

Report No.: SUCR2401000003TL03
Rev.: 01
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TEST REPORT

Application No.: SUCR2401000003TL
Applicant: KonnectONE, Inc
Address of Applicant: 40 Lake Bellevue Drive, Suite 340, Bellevue, Washington 98005, U.S.A
Manufacturer: KonnectONE, Inc
Address of Manufacturer: 40 Lake Bellevue Drive, Suite 340, Bellevue, Washington 98005, U.S.A
EUT Description: CPE
Model No.: K868CPE
Trade Mark: Moxee
FCC ID: 2APQU-K868CPE
Standards: FCC 47 CFR Part 2, Subpart J
FCC 47 CFR Part 15, Subpart E
Date of Receipt: 2023/01/03
Date of Test: 2024/01/03 to 2024/01/18
Date of Issue: 2024/01/29

Test Result :	PASS *
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* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:

Well Wei

Well Wei
Wireless Laboratory Manager



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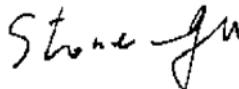
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1 Version

Revision Record

Version	Chapter	Date	Modifier	Remark
01		2024/01/29		Original

Prepared By	
	(Ives Cheng) / Test Engineer
Checked By	
	(Stone Gu) / Reviewer

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2 Test Summary

Test Item	Band ^[1]	FCC rules No.	Test Requirements	Test Result	Result
Antenna Requirement	--	15.203/15.407 (a)	--	Clause 4.1	PASS
26dB Emission Bandwidth	Band I	15.407(a)(1)	No limit.	Clause 4.5	For Report Purpose
	Band II-A	15.407(a)(2)			
	Band II-C	15.407(a)(2)			
6dB Emission Bandwidth	Band III	15.407(e)	≥ 500 kHz.	Clause 4.6	PASS
99% Occupied Bandwidth	Band I	KDB 789033 D02§ D	No limit.	Clause 4.7	For Report Purpose
	Band II-A				
	Band II-C				
	Band III				
Duty Cycle	Band I	--	No limit.	Clause 4.3	For Report Purpose
	Band II-A				
	Band II-C				
	Band III				
Maximum Conducted Output Power	Band I	15.407(a)(ii)	<1W	Clause 4.4	PASS
	Band II-A	15.407(a)(2)	<MIN{250mW,11dBm+10*Ig(EBW)}		
	Band II-C		<1W		
	Band III	15.407(a)(3)	<30dBm/500KHz		
Maximum Power Spectral Density	Band I	15.407(a)(ii)	<17dBm/MHz	Clause 4.8	PASS
	Band II-A	15.407(a)(2)	<11dBm/MHz		
	Band II-C		<30dBm/500KHz		
	Band III	15.407(a)(3)	F<1GHz: §15.209 limit (QP). F≥1GHz & out-restricted: <-27dBm/MHz PK e.i.r.p. (exl. 5.15- 5.35 GHz). F≥1GHz & in-restricted: §15.209 limit (AV&PK).		
Radiated Spurious Emissions	Band I	15.407(b) 15.205/15.209	F<1GHz: §15.209 limit (QP). F≥1GHz & out-restricted: <-27dBm/MHz PK e.i.r.p. (exl. 5.25- 5.35 GHz). F≥1GHz & in-restricted: §15.209 limit (AV&PK).	Clause 4.9	PASS
	Band II-A	15.407(b) 15.205/15.209	F<1GHz: §15.209 limit (QP). F≥1GHz & out-restricted: <-27dBm/MHz PK e.i.r.p. (exl. 5.47- 5.725 GHz). F≥1GHz & in-restricted: §15.209 limit (AV&PK).		PASS
	Band II-C	15.407(b) 15.205/15.209	F<1GHz: §15.209 limit (QP). F≥1GHz & out-restricted: <-27dBm/MHz PK e.i.r.p. (exl. 5.47- 5.725 GHz). F≥1GHz & in-restricted: §15.209 limit (AV&PK).		PASS
	Band III	15.407(b)	F<1GHz:		PASS

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		15.205/15.209	§15.209 limit (QP) $F \geq 1\text{GHz}$ & out-restricted:(PK) 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. $F \geq 1\text{GHz}$ & in-restricted: §15.209 limit (AV&PK).		
Restricted bands around fundamental frequency	Band I Band II-A Band II-C Band III	15.407(b) 15.205/15.209	---	Clause 4.10	PASS
AC Power Line Conducted Emissions	Band I Band II-A Band II-C Band III	15.207	---	Clause 4.2	PASS
Frequency Stability	Band I Band II-A Band II-C Band III	15.407(g)	Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual	N/A	N/A

Note 1:
 Band I: 5150-5250MHz
 Band II-A: 5250-5350MHz
 Band II-C: 5470-5725MHz
 Band III: 5725-5850MHz



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3 General Information

3.1 Details of Client

Applicant:	KonnectONE, Inc
Address of Applicant:	40 Lake Bellevue Drive, Suite 340, Bellevue, Washington 98005, U.S.A
Manufacturer:	KonnectONE, Inc
Address of Manufacturer:	40 Lake Bellevue Drive, Suite 340, Bellevue, Washington 98005, U.S.A

3.2 Test Location

Company:	SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.
Address:	South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu) Pilot Free Trade Zone
Post code:	215000
Test engineer:	Ives Cheng, King-p Li

3.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **A2LA (Certificate No. 6336.01)**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

• **Innovation, Science and Economic Development Canada**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

• **FCC –Designation Number: CN1312**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an accredited testing laboratory.

Designation Number: CN1312.

Test Firm Registration Number: 717327

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3.4 General Description of EUT

EUT Description:	CPE	
Model No.:	K868CPE	
Trade Mark:	Moxee	
Hardware Version:	K868CPE_MB_V1.00	
Software Version:	K868CPE_EQ100_C277_V0201	
Power Supply:	12V	
IMEI:	RF Conducted	860662054426370
	RSE & AC power line	860662054426340
WLAN Mode Supported:	802.11a:	20 MHz channel bandwidth
	802.11n:	20 MHz / 40 MHz channel bandwidth
	802.11ac:	20 MHz / 40 MHz / 80 MHz channel bandwidth
Operation Frequency:	5150MHz to 5250MHz	
	5250MHz to 5350MHz	
	5470MHz to 5725MHz	
	5725MHz to 5850MHz	
Modulation Type:	802.11a:	OFDM (BPSK, QPSK, 16QAM, 64QAM)
	802.11n:	OFDM (BPSK, QPSK, 16QAM, 64QAM)
	802.11ac:	OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Channel Spacing:	20MHz:	802.11a/n(HT20)/ac(VHT20)
	40MHz:	802.11n(HT40)/ac(VHT40)
	80MHz:	802.11ac(VHT80)
Antenna Type:	External Antenna	
Antenna Gain:	5150MHz to 5250MHz: 1.5dBi(Ant0); 1.49dBi(Ant1); 5250MHz to 5350MHz: 1.5dBi(Ant0); 1.49dBi(Ant1); 5470MHz to 5725MHz: 1.5dBi(Ant0); 1.49dBi(Ant1); 5725MHz to 5850MHz: 1.5dBi(Ant0); 1.49dBi(Ant1);	
	Note: The antenna gain are derived from the gain information report provided by the manufacturer.	
Smart System:	<input checked="" type="checkbox"/> SISO	802.11a
	<input checked="" type="checkbox"/> MIMO	802.11n/ac: 2Tx & 2Rx
	<input type="checkbox"/> Diversity	CDD:802.11a: 2Tx & 2Rx
TPC Function:	<input type="checkbox"/> Support, <input checked="" type="checkbox"/> Not Support	
Use Conditions:	Indoor	
RF Cable:	2dB	
Remark:	As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy,	



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suitability, reliability or/and integrity of the information.

Remark:

In FCC 15.31, for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table, and the selected channel to perform the test as below:

Frequency range over which device operates	Number of Measurement Frequencies Required	Location of Measurement Frequency in Band of Operation
1 MHz or less	1	centre
1 MHz to 10 MHz	2	1 near high end, 1 near low end
Greater than 10 MHz	3	1 near high end, 1 near centre

For UNII Band I:

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n/ac 20MHz	The Lowest channel	5180
	The Middle channel	5200
	The Highest channel	5240
IEEE 802.11n/ac 40MHz	The Lowest channel	5190
	The Highest channel	5230
IEEE 802.11ac 80MHz	The Middle channel	5210

For UNII Band II-A:

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n/ac 20MHz	The Lowest channel	5260
	The Middle channel	5280
	The Highest channel	5320
IEEE 802.11n/ac 40MHz	The Lowest channel	5270
	The Highest channel	5310
IEEE 802.11ac 80MHz	The Middle channel	5290

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For UNII Band II-C:

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n/ac 20MHz	The Lowest channel	5500
	The Middle channel	5580
	The Highest channel	5700
IEEE 802.11n/ac 40MHz	The Lowest channel	5510
	The Middle channel	5550
	The Highest channel	5670
IEEE 802.11ac 80MHz	The Middle channel	5530

For UNII Band III:

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n/ac 20MHz	The Lowest channel	5745
	The Middle channel	5785
	The Highest channel	5825
IEEE 802.11n/ac 40MHz	The Lowest channel	5755
	The Highest channel	5795
IEEE 802.11ac 80MHz	The Middle channel	5775

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3.5 Test Environment and Mode

Environment Parameter	101 kPa Selected Values During Tests	
Relative Humidity	44-46 % RH Ambient	
Value	Temperature(°C)	Voltage(V)
NTNV	22~23	12

Remark:
NV: Normal Voltage
NT: Normal Temperature

3.6 Description of Support Units

The EUT has been tested as an independent unit.

3.7 Worst-case configuration and mode

Low data rate was used to test on antenna port conducted tests and radiated spurious emissions since it has the highest maximum power. Following are the worst-case data rates set for test:

Modulation Type	SISO - Data Rate	CDD/MIMO - Data Rate
802.11a	6 Mbps	/
802.11n (HT 20)	/	MCS0 (13 Mbps)
802.11n (HT 40)	/	MCS0 (27 Mbps)
802.11ac (VHT 20)	/	MCS0 (13 Mbps)
802.11ac (VHT 40)	/	MCS0 (27 Mbps)
802.11ac (VHT 80)	/	MCS0 (58.5 Mbps)



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4 Test results and Measurement Data

4.1 Antenna Requirement

Standard requirement:	47 CFR Part 15 Section 15.203
The antenna is Fixed Internal Antenna and no consideration of replacement. The best case gain of the antenna is	
5150MHz to 5250MHz: 1.5dBi(Ant0); 1.49dBi(Ant1);*	
5250MHz to 5350MHz: 1.5dBi(Ant0); 1.49dBi(Ant1);*	
5470MHz to 5725MHz: 1.5dBi(Ant0); 1.49dBi(Ant1);*	
5725MHz to 5850MHz: 1.5dBi(Ant0); 1.49dBi(Ant1);*	
*Note: <i>The antenna gain are derived from the gain information report provided by the manufacturer.</i>	
Remark: <i>As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.</i>	



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Cyclic Delay Diversity (CDD) System:

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

If all antennas have the same gain, G_{ANT} , Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

- For power spectral density (PSD) measurements on all devices,
 $Array Gain = 10 \log(N_{ANT}/N_{SS}) = 1 \text{ dB}$.
- For power measurements on IEEE 802.11 devices:
 $Array Gain = 0 \text{ dB} \text{ (i.e., no array gain) for } N_{ANT} \leq 4$;

For power, the directional gain may be calculated by using the formulas applicable to equal gain antennas with GANT set equal to the gain of the antenna having the highest gain.

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

The Power and PSD limit should be modified if the directional gain of eut is over 6dbi.

The EUT supports CDD System.

All antennas have Unequal antenna gain:

Operation Frequency	ANT Gain0 (dBi)	ANT Gain1 (dBi)	Directional gain For Power (dBi)	Directional gain For PSD (dBi)	Power Limit Reduction (dBm)	PSD Limit Reduction (dBm)
5150MHz to 5250MHz	1.5	1.49	1.5	4.51	0	0
5250MHz to 5350MHz	1.5	1.49	1.5	4.51	0	0
5470MHz to 5725MHz	1.5	1.49	1.5	4.51	0	0
5725MHz to 5850MHz	1.5	1.49	1.5	4.51	0	0

5150MHz to 5250MHz:

Power Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) = 0

PSD Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) = 0

5250MHz to 5350MHz:

Power Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) = 0

PSD Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) = 0

5470MHz to 5725MHz:

Power Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) = 0

PSD Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) = 0

5725MHz to 5850MHz:

Power Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) = 0

PSD Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) = 0

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4.2 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15 Section 15.207		
Test Method:	ANSI C63.10: 2013 Section 6.2		
Test Frequency Range:	150kHz to 30MHz		
Receiver Setup:	RBW = 9kHz, VBW = 30kHz		
Limit:	Frequency range (MHz)		Limit (dBuV)
			Quasi-peak
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
Test Procedure:	<ol style="list-style-type: none">1) The mains terminal disturbance voltage test was conducted in a shielded room.2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.		

