



FCC PART 15 TEST REPORT

No.24T04Z101589-012

for

POINTMOBILE CO., LTD

Mobile Computer

PM452

FCC ID: V2X-PM452W

with

Hardware Version: MP

Software Version: 452.00.XX

Issued Date: 2024-10-08

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
24T04Z101589-012	Rev.0	1st edition	2024-09-06
24T04Z101589-012	Rev.1	2 nd edition Modified the Maximum output Power of ax20/40/80/160 and duty cycle.	2024-10-08

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1. TEST LATORATORY

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA website.

1.2. Testing Location

Conducted testing Location: CTTL(Huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191

Radiated testing Location: CTTL(Huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, 100191, P. R. China

1.3. Testing Environment

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

1.4. Project date

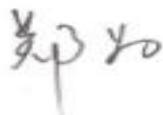
Testing Start Date: 2024-06-21

Testing End Date: 2024-09-26

1.5. Signature



Dong Jiaxuan
(Prepared this test report)



Zheng Wei
(Reviewed this test report)



Pang Shuai
(Approved this test report)

2. CLIENT INFORMATION

2.1. Applicant Information

Company Name: POINTMOBILE CO., LTD
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Seoul, 08513 Republic of Korea
Contact: Hanna Chae
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2.2. Manufacturer Information

Company Name: POINTMOBILE CO., LTD
Address/Post: A-26F, Building Gasan Publik 178, Digital-ro, Geumcheon-gu
Seoul, 08513 Republic of Korea
Contact: Hanna Chae
Email: certi.manager@pointmobile.com
Tel.: +82 10 7773 8827
Fax: +82 2-3397-7872

**3. EQUIPMENT UNDER TEST (EUT) AND
ANCILLARY EQUIPMENT(AE)**

3.1. About EUT

Description	Mobile Computer
Model name	PM452
FCC ID	V2X-PM452W
WLAN Frequency Band	ISM Bands: -5925MHz~6425MHz -6425MHz~6525MHz -6525MHz~6875MHz -6875MHz~7125MHz
Type of modulation	OFDM/OFDMA
Antenna	Internal Antenna
Voltage	3.63V
Equipment class	indoor only client (6XD)

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version
UT14a	/	MP	452.00.XX
UT05a	/	MP	452.00.XX
UT17a	356658610000189	MP	452.00.XX

*EUT ID: is used to identify the test sample in the lab internally.

* UT05a/17a is used for Conduction test, UT14a is used for Radiation test.

3.3. Internal Identification of AE used during the test

AE ID*	Description
AE ID:	is used to identify the test sample in the lab internally.

3.4. General Description

The Equipment under Test (EUT) is a model of Tablet with embedded antenna and inbuilt battery. It consists of normal options: travel charger, USB cable.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.

3.5. Interpretation of the Test Environment

For the test methods, the test environment uncertainty figures correspond to an expansion factor k=2.

Measurement Uncertainty

Parameter	Uncertainty
temperature	0.48°C
humidity	2 %
DC voltages	0.003V

4. REFERENCE DOCUMENTS

4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

FCC Part15	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices	2021
ANSI C63.10	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2013
UNII: KDB 789033 D02	General U-NII Test Procedures New Rules v02r01	2017-12
KDB 987594 D02	GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE 6 GHz (U-NII) DEVICES PART 15, SUBPART E	2023-08

5. LABORATORY ENVIRONMENT

Conducted RF performance testing is performed in shielding room.

EMC performance testing is performed in Semi-anechoic chamber.

6. SUMMARY OF TEST RESULTS

6.1. Summary of Test Results

SUMMARY OF MEASUREMENT RESULTS	Sub-clause of Part15E	Sub-clause of IC	Verdict
Maximum Output Power	15.407	/	P
Peak Power Spectral Density	15.407	/	BR
26dB Emission Bandwidth	15.403	/	BR
99% Occupied bandwidth	/	/	BR
Contention Based Protocol	KDB 987592 DU2	/	BR
In-Band Emissions	15.407(b)	/	BR
Radiated Unwanted Emission	15.209,15.407	/	BR
AC Powerline Conducted Emission (150kHz- 30MHz)	15.107, 15.207	/	BR

Please refer to **ANNEX A** for detail.

Terms used in Verdict column

P	Pass, The EUT complies with the essential requirements in the standard.
NP	Not Perform, The test was not performed by CTTL
NA	Not Applicable, The test was not applicable
F	Fail, The EUT does not comply with the essential requirements in the standard
BR	BR Re-use test data from basic model report.

6.2. For conducted result :

1. The standard client and indoor client are the same power level, thus test items according to indoor client standard to test, which is stringent limit.
2. EUT support 802.11ax modes on U-NII-5/-6/-7/-8, and can't transmit simultaneously in U-NII-5/-6/-7/-8.
3. 802.11ax support full RU and single RU modes.

6.3. Antenna Gain

Antenna gain is -4dBi and the value is supplied by the applicant or manufacturer.

6.4. Statements

CTTL has evaluated the test cases requested by the client/manufacturer as listed in section 6.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.2.

This report only deals with the WLAN function among the features described in section 3.

The Equipment Under Test (EUT) model PM452 are variant product of PM452, according to the declaration of changes provided by the applicant and FCC KDB publication 178919 D01, except Maximum output Power, other results are derived from test report No.24T04Z101463-023.

For detail differences between two models please refer the Declaration of Changes document.

6.5. Test Conditions

For this report, all the test cases are tested under normal temperature and normal voltage, and also under norm humidity, the specific condition is shown as follows:

Temperature	26°C
Voltage	3.63V
Humidity	44%

7. TEST EQUIPMENTS UTILIZED

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Vector Signal Analyzer	FSQ40	200089	Rohde & Schwarz	1 year	2025-06-15
2	Vector Signal Generator	SMW200A	103421	Rohde & Schwarz	1 year	2025-06-15
3	Test Receiver	ESCI 3	100344	R&S	1 year	2025-04-01
4	LISN	ENV216	101200	R&S	1 year	2025-05-16
5	Attenuator	10dB/2W	/	Rosenberger	/	/
6	Shielding Room	S81	/	ETS-Lindgren	/	/

Instrument	Brand Name	Model
WLAN AP	ASUS	GT-AXE11000

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESW44	103144	R&S	1 year	2024-11-26
2	EMI Antenna	VULB 9163	01223	SCHWARZBECK	1 year	2024-08-18
3	EMI Antenna	3115	00167250	ETS-Lindgren	1 year	2025-05-11
4	EMI Antenna	3116	2663	ETS-Lindgren	1 year	2025-03-21

8. Measurement Uncertainty

8.1 Transmitter Output Power

Measurement Uncertainty: 0.387dB, k=1.96

8.2 Peak Power Spectral Density

Measurement Uncertainty: 0.705dB, k=1.96

8.3 99% Occupied bandwidth

Measurement Uncertainty: 60.80Hz, k=1.96

8.4 Occupied Channel Bandwidth

Measurement Uncertainty: 60.80Hz, k=1.96

8.5 Band Edges Compliance

Measurement Uncertainty : 0.62dB,k=1.96

8.6 Spurious Emissions

Conducted (k=1.96)

Frequency Range	Uncertainty(dB)
30MHz ≤ f ≤ 2GHz	1.22
2GHz ≤ f ≤3.6GHz	1.22
3.6GHz ≤ f ≤8GHz	1.22
8GHz ≤ f ≤12.75GHz	1.51
12.75GHz ≤ f ≤26GHz	1.51
26GHz ≤ f ≤40GHz	1.59

Radiated (k=2)

Frequency Range	Uncertainty(dB)
9kHz-30MHz	/
30MHz ≤ f ≤ 1GHz	4.72
1GHz ≤ f ≤18GHz	4.84
18GHz ≤ f ≤40GHz	5.12

8.7 AC Power-line Conducted Emission

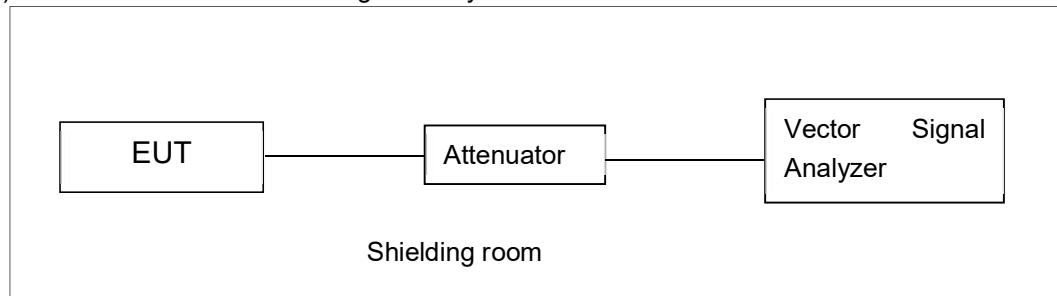
Measurement Uncertainty : 3.08,k=2

ANNEX A: MEASUREMENT RESULTS

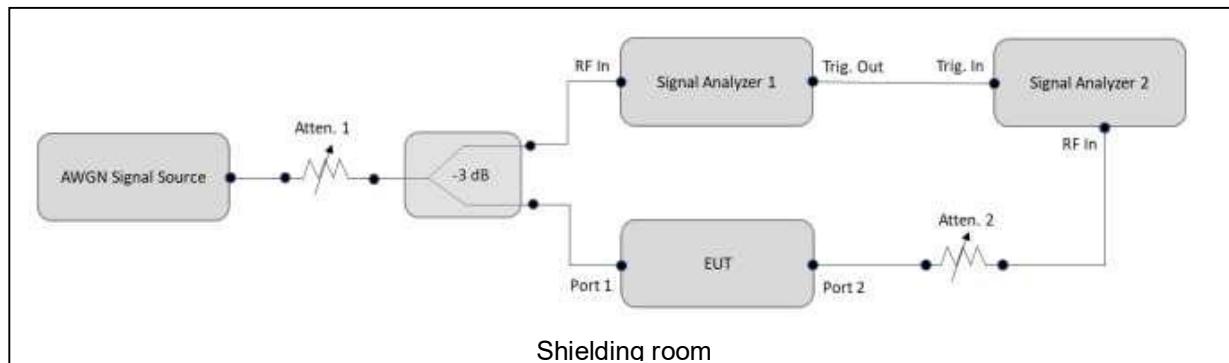
A.1. Measurement Method

A.1.1. Conducted Measurements

- 1). Connect the EUT to the test system correctly.
- 2). Set the EUT to the required work mode.
- 3). Set the EUT to the required channel.
- 4). Set the spectrum analyzer to start measurement.
- 5). Record the values. Vector Signal Analyzer



Test Setup for Maximum Output Power, Peak Power Spectral Density, Occupied 26dB Bandwidth, 99% Occupied bandwidth, In-Band Emissions



Test Setup for Contention Based Protocol

A.1.2. Radiated Emission Measurements

Measurement performed according to Clause 6.4, 6.5, 6.6 in ANSI C63.10-2013 and II.G.4, II.G.5, II.G.6 in KDB 789033.

The radiated emission test is performed in semi-anechoic chamber. The EUT was placed on a non-conductive table with 80cm above the ground plane for measurement below 1GHz and 1.5m above the ground plane for measurement above 1GHz. The measurement antenna was placed at a distance of 3 meters from the EUT. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated from 0° to 360° and the measurement antenna is moved from 1m to 4m to get the maximization result. The maximization process was repeated with the EUT positioned in each of its three orthogonal orientation.

A.2. Maximum output Power

Measurement Limit and Method:

Standard	Frequency (MHz)	e.i.r.p Limit (dBm)
FCC CRF Part 15.407(a)	5925MHz~6425MHz	24dBm
	6425MHz~6525MHz	24dBm
	6525MHz~6875MHz	24dBm
	6875MHz~7125MHz	24dBm

The measurement method SA-2 is made according to KDB 987594 and KDB 789033.

Note: eirp value=Conducted values (with conducted samples) + Antenna Gain.

Measurement Results:

802.11ax HE20(full RU) mode

Mode	Channel	Test Result	
		Ant2(dBm)	Ant2 EIRP(dBm)
		MCS0	MCS0
802.11ax-20 full RU	5955MHz (Ch1)	11.16	7.16
	6175MHz (Ch45)	11.50	7.50
	6415MHz (Ch93)	10.92	6.92
	6435MHz (Ch97)	10.78	6.78
	6475MHz (Ch105)	10.87	6.87
	6515MHz (Ch113)	10.76	6.76
	6535MHz (Ch117)	10.81	6.81
	6695MHz (Ch149)	10.51	6.51
	6855MHz (Ch181)	10.58	6.58
	6875MHz (Ch185)	10.52	6.52
	6895MHz (ch189)	10.67	6.67
	6995MHz (Ch209)	10.33	6.33
	7115MHz (Ch233)	10.49	6.49

The spot check result of average output power are 11.16dBm (802.11ax20 MCS0 ch1 prototype result: 11.31dBm)

The data rate MCS0 is selected as worse condition, and the following cases are performed with this condition.

802.11ax-HE40(full RU) mode

Mode	Channel	Test Result	
		Ant2(dBm)	Ant2 EIRP(dBm)
		MCS0	MCS0
802.11ax-40 full RU	5965MHz (Ch3)	11.62	7.62
	6165MHz (Ch43)	11.78	7.78
	6405MHz (Ch91)	11.10	7.10
	6445MHz (Ch99)	11.12	7.12
	6485MHz (Ch107)	11.06	7.06
	6525MHz (Ch115)	11.04	7.04
	6565MHz (Ch123)	11.07	7.07
	6685MHz (Ch147)	10.87	6.87
	6845MHz (Ch179)	10.87	6.87
	6885MHz (Ch187)	10.90	6.90
	6925MHz (ch195)	10.66	6.66
	6965MHz (Ch203)	10.61	6.61
	7085MHz (Ch227)	10.75	6.75

The spot check result of average output power are 11.78dBm (802.11ax40 MCS0 ch43 prototype result: 11.91dBm)

The data rate MCS0 is selected as worse condition, and the following cases are performed with this condition.

802.11ax-HE80(full RU) mode

Mode	Channel	Test Result	
		Ant2(dBm)	Ant2 EIRP(dBm)
		MCS0	MCS0
802.11ax-80 full RU	5985MHz (Ch7)	11.65	7.65
	6145MHz (Ch39)	11.44	7.44
	6385MHz (Ch87)	11.13	7.13
	6465MHz (Ch103)	11.00	7.00
	6545MHz (Ch119)	11.12	7.12
	6625MHz (Ch135)	10.93	6.93
	6705MHz (Ch151)	11.02	7.02
	6785MHz (Ch167)	10.91	6.91
	6865MHz (Ch183)	11.03	7.03
	6945MHz (Ch199)	10.66	6.66
	7025MHz (Ch215)	10.73	6.73

The spot check result of average output power are 11.44dBm (802.11ax80 MCS0 ch39 prototype result: 11.82dBm)

The data rate MCS0 is selected as worse condition, and the following cases are performed with this condition.

802.11ax-HE160(full RU) mode

Mode	Channel	Test Result	
		Ant2(dBm)	Ant2 EIRP(dBm)
		MCS0	MCS0
802.11ax-160 full RU	6025MHz (Ch15)	11.24	7.24
	6185MHz (Ch47)	11.19	7.19
	6345MHz (Ch79)	11.12	7.12
	6505MHz (Ch111)	10.82	6.82
	6665MHz (Ch143)	10.82	6.82
	6825MHz (Ch175)	10.65	6.65
	6985MHz (Ch207)	10.74	6.74

The spot check result of average output power are 11.19dBm (802.11ax160 MCS0 ch47 prototype result: 11.42dBm)

The data rate MCS0 is selected as worse condition, and the following cases are performed with this condition.

802.11ax-20 single RU

Mode	Channel	Test Result	
		Ant2 (dBm)	Ant2 EIRP (dBm)
		MCS0	MCS0
RU26-I	5955MHz (Ch1)	5.07	1.07
	6175MHz (Ch45)	5.11	1.11
	6415MHz (Ch93)	4.61	0.61
	6435MHz (Ch97)	4.48	0.48
	6475MHz (Ch105)	4.16	0.16
	6515MHz (Ch113)	4.46	0.46
RU26-R	6535MHz (Ch117)	4.56	0.56
	6695MHz (Ch149)	4.65	0.65
	6855MHz (Ch181)	4.21	0.21
	6875MHz (Ch185)	4.56	0.56
	6895MHz (ch189)	4.45	0.45
	6995MHz (Ch209)	4.07	0.07
	7115MHz (Ch233)	4.45	0.45

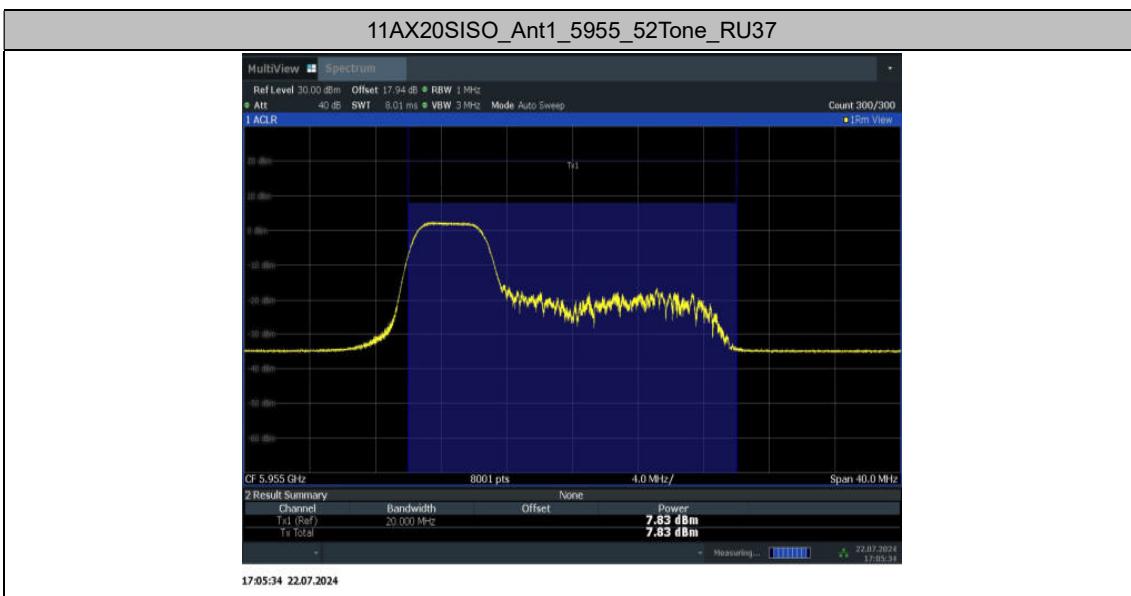
The data rate MCS0 is selected as worse condition, and the following cases are performed with this condition.

