

Report No.: SEWM2212000309RG05

Rev.: 02

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## **TEST REPORT**

Application No.: SEWM2212000309RG

Applicant: Sony Corporation

Address of Applicant: 1-7-1 Konan Minato-ku Tokyo, 108-0075 Japan

Manufacturer: Sony Corporation

Address of Manufacturer: 1-7-1 Konan Minato-ku Tokyo, 108-0075 Japan

EUT Description: GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac, NFC and GNSS

Trade Mark: Sony

**FCC ID**: PY7-97087H

Standards: FCC 47 CFR Part 2, Subpart J

FCC 47 CFR Part 15, Subpart E

**Date of Receipt:** 2022/11/30

**Date of Test:** 2022/12/26 to 2023/03/09 (for original report SEWM2212000308RG05)

2022/12/26 to 2023/03/09 (for new report SEWM2212000309RG05)

**Date of Issue:** 2023/03/16

Test Result : PASS \*

\* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:

Panta Sun Wireless Laboratory Manager



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## 1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2023/02/24		Original
02		2023/03/16		Added test data of     Straddle Channel 6dB     emission bandwidth     Added variant model     and parent model data     reference description.

This report supersedes our previous report SEWM2212000309RG05, issued on 2023/02/24, which is hereby deemed null and void.

Prepared By	Leefwerg
	(Ives Cheng) / Test Engineer
Checked By	(Well Wei) / Reviewer



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2 Test Summary

Z rest Summary						
Test Item	Band <sup>[1]</sup>	FCC rules No.	Test Requirements	Test Result	Result	
Antenna Requirement		15.203/15.407(a)	-	Clause 4.1	PASS	
26dB	Band I	15.407(a)(1)		Clause	Reporting only	
Emission	Band II-A	15.407(a)(2)	No limit.	Clause 4.5		
Bandwidth	Band II-C	15.407(a)(2)		4.5	Offity	
6dB Emission Bandwidth	Band III	15.407(e)	≥ 500 kHz.	Clause 4.6	PASS	
99% Occupied Bandwidth	Band II-A Band II-C Band III	KDB 789033 D02§ D	No limit.	Clause 4.7	Reporting only	
Duty Cycle	Band I Band II-A Band II-C Band III		No limit.	Clause 4.3	Reporting only	
Maximum	Band I	15.407(a)(iv)	< 250mW			
Conducted Output	Band II-A Band II-C 15.407(a)(2)		<min{250mw,11dbm+10*lg(ebw)}< td=""><td>Clause 4.4</td><td>PASS*</td></min{250mw,11dbm+10*lg(ebw)}<>	Clause 4.4	PASS*	
Power	Band III	15.407(a)(3)	< 1W			
Maximum	Band I	15.407(a)(iv)	<11dBm/MHz			
Power Spectral	Band II-A	15.407(a)(2)	<11dBm/MHz	Clause	PASS	
	Band II-C			4.8	1 700	
Density	Band III	15.407(a)(3)	<30dBm/500KHz			
	Band I	15.209 15.407(b)	F<1GHz: §15.209/§7.2.5 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/§7.2.5 limit (AV&PK).		PASS*	
Unwanted Emissions that fall Out of the Restricted Bands (Radiated)	Band II-A 15.407(b) 15.209		F<1GHz: §15.209/§7.2.5 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/§7.2.5 limit (AV&PK).	Clause 4.9	PASS*	
	Band II-C	15.407(b) 15.209	F<1GHz: §15.209/§7.2.5 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/§7.2.5 limit (AV&PK).		PASS*	
	Band III	15.407(b) 15.209	F<1GHz: §15.209/§7.2.5 limit (QP) F≥1GHz &out-restricted:(QP)		PASS*	



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			a) 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges; b) 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges; c) 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and d) -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges. F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).		
Unwanted Emissions in the Restricted Bands (Radiated)	Band I Band II-A Band II-C Band III	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
Dynamic Frequency Selection	Band II-A Band II-C	15.407	Channel Move Time:10 Seconds	Clause 4.11	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

Remark: "PASS\*" There is FCC ID PY7-97087H (this model) spot check data. "Pass" refers to FCC ID PY7-

51629L (parent model) data.



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#### Remark:

This test report (Report No.: SEWM2212000309RG05 issue on 2023/03/16) is based on the original test report (Report No.: SEWM2212000308RG05 issue on 2023/03/09).

#### Introduction section:

Sony corporation, hereby declares that the test data reuse policy of FCC KDB 484596D01 v01 has been followed and take full responsibility that the test data as referenced form the parent model report FCC ID PY7-51629L represents compliance for the new FCC ID PY7-97087H.

#### Difference section:

Sony corporation, hereby declares FCC ID PY7-97087H(this model) is the variant from FCC ID PY7-51629L(parent model). They have the same dimension and share the same PCB layout, antennas and components in WLAN and Bluetooth, Though both devices use different names for the NFC chipset, this difference lies in the payment manager application software installed on the secure microcomputer, and there is also no difference in electrical and RF performance for NFC.

#### Reference detail section:

Therefore in this report Dynamic Frequency Selection were fully tested, and the items of Power, Transmitter emission Above 1GHz and Restricted bands around fundamental frequency were performed based on the worst case of the original report with report number SEWM2212000308RG05 issue on 2023/03/09 and other test data in this report are based on the previous report with report number SEWM2212000308RG05 issue on 2023/03/09.

Rule part	Equipment class	Reference FCC ID	Type Grant/permissive Change	Reference Report	Variant model FCC ID	Variant model Report
15E	NII	PY7-51629L	Original Grant	SEWM221200 0308RG05	PY7-97087H	SEWM2212000 309RG05





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### Summary of the Spot check:

Conducted power test and radiated spurious emission test against the variant model based on the worst-case condition from the original model was performed in this filing and the verification test results similar to the original FCC ID. All tests meet FCC technical limits. Detail sport check test result can be found in the variant model report.

Test Item	PY7-97087H Worst Result	PY7-51629L Worst Result	Difference(dB)
Conducted Peak Output Power	9.63	9.94	-0.31
Dynamic Frequency Selection	-12.67	-11.26	-1.41
Radiated Spurious emissions	Peak: 45.26 Average: 35.17	Peak: 46.35 Average: 37.15	Peak: -1.09 Average: -1.98
Restricted bands around fundamental frequency (Radiated Emission)	Peak: 53.41 Average: 41.93	Peak: 53.73 Average: 42.62	Peak: -0.32 Average: -0.69



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### 3 General Information

### 3.1 Details of Client

Applicant:	Sony Corporation	
Address of Applicant:	1-7-1 Konan Minato-ku Tokyo, 108-0075 Japan	
Manufacturer:	Sony Corporation	
Address of Manufacturer:	1-7-1 Konan Minato-ku Tokyo, 108-0075 Japan	

### 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 Area, China (Jiangsu) Pilot Free Trade Zone				
Post code:	215000			
Test engineer:	Ives Cheng, Tizzy Song			

### 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

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Test Firm Registration Number: 717327



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## 3.4 General Description of EUT

EUT Description:	GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac, NFC and GNSS			
Trade Mark:	Sony			
Hardware Version:	A			
Software Version:	0.129			
SN:	RF Conduc	ted	HQ62B20407 HQ62B206A1	
SIN:	RSE & AC	oower line	HQ62B2030D HQ62B2066A	
	802.11a:	20 MHz cha	nnel bandwidth	
WLAN Mode Supported:	802.11n:	20 MHz / 40	MHz channel bandwidth	
	802.11ac:	20 MHz / 40	MHz / 80 MHz channel bandwidth	
Operation Frequency:	5150MHz to 5250MHz to 5470MHz to 5725MHz to	5350MHz 5725MHz		
	802.11a:	OFDM (BPSK, QPSK, 16QAM, 64QAM)		
Modulation Type:	802.11n:	OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)		
	802.11ac:	OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)		
	20MHz:	802.11a/n(HT20)/ac(VHT20)		
Channel Spacing:	40MHz:	802.11n(HT40)/ac(VHT40)		
	80MHz:	802.11ac(VHT80)		
Antenna Type:	PIFA Anten	enna		
Antenna Gain:	5250MHz to 5470MHz to	5250MHz: 0 5350MHz: 1 5725MHz: 2 5850MHz: 2	.1dBi(Ant6) 2.0dBi(Ant6)	
	⊠ SISO	802.11a/n/ac		
		CDD: 802	.11a/n/ac: Tx & Rx	
Smart System:		STBC: 80	2.11n/ac: Tx & Rx	
		TXBF: 80	2.11n/ac: Tx & Rx	
☐ Diversity 802.1				
TPC Function:	⊠Support,	Support, Not Support		
DFS Function:	Master			
	☐Slave wit	h radar detec	tion	
RF Cable:	2.0dB			
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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)			
	The Lowest channel	5180			
IEEE 802.11a/n/ac 20MHz	The Middle channel	5200			
	The Highest channel	5240			
IEEE 802.11n/ac 40MHz	The Lowest channel	5190			
IEEE 602. I IN/ac 40MH2	The Highest channel	5230			
IEEE 802.11ac 80MHz	The Middle channel	5210			

For UNII Band II-A:							
Mode	Channel	Frequency(MHz)					
	The Lowest channel	5260					
IEEE 802.11a/n/ac 20MHz	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)					
	The Lowest channel	5500					
IEEE 802.11a/n/ac 20MHz	The Middle channel	5580					
	The Highest channel	5700					
	The Lowest channel	5510					
IEEE 802.11n/ac 40MHz	The Middle channel	5550					
	The Highest channel	5670					
IEEE 902 1100 90MHz	The Lowest channel	5530					
IEEE 802.11ac 80MHz	The Highest channel	5610					

For UNII Band III:							
Mode Channel Frequency(Mi							
	The Lowest channel	5745					
IEEE 802.11a/n/ac 20MHz	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					

Frequency Band	Channel	Freq.(MHz)	Channel	Freq.(MHz)
Straddla Channal	144 <sup>[1]</sup>	5720	142 <sup>[2]</sup>	5710
Straddle Channel	138 <sup>[3]</sup>	5690		

#### Note:

- 1. The above Frequency and Channel were 802.11a, 802.11n HT20 and 802.11ac VHT20.
- 2. The above Frequency and Channel were 802.11n HT40 and 802.11ac VHT40.
- 3. The above Frequency and Channel were 802.11ac VHT80.



