RF MEASUREMENT REPORT

FCC ID:	YY3-14249P
Applicant:	Handheld Group AB
Product:	Nautiz X9
Model No.:	NX9V2-RF1-AS0, NX9V2-RF1-A00
Brand Name:	Handheld
FCC Classification:	Unlicensed National Information Infrastructure (NII)
FCC Rule Part(s):	Part 15 Subpart E (Section 15.407)
Test Date:	October 12 ~ November 11, 2021

Reviewed By: Kevin Guo

Approved By: Robin Wu

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.02

The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

Revision History

Report No.	Version	Description	Issue Date	Note
2109RSU034-U2	Rev. 01	Initial Report	11-26-2021	

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1. General Information

1.1. Applicant

Handheld Group AB

Strandgaton 40 531 30 LIDKÖPING Sweden

1.2. Manufacturer

Handheld Group AB

Strandgaton 40 531 30 LIDKÖPING Sweden

1.3. Testing Facility

☐	**Test Site – MRT Suzhou Laboratory**				
	Laboratory Location (Suzhou - Wuzhong) D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China **Laboratory Location (Suzhou - SIP)** 4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China				
	Laboratory Accreditations				
	A2LA: 3628.01		CNAS: L10551		
	FCC: CN1166		ISED: CN0001		
	VCCI:	☐R-20025	☐G-20034	☐C-20020	☐T-20020
		☐R-20141	☐G-20134	☐C-20103	☐T-20104
☒	**Test Site – MRT Shenzhen Laboratory**				
	Laboratory Location (Shenzhen) 1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China				
	Laboratory Accreditations				
	A2LA: 3628.02		CNAS: L10551		
	FCC: CN1284		ISED: CN0105		
☐	**Test Site – MRT Taiwan Laboratory**				
	Laboratory Location (Taiwan) No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)				
	Laboratory Accreditations				
	TAF: L3261-190725				
	FCC: 291082, TW3261		ISED: TW3261		

1.4. Product Information

Product Name	Nautiz X9
Model No.	NX9V2-RF1-AS0, NX9V2-RF1-A00
Brand Name	Handheld
Wi-Fi Specification	802.11a/b/g/n/ac
Bluetooth Version	Bluetooth v5.0 Dual Mode
Wi-Fi Specification	802.11a/b/g/n/ac
GSM Bands	GSM850 / 1900
WCDMA Bands	Band II / IV / V
LTE Bands	FDD Band: 2, 4, 5,12, 17 TDD Band: 41
NFC Specification	13.56MHz
GNSS Specification	GPS / GLONASS / Beidou / Galileo
Software version	V000.06.00
Hardware version	DVT
Antenna Information	Refer to section 1.7
IMEI No.	Conducted Measurement: 358591250000136 Radiated Measurement: 35859125000698
Accessories	
Battery	Brand Name: Handheld Model: NX9V2-1004 Capacity: Typical 3.8V, 4800mAh, 18.24Wh
Power Adapter	MFR: Phihong Technology Co. Ltd. Model: PSAF10R-050Q Input: AC 100-240V~0.3A, 50-60Hz Output: DC 5V-2.0A
Micro USB Cable	Length: Shielded, 1.0m
Remark: 1. The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

Note:

1. Model Difference Description (declared by the manufacturer)

Model Number	Model Difference	Note
NX9V2-RF1-AS0	Support Barcode	--
NX9V2-RF1-A00	Not Barcode	Remove barcode hardware

2.The difference does not affect the RF test result, so we selected NX9V2-RF1-AS0 for all RF testing.

1.5. Radio Specification

Frequency Range	For 802.11a/n-HT20/ac-VHT20: 5180~5240MHz, 5745~5825MHz For 802.11n-HT40/ac-VHT40: 5190~5230MHz, 5755~5795MHz For 802.11ac-VHT80: 5210MHz, 5290MHz, 5775MHz
Type of Modulation	802.11a/n/ac: OFDM
Data Rate	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 150Mbps 802.11ac: up to 433.3Mbps

Note: For other features of this EUT, test report will be issued separately.

1.6. Working Frequencies

802.11a/n-HT20/ac-VHT20

Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz
48	5240 MHz	149	5745 MHz	153	5765 MHz
157	5785 MHz	161	5805 MHz	165	5825 MHz

802.11n-HT40/ac-VHT40

Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz	151	5755 MHz
159	5795 MHz			--	--

802.11ac-VHT80

Channel	Frequency	Channel	Frequency	Channel	Frequency
42	5210 MHz	155	5775 MHz	--	--

1.7. Antenna Details

Antenna Type	Frequency Band (MHz)	T_X Paths	Max Antenna Gain (dBi)
Wi-Fi and Bluetooth			
FPC Antenna	2400 ~ 2500	1	2.25
	5150 ~ 5250 5725 ~ 5850	1	1.92

2. Test Configuration

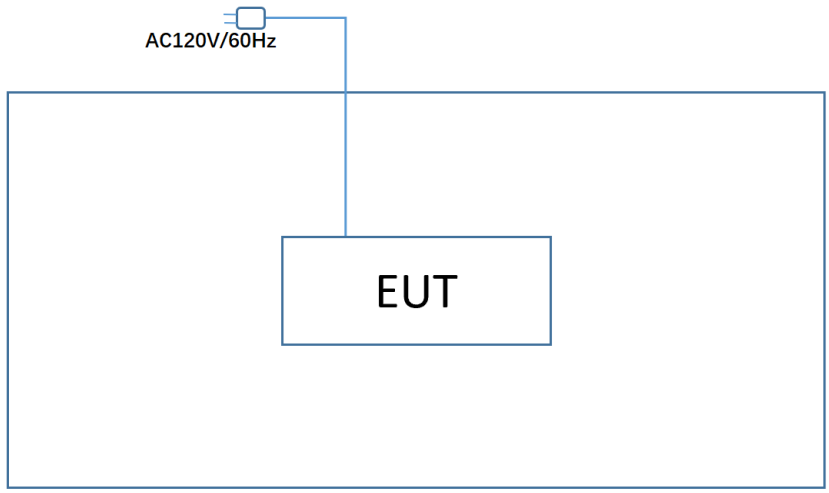
2.1. Test Mode

Mode 1: Transmit by 802.11a (6Mbps)
Mode 2: Transmit by 802.11n-HT20 (MCS0)
Mode 3: Transmit by 802.11n-HT40 (MCS0)
Mode 4: Transmit by 802.11ac-VHT20 (MCS0)
Mode 5: Transmit by 802.11ac-VHT40 (MCS0)
Mode 6: Transmit by 802.11ac-VHT80 (MCS0)

2.2. Test System Connection Diagram

The device was tested per the guidance ANSI C63.10: 2013 was used to reference the appropriate EUT setup for radiated emissions testing and AC line conducted testing.

Connection Diagram – Radiated Emission testing & AC Conducted Emissions



2.3. Test System Details

Product		Manufacturer	Model No.
1	N/A	N/A	N/A

2.4. Test Software

The test utility software used during testing was “Engineer Mode”.

Note: Final power setting please refer to operational description.

2.5. Applied Standards

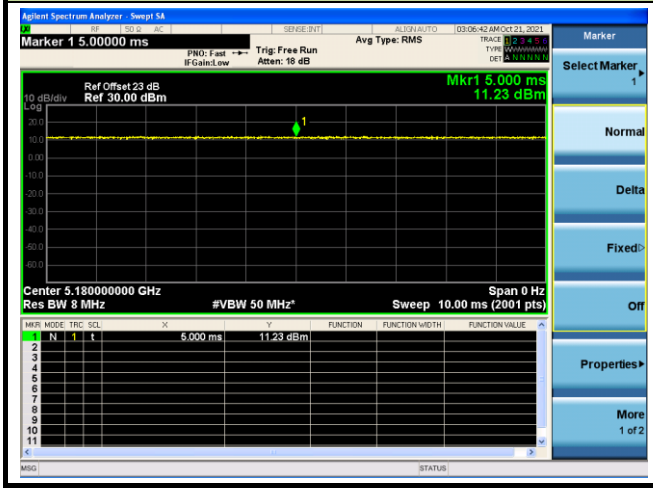
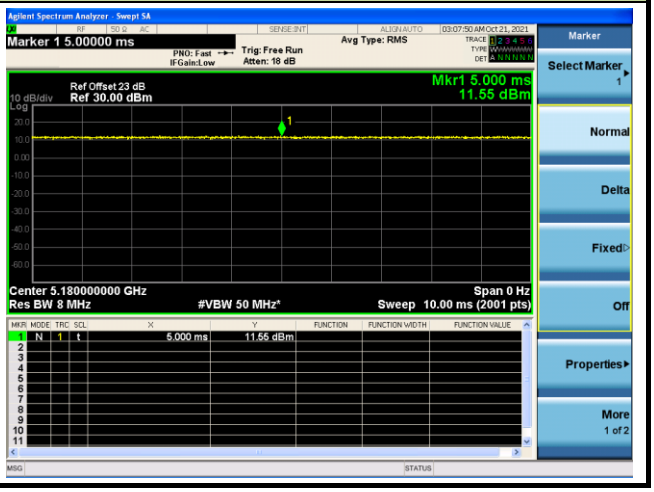
According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

