

# Test Report

**Report No.:** MTi240103011-02E2

**Date of issue:** 2024-03-27

**Applicant:** Dongguan Lingdu Electronic Technology Co.,Ltd

**Product:** Dash Cam

**Model(s):** D600, D500, D200, D100, LD01, A12, A14, M350, M360

**FCC ID:** 2BEAP-D600

Shenzhen Microtest Co., Ltd.

<http://www.mtitest.com>

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<b>Test Result Certification</b>	
<b>Applicant:</b>	Dongguan Lingdu Electronic Technology Co.,Ltd
<b>Address:</b>	No.1, Longcheng Street, Qingxi Town, Dongguan City, Guangdong Province, China
<b>Manufacturer:</b>	Dongguan Lingdu Electronic Technology Co.,Ltd
<b>Address:</b>	No.1, Longcheng Street, Qingxi Town, Dongguan City, Guangdong Province, China
<b>Product description</b>	
<b>Product name:</b>	Dash Cam
<b>Trade mark:</b>	N/A
<b>Model name:</b>	D600
<b>Series Model(s):</b>	D500, D200, D100, LD01, A12, A14, M350, M360
<b>Standards:</b>	47 CFR Part 15E
<b>Test Method:</b>	ANSI C63.10-2013 KDB 789033 D02 General UNII Test Procedures New Rules v02r01
<b>Date of Test</b>	
<b>Date of test:</b>	2024-03-13 to 2024-03-22
<b>Test result:</b>	Pass

<b>Test Engineer</b>	:	<i>Yanice Xie</i>
		(Yanice.Xie)
<b>Reviewed By</b>	:	<i>Leon Chen</i>
		(Leon Chen)
<b>Approved By</b>	:	<i>Tom Xue</i>
		(Tom Xue)

## 1 General Description

### 1.1 Description of the EUT

Product name:	Dash Cam
Model name:	D600
Series Model(s):	D500, D200, D100, LD01, A12, A14, M350, M360
Model difference:	All the models are the same circuit and module, except the model name.
Electrical rating:	Input:DC 12-24V Output:DC 5V/2.5A
Accessories:	1. Rear camera(6m/20ft) *1 2. Car charger*1 3. Micro USB Power cable(3.5M/12ft)*1 4. Cable clips*5 5. Pry tool*1
Test sample(s) number:	MTi240103011-02S1001
<b>RF specification</b>	
Operating frequency range:	802.11a/n(HT20)/ac(HT20)/ax(HE20): U-NII Band 1: 5180MHz to 5240MHz; U-NII Band 3: 5745MHz to 5825MHz;  802.11n(HT40)/ac(HT40)/ax(HE40): U-NII Band 1: 5190MHz to 5230MHz; U-NII Band 3: 5755MHz to 5795MHz;  802.11ac(HT80)/ax(HE80): U-NII Band 1: 5210MHz; U-NII Band 3: 5775MHz
Channel number:	802.11a/n(HT20)/ac(HT20): U-NII Band 1: 4; U-NII Band 3: 5;  802.11n(HT40)/ac(HT40): U-NII Band 1: 2; U-NII Band 3: 2;  802.11ac(HT80): U-NII Band 1: 1; U-NII Band 3: 1
Modulation type:	802.11a: OFDM(BPSK, QPSK, 16QAM, 64QAM); 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM); 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM); 802.11ax: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Antenna(s) type:	FPC Antenna
Antenna(s) gain:	Band 1:5.78 dBi, Band 4:5.65 dBi

### 1.2 Description of test modes

No.	Emission test modes
Mode1	802.11a mode
Mode2	802.11n20 mode

Mode3	802.11n40 mode
Mode4	802.11ac20 mode
Mode5	802.11ac40 mode
Mode6	802.11ac80 mode

### 1.2.1 Operation channel list

#### U-NII-1:

Bandwidth:	20MHz	Bandwidth:	40MHz	Bandwidth:	80MHz
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	38	5190	42	5210
40	5200	46	5230	/	/
44	5220	/	/	/	/
48	5240	/	/	/	/

#### U-NII-3:

Bandwidth:	20MHz	Bandwidth:	40MHz	Bandwidth:	80MHz
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	151	5755	155	5775
153	5765	159	5795	/	/
157	5785	/	/	/	/
161	5805	/	/	/	/
165	5825	/	/	/	/

### Test Channel List

#### Operation Band: 5150-5250 MHz

Bandwidth (MHz)	Lowest Channel (LCH) (MHz)	Middle Channel (MCH) (MHz)	Highest Channel (HCH) (MHz)
20	5180	5200	5240
40	5190	/	5230
80	/	/	/

#### Operation Band: 5725-5850 MHz

Bandwidth (MHz)	Lowest Channel (LCH) (MHz)	Middle Channel (MCH) (MHz)	Highest Channel (HCH) (MHz)
20	5745	5785	5825
40	5755	/	5795
80	/	/	/

Note: The test software provided by manufacturer is used to control EUT for working in engineering mode, that enables selectable channel, and capable of continuous transmitting mode.

#### Test Software:

For power setting, refer to below table.

## U-NII Band 1:

Mode	LCH	MCH	HCH
802.11a	51	50	47
802.11n(HT20)	50	48	46
802.11n(HT40)	46	/	44
802.11ac(VHT20)	49	46	46
802.11ac(VHT40)	48	/	45
802.11ac(VHT80)	/	45	/

## U-NII Band 3:

Mode	LCH	MCH	HCH
802.11a	47	48	48
802.11n(HT20)	46	46	45
802.11n(HT40)	44	/	44
802.11ac(VHT20)	45	45	46
802.11ac(VHT40)	45	/	45
802.11ac(VHT80)	/	45	/

### 1.3 Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15°C ~ 35°C
Humidity:	20% RH ~ 75% RH
Atmospheric pressure:	98 kPa ~ 101 kPa

### 1.4 Description of support units

Support equipment list			
Description	Model	Serial No.	Manufacturer
Accumulator	6-QW-45(370)-L	/	Camzel Group Co., Ltd.
Support cable list			
Description	Length (m)	From	To
/	/	/	/

### 1.5 Measurement uncertainty

Measurement	Uncertainty
Time	±1 %
RF output power, conducted	±1 dB
Power Spectral Density, conducted	±1 dB
Occupied channel bandwidth	±3 %
Radiated spurious emissions (above 1GHz)	±5.3dB
Radiated spurious emissions (9kHz~30MHz)	±4.3dB
Radiated spurious emissions (30MHz~1GHz)	±4.7dB
Temperature	±1 °C
Humidity	± 5 %

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



## 2 Summary of Test Result

No.	Item	Standard	Requirement	Result
1	Antenna requirement	47 CFR Part 15E	Part 15.203	Pass
2	Duty Cycle	47 CFR Part 15E	/	Pass
3	Maximum conducted output power	47 CFR Part 15E	47 CFR Part 15.407(a)(1)(ii) 47 CFR Part 15.407(a)(1)(iii) 47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(3)(i)	Pass
4	Power spectral density	47 CFR Part 15E	47 CFR Part 15.407(a)(1)(ii) 47 CFR Part 15.407(a)(1)(iii) 47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(3)(i)	Pass
5	Emission bandwidth and occupied bandwidth	47 CFR Part 15E	U-NII 1, U-NII 2A, U-NII 2C: No limits, only for report use. 47 CFR Part 15.407(e)	Pass
6	Band edge emissions (Radiated)	47 CFR Part 15E	47 CFR Part 15.407(b)(1) 47 CFR Part 15.407(b)(4) 47 CFR Part 15.407(b)(10)	Pass
7	Undesirable emission limits (below 1GHz)	47 CFR Part 15E	47 CFR Part 15.407(b)(9)	Pass
8	Undesirable emission limits (above 1GHz)	47 CFR Part 15E	47 CFR Part 15.407(b)(1) 47 CFR Part 15.407(b)(4) 47 CFR Part 15.407(b)(10)	Pass
9	Conducted Emission at AC power line	47 CFR Part 15E	47 CFR Part 15.207(a)	N/A

### Notes:

1.N/A means not applicable.