Mode	Channel	Test Result	
		Ant2 (dBm)	Ant2 EIRP (dBm)
		MCS0	MCS0
RU52-I	5955MHz (Ch1)	7.83	3.83
	6175MHz (Ch45)	7.65	3.65
	6415MHz (Ch93)	7.18	3.18
	6435MHz (Ch97)	6.98	2.98
	6475MHz (Ch105)	6.87	2.87
	6515MHz (Ch113)	7.03	3.03
RU52-R	6535MHz (Ch117)	7.04	3.04
	6695MHz (Ch149)	7.43	3.43
	6855MHz (Ch181)	6.76	2.76
	6875MHz (Ch185)	7.23	3.23
	6895MHz (ch189)	7.09	3.09
	6995MHz (Ch209)	6.70	2.70
	7115MHz (Ch233)	7.04	3.04

The data rate MCS0 is selected as worse condition, and the following cases are performed with this condition.

Mode	Channel	Test Result	
		Ant2 (dBm)	Ant2 EIRP (dBm)
		MCS0	MCS0
RU106-I	5955MHz (Ch1)	10.87	6.87
	6175MHz (Ch45)	10.97	6.97
	6415MHz (Ch93)	10.46	6.46
	6435MHz (Ch97)	10.39	6.39
	6475MHz (Ch105)	9.95	5.95
	6515MHz (Ch113)	9.91	5.91
RU106-R	6535MHz (Ch117)	10.05	6.05
	6695MHz (Ch149)	10.22	6.22
	6855MHz (Ch181)	9.72	5.72
	6875MHz (Ch185)	10.00	6.00
	6895MHz (ch189)	9.80	5.80
	6995MHz (Ch209)	9.66	5.66
	7115MHz (Ch233)	10.03	6.03

The data rate MCS0 is selected as worse condition, and the following cases are performed with this condition.



The duty cycle of all mode are 100%

Conclusion: PASS

A.3. Peak Power Spectral Density (conducted)

Measurement Limit and Method:

Standard	Frequency (MHz)	e.i.r.p Limit (dBm/MHz)
FCC CRF Part 15.407(a)	5925MHz~6425MHz	-1
	6425MHz~6525MHz	-1
	6525MHz~6875MHz	-1
	6875MHz~7125MHz	-1

The output power measurement method Section F is made according to KDB 987594 and KDB 789033.

Note: mimo eirp value=Conducted values (with conducted samples) + Antenna Gain.

Measurement Results:

802.11ax HE20(full RU) mode

Mode	Channel	Test Result	
		Ant2(dBm)	Ant2 EIRP(dBm)
		MCS0	MCS0
802.11ax-20 full RU	5955MHz (Ch1)	1.83	-2.17
	6175MHz (Ch45)	1.62	-2.38
	6415MHz (Ch93)	1.50	-2.50
	6435MHz (Ch97)	1.34	-2.66
	6475MHz (Ch105)	1.22	-2.78
	6515MHz (Ch113)	0.93	-3.07
	6535MHz (Ch117)	1.08	-2.92
	6695MHz (Ch149)	1.19	-2.81
	6855MHz (Ch181)	0.57	-3.43
	6875MHz (Ch185)	0.96	-3.04
	6895MHz (ch189)	0.87	-3.13
	6995MHz (Ch209)	0.64	-3.36
	7115MHz (Ch233)	1.08	-2.92

802.11ax-HE40(full RU) mode

Mode	Channel	Test Result	
		Ant2(dBm)	Ant2 EIRP(dBm)
		MCS0	MCS0
802.11ax-40 full RU	5965MHz (Ch3)	-1.27	-5.27
	6165MHz (Ch43)	-0.92	-4.92
	6405MHz (Ch91)	1.13	-2.87
	6445MHz (Ch99)	-1.25	-5.25
	6485MHz (Ch107)	-1.29	-5.29
	6525MHz (Ch115)	-1.62	-5.62
	6565MHz (Ch123)	-1.54	-5.54
	6685MHz (Ch147)	-1.54	-5.54
	6845MHz (Ch179)	-2.53	-6.53
	6885MHz (Ch187)	-2.25	-6.25
	6925MHz (ch195)	-2.62	-6.62
	6965MHz (Ch203)	-2.59	-6.59
	7085MHz (Ch227)	-2.13	-6.13

802.11ax-HE80(full RU) mode

Mode	Channel	Test Result	
		Ant2(dBm)	Ant2 EIRP(dBm)
		MCS0	MCS0
802.11ax-80 full RU	5985MHz (Ch7)	-4.16	-8.16
	6145MHz (Ch39)	-3.69	-7.69
	6385MHz (Ch87)	-4.30	-8.30
	6465MHz (Ch103)	-4.07	-8.07
	6545MHz (Ch119)	-4.40	-8.40
	6625MHz (Ch135)	-4.70	-8.70
	6705MHz (Ch151)	-4.70	-8.70
	6785MHz (Ch167)	-5.27	-9.27
	6865MHz (Ch183)	-5.36	-9.36
	6945MHz (Ch199)	-5.45	-9.45
	7025MHz (Ch215)	-4.93	-8.93

802.11ax-HE160(full RU) mode

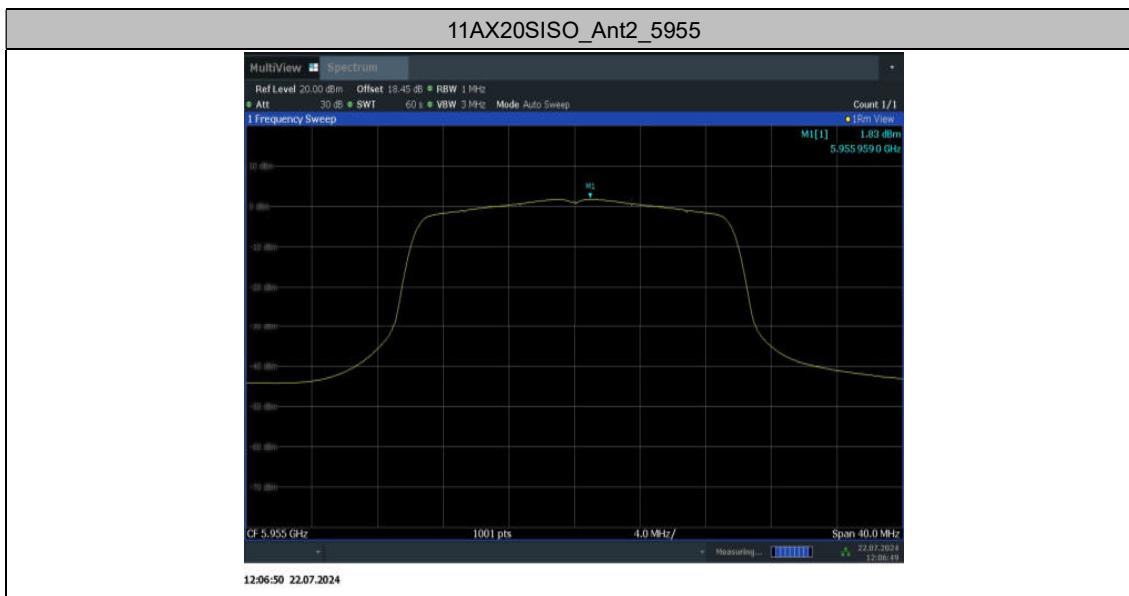
Mode	Channel	Test Result	
		Ant2(dBm)	Ant2 EIRP(dBm)
		MCS0	MCS0
802.11ax-160 full RU	6025MHz (Ch15)	-7.19	-11.19
	6185MHz (Ch47)	-7.42	-11.42
	6345MHz (Ch79)	-7.34	-11.34
	6505MHz (Ch111)	-7.62	-11.62
	6665MHz (Ch143)	-7.68	-11.68
	6825MHz (Ch175)	-8.41	-12.41
	6985MHz (Ch207)	-8.30	-12.30

802.11ax-20 single RU

Mode	Channel	Test Result	
		Ant2 (dBm)	Ant2 EIRP (dBm)
		MCS0	MCS0
RU26-I	5955MHz (Ch1)	2.16	-1.84
	6175MHz (Ch45)	2.21	-1.79
	6415MHz (Ch93)	1.78	-2.22
	6435MHz (Ch97)	1.62	-2.38
	6475MHz (Ch105)	1.29	-2.71
	6515MHz (Ch113)	1.52	-2.48
RU26-R	6535MHz (Ch117)	1.67	-2.33
	6695MHz (Ch149)	1.81	-2.19
	6855MHz (Ch181)	1.26	-2.74
	6875MHz (Ch185)	1.67	-2.33
	6895MHz (ch189)	1.52	-2.48
	6995MHz (Ch209)	1.15	-2.85
	7115MHz (Ch233)	1.55	-2.45

Mode	Channel	Test Result	
		Ant2 (dBm)	Ant2 EIRP (dBm)
		MCS0	MCS0
RU52-I	5955MHz (Ch1)	1.95	-2.05
	6175MHz (Ch45)	1.92	-2.08
	6415MHz (Ch93)	1.37	-2.63
	6435MHz (Ch97)	1.21	-2.79
	6475MHz (Ch105)	0.97	-3.03
	6515MHz (Ch113)	1.18	-2.82
RU52-R	6535MHz (Ch117)	1.19	-2.81
	6695MHz (Ch149)	1.55	-2.45
	6855MHz (Ch181)	1.06	-2.94
	6875MHz (Ch185)	1.23	-2.77
	6895MHz (ch189)	1.20	-2.80
	6995MHz (Ch209)	0.86	-3.14
	7115MHz (Ch233)	1.18	-2.82

Mode	Channel	Test Result	
		Ant2 (dBm)	Ant2 EIRP (dBm)
		MCS0	MCS0
RU106-I	5955MHz (Ch1)	2.03	-1.97
	6175MHz (Ch45)	2.10	-1.90
	6415MHz (Ch93)	1.62	-2.38
	6435MHz (Ch97)	1.52	-2.48
	6475MHz (Ch105)	1.09	-2.91
	6515MHz (Ch113)	1.04	-2.96
RU106-R	6535MHz (Ch117)	1.18	-2.82
	6695MHz (Ch149)	1.46	-2.54
	6855MHz (Ch181)	0.95	-3.05
	6875MHz (Ch185)	1.14	-2.86
	6895MHz (ch189)	0.99	-3.01
	6995MHz (Ch209)	0.79	-3.21
	7115MHz (Ch233)	1.26	-2.74



Conclusion: PASS

A.4. Emission Bandwidth(conducted)

Measurement Limit and Method:

According to FCC guidance, the 26 dB bandwidth has been applied for all channels below 320MHz. For 320MHz, the 99% bandwidth has been used.

47CFR 15.407(a)(10) The maximum transmitter channel bandwidth for U-NII devices in the 5.925–7.125 GHz band is 320 megahertz.

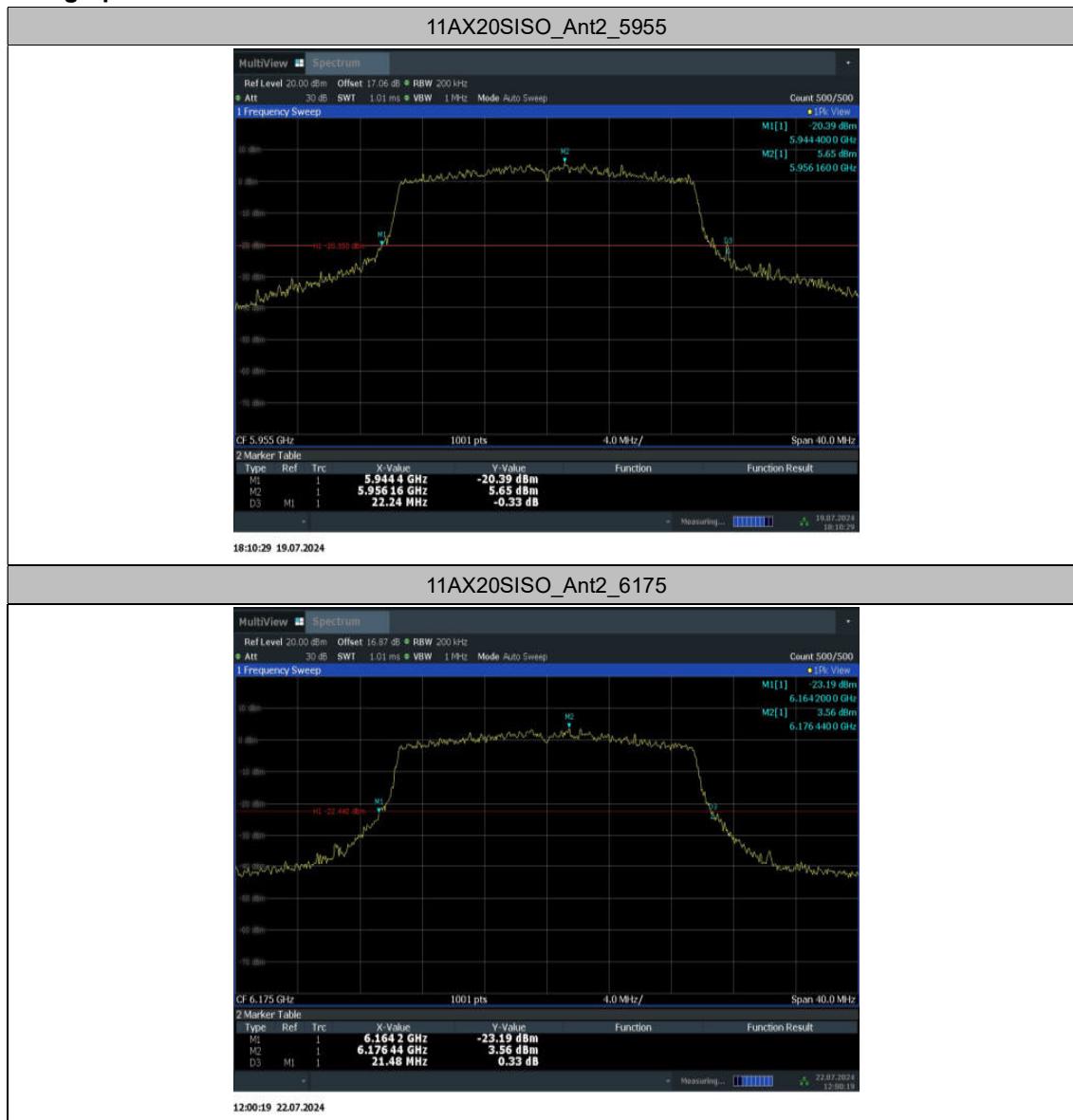
The measurement is made according to KDB 987594 and KDB 789033

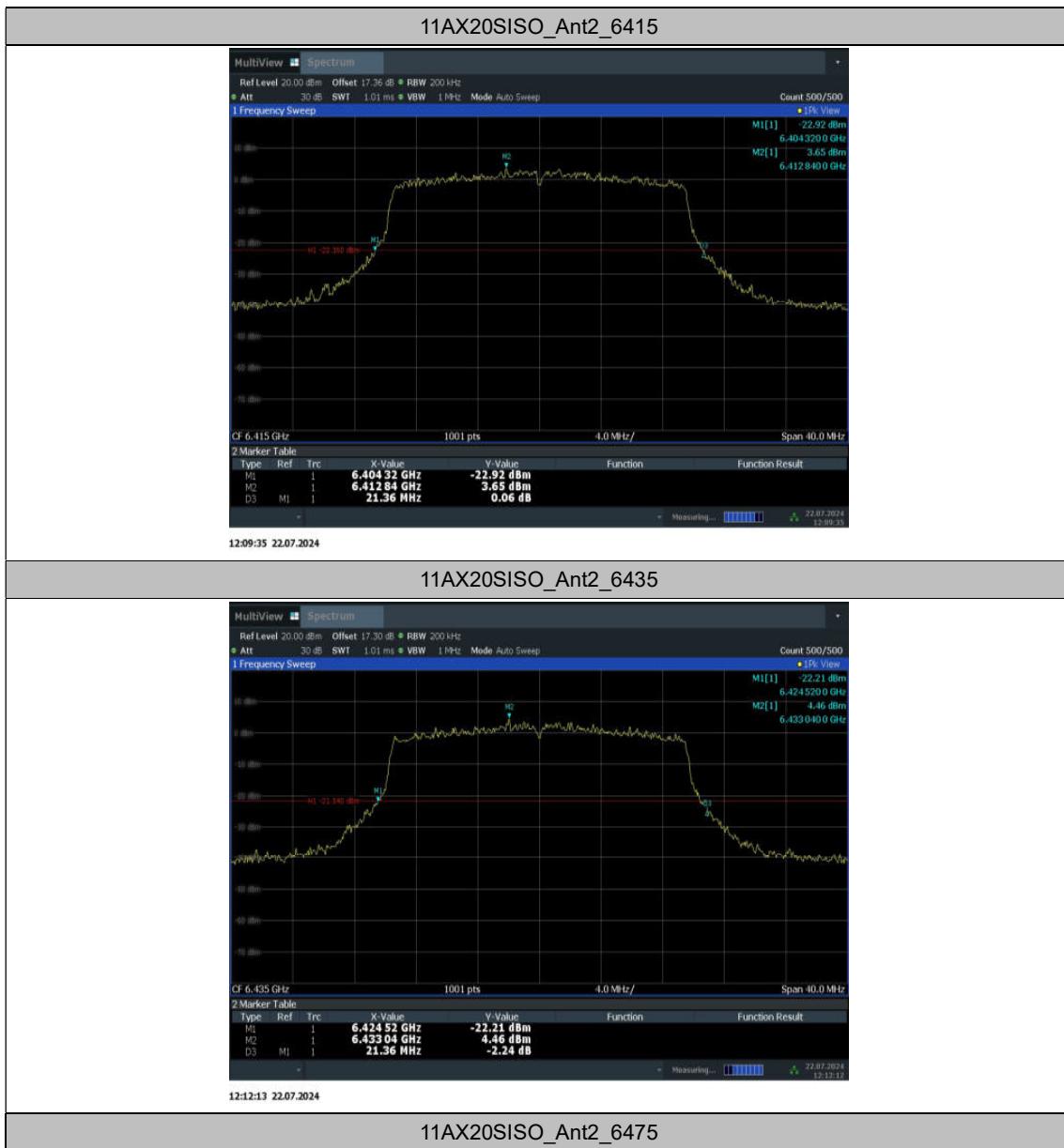
Measurement Result:

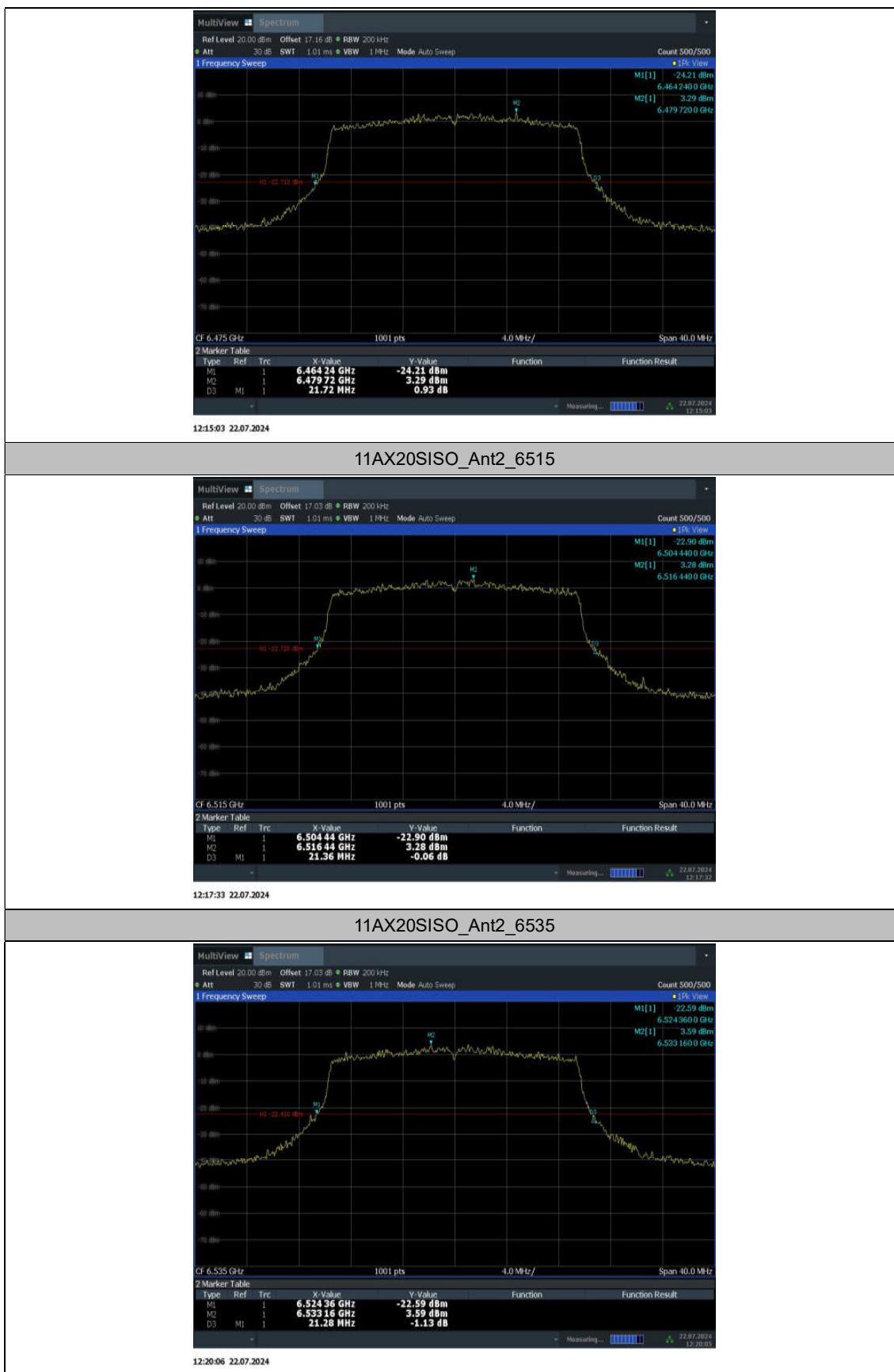
TestMode	Antenna	Channel	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11AX20SISO	Ant2	5955	22.24	5944.40	5966.64	---	---
		6175	21.48	6164.20	6185.68	---	---
		6415	21.36	6404.32	6425.68	---	---
		6435	21.36	6424.52	6445.88	---	---
		6475	21.72	6464.24	6485.96	---	---
		6515	21.36	6504.44	6525.80	---	---
		6535	21.28	6524.36	6545.64	---	---
		6695	21.56	6684.24	6705.80	---	---
		6855	20.92	6844.52	6865.44	---	---
		6875	21.16	6864.48	6885.64	---	---
		6895	21.64	6884.28	6905.92	---	---
		6995	21.24	6984.36	7005.60	---	---
		7115	22.16	7103.72	7125.88	---	---
		5965	39.68	5945.08	5984.76	---	---
11AX40SISO	Ant2	6165	39.92	6145.00	6184.92	---	---
		6405	39.68	6385.16	6424.84	---	---
		6445	39.76	6425.08	6464.84	---	---
		6485	39.68	6465.16	6504.84	---	---
		6525	39.52	6505.16	6544.68	---	---
		6565	39.76	6545.08	6584.84	---	---
		6685	39.76	6665.08	6704.84	---	---
		6845	39.76	6825.08	6864.84	---	---
		6885	39.76	6865.24	6905.00	---	---
		6925	39.84	6905.08	6944.92	---	---
		6965	39.68	6945.08	6984.76	---	---
		7085	39.84	7065.08	7104.92	---	---
11AX80SISO	Ant2	5985	81.12	5944.36	6025.48	---	---
		6145	81.12	6104.36	6185.48	---	---
		6385	80.80	6344.68	6425.48	---	---
		6465	80.80	6424.52	6505.32	---	---
		6545	80.64	6504.68	6585.32	---	---
		6625	80.96	6584.52	6665.48	---	---
		6705	80.80	6664.68	6745.48	---	---

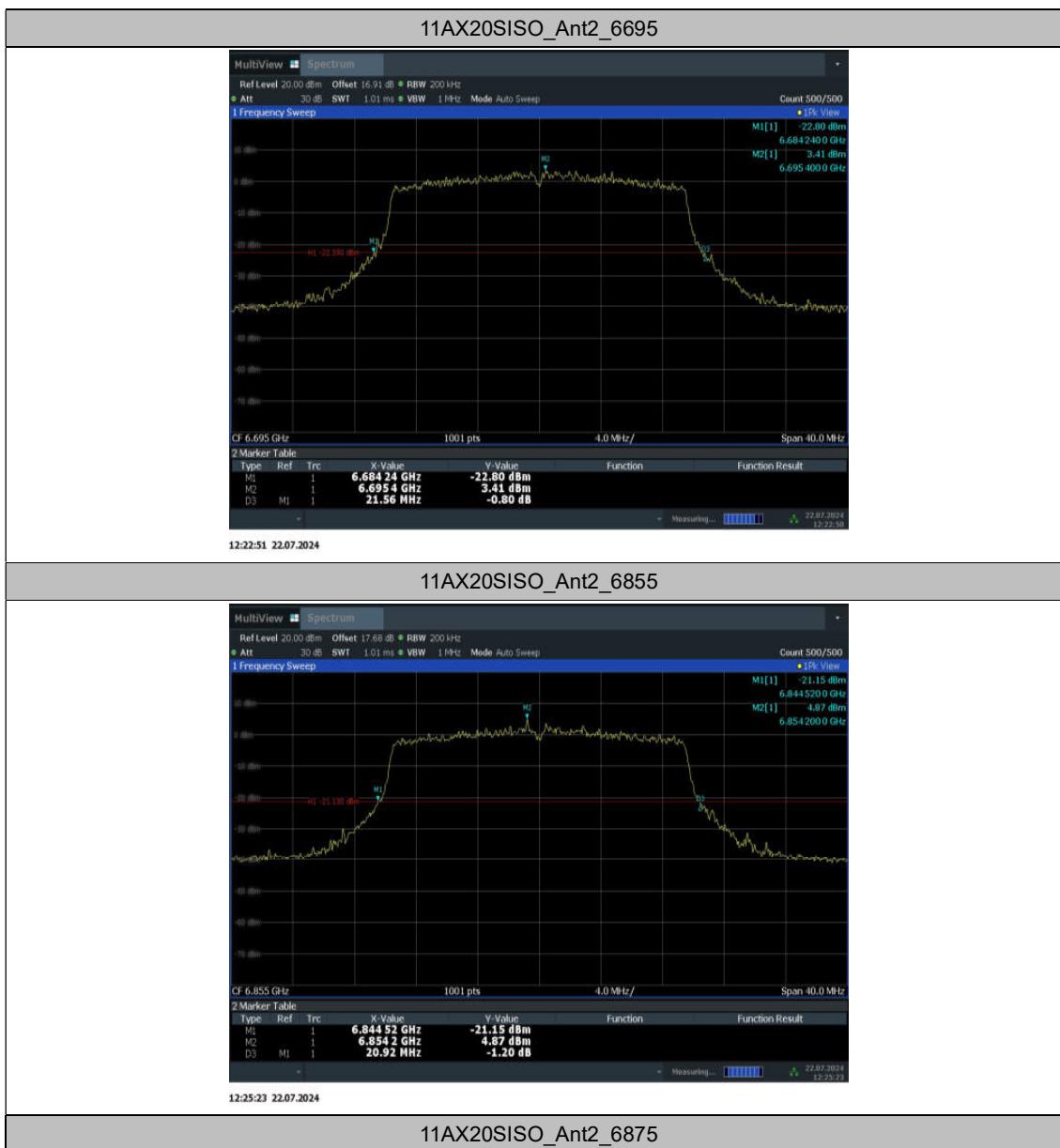
		6785	80.96	6744.52	6825.48	---	---
		6865	80.96	6824.52	6905.48	---	---
		6945	80.96	6904.52	6985.48	---	---
		7025	80.96	6984.52	7065.48	---	---
11AX160SISO	Ant2	6025	163.20	5943.40	6106.60	---	---
		6185	163.20	6103.08	6266.28	---	---
		6345	163.20	6263.40	6426.60	---	---
		6505	163.52	6423.08	6586.60	---	---
		6665	162.88	6583.40	6746.28	---	---
		6825	163.52	6743.08	6906.60	---	---
		6985	163.84	6903.08	7066.92	---	---

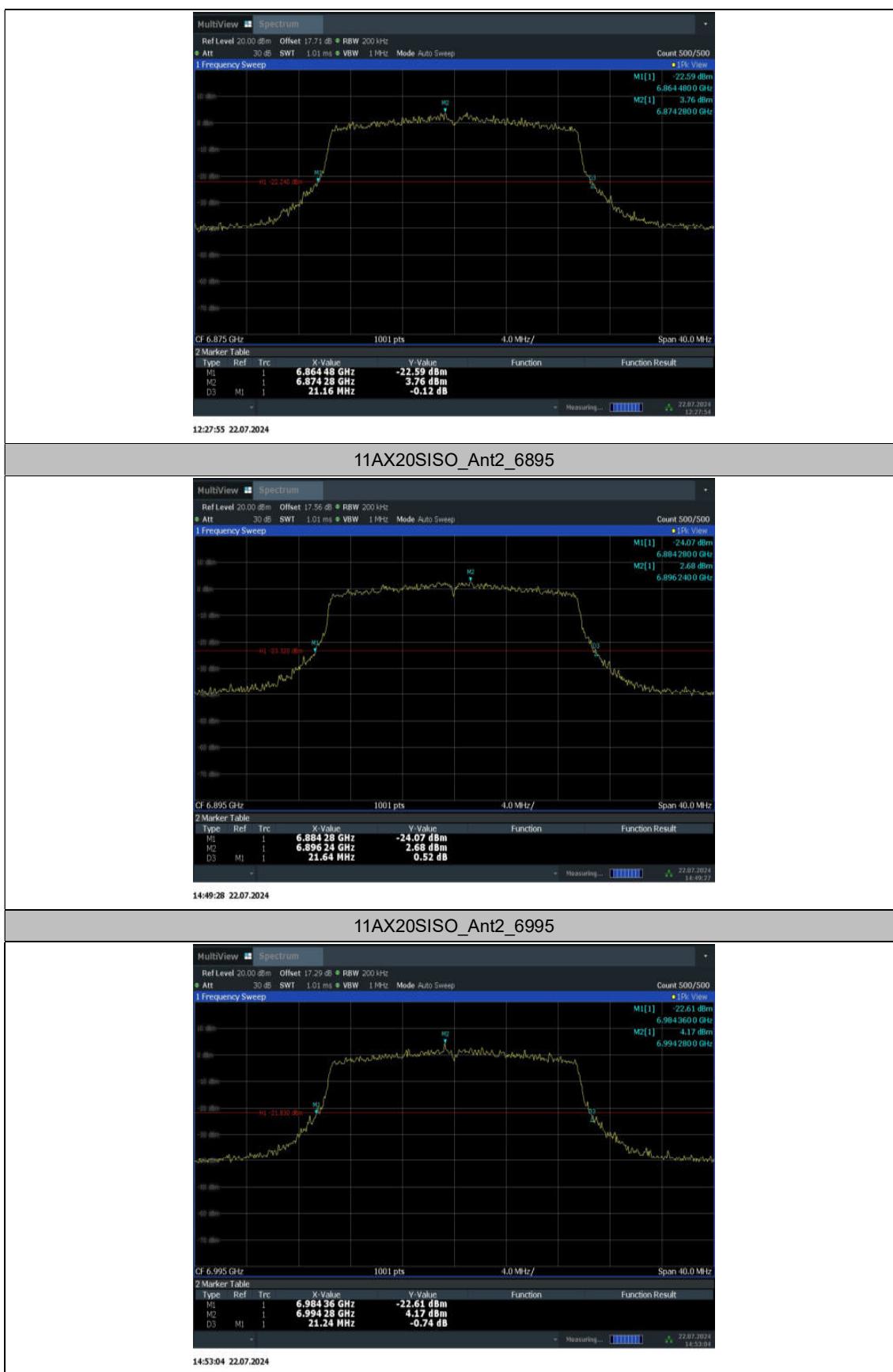
Test graphs as below:

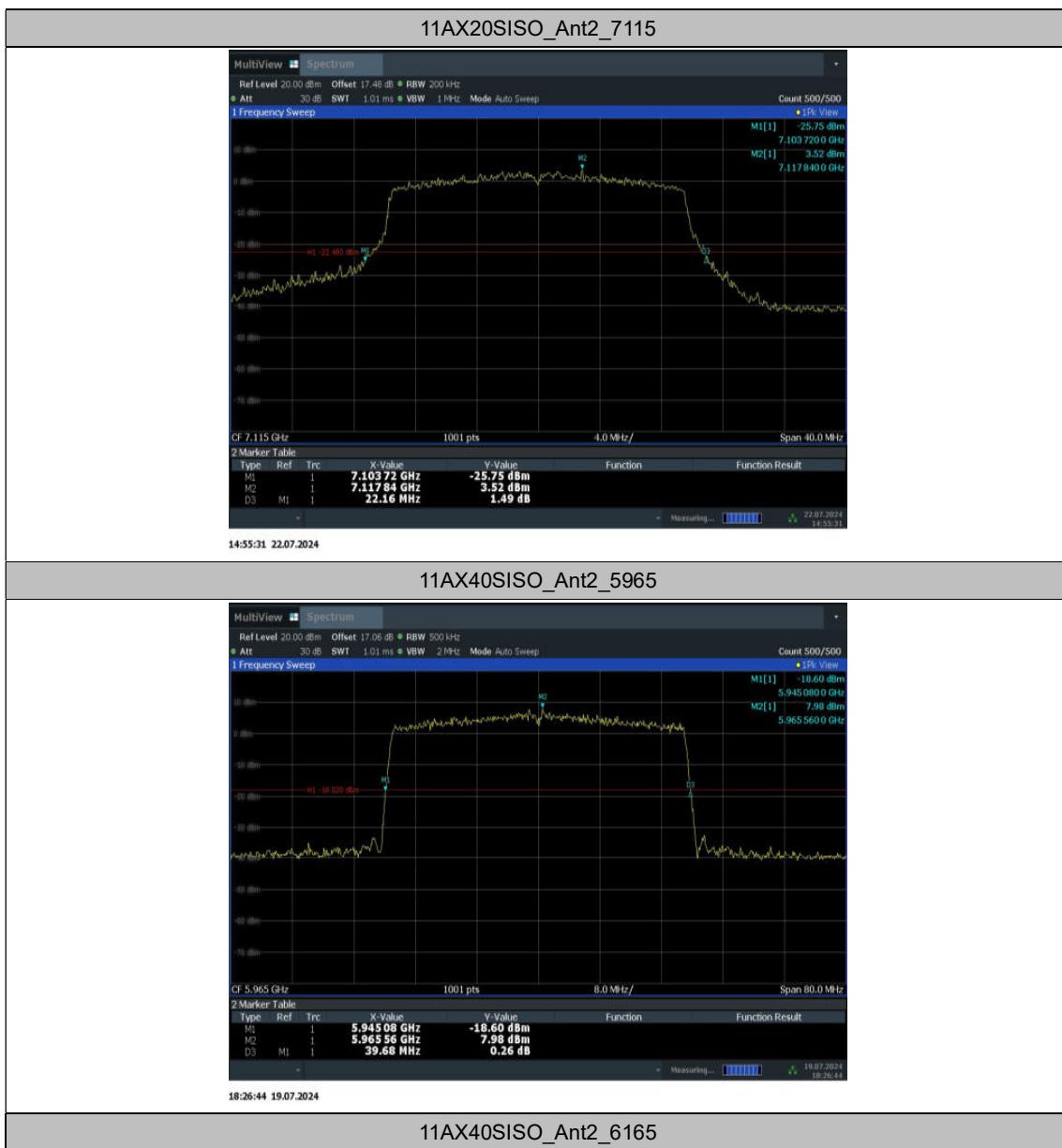












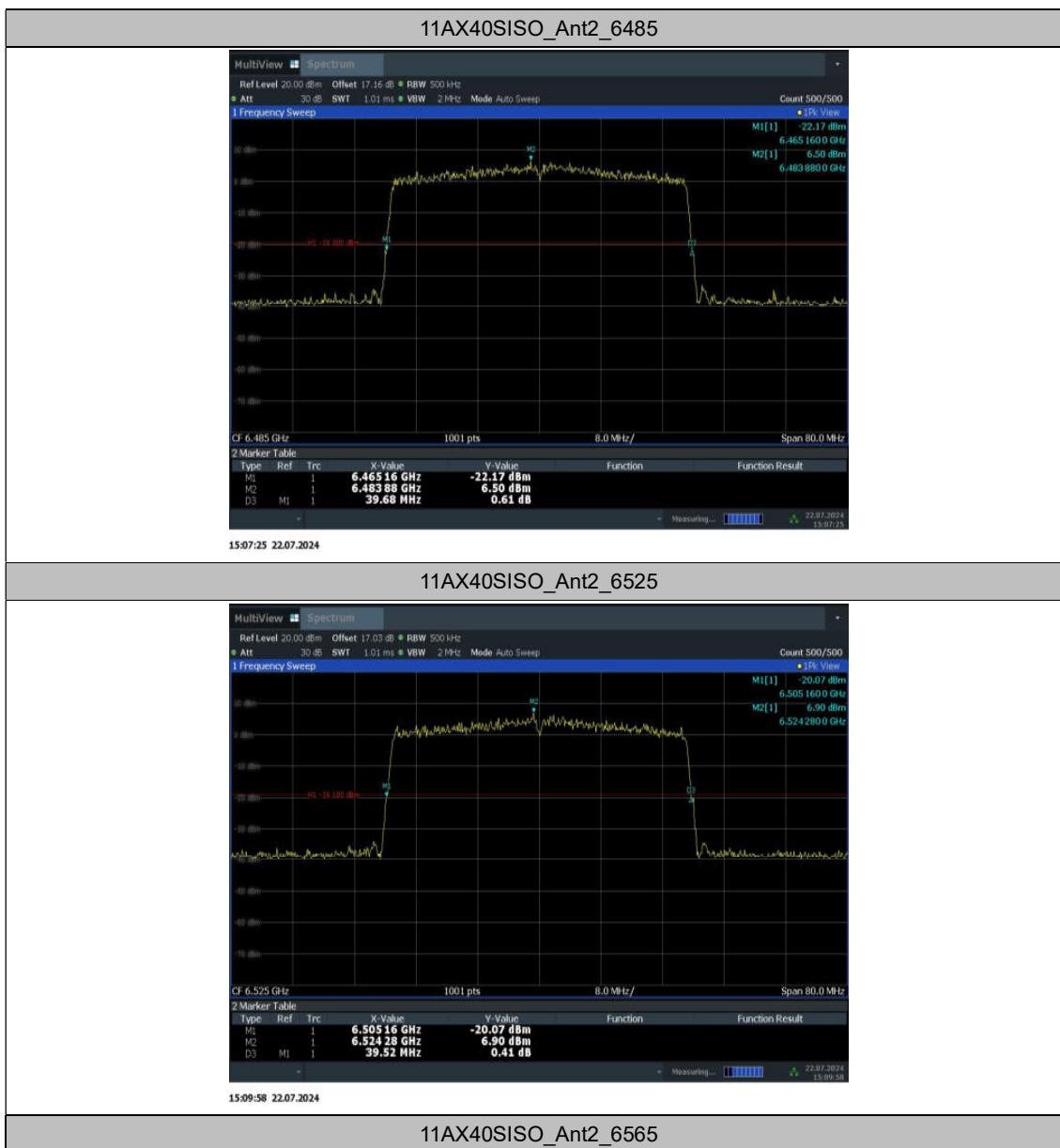


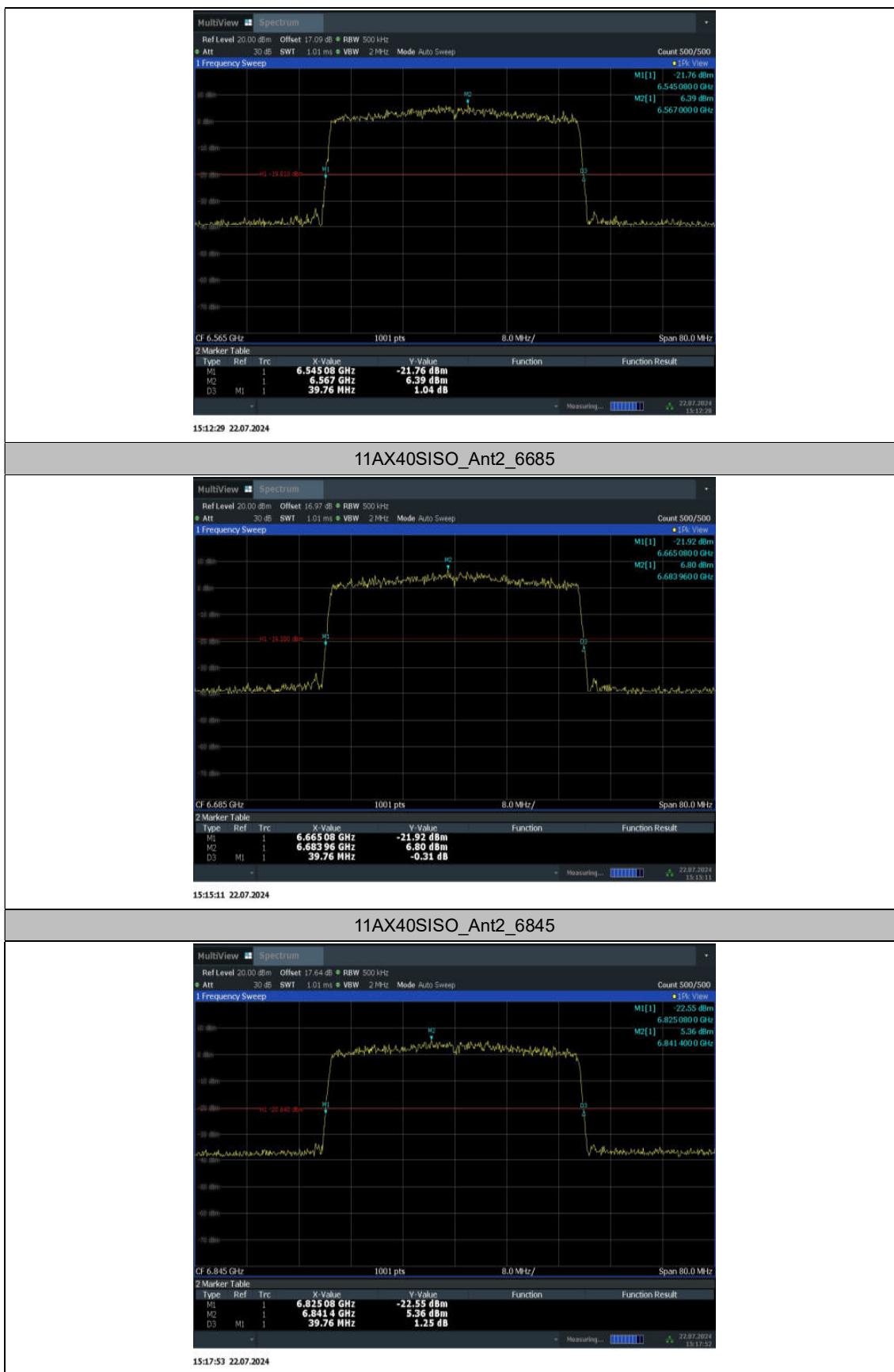
11AX40SISO_Ant2_6405

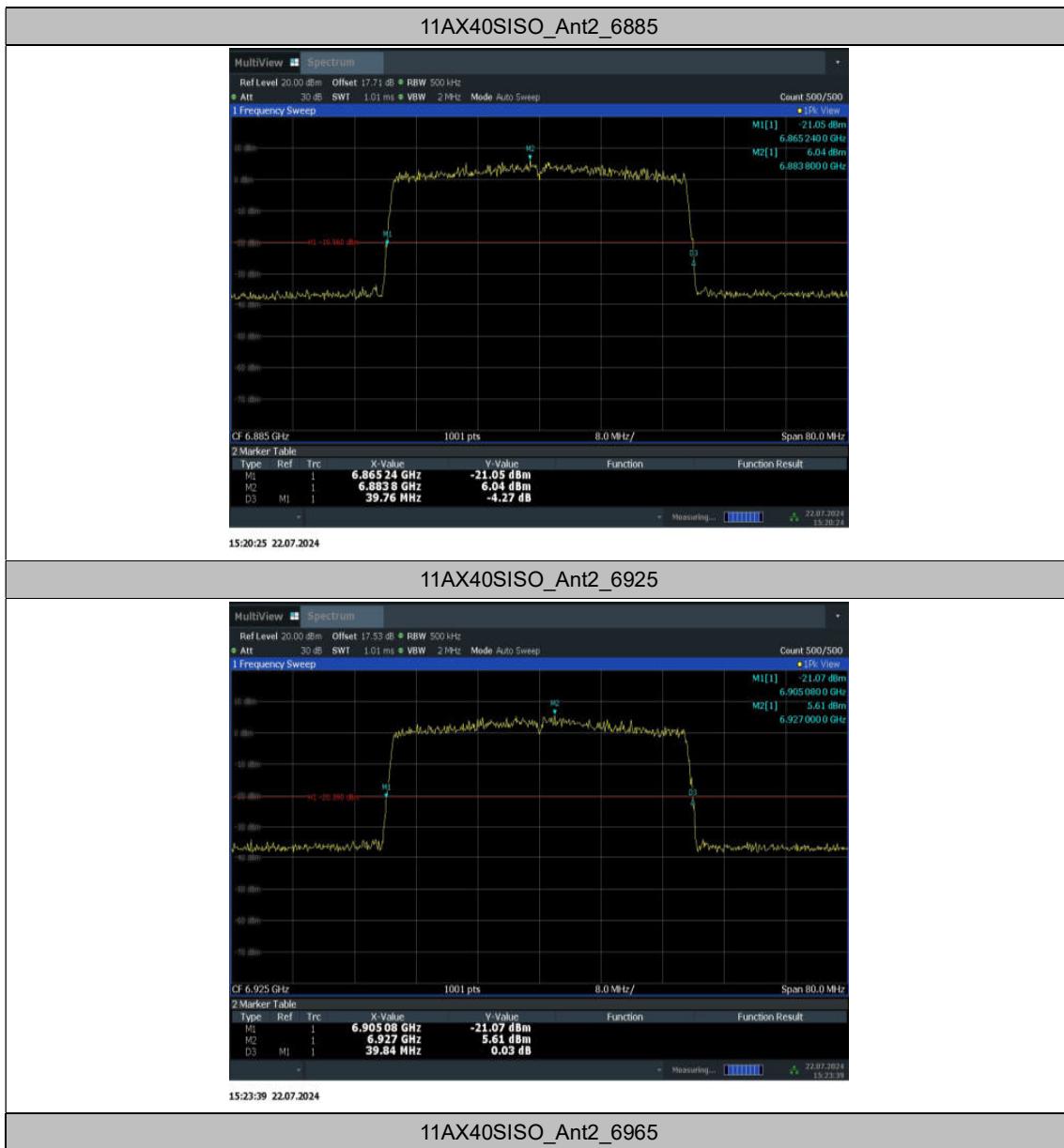


11AX40SISO Ant2 6445

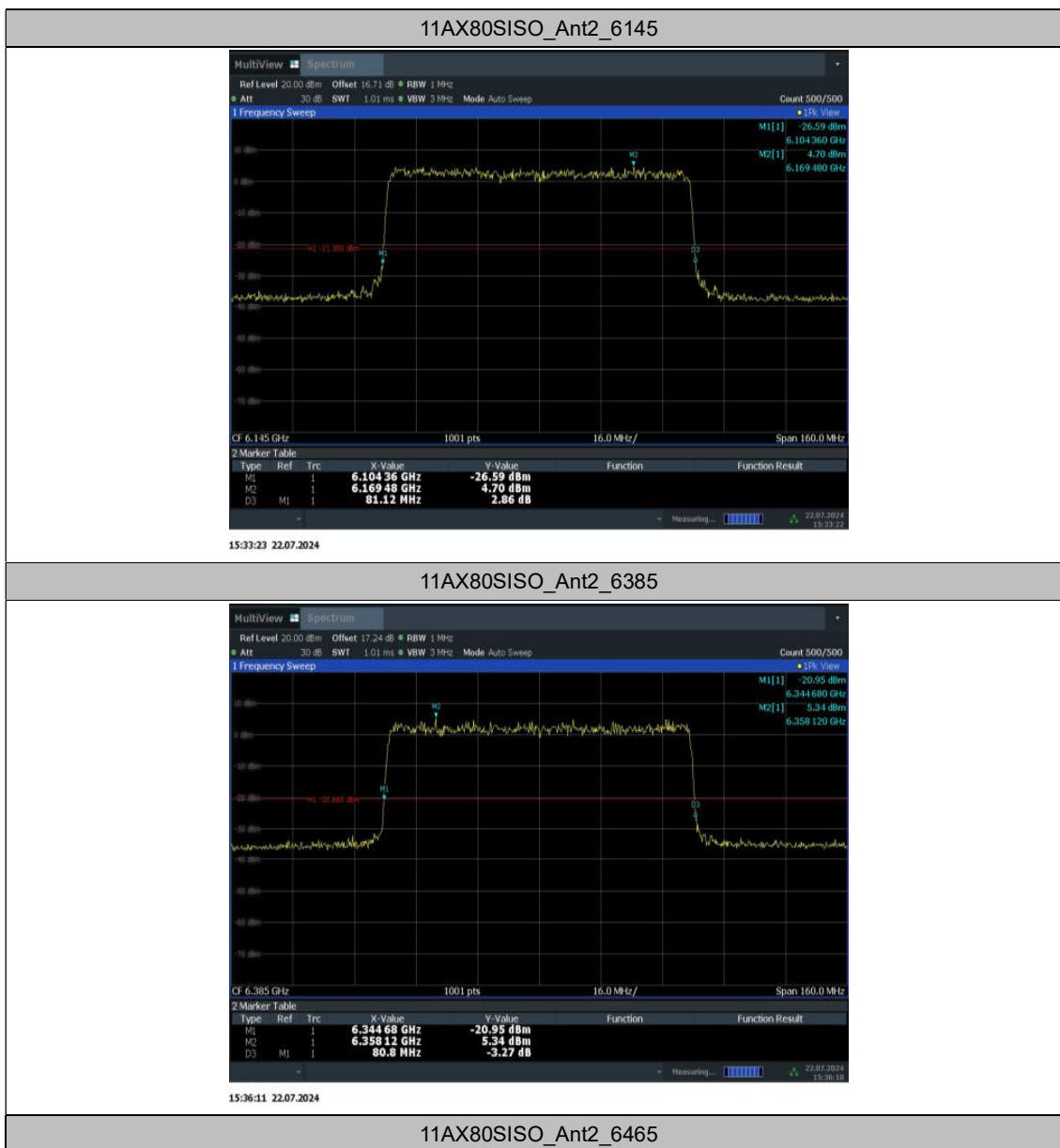




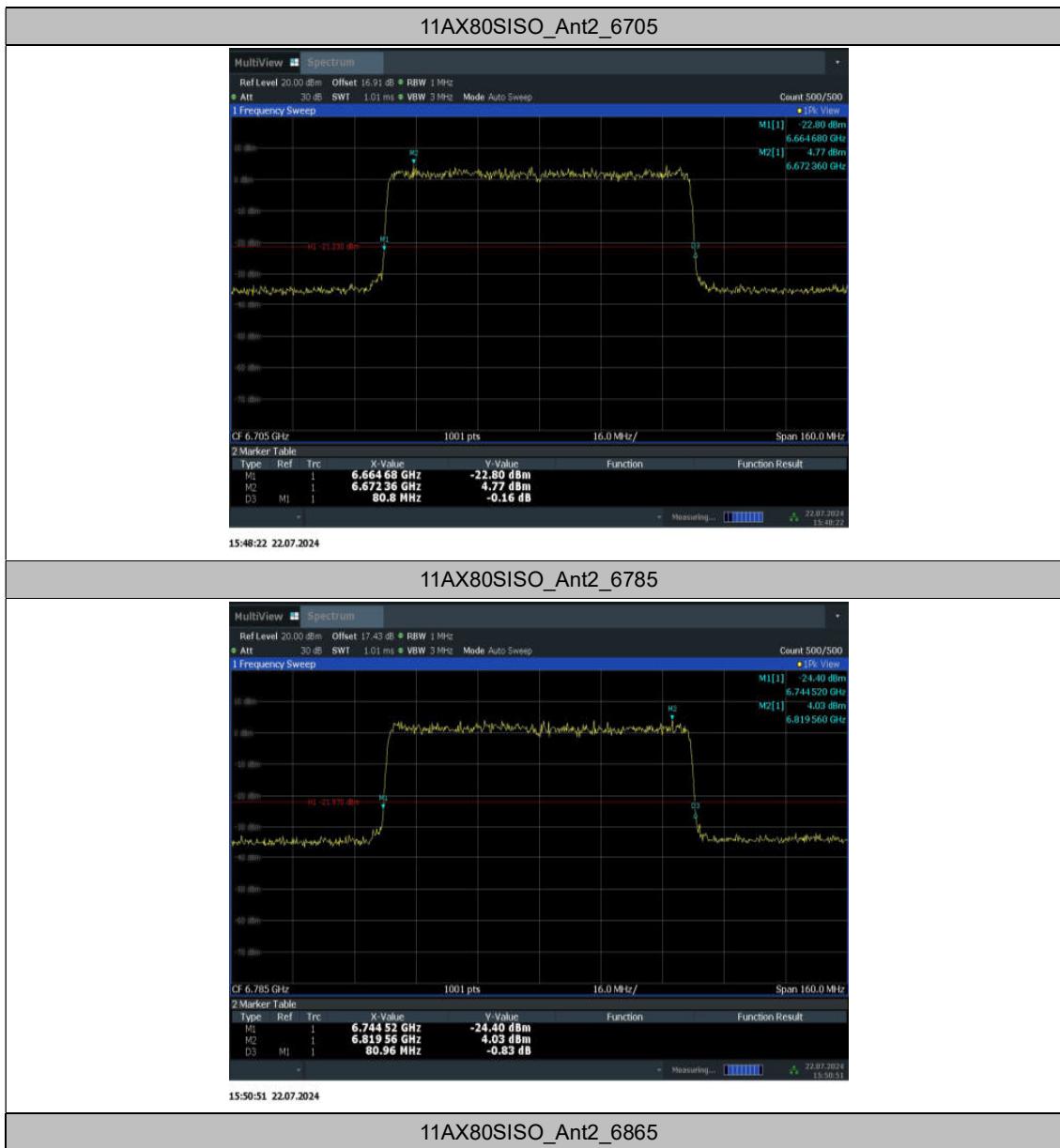




















A.5. 99% Occupied bandwidth

Method of Measurement: See ANSI C63.10-2013-clause 12.4.2.

