

TEST REPORT

Applicant Name : Thundercomm Technology Co., Ltd
Address : No. 107, Middle Datagu Road, Xiantao Street, Yubei District,
Chongqing, China, 401122
Report Number : SZ1221125-56971E-RF-00DA1
FCC ID: 2AOHHTURBOXC610

Test Standard (s)

FCC PART 15.407

Sample Description

Product Type: TurboX C610 SOM
Model No.: TurboX C610
Multiple Model(s) No.: TurboX C610 Open Kit(Difference declaration please see
the DoS)
Trade Mark: **TURBO** ⚡™
Date Received: 2022/11/25
Report Date: 2022/12/09

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

Prepared and Checked By:

Approved By:

Blaker Zhang

Blaker Zhang
RF Engineer

Jacob Kong
RF Supervisor

Note: BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk "*". Customer model name, addresses, names, trademarks etc. are not considered data.

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Bay Area Compliance Laboratories Corp. (Shenzhen)

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	RSZ200929002-00D	Original Report	2020-12-22
1	SZ1221125-56971E-RF-00DA1	Amended Report	2022-12-09

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	TurboX C610 SOM
Model	TurboX C610
Frequency Range	5G Wi-Fi: 5150-5250MHz; 5250-5350MHz; 5470-5730MHz; 5725-5850MHz
Maximum Conducted Average Output Power	5150-5250 MHz: 14.80dBm (802.11a), 13.95dBm(802.11n20), 12.97dBm(802.11n40) 13.81dBm (802.11ac20), 12.87dBm(802.11 ac40), 11.25dBm(802.11 ac80) 5250-5350MHz: 14.88dBm (802.11a), 13.74dBm(802.11n20), 12.69dBm(802.11n40) 13.94dBm (802.11ac20), 12.70dBm(802.11 ac40), 11.88dBm(802.11 ac80) 5470-5730MHz: 14.92dBm (802.11a), 13.88dBm(802.11n20), 12.64dBm(802.11n40) 13.96dBm (802.11ac20), 12.62dBm(802.11 ac40), 11.64dBm(802.11 ac80) 5725-5850 MHz: 14.68dBm (802.11a), 13.79dBm(802.11n20), 12.49dBm(802.11n40) 13.88dBm (802.11ac20), 12.84dBm(802.11 ac40), 11.11dBm(802.11 ac80)
Modulation Technique	OFDM
Antenna Specification*	PIFA Antenna: 2dBi(provided by the applicant)
Voltage Range	DC 3.8V
Date of Test	2020-10-05 to 2020-11-25
Sample serial number	RSZ200929002-RF-S1(Assigned by BACL, Shenzhen)
Received date	2020-09-29
Sample/EUT Status	Good condition
Adapter information	N/A

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.

Note: This is the CIPC application, the details as follow:

(1) Changing the company address to “No. 107, Middle Datagu Road, Xiantao Street, Yubei District, Chongqing, China, 401122”.

(2) Adding Memory SKU3 and SKU10

Based on above differences, it will affect partly EUT photos , so the partly EUT photos will be added, all test datas and other photos please refer to the original report RSZ200929002-00D.

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 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

Each test item follows test standards and with no deviation.

EXHIBIT - EUT PHOTOGRAPHS

Please refer to the report number is SZ1221125-56971E-EUT.

PRODUCT SIMILARITY DECLARATION LETTER

Applicant: Thundercomm Technology Co., Ltd
Address: No. 107, Middle Datagu Road, Xiantao Street, Yubei District, Chongqing, China,
401122
Tel: 18664928002
Email: Qiyong.zhou@thundercomm.com

Product Similarity Declaration

Date: 2022-12-09

To:
Bay Area Compliance Laboratories Corp.
1274 Anvilwood Avenue
Sunnyvale, CA94089

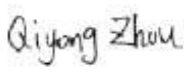
Dear Sir/Madam,

We, Thundercomm Technology Co., Ltd, hereby declare that we have a product named as TurboX C610 SOM,(model:TurboX C610) was tested by BACL. Meanwhile, for our marketing purpose, we would like to list a series model (TurboX C610 open kit) on reports and certificate, all the models are identical in schematics. The difference is that the series model has one more IO board. No other changes are made on them.

TurboX C610 has different SKU according to different DDR and EMMC. SKU1 is with DDR 2 GB + EMMC 16GB, SKU3 is with DDR 4GB + EMMC 64GB, SKU 10 is with DDR 8GB + EMMC 64GB.

We confirm that all information above is true, and we'll be responsible for all the consequences. Please contact me if you have any question.

Sincerely,

Signature: 

Printed Name: Qiyong Zhou

Title: Manager

BELOW IS THE REFERENCED REPORT



FCC PART 15.407 TEST REPORT

For

Thundercomm Technology Co., Ltd

Building 4, No. 99, Data Valley Middle Road, Xiantao District, Yubei District, Chongqing

FCC ID: 2AOHHTURBOXC610

Report Type: Original Report	Product Type: TurboX C610 SOM
Report Number: RSZ200929002-00D	
Report Date: 2020-12-22	
Jacob Kong	
Reviewed By: RF Engineer	
Prepared By: Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn	



Jacob Kong

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk “★”.

BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk “*”. Customer model name, addresses, names, trademarks etc. are not considered data.

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Received date	2020-09-29
Sample/EUT Status	Good condition
Adapter information	N/A

Objective

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

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Test Methodology

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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 5250-5350MHz Band, 7 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	60	5300
54	5270	62	5310
56	5280	64	5320
58	5290	/	/

For 5470-5725MHz Band, 21 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	124	5620
102	5510	126	5630
104	5520	128	5640
106	5530	132	5660
108	5540	134	5670
110	5550	136	5680
112	5560	138	5690
116	5580	140	5700
118	5590	142	5710
120	5600	144	5720
122	5610	/	/

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

EUT Exercise Software

“QRCT3” software was made to the EUT tested. The power level was provided by the applicant.

U-NII	Mode	Frequency (MHz)	Rate (Mbps)	Power Level*
5150 – 5250MHz	802.11 a	5180	6	17
		5200	6	17
		5240	6	17
	802.11 n20	5180	MCS0	16
		5200	MCS0	16
		5240	MCS0	16
	802.11 n40	5190	MCS0	15
		5230	MCS0	14
	802.11 ac20	5180	MCS0	16
		5200	MCS0	16
		5240	MCS0	16
	802.11 ac40	5190	MCS0	15
		5230	MCS0	14
	802.11 ac80	5210	MCS0	13
5250 – 5350MHz	802.11 a	5260	6	17
		5280	6	17
		5320	6	17
	802.11 n20	5260	MCS0	16
		5280	MCS0	14
		5320	MCS0	15
	802.11 n40	5270	MCS0	14
		5310	MCS0	13
	802.11 ac20	5260	MCS0	16
		5280	MCS0	15
		5320	MCS0	15
	802.11 ac40	5270	MCS0	14
		5310	MCS0	13
	802.11 ac80	5290	MCS0	13

U-NII	Mode	Frequency (MHz)	Rate (Mbps)	Power Level
5470 – 5725MHz	802.11 a	5500	6	15
		5600	6	17
		5700	6	17
		5720	6	17
	802.11 n20	5500	MCS0	15
		5600	MCS0	14
		5700	MCS0	18
		5720	6	17
	802.11 n40	5510	MCS0	13
		5550	MCS0	13
		5670	MCS0	16
		5710	MCS0	16
	802.11 ac20	5500	MCS0	14
		5600	MCS0	16
		5700	MCS0	18
		5720	MCS0	18
	802.11 ac40	5510	MCS0	13
		5550	MCS0	13
		5670	MCS0	16
		5710	MCS0	16
	802.11 ac80	5530	MCS0	12
		5610	MCS0	14
		5690	MCS0	14
5725 – 5850MHz	802.11 a	5745	6	20
		5785	6	20
		5825	6	20
	802.11 n20	5745	MCS0	18
		5785	MCS0	19
		5825	MCS0	20
	802.11 n40	5755	MCS0	17
		5795	MCS0	17
	802.11 ac20	5745	MCS0	18
		5785	MCS0	19
		5825	MCS0	20
	802.11 ac40	5755	MCS0	17
		5795	MCS0	18
	802.11 ac80	5775	MCS0	16

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.

Duty cycle

Test Result: Compliant. Please refer to the Appendix.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

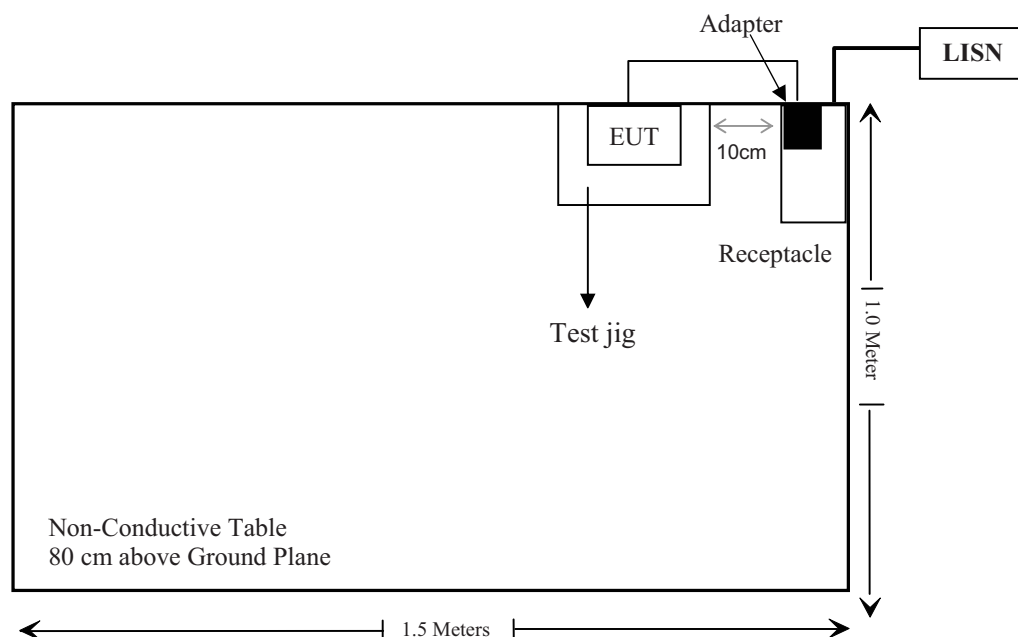
Manufacturer	Description	Model	Serial Number
Thundercomm Technology Co., Ltd	C610 IO Board	Ver.02	NA
GUANGDONG LIANYUNDA ELECTRONIC CO., LTD.	Adapter	LYD1202000B	Unknown

External I/O Cable

Cable Description	Length (m)	From Port	To
Un-shielding un-Detachable DC Cable	1.2	EUT	Adapter

Block Diagram of Test Setup

For conducted emission:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 (b) (1) & §2.1091	Maximum Permissible exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.407(b)(6)& §15.207(a)	Conducted Emissions	Compliance
§15.205& §15.209 &§15.407(b) (1), (2), (3), (4), (6) (7)	Undesirable Emission& Restricted Bands	Compliance
§15.407(a) (1), (5),(e)	26 dB Emission Bandwidth & 6dB Bandwidth	Compliance
§15.407(a)(1),(2), (3)	Conducted Transmitter Output Power	Compliance
§15.407 (a)(1), (2), (3)	Power Spectral Density	Compliance
§15.407 (h)	Transmit Power Control (TPC)	Not Applicable
§15.407 (h)	Dynamic Frequency Selection (DFS)	Compliance*

Not Applicable: A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

Compliance*: Please refer to the DFS report: RSZ200929001-00.

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 Limitor	ESH3Z2	DE25985	2019/11/29	2020/11/28
Unknown	CE Cable	CE Cable	UF A210B-1-0720-504504	2019/11/29	2020/11/28
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
Radiated Emission Test					
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
COM-POWER	Dipole Antenna	AD-100	721027	NCR	NCR
Unknown	Cable 2	RF Cable 2	F-03-EM197	2019/11/29	2020/11/28
Rohde & Schwarz	Auto test software	EMC 32	V9.10	NCR	NCR
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
COM-POWER	Pre-amplifier	PA-122	181919	2020/11/29	2021/11/28
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2019/11/29	2020/11/28
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2020/11/29	2021/11/28
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017/12/22	2020/12/21
Ducommun Technologies	Horn antenna	ARH-4223-02	1007726-021304	2017/12/06	2020/12/05
Ducommun Technologies	Horn antenna	ARH-4223-02	1007726-021304	2020/12/06	2023/12/05
Ducommun Technologies	Horn antenna	ARH-2823-02	1007726-021302	2017/12/06	2020/12/05
Ducommun Technologies	Horn antenna	ARH-2823-02	1007726-021302	2020/12/06	2023/12/05
Insulted Wire Inc.	RF Cable	SPS-2503-3150	02222010	2019/11/29	2020/11/28
Insulted Wire Inc.	RF Cable	SPS-2503-3150	02222010	2020/11/29	2021/11/28
Unknown	RF Cable	W1101-EQ1 OUT	F-19-EM005	2019/11/29	2020/11/28
Unknown	RF Cable	W1101-EQ1 OUT	F-19-EM005	2020/11/29	2021/11/28
SNSD	Band Reject filter	BSF5150-5850MN-0899-004	5G filter	2020/04/20	2021/04/20

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
Unknow	RF Cable	Unknow	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).

1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 1.1307 (b)(1), 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)

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)			
5G Wi-Fi	5150-5250	2.0	1.58	15.0	31.62	20	0.01	1
	5250-5350	2.0	1.58	15.0	31.62	20	0.01	1
	5470-5725	2.0	1.58	15.0	31.62	20	0.01	1
	5725-5850	2.0	1.58	15.0	31.62	20	0.01	1

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

Result: Compliance

FCC §15.203 – ANTENNA REQUIREMENT

Applicable Standard

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

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

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.407 (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 been tested with a PIFA antenna and the antenna gain is 2.0 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

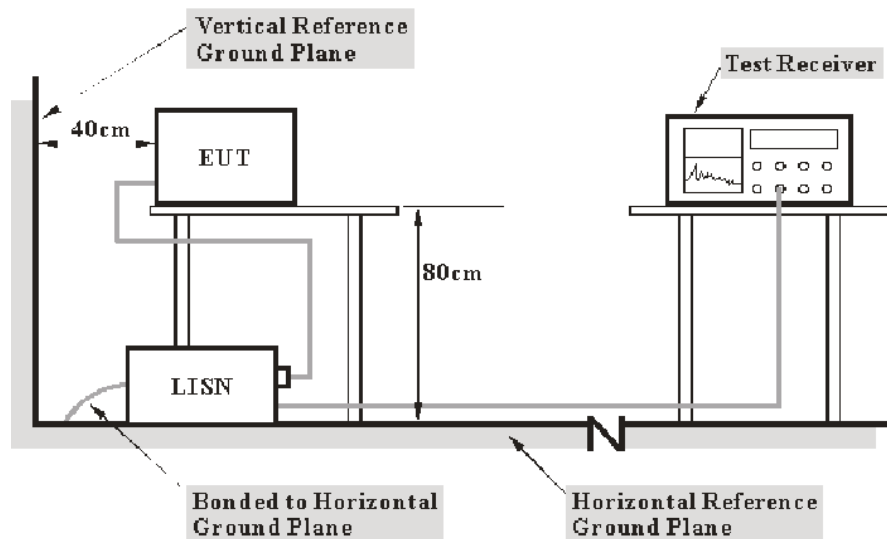
Result: Compliance.

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.

Test Results Summary

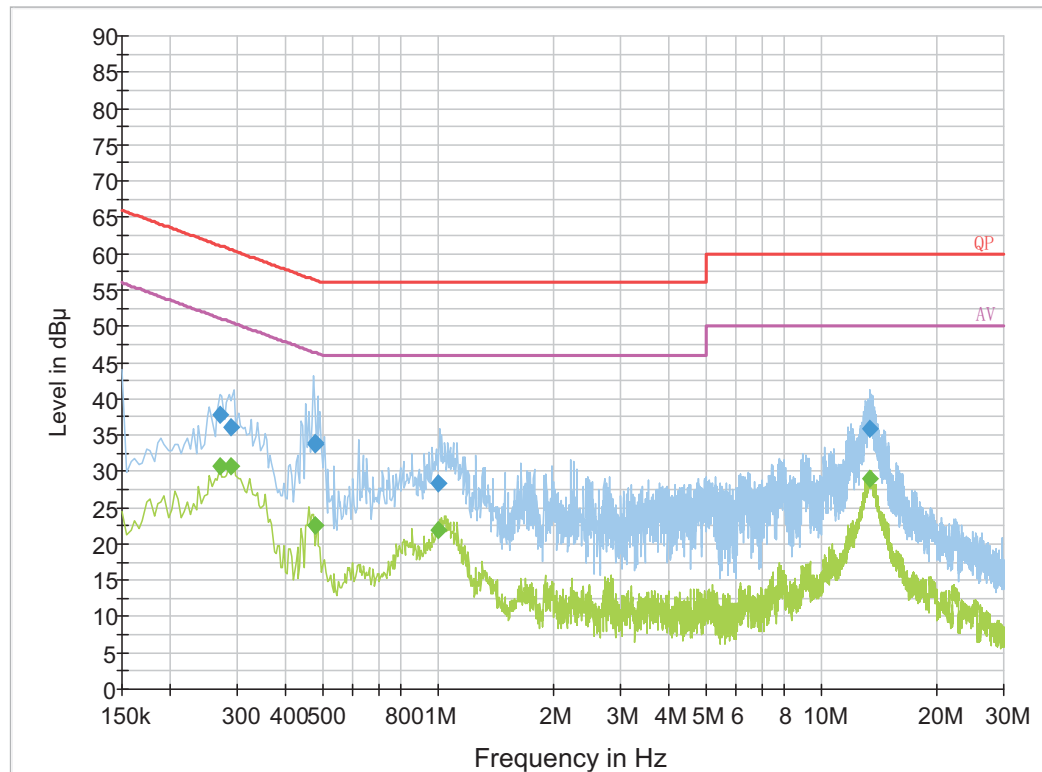
According to the EUT complied with the FCC Part 15.207.

Test Data**Environmental Conditions**

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

The testing was performed by Haiguo Li on 2020-10-15.

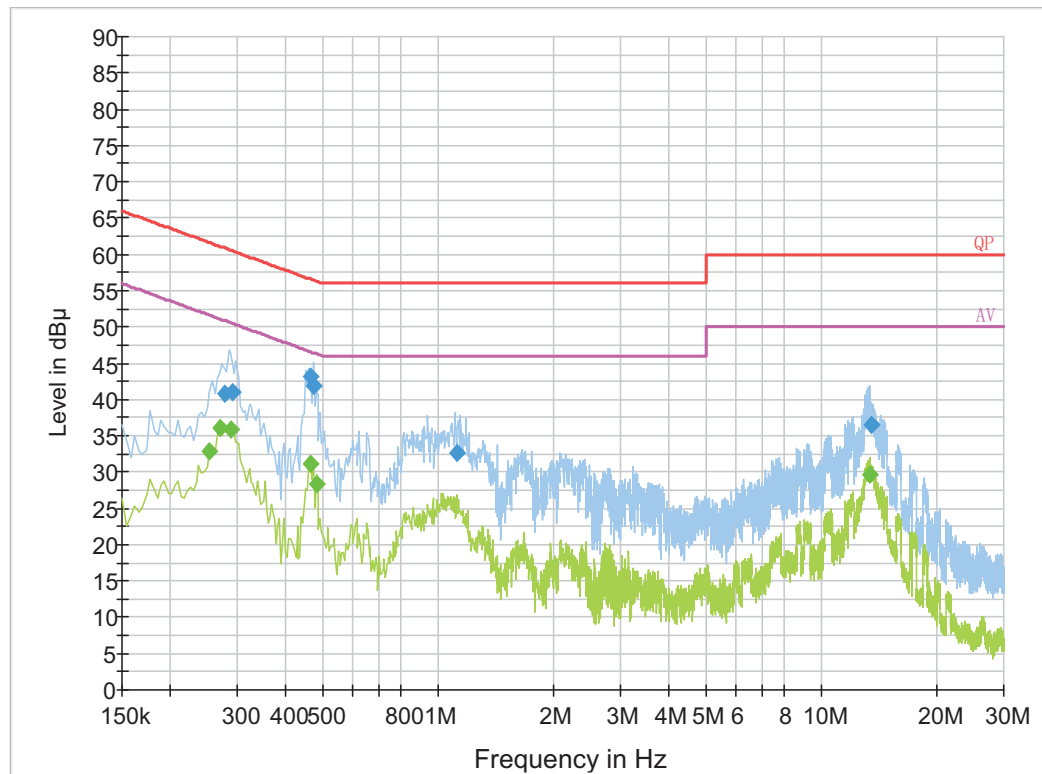
EUT operation mode: Transmitting (worst case is 802.11a mode 5580 MHz)

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)
0.269500	37.7	9.000	L1	19.8	23.4	61.1
0.289500	36.2	9.000	L1	19.7	24.3	60.5
0.478710	33.9	9.000	L1	19.8	22.5	56.4
0.478890	33.8	9.000	L1	19.8	22.6	56.4
1.002790	28.4	9.000	L1	19.9	27.6	56.0
13.452190	35.8	9.000	L1	20.0	24.2	60.0

Final Result 2

Frequency (MHz)	Average (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.269500	30.8	9.000	L1	19.8	20.3	51.1
0.289500	30.7	9.000	L1	19.7	19.8	50.5
0.478710	22.5	9.000	L1	19.8	23.9	46.4
0.478890	22.5	9.000	L1	19.8	23.9	46.4
1.002790	22.0	9.000	L1	19.9	24.0	46.0
13.452190	29.0	9.000	L1	20.0	21.0	50.0

AC120V, 60 Hz, Neutral:**Final Result 1**

Frequency (MHz)	QuasiPeak (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.277500	40.8	9.000	N	19.7	20.1	60.9
0.290500	41.0	9.000	N	19.7	19.5	60.5
0.466890	43.3	9.000	N	19.8	13.3	56.6
0.474770	41.8	9.000	N	19.8	14.6	56.4
1.126650	32.7	9.000	N	19.8	23.3	56.0
13.513030	36.6	9.000	N	19.9	23.4	60.0

Final Result 2

Frequency (MHz)	Average (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.254000	32.9	9.000	N	19.8	18.7	51.6
0.270000	36.1	9.000	N	19.7	15.0	51.1
0.290000	35.9	9.000	N	19.7	14.6	50.5
0.466000	31.2	9.000	N	19.8	15.4	46.6
0.482000	28.3	9.000	N	19.8	18.0	46.3
13.398000	29.6	9.000	N	19.9	20.4	50.0

Note:

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

§15.205 & §15.209 & §15.407(B) (1), (2), (3), (4),(6),(7) – UNDESIRABLE EMISSION

Applicable Standard

FCC §15.407 (b) (1), (2), (3), (4), (6), (7); §15.209; §15.205;

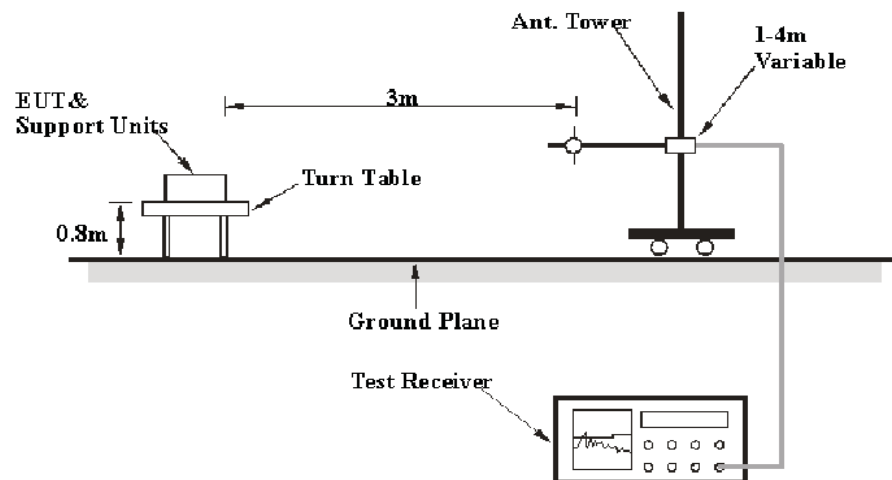
(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

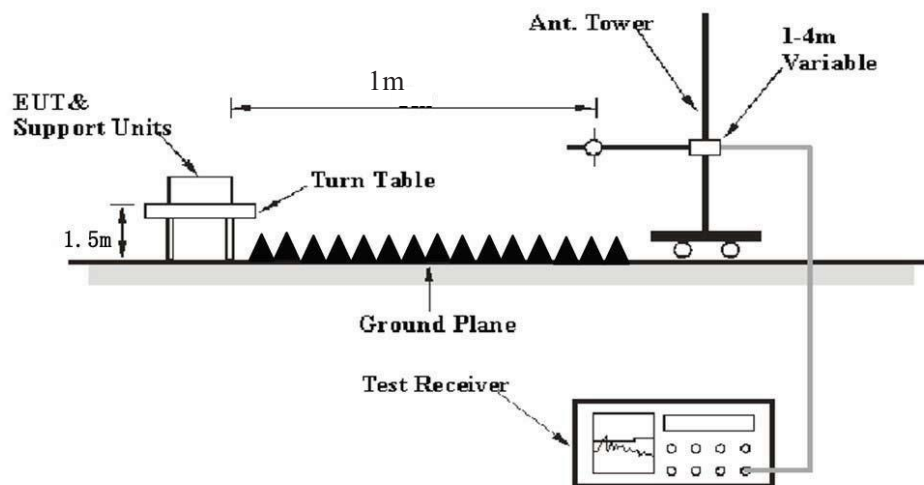
- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.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

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart E, section 15.205, 15.209 and 15.407 rules.

Test Data

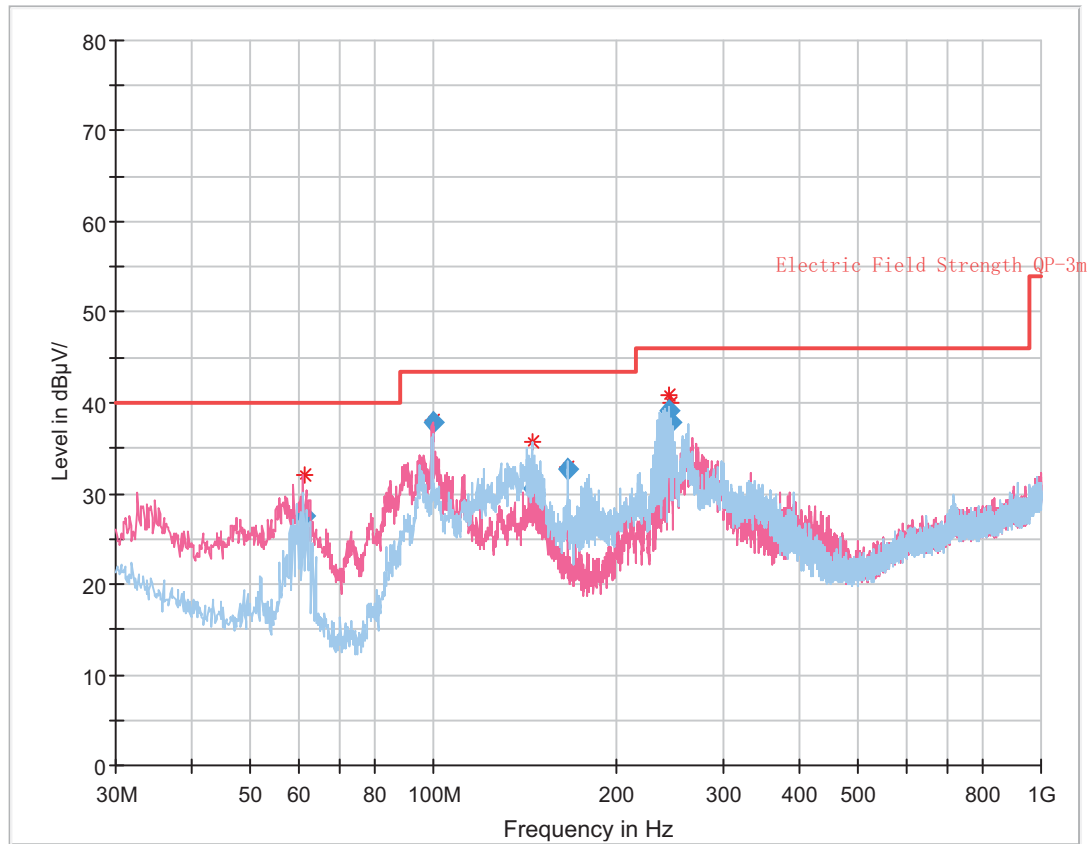
Environmental Conditions

Temperature:	14.1~30 °C
Relative Humidity:	47~55 %
ATM Pressure:	101.0 kPa

The testing was performed by Holland Yang on 2020-10-15 for below 1GHz and by Leven Gan from 2020-10-18 to 2020-12-17 for above 1GHz.