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### 3.5 Test Environment and Mode

Environment Parameter	101.0 kPa Selected Values During Tests					
Relative Humidity	44-46 % RH Ambient					
Value	Temperature(°C)	Voltage(V)				
NTNV	22~23	3.89				

Remark:

NV: Normal Voltage NT: Normal Temperature

### 3.6 Description of Support Units

Description	Manufacturer	Model No.
Douter	ACLIC	GT-AXE11000
Router	ASUS	(FCC ID MSQ-RTAXJF00)

### 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	MIMO - Data Rate
802.11a	6 Mbps	/
802.11n (HT 20)	MCS0 (6.5 Mbps)	/
802.11n (HT 40)	MCS0 (13.5 Mbps)	/
802.11ac (VHT 20)	MCS0 (6.5 Mbps)	/
802.11ac (VHT 40)	MCS0 (13.5 Mbps)	/
802.11ac (VHT 80)	MCS0 (29.3 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 PIFA Antenna and no consideration of replacement.						
The best case gain of the an	The best case gain of the antenna is					
5150MHz to 5250MHz: 0.3dBi(Ant6)						
5250MHz to 5350MHz: 1.1dBi(Ant6)						
5470MHz to 5725MHz: 2.0dBi(Ant6)						
5725MHz to 5850MHz: 2.5df	Bi(Ant6)					



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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 (d	BuV)		
	Frequency range (MHZ)	Quasi-peak	Average		
	0.15-0.5	66 to 56*	56 to 46*		
	0.5-5	56	46		
	5-30	60	50		
	* Decreases with the log	arithm of the frequency.			
Test Procedure:	room.  2) The EUT was connected Impedance Stabilizated impedance. The power connected to a second plane in the same was multiple socket outlets single LISN provided.  3) The tabletop EUT was ground reference planglaced on the horizor.  4) The test was perform of the EUT shall be overtical ground reference plane. The unit under test and be mounted on top of the between the closest part of the EUT and associated.  5) In order to find the man equipment and all of	cted to AC power source throus ion Network) which provides er cables of all other units of and LISN 2, which was bonded by as the LISN 1 for the unit be strip was used to connect must the rating of the LISN was not as placed upon a non-metallic me. And for floor-standing arrantal ground reference plane, and with a vertical ground reference plane was bonded to the LISN 1 was placed 0.8 m frow the points of the LISN 1 and the floor error of the LISN 1 and the floor equipment was at least 0 aximum emission, the relative the interface cables must be on conducted measurement.	ugh a LISN 1 (Line a 50Ω/50μH + 5Ω linear the EUT were I to the ground reference being measured. A ultiple power cables to a cot exceeded. I table 0.8m above the angement, the EUT was been serence plane. The reference plane. The endition has been an above the angement of the plane for LISNs is distance was EUT. All other units of a 50Ω to 10Ω		



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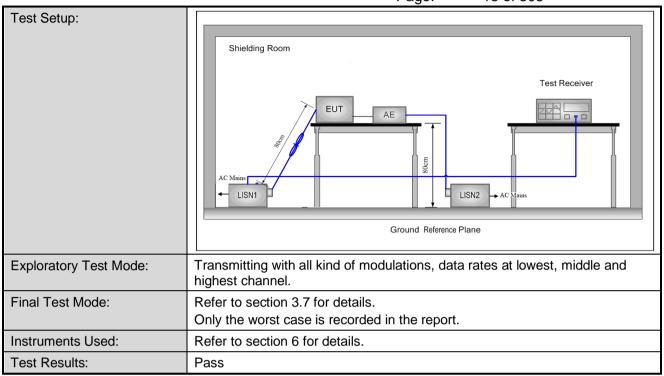
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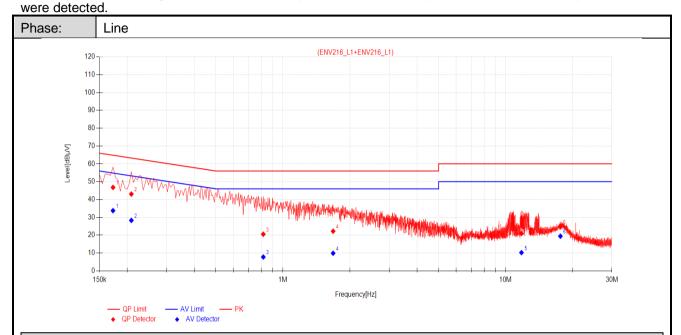
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#### Measurement Data

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



Final	Data List										
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.1725	10.73	36.06	46.79	64.84	18.05	23.04	33.77	54.84	21.07	PASS
2	0.2085	10.82	32.25	43.07	63.26	20.19	17.49	28.31	53.26	24.95	PASS
3	0.8160	10.52	10.02	20.54	56.00	35.46	-2.76	7.76	46.00	38.24	PASS
4	1.6800	10.75	11.50	22.25	56.00	33.75	-0.87	9.88	46.00	36.12	PASS
5	11.7780	10.58	10.36	20.94	60.00	39.06	-0.35	10.23	50.00	39.77	PASS
6	17.6235	10.47	14.32	24.79	60.00	35.21	8.97	19.44	50.00	30.56	PASS

### Remark:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Value =Reading[dBµV] + Factor(Lisn factor[dB] + cable loss[dB]).
- 3. Margin = Limit[ $dB\mu V$ ] Value[ $dB\mu V$ ]



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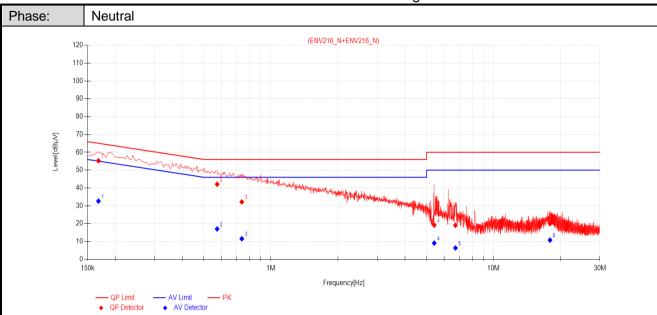
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Final	Data List										
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.1680	10.72	44.54	55.26	65.06	9.80	21.91	32.63	55.06	22.43	PASS
2	0.5730	10.71	31.39	42.10	56.00	13.90	6.32	17.03	46.00	28.97	PASS
3	0.7395	10.81	21.38	32.19	56.00	23.81	0.72	11.53	46.00	34.47	PASS
4	5.4105	10.62	8.62	19.24	60.00	40.76	-1.55	9.07	50.00	40.93	PASS
5	6.7380	10.53	8.53	19.06	60.00	40.94	-4.16	6.37	50.00	43.63	PASS
6	17.9160	10.49	9.61	20.10	60.00	39.90	0.28	10.77	50.00	39.23	PASS

#### Remark:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Value =Reading[dB $\mu$ V] + Factor(Lisn factor[dB] + cable loss[dB]).
- 3. Margin = Limit[ $dB\mu V$ ] Value[ $dB\mu V$ ]



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## 4.3 Duty Cycle

The detailed test data see: Appendix



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## 4.4 Conducted Output Power

Test Requirement:	47 CFR Part 15 Se	ection 15.407(a)(iv)				
Test Method:	ANSI C63.10 :2013 Section 12.3.3.2					
Test Setup:	Power meter O					
		Ground Reference Plane				
	* 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.					
Test Instruments:	Refer to section 6 f	for details.				
Exploratory Test Mode:	Transmitting with a	all kind of modulations, data rates				
Final Test Mode:	Refer to section 3.7	7 for details.				
Limit:	Frequency Band	Limit				
	5150-5250MHz	Not exceed 250mW(24dBm)				
	5250-5350MHz	The lesser of 250mW(24dBm) or 11+ 10logB				
	5470-5725MHz The lesser of 250mW(24dBm) or 11+ 10logB 5725-5850MHz Not exceed 1W(30dBm)					
	*Where B is the 26	odB emission bandwidth in MHz				
Test Results:	Pass					
The detailed test data see: A	ppendix					



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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:	PC    Spectrum Analyzer   O   O   O   O   O   O   O   O   O		
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:	Pass		
The detailed test data see: A	ppendix		



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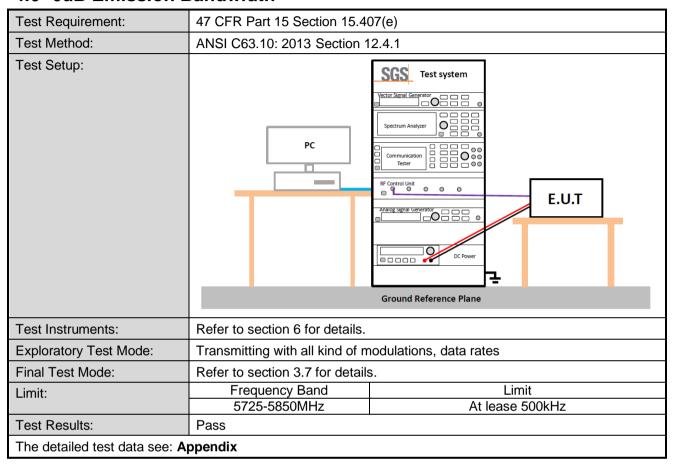


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### 4.6 6dB Emission Bandwidth





