

TESTREPORT

Applicant Name : Shenzhen Youmi Intelligent Technology Co., Ltd.
Address : 406-407 Jinqi Zhigu Building, 4/F, 1 Tangling Road, Nanshan District, Shenzhen City, China
Report Number: RA230620-35481E-RF-00B
FCC ID: 2ATZ4-G5AC

Test Standard (s)

FCC PART 15.407

Sample Description

Product Type: Smart phone
Model No.: G5
Multiple Model(s) No.: N/A
Trade Mark: UMIDIGI
Date Received: 2023/06/20
Report Date: 2023/07/06

Test Result:	Pass*
--------------	-------

* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Roger Ling

Roger Ling
EMC Engineer

Approved By:

Candy Li

Candy Li
EMC Engineer

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

Shenzhen Accurate Technology Co., Ltd. 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.

This report cannot be reproduced except in full, without prior written approval of the Company. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

Shenzhen Accurate Technology Co., Ltd.

1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China
Tel: +86 755-26503290 Fax: +86-755-26503290 Web: www.atc-lab.com

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY	4
GENERAL INFORMATION.....	5
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	5
OBJECTIVE	5
TEST METHODOLOGY	5
MEASUREMENT UNCERTAINTY	6
TEST FACILITY	6
SYSTEM TEST CONFIGURATION	7
DESCRIPTION OF TEST CONFIGURATION	7
EUT EXERCISE SOFTWARE	8
DUTY CYCLE	8
EQUIPMENT MODIFICATIONS	8
SUMMARY OF TEST RESULTS	10
TEST EQUIPMENT LIST	11
FCC §1.1307(B) & §2.1093 - RF EXPOSURE INFORMATION.....	13
APPLICABLE STANDARD	13
TEST RESULT	13
FCC §15.203 – ANTENNA REQUIREMENT	14
APPLICABLE STANDARD	14
ANTENNA CONNECTOR CONSTRUCTION	14
FCC §15.407 (B) (6) §15.207 (A) – CONDUCTED EMISSIONS	15
APPLICABLE STANDARD	15
EUT SETUP	15
EMI TEST RECEIVER SETUP.....	15
TEST PROCEDURE	15
CORRECTED FACTOR & MARGIN CALCULATION	16
TEST DATA	16
§15.205 & §15.209 & §15.407(B)– UNDESIRABLE EMISSION	21
APPLICABLE STANDARD	21
EUT SETUP	21
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP	22
TEST PROCEDURE	22
FACTOR & MARGIN CALCULATION	23
TEST DATA	23
FCC §15.407(A),(E) – 26 DB & 6DB EMISSION BANDWIDTH.....	38
APPLICABLE STANDARD	38
TEST PROCEDURE	38
TEST DATA	39
FCC §15.407(A) – CONDUCTED TRANSMITTER OUTPUT POWER.....	40
APPLICABLE STANDARD	40
TEST PROCEDURE	40
TEST DATA	41

FCC §15.407(A) - POWER SPECTRAL DENSITY	42
TEST PROCEDURE	42
TEST DATA	43
APPENDIX	44
APPENDIX A1: EMISSION BANDWIDTH	44
APPENDIX A2: OCCUPIED CHANNEL BANDWIDTH	50
APPENDIX A3: MIN EMISSION BANDWIDTH.....	60
APPENDIX B: DUTY CYCLE	66
APPENDIX C: MAXIMUM CONDUCTED OUTPUT POWER	69
APPENDIX D: MAXIMUM POWER SPECTRAL DENSITY	70

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	RA230620-35481E-RF-00B	Original Report	2023/07/06

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Frequency Range	5G Wi-Fi: 5150-5250MHz; 5725-5850MHz
Mode	802.11a/n20/n40/ac20/ac40/ac80
Maximum Conducted Average Output Power	5150-5250 MHz: 13.33dBm 5725-5850 MHz: 8.73dBm
Modulation Technique	OFDM
Antenna Specification*	1.23dBi (It is provided by the applicant)
Voltage Range	DC 3.85V from battery or DC 5V from adapter
Sample serial number	CE&RE: 2754-1 RF: 2754-2 (Assigned by ATC)
Sample/EUT Status	Good condition
Adapter 1 information	Model: HJ-0502000W2-US Input: AC 100-240V~50/60Hz, 0.3A Output: DC 5V, 2A
Adapter 2 information	Model: HF-0502000U Input: AC 100-240V~50/60Hz, 0.3A Output: DC 5.0V, 2A

Objective

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

The tests were performed in order to determine compliance with FCC Part 15, Subpart E, section 15.203, 15.205, 15.207, 15.209 and 15.407 rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices. And KDB789033 D02 General U-NII Test Procedures New Rules v02r01.

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF Frequency		0.082×10^{-7}
RF output power, conducted		0.71dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions		2.72dB
Emissions, Radiated	9kHz - 30MHz	2.06dB
	30MHz - 1GHz	5.08dB
	1GHz - 18GHz	4.96dB
	18GHz - 26.5GHz	5.16dB
	26.5GHz - 40GHz	4.64dB
Temperature		1℃
Humidity		6%
Supply voltages		0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the Floor 1, KuMaKe Building, Dongzhou Community, Guangming Street, Guangming District, 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.: 708358, the FCC Designation No.: CN1189.

Accredited by American Association for Laboratory Accreditation (A2LA). The Certificate Number is 4297.01

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0016. The Registration Number is 30241.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

The device support 802.11a/n20/n40/ac20/ac40/ac80 mode, the 802.11n20/n40 mode was reduce test as it identical to 802.11a20/ac40 mode

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

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

For 802.11a/ac20 mode: channel 36, 40, 48 were tested;

For 802.11ac40 mode: channel 38, 46 were tested;

For 802.11ac80 mode, channel 42 was tested.

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

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

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

For 802.11ac40 mode: channel 151, 159 were tested;

For 802.11ac80 mode, channel 155 was tested.

EUT Exercise Software

EUT was test in engineering mode.

The worst case was performed under:

U-NII	Mode	Data rate	Power Level*		
			Low Channel	Middle Channel	High Channel
5150 – 5250MHz	802.11a	6Mbps	Default	Default	Default
	802.11ac20	MCS0	Default	Default	Default
	802.11ac40	MCS0	11	/	11
	802.11ac80	MCS0	/	11	/
5725 – 5850MHz	802.11a	6Mbps	18	18	18
	802.11ac20	MCS0	18	18	18
	802.11ac40	MCS0	18	/	18
	802.11ac80	MCS0	/	18	/

Note: the power level was provided by the applicant.

Duty cycle

Test Result: Pass. Please refer to the Appendix.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

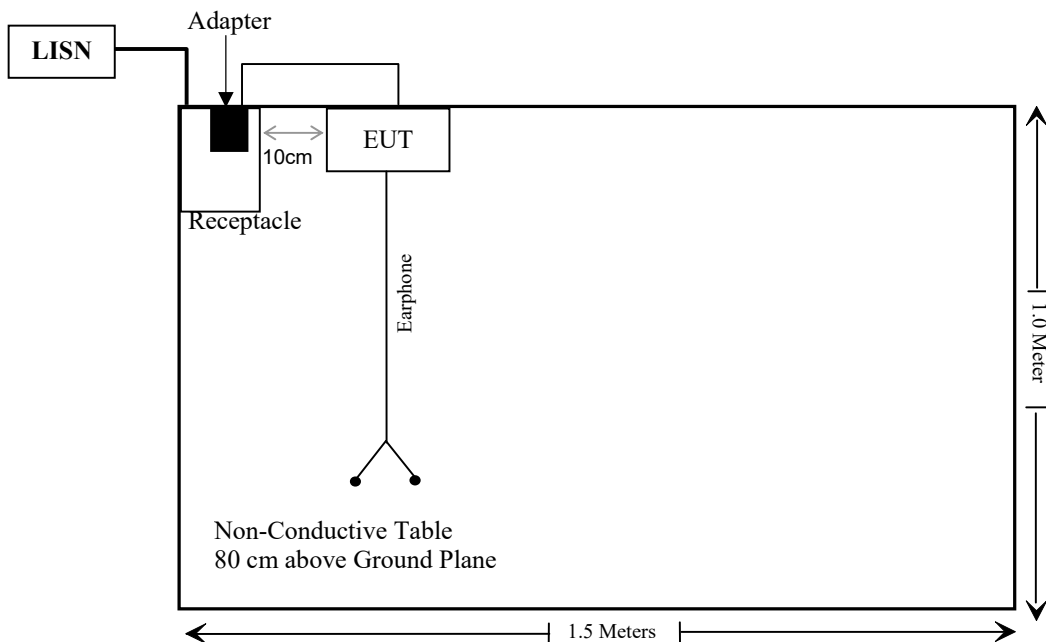
Manufacturer	Description	Model	Serial Number
Unknown	Earphone	Unknown	Unknown

External I/O Cable

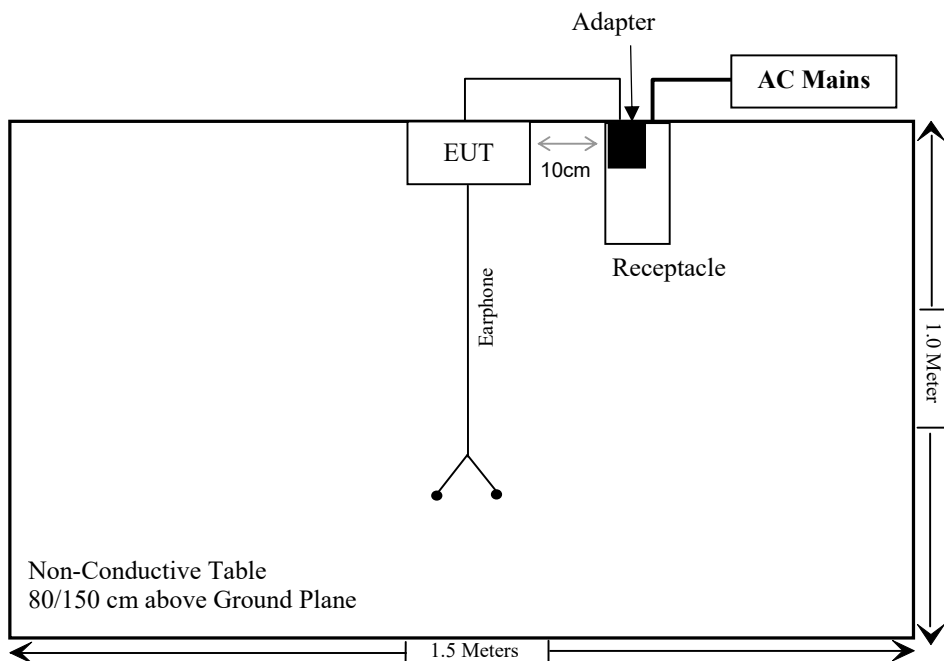
Cable Description	Length (m)	From/Port	To
Un-shielding Detachable USB Cable	1.0	EUT	Adapter

Block Diagram of Test Setup

For conducted emissions:



For Radiated Emissions:



Note: the support table edge was flush with the center of turntable

SUMMARY OF TEST RESULTS

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

Not Applicable: the EUT not operating within frequency range of 5250-5350MHz&5470-5725MHz.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde& Schwarz	EMI Test Receiver	ESCI	100784	2022/11/25	2023/11/24
Rohde & Schwarz	L.I.S.N.	ENV216	101314	2022/11/25	2023/11/24
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2022/12/07	2023/12/06
Unknown	RF Coaxial Cable	No.17	N0350	2022/11/25	2023/11/24
Conducted Emission Test Software: e3 19821b (V9)					
Radiated Emissions Test					
Rohde& Schwarz	Test Receiver	ESR	102725	2022/11/25	2023/11/24
Rohde&Schwarz	Spectrum Analyzer	FSV40	101949	2022/11/25	2023/11/24
SONOMA INSTRUMENT	Amplifier	310 N	186131	2022/11/08	2023/11/07
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2022/11/08	2023/11/07
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2022/11/08	2023/11/07
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2022/11/30	2025/11/29
Schwarzbeck	HORN ANTENNA	BBHA9170	9170-359	2022/12/26	2025/12/25
Radiated Emission Test Software: e3 19821b (V9)					
Unknown	RF Coaxial Cable	No.10	N050	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.11	N1000	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.12	N040	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.13	N300	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.14	N800	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.15	N600	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.16	N650	2022/11/25	2023/11/24
CD	Band Reject Filter	BRM-5.15/5.35g-45	075	2022/11/25	2023/11/24
CD	Band Reject Filter	BRM-5.725/5.875G-45	065	2022/11/25	2023/11/24

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde&Schwarz	Spectrum Analyzer	FSV-40	101590	2022/11/25	2023/11/24
Tonscend	RF Control Unit	JS0806-2	19G8060182	2022/10/24	2023/10/23
Agilent	Power Sensor	U2021XA	MY5425003	2023/02/25	2024/02/24
HP	20dB Attenuator	8491A	53857	2022/11/25	2023/11/24

* **Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

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

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliant, please refer to the SAR report: CR230635481-20A.

FCC §15.203 – ANTENNA REQUIREMENT

Applicable Standard

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

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

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

And according to FCC 47 CFR section 15.407 (a), if the transmitting antennas of directional gain greater than 6dBi are used, the transmit power and power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has one internal antenna arrangement for 5G Wi-Fi which were permanently attached. Please refer to the EUT photos.

Type	Antenna Gain	Impedance	Frequency Range
FPC	1.23dBi	50 Ω	5150-5850MHz

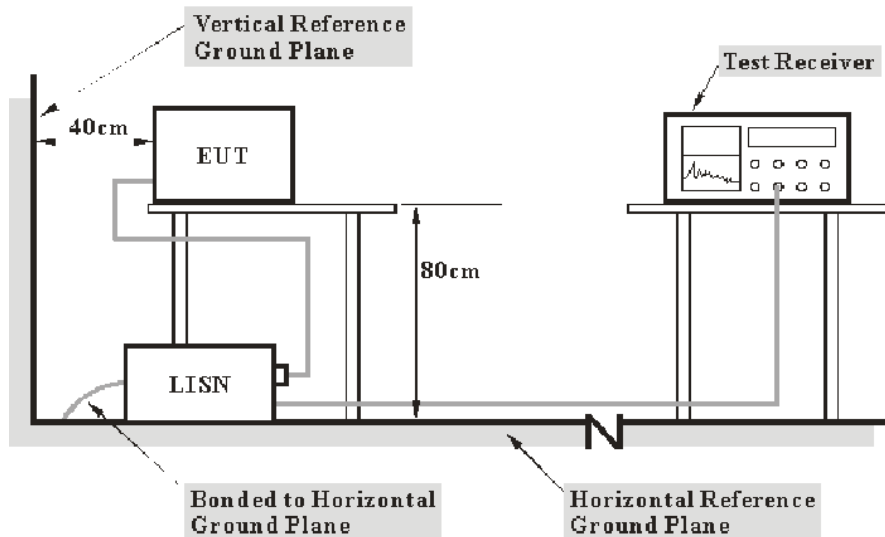
Result: Compliant.

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

Applicable Standard

FCC §15.207, §15.407(b) (6)

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the LISN.

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

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

Corrected Factor & Margin Calculation

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

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

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

$$\begin{aligned}\text{Over Limit} &= \text{Level} - \text{Limit} \\ \text{Level} &= \text{Read Level} + \text{Factor}\end{aligned}$$

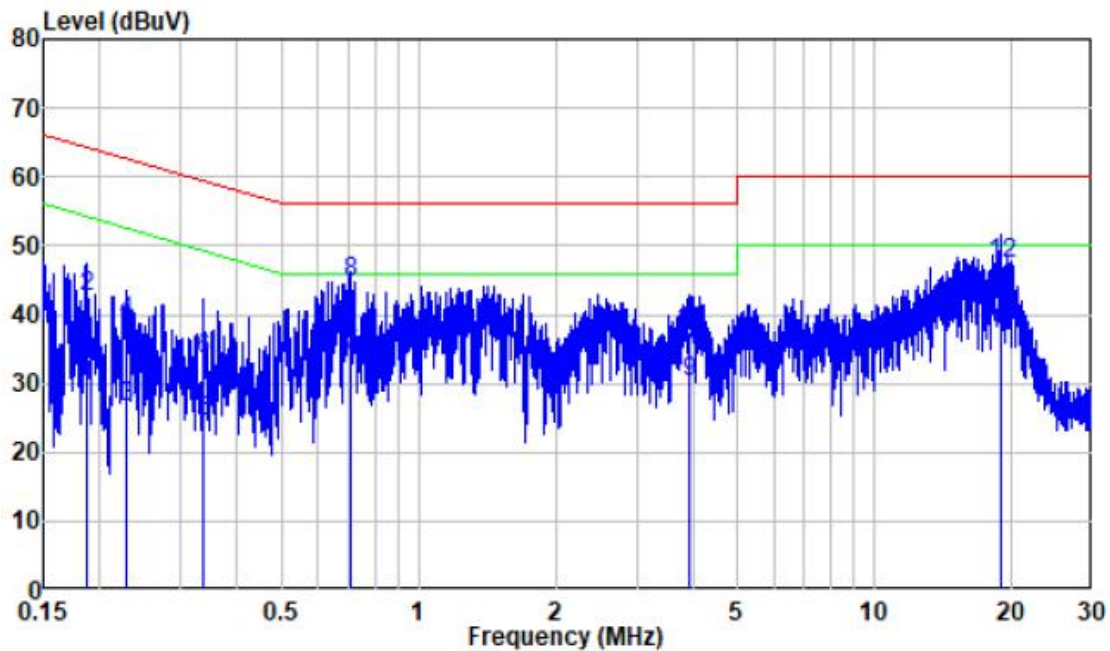
Test Data

Environmental Conditions

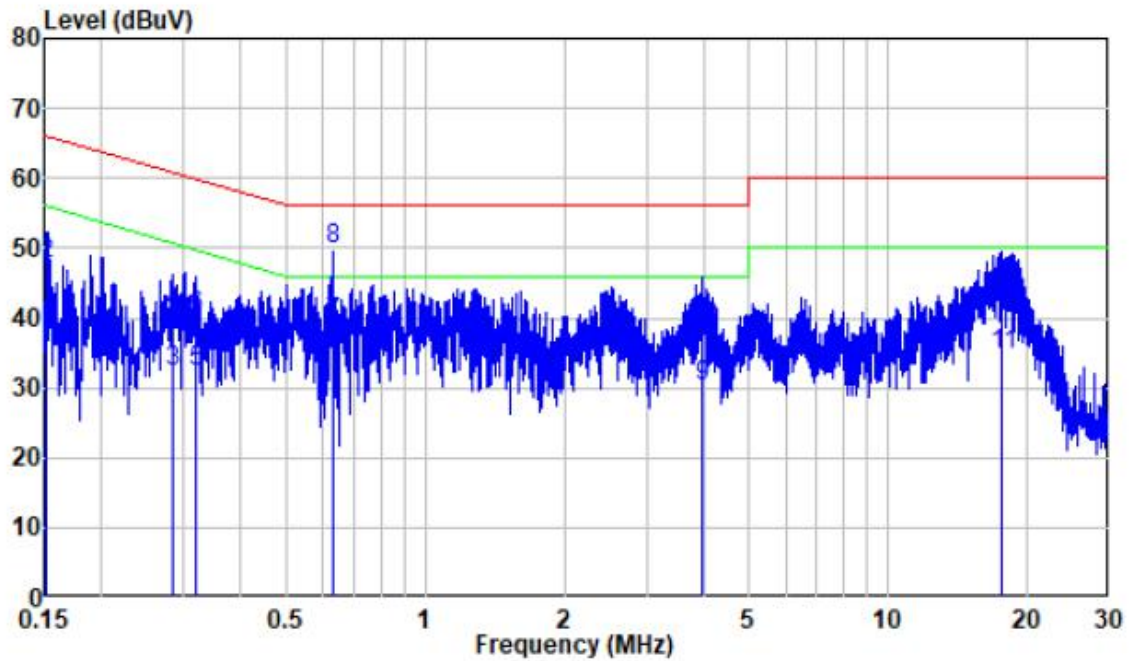
Temperature:	23 °C
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Jerry Wu on 2023-06-30.