EUT operation mode: Transmitting

30 MHz – 1 GHz: (worst case is 802.11a mode 5580 MHz)



Final Result

Frequency (MHz)	QuasiPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
61.173625	27.46	40.00	12.54	102.0	V	236.0	-17.1
99.622000	37.86	43.50	5.64	110.0	V	268.0	-14.0
145.547000	30.57	43.50	12.93	194.0	H	80.0	-11.0
165.982125	32.73	43.50	10.77	129.0	H	270.0	-11.5
243.432625	39.19	46.00	6.81	126.0	H	251.0	-10.8
245.715875	37.90	46.00	8.10	111.0	H	255.0	-10.8

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	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	PK/QP/Ave.	Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11a									
5180 MHz									
5149.93	34.20	PK	336	1.1	H	38.36	72.56	83.5	10.94
5149.93	18.26	Ave.	336	1.1	H	38.36	56.62	63.5	6.88
5356.85	31.33	PK	72	1.5	H	39.09	70.42	83.5	13.08
5356.85	18.27	Ave.	72	1.5	H	39.09	57.36	63.5	6.14
10360.00	45.08	PK	220	1.7	H	17.42	62.50	77.7	15.20
5200 MHz									
10400.00	44.81	PK	234	1.9	H	17.52	62.33	77.7	15.37
5240 MHz									
5148.34	32.41	PK	120	1.1	H	38.36	70.77	83.5	12.73
5148.34	18.34	Ave.	120	1.1	H	38.36	56.70	63.5	6.80
5352.67	34.23	PK	130	1.8	H	39.09	73.32	83.5	10.18
5352.67	18.61	Ave.	130	1.8	H	39.09	57.70	63.5	5.80
10480.00	45.23	PK	347	2.1	H	17.25	62.48	77.7	15.22
802.11n20									
5180 MHz									
5147.68	32.17	PK	346	1.9	H	38.36	70.53	83.5	12.97
5147.68	18.31	Ave.	346	1.9	H	38.36	56.67	63.5	6.83
5351.47	32.24	PK	234	2.2	H	39.09	71.33	83.5	12.17
5351.47	18.37	Ave.	234	2.2	H	39.09	57.46	63.5	6.04
10360.00	48.12	PK	206	2.3	H	17.42	65.54	77.7	12.16
5200 MHz									
10400.00	48.21	PK	51	1.8	H	17.52	65.73	77.7	11.97
5240 MHz									
5148.59	31.84	PK	173	2.1	H	38.36	70.20	83.5	13.30
5148.59	18.27	Ave.	173	2.1	H	38.36	56.63	63.5	6.87
5352.61	32.47	PK	9	2.4	H	39.09	71.56	83.5	11.94
5352.61	18.45	Ave.	9	2.4	H	39.09	57.54	63.5	5.96
10480.00	48.55	PK	300	1.8	H	17.25	65.80	77.7	11.90

Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.	Degree	Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11ac20									
5180 MHz									
5148.63	32.81	PK	306	1.9	H	38.36	71.17	83.5	12.33
5148.63	18.71	Ave.	306	1.9	H	38.36	57.07	63.5	6.43
5352.46	32.77	PK	39	2.0	H	39.09	71.86	83.5	11.64
5352.46	18.70	Ave.	39	2.0	H	39.09	57.79	63.5	5.71
10360.00	47.96	PK	2	1.4	H	17.42	65.38	77.7	12.32
5200 MHz									
10400.00	48.78	PK	111	1.2	H	17.52	66.30	77.7	11.40
5240 MHz									
5149.47	33.26	PK	353	2.4	H	38.36	71.62	83.5	11.88
5149.47	18.75	Ave.	353	2.4	H	38.36	57.11	63.5	6.39
5354.17	33.13	PK	187	1.3	H	39.09	72.22	83.5	11.28
5354.17	18.73	Ave.	187	1.3	H	39.09	57.82	63.5	5.68
10480.00	48.81	PK	16	2.0	H	17.25	66.06	77.7	11.64
802.11n40									
5190 MHz									
5147.85	31.51	PK	85	1.2	H	38.36	69.87	83.5	13.63
5147.85	18.42	Ave.	85	1.2	H	38.36	56.78	63.5	6.72
5350.29	32.42	PK	319	2.4	H	39.09	71.51	83.5	11.99
5350.29	18.45	Ave.	319	2.4	H	39.09	57.54	63.5	5.96
10380.00	43.16	PK	148	1.0	H	17.42	60.58	77.7	17.12
5230 MHz									
5147.55	32.87	PK	357	2.2	H	38.36	71.23	83.5	12.27
5147.55	18.57	Ave.	357	2.2	H	38.36	56.93	63.5	6.57
5354.27	32.84	PK	286	1.4	H	39.09	71.93	83.5	11.57
5354.27	18.59	Ave.	286	1.4	H	39.09	57.68	63.5	5.82
10460.00	43.25	PK	66	2.0	H	17.15	60.40	77.7	17.30
802.11ac40									
5190 MHz									
5148.56	32.84	PK	80	2.2	H	38.36	71.20	83.5	12.30
5148.56	18.78	Ave.	80	2.2	H	38.36	57.14	63.5	6.36
5352.67	32.45	PK	173	1.5	H	39.09	71.54	83.5	11.96
5352.67	18.81	Ave.	173	1.5	H	39.09	57.90	63.5	5.60
10380.00	45.48	PK	296	1.6	H	17.42	62.90	77.7	14.80
5230 MHz									
5148.63	32.71	PK	106	1.1	H	38.36	71.07	83.5	12.43
5148.63	18.47	Ave.	106	1.1	H	38.36	56.83	63.5	6.67
5352.96	33.52	PK	315	2.3	H	39.09	72.61	83.5	10.89
5352.96	18.53	Ave.	315	2.3	H	39.09	57.62	63.5	5.88
10460.00	45.86	PK	284	2.1	H	17.15	63.01	77.7	14.69
802.11ac80									
5210MHz									
5144.42	35.43	PK	80	2.5	H	38.36	73.79	83.5	9.71
5144.42	20.90	Ave.	80	2.5	H	38.36	59.26	63.5	4.24
5352.96	31.33	PK	131	1.3	H	39.09	70.42	83.5	13.08
5352.96	18.61	Ave.	131	1.3	H	39.09	57.70	63.5	5.80
10420.00	44.37	PK	93	1.7	H	17.52	61.89	77.7	15.81

5250-5350 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									
5260 MHz									
5147.81	31.88	PK	297	2.0	H	38.36	70.24	83.5	13.26
5147.81	17.85	Ave.	297	2.0	H	38.36	56.21	63.5	7.29
5352.71	32.42	PK	33	1.7	H	39.09	71.51	83.5	11.99
5352.71	17.92	Ave.	33	1.7	H	39.09	57.01	63.5	6.49
10520.00	46.64	PK	91	2.3	H	17.25	63.89	77.7	13.81
5280 MHz									
10560.00	46.75	PK	2	1.6	H	17.91	64.66	77.7	13.04
5320 MHz									
5148.45	31.92	PK	32	1.9	H	38.36	70.28	83.5	13.22
5148.45	17.88	Ave.	32	1.9	H	38.36	56.24	63.5	7.26
5352.71	33.54	PK	79	1.6	H	39.09	72.63	83.5	10.87
5352.71	18.20	Ave.	79	1.6	H	39.09	57.29	63.5	6.21
10640.00	46.58	PK	177	1.0	H	18.01	64.59	83.5	18.91
10640.00	32.96	Ave.	177	1.0	H	18.01	50.97	63.5	12.53
802.11n20									
5260 MHz									
5149.52	31.94	PK	314	1.7	H	38.36	70.30	83.5	13.20
5149.52	17.97	Ave.	314	1.7	H	38.36	56.33	63.5	7.17
5352.69	32.12	PK	38	2.2	H	39.09	71.21	83.5	12.29
5352.69	18.01	Ave.	38	2.2	H	39.09	57.10	63.5	6.40
10520.00	43.55	PK	14	1.2	H	17.25	60.80	77.7	16.90
5280 MHz									
10560.00	43.62	PK	1	2.3	H	17.91	61.53	77.7	16.17
5320 MHz									
5148.53	31.56	PK	359	2.2	H	38.36	69.92	83.5	13.58
5148.53	17.9	Ave.	359	2.2	H	38.36	56.26	63.5	7.24
5350.22	36.57	PK	351	1.1	H	39.09	75.66	83.5	7.84
5350.22	19.57	Ave.	351	1.1	H	39.09	58.66	63.5	4.84
10640.00	43.85	PK	238	2.4	H	18.01	61.86	83.5	21.64
10640.00	31.23	Ave.	238	2.4	H	18.01	49.24	63.5	14.26

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)
802.11ac20									
5260 MHz									
5148.75	31.99	PK	256	2.1	H	38.36	70.35	83.5	13.15
5148.75	17.98	Ave.	256	2.1	H	38.36	56.34	63.5	7.16
5352.45	32.41	PK	161	1.9	H	39.09	71.50	83.5	12.00
5352.45	18.05	Ave.	161	1.9	H	39.09	57.14	63.5	6.36
10520.00	43.47	PK	59	1.7	H	17.25	60.72	77.7	16.98
5280 MHz									
10560.00	43.59	PK	333	1.6	H	17.91	61.50	77.7	16.20
5320 MHz									
5146.54	31.95	PK	14	1.3	H	38.36	70.31	83.5	13.19
5146.54	18.03	Ave.	14	1.3	H	38.36	56.39	63.5	7.11
5350.81	33.12	PK	88	2.0	H	39.09	72.21	83.5	11.29
5350.81	18.17	Ave.	88	2.0	H	39.09	57.26	63.5	6.24
10640.00	43.81	PK	257	1.7	H	18.01	61.82	83.5	21.68
10640.00	31.29	Ave.	257	1.7	H	18.01	49.30	63.5	14.20
802.11n40									
5270 MHz									
5148.85	32.81	PK	59	1.4	H	38.36	71.17	83.5	12.33
5148.85	18.25	Ave.	59	1.4	H	38.36	56.61	63.5	6.89
5353.62	33.12	PK	259	2.4	H	39.09	72.21	83.5	11.29
5353.62	18.27	Ave.	259	2.4	H	39.09	57.36	63.5	6.14
10540.00	43.88	PK	264	1.6	H	17.25	61.13	77.7	16.57
5310 MHz									
5148.53	32.15	PK	250	2.1	H	38.36	70.51	83.5	12.99
5148.53	18.23	Ave.	250	2.1	H	38.36	56.59	63.5	6.91
5350.41	35.78	PK	93	1.2	H	39.09	74.87	83.5	8.63
5350.41	20.71	Ave.	93	1.2	H	39.09	59.80	63.5	3.70
10620.00	43.71	PK	302	2.4	H	18.01	61.72	83.5	21.78
10620.00	29.62	Ave.	302	2.4	H	18.01	47.63	63.5	15.87

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									
5270 MHz									
5148.34	32.13	PK	57	2.1	H	38.36	70.49	83.5	13.01
5148.34	18.32	Ave.	57	2.1	H	38.36	56.68	63.5	6.82
5351.71	32.41	PK	209	2.1	H	39.09	71.50	83.5	12.00
5351.71	18.35	Ave.	209	2.1	H	39.09	57.44	63.5	6.06
10540.00	43.63	PK	258	1.6	H	17.25	60.88	77.7	16.82
5310 MHz									
5147.86	32.77	PK	335	1.3	H	38.36	71.13	83.5	12.37
5147.86	18.31	Ave.	335	1.3	H	38.36	56.67	63.5	6.83
5352.40	35.42	PK	203	2.0	H	39.09	74.51	83.5	8.99
5352.40	20.67	Ave.	203	2.0	H	39.09	59.76	63.5	3.74
10620.00	43.85	PK	76	2.0	H	18.01	61.86	83.5	21.64
10620.00	29.59	Ave.	76	2.0	H	18.01	47.60	63.5	15.90
802.11ac80									
5290MHz									
5147.82	32.28	PK	204	1.6	H	38.36	70.64	83.5	12.86
5147.82	17.92	Ave.	204	1.6	H	38.36	56.28	63.5	7.22
5351.43	33.42	PK	352	2.5	H	39.09	72.51	83.5	10.99
5351.43	19.88	Ave.	352	2.5	H	39.09	58.97	63.5	4.53
10580.00	43.38	PK	52	2.0	H	17.91	61.29	77.7	16.41

5470-5725MHz:

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									
5500 MHz									
5468.45	34.29	PK	103	1.6	H	39.37	73.66	77.7	4.04
5726.85	33.42	PK	338	1.6	H	39.49	72.91	77.7	4.79
11000.00	44.51	PK	27	1.1	H	17.66	62.17	83.5	21.33
11000.00	29.65	Ave.	27	1.1	H	17.66	47.31	63.5	16.19
5580MHz									
11160.00	44.59	PK	47	1.2	H	17.39	61.98	83.5	21.52
11160.00	29.81	Ave.	47	1.2	H	17.39	47.20	63.5	16.30
5700 MHz									
5467.83	32.48	PK	330	1.5	H	39.37	71.85	77.7	5.85
5725.17	35.15	PK	277	1.1	H	39.49	74.64	77.7	3.06
11400.00	44.57	PK	347	1.7	H	17.73	62.30	83.5	21.20
11400.00	30.02	Ave.	347	1.7	H	17.73	47.75	63.5	15.75
5720 MHz									
5853.24	33.75	PK	136	2.2	H	39.87	73.62	124.31	50.69
5855.36	34.01	PK	273	1.2	H	39.87	73.88	120.2	46.32
5888.49	34.31	PK	37	1.5	H	39.87	74.18	104.72	30.54
5934.47	34.39	PK	171	1.7	H	39.97	74.36	77.7	3.34
11440.00	43.06	PK	52	2.0	H	17.73	60.79	83.5	22.71
11440.00	30.92	AV	52	2.0	H	17.73	48.65	63.5	14.85
802.11n20									
5500 MHz									
5467.81	33.42	PK	309	1.1	H	39.37	72.79	77.7	4.91
5726.22	31.85	PK	359	1.8	H	39.49	71.34	77.7	6.36
11000.00	44.47	PK	26	1.8	H	17.66	62.13	83.5	21.37
11000.00	29.52	Ave.	26	1.8	H	17.66	47.18	63.5	16.32
5580 MHz									
11160.00	44.53	PK	210	1.7	H	17.39	61.92	83.5	21.58
11160.00	29.69	Ave.	210	1.7	H	17.39	47.08	63.5	16.42
5700 MHz									
5468.42	32.69	PK	331	2.4	H	39.37	72.06	77.7	5.64
5726.12	35.12	PK	239	1.9	H	39.49	74.61	77.7	3.09
11400.00	44.69	PK	92	1.2	H	17.73	62.42	83.5	21.08
11400.00	30.15	Ave.	92	1.2	H	17.73	47.88	63.5	15.62

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)
5720 MHz									
5852.72	35.01	PK	38	1.0	H	39.87	74.88	125.50	50.62
5857.39	32.88	PK	121	1.1	H	39.87	72.75	119.63	46.88
5886.11	33.64	PK	224	2.1	H	39.87	73.51	106.48	32.97
5956.35	34.71	PK	123	1.6	H	39.84	74.55	77.7	3.15
11440.00	43.12	PK	83	2.3	H	17.73	60.85	83.5	22.65
11440.00	30.85	AV	83	2.3	H	17.73	48.58	63.5	14.92
802.11ac20									
5500 MHz									
5468.95	33.27	PK	355	2.2	H	39.37	72.64	77.7	5.06
5727.53	32.14	PK	274	2.5	H	39.49	71.63	77.7	6.07
11000.00	44.29	PK	142	1.6	H	17.66	61.95	83.5	21.55
11000.00	29.47	Ave.	142	1.6	H	17.66	47.13	63.5	16.37
5580 MHz									
11160.00	44.61	PK	283	1.4	H	17.39	62.00	83.5	21.50
11160.00	29.66	Ave.	283	1.4	H	17.39	47.05	63.5	16.45
5700 MHz									
5467.81	32.52	PK	30	2.0	H	39.37	71.89	77.7	5.81
5725.96	35.14	PK	315	2.5	H	39.49	74.63	77.7	3.07
11400.00	44.76	PK	219	1.3	H	17.73	62.49	83.5	21.01
11400.00	30.10	Ave.	219	1.3	H	17.73	47.83	63.5	15.67
5720 MHz									
5853.97	33.94	PK	326	2.4	H	39.87	73.81	122.65	48.84
5858.98	33.44	PK	323	1.5	H	39.87	73.31	119.19	45.88
5896.53	34.68	PK	308	2.2	H	39.87	74.55	98.77	24.22
5929.94	34.28	PK	36	1.4	H	39.97	74.25	77.7	3.45
11440.00	43.23	PK	189	1.4	H	17.73	60.96	83.5	22.54
11440.00	30.46	AV	189	1.4	H	17.73	48.19	63.5	15.31
802.11N40									
5510 MHz									
5469.50	32.77	PK	249	2.4	H	39.37	72.14	77.7	5.56
5727.81	32.45	PK	345	1.2	H	39.49	71.94	77.7	5.76
11020.00	44.37	PK	130	1.5	H	17.66	62.03	83.5	21.47
11020.00	30.13	Ave.	130	1.5	H	17.66	47.79	63.5	15.71
11020.00	26.47	Ave.	11	1.0	H	17.66	44.13	63.5	19.37

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)
5550MHz									
11100.00	44.24	PK	42	2.0	H	16.72	60.96	83.5	22.54
11100.00	30.01	Ave.	42	2.0	H	16.72	46.73	63.5	16.77
5670MHz									
5468.42	32.49	PK	66	1.8	H	39.37	71.86	77.7	5.84
5726.54	33.28	PK	24	2.5	H	39.49	72.77	77.7	4.93
11340.00	44.23	PK	41	2.1	H	17.43	61.66	83.5	21.84
11340.00	30.18	Ave.	41	2.1	H	17.43	47.61	63.5	15.89
5710MHz									
5854.41	32.74	PK	44	1.9	H	39.87	72.61	121.65	49.04
5863.76	34.71	PK	309	1.3	H	39.87	74.58	117.85	43.27
5895.08	34.33	PK	259	2.3	H	39.87	74.20	99.84	25.64
5935.74	34.39	PK	121	1.7	H	39.97	74.36	77.7	3.34
11420.00	43.41	PK	140	1.5	H	17.73	61.14	83.5	22.36
11420.00	29.99	AV	140	1.5	H	17.73	47.72	63.5	15.78
802.11AC40									
5510 MHz									
5468.22	32.47	PK	170	2.3	H	39.37	71.84	77.7	5.86
5728.42	32.71	PK	141	1.3	H	39.49	72.20	77.7	5.50
11020.00	43.98	PK	301	1.9	H	17.66	61.64	83.5	21.86
11020.00	30.05	Ave.	301	1.9	H	17.66	47.71	63.5	15.79
5550MHz									
11100.00	43.87	PK	161	2.2	H	16.72	60.59	83.5	22.91
11100.00	29.98	Ave.	161	2.2	H	16.72	46.70	63.5	16.80
5670 MHz									
5468.41	32.47	PK	9	1.9	H	39.37	71.84	77.7	5.86
5725.66	33.12	PK	329	1.2	H	39.49	72.61	77.7	5.09
11340.00	44.05	PK	348	2.4	H	17.43	61.48	83.5	22.02
11340.00	30.11	Ave.	348	2.4	H	17.43	47.54	63.5	15.96
5710MHz									
5852.41	34.33	PK	48	2.1	H	39.87	74.20	126.21	52.01
5866.42	34.58	PK	345	1.2	H	39.87	74.45	117.7	43.25
5880.97	33.19	PK	347	1.5	H	39.87	73.06	110.28	37.22
5941.69	33.98	PK	222	1.2	H	39.97	73.95	77.7	3.75
11420.00	43.32	PK	251	2.2	H	17.73	61.05	83.5	22.45
11420.00	30.15	AV	251	2.2	H	17.73	47.88	63.5	15.62

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									
5530 MHz									
5467.83	32.33	PK	76	1.9	H	39.37	71.70	77.7	6.00
5727.34	32.72	PK	199	2.0	H	39.49	72.21	77.7	5.49
11060.00	44.21	PK	3	1.3	H	16.72	60.93	83.5	22.57
11060.00	30.18	Ave.	3	1.3	H	16.72	46.90	63.5	16.60
5610 MHz									
5468.44	32.57	PK	2	2.1	H	39.37	71.94	77.7	5.76
5725.63	32.81	PK	314	1.3	H	39.49	72.30	77.7	5.40
11220.00	44.69	PK	184	2.4	H	17.39	62.08	83.5	21.42
11220.00	30.25	Ave.	184	2.4	H	17.39	47.64	63.5	15.86
5690 MHz									
5852.07	34.39	PK	89	1.3	H	39.87	74.26	126.98	52.72
5863.58	33.75	PK	303	2.1	H	39.87	73.62	117.9	44.28
5918.09	34.37	PK	159	1.1	H	39.97	74.34	82.81	8.47
5934.69	34.58	PK	71	2.1	H	39.97	74.55	77.7	3.15
11380.00	43.28	PK	227	1.2	H	17.73	61.01	83.5	22.49
11380.00	30.23	AV	227	1.2	H	17.73	47.96	63.5	15.54

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									
5647.65	31.92	PK	261	1.3	H	39.46	71.38	77.7	6.32
5693.89	32.67	PK	261	1.3	H	39.49	72.16	110.18	38.02
5719.99	41.64	PK	314	1.0	H	39.49	81.13	120.3	39.17
5724.32	47.92	PK	314	1.0	H	39.49	87.41	130.15	42.74
11490.00	43.81	PK	191	2.3	H	17.47	61.28	83.5	22.22
11490.00	30.18	Ave.	191	2.3	H	17.47	47.65	63.5	15.85
5785 MHz									
11570.00	43.89	PK	198	1.8	H	17.51	61.40	83.5	22.10
11570.00	30.22	Ave.	198	1.8	H	17.51	47.73	63.5	15.77
5825 MHz									
5850.05	36.42	PK	279	1.9	H	39.87	76.29	131.59	55.30
5857.33	34.19	PK	279	1.9	H	39.87	74.06	119.65	45.59
5893.42	33.29	PK	154	2.1	H	39.87	73.16	101.07	27.91
5927.82	34.59	PK	154	2.1	H	39.97	74.56	77.7	3.14
11650.00	43.94	PK	326	2.0	H	16.18	60.12	83.5	23.38
11650.00	30.25	Ave.	326	2.0	H	16.18	46.43	63.5	17.07
802.11n20									
5745 MHz									
5607.85	32.89	PK	49	1.6	H	39.46	72.35	77.7	5.35
5699.60	33.72	PK	49	1.6	H	39.49	73.21	114.4	41.19
5719.78	44.43	PK	129	1.5	H	39.49	83.92	120.24	36.32
5724.81	49.38	PK	129	1.5	H	39.49	88.87	131.27	42.40
11490.00	44.26	PK	300	2.0	H	17.47	61.73	83.5	21.77
11490.00	30.35	Ave.	300	2.0	H	17.47	47.82	63.5	15.68
5785 MHz									
11570.00	44.75	PK	78	2.3	H	17.51	62.26	83.5	21.24
11570.00	30.57	Ave.	78	2.3	H	17.51	48.08	63.5	15.42
5825 MHz									
5850.06	37.59	PK	191	1.8	H	39.87	77.46	131.56	54.10
5870.49	34.7	PK	191	1.8	H	39.87	74.57	115.96	41.39
5907.09	34.06	PK	47	1.7	H	39.87	73.93	90.95	17.02
5941.52	34.38	PK	47	1.7	H	39.97	74.35	77.7	3.35
11650.00	44.27	PK	342	1.8	H	16.18	60.45	83.5	23.05
11650.00	30.59	Ave.	342	1.8	H	16.18	46.77	63.5	16.73

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)
802.11ac20									
5745 MHz									
5625.87	33.01	PK	116	1.3	H	39.46	72.47	77.7	5.23
5688.09	33.66	PK	116	1.3	H	39.49	73.15	105.89	32.74
5719.23	42.86	PK	44	2.3	H	39.49	82.35	120.08	37.73
5724.92	47.87	PK	44	2.3	H	39.49	87.36	131.52	44.16
11490.00	44.23	PK	233	2.4	H	17.47	61.70	83.5	21.80
11490.00	30.39	Ave.	233	2.4	H	17.47	47.86	63.5	15.64
5785 MHz									
11570.00	44.51	PK	248	2.3	H	17.51	62.02	83.5	21.48
11570.00	30.44	Ave.	248	2.3	H	17.51	47.95	63.5	15.55
5825 MHz									
5851.02	38.29	PK	137	2.2	H	39.87	78.16	129.37	51.21
5867.49	35.08	PK	137	2.2	H	39.87	74.95	116.8	41.85
5916.28	34.77	PK	23	2.0	H	39.87	74.64	84.15	9.51
5936.47	34.54	PK	23	2.0	H	39.97	74.51	77.7	3.19
11650.00	44.42	PK	330	1.8	H	16.18	60.60	83.5	22.90
11650.00	30.27	Ave.	330	1.8	H	16.18	46.45	63.5	17.05
802.11n40									
5755 MHz									
5610.31	32.74	PK	28	2.3	H	39.46	72.20	77.7	5.50
5663.13	32.66	PK	28	2.3	H	39.49	72.15	87.42	15.27
5719.11	45.19	PK	244	1.9	H	39.49	84.68	120.05	35.37
5723.39	47.55	PK	244	1.9	H	39.49	87.04	128.03	40.99
11510.00	42.96	PK	200	2.0	H	17.47	60.43	83.5	23.07
11510.00	29.48	Ave.	200	2.0	H	17.47	46.95	63.5	16.55
5795 MHz									
5853.17	34.47	PK	267	1.8	H	39.87	74.34	124.47	50.13
5857.82	35.65	PK	267	1.8	H	39.87	75.52	119.51	43.99
5912.01	33.7	PK	3	2.3	H	39.87	73.57	87.31	13.74
5929.53	34.48	PK	3	2.3	H	39.97	74.45	77.7	3.25
11590.00	43.24	PK	330	1.5	H	17.51	60.75	83.5	22.75
11590.00	29.65	Ave.	330	1.5	H	17.51	47.16	63.5	16.34

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									
5625.36	32.65	PK	89	2.2	H	39.46	72.11	77.7	5.59
5698.08	32.02	PK	89	2.2	H	39.49	71.51	113.28	41.77
5719.99	44.35	PK	201	2.3	H	39.49	83.84	120.3	36.46
5724.93	47.56	PK	201	2.3	H	39.49	87.05	131.54	44.49
11510.00	43.04	PK	147	2.4	H	17.47	60.51	83.5	22.99
11510.00	29.53	Ave.	147	2.4	H	17.47	47.00	63.5	16.50
5795MHz									
5852.30	34.98	PK	48	1.4	H	39.87	74.85	126.46	51.61
5863.29	34.18	PK	48	1.4	H	39.87	74.05	117.98	43.93
5891.31	34.11	PK	94	1.8	H	39.87	73.98	102.62	28.64
5933.52	34.53	PK	94	1.8	H	39.97	74.50	77.7	3.20
11590.00	43.14	PK	300	1.3	H	17.51	60.65	83.5	22.85
11590.00	29.56	Ave.	300	1.3	H	17.51	47.07	63.5	16.43
802.11AC80									
5755 MHz									
5635.05	31.84	PK	217	2.3	H	39.46	71.30	77.7	6.40
5698.95	32.93	PK	217	2.3	H	39.49	72.42	113.89	41.47
5718.57	44.77	PK	43	1.4	H	39.49	84.26	119.9	35.64
5722.94	45.8	PK	43	1.4	H	39.49	85.29	127	41.71
5850.72	40.56	PK	187	1.1	H	39.87	80.43	130.07	49.64
5855.19	38.07	PK	187	1.1	H	39.87	77.94	120.25	42.31
5876.34	34.49	PK	150	2.3	H	39.87	74.36	113.71	39.35
5951.45	35.12	PK	150	2.3	H	39.84	74.96	77.7	2.74
11550.00	42.84	PK	202	1.1	H	17.51	60.35	83.5	23.15
11550.00	28.89	Ave.	202	1.1	H	17.51	46.40	63.5	17.10

Note:

Corrected Amplitude = Corrected Factor + Reading

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

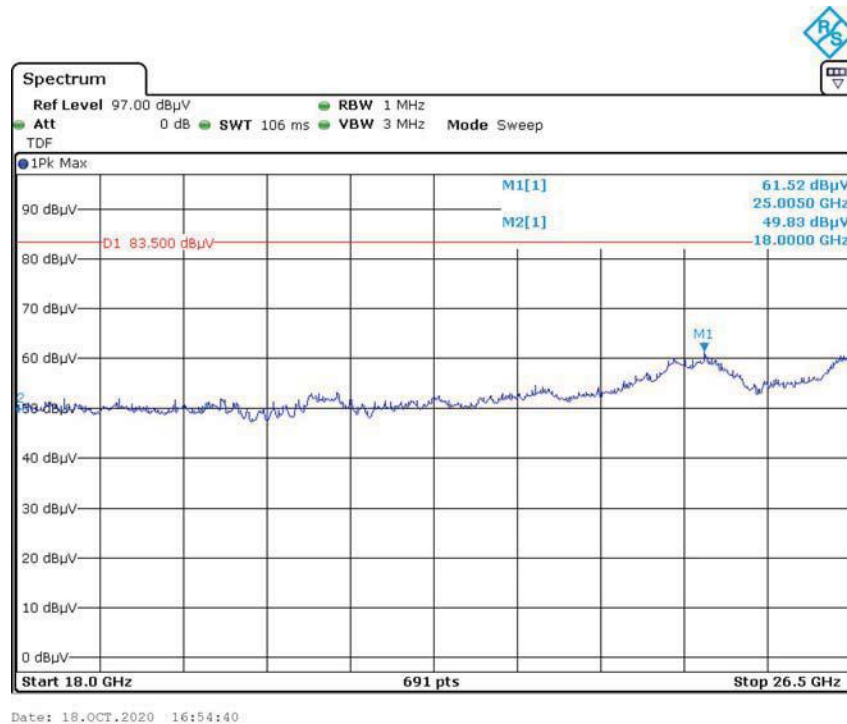
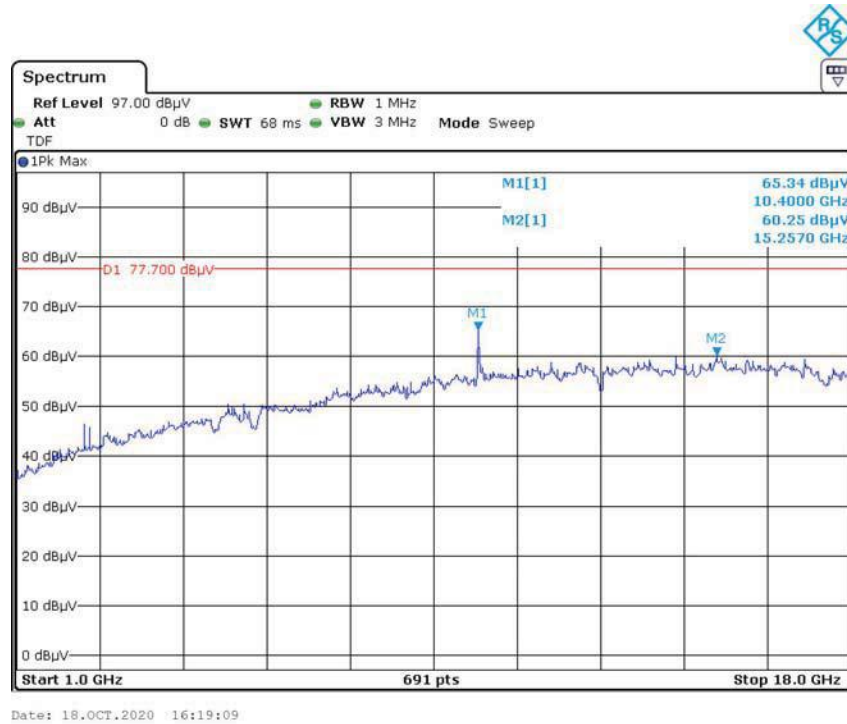
Margin = Limit- Corr. Amplitude

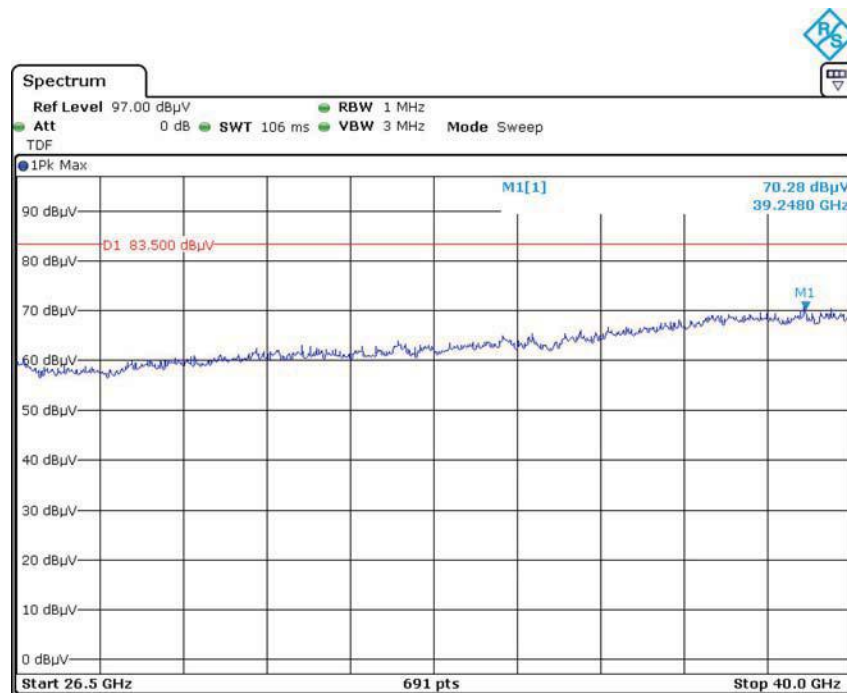
All other spurious emissions are 20 dB below the limit or are on the system noise floor level.