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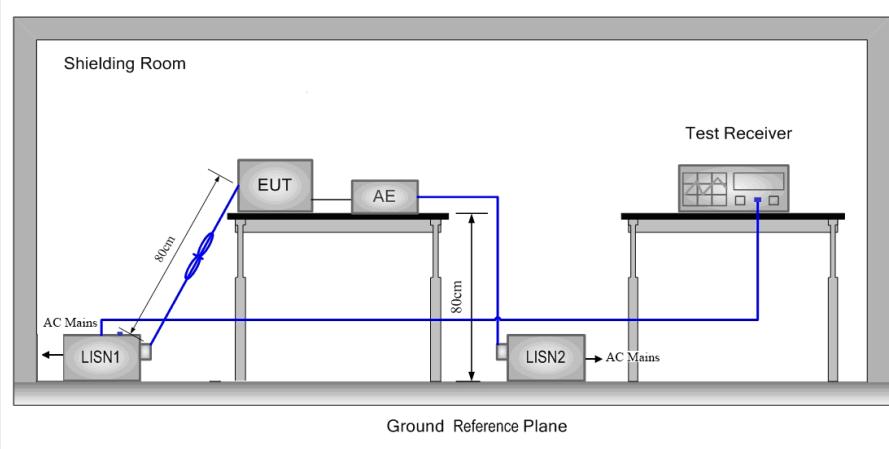
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Test Setup:	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates at lowest, middle and highest channel.
Final Test Mode:	Refer to section 3.7 for details. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 6 for details.
Test Results:	Pass

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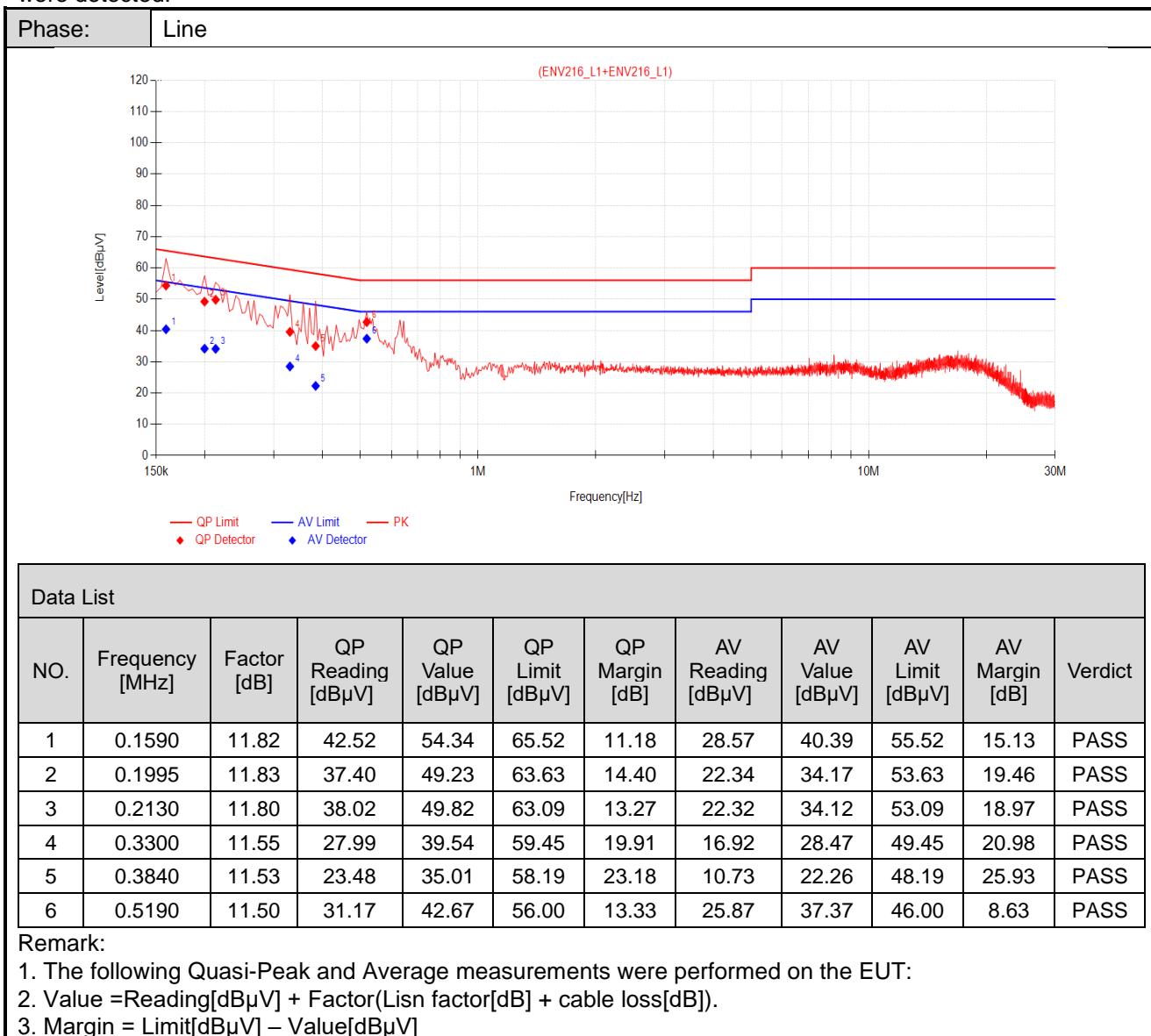
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Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.



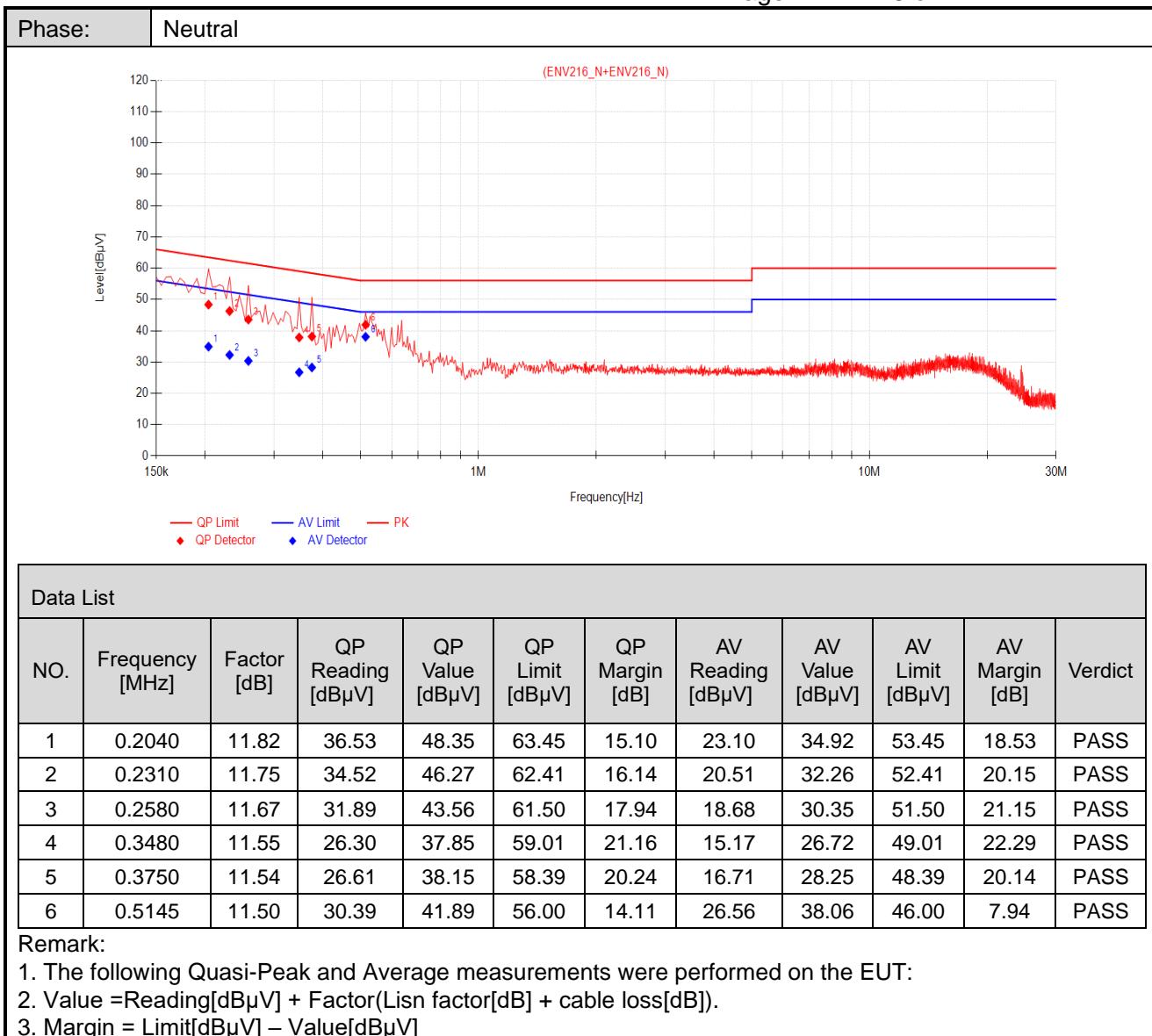
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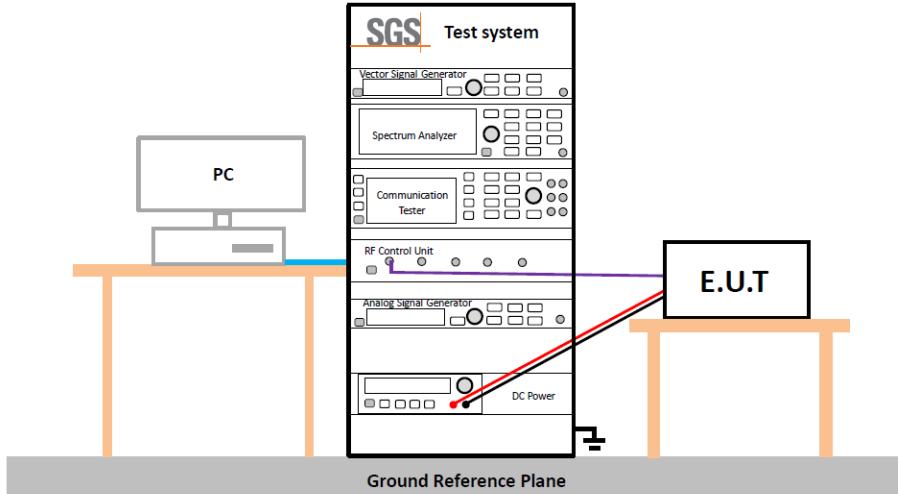
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4.3 Duty Cycle

Test Requirement:	ANSI C63.10 :2013 Section 12.2
Test Method:	ANSI C63.10 :2013 Section 12.2
Test Setup:	
Instruments Used:	Refer to section 6 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Refer to section 3.7 for details.
Limit:	No restriction limits
Test Results:	For report purpose
The detailed test data see: Appendix	



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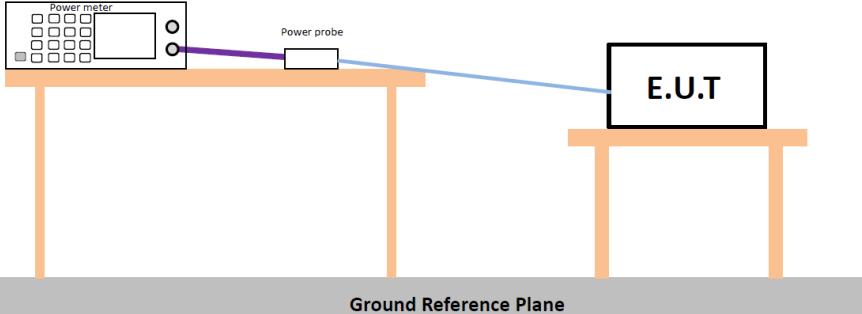
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4.4 Conducted Output Power

Test Requirement:	47 CFR Part 15 Section 15.407(a)	
Test Method:	ANSI C63.10 :2013 Section 12.3.3.2	
Test Setup:		
	<p>* Test with power meter (Detector function: Average) Method PM-G is measurement using a gated RF average power meter. Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Because the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.</p>	
Test Instruments:	Refer to section 6 for details.	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates	
Final Test Mode:	Refer to section 3.7 for details.	
Limit:	Frequency Band	Limit
	5150-5250MHz	Not exceed 1W(30dBm)
	5250-5350MHz	The lesser of 250mW(23.98dBm) or $11 + 10\log B$
	5470-5725MHz	The lesser of 250mW(23.98dBm) or $11 + 10\log B$
	5725-5850MHz	Not exceed 1W(30dBm)
	*Where B is the 26dB emission bandwidth in MHz	
Test Results:	Pass	
The detailed test data see: Appendix		



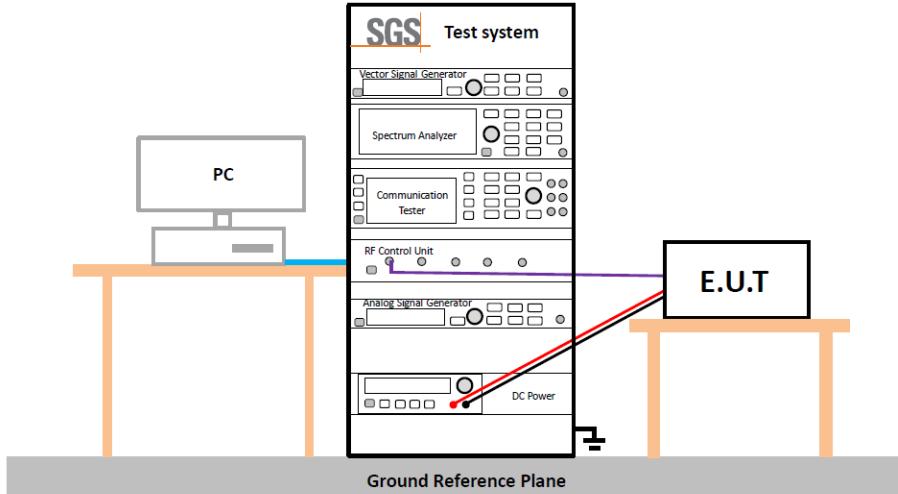
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4.5 26dB Emission Bandwidth