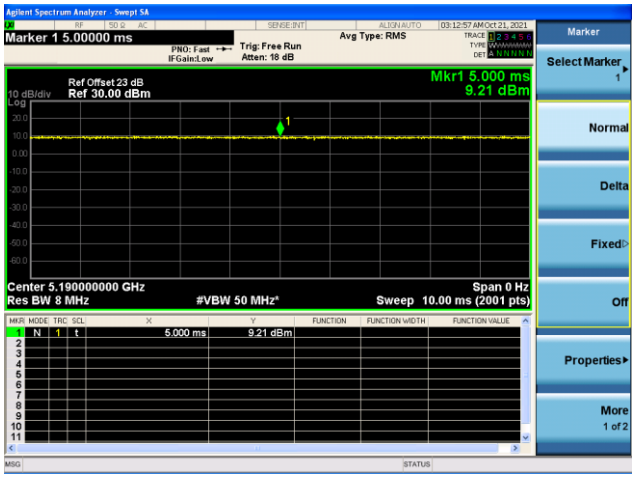
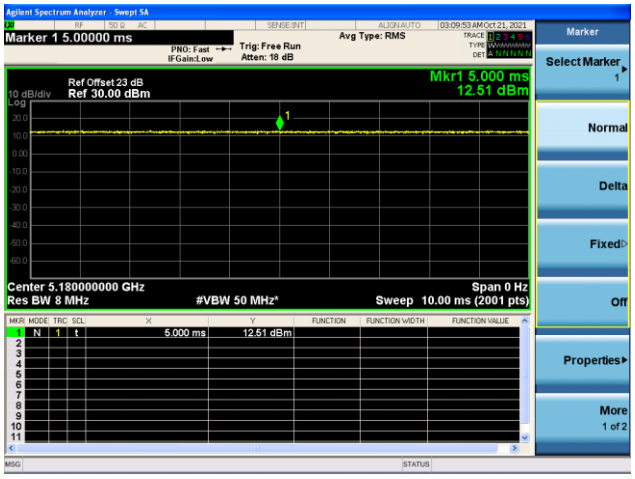
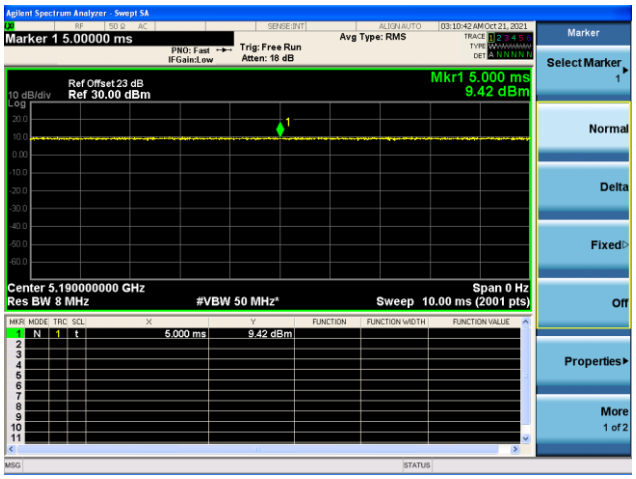
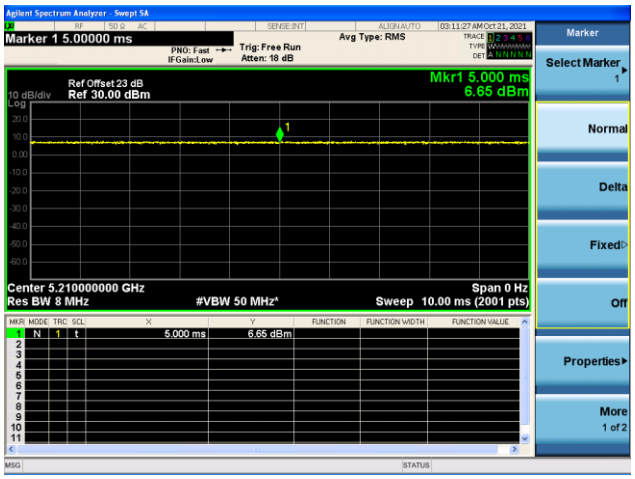
- FCC Part 15.407
- KDB 789033 D02v02r01
- ANSI C63.10-2013

2.6. Duty Cycle

The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Test Mode	Duty Cycle
802.11a	100%
802.11n-HT20	100%
802.11n-HT40	100%
802.11ac-VHT20	100%
802.11ac-VHT40	100%
802.1ac-VHT80	100%

Duty Cycle (T = Transmission Duration)	
802.11a	802.11n-HT20
	

Duty Cycle (T = Transmission Duration)	
802.11n-HT40	802.11ac-VHT20
	
802.11ac-VHT40	802.11ac-VHT80
	

2.7. Test Environment Condition

Ambient Temperature	15°C~35°C
Relative Humidity	20%RH ~75%RH

3. Antenna Requirements

Excerpt from §15.203 of the FCC Rules/Regulations:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 shall be considered sufficient to comply with the provisions of this section."

- The antenna of the device is **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The unit complies with the requirement of §15.203.

4. Measuring Instrument

No.	Instrument	Manufacturer	Model No.	Asset No.	Last Cali. Date	Cali. Due Date	Test Site
1	Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06292	1 year	2022/10/20	NS-AC1
2	Anechoic Chamber	BOOMWAVE	NS-AC1	MRTSUE06496	1 year	2022/7/24	NS-AC1
3	Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06572	1 year	2022/3/14	NS-AC1
4	TRILOG Antenna	Schwarzbeck	VULB 9162	MRTSUE06573	1 year	2022/6/29	NS-AC1
5	Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06574	1 year	2022/7/12	NS-AC1
6	EMI Test Receiver	R&S	ESR3	MRTSUE06575	1 year	2022/6/27	NS-AC1
7	Thermohygrometer	DELI	NO.8813	MRTSUE06588	1 year	2022/6/30	NS-AC1
8	Preamplifier	EMCI	EMC184045SE	MRTSUE06641	1 year	2022/1/14	NS-AC1
9	Signal Analyzer	Agilent	N9010A	MRTSUE06195	1 year	2022/3/17	NS-AC1/NS-TR2
10	Signal Analyzer	Keysight	N9020A	MRTSUE10065	1 year	2022/6/17	NS-AC1/NS-TR2
11	Shielding Room	BOOMWAVE	NS-SR1	MRTSUE06550	/	/	NS-SR1
12	Shielding Room	BOOMWAVE	NS-SR2	MRTSUE06551	/	/	NS-SR2
13	Two-Line V-Network	R&S	ENV216	MRTSUE06577	1 year	2022/07/4	NS-SR2
14	Two-Line V-Network	R&S	ENV216	MRTSUE06578	1 year	2022/07/4	NS-SR2
15	USB Power Sensor	Keysight	U2021XA	MRTSUE06581	1 year	2022/8/15	NS-TR2

Software	Version	Function
EMI Software	V3	EMI Test Software

5. Measurement Uncertainty

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

AC Conducted Emission Measurement
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz~150kHz: 3.74dB 150kHz~30MHz: 3.44dB
Radiated Disturbance
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): Horizontal: 30MHz~300MHz: 5.04dB 300MHz~1GHz: 4.95dB 1GHz~40GHz: 6.40dB Vertical: 30MHz~300MHz: 5.24dB 300MHz~1GHz: 6.03dB 1GHz~40GHz: 6.40dB
Spurious Emissions, Conducted
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.78dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.13dB
Power Spectrum Density
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.15dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.28%

6. Test Result

6.1. Summary

FCC Section(s)	Test Description	Test Condition	Verdict
15.407(a)	26dB Bandwidth	Conducted	Pass
15.407(e)	6dB Bandwidth		Pass
15.407(a)(1)(iv), (3)(i)	Maximum Conducted Output Power		Pass
15.407(a)(1)(iv), (3)(i), (12)	Peak Power Spectral Density		Pass
15.407(g)	Frequency Stability		Pass
15.407(b)(1), (4)(i)	Undesirable Emissions		Pass
15.205, 15.209 15.407(b) (8), (9), (10)	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Radiated	Pass
15.207	AC Conducted Emissions 150kHz - 30MHz	Line Conducted	Pass

Remark:

1. The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
2. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst-case emissions.

6.2. 26dB Bandwidth

6.2.1. Test Limit

N/A

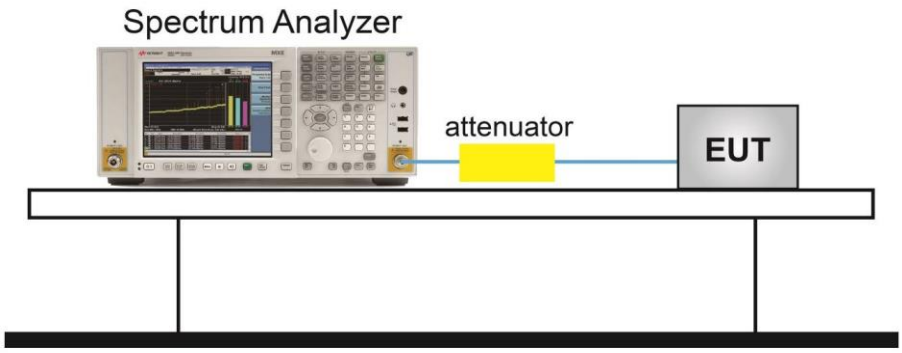
6.2.2. Test Procedure used

KDB 789033 D02v02r01- Section C.1

6.2.3. Test Setting

1. The analyzers' automatic bandwidth measurement capability was used to perform the 26dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 26. The automatic bandwidth measurement function also has the capability of simultaneously measuring the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediated power nulls in the fundamental emission.
2. RBW = approximately 1% of the emission bandwidth.
3. VBW ≥ 3×RBW.
4. Detector = Peak.
5. Trace mode = max hold.

6.2.4. Test Setup



6.2.5. Test Result

Refer to Appendix A.1.

6.3. 6dB Bandwidth

6.3.1. Test Limit

The minimum 6dBbandwidth shall be at least 500 kHz.

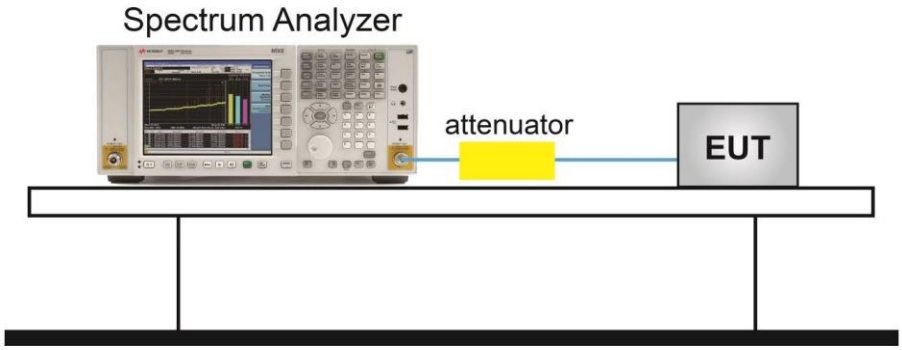
6.3.2. Test Procedure used

KDB 789033 D02v02r01- Section C.2

6.3.3. Test Setting

1. Set center frequency to the nominal EUT channel center frequency.
2. RBW = 100 kHz.
3. VBW 3 × RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. 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.

6.3.4. Test Setup



6.3.5. Test Result

Refer to Appendix A.2.

6.4. Output Power

6.4.1. Test Limit

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 band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm).

If transmitting antennas of directional gain greater than 6dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

6.4.2. Test Procedure Used

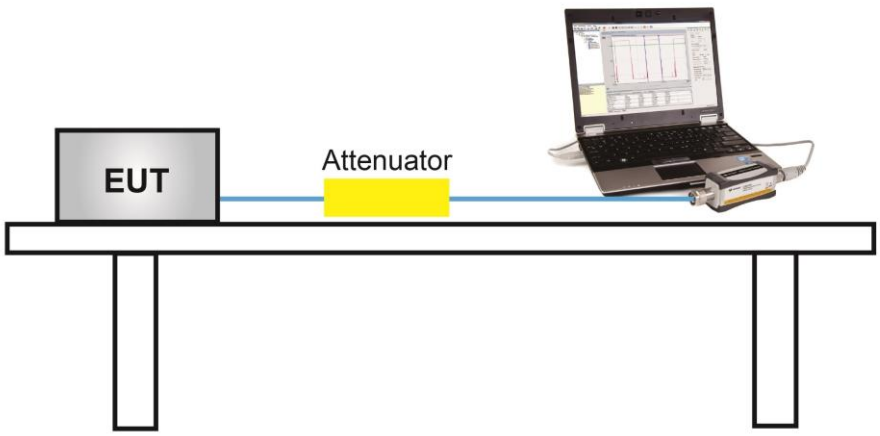
KDB 789033D02v02r01- Section E)3)b) Method PM-G

6.4.3. Test Setting

Average Power Measurement

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.

