Report No.:
 SEWM2304000111RG05

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## **TEST REPORT**

Application No:	SEWM2304000111RG
Applicant:	Shenzhen Tinno Mobile Technology Corp.
Address of Applicant:	TINNO HQ Building, Tongfa South Road Nanshan District Shenzhen, Guangdong Province
Manufacturer:	Shenzhen Tinno Mobile Technology Corp.
Address of Manufacturer:	TINNO HQ Building, Tongfa South Road Nanshan District Shenzhen, Guangdong Province
EUT Description:	Smart Phone
Model No.:	U680AA, U680AC
FCC ID:	XD6U680AA
Standards:	FCC 47 CFR Part 2, Subpart J FCC 47 CFR Part 15, Subpart E
Date of Receipt:	2023/04/20
Date of Test:	2023/05/10 to 2023/06/06
Date of Issue:	2023/06/07
Test Result :	PASS *

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

Authorized Signature:

m

Panta Sun Wireless Laboratory Manager



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## 1 Version

		<b>Revision Record</b>		
Version	Chapter	Date	Modifier	Remark
01		2023/06/07		Original

Prepared By	(Tizzy Song) / Test Engineer
Checked By	(Well Wei) / Reviewer



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Z TESUS	2 Test 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 Emission Bandwidth	Band I Band II-A Band II-C	15.407(a)(1) 15.407(a)(2) 15.407(a)(2)	No limit.	Clause 4.5	For Report Purpose
6dB Emission Bandwidth	Band III	15.407(e)	≥ 500 kHz.	Clause 4.6	PASS
99% Occupied Bandwidth	Band I Band II-A Band II-C Band III	KDB 789033 D02§ D	No limit.	Clause 4.7	For Report Purpose
Duty Cycle	Band I Band II-A Band II-C Band III		No limit.	Clause 4.3	For Report Purpose
Maximum	Band I	15.407(a)(iv)	< 250mW		
Conducted Output Power	Band II-A Band II-C	15.407(a)(2)	<min{250mw,11dbm+10*lg(ebw)}< td=""><td>Clause 4.4</td><td rowspan="2">PASS</td></min{250mw,11dbm+10*lg(ebw)}<>	Clause 4.4	PASS
	Band III	15.407(a)(3)	< 1W		
Maximum	Band I	15.407(a)(iv)	<11dBm/MHz		PASS
Power Spectral Density	Band II-A Band II-C	15.407(a)(2)	<11dBm/MHz	Clause 4.8	
Benoity	Band III	15.407(a)(3)	<30dBm/500KHz		
	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. 5.15- 5.35 GHz). F≥1GHz & in-restricted: §15.209 limit (AV&PK).		PASS
Radiated Spurious Emissions	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. 5.25- 5.35 GHz). F≥1GHz & in-restricted: §15.209 limit (AV&PK).	Clause 4.9	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) 15.205/15.209	F<1GHz: §15.209 limit (QP) F≥1GHz &out-restricted:(PK)		PASS

## 2 Test Summary



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			Report No.: SEWM Rev.: 01	23040001	11RG05
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			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≥1GHz & 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
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					



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## **3** General Information

## 3.1 Details of Client

Applicant:	Shenzhen Tinno Mobile Technology Corp.
Address of Applicant:	TINNO HQ Building, Tongfa South Road Nanshan District Shenzhen, Guangdong Province
Manufacturer:	Shenzhen Tinno Mobile Technology Corp.
Address of Manufacturer:	TINNO HQ Building, Tongfa South Road Nanshan District Shenzhen, Guangdong Province

### 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, 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 accredited testing laboratory.

Designation Number: CN1312.

Test Firm Registration Number: 717327



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#### EUT Description: Smart Phone U680AA. U680AC Model No.: Hardware Version: V1.0 U680AAV01.02.10 Software Version: **RF** Conducted 861745060000385 IMEI: **RSE & AC power line** 861745060008388 802.11a: 20 MHz channel bandwidth 802.11n: 20 MHz / 40 MHz channel bandwidth WLAN Mode Supported: 802.11ac: 20 MHz / 40 MHz / 80 MHz channel bandwidth 5150MHz to 5250MHz 5250MHz to 5350MHz **Operation Frequency:** 5470MHz to 5725MHz 5725MHz to 5850MHz 802.11a: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) Modulation Type: 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) External, X Integrated Antenna Type: 5150MHz to 5250MHz: -2.1dBi(Ant2); 5250MHz to 5350MHz: -2.1dBi(Ant2); 5470MHz to 5725MHz: -2.1dBi(Ant2); Antenna Gain: 5725MHz to 5850MHz: -2.1dBi(Ant2); Note: The antenna gain are derived from the gain information report provided by the manufacturer. ⊠ siso 802.11a/n/ac CDD: 802.11a/n/ac: Tx & Rx STBC: 802.11n/ac: Tx & Rx Smart System: TXBF: 802.11n/ac: Tx & Rx Diversity 802.11a: Tx & Rx **TPC** Function: Support, Not Support Master **DFS** Function: Slave without radar detection Slave with radar detection 2.0dB **RF** Cable:

## 3.4 General Description of EUT



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#### 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	
	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)	
	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 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	101.0kPa Selected Values During Tests			
Relative Humidity	44-46 % RH Ambient			
Value	Temperature(°C)	Voltage(V)		
NTNV	22~23	3.70		
Remark: NV: Normal Voltage NT: Normal Temperature				

### 3.6 Description of Support Units

Description	Manufacturer	Model No.
Router	ASUS	GT-AXE11000 (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 Integrated Antenna and no consideration of replacement.

The best case gain of the antenna is

5150MHz to 5250MHz: -2.1dBi(Ant2);\*

5250MHz to 5350MHz: -2.1dBi(Ant2);\*

5470MHz to 5725MHz: -2.1dBi(Ant2);\*

5725MHz to 5850MHz: -2.1dBi(Ant2);\*

\*Note:

The antenna gain are derived from the gain information report provided by the manufacturer. Remark:

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.



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#### Test Requirement: 47 CFR Part 15 Section 15.207 Test Method: ANSI C63.10-2020 Section 6.2 Test Frequency Range: 150kHz to 30MHz RBW = 9kHz, VBW = 30kHz **Receiver Setup:** Limit: Limit (dBuV) Frequency range (MHz) Quasi-peak Average 66 to 56\* 0.15-0.5 56 to 46\* 0.5-5 46 56 5-30 60 50 \* Decreases with the logarithm of the frequency. Test Procedure: 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 $50\Omega/50\mu$ 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 C63.10-2020 on conducted measurement.

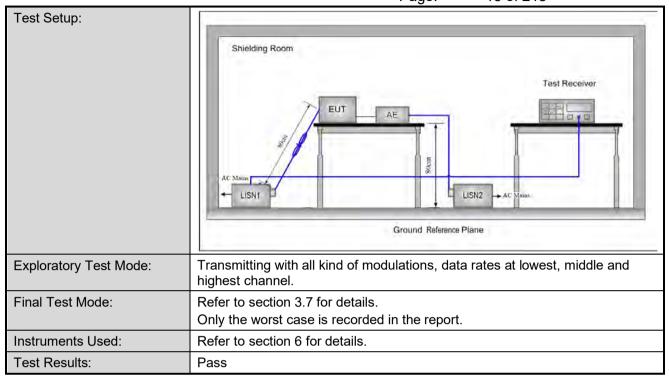
### 4.2 AC Power Line Conducted Emissions



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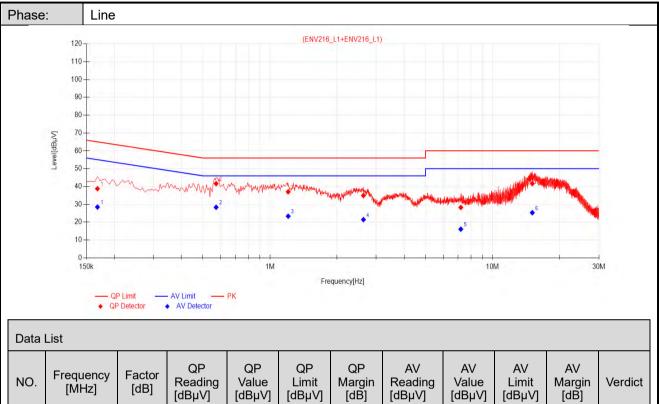
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#### Measurement Data

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.



NO.	[MHz]	[dB]	[dBµV]	[dBµV]	[dBµV]	[dB]	[dBµV]	[dBµV]	[dBµV]	[dB]	Verdict
1	0.1680	11.77	27.01	38.78	65.06	26.28	16.72	28.49	55.06	26.57	PASS
2	0.5730	11.62	30.01	41.63	56.00	14.37	16.75	28.37	46.00	17.63	PASS
3	1.2075	11.73	25.31	37.04	56.00	18.96	11.62	23.35	46.00	22.65	PASS
4	2.6295	11.73	23.23	34.96	56.00	21.04	9.72	21.45	46.00	24.55	PASS
5	7.1970	11.89	16.38	28.27	60.00	31.73	4.20	16.09	50.00	33.91	PASS
6	15.0720	11.93	29.72	41.65	60.00	18.35	13.39	25.32	50.00	24.68	PASS
Remai	rk.										

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]



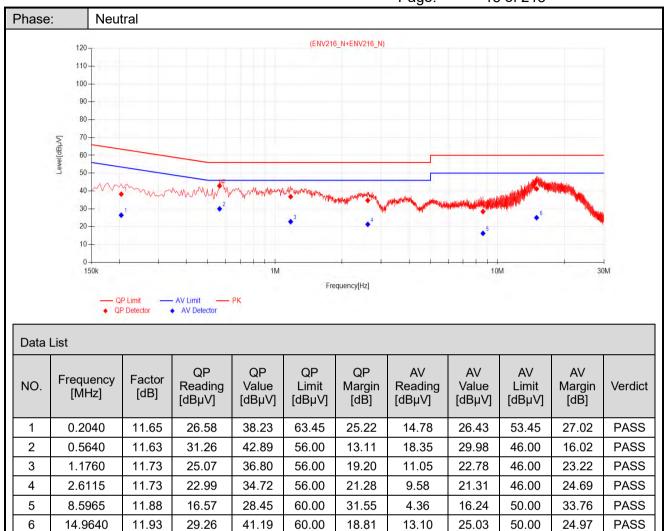
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Remark:

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[dBµV] – Value[dBµV]



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## 4.3 Duty Cycle

The detailed test data see: Appendix



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Test Requirement:	47 CFR Part 15 Se	ection 15.407(a)(iv)			
Test Method:	ANSI C63.10-2020 Section 12.4.3.2				
Test Setup:		Power probe			
	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 provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power co level. Because the measurement is made only during the ON time of transmitter, no duty cycle correction factor is required.				
Test Instruments:	Refer to section 6 f	for details.			
Exploratory Test Mode:	Transmitting with a	ll 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	dB emission bandwidth in MHz			
Test Results:	Pass				
The detailed test data see: A	Appendix				

### 4.4 Conducted Output Power



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#### **Test Requirement:** 47 CFR Part 15 Section 15.407(a), KDB 789033 D02& C Test Method: ANSI C63.10-2020 Section 12.5.2 Test Setup: SGS Test system 0 PC 0 Tester 0 és: E.U.T DC Powe 00000 Ground Reference Plane 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. No restriction limits Limit: **Test Results:** Pass The detailed test data see: Appendix