Peak

Pre-scan with 802.11ac20 5200MHz

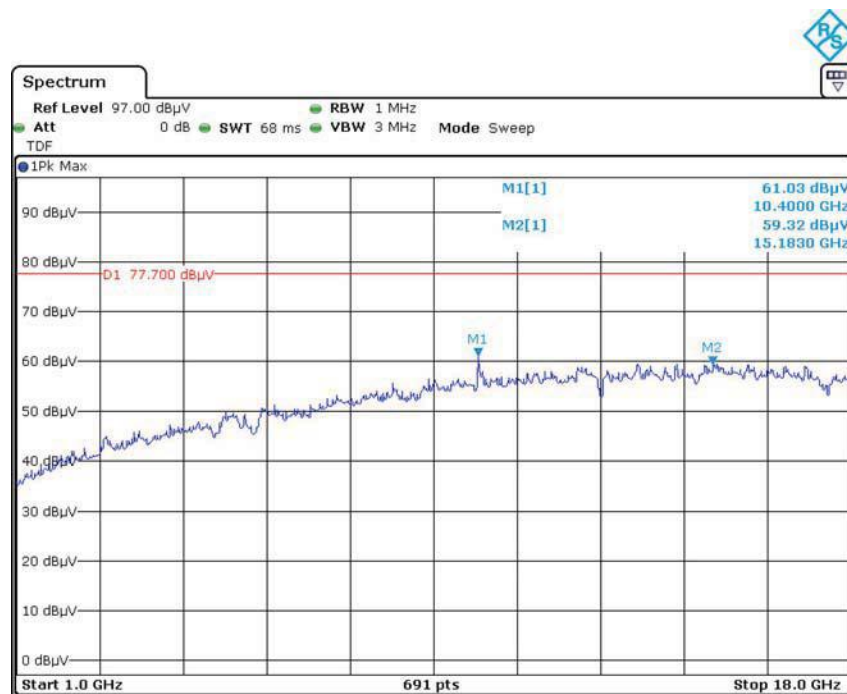
Horizontal



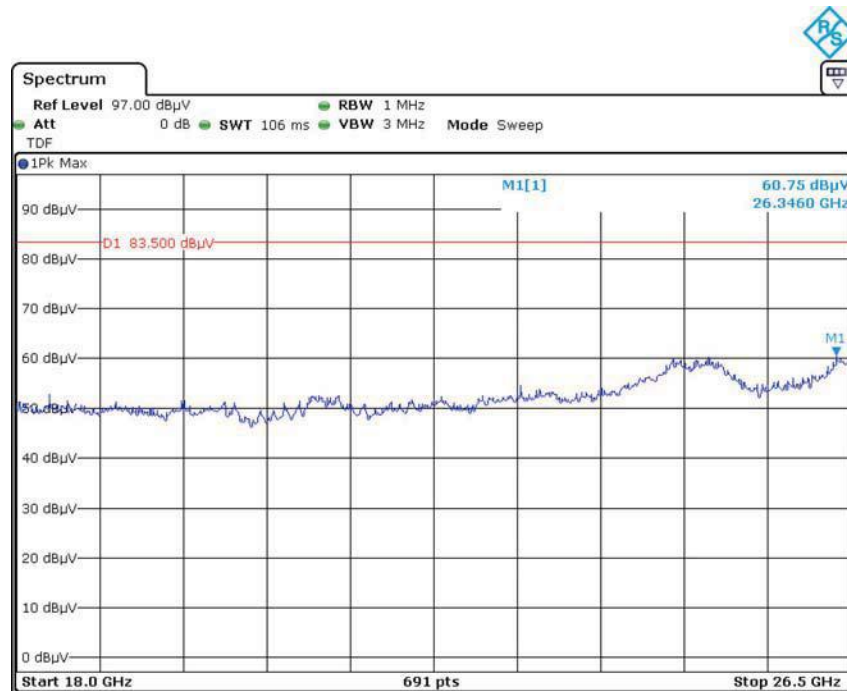


Date: 18.OCT.2020 17:12:12

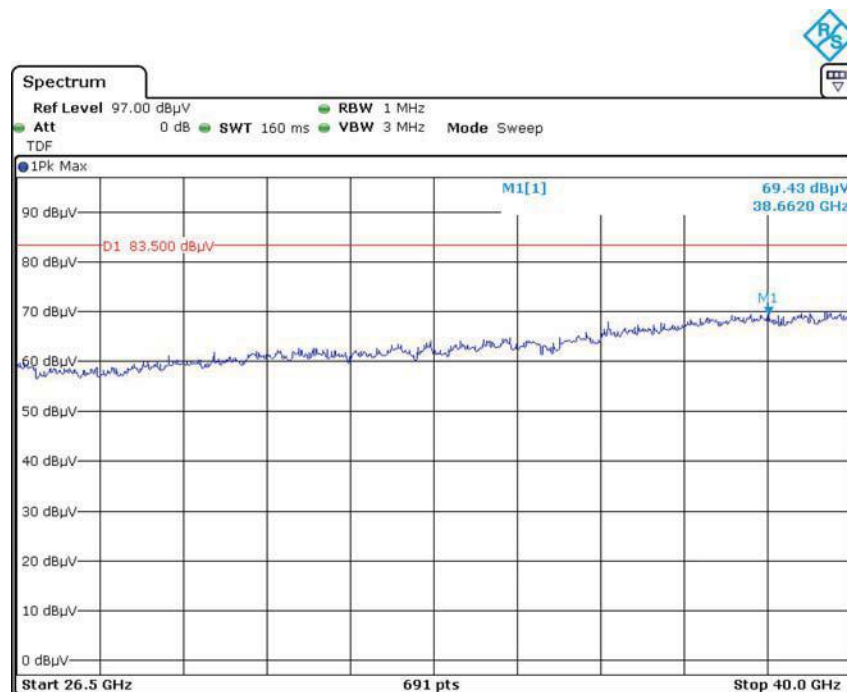
Vertical



Date: 18.OCT.2020 16:23:48

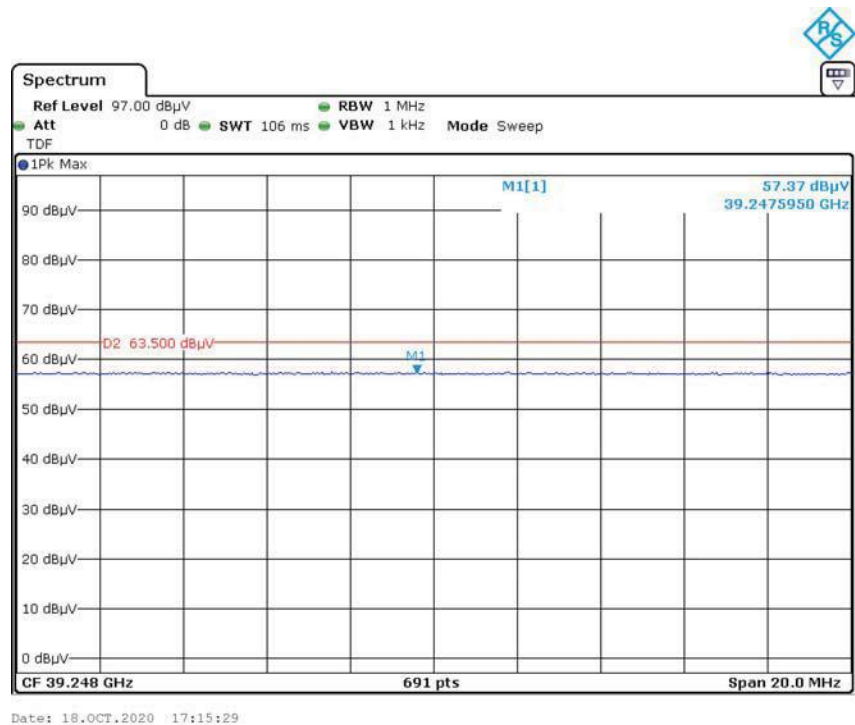
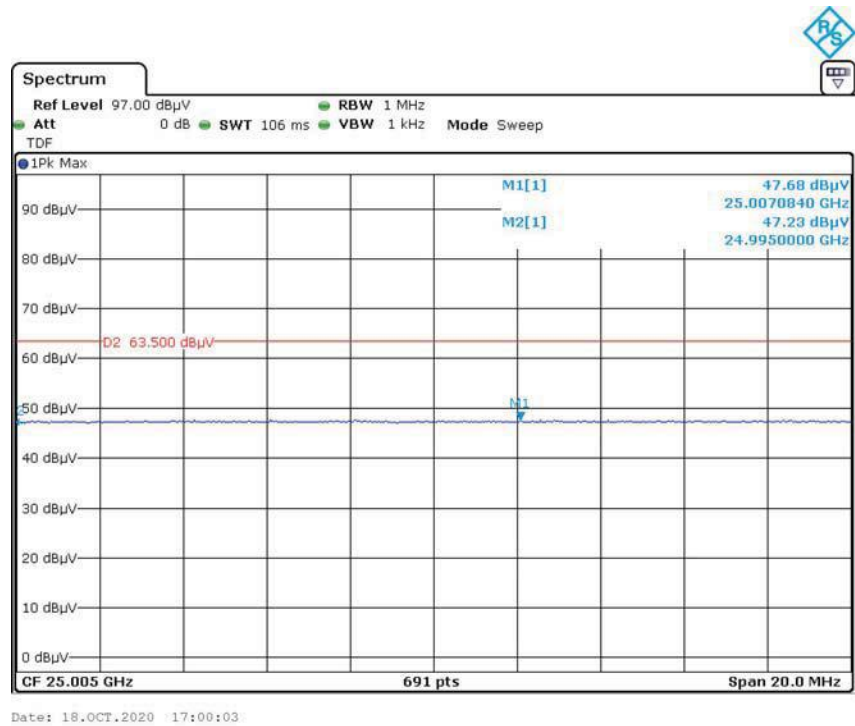


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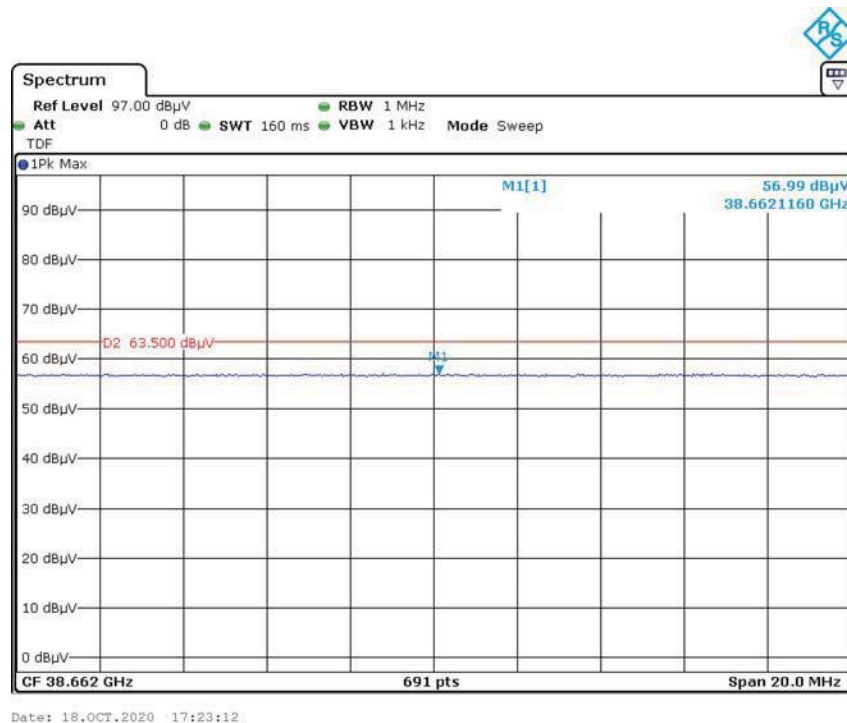
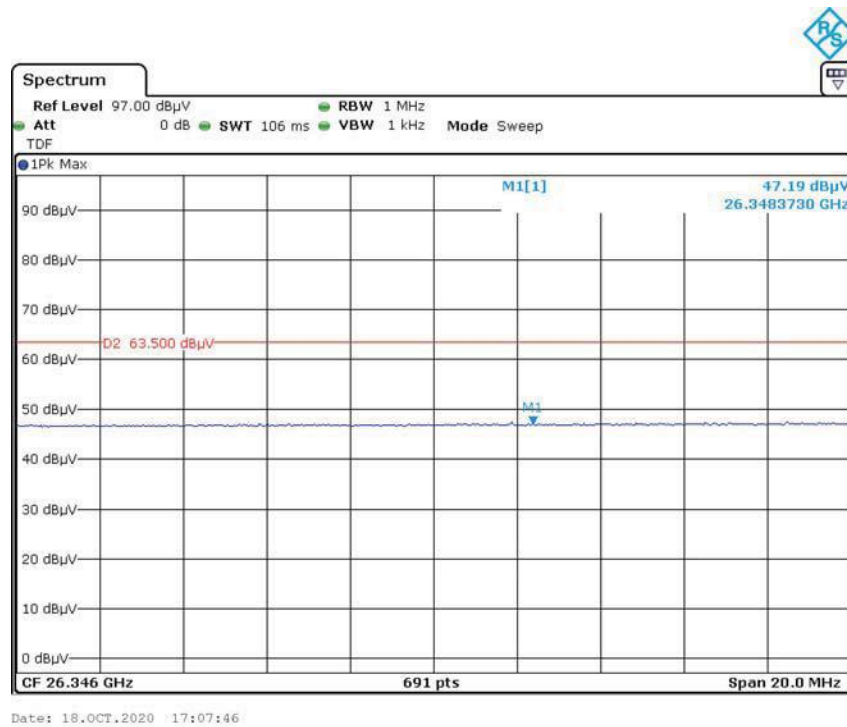


Date: 18.OCT.2020 17:18:52

Average Horizontal



Vertical



FCC §15.407(1), (5),(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

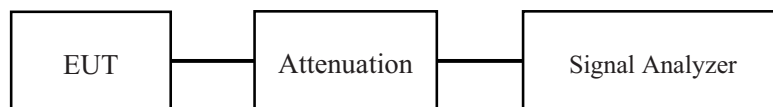
1. Emission Bandwidth (EBW)

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- 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:

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- 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:	27 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by James Fu on 2020-10-05 to 2020-11-25.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the Appendix.

FCC §15.407(a)(1)(2)(3) – 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.

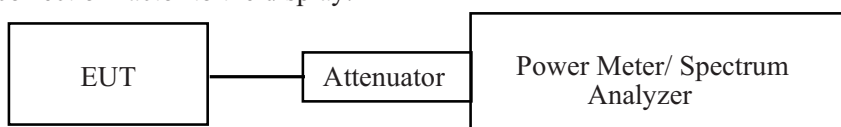
For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting 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

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



Test Data**Environmental Conditions**

Temperature:	27 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by James Fu on 2020-10-05 to 2020-11-25.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the Appendix.

FCC §15.407(a) (1) (2) (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 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 ($< 1 \text{ MHz}$, or $< 500 \text{ kHz}$) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:

- a) Set $\text{RBW} \geq 1/T$, where T is defined in section II.B.1.a).
- b) Set $\text{VBW} \geq 3 \text{ RBW}$.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10 \log (500 \text{ kHz}/\text{RBW})$ 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 $10 \log (1\text{MHz}/\text{RBW})$ 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:	27 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by James Fu on 2020-10-05 to 2020-11-25.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the Appendix.

APPENDIX

Appendix A1: Emission Bandwidth Test Result

m	Antenna	Channel	26db EBW [MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	25.680	---	PASS
		5200	26.400	---	PASS
		5240	26.120	---	PASS
		5260	26.160	---	PASS
		5280	27.040	---	PASS
		5320	25.160	---	PASS
		5500	28.320	---	PASS
		5580	26.440	---	PASS
		5700	25.920	---	PASS
		5720	22.800	---	PASS
11N20SISO	Ant1	5720_UNII-2C	16.16	---	PASS
		5180	23.560	---	PASS
		5200	24.200	---	PASS
		5240	23.520	---	PASS
		5260	23.480	---	PASS
		5280	24.320	---	PASS
		5320	23.400	---	PASS
		5500	25.000	---	PASS
		5580	23.920	---	PASS
		5700	23.400	---	PASS
11N40SISO	Ant1	5720_UNII-2C	16.6	---	PASS
		5190	42.240	---	PASS
		5230	42.080	---	PASS
		5270	42.240	---	PASS
		5310	42.400	---	PASS
		5510	41.520	---	PASS
		5550	42.400	---	PASS
		5670	42.000	---	PASS
		5710	42.000	---	PASS
		5710_UNII-2C	35.96	---	PASS
11AC20SISO	Ant1	5180	23.360	---	PASS
		5200	23.360	---	PASS
		5240	23.440	---	PASS
		5260	23.440	---	PASS
		5280	23.640	---	PASS
		5320	23.680	---	PASS
		5500	24.360	---	PASS
		5580	24.280	---	PASS
		5700	23.360	---	PASS
		5720	23.080	---	PASS
11AC40SISO	Ant1	5720_UNII-2C	16.36	---	PASS
		5190	41.920	---	PASS
		5230	42.080	---	PASS
		5270	42.160	---	PASS
		5310	41.840	---	PASS
		5510	42.000	---	PASS
11AC40SISO	Ant1	5550	49.040	---	PASS

		5670	42.000	---	PASS
		5710	41.680	---	PASS
		5710_UNII-2C	35.96	---	PASS
11AC80SISO	Ant1	5210	84.960	---	PASS
		5290	83.840	---	PASS
		5530	84.800	---	PASS
		5610	84.640	---	PASS
		5690	83.680	---	PASS
		5690_UNII-2C	76.92	---	PASS

Test Graphs

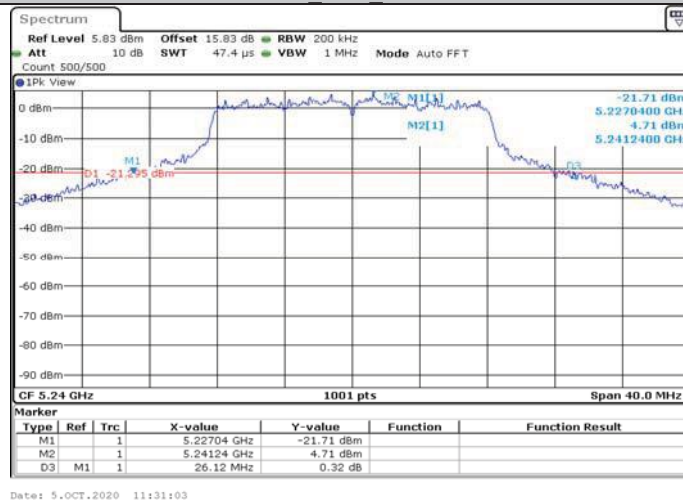
11A_Ant1_5180



11A_Ant1_5200



11A_Ant1_5240

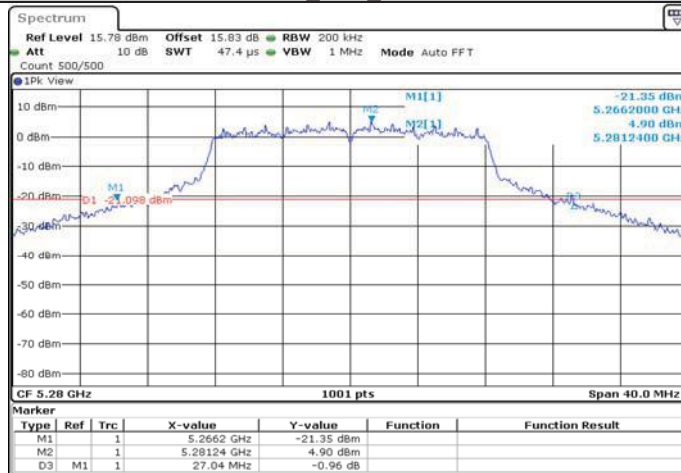


11A_Ant1_5260



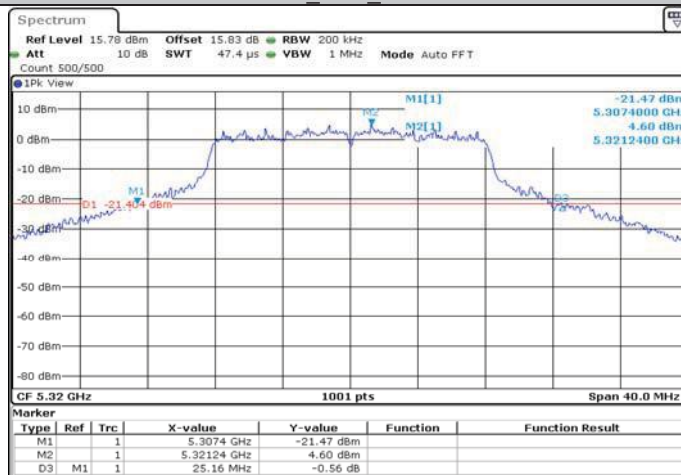
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11A_Ant1_5280



Date: 5.OCT.2020 11:38:07

11A_Ant1_5320



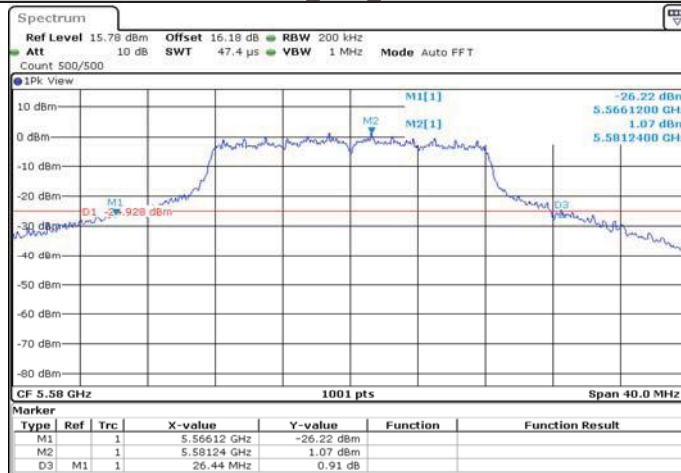
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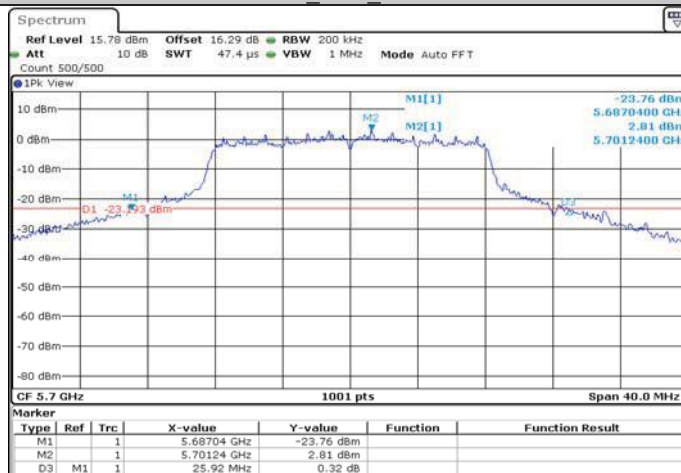
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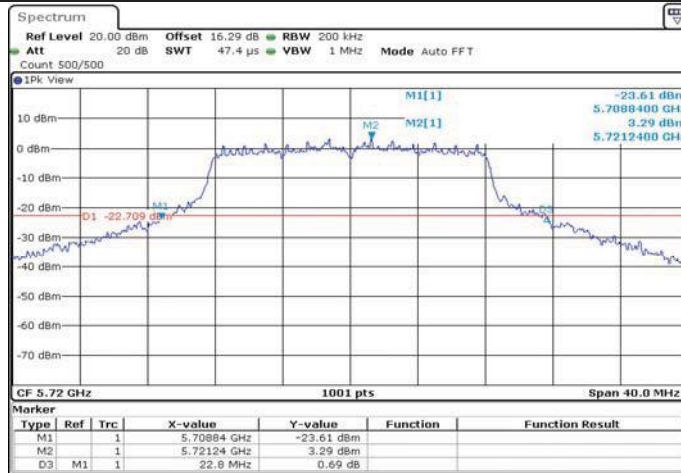
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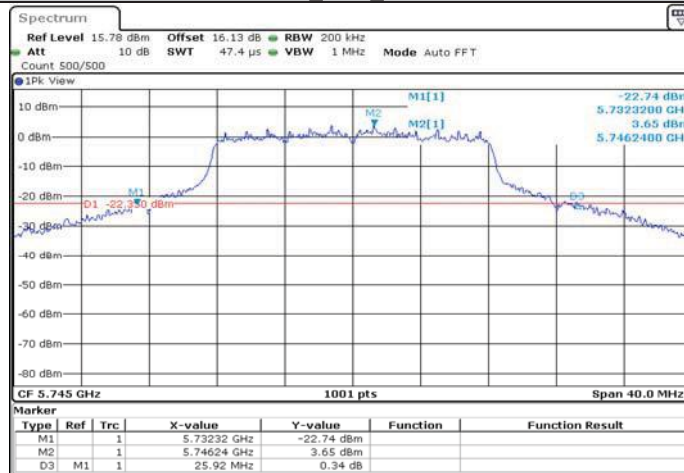
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11A_Ant1_5720



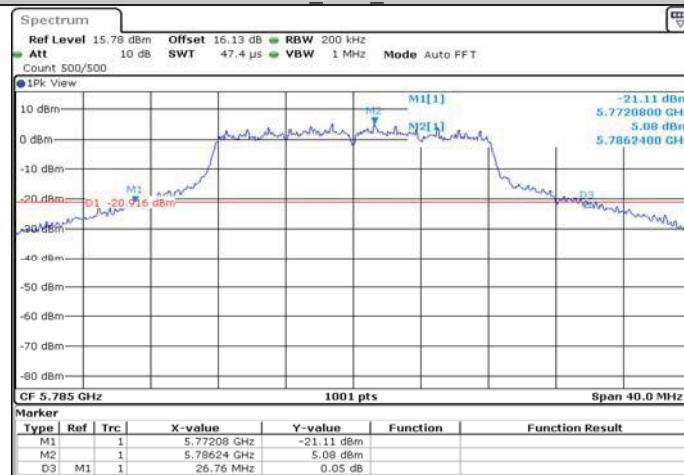
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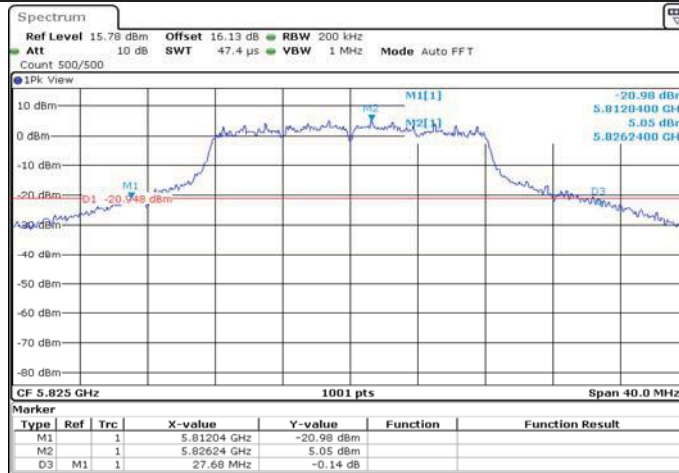
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11A_Ant1_5785



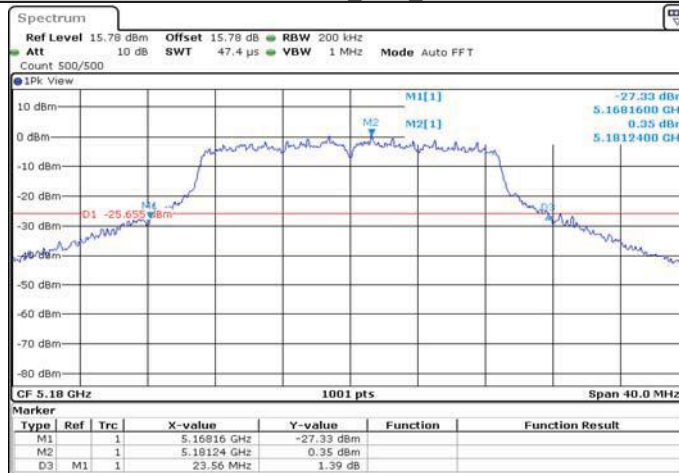
Date: 5.OCT.2020 12:02:07

11A_Ant1_5825



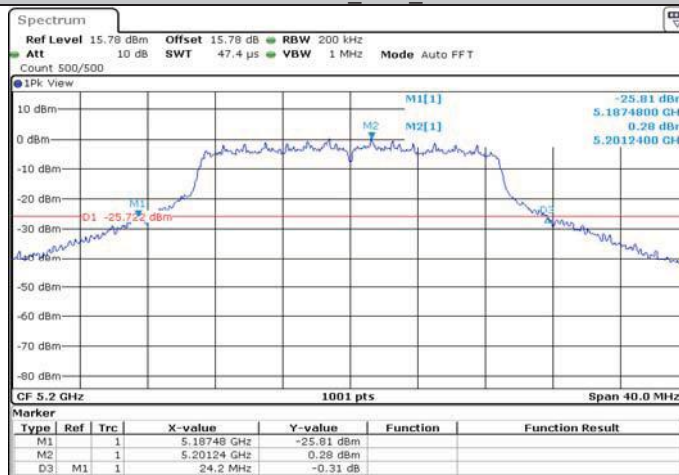
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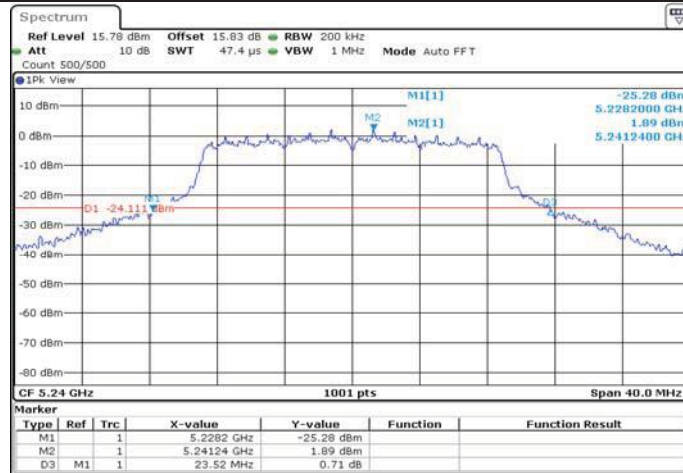
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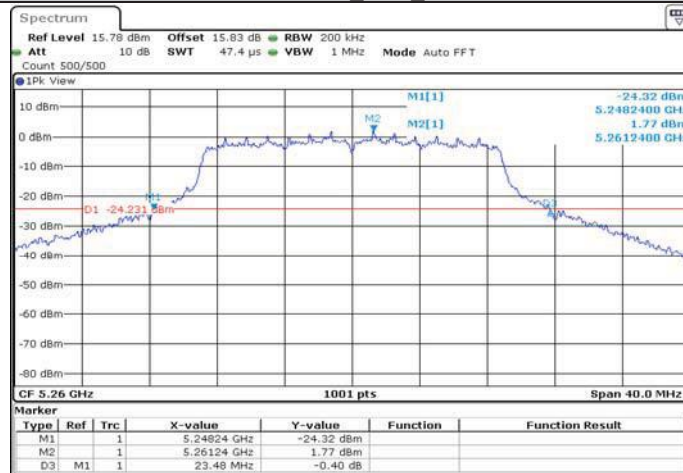
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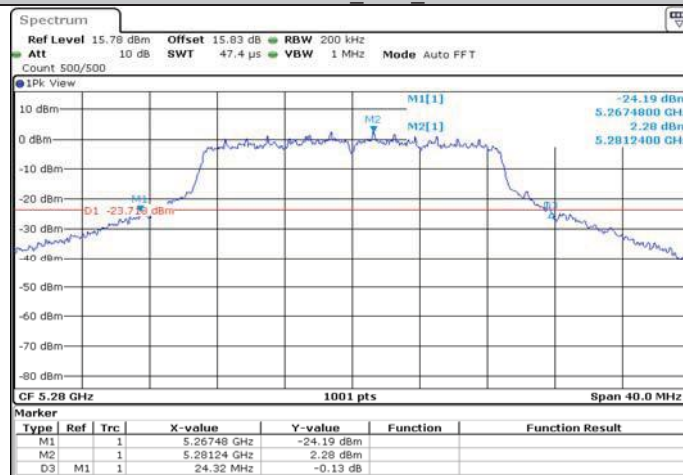
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11N20SISO_Ant1_5260



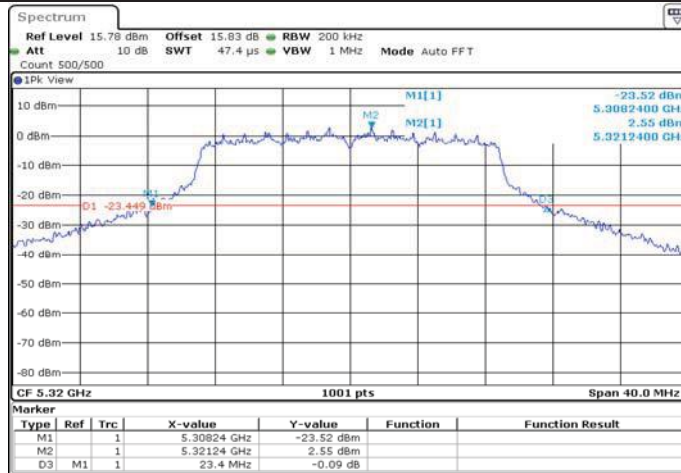
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11N20SISO_Ant1_5280