Test Requirement:	47 CFR Part 15 Section 15.407(a), KDB 789033 D02& C
Test Method:	ANSI C63.10: 2013 Section 12.4.1
Test Setup:	
Instruments Used:	Refer to section 6 for details.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Refer to section 3.7 for details.
Limit:	No restriction limits
Test Results:	For Report Purpose
The detailed test data see: Appendix	

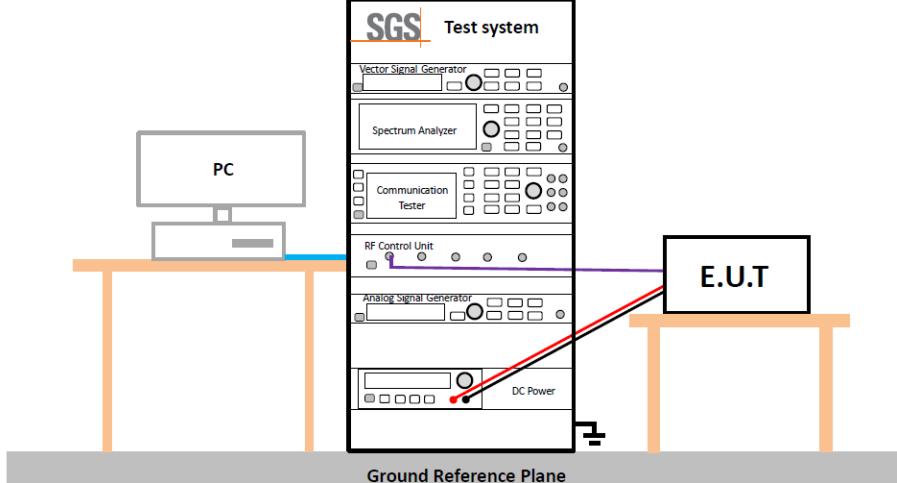
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4.6 6dB Emission Bandwidth

Test Requirement:	47 CFR Part 15 Section 15.407(e)	
Test Method:	ANSI C63.10: 2013 Section 12.4.1	
Test Setup:		
Test Instruments:	Refer to section 6 for details.	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates	
Final Test Mode:	Refer to section 3.7 for details.	
Limit:	Frequency Band	Limit
	5725-5850MHz	At least 500kHz
Test Results:	Pass	
The detailed test data see: Appendix		



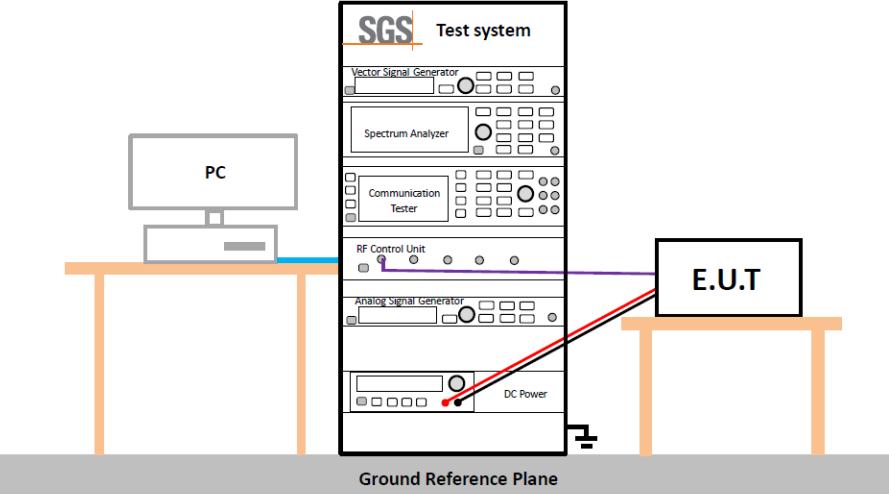
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4.7 99% Occupied Bandwidth

Test Requirement:	KDB 789033 D02§ D
Test Method:	ANSI C63.10: 2013 Section 12.4.2
Test Setup:	 <p>The diagram illustrates the test setup. A PC is connected to a vertical stack of test equipment. From top to bottom, the equipment includes: Vector Signal Generator, Spectrum Analyzer, Communication Tester, RF Control Unit, Analog Signal Generator, and DC Power. A red line connects the PC to the Vector Signal Generator. Another red line connects the DC Power unit to the E.U.T (Equipment Under Test). The entire setup is placed on a table, with the ground reference plane indicated by a grey bar at the bottom.</p>
Instruments Used:	Refer to section 6 for details.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Refer to section 3.7 for details.
Limit:	No restriction limits
Test Results:	For Report Purpose
The detailed test data see: Appendix	



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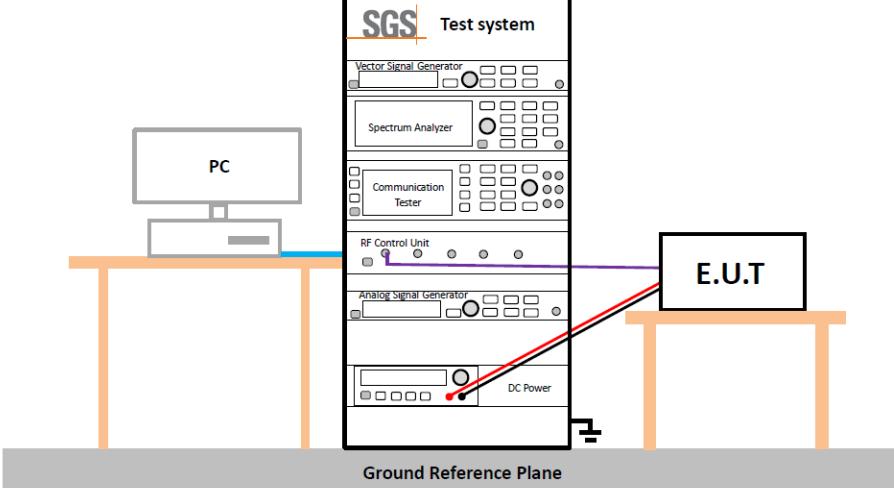
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4.8 Power Spectral Density

Test Requirement:	47 CFR Part 15 Section 15.407(a)	
Test Method:	ANSI C63.10: 2013 Section 12.5 KDB 789033 D02 v02r01, Section F.	
Test Setup:		
Instruments Used:	Refer to section 6 for details.	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates	
Final Test Mode:	Refer to section 3.7 for details.	
Limit:	Frequency Band	Limit
	5150-5250MHz	The power spectral density less than 17dBm/1MHz
	5250-5350MHz	The power spectral density less than 11dBm/1MHz
	5470-5725MHz	The power spectral density less than 11dBm/1MHz
	5725-5850MHz	The power spectral density less than <30dBm/500KHz
Test Results:	Pass	
The detailed test data see: Appendix		



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4.9 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15 Section 15.205 and 15.209
Test Method:	ANSI C63.10: 2013 Section 6.4 / 6.5 / 6.6
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)
Test frequency:	9kHz ~ 40GHz(or 10 Harmonic)

Test Setup:

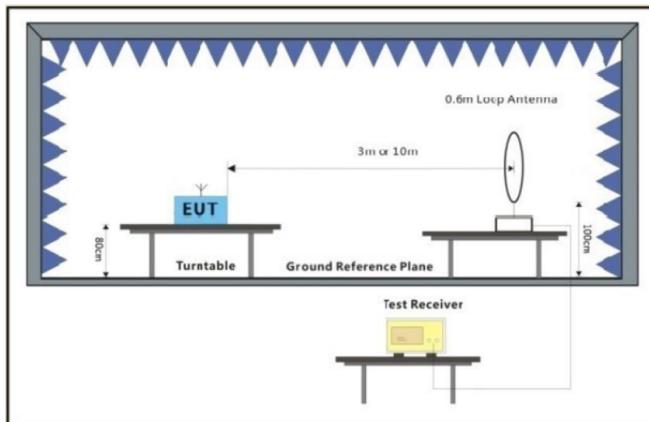


Figure 1. 9kHz to 30MHz

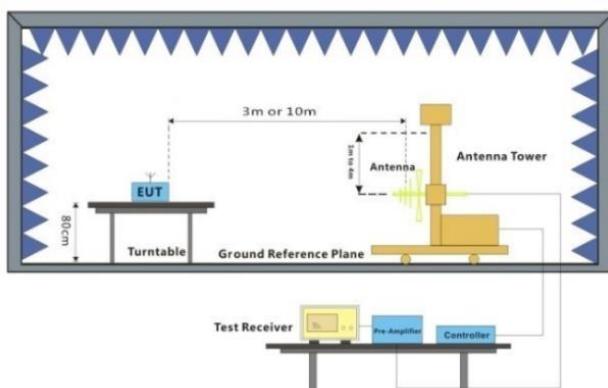


Figure 1. 30MHz to 1GHz

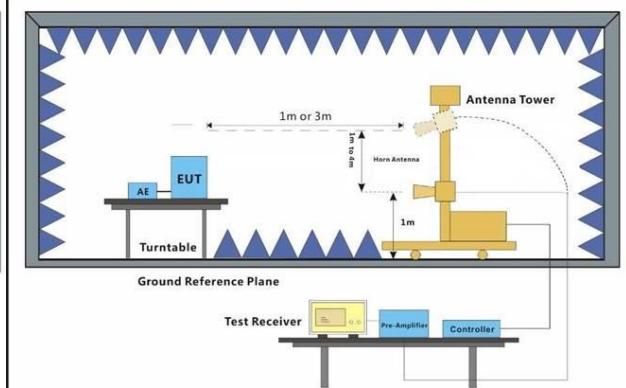


Figure 2. Above 1 GHz

Test Procedure:	<ol style="list-style-type: none"> For below 1GHz test, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. For above 1GHz test, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. (Distance from antenna to EUT is 1m for measurements >18GHz). The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
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	<p>e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>g. Test the EUT in the outermost channels.</p> <p>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.</p> <p>i. Repeat above procedures until all frequencies measured was complete.</p> <p>j. The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported</p> <p>k. The disturbance above 18GHz was very low, and the harmonics were the highest point could be found when testing, so only the harmonics had been displayed.</p> <p>l. At a measurement distance of 1 meter the limit line was increased by $20 \times \log(3/1) = 9.54$ dB.</p>
Test Configuration:	<p>Measurements below 30MHz</p> <ul style="list-style-type: none"> • RBW = 10 kHz • VBW = 30 kHz • Detector = Peak & Average & Quasi-peak • Trace mode = max hold <p>Measurements Below 1000MHz</p> <ul style="list-style-type: none"> • RBW = 120 kHz • VBW = 300 kHz • Detector = Quasi-peak • Trace mode = max hold <p>Peak Measurements Above 1000 MHz</p> <ul style="list-style-type: none"> • RBW = 1 MHz • VBW \geq 3 MHz • Detector = Peak • Sweep time = auto • Trace mode = max hold <p>Average Measurements Above 1000MHz</p> <ul style="list-style-type: none"> • RBW = 1 MHz • VBW = 10Hz, when duty cycle is no less than 98 percent. • VBW \geq 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates.
Final Test Mode:	<p>Refer to section 3.7 for details.</p> <p>For below 1GHz part, through pre-scan all channels, but only the worst case is recorded in the report.</p>
Instruments Used:	Refer to section 6 for details.
Test Results:	Pass



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Report No.: SUCR2401000003TL03

Rev.: 01

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The detailed test data see: **Appendix**



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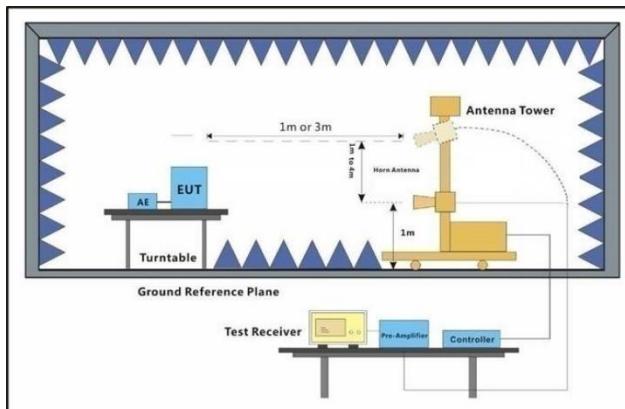
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4.10 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15 Section 15.407(b)		
Test Method:	ANSI C63.10: 2013 Section 12.7		
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)		
Limit:	Frequency	Limit (dBuV/m)	Remark
	30MHz-88MHz	40.0	Quasi-peak
	88MHz-216MHz	43.5	Quasi-peak
	216MHz-960MHz	46.0	Quasi-peak
	960MHz-1GHz	54.0	Quasi-peak
	Above 1GHz	54.0	Average Value
		74.0	Peak Value

Test Setup:



Test Procedure:	<ol style="list-style-type: none"> The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel. Test the EUT in the outermost channels. The radiation measurements are performed in X, Y, Z axis positioning for
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	<p>Transmitting mode, And found the X axis positioning which it is worse case.</p> <p>i. Repeat above procedures until all frequencies measured was complete.</p>
Test Configuration:	<p>Measurements Below 1000MHz</p> <ul style="list-style-type: none"> • RBW = 120 kHz • VBW = 300 kHz • Detector = Quasi-peak • Trace mode = max hold <p>Peak Measurements Above 1000 MHz</p> <ul style="list-style-type: none"> • RBW = 1 MHz • VBW \geq 3 MHz • Detector = Peak • Sweep time = auto • Trace mode = max hold <p>Average Measurements Above 1000MHz</p> <ul style="list-style-type: none"> • RBW = 1 MHz • VBW = 10Hz, when duty cycle is no less than 98 percent. • VBW \geq 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates.
Final Test Mode:	Refer to section 3.7 for details.
Instruments Used:	Refer to section 6 for details.
Test Results:	Pass
The detailed test data see: Appendix	