### 4.5 26dB Emission Bandwidth



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#### **Test Requirement:** 47 CFR Part 15 Section 15.407(e) Test Method: ANSI C63.10-2020 Section 12.5.1 Test Setup: SGS Test system 0 PC 0 Tester 0 és: E.U.T DC Powe 00000 Ground Reference Plane **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. Frequency Band Limit Limit: 5725-5850MHz At lease 500kHz **Test Results:** Pass The detailed test data see: Appendix

### 4.6 6dB Emission Bandwidth



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## 4.7 99% Occupied Bandwidth

Test Requirement:	KDB 789033 D02§ D			
Test Method:	ANSI C63.10-2020 Section 12.5.3			
Test Setup:	PC       Image: Sector Se			
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	Appendix			



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Test Requirement:	47 CFR Part 15 Sec	47 CFR Part 15 Section 15.407(a)(iv)			
Test Method:	ANSI C63.10-2020 Section 12.6				
	KDB 789033 D02 v	02r01, Section F.			
Test Setup:	P	SGS       Test system         Spectrum Analyzer       IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII			
Instruments Used:	Refer to section 6 for details.				
Exploratory Test Mode:	Transmitting with al	l 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:	Appendix				

### 4.8 Power Spectral Density



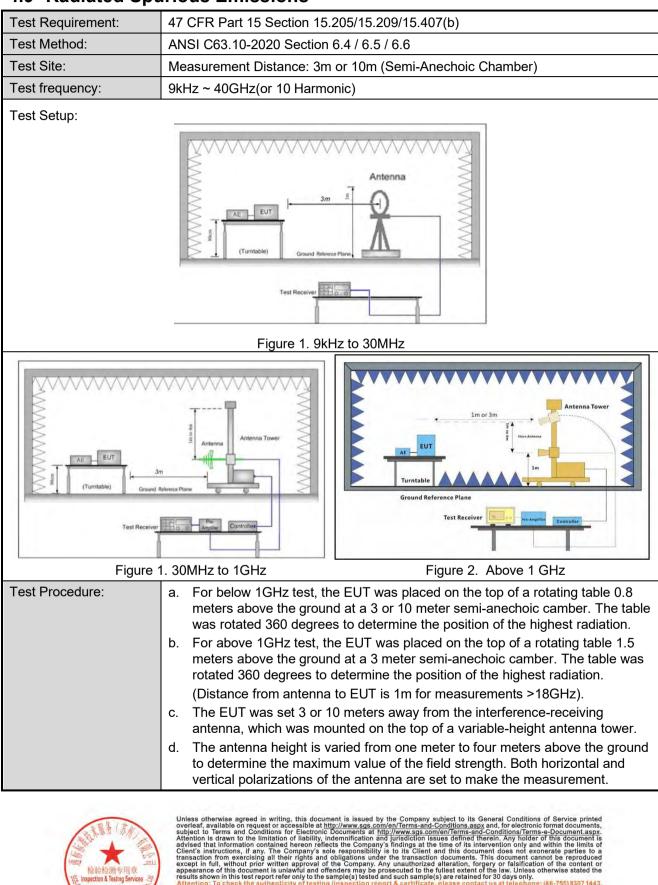
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### 4.9 Radiated Spurious Emissions

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	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.				
	<ul> <li>f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> </ul>				
	g. Test the EUT in the outermost channels.				
	<ul> <li>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.</li> </ul>				
	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:	Measurements below 30MHz				
	• RBW = 10 kHz				
	• VBW = 30 kHz				
	Detector = Peak & Average & Quasi-peak				
	Trace mode = max hold				
	Measurements Below 1000MHz				
	• RBW = 120 kHz				
	<ul> <li>VBW = 300 kHz</li> <li>Detector = Quasi-peak</li> </ul>				
	<ul> <li>Trace mode = max hold</li> </ul>				
	Peak Measurements Above 1000 MHz				
	• RBW = 1 MHz				
	• VBW $\geq$ 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>				
	• VBW $\geq$ 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.				
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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### 4.10 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15 Section 15.205/15.209/15.407(b)					
Test Method:	ANSI C63.10-2020 Section 12.7					
Test Site:	Measurement Distance: 3m	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			
	Above IGHZ	74.0	Peak Value			

#### Test Setup:

SG

Test Setup.	
	Antenna Tower Im or 3m Im or 3m I
Test Procedure:	<ul> <li>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.</li> <li>b. The EUT was set 3 meters away from the interference-receiving antenna,</li> </ul>
	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
	g. Test the EUT in the outermost channels.
	h. The radiation measurements are performed in X, Y, Z axis positioning for



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

### 4.11.1 DFS Overview

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

Requirement	<b>Operational Mode</b>			
	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	Client Without				
	with Radar Detection	<b>Radar Detection</b>				
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	Master Device or Client with	<b>Client Without Radar</b>				
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 perfe	ormance check (Section 7.8.4) sho	uld include several				
frequencies within the radar detection	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

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

Maximum Transmit Power	Value				
	(See Notes 1, 2, and 3)				
$EIRP \ge 200 milliwatt$	-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					
<b>Note 1:</b> 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

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Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
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	$\operatorname{Roundup} \left\{ \begin{pmatrix} \frac{1}{360} \end{pmatrix}, \\ \begin{pmatrix} \frac{19 \cdot 10^{6}}{\operatorname{PRI}_{\mu \operatorname{sec}}} \end{pmatrix} \right\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 µsec, 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
goregate	(Radar Types 1-	4)		80%	120



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Pulse Repetition Frequency Number	a - Pulse Repetition Intervals Valu Pulse Repetition Frequency (Pulses Per Second)	Pulse Repetition Interval (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 Detections	Minimum Percentage 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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		1 80	ie o – Lon	g Puise Kaa	ar lest wav	elorm	
Radar	Pulse	Chirp	PRI	Number	Number	Minimum	Minimum
Туре	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 6 – Long Pulse Radar Test Waveform

Table 7 – Frequency	Hopping	Radar Test	Waveform
---------------------	---------	------------	----------

Radar	Pulse	PRI	Pulses	Hopping	Hopping	Minimum	Minimum
Type	Width	(µsec)	per	Rate	Sequence	Percentage of	Number of
	(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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#### Measurement Uncertainty (95% confidence levels, k=2) 5

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		± 3.13dB (9k to 30MHz)
	Radiated Emission	± 4.88dB (30M to 1GHz)
		± 4.75dB (1GHz to 18GHz)
		± 4.77dB (Above 18GHz)

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The Ulab (lab Uncertainty) is less than Ucispr/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 Analyzar	ROHDE&	FSV3030	SUWI-01-02-02	2022/05/17	2023/05/16	
Signal Analyzer	SCHWARZ	F3V3030	3000-01-02-02	2023/05/11	2024/05/10	
Measurement Software	Tonscend	JS1120-3 Test System V3.1.55	SUWI-02-09-09	NCR	NCR	
Signal Analyzar	ROHDE& SCHWARZ	FSW43	SUWI-01-02-04	2022/05/28	2023/05/27	
Signal Analyzer				2023/05/11	2024/05/10	
Wideband Radio Communication Tester	ROHDE& SCHWARZ	CMW500	SUWI-01-16-05	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	2022/11/23	2023/11/22	
Pulse power sensor	Anritsu	MA2411B	SUWI-01-32-01	2022/11/23	2023/11/22	
MXG Vector signal genitor	KEYSIGHT	N5182B	SUWI-01-38-01	2023/02/06	2024/02/05	
Temperature Chamber	ESPEC	SU-242	SUWI-01-13-01	2023/02/06	2024/02/05	
Signal Generator	ROHDE&SCHWARZ	SMM100A	SN:101716	2023/02/22	2024/02/21	

Conduction Test Equipment						
Test Equipment	Manufacturer	facturer 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	
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	



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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-04-02-02	2021/11/25	2024/11/24	
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-13	2023/02/07	2024/02/06	
Signal	ROHDE&SCHWARZ	501440		2022/05/28	2023/05/27	
Analyzer	RUNDEQSCHWARZ	FSW43	SUWI-01-02-04	2023/05/11	2024/05/10	
Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-06	2022/11/23	2023/11/22	
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2023/02/08	2024/02/07	
Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	VULB 9168	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	SCHWRZBECK MESS-ELEKTRONIK	BBHA 9170	SUWI-01-11-03	2021/05/14	2023/05/13	
antenna				2023/05/12	2024/05/11	
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	Ant2	5180	26.12	5167.76	5193.88	
11a	Ant2	5220	24.20	5208.68	5232.88	
11a	Ant2	5240	27.00	5226.52	5253.52	
11a	Ant2	5260	26.52	5247.88	5274.40	
11a	Ant2	5300	25.44	5288.16	5313.60	
11a	Ant2	5320	26.72	5306.44	5333.16	
11a	Ant2	5500	27.32	5486.76	5514.08	
11a	Ant2	5580	25.56	5566.68	5592.24	
11a	Ant2	5700	26.56	5686.88	5713.44	
11a	Ant2	5745	23.04	5733.08	5756.12	
11a	Ant2	5785	24.36	5773.96	5798.32	
11a	Ant2	5825	24.84	5813.80	5838.64	
11ac20SISO	Ant2	5180	27.20	5168.44	5195.64	
11ac20SISO	Ant2	5220	26.04	5207.20	5233.24	
11ac20SISO	Ant2	5240	29.80	5225.32	5255.12	
11ac20SISO	Ant2	5260	26.04	5245.24	5271.28	
11ac20SISO	Ant2	5300	27.28	5287.28	5314.56	
11ac20SISO	Ant2	5320	26.80	5307.60	5334.40	For
11ac20SISO	Ant2	5500	25.92	5487.72	5513.64	Report
11ac20SISO	Ant2	5580	28.20	5564.56	5592.76	Purpose
11ac20SISO	Ant2	5700	25.36	5687.00	5712.36	
11ac20SISO	Ant2	5745	29.56	5730.36	5759.92	
11ac20SISO	Ant2	5785	27.32	5771.24	5798.56	
11ac20SISO	Ant2	5825	31.20	5809.88	5841.08	
11ac40SISO	Ant2	5190	41.68	5169.92	5211.60	
11ac40SISO	Ant2	5230	43.76	5209.36	5253.12	
11ac40SISO	Ant2	5270	49.52	5247.60	5297.12	
11ac40SISO	Ant2	5310	49.92	5285.20	5335.12	
11ac40SISO	Ant2	5510	46.48	5489.12	5535.60	
11ac40SISO	Ant2	5550	43.92	5529.76	5573.68	
11ac40SISO	Ant2	5670	47.04	5645.68	5692.72	
11ac40SISO	Ant2	5755	42.16	5733.40	5775.56	]
11ac40SISO	Ant2	5795	48.40	5773.40	5821.80	
11ac80SISO	Ant2	5210	91.52	5169.52	5261.04	]
11ac80SISO	Ant2	5290	91.36	5249.68	5341.04	]
11ac80SISO	Ant2	5530	80.80	5489.52	5570.32	]
11ac80SISO	Ant2	5775	94.24	5733.56	5827.80	

