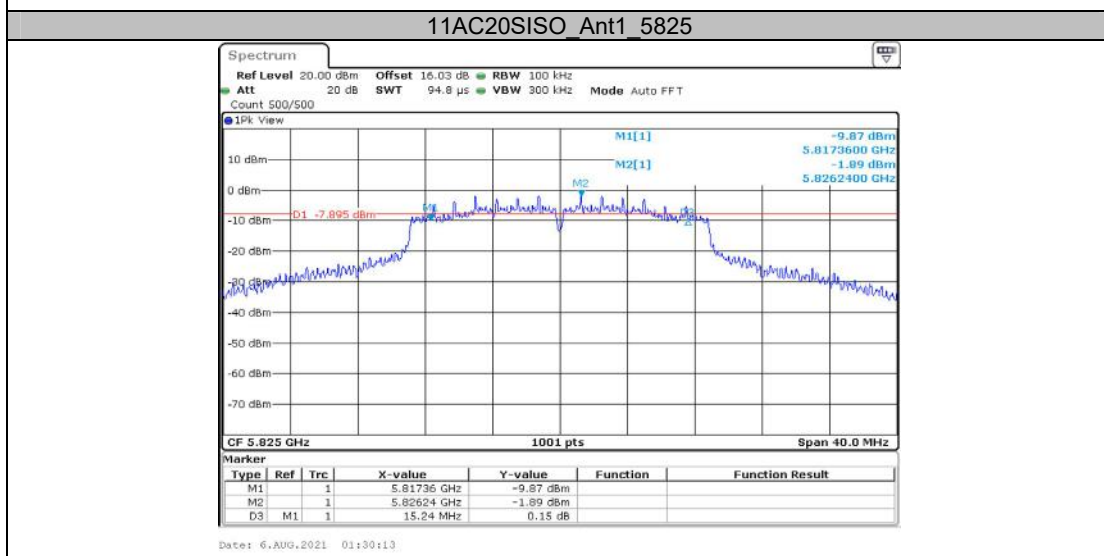
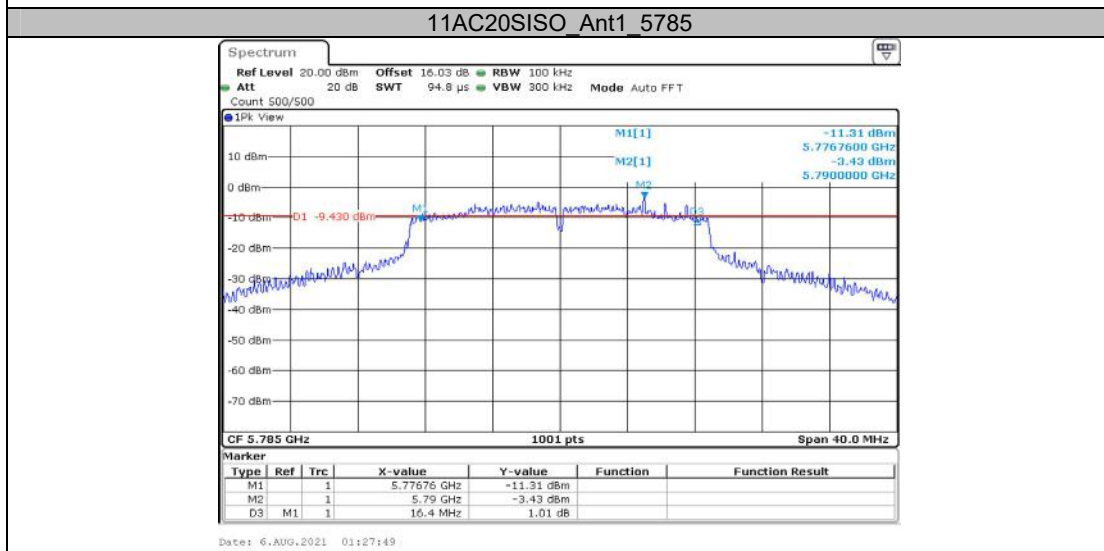
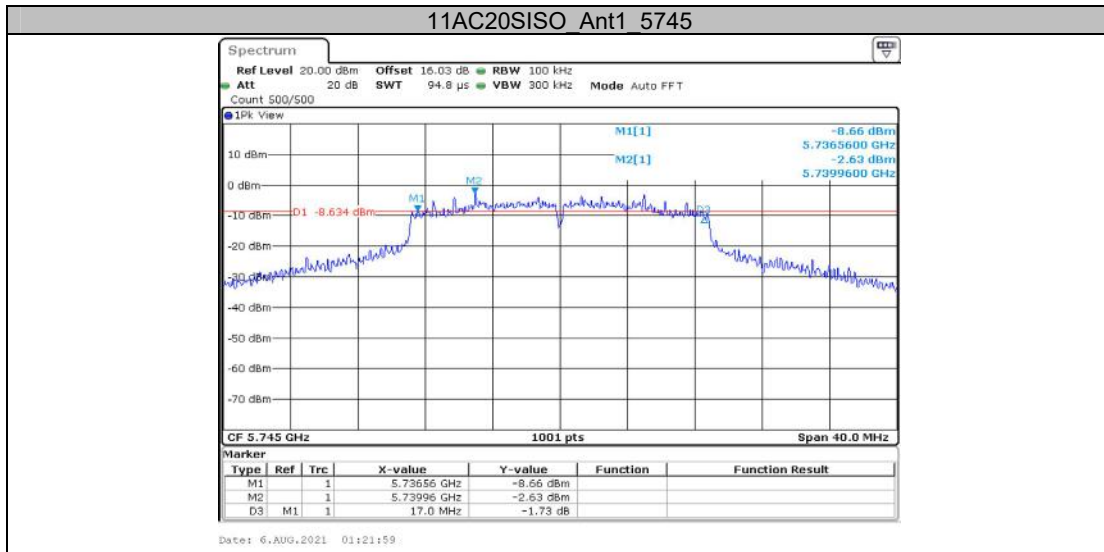
Test Mode	Antenna	Channel	6db EBW [MHz]	Limit[MHz]	Verdict
11A	Ant1	5745	15.120	0.5	PASS
		5785	15.200	0.5	PASS
		5825	15.600	0.5	PASS
11N20SISO	Ant1	5745	14.880	0.5	PASS
		5785	15.520	0.5	PASS
		5825	15.240	0.5	PASS
11N40SISO	Ant1	5755	35.200	0.5	PASS
		5795	35.280	0.5	PASS
11AC20SISO	Ant1	5745	17.000	0.5	PASS
		5785	16.400	0.5	PASS
		5825	15.240	0.5	PASS
11AC40SISO	Ant1	5755	35.200	0.5	PASS
		5795	35.280	0.5	PASS
11AC80SISO	Ant1	5775	65.440	0.5	PASS

### Test Graphs

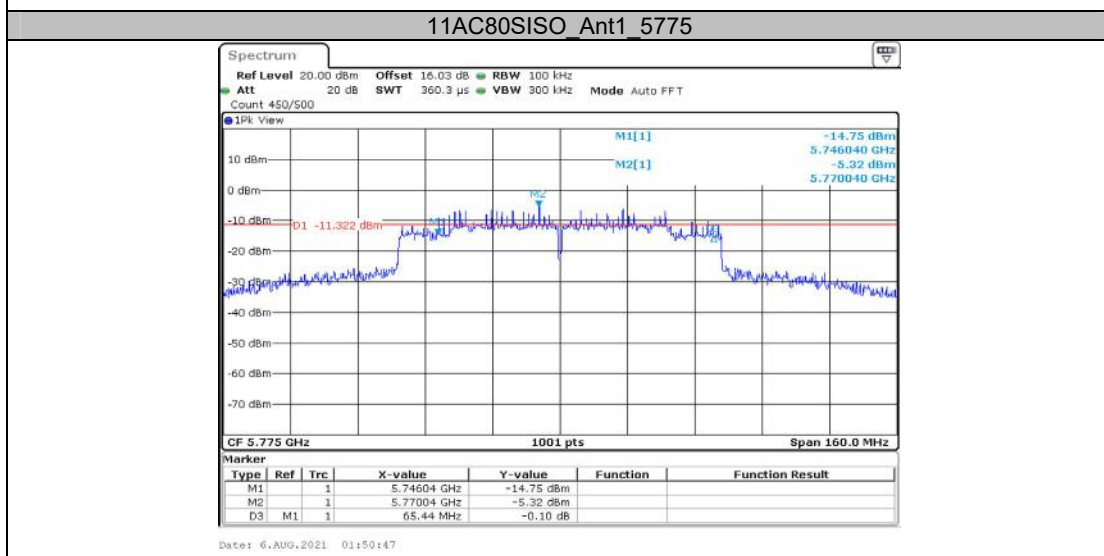
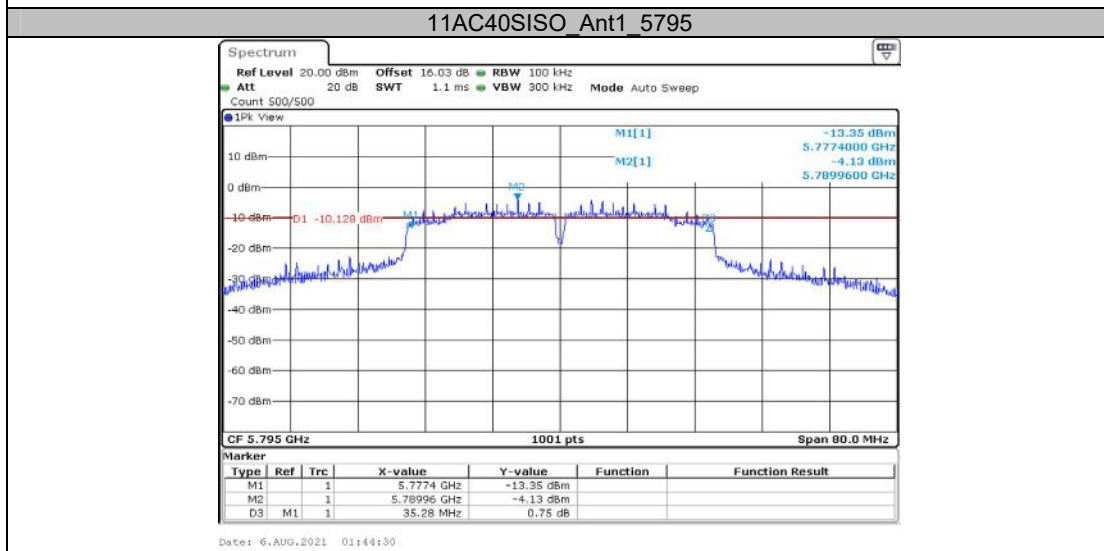
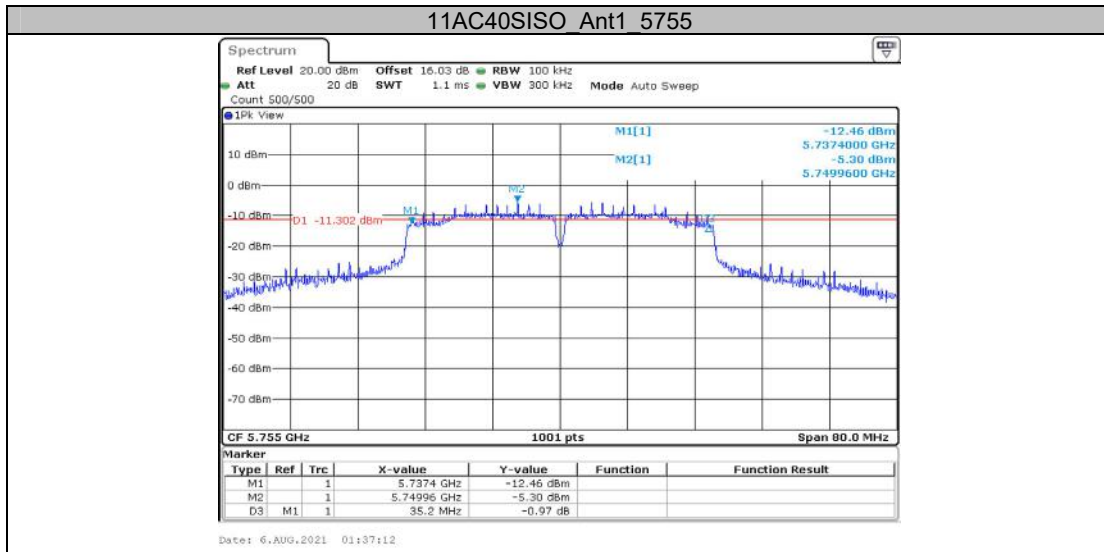