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5 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	±0.54dB
2	RF power density, conducted	±1.03dB
3	Spurious emissions, conducted	±0.54dB
4	Radio Frequency	±1.0 %
5	Duty Cycle	±0.37%
6	Occupied Bandwidth	±1.0 %
7	Conduction Emission	± 2.90dB (150kHz to 30MHz)
8	Radiated Emission	± 3.13dB (9k -30MHz)
		± 4.80dB (30M -1GHz)
		± 4.80dB (1GHz to 18GHz)
		± 4.80dB (Above 18GHz)

Remark:

The U_{lab} (lab Uncertainty) is less than $U_{cisp/ETSI}$ (CISPR/ETSI Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

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6 Equipment List

RF Test Equipment					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)
Shielding Room	Brilliant-emc	N/A	SUWI-04-01-06	2021/05/08	2024/05/07
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-07	2023/02/06	2024/02/05
Signal Analyzer	ROHDE&SCHWARZ	FSV3030	SUWI-01-02-02	2023/05/11	2024/05/10
Measurement Software	Tonscend	JS1120-3 Test System V 3.3.20	SUWI-02-09-09	NCR	NCR
Measurement Software	TST	TST-272 V2.0	SUWI-03-55-03	NCR	NCR
Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	2023/05/11	2024/05/10
Temperature Chamber	ESPEC	SU-242	SUWI-01-13-01	2023/02/06	2024/02/05
DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	2023/02/06	2024/02/05
Power meter	Anritsu	ML2495A	SUWI-01-31-01	2023/11/21	2024/11/20
Pulse power sensor	Anritsu	MA2411B	SUWI-01-32-01	2023/11/21	2024/11/20
MXG Vector signal genitor	KEYSIGHT	N5182B	SUWI-01-38-01	2023/02/06	2024/02/05
Signal Generator	ROHDE&SCHWARZ	SMM100A	SUWI-01-07-04	2023/02/16	2024/02/15
Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-07	2023/11/21	2024/11/20

Remark: NCR=No Calibration Requirement.

Conduction Test Equipment					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2023/02/08	2024/02/07
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-06	2023/02/07	2024/02/06
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-03	2023/02/08	2024/02/07
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-04	2023/02/08	2024/02/07
Measurement Software	Tonscend	JS32-CE V4.0.0.2	SUWI-02-09-05	NCR	NCR

Remark: NCR=No Calibration Requirement.

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RSE Test System					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)
Semi-Anechoic Chamber	Brilliant-emc	N/A	SUWI-04-02-01	2021/05/08	2024/05/07
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-05	2023/02/07	2024/02/06
Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	2023/05/11	2024/05/10
Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-07	2023/11/21	2024/11/20
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2023/02/08	2024/02/07
Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	VULB 9163	SUWI-01-11-01	2023/05/13	2024/05/12
Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	BBHA 9120D	SUWI-01-11-02	2023/05/13	2024/05/12
Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	BBHA 9170	SUWI-01-11-03	2023/05/12	2024/05/11
Active Loop Antenna	SCHWRZBECK MESS-ELEKTRONIK	FMZB 1519B	SUWI-01-21-01	2023/05/13	2024/05/12
Amplifier	Tonscend	TAP9K3G40	SUWI-01-14-01	2023/02/06	2024/02/05
Amplifier	Tonscend	TAP01018050	SUWI-01-14-02	2023/02/06	2024/02/05
Amplifier	Tonscend	TAP18040048	SUWI-01-14-03	2023/02/08	2024/02/07
Measurement Software	Tonscend	JS32-RE 4.0.0.0	SUWI-02-09-04	NCR	NCR

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7 Photographs - Setup Photos

Refer to Appendix A.2 WLAN Setup Photos.



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Appendix



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Emission Bandwidth

Test Result

TestMode	Antenna	Frequency[MHz]	26dB EBW [MHz]	FL[MHz]	FH[MHz]	Verdict
11a	Ant0	5180	18.72	5170.48	5189.20	For Report Purpose
11a	Ant0	5220	18.72	5210.64	5229.36	
11a	Ant0	5240	18.88	5230.44	5249.32	
11a	Ant0	5260	18.80	5250.48	5269.28	
11a	Ant0	5300	18.84	5290.48	5309.32	
11a	Ant0	5320	18.76	5310.52	5329.28	
11a	Ant0	5500	18.80	5490.52	5509.32	
11a	Ant0	5580	18.92	5570.36	5589.28	
11a	Ant0	5700	18.88	5690.44	5709.32	
11a	Ant0	5745	18.72	5735.60	5754.32	
11a	Ant0	5785	18.80	5775.44	5794.24	
11a	Ant0	5825	18.80	5815.52	5834.32	
11ac20MIMO	Ant0	5180	19.80	5170.00	5189.80	
11ac20MIMO	Ant1	5180	19.92	5170.04	5189.96	
11ac20MIMO	Ant0	5220	20.00	5210.04	5230.04	
11ac20MIMO	Ant1	5220	19.52	5210.16	5229.68	
11ac20MIMO	Ant0	5240	19.80	5230.08	5249.88	
11ac20MIMO	Ant1	5240	19.88	5230.00	5249.88	
11ac20MIMO	Ant0	5260	19.72	5250.08	5269.80	
11ac20MIMO	Ant1	5260	19.84	5250.04	5269.88	
11ac20MIMO	Ant0	5300	19.68	5290.16	5309.84	
11ac20MIMO	Ant1	5300	19.76	5290.08	5309.84	
11ac20MIMO	Ant0	5320	19.80	5310.04	5329.84	
11ac20MIMO	Ant1	5320	19.60	5310.20	5329.80	
11ac20MIMO	Ant0	5500	19.76	5490.08	5509.84	
11ac20MIMO	Ant1	5500	19.72	5490.08	5509.80	
11ac20MIMO	Ant0	5580	19.80	5570.12	5589.92	
11ac20MIMO	Ant1	5580	19.64	5570.08	5589.72	
11ac20MIMO	Ant0	5700	19.80	5690.08	5709.88	
11ac20MIMO	Ant1	5700	19.96	5690.04	5710.00	
11ac20MIMO	Ant0	5745	19.56	5735.24	5754.80	
11ac20MIMO	Ant1	5745	19.80	5735.08	5754.88	
11ac20MIMO	Ant0	5785	19.68	5775.12	5794.80	
11ac20MIMO	Ant1	5785	20.00	5775.00	5795.00	
11ac20MIMO	Ant0	5825	19.72	5815.12	5834.84	
11ac20MIMO	Ant1	5825	19.68	5815.12	5834.80	
11ac40MIMO	Ant0	5190	38.96	5170.48	5209.44	For Report Purpose
11ac40MIMO	Ant1	5190	39.44	5170.32	5209.76	
11ac40MIMO	Ant0	5230	39.68	5210.24	5249.92	
11ac40MIMO	Ant1	5230	39.36	5210.40	5249.76	
11ac40MIMO	Ant0	5270	39.36	5250.40	5289.76	
11ac40MIMO	Ant1	5270	38.96	5250.48	5289.44	
11ac40MIMO	Ant0	5310	39.36	5290.40	5329.76	
11ac40MIMO	Ant1	5310	39.44	5290.24	5329.68	
11ac40MIMO	Ant0	5510	39.36	5490.40	5529.76	
11ac40MIMO	Ant1	5510	39.12	5490.48	5529.60	
11ac40MIMO	Ant0	5550	39.60	5530.32	5569.92	
11ac40MIMO	Ant1	5550	39.36	5530.40	5569.76	
11ac40MIMO	Ant0	5670	39.76	5650.08	5689.84	
11ac40MIMO	Ant1	5670	39.12	5650.48	5689.60	

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11ac40MIMO	Ant0	5755	39.44	5735.48	5774.92	
11ac40MIMO	Ant1	5755	39.44	5735.48	5774.92	
11ac40MIMO	Ant0	5795	39.28	5775.48	5814.76	
11ac40MIMO	Ant1	5795	39.04	5775.48	5814.52	
11ac80MIMO	Ant0	5210	83.52	5168.24	5251.76	
11ac80MIMO	Ant1	5210	83.68	5168.08	5251.76	
11ac80MIMO	Ant0	5290	83.52	5248.40	5331.92	
11ac80MIMO	Ant1	5290	83.52	5248.40	5331.92	
11ac80MIMO	Ant0	5530	83.52	5488.40	5571.92	
11ac80MIMO	Ant1	5530	83.68	5488.24	5571.92	
11ac80MIMO	Ant0	5775	83.36	5733.40	5816.76	
11ac80MIMO	Ant1	5775	83.52	5733.24	5816.76	

Remark:

For 802.11n HT20/ac VHT20 and 802.11n HT40/ac VHT40 mode, the whole testing have assessed only, 802.11ac VHT20/40 by referring to their higher output power.

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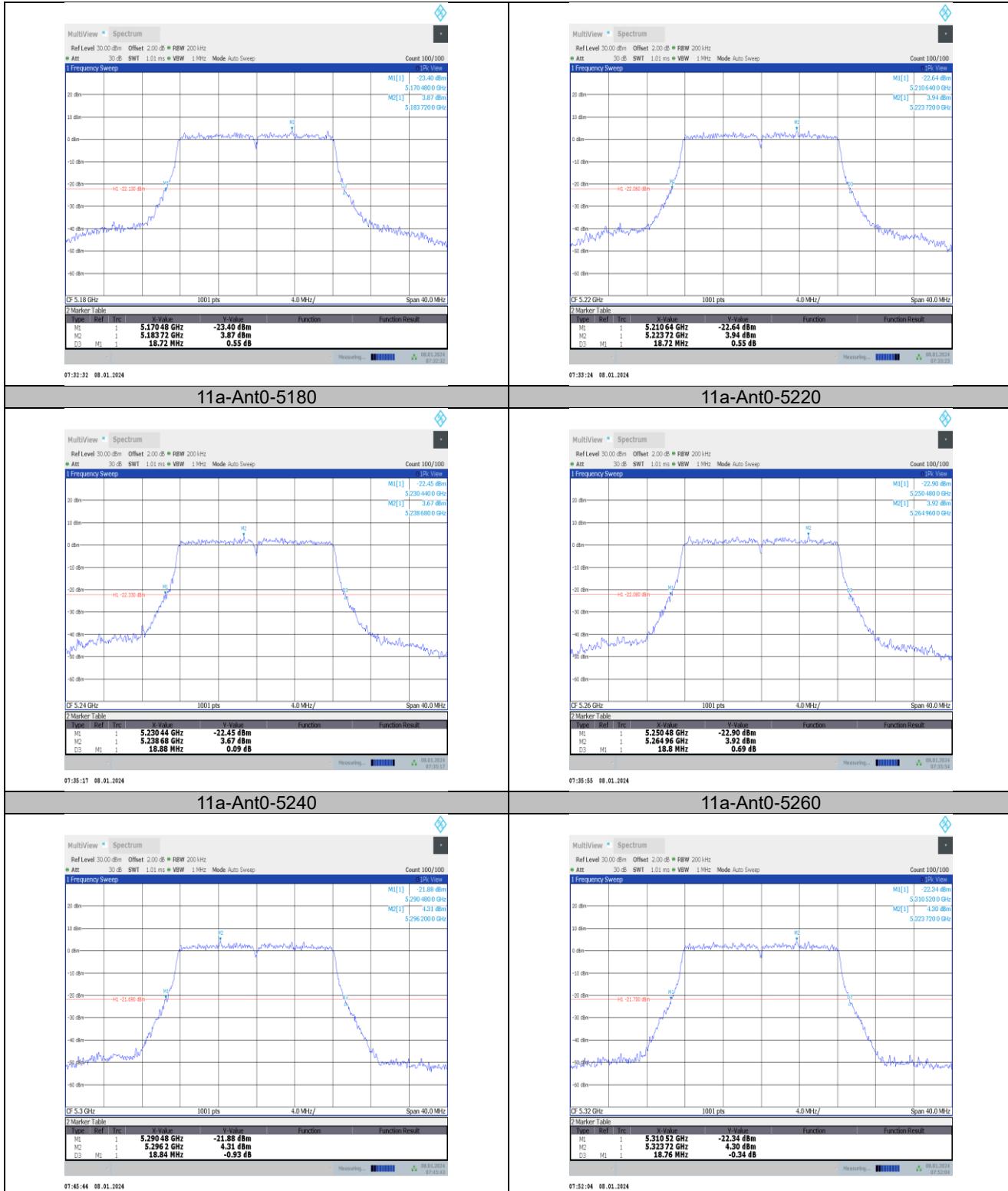
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Test Graphs