#### 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.



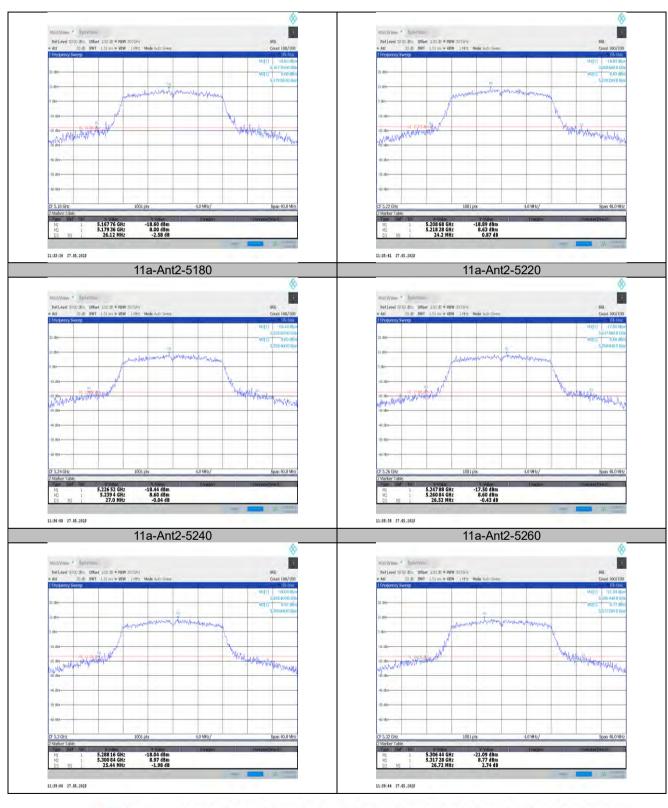
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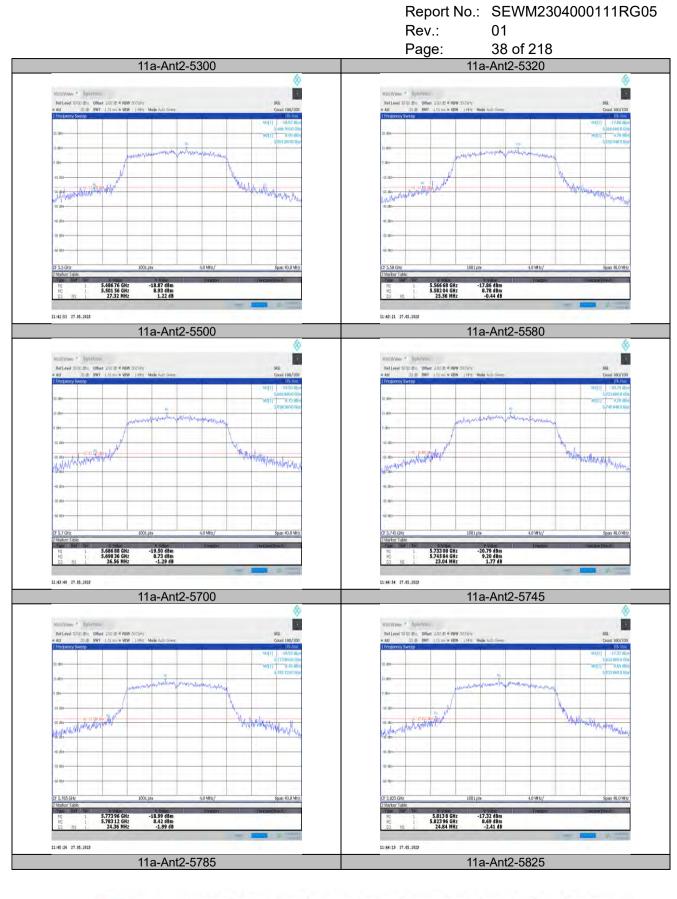


### **Test Graphs**



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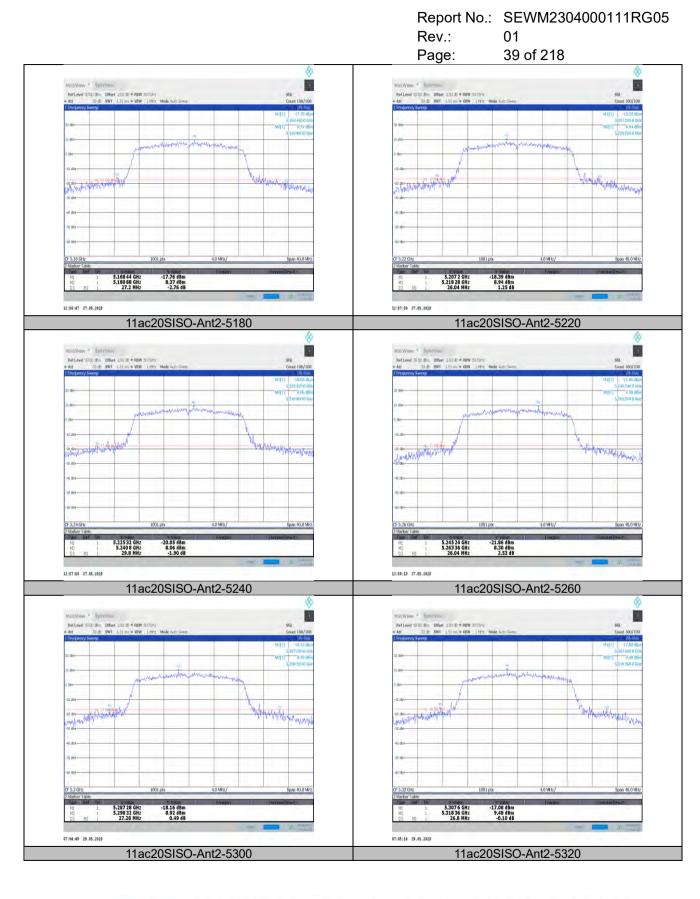
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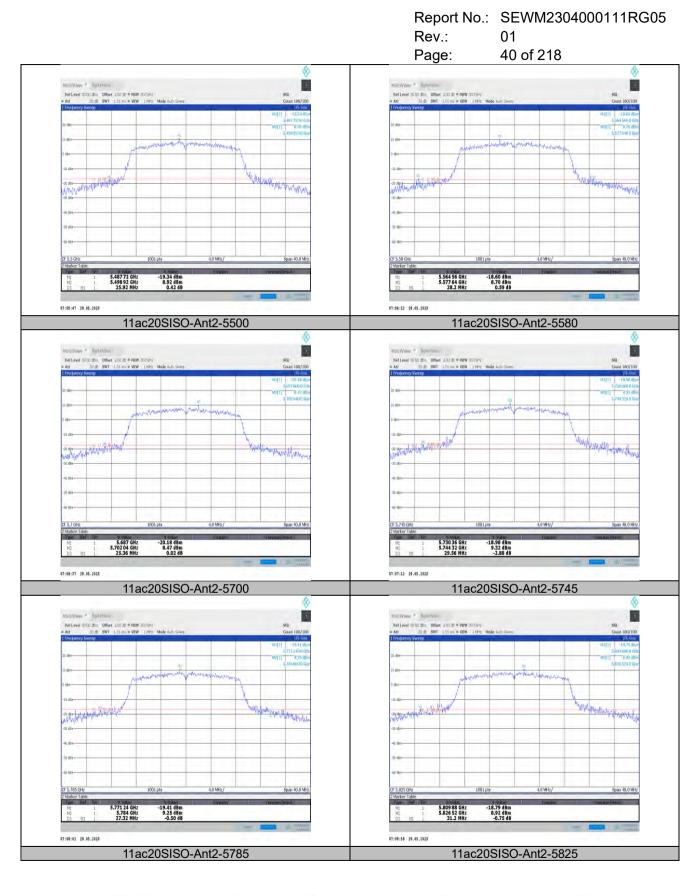
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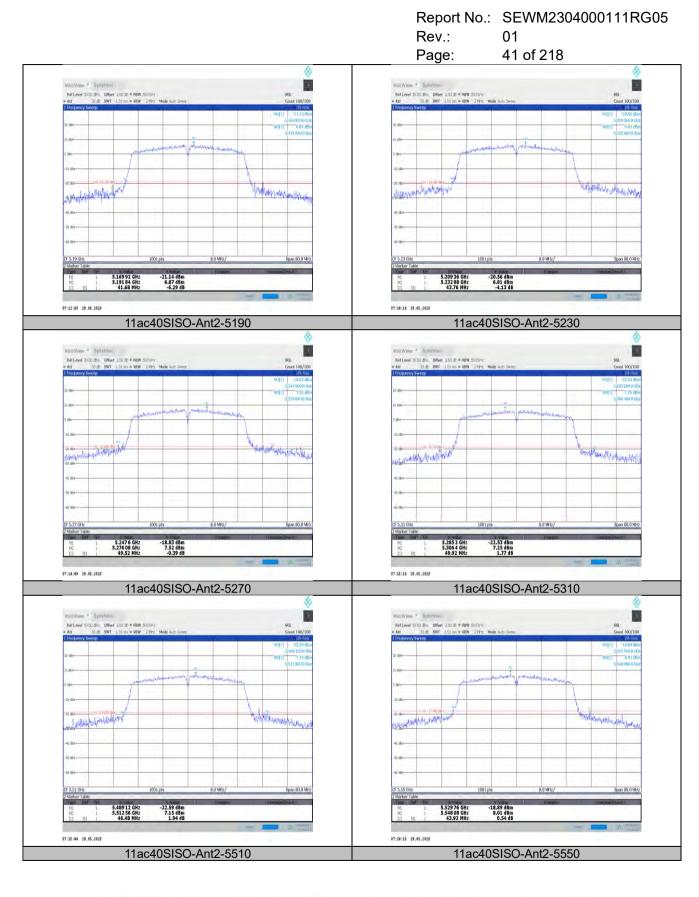
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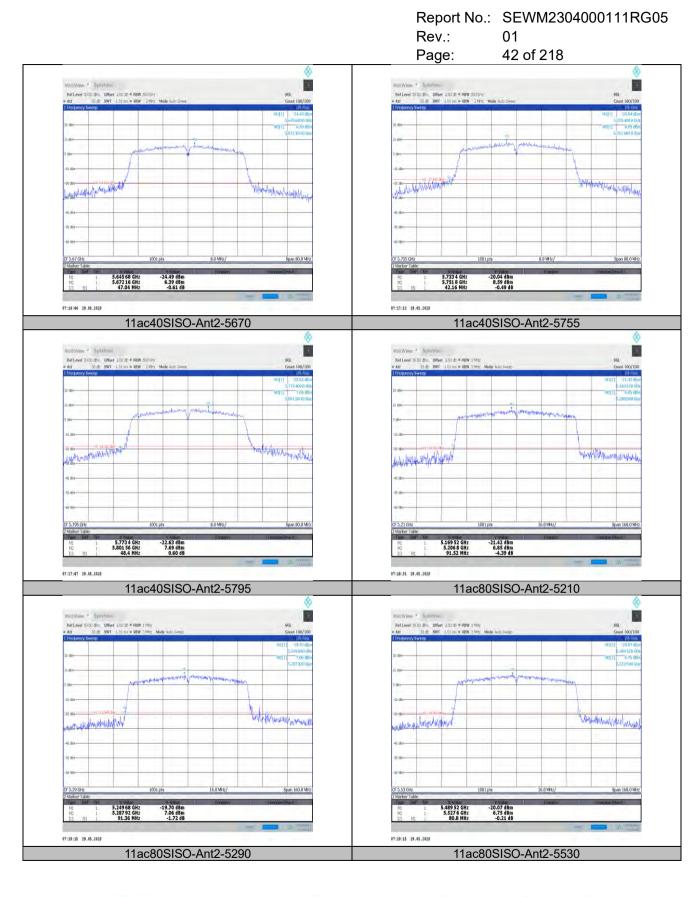
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### Occupied channel bandwidth