**Appendix B: Maximum conducted output power****Test Result** (Note: the Duty Cycle Factor has added into the result.)

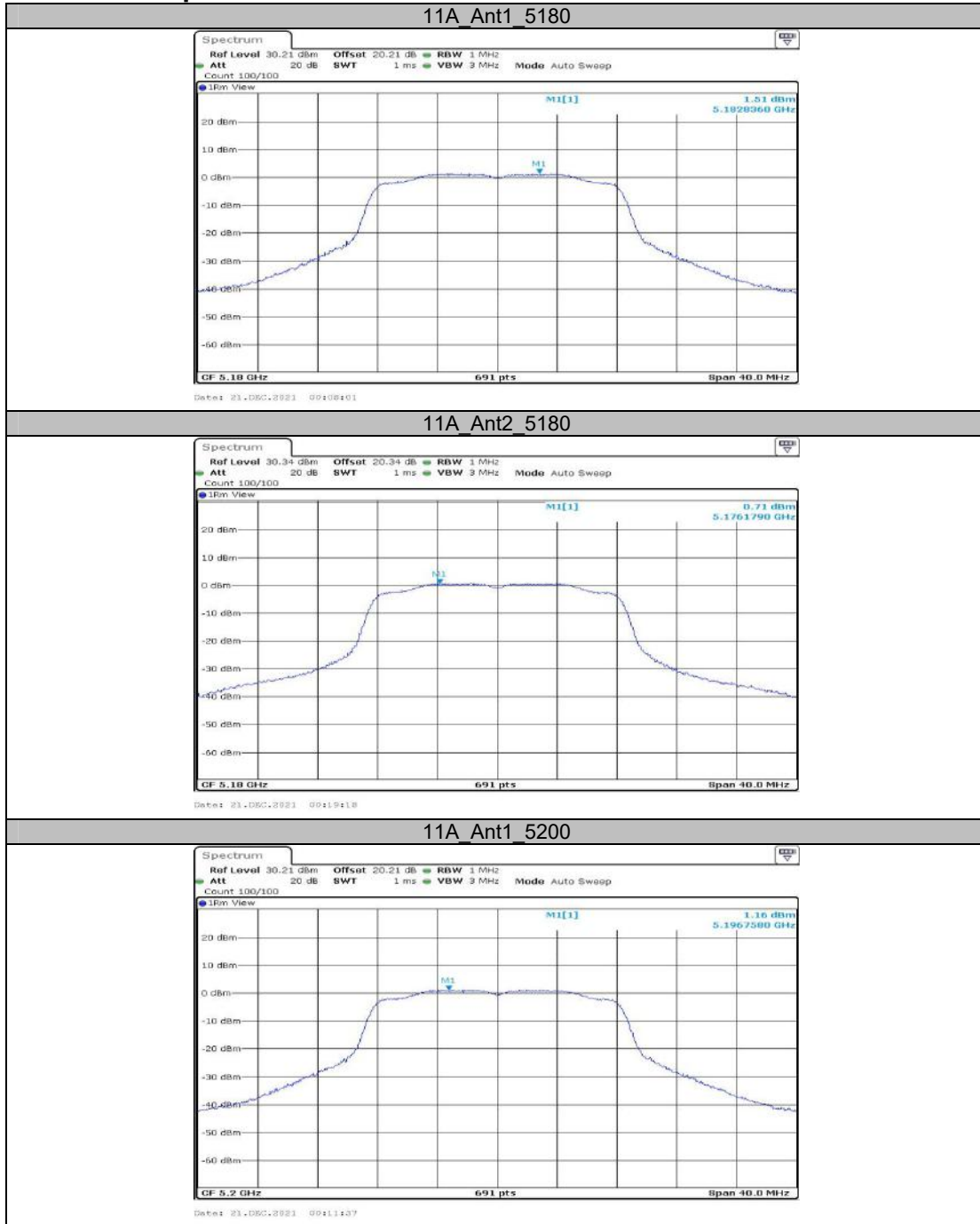
Test Mode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
11A	Ant1	5180	12.69	≤23.98	PASS
	Ant2	5180	12.47	≤23.98	PASS
	Ant1	5200	12.63	≤23.98	PASS
	Ant2	5200	12.36	≤23.98	PASS
	Ant1	5240	12.66	≤23.98	PASS
	Ant2	5240	12.45	≤23.98	PASS
	Ant1	5745	12.16	≤30	PASS
	Ant2	5745	11.76	≤30	PASS
	Ant1	5785	12.43	≤30	PASS
	Ant2	5785	12.38	≤30	PASS
11N20SISO	Ant1	5825	13.14	≤30	PASS
	Ant2	5825	11.93	≤30	PASS
	Ant1	5180	12.64	≤23.98	PASS
	Ant2	5180	12.29	≤23.98	PASS
	Ant1	5200	12.92	≤23.98	PASS
	Ant2	5200	12.71	≤23.98	PASS
	Ant1	5240	12.86	≤23.98	PASS
	Ant2	5240	12.47	≤23.98	PASS
	Ant1	5745	12.72	≤30	PASS
	Ant2	5745	12.01	≤30	PASS
11N40SISO	Ant1	5785	12.30	≤30	PASS
	Ant2	5785	12.28	≤30	PASS
	Ant1	5825	12.57	≤30	PASS
	Ant2	5825	12.26	≤30	PASS
	Ant1	5190	12.47	≤23.98	PASS
	Ant2	5190	12.22	≤23.98	PASS
	Ant1	5230	12.42	≤23.98	PASS
	Ant2	5230	12.28	≤23.98	PASS
11AC20SISO	Ant1	5755	12.76	≤30	PASS
	Ant2	5755	12.65	≤30	PASS
	Ant1	5795	12.86	≤30	PASS
	Ant2	5795	12.50	≤30	PASS
	Ant1	5180	13.52	≤23.98	PASS
	Ant2	5180	13.40	≤23.98	PASS
	Ant1	5200	12.76	≤23.98	PASS
	Ant2	5200	12.14	≤23.98	PASS
	Ant1	5240	13.13	≤23.98	PASS
	Ant2	5240	12.59	≤23.98	PASS
11AC40SISO	Ant1	5745	12.89	≤30	PASS
	Ant2	5745	12.71	≤30	PASS
	Ant1	5785	12.86	≤30	PASS
	Ant2	5785	12.52	≤30	PASS
	Ant1	5825	13.78	≤30	PASS
	Ant2	5825	12.68	≤30	PASS
	Ant1	5190	12.79	≤23.98	PASS
	Ant2	5190	12.29	≤23.98	PASS
11AC80SISO	Ant1	5230	13.17	≤23.98	PASS
	Ant2	5230	12.85	≤23.98	PASS
	Ant1	5755	12.98	≤30	PASS
	Ant2	5755	12.68	≤30	PASS
	Ant1	5795	13.40	≤30	PASS
	Ant2	5795	12.79	≤30	PASS
	Ant1	5210	13.69	≤23.98	PASS
	Ant2	5210	13.51	≤23.98	PASS
11AC80SISO	Ant1	5775	13.36	≤30	PASS
	Ant2	5775	13.00	≤30	PASS

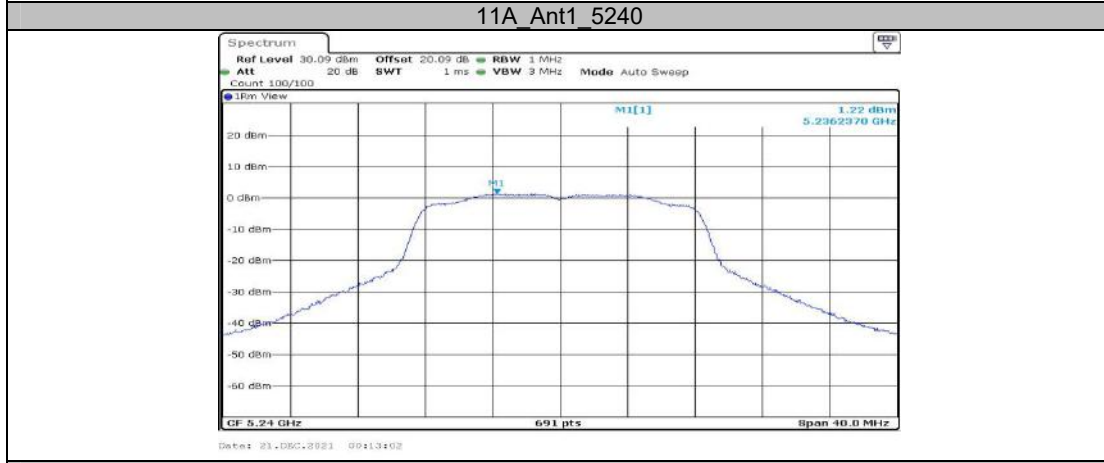
**Appendix C: Maximum power spectral density****Test Result**

Test Mode	Antenna	Channel	Result [dBm/MHz]	Limit[dBm/MHz]	Verdict
11A	Ant1	5180	1.51	≤11	PASS
	Ant2	5180	0.71	≤11	PASS
	Ant1	5200	1.16	≤11	PASS
	Ant2	5200	0.53	≤11	PASS
	Ant1	5240	1.22	≤11	PASS
	Ant2	5240	1	≤11	PASS
	Ant1	5745	-2.41	≤30	PASS
	Ant2	5745	-2.91	≤30	PASS
	Ant1	5785	-2.22	≤30	PASS
	Ant2	5785	-2.45	≤30	PASS
	Ant1	5825	-1.3	≤30	PASS
	Ant2	5825	-2.87	≤30	PASS
11N20SISO	Ant1	5180	1.08	≤11	PASS
	Ant2	5180	0.45	≤11	PASS
	Ant1	5200	1.11	≤11	PASS
	Ant2	5200	0.75	≤11	PASS
	Ant1	5240	0.86	≤11	PASS
	Ant2	5240	0.44	≤11	PASS
	Ant1	5745	-2.57	≤30	PASS
	Ant2	5745	-2.92	≤30	PASS
	Ant1	5785	-2.58	≤30	PASS
	Ant2	5785	-2.72	≤30	PASS
	Ant1	5825	-2.04	≤30	PASS
	Ant2	5825	-2.8	≤30	PASS
11N40SISO	Ant1	5190	-2.33	≤11	PASS
	Ant2	5190	-3.1	≤11	PASS
	Ant1	5230	-2.65	≤11	PASS
	Ant2	5230	-2.79	≤11	PASS
	Ant1	5755	-5.89	≤30	PASS
	Ant2	5755	-6.27	≤30	PASS
	Ant1	5795	-5.44	≤30	PASS
	Ant2	5795	-5.65	≤30	PASS
11AC20SISO	Ant1	5180	1.16	≤11	PASS
	Ant2	5180	1.01	≤11	PASS
	Ant1	5200	0.88	≤11	PASS
	Ant2	5200	0.74	≤11	PASS
	Ant1	5240	1.48	≤11	PASS
	Ant2	5240	0.94	≤11	PASS
	Ant1	5745	-2.55	≤30	PASS
	Ant2	5745	-2.71	≤30	PASS
	Ant1	5785	-2.07	≤30	PASS
	Ant2	5785	-2.16	≤30	PASS
	Ant1	5825	-2.39	≤30	PASS
	Ant2	5825	-1.24	≤30	PASS
11AC40SISO	Ant1	5190	-2.27	≤11	PASS
	Ant2	5190	-2.43	≤11	PASS
	Ant1	5230	-1.73	≤11	PASS
	Ant2	5230	-2.4	≤11	PASS
	Ant1	5755	-5.85	≤30	PASS
	Ant2	5755	-6.01	≤30	PASS
	Ant1	5795	-5.28	≤30	PASS
	Ant2	5795	-5.59	≤30	PASS
11AC80SISO	Ant1	5210	-4.53	≤11	PASS
	Ant2	5210	-4.9	≤11	PASS
	Ant1	5775	-8.11	≤30	PASS
	Ant2	5775	-8.53	≤30	PASS

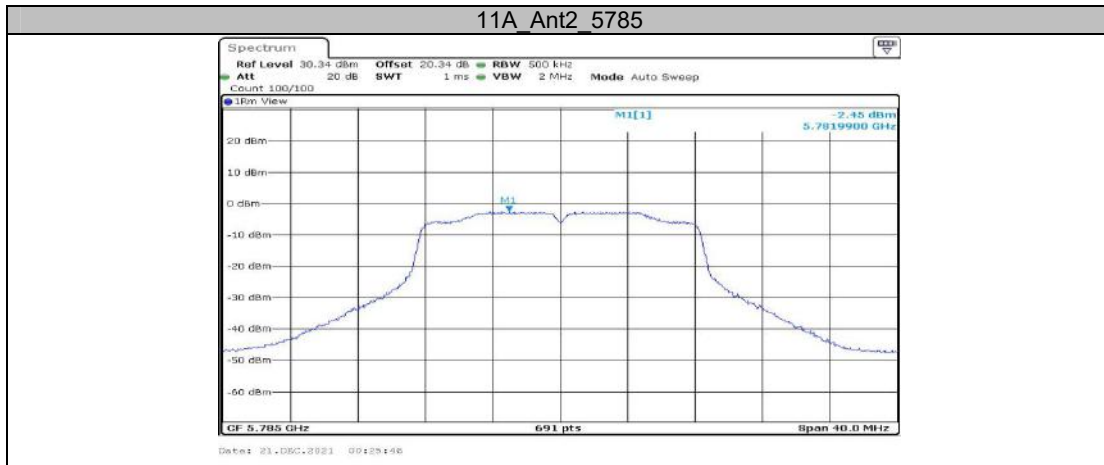
Note: 1. The Result and Limit Unit is dBm/500 kHz in the band 5.725–5.85 GHz.  
 2. The Duty Cycle Factor is compensated in the graph.

