

TEST REPORT

Applicant: Quectel Wireless Solutions Co., Ltd.
EUT Description: Smart LTE Module
Model: SC200V-EM
Brand: Quectel
FCC ID: XMR2025SC200VEM
Standards: FCC 47 CFR Part 15 Subpart E
Date of Receipt: 2025/04/24
Date of Test: 2025/04/24 to 2025/06/13
Date of Issue: 2025/06/13

TOWE. Tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of the model are manufactured with identical electrical and mechanical components. All sample tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise. Without written approval of TOWE, the test report shall not be reproduced except in full.



A handwritten signature in black ink, appearing to be 'Huang Kun'.

Huang Kun
Approved By:

A handwritten signature in black ink, appearing to be 'Chen Chengfu'.

Chen Chengfu
Reviewed By:

Revision History

Rev.	Issue Date	Description	Revised by
01	2025/06/13	Original	Chen Chengfu

Summary of Test Results

Clause	FCC Part	Test Items	Test Bands	Result
4.1	§15.203	Antenna Requirement	---	PASS
4.2	§15.407(g)	Frequency Stability	---	---
4.3	§15.207	AC Power Line Conducted Emission	Section 2.2	N/A
4.4	§15.407(a)(1)(iv) §15.407(a)(2) §15.407(a)(3)(i)	Maximum Conducted Output Power	U-NII-1 U-NII-2A U-NII-2C U-NII-3	PASS
4.5	§KDB 789033 II.C.1	Emission Bandwidth	U-NII-1 U-NII-2A U-NII-2C	Reporting purposes only
4.6	§15.407(e)	Minimum Emission Bandwidth	U-NII-3	PASS
4.7	§KDB 789033 II.D	Occupied Bandwidth	U-NII-1 U-NII-2A U-NII-2C U-NII-3	Reporting purposes only
4.8	§15.407(a)(1)(iv) §15.407(a)(2) §15.407(a)(3)(i)	Maximum Power Spectral Density	U-NII-1 U-NII-2A U-NII-2C U-NII-3	PASS
4.9	§15.407(b) §15.209(d)	Unwanted Emissions	U-NII-1 U-NII-2A U-NII-2C U-NII-3	PASS

Test Method: ANSI C63.10:2020, KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Remark:

1. Pass is EUT meets standard requirements.
2. The EUT is DC power supply, "N/A" denotes "not applicable".

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1 General Description

1.1 Lab Information

1.1.1 Testing Location

These measurements tests were conducted at the Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. Facility located at F401 and F101, Building E, Hongwei Industrial Zone, Liuxian 3rd Road, Bao'an District, Shenzhen, China. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014

Tel.: +86-755-27212361

Contact Email: info@towewireless.com

1.1.2 Test Facility / Accreditations

A2LA (Certificate Number: 7088.01)

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

FCC Designation No.: CN1353

Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. Has been recognized as an accredited testing laboratory. Designation Number: CN1353.

ISED CAB identifier: CN0152

Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. Has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0152

Company Number: 31000

1.2 Client Information

1.2.1 Applicant

Applicant:	Quectel Wireless Solutions Co., Ltd.
Address:	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233

1.2.2 Manufacturer

Manufacturer:	Quectel Wireless Solutions Co., Ltd.
Address:	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233

1.3 Product Information

EUT Description:	Smart LTE Module			
Model:	SC200V-EM			
Brand:	Quectel			
Hardware Version:	R1.0			
Software Version:	SC200VEMNAR01A01			
SN:	RF Conducted	D1C25D22U000073		
	RSE	D1C25D22U000070		
Modulation Type:	802.11a/n:	OFDM-BPSK, QPSK, 16QAM, 64QAM		
	802.11ac:	OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM		
Smart System:	☒ SISO	802.11a/n/ac	/	
	☐ MIMO	802.11n/ac	()TX()RX	
	☐ CDD	802.11a	()TX()RX	
EUT Function	☒ Client	☐ Outdoor AP	☐ Indoor AP ☐ Fixed P2P AP	
DFS Function:	☐ Master ☐ Slave with radar detection ☒ Slave without radar detection			
Frequency Range:	U-NII-1:	5150 ~ 5250MHz		
	U-NII-2A:	5250 ~ 5350MHz		
	U-NII-2C:	5470 ~ 5725MHz		
	U-NII-3:	5725 ~ 5850MHz		
Channel Frequency:	20M BWch.:	U-NII-1:	5180 ~ 5240MHz	4 Channels
		U-NII-2A:	5260 ~ 5320MHz	4 Channels
		U-NII-2C:	5500 ~ 5700MHz	11 Channels
		U-NII-3:	5745 ~ 5825MHz	5 Channels
	40M BWch.:	U-NII-1:	5190 ~ 5230MHz	2 Channels
		U-NII-2A:	5270 ~ 5310MHz	2 Channels
		U-NII-2C:	5510 ~ 5670MHz	5 Channels
		U-NII-3:	5755 ~ 5795MHz	2 Channels
	80M BWch.:	U-NII-1:	5210MHz	1 Channel
		U-NII-2A:	5290MHz	1 Channel
		U-NII-2C:	5530 ~ 5610MHz	2 Channels
		U-NII-3:	5775MHz	1 Channel
Antenna Type:	☒ External, ☐ Integrated			
Antenna Gain:	Frequency Range	Ant0 (dBi)		
	U-NII-1:	-0.67		
	U-NII-2A:	-0.19		
	U-NII-2C:	1.28		
	U-NII-3:	1.1		
Remark: The above EUT's information was declared by applicant, please refer to the specifications or user's manual for more detailed description.				

2 Test Configuration

2.1 Test Channel

Frequency Channels for U-NII-1							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	40	5200MHz	44	5220MHz	48	5240MHz
38	5190MHz	42	5210MHz	46	5230MHz	/	
Remark: In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:							
Modulation Type		Test Channel		Test Frequency			
802.11a/n20 /ac20		The Lowest channel (CH36)		5180MHz			
		The Middle channel (CH40)		5200MHz			
		The Highest channel (CH48)		5240MHz			
Modulation Type		Test Channel		Test Frequency			
802.11n40 /ac40		The Lowest channel (CH38)		5190MHz			
		The Highest channel (CH46)		5230MHz			
Modulation Type		Test Channel		Test Frequency			
802.11ac80		The Middle channel (CH42)		5210MHz			

Frequency Channels for U-NII-2A							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
52	5260MHz	56	5280MHz	60	5300MHz	64	5320MHz
54	5270MHz	58	5290MHz	62	5310MHz	/	
Remark: In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:							
Modulation Type		Test Channel		Test Frequency			
802.11a/n20 /ac20		The Lowest channel (CH52)		5260MHz			
		The Middle channel (CH60)		5300MHz			
		The Highest channel (CH64)		5320MHz			
Modulation Type		Test Channel		Test Frequency			
802.11n40 /ac40		The Lowest channel (CH54)		5270MHz			
		The Highest channel (CH62)		5310MHz			
Modulation Type		Test Channel		Test Frequency			
802.11ac80		The Middle channel (CH58)		5290MHz			

Frequency Channels for U-NII-2C

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
100	5500MHz	110	5550MHz	120	5600MHz	132	5660MHz
102	5510MHz	112	5560MHz	122	5610MHz	134	5670MHz
104	5520MHz	114	5570MHz	124	5620MHz	136	5680MHz
106	5530MHz	116	5580MHz	126	5630MHz	140	5700MHz
108	5540MHz	118	5590MHz	128	5640MHz	/	