### **Test Result**

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
11a	Ant2	5180	17.246	5171.3894	5188.6354	
11a	Ant2	5220	17.245	5211.4312	5228.6762	
11a	Ant2	5240	17.356	5231.3521	5248.7084	
11a	Ant2	5260	17.32	5251.3565	5268.6761	
11a	Ant2	5300	17.372	5291.3466	5308.7183	
11a	Ant2	5320	17.313	5311.3562	5328.6691	
11a	Ant2	5500	17.332	5491.3279	5508.6595	
11a	Ant2	5580	17.28	5571.3428	5588.6225	
11a	Ant2	5700	17.285	5691.3396	5708.6246	
11a	Ant2	5745	17.197	5736.3577	5753.5548	
11a	Ant2	5785	17.086	5776.4240	5793.5100	
11a	Ant2	5825	17.149	5816.4261	5833.5751	
11ac20SISO	Ant2	5180	18.118	5170.9228	5189.0412	
11ac20SISO	Ant2	5220	18.136	5210.9275	5229.0639	
11ac20SISO	Ant2	5240	18.274	5230.8331	5249.1071	
11ac20SISO	Ant2	5260	18.098	5250.9521	5269.0503	
11ac20SISO	Ant2	5300	18.133	5290.9595	5309.0922	
11ac20SISO	Ant2	5320	18.196	5310.9249	5329.1209	For
11ac20SISO	Ant2	5500	18.135	5490.8990	5509.0344	Report
11ac20SISO	Ant2	5580	18.154	5570.8970	5589.0508	Purpose
11ac20SISO	Ant2	5700	18.166	5690.9202	5709.0859	
11ac20SISO	Ant2	5745	18.217	5735.8895	5754.1067	
11ac20SISO	Ant2	5785	18.179	5775.9507	5794.1293	
11ac20SISO	Ant2	5825	18.266	5815.9124	5834.1780	
11ac40SISO	Ant2	5190	36.336	5171.8344	5208.1709	
11ac40SISO	Ant2	5230	36.333	5211.8779	5248.2106	
11ac40SISO	Ant2	5270	36.449	5251.8443	5288.2936	
11ac40SISO	Ant2	5310	36.36	5291.9014	5328.2619	
11ac40SISO	Ant2	5510	36.374	5491.8359	5528.2096	
11ac40SISO	Ant2	5550	36.346	5531.8086	5568.1546	
11ac40SISO	Ant2	5670	36.265	5651.8333	5688.0982	
11ac40SISO	Ant2	5755	36.451	5736.8151	5773.2663	
11ac40SISO	Ant2	5795	36.354	5776.9347	5813.2889	
11ac80SISO	Ant2	5210	75.775	5172.2523	5248.0277	
11ac80SISO	Ant2	5290	75.566	5252.4019	5327.9684	
11ac80SISO	Ant2	5530	75.697	5492.2088	5567.9056	
11ac80SISO	Ant2	5775	76.06	5737.1159	5813.1762	

### 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.



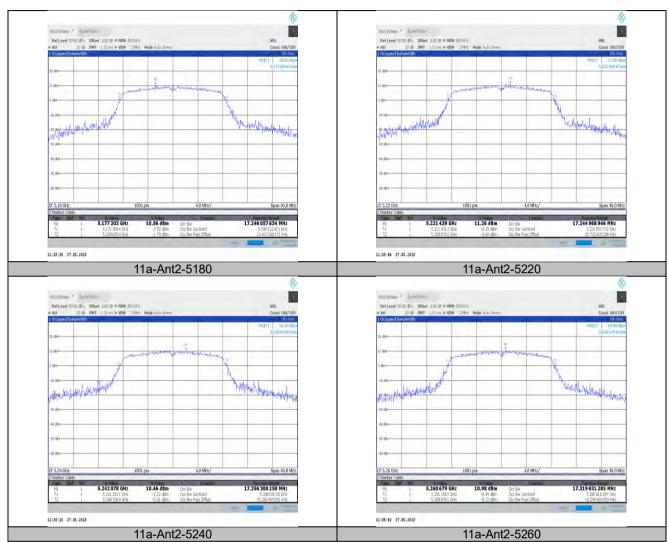
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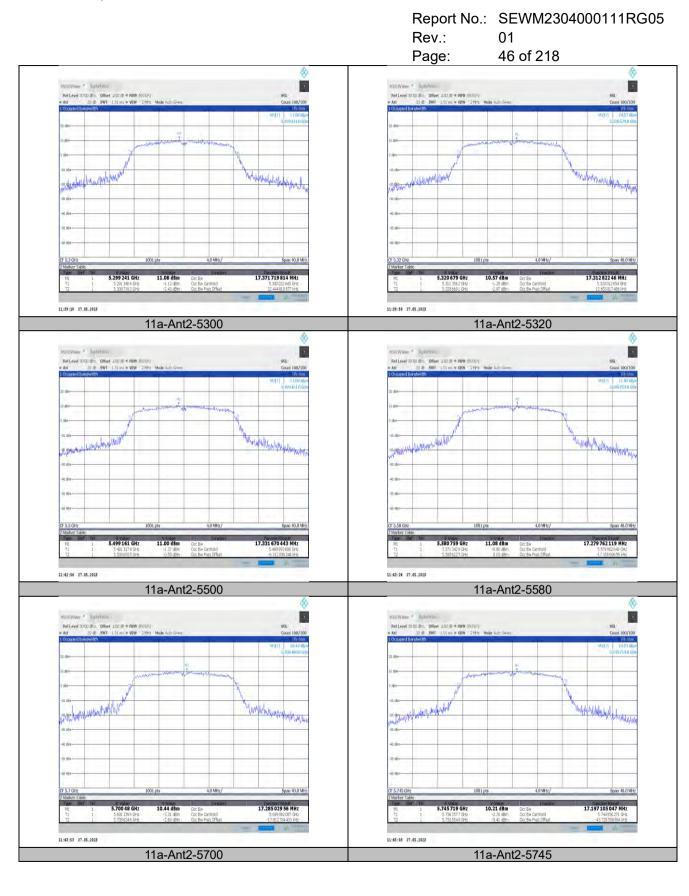
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### **Test Graphs**





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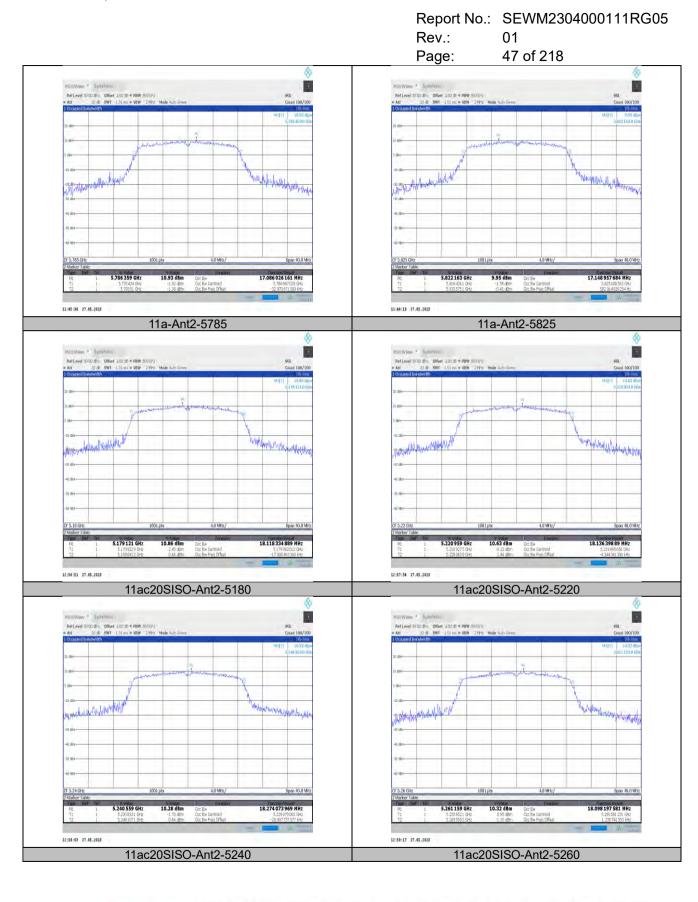
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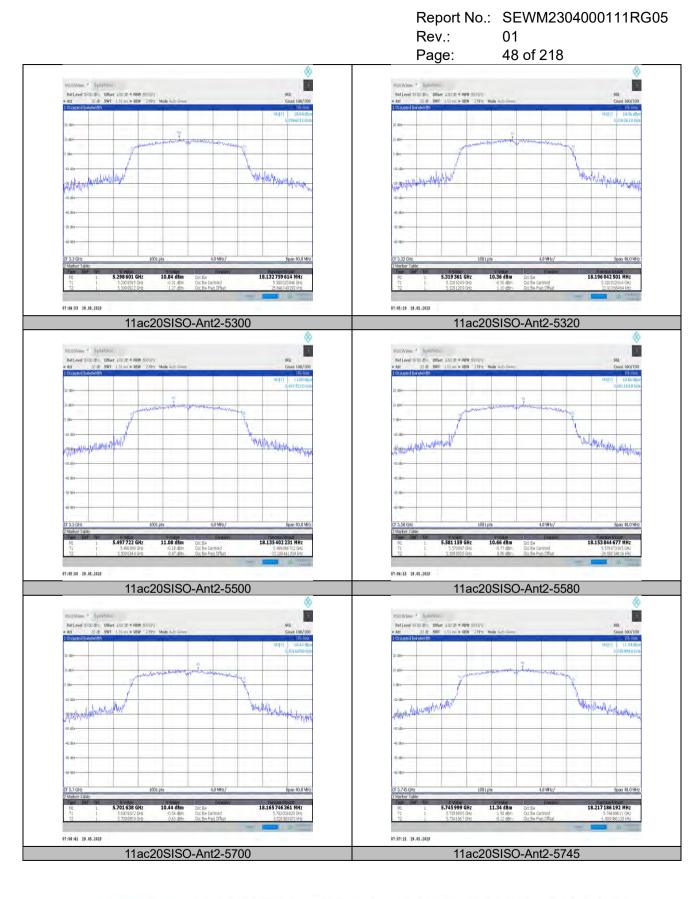