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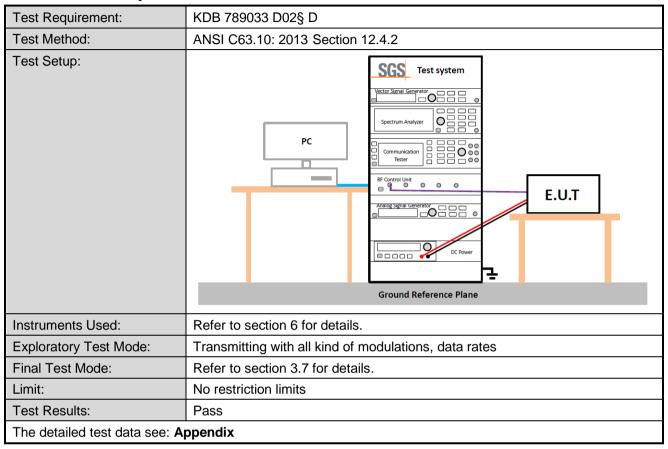


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## 4.7 99% Occupied Bandwidth





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## 4.8 Power Spectral Density

Test Requirement:	47 CFR Part 15 Sec	tion 15.407(a)(iv)	
Test Method:	ANSI C63.10: 2013 Section 12.5		
	KDB 789033 D02 v02r01, Section F.		
Test Setup:	PC	SGS Test system  Wettor Signal Generator  Spectrum Analyzer  Communication  Tester  RF Control Unit  Communication  DC Power  E.U.T  Ground Reference Plane	
Instruments Used:	Refer to section 6 for	or 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 11dBm/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: A	ppendix		



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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:

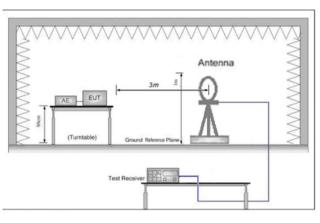
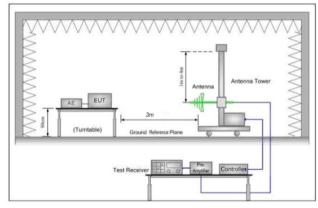


Figure 1. 9kHz to 30MHz



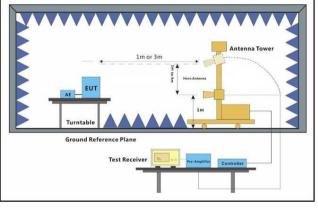


Figure 1. 30MHz to 1GHz

Figure 2. Above 1 GHz

#### Test Procedure:

- a. 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 camber. 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 camber. The table was rotated 360 degrees to determine the position of the highest radiation.
   (Distance from antenna to EUT is 1m for measurements >18GHz).
- c. 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.
- d. 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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	F age. 25 01 500
	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.
	f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
	g. Test the EUT in the outermost channels.
	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.
	i. Repeat above procedures until all frequencies measured was complete.
	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
	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.
	<ol> <li>At a measurement distance of 1 meter the limit line was increased by 20*LOG(3/1) = 9.54 dB.</li> </ol>
Test Configuration:	<ul> <li>Measurements Below 1000MHz</li> <li>RBW = 120 kHz</li> <li>VBW = 300 kHz</li> <li>Detector = Peak</li> <li>Trace mode = max hold</li> <li>Peak Measurements Above 1000 MHz</li> <li>RBW = 1 MHz</li> <li>VBW ≥ 3 MHz</li> <li>Detector = Peak</li> <li>Sweep time = auto</li> <li>Trace mode = max hold</li> <li>Average Measurements Above 1000MHz</li> <li>RBW = 1 MHz</li> <li>VBW = 1 MHz</li> <li>VBW = 10Hz, when duty cycle is no less than 98 percent.</li> <li>VBW ≥ 1/T, when duty cycle is less than 98 percent where Tis 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.</li> </ul>
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	E Appendix



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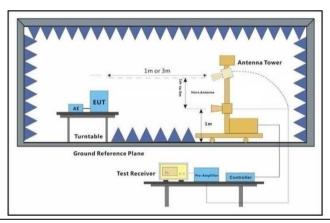
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### 4.10 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15 Section 15.407(b)				
Test Method:	ANSI C63.10: 2013 Section 12.7				
Test Site:	Measurement Distance: 3m	Measurement Distance: 3m (Semi-Anechoic Chamber)			
Limit:	Frequency	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 4 CUIs 54.0 Average Va				
	Above 1GHz 74.0 Peak Value				

#### Test Setup:



### Test Procedure:

- a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. 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.
- d. 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.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. 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.
- h. The radiation measurements are performed in X, Y, Z axis positioning for



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	Transmitting mode, And found the X axis positioning which it is worse case.	
	i. Repeat above procedures until all frequencies measured was complete.	
Test Configuration:	Measurements Below 1000MHz	
	• RBW = 120 kHz	
	• VBW = 300 kHz	
	Detector = Peak	
	Trace mode = max hold	
	Peak Measurements Above 1000 MHz	
	• RBW = 1 MHz	
	• VBW ≥ 3 MHz	
	Detector = Peak	
	Sweep time = auto	
	Trace mode = max hold	
	Average Measurements Above 1000MHz	
	• RBW = 1 MHz	
	<ul> <li>VBW = 10Hz, when duty cycle is no less than 98 percent.</li> </ul>	
	<ul> <li>VBW ≥ 1/T, when duty cycle is less than 98 percent where Tis 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.</li> </ul>	
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	e: Appendix	



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## 4.11 Dynamic Frequency Selection

#### 4.11.1 DFS Overview

Table 1: Applicability of DFS Requirements Prior to Use of a Channel

Requirement	Operational Mode			
	Master	Client Without Radar Detection	Client With Radar Detection	
Non-Occupancy Period	Yes	Not required	Yes	
DFS Detection Threshold	Yes	Not required	Yes	
Channel Availability Check Time	Yes	Not required	Not required	
U-NII Detection Bandwidth	Yes	Not required	Yes	

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode		
	Master Device or Client with Radar Detection	Client Without Radar Detection	
DFS Detection Threshold	Yes	Not required	
Channel Closing Transmission Time	Yes	Yes	
Channel Move Time	Yes	Yes	
U-NII Detection Bandwidth	Yes	Not required	
Additional requirements for devices with	Mostor Dovice or Client with	Client Without Dadar	

Additional requirements for devices with	Master Device or Client with	Client Without Radar	
multiple bandwidth modes	Radar Detection	Detection	
U-NII Detection Bandwidth and Statistical	All BW modes must be tested	Not required	
Performance Check			
Channel Move Time and Channel Closing	Test using widest BW mode	Test using the widest	
Transmission Time	available	BW mode available for	
		the link	
All other tests	Any single BW mode	Not required	

**Note:** Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.



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#### 4.11.2 DFS Detection Thresholds

# Table 3: DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection

Maximum Transmit Power	Value
	(See Notes 1, 2, and 3)
EIRP ≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and	-62 dBm
power spectral density < 10 dBm/MHz	
EIRP < 200 milliwatt that do not meet the power spectral density	-64 dBm
requirement	

Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna.

**Note 2:** Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.

**Note3:** EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.



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#### 4.11.3 RADAR TEST WAVEFORMS

Table 5 - Short Pulse Radar Test Waveforms

Radar	Pulse Width	PRI	Number of Pulses	Minimum	Minimum
			Number of Pulses		
Type	(µsec)	(µsec)		Percentage of	Number of
				Successful	Trials
				Detection	
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a Test B: 15 unique PRI values randomly selected within the range of 518-3066 µsec,	Roundup $ \left\{ \frac{\frac{1}{360}}{\left(\frac{19 \cdot 10^6}{\text{PRI}_{\mu \text{sec}}}\right)} \right\} $	60%	30
		with a minimum increment of 1 µsec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (1	Radar Types 1-	4)		80%	120
Note 1. Clear Dala Dada Tana O de additional for the detaction has decided to the additional manner					

**Note 1:** Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.



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Table 5a - Pulse Repetition Intervals Values for Test A

Pulse Repetition	Pulse Repetition Frequency	Pulse Repetition
Frequency	(Pulses Per Second)	Interval
Number		(Microseconds)
1	1930.5	518
2	1858.7	538
3	1792.1	558
4	1730.1	578
5	1672.2	598
6	1618.1	618
7	1567.4	638
8	1519.8	658
9	1474.9	678
10	1432.7	698
11	1392.8	718
12	1355	738
13	1319.3	758
14	1285.3	778
15	1253.1	798
16	1222.5	818
17	1193.3	838
18	1165.6	858
19	1139	878
20	1113.6	898
21	1089.3	918
22	1066.1	938
23	326.2	3066

The aggregate is the average of the percentage of successful detections of Short Pulse Radar Types 1-4. For example, the following table indicates how to compute the aggregate of percentage of successful detections.

Radar Type	Number of Trials	Number of Successful	Minimum Percentage			
		Detections	of Successful			
			Detection			
1	35	29	82.9%			
2	30	18	60%			
3	30	27	90%			
4	50	44	88%			
Aggregate $(82.9\% + 60\% + 90\% + 88\%)/4 = 80.2\%$						



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Table 6 - Long Pulse Radar Test Waveform

		<b>-</b>	<b>-</b>			<del>                                     </del>	
Radar	Pulse	Chirp	PRI	Number	Number	Minimum	Minimum
Type	Width	Width	(µsec)	of Pulses	of Bursts	Percentage of	Number of
	(µsec)	(MHz)		per Burst		Successful	Trials
						Detection	
5	50-100	5-20	1000-	1-3	8-20	80%	30
			2000				

Table 7 – Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width	PRI (µsec)	Pulses	Hopping Rate	Hopping Sequence	Minimum Percentage of	Minimum Number of
Турс	(µsec)	(µsec)	Hop	(kHz)	Length	Successful	Trials
					(msec)	Detection	
6	1	333	9	0.333	300	70%	30

### 4.11.4 Response Requirements

Table 4: DFS Response Requirement Values

Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds
	See Note 1.
Channel Closing Transmission Time	200 milliseconds + an
	aggregate of 60
	milliseconds over remaining
	10 second period.
	See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 100% of the U-
	NII 99% transmission
	power bandwidth. See Note
	3.

Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions. Note 3: During the *U-NII Detection Bandwidth* detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

The detailed test data see: Appendix



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

	<b>y</b> (	, ,			
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)			
		± 3.13dB (9k -30MHz)			
0	Dadiated Emission	± 4.88dB (30M -1GHz)			
8	Radiated Emission	± 4.75dB (1GHz to 18GHz)			
		± 4.77dB (Above 18GHz)			

#### Remark:

The U<sub>lab</sub> (lab Uncertainty) is less than U<sub>cispr/ETSI</sub> (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	MingGao	TH101B	SUWI-01-01-07	2022/02/16	2023/02/15		
meter		1111010	30771-01-01	2023/02/06	2024/02/05		
Signal Analyzer	ROHDE& SCHWARZ	FSV3030	SUWI-01-02-02	2022/05/17	2023/05/16		
Measurement Software	Tonscend	JS1120-3 Test System V3.1.55	SUWI-02-09-09	NCR	NCR		
Signal Analyzer	ROHDE& SCHWARZ	FSW43	SUWI-01-02-04	2022/05/28	2023/05/27		
Wideband	ROHDE&			2022/02/14	2023/02/13		
Radio Communication Tester	SCHWARZ	CMW500 SUW	SUWI-01-16-05	2023/02/06	2024/02/05		
DC Power	HYELEC	HY3005B	LIV0005D QLIV4L04 40 04		2023/02/14		
Supply	HYELEC	П13005Б	SUWI-01-18-01	2023/02/06	2024/02/05		
Power meter	Anritsu	ML2495A	SUWI-01-31-01	2022/11/23	2023/11/22		
Pulse power sensor	Anritsu	MA2411B	SUWI-01-32-01	2022/11/23	2023/11/22		
MXG Vector	KEYSIGHT	N5182B	SUWI-01-38-01	2022/02/14	2023/02/13		
signal genitor	KE Y SIGHT	DZ01CVI	3011-01-30-01	2023/02/06	2024/02/05		
Temperature		SU-242	SUWI-01-13-01	2022/02/15	2023/02/14		
Chamber	ESPEC			2023/02/06	2024/02/05		



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			. age.				
CE Test System							
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-04-03-01	2021/05/08	2024/05/07		
	DOLIDE & COLIMADA	ECD7	SUWI-01-10-01	2022/02/19	2023/02/18		
Test receiver	ROHDE&SCHWARZ	ESR7		2023/02/08	2024/02/07		
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-06	2022/02/16	2023/02/15		
				2023/02/07	2024/02/06		
A .: (:	ROHDE&SCHWARZ	ENV216	SUWI-01-19-01	2022/02/19	2023/02/18		
Artificial network				2023/02/08	2024/02/07		
Artificial notwork	DOUDE & COUMA DZ	ENV216	SUMU 01 10 02	2022/02/19	2023/02/18		
Artificial network	ROHDE&SCHWARZ	EINV216	SUWI-01-19-02	2023/02/08	2024/02/07		
Measurement Software	Tonscend	JS32-CE 4.0.0.2	SUWI-02-09-05	NCR	NCR		



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PSE Took Suptom							
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-04-02-02	2021/11/25	2024/11/24		
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-15	2022/02/16 2023/02/07	2023/02/15		
Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	2022/05/28	2023/05/27		
Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-06	2022/11/23	2023/11/22		
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2022/02/19 2023/02/08	2023/02/18		
Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	VULB 9163	SUWI-01-11-04	2021/12/05	2023/12/04		
Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	BBHA 9120D	SUWI-01-11-05	2021/12/05	2023/12/04		
Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	BBHA 9170	SUWI-01-11-03	2021/05/14	2023/05/13		
Active Loop Antenna	SCHWRZBECK MESS-ELEKTRONIK	FMZB 1519B	SUWI-01-21-01	2021/06/10	2023/06/09		
Amplifier	Tonscend	TAP9K3G32	SUWI-01-14-06	2022/11/23	2023/11/22		
Amplifier	Tonscend	TAP01018050	SUWI-01-14-04	2022/11/23	2023/11/22		
Amplifier	Tonscend	TAP30M7G30	SUWI-01-14-05	2022/11/23	2023/11/22		
Measurement Software	Tonscend	JS32-RE V4.0.0.0	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		5180	22.36	5168.80	5191.16	Reporting only
		5220	23.32	5208.44	5231.76	
		5240	22.92	5228.80	5251.72	
		5260	23.00	5248.76	5271.76	
	Ant6	5300	23.00	5288.72	5311.72	
		5320	23.04	5308.76	5331.80	
		5500	22.20	5488.80	5511.00	
		5580	23.12	5568.68	5591.80	
		5700	22.40	5688.76	5711.16	
		5720	22.40	5708.76	5731.16	
		5720_UNII-2C	16.24	5708.76	5725	
		5720_UNII-3	6.16	5725	5731.16	
		5745	22.52	5733.80	5756.32	
		5785	22.36	5773.76	5796.12	
		5825	22.96	5813.80	5836.76	
		5180	23.48	5168.32	5191.80	
		5220	22.96	5208.72	5231.68	
		5240	23.80	5228.00	5251.80	
		5260	24.00	5247.76	5271.76	
		5300	23.64	5288.12	5311.76	
		5320	24.00	5308.00	5332.00	
	Ant6	5500	23.48	5488.24	5511.72	
11ac20SISO		5580	23.88	5567.96	5591.84	
		5700	23.64	5688.36	5712.00	
		5720	24.48	5707.36	5731.84	
		5720 UNII-2C	17.64	5707.36	5725	
		5720 UNII-3	6.84	5725	5731.84	
		<u>5</u> 745	23.72	5733.08	5756.80	
		5785	23.60	5773.24	5796.84	
		5825	23.56	5813.32	5836.88	
	Ant6	5190	41.20	5169.44	5210.64	
		5230	41.92	5208.88	5250.80	
44 400100		5270	42.16	5248.80	5290.96	
		5310	41.76	5289.04	5330.80	
		5510	41.68	5489.28	5530.96	
		5550	41.60	5529.12	5570.72	
11ac40SISO		5670	41.36	5649.36	5690.72	
		5710	41.76	5688.96	5730.72	
		5710_UNII-2C	36.04	5688.96	5725	
		5710 UNII-3	5.72	5725	5730.72	
		5755	41.68	5734.04	5775.72	
		5795	41.60	5774.20	5815.80	
11ac80SISO	Ant6	5210	84.80	5167.12	5251.92	
		5290	84.48	5247.76	5332.24	
		5530	84.32	5487.92	5572.24	
		5610	84.32	5567.92	5652.24	
		5690	84.64	5647.60	5732.24	
		5690_UNII-2C	77.4	5647.60	5725	
		5690_UNII-3	7.24	5725	5732.24	
		<u>5</u> 775	84.48	5732.60	5817.08	



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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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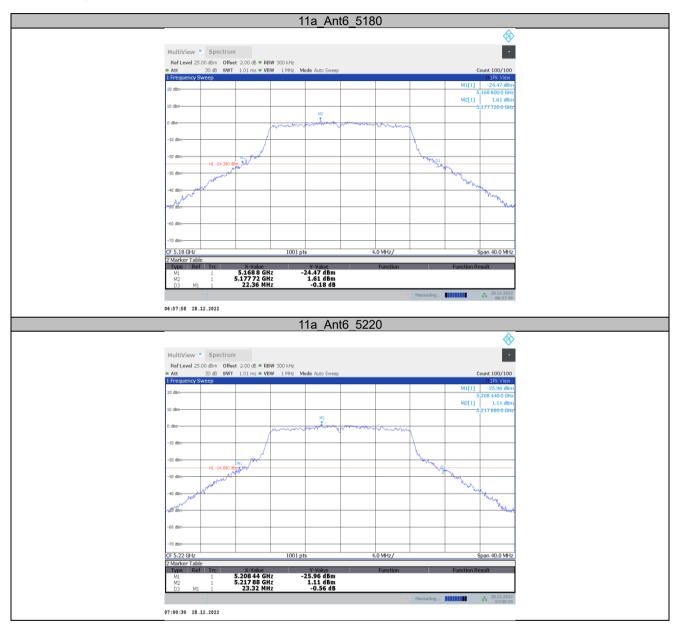