6.4.4. Test Setup



6.4.5. Test Result

Refer to Appendix A.3.

6.5. Power Spectral Density

6.5.1. Test Limit

For the band 5.15-5.25 GHz, 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.

If transmitting antennas of directional gain greater than 6dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

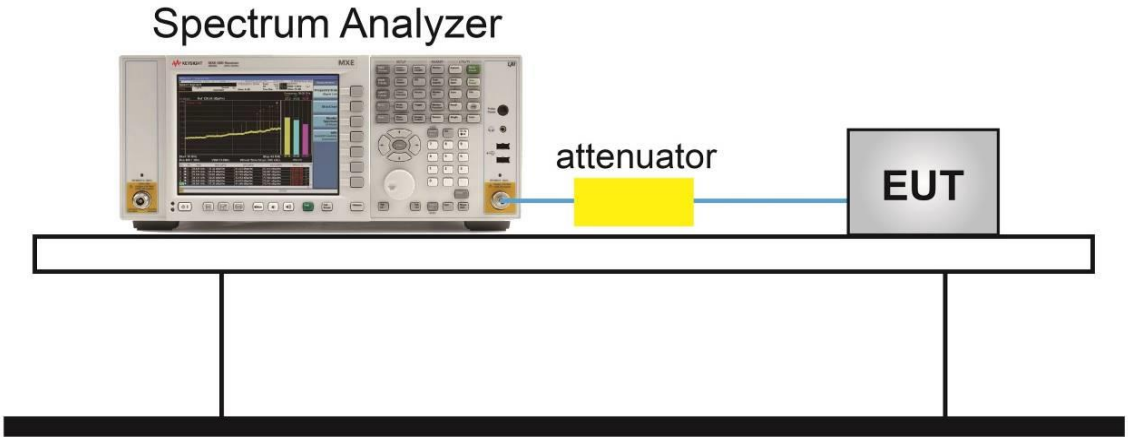
6.5.2. Test Procedure Used

KDB 789033 D02v02r01-SectionF

6.5.3. Test Setting

1. Analyzer was set to the center frequency of the UNII channel under investigation
2. Span was set to encompass the entire 26dB EBW of the signal.
3. RBW = 1MHz, if measurement bandwidth of Maximum PSD is specified in 500 kHz, RBW = 510 kHz
4. VBW = 3MHz
5. Number of sweep points ≥ 2 × (span / RBW)
6. Detector = power averaging (Average)
7. Sweep time = auto
8. Trigger = free run
9. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
10. Add 10*log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add 10*log(1/0.25) = 6 dB if the duty cycle is 25 percent.

6.5.4. Test Setup



6.5.5. Test Result

Refer to Appendix A.4.

6.6. Frequency Stability Measurement

6.6.1. Test Limit

Manufactures 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.

6.6.2. Test Procedure Used

Frequency Stability Under Temperature Variations:

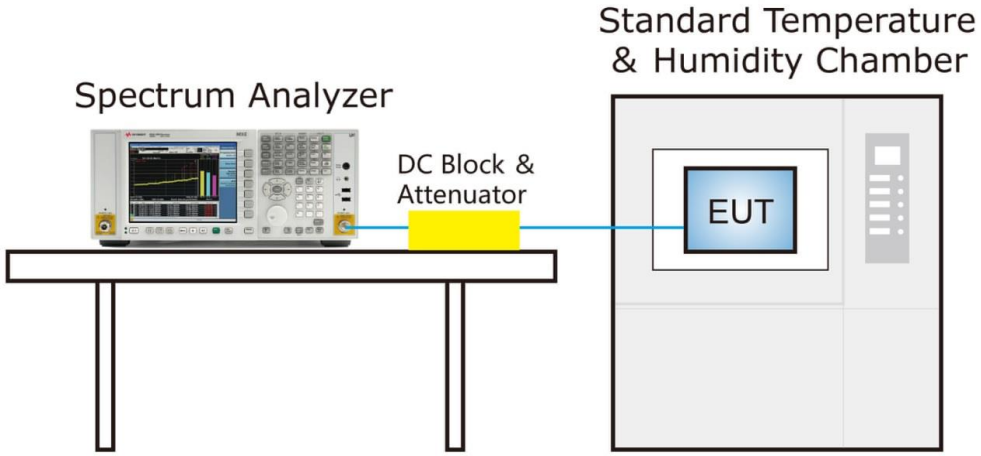
The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to highest. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C decreased per stage until the lowest temperature reached.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, record the maximum frequency change.

6.6.3. Test Setup



6.6.4. Test Result

Refer to Appendix A.5.

6.7. Radiated Spurious Emission

6.7.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

6.7.2. Test Procedure Used

KDB 789033 D02v02r01- Section G

6.7.3. Test Setting

Table 1 - RBW as a function of frequency

Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000MHz	1MHz

Quasi-Peak Measurements below 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest

2. Span was set greater than 1MHz

3. RBW = as specified in Table 1

4. Detector = CISPR quasi-peak

5. Sweep time = auto couple

6. Trace was allowed to stabilize

Peak Measurements above 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest

2. RBW = 1MHz

3. VBW = 3MHz

4. Detector = peak

5. Sweep time = auto couple

6. Trace mode = max hold

7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method VB)

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest

2. RBW = 1MHz

3. VBW; If the EUT is configured to transmit with duty cycle ≥ 98%, set VBW = 10 Hz.

If the EUT duty cycle is < 98%, set VBW ≥ 1/T. T is the minimum transmission duration.

4. Detector = Peak

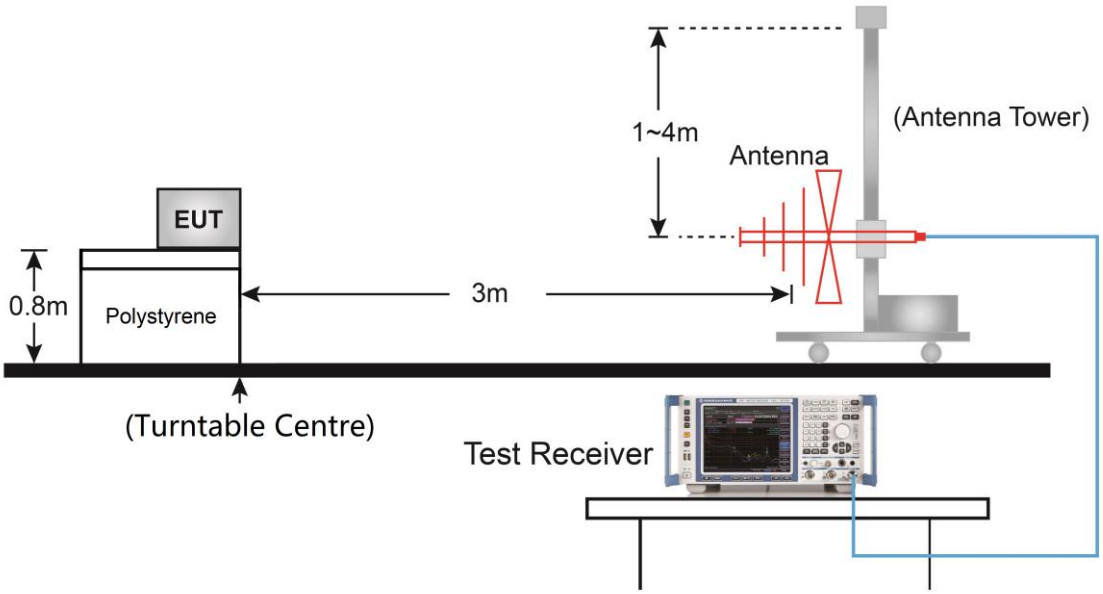
5. Sweep time = auto

6. Trace mode = max hold

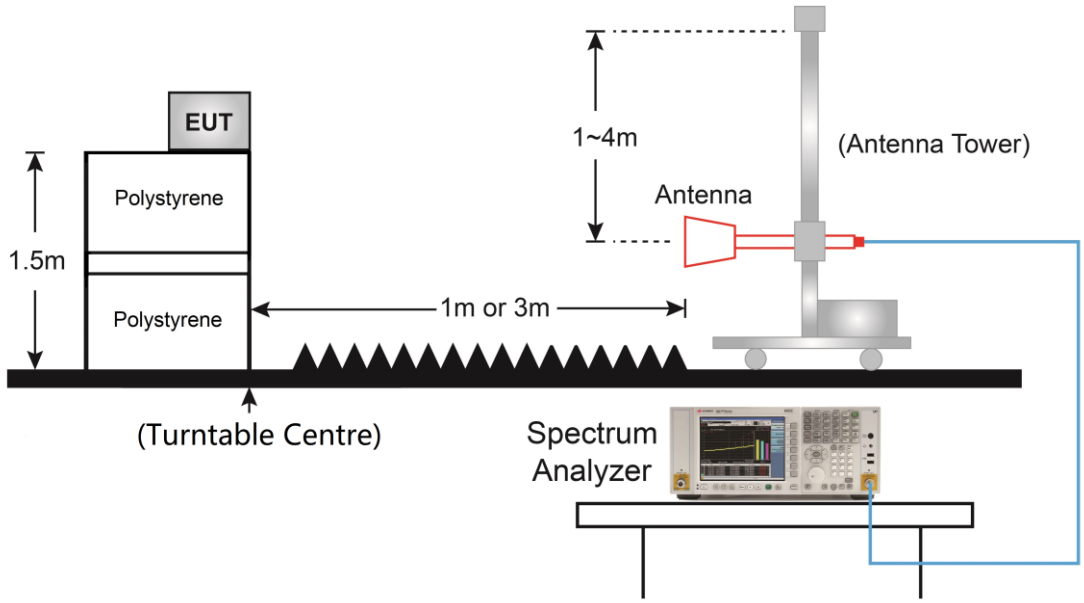
7. Trace was allowed to stabilize

6.7.4. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



6.7.5. Test Result

Refer to Appendix A.6.

6.8. Radiated Restricted Band Edge

6.8.1. Test Limit

For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a).

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1] 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41	--	--	--

For 15.407(b) requirement:

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 5.725-5.85 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.