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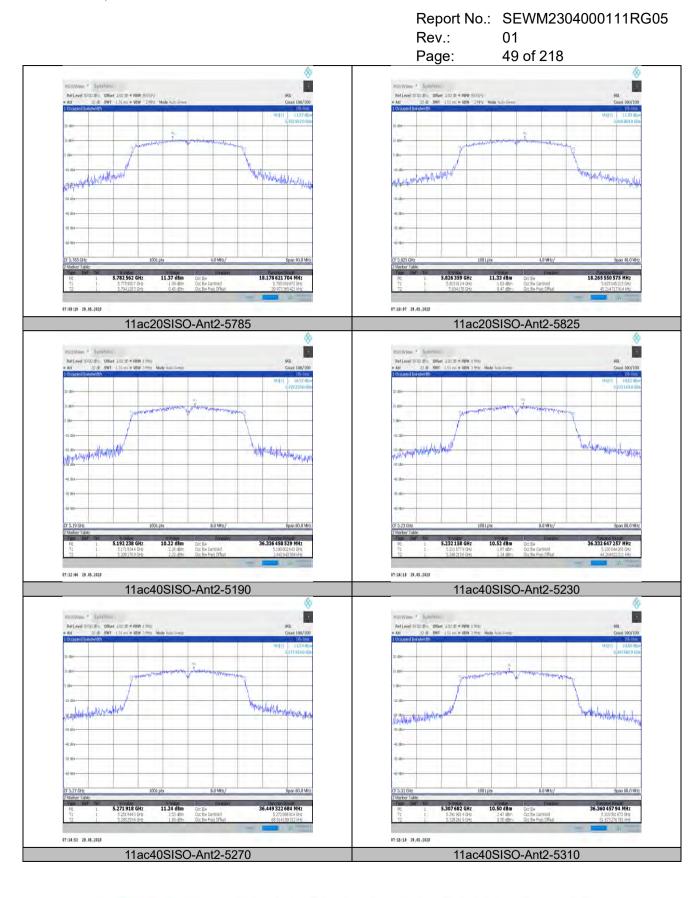
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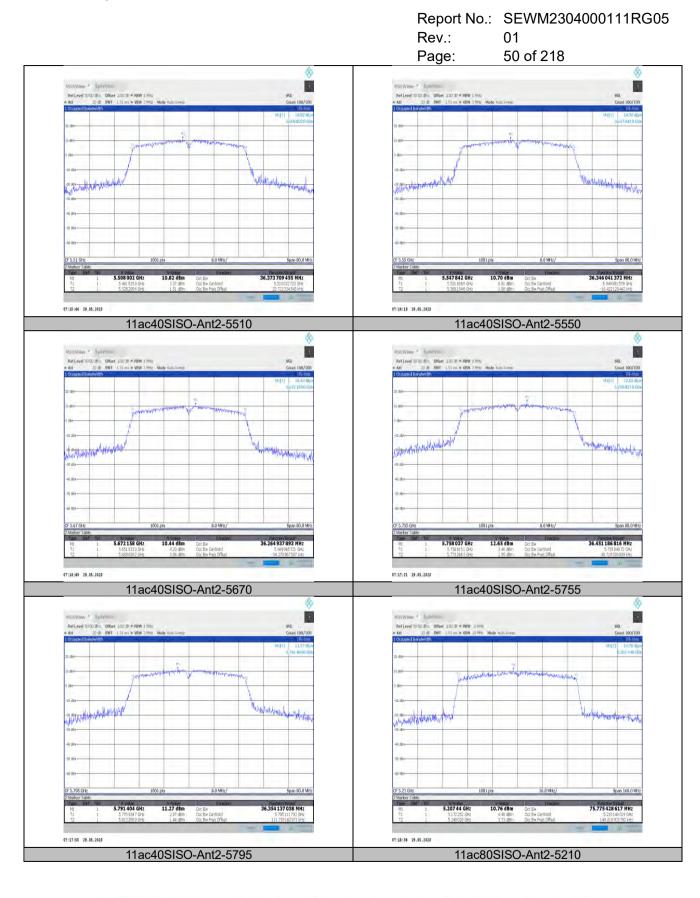


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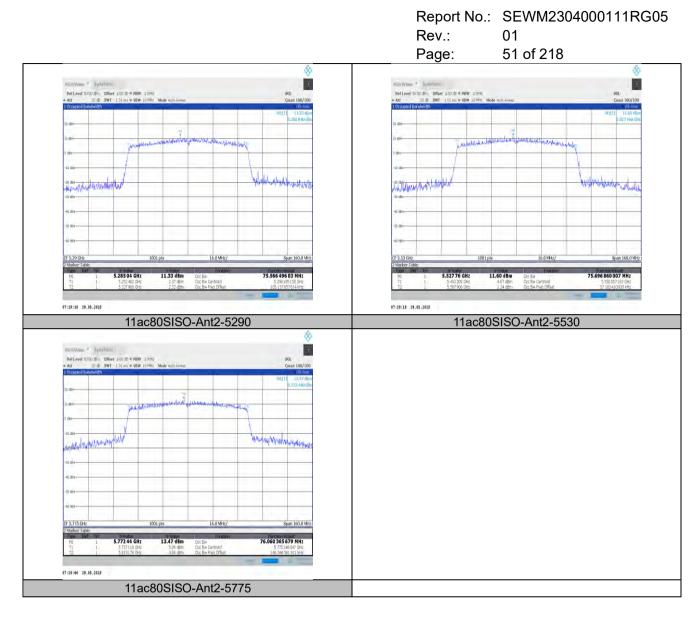
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### 6dB emission bandwidth

### **Test Result B4**

TestMode	Antenna	Frequency[MHz]	6dB EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11a	Ant2	5745	16.44	5736.76	5753.20	≥0.5	PASS
11a	Ant2	5785	16.44	5776.76	5793.20	≥0.5	PASS
11a	Ant2	5825	16.44	5816.76	5833.20	≥0.5	PASS
11ac20SISO	Ant2	5745	17.64	5736.16	5753.80	≥0.5	PASS
11ac20SISO	Ant2	5785	17.64	5776.16	5793.80	≥0.5	PASS
11ac20SISO	Ant2	5825	17.64	5816.16	5833.80	≥0.5	PASS
11ac40SISO	Ant2	5755	36.48	5736.76	5773.24	≥0.5	PASS
11ac40SISO	Ant2	5795	36.16	5777.08	5813.24	≥0.5	PASS
11ac80SISO	Ant2	5775	76.64	5736.76	5813.40	≥0.5	PASS

### 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.



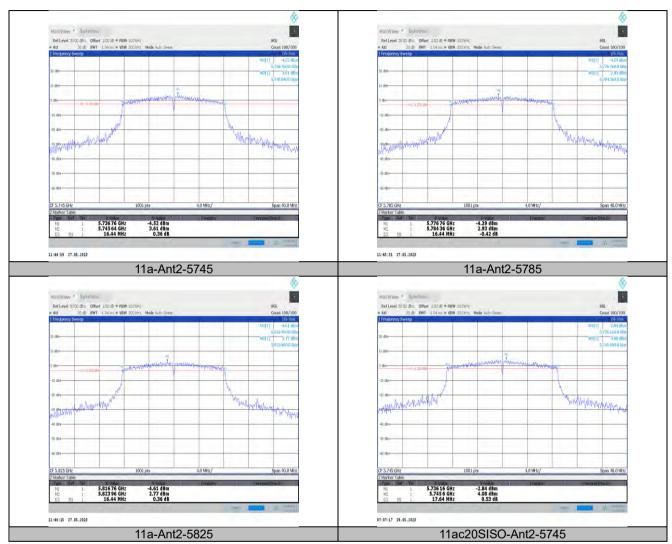
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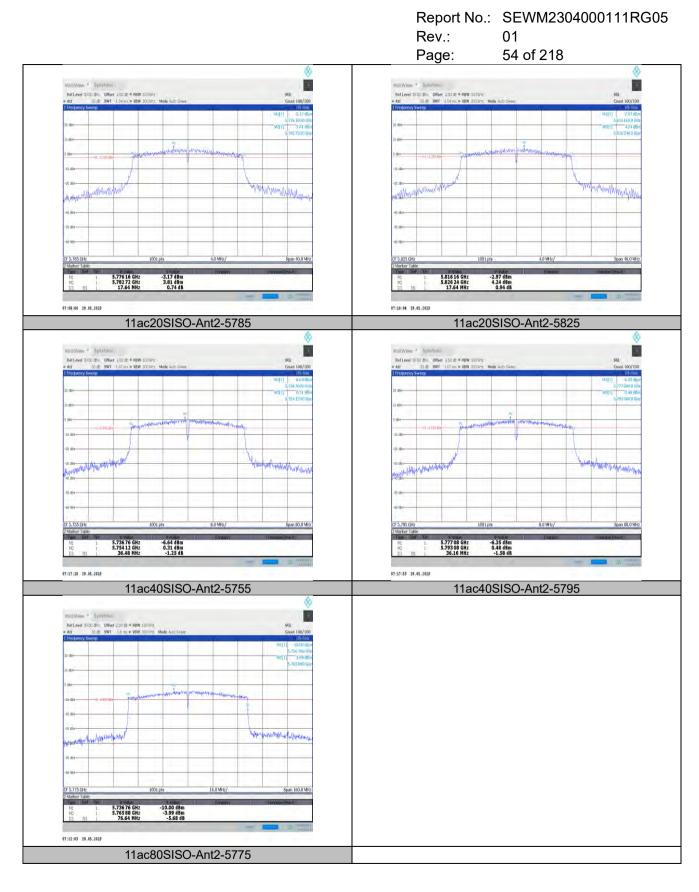
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### **Test Graphs B4**







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### **Duty Cycle**

Test Result

TestMode	Antenna	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle* [%]
11a	Ant2	5180	30.00	30.00	100.00
11n20SISO	Ant2	5180	30.00	30.00	100.00
11n40SISO	Ant2	5190	30.00	30.00	100.00
11ac20SISO	Ant2	5180	30.00	30.00	100.00
11ac40SISO	Ant2	5190	30.00	30.00	100.00
11ac80SISO	Ant2	5210	30.00	30.00	100.00

Note:

Radiated Emission Average VBW Setting: \*Duty cycle > 98% VBW setting=10Hz



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#### . . Ref Level #700 db Dilvet 200 db RBW 10166 Att 30 db SWT 30 ms VBW 10166 Ref Level 10 00 20 Dilver 2 00 d5 \* R8W 30 Mer. • Att 30 d5 • SWT 30 ms • VBW 10 Mer. SGL Count 1/1 SGL W. r.h. Ale MALA Allow Marshall a second in the interspect which an adapted to a particular particular properties and a second at the second at :En-120 an. an Brii vin-CF 5.18 GHz CF 5.18 GHz 1001 pt 1001 pts 3.0 ms 17:30:48 22.05.2023 17:31:16 22.05.2023 NTNV-11a-Ant2-5180 NTNV-11n20SISO-Ant2-5180 \$ Wine . Auto Mattrivine . Au 1 Rel Level = 700 2 Diffuet 200 2 = RBW 10 Mer. = Att \_\_\_\_\_\_30 2 = SWT \_\_\_\_\_\_30 ms = VBW 10 Mer. Ref Level #700 db Offwet 200 db RBW 101442 • Att 30 db SWT Sims = VBW 101442 SGL Count 1/1 1/1 10 within with the state of Al and have 1 July neen bleeder and and del Margal Augh in the same MAN Inen I IEn-TET CF 5.19 GHz CF 5.18 GHz 1001 pt 1001 pts 3.0 ms 17:31:43 22.05.2023 17:32:22 22.05.2023 NTNV-11n40SISO-Ant2-5190 NTNV-11ac20SISO-Ant2-5180

### **Test Graphs**



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NTNV-11ac40SISO-Ant	2-5100		c80SISO-Ant2-5210



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### Maximum conducted output power