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#### **Test Graphs**





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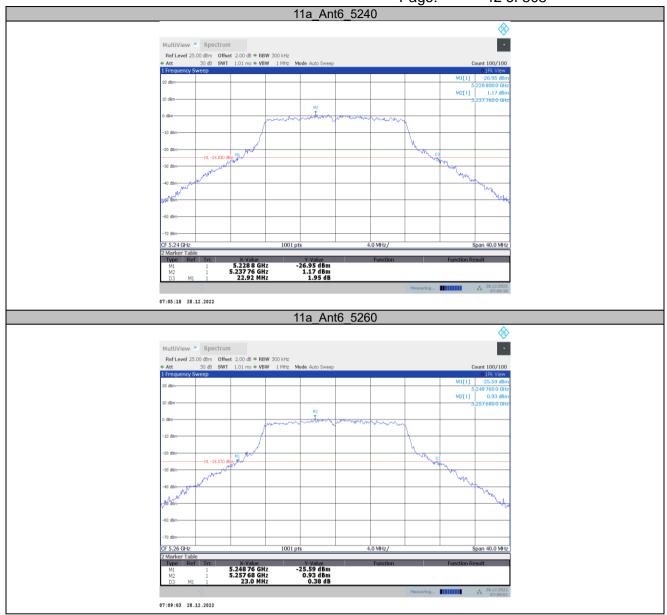
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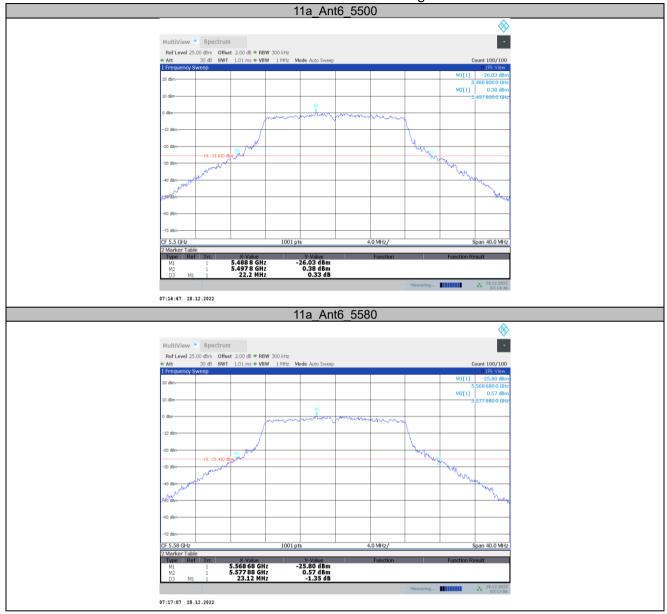
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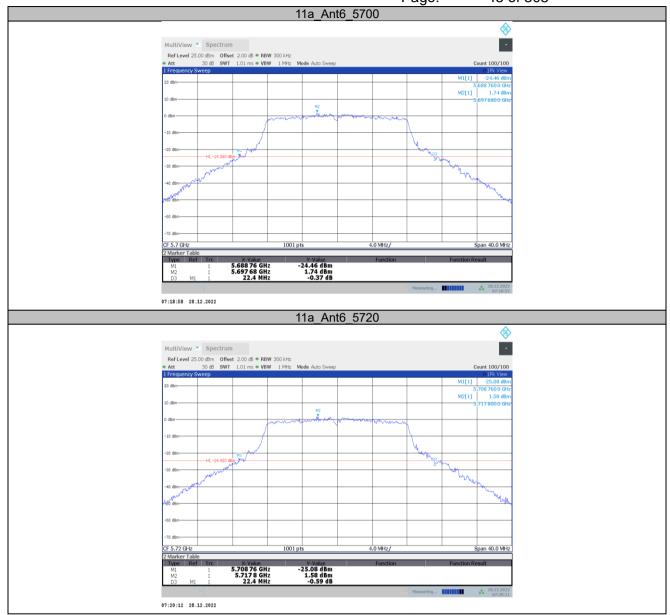
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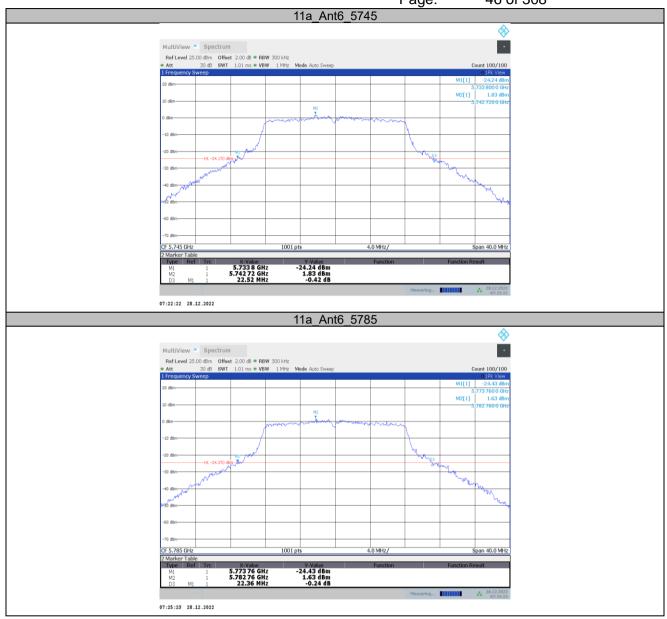
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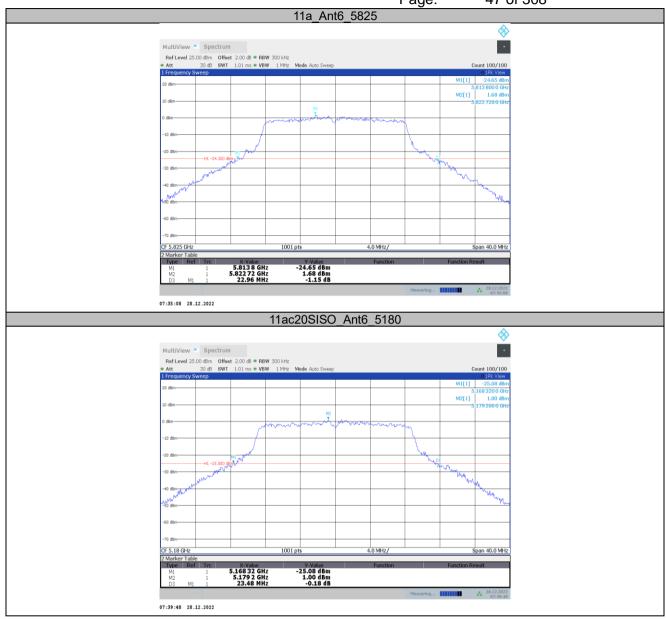
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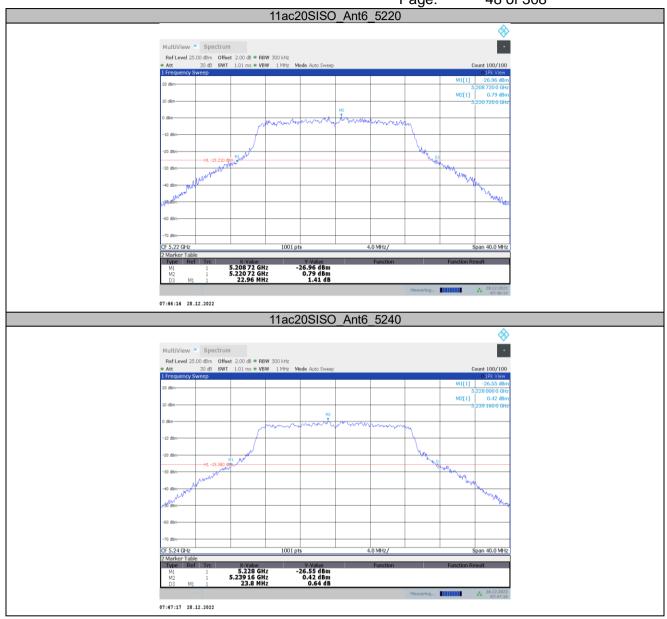
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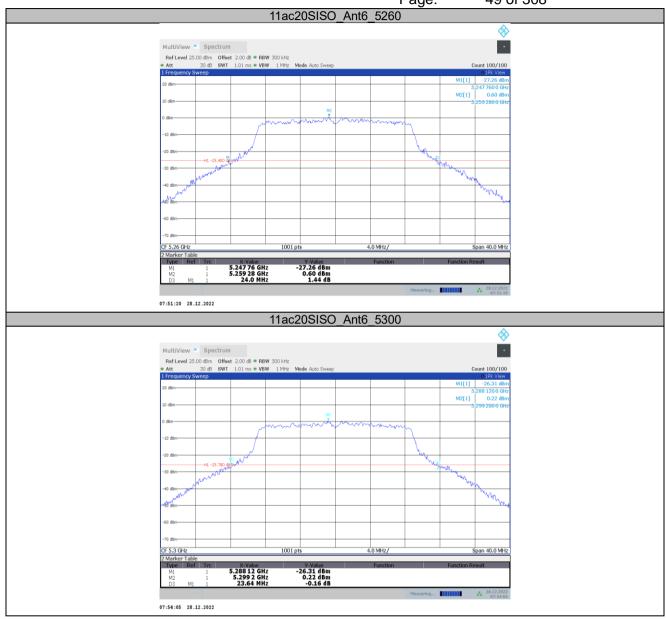
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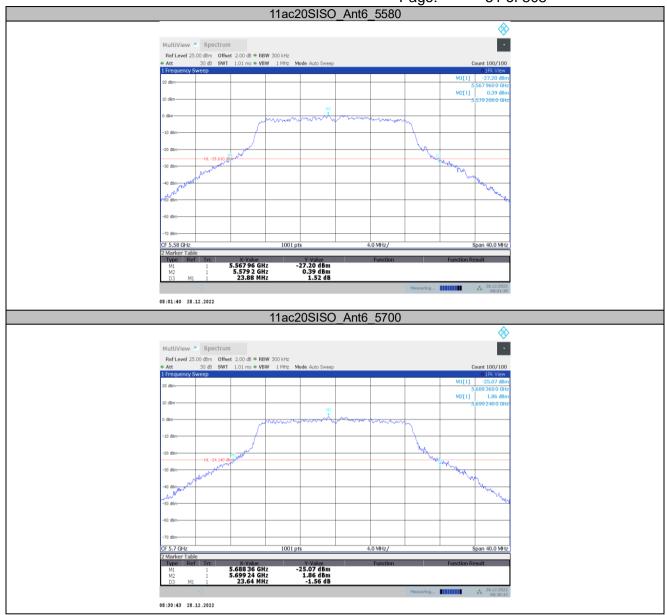
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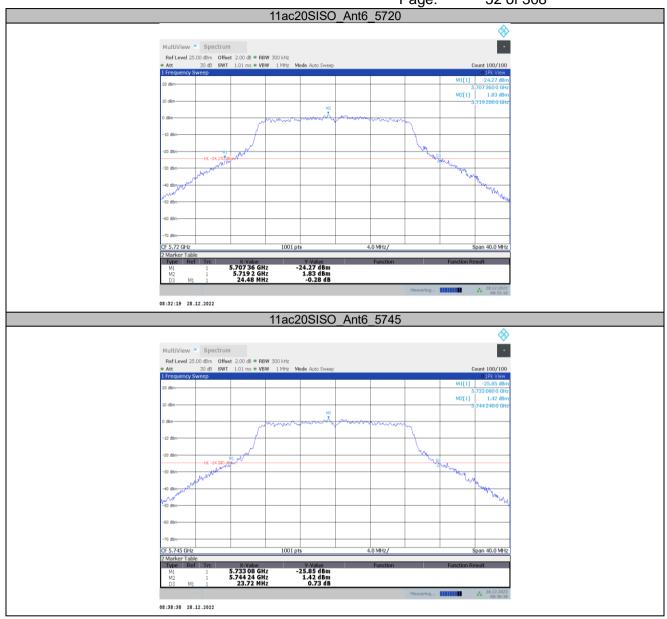
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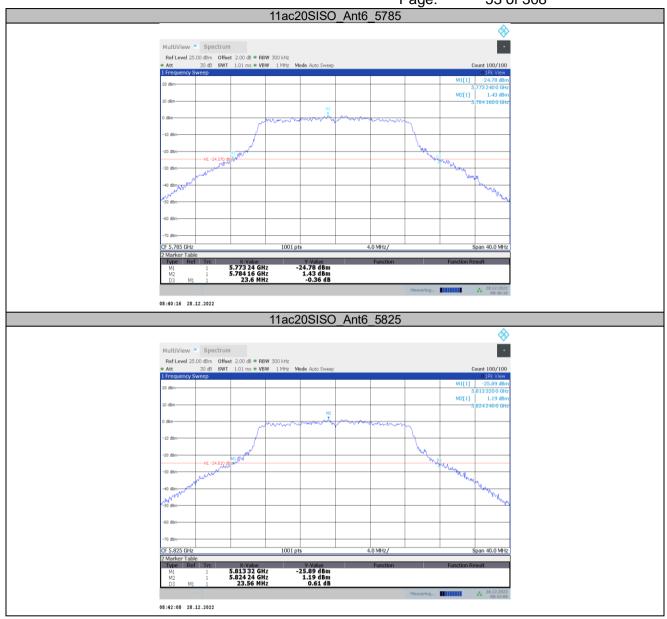
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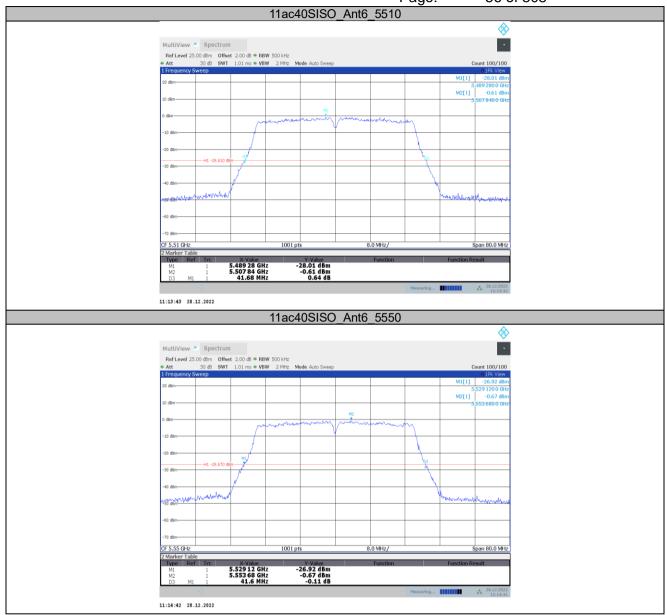
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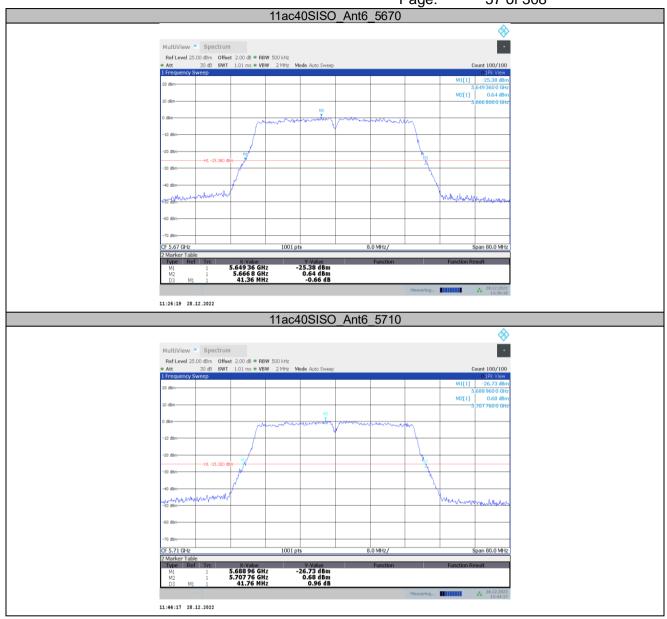
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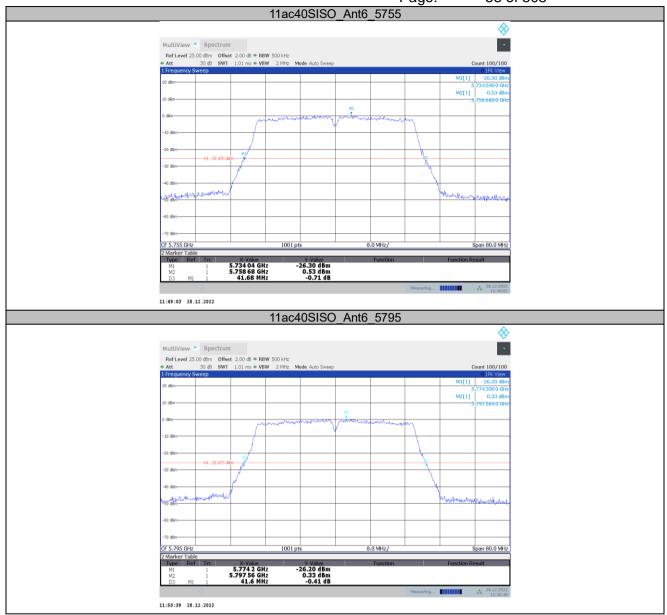
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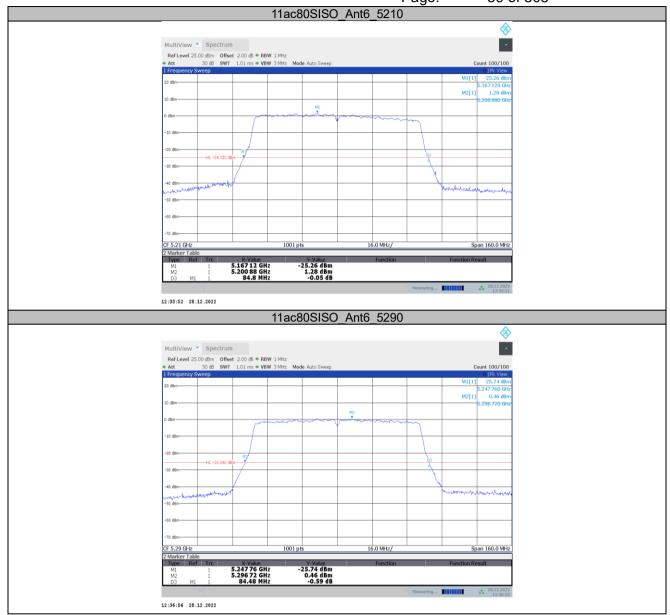
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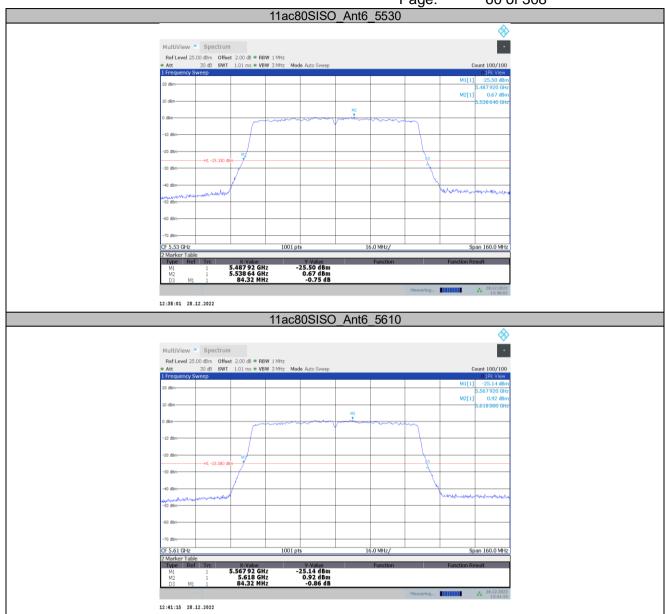
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# Occupied channel bandwidth Test Result