Since the EUT power by DC supply, therefore AC power line conducted emissions test is not required.

### 3 Test Facilities and accreditations

#### 3.1 Test laboratory

Test laboratory:	Shenzhen Microtest Co., Ltd.
Test site location:	101, No.7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Telephone:	(86-755)88850135
Fax:	(86-755)88850136
CNAS Registration No.:	CNAS L5868
FCC Registration No.:	448573
IC Registration No.:	21760
CABID:	CN0093

#### 4 List of test equipment

No.	Equipment	Manufacturer	Model	Serial No.	Cal. date	Cal. Due
Emission bandwidth and occupied bandwidth Duty Cycle Maximum conducted output power Power spectral density						
1	Wideband Radio Communication Tester	Rohde&schwarz	CMW500	149155	2023-04-26	2024-04-25
2	ESG Series Analog Ssignal Generator	Agilent	E4421B	GB40051240	2023-04-25	2024-04-24
3	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2023-04-25	2024-04-24
4	Synthesized Sweeper	Agilent	83752A	3610A01957	2023-04-25	2024-04-24
5	MXA Signal Analyzer	Agilent	N9020A	MY50143483	2023-04-26	2024-04-25
6	RF Control Unit	Tonscend	JS0806-1	19D8060152	2023-04-26	2024-04-25
7	Band Reject Filter Group	Tonscend	JS0806-F	19D8060160	2023-05-05	2024-05-04
8	ESG Vector Signal Generator	Agilent	N5182A	MY50143762	2023-04-25	2024-04-24
9	DC Power Supply	Agilent	E3632A	MY40027695	2023-05-05	2024-05-04
Band edge emissions (Radiated) Undesirable emission limits (above 1GHz)						
1	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2023-04-26	2024-04-25
2	Double Ridged Broadband Horn Antenna	schwarabeck	BBHA 9120 D	2278	2023-06-17	2025-06-16
3	Amplifier	Agilent	8449B	3008A01120	2023-06-26	2024-06-25
4	Multi-device Controller	TuoPu	TPMDC	/	2023-05-04	2024-05-03
5	MXA signal analyzer	Agilent	N9020A	MY54440859	2023-06-01	2024-05-31
Undesirable emission limits (below 1GHz)						
1	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2023-04-26	2024-04-25
2	TRILOG Broadband Antenna	schwarabeck	VULB 9163	9163-1338	2023-06-11	2025-06-10
3	Active Loop Antenna	Schwarzbeck	FMZB 1519 B	00066	2023-06-11	2025-06-10
4	Amplifier	Hewlett-Packard	8447F	3113A06184	2023-04-25	2024-04-24
5	Multi-device Controller	TuoPu	TPMDC	/	2023-05-04	2024-05-03

## 5 Evaluation Results (Evaluation)

### 5.1 Antenna requirement

Test Requirement:	Refer to 47 CFR Part 15.203, 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 shall be considered sufficient to comply with the provisions of this section.
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#### 5.1.1 Conclusion:

The antenna of the EUT is permanently attached. The EUT complies with the requirement of FCC PART 15.203.
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## 6 Radio Spectrum Matter Test Results (RF)

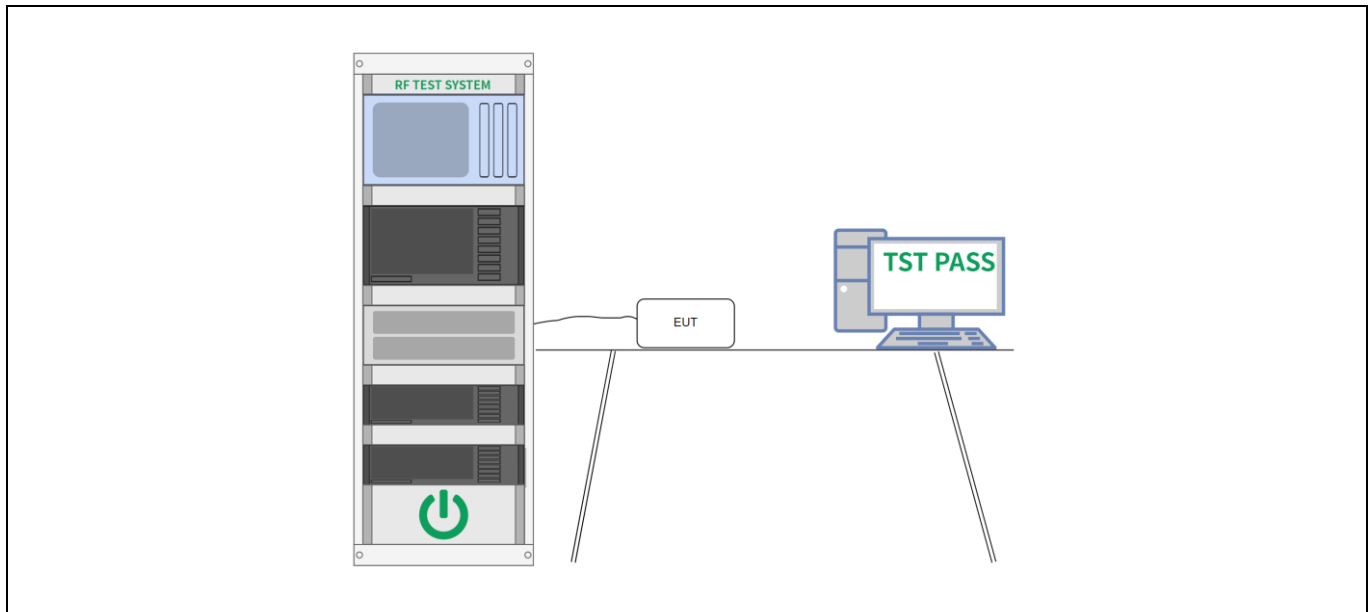
### 6.1 Duty Cycle

Test Requirement:	All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x, and maximum-power transmission duration, T, are required for each tested mode of operation.
Test Limit:	No limits, only for report use.
Test Method:	ANSI C63.10-2013 section 12.2 (b)
Procedure:	i) Set the center frequency of the instrument to the center frequency of the transmission. ii) Set RBW $\geq$ EBW if possible; otherwise, set RBW to the largest available value. iii) Set VBW $\geq$ RBW. iv) Set detector = peak. v) The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ , where T is defined in item a1) of 12.2, and the number of sweep points across duration T exceeds 100.

#### 6.1.1 E.U.T. Operation:

Operating Environment:					
Temperature:	24 °C	Humidity:	56.5 %	Atmospheric Pressure:	100 kPa
Pre test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6				
Final test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6				

#### 6.1.2 Test Setup Diagram:



#### 6.1.3 Test Data:

Please Refer to Appendix for Details.