### **Test Result Channel Power**

TestMode	Antenna	Frequency[MHz]	Result [dBm]	Limit [dBm]	Verdict
11a	Ant2	5180	17.59	≤23.98	PASS
11a	Ant2	5220	17.63	≤23.98	PASS
11a	Ant2	5240	17.41	≤23.98	PASS
11a	Ant2	5260	17.88	≤23.98	PASS
11a	Ant2	5300	17.69	≤23.98	PASS
11a	Ant2	5320	17.74	≤23.98	PASS
11a	Ant2	5500	16.10	≤23.98	PASS
11a	Ant2	5580	16.45	≤23.98	PASS
11a	Ant2	5700	16.23	≤23.98	PASS
11a	Ant2	5745	17.59	≤30.00	PASS
11a	Ant2	5785	17.87	≤30.00	PASS
11a	Ant2	5825	17.99	≤30.00	PASS
11n20SISO	Ant2	5180	17.87	≤23.98	PASS
11n20SISO	Ant2	5220	17.89	≤23.98	PASS
11n20SISO	Ant2	5240	17.84	≤23.98	PASS
11n20SISO	Ant2	5260	17.99	≤23.98	PASS
11n20SISO	Ant2	5300	17.96	≤23.98	PASS
11n20SISO	Ant2	5320	17.95	≤23.98	PASS
11n20SISO	Ant2	5500	16.98	≤23.98	PASS
11n20SISO	Ant2	5580	17.32	≤23.98	PASS
11n20SISO	Ant2	5700	17.41	≤23.98	PASS
11n20SISO	Ant2	5745	17.98	≤30.00	PASS
11n20SISO	Ant2	5785	17.94	≤30.00	PASS
11n20SISO	Ant2	5825	17.99	≤30.00	PASS
11n40SISO	Ant2	5190	16.53	≤23.98	PASS
11n40SISO	Ant2	5230	16.51	≤23.98	PASS
11n40SISO	Ant2	5270	16.06	≤23.98	PASS
11n40SISO	Ant2	5310	16.18	≤23.98	PASS
11n40SISO	Ant2	5510	16.48	≤23.98	PASS
11n40SISO	Ant2	5550	16.62	≤23.98	PASS
11n40SISO	Ant2	5670	16.19	≤23.98	PASS
11n40SISO	Ant2	5755	17.91	≤30.00	PASS
11n40SISO	Ant2	5795	17.99	≤30.00	PASS
11ac20SISO	Ant2	5180	17.89	≤23.98	PASS
11ac20SISO	Ant2	5220	17.90	≤23.98	PASS
11ac20SISO	Ant2	5240	17.81	≤23.98	PASS
11ac20SISO	Ant2	5260	18.03	≤23.98	PASS
11ac20SISO	Ant2	5300	17.93	≤23.98	PASS
11ac20SISO	Ant2	5320	17.92	≤23.98	PASS
11ac20SISO	Ant2	5500	17.01	≤23.98	PASS
11ac20SISO	Ant2	5580	17.39	≤23.98	PASS
11ac20SISO	Ant2	5700	17.43	≤23.98	PASS
11ac20SISO	Ant2	5745	17.99	≤30.00	PASS
11ac20SISO	Ant2	5785	17.95	≤30.00	PASS
11ac20SISO	Ant2	5825	18.06	≤30.00	PASS
11ac40SISO	Ant2	5190	16.89	≤23.98	PASS
11ac40SISO	Ant2	5230	16.85	≤23.98	PASS
11ac40SISO	Ant2	5270	16.73	≤23.98	PASS
11ac40SISO	Ant2	5310	16.21	≤23.98	PASS
11ac40SISO	Ant2	5510	16.88	≤23.98	PASS



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11ac40SISO	Ant2	5550	16.25	≤23.98	PASS
11ac40SISO	Ant2	5670	16.44	≤23.98	PASS
11ac40SISO	Ant2	5755	17.99	≤30.00	PASS
11ac40SISO	Ant2	5795	18.01	≤30.00	PASS
11ac80SISO	Ant2	5210	16.44	≤23.98	PASS
11ac80SISO	Ant2	5290	16.76	≤23.98	PASS
11ac80SISO	Ant2	5530	16.82	≤23.98	PASS
11ac80SISO	Ant2	5775	17.69	≤30.00	PASS



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### Maximum power spectral density

### **Test Result**

TestMode	Antenna	Frequency[MHz]	Result	Limit	Verdict
11a	Ant2	5180	6.25	≤11.00	PASS
11a	Ant2	5220	6.98	≤11.00	PASS
11a	Ant2	5240	6.64	≤11.00	PASS
11a	Ant2	5260	6.62	≤11.00	PASS
11a	Ant2	5300	6.68	≤11.00	PASS
11a	Ant2	5320	6.95	≤11.00	PASS
11a	Ant2	5500	7.09	≤11.00	PASS
11a	Ant2	5580	6.76	≤11.00	PASS
11a	Ant2	5700	6.49	≤11.00	PASS
11a	Ant2	5745	4.09	≤30.00	PASS
11a	Ant2	5785	3.85	≤30.00	PASS
11a	Ant2	5825	3.31	≤30.00	PASS
11ac20SISO	Ant2	5180	6.62	≤11.00	PASS
11ac20SISO	Ant2	5220	6.77	≤11.00	PASS
11ac20SISO	Ant2	5240	6.48	≤11.00	PASS
11ac20SISO	Ant2	5260	6.27	≤11.00	PASS
11ac20SISO	Ant2	5300	6.44	≤11.00	PASS
11ac20SISO	Ant2	5320	6.53	≤11.00	PASS
11ac20SISO	Ant2	5500	6.71	≤11.00	PASS
11ac20SISO	Ant2	5580	6.93	≤11.00	PASS
11ac20SISO	Ant2	5700	6.37	≤11.00	PASS
11ac20SISO	Ant2	5745	4.6	≤30.00	PASS
11ac20SISO	Ant2	5785	4.55	≤30.00	PASS
11ac20SISO	Ant2	5825	4.59	≤30.00	PASS
11ac40SISO	Ant2	5190	2.71	≤11.00	PASS
11ac40SISO	Ant2	5230	3.77	≤11.00	PASS
11ac40SISO	Ant2	5270	3.5	≤11.00	PASS
11ac40SISO	Ant2	5310	2.66	≤11.00	PASS
11ac40SISO	Ant2	5510	2.86	≤11.00	PASS
11ac40SISO	Ant2	5550	2.82	≤11.00	PASS
11ac40SISO	Ant2	5670	2.42	≤11.00	PASS
11ac40SISO	Ant2	5755	1.04	≤30.00	PASS
11ac40SISO	Ant2	5795	0.65	≤30.00	PASS
11ac80SISO	Ant2	5210	-1.73	≤11.00	PASS
11ac80SISO	Ant2	5290	-1.76	≤11.00	PASS
11ac80SISO	Ant2	5530	-1.49	≤11.00	PASS
11ac80SISO	Ant2	5775	-2.51	≤30.00	PASS

Note: 1.The Result and Limit Unit is dBm/1MHz in the band 5.150-5250 GHz,5250-5350GHz, 5470-5725GHz.

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

3. The Duty Cycle Factor and RBW Factor is compensated in the graph.

Remark:

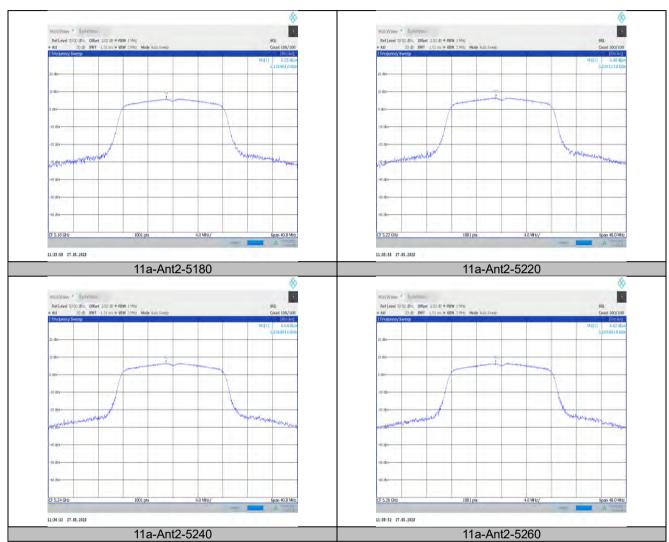
For 802.11n HT20/ac VHT20 and 802.11n HT40/ac VHT40 mode, the whole testing have assessed only, 802.11ac VHT20/40 by referring to their higher output power.



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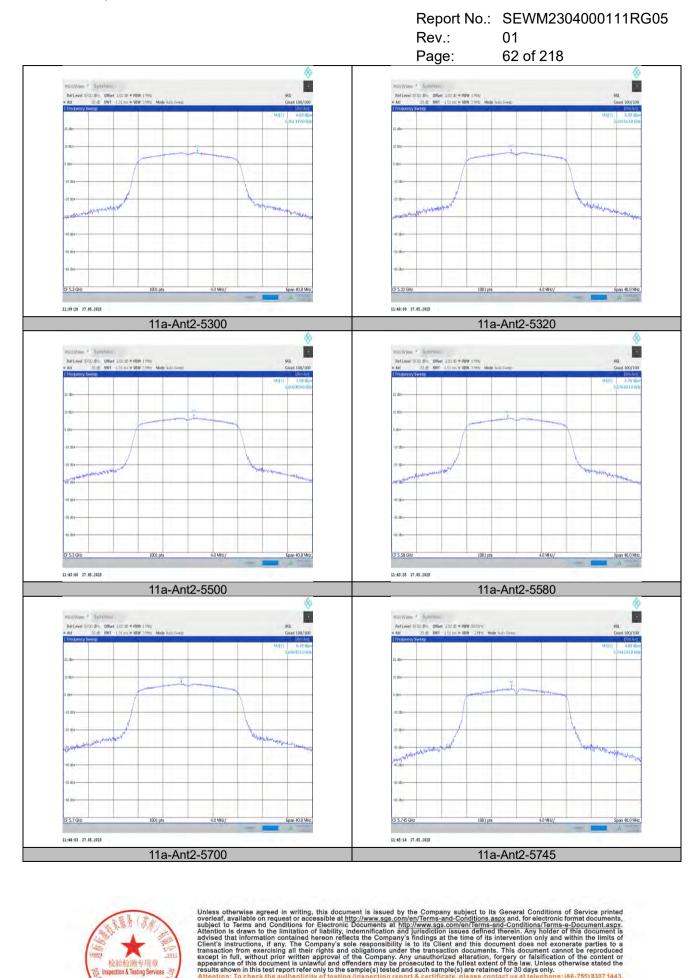
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### **Test Graphs**