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
11a		5180	17.037	5171.469	5188.506	
		5220	17.011	5211.480	5228.490	
		5240	17.069	5231.453	5248.522	
		5260	17.059	5251.443	5268.502	
	Ant6	5300	17.049	5291.439	5308.488	
		5320	17.085	5311.420	5328.505	
		5500	17.044	5491.426	5508.470	
		5580	17.078	5571.439	5588.516	
		5700	17.063	5691.444	5708.507	
		5720	17.05	5711.441	5728.491	
		5720_UNII-2C	13.559	5711.441	5725	
		5720_UNII-3	3.491	5725	5728.491	
		<u>5</u> 745	17.062	5736.436	5753.498	
		5785	17.104	5776.436	5793.540	
		5825	17.092	5816.447	5833.538	
		5180	18.238	5170.910	5189.148	- -
		5220	18.215	5210.919	5229.134	
	Ant6	5240	18.189	5230.920	5249.109	1
		5260	18.205	5250.894	5269.099	Reporting only
		5300	18.229	5290.902	5309.131	
		5320	18.236	5310.870	5329.107	
		5500	18.254	5490.868	5509.123	
11ac20SISO		5580	18.233	5570.881	5589.114	
		5700	18.224	5690.897	5709.121	
		5720	18.242	5710.892	5729.134	
		5720 UNII-2C	14.108	5710.892	5725	
		5720 UNII-3	4.134	5725	5729.134	
		<u>5</u> 745	18.242	5735.888	5754.130	
		5785	18.221	5775.894	5794.115	
		5825	18.239	5815.892	5834.132	
	Ant6	5190	36.532	5171.761	5208.293	
		5230	36.532	5211.758	5248.289	
		5270	36.544	5251.757	5288.301	
		5310	36.522	5291.766	5328.287	
		5510	36.519	5491.759	5528.278	
11100100		5550	36.539	5531.758	5568.296	
11ac40SISO		5670	36.509	5651.767	5688.276	
		5710	36.631	5691.695	5728.327	
		5710 UNII-2C	33.305	5691.695	5725	
		5710 UNII-3	3.327	5725	5728.327	
		5755	36.535	5736.750	5773.286	
		5795	36.497	5776.769	5813.267	
11ac80SISO	Ant6	5210	75.771	5171.860	5247.631	
		5290	75.879	5252.112	5327.991	
		5530	75.823	5492.117	5567.940	
		5610	75.787	5572.148	5647.935	
		5690	75.805	5652.158	5727.963	
		5690 UNII-2C	72.842	5652.158	5725	
		5690 UNII-3	2.963	5725	5727.963	
		5775	75.794	5737.080	5812.875	