## 6.2 Maximum conducted output power

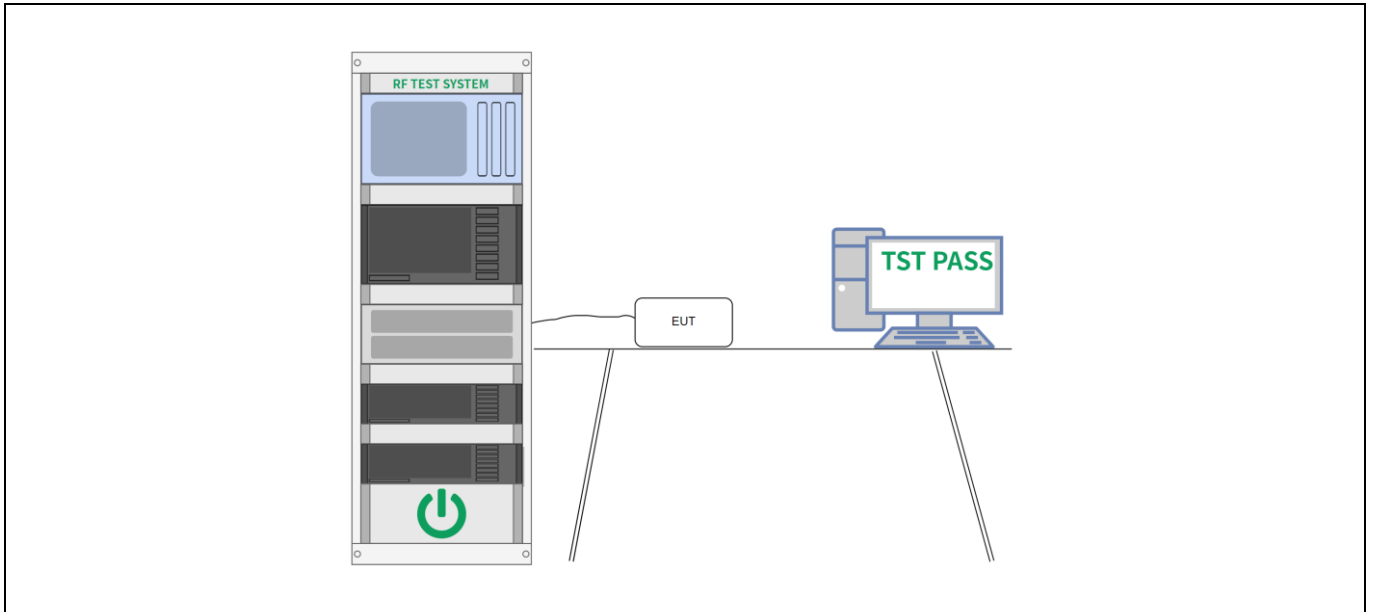
Test Requirement:	47 CFR Part 15.407(a)(1)(ii) 47 CFR Part 15.407(a)(1)(iii) 47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(3)(i)
Test Limit:	<p>For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p> <p>For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.</p> <p>Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power.</p> <p>For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power is required for each 1 dB of antenna gain in excess of 23 dBi.</p> <p>Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.</p> <p>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. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p> <p>For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.</p>
Test Method:	ANSI C63.10-2013, section 12.3
Procedure:	Refer to ANSI C63.10-2013 section 12.3

### 6.2.1 E.U.T. Operation:

Operating Environment:			
Temperature:	24 °C	Humidity:	56.5 %
		Atmospheric Pressure:	100 kPa
Pre test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6		

Final test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6
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### 6.2.2 Test Setup Diagram:



### 6.2.3 Test Data:

Please Refer to Appendix for Details.

### 6.3 Power spectral density

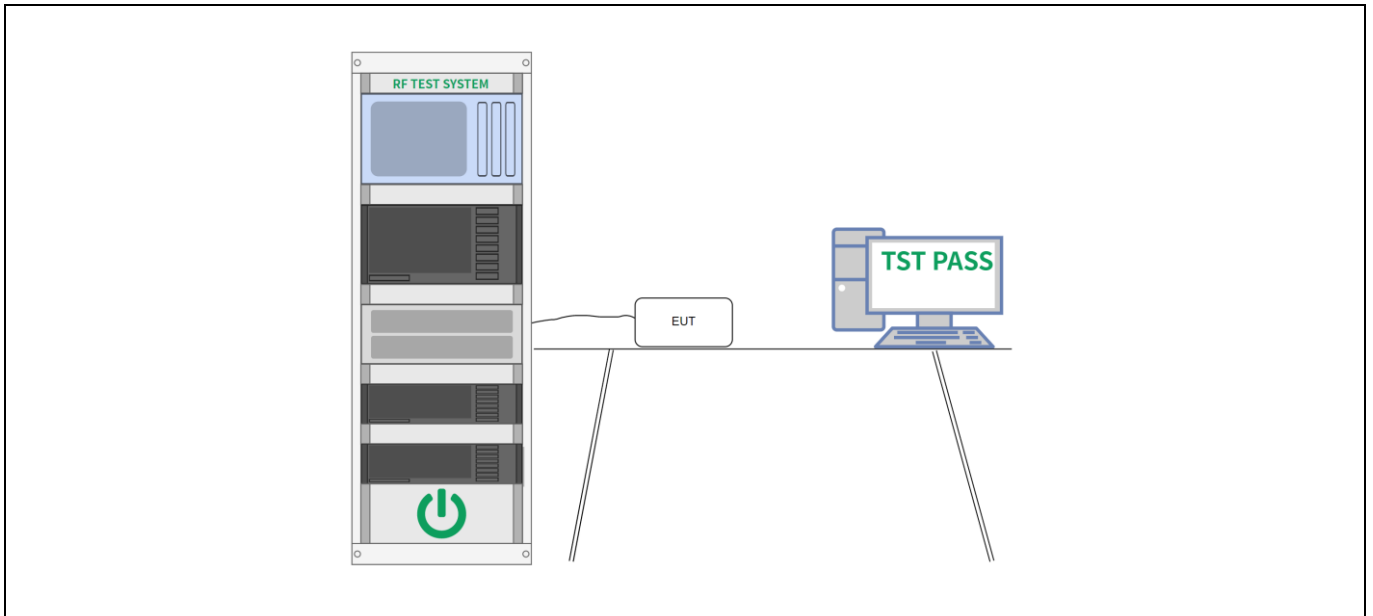
Test Requirement:	47 CFR Part 15.407(a)(1)(ii) 47 CFR Part 15.407(a)(1)(iii) 47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(3)(i)
Test Limit:	<p>For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.</p> <p>If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p> <p>For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.</p> <p>Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.</p> <p>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.</p> <p>If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p> <p>For the band 5.725-5.850 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.</p> <p>If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power.</p> <p>Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.</p>
Test Method:	ANSI C63.10-2013, section 12.5
Procedure:	Refer to ANSI C63.10-2013, section 12.5

#### 6.3.1 E.U.T. Operation:

Operating Environment:			
Temperature:	24 °C	Humidity:	56.5 %
		Atmospheric Pressure:	100 kPa
Pre test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6		
Final test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6		



**6.3.2 Test Setup Diagram:**



**6.3.3 Test Data:**

Please Refer to Appendix for Details.