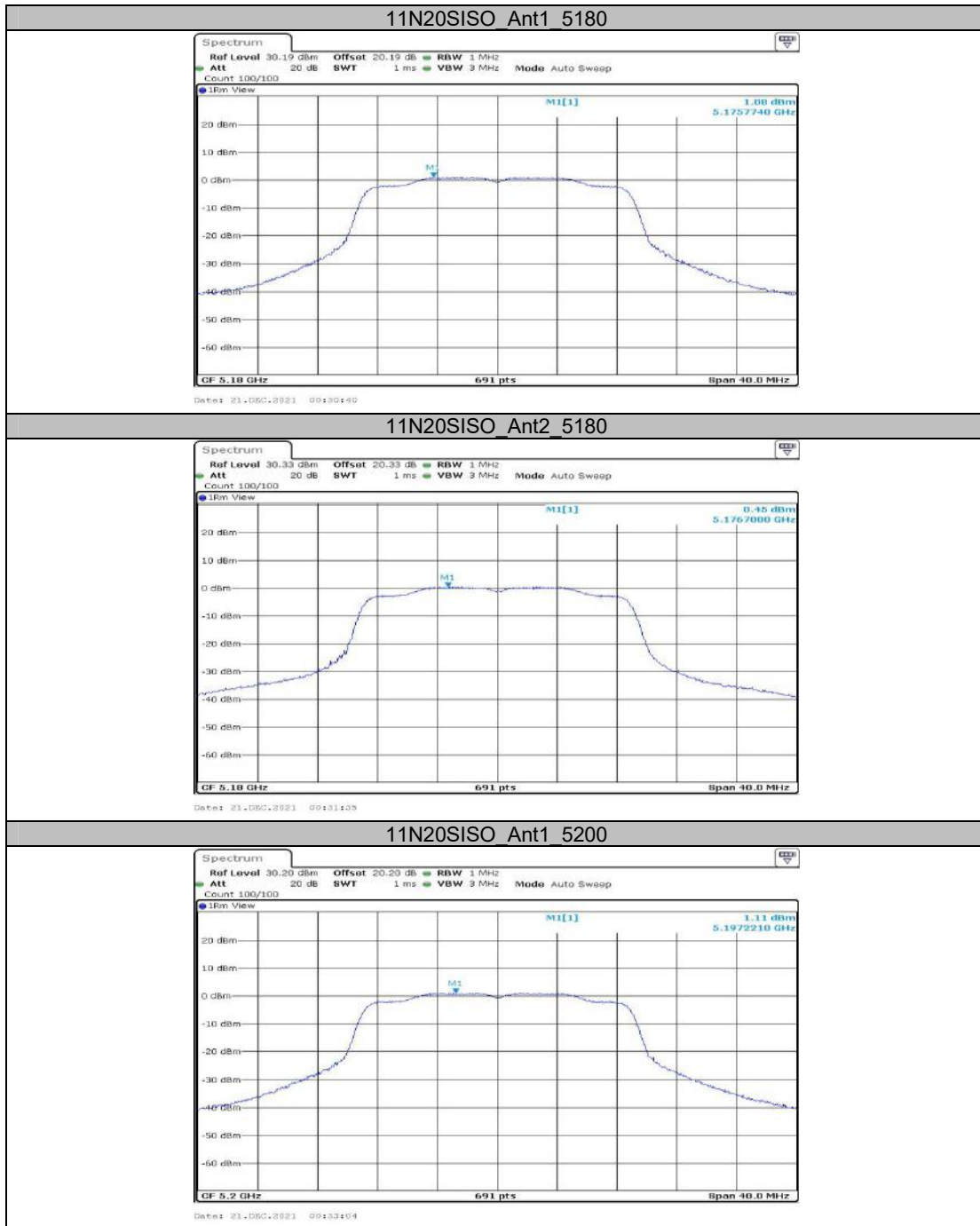
### Test Graphs



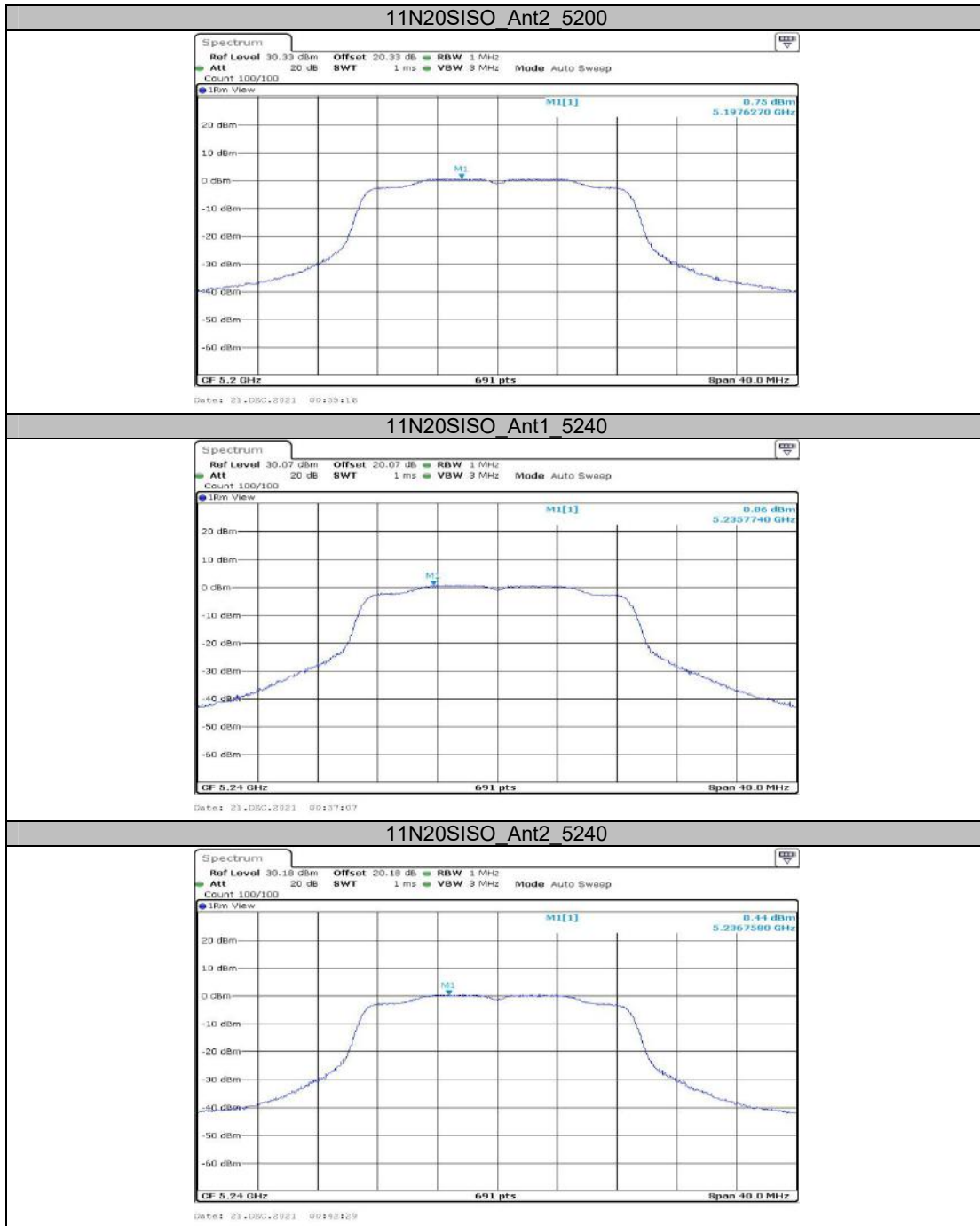


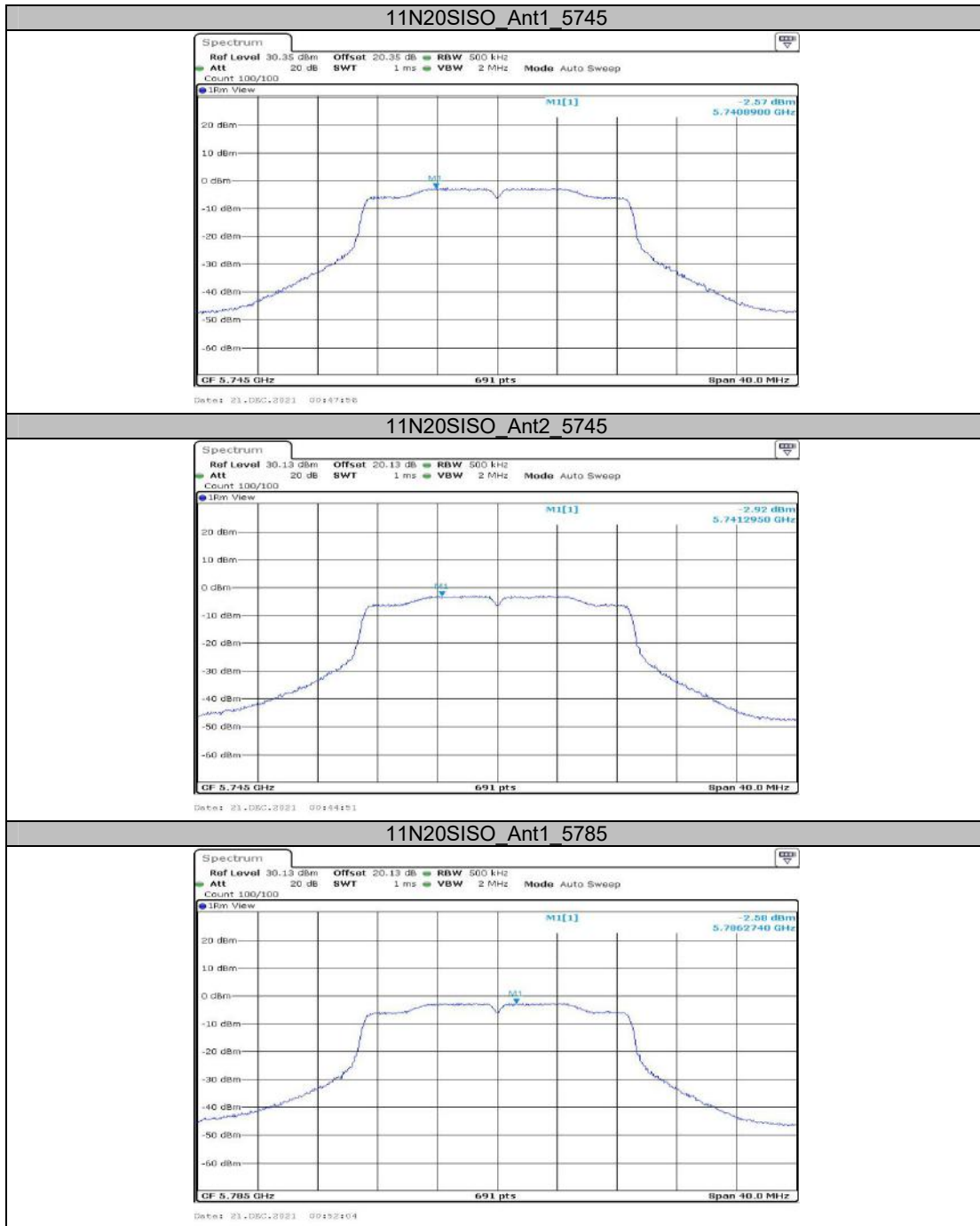


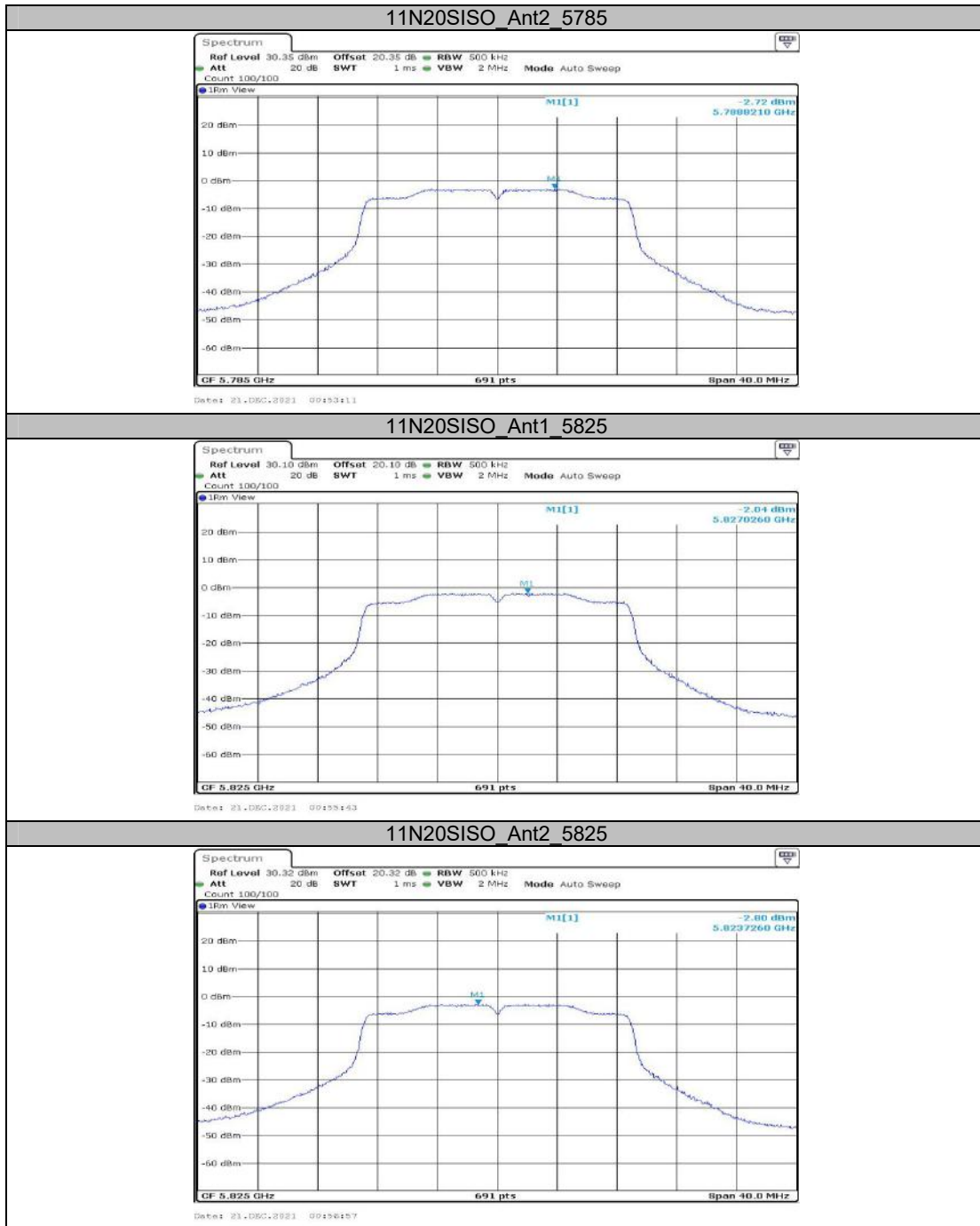