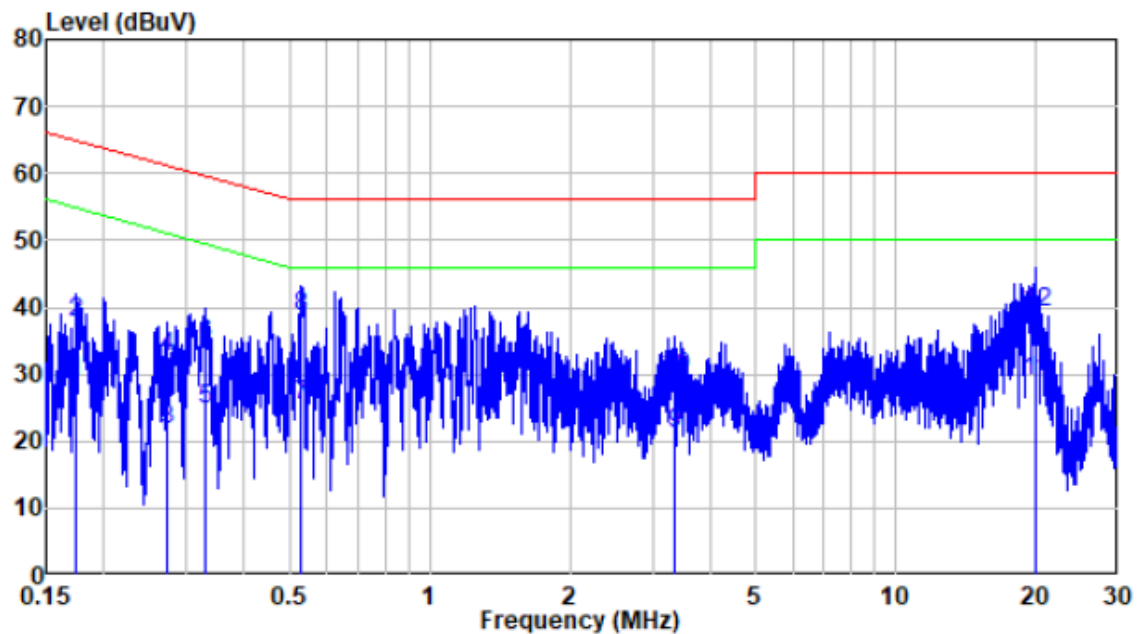
EUT operation mode: Transmitting (802.11a, 5180MHz)

Adapter 1:**AC 120V/60 Hz, Line:**

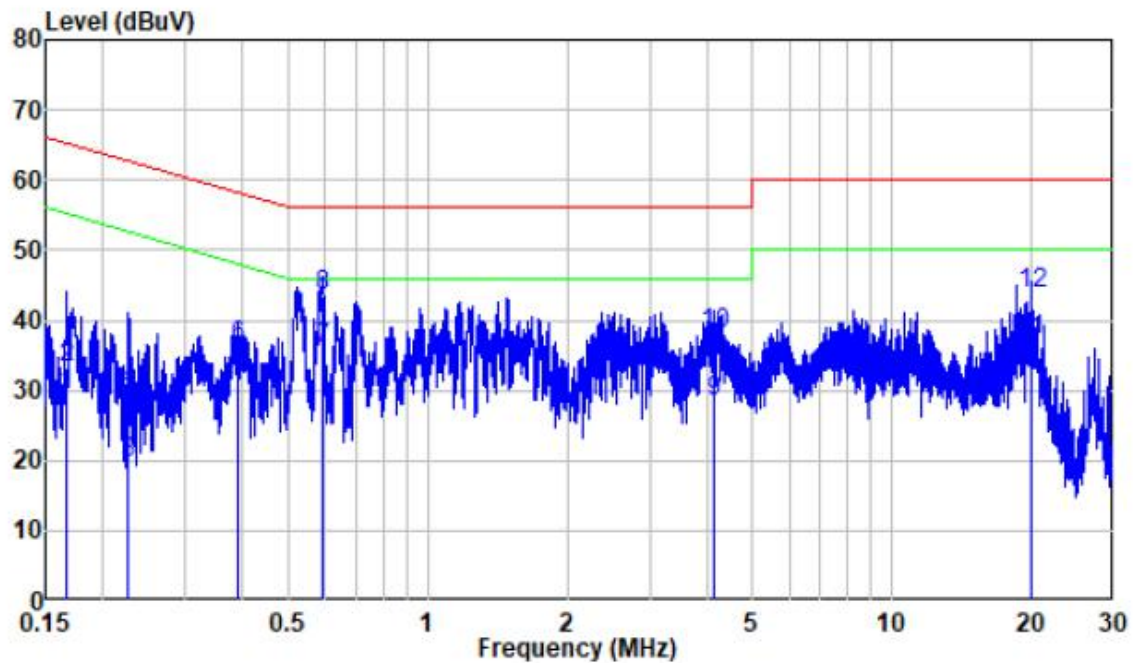
	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.186	10.30	19.42	29.72	54.21	-24.49	Average
2	0.186	10.30	32.17	42.47	64.21	-21.74	QP
3	0.228	10.33	16.30	26.63	52.52	-25.89	Average
4	0.228	10.33	28.47	38.80	62.52	-23.72	QP
5	0.338	10.44	14.15	24.59	49.26	-24.67	Average
6	0.338	10.44	23.07	33.51	59.26	-25.75	QP
7	0.706	10.67	23.44	34.11	46.00	-11.89	Average
8	0.706	10.67	33.91	44.58	56.00	-11.42	QP
9	3.907	10.54	19.72	30.26	46.00	-15.74	Average
10	3.907	10.54	27.04	37.58	56.00	-18.42	QP
11	18.870	10.29	26.96	37.25	50.00	-12.75	Average
12	18.870	10.29	37.15	47.44	60.00	-12.56	QP

AC 120V/60 Hz, Neutral:

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.152	10.27	25.44	35.71	55.87	-20.16	Average
2	0.152	10.27	37.42	47.69	65.87	-18.18	QP
3	0.283	10.35	22.05	32.40	50.72	-18.32	Average
4	0.283	10.35	30.36	40.71	60.72	-20.01	QP
5	0.318	10.37	21.81	32.18	49.76	-17.58	Average
6	0.318	10.37	29.83	40.20	59.76	-19.56	QP
7	0.633	10.47	28.63	39.10	46.00	-6.90	Average
8	0.633	10.47	39.25	49.72	56.00	-6.28	QP
9	3.946	10.54	19.70	30.24	46.00	-15.76	Average
10	3.946	10.54	28.01	38.55	56.00	-17.45	QP
11	17.649	10.20	24.55	34.75	50.00	-15.25	Average
12	17.649	10.20	33.64	43.84	60.00	-16.16	QP

Adapter 2:**AC 120V/60 Hz, Line:**

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.174	10.33	18.70	29.03	54.76	-25.73	Average
2	0.174	10.33	27.45	37.78	64.76	-26.98	QP
3	0.272	10.38	11.43	21.81	51.06	-29.25	Average
4	0.272	10.38	22.19	32.57	61.06	-28.49	QP
5	0.330	10.43	14.28	24.71	49.46	-24.75	Average
6	0.330	10.43	24.11	34.54	59.46	-24.92	QP
7	0.530	10.59	14.85	25.44	46.00	-20.56	Average
8	0.530	10.59	27.97	38.56	56.00	-17.44	QP
9	3.359	10.50	10.68	21.18	46.00	-24.82	Average
10	3.359	10.50	19.01	29.51	56.00	-26.49	QP
11	19.871	10.32	18.54	28.86	50.00	-21.14	Average
12	19.871	10.32	29.06	39.38	60.00	-20.62	QP

AC 120V/60 Hz, Neutral:

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.166	10.28	19.00	29.28	55.14	-25.86	Average
2	0.166	10.28	22.81	33.09	65.14	-32.05	QP
3	0.226	10.30	9.22	19.52	52.58	-33.06	Average
4	0.226	10.30	19.57	29.87	62.58	-32.71	QP
5	0.388	10.41	22.06	32.47	48.11	-15.64	Average
6	0.388	10.41	25.93	36.34	58.11	-21.77	QP
7	0.594	10.47	25.44	35.91	46.00	-10.09	Average
8	0.594	10.47	33.07	43.54	56.00	-12.46	QP
9	4.122	10.53	17.80	28.33	46.00	-17.67	Average
10	4.122	10.53	27.40	37.93	56.00	-18.07	QP
11	19.924	10.22	26.89	37.11	50.00	-12.89	Average
12	19.924	10.22	33.68	43.90	60.00	-16.10	QP

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

Applicable Standard

FCC §15.407 (b); §15.209; §15.205;

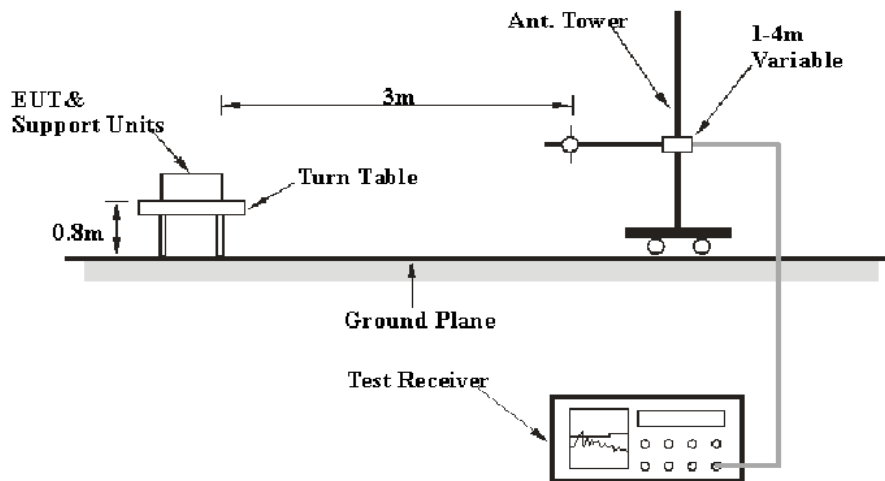
(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

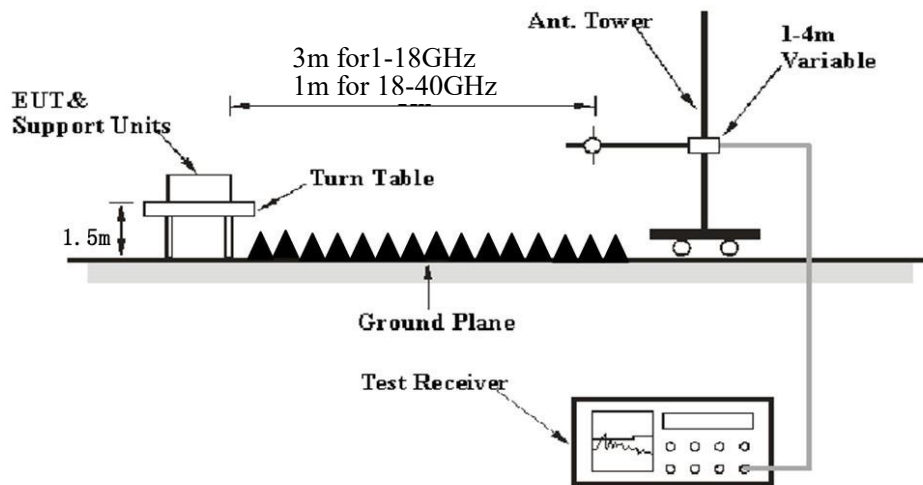
- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band:
 - (i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

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

EUT Setup

Below 1 GHz:



Above 1 GHz:

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

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

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1MHz	10 Hz ^{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.

According to ANSI C63.10-2013,9.4: For field strength measurements made at other than the distance at which the applicable limit is specified, extrapolate the measured field strength to the field strength at the distance specified by the limit using an inverse distance correction factor (20 dB/decade of distance). In some cases, a different distance correction factor may be required;

$$E_{\text{SpecLimit}} = E_{\text{Meas}} + 20 \log \left(\frac{d_{\text{Meas}}}{d_{\text{SpecLimit}}} \right)$$

where

$E_{\text{SpecLimit}}$	is the field strength of the emission at the distance specified by the limit, in dB μ V/m
E_{Meas}	is the field strength of the emission at the measurement distance, in dB μ V/m
d_{Meas}	is the measurement distance, in m
$d_{\text{SpecLimit}}$	is the distance specified by the limit, in m

So the extrapolation factor of 1m is $20 \cdot \log(1/3) = -9.5$ dB, for 18-40GHz range, the limit of 1m distance was added by 9.5dB from limit of 3m to compared with the result measurement at 1m distance.

Factor & Margin Calculation

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

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

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

$$\begin{aligned} \text{Over Limit/Margin} &= \text{Level / Corrected Amplitude} - \text{Limit} \\ \text{Level / Corrected Amplitude} &= \text{Read Level} + \text{Factor} \end{aligned}$$

Test Data

Environmental Conditions

Temperature:	23~24.5 °C
Relative Humidity:	51~52 %
ATM Pressure:	101.0 kPa

The testing was performed by Jason Liu on 2023-06-30 for below 1GHz and Jimi Zheng on 2023-06-27 for above 1GHz.

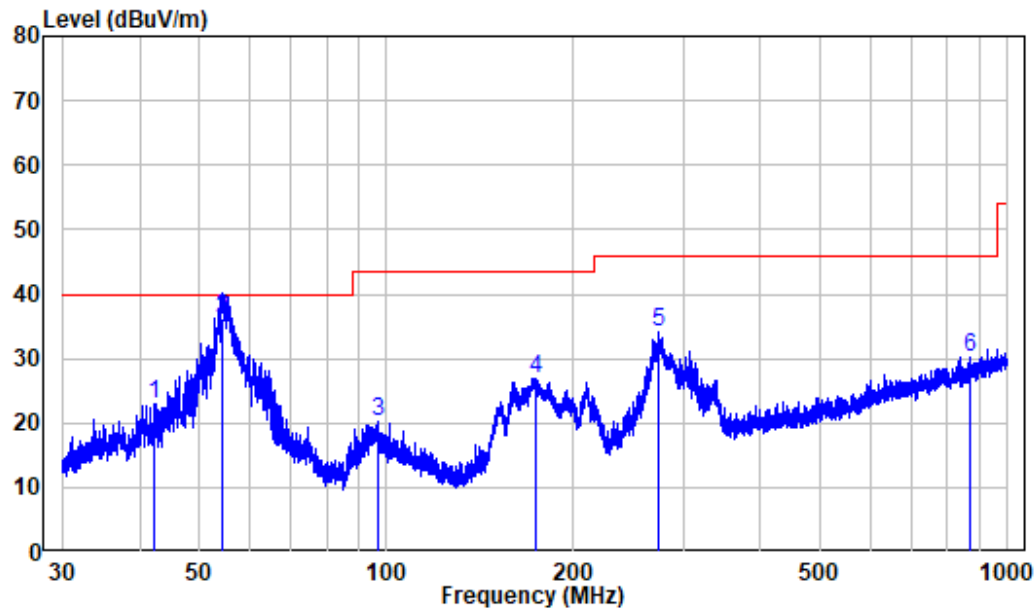
EUT operation mode: Transmitting (Pre-scan in the X, Y and Z axes of orientation, the worst case of X-axes orientation was recorded)

30 MHz – 1 GHz: (802.11a, 5180MHz)

Note: When the test result of Peak was more than 6dB below the limit of QP, just the Peak value was recorded.

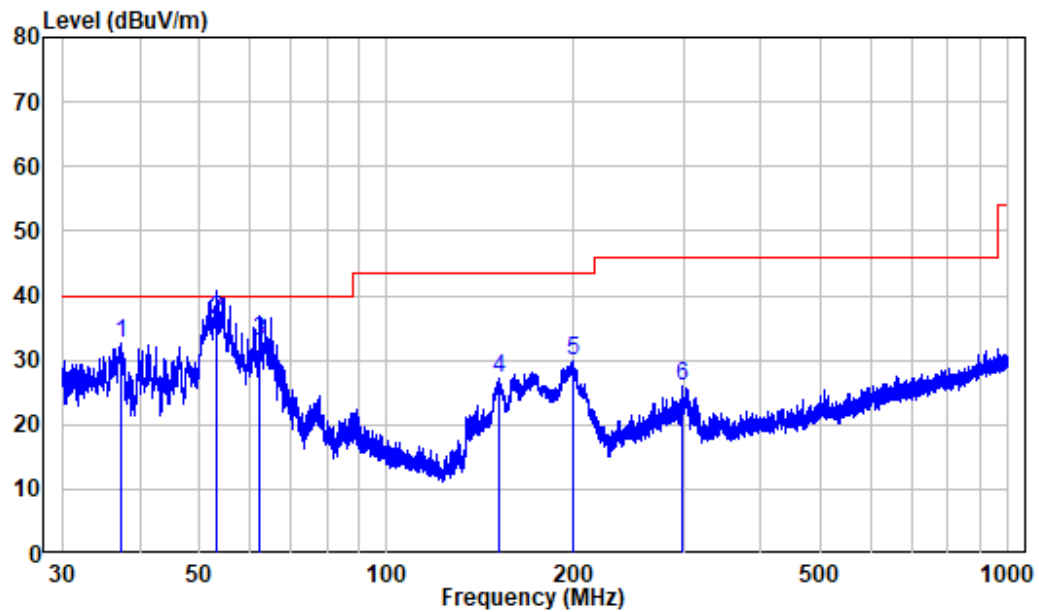
Adapter 1:

Horizontal



Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	42.321	-10.00	32.82	22.82	40.00	-17.18 Peak
2	54.285	-10.33	46.58	36.25	40.00	-3.75 QP
3	96.817	-12.29	32.51	20.22	43.50	-23.28 Peak
4	173.509	-13.23	40.24	27.01	43.50	-16.49 Peak
5	273.594	-10.00	44.23	34.23	46.00	-11.77 Peak
6	869.511	0.97	29.09	30.06	46.00	-15.94 Peak

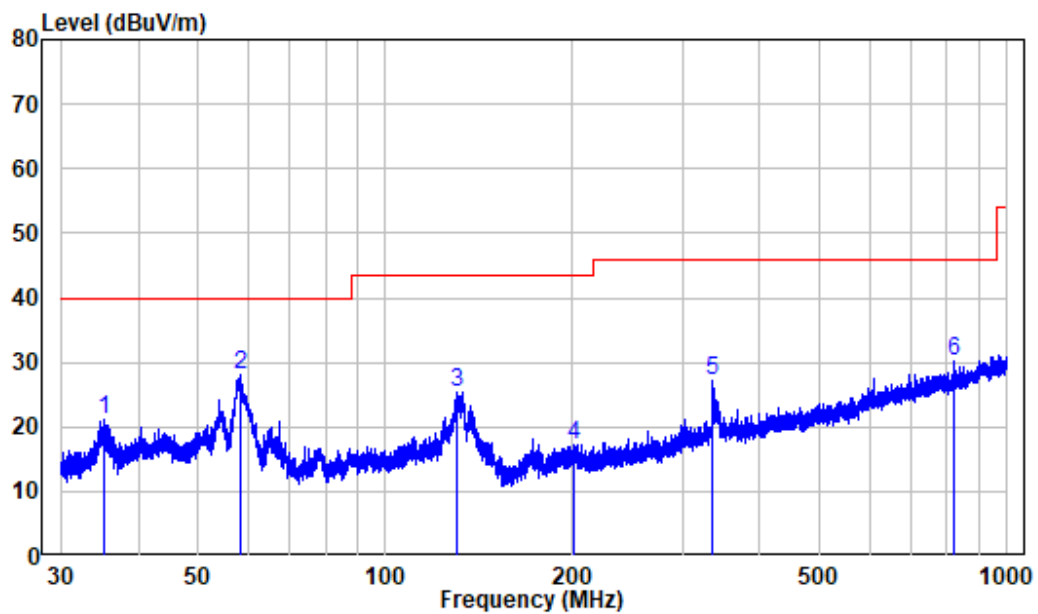
Vertical



	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	37.253	-10.96	43.51	32.55	40.00	-7.45	Peak
2	53.178	-10.20	46.31	36.11	40.00	-3.89	QP
3	62.541	-11.63	44.39	32.76	40.00	-7.24	QP
4	151.398	-15.19	42.50	27.31	43.50	-16.19	Peak
5	199.198	-11.45	41.19	29.74	43.50	-13.76	Peak
6	297.876	-9.25	35.28	26.03	46.00	-19.97	Peak

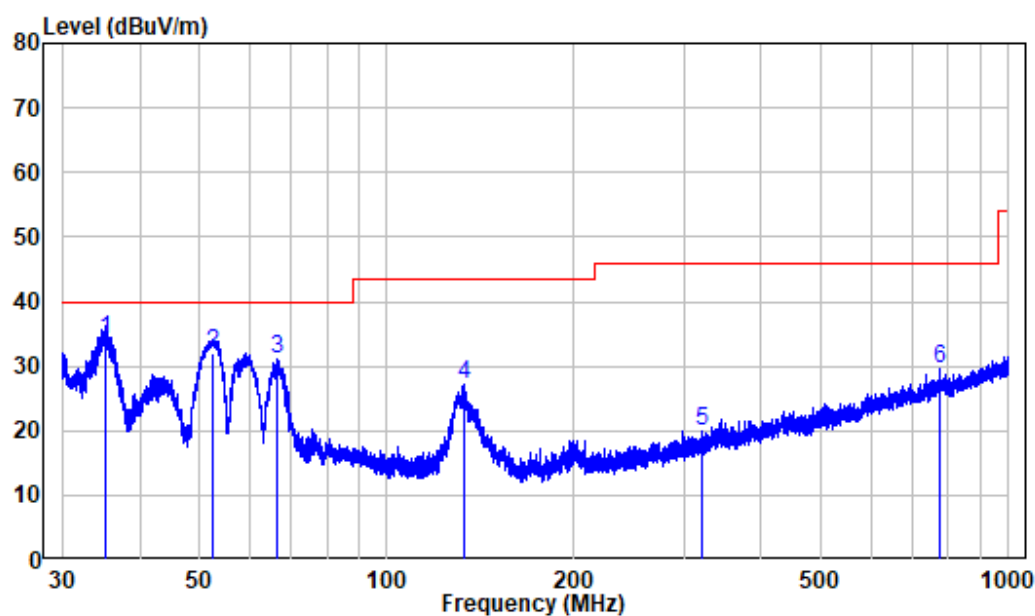
Adapter 2:

Horizontal



	Freq		Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz		dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	35.174		-11.48	32.64	21.16	40.00	-18.84	Peak
2	58.280		-10.00	38.04	28.04	40.00	-11.96	Peak
3	129.809		-14.88	40.26	25.38	43.50	-18.12	Peak
4	200.424		-11.43	28.63	17.20	43.50	-26.30	Peak
5	335.741		-7.59	34.71	27.12	46.00	-18.88	Peak
6	823.874		0.06	30.23	30.29	46.00	-15.71	Peak

Vertical



	Freq	Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	35.205	-11.47	45.66	34.19	40.00	-5.81	QP
2	52.277	-10.03	41.90	31.87	40.00	-8.13	QP
3	66.674	-13.20	44.18	30.98	40.00	-9.02	Peak
4	133.034	-14.98	42.05	27.07	43.50	-16.43	Peak
5	321.483	-8.40	28.33	19.93	46.00	-26.07	Peak
6	774.837	0.03	29.65	29.68	46.00	-16.32	Peak