Remark:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Modulation Type	Test Channel	Test Frequency
802.11a/n20 /ac20	The Lowest channel (CH100)	5500MHz
	The Middle channel (CH116)	5580MHz
	The Highest channel (CH140)	5700MHz
Modulation Type	Test Channel	Test Frequency
802.11n40 /ac40	The Lowest channel (CH102)	5510MHz
	The Middle channel (CH118)	5590MHz
	The Highest channel (CH134)	5670MHz
Modulation Type	Test Channel	Test Frequency
802.11ac80	The Lowest channel (CH106)	5530MHz
	The Highest channel (CH122)	5610MHz

Frequency Channels for U-NII-3

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

Remark:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Modulation Type	Test Channel	Test Frequency
802.11a/n20 /ac20	The Lowest channel (CH149)	5745MHz
	The Middle channel (CH157)	5785MHz
	The Highest channel (CH165)	5825MHz
Modulation Type	Test Channel	Test Frequency
802.11n40 /ac40	The Lowest channel (CH151)	5755MHz
	The Highest channel (CH159)	5795MHz
Modulation Type	Test Channel	Test Frequency
802.11ac80	The Middle channel (CH155)	5775MHz

2.2 Worst-case configuration and Mode

Modulation Type	SISO - Data Rate	MIMO - Data Rate
802.11a	6 Mbps	NA
802.11n20	MCS0 (6.5 Mbps)	NA
802.11n40	MCS0 (13.5 Mbps)	NA
802.11ac20	MCS0 (6.5 Mbps)	NA
802.11ac40	MCS0 (13.5 Mbps)	NA
802.11ac80	MCS0 (29.3 Mbps)	NA
Transmitting mode:	Keep the EUT was programmed to be in continuously transmitting mode.	
Normal Link:	Keep the EUT operation to normal function.	

2.3 Support Unit used in test

Description	Manufacturer	Model	Serial Number
Development Board	Quectel	SMART-EVB-G5	MPY24F82X000102
Development Board	Quectel	SC200V-EM-TE-A	E1C25D72Z000023
Remark: all above the information of table are provided by client.			

2.4 Test Environment

Temperature:	Normal: 15°C ~ 35°C
Humidity:	45 ~ 56 % RH Ambient
Voltage:	DC 3.8V (Module Input)
Remark: The testing environment is within the scope of the EUT user manual and meets the requirements of the standard testing environment.	

2.5 Test RF Cable

For all conducted test items: The offset level is set spectrum analyzer to compensate the RF cable loss and attenuator factor between RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

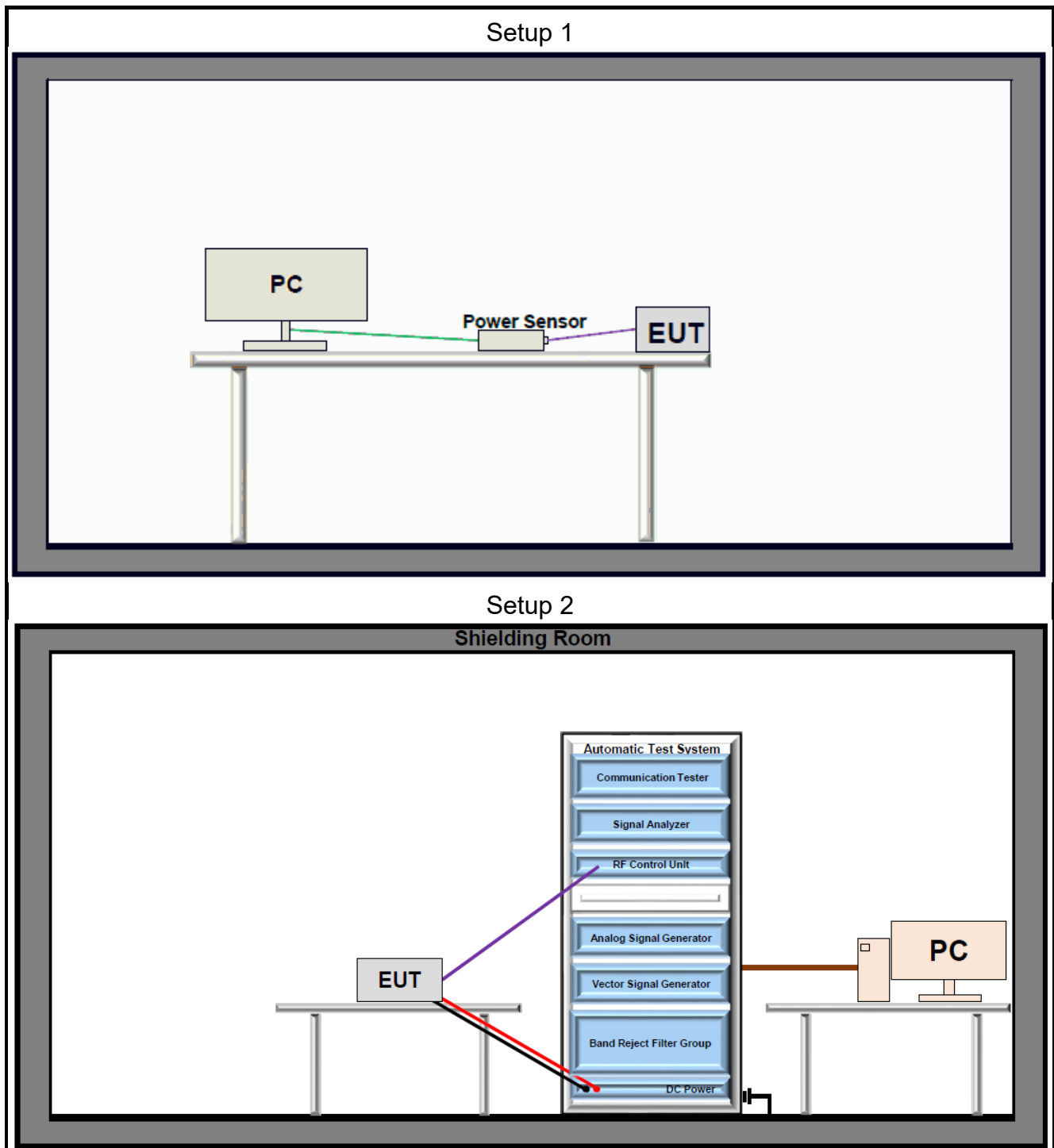
Offset = RF cable loss + attenuator factor.