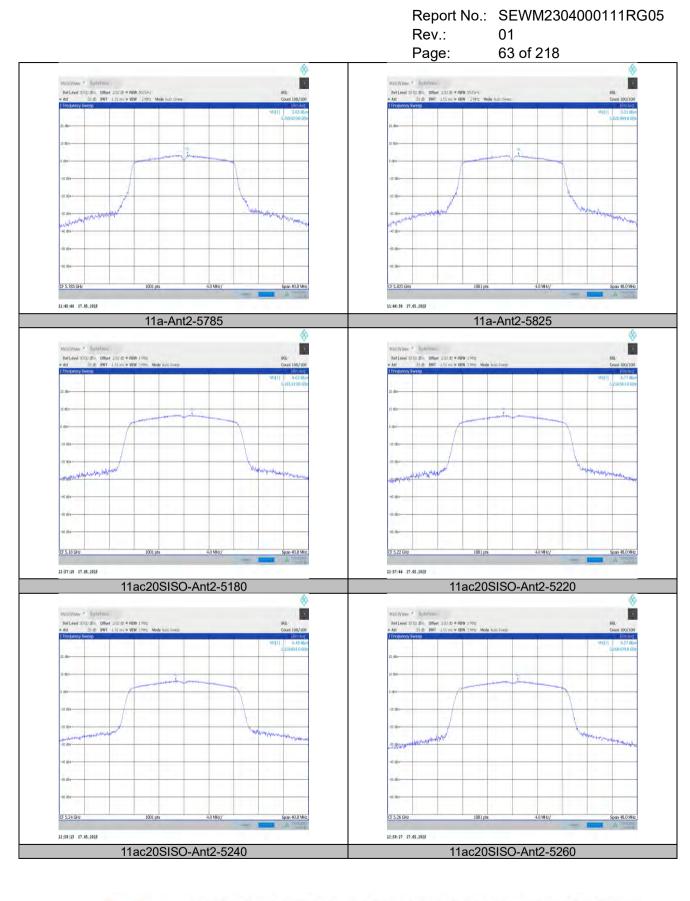




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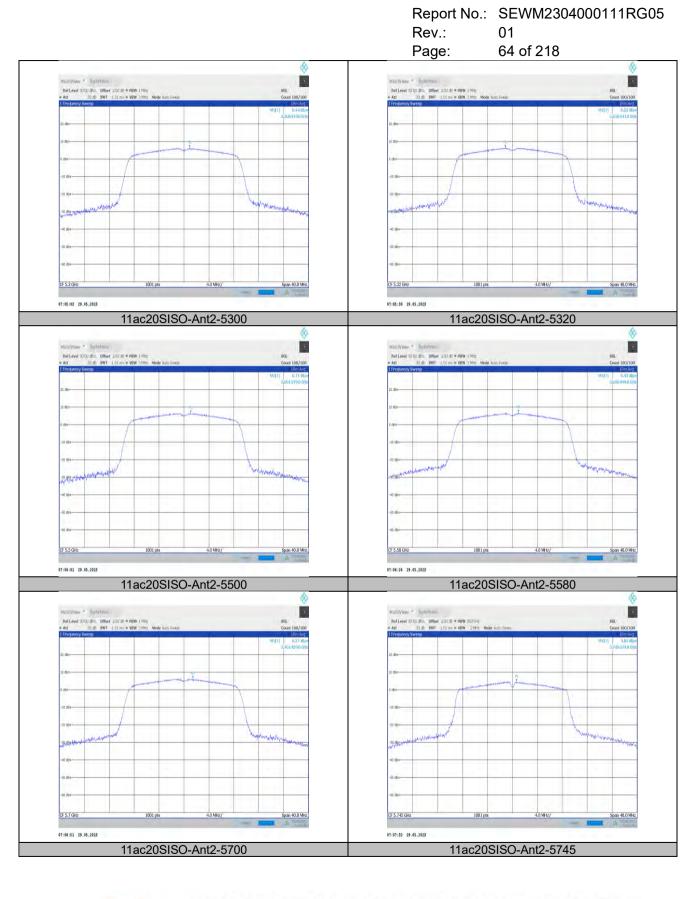
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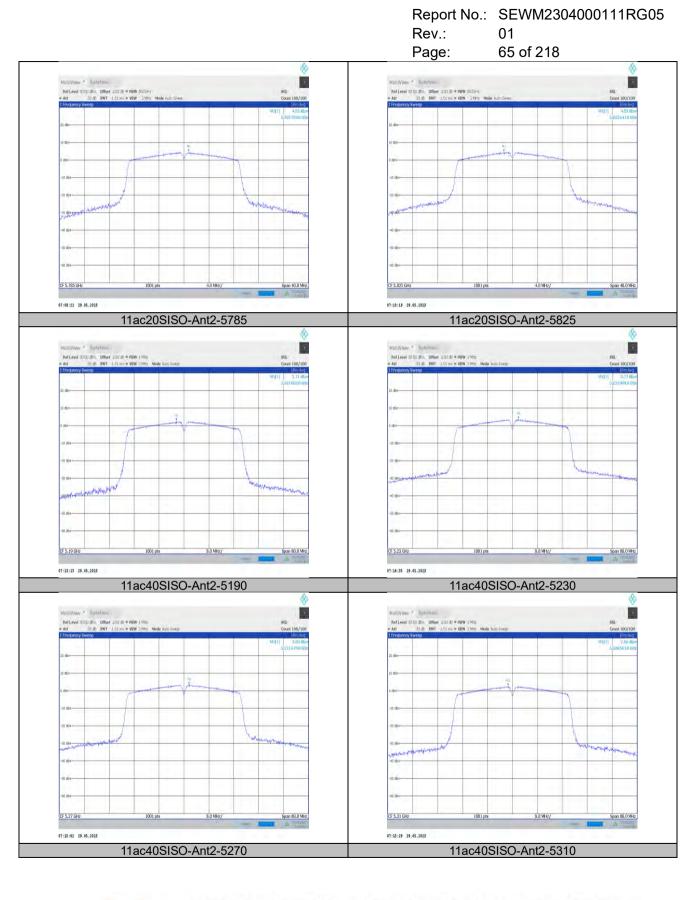
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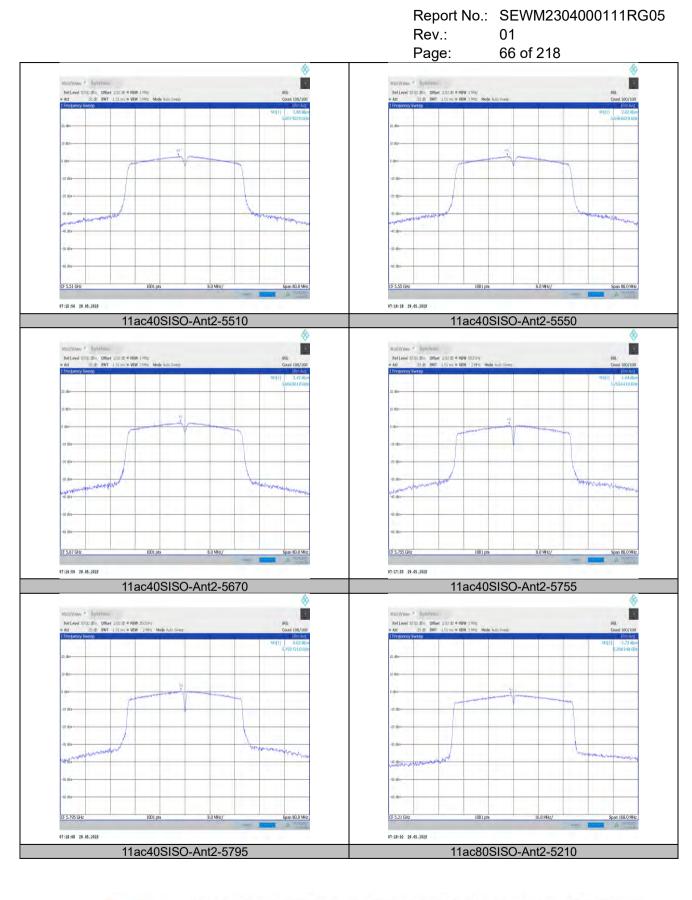
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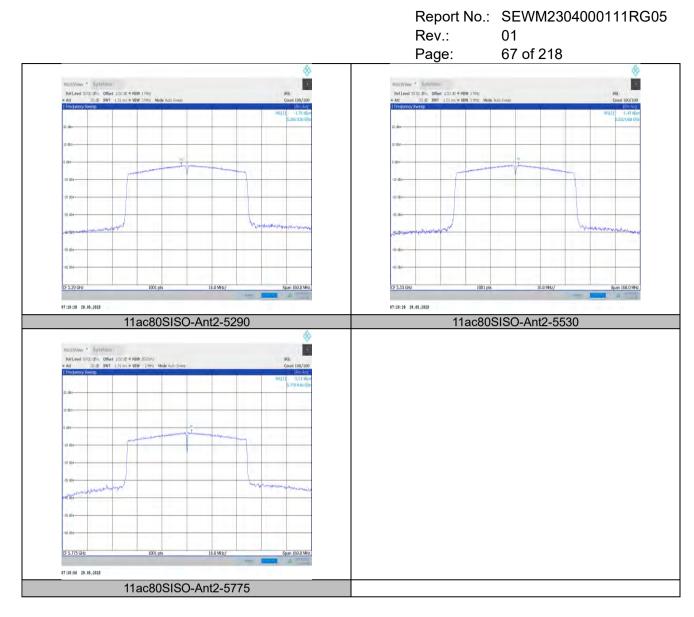
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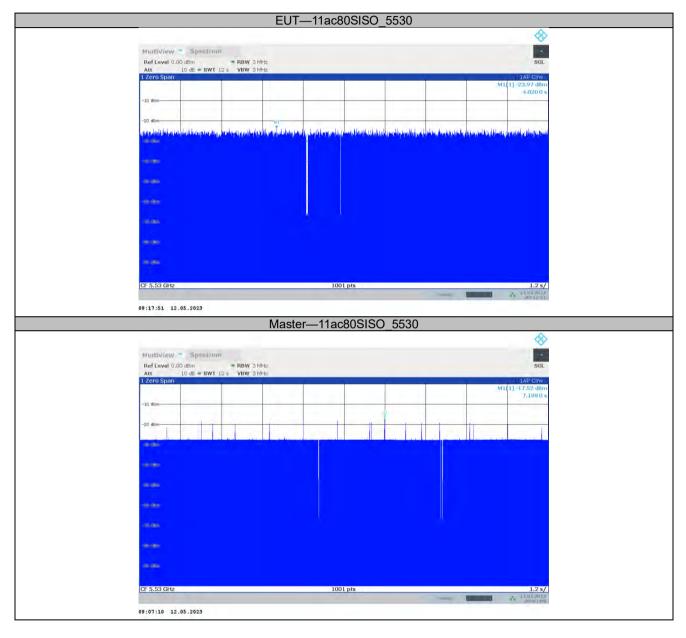
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### **Data Traffic Plot**

### **Test Graphs**





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### Channel Move Time and Channel Closing Transmission Time Test Result

TestMode	Frequency[MHz]	CCTT[ms]	Limit[ms]	CMT[ms]	Limit[ms]	Verdict
11ac80SISO	5530	200+13	200+60	826.5	10000	PASS





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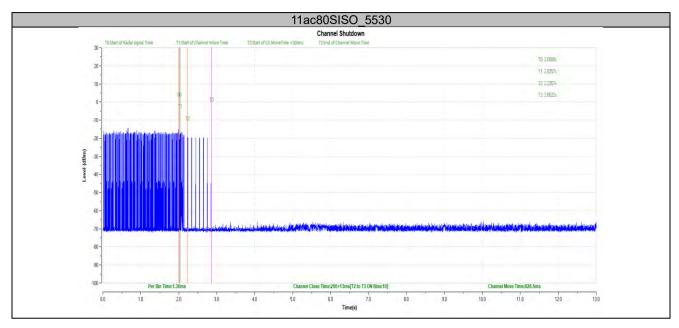
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### **Test Graphs**



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### **Non-Occupancy Period**

### **Test Result**

TestMode	Frequency[MHz]	Result	Limit[s]	Verdict
11ac80SISO	5530	see test graph	≥1800	PASS



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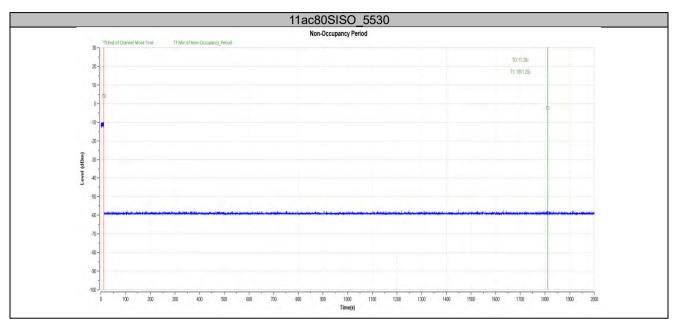
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#### **Test Graphs**



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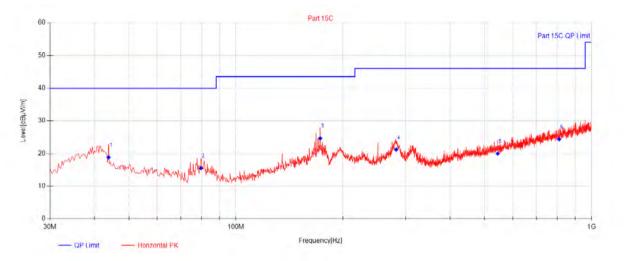
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### **Radiated Spurious Emissions**