Above 1GHz:**5150-5250 MHz:**

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave		Height (m)	Polar (H/V)				
802.11a									
5180 MHz									
4500	64.74	PK	203	1.6	H	-6.01	58.73	74	-15.27
4500	52.57	AV	203	1.6	H	-6.01	46.56	54	-7.44
4500	65.17	PK	322	2	V	-6.01	59.16	74	-14.84
4500	52.99	AV	322	2	V	-6.01	46.98	54	-7.02
5150	66.54	PK	241	1.3	H	-4.29	62.25	74	-11.75
5150	54.26	AV	241	1.3	H	-4.29	49.97	54	-4.03
5150	66.75	PK	16	1.8	V	-4.29	62.46	74	-11.54
5150	54.31	AV	16	1.8	V	-4.29	50.02	54	-3.98
10360	56.68	PK	257	1.8	H	6.04	62.72	68.2	-5.48
10360	56.87	PK	180	1.8	V	6.04	62.91	68.2	-5.29
5200 MHz									
10400	56.23	PK	145	2.4	H	6.30	62.53	68.2	-5.67
10400	56.75	PK	269	2.4	V	6.30	63.05	68.2	-5.15
5240 MHz									
5350	62.90	PK	332	1.4	H	-3.15	59.75	74	-14.25
5350	49.71	AV	332	1.4	H	-3.15	46.56	54	-7.44
5350	62.87	PK	308	2.3	V	-3.15	59.72	74	-14.28
5350	49.58	AV	308	2.3	V	-3.15	46.43	54	-7.57
5460	60.75	PK	104	2.4	H	-2.38	58.37	74	-15.63
5460	47.78	AV	104	2.4	H	-2.38	45.40	54	-8.60
5460	60.18	PK	154	2.5	V	-2.38	57.80	74	-16.20
5460	47.03	AV	154	2.5	V	-2.38	44.65	54	-9.35
10480	56.45	PK	146	1.6	H	6.00	62.45	68.2	-5.75
10480	57.36	PK	83	1.6	V	6.00	63.36	68.2	-4.84

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave		Height (m)	Polar (H/V)				
802.11ac20									
5180 MHz									
4500	65.14	PK	188	1.2	H	-6.01	59.13	74	-14.87
4500	53.16	AV	188	1.2	H	-6.01	47.15	54	-6.85
4500	64.56	PK	108	1	V	-6.01	58.55	74	-15.45
4500	52.76	AV	108	1	V	-6.01	46.75	54	-7.25
5150	66.74	PK	253	1.2	H	-4.29	62.45	74	-11.55
5150	54.47	AV	253	1.2	H	-4.29	50.18	54	-3.82
5150	66.42	PK	96	1.2	V	-4.29	62.13	74	-11.87
5150	54.11	AV	96	1.2	V	-4.29	49.82	54	-4.18
10360	55.60	PK	161	1.9	H	6.04	61.64	68.2	-6.56
10360	56.62	PK	208	1.9	V	6.04	62.66	68.2	-5.54
5200MHz									
10400	55.67	PK	82	1.4	H	6.30	61.97	68.2	-6.23
10400	56.82	PK	7	1.4	V	6.30	63.12	68.2	-5.08
5240 MHz									
5350	63.61	PK	135	1.9	H	-3.15	60.46	74	-13.54
5350	49.77	AV	135	1.9	H	-3.15	46.62	54	-7.38
5350	62.84	PK	22	1.8	V	-3.15	59.69	74	-14.31
5350	49.15	AV	22	1.8	V	-3.15	46.00	54	-8.00
5460	61.57	PK	199	1.1	H	-2.38	59.19	74	-14.81
5460	47.83	AV	199	1.1	H	-2.38	45.45	54	-8.55
5460	60.02	PK	28	2.5	V	-2.38	57.64	74	-16.36
5460	47.31	AV	28	2.5	V	-2.38	44.93	54	-9.07
10480	56.80	PK	313	1.4	H	6.00	62.80	68.2	-5.40
10480	57.78	PK	359	1.4	V	6.00	63.78	68.2	-4.42

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave		Height (m)	Polar (H/V)				
802.11ac40									
5190 MHz									
4500	70.24	PK	5	1.1	H	-6.01	64.23	74	-9.77
4500	54.09	AV	5	1.1	H	-6.01	48.08	54	-5.92
4500	68.58	PK	74	1.6	V	-6.01	62.57	74	-11.43
4500	53.58	AV	74	1.6	V	-6.01	47.57	54	-6.43
5150	71.07	PK	63	2	H	-4.29	66.78	74	-7.22
5150	55.27	AV	63	2	H	-4.29	50.98	54	-3.02
5150	70.38	PK	38	2.1	V	-4.29	66.09	74	-7.91
5150	55.13	AV	38	2.1	V	-4.29	50.84	54	-3.16
10380	54.38	PK	199	1.1	H	6.17	60.55	68.2	-7.65
10380	54.62	PK	195	1.1	V	6.17	60.79	68.2	-7.41
5230 MHz									
5350	62.80	PK	207	2.3	H	-3.15	59.65	74	-14.35
5350	50.12	AV	207	2.3	H	-3.15	46.97	54	-7.03
5350	62.57	PK	74	1.6	V	-3.15	59.42	74	-14.58
5350	49.85	AV	74	1.6	V	-3.15	46.70	54	-7.30
5460	60.82	PK	198	1.3	H	-2.38	58.44	74	-15.56
5460	48.53	AV	198	1.3	H	-2.38	46.15	54	-7.85
5460	60.24	PK	293	2.3	V	-2.38	57.86	74	-16.14
5460	47.41	AV	293	2.3	V	-2.38	45.03	54	-8.97
10460	55.23	PK	121	2.3	H	5.91	61.14	68.2	-7.06
10460	55.08	PK	324	2.3	V	5.91	60.99	68.2	-7.21

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave		Height (m)	Polar (H/V)				
802.11ac80									
5210MHz									
4500	67.93	PK	172	1.5	H	-6.01	61.92	74	-12.08
4500	53.66	AV	172	1.5	H	-6.01	47.65	54	-6.35
4500	68.12	PK	215	2	V	-6.01	62.11	74	-11.89
4500	54.33	AV	215	2	V	-6.01	48.32	54	-5.68
5150	68.98	PK	253	2.4	H	-4.29	64.69	74	-9.31
5150	54.96	AV	253	2.4	H	-4.29	50.67	54	-3.33
5150	69.15	PK	9	1.4	V	-4.29	64.86	74	-9.14
5150	55.21	AV	9	1.4	V	-4.29	50.92	54	-3.08
5350	63.05	PK	150	1.6	H	-3.15	59.90	74	-14.10
5350	51.01	AV	150	1.6	H	-3.15	47.86	54	-6.14
5350	64.16	PK	29	1.9	V	-3.15	61.01	74	-12.99
5350	51.12	AV	29	1.9	V	-3.15	47.97	54	-6.03
5460	61.42	PK	118	2.1	H	-2.38	59.04	74	-14.96
5460	49.18	AV	118	2.1	H	-2.38	46.80	54	-7.20
5460	62.79	PK	195	1.4	V	-2.38	60.41	74	-13.59
5460	49.84	AV	195	1.4	V	-2.38	47.46	54	-6.54
10420	54.39	PK	49	2.1	H	6.12	60.51	68.2	-7.69
10420	54.60	PK	43	2.1	V	6.12	60.72	68.2	-7.48

5725-5850 MHz:

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave		Height (m)	Polar (H/V)				
802.11a									
5745 MHz									
5650	62.07	PK	261	1	H	-2.80	59.27	68.2	-8.93
5700	61.32	PK	45	1.8	H	-1.62	59.70	105.2	-45.50
5720	66.58	PK	182	2.2	H	-1.95	64.63	110.8	-46.17
5725	76.11	PK	114	2.3	H	-2.03	74.08	122.2	-48.12
5650	61.89	PK	182	2.2	V	-2.80	59.09	68.2	-9.11
5700	61.00	PK	328	1.9	V	-1.62	59.38	105.2	-45.82
5720	66.16	PK	76	1.6	V	-1.95	64.21	110.8	-46.59
5725	74.90	PK	278	1	V	-2.03	72.87	122.2	-49.33
11490	53.91	PK	357	1.9	H	7.99	61.90	74	-12.10
11490	41.18	AV	191	1.9	H	7.99	49.17	54	-4.83
11490	55.02	PK	162	1.8	V	7.99	63.01	74	-10.99
11490	42.47	AV	259	1.8	V	7.99	50.46	54	-3.54
5785 MHz									
11570	54.99	PK	239	1.5	H	7.69	62.68	74	-11.32
11570	41.72	AV	50	1.5	H	7.69	49.41	54	-4.59
11570	55.86	PK	59	1.5	V	7.69	63.55	74	-10.45
11570	42.95	AV	223	1.5	V	7.69	50.64	54	-3.36
5825 MHz									
5850	67.88	PK	102	2.1	H	-0.60	67.28	122.2	-54.92
5855	62.83	PK	162	2.2	H	-0.50	62.33	110.8	-48.47
5875	60.68	PK	358	1.6	H	-0.09	60.59	105.2	-44.61
5925	60.18	PK	90	1.3	H	-0.12	60.06	68.2	-8.14
5850	67.06	PK	343	1.3	V	-0.60	66.46	122.2	-55.74
5855	62.16	PK	101	1.9	V	-0.50	61.66	110.8	-49.14
5875	60.00	PK	42	2	V	-0.09	59.91	105.2	-45.29
5925	59.46	PK	316	2.5	V	-0.12	59.34	68.2	-8.86
11650	56.24	PK	75	1	H	6.82	63.06	74	-10.94
11650	42.43	AV	232	1	H	6.82	49.25	54	-4.75
11650	56.56	PK	41	1.6	V	6.82	63.38	74	-10.62
11650	43.40	AV	297	1.6	V	6.82	50.22	54	-3.78

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave		Height (m)	Polar (H/V)				
802.11ac20									
5745 MHz									
5650	62.18	PK	335	1.4	H	-2.80	59.38	68.2	-8.82
5700	61.55	PK	234	1.2	H	-1.62	59.93	105.2	-45.27
5720	69.86	PK	41	1.6	H	-1.95	67.91	110.8	-42.89
5725	76.45	PK	286	2.2	H	-2.03	74.42	122.2	-47.78
5650	61.52	PK	138	2	V	-2.80	58.72	68.2	-9.48
5700	61.13	PK	11	1.7	V	-1.62	59.51	105.2	-45.69
5720	68.99	PK	174	2	V	-1.95	67.04	110.8	-43.76
5725	76.03	PK	311	1.9	V	-2.03	74.00	122.2	-48.20
11490	55.06	PK	97	1.9	H	7.99	63.05	74	-10.95
11490	40.21	AV	338	1.9	H	7.99	48.20	54	-5.80
11490	55.23	PK	58	2.2	V	7.99	63.22	74	-10.78
11490	42.00	AV	34	2.2	V	7.99	49.99	54	-4.01
5785 MHz									
11570	54.96	PK	274	1.7	H	7.69	62.65	74	-11.35
11570	41.53	AV	282	1.7	H	7.69	49.22	54	-4.78
11570	55.65	PK	159	2.1	V	7.69	63.34	74	-10.66
11570	42.57	AV	307	2.1	V	7.69	50.26	54	-3.74
5825 MHz									
5850	67.93	PK	8	2	H	-0.60	67.33	122.2	-54.87
5855	63.39	PK	8	2	H	-0.50	62.89	110.8	-47.91
5875	60.89	PK	184	1.5	H	-0.09	60.80	105.2	-44.40
5925	60.27	PK	334	1.3	H	-0.12	60.15	68.2	-8.05
5850	66.89	PK	220	1.5	V	-0.60	66.29	122.2	-55.91
5855	62.83	PK	38	1.2	V	-0.50	62.33	110.8	-48.47
5875	60.17	PK	170	2.2	V	-0.09	60.08	105.2	-45.12
5925	59.47	PK	231	2.3	V	-0.12	59.35	68.2	-8.85
11650	55.33	PK	299	2.4	H	6.82	62.15	74	-11.85
11650	42.26	AV	25	2.4	H	6.82	49.08	54	-4.92
11650	55.99	PK	66	1.1	V	6.82	62.81	74	-11.19
11650	43.87	AV	159	1.1	V	6.82	50.69	54	-3.31

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave		Height (m)	Polar (H/V)				
802.11ac40									
5755 MHz									
5650	62.11	PK	316	1.1	H	-2.80	59.31	68.2	-8.89
5700	61.35	PK	313	1.6	H	-1.62	59.73	105.2	-45.47
5720	75.13	PK	48	2.2	H	-1.95	73.18	110.8	-37.62
5725	75.85	PK	225	2.3	H	-2.03	73.82	122.2	-48.38
5650	61.82	PK	110	2.4	V	-2.80	59.02	68.2	-9.18
5700	61.29	PK	111	1.4	V	-1.62	59.67	105.2	-45.53
5720	73.91	PK	248	1.2	V	-1.95	71.96	110.8	-38.84
5725	75.14	PK	101	1.9	V	-2.03	73.11	122.2	-49.09
11510	53.86	PK	267	1.1	H	8.04	61.90	74	-12.10
11510	40.10	AV	154	1.1	H	8.04	48.14	54	-5.86
11510	54.07	PK	79	1.4	V	8.04	62.11	74	-11.89
11510	41.79	AV	97	1.4	V	8.04	49.83	54	-4.17
5795 MHz									
5850	62.13	PK	152	1.7	H	-0.60	61.53	122.2	-60.67
5855	61.18	PK	79	1.7	H	-0.50	60.68	110.8	-50.12
5875	60.25	PK	330	2.2	H	-0.09	60.16	105.2	-45.04
5925	59.89	PK	279	2.3	H	-0.12	59.77	68.2	-8.43
5850	61.45	PK	348	2.2	V	-0.60	60.85	122.2	-61.35
5855	60.97	PK	266	1.5	V	-0.50	60.47	110.8	-50.33
5875	60.07	PK	171	2.5	V	-0.09	59.98	105.2	-45.22
5925	59.81	PK	319	1.6	V	-0.12	59.69	68.2	-8.51
11590	53.95	PK	132	1.5	H	7.60	61.55	74	-12.45
11590	41.61	AV	248	1.5	H	7.60	49.21	54	-4.79
11590	54.60	PK	302	1.6	V	7.60	62.20	74	-11.80
11590	42.32	AV	112	1.6	V	7.60	49.92	54	-4.08

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave		Height (m)	Polar (H/V)				
802.11ac80									
5775 MHz									
5650	62.70	PK	13	1	H	-2.80	59.90	68.2	-8.30
5700	63.04	PK	268	1.2	H	-1.62	61.42	105.2	-43.78
5720	70.13	PK	173	1.6	H	-1.95	68.18	110.8	-42.62
5725	70.90	PK	115	1	H	-2.03	68.87	122.2	-53.33
5650	62.22	PK	48	1.8	V	-2.80	59.42	68.2	-8.78
5700	62.73	PK	263	1.5	V	-1.62	61.11	105.2	-44.09
5720	68.96	PK	164	2.4	V	-1.95	67.01	110.8	-43.79
5725	69.84	PK	323	1.4	V	-2.03	67.81	122.2	-54.39
5850	62.26	PK	335	2.1	H	-0.60	61.66	122.2	-60.54
5855	61.63	PK	106	1.4	H	-0.50	61.13	110.8	-49.67
5875	60.64	PK	74	1.6	H	-0.09	60.55	105.2	-44.65
5925	60.16	PK	278	1.6	H	-0.12	60.04	68.2	-8.16
5850	61.65	PK	95	1.1	V	-0.60	61.05	122.2	-61.15
5855	61.46	PK	100	1.8	V	-0.50	60.96	110.8	-49.84
5875	60.20	PK	146	1.1	V	-0.09	60.11	105.2	-45.09
5925	59.55	PK	174	1.1	V	-0.12	59.43	68.2	-8.77
11550	53.54	PK	84	2	H	7.77	61.31	74	-12.69
11550	41.11	AV	353	2	H	7.77	48.88	54	-5.12
11550	53.99	PK	336	1.2	V	7.77	61.76	74	-12.24
11550	42.48	AV	311	1.2	V	7.77	50.25	54	-3.75

Note:

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

Corrected Amplitude = Corrected Factor + Reading

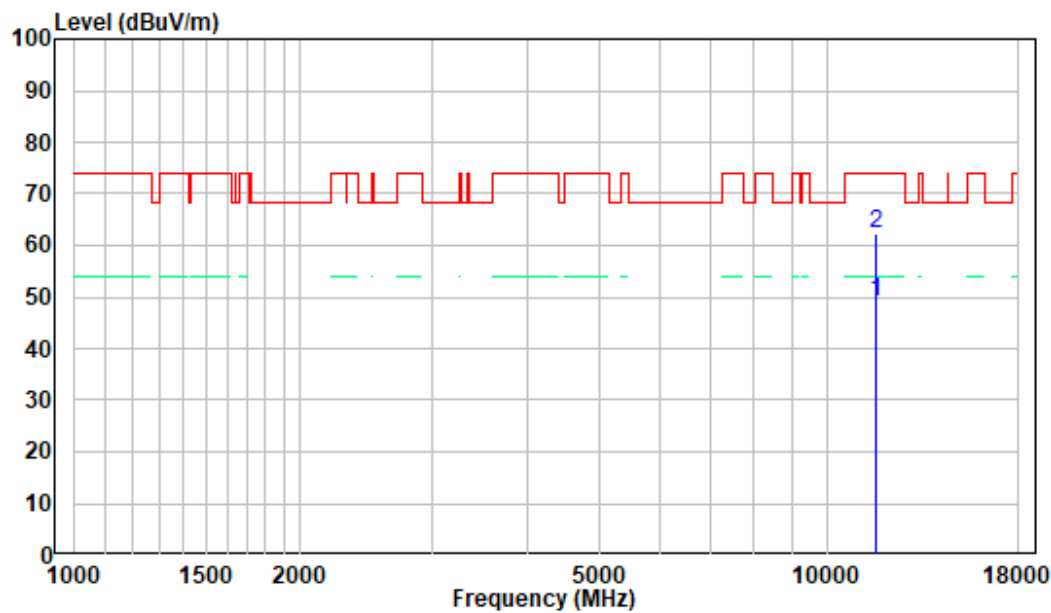
Margin = Corrected. Amplitude - Limit

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

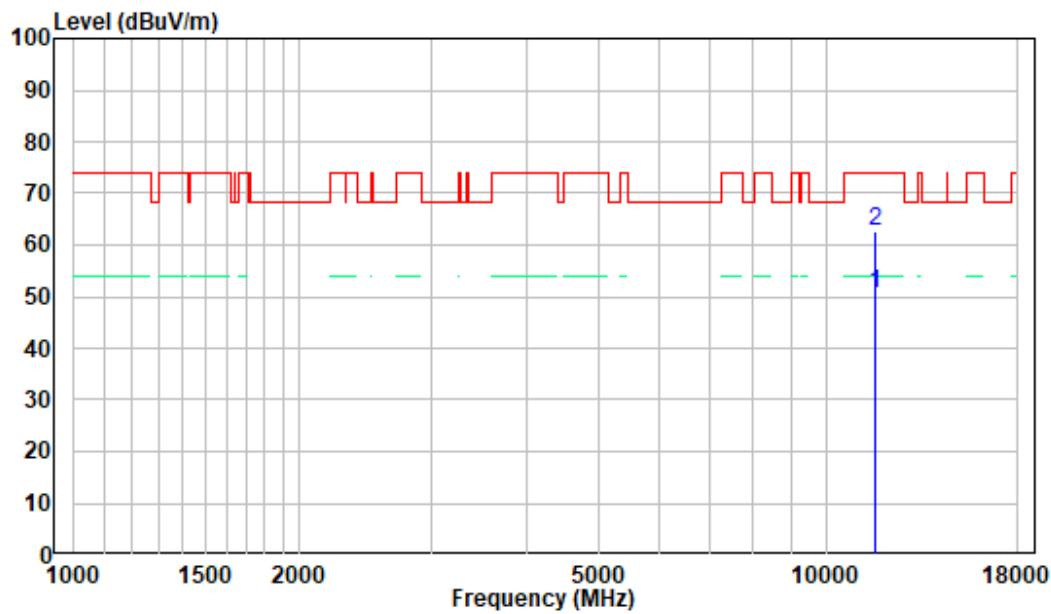
1 GHz - 18 GHz: (Pre-Scan plots)

802.11 ac20, 5825MHz

Horizontal

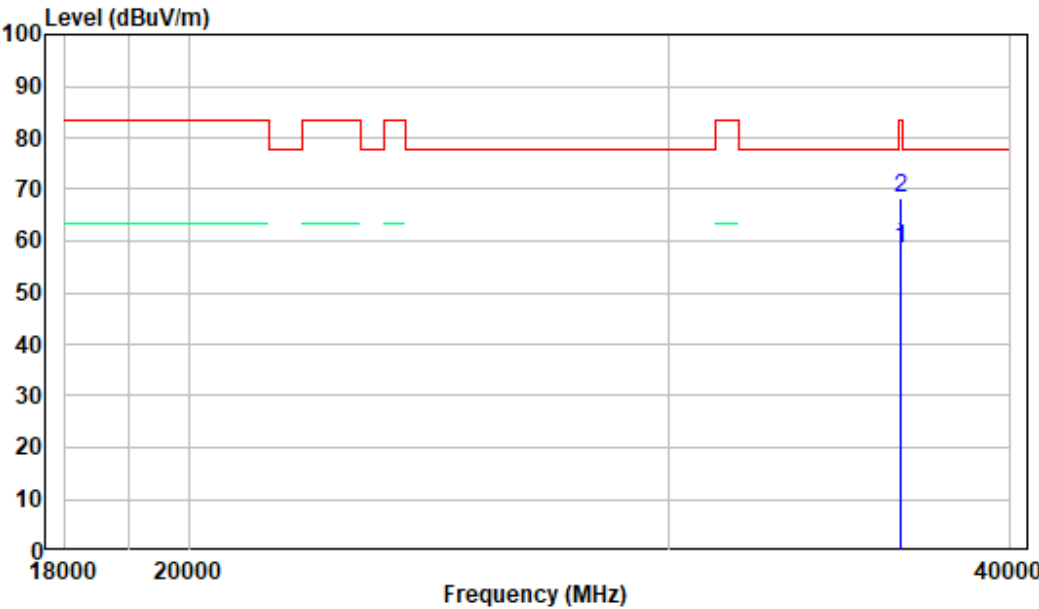


Vertical

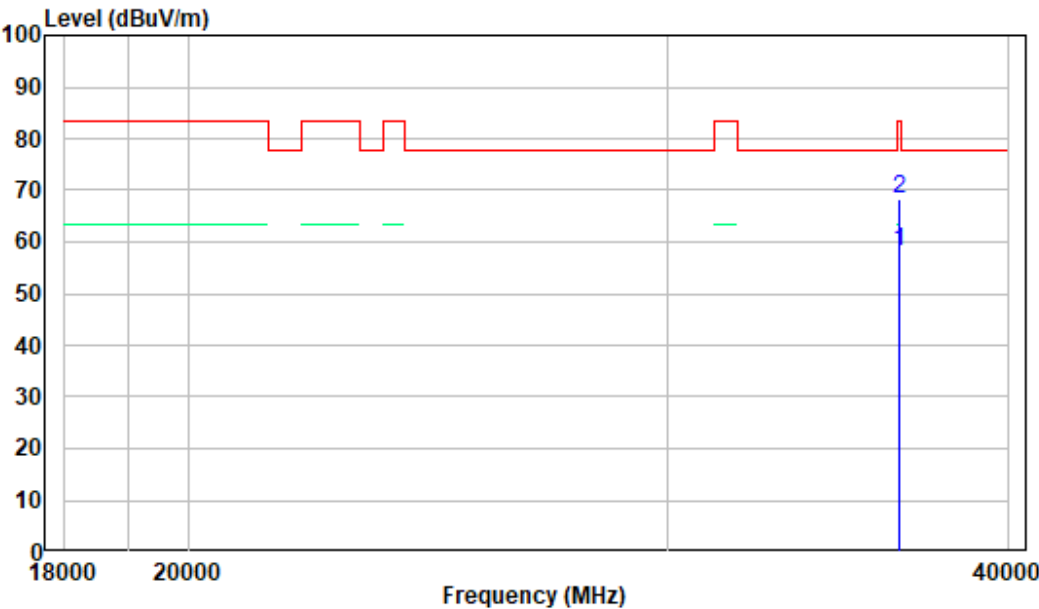


18-40GHz: (Pre-Scan plots)

802.11 ac20, 5825MHz
Horizontal



Vertical



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

Applicable Standard

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

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

Test Procedure

According to KDB789033 D02 section II.C and section II.D

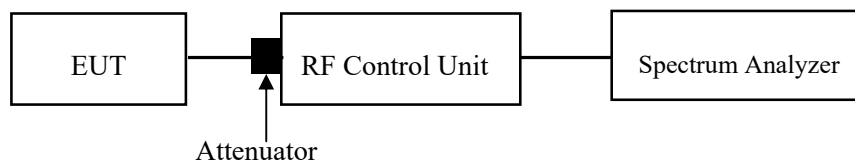
1. Emission Bandwidth (EBW)

- 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 5.725-5.85 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:	24.5 °C
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Amanda Wei on 2023-06-29 and 2023-06-30.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the Appendix.