Refer to KDB 789033 D02v02r01 G)2)c), as specified in § 15.407(b), emissions above 1000 MHz that are

outside of the restricted bands are subject to a maximum emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in § 15.407(b)(4)). However, an out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.
All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

6.8.2. Test Procedure Used

KDB 789033 D02v02r01- Section G

6.8.3. Test Setting

Peak Measurements above 1GHz

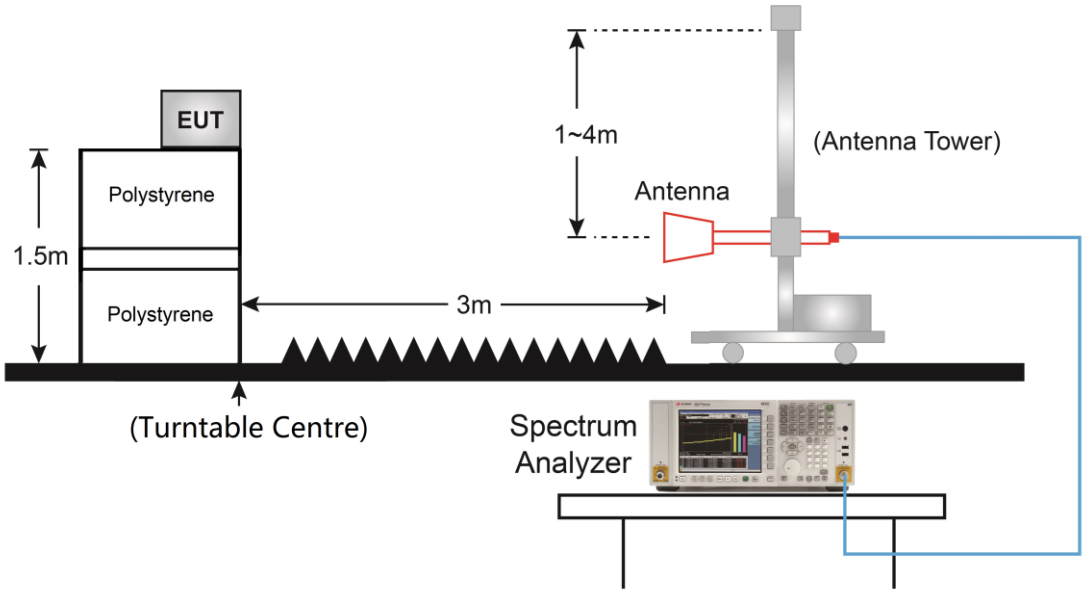
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = Peak
5. Sweep time = Auto couple
6. Trace mode = Max hold
7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method VB)

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz

3. VBW; if the EUT is configured to transmit with duty cycle ≥ 98%, set VBW = 10Hz
4. If the EUT duty cycle is < 98%, set VBW ≥ 1/T. T is the minimum transmission duration
5. Detector = Peak
6. Sweep time = Auto
7. Trace mode = Max hold
8. Trace was allowed to stabilize

6.8.4. Test Setup



6.8.5. Test Result

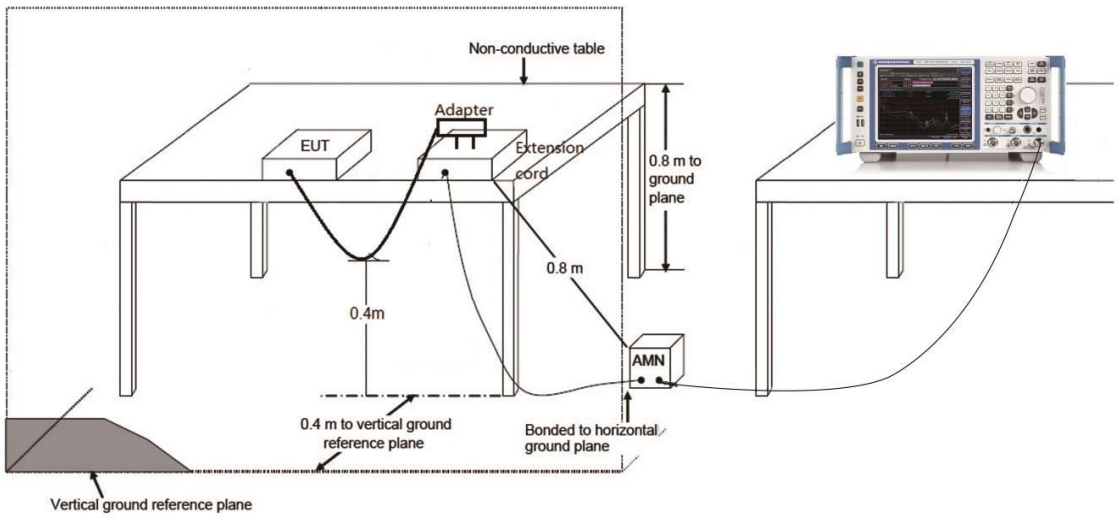
Refer to Appendix A.7.

6.9. AC Conducted Emissions

6.9.1. Test Limit

FCC Part 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50
Note 1: The lower limit shall apply at the transition frequencies. Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.		

6.9.2. Test Setup



6.9.3. Test Result

Refer to Appendix A.8.

7. Conclusion

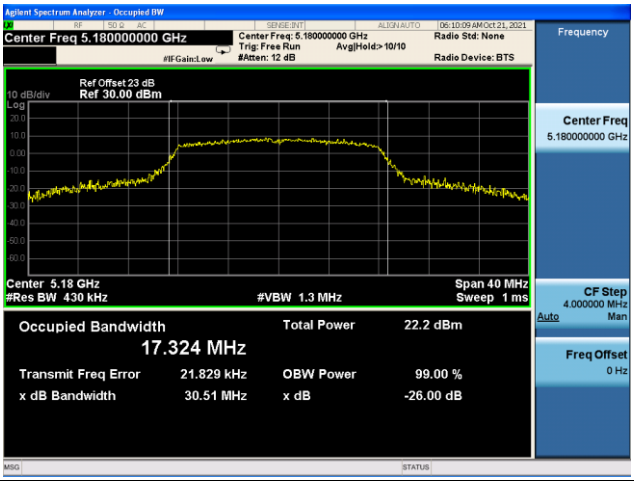
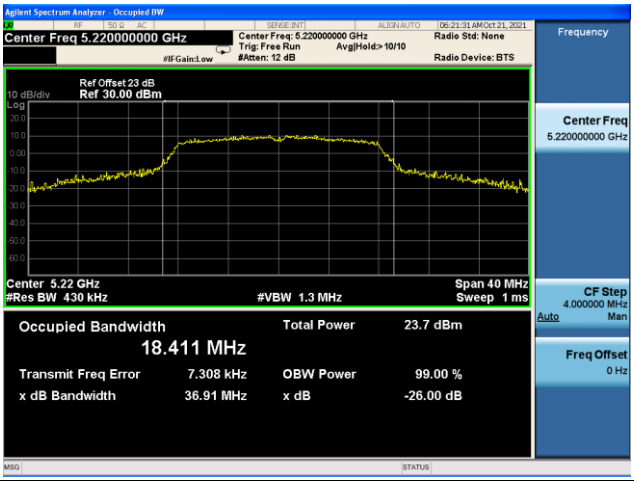
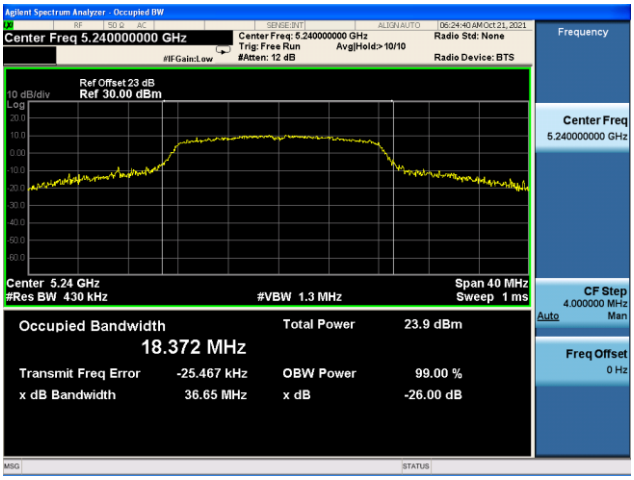
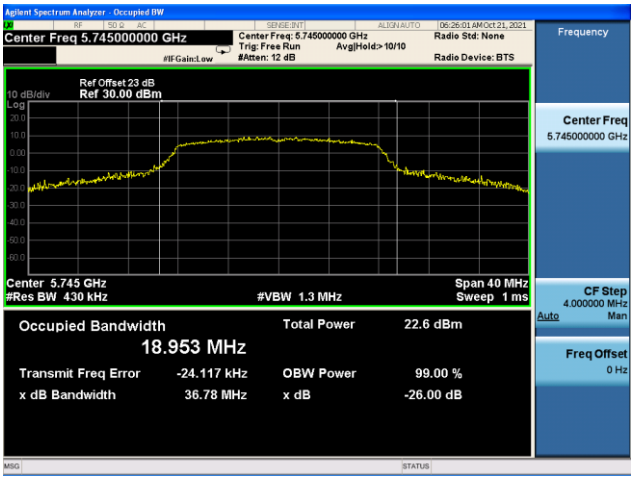
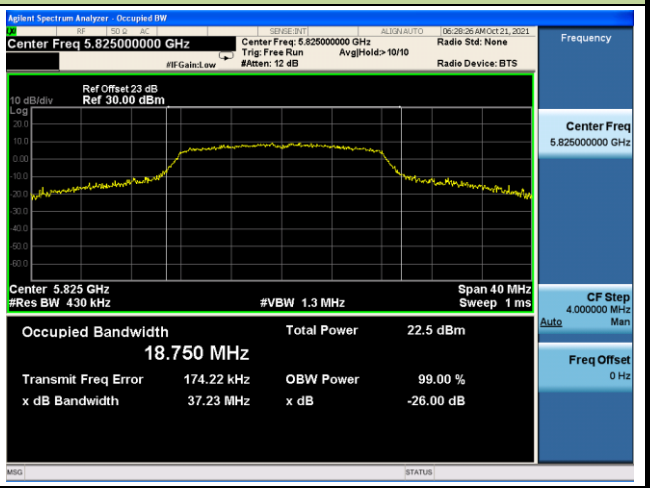
The data collected relate only the item(s) tested and show that the device is in compliance with Part 15E of the FCC rules.