- a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.
- c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than $[10 \log (\text{OBW}/\text{RBW})]$ below the reference level. Specific guidance is given in 4.1.5.2.
- d) Step a) through step c) might require iteration to adjust within the specified range.
- e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
- f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.
- g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.
- h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

Measurement Limit:

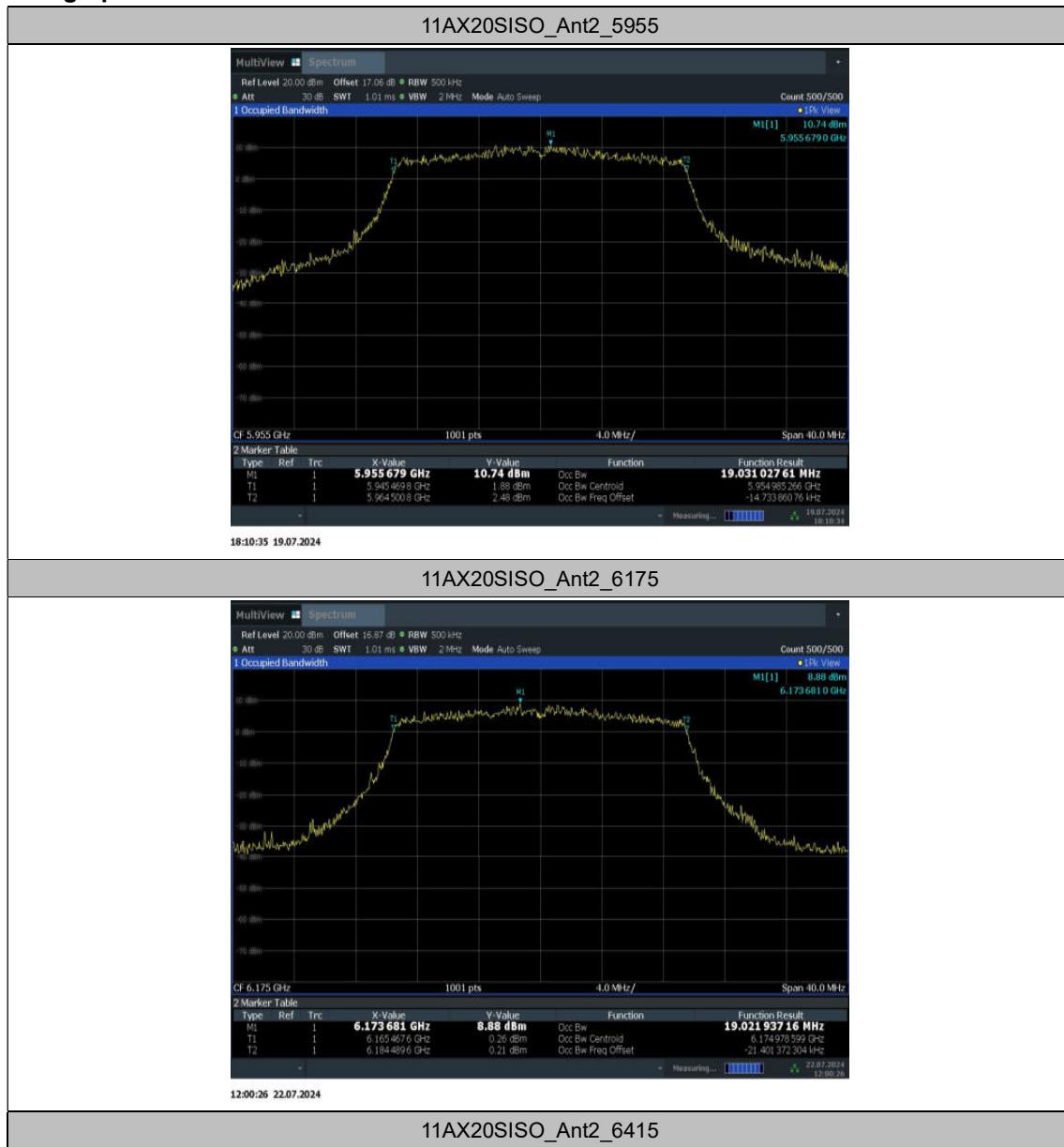
According to FCC guidance, the 26 dB bandwidth has been applied for all channels below 320MHz. For 320MHz, the 99% bandwidth has been used.

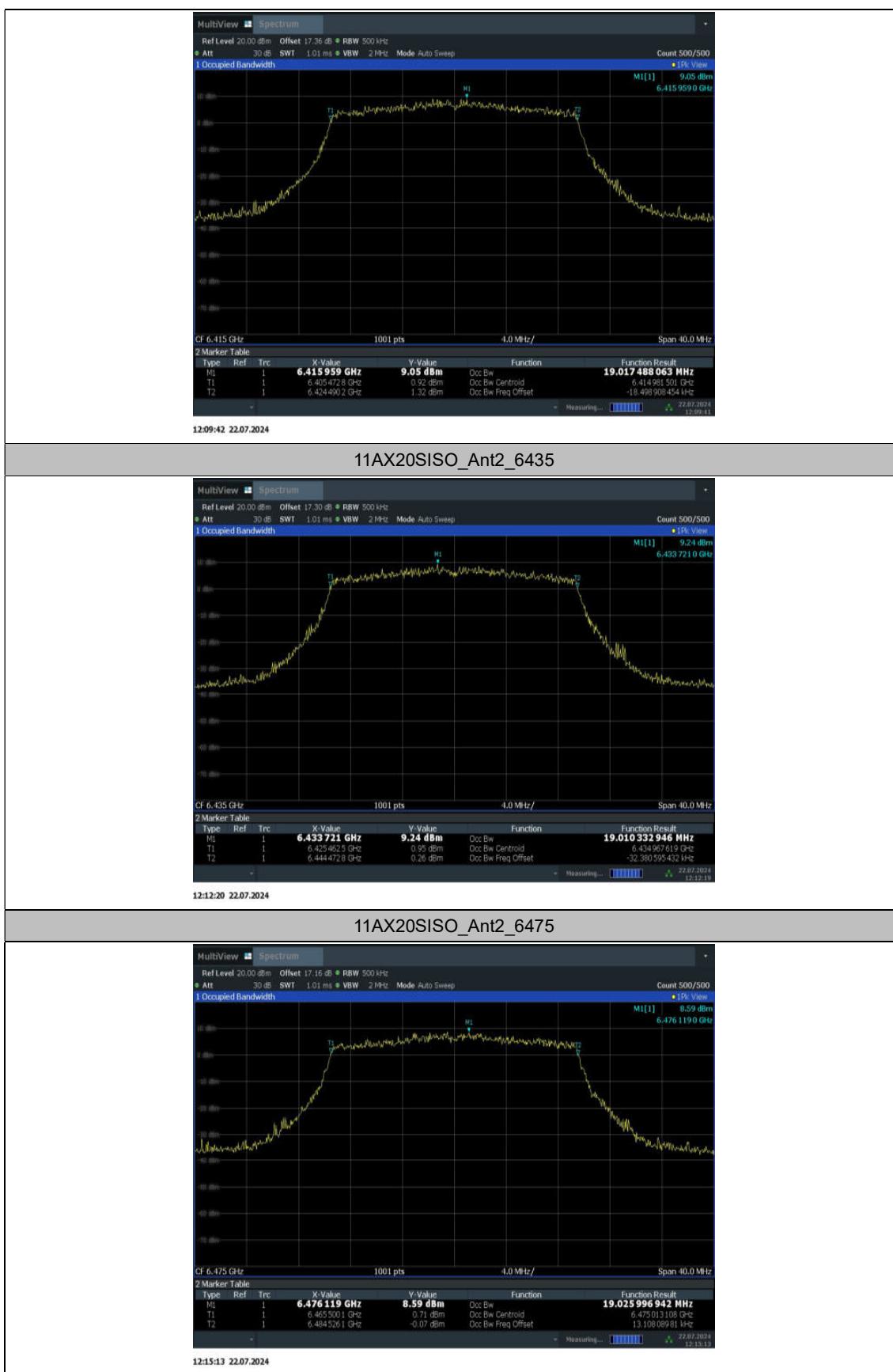
47CFR 15.407(a)(10) The maximum transmitter channel bandwidth for U-NII devices in the 5.925–7.125 GHz band is 320 megahertz.

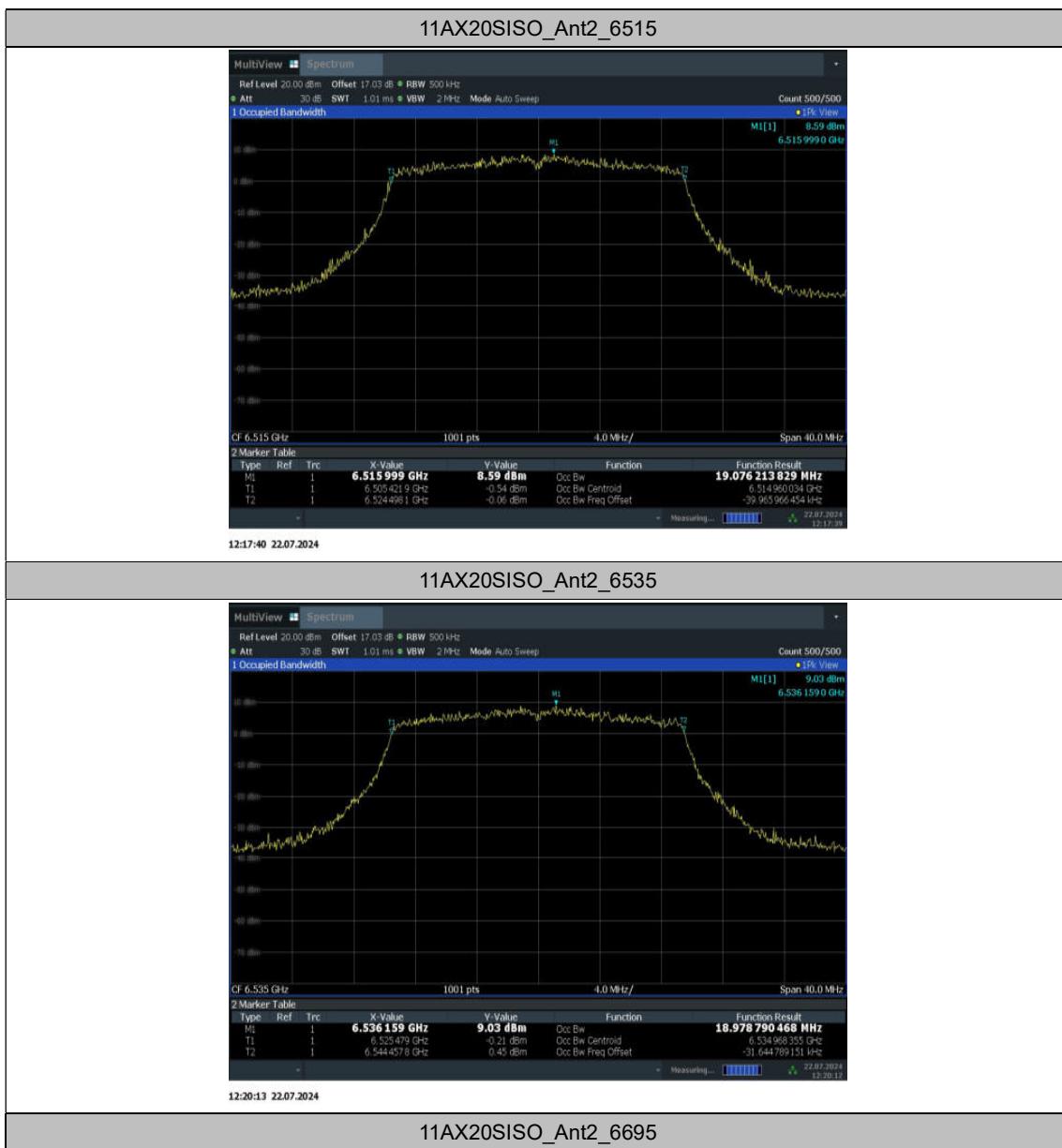
TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11AX20SISO	Ant2	5955	19.031	5945.4698	5964.5008	≤320	PASS
		6175	19.022	6165.4676	6184.4896	≤320	PASS
		6415	19.017	6405.4728	6424.4902	≤320	PASS
		6435	19.01	6425.4625	6444.4728	≤320	PASS
		6475	19.026	6465.5001	6484.5261	≤320	PASS
		6515	19.076	6505.4219	6524.4981	≤320	PASS
		6535	18.979	6525.4790	6544.4578	≤320	PASS
		6695	19.028	6685.4699	6704.4979	≤320	PASS
		6855	19.07	6845.4452	6864.5152	≤320	PASS
		6875	19.027	6865.4430	6884.4697	≤320	PASS
		6895	19.046	6885.4551	6904.5011	≤320	PASS
		6995	19.006	6985.4775	7004.4836	≤320	PASS
		7115	19.05	7105.4474	7124.4970	≤320	PASS
		5965	37.683	5946.1500	5983.8330	≤320	PASS
		6165	37.696	6146.0875	6183.7833	≤320	PASS
11AX40SISO	Ant2	6405	37.619	6386.1411	6423.7602	≤320	PASS
		6445	37.595	6426.1813	6463.7759	≤320	PASS
		6485	37.659	6466.1505	6503.8100	≤320	PASS
		6525	37.745	6506.0521	6543.7968	≤320	PASS
		6565	37.766	6546.1395	6583.9053	≤320	PASS
		6685	37.711	6666.0798	6703.7907	≤320	PASS
		6845	37.73	6826.1548	6863.8850	≤320	PASS
		6885	37.571	6866.2024	6903.7737	≤320	PASS
		6925	37.665	6906.1041	6943.7686	≤320	PASS
		6965	37.599	6946.1871	6983.7865	≤320	PASS
		7085	37.708	7066.1255	7103.8333	≤320	PASS
		5985	77.955	5945.9394	6023.8946	≤320	PASS
		6145	77.672	6106.0764	6183.7482	≤320	PASS
11AX80SISO	Ant2	6385	77.89	6346.0150	6423.9049	≤320	PASS
		6465	77.711	6426.0605	6503.7710	≤320	PASS
		6545	77.88	6506.0294	6583.9091	≤320	PASS
		6625	77.895	6586.1319	6664.0269	≤320	PASS
		6705	77.871	6665.9972	6743.8678	≤320	PASS
		6785	77.783	6746.0623	6823.8458	≤320	PASS
		6865	77.941	6825.9679	6903.9090	≤320	PASS
		6945	77.966	6905.8854	6983.8510	≤320	PASS
		7025	77.738	6986.1740	7063.9116	≤320	PASS
		6025	158.422	5945.8078	6104.2303	≤320	PASS
11AX160SISO	Ant2	6185	158.4	6105.6497	6264.0502	≤320	PASS
		6345	158.08	6265.9219	6424.0016	≤320	PASS
		6505	157.865	6426.1899	6584.0549	≤320	PASS
		6665	158.326	6585.8989	6744.2244	≤320	PASS

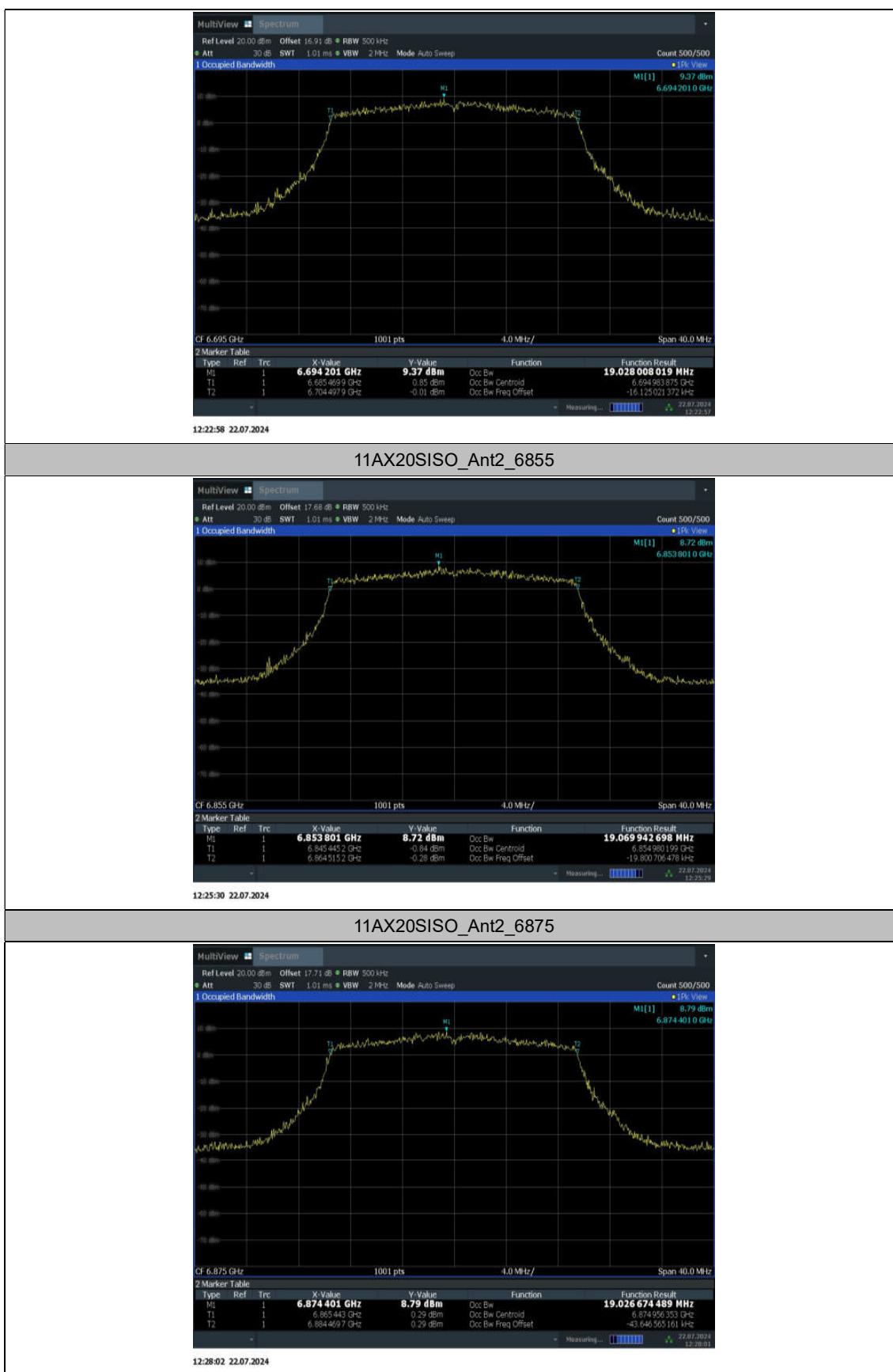
		6825	158.927	6745.6588	6904.5862	≤320	PASS
		6985	158.604	6905.8820	7064.4856	≤320	PASS