FCC §15.407(a) – CONDUCTED TRANSMITTER OUTPUT POWER

Applicable Standard

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

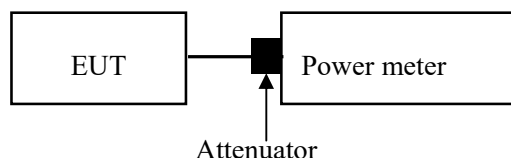
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Method PM-G should be applied

- 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.



Test Data**Environmental Conditions**

Temperature:	24.5 °C
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Amanda Wei on 2023-06-29 and 2023-06-30.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the Appendix.

FCC §15.407(a) - POWER SPECTRAL DENSITY

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

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

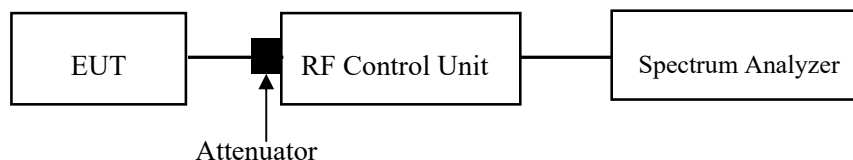
Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Method SA-2 should be applied

- Set RBW=1MHz or 500 kHz. VBW>3 RBW
- If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10 \log(500 \text{ kHz RBW})$ to the measured result. Whereas RBW (<500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
- If measurement bandwidth of Maximum PSD is specified in 1 MHz, add $10 \log(1 \text{ MHz/RBW})$ to the measured result, whereas RBW (<1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
- Detector=power averaging(1ms)
- Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 kHz for the II.F.5.c) and ILF 5.d. since RBW=100 kHz is available on nearly all spectrum analyzers.

- Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.



Test Data**Environmental Conditions**

Temperature:	24.5 °C
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Amanda Wei on 2023-06-29 and 2023-06-30.

EUT operation mode: Transmitting

Test Result: Pass

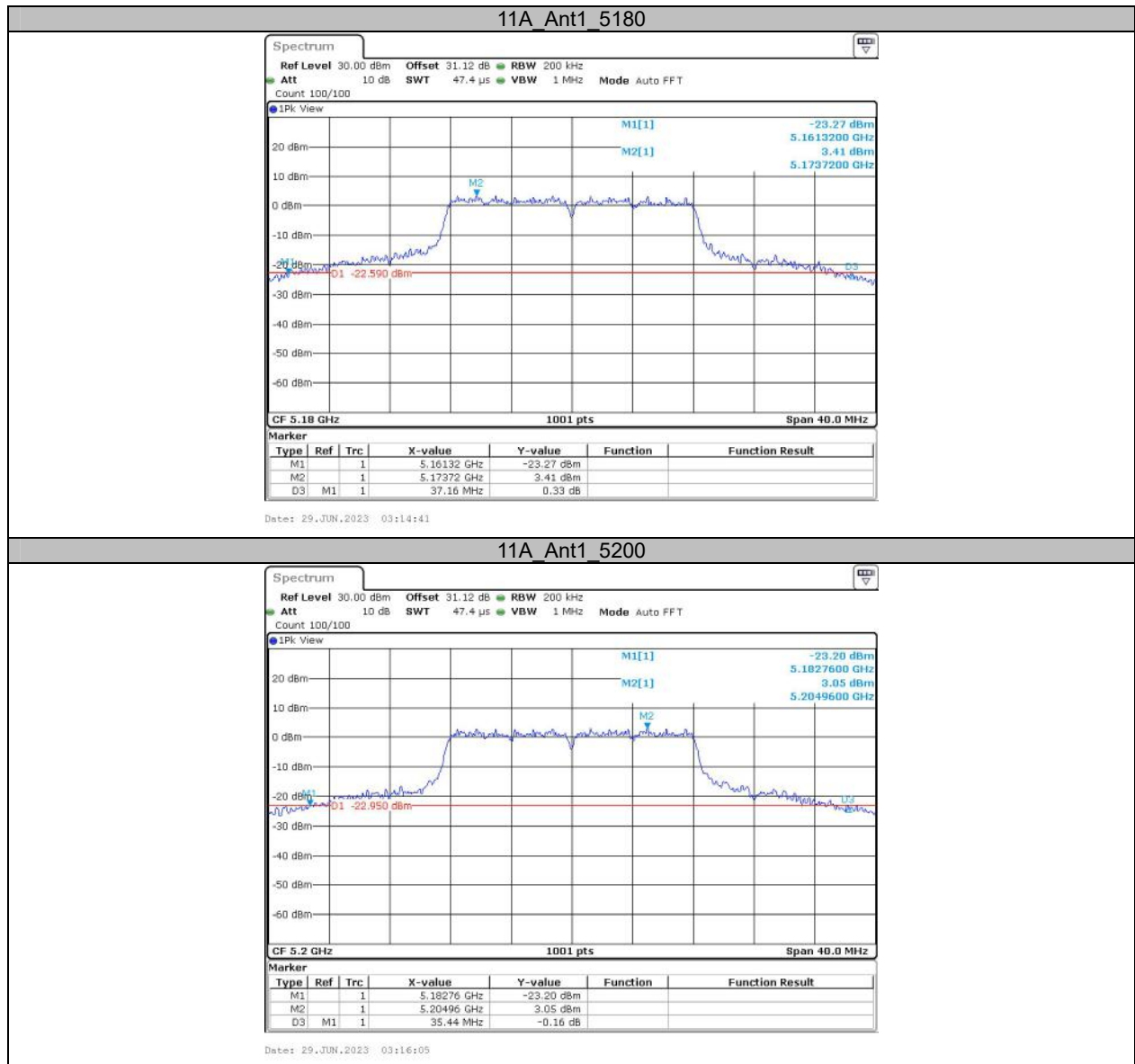
Please refer to the Appendix.

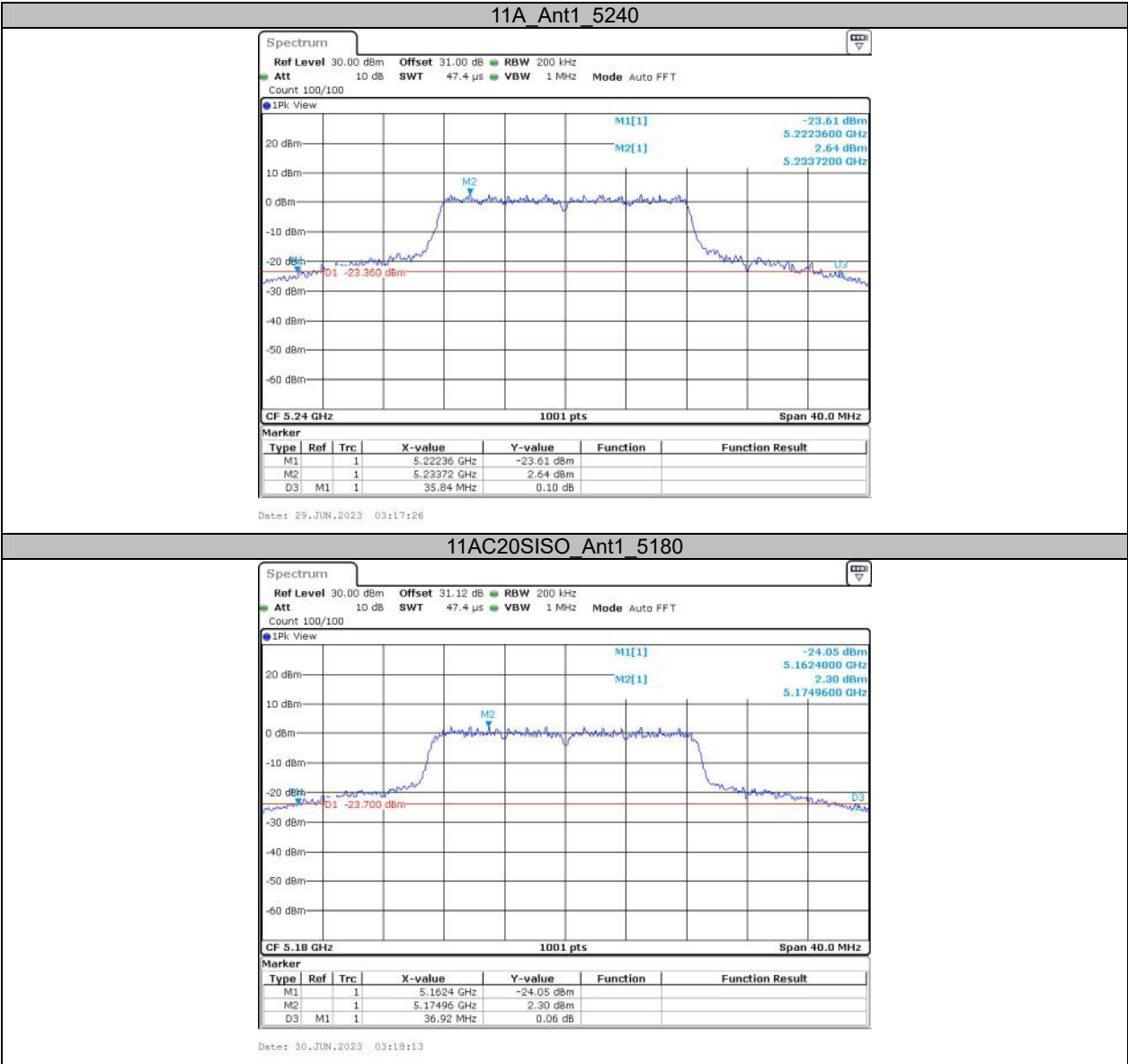
APPENDIX

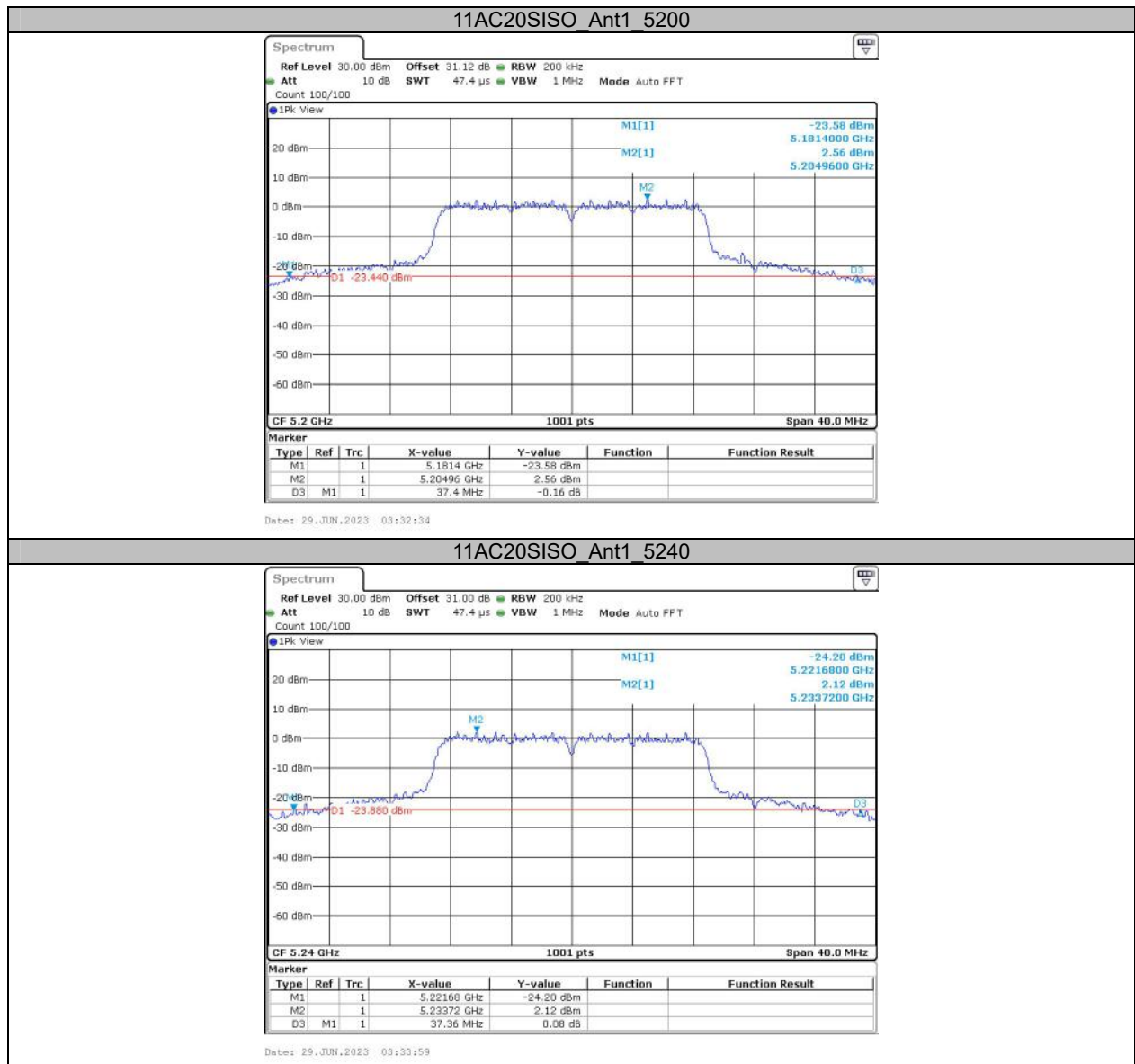
Appendix A1: Emission Bandwidth Test Result

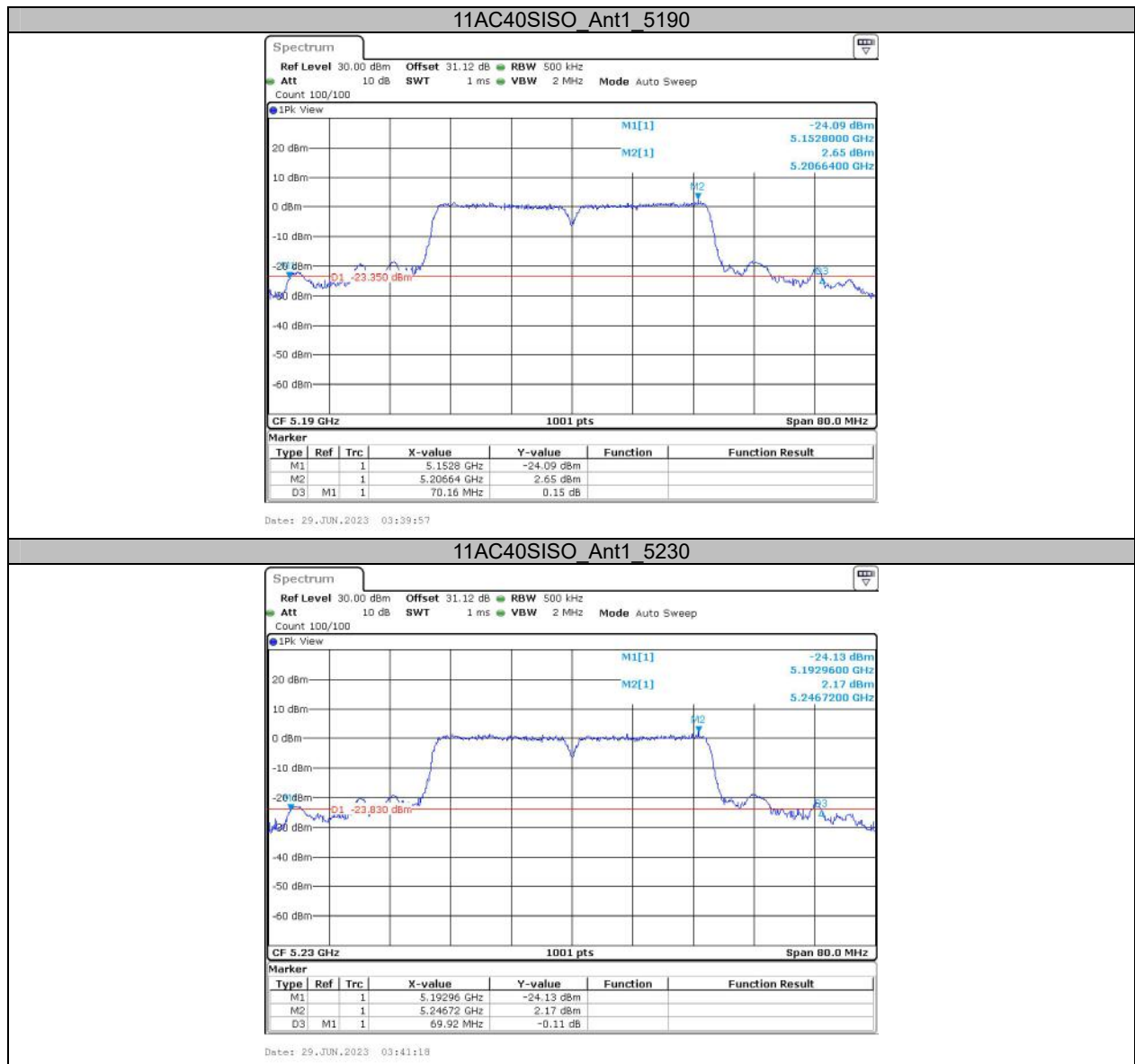
Test Mode	Antenna	Frequency[MHz]	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	37.16	5161.32	5198.48	---	---
		5200	35.44	5182.76	5218.20	---	---
		5240	35.84	5222.36	5258.20	---	---
11AC20SISO	Ant1	5180	36.92	5162.40	5199.32	---	---
		5200	37.40	5181.40	5218.80	---	---
		5240	37.36	5221.68	5259.04	---	---
11AC40SISO	Ant1	5190	70.16	5152.80	5222.96	---	---
		5230	69.92	5192.96	5262.88	---	---
11AC80SISO	Ant1	5210	109.76	5153.84	5263.60	---	---