2.6 Modifications

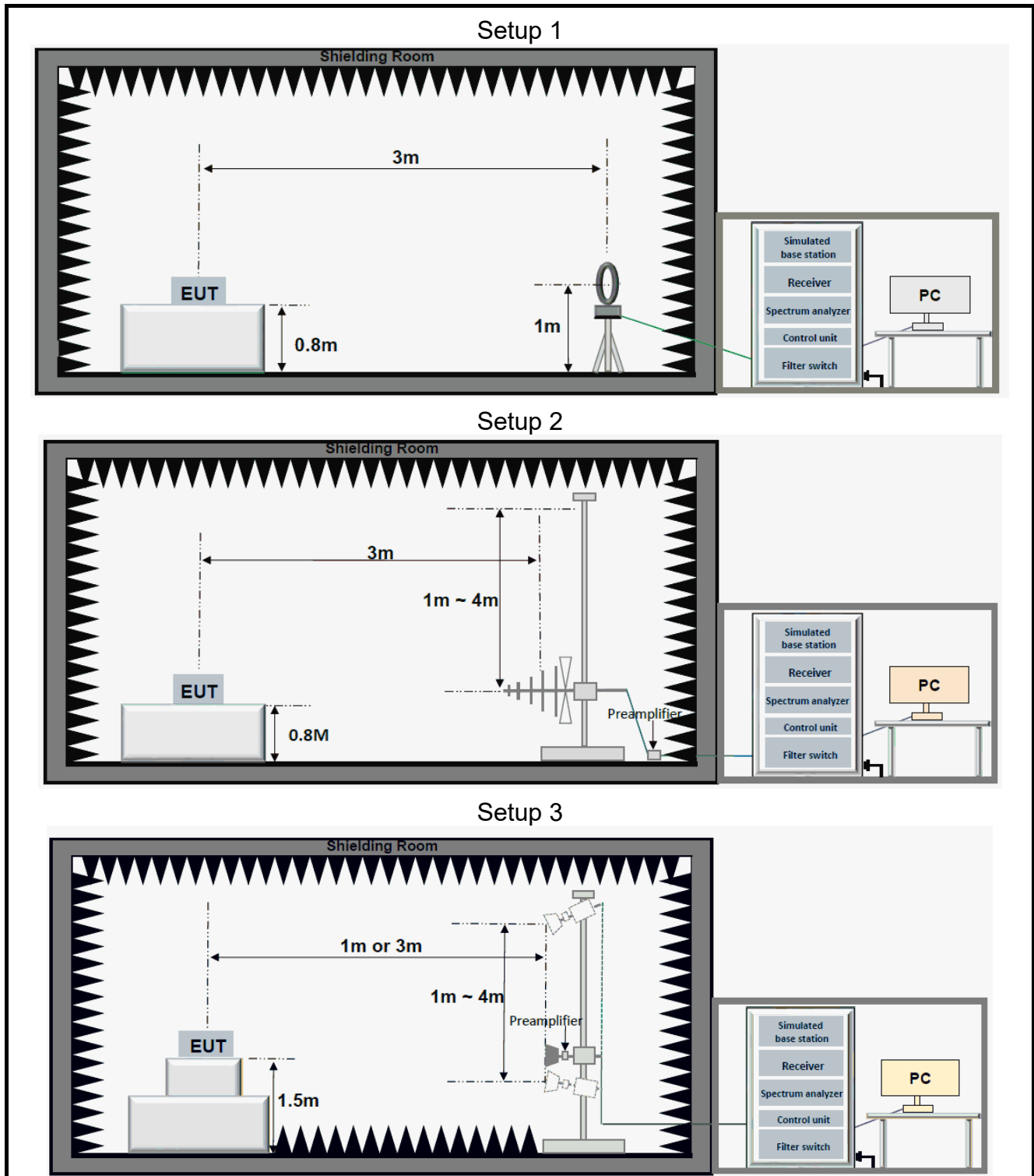
No modifications were made during testing.

2.7 Test Setup Diagram

2.7.1 Conducted Configuration



2.7.2 Radiated Configuration



3 Equipment and Measurement Uncertainty

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, whichever is less, and where applicable is traceable to recognized national standards.

3.1 Test Equipment List

RF Conducted					
Description	Manufacturer	Model	S.N.	Last Due	Cal Due
Signal Analyzer	Keysight	N9020A	US46470429	2025/03/14	2026/03/13
Signal Generator	R&S	SMR20	101027	2025/03/11	2026/03/10
Vector Signal Generator	R&S	SMM100A	549353	2024/05/30	2025/05/29
				2025/05/29	2026/05/28
Power Sensor	Anritsu	MA24408A	12520	2024/05/30	2025/05/29
				2025/05/29	2026/05/28
RF Control Unit	Tonscend	JS0806-2	23C80620671	2024/05/30	2025/05/29
				2025/05/29	2026/05/28
EXA Signal Analyzer, Multi-touch	Keysight	N9010B	MY63440541	2024/05/30	2025/05/29
				2025/05/29	2026/05/28
Measurement Software	Tonscend	TS1120-3	10659	N/A	N/A

Radiated Emission					
Description	Manufacturer	Model	S.N.	Last Due	Cal Due
Biconic Logarithmic Periodic Antennas	Schwarzbeck	VULB9163	1643	2023/06/25	2025/06/24
Double-Ridged Horn Antennas	Schwarzbeck	BBHA 9120D	2809	2023/06/25	2025/06/24
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	1290	2023/06/25	2025/06/24
Loop Antenna	Schwarzbeck	FMZB 1519C	1519C-028	2023/06/29	2025/06/28
Signal Analyzer	Keysight	N9020A	MY49100252	2025/03/11	2026/03/10
EXA Signal Analyzer, Multi-touch	Keysight	N9010B	MY63440541	2024/05/30	2025/05/29
				2025/05/29	2026/05/28
Wideband Radio Communication Tester	R&S	CMW500	150645	2025/03/11	2026/03/10
Low Noise Amplifier	Tonscend	TAP9K3G40	AP23A8060273	2025/03/11	2027/03/10
Low Noise Amplifier	Tonscend	TAP01018050	AP22G806258	2025/03/11	2027/03/10
Low Noise Amplifier	Tonscend	TAP18040048	AP22G806247	2025/03/11	2027/03/10
Hygrometer	BINGYU	HTC-1	N/A	2023/06/01	2025/05/31
				2025/05/29	2027/05/28
Band Reject Filter Group	Townshend	JS0806-F	23A806F0652	N/A	N/A
Test Software	Tonscend	TS+	Version: 5.0.0	N/A	N/A

3.2 Measurement Uncertainty

Parameter	U _{lab}
Frequency Error	679.98Hz
Output Power	0.76dB
Conducted Spurious Emissions	2.22dB
Radiated Emissions(9kHz~30MHz)	2.40dB
Radiated Emissions(30MHz~1000MHz)	4.66dB
Radiated Emissions(1GHz~18GHz)	5.42dB
Radiated Emissions(18GHz~40GHz)	5.46dB

Uncertainty figures are valid to a confidence level of 95%

4 Test Results

4.1 Antenna Requirement

Standard Applicable:	47 CFR Part 15C Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
The antenna gain and type as provided by the manufacturer are as follows: The antenna Type is External. With maximum gain is U-NII-1: -0.67dBi; U-NII-2A: -0.19dBi; U-NII-2C: 1.28dBi; U-NII-3: 1.1dBi; Antenna Anti-Replacement Construction: An embedded-in antenna design is used.	

4.2 Frequency Stability

Standard Applicable:	47 CFR Part 15C Section 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 user's manual.	

4.3 Maximum Conducted Output Power

Limits

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz.

For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

Test Procedure

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section II.E.2.b (Other Channel)

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section II.E.3.b(Straddle Channel)

Test Settings

1. PM-G:
Set to the maximum power setting and enable the EUT transmit continuously.
The power output was measured on the EUT antenna port using RF Cable with attenuator connected to a power meter via wideband power sensor. Peak output power was read directly from power meter.
Measure and record the results in the test report.
2. SA:
RBW = 1MHz
VBW $\geq$ 3MHz
Span = Encompass the EBW (or, alternatively, the entire 99% occupied bandwidth)
Sweep = Auto
Detector = power averaging (rms)

Test Setup

Refer to section 2.7.1 Setup 1 for details.