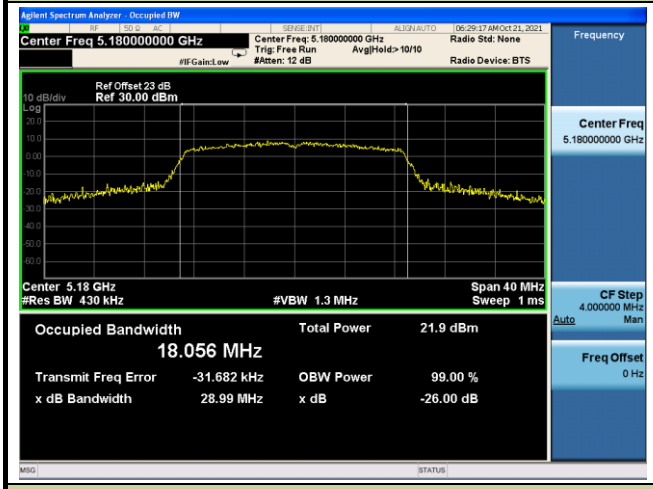
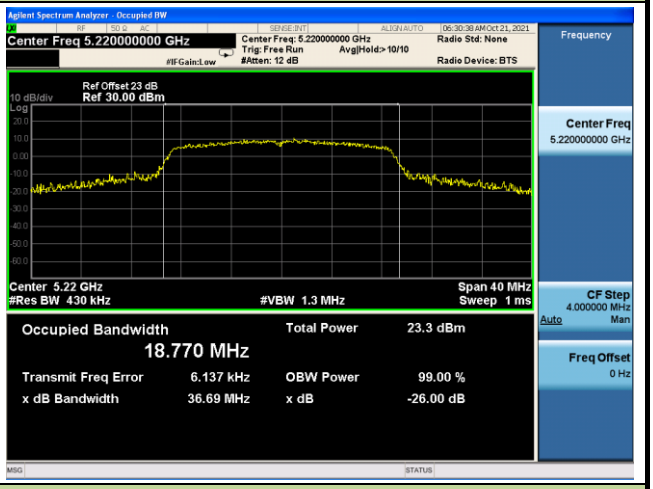
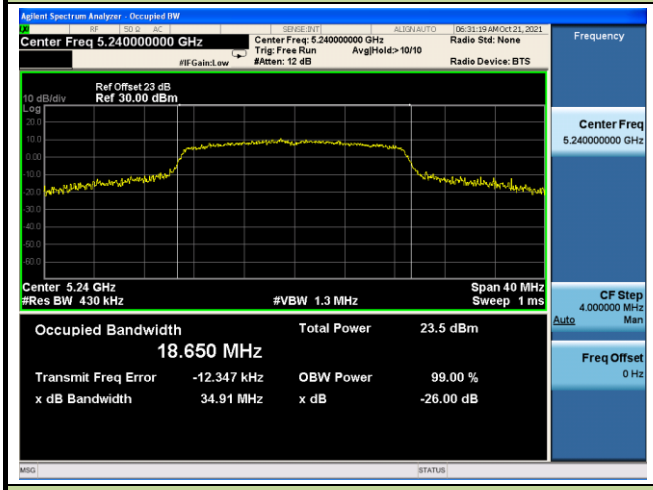
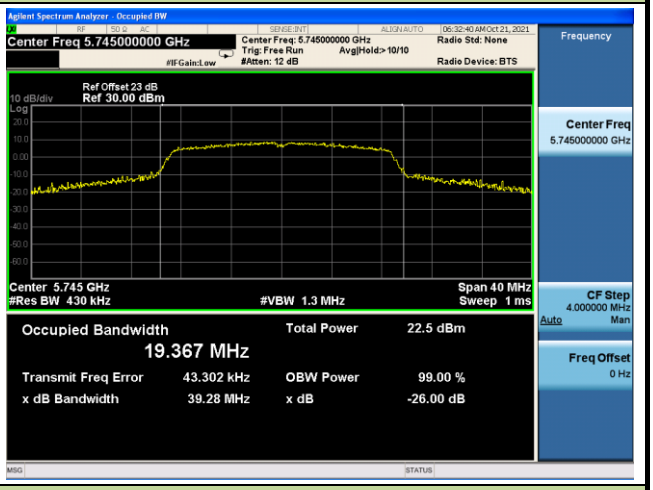
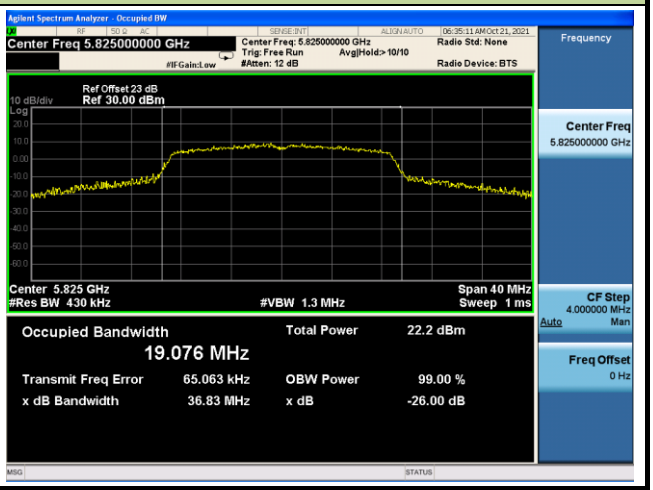
Appendix A – Test Result

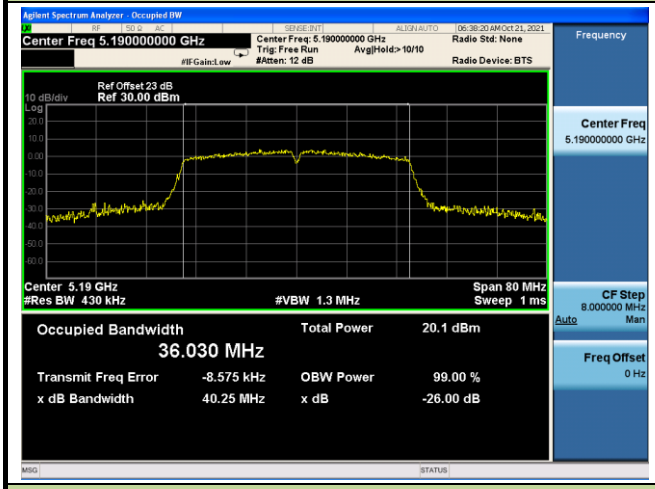
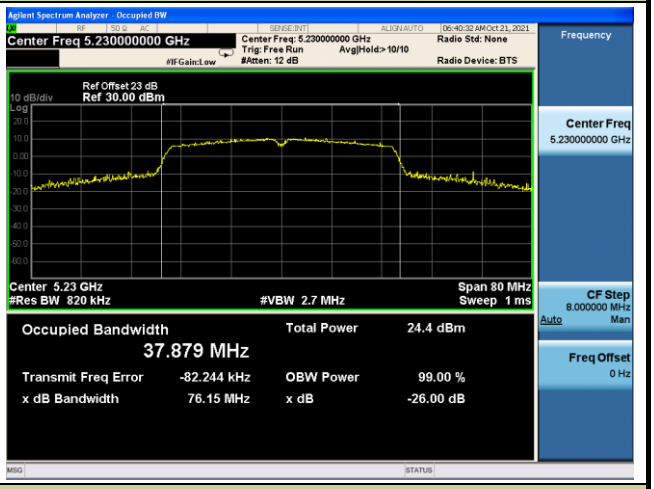
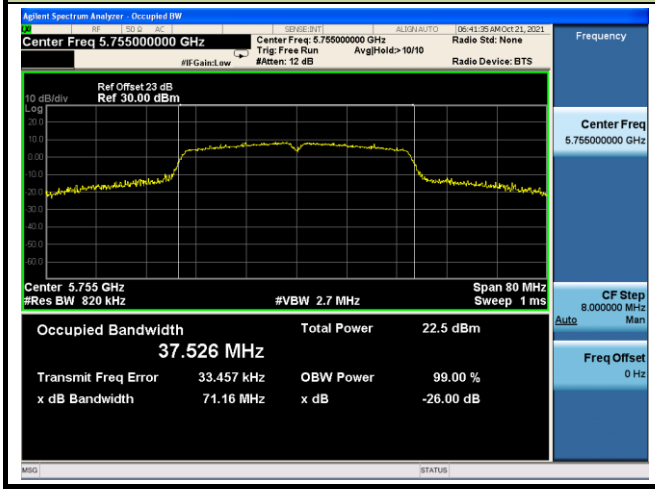
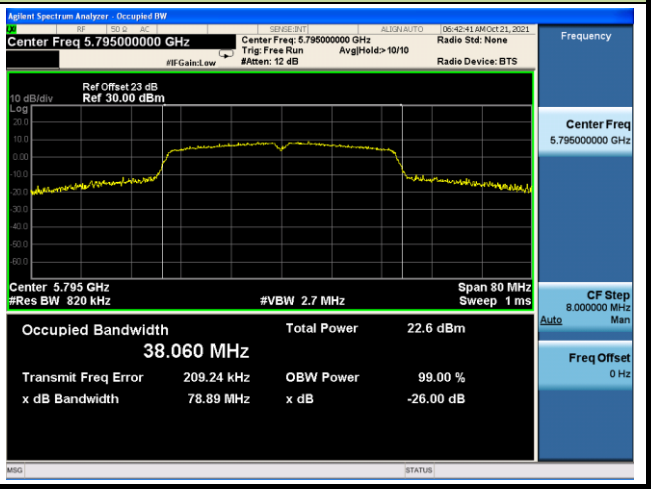
A.1 26dB Bandwidth Test Result