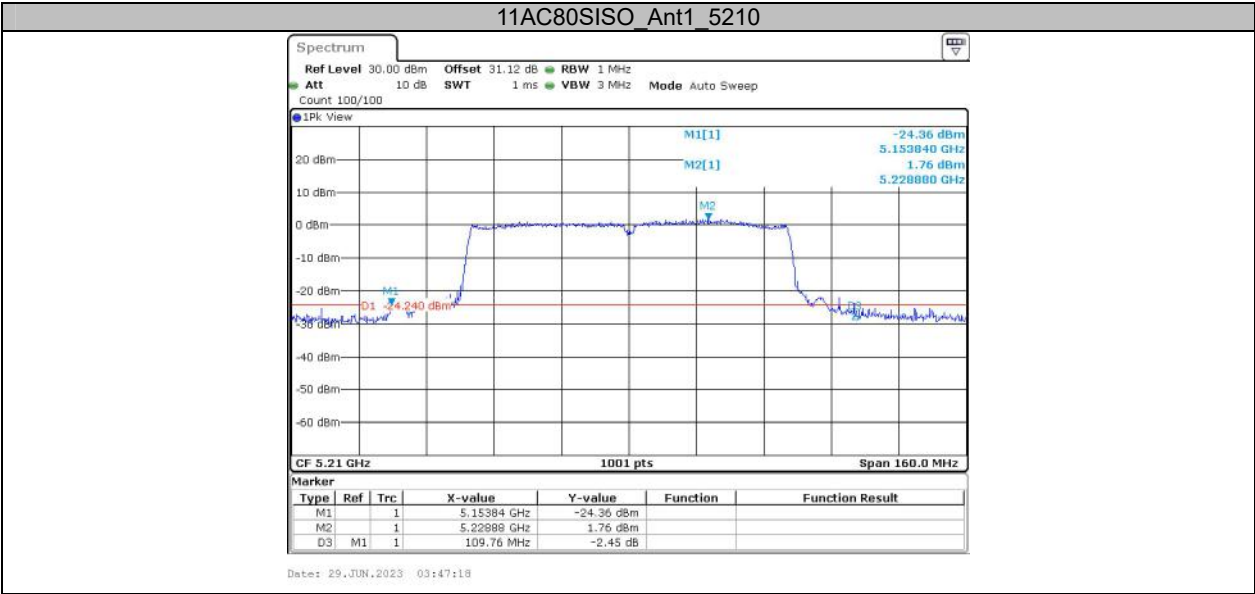
Test Graphs









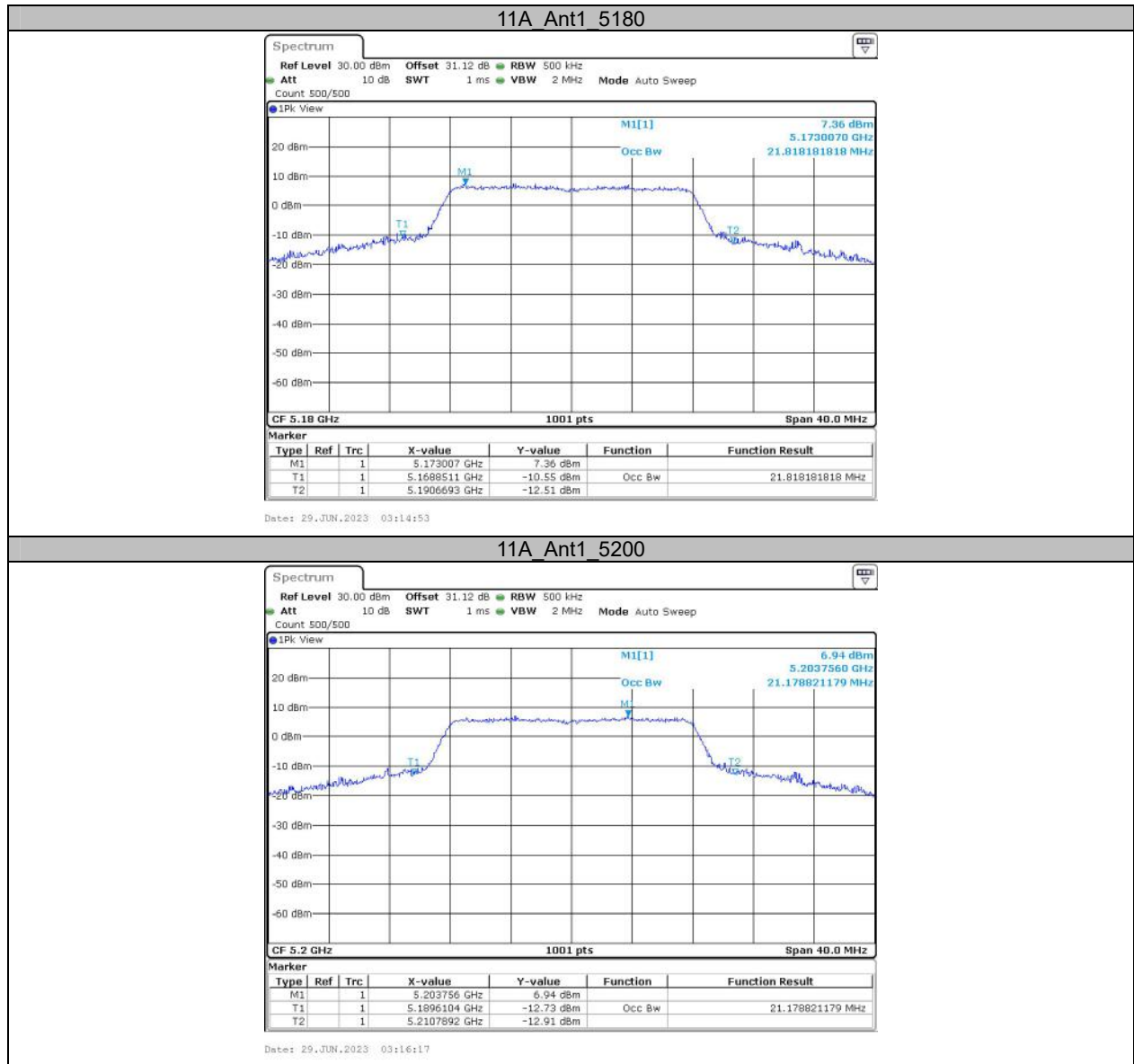


Appendix A2: Occupied channel bandwidth Test Result

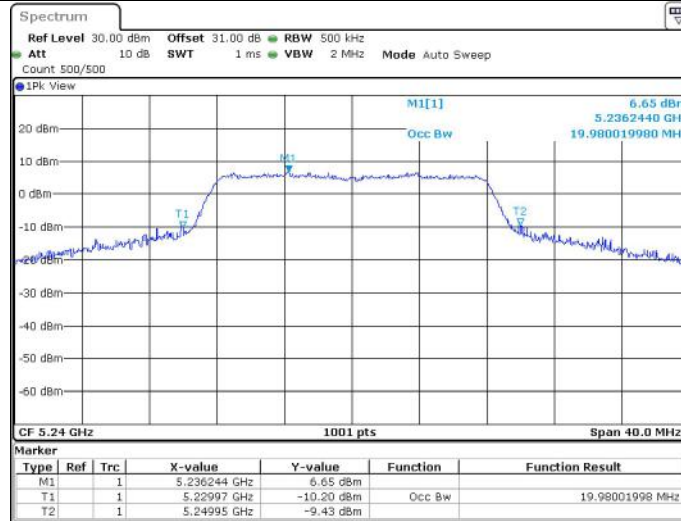
Test Mode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	21.818	5168.851	5190.669	---	---
		5200	21.179	5189.610	5210.789	---	---
		5240	19.98	5229.970	5249.950	---	---
		5745	17.862	5735.889	5753.751	---	---
		5785	17.742	5776.009	5793.751	---	---
		5825	17.622	5816.089	5833.711	---	---
11AC20SISO	Ant1	5180	20.699	5169.451	5190.150	---	---
		5200	19.9	5190.330	5210.230	---	---
		5240	19.141	5230.370	5249.510	---	---
		5745	18.302	5735.729	5754.031	---	---
		5785	18.222	5775.809	5794.031	---	---
		5825	18.182	5815.809	5833.991	---	---
11AC40SISO	Ant1	5190	38.122	5170.979	5209.101	---	---
		5230	37.642	5211.219	5248.861	---	---
		5755	37.243	5736.299	5773.541	---	---
		5795	37.163	5776.379	5813.541	---	---
11AC80SISO	Ant1	5210	76.244	5171.958	5248.202	---	---
		5775	76.404	5736.798	5813.202	---	---

Note: the EUT not operating with any part of OBW fall within frequency range of 5250-5350MHz&5470-5725MHz range.