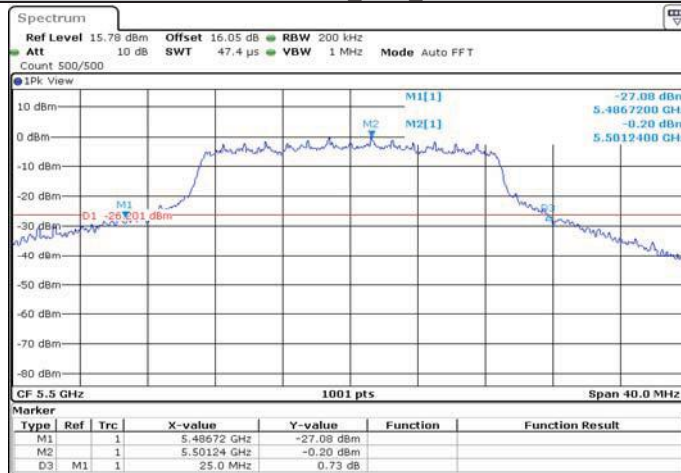
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11N20SISO Ant1 5320



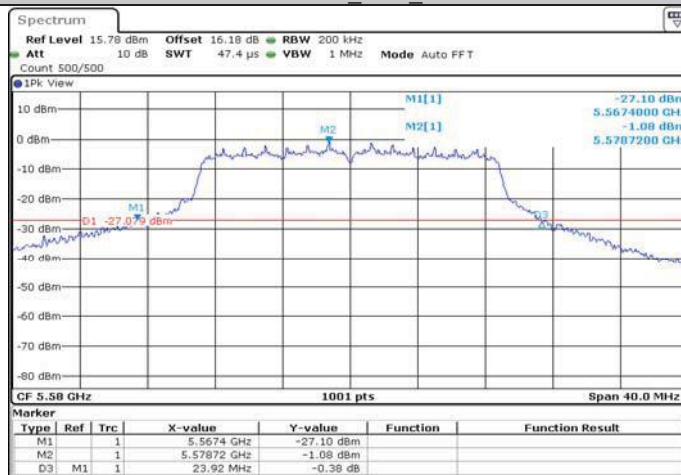
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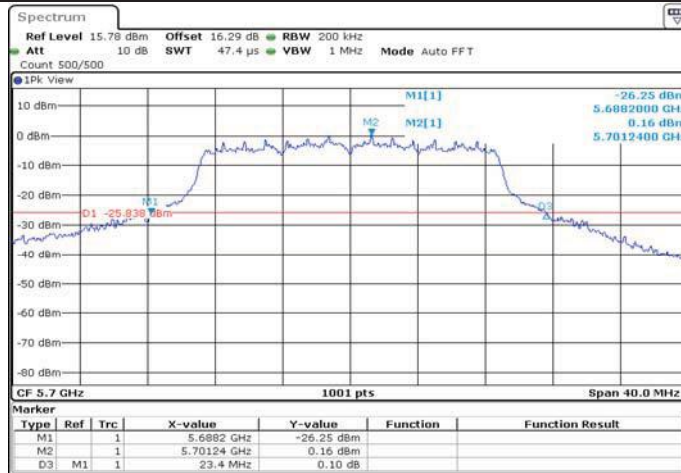
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11N20SISO Ant1 5580



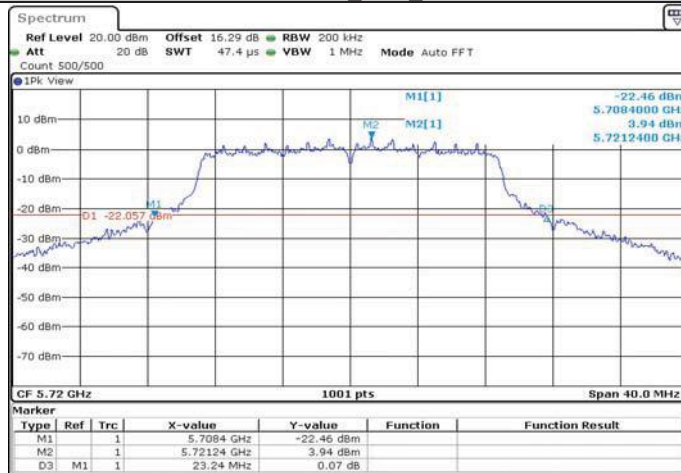
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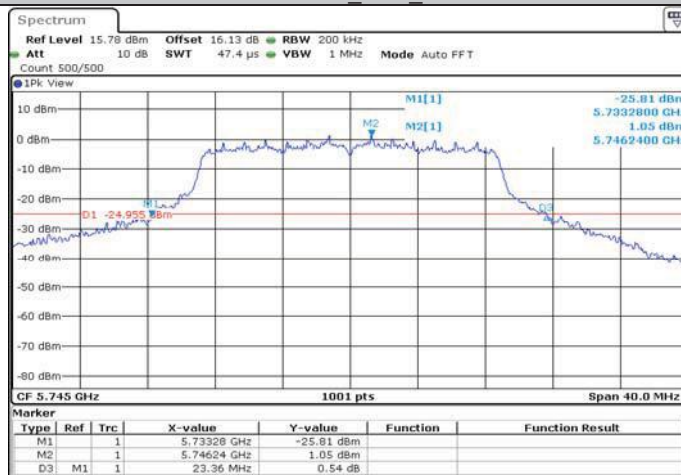
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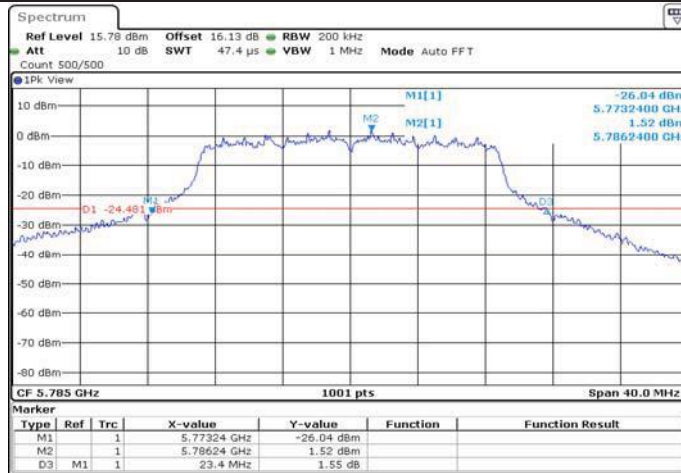
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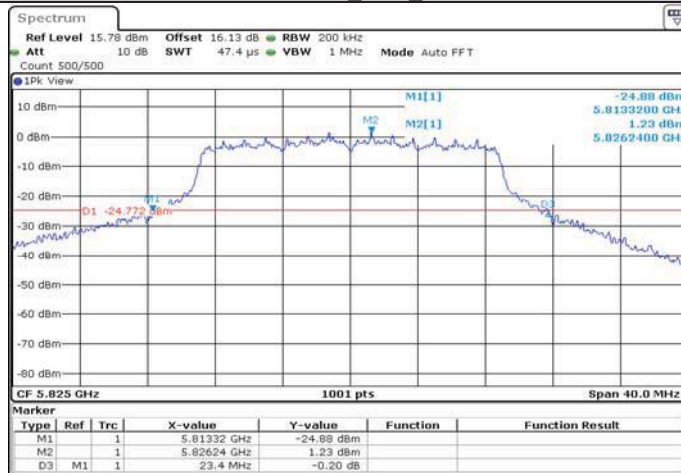
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11N20SISO Ant1 5785



Date: 5.OCT.2020 12:50:05

11N20SISO Ant1 5825



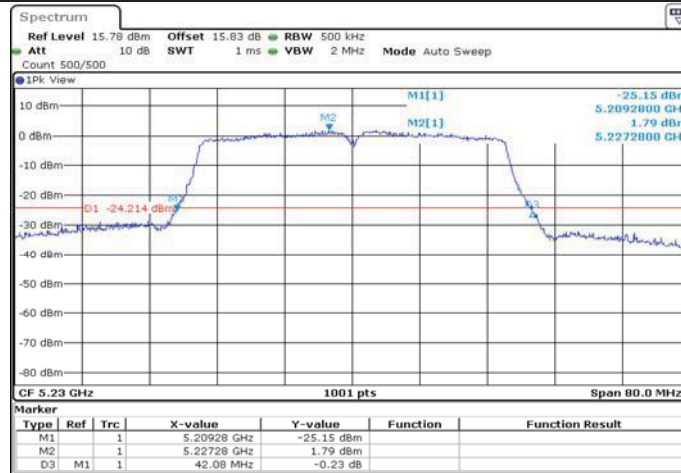
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11N40SISO Ant1 5190



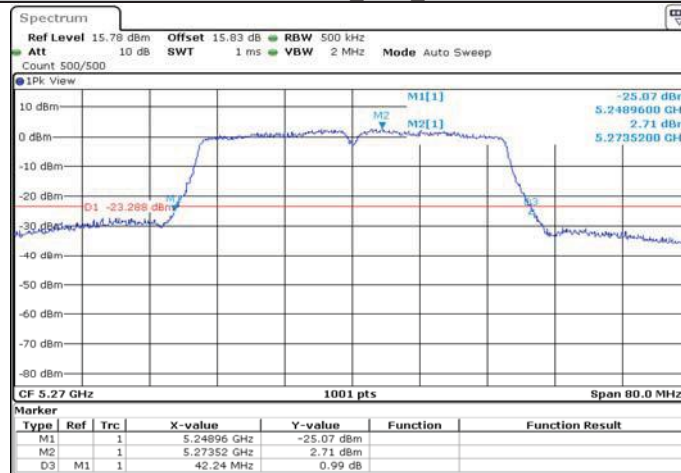
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11N40SISO Ant1 5230



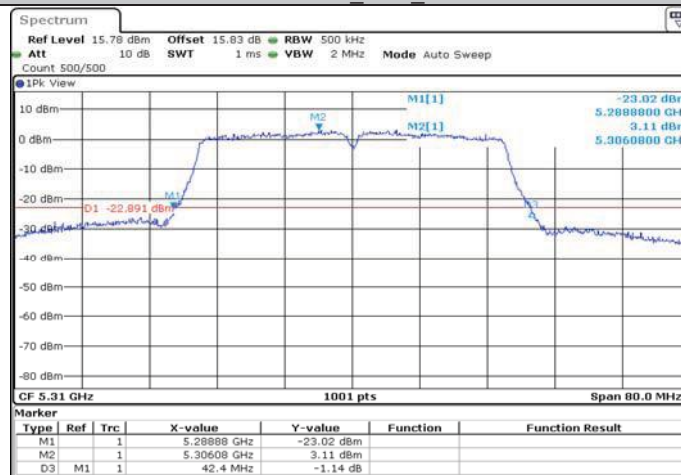
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11N40SISO Ant1 5270



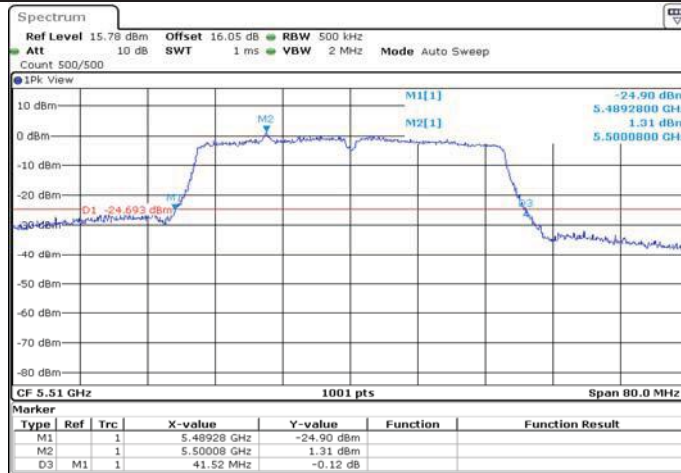
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11N40SISO Ant1 5310



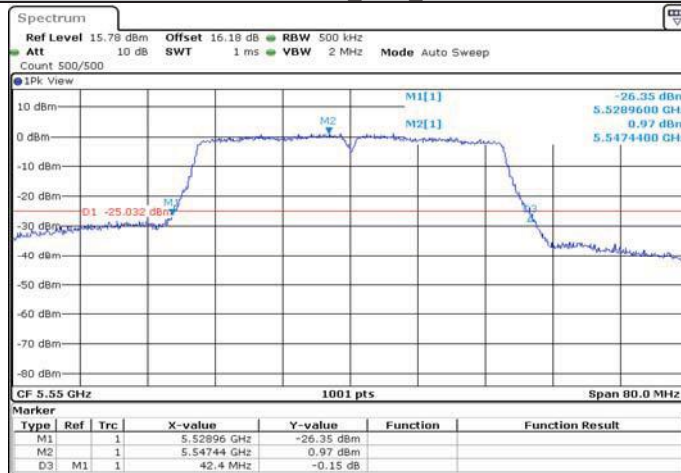
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11N40SISO_Ant1_5510



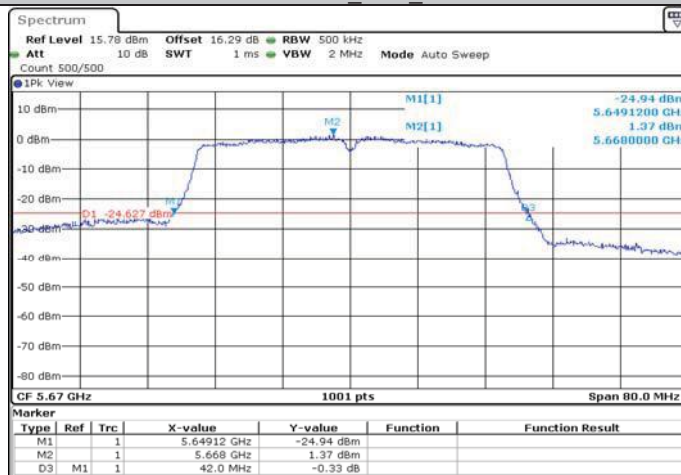
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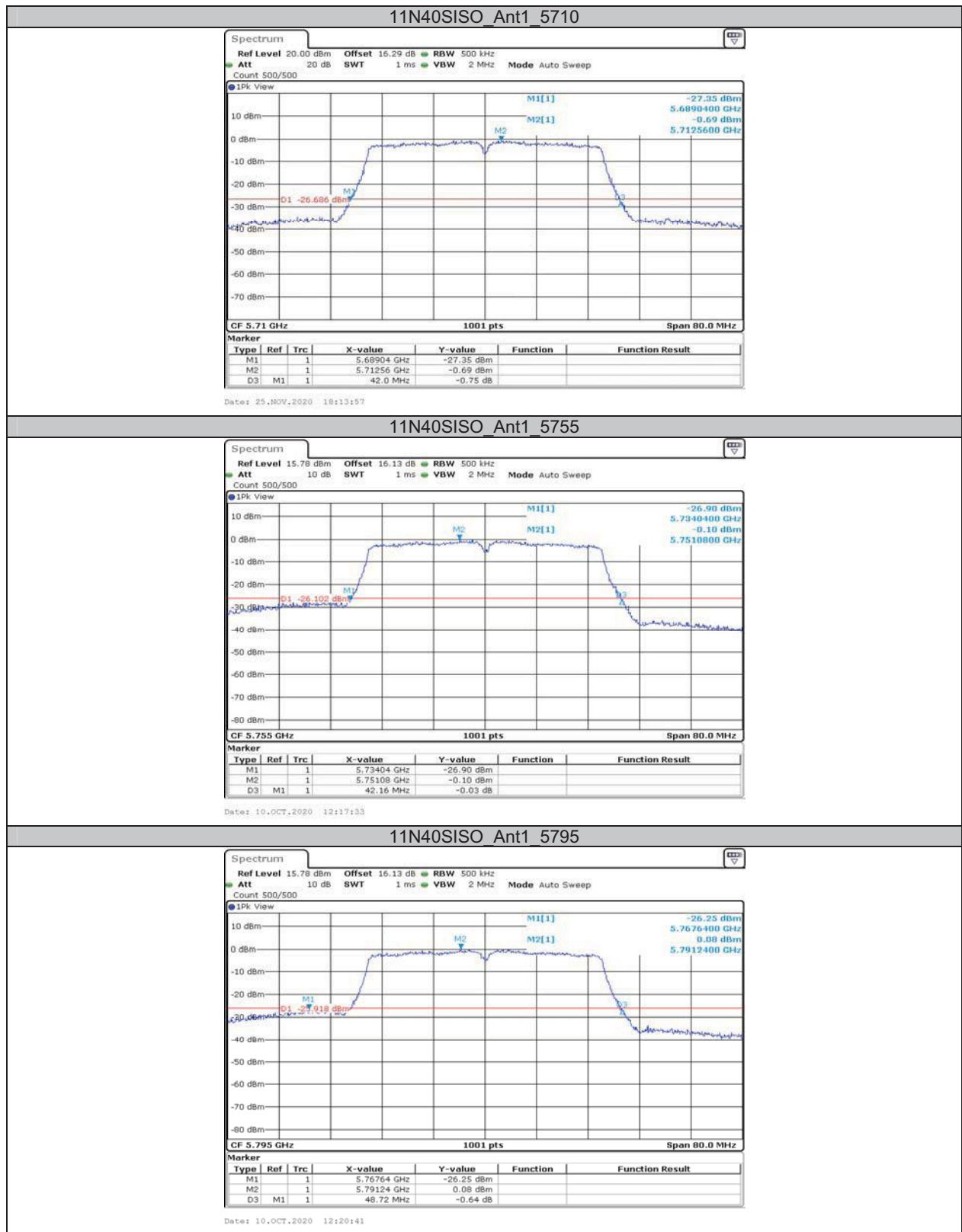


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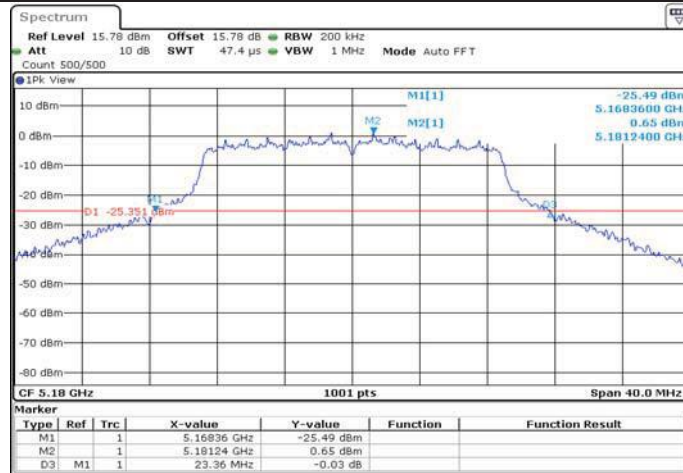
11N40SISO_Ant1_5670



Date: 10.OCT.2020 12:15:45

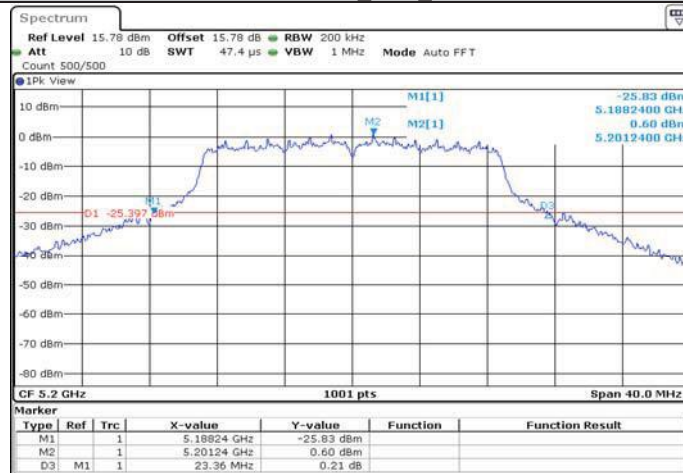


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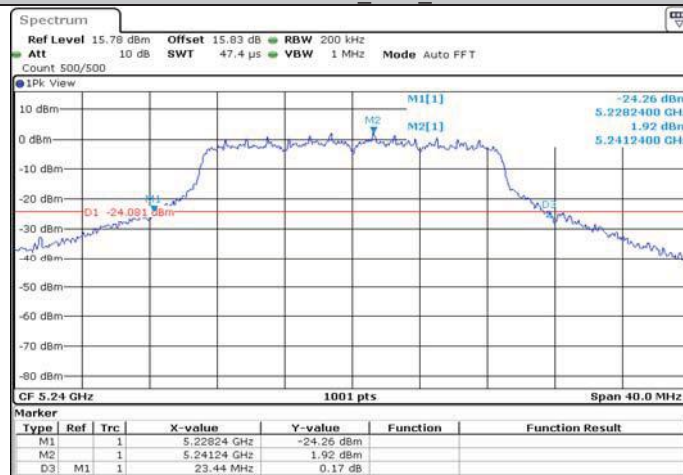
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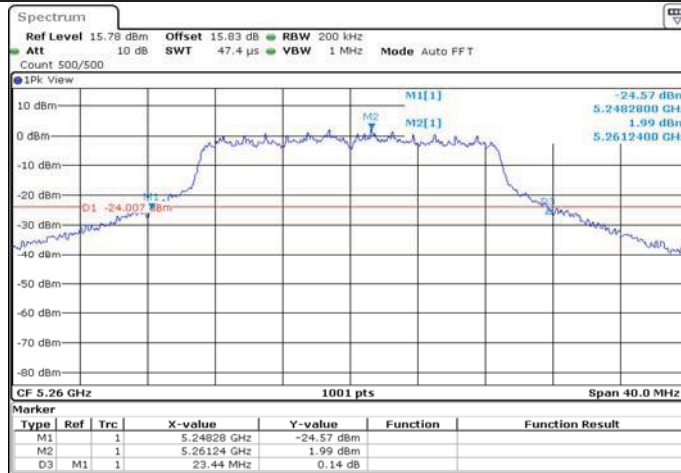
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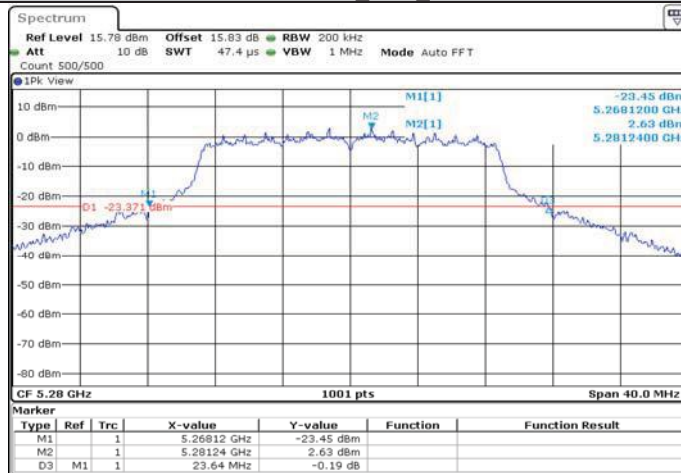
Date: 5.OCT.2020 15:04:00

11AC20SISO_Ant1_5260



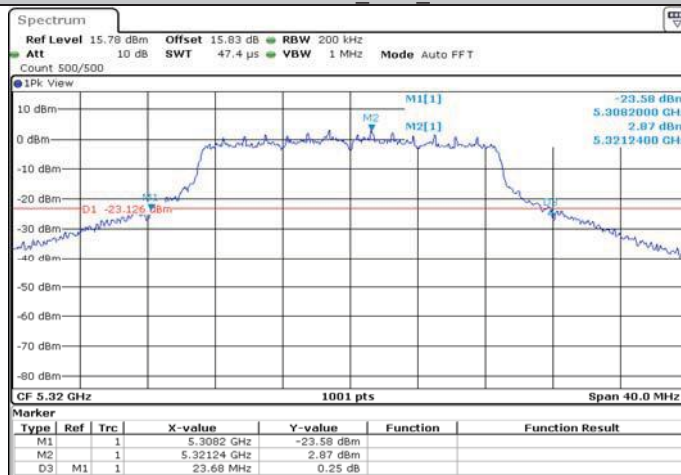
Date: 5.OCT.2020 15:17:54

11AC20SISO_Ant1_5280



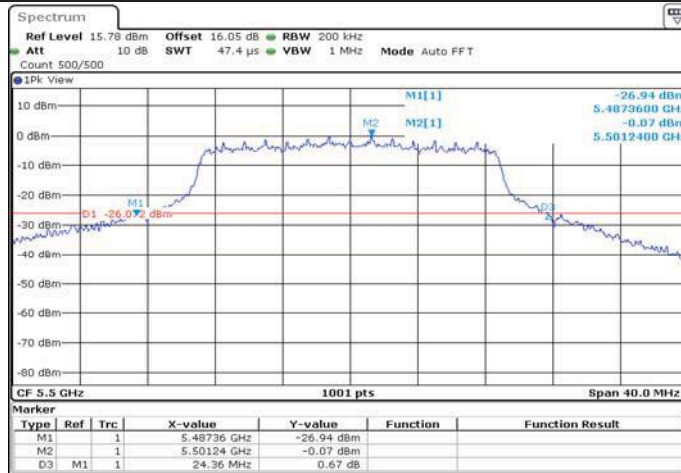
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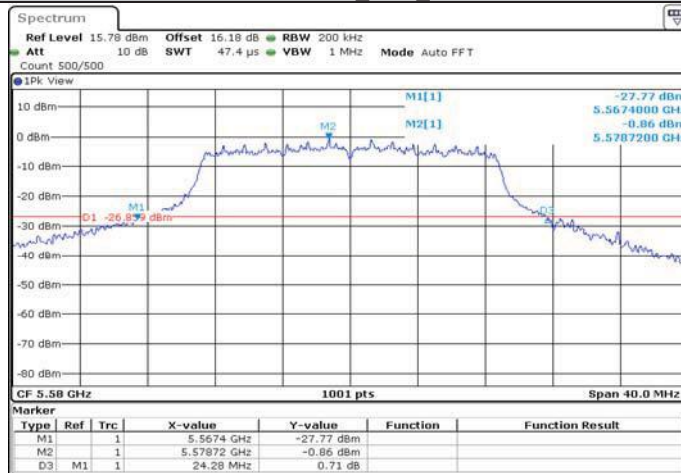
Date: 5.OCT.2020 15:26:06

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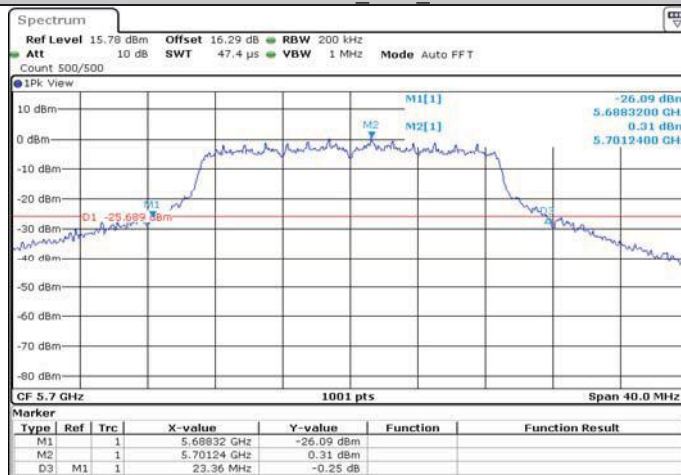
Date: 5.OCT.2020 15:28:26

11AC20SISO_Ant1_5580



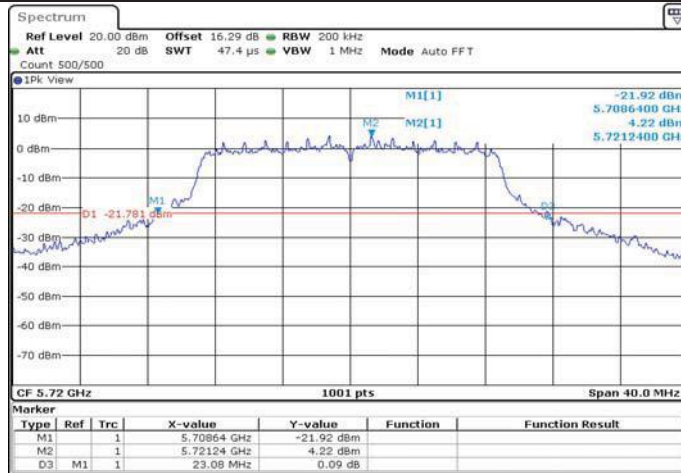
Date: 5.OCT.2020 15:31:07

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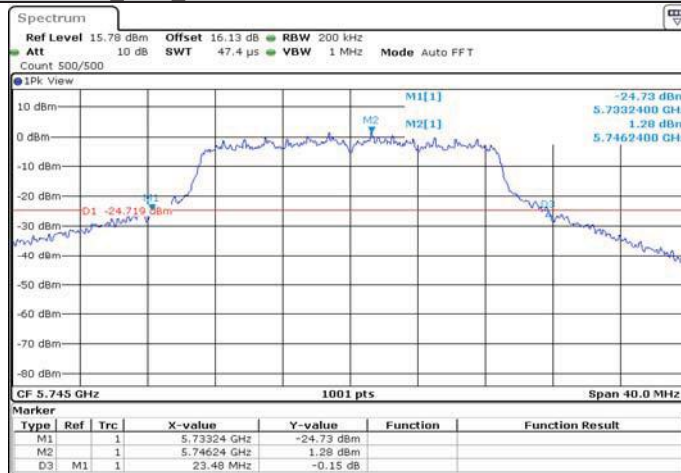
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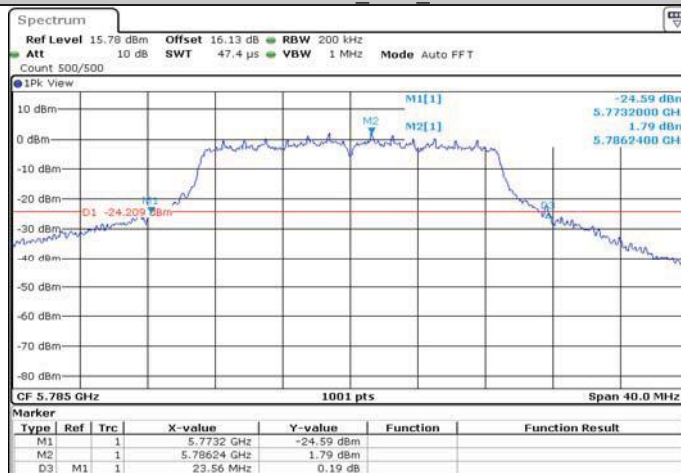
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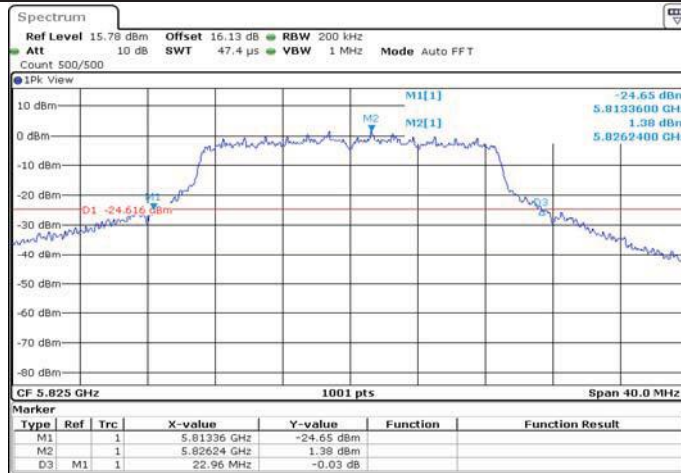
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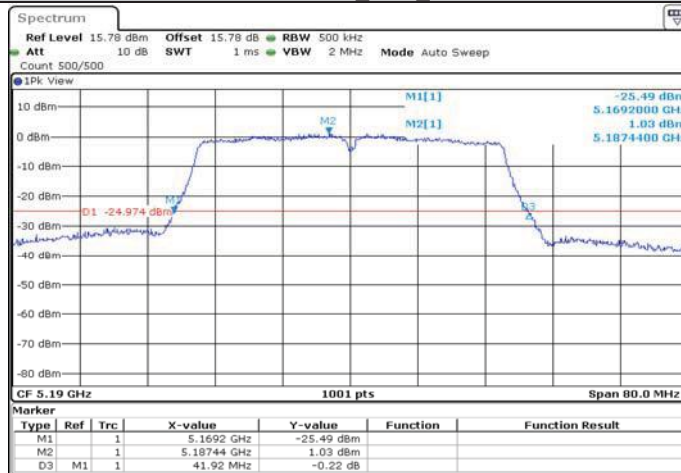
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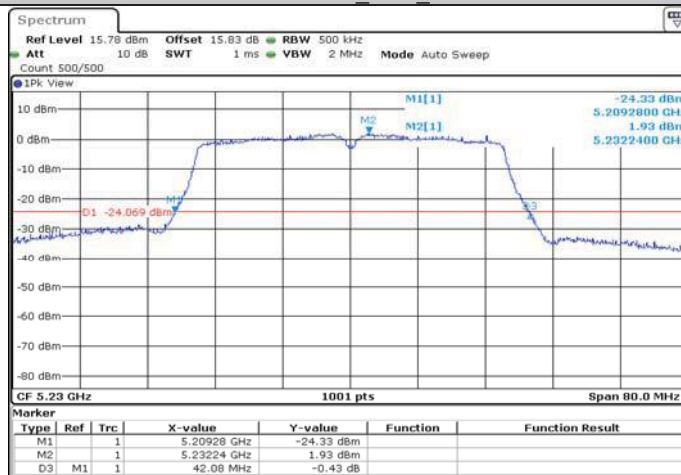
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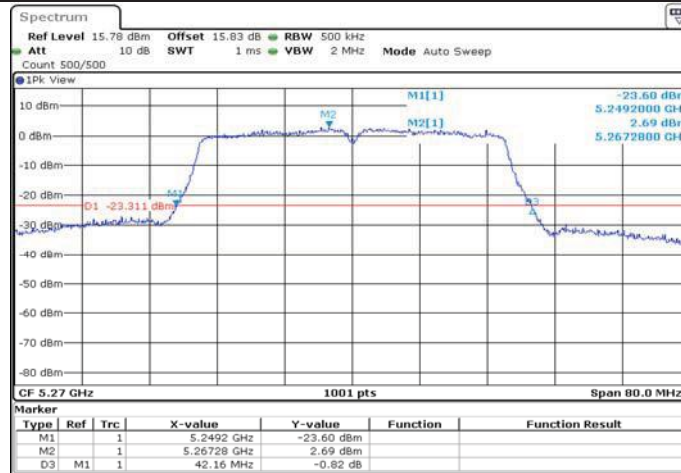
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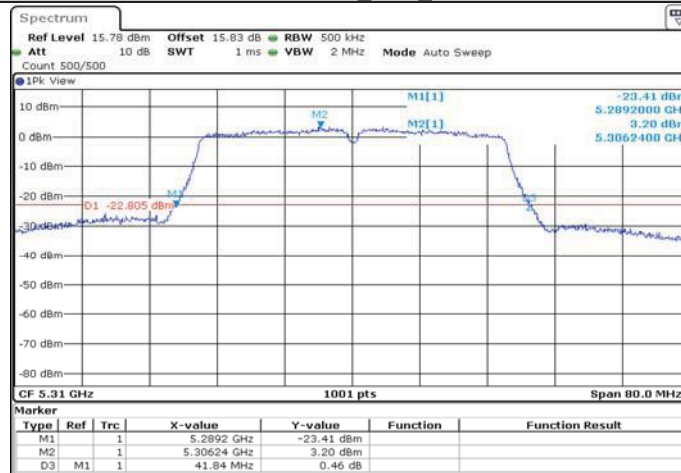
Date: 5.OCT.2020 15:47:57