#### Radiated emission below 1GHz

#### Worst case Mode: 802.11b\_Channel 06

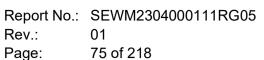


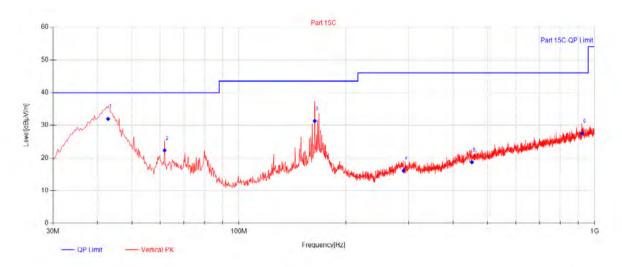
Data	ı List									
NO.	Frequency [MHz]	Reading [dBµV]	Factor [dB]	AF [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	43.8225	41.29	-36.22	13.75	18.82	40.00	21.18	158	161	Horizontal
2	79.7125	41.82	-35.66	9.33	15.50	40.00	24.50	249	182	Horizontal
3	172.59	45.32	-35.16	14.48	24.64	43.50	18.86	155	130	Horizontal
4	282.2	43.25	-34.43	12.36	21.18	46.00	24.82	263	182	Horizontal
5	544.8275	35.49	-32.82	17.30	19.97	46.00	26.03	187	342	Horizontal
6	811.0925	34.99	-31.38	20.78	24.38	46.00	21.62	162	212	Horizontal



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1	42.8525	54.34	-36.23	13.83	31.94	40.00	8.06	102	200	Vertical
2	61.7675	46.34	-36.42	12.41	22.33	40.00	17.67	187	169	Vertical
3	163.375	52.33	-35.26	14.23	31.30	43.50	12.20	145	301	Vertical
4	290.445	37.61	-34.06	12.56	16.11	46.00	29.89	226	250	Vertical
5	451.95	35.76	-33.06	15.99	18.69	46.00	27.31	133	301	Vertical
6	922.6425	36.52	-30.87	21.87	27.52	46.00	18.48	254	280	Vertical

#### Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain. The basic equation with a sample calculation is as follows:

Value = Reading(dB $\mu$ V) + AF(dB/m) + Factor(dB):

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier gain(dB)

Margin = Limit( $dB\mu V/m$ ) – Value( $dB\mu V/m$ )

2) All channels have been tested, but only the worst case data displayed in this report.



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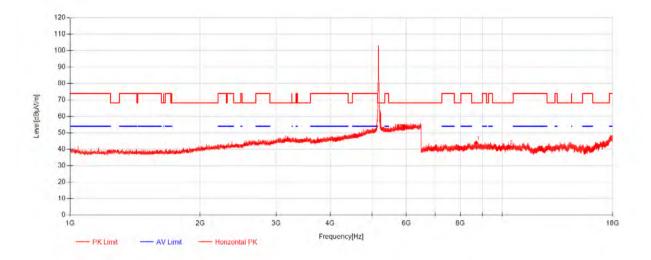
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### **Transmitter emission Above 1GHz**

#### 802.11a\_Channel 36



Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	8706.0833	47.37	37.93	-41.33	43.97	68.30	24.33	145	317	Horizontal			
2	10360.0000	41.54	38.85	-38.82	41.57	68.30	26.73	178	359	Horizontal			
3	15540.0000	35.13	38.52	-34.81	38.84	74.00	35.16	251	122	Horizontal			



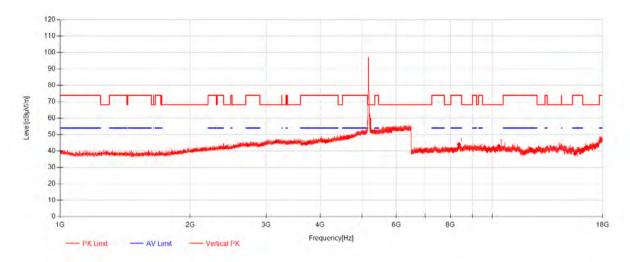
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Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	8378.3333	48.28	37.30	-41.48	44.10	74.00	29.90	103	245	Vertical			
2	10360.0000	43.00	38.85	-38.82	43.03	68.30	25.27	221	219	Vertical			
3	15540.0000	34.75	38.52	-34.81	38.46	74.00	35.54	187	219	Vertical			



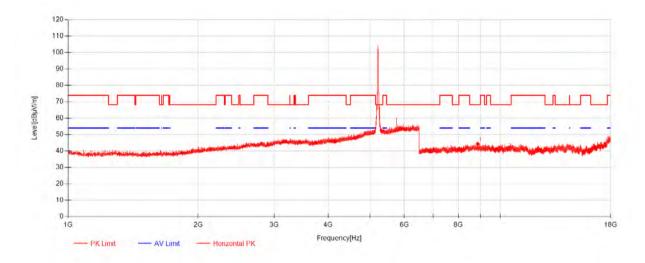
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#### 802.11a\_Channel 44

Data	Data List													
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	8872.3542	47.16	38.12	-40.97	44.31	68.30	23.99	155	146	Horizontal				
2	10400.0000	40.86	38.86	-38.72	41.00	68.30	27.30	187	170	Horizontal				
3	15600.0000	35.45	38.44	-34.37	39.52	74.00	34.48	231	3	Horizontal				



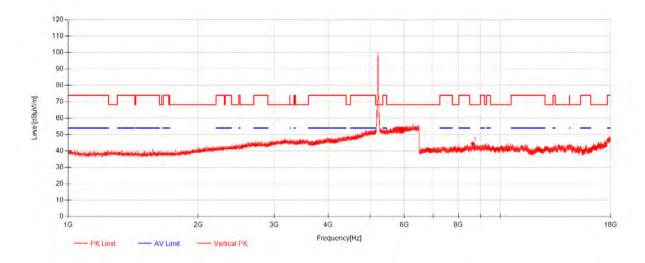
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#### 802.11a\_Channel 44

Data	Data List													
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	8642.3542	47.74	37.82	-41.08	44.48	68.30	23.82	163	48	Vertical				
2	10400.0000	40.63	38.86	-38.72	40.77	68.30	27.53	178	354	Vertical				
3	15600.0000	35.82	38.44	-34.37	39.89	74.00	34.11	162	123	Vertical				



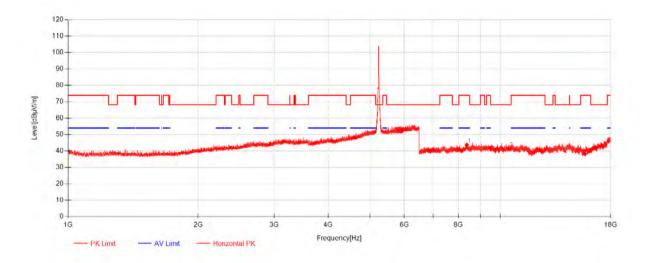
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#### 802.11a\_Channel 48

Data	Data List													
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	8370.1875	48.09	37.29	-41.52	43.86	74.00	30.14	155	292	Horizontal				
2	10480.0000	41.28	38.94	-38.75	41.47	68.30	26.83	241	48	Horizontal				
3	15720.0000	33.07	38.30	-33.22	38.15	74.00	35.85	192	267	Horizontal				



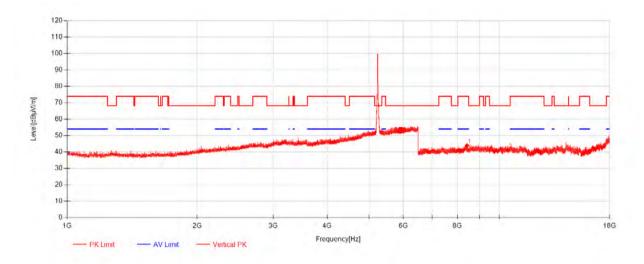
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#### 802.11a\_Channel 48

Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	8424.3333	48.07	37.38	-41.47	43.98	74.00	30.02	187	170	Vertical			
2	10480.0000	40.91	38.94	-38.75	41.10	68.30	27.20	154	340	Vertical			
3	15720.0000	34.14	38.30	-33.22	39.22	74.00	34.78	223	218	Vertical			



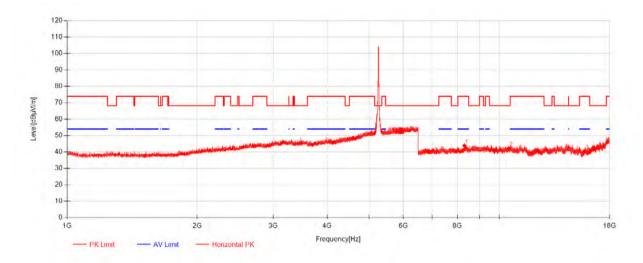
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#### 802.11a\_Channel 52

Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	8308.8542	48.52	37.22	-41.83	43.91	74.00	30.09	154	4	Horizontal			
2	10520.0000	41.95	38.98	-38.61	42.32	68.30	25.98	221	25	Horizontal			
3	15780.0000	35.26	38.22	-33.10	40.38	74.00	33.62	161	317	Horizontal			



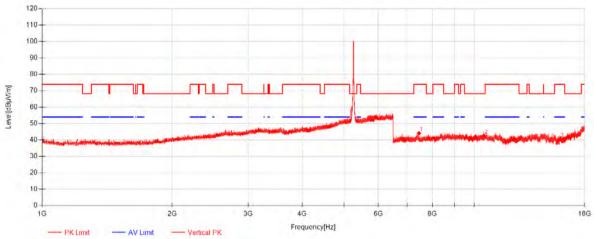
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	PK Limit	AV Lim	it — Verl	lical PK						
Data	List									
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	7451.625	50.63	36.46	-42.99	44.11	74.00	29.89	102	98	Vertical
2	10520.0000	42.20	38.98	-38.61	42.57	68.30	25.73	191	48	Vertical
3	15780.0000	35.30	38.22	-33.10	40.42	74.00	33.58	225	25	Vertical

#### 802.11a\_Channel 52



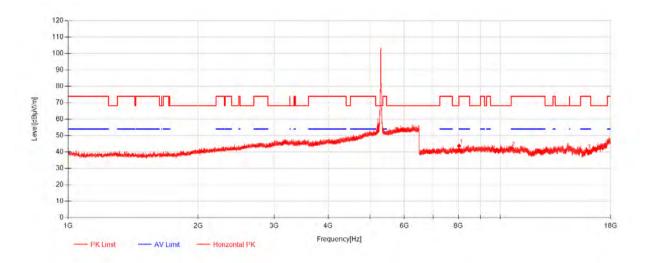
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#### 802.11a\_Channel 60

Data	Data List													
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity				
1	8032.375	48.61	37.02	-41.87	43.76	74.00	30.24	113	354	Horizontal				
2	10600.0000	41.21	39.06	-38.01	42.26	74.00	31.74	187	194	Horizontal				
3	15900.0000	36.73	38.03	-34.13	40.63	74.00	33.37	262	360	Horizontal				



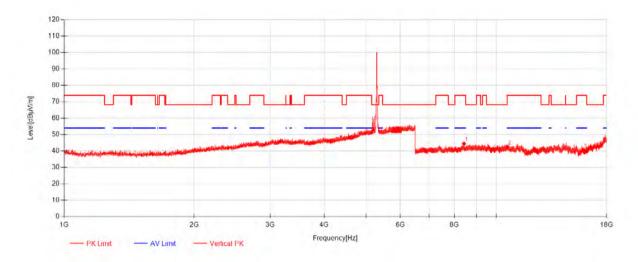
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Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	8423.375	48.55	37.38	-41.47	44.46	74.00	29.54	137	96	Vertical
2	10600.0000	41.50	39.06	-38.01	42.55	74.00	31.45	224	194	Vertical
3	15900.0000	36.61	38.03	-34.13	40.51	74.00	33.49	162	170	Vertical



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