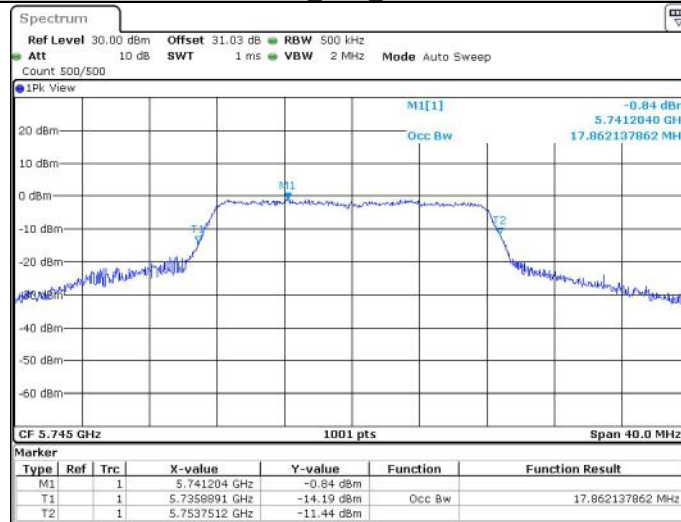
Test Graphs



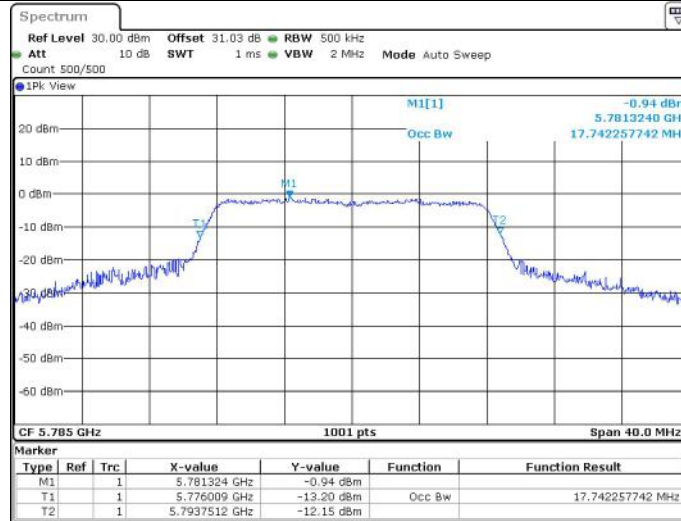
11A_Ant1_5240



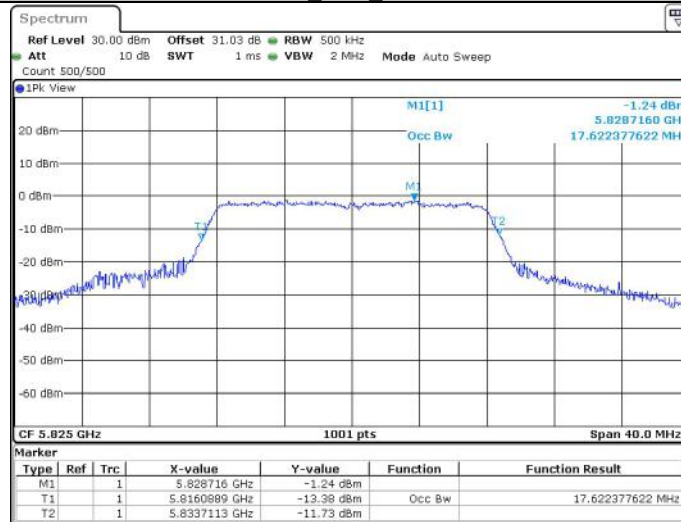
11A_Ant1_5745

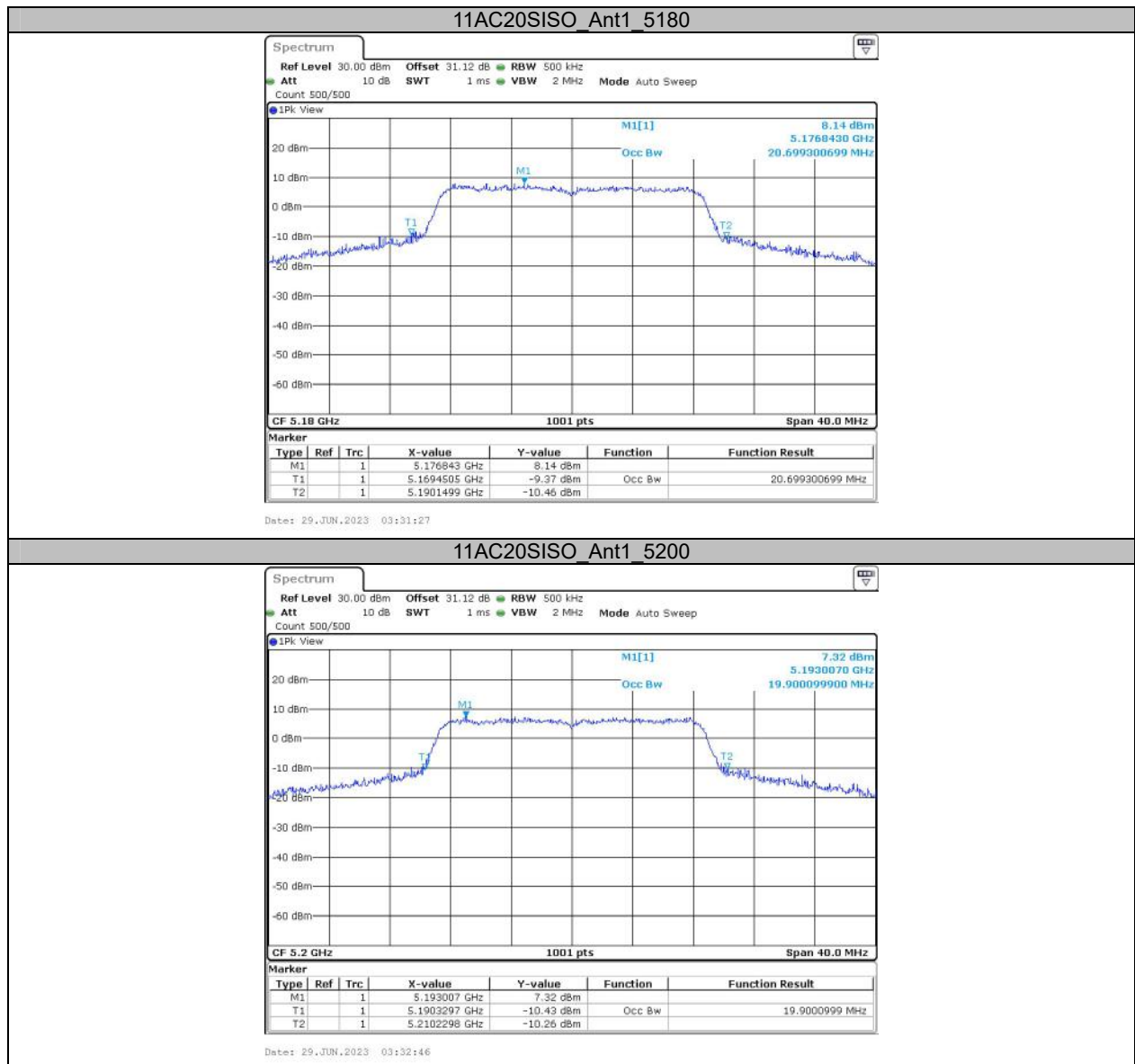


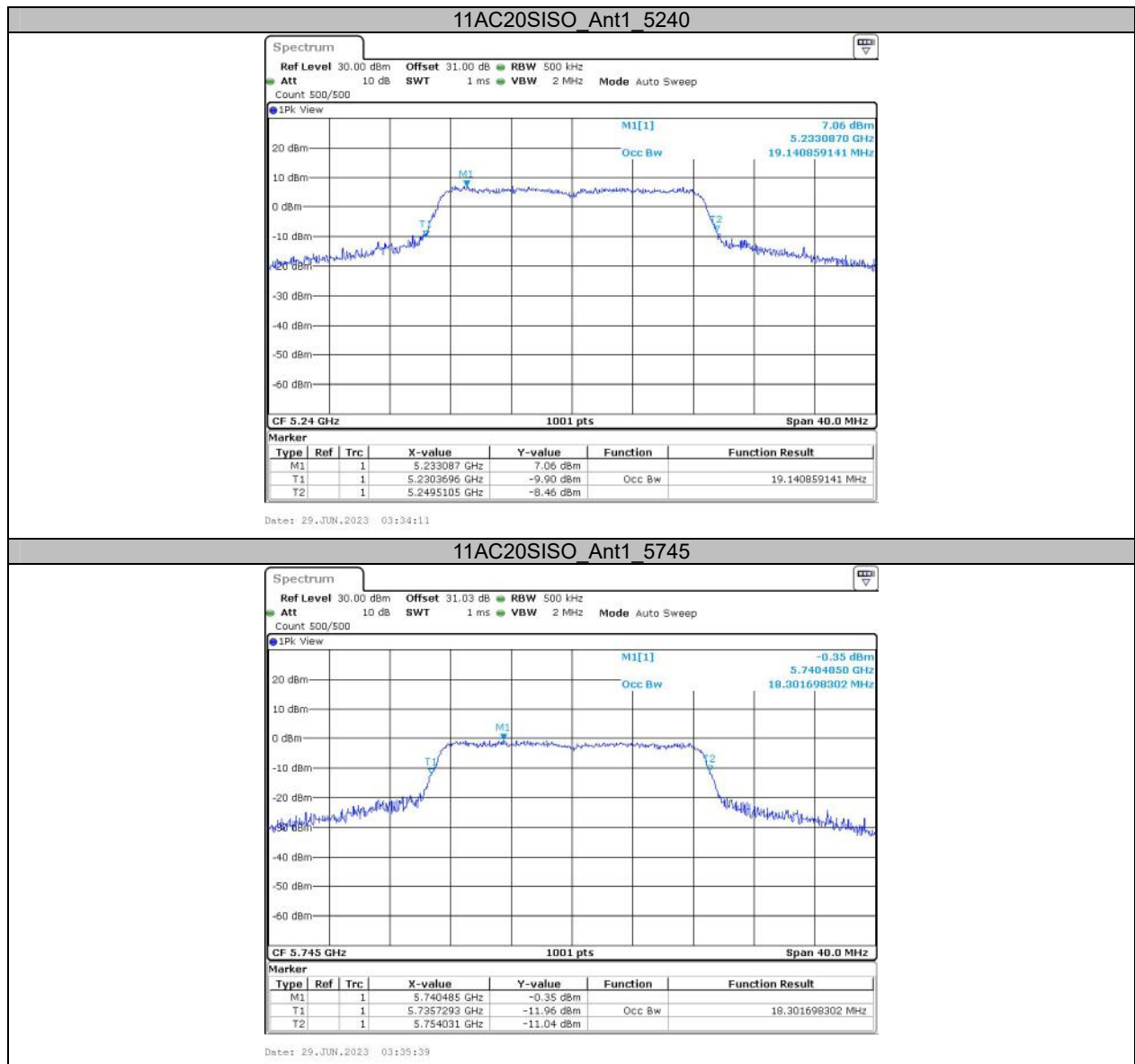
11A_Ant1_5785

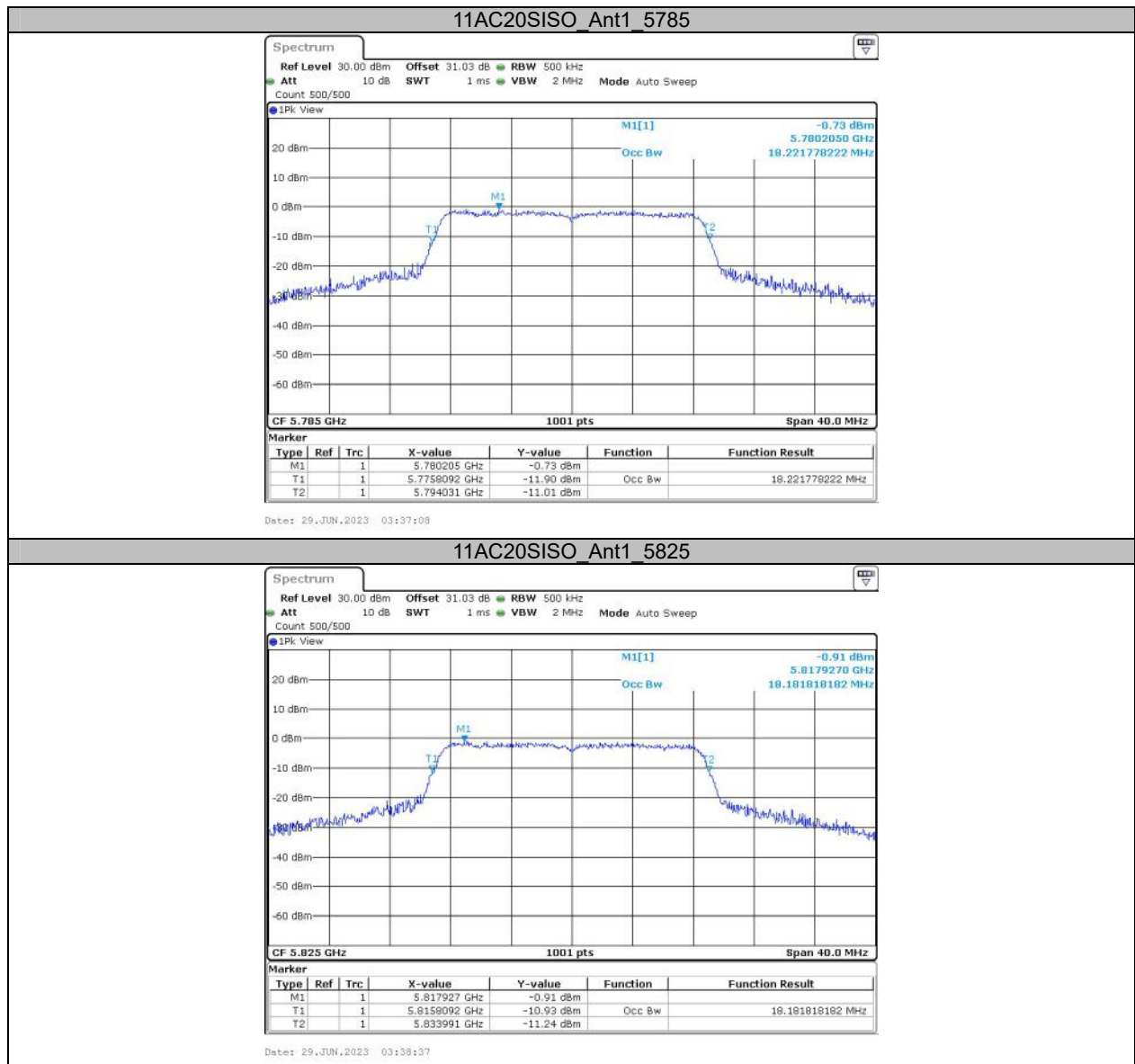


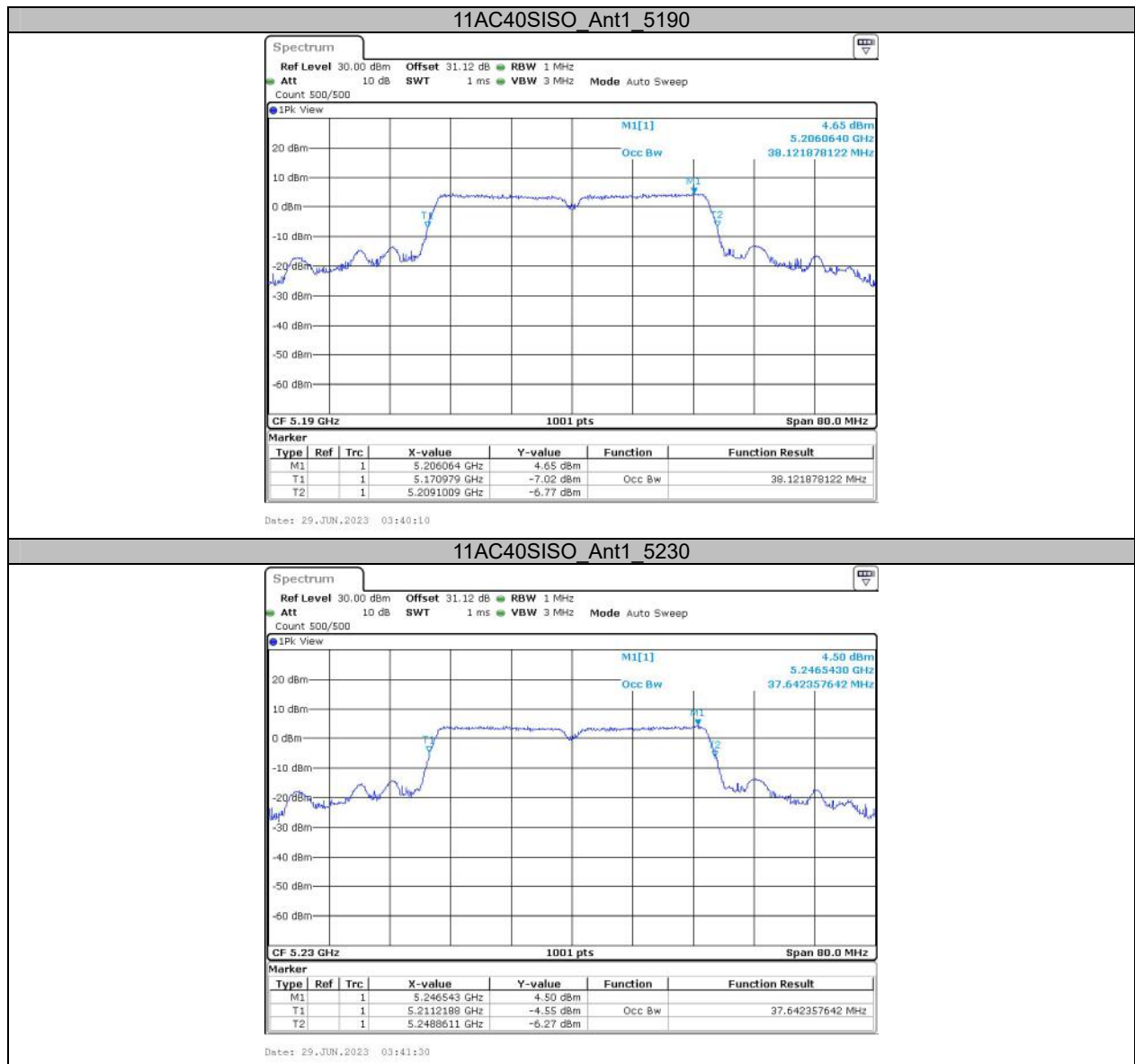
11A_Ant1_5825

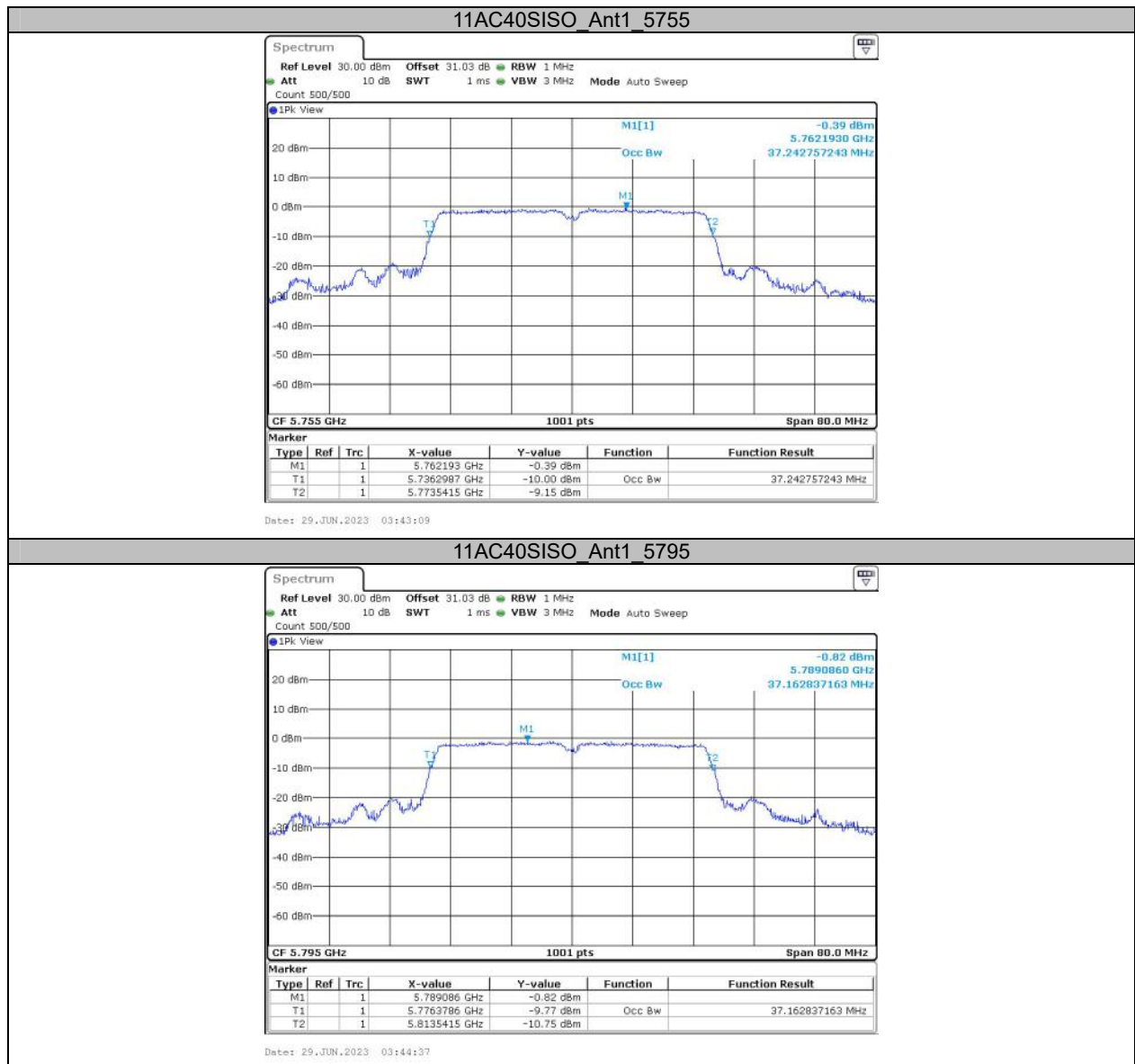


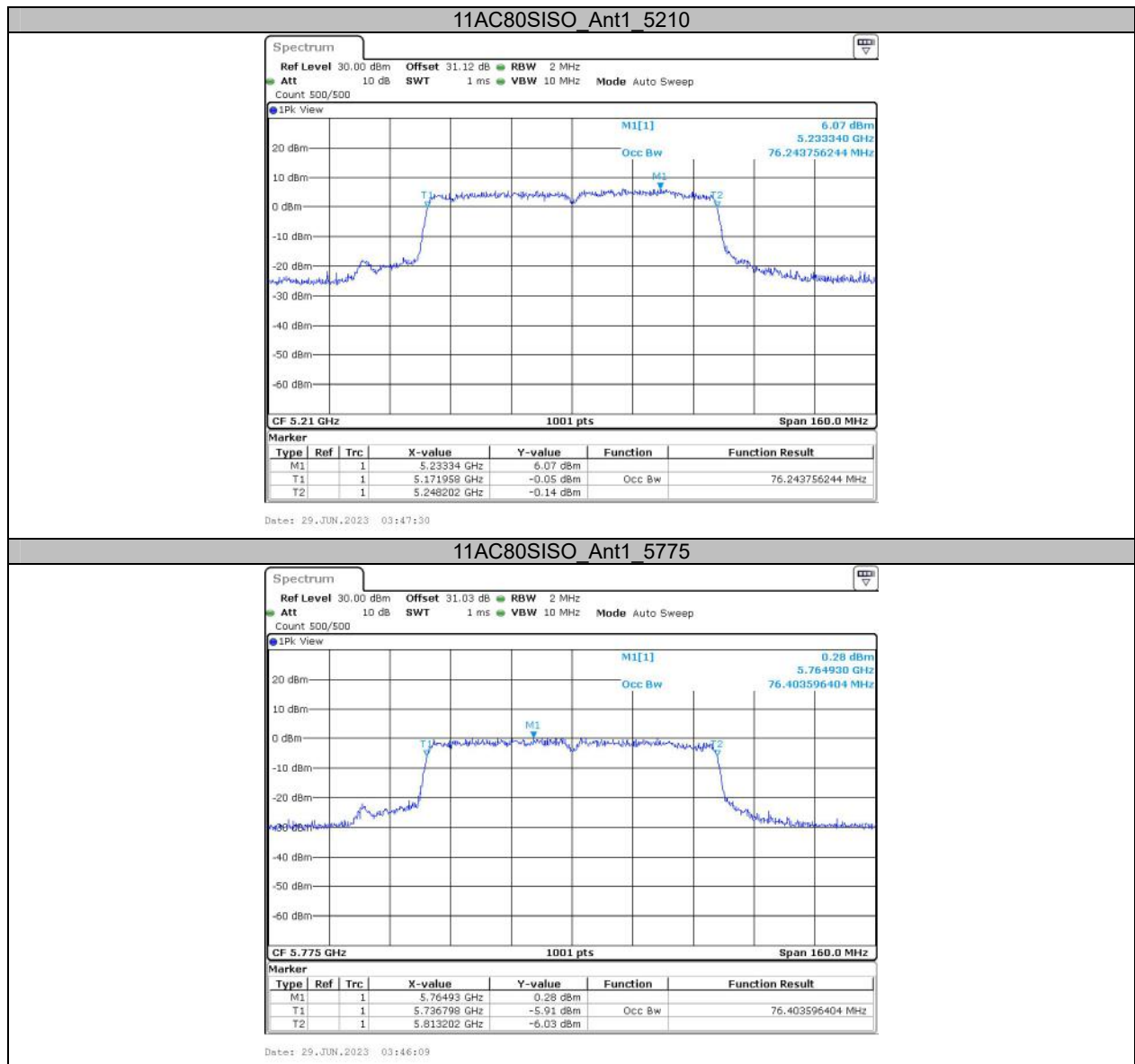








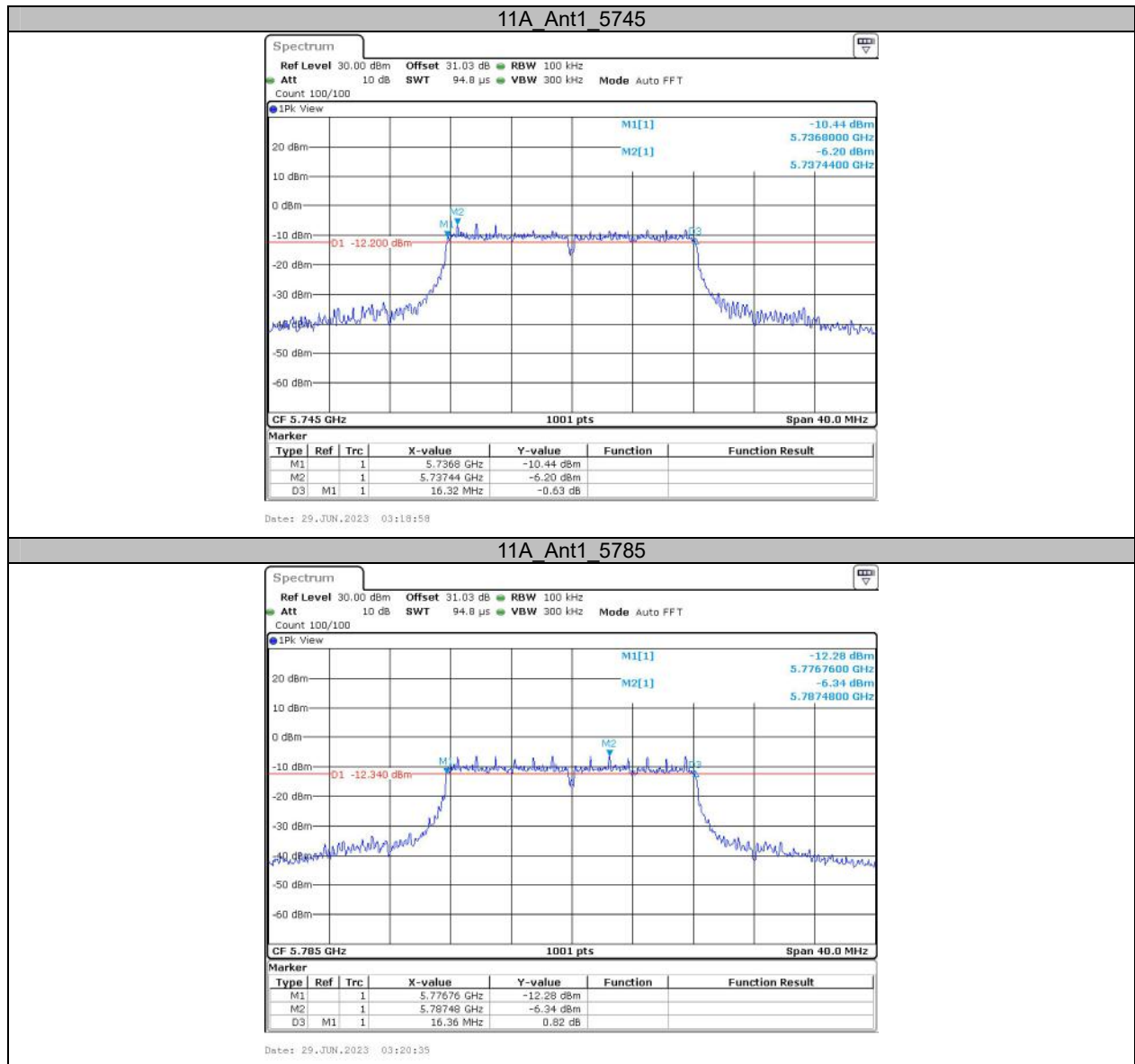


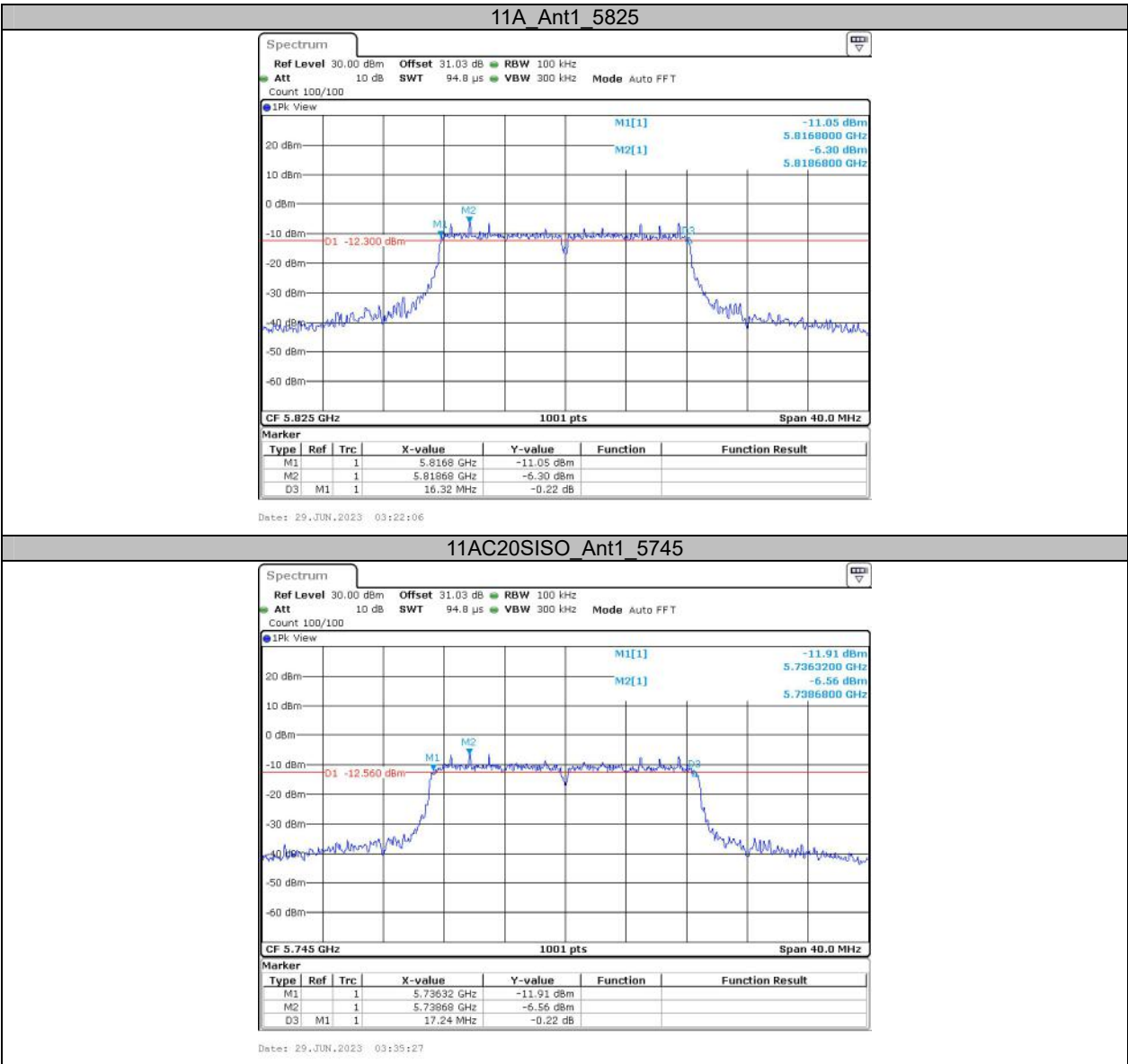


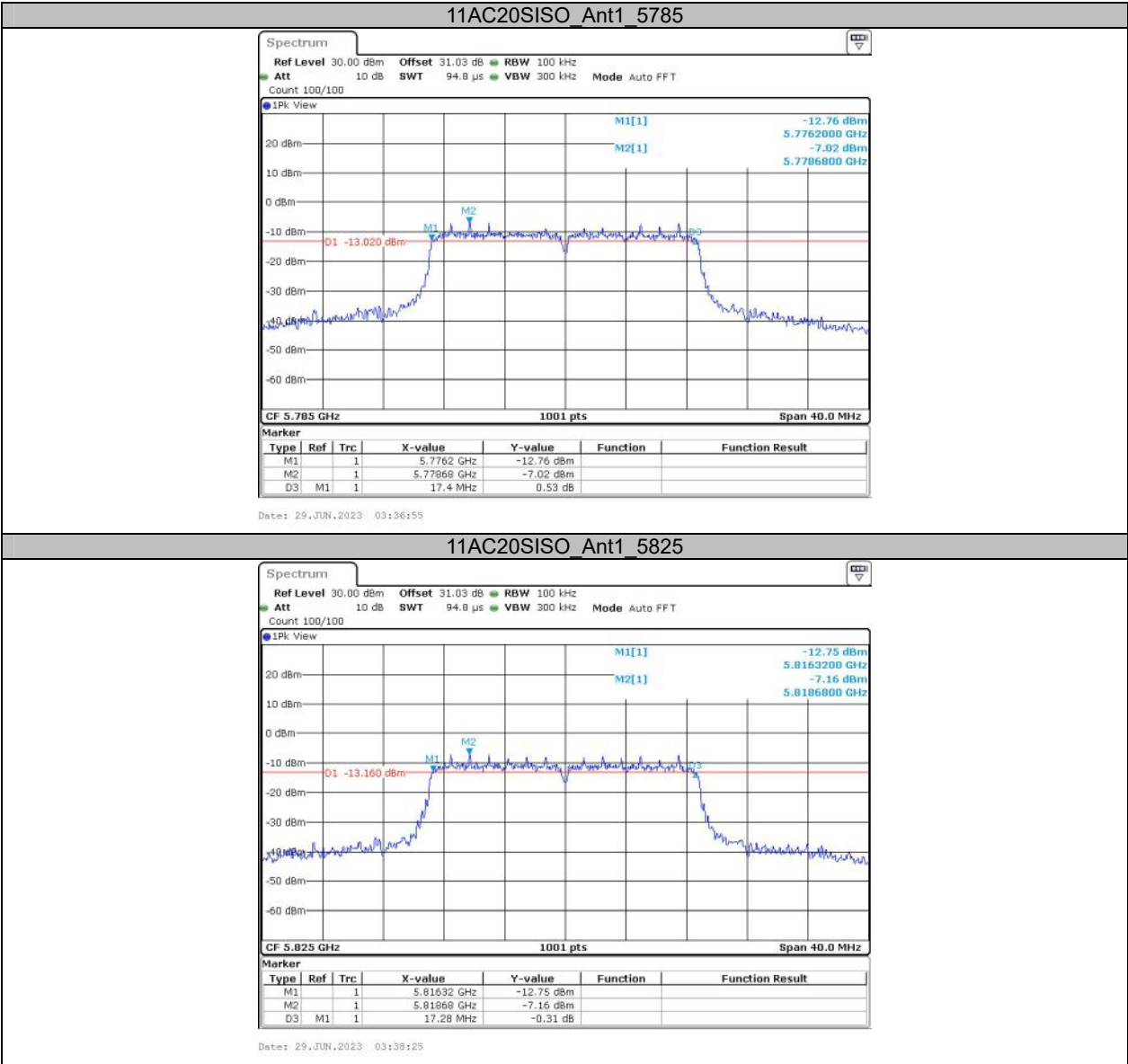
**Appendix A3: Min emission bandwidth
Test Result B4**