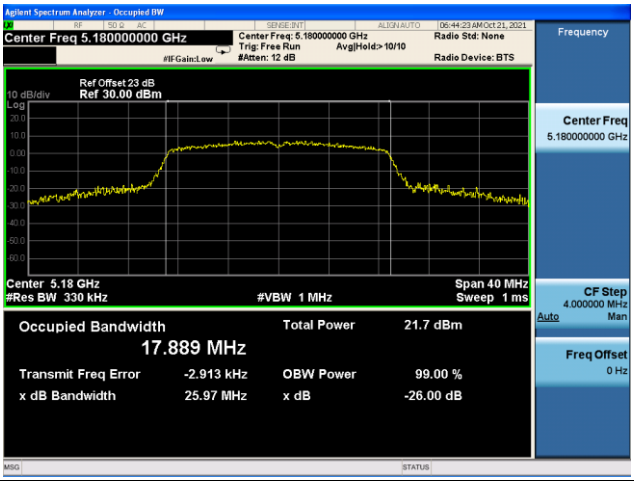
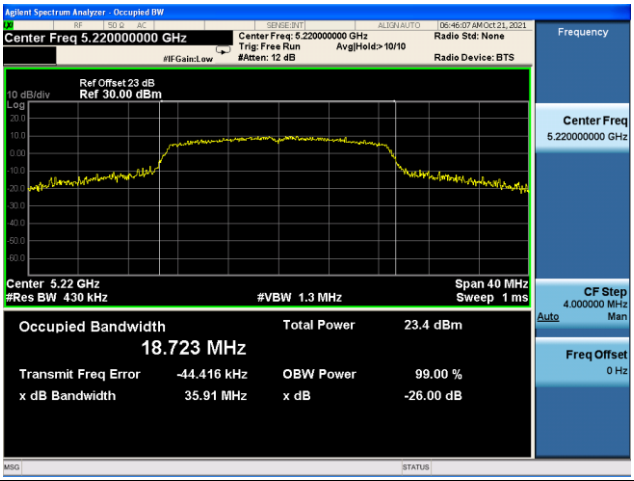
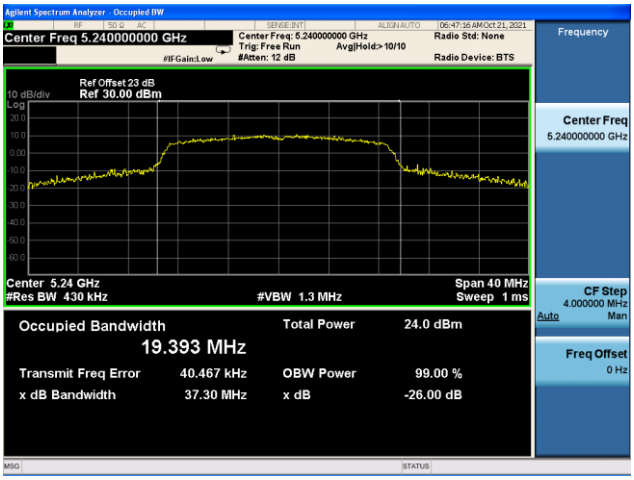
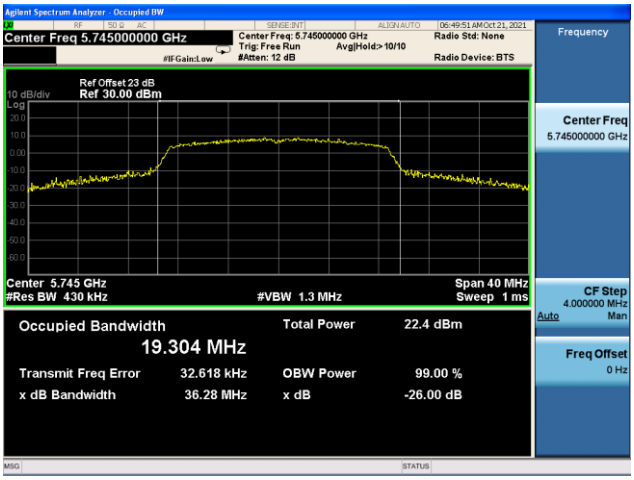
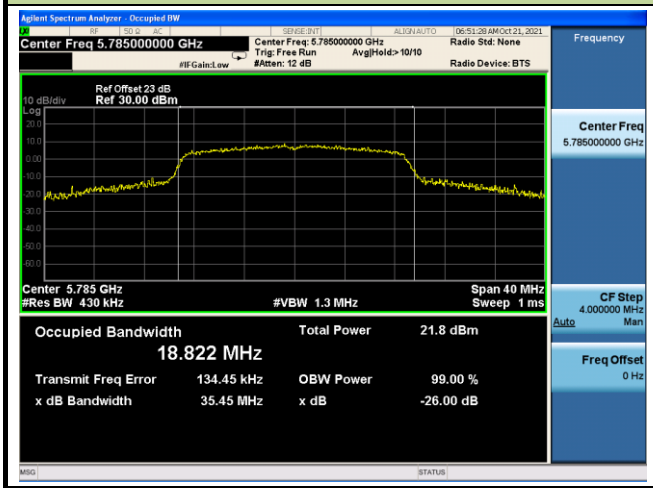
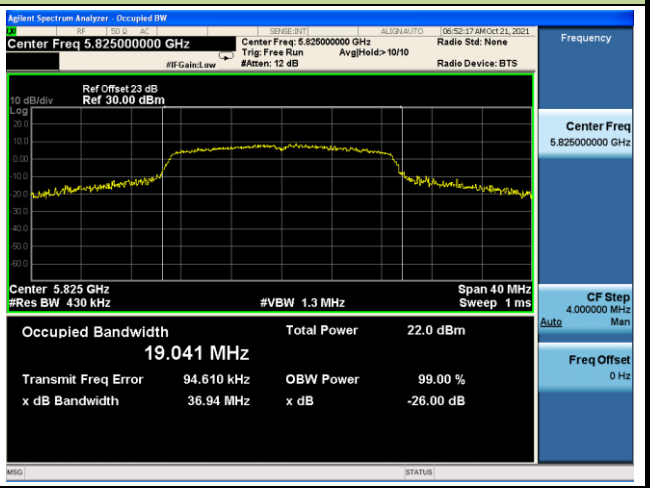
Test Site	NS-SR2	Test Engineer	Summer Tang
Test Date	2021/10/21		

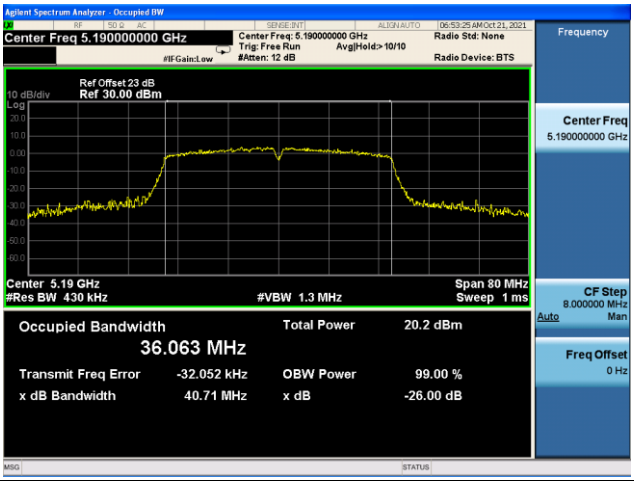
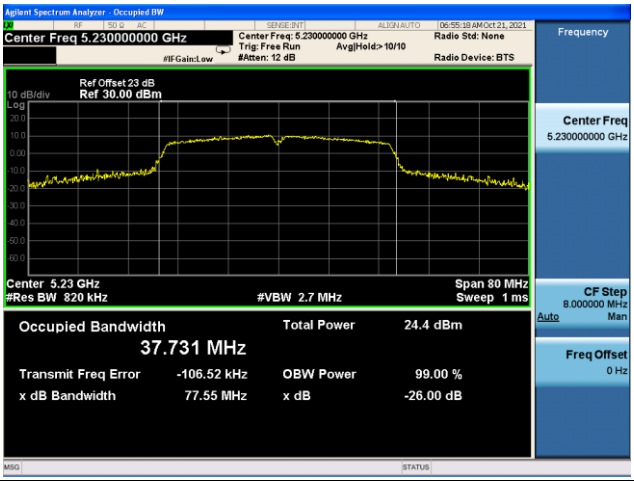
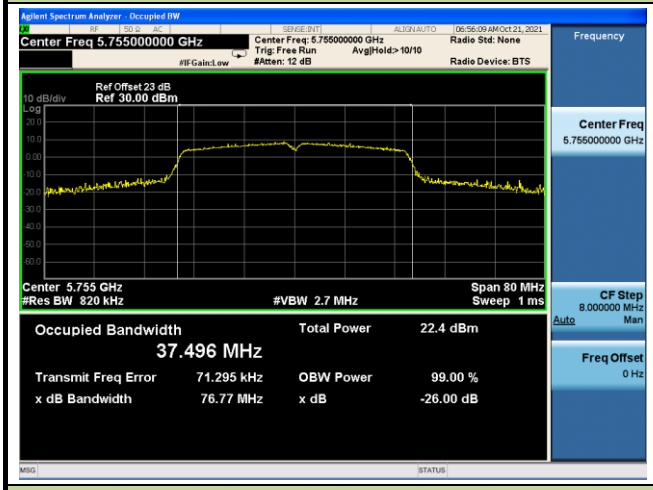
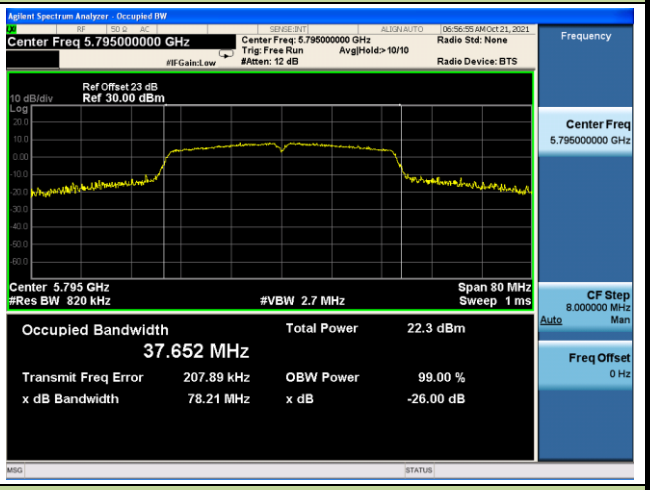
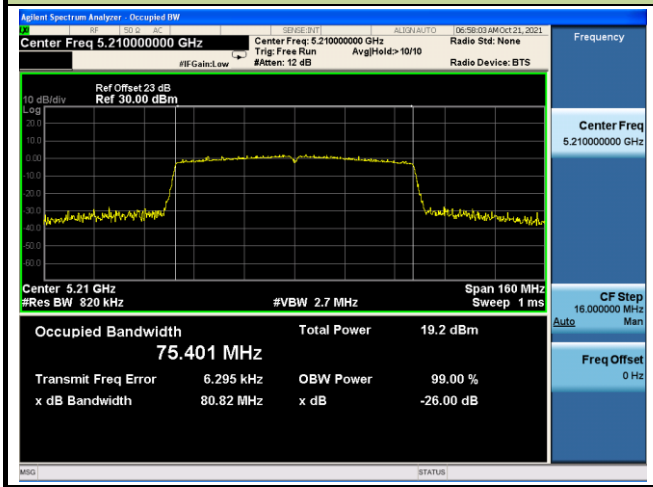
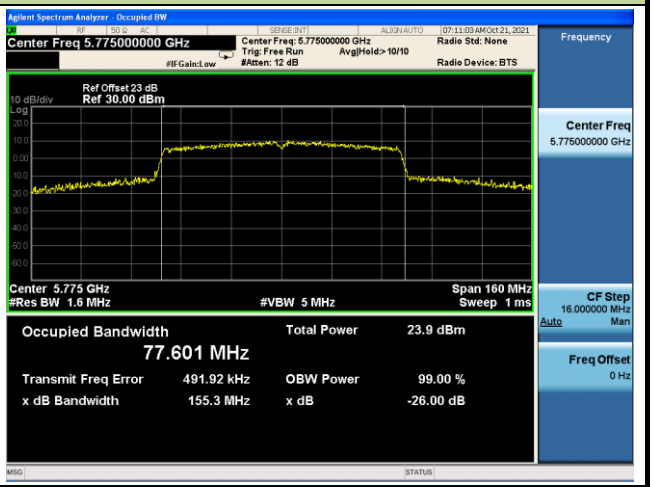
Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11a	6Mbps	36	5180	30.51	17.32
802.11a	6Mbps	44	5220	36.91	18.41
802.11a	6Mbps	48	5240	36.65	18.37
802.11a	6Mbps	149	5745	36.78	18.95
802.11a	6Mbps	157	5785	37.23	18.96
802.11a	6Mbps	165	5825	37.23	18.75
802.11n-HT20	MCS0	36	5180	28.99	18.06
802.11n-HT20	MCS0	44	5220	36.69	18.77
802.11n-HT20	MCS0	48	5240	34.91	18.65
802.11n-HT20	MCS0	149	5745	39.28	19.37
802.11n-HT20	MCS0	157	5785	37.02	19.35
802.11n-HT20	MCS0	165	5825	36.83	19.08
802.11n-HT40	MCS0	38	5190	40.25	36.03
802.11n-HT40	MCS0	46	5230	76.15	37.88
802.11n-HT40	MCS0	151	5755	71.16	37.53
802.11n-HT40	MCS0	159	5795	78.89	38.06
802.11ac-VHT20	MCS0	36	5180	25.97	17.89
802.11ac-VHT20	MCS0	44	5220	35.91	18.72
802.11ac-VHT20	MCS0	48	5240	37.30	19.39
802.11ac-VHT20	MCS0	149	5745	36.28	19.30
802.11ac-VHT20	MCS0	157	5785	35.45	18.82
802.11ac-VHT20	MCS0	165	5825	36.94	19.04
802.11ac-VHT40	MCS0	38	5190	40.71	36.06
802.11ac-VHT40	MCS0	46	5230	77.55	37.73
802.11ac-VHT40	MCS0	151	5755	76.77	37.50
802.11ac-VHT40	MCS0	159	5795	78.21	37.65
802.11ac-VHT80	MCS0	42	5210	80.82	75.40
802.11ac-VHT80	MCS0	155	5775	155.30	77.60