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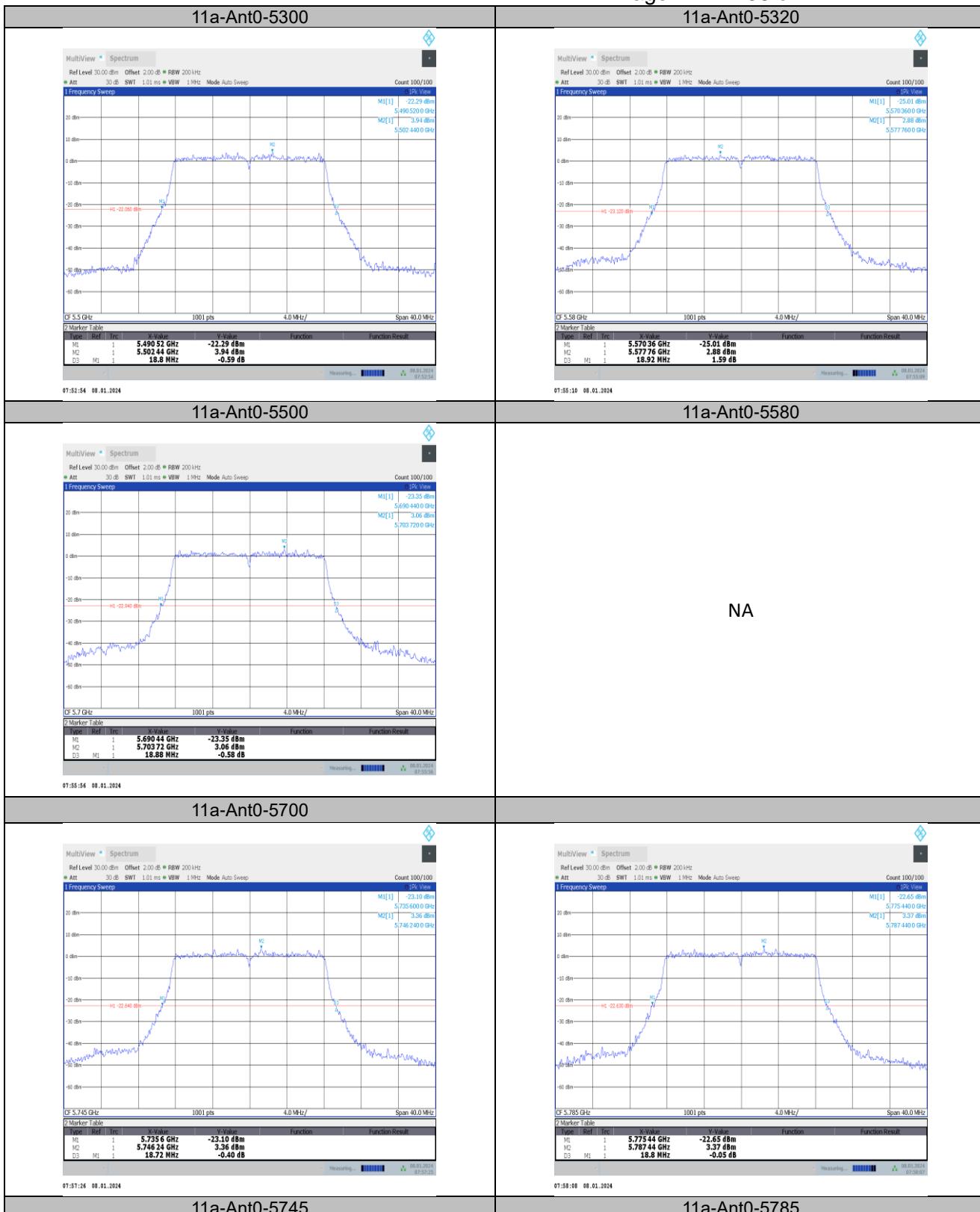