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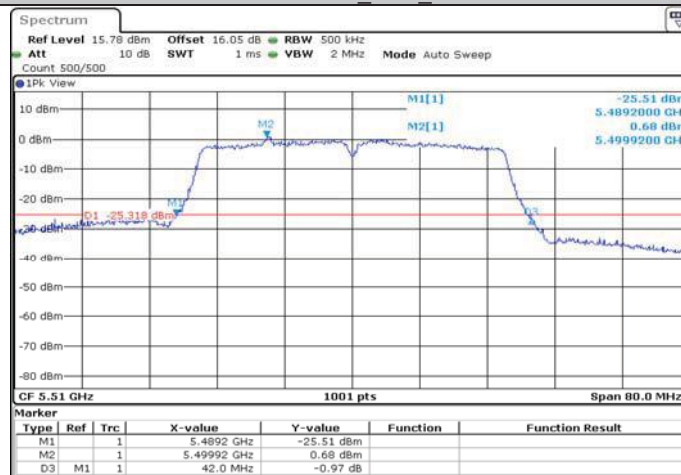
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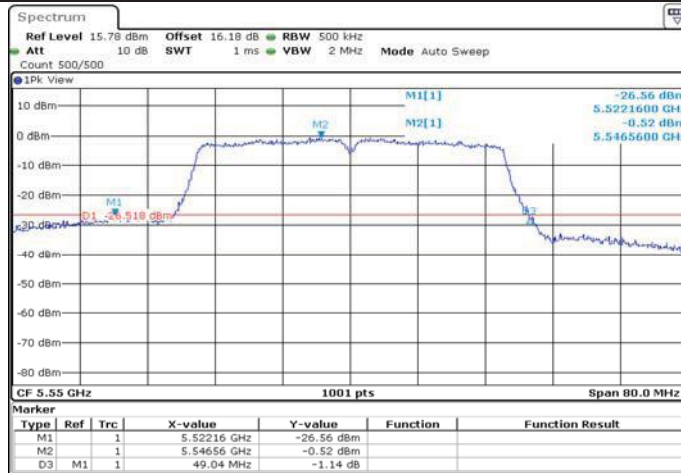
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11AC40SISO_Ant1_5510



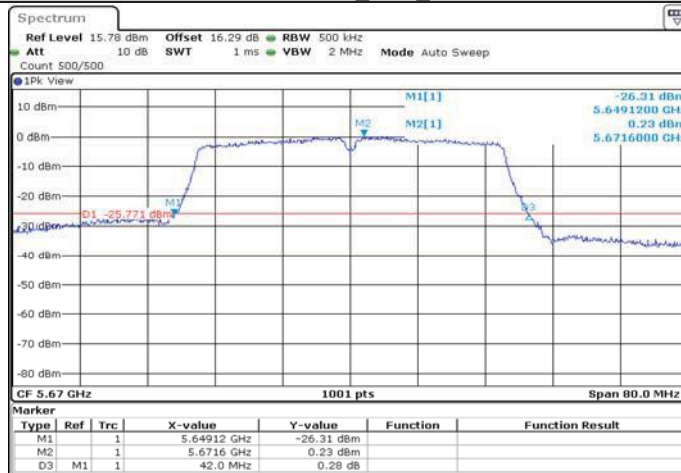
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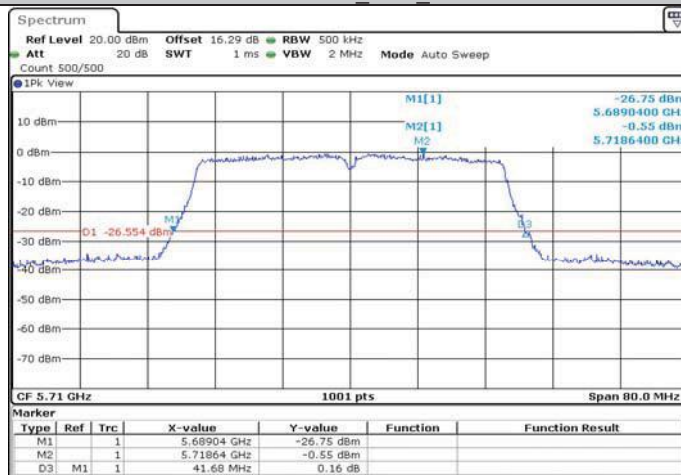
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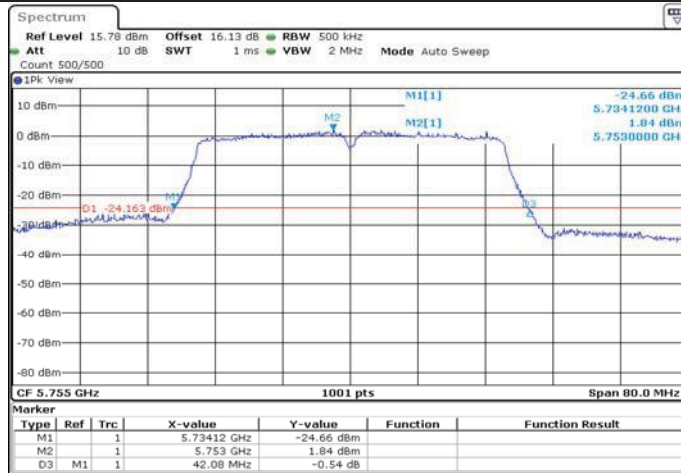
Date: 5.OCT.2020 16:00:40

11AC40SISO_Ant1_5710



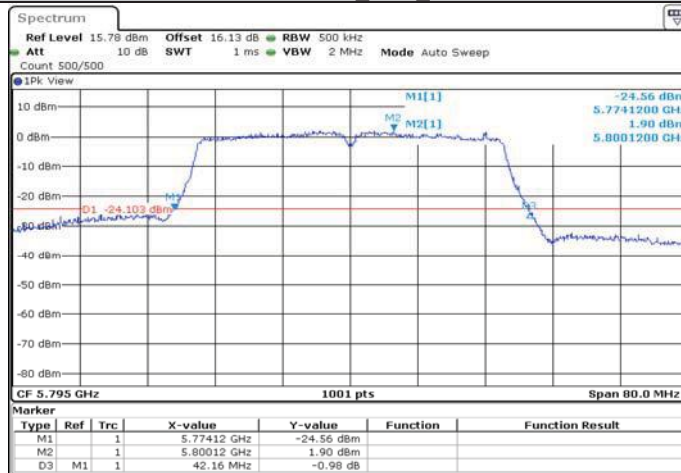
Date: 25.NOV.2020 18:23:51

11AC40SISO_Ant1_5755



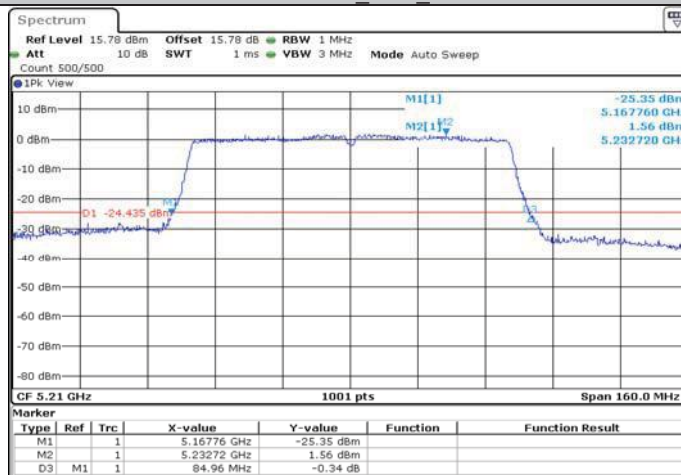
Date: 5.OCT.2020 16:05:32

11AC40SISO_Ant1_5795



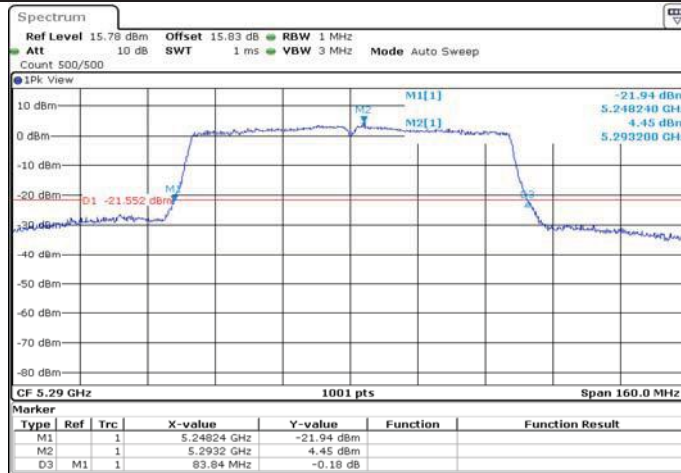
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11AC80SISO_Ant1_5210



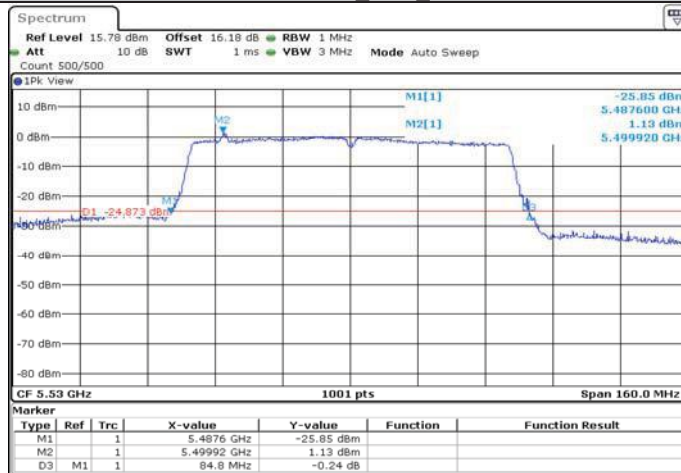
Date: 5.OCT.2020 16:13:06

11AC80SISO_Ant1_5290



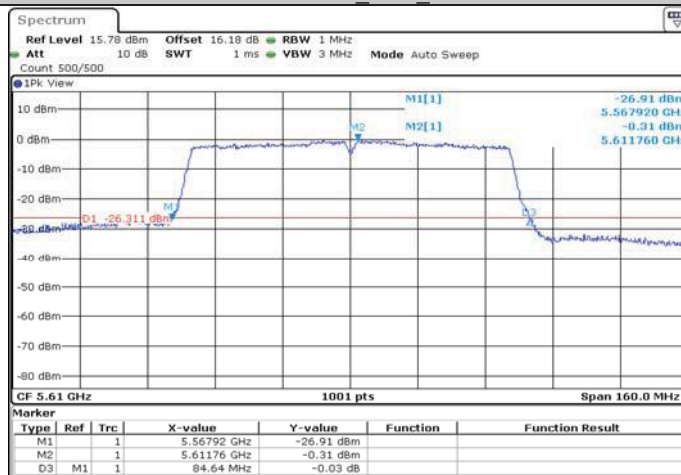
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11AC80SISO_Ant1_5530

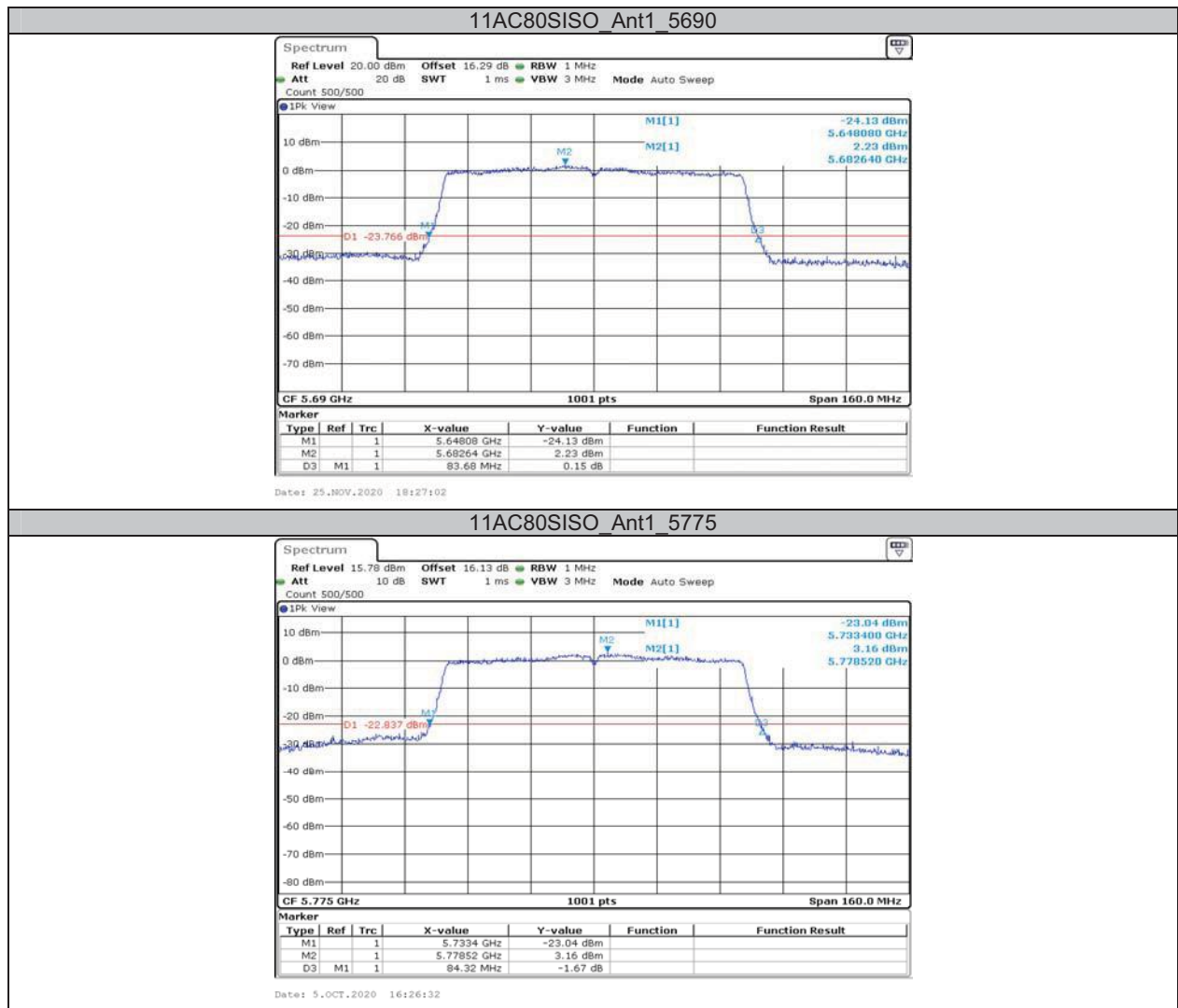


Date: 5.OCT.2020 16:21:46

11AC80SISO_Ant1_5610



Date: 5.OCT.2020 16:24:17

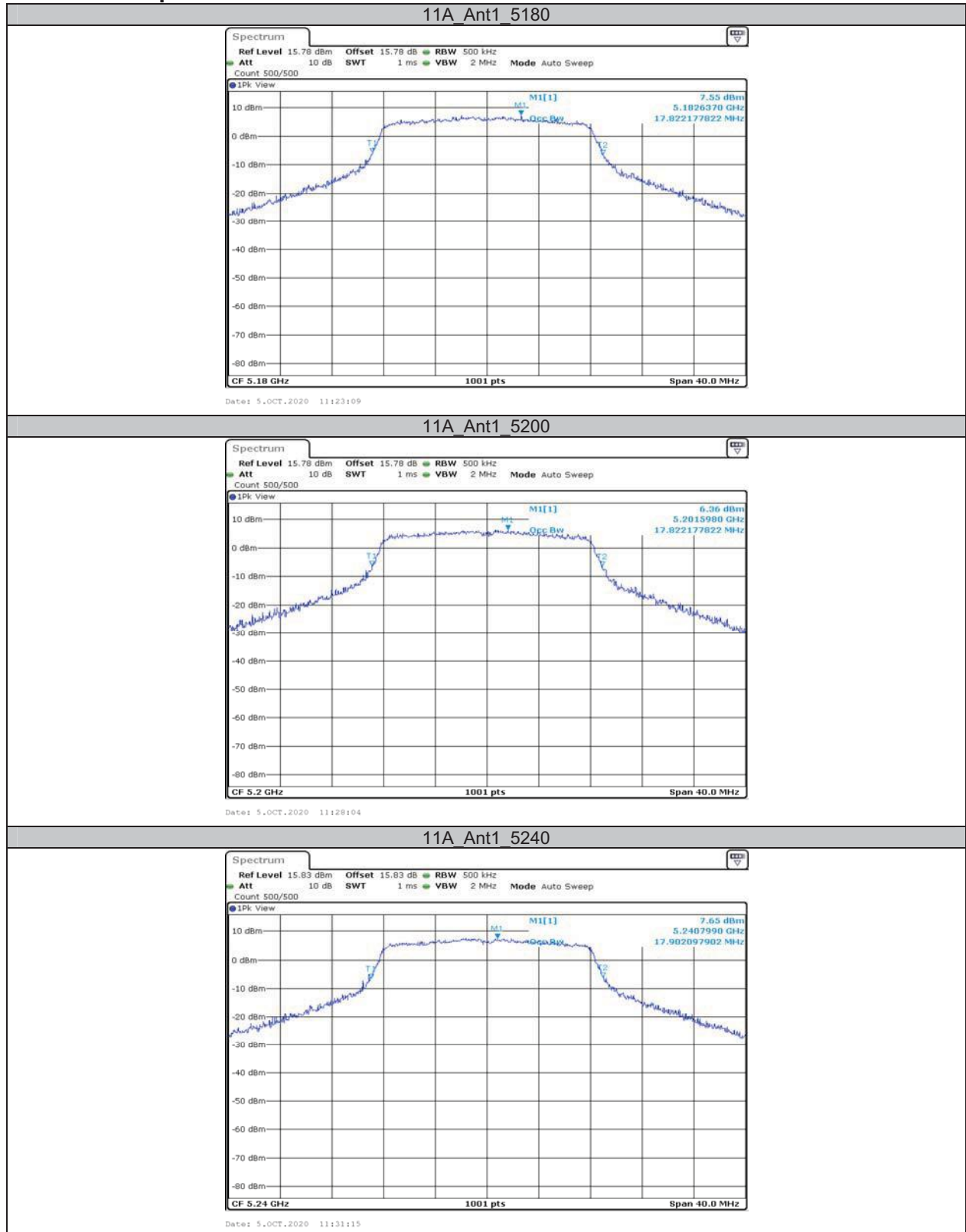


Appendix A2: Occupied channel bandwidth Test Result

TestMode	Antenna	Channel	OCB [MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	17.822	---	PASS
		5200	17.822	---	PASS
		5240	17.902	---	PASS
		5260	17.942	---	PASS
		5280	17.822	---	PASS
		5320	17.742	---	PASS
		5500	18.102	---	PASS
		5580	17.902	---	PASS
		5700	17.862	---	PASS
		5720	17.463	---	PASS
		5720_UNII-2C	13.711	---	PASS
		5720_UNII-3	3.751	---	PASS
		5745	17.822	---	PASS
		5785	18.222	---	PASS
		5825	17.982	---	PASS
11N20SISO	Ant1	5180	18.422	---	PASS
		5200	18.541	---	PASS
		5240	18.462	---	PASS
		5260	18.581	---	PASS
		5280	18.462	---	PASS
		5320	18.501	---	PASS
		5500	18.581	---	PASS
		5580	18.581	---	PASS
		5700	18.541	---	PASS
		5720	18.581	---	PASS
		5720_UNII-2C	14.231	---	PASS
		5720_UNII-3	4.351	---	PASS
		5745	18.541	---	PASS
		5785	18.462	---	PASS
		5825	18.462	---	PASS
11N40SISO	Ant1	5190	36.683	---	PASS
		5230	36.603	---	PASS
		5270	36.763	---	PASS
		5310	36.763	---	PASS
		5510	36.683	---	PASS
		5550	36.683	---	PASS
		5670	36.763	---	PASS
		5720	36.683	---	PASS
		5710_UNII-2C	33.382	---	PASS
		5710_UNII-3	3.302	---	PASS
		5755	36.843	---	PASS
11AC20SISO	Ant1	5180	18.462	---	PASS
		5200	18.541	---	PASS
		5240	18.501	---	PASS
		5260	18.501	---	PASS
		5280	18.501	---	PASS
		5320	18.541	---	PASS
		5500	18.541	---	PASS
		5580	18.581	---	PASS
		5700	18.541	---	PASS
		5720	18.462	---	PASS
		5720_UNII-2C	14.191	---	PASS
		5720_UNII-3	4.271	---	PASS
		5745	18.501	---	PASS

		5785	18.462	---	PASS
		5825	18.462	---	PASS
11AC40SISO	Ant1	5190	36.603	---	PASS
		5230	36.603	---	PASS
		5270	36.683	---	PASS
		5310	36.763	---	PASS
		5510	36.683	---	PASS
		5550	36.683	---	PASS
		5670	36.683	---	PASS
		5720	36.763	---	PASS
		5710_UNII-2C	33.382	---	PASS
		5710_UNII-3	3.382	---	PASS
		5755	36.683	---	PASS
		5795	36.763	---	PASS
11AC80SISO	Ant1	5210	76.084	---	PASS
		5290	76.084	---	PASS
		5530	76.244	---	PASS
		5610	76.244	---	PASS
		5690	76.084	---	PASS
		5690_UNII-2C	73.042	---	PASS
		5690_UNII-3	3.042	---	PASS
		5775	76.084	---	PASS

Test Graphs



11A_Ant1_5260



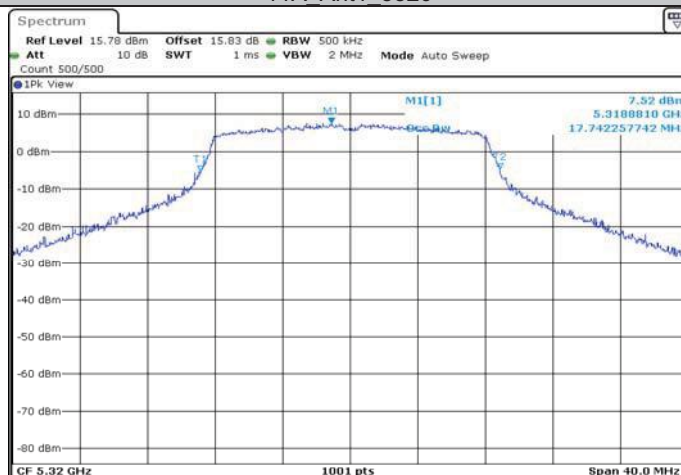
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11A_Ant1_5280