**6.4 Emission bandwidth and occupied bandwidth**

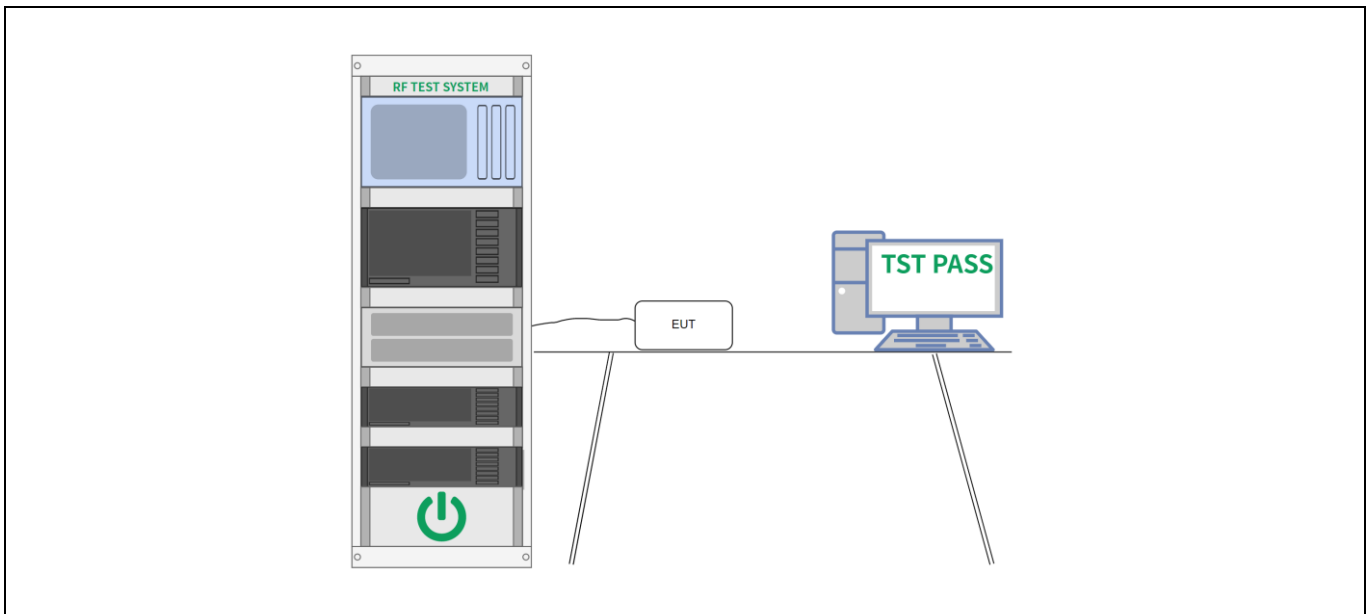
Test Requirement:	U-NII 1, U-NII 2A, U-NII 2C: No limits, only for report use.  U-NII 3, U-NII 4: 47 CFR Part 15.407(e)
Test Limit:	U-NII 1, U-NII 2A, U-NII 2C: No limits, only for report use.  U-NII 3, U-NII 4: Within the 5.725-5.850 GHz and 5.850-5.895 GHz bands, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.
Test Method:	ANSI C63.10-2013, section 6.9 & 12.4 KDB 789033 D02, Clause C.2
Procedure:	<p>Emission bandwidth:</p> <ul style="list-style-type: none"> <li>a) Set RBW = approximately 1% of the emission bandwidth.</li> <li>b) Set the VBW &gt; RBW.</li> <li>c) Detector = peak.</li> <li>d) Trace mode = max hold.</li> <li>e) Measure the maximum width of the emission that is 26 dB down from the peak of the emission.</li> </ul> <p>Compare this with the RBW setting of the instrument. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.</p> <p>Occupied bandwidth:</p> <ul style="list-style-type: none"> <li>a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.</li> <li>b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.</li> <li>c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than <math>[10 \log (OBW/RBW)]</math> below the reference level. Specific guidance is given in 4.1.5.2.</li> <li>d) Step a) through step c) might require iteration to adjust within the specified range.</li> <li>e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.</li> <li>f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.</li> <li>g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the</li> </ul>

	<p>total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.</p> <p>h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).</p> <p>6 dB emission bandwidth:</p> <p>a) Set RBW = 100 kHz.</p> <p>b) Set the video bandwidth (VBW) <math>\geq 3 \times</math> RBW.</p> <p>c) Detector = Peak.</p> <p>d) Trace mode = max hold.</p> <p>e) Sweep = auto couple.</p> <p>f) Allow the trace to stabilize.</p> <p>g) 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.</p>
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#### 6.4.1 E.U.T. Operation:

Operating Environment:					
Temperature:	24 °C	Humidity:	56.5 %	Atmospheric Pressure:	100 kPa
Pre test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6				
Final test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6				

#### 6.4.2 Test Setup Diagram:



#### 6.4.3 Test Data:

Please Refer to Appendix for Details.

## 6.5 Band edge emissions (Radiated)

Test Requirement:	47 CFR Part 15.407(b)(1) 47 CFR Part 15.407(b)(4) 47 CFR Part 15.407(b)(10)																																																																										
Test Limit:	<p>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.</p> <p>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.</p> <table border="1"> <thead> <tr> <th>MHz</th> <th>MHz</th> <th>MHz</th> <th>GHz</th> </tr> </thead> <tbody> <tr> <td>0.090-0.110</td> <td>16.42-16.423</td> <td>399.9-410</td> <td>4.5-5.15</td> </tr> <tr> <td><sup>1</sup>0.495-0.505</td> <td>16.69475-16.69525</td> <td>608-614</td> <td>5.35-5.46</td> </tr> <tr> <td>2.1735-2.1905</td> <td>16.80425-16.80475</td> <td>960-1240</td> <td>7.25-7.75</td> </tr> <tr> <td>4.125-4.128</td> <td>25.5-25.67</td> <td>1300-1427</td> <td>8.025-8.5</td> </tr> <tr> <td>4.17725-4.17775</td> <td>37.5-38.25</td> <td>1435-1626.5</td> <td>9.0-9.2</td> </tr> <tr> <td>4.20725-4.20775</td> <td>73-74.6</td> <td>1645.5-1646.5</td> <td>9.3-9.5</td> </tr> <tr> <td>6.215-6.218</td> <td>74.8-75.2</td> <td>1660-1710</td> <td>10.6-12.7</td> </tr> <tr> <td>6.26775-6.26825</td> <td>108-121.94</td> <td>1718.8-1722.2</td> <td>13.25-13.4</td> </tr> <tr> <td>6.31175-6.31225</td> <td>123-138</td> <td>2200-2300</td> <td>14.47-14.5</td> </tr> <tr> <td>8.291-8.294</td> <td>149.9-150.05</td> <td>2310-2390</td> <td>15.35-16.2</td> </tr> <tr> <td>8.362-8.366</td> <td>156.52475-156.52525</td> <td>2483.5-2500</td> <td>17.7-21.4</td> </tr> <tr> <td>8.37625-8.38675</td> <td>156.7-156.9</td> <td>2690-2900</td> <td>22.01-23.12</td> </tr> <tr> <td>8.41425-8.41475</td> <td>162.0125-167.17</td> <td>3260-3267</td> <td>23.6-24.0</td> </tr> <tr> <td>12.29-12.293</td> <td>167.72-173.2</td> <td>3332-3339</td> <td>31.2-31.8</td> </tr> <tr> <td>12.51975-12.52025</td> <td>240-285</td> <td>3345.8-3358</td> <td>36.43-36.5</td> </tr> <tr> <td>12.57675-12.57725</td> <td>322-335.4</td> <td>3600-4400</td> <td>(<sup>2</sup>)</td> </tr> <tr> <td>13.36-13.41</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p><sup>1</sup>Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.</p> <p><sup>2</sup>Above 38.6</p> <p>The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in § 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in § 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in § 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in § 15.35 apply to these measurements.</p> <p>Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:</p>			MHz	MHz	MHz	GHz	0.090-0.110	16.42-16.423	399.9-410	4.5-5.15	<sup>1</sup> 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	( <sup>2</sup> )	13.36-13.41			
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	Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
	0.009-0.490	2400/F(kHz)	300
	0.490-1.705	24000/F(kHz)	30
	1.705-30.0	30	30
	30-88	100 **	3
	88-216	150 **	3
	216-960	200 **	3
	Above 960	500	3
	<p>** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.</p> <p>In the emission table above, the tighter limit applies at the band edges. 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.</p>		
Test Method:	ANSI C63.10-2013, section 12.7		
Procedure:	<p>Above 1GHz:</p> <p>a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</p> <p>b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</p> <p>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.</p> <p>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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.</p> <p>g. Test the EUT in the lowest channel, the middle channel, the Highest channel.</p> <p>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.</p> <p>i. Repeat above procedures until all frequencies measured was complete.</p> <p>Remark:</p> <p>1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor</p> <p>2. Scan from 18GHz to 40GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.</p> <p>3. As shown in this section, for frequencies above 1GHz, the field strength</p>		