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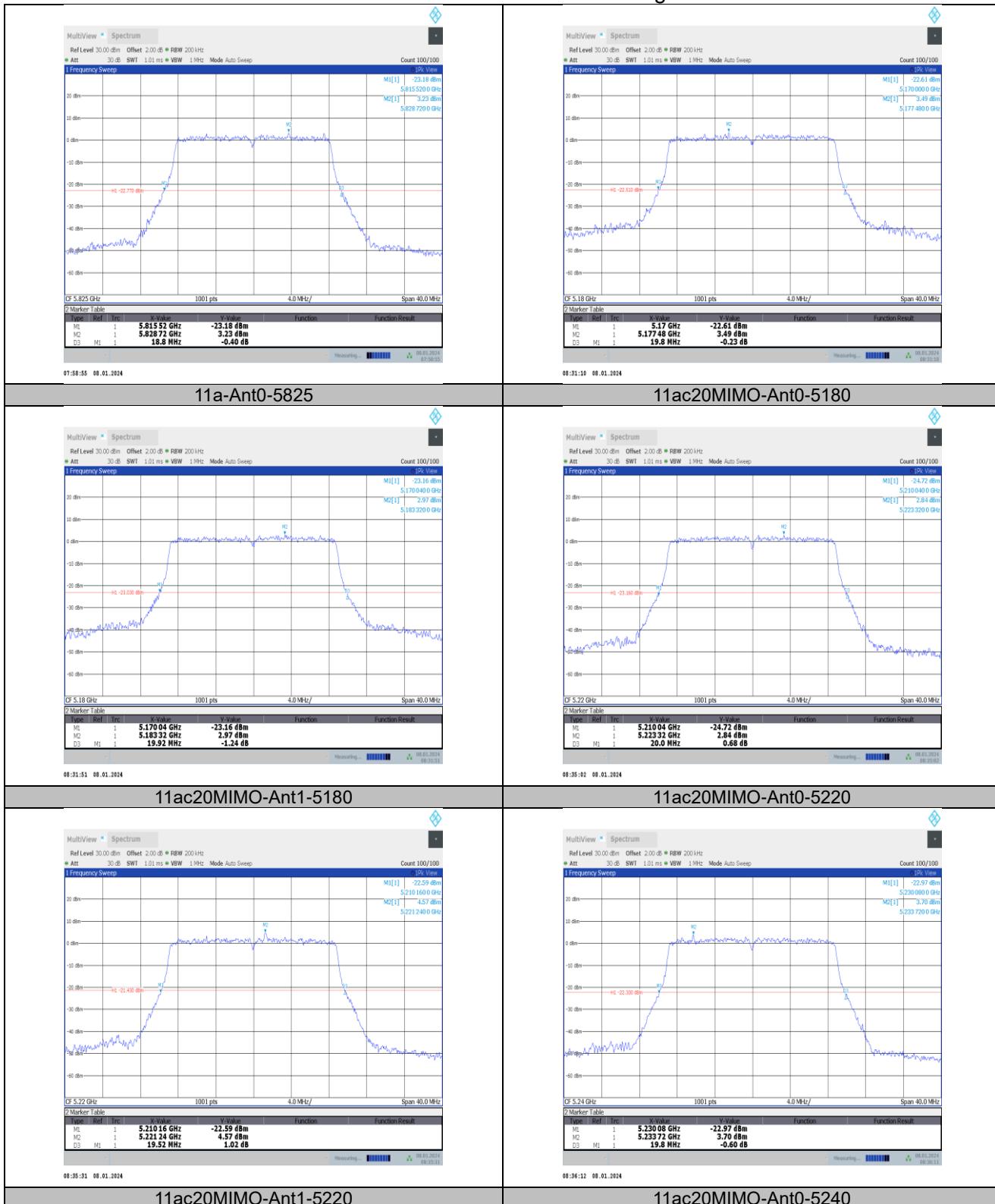
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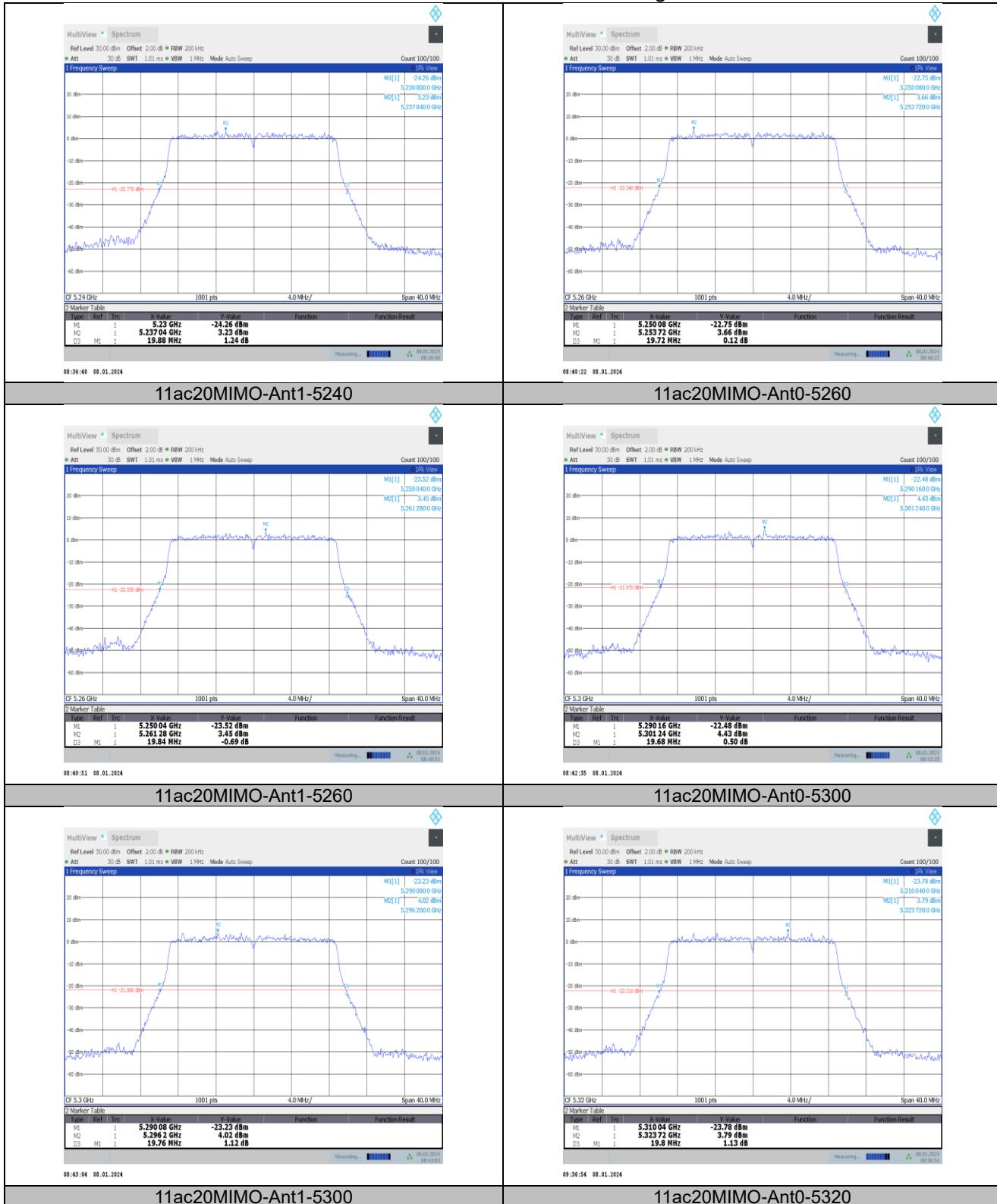
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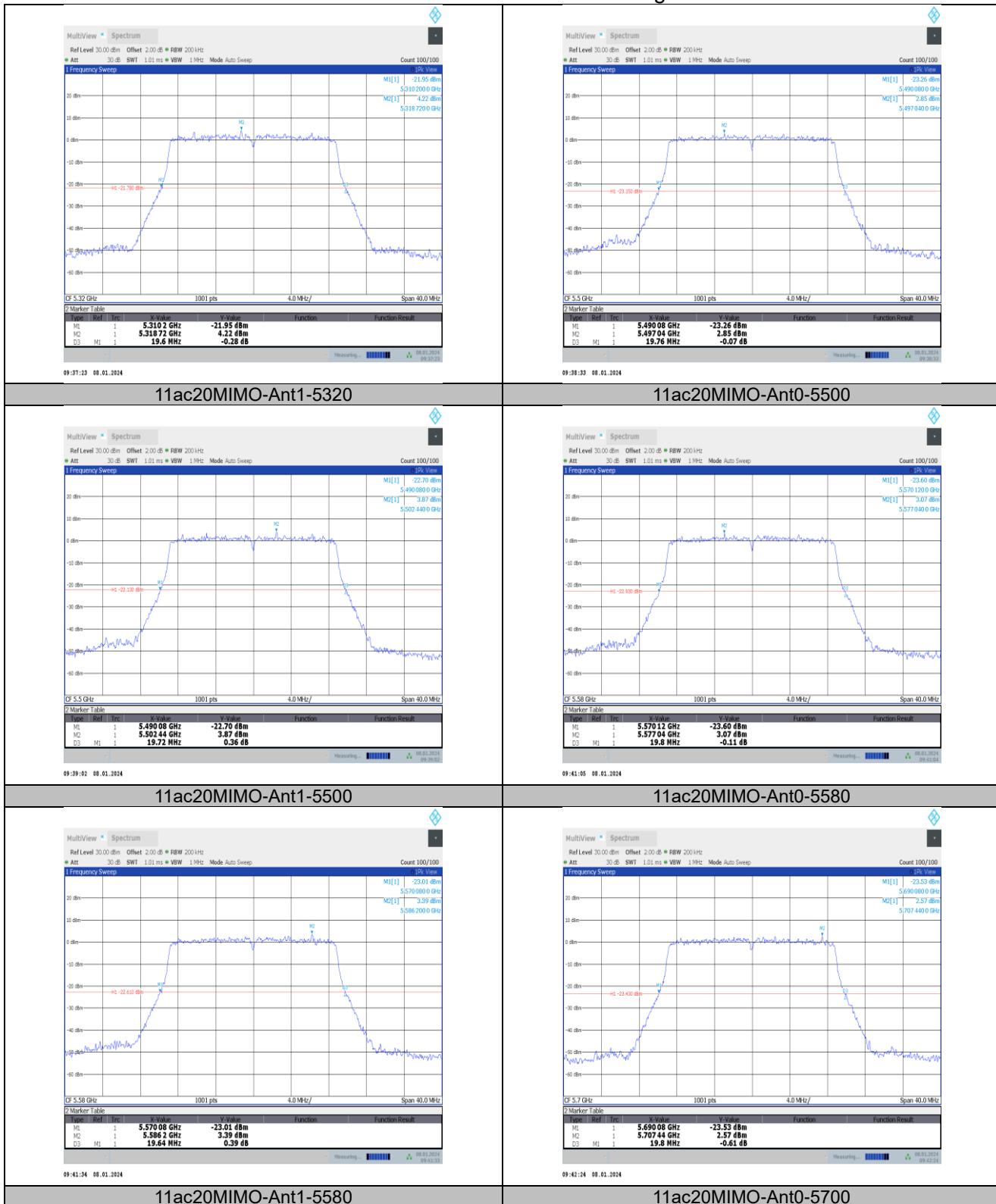
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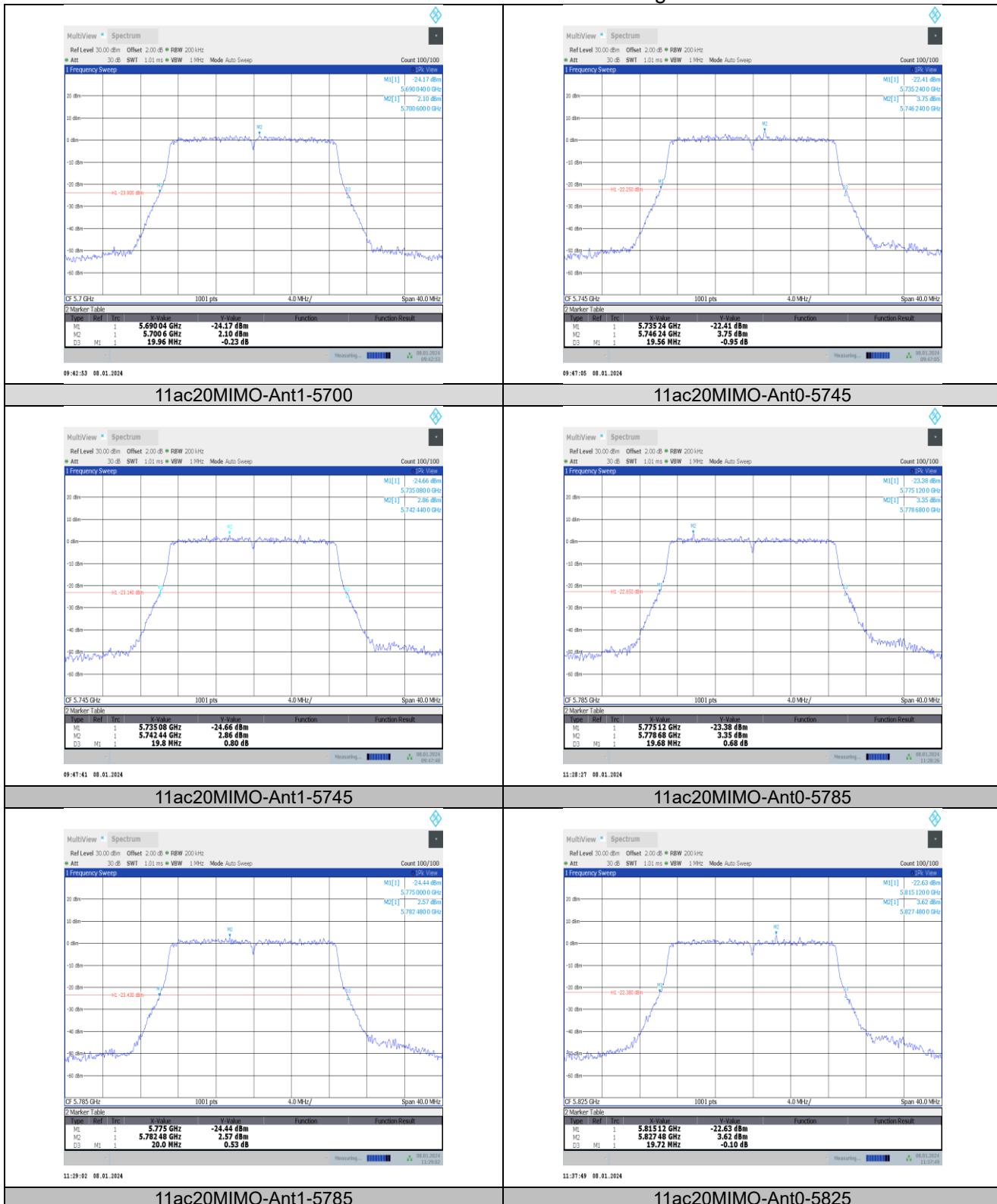
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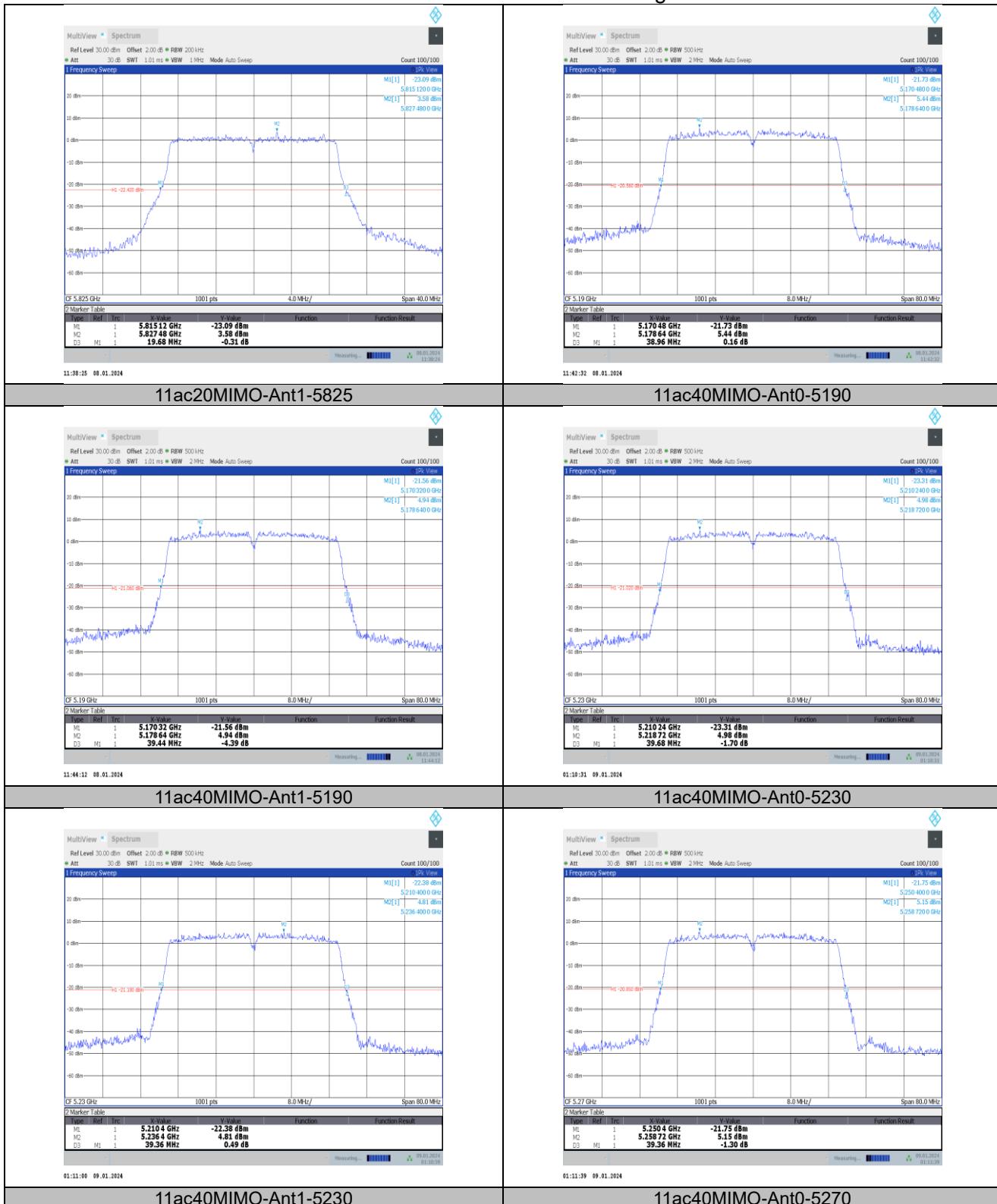
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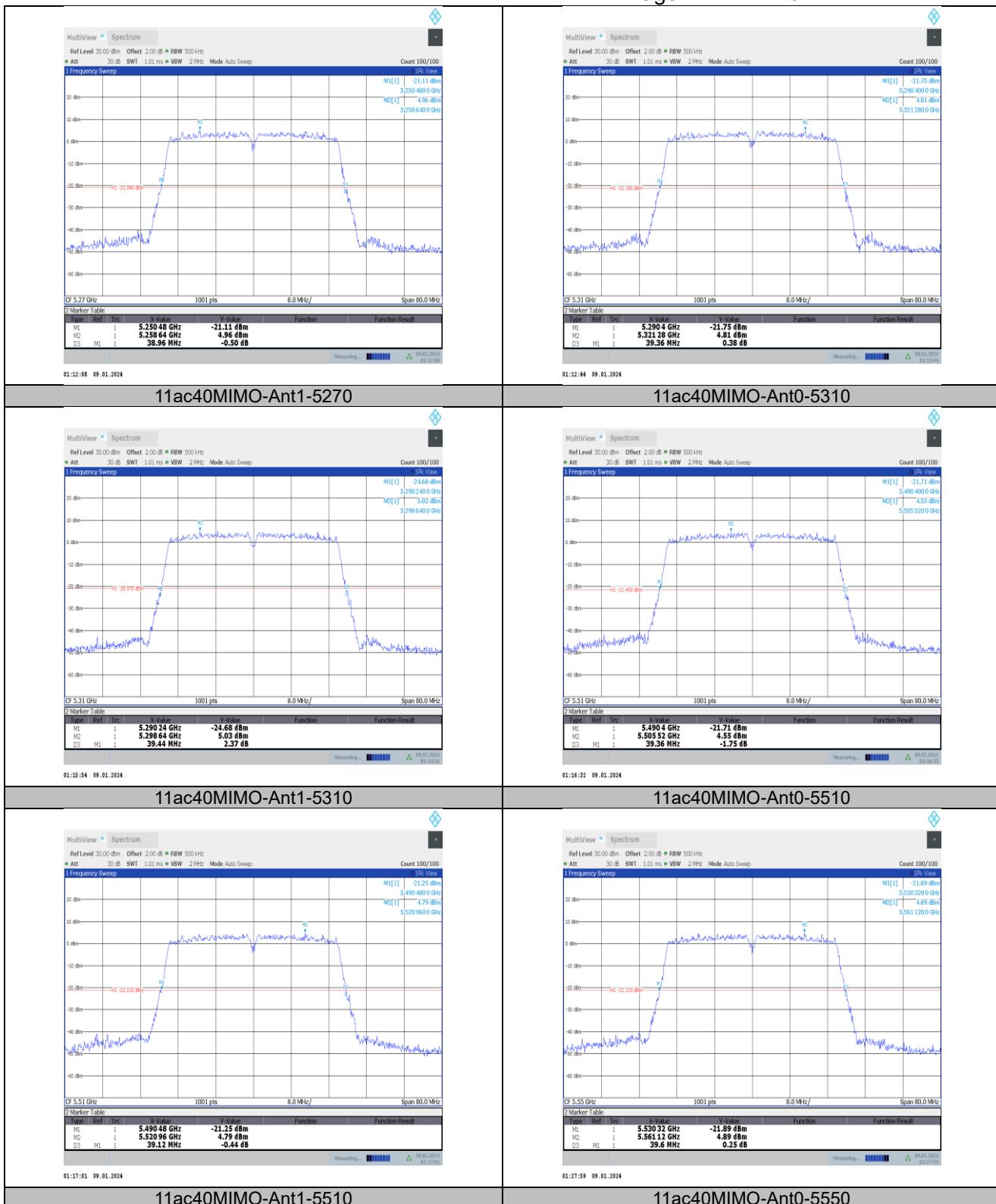
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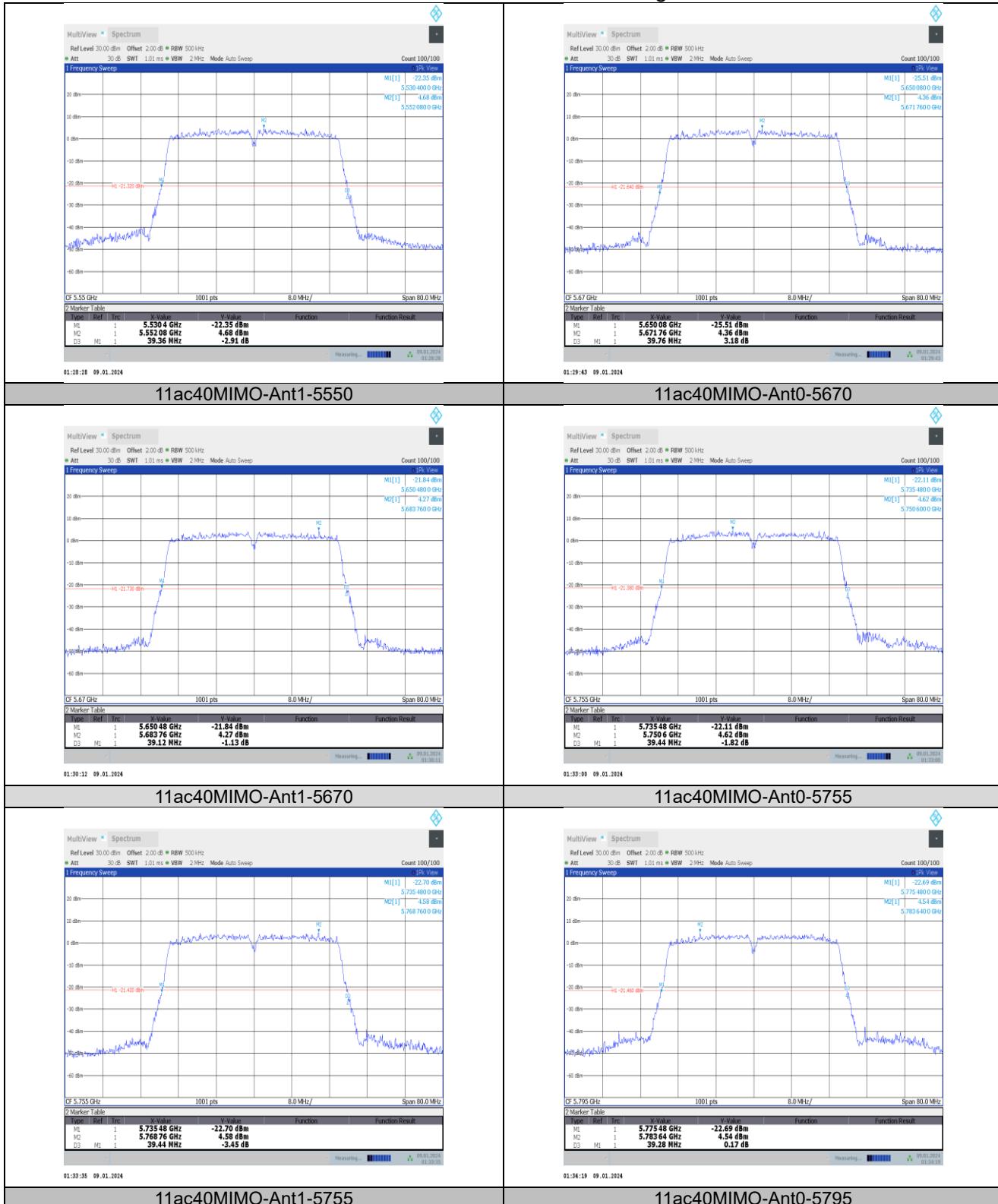
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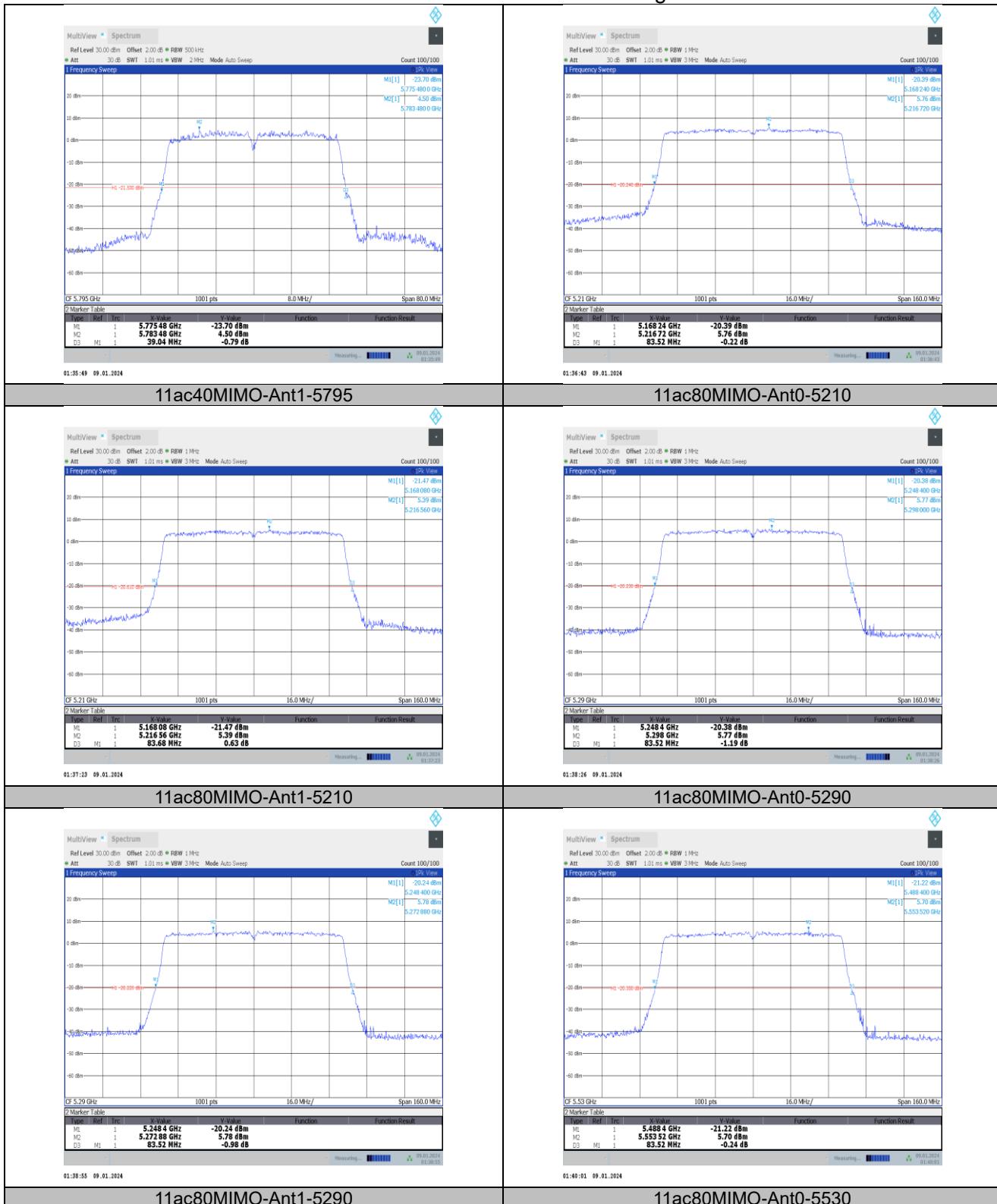
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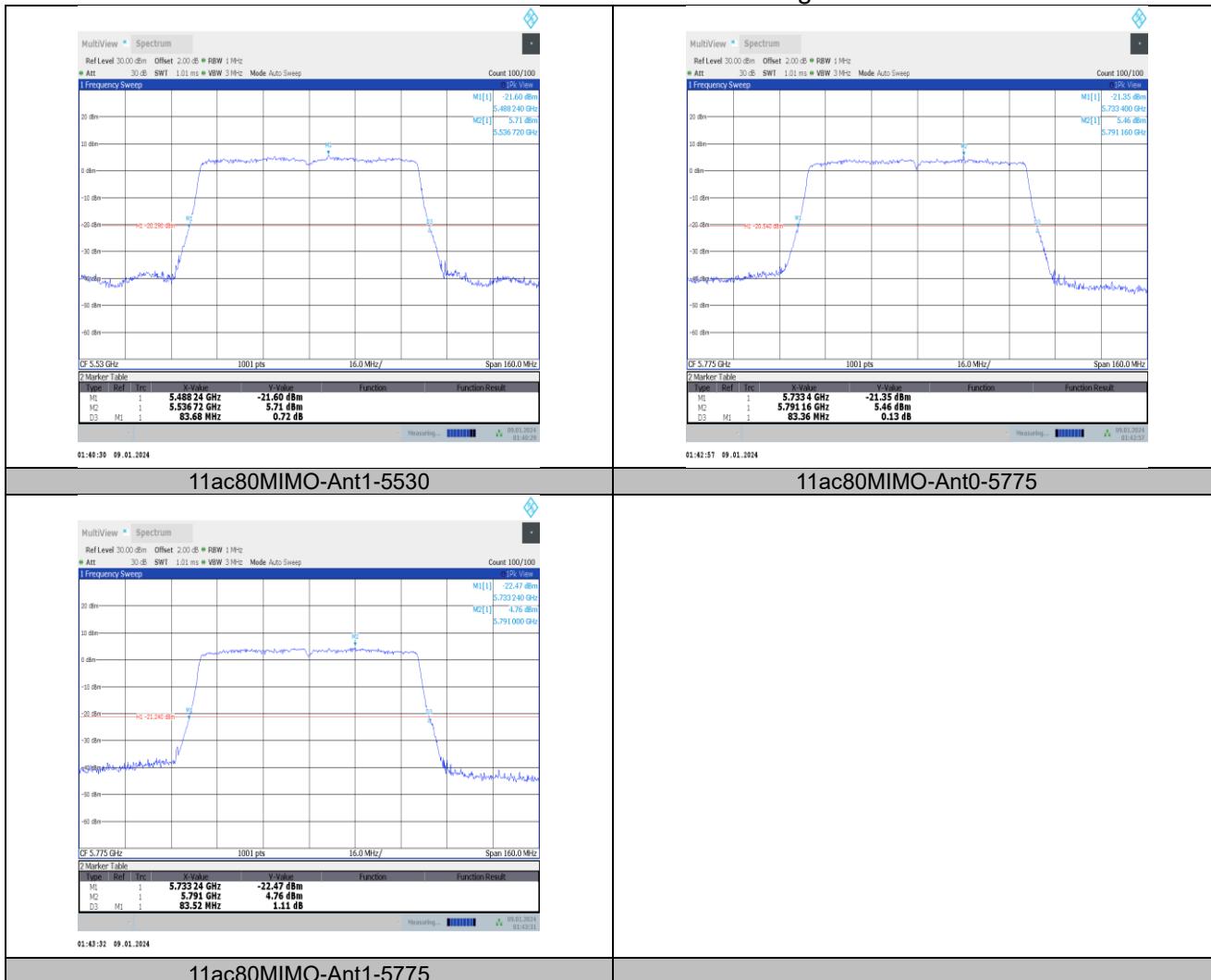
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Occupied channel bandwidth