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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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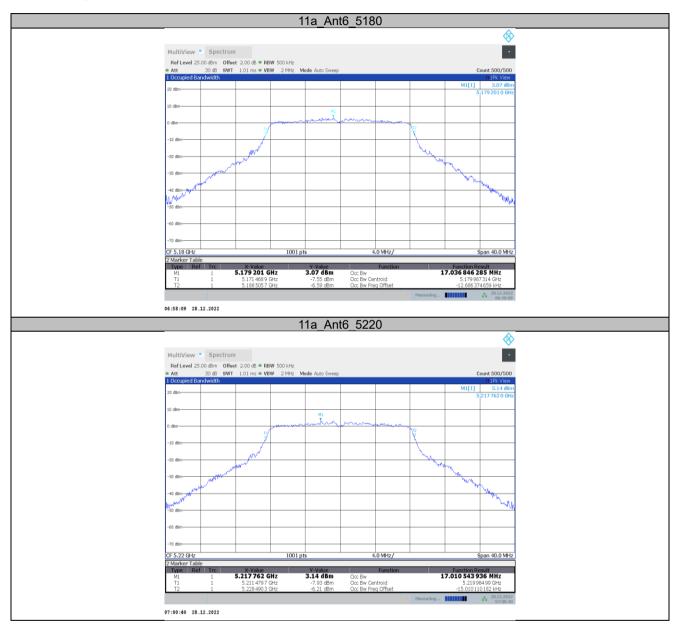