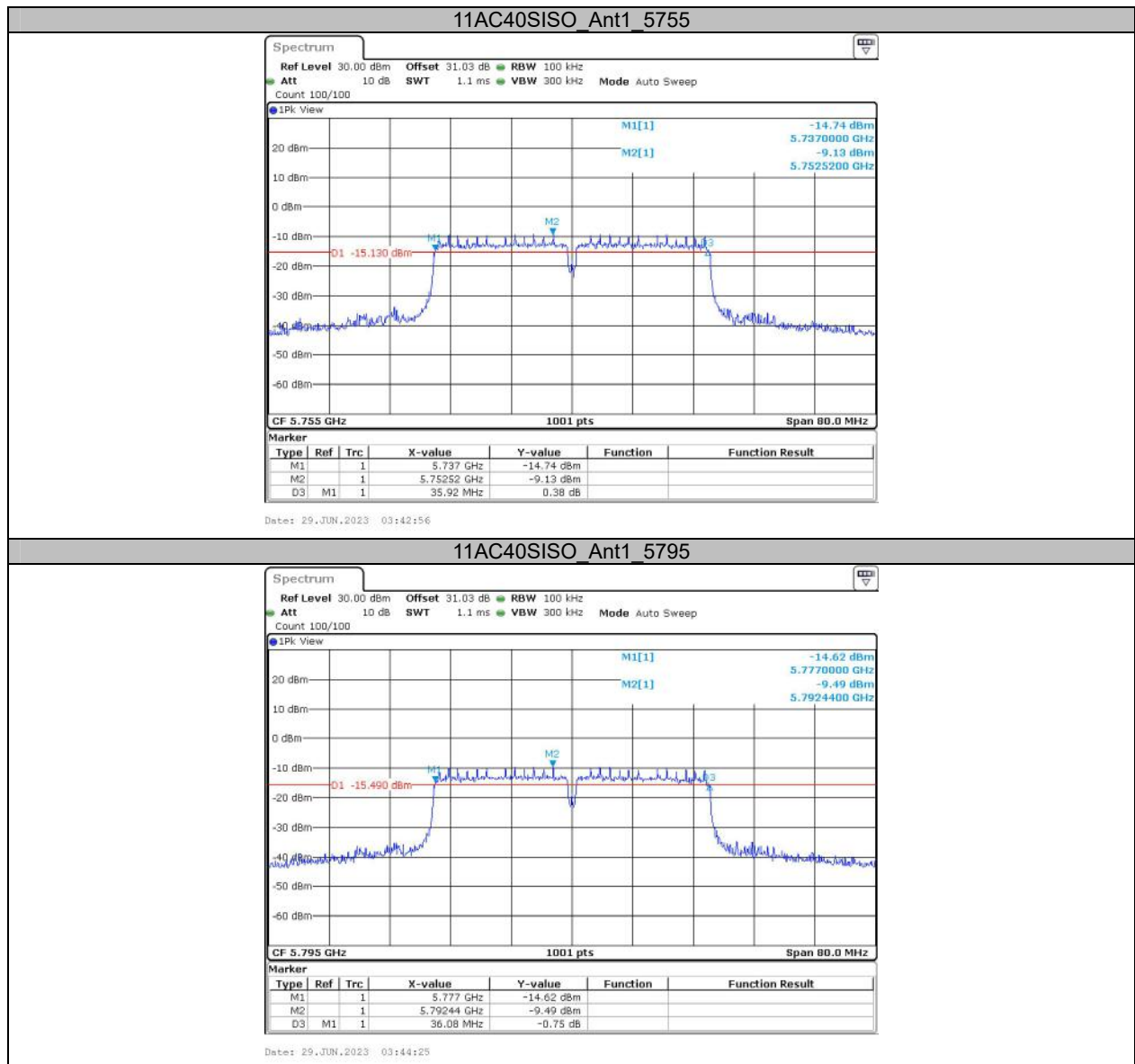
Test Mode	Antenna	Frequency[MHz]	6db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5745	16.32	5736.80	5753.12	0.5	PASS
		5785	16.36	5776.76	5793.12	0.5	PASS
		5825	16.32	5816.80	5833.12	0.5	PASS
11AC20SISO	Ant1	5745	17.24	5736.32	5753.56	0.5	PASS
		5785	17.40	5776.20	5793.60	0.5	PASS
		5825	17.28	5816.32	5833.60	0.5	PASS
11AC40SISO	Ant1	5755	35.92	5737.00	5772.92	0.5	PASS
		5795	36.08	5777.00	5813.08	0.5	PASS
11AC80SISO	Ant1	5775	75.52	5737.08	5812.60	0.5	PASS

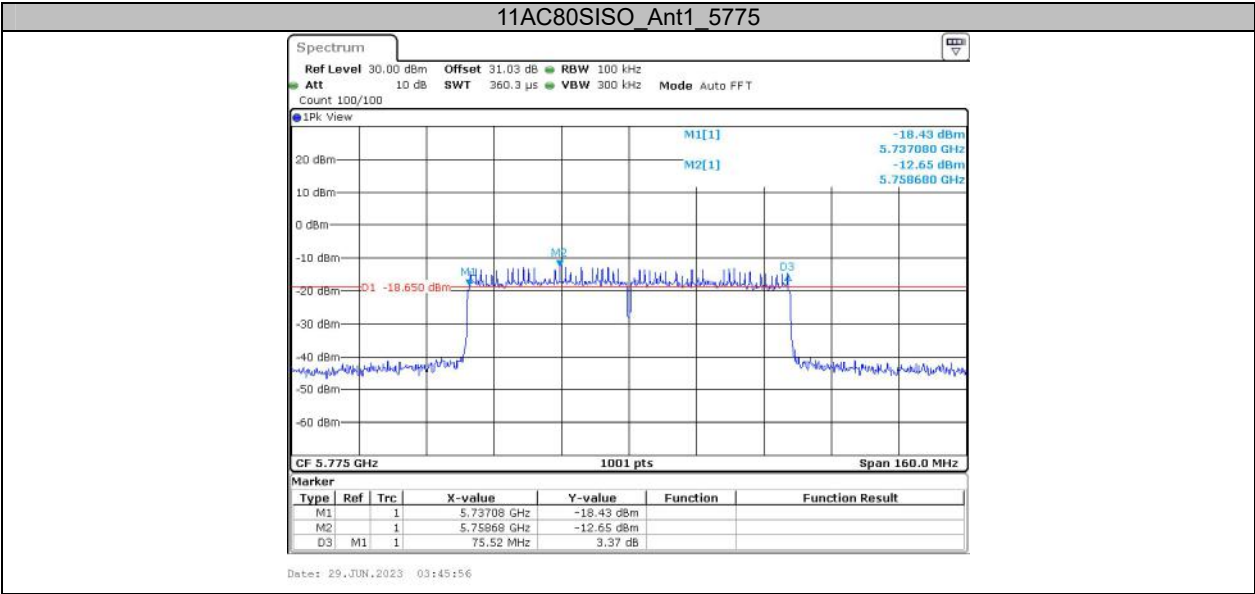
Test Graphs B4











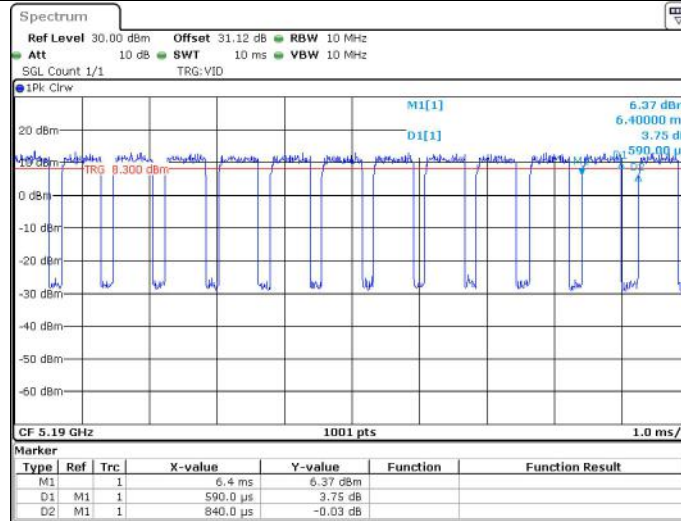
**Appendix B: Duty Cycle
Test Result**

Test Mode	Antenna	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Duty cycle Correction Factor [dB]	1/T Minimum VBW [kHz]
11A	Ant1	5180	1.40	1.58	88.61	0.53	0.71
11AC20SISO	Ant1	5180	1.18	1.36	86.76	0.62	0.85
11AC40SISO	Ant1	5190	0.59	0.84	70.24	1.53	1.69
11AC80SISO	Ant1	5210	0.29	0.46	63.04	2.00	3.45

Test Graphs

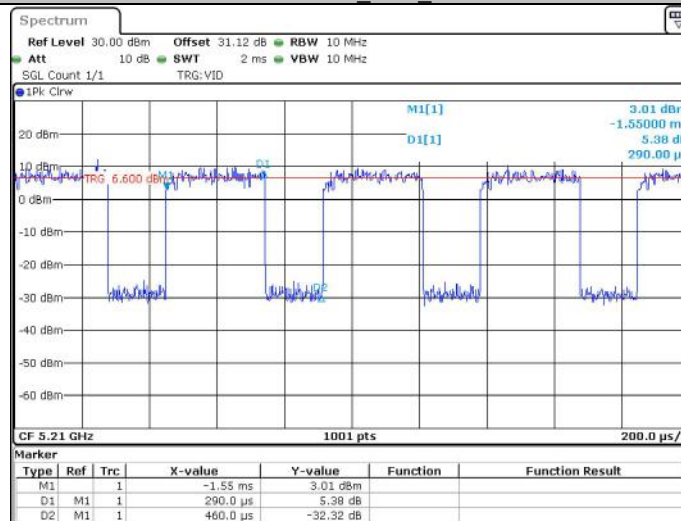


11AC40SISO_Ant1_5190



Date: 29 JUN 2023 03:40:22

11AC80SISO_Ant1_5210



Date: 30 JUN 2023 03:31:00

Appendix C: Maximum conducted output power Test Result Channel Power

Test Mode	Antenna	Frequency[MHz]	Result [dBm]	Limit [dBm]	Verdict
11A	Ant1	5180	13.33	≤23.98	PASS
		5200	13.31	≤23.98	PASS
		5240	12.99	≤23.98	PASS
		5745	7.32	≤30.00	PASS
		5785	7.55	≤30.00	PASS
		5825	7.47	≤30.00	PASS
11AC20SISO	Ant1	5180	12.88	≤23.98	PASS
		5200	12.69	≤23.98	PASS
		5240	12.53	≤23.98	PASS
		5745	8.73	≤30.00	PASS
		5785	8.54	≤30.00	PASS
		5825	8.48	≤30.00	PASS
11AC40SISO	Ant1	5190	10.41	≤23.98	PASS
		5230	10.23	≤23.98	PASS
		5755	8.11	≤30.00	PASS
		5795	7.84	≤30.00	PASS
11AC80SISO	Ant1	5210	10.65	≤23.98	PASS
		5775	7.32	≤30.00	PASS

Note: The Duty Cycle Factor is compensated in the final result.

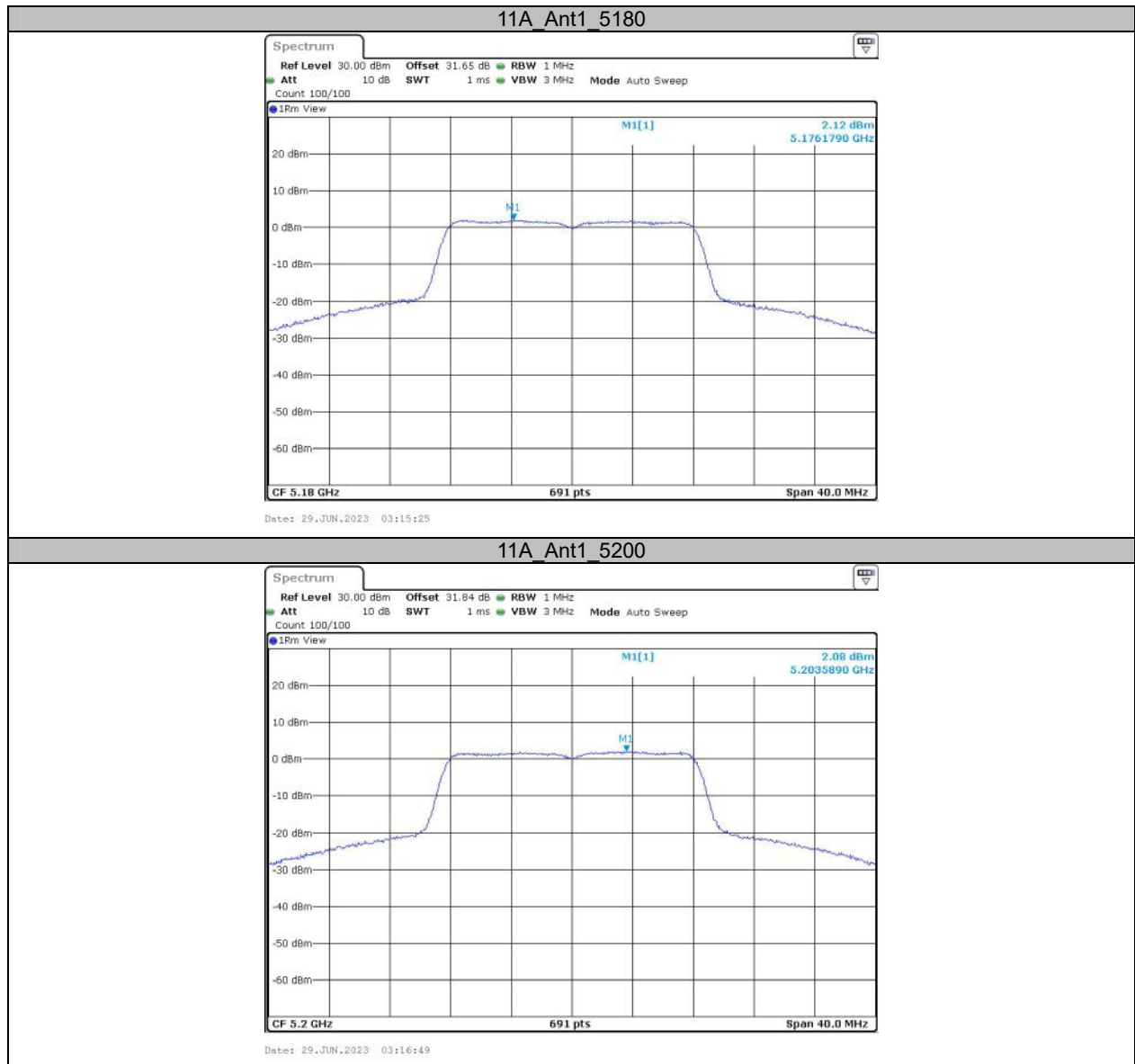
Appendix D: Maximum power spectral density Test Result

Test Mode	Antenna	Frequency[MHz]	Result [dBm/MHz]	Limit[dBm/MHz]	Verdict
11A	Ant1	5180	2.12	≤11.00	PASS
		5200	2.08	≤11.00	PASS
		5240	1.59	≤11.00	PASS
		5745	-6.43	≤30.00	PASS
		5785	-6.59	≤30.00	PASS
		5825	-6.7	≤30.00	PASS
11AC20SISO	Ant1	5180	1.58	≤11.00	PASS
		5200	1.14	≤11.00	PASS
		5240	0.88	≤11.00	PASS
		5745	-5.44	≤30.00	PASS
		5785	-5.88	≤30.00	PASS
		5825	-5.69	≤30.00	PASS
11AC40SISO	Ant1	5190	-3.77	≤11.00	PASS
		5230	-4.18	≤11.00	PASS
		5755	-9.22	≤30.00	PASS
		5795	-9.5	≤30.00	PASS
11AC80SISO	Ant1	5210	-6.63	≤11.00	PASS
		5775	-12.96	≤30.00	PASS

Note: 1. The Result and Limit Unit is dBm/500 kHz in the band 5.725–5.85 GHz.