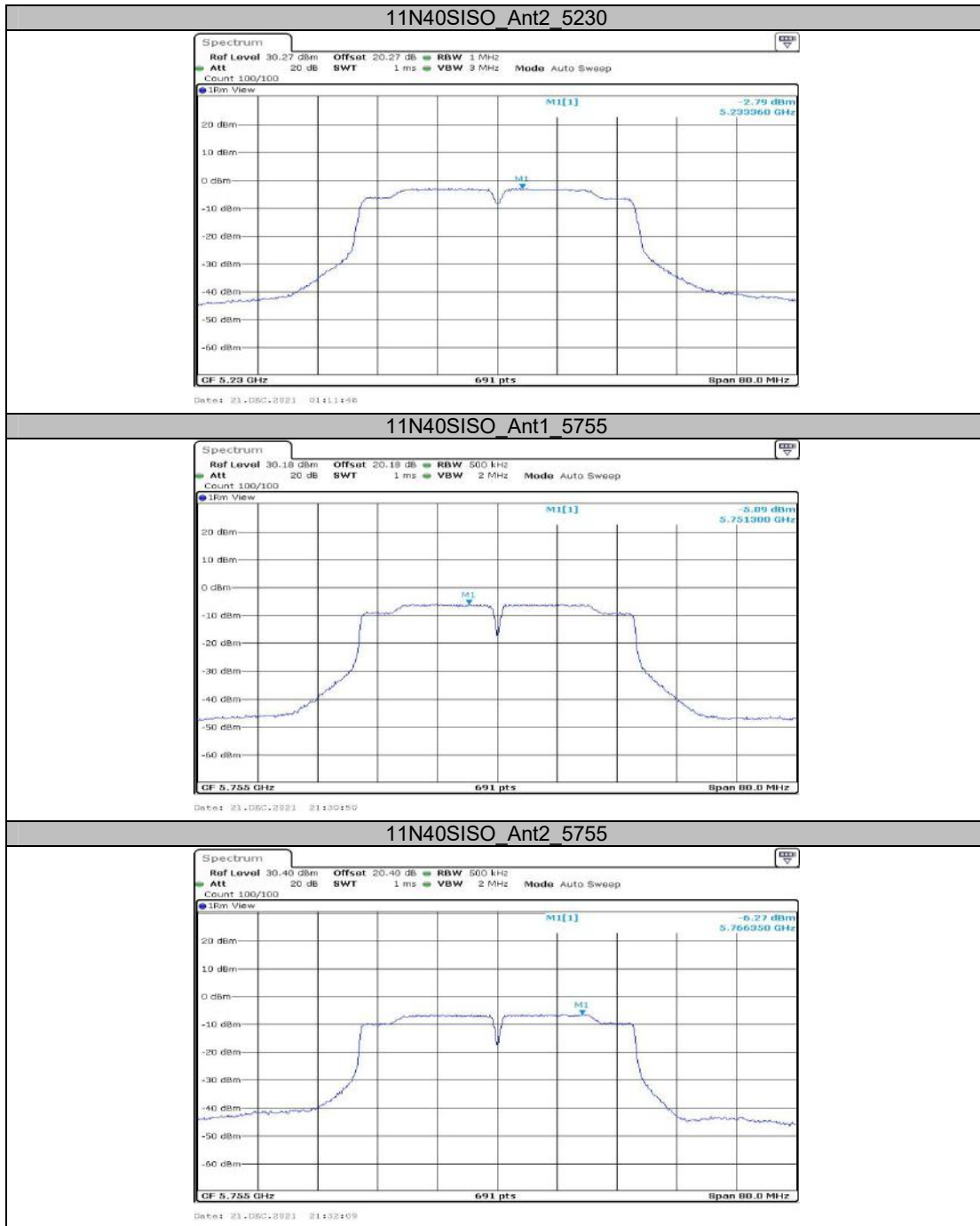


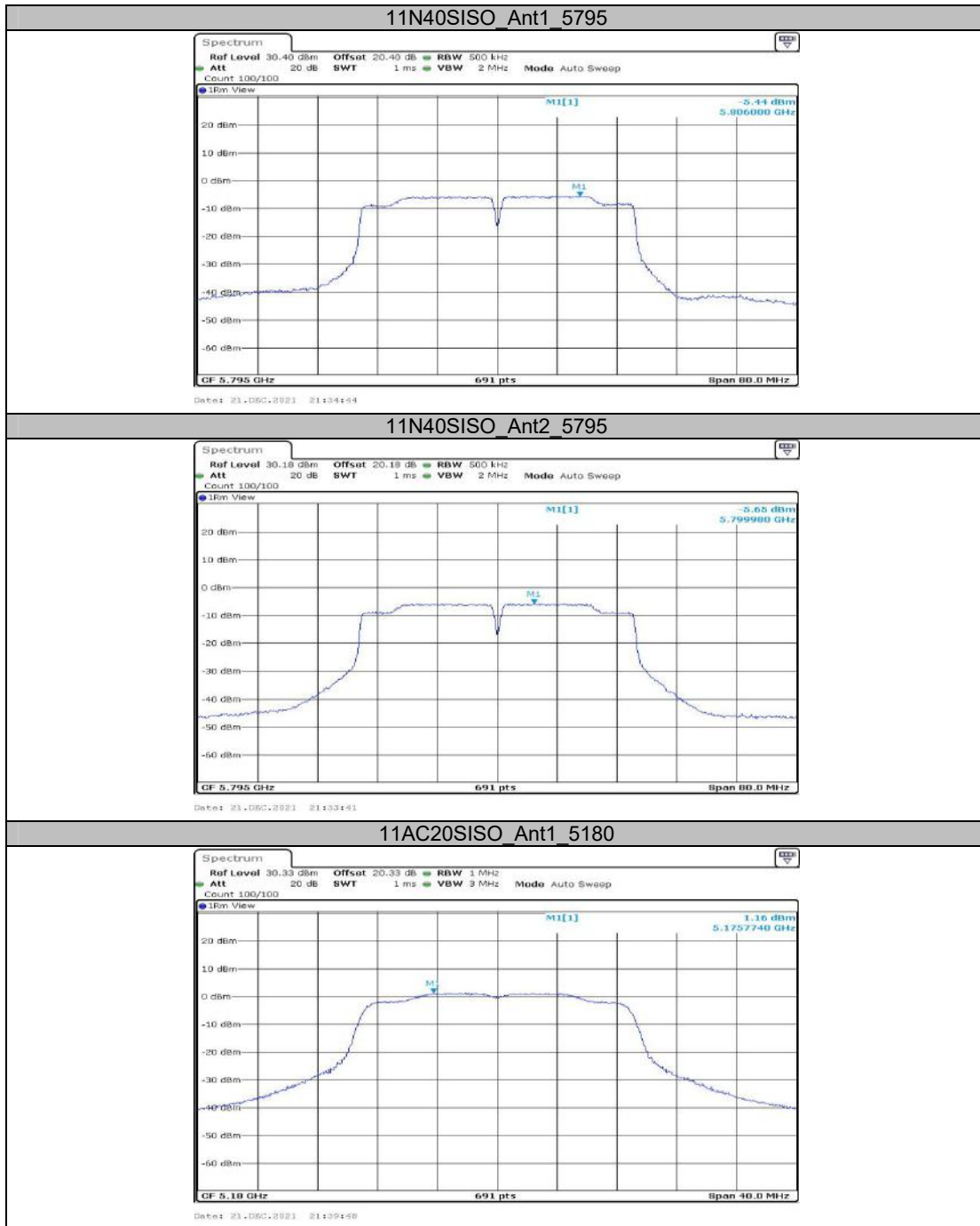


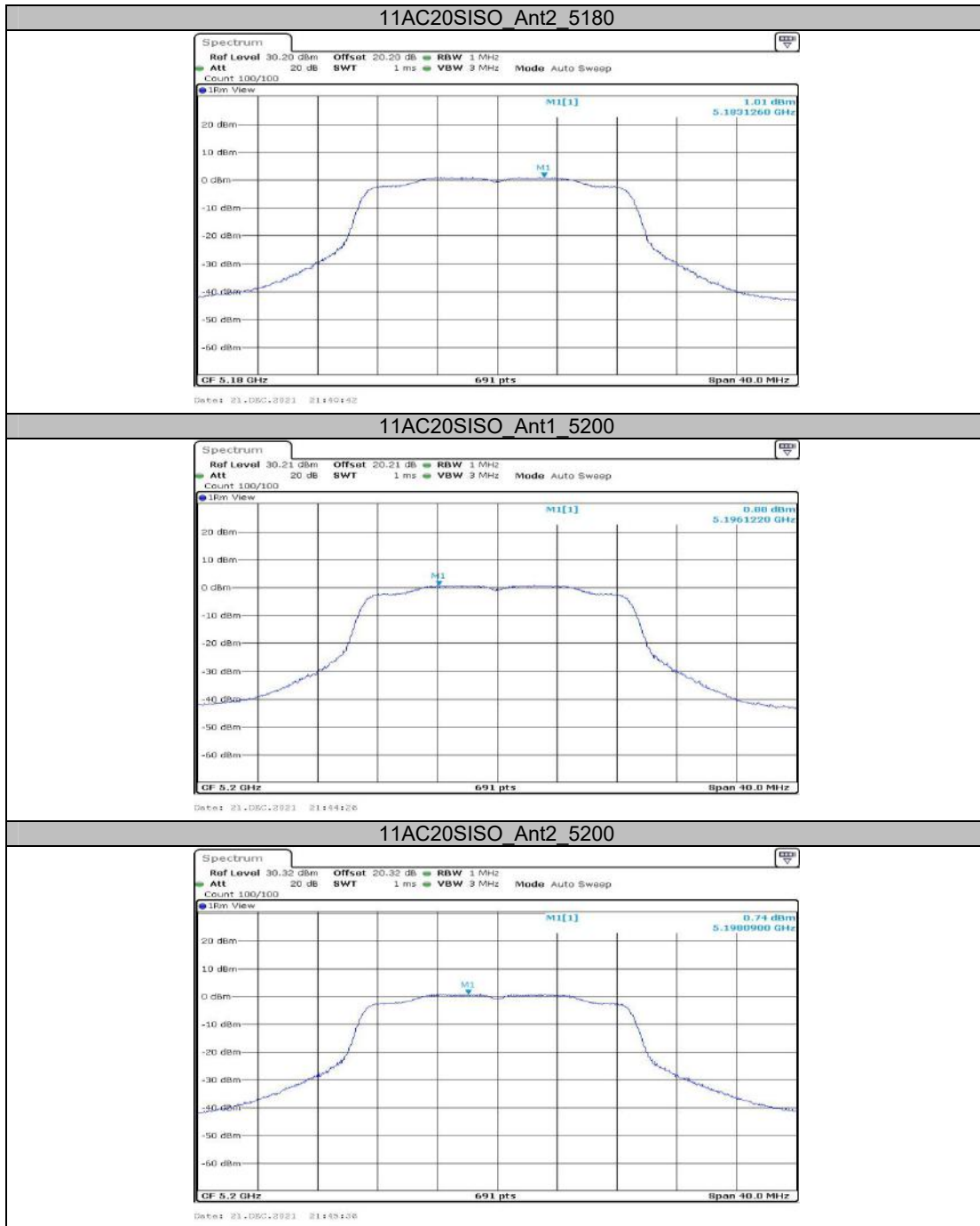


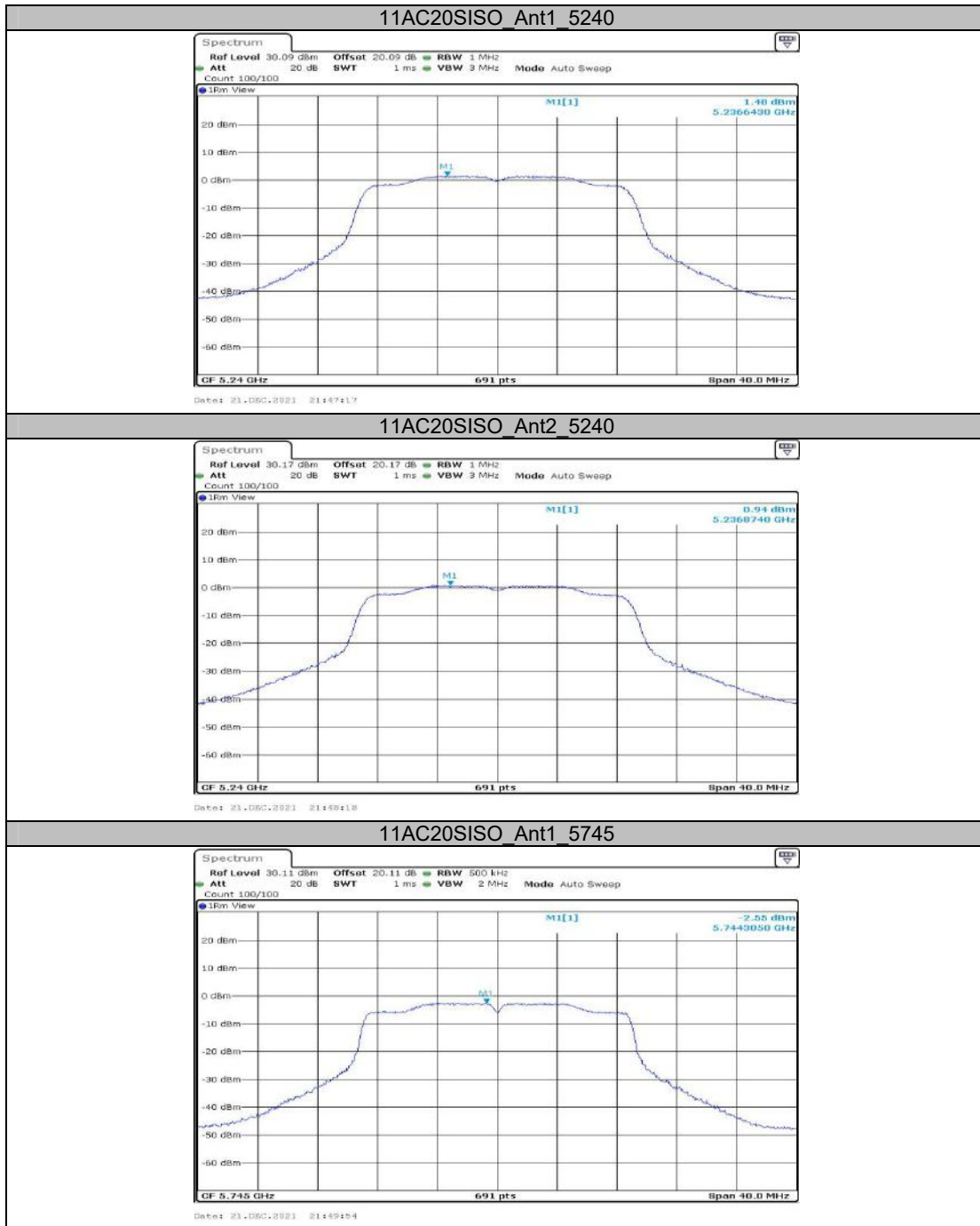