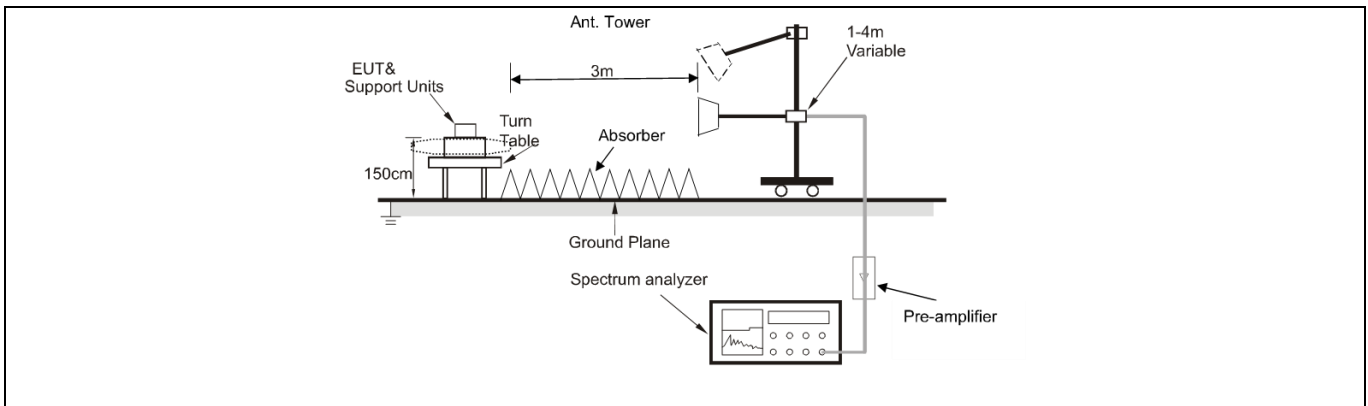
limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

4. The disturbance above 18GHz were very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

### 6.5.1 E.U.T. Operation:

Operating Environment:					
Temperature:	24 °C	Humidity:	54 %	Atmospheric Pressure:	101 kPa
Pre test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6				
Final test mode:	All of the listed pre-test mode were tested, only the data of the worst mode (Mode1) is recorded in the report				

### 6.5.2 Test Setup Diagram:



**6.5.3 Test Data:**

Mode1 / Polarization: Horizontal / Band: 5150-5250 MHz / BW: 20 / CH: L

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		4500.000	50.20	-8.46	41.74	74.00	-32.26	peak
2		4500.000	41.17	-8.46	32.71	54.00	-21.29	AVG
3		5150.000	68.56	-5.61	62.95	74.00	-11.05	peak
4	*	5150.000	55.59	-5.61	49.98	54.00	-4.02	AVG

Mode1 / Polarization: Vertical / Band: 5150-5250 MHz / BW: 20 / CH: L

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		4500.000	50.47	-8.46	42.01	74.00	-31.99	peak
2		4500.000	41.26	-8.46	32.80	54.00	-21.20	AVG
3		5150.000	59.36	-5.61	53.75	74.00	-20.25	peak
4	*	5150.000	47.99	-5.61	42.38	54.00	-11.62	AVG

Mode1 / Polarization: Horizontal / Band: 5150-5250 MHz / BW: 20 / CH: H

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		5350.000	53.81	-5.17	48.64	74.00	-25.36	peak
2	*	5350.000	42.64	-5.17	37.47	54.00	-16.53	AVG
3		5460.000	51.87	-5.16	46.71	74.00	-27.29	peak
4		5460.000	41.72	-5.16	36.56	54.00	-17.44	AVG

Mode1 / Polarization: Vertical / Band: 5150-5250 MHz / BW: 20 / CH: H

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		5350.000	50.35	-5.17	45.18	74.00	-28.82	peak
2	*	5350.000	40.48	-5.17	35.31	54.00	-18.69	AVG
3		5460.000	50.32	-5.16	45.16	74.00	-28.84	peak
4		5460.000	40.29	-5.16	35.13	54.00	-18.87	AVG



Mode1 / Polarization: Horizontal / Band: 5725-5850 MHz / BW: 20 / CH: L

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	*	5650.000	52.00	-4.01	47.99	68.20	-20.21	peak
2		5700.000	57.39	-4.07	53.32	105.20	-51.88	peak
3		5720.000	63.62	-4.23	59.39	110.80	-51.41	peak
4		5725.000	82.97	-4.27	78.70	122.20	-43.50	peak

Mode1 / Polarization: Vertical / Band: 5725-5850 MHz / BW: 20 / CH: L

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	*	5650.000	51.28	-4.01	47.27	68.20	-20.93	peak
2		5700.000	51.79	-4.07	47.72	105.20	-57.48	peak
3		5720.000	54.64	-4.23	50.41	110.80	-60.39	peak
4		5725.000	66.35	-4.27	62.08	122.20	-60.12	peak

Mode1 / Polarization: Horizontal / Band: 5725-5850 MHz / BW: 20 / CH: H

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		5850.000	55.36	-4.31	51.05	122.20	-71.15	peak
2		5855.000	50.02	-4.23	45.79	110.80	-65.01	peak
3		5875.000	50.46	-3.93	46.53	105.20	-58.67	peak
4	*	5920.000	50.03	-3.59	46.44	71.90	-25.46	peak

Mode1 / Polarization: Vertical / Band: 5725-5850 MHz / BW: 20 / CH: H

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		5850.000	67.76	-4.31	63.45	122.20	-58.75	peak
2		5855.000	63.33	-4.23	59.10	110.80	-51.70	peak
3		5875.000	56.06	-3.93	52.13	105.20	-53.07	peak
4	*	5920.000	52.38	-3.59	48.79	71.90	-23.11	peak