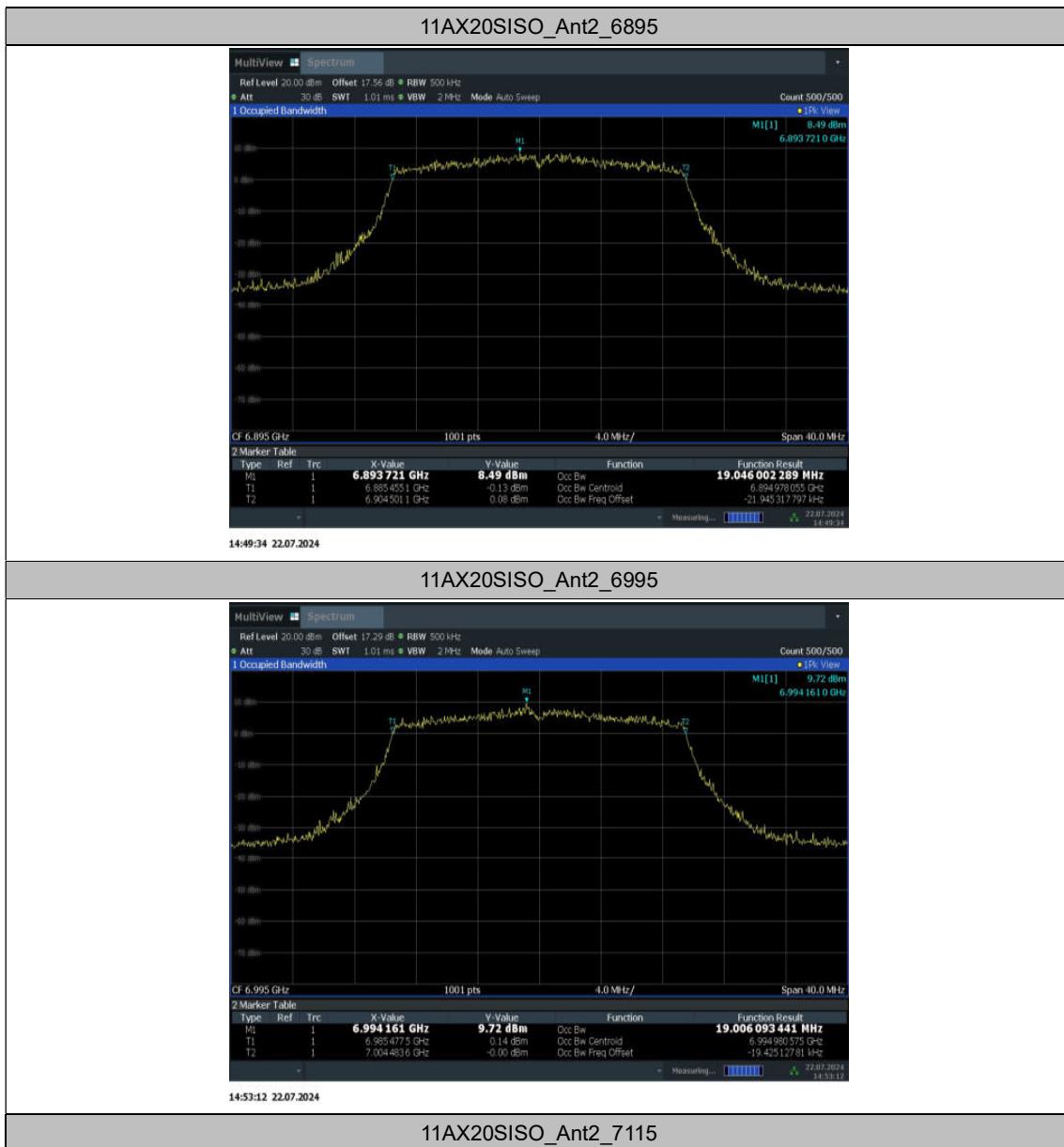
Test graphs as below:

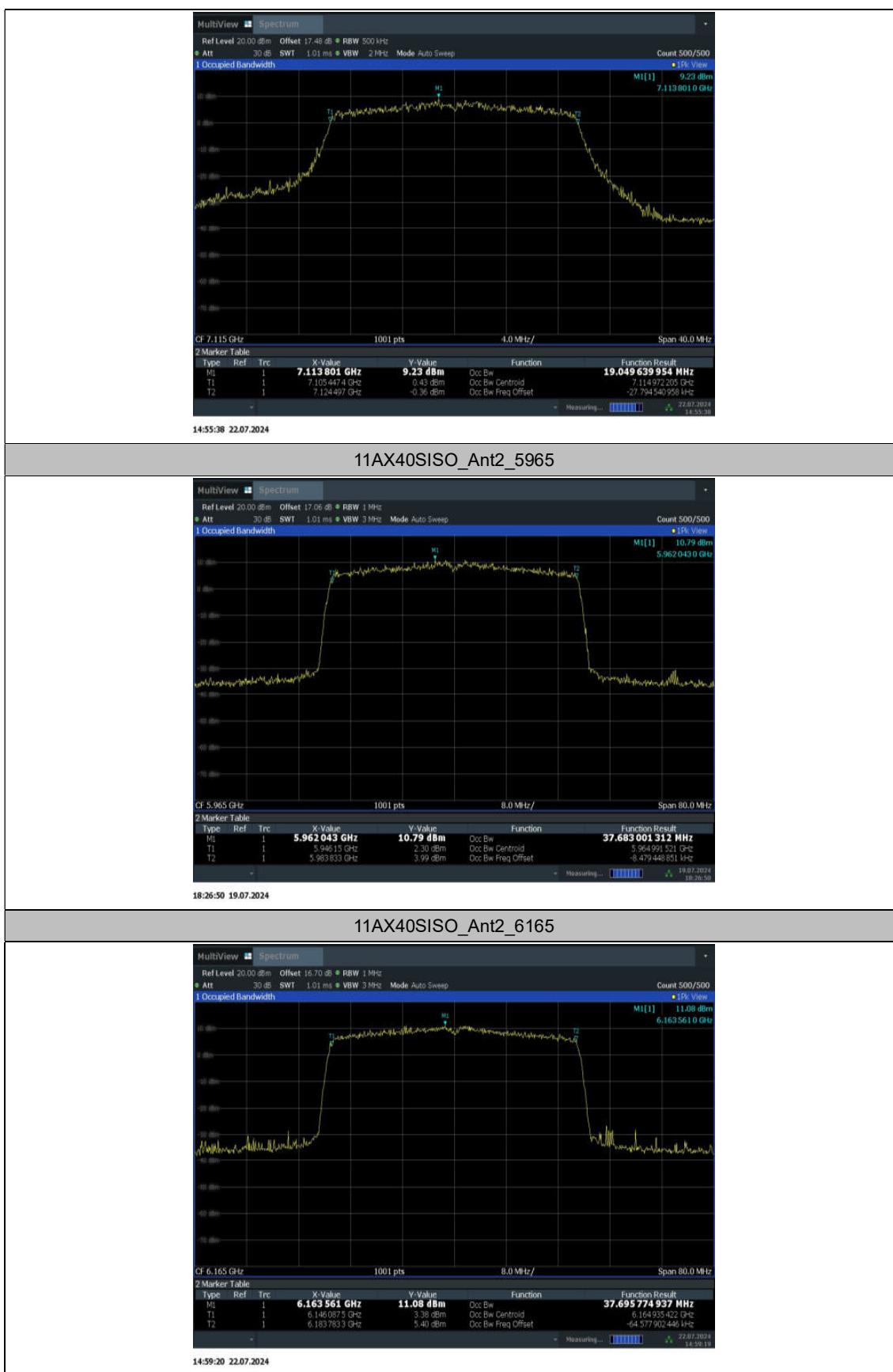


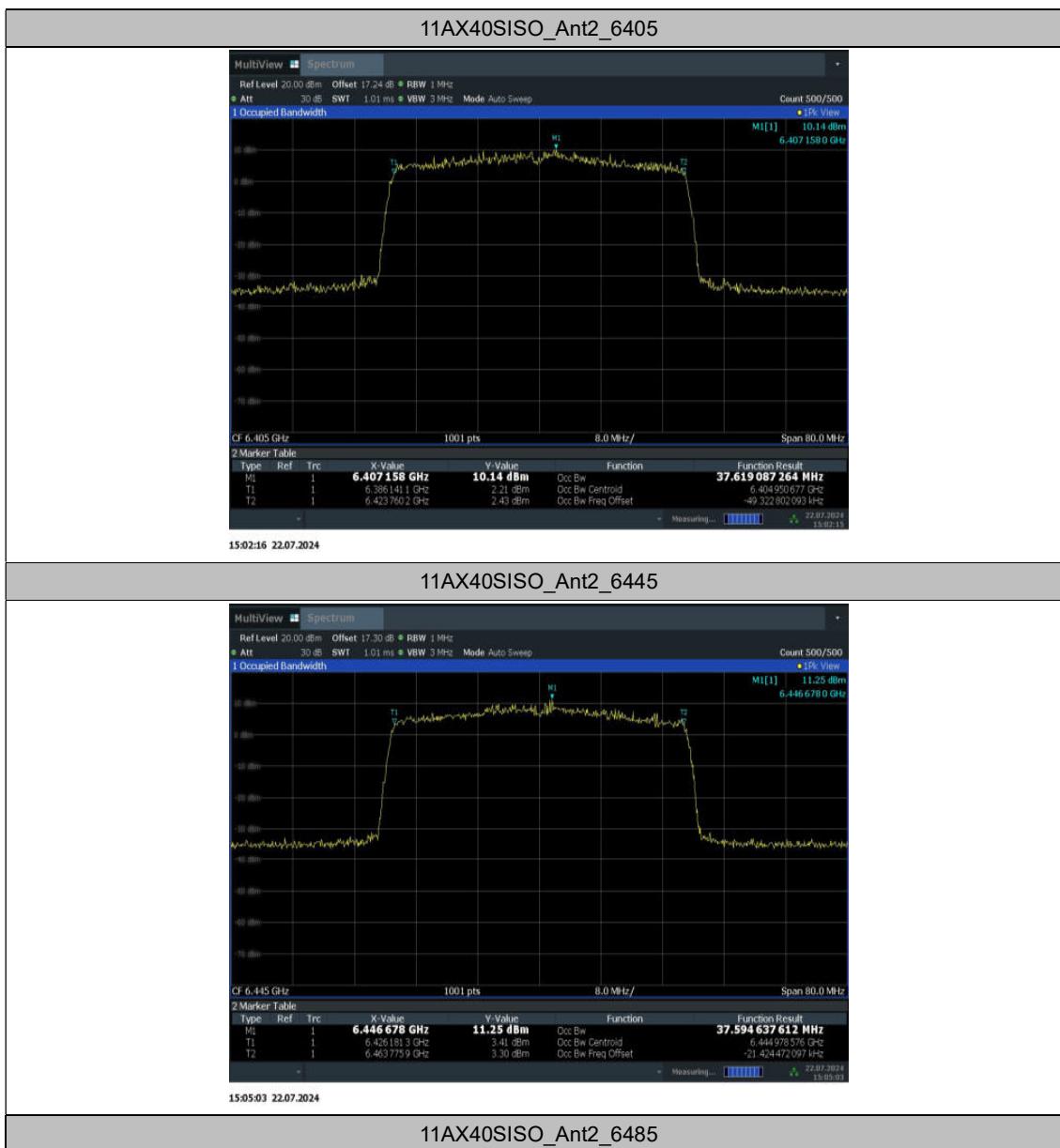


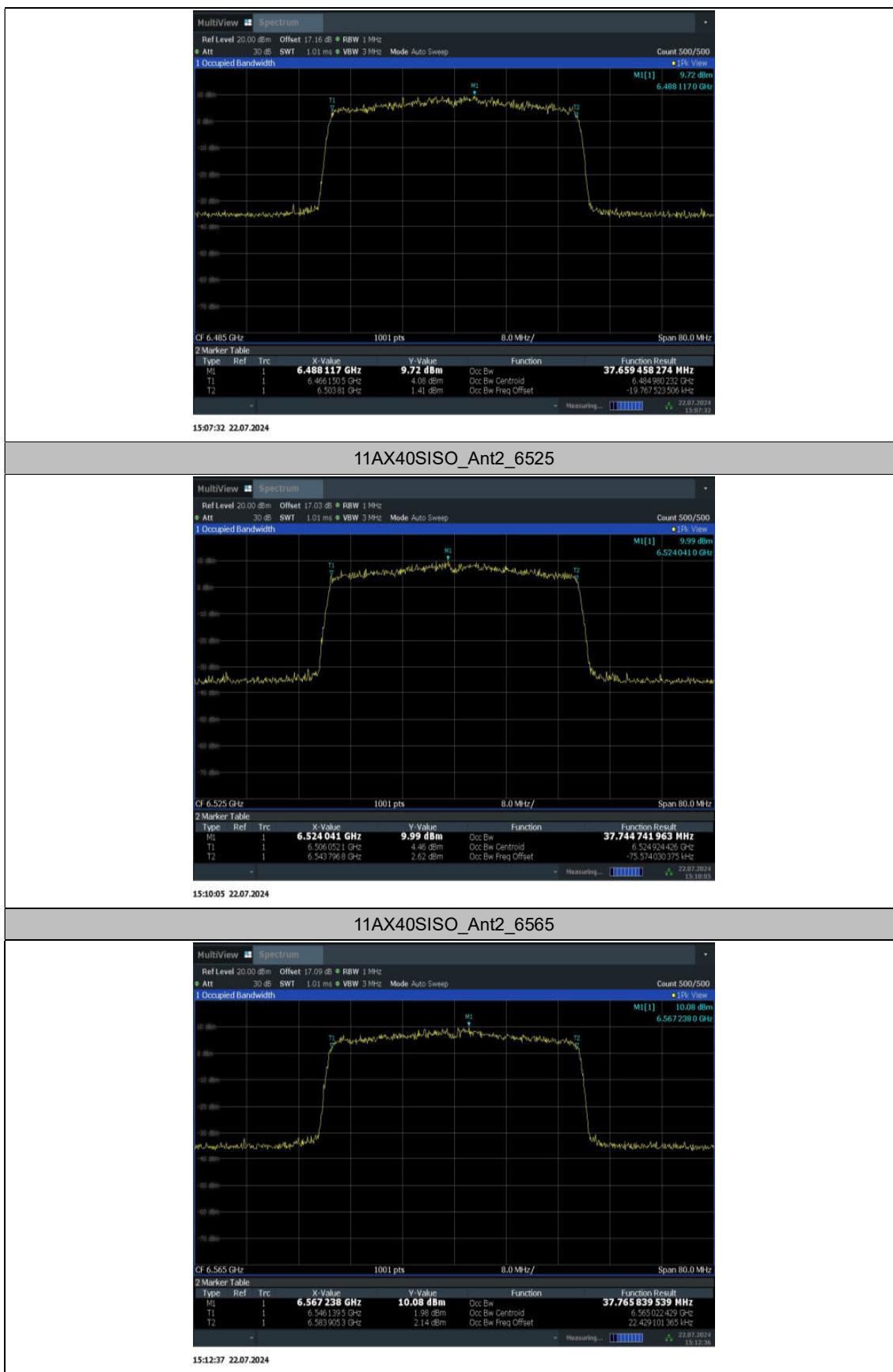


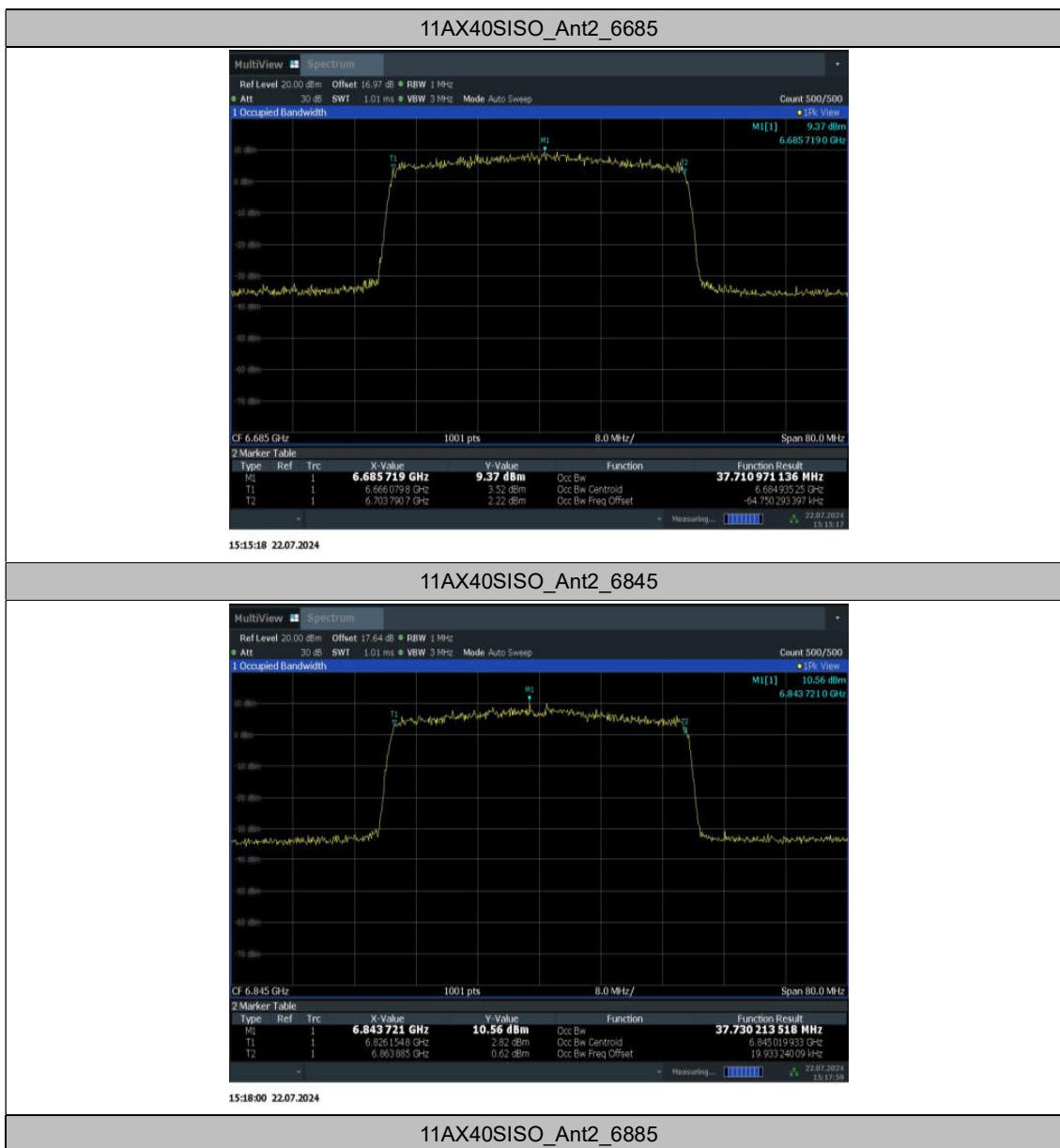


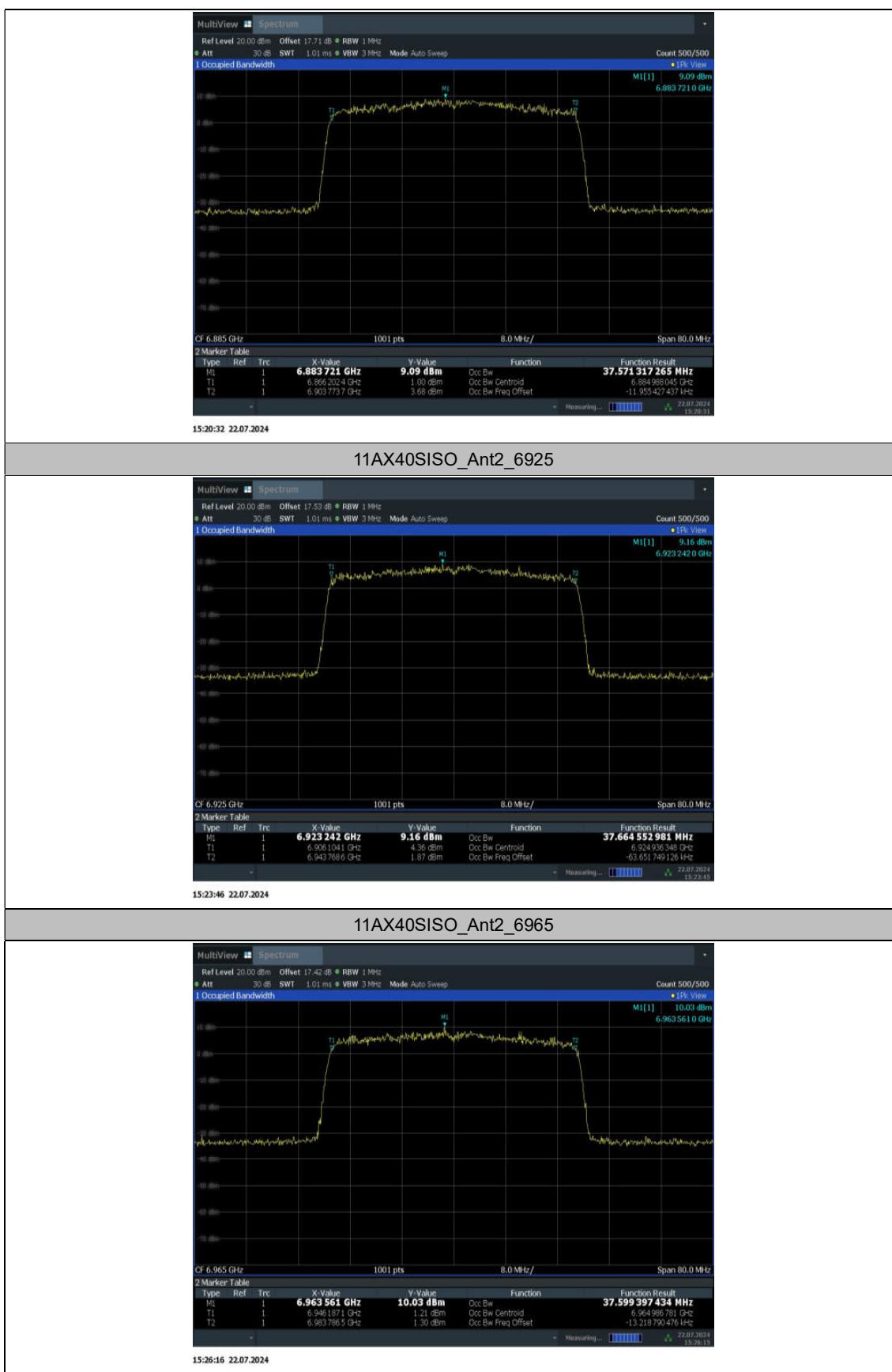


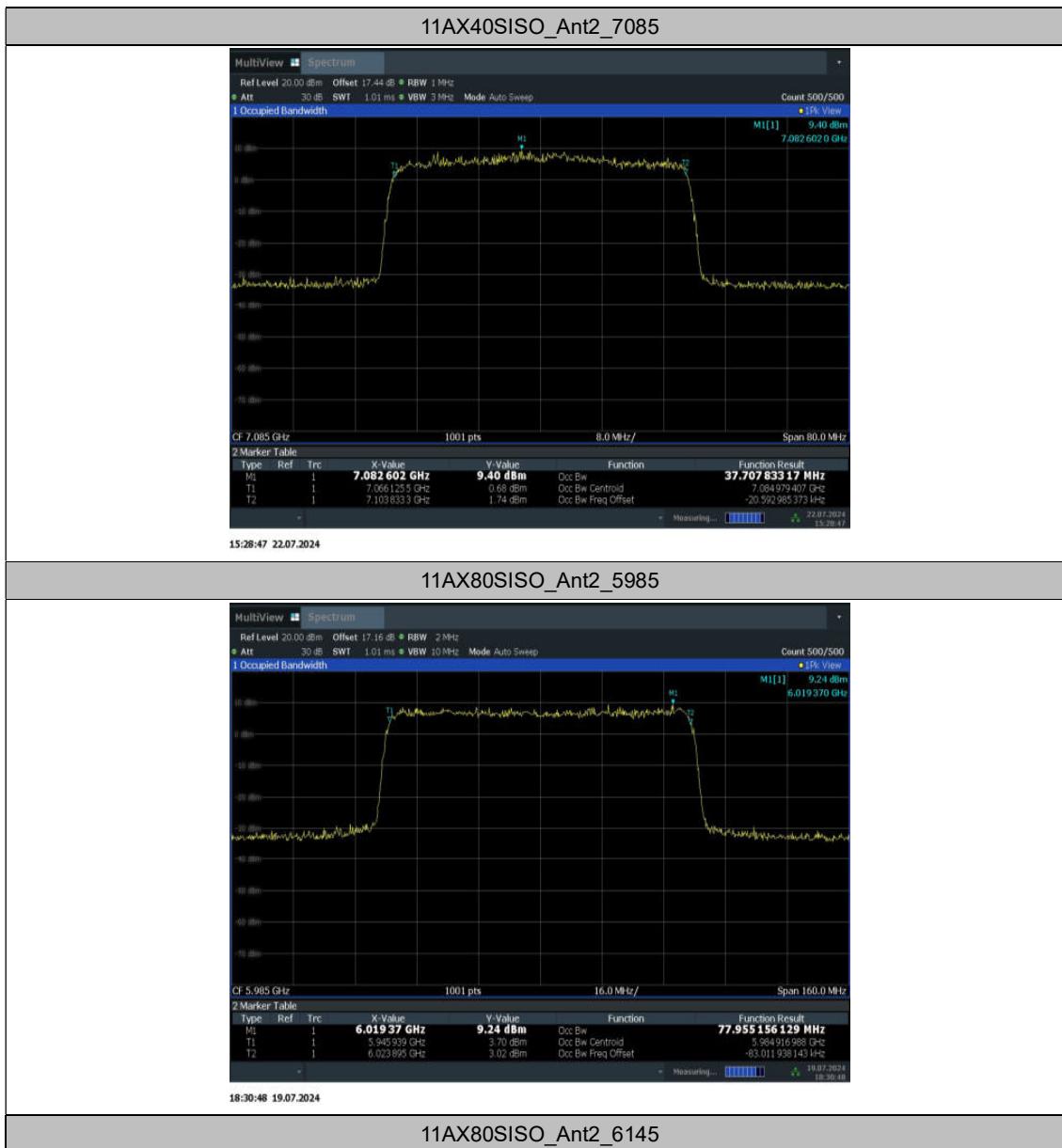


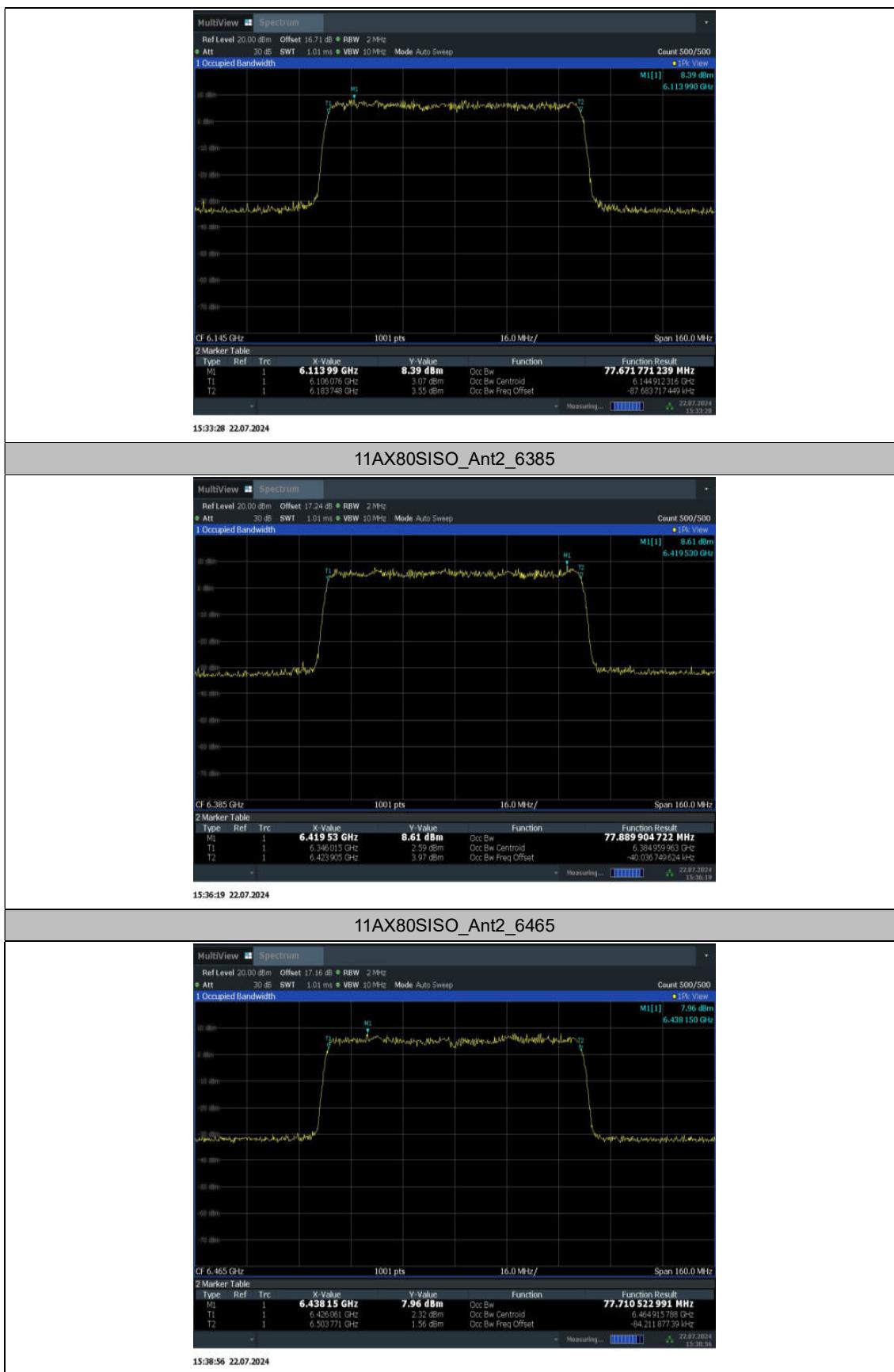


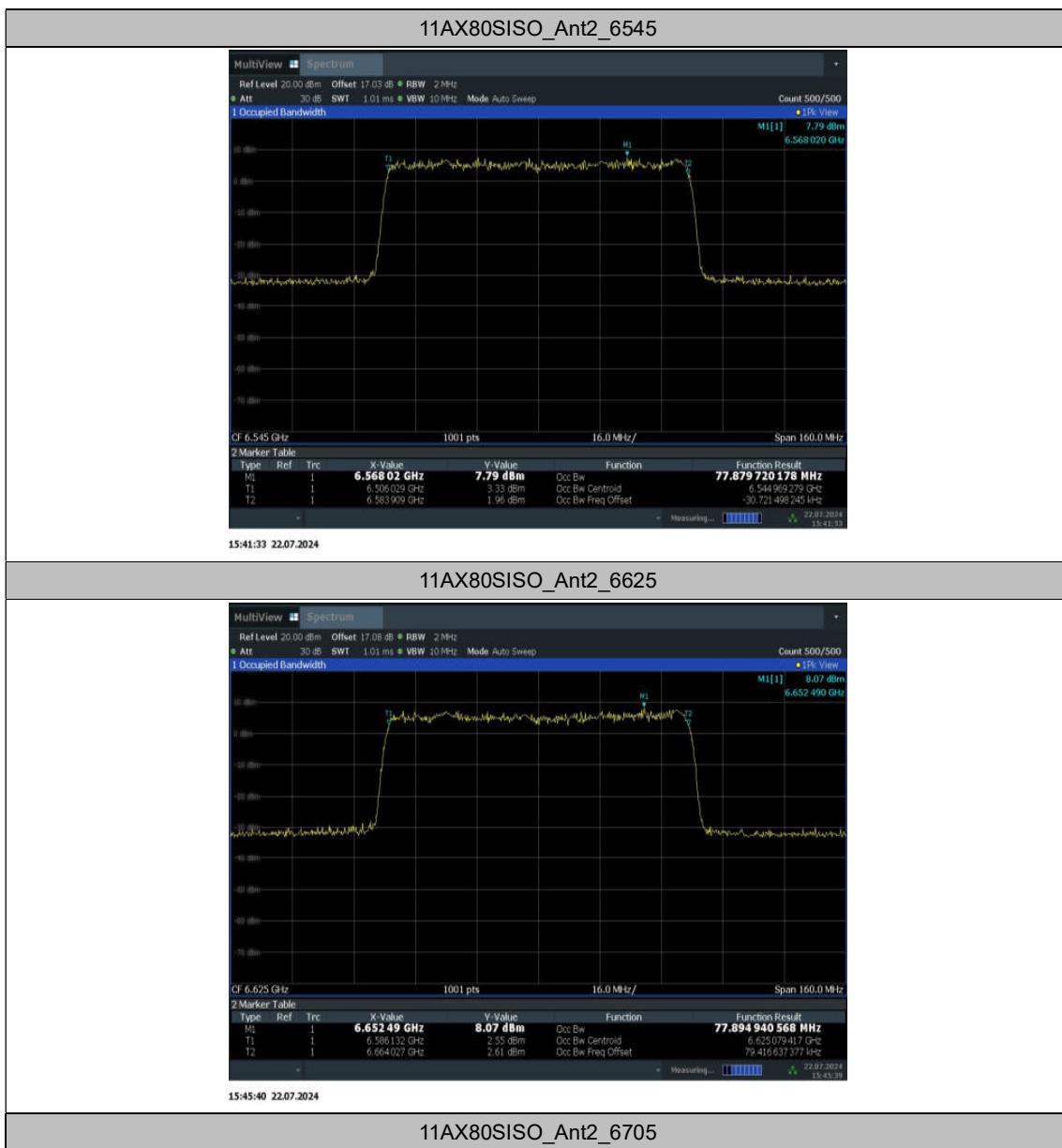




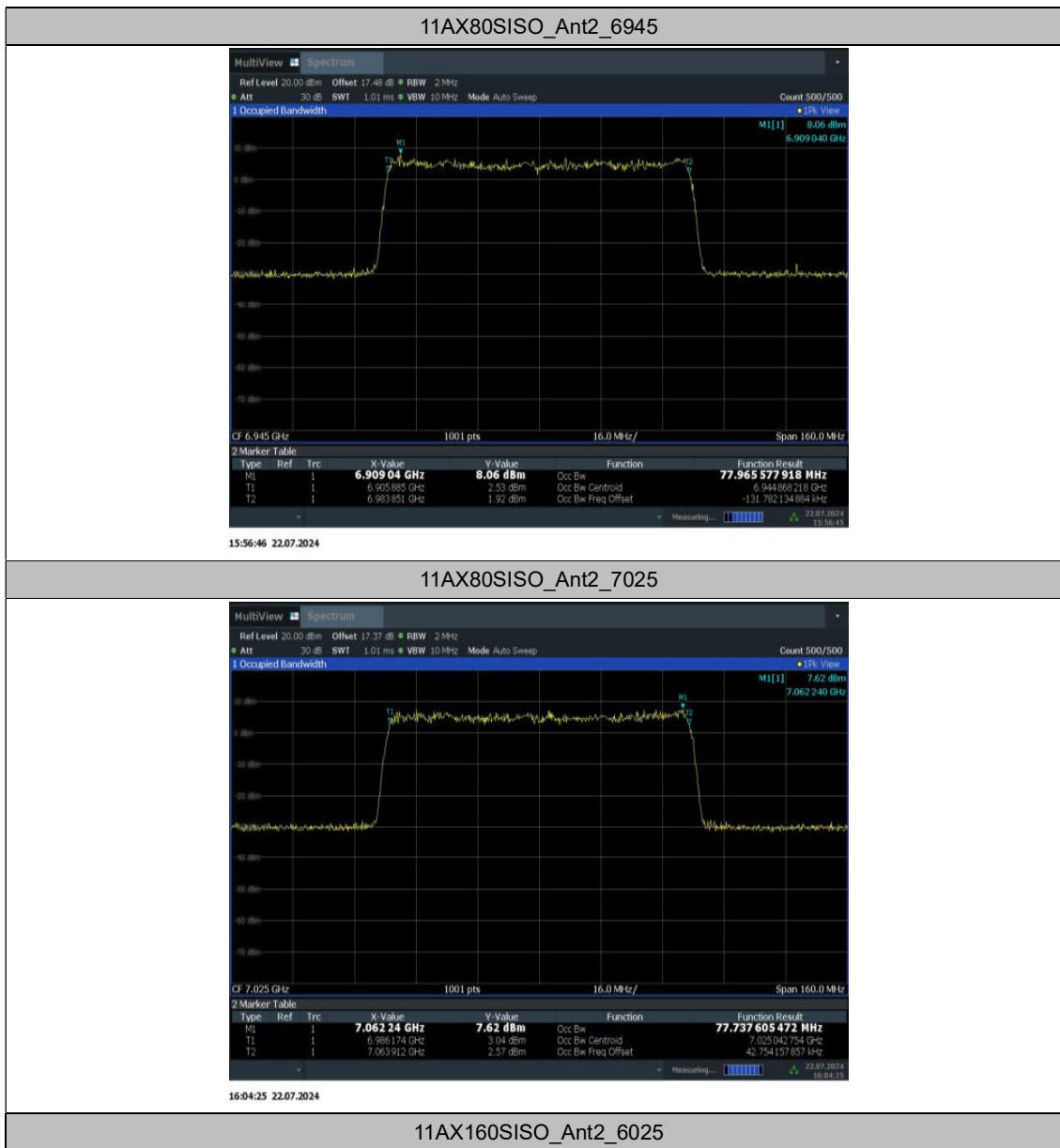


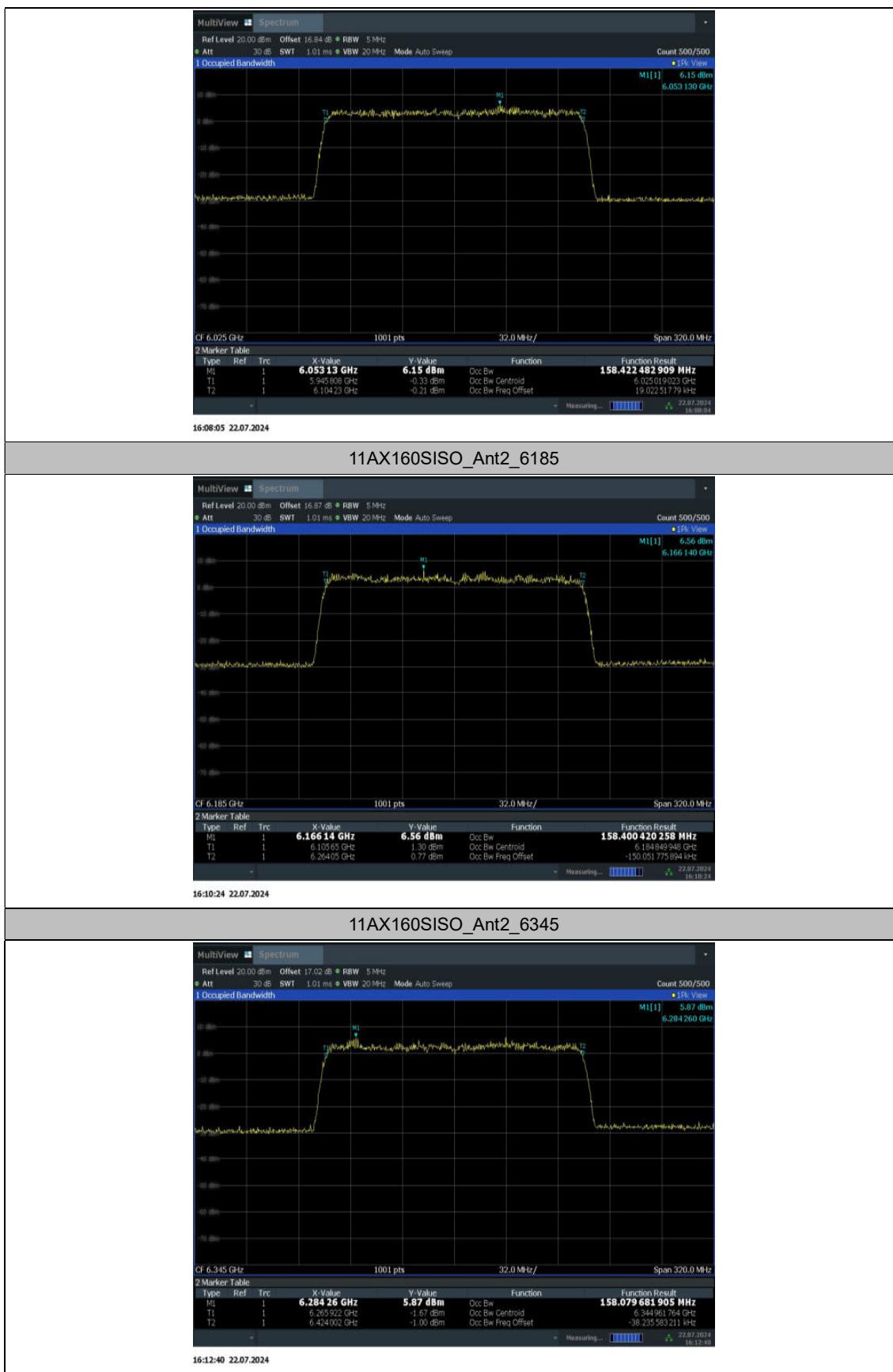
















A.6. Contention Based Protocol

Measurement Limit and Method:

Indoor access points, subordinate devices and client devices operating in the 5.925-7.125 GHz band must employ a contention-based protocol.

Unlicensed low-power indoor devices must detect co-channel radio frequency power that is at least -62 dBm or lower. Upon detection of energy in the band, unlicensed low power indoor devices must vacate the channel (in which incumbent signal is transmitted) and stay off the incumbent channel as long as detected radio frequency power is equal to or greater than the threshold (-62 dBm)1. The -62 dBm (or lower) threshold is referenced to a 0 dBi antenna gain.

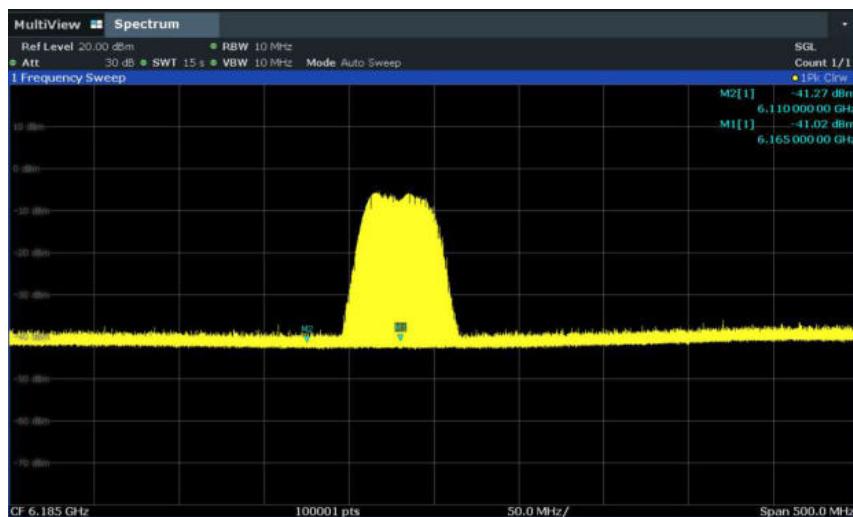
To ensure incumbent operations are reliably detected in the band, low power indoor devices must detect RF energy throughout their intended operating channel. For example, an 802.11 device that plans to transmit a 40 MHz- wide signal (on a primary 20 MHz channel and a secondary 20 MHz channel) must detect energy throughout the entire 40 MHz channel. Additionally, low-power indoor devices must detect co-channel energy with 90% or greater certainty.

The measurement is made according to KDB 987594.

EUT does not use channel puncturing for incumbent avoidance. The EUT use bandwidth reduction for incumbent avoidance. Following figure illustrates an example scenarios of an 160MHz channel centered at 6185 MHz.

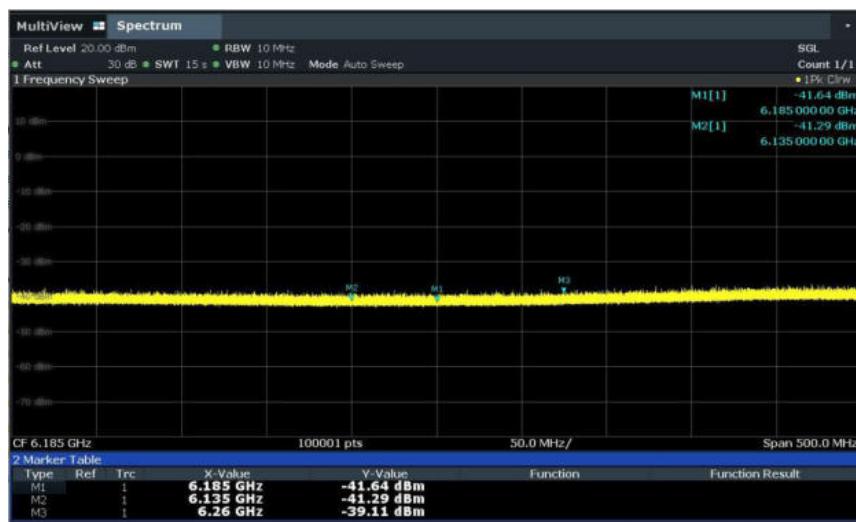
For the lower edge:

A 10 MHz AWGN signal (center frequency is 6110MHz) is injected, the signal reduces to 40 MHz centered around 6165MHz.



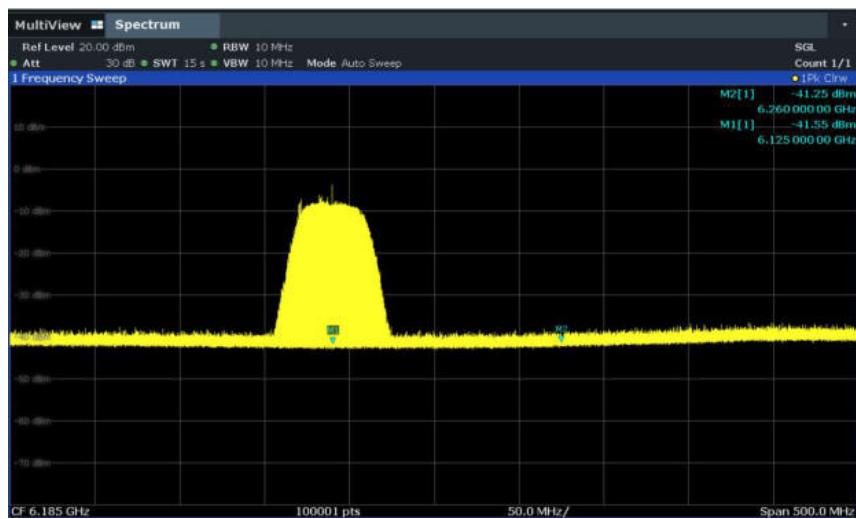
For the center frequency

A 10 MHz AWGN signal (center frequency is 6185MHz) is injected, the signal completely ceases operation.



For the upper edge:

A 10 MHz AWGN signal (center frequency is 6260MHz) is injected, the signal reduces to 40 MHz centered around 6125MHz.



Measurement Results:

Note: The test evaluated the minimum antenna gain, which is reflected in the Ant Gain column.

Band	BW (MHz)	Fre. (MHz)	Incumbent Freq (MHz)	AWGN Signal Level (at Antenna Port) (dBm)	Incumbent Signal Level (Refer to 0dBi Antenna) (dBm)	Ant Gain (dBi)	Detection Rate(%)	Threshold Level(dB m)
UNII Band 5	20	6135	fc1 = fc2	-70	-66	-4	100	-62
					Cease transmission			
				-75	-71	-4	<90	-62
					Minimal transmission			
				-90	-86	-4	0	-62
					Normal transmission			
	160	6185	fc1 = fc2	-69	-65	-4	100	-62
					Cease transmission			
				-71	-67	-4	<90	-62
					Minimal transmission			
				-90	-86	-4	0	-62
					Normal transmission			
	6260	Upper Edge	-67	-63	-4	90	-62	
				Cease transmission				
			-67.5	-63.5	-4	<90	-62	
				Minimal transmission				
			-90	-86	-4	0	-62	
				Normal transmission				
			-70	-66	-4	100	-62	
				Cease transmission				
			-71	-67	-4	<90	-62	

Band	BW (MHz)	Fre. (MHz)	Incumbent Freq (MHz)	AWGN Signal Level (at Antenna Port) (dBm)	Minimal transmission				
					-90	-86	-4	0	-62
						Normal transmission			