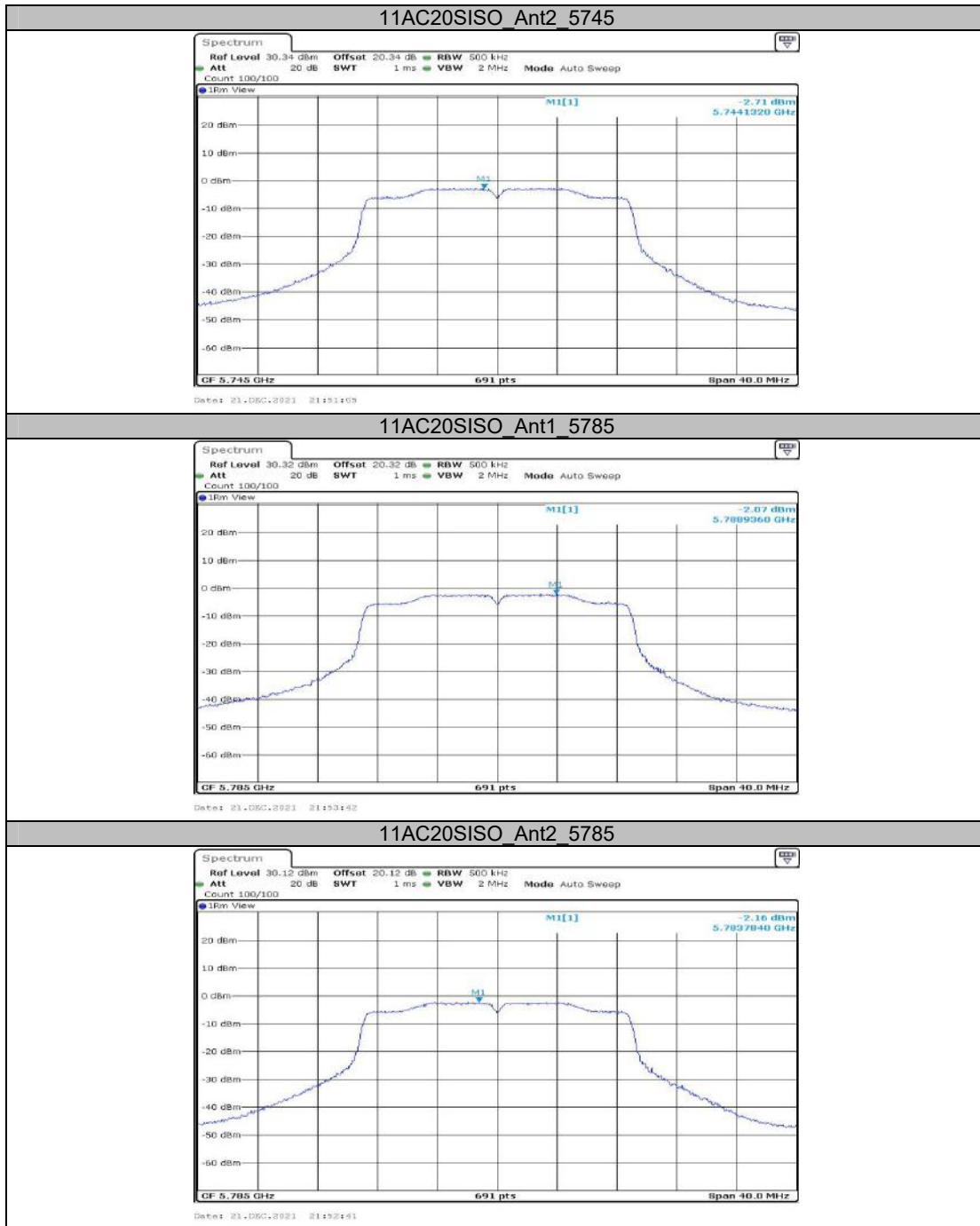


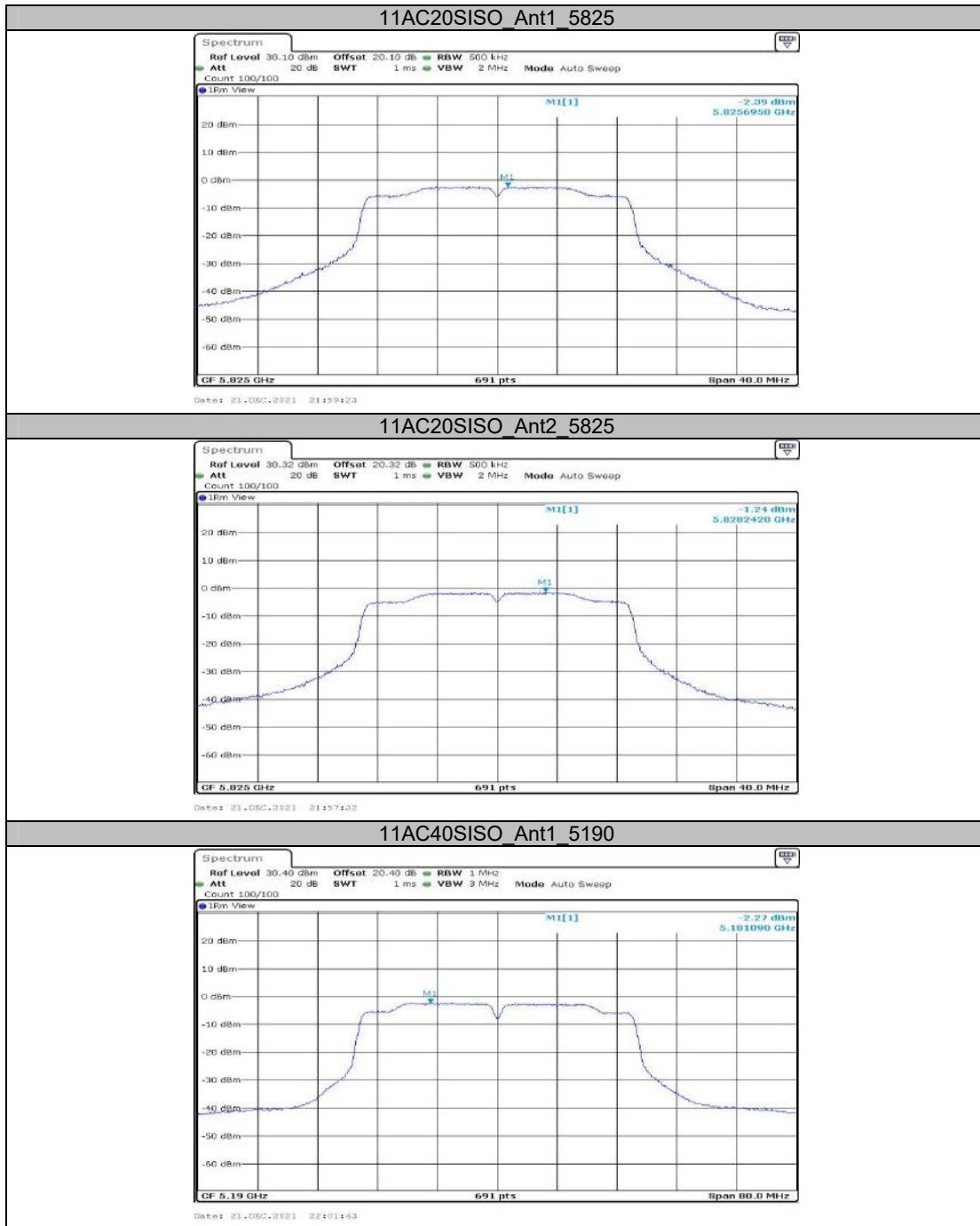


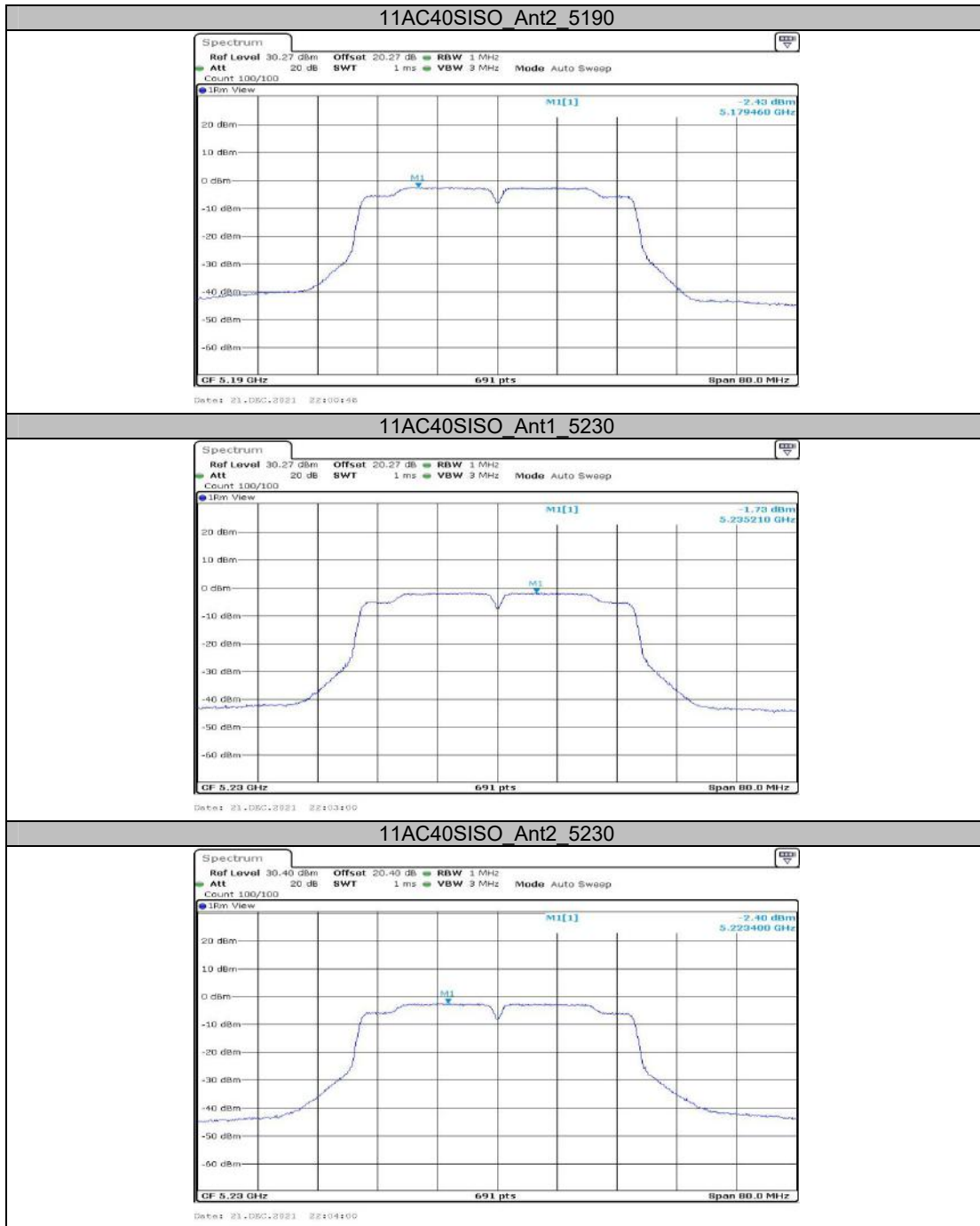


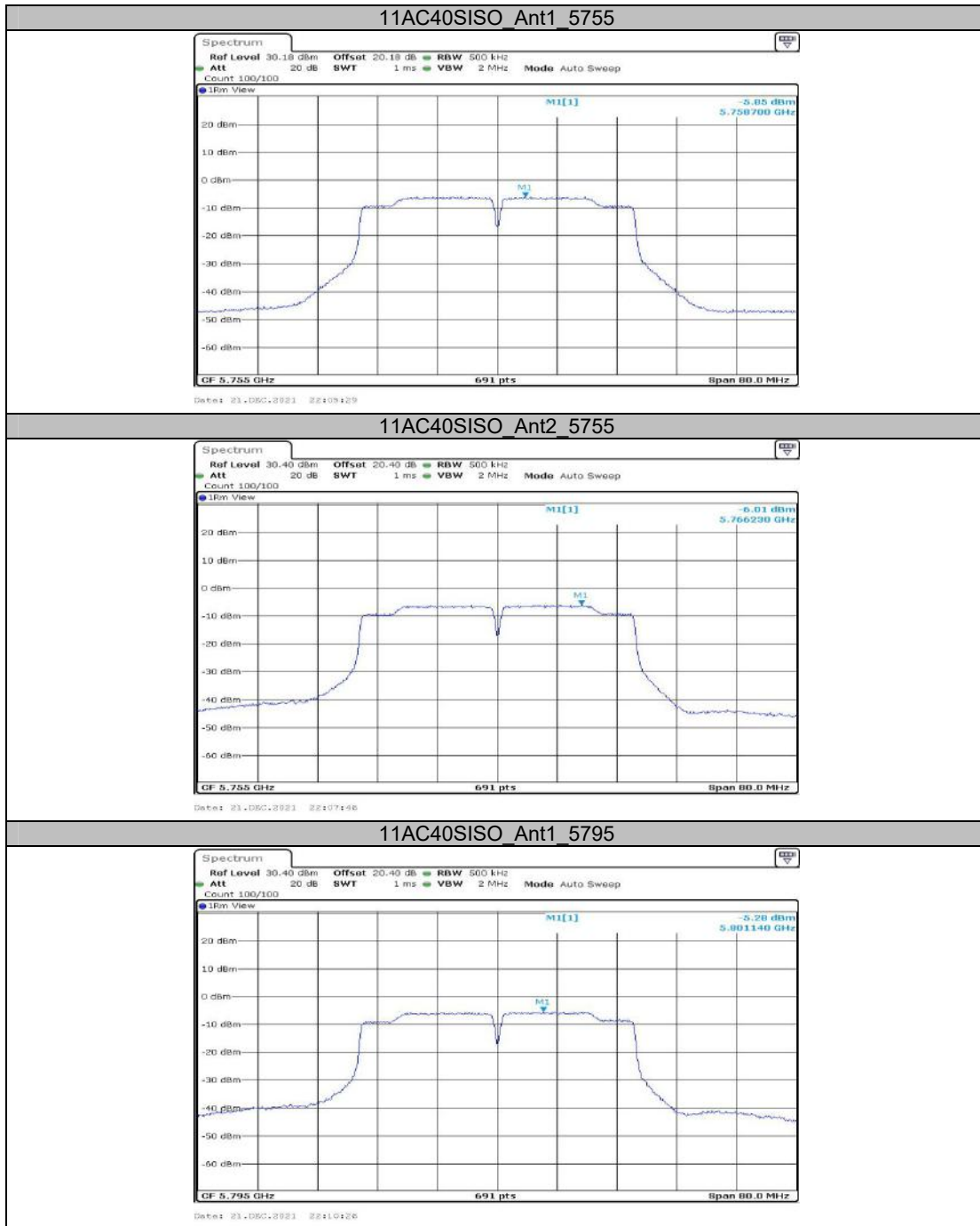