Measuring Instruments

The measuring equipment is listed in the section 3.1 of this test report.

Test Result

The detailed test data see: **Appendix**.

4.4 Emission Bandwidth

Limits

None, for reporting purposes only.

Test Procedure

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section II.C.1.

Test Settings

1. Set to the maximum power setting and enable the EUT transmit continuously.
2. The transmitter output is connected to a spectrum analyzer:
3. RBW = 1% - 5%(99%BW)
4. VBW = 3 times the RBW
5. Sweep = Auto
6. Detector = Peak
7. Trace = Max hold
8. The trace was allowed to stabilize
9. Measure and record the results in the test report.

Test Notes

The signal analyzers' automatic bandwidth measurement capability of the spectrum analyzer was used to perform the 26dB bandwidth measurement. The "X" dB bandwidth parameter was set to X= 26. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.

Test Setup

Refer to section 2.7.1 Setup 2 for details.

Measuring Instruments

The measuring equipment is listed in the section 3.1 of this test report.

Test Result

The detailed test data see: **Appendix**.

4.5 Minimum Emission Bandwidth

Limits

Within the 5.725-5.850 GHz and 5.850-5.895 GHz bands, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section II.C.2.

Test Settings

1. Set to the maximum power setting and enable the EUT transmit continuously.
2. The transmitter output is connected to a spectrum analyzer:
3. RBW = 100kHz(DTS)
4. VBW = 3 times the RBW
5. Sweep = Auto
6. Detector = Peak
7. Trace = Max hold
8. The trace was allowed to stabilize
9. Measure and record the results in the test report.

Test Notes

Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Setup

Refer to section 2.7.1- Setup 2 for details.

Measuring Instruments

The measuring equipment is listed in the section 3.1 of this test report.

Test Result

The detailed test data see: **Appendix**.

4.6 Occupied Bandwidth

Limits

None, for reporting purposes only.

Test Procedure

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section II.D.

Test Settings

1. Set to the maximum power setting and enable the EUT transmit continuously.
2. The transmitter output is connected to a spectrum analyzer:
3. RBW = 1% - 5%(99%BW)
4. VBW = 3 times the RBW
5. Sweep = Auto
6. Detector = Peak
7. Trace = Max hold
8. The trace was allowed to stabilize
9. Measure and record the results in the test report.

Test Setup

Refer to section 2.7.1- Setup 2 for details.

Measuring Instruments

The measuring equipment is listed in the section 3.1 of this test report.

Test Result

The detailed test data see: **Appendix**.

4.7 Maximum Power Spectral Density

Limits

For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1-megahertz band.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1-megahertz band.

For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

Test Procedure

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section II.F

Test Settings

1. Set to the maximum power setting and enable the EUT transmit continuously
2. The transmitter output is connected to a spectrum analyzer
3. RBW = 1MHz (for 5.15–5.25 GHz, 5.25–5.35 GHz, and 5.47–5.725 GHz)
4. RBW = 500kHz (for 5.725–5.85 GHz)
5. VBW $\geq$ 3 times RBW
6. Sweep = Auto
7. Detector = Peak
8. Trace = Max hold
9. The trace was allowed to stabilize
10. Measure and record the results in the test report.

Test Setup

Refer to section 2.7.1- Setup 2 for details.

Measuring Instruments

The measuring equipment is listed in the section 3.1 of this test report.

Test Result

The detailed test data see: **Appendix**.

4.8 Unwanted Emissions

Limits

Spurious emissions are permitted in an of the frequency bands:

MHz	MHz	MHz	MHz	GHz	GHz
0.090 - 0.110	12.29 - 12.293	149.9 - 150.05	1660 - 1710	4.5 - 5.15	14.47 - 14.5
0.495 - 0.505	12.51975 - 12.52025	156.52475 - 156.52525	1718.8 - 1722.2	5.35 - 5.46	15.35 - 16.2
2.1735 - 2.1905	12.5767 - 12.57725	156.7 - 156.9	2200 - 2300	7.25 - 7.75	17.7 - 21.4
4.125 - 128	13.36 - 13.41	162.0125 - 167.17	2310 - 2390	8.025 - 8.5	22.01 - 23.12
4.17725 - 4.17775	16.42 - 16.423	167.72 - 173.2	2483.5 - 2500	9.0 - 9.2	23.6 - 24.0
4.20725 - 4.20775	16.69475 - 16.69525	240 - 285	2655 - 2900	9.3 - 9.5	31.2 - 31.8
6.215 - 6.218	1680425 - 1680475	322 - 335.4	3260 - 3267	10.6 - 12.7	36.43 - 36.5
6.26775 - 6.26825	25.5 - 25.67	399.9 - 410	3332 - 3339	13.25 - 13.4	
6.31175 - 6.31225	37.5 - 38.25	608 - 614	3345.8 - 3358		
8.291 - 8.294	73 - 74.6	960 - 1240	3600 - 4400		
8.362 - 8.366	74.8 - 75.2	1300 - 1427			
8.37625 - 8.38675	108 - 121.94	1435 - 1626.5			
8.41425 - 8.41475	123 - 138	1645.5 - 1646.5			

Radiated disturbance of an intentional radiator:

Frequency	Field strength ($\mu\text{V/m}$)	Limit (dB $\mu\text{V/m}$)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	74.0	Peak	3
		54.0	Average	

Un-restricted band emissions above 1GHz limit:

For transmitters operating in the 5.15-5.25 GHz band:

All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.25-5.35 GHz band:

All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.47-5.725 GHz band:

All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating solely in the 5.725-5.850 GHz band:

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.

Test Procedure

ANSI C63.10:2020 Section 6.4 & 6.5 & 6.6.

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section II.G.3 ~ 6.

Test Settings

1. For radiated emissions measurements performed at frequencies less than or equal to 1GHz, the EUT shall be placed on a RF-transparent table or support at a nominal height of 80cm above the reference ground plane.
2. For radiated emissions measurements performed at frequencies above 1GHz, the EUT shall be placed on a RF-transparent table or support at a nominal height of 80cm above the ground plane.
3. Radiated measurements shall be made with the measurement antenna positioned in both horizontal and vertical polarization. The measurement antenna shall be varied from 1m to 4m in height above the reference ground in a search for the relative positioning that produces the maximum radiated signal level (i.e, field strength or received power), when orienting the measurement antenna in vertical polarization, the minimum height of the lowest element of the antenna shall clear the site reference ground plane by at least 25cm.
4. For each suspected emission, the EUT was ranged its worst case and then tune the antenna tower(from 1~4m) and turntable(from 0~360°) find the maximum reading. Preamplifier and a high pass filter are used for the test in order get better signal level comply with the guidelines.
5. The simulated base station was set to force the EUT to its maximum transmitting power.
6. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
7. spectrum analyzer setting:
Measurements Below 1000MHz: RBW = 120 kHz; VBW $\geq$ 300 kHz; Detector = Peak
Measurements Above 1000MHz: RBW = 1 MHz; VBW $\geq$ 3 MHz; Detector = Peak
Average Measurements Above 1000MHz:
RBW = 1 MHz, VBW $\geq$ 1/T, with peak detector for average measurements.
8. The field strength is calculated by adding the Antenna Factor, Cable Factor. The basic equation with a sample calculation is as follows:
Level = Reading(dB μ V) + AF(dB/m) + Factor(dB):
AF = Antenna Factor(dB/m)
Factor = Cable Factor(dB) - Preamplifier gain(dB)
Margin = Limit(dB μ V/m) – Level(dB μ V/m)
9. Repeat above procedures until all frequencies measured was complete.
10. Measure and record the results in the test report.