Test Result

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
11a	Ant0	5180	16.691	5171.6201	5188.3106	For Report Purpose
11a	Ant0	5220	16.673	5211.6273	5228.2999	
11a	Ant0	5240	16.713	5231.5971	5248.3097	
11a	Ant0	5260	16.653	5251.6345	5268.2879	
11a	Ant0	5300	16.65	5291.6272	5308.2768	
11a	Ant0	5320	16.676	5311.6188	5328.2951	
11a	Ant0	5500	16.656	5491.6245	5508.2808	
11a	Ant0	5580	16.65	5571.6376	5588.2879	
11a	Ant0	5700	16.639	5691.6364	5708.2758	
11a	Ant0	5745	16.676	5736.6126	5753.2881	
11a	Ant0	5785	16.669	5776.6136	5793.2829	
11a	Ant0	5825	16.709	5816.5822	5833.2916	
11ac20MIMO	Ant0	5180	17.795	5171.0566	5188.8511	For Report Purpose
11ac20MIMO	Ant1	5180	17.764	5171.0811	5188.8453	
11ac20MIMO	Ant0	5220	17.752	5211.0943	5228.8468	
11ac20MIMO	Ant1	5220	17.732	5211.1031	5228.8349	
11ac20MIMO	Ant0	5240	17.75	5231.0870	5248.8371	
11ac20MIMO	Ant1	5240	17.773	5231.0660	5248.8395	
11ac20MIMO	Ant0	5260	17.756	5251.0858	5268.8421	
11ac20MIMO	Ant1	5260	17.73	5251.0739	5268.8043	
11ac20MIMO	Ant0	5300	17.721	5291.1126	5308.8331	
11ac20MIMO	Ant1	5300	17.751	5291.0831	5308.8346	
11ac20MIMO	Ant0	5320	17.74	5311.0881	5328.8283	For Report Purpose
11ac20MIMO	Ant1	5320	17.741	5311.1017	5328.8429	
11ac20MIMO	Ant0	5500	17.726	5491.1086	5508.8350	
11ac20MIMO	Ant1	5500	17.724	5491.0861	5508.8100	
11ac20MIMO	Ant0	5580	17.719	5571.1162	5588.8352	
11ac20MIMO	Ant1	5580	17.728	5571.1017	5588.8301	
11ac20MIMO	Ant0	5700	17.75	5691.0682	5708.8181	
11ac20MIMO	Ant1	5700	17.737	5691.0883	5708.8254	
11ac20MIMO	Ant0	5745	17.732	5736.1084	5753.8404	
11ac20MIMO	Ant1	5745	17.734	5736.1072	5753.8408	
11ac20MIMO	Ant0	5785	17.78	5776.0728	5793.8531	For Report Purpose
11ac20MIMO	Ant1	5785	17.773	5776.0859	5793.8591	
11ac20MIMO	Ant0	5825	17.767	5816.0762	5833.8433	
11ac20MIMO	Ant1	5825	17.765	5816.0833	5833.8487	
11ac40MIMO	Ant0	5190	35.964	5172.0478	5208.0122	
11ac40MIMO	Ant1	5190	35.972	5172.0518	5208.0235	
11ac40MIMO	Ant0	5230	35.974	5212.0366	5248.0107	
11ac40MIMO	Ant1	5230	35.959	5212.0362	5247.9950	
11ac40MIMO	Ant0	5270	35.96	5252.0397	5287.9994	
11ac40MIMO	Ant1	5270	35.973	5252.0289	5288.0024	
11ac40MIMO	Ant0	5310	35.972	5292.0310	5328.0027	
11ac40MIMO	Ant1	5310	35.981	5292.0252	5328.0058	
11ac40MIMO	Ant0	5510	35.973	5492.0418	5528.0145	
11ac40MIMO	Ant1	5510	35.979	5492.0393	5528.0188	
11ac40MIMO	Ant0	5550	35.99	5532.0310	5568.0214	
11ac40MIMO	Ant1	5550	35.997	5532.0326	5568.0297	
11ac40MIMO	Ant0	5670	36.022	5652.0239	5688.0463	
11ac40MIMO	Ant1	5670	36.022	5652.0355	5688.0572	
11ac40MIMO	Ant0	5755	35.913	5737.1077	5773.0206	