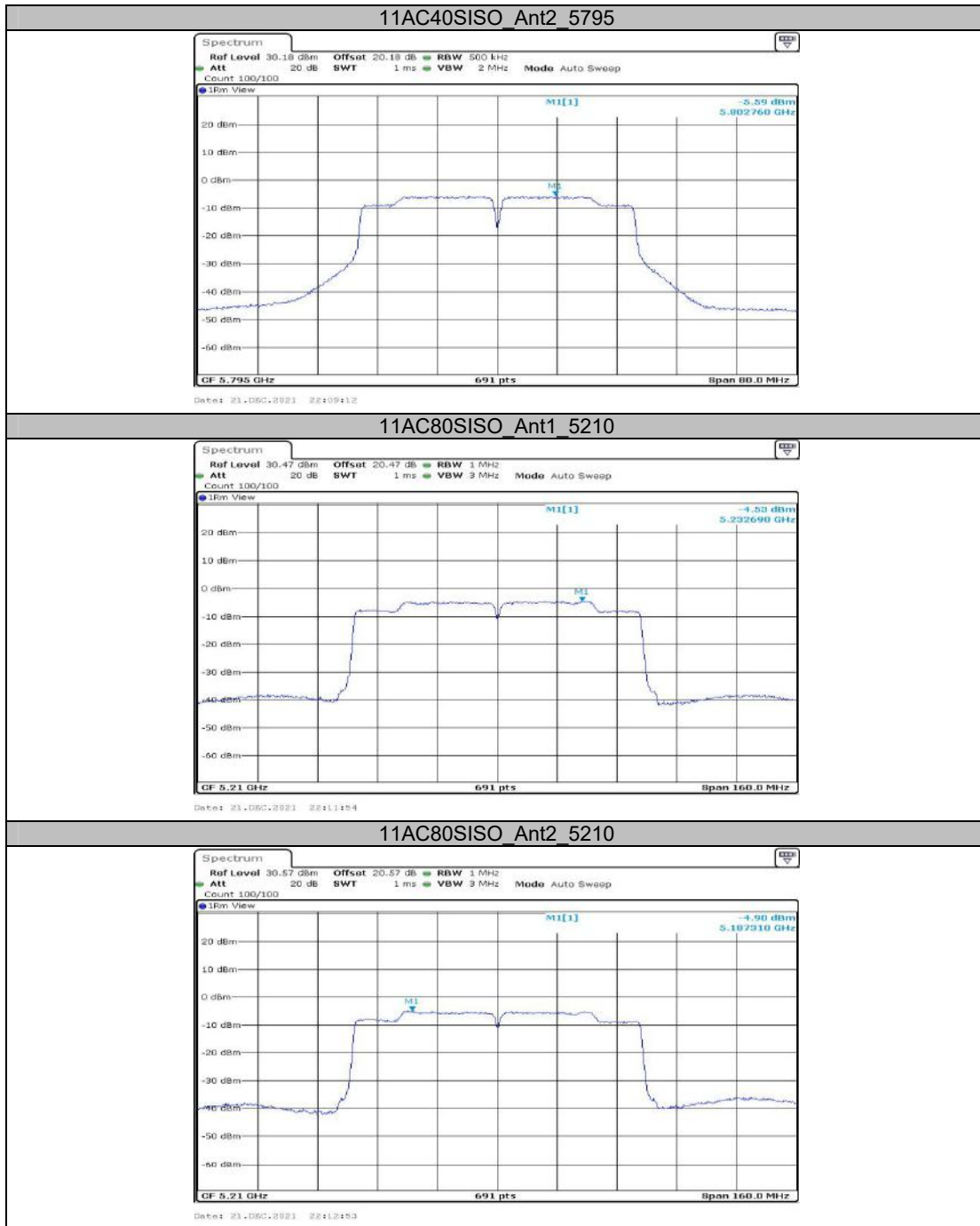


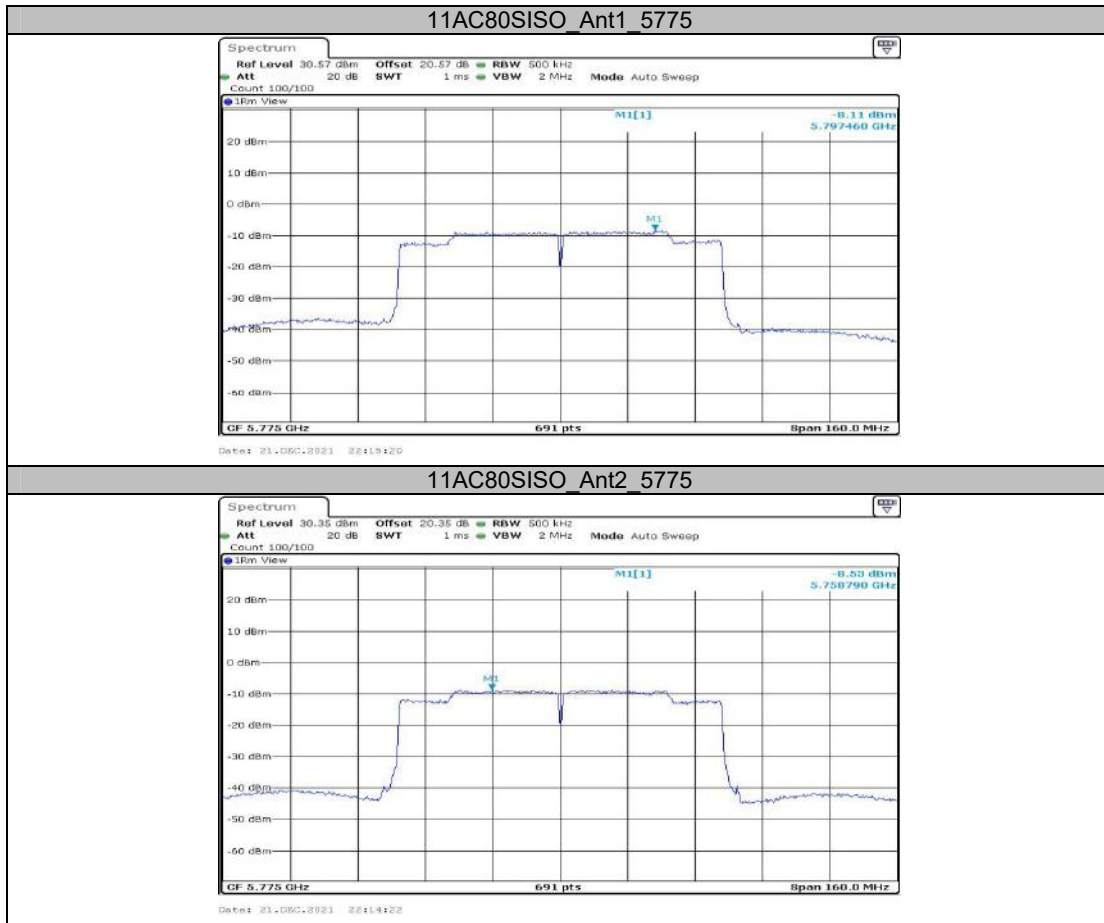








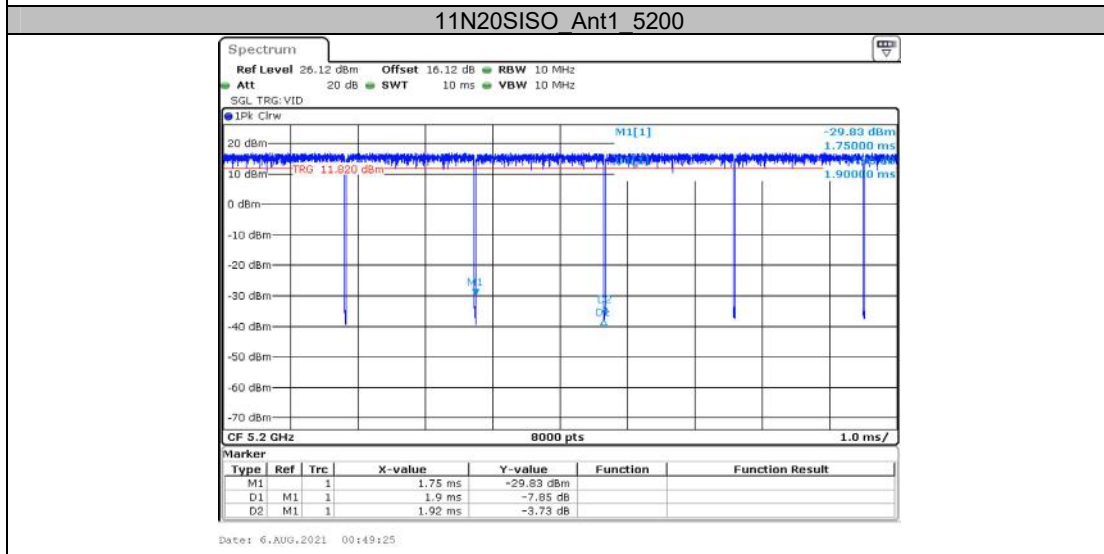
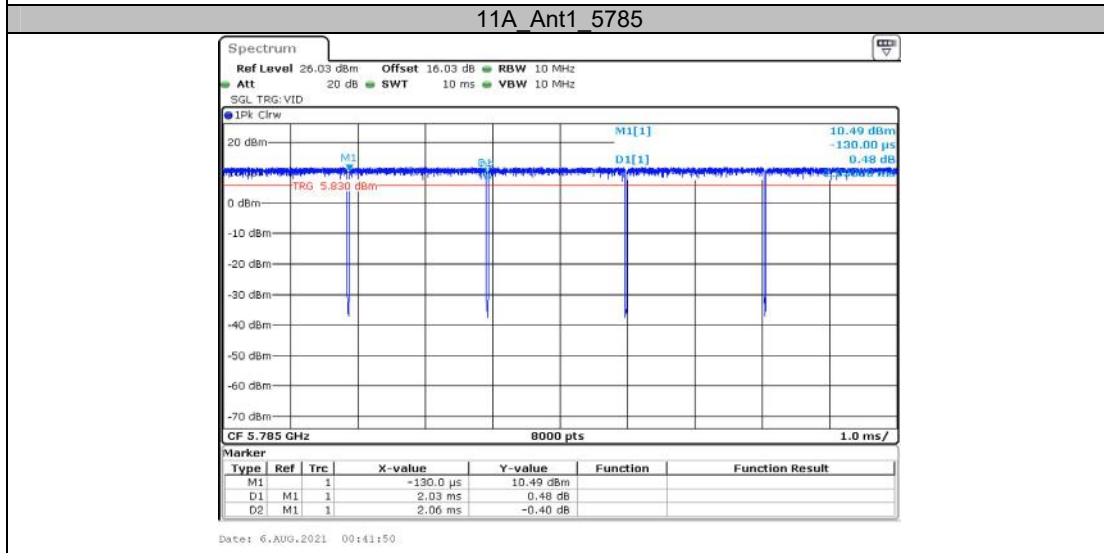
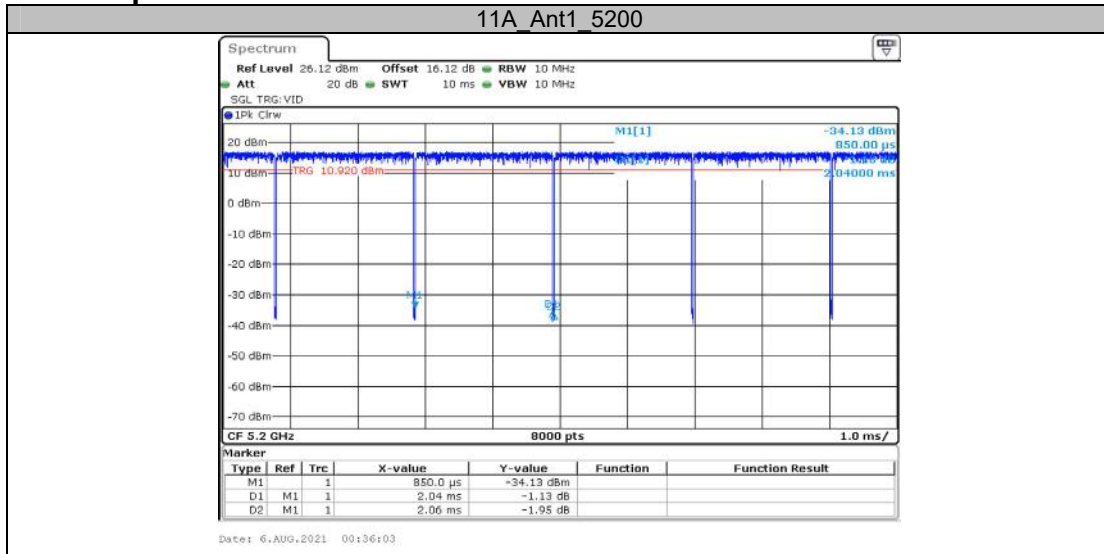