Test Notes

1. Emissions below 18GHz were measured at a 3-meter test distance while emissions above 18GHz were measured at a 1-meter test distance with the application of a distance correction factor.
2. Radiated spurious emissions were investigated from 9kHz to 30MHz, 30MHz-1GHz and above 1GHz. the disturbance between 9kHz to 30MHz, 30MHz-1GHz and 18GHz to 40GHz was very low. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be recorded, so only the harmonics had been displayed.
3. The "-" shown in the following RSE tables are used to denote a noise floor measurement.

Test Setup

Refer to section 2.7.2 for details.

Measuring Instruments

The measuring equipment is listed in the section 3.1 of this test report.

Test Result

The detailed test data see: **Appendix**.

5 Test Setup Photos

The detailed test data see: **Appendix-A BTWIFI Setup Photos**

Appendix

Emission Bandwidth Test Result

TestMode	Antenna	Frequency[MHz]	26dB EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11a	Ant0	5180	22.080	5169.040	5191.120	---	---
11a	Ant0	5200	23.120	5188.320	5211.440	---	---
11a	Ant0	5240	23.480	5228.280	5251.760	---	---
11a	Ant0	5260	23.040	5248.240	5271.280	---	---
11a	Ant0	5300	22.960	5288.960	5311.920	---	---
11a	Ant0	5320	22.320	5308.720	5331.040	---	---
11a	Ant0	5500	22.080	5489.040	5511.120	---	---
11a	Ant0	5600	23.000	5588.720	5611.720	---	---
11a	Ant0	5700	22.280	5689.440	5711.720	---	---
11a	Ant0	5745	22.840	5733.640	5756.480	---	---
11a	Ant0	5785	22.600	5773.600	5796.200	---	---
11a	Ant0	5825	21.720	5814.360	5836.080	---	---
11n20SISO	Ant0	5180	22.600	5169.000	5191.600	---	---
11n20SISO	Ant0	5200	22.440	5188.960	5211.400	---	---
11n20SISO	Ant0	5240	22.240	5229.040	5251.280	---	---
11n20SISO	Ant0	5260	22.680	5248.840	5271.520	---	---
11n20SISO	Ant0	5300	23.960	5288.360	5312.320	---	---
11n20SISO	Ant0	5320	23.200	5308.440	5331.640	---	---
11n20SISO	Ant0	5500	22.840	5488.840	5511.680	---	---
11n20SISO	Ant0	5600	24.040	5587.800	5611.840	---	---
11n20SISO	Ant0	5700	22.600	5688.760	5711.360	---	---
11n20SISO	Ant0	5745	24.320	5733.200	5757.520	---	---
11n20SISO	Ant0	5785	21.400	5774.280	5795.680	---	---
11n20SISO	Ant0	5825	23.600	5812.960	5836.560	---	---
11n40SISO	Ant0	5190	40.880	5169.680	5210.560	---	---
11n40SISO	Ant0	5230	40.560	5209.600	5250.160	---	---
11n40SISO	Ant0	5270	40.640	5249.840	5290.480	---	---
11n40SISO	Ant0	5310	40.960	5289.680	5330.640	---	---
11n40SISO	Ant0	5510	41.120	5489.360	5530.480	---	---
11n40SISO	Ant0	5590	41.040	5569.520	5610.560	---	---
11n40SISO	Ant0	5670	40.560	5649.840	5690.400	---	---
11n40SISO	Ant0	5755	40.480	5734.760	5775.240	---	---
11n40SISO	Ant0	5795	40.720	5774.600	5815.320	---	---
11ac20SISO	Ant0	5180	23.200	5168.560	5191.760	---	---
11ac20SISO	Ant0	5200	22.720	5189.000	5211.720	---	---
11ac20SISO	Ant0	5240	23.400	5228.600	5252.000	---	---
11ac20SISO	Ant0	5260	22.520	5248.640	5271.160	---	---
11ac20SISO	Ant0	5300	22.160	5288.920	5311.080	---	---
11ac20SISO	Ant0	5320	23.200	5308.720	5331.920	---	---
11ac20SISO	Ant0	5500	22.680	5488.920	5511.600	---	---
11ac20SISO	Ant0	5600	22.920	5588.040	5610.960	---	---
11ac20SISO	Ant0	5700	24.040	5688.440	5712.480	---	---
11ac20SISO	Ant0	5745	22.840	5733.400	5756.240	---	---
11ac20SISO	Ant0	5785	22.760	5773.760	5796.520	---	---
11ac20SISO	Ant0	5825	22.200	5813.920	5836.120	---	---
11ac40SISO	Ant0	5190	40.640	5169.760	5210.400	---	---
11ac40SISO	Ant0	5230	40.960	5209.440	5250.400	---	---
11ac40SISO	Ant0	5270	41.360	5249.040	5290.400	---	---
11ac40SISO	Ant0	5310	41.040	5289.760	5330.800	---	---
11ac40SISO	Ant0	5510	41.120	5489.520	5530.640	---	---
11ac40SISO	Ant0	5590	40.640	5569.680	5610.320	---	---
11ac40SISO	Ant0	5670	40.480	5649.840	5690.320	---	---
11ac40SISO	Ant0	5755	40.960	5734.520	5775.480	---	---
11ac40SISO	Ant0	5795	41.360	5774.680	5816.040	---	---
11ac80SISO	Ant0	5210	86.400	5166.480	5252.880	---	---
11ac80SISO	Ant0	5290	87.680	5244.720	5332.400	---	---
11ac80SISO	Ant0	5530	86.720	5484.720	5571.440	---	---
11ac80SISO	Ant0	5610	91.200	5562.320	5653.520	---	---
11ac80SISO	Ant0	5775	89.120	5727.800	5816.920	---	---