## 6.6 Undesirable emission limits (below 1GHz)

Test Requirement:	47 CFR Part 15.407(b)(9)																								
Test Limit:	<p>Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209.</p> <p>Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:</p> <table border="1"> <thead> <tr> <th>Frequency (MHz)</th> <th>Field strength (microvolts/meter)</th> <th>Measurement distance (meters)</th> </tr> </thead> <tbody> <tr> <td>0.009-0.490</td> <td>2400/F(kHz)</td> <td>300</td> </tr> <tr> <td>0.490-1.705</td> <td>24000/F(kHz)</td> <td>30</td> </tr> <tr> <td>1.705-30.0</td> <td>30</td> <td>30</td> </tr> <tr> <td>30-88</td> <td>100 **</td> <td>3</td> </tr> <tr> <td>88-216</td> <td>150 **</td> <td>3</td> </tr> <tr> <td>216-960</td> <td>200 **</td> <td>3</td> </tr> <tr> <td>Above 960</td> <td>500</td> <td>3</td> </tr> </tbody> </table> <p>** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.</p> <p>In the emission table above, the tighter limit applies at the band edges. 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.</p>	Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)	0.009-0.490	2400/F(kHz)	300	0.490-1.705	24000/F(kHz)	30	1.705-30.0	30	30	30-88	100 **	3	88-216	150 **	3	216-960	200 **	3	Above 960	500	3
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)																							
0.009-0.490	2400/F(kHz)	300																							
0.490-1.705	24000/F(kHz)	30																							
1.705-30.0	30	30																							
30-88	100 **	3																							
88-216	150 **	3																							
216-960	200 **	3																							
Above 960	500	3																							
Test Method:	ANSI C63.10-2013, section 12.7																								
Procedure:	<p>Below 1GHz:</p> <p>a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</p> <p>b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</p> <p>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.</p> <p>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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet.</p> <p>g. Test the EUT in the lowest channel, the middle channel, the Highest channel.</p> <p>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.</p> <p>i. Repeat above procedures until all frequencies measured was complete.</p>																								

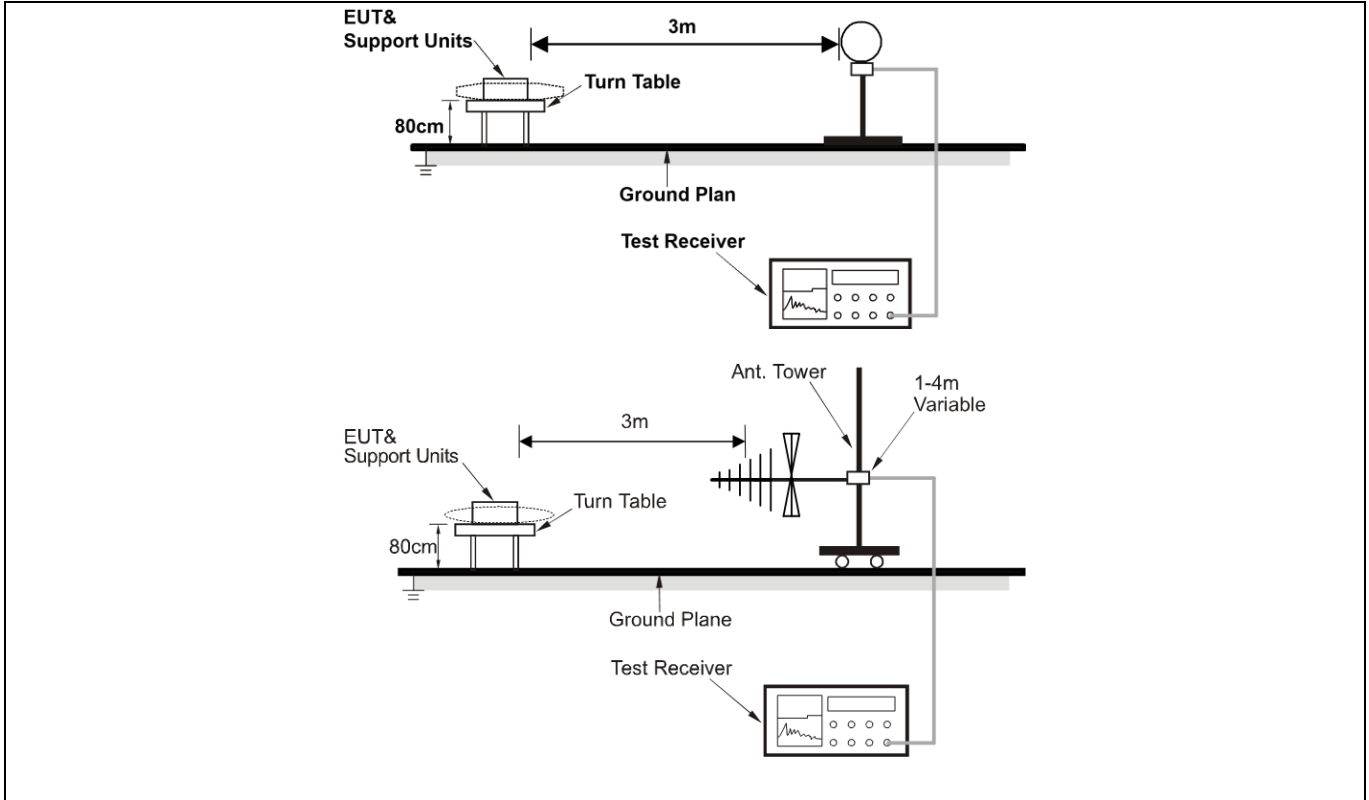
	<p>Remark:</p> <ol style="list-style-type: none"> <li>1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor</li> <li>2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.</li> <li>3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.</li> </ol> <p>Above 1GHz:</p> <ol style="list-style-type: none"> <li>a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. 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, which was mounted on the top of a variable-height antenna tower.</li> <li>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.</li> <li>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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.</li> <li>g. Test the EUT in the lowest channel, the middle channel, the Highest channel.</li> <li>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.</li> <li>i. Repeat above procedures until all frequencies measured was complete.</li> </ol> <p>Remark:</p> <ol style="list-style-type: none"> <li>1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor</li> <li>2. Scan from 18GHz to 40GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.</li> <li>3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.</li> <li>4. The disturbance above 18GHz were very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.</li> </ol>
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### 6.6.1 E.U.T. Operation:

Operating Environment:

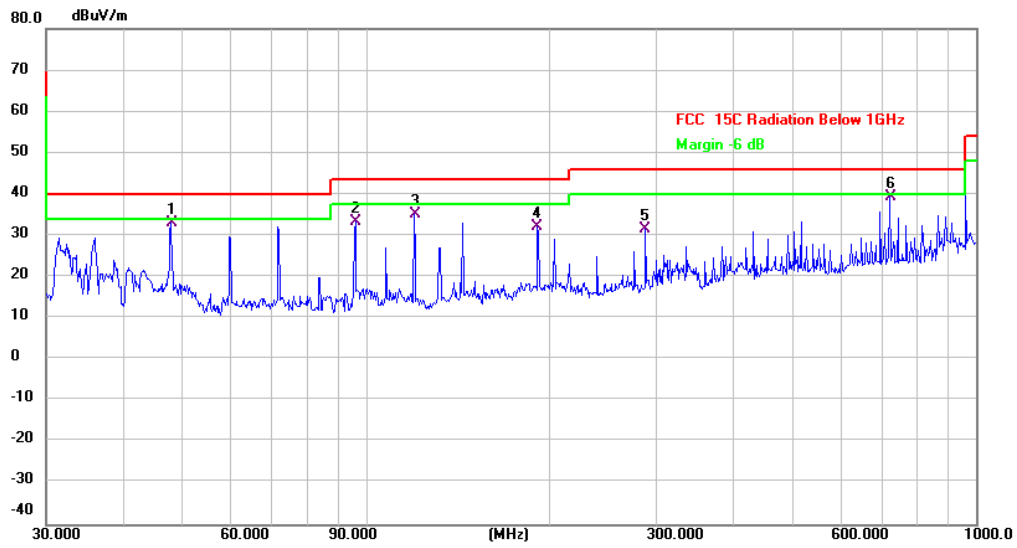
Temperature:	24 °C	Humidity:	54 %	Atmospheric Pressure:	101 kPa
Pre test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6				
Final test mode:	All of the listed pre-test mode were tested, only the data of the worst mode (Mode1) is recorded in the report				