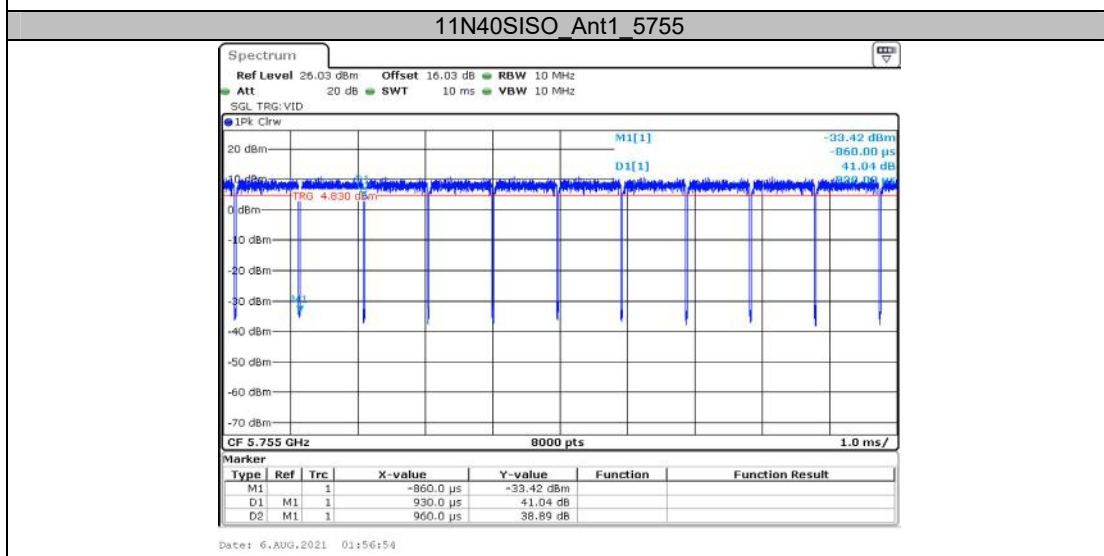
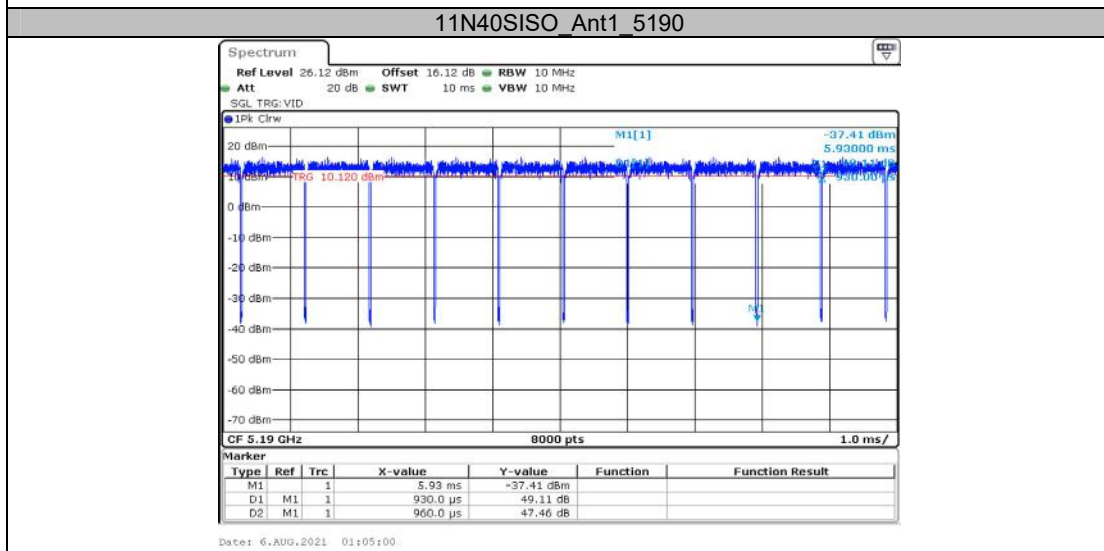
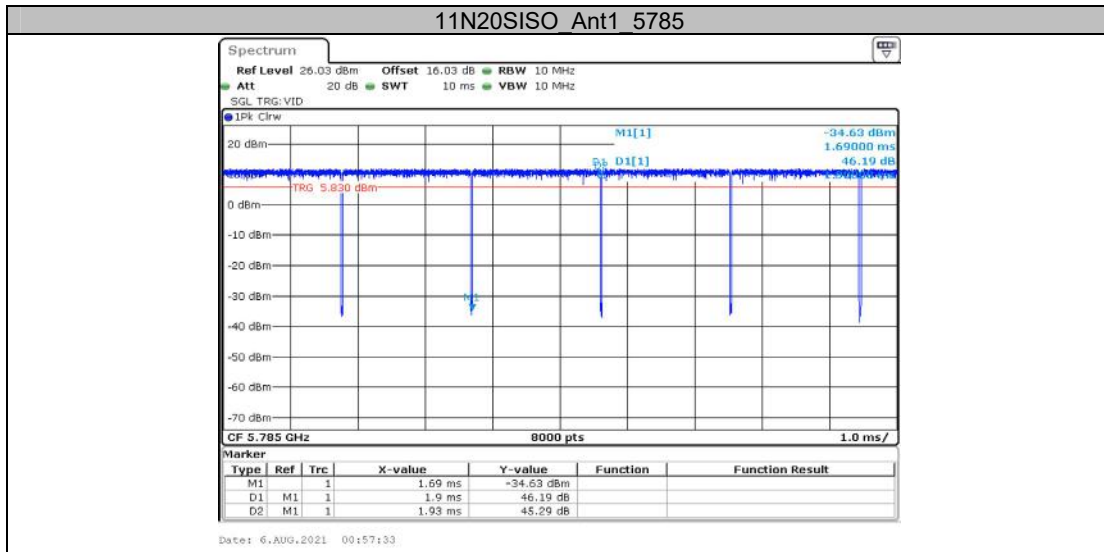
### Appendix D: Duty Cycle Test Result