Test Graphs



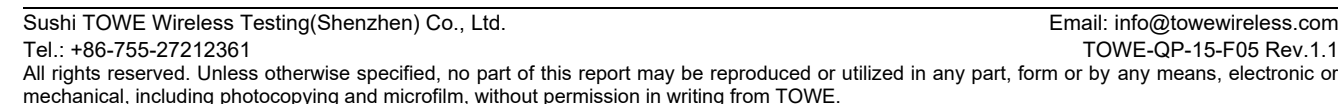






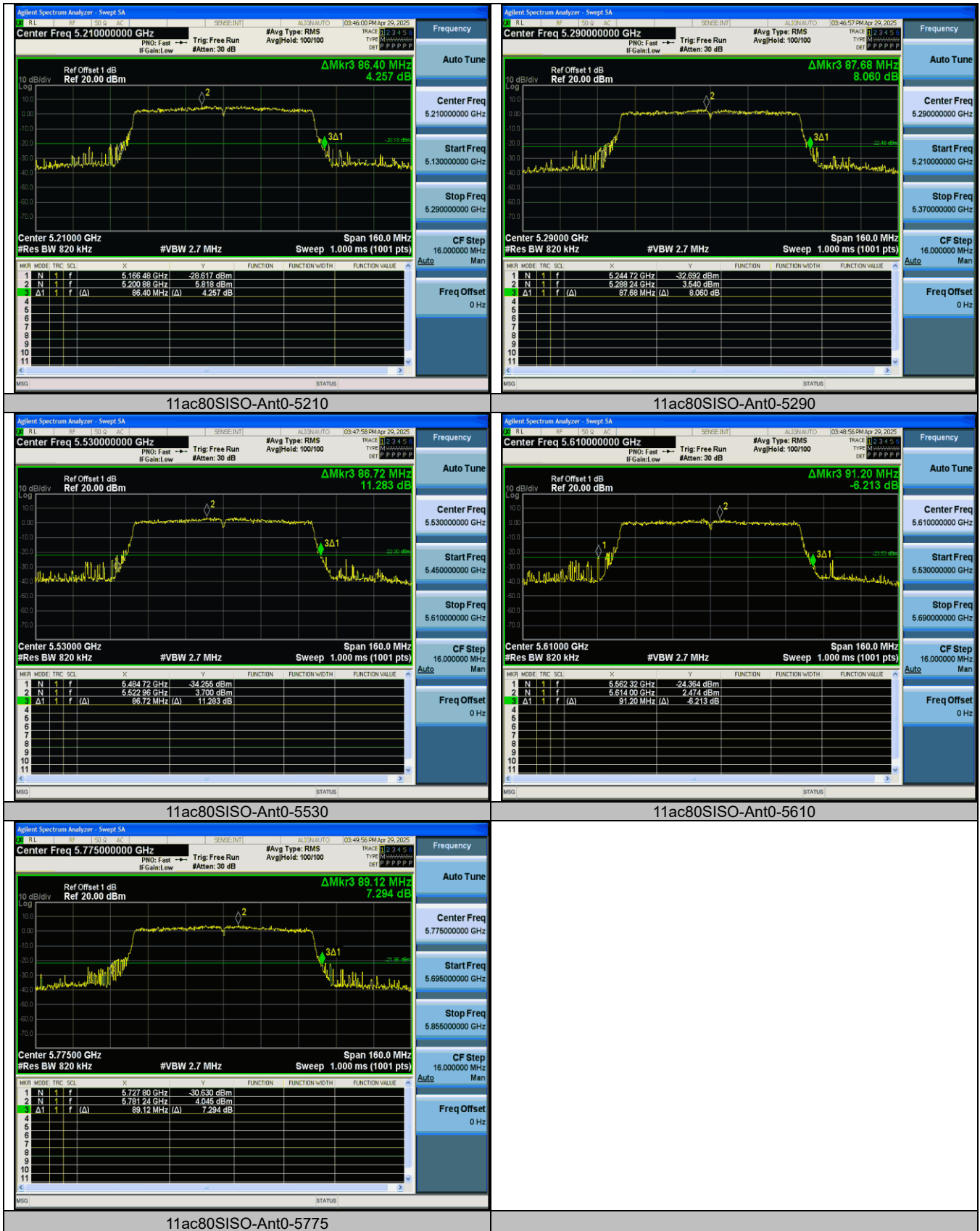












Occupied channel bandwidth

Test Result

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11a	Ant0	5180	16.985	5171.5300	5188.5150	---	---
11a	Ant0	5200	16.969	5191.5630	5208.5320	---	---
11a	Ant0	5240	16.976	5231.5091	5248.4851	---	---
11a	Ant0	5260	16.973	5251.5071	5268.4801	---	---
11a	Ant0	5300	16.947	5291.5596	5308.5066	---	---
11a	Ant0	5320	16.981	5311.5475	5328.5285	---	---
11a	Ant0	5500	16.967	5491.5295	5508.4965	---	---
11a	Ant0	5600	16.999	5591.4856	5608.4846	---	---
11a	Ant0	5700	16.948	5691.5232	5708.4712	---	---
11a	Ant0	5745	16.928	5736.5585	5753.4865	---	---
11a	Ant0	5785	16.943	5776.5356	5793.4786	---	---
11a	Ant0	5825	16.935	5816.5193	5833.4543	---	---
11n20SISO	Ant0	5180	18.067	5171.0145	5189.0815	---	---
11n20SISO	Ant0	5200	18.092	5190.9946	5209.0866	---	---
11n20SISO	Ant0	5240	18.074	5230.9875	5249.0615	---	---
11n20SISO	Ant0	5260	18.068	5250.9745	5269.0425	---	---
11n20SISO	Ant0	5300	18.154	5290.9683	5309.1223	---	---
11n20SISO	Ant0	5320	18.098	5310.9915	5329.0895	---	---
11n20SISO	Ant0	5500	18.144	5490.9707	5509.1147	---	---
11n20SISO	Ant0	5600	18.130	5590.9574	5609.0874	---	---
11n20SISO	Ant0	5700	18.074	5690.9856	5709.0596	---	---
11n20SISO	Ant0	5745	18.114	5735.9703	5754.0843	---	---
11n20SISO	Ant0	5785	18.081	5775.9699	5794.0509	---	---
11n20SISO	Ant0	5825	18.087	5815.9463	5834.0333	---	---
11n40SISO	Ant0	5190	36.512	5171.8008	5208.3128	---	---
11n40SISO	Ant0	5230	36.421	5211.8295	5248.2505	---	---
11n40SISO	Ant0	5270	36.544	5251.7450	5288.2890	---	---
11n40SISO	Ant0	5310	36.488	5291.8232	5328.3112	---	---
11n40SISO	Ant0	5510	36.456	5491.7936	5528.2496	---	---
11n40SISO	Ant0	5590	36.466	5571.7681	5608.2341	---	---
11n40SISO	Ant0	5670	36.497	5651.8015	5688.2985	---	---
11n40SISO	Ant0	5755	36.421	5736.8123	5773.2333	---	---
11n40SISO	Ant0	5795	36.459	5776.7789	5813.2379	---	---
11ac20SISO	Ant0	5180	18.091	5170.9999	5189.0909	---	---
11ac20SISO	Ant0	5200	18.123	5190.9638	5209.0868	---	---
11ac20SISO	Ant0	5240	18.093	5230.9537	5249.0467	---	---
11ac20SISO	Ant0	5260	18.091	5250.9639	5269.0549	---	---
11ac20SISO	Ant0	5300	18.105	5290.9853	5309.0903	---	---
11ac20SISO	Ant0	5320	18.113	5310.9755	5329.0885	---	---
11ac20SISO	Ant0	5500	18.087	5490.9704	5509.0574	---	---
11ac20SISO	Ant0	5600	18.101	5590.9468	5609.0478	---	---
11ac20SISO	Ant0	5700	18.111	5690.9585	5709.0695	---	---
11ac20SISO	Ant0	5745	18.109	5735.9439	5754.0529	---	---
11ac20SISO	Ant0	5785	18.036	5775.9837	5794.0197	---	---
11ac20SISO	Ant0	5825	18.102	5815.9346	5834.0366	---	---
11ac40SISO	Ant0	5190	36.458	5171.8174	5208.2754	---	---
11ac40SISO	Ant0	5230	36.451	5211.7978	5248.2488	---	---
11ac40SISO	Ant0	5270	36.449	5251.7846	5288.2336	---	---
11ac40SISO	Ant0	5310	36.423	5291.8609	5328.2839	---	---
11ac40SISO	Ant0	5510	36.439	5491.8044	5528.2434	---	---
11ac40SISO	Ant0	5590	36.428	5571.7717	5608.1997	---	---
11ac40SISO	Ant0	5670	36.404	5651.8529	5688.2569	---	---
11ac40SISO	Ant0	5755	36.443	5736.7931	5773.2361	---	---
11ac40SISO	Ant0	5795	36.399	5776.7844	5813.1834	---	---
11ac80SISO	Ant0	5210	75.842	5172.1638	5248.0058	---	---
11ac80SISO	Ant0	5290	76.051	5252.0147	5328.0657	---	---
11ac80SISO	Ant0	5530	75.838	5492.0674	5567.9054	---	---
11ac80SISO	Ant0	5610	76.044	5571.9220	5647.9660	---	---
11ac80SISO	Ant0	5775	75.935	5736.9776	5812.9126	---	---