**6.6.2 Test Setup Diagram:**



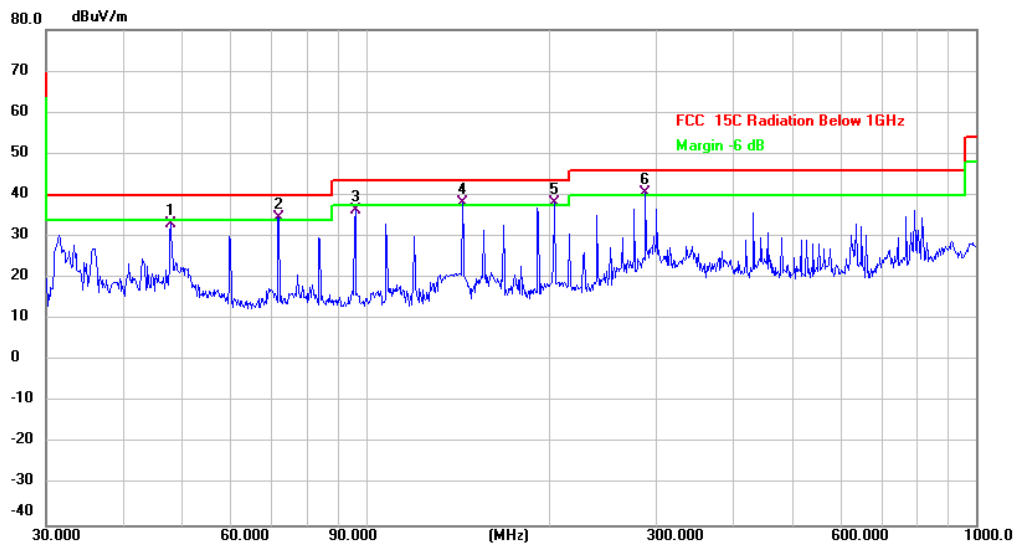
**6.6.3 Test Data:**

Mode1 / Polarization: Horizontal / Band: 5150-5250 MHz / BW: 20 / CH: H



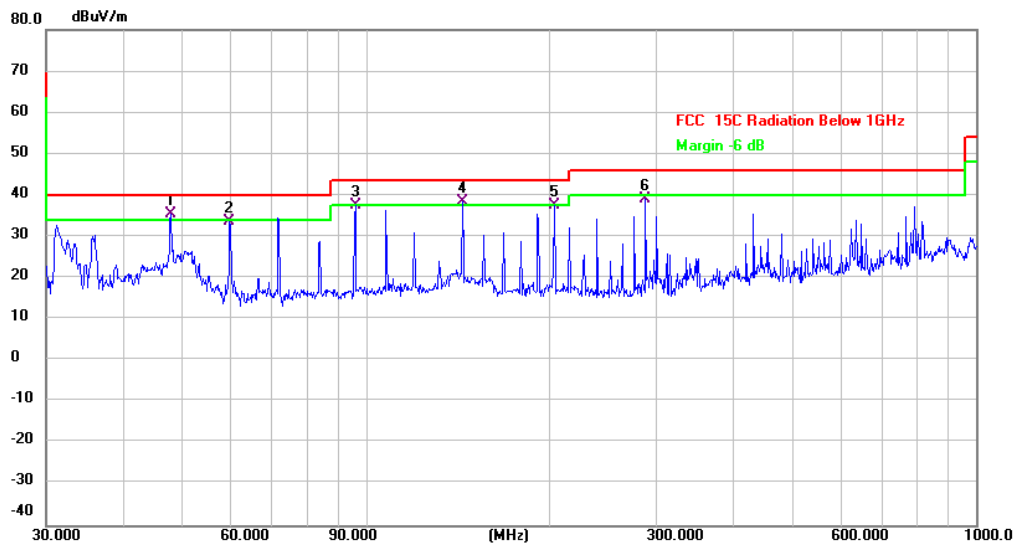
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		47.9940	40.49	-7.51	32.98	40.00	-7.02	QP	
2		96.0986	43.94	-10.55	33.39	43.50	-10.11	QP	
3		119.8556	44.40	-9.22	35.18	43.50	-8.32	QP	
4		191.7450	42.09	-9.86	32.23	43.50	-11.27	QP	
5		287.9904	37.02	-5.60	31.42	46.00	-14.58	QP	
6	*	721.7259	38.95	0.47	39.42	46.00	-6.58	QP	

Mode1 / Polarization: Vertical / Band: 5150-5250 MHz / BW: 20 / CH: H



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		47.9940	40.70	-7.51	33.19	40.00	-6.81	QP	
2	!	72.0843	45.87	-11.27	34.60	40.00	-5.40	QP	
3		96.0986	46.89	-10.55	36.34	43.50	-7.16	QP	
4	!	143.8295	48.66	-10.56	38.10	43.50	-5.40	QP	
5	*	204.2377	45.78	-7.58	38.20	43.50	-5.30	QP	
6	!	287.9904	46.11	-5.60	40.51	46.00	-5.49	QP	

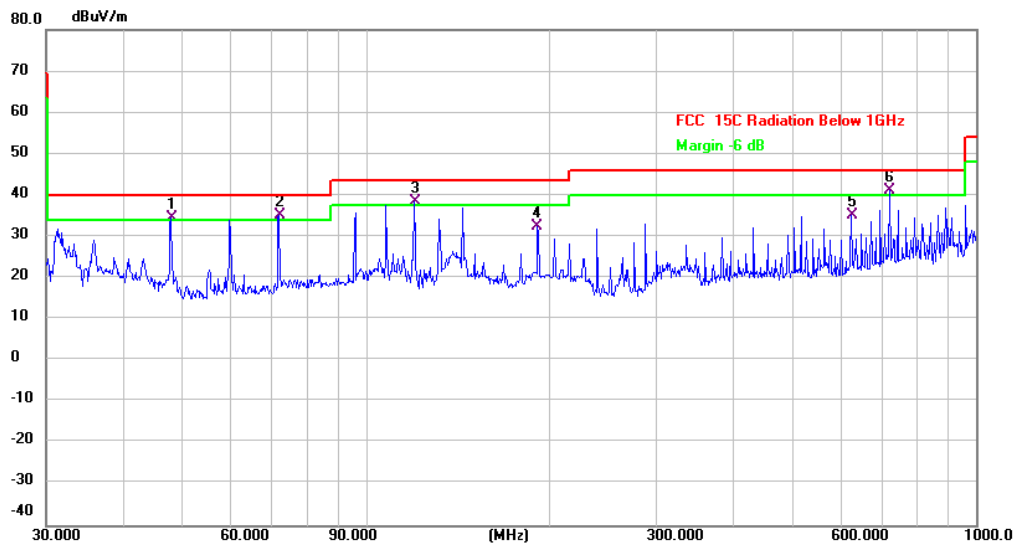
Mode1 / Polarization: Horizontal / Band: 5725-5850 MHz / BW: 20 / CH: H



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	47.9940	42.82	-7.51	35.31	40.00	-4.69	QP	
2		59.8588	43.54	-9.79	33.75	40.00	-6.25	QP	
3		96.0986	48.04	-10.55	37.49	43.50	-6.01	QP	
4	!	143.8295	49.04	-10.56	38.48	43.50	-5.02	QP	
5	!	204.2377	45.20	-7.58	37.62	43.50	-5.88	QP	
6		287.9904	44.52	-5.60	38.92	46.00	-7.08	QP	