802.11a 26dB & 99% Bandwidth	
Channel 36 (5180MHz)	Channel 44 (5220MHz)
	
Channel 48 (5240MHz)	Channel 52 (5745MHz)
	
Channel 140 (5785MHz)	Channel 149 (5825MHz)
	

802.11n-HT20 26dB & 99% Bandwidth	
Channel 36 (5180MHz)	Channel 44 (5220MHz)
	
Channel 48 (5240MHz)	Channel 52 (5745MHz)
	
Channel 140 (5785MHz)	Channel 149 (5825MHz)
	

802.11n-HT40 26dB & 99% Bandwidth	
Channel 36 (5190MHz)	Channel 44 (5230MHz)
	
Channel 48 (5755MHz)	Channel 52 (5795MHz)
	

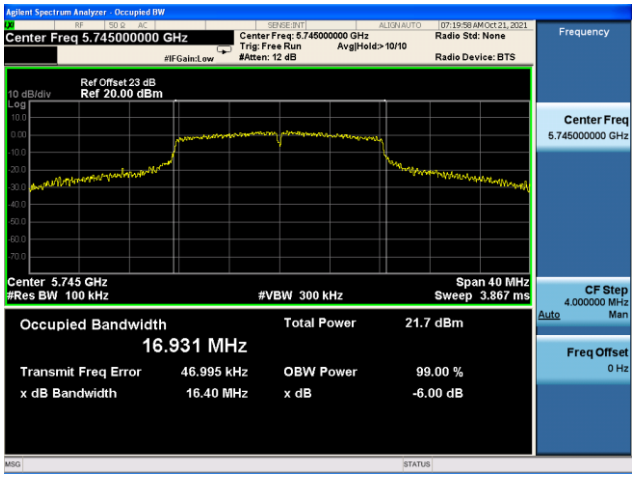
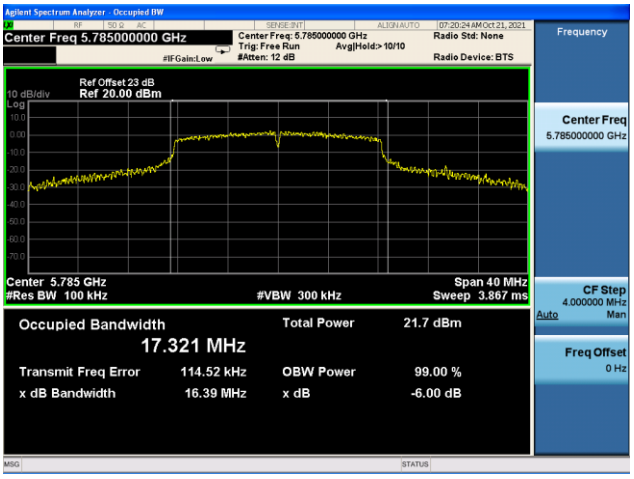
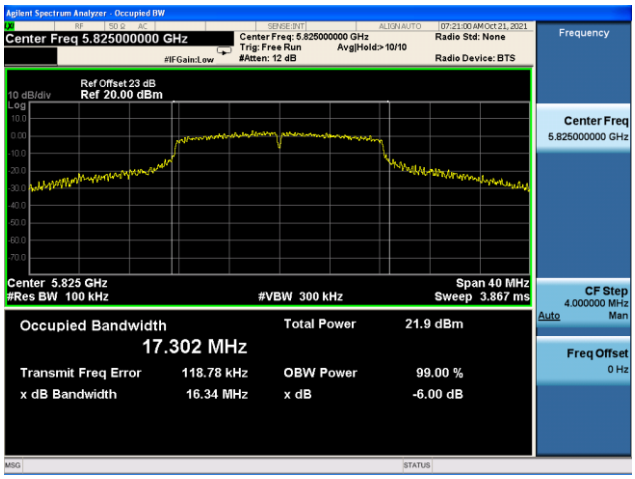
802.11ac-VHT20 26dB & 99% Bandwidth	
Channel 36 (5180MHz)	Channel 44 (5220MHz)
	
Channel 48 (5240MHz)	Channel 52 (5745MHz)
	
Channel 140 (5785MHz)	Channel 149 (5825MHz)
	

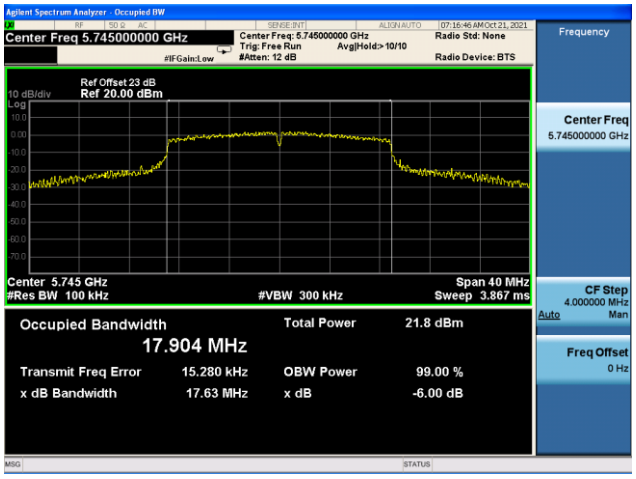
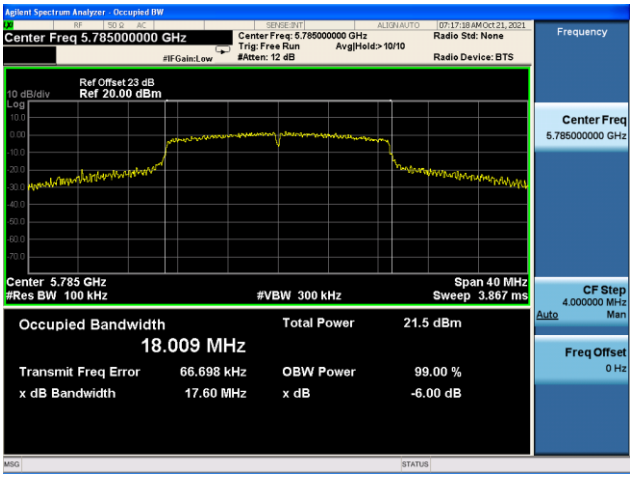
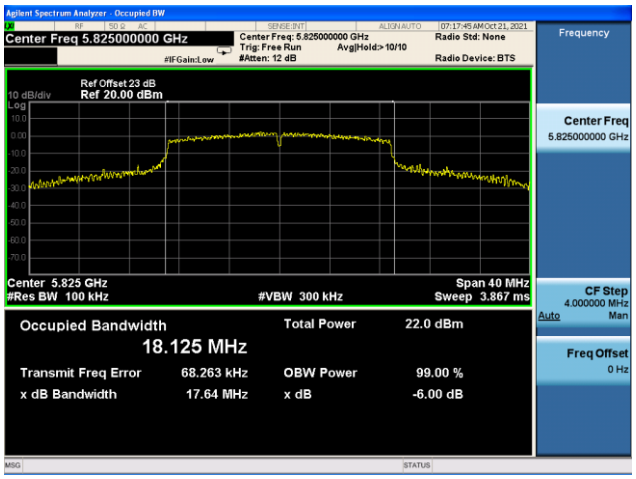
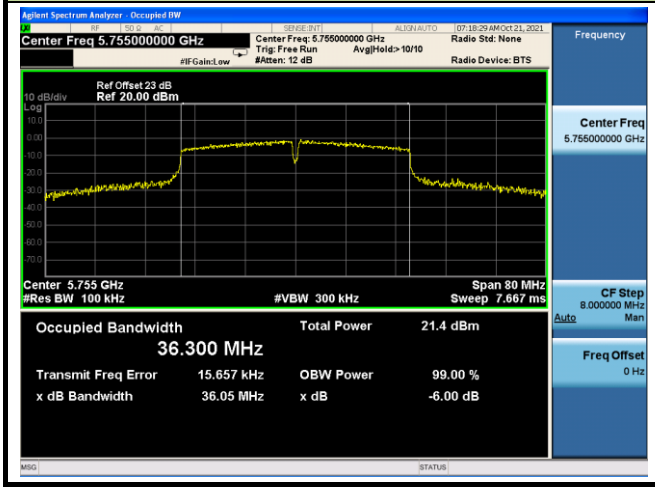
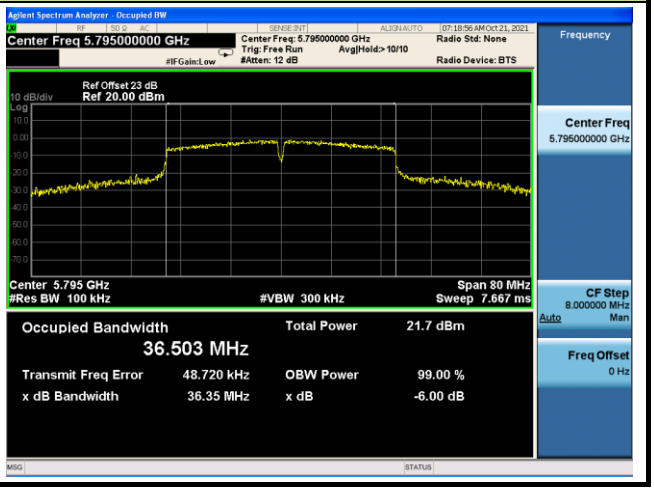
802.11ac-VHT40 26dB & 99% Bandwidth	
Channel 36 (5190MHz)	Channel 44 (5230MHz)
	