Date: 5.OCT.2020 11:38:18

11A_Ant1_5320



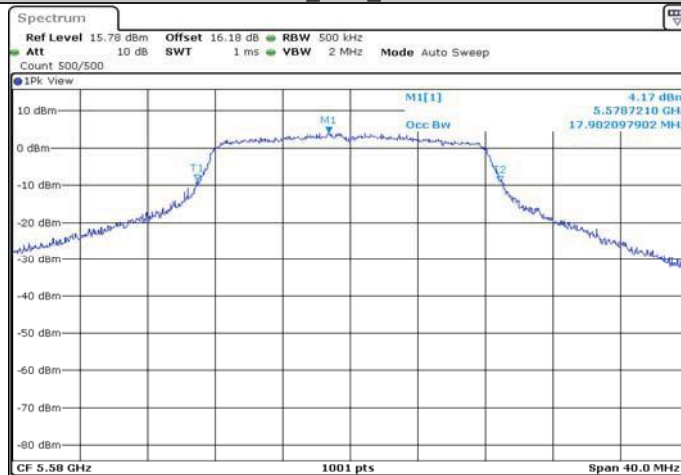
Date: 5.OCT.2020 11:40:55

11A_Ant1_5500



Date: 5.OCT.2020 11:44:05

11A_Ant1_5580

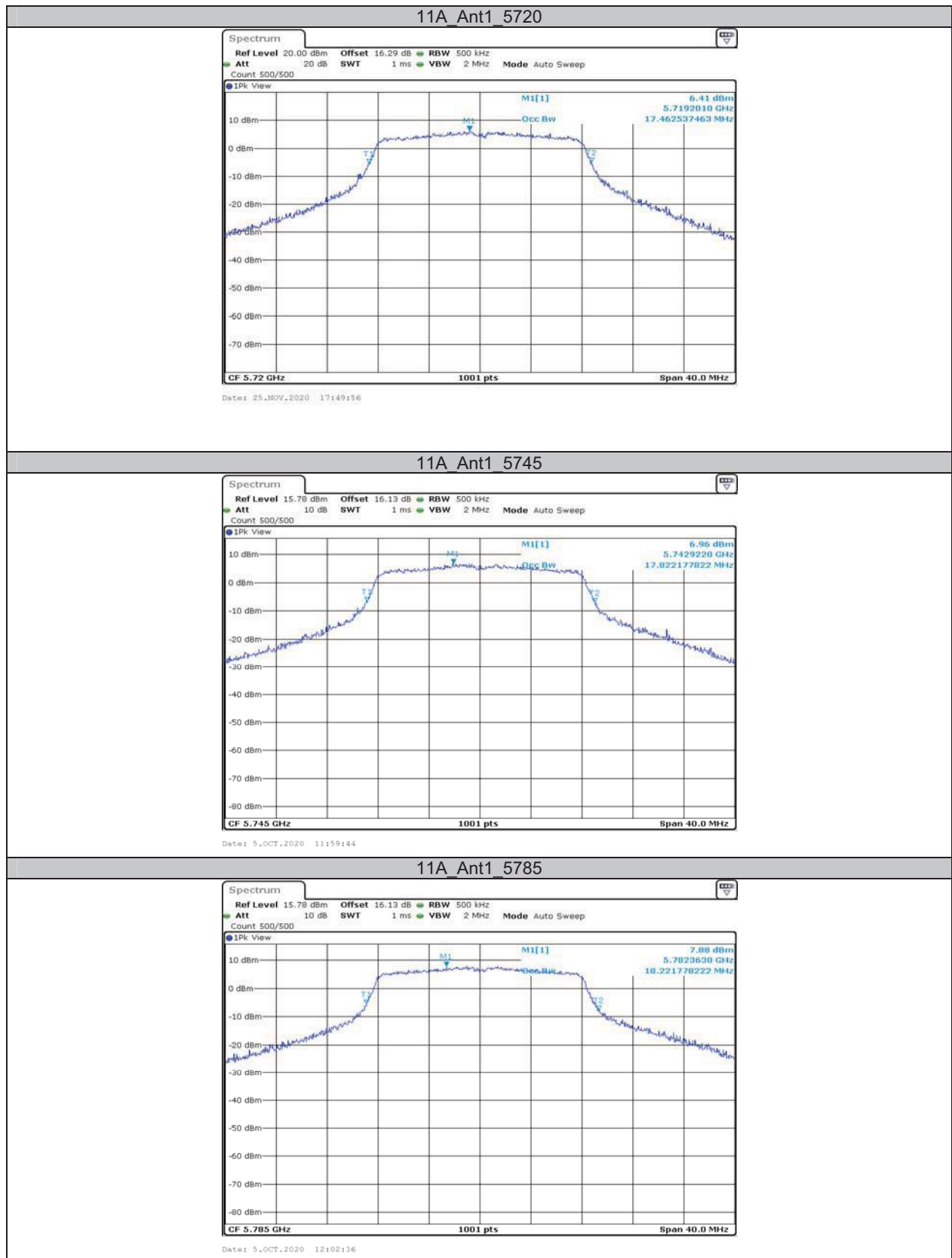


Date: 5.OCT.2020 11:48:14

11A_Ant1_5700



Date: 5.OCT.2020 11:55:46



11A_Ant1_5825



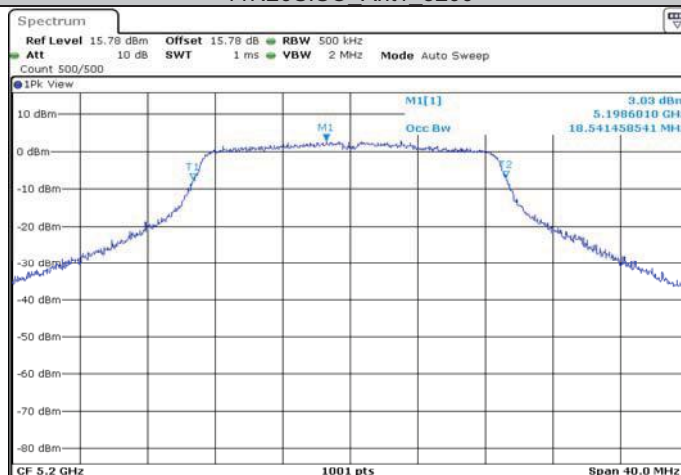
Date: 5.OCT.2020 12:06:34

11N20SISO_Ant1_5180

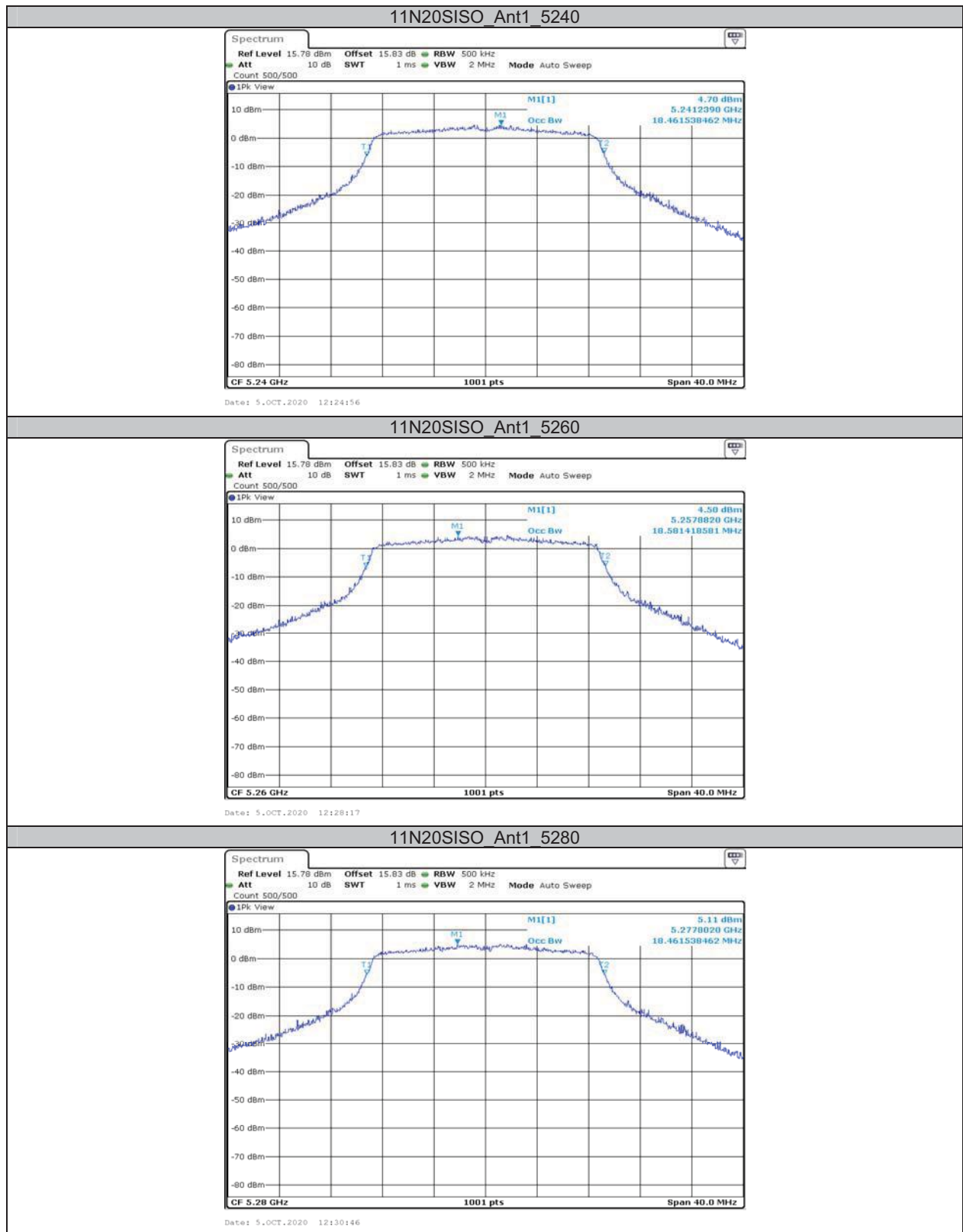


Date: 5.OCT.2020 12:10:06

11N20SISO_Ant1_5200



Date: 5.OCT.2020 12:21:21



11N20SISO_Ant1_5320



11N20SISO_Ant1_5500



11N20SISO_Ant1_5580



11N20SISO_Ant1_5700



Date: 5.OCT.2020 12:43:38

11N20SISO_Ant1_5720



Date: 25.NOV.2020 17:53:40

11N20SISO_Ant1_5745



Date: 5.OCT.2020 12:46:51

11N20SISO_Ant1_5785



Date: 5.OCT.2020 12:50:34

11N20SISO_Ant1_5825



Date: 5.OCT.2020 12:55:39

11N40SISO_Ant1_5190



Date: 5.OCT.2020 13:10:29

11N40SISO_Ant1_5230

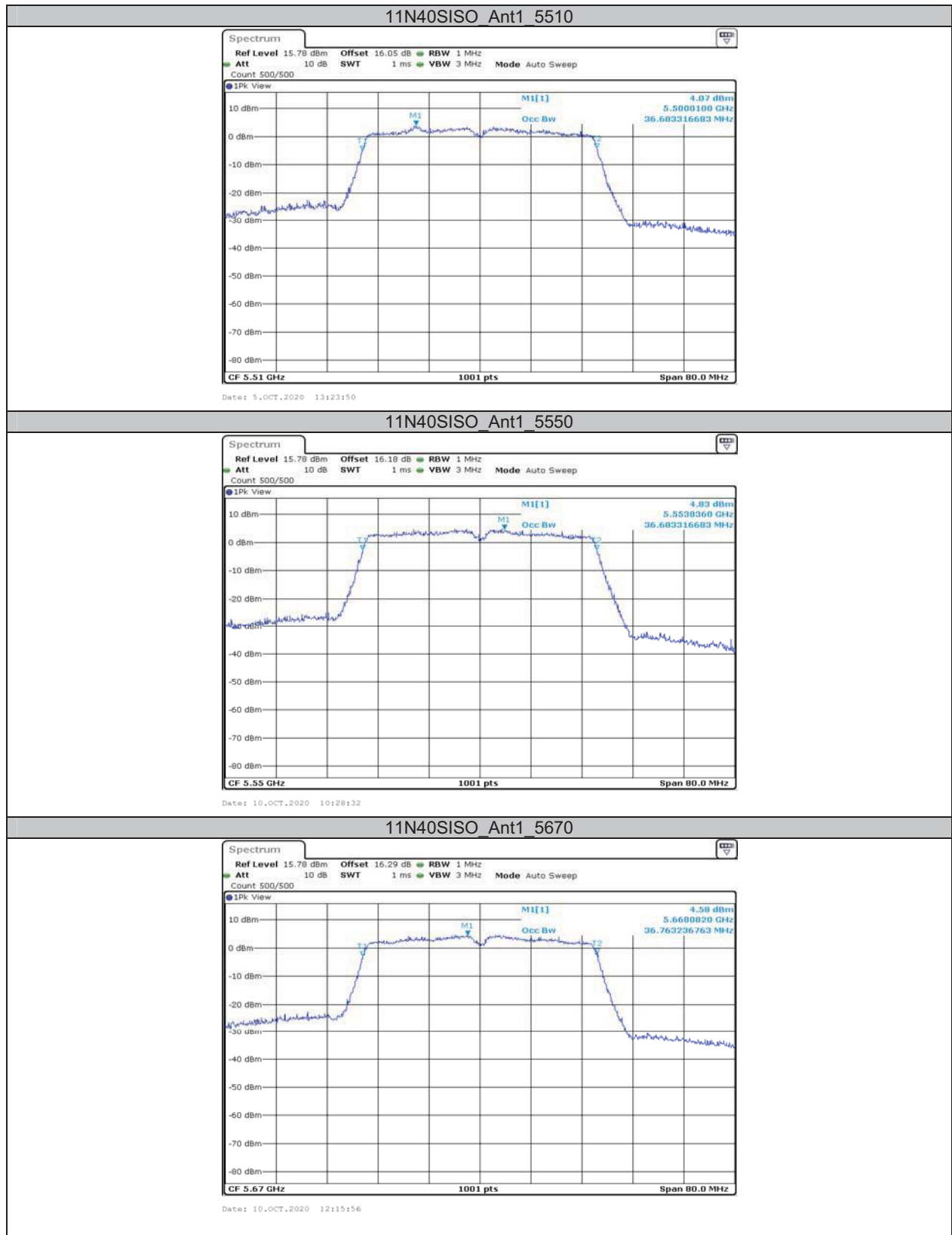


11N40SISO_Ant1_5270



11N40SISO_Ant1_5310





11N40SISO_Ant1_5710



11N40SISO_Ant1_5755



11N40SISO_Ant1_5795



11AC20SISO_Ant1_5180



11AC20SISO_Ant1_5200



11AC20SISO_Ant1_5240



11AC20SISO_Ant1_5260



Date: 5.OCT.2020 15:18:05

11AC20SISO_Ant1_5280



Date: 5.OCT.2020 15:21:20

11AC20SISO_Ant1_5320



Date: 5.OCT.2020 15:26:17

11AC20SISO_Ant1_5500



11AC20SISO_Ant1_5580



11AC20SISO_Ant1_5700



11AC20SISO_Ant1_5720



Date: 25,NOV,2020 18:18:40

11AC20SISO_Ant1_5745



Date: 5.OCT,2020 15:36:15

11AC20SISO_Ant1_5785



Date: 5.OCT,2020 15:39:07

11AC20SISO_Ant1_5825



11AC40SISO_Ant1_5190



11AC40SISO_Ant1_5230



11AC40SISO_Ant1_5270



11AC40SISO_Ant1_5310



11AC40SISO_Ant1_5510



11AC40SISO_Ant1_5550



11AC40SISO_Ant1_5710



11AC40SISO_Ant1_5670



11AC40SISO_Ant1_5755



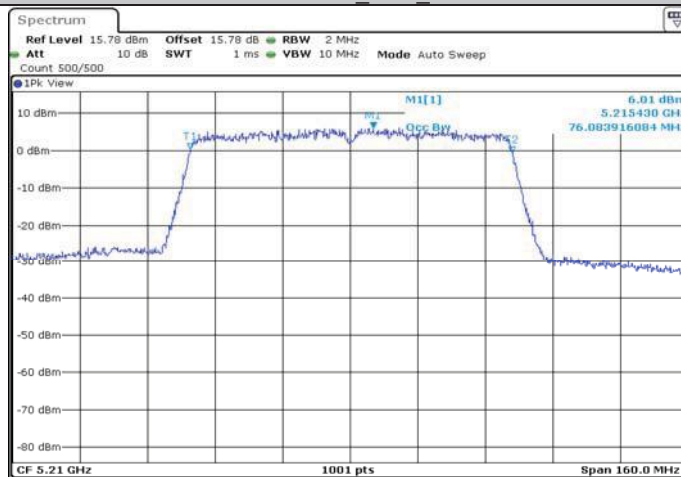
Date: 5.OCT.2020 16:06:03

11AC40SISO_Ant1_5795



Date: 5.OCT.2020 16:08:34

11AC80SISO_Ant1_5210



Date: 5.OCT.2020 16:13:17

11AC80SISO_Ant1_5290



Date: 5.OCT.2020 16:19:47

11AC80SISO_Ant1_5530

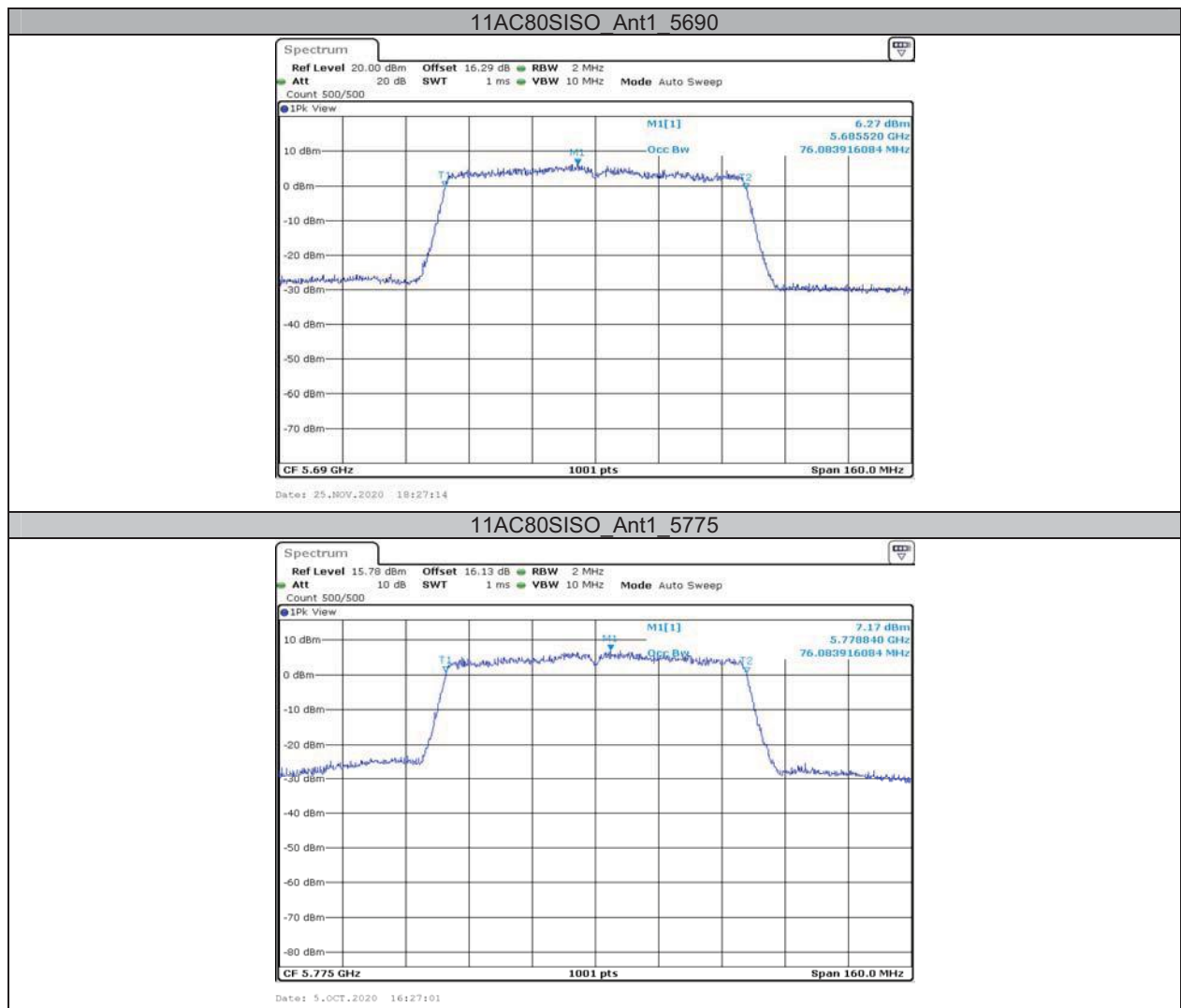


Date: 5.OCT.2020 16:21:57

11AC80SISO_Ant1_5610



Date: 5.OCT.2020 16:24:29

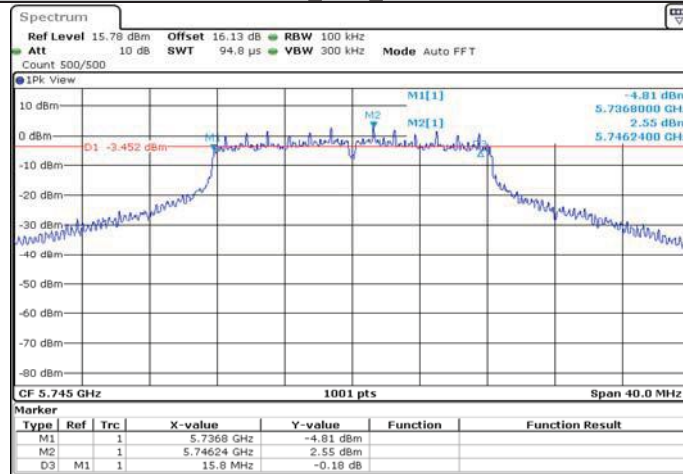


**Appendix A3: Min emission bandwidth
Test Result**

TestMode	Antenna	Channel	6db EBW [MHz]	Limit[MHz]	Verdict
11A	Ant1	5745	15.800	0.5	PASS
		5785	15.240	0.5	PASS
		5825	15.440	0.5	PASS
11N20SISO	Ant1	5745	16.600	0.5	PASS
		5785	15.440	0.5	PASS
		5825	15.240	0.5	PASS
11N40SISO	Ant1	5755	36.000	0.5	PASS
		5795	36.000	0.5	PASS
11AC20SISO	Ant1	5745	15.800	0.5	PASS
		5785	15.240	0.5	PASS
		5825	15.800	0.5	PASS
11AC40SISO	Ant1	5755	35.920	0.5	PASS
		5795	36.000	0.5	PASS
11AC80SISO	Ant1	5775	75.520	0.5	PASS

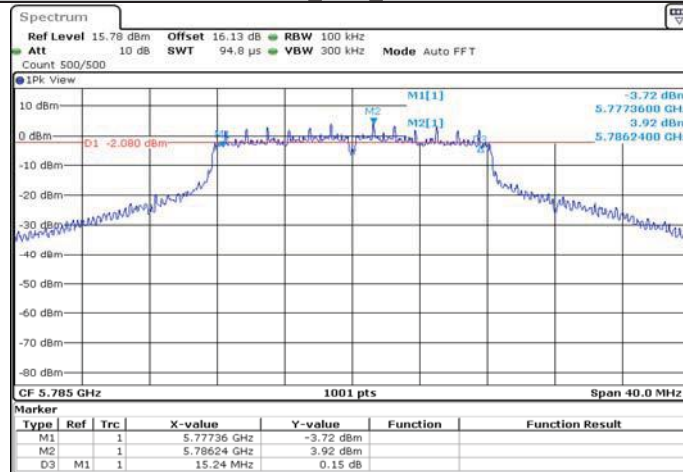
Test Graphs

11A_Ant1_5745



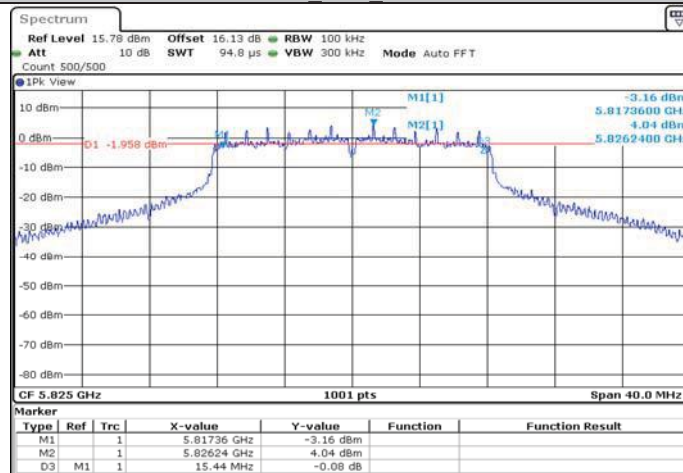
Date: 5.OCT.2020 11:59:33

11A_Ant1_5785



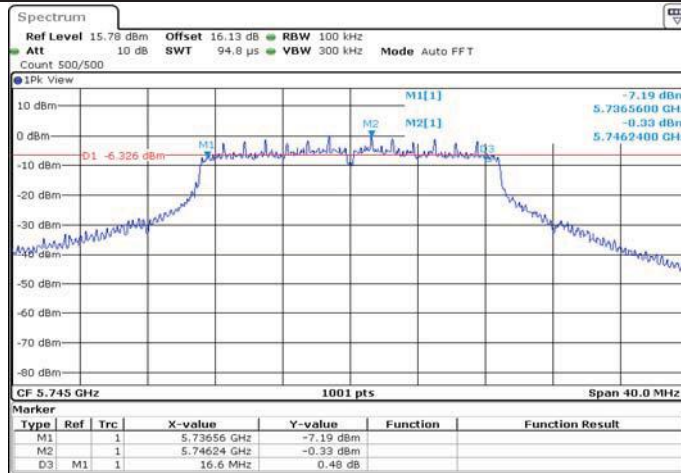
Date: 5.OCT.2020 12:02:25

11A_Ant1_5825



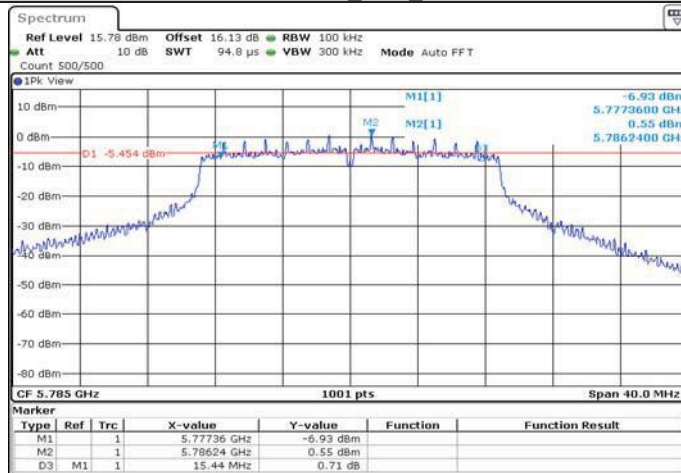
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11N20SISO_Ant1_5745



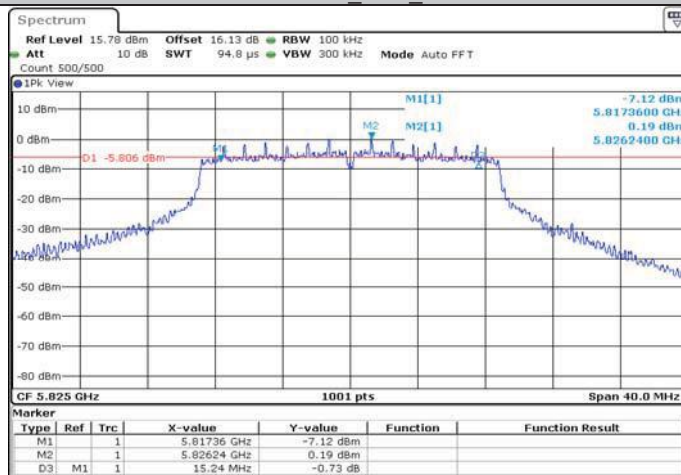
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11N20SISO_Ant1_5785



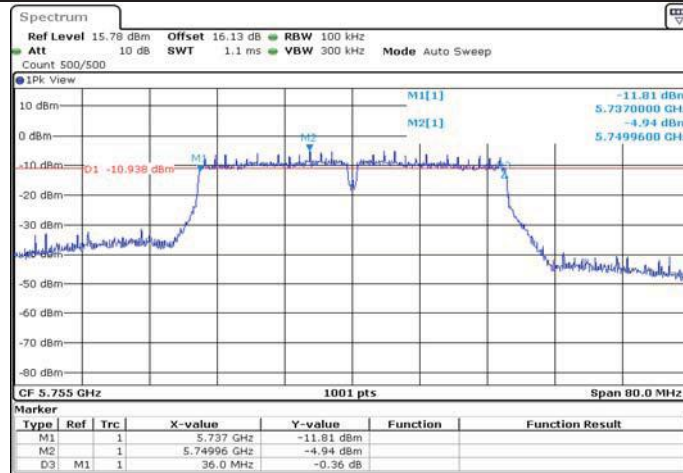
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11N20SISO_Ant1_5825



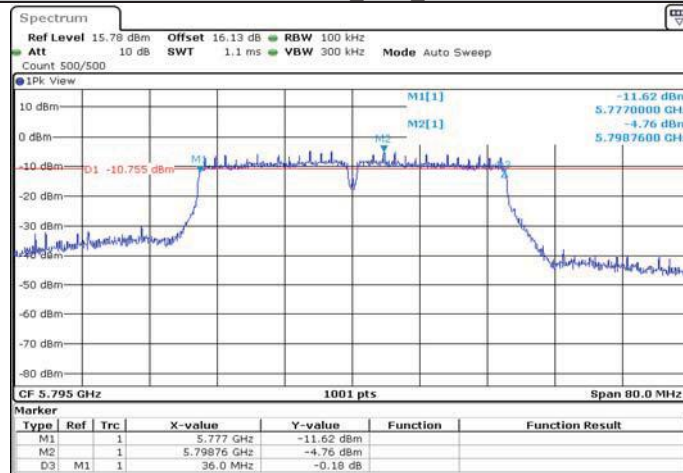
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11N40SISO_Ant1_5755



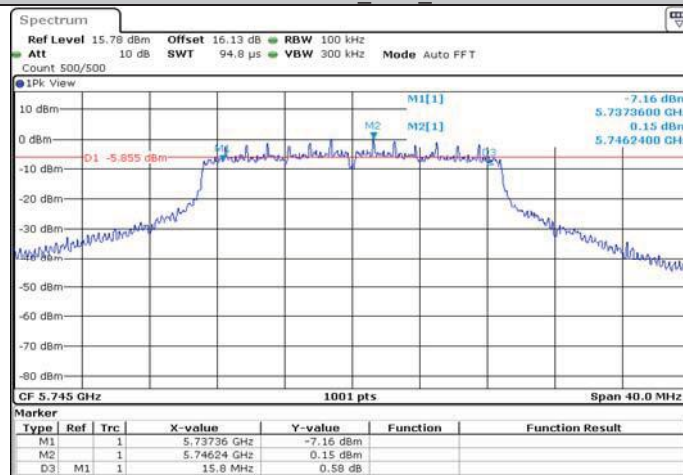
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11N40SISO_Ant1_5795



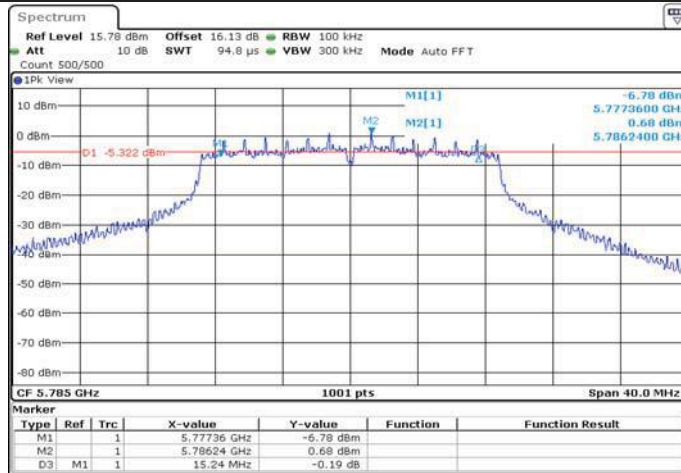
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11AC20SISO_Ant1_5745



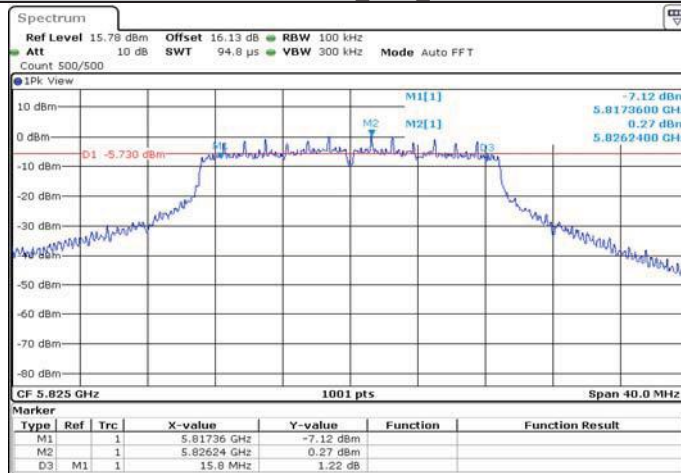
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11AC20SISO_Ant1_5785



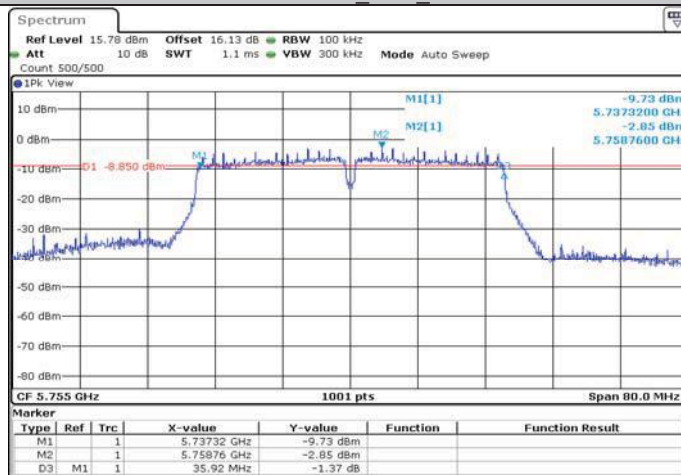
Date: 5.OCT.2020 15:38:56

11AC20SISO_Ant1_5825



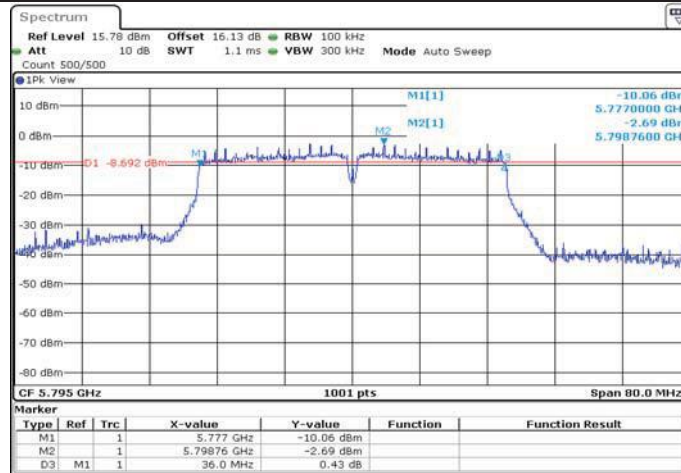
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11AC40SISO_Ant1_5755