2. The Duty Cycle Factor is compensated in the graph.

Test Graphs

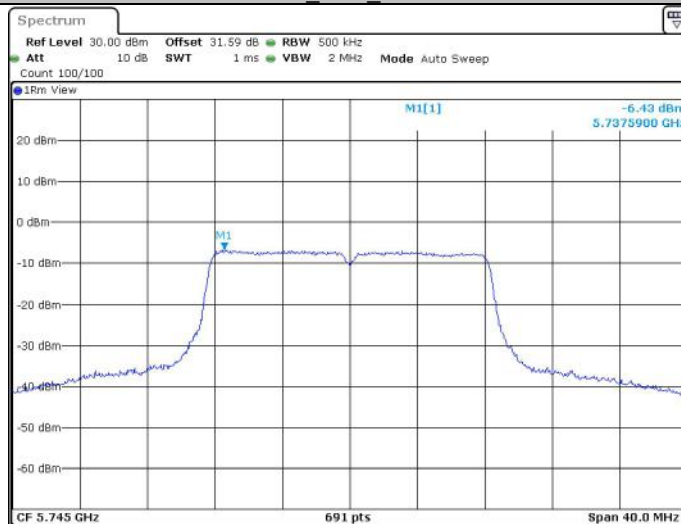


11A_Ant1_5240

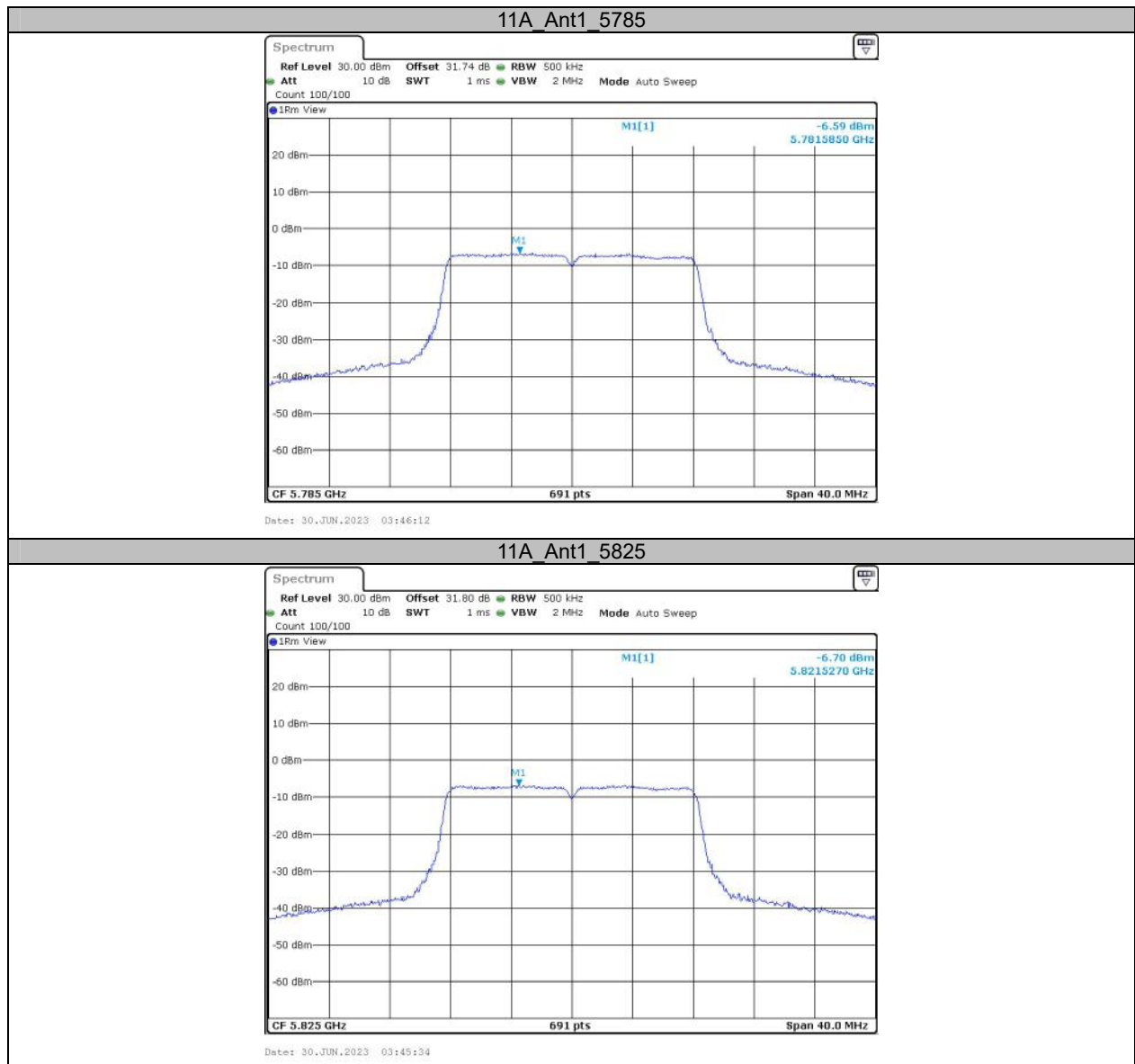


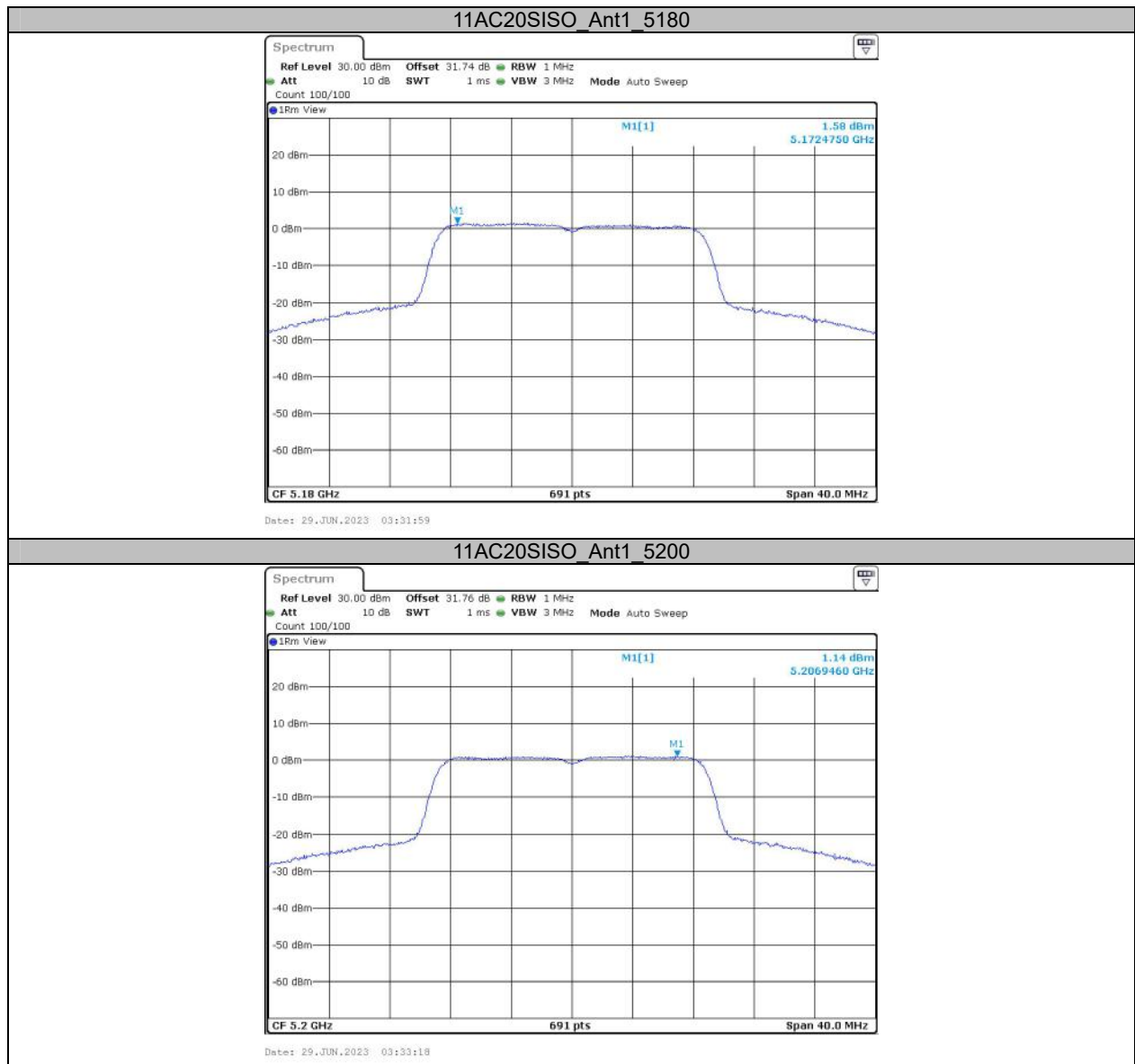
Date: 29 JUN 2023 03:18:09

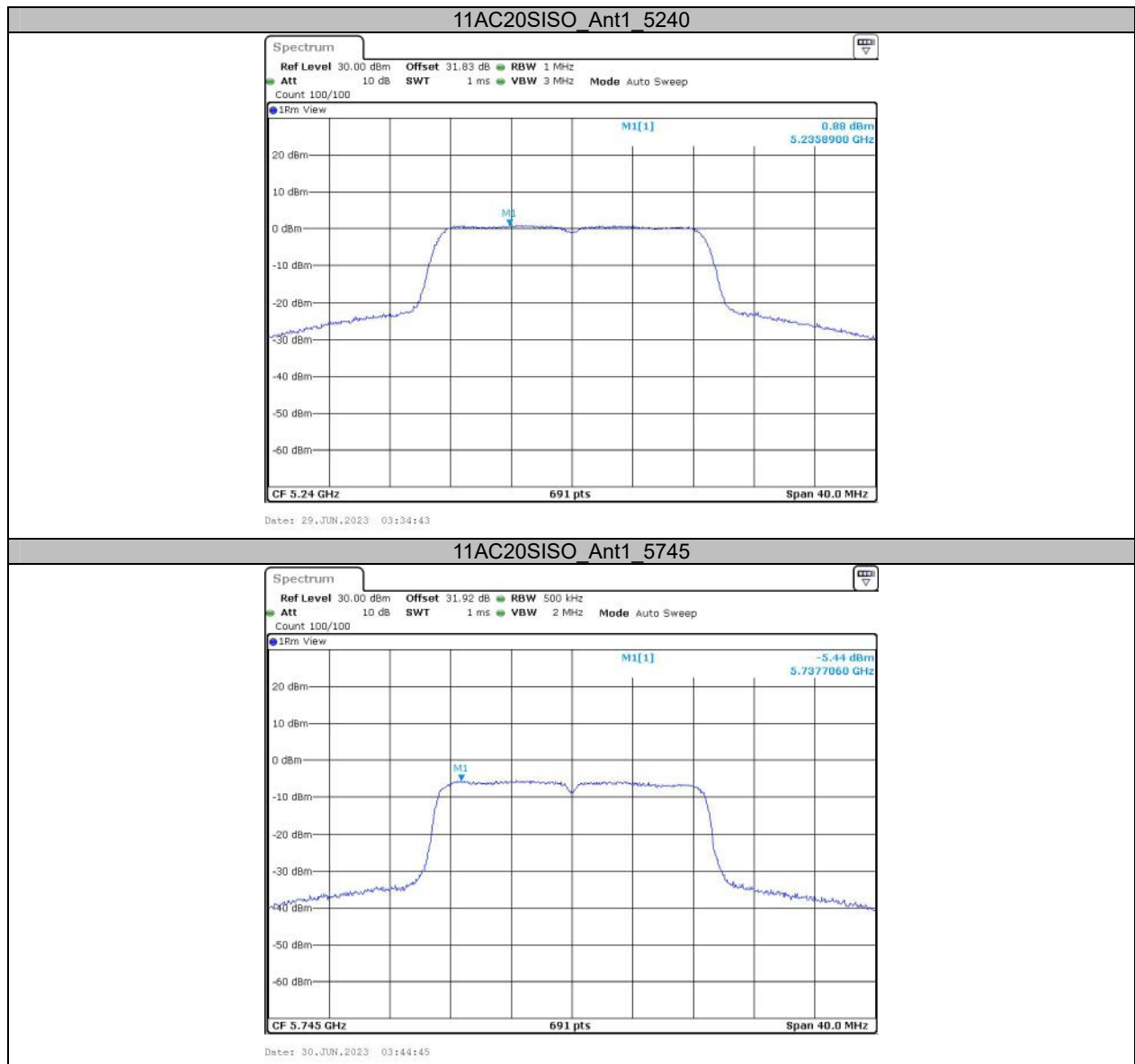
11A_Ant1_5745

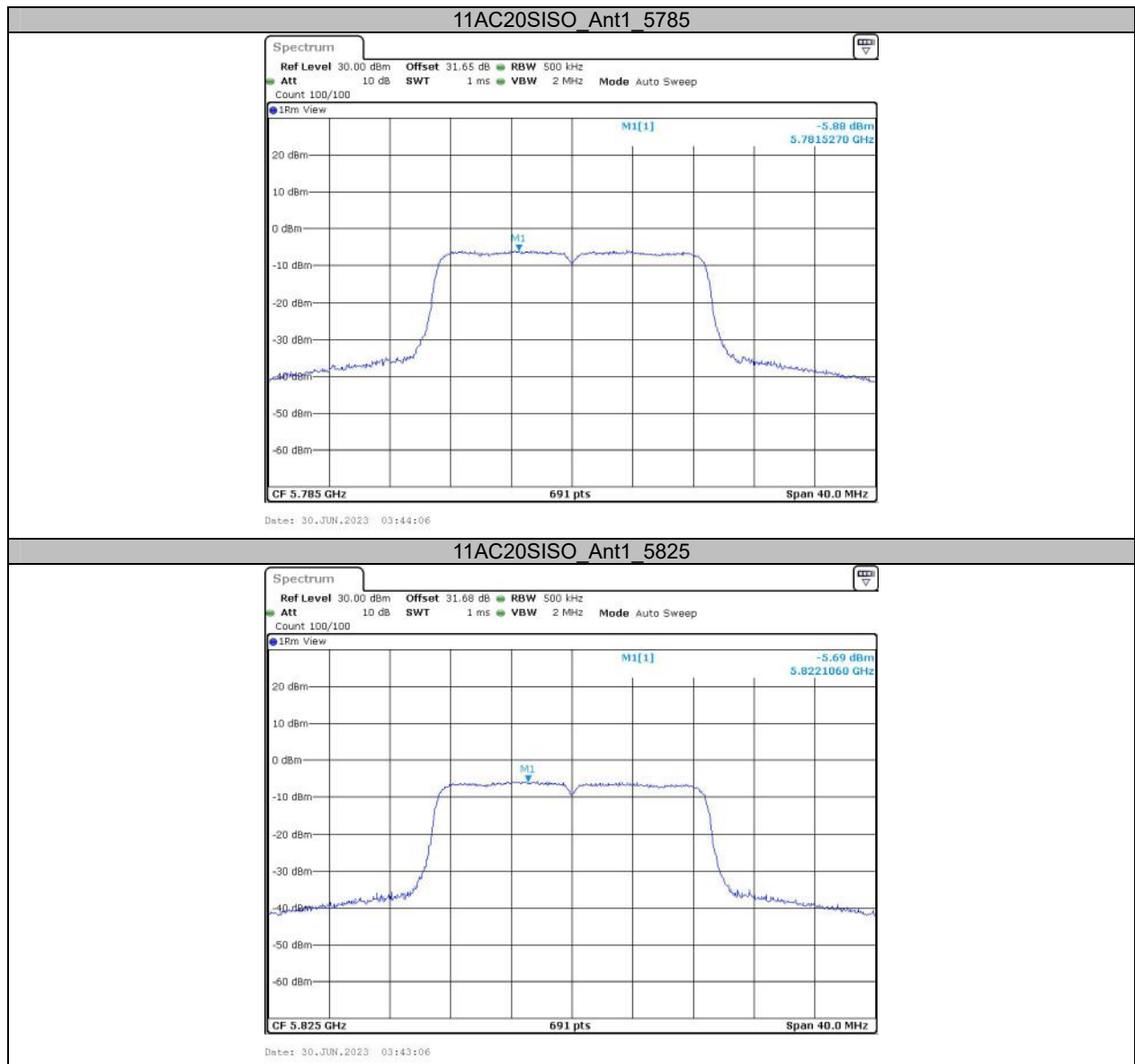


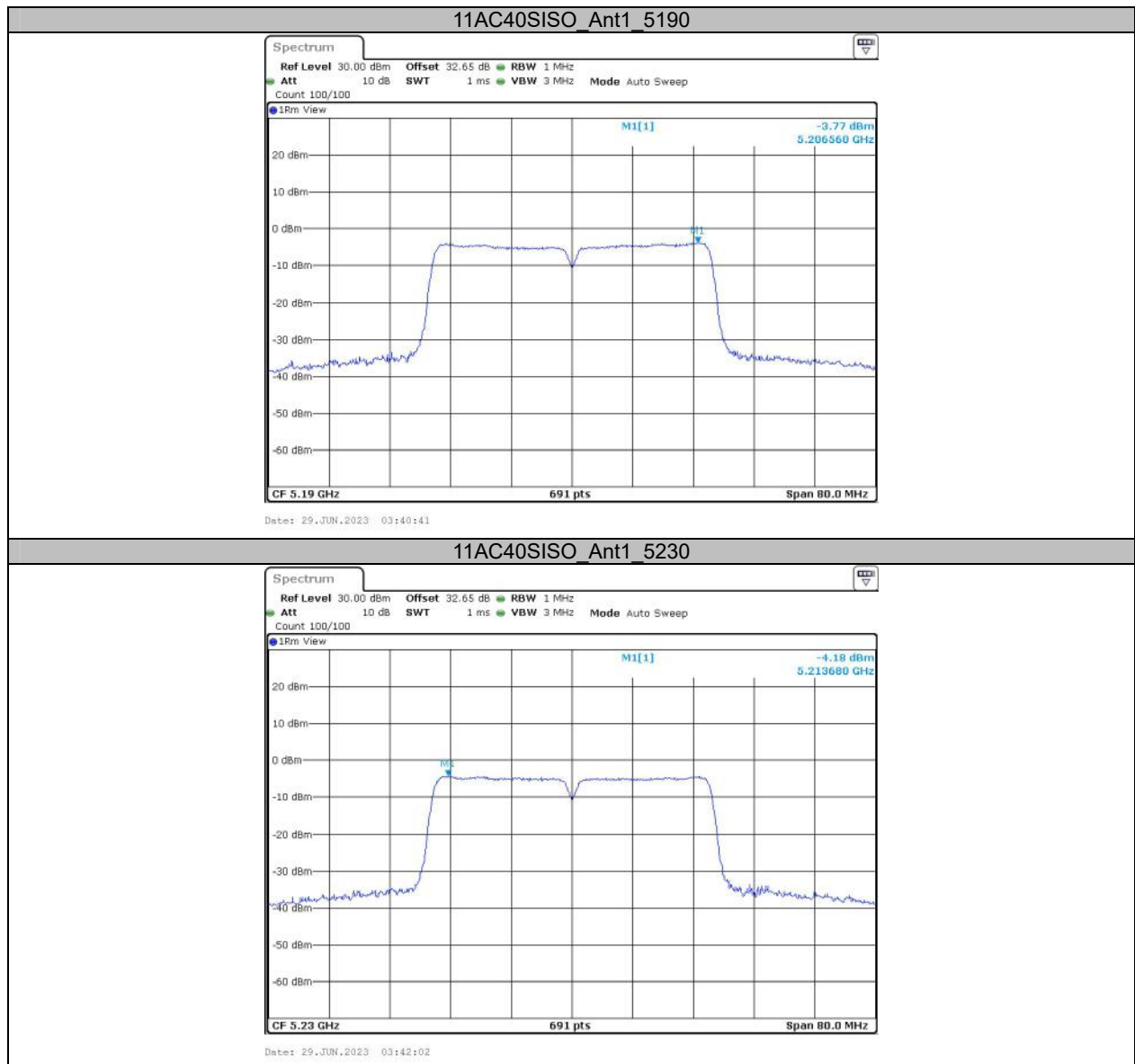
Date: 30 JUN 2023 03:46:52

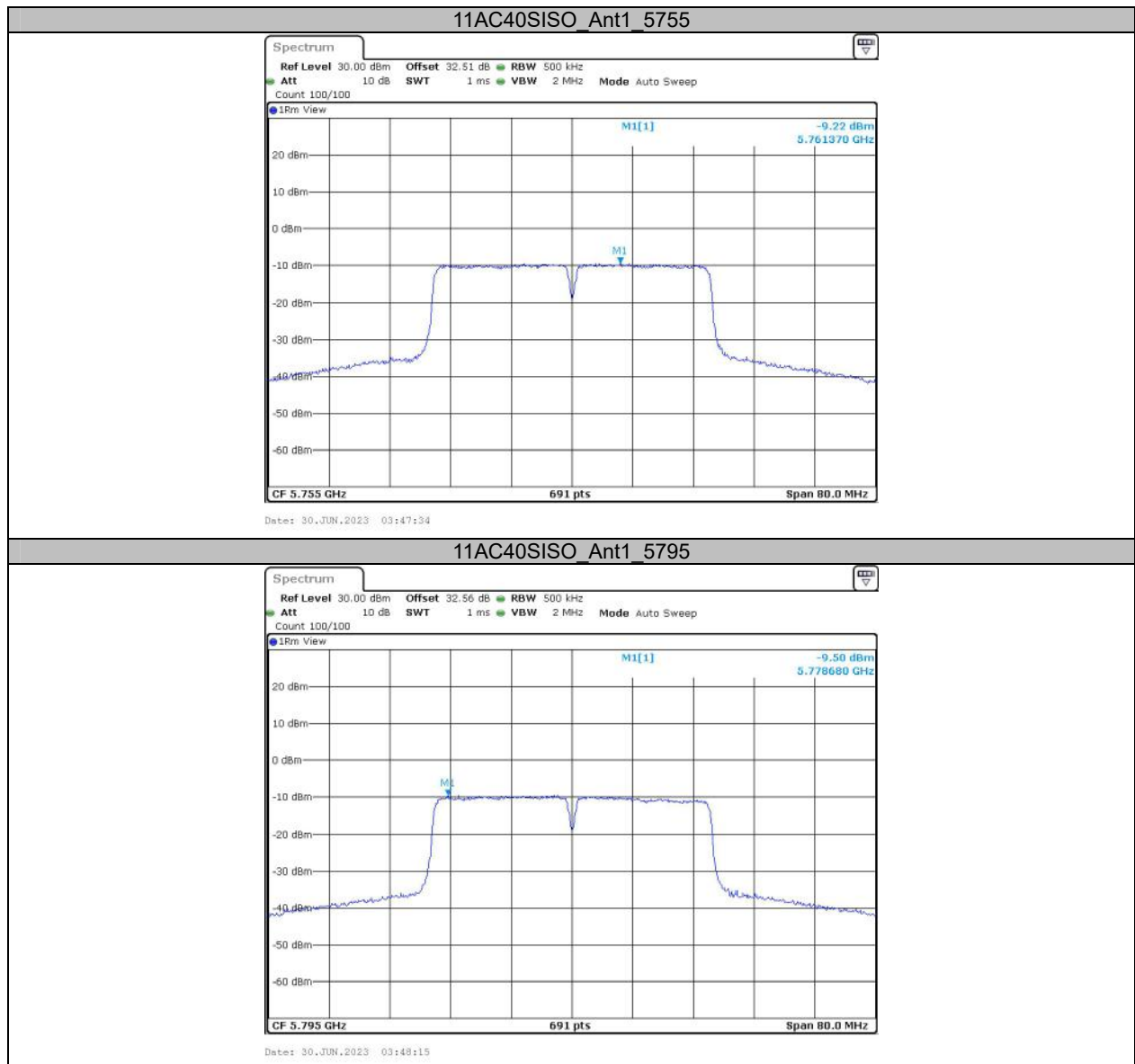


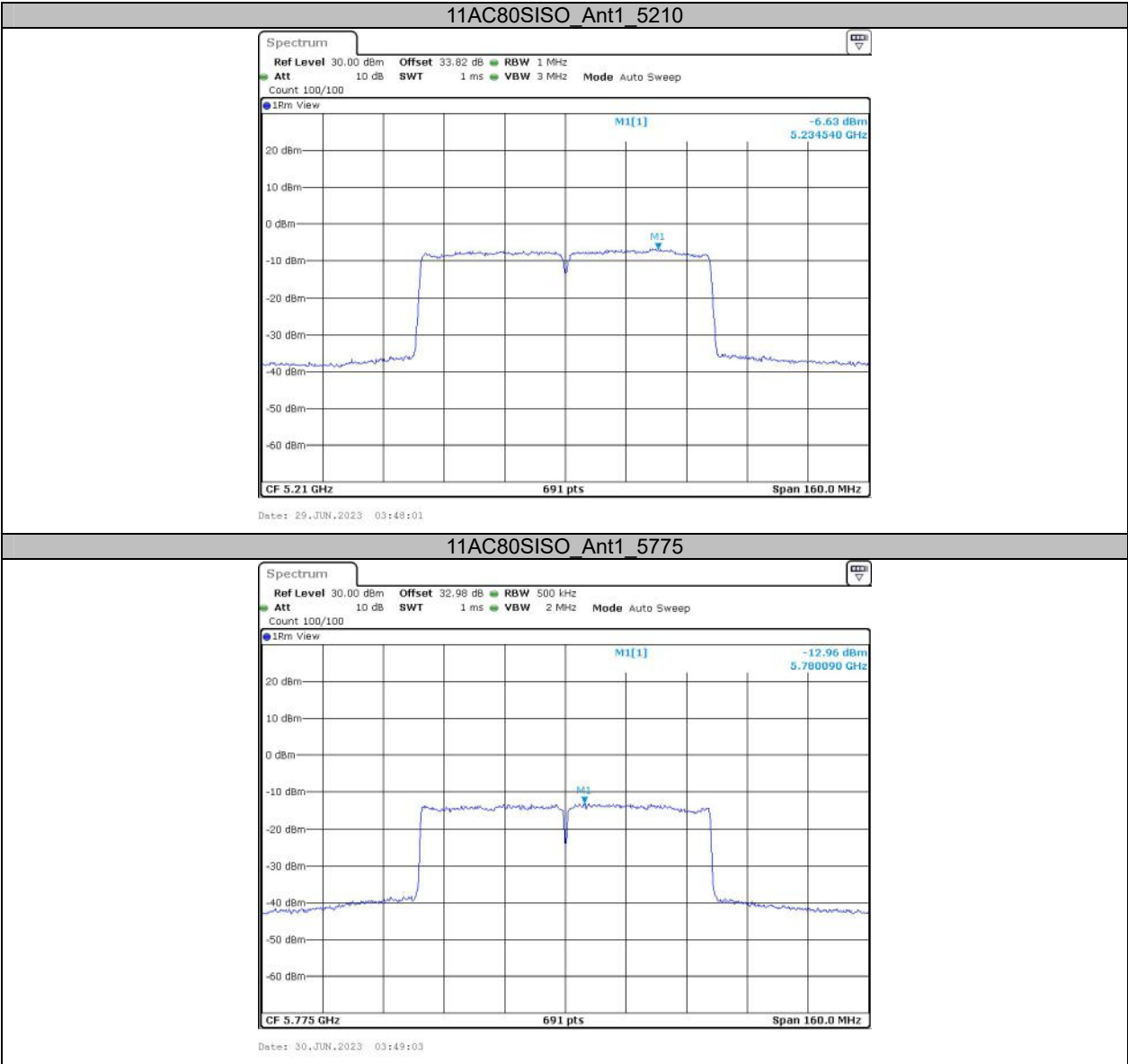












***** END OF REPORT *****