Band	BW (MHz)	Fre. (MHz)	Incumbent Freq (MHz)	AWGN Signal Level (at Antenna Port) (dBm)	Incumbent Signal Level (Refer to 0dBi Antenna) (dBm)	Ant Gain (dBi)	Detection Rate(%)	Threshold Level(dB m)	
UNII Band 6	20	6455 fc1 = fc2	6455 fc1 = fc2	-71	-67	-4	100	-62	
					Cease transmission				
				-74	-70	-4	<90	-62	
					Minimal transmission				
				-90	-86	-4	0	-62	
					Normal transmission				
				-68	-64	-4	90	-62	
					Cease transmission				
160 UNII Band 6	160	6425 fc1 = fc2	6430 Lower Edge	-70	-66	-4	<90	-62	
					Minimal transmission				
				-90	-86	-4	0	-62	
					Normal transmission				
				-69	-65	-4	100	-62	
					Cease transmission				
			6505 fc1 = fc2	-71	-67	-4	<90	-62	
					Minimal transmission				
				-90	-86	-4	0	-62	
			6580 Upper Edge		Normal transmission				
			-69	-65	-4	100	-62		
				Cease transmission					
			-70.5	-66.5	-4	<90	-62		

Band	BW (MHz)	Fre. (MHz)	Incumbent Freq (MHz)	AWGN Signal Level (at Antenna Port) (dBm)	Minimal transmission			
					-90	-86	-4	0
						Normal transmission		
Band	BW (MHz)	Fre. (MHz)	Incumbent Freq (MHz)	AWGN Signal Level (at Antenna Port) (dBm)	Incumbent Signal Level (Refer to 0dBi Antenna) (dBm)	Ant Gain (dBi)	Detection Rate(%)	Threshold Level(dB m)
UNII Band 7	20	6855	fc1 = fc2	-70	-66	-4	100	-62
					Cease transmission			
				-74	-70	-4	<90	-62
					Minimal transmission			
				-90	-86	-4	0	-62
					Normal transmission			
				-72	-68	-4	90	-62
					Cease transmission			
160 UNII Band 7	160	6665	6590 Lower Edge	-73.5	-69.5	-4	<90	-62
					Minimal transmission			
				-90	-86	-4	0	-62
					Normal transmission			
				-72	-68	-4	100	-62
					Cease transmission			
			6665 fc1 = fc2	-73	-69	-4	<90	-62
					Minimal transmission			
				-90	-86	-4	0	-62
					Normal transmission			
			6740 Upper Edge	-73	-69	-4	90	-62
					Cease transmission			
				-74	-70	-4	<90	-62

Band	BW (MHz)	Fre. (MHz)	Incumbent Freq (MHz)	AWGN Signal Level (at Antenna Port) (dBm)	Minimal transmission				
					-90	-86	-4	0	-62
						Normal transmission			
Band	BW (MHz)	Fre. (MHz)	Incumbent Freq (MHz)	AWGN Signal Level (at Antenna Port) (dBm)	Incumbent Signal Level (Refer to 0dBi Antenna) (dBm)	Ant Gain (dBi)	Detection Rate(%)	Threshold Level(dB m)	
UNII Band 8	20	7015	7015 fc1 = fc2	-72	-68	-4	100	-62	
					Cease transmission				
				-76	-72	-4	<90	-62	
					Minimal transmission				
				-90	-86	-4	0	-62	
					Normal transmission				
160 UNII Band 8	160	6985	6910 Lower Edge	-70	-66	-4	90	-62	
					Cease transmission				
				-71	-67	-4	<90	-62	
					Minimal transmission				
				-90	-86	-4	0	-62	
					Normal transmission				
			6985 fc1 = fc2	-71	-67	-4	100	-62	
					Cease transmission				
				-71.5	-67.5	-4	<90	-62	
					Minimal transmission				
				-90	-86	-4	0	-62	
					Normal transmission				
			7060 Upper Edge	-71	-67	-4	90	-62	
					Cease transmission				
				-72	-68	-4	<90	-62	

					Minimal transmission			
				-90	-86	-4	0	-62
					Normal transmission			

Note: Incumbent signal level (dBm) = AWGN Signal power Level (dBm)-Antenna Gain (dBi),

The EUT encounters the incumbent signal that its power level is less than or equal to the detection threshold (-62dBm) with reference to 0dBi antenna gain. Path loss is negligible (0dB).

EUT support bandwidth reduction mechanism.

Conclusion: PASS

Test graphs as below:

Mode	AWGN Signal Level	ceased transmission
802.1ax-HE20-6135MHz	See test graph	See test graph
802.11ax-HE160-6185MHz(middle)	See test graph	See test graph



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Contention Based Protocol 802.11ax-HE20 (ch6135MHz-AWGN Signal Level)