Channel 48 (5755MHz)	Channel 52 (5795MHz)
	
802.11ac-VHT80 26dB & 99% Bandwidth	
Channel 36 (5210MHz)	Channel 44 (5775MHz)
	

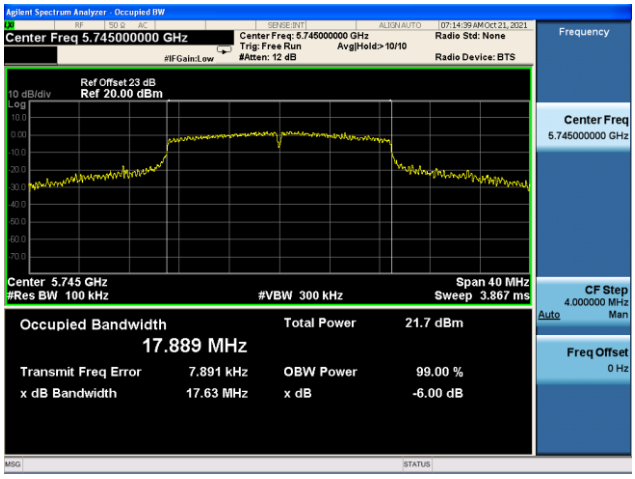
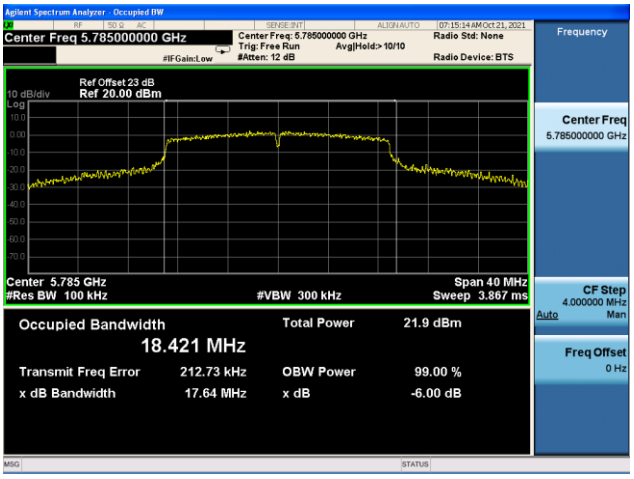
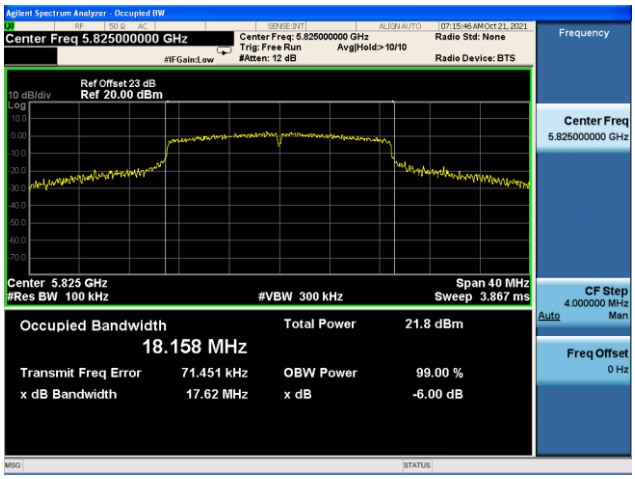
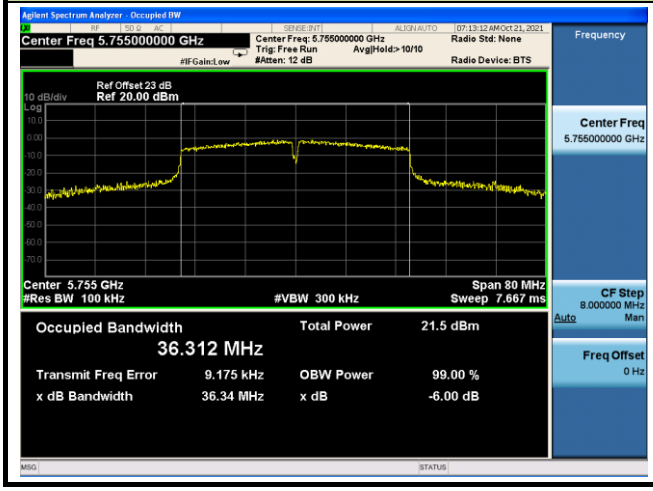
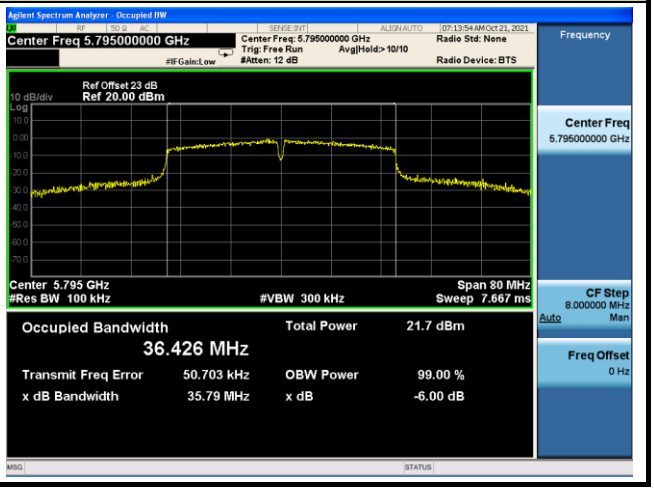
A.2 6dB Bandwidth Test Result

Test Site	NS-SR2	Test Engineer	Summer Tang
Test Date	2021/10/21		

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
802.11a	6Mbps	149	5745	16.40	≥ 0.5	Pass
802.11a	6Mbps	157	5785	16.39	≥ 0.5	Pass
802.11a	6Mbps	165	5825	16.34	≥ 0.5	Pass
802.11n-HT20	MCS0	149	5745	17.63	≥ 0.5	Pass
802.11n-HT20	MCS0	157	5785	17.60	≥ 0.5	Pass
802.11n-HT20	MCS0	165	5825	17.64	≥ 0.5	Pass
802.11n-HT40	MCS0	151	5755	36.05	≥ 0.5	Pass
802.11n-HT40	MCS0	159	5795	36.35	≥ 0.5	Pass
802.11ac-VHT20	MCS0	149	5745	17.63	≥ 0.5	Pass
802.11ac-VHT20	MCS0	157	5785	17.64	≥ 0.5	Pass
802.11ac-VHT20	MCS0	165	5825	17.62	≥ 0.5	Pass
802.11ac-VHT40	MCS0	151	5755	36.34	≥ 0.5	Pass
802.11ac-VHT40	MCS0	159	5795	35.79	≥ 0.5	Pass
802.11ac-VHT80	MCS0	155	5775	76.45	≥ 0.5	Pass

802.11a 6dB Bandwidth	
Channel 149 (5745MHz)	Channel 157 (5785MHz)
	
Channel 165 (5825MHz)	
	

802.11n-HT20 6dB Bandwidth	
Channel 149 (5745MHz)	Channel 157 (5785MHz)
	
Channel 165 (5825MHz)	
	
802.11n-HT40 6dB Bandwidth	
Channel 151 (5755MHz)	Channel 159 (5795MHz)
	

802.11ac-VHT20 6dB Bandwidth	
Channel 149 (5745MHz)	Channel 157 (5785MHz)
	
Channel 165 (5825MHz)	
	
802.11ac-VHT40 6dB Bandwidth	
Channel 151 (5755MHz)	Channel 159 (5795MHz)
	

802.11ac-VHT80 6dB Bandwidth	
Channel 155 (5775MHz)	
	

A.3 Output Power Test Result

Test Site	NS-SR2	Test Engineer	Summer Tang
Test Date	2021/10/20-2021/10/21		

Test Mode	Data Rate/ MCS	Ch. No.	Frequency (MHz)	Average Power (dBm)	Average Power Limit (dBm)
11a	6Mbps	36	5180	14.11	≤ 23.98
11a	6Mbps	44	5220	16.21	≤ 23.98
11a	6Mbps	48	5240	16.38	≤ 23.98
11a	6Mbps	149	5745	15.24	≤ 30.00
11a	6Mbps	157	5785	15.17	≤ 30.00
11a	6Mbps	165	5825	15.16	≤ 30.00
11n-HT20	MCS0	36	5180	14.21	≤ 23.98
11n-HT20	MCS0	44	5220	15.95	≤ 23.98
11n-HT20	MCS0	48	5240	16.36	≤ 23.98
11n-HT20	MCS0	149	5745	15.23	≤ 30.00
11n-HT20	MCS0	157	5785	15.04	≤ 30.00
11n-HT20	MCS0	165	5825	15.07	≤ 30.00
11n-HT40	MCS0	38	5190	12.32	≤ 23.98
11n-HT40	MCS0	46	5230	15.96	≤ 23.98
11n-HT40	MCS0	151	5755	14.78	≤ 30.00
11n-HT40	MCS0	159	5795	14.82	≤ 30.00
11ac-VHT20	MCS0	36	5180	14.54	≤ 23.98
11ac-VHT20	MCS0	44	5220	16.19	≤ 23.98
11ac-VHT20	MCS0	48	5240	16.38	≤ 23.98
11ac-VHT20	MCS0	149	5745	15.16	≤ 30.00
11ac-VHT20	MCS0	157	5785	15.18	≤ 30.00
11ac-VHT20	MCS0	165	5825	15.06	≤ 30.00
11ac-VHT40	MCS0	38	5190	12.35	≤ 23.98
11ac-VHT40	MCS0	46	5230	15.96	≤ 23.98
11ac-VHT40	MCS0	151	5755	15.27	≤ 30.00
11ac-VHT40	MCS0	159	5795	14.81	≤ 30.00
11ac-VHT80	MCS0	42	5210	10.41	≤ 23.98
11ac-VHT80	MCS0	155	5775	14.70	≤ 30.00