Test Graphs





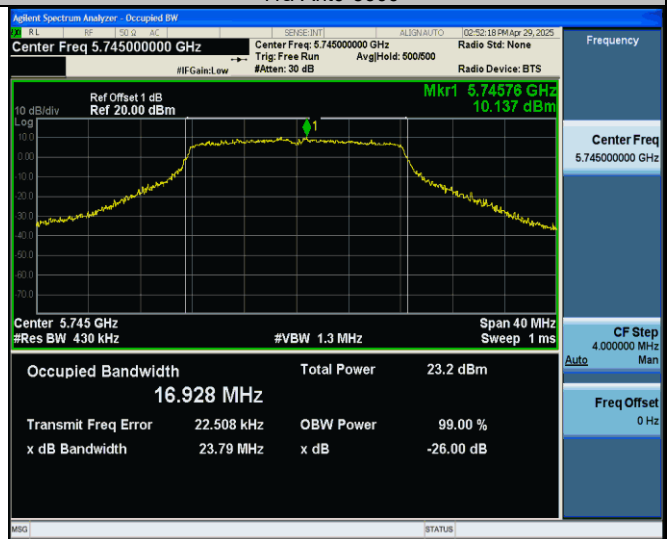
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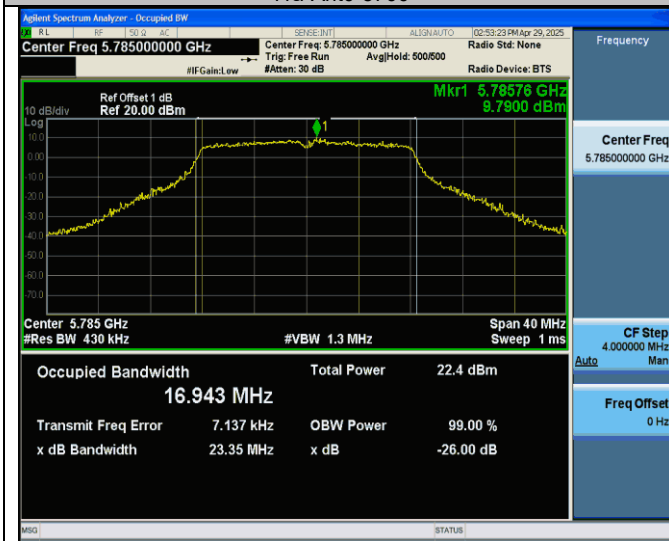
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11a-Ant0-5700