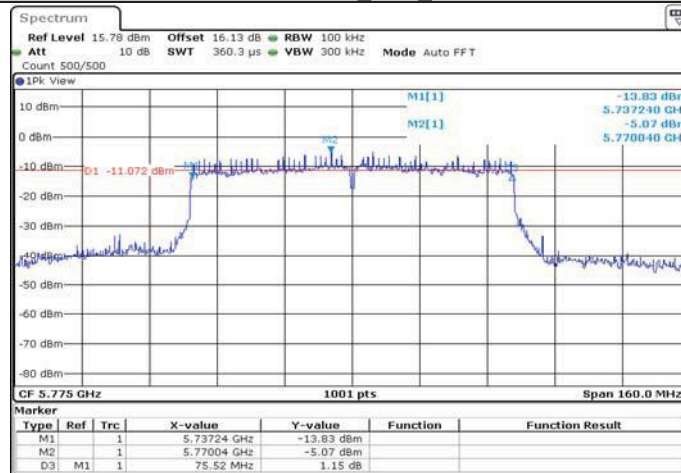
Date: 5.OCT.2020 16:05:52

11AC40SISO Ant1 5795



Date: 5.OCT.2020 16:08:23

11AC80SISO Ant1 5775



Date: 5.OCT.2020 16:26:50

Appendix B: Maximum conducted output power Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
11A	Ant1	5180	14.25	<=23.98	PASS
		5200	14.20	<=23.98	PASS
		5240	14.80	<=23.98	PASS
		5260	14.87	<=23.98	PASS
		5280	14.88	<=23.98	PASS
		5320	14.70	<=23.98	PASS
		5500	14.40	<=23.98	PASS
		5580	14.92	<=23.98	PASS
		5700	14.64	<=23.98	PASS
		5720 UNII-2C	13.91	<=23.98	PASS
		5720 UNII-3	7.03	<=30	PASS
		5745	14.37	<=30	PASS
		5785	14.68	<=30	PASS
		5825	14.09	<=30	PASS
11N20SISO	Ant1	5180	13.18	<=23.98	PASS
		5200	13.19	<=23.98	PASS
		5240	13.95	<=23.98	PASS
		5260	13.02	<=23.98	PASS
		5280	13.42	<=23.98	PASS
		5320	13.74	<=23.98	PASS
		5500	13.22	<=23.98	PASS
		5580	13.88	<=23.98	PASS
		5700	13.42	<=23.98	PASS
		5720 UNII-2C	13.64	<=23.98	PASS
		5720 UNII-3	-2.31	<=30	PASS
		5745	13.01	<=30	PASS
		5785	13.50	<=30	PASS
		5825	13.79	<=30	PASS
11N40SISO	Ant1	5190	12.97	<=23.98	PASS
		5230	12.33	<=23.98	PASS
		5270	12.69	<=23.98	PASS
		5310	12.11	<=23.98	PASS
		5510	12.64	<=23.98	PASS
		5550	12.08	<=23.98	PASS
		5670	12.56	<=23.98	PASS
		5710 UNII-2C	12.13	<=23.98	PASS
		5710 UNII-3	2.36	<=30	PASS
		5755	12.49	<=30	PASS
		5795	12.09	<=30	PASS
11AC20SISO	Ant1	5180	13.22	<=23.98	PASS
		5200	13.31	<=23.98	PASS
		5240	13.81	<=23.98	PASS
		5260	13.94	<=23.98	PASS
		5280	13.31	<=23.98	PASS
		5320	13.68	<=23.98	PASS
		5500	13.14	<=23.98	PASS
		5580	13.96	<=23.98	PASS
		5700	13.49	<=23.98	PASS
		5720 UNII-2C	13.64	<=22.99	PASS
		5720 UNII-3	7.32	<=30	PASS
		5745	13.10	<=30	PASS
		5785	13.53	<=30	PASS
		5825	13.88	<=30	PASS
11AC40SISO	Ant1	5190	12.87	<=23.98	PASS
		5230	12.33	<=23.98	PASS

		5270	12.70	<=23.98	PASS
		5310	12.15	<=23.98	PASS
		5510	12.62	<=23.98	PASS
		5550	12.00	<=23.98	PASS
		5670	12.54	<=23.98	PASS
		5710 UNII-2C	11.21	<=23.98	PASS
		5710 UNII-3	1.09	<=30	PASS
		5755	12.62	<=30	PASS
11AC80SISO	Ant1	5795	12.84	<=30	PASS
		5210	11.25	<=23.98	PASS
		5290	11.88	<=23.98	PASS
		5530	11.29	<=23.98	PASS
		5610	11.64	<=23.98	PASS
		5690 UNII-2C	10.98	<=23.98	PASS
		5690 UNII-3	-2.43	<=30	PASS
		5775	11.11	<=30	PASS

Appendix C: Maximum power spectral density Test Result

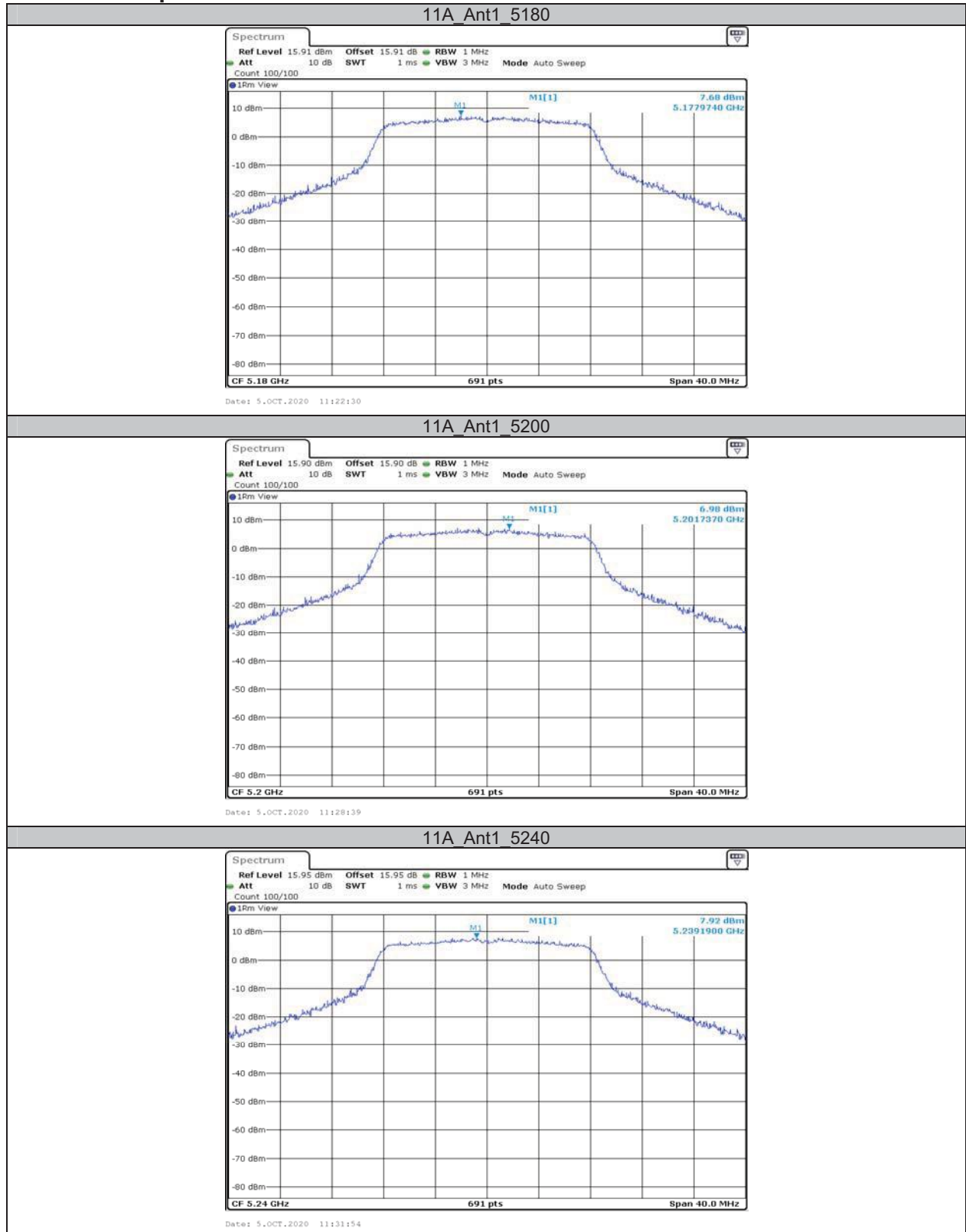
TestMode	Antenna	Channel	Result [dBm/MHz]	Limit[dBm/MHz]	Verdict
11A	Ant1	5180	7.68	<=11	PASS
		5200	6.98	<=11	PASS
		5240	7.92	<=11	PASS
		5260	8.07	<=11	PASS
		5280	8.02	<=11	PASS
		5320	7.68	<=11	PASS
		5500	6.66	<=11	PASS
		5580	6.76	<=11	PASS
		5700	4.27	<=11	PASS
		5720_UNII-2C	6.6	<=11	PASS
		5720_UNII-3	3.4	<=30	PASS
		5745	2.45	<=30	PASS
		5785	4.81	<=30	PASS
		5825	4.4	<=30	PASS
11N20SISO	Ant1	5180	5.55	<=11	PASS
		5200	5.4	<=11	PASS
		5240	4.54	<=11	PASS
		5260	4.14	<=11	PASS
		5280	4.83	<=11	PASS
		5320	5.5	<=11	PASS
		5500	4.75	<=11	PASS
		5580	7.66	<=11	PASS
		5700	4.64	<=11	PASS
		5720_UNII-2C	6.85	<=11	PASS
		5720_UNII-3	3.95	<=30	PASS
		5745	3.04	<=30	PASS
		5785	3.38	<=30	PASS
		5825	4.15	<=30	PASS
11N40SISO	Ant1	5190	1.14	<=11	PASS
		5230	0.4	<=11	PASS
		5270	1.09	<=11	PASS
		5310	0.82	<=11	PASS
		5510	1.29	<=11	PASS
		5550	0.15	<=11	PASS
		5670	0.89	<=11	PASS
		5710_UNII-2C	-0.08	<=11	PASS
		5710_UNII-3	-3.55	<=30	PASS
		5755	-0.62	<=30	PASS
11AC20SISO	Ant1	5180	4.42	<=11	PASS
		5200	4.62	<=11	PASS
		5240	5.14	<=11	PASS
		5260	5.35	<=11	PASS
		5280	5.48	<=11	PASS
		5320	4.94	<=11	PASS
		5500	4.87	<=11	PASS
		5580	5.47	<=11	PASS
		5700	5.2	<=11	PASS
		5720_UNII-2C	6.88	<=11	PASS
		5720_UNII-3	4.14	<=30	PASS
		5745	2.7	<=30	PASS
		5785	3.15	<=30	PASS
		5825	3.74	<=30	PASS
11AC40SISO	Ant1	5190	1.05	<=11	PASS

		5230	0.46	<=11	PASS
		5270	1.32	<=11	PASS
		5310	0.9	<=11	PASS
		5510	0.74	<=11	PASS
		5550	0.27	<=11	PASS
		5670	0.94	<=11	PASS
		5710_UNII-2C	0.06	<=11	PASS
		5710_UNII-3	-3.72	<=30	PASS
		5755	-0.63	<=30	PASS
		5795	-0.42	<=30	PASS
11AC80SISO	Ant1	5210	-3.65	<=11	PASS
		5290	-2.43	<=11	PASS
		5530	-3.25	<=11	PASS
		5610	-3.19	<=11	PASS
		5690_UNII-2C	-0.88	<=11	PASS
		5690_UNII-3	-6.2	<=30	PASS
		5775	-5.16	<=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 and RBW Factor is compensated in the graph.

Test Graphs



11A_Ant1_5260



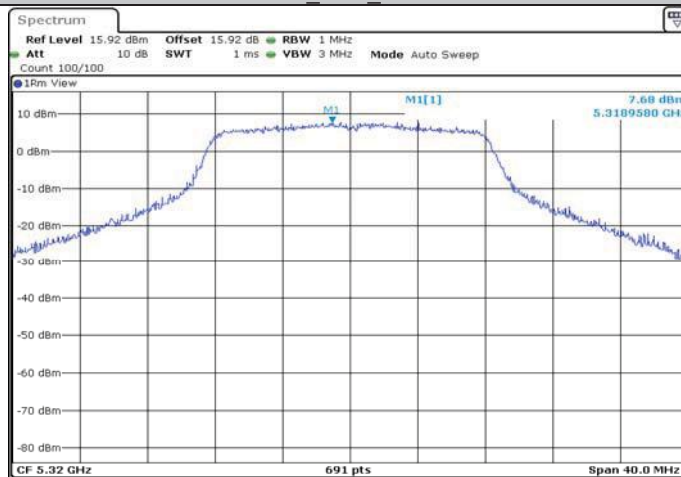
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11A_Ant1_5280



Date: 5.OCT.2020 11:38:51

11A_Ant1_5320



Date: 5.OCT.2020 11:41:28

11A_Ant1_5500



11A_Ant1_5580



11A_Ant1_5700



11A_Ant1_5720_UNII-2C



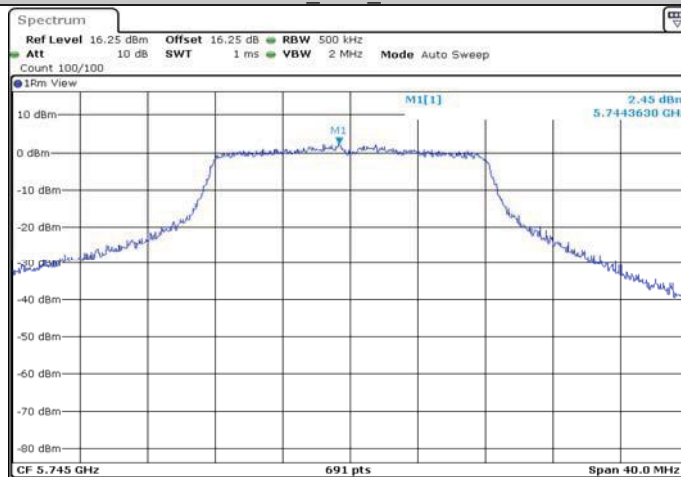
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11A_Ant1_5720_UNII-3



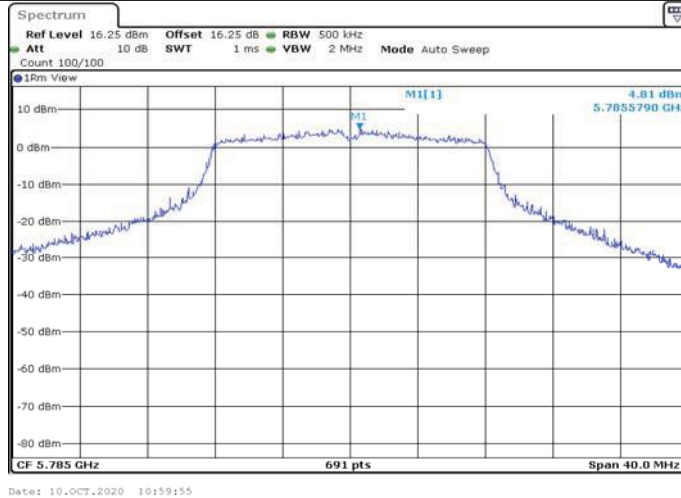
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11A_Ant1_5745