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11ac40MIMO	Ant1	5755	35.928	5737.1059	5773.0335	
11ac40MIMO	Ant0	5795	35.922	5777.1083	5813.0303	
11ac40MIMO	Ant1	5795	36.012	5777.0210	5813.0331	
11ac80MIMO	Ant0	5210	75.871	5172.0559	5247.9274	
11ac80MIMO	Ant1	5210	75.804	5172.1010	5247.9045	
11ac80MIMO	Ant0	5290	75.798	5252.0892	5327.8869	
11ac80MIMO	Ant1	5290	75.809	5252.0952	5327.9041	
11ac80MIMO	Ant0	5530	75.892	5492.1108	5568.0031	
11ac80MIMO	Ant1	5530	75.849	5492.1374	5567.9861	
11ac80MIMO	Ant0	5775	75.937	5737.1123	5813.0498	
11ac80MIMO	Ant1	5775	75.683	5737.3304	5813.0138	

Remark:

For 802.11n HT20/ac VHT20 and 802.11n HT40/ac VHT40 mode, the whole testing have assessed only, 802.11ac VHT20/40 by referring to their higher output power.



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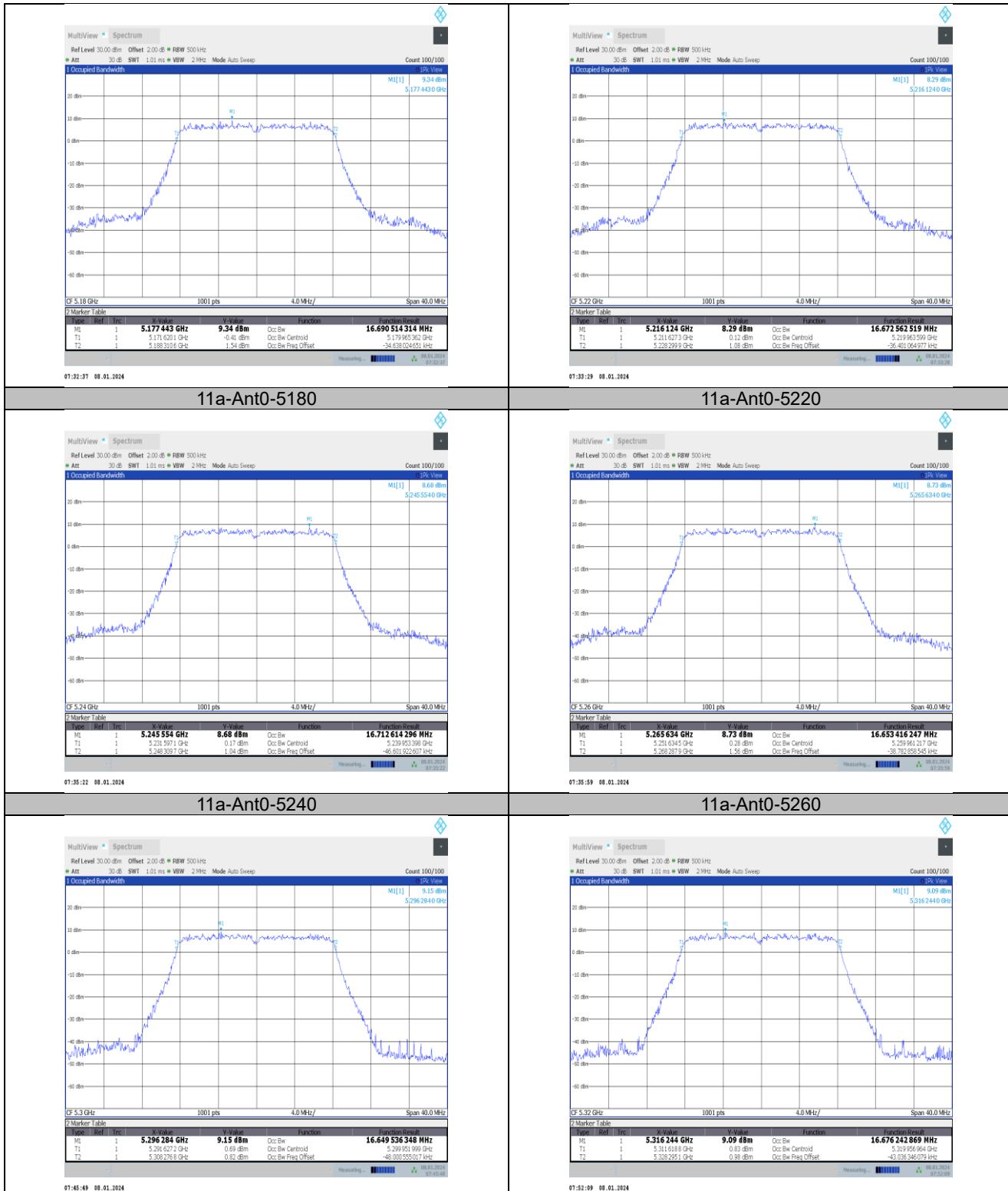
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Test Graphs



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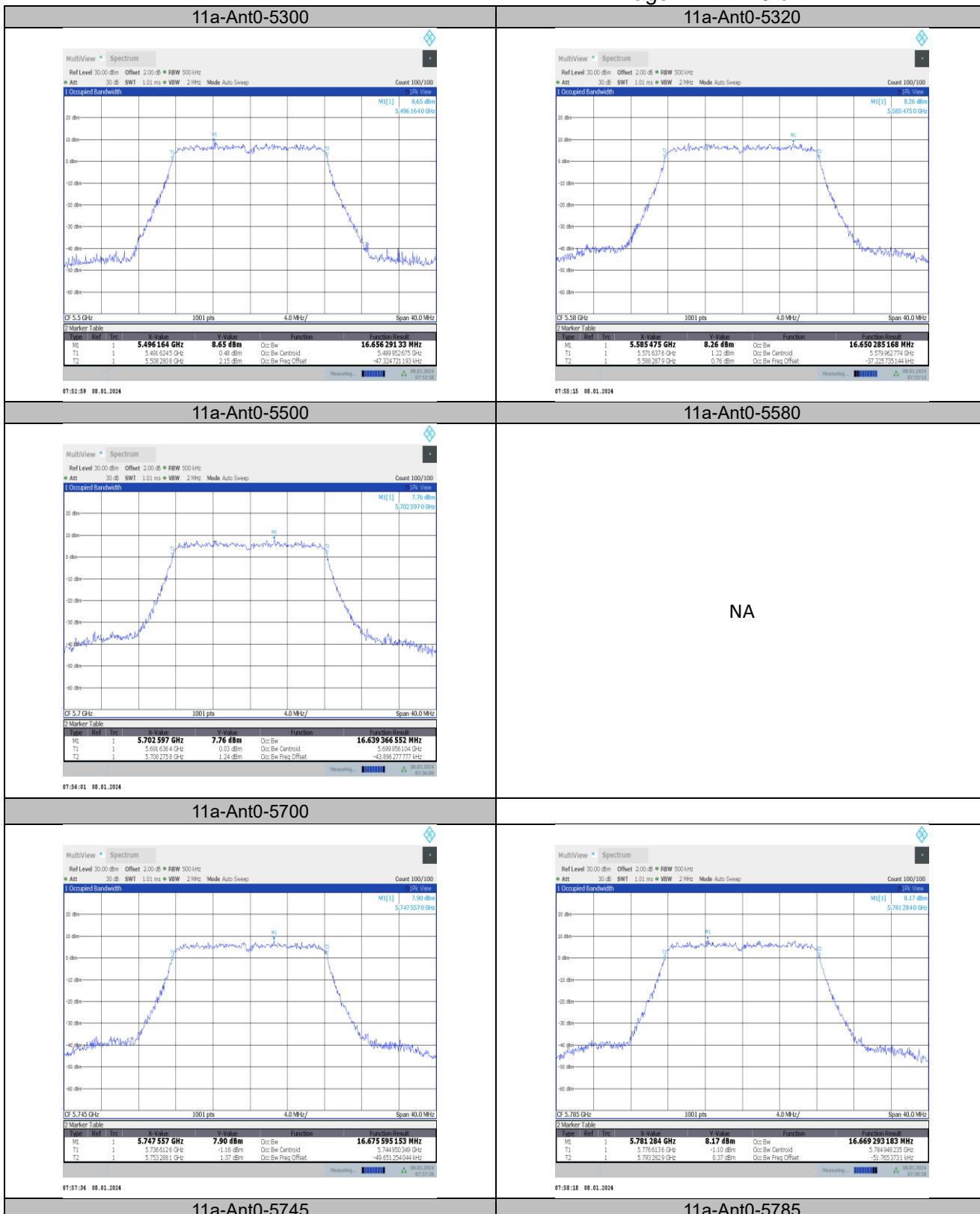


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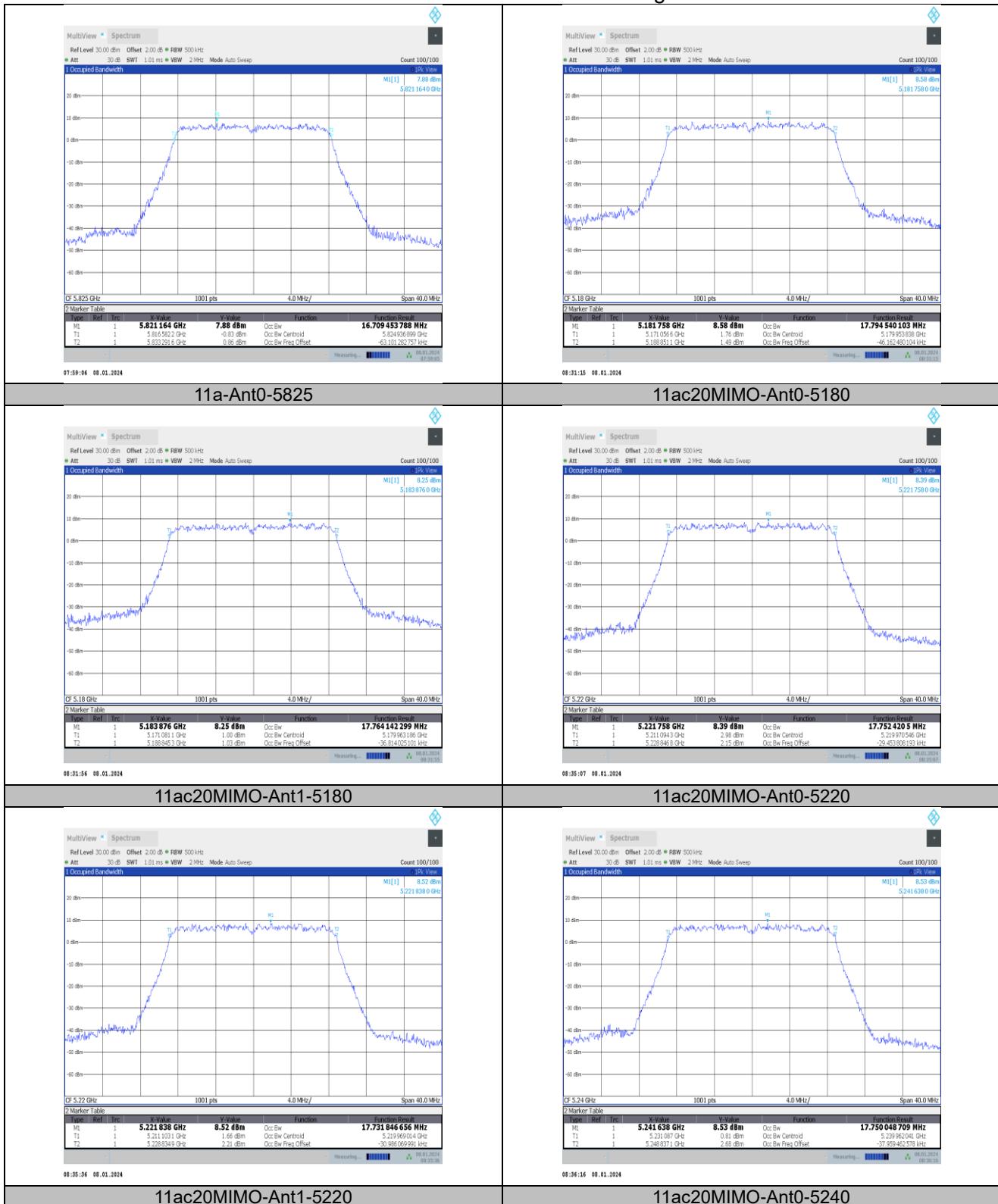
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