11a-Ant0-5745



11a-Ant0-5785



11a-Ant0-5825















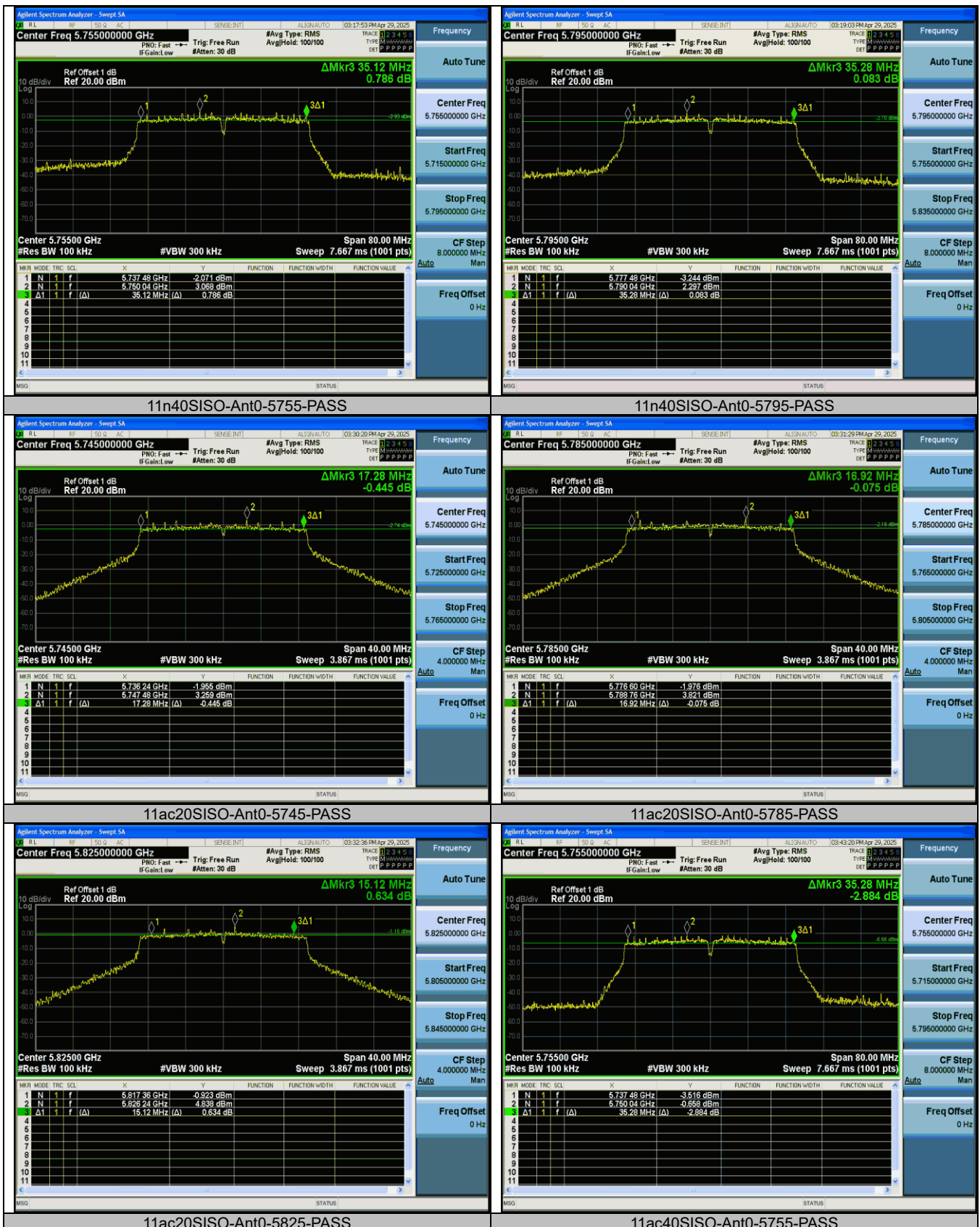


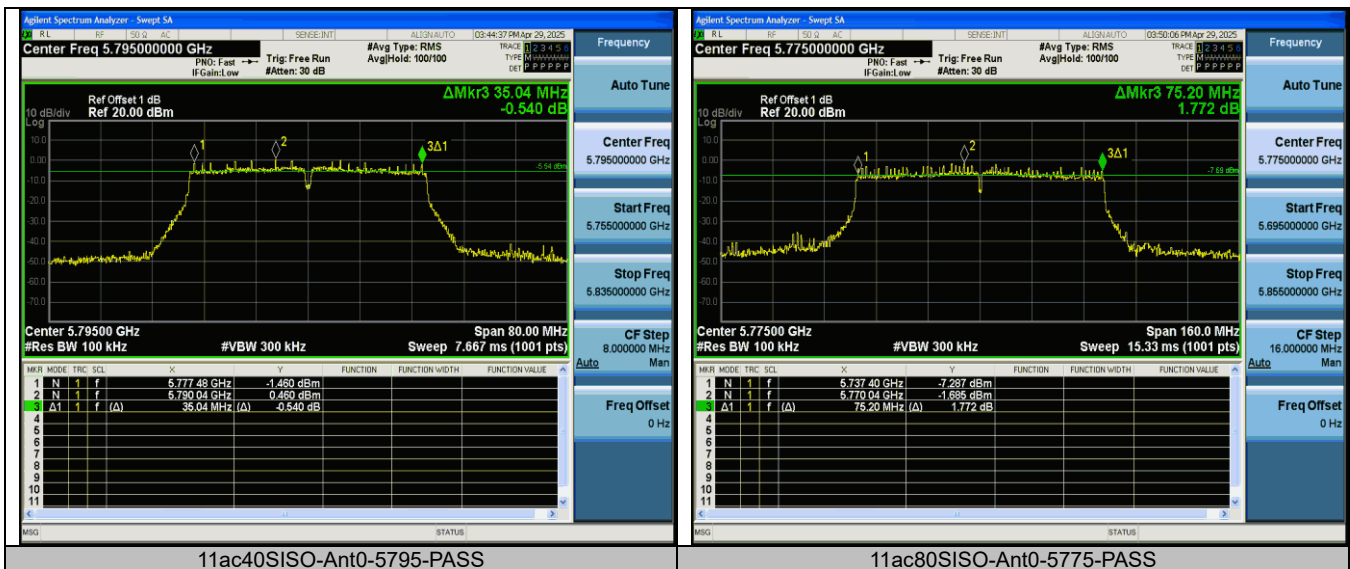
**Min emission bandwidth
Test Result B4**

TestMode	Antenna	Frequency[MHz]	6dB EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11a	Ant0	5745	15.680	5737.120	5752.800	0.5	PASS
11a	Ant0	5785	16.280	5776.880	5793.160	0.5	PASS
11a	Ant0	5825	14.000	5817.520	5831.520	0.5	PASS
11n20SISO	Ant0	5745	14.920	5737.600	5752.520	0.5	PASS
11n20SISO	Ant0	5785	15.000	5777.560	5792.560	0.5	PASS
11n20SISO	Ant0	5825	16.000	5816.880	5832.880	0.5	PASS
11n40SISO	Ant0	5755	35.120	5737.480	5772.600	0.5	PASS
11n40SISO	Ant0	5795	35.280	5777.480	5812.760	0.5	PASS
11ac20SISO	Ant0	5745	17.280	5736.240	5753.520	0.5	PASS
11ac20SISO	Ant0	5785	16.920	5776.600	5793.520	0.5	PASS
11ac20SISO	Ant0	5825	15.120	5817.360	5832.480	0.5	PASS
11ac40SISO	Ant0	5755	35.280	5737.480	5772.760	0.5	PASS
11ac40SISO	Ant0	5795	35.040	5777.480	5812.520	0.5	PASS
11ac80SISO	Ant0	5775	75.200	5737.400	5812.600	0.5	PASS

Test Graphs B4







Duty Cycle Test Result

TestMode	Antenna	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
11a	Ant0	5180	2.05	2.08	98.56
11a	Ant0	5200	2.05	2.08	98.56
11a	Ant0	5240	2.05	2.08	98.56
11a	Ant0	5260	2.05	2.08	98.56
11a	Ant0	5300	2.05	2.08	98.56
11a	Ant0	5320	2.05	2.08	98.56
11a	Ant0	5500	2.05	2.08	98.56
11a	Ant0	5600	2.04	2.08	98.08
11a	Ant0	5700	2.05	2.09	98.09
11a	Ant0	5745	2.05	2.08	98.56
11a	Ant0	5785	2.05	2.09	98.09
11a	Ant0	5825	2.04	2.08	98.08
11n20SISO	Ant0	5180	1.91	1.95	97.95
11n20SISO	Ant0	5200	1.91	1.95	97.95
11n20SISO	Ant0	5240	1.91	1.94	98.45
11n20SISO	Ant0	5260	1.90	1.94	97.94
11n20SISO	Ant0	5300	1.91	1.95	97.95
11n20SISO	Ant0	5320	1.91	1.94	98.45
11n20SISO	Ant0	5500	1.91	1.95	97.95
11n20SISO	Ant0	5600	1.91	1.95	97.95
11n20SISO	Ant0	5700	1.91	1.95	97.95
11n20SISO	Ant0	5745	1.91	1.95	97.95
11n20SISO	Ant0	5785	1.91	1.95	97.95
11n20SISO	Ant0	5825	1.91	1.95	97.95
11n40SISO	Ant0	5190	0.94	0.98	95.92
11n40SISO	Ant0	5230	0.94	0.98	95.92
11n40SISO	Ant0	5270	0.94	0.98	95.92
11n40SISO	Ant0	5310	0.94	0.98	95.92
11n40SISO	Ant0	5510	0.94	0.98	95.92
11n40SISO	Ant0	5590	0.94	0.98	95.92
11n40SISO	Ant0	5670	0.94	0.97	96.91
11n40SISO	Ant0	5755	0.94	0.98	95.92
11n40SISO	Ant0	5795	0.94	0.97	96.91
11ac20SISO	Ant0	5180	1.92	1.96	97.96
11ac20SISO	Ant0	5200	1.92	1.96	97.96
11ac20SISO	Ant0	5240	1.92	1.96	97.96
11ac20SISO	Ant0	5260	1.92	1.96	97.96
11ac20SISO	Ant0	5300	1.92	1.96	97.96
11ac20SISO	Ant0	5320	1.92	1.96	97.96
11ac20SISO	Ant0	5500	1.92	1.96	97.96
11ac20SISO	Ant0	5600	1.92	1.96	97.96
11ac20SISO	Ant0	5700	1.92	1.96	97.96
11ac20SISO	Ant0	5745	1.92	1.95	98.46
11ac20SISO	Ant0	5785	1.92	1.96	97.96
11ac20SISO	Ant0	5825	1.92	1.96	97.96
11ac40SISO	Ant0	5190	0.94	0.98	95.92
11ac40SISO	Ant0	5230	0.94	0.98	95.92
11ac40SISO	Ant0	5270	0.94	0.98	95.92
11ac40SISO	Ant0	5310	0.94	0.98	95.92
11ac40SISO	Ant0	5510	0.95	0.98	96.94
11ac40SISO	Ant0	5590	0.95	0.98	96.94
11ac40SISO	Ant0	5670	0.95	0.98	96.94
11ac40SISO	Ant0	5755	0.95	0.98	96.94
11ac40SISO	Ant0	5795	0.94	0.98	95.92
11ac80SISO	Ant0	5210	0.46	0.49	93.88
11ac80SISO	Ant0	5290	0.46	0.49	93.88
11ac80SISO	Ant0	5530	0.46	0.50	92.00
11ac80SISO	Ant0	5610	0.46	0.49	93.88
11ac80SISO	Ant0	5775	0.46	0.50	92.00

Test Graphs