Date: 10, OCT, 2020 10:44:36

11A_Ant1_5785

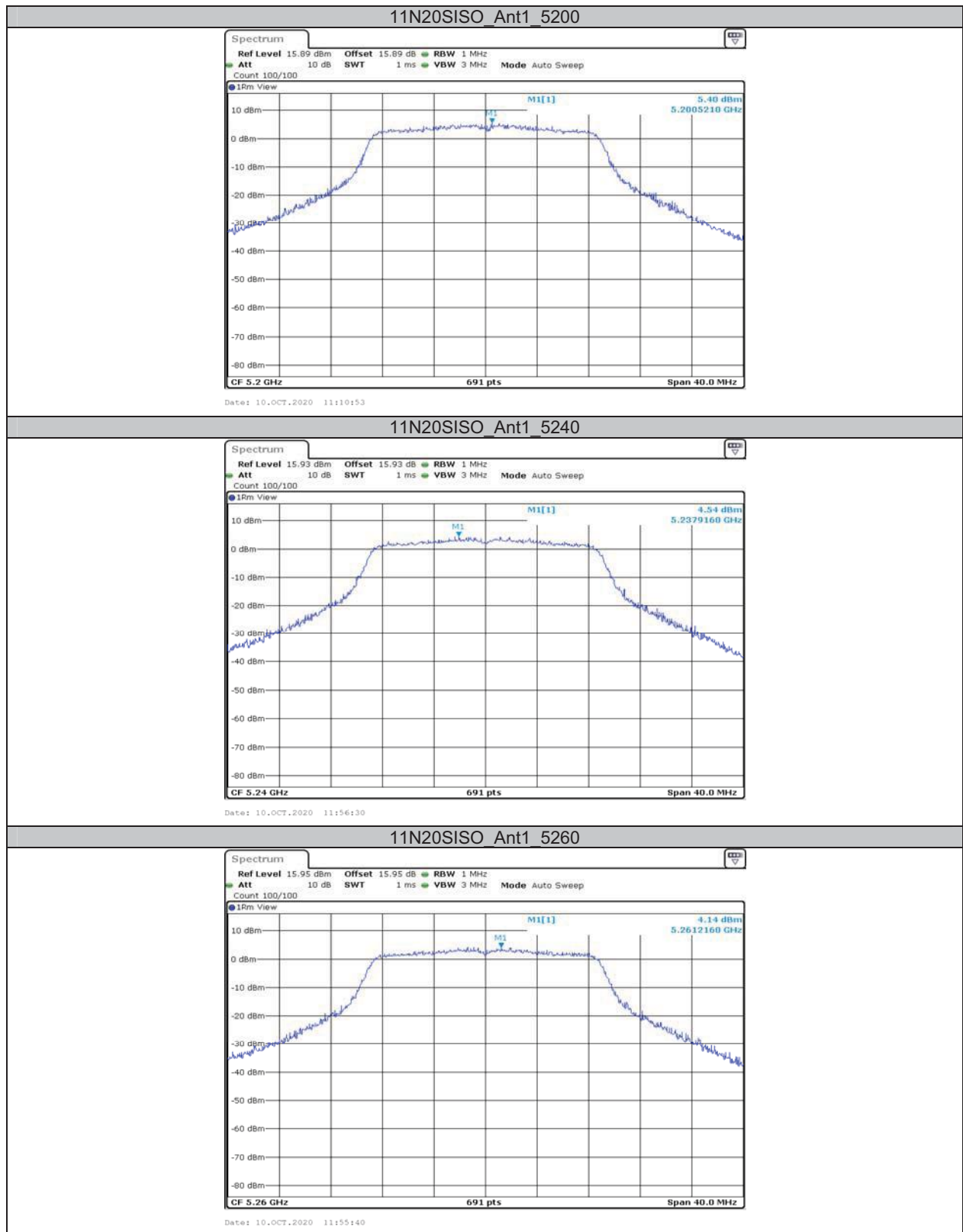


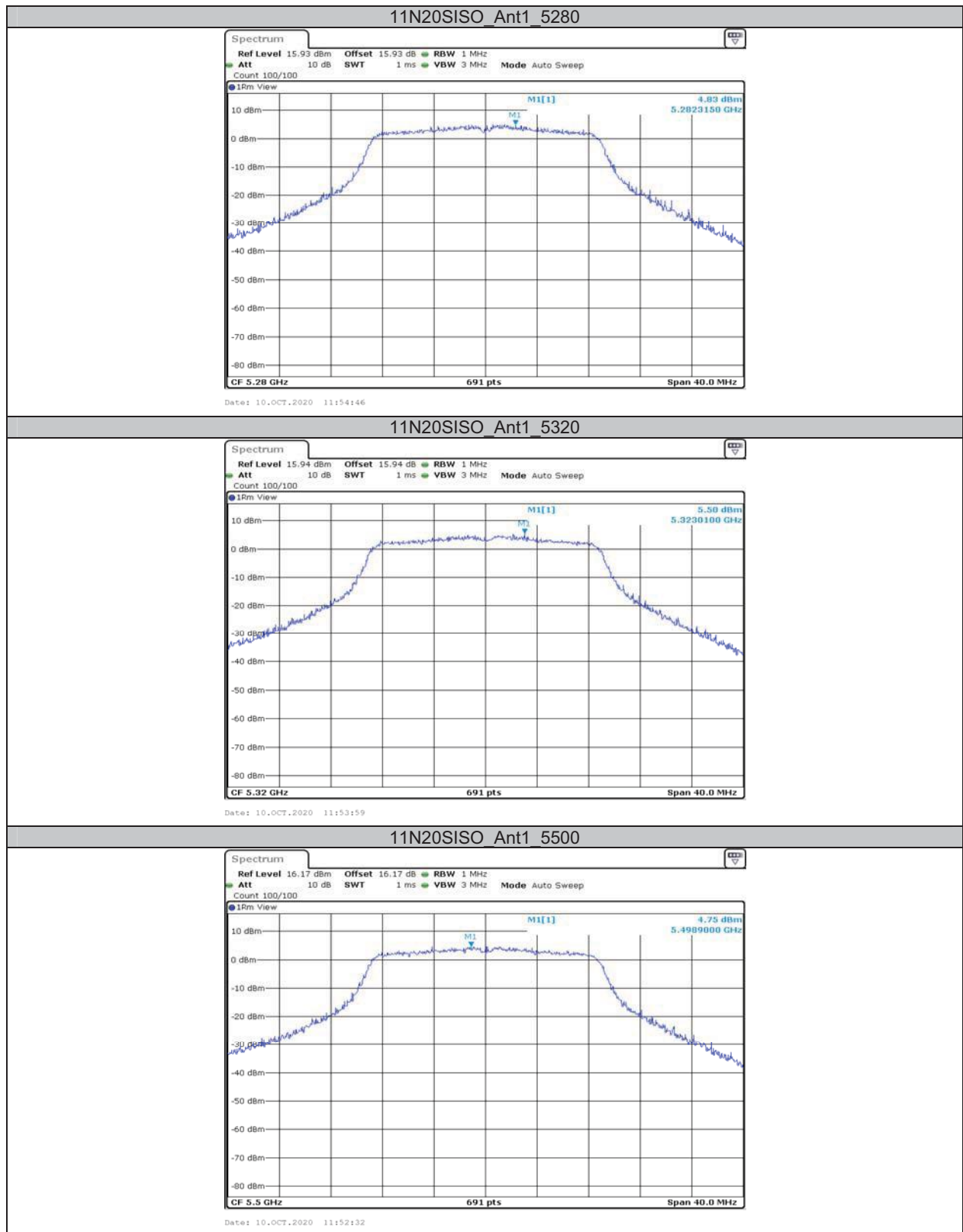
11A_Ant1_5825

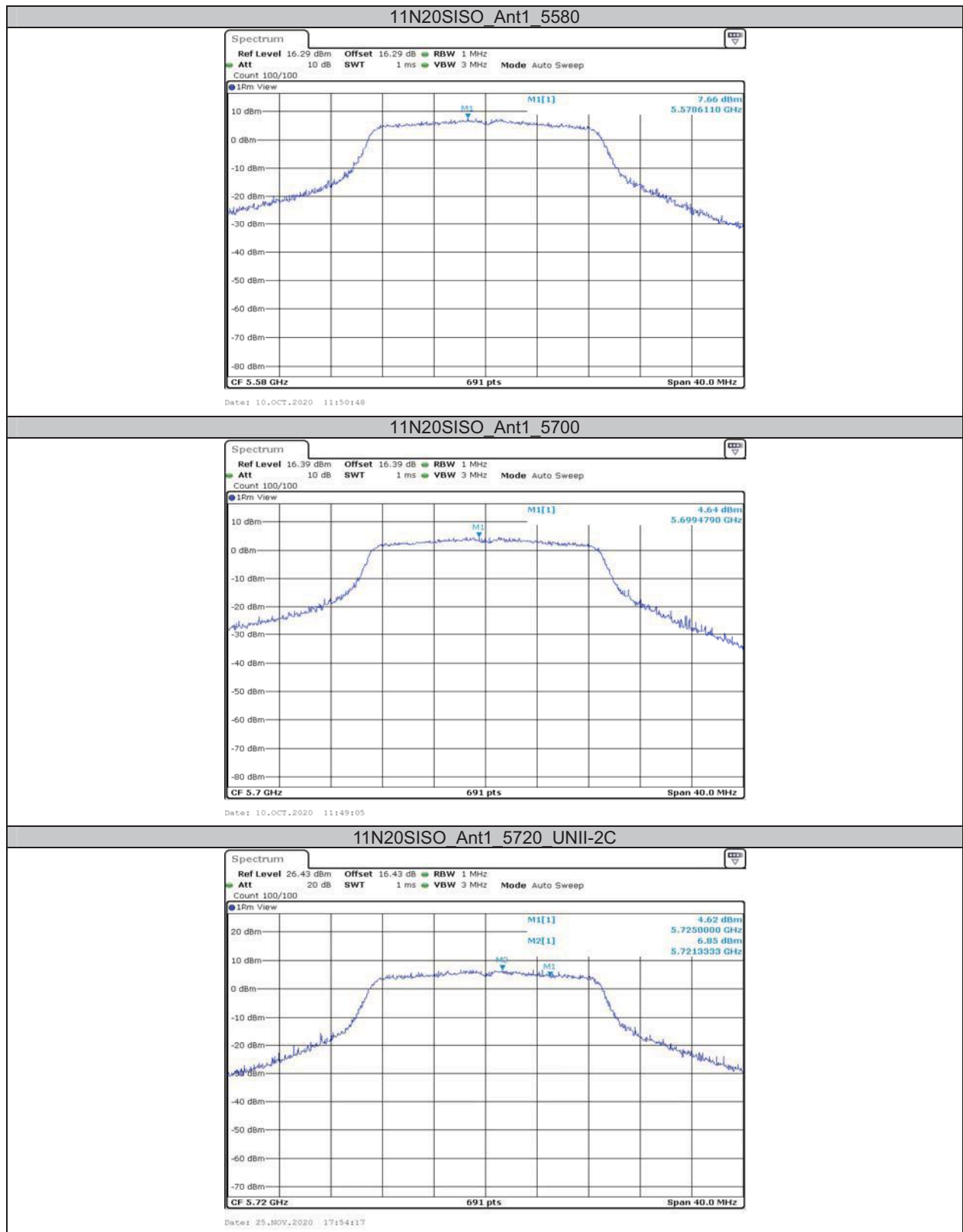


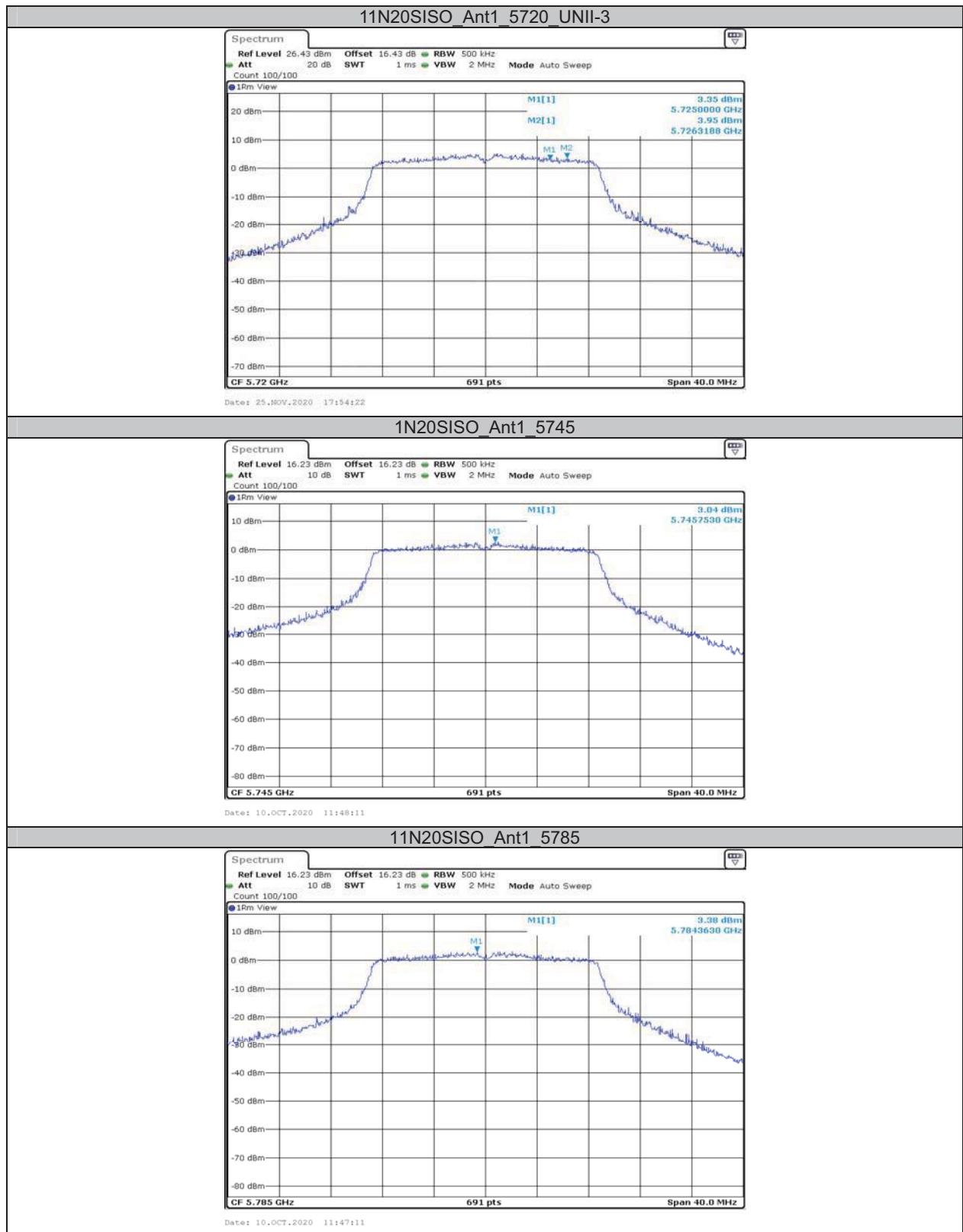
11N20SISO_Ant1_5180











11N20SISO_Ant1_5825

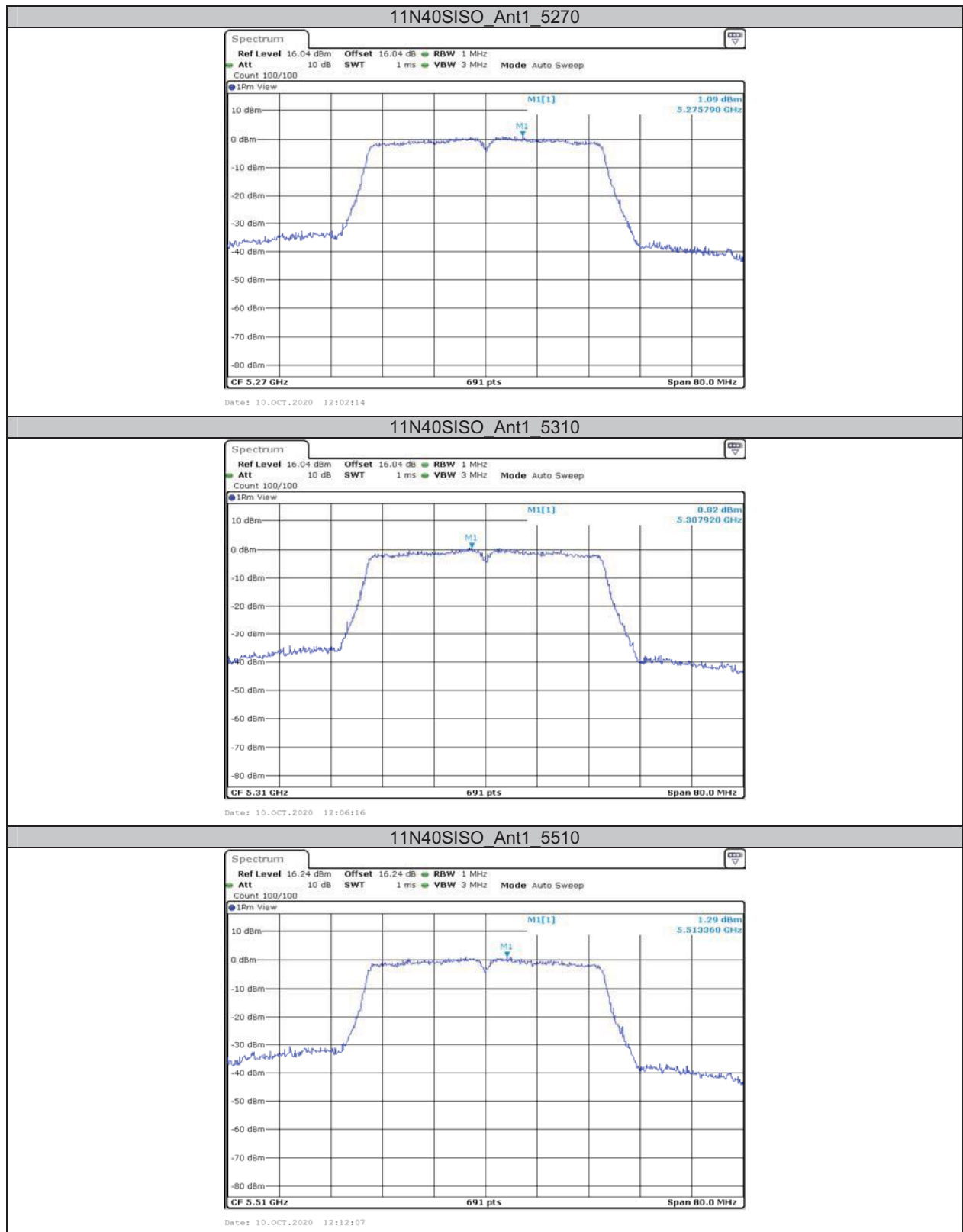


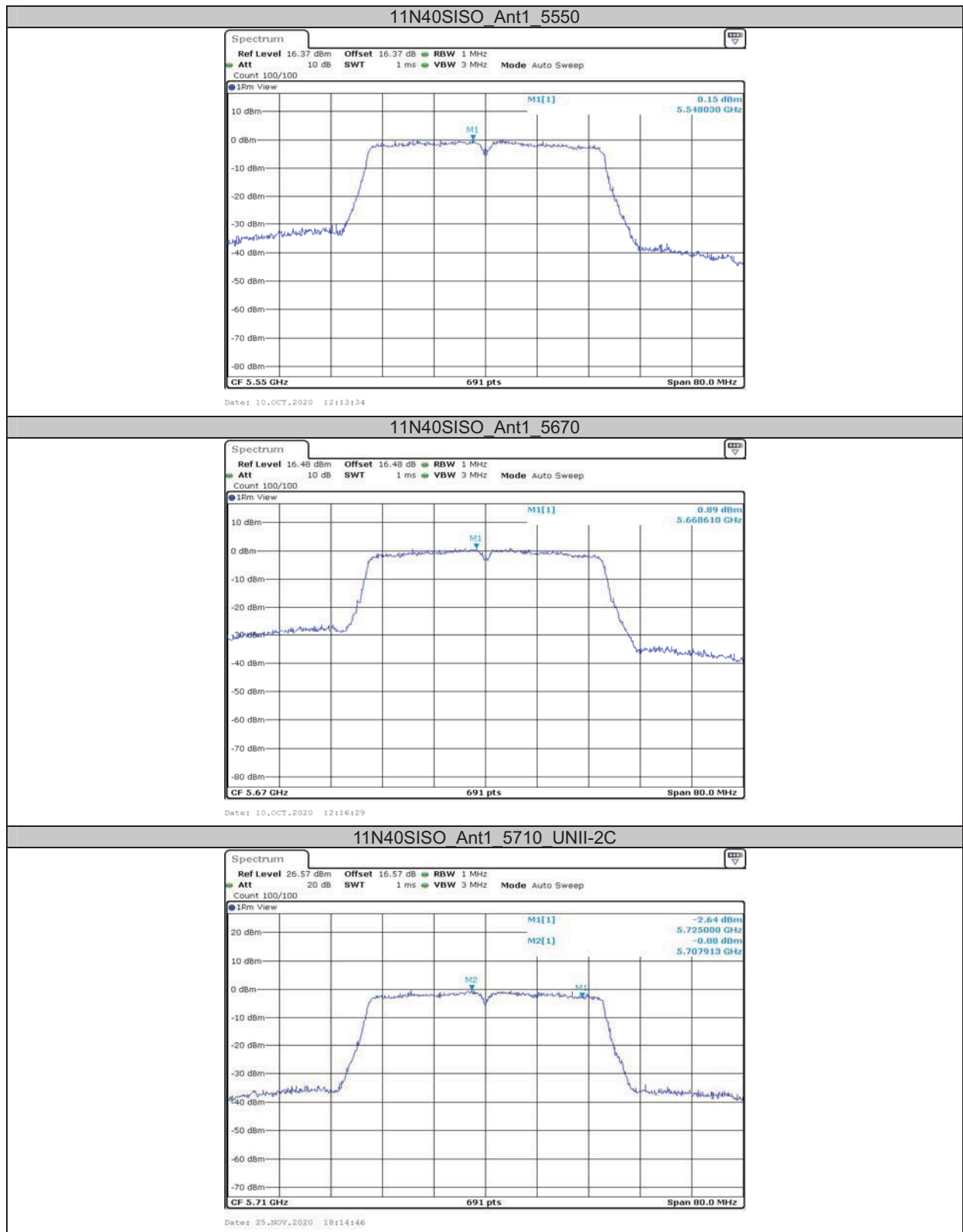
11N40SISO_Ant1_5190

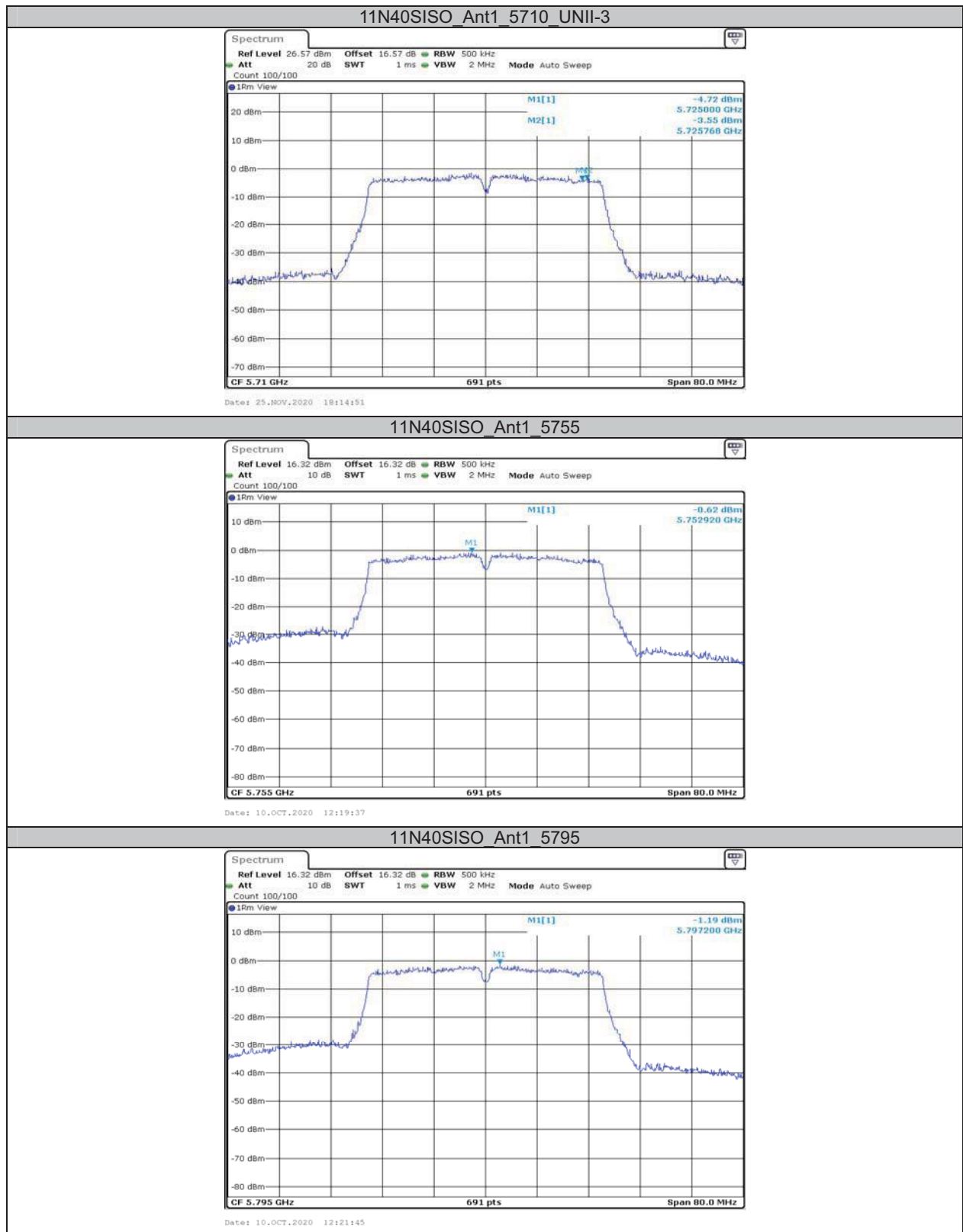


11N40SISO_Ant1_5230

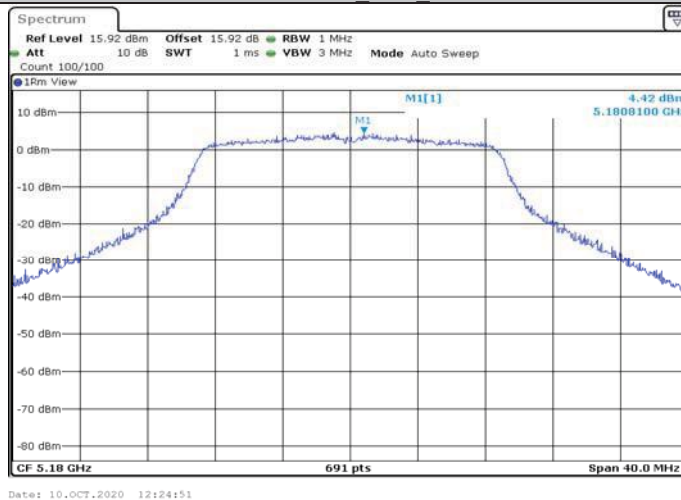








11AC20SISO_Ant1_5180



11AC20SISO_Ant1_5200



11AC20SISO_Ant1_5240

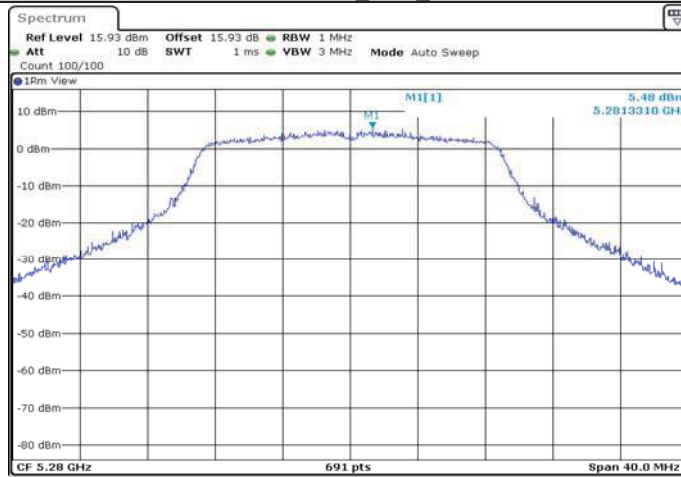


11AC20SISO_Ant1_5260



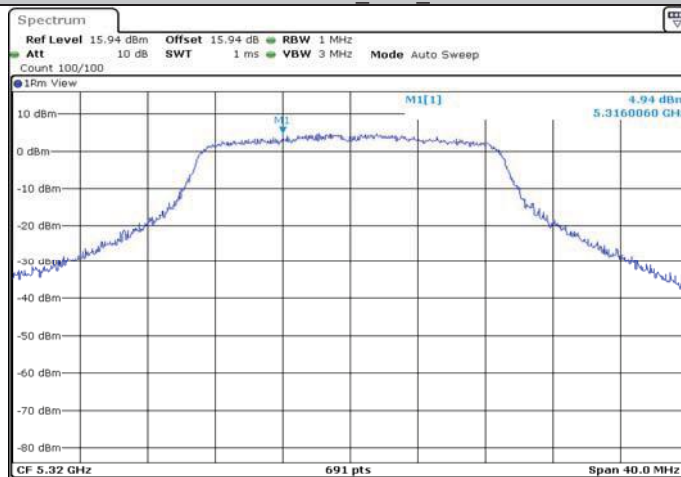
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11AC20SISO_Ant1_5280

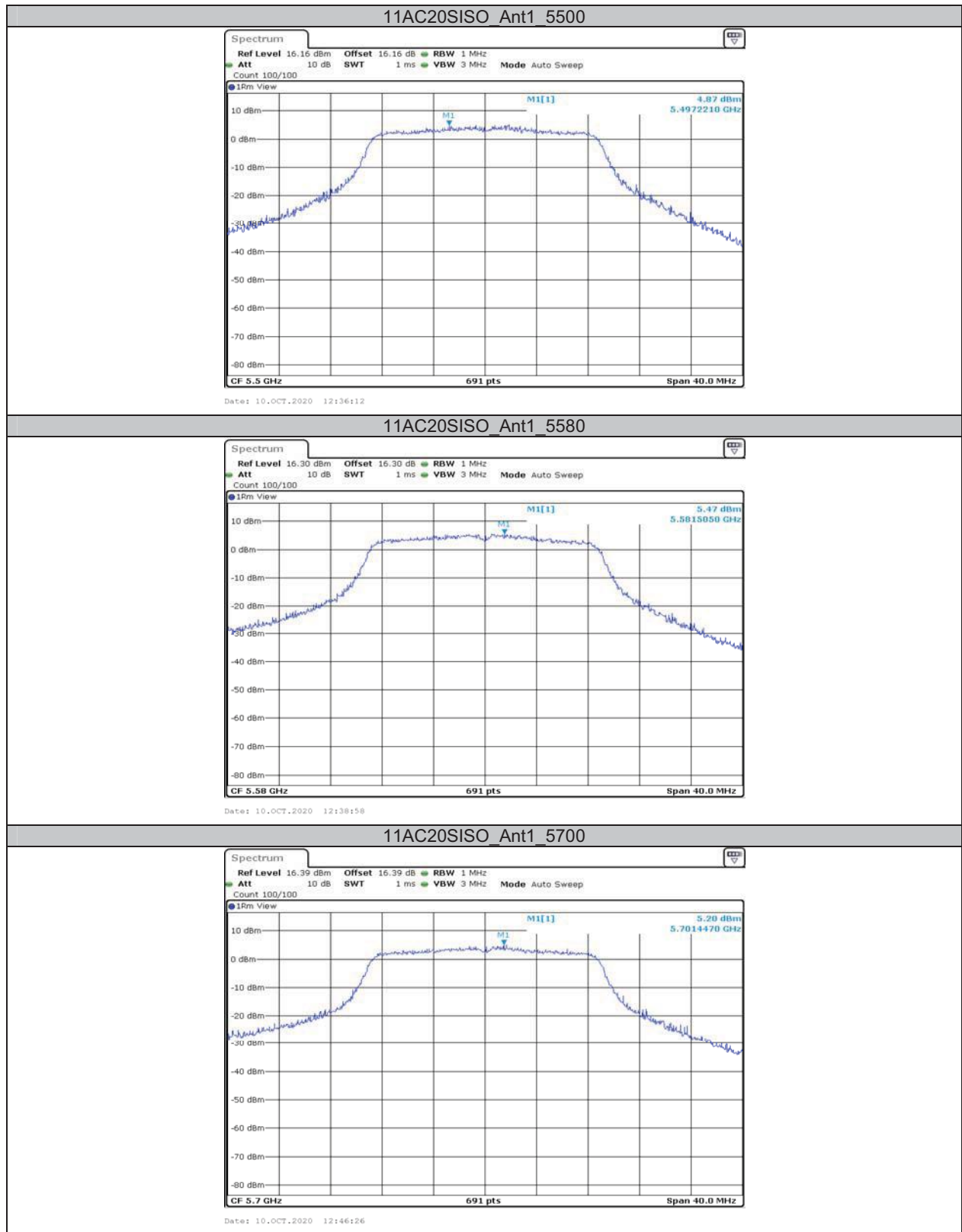


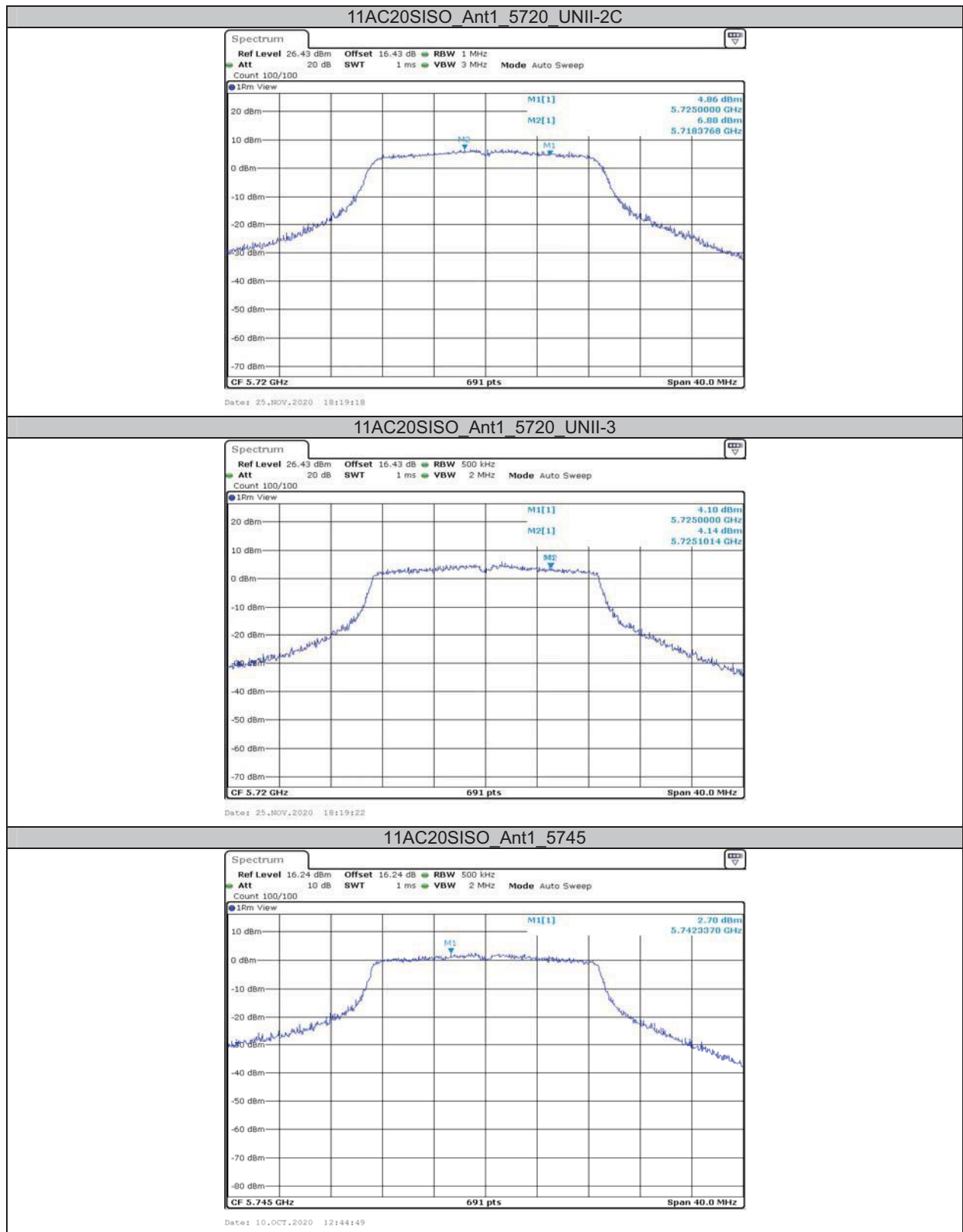
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11AC20SISO_Ant1_5320



Date: 10.OCT.2020 12:34:28





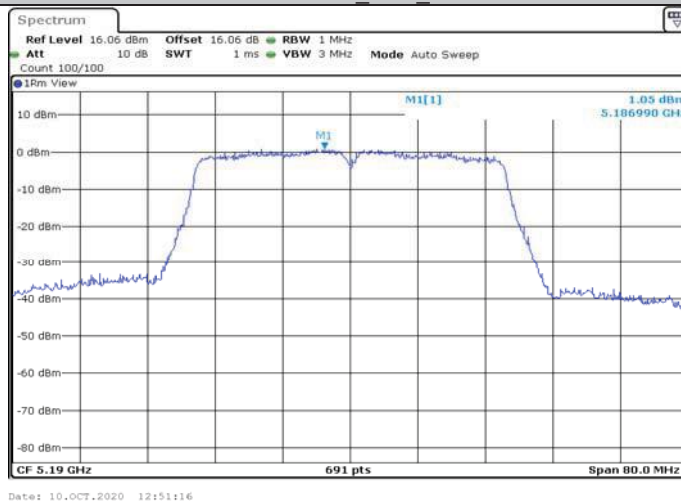
11AC20SISO_Ant1_5785



11AC20SISO_Ant1_5825



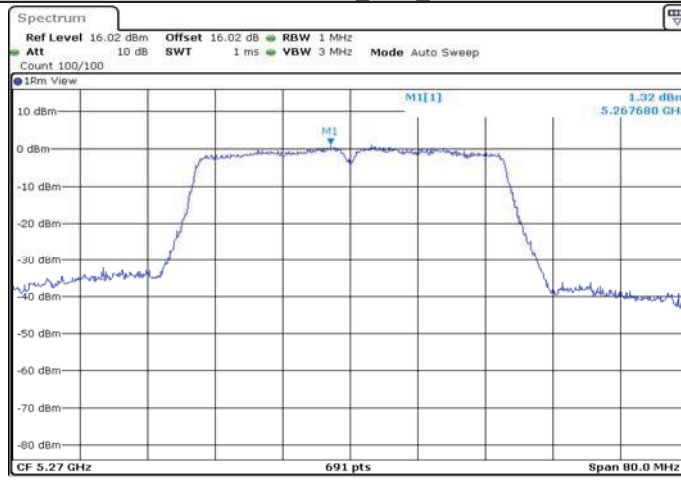
11AC40SISO_Ant1_5190



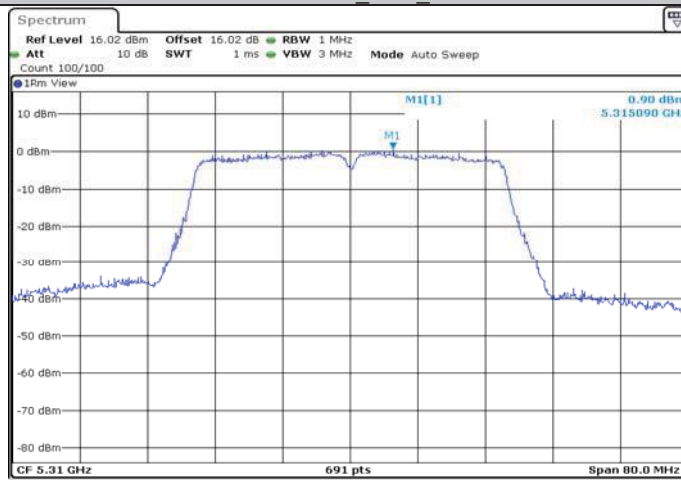
11AC40SISO_Ant1_5230



11AC40SISO_Ant1_5270



11AC40SISO_Ant1_5310



11AC40SISO_Ant1_5510



Date: 10.OCT.2020 13:01:48

11AC40SISO_Ant1_5550



Date: 10.OCT.2020 13:02:48

11AC40SISO_Ant1_5670



Date: 10.OCT.2020 13:05:01

11AC40SISO_Ant1_5710_UNII-2C



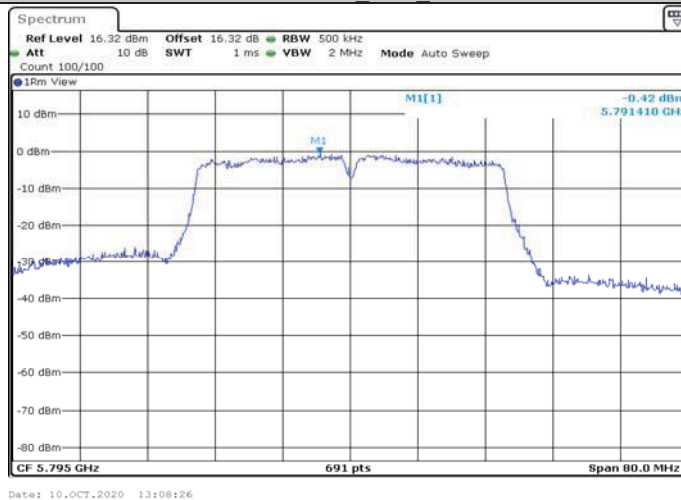
11AC40SISO_Ant1_5710_UNII-3



11AC40SISO_Ant1_5755



11AC40SISO_Ant1_5795

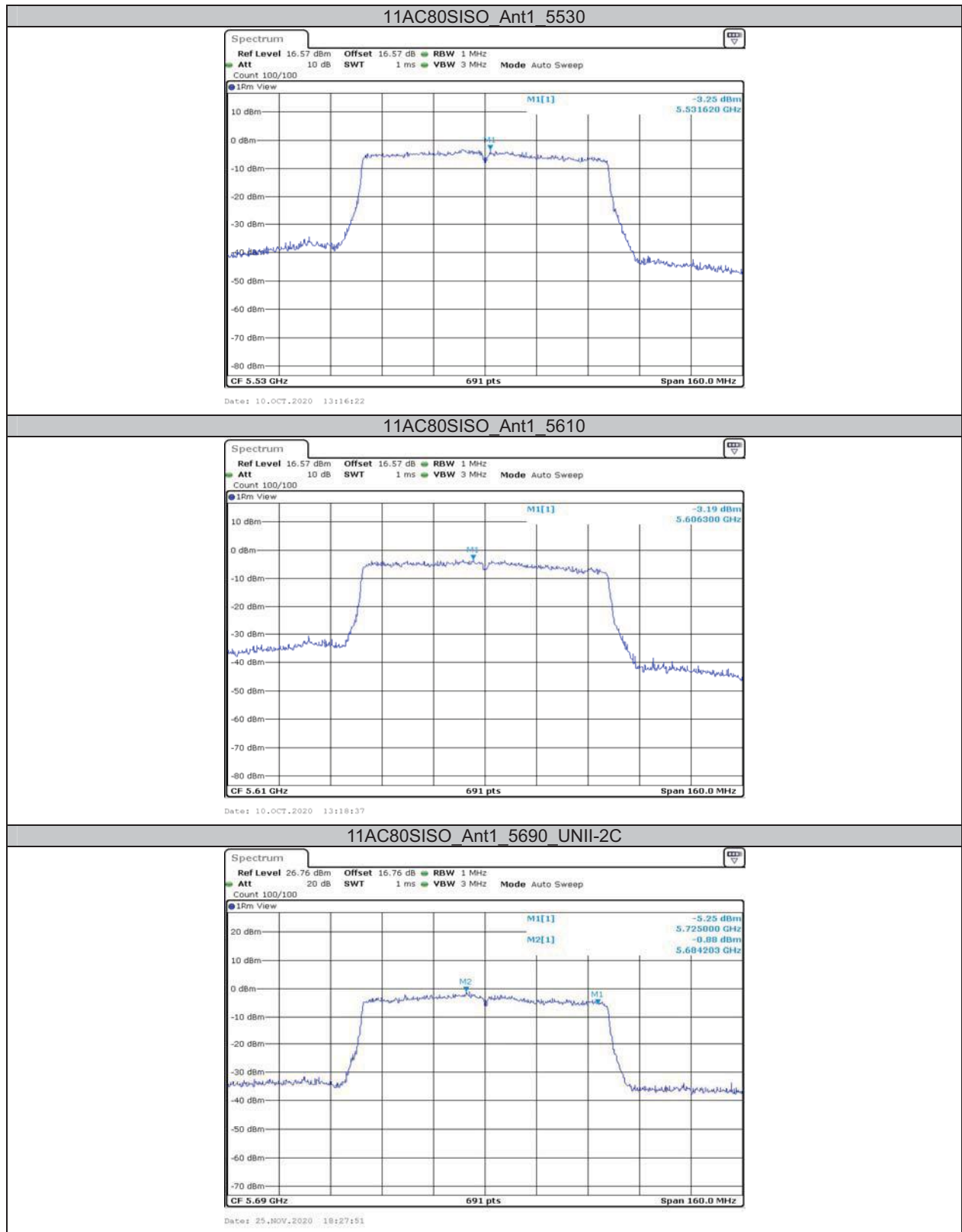


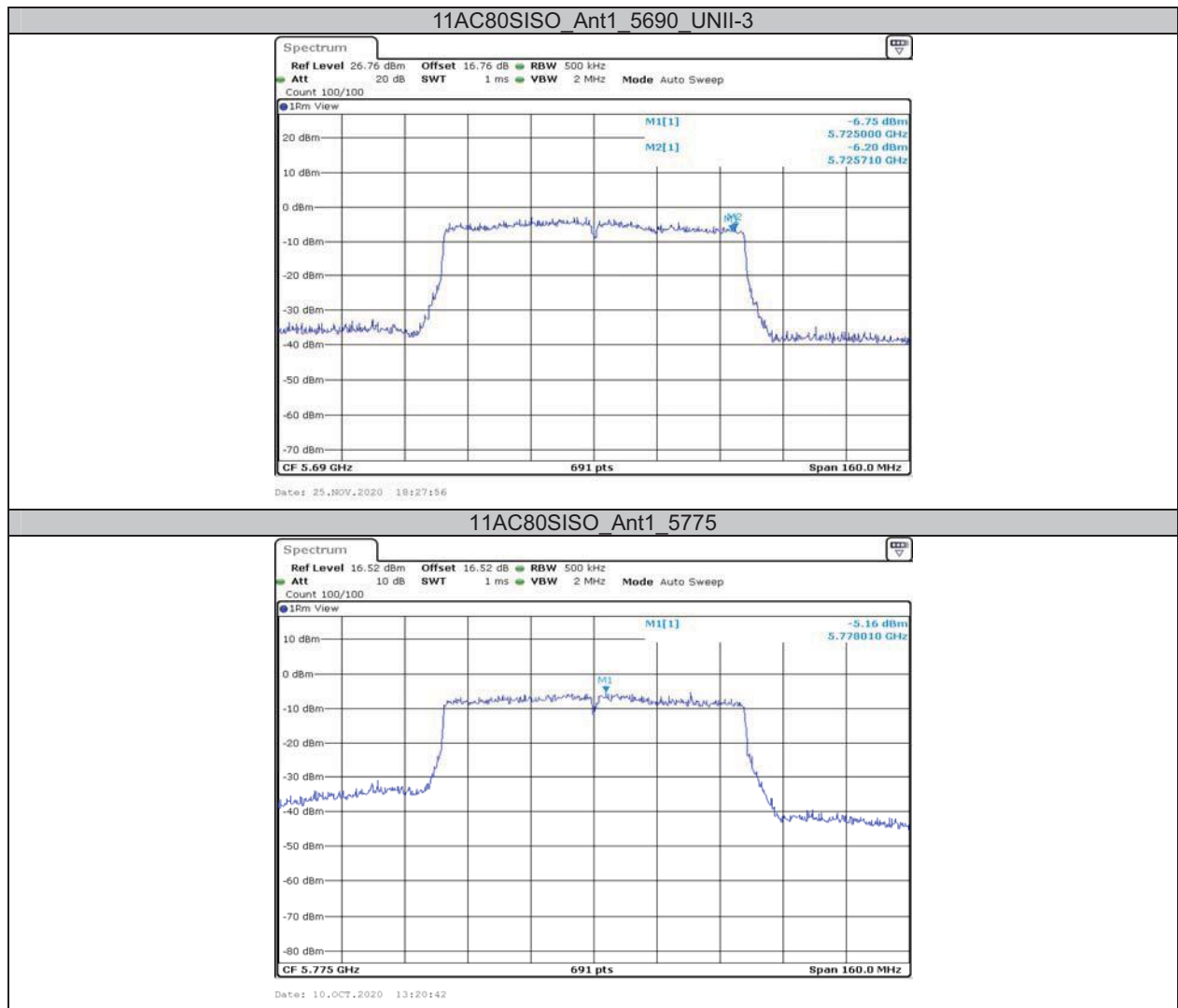
11AC80SISO_Ant1_5210



11AC80SISO_Ant1_5290







**Appendix H: Duty Cycle
Test Result**

TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
11A	Ant1	5180	2.01	2.07	97.10
11N20SISO	Ant1	5180	1.87	1.93	96.89
11N40SISO	Ant1	5190	0.91	0.97	93.81
11AC20SISO	Ant1	5180	1.87	1.93	96.89
11AC40SISO	Ant1	5190	0.91	0.97	93.81
11AC80SISO	Ant1	5210	0.44	0.50	88.00

Test Graphs





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