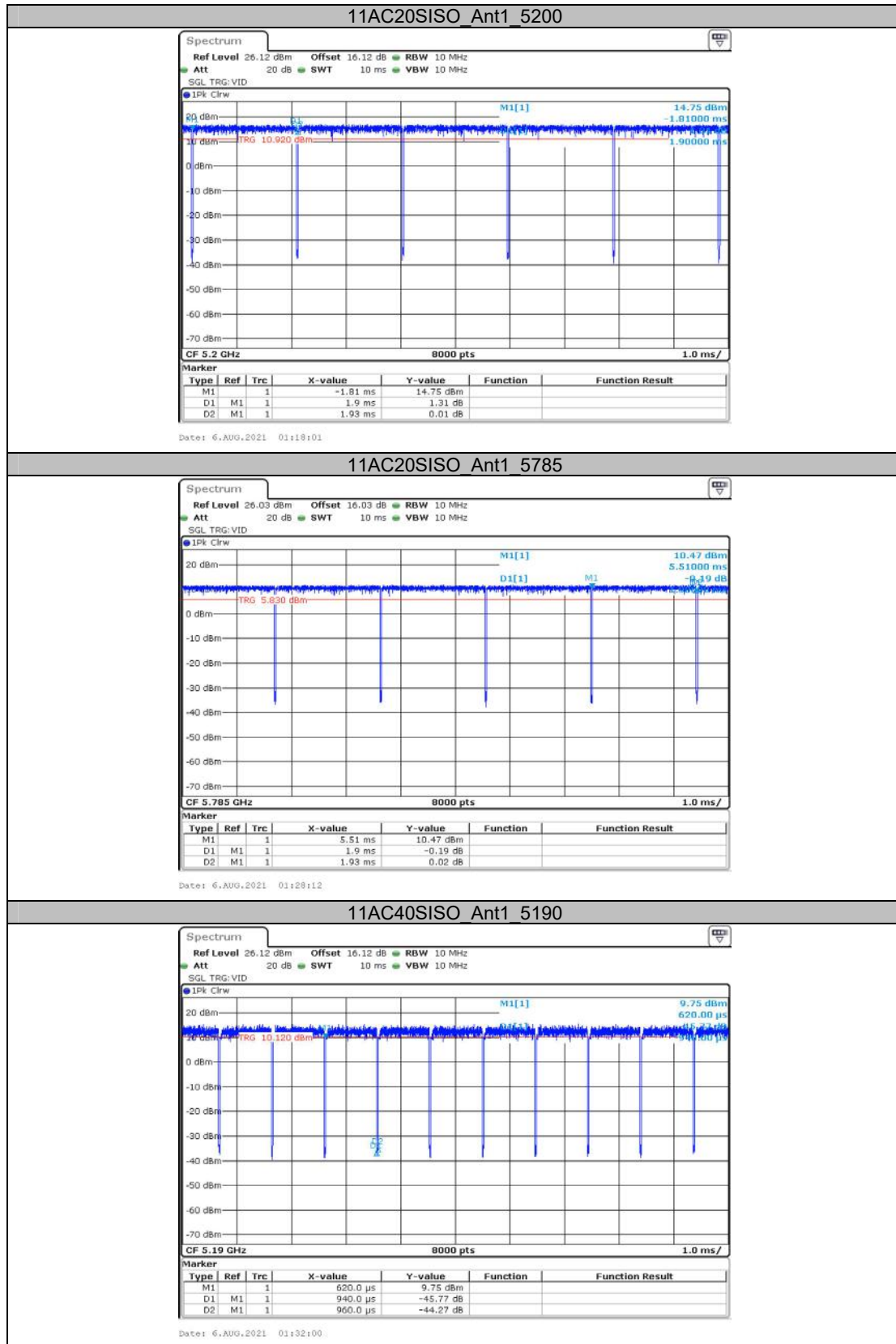
Test Mode	Antenna	Channel	TransmissionDuration [ms]	Transmission Period [ms]	Duty Cycle [%]
11A	Ant1	5200	2.04	2.06	99.03
		5785	2.03	2.06	98.54
11N20SISO	Ant1	5200	1.90	1.92	98.96
		5785	1.90	1.93	98.45
11N40SISO	Ant1	5190	0.93	0.96	96.88
		5755	0.93	0.96	96.88
11AC20SISO	Ant1	5200	1.90	1.93	98.45
		5785	1.90	1.93	98.45
11AC40SISO	Ant1	5190	0.94	0.96	97.92
		5755	0.93	0.96	96.88
11AC80SISO	Ant1	5210	0.43	0.46	93.48
		5775	0.43	0.46	93.48

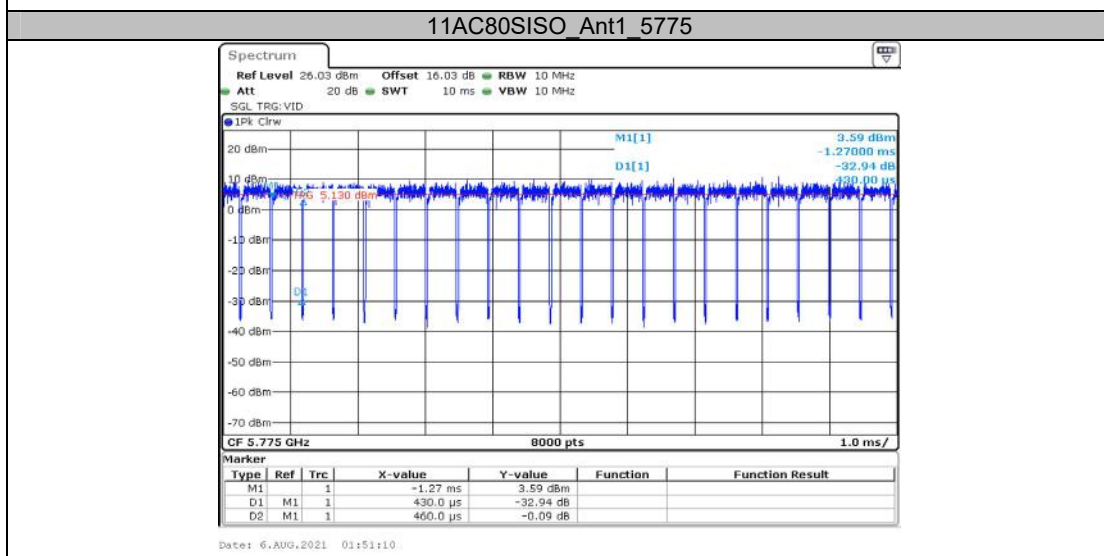
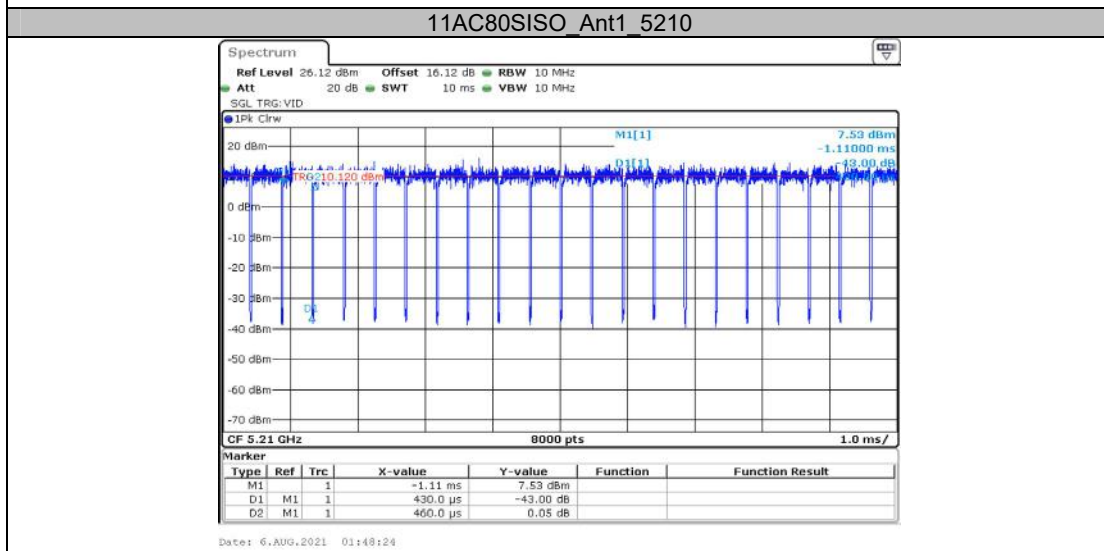
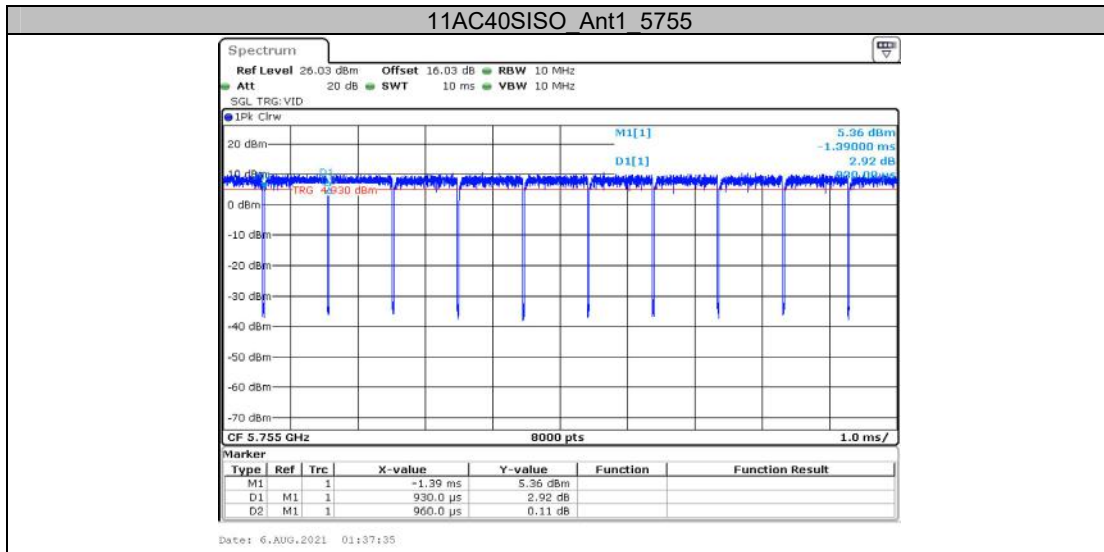
### Test Graphs











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