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#### **Test Graphs**





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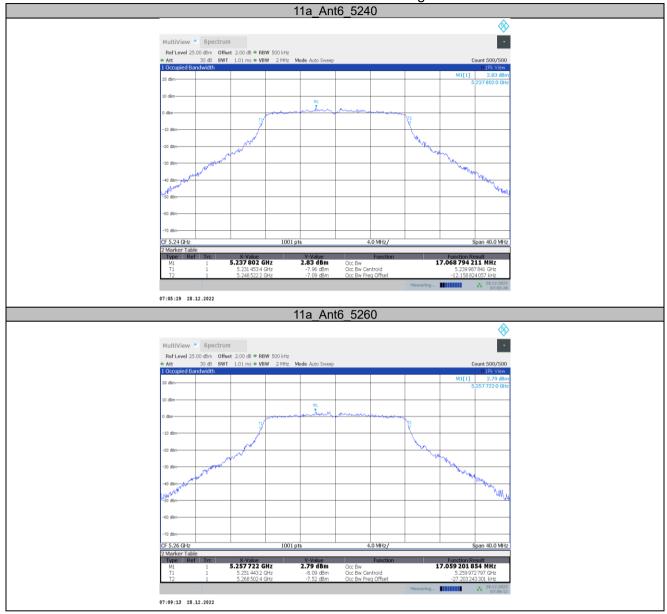
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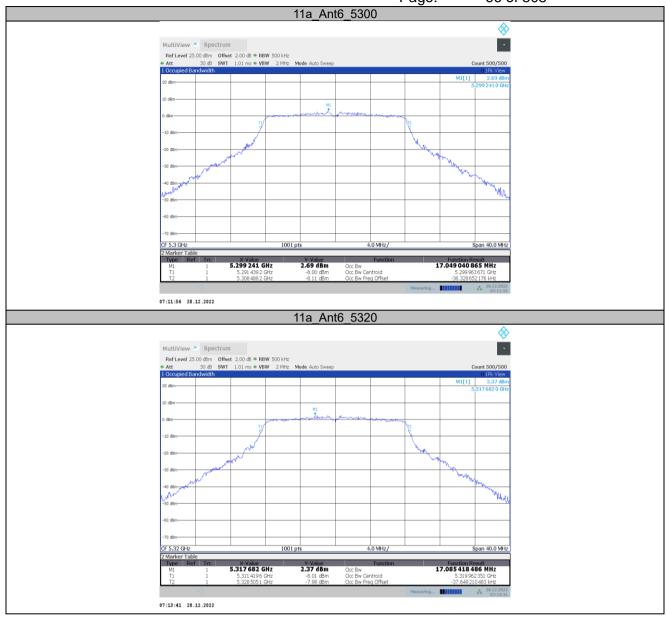
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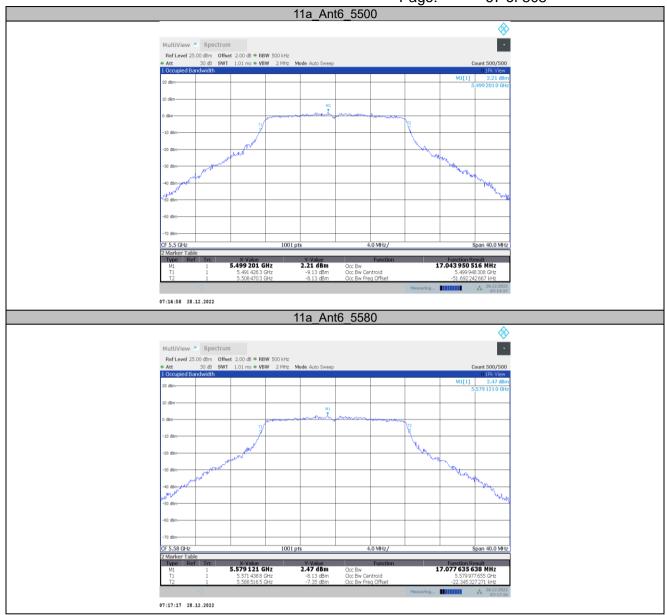
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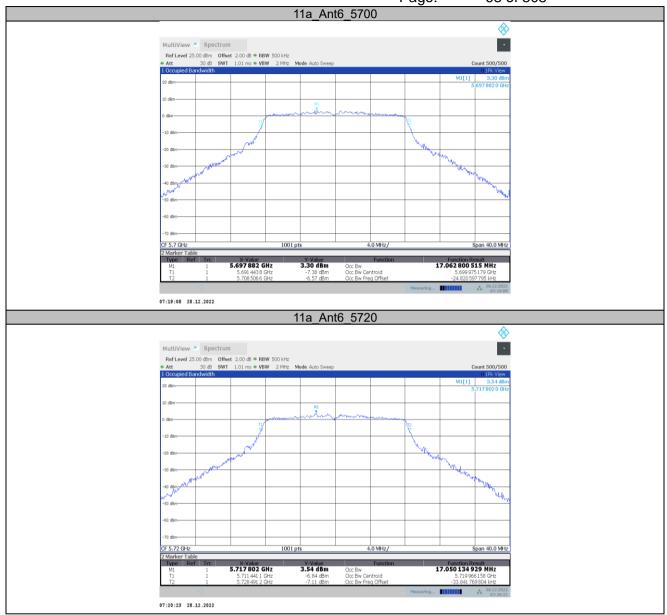
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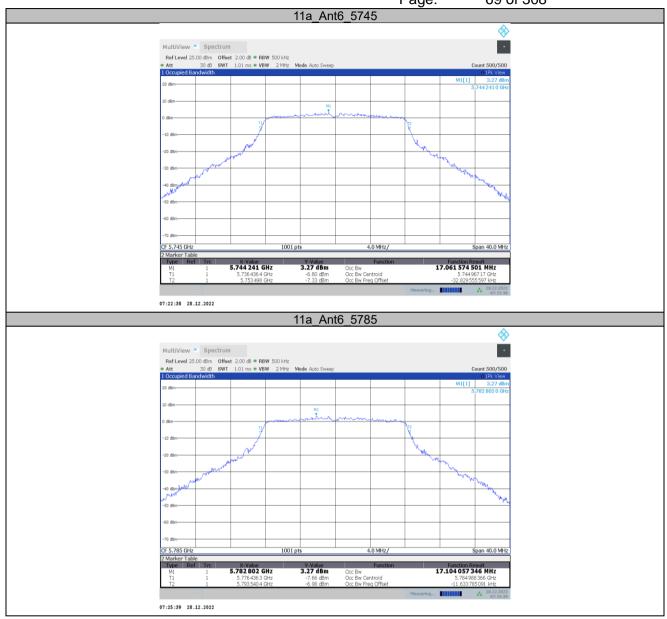
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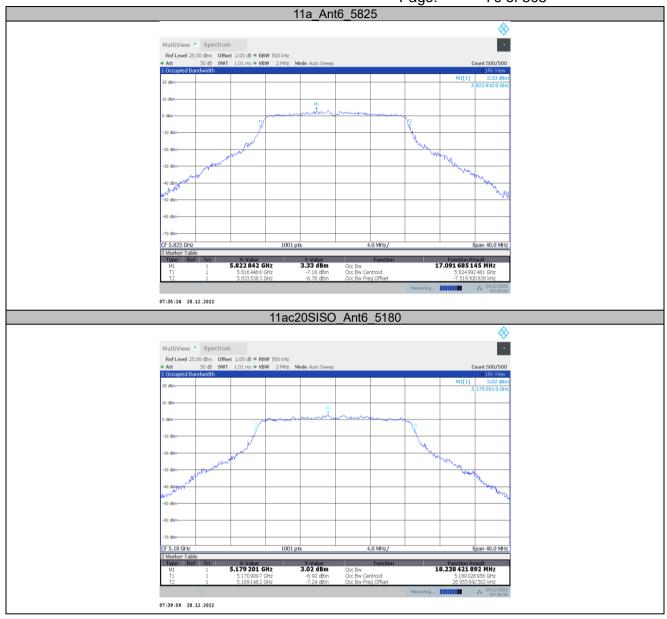
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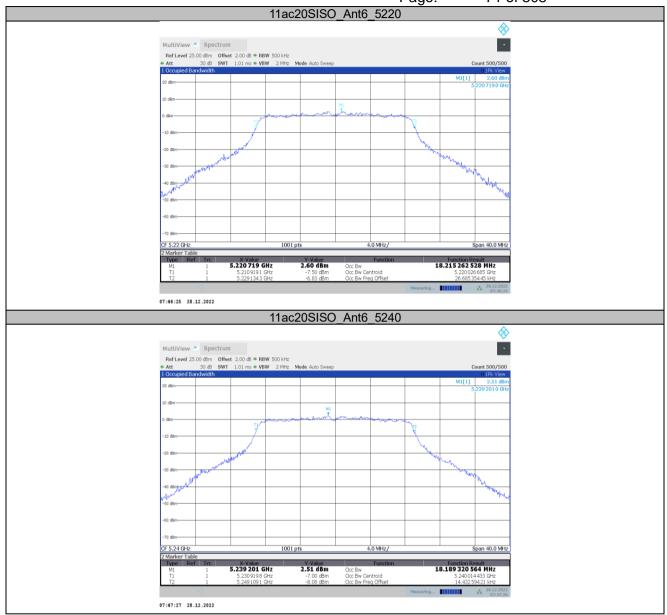
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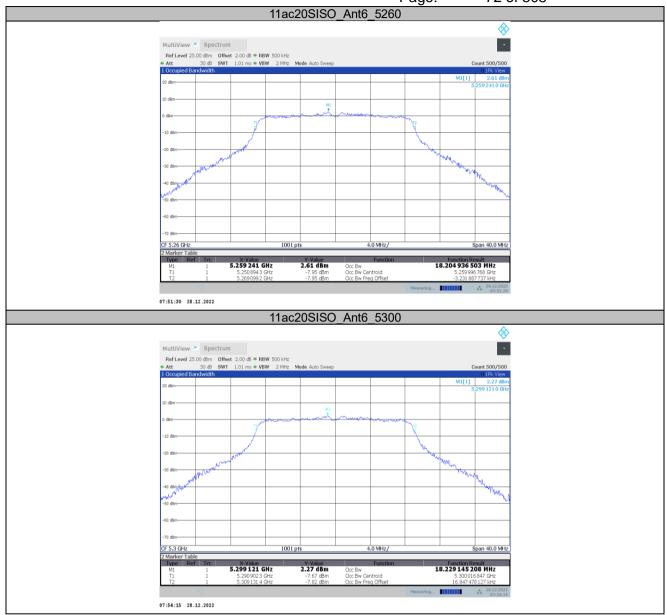
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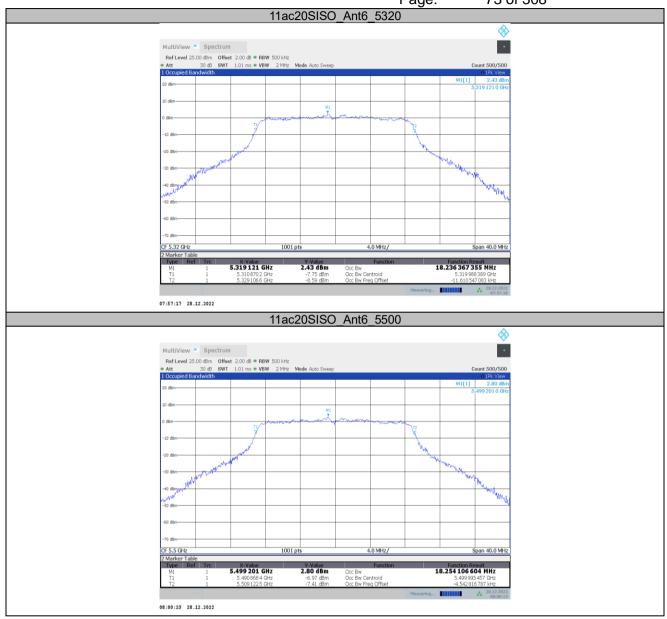
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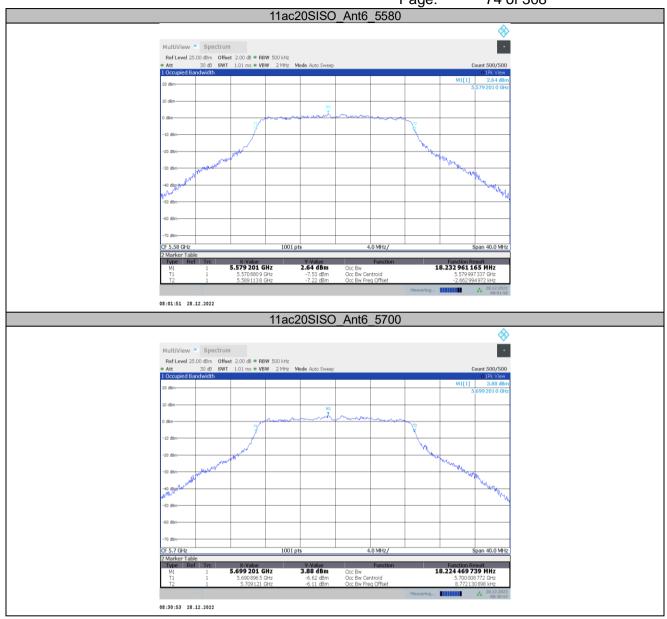
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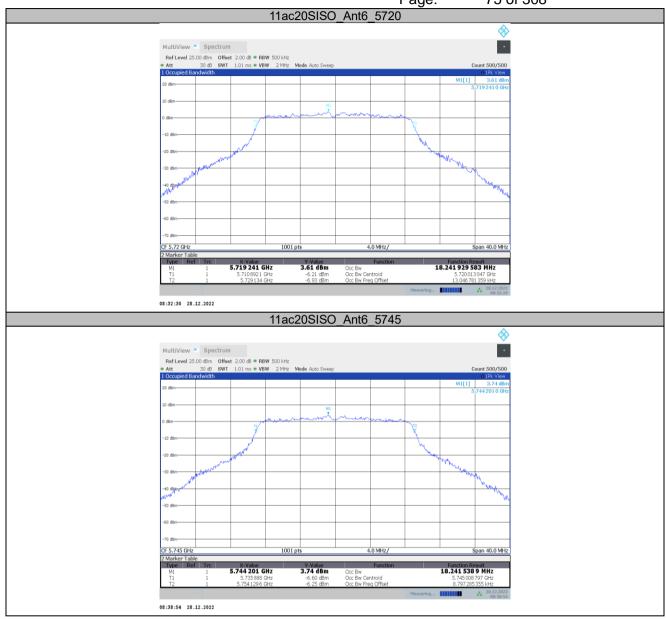
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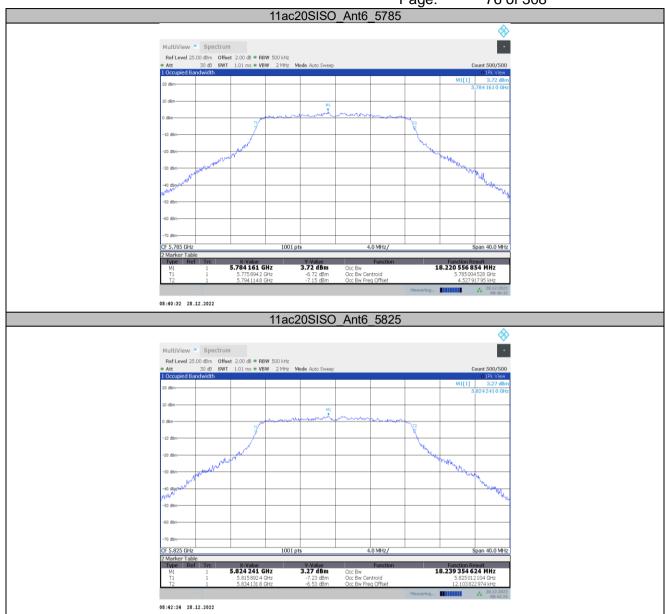
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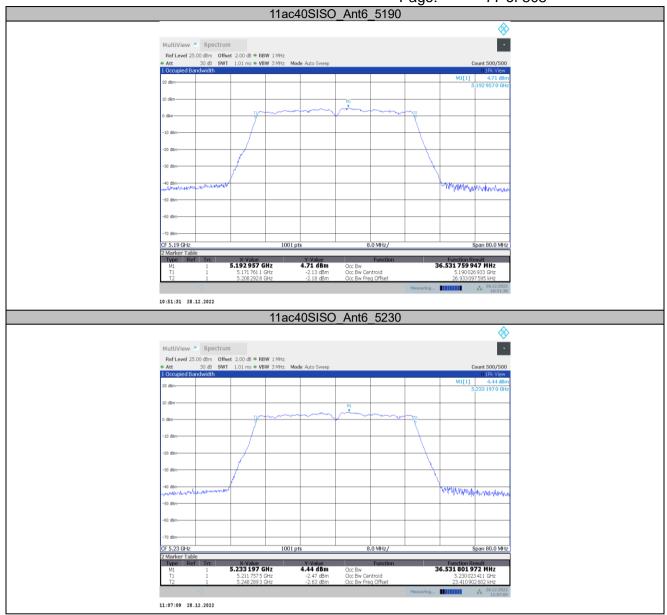
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