Mode1 / Polarization: Vertical / Band: 5725-5850 MHz / BW: 20 / CH: H



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	!	47.9940	42.15	-7.51	34.64	40.00	-5.36	QP	
2	!	72.0843	46.36	-11.27	35.09	40.00	-4.91	QP	
3	!	119.8556	47.64	-9.22	38.42	43.50	-5.08	QP	
4		191.7450	42.38	-9.86	32.52	43.50	-10.98	QP	
5		625.0780	35.14	-0.05	35.09	46.00	-10.91	QP	
6	*	721.7258	40.73	0.47	41.20	46.00	-4.80	QP	

**6.7 Undesirable emission limits (above 1GHz)**

Test Requirement:	47 CFR Part 15.407(b)(1) 47 CFR Part 15.407(b)(4) 47 CFR Part 15.407(b)(10)																																																																								
Test Limit:	<p>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.</p> <p>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.</p> <table border="1"> <thead> <tr> <th>MHz</th> <th>MHz</th> <th>MHz</th> <th>GHz</th> </tr> </thead> <tbody> <tr> <td>0.090-0.110</td> <td>16.42-16.423</td> <td>399.9-410</td> <td>4.5-5.15</td> </tr> <tr> <td><sup>1</sup>0.495-0.505</td> <td>16.69475-16.69525</td> <td>608-614</td> <td>5.35-5.46</td> </tr> <tr> <td>2.1735-2.1905</td> <td>16.80425-16.80475</td> <td>960-1240</td> <td>7.25-7.75</td> </tr> <tr> <td>4.125-4.128</td> <td>25.5-25.67</td> <td>1300-1427</td> <td>8.025-8.5</td> </tr> <tr> <td>4.17725-4.17775</td> <td>37.5-38.25</td> <td>1435-1626.5</td> <td>9.0-9.2</td> </tr> <tr> <td>4.20725-4.20775</td> <td>73-74.6</td> <td>1645.5-1646.5</td> <td>9.3-9.5</td> </tr> <tr> <td>6.215-6.218</td> <td>74.8-75.2</td> <td>1660-1710</td> <td>10.6-12.7</td> </tr> <tr> <td>6.26775-6.26825</td> <td>108-121.94</td> <td>1718.8-1722.2</td> <td>13.25-13.4</td> </tr> <tr> <td>6.31175-6.31225</td> <td>123-138</td> <td>2200-2300</td> <td>14.47-14.5</td> </tr> <tr> <td>8.291-8.294</td> <td>149.9-150.05</td> <td>2310-2390</td> <td>15.35-16.2</td> </tr> <tr> <td>8.362-8.366</td> <td>156.52475-156.52525</td> <td>2483.5-2500</td> <td>17.7-21.4</td> </tr> <tr> <td>8.37625-8.38675</td> <td>156.7-156.9</td> <td>2690-2900</td> <td>22.01-23.12</td> </tr> <tr> <td>8.41425-8.41475</td> <td>162.0125-167.17</td> <td>3260-3267</td> <td>23.6-24.0</td> </tr> <tr> <td>12.29-12.293</td> <td>167.72-173.2</td> <td>3332-3339</td> <td>31.2-31.8</td> </tr> <tr> <td>12.51975-12.52025</td> <td>240-285</td> <td>3345.8-3358</td> <td>36.43-36.5</td> </tr> <tr> <td>12.57675-12.57725</td> <td>322-335.4</td> <td>3600-4400</td> <td>(<sup>2</sup>)</td> </tr> <tr> <td>13.36-13.41</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p><sup>1</sup>Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.</p> <p><sup>2</sup>Above 38.6</p> <p>The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in § 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in § 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in § 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in § 15.35 apply to these measurements.</p> <p>Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:</p>	MHz	MHz	MHz	GHz	0.090-0.110	16.42-16.423	399.9-410	4.5-5.15	<sup>1</sup> 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	( <sup>2</sup> )	13.36-13.41			
MHz	MHz	MHz	GHz																																																																						
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15																																																																						
<sup>1</sup> 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46																																																																						
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4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5																																																																						
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12.29-12.293	167.72-173.2	3332-3339	31.2-31.8																																																																						
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12.57675-12.57725	322-335.4	3600-4400	( <sup>2</sup> )																																																																						
13.36-13.41																																																																									

	Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
	0.009-0.490	2400/F(kHz)	300
	0.490-1.705	24000/F(kHz)	30
	1.705-30.0	30	30
	30-88	100 **	3
	88-216	150 **	3
	216-960	200 **	3
	Above 960	500	3
	<p>** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.</p> <p>In the emission table above, the tighter limit applies at the band edges. 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.</p>		
Test Method:	ANSI C63.10-2013, section 12.7		
Procedure:	<p>Above 1GHz:</p> <p>a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</p> <p>b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</p> <p>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.</p> <p>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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.</p> <p>g. Test the EUT in the lowest channel, the middle channel, the Highest channel.</p> <p>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.</p> <p>i. Repeat above procedures until all frequencies measured was complete.</p> <p>Remark:</p> <p>1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor</p> <p>2. Scan from 18GHz to 40GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.</p> <p>3. As shown in this section, for frequencies above 1GHz, the field strength</p>		

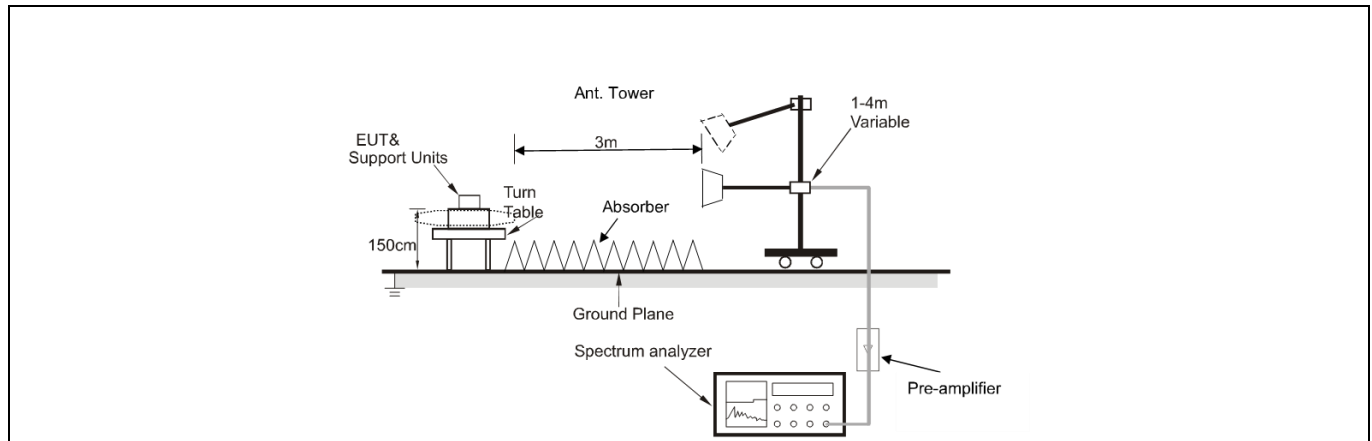
limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

4. The disturbance above 18GHz were very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

### 6.7.1 E.U.T. Operation:

Operating Environment:					
Temperature:	24 °C	Humidity:	54 %	Atmospheric Pressure:	101 kPa
Pre test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6				
Final test mode:	All of the listed pre-test mode were tested, only the data of the worst mode (Mode1) is recorded in the report。				
Note: Test frequency are from 1GHz to 40GHz, the amplitude of spurious emissions which are attenuated more than 20 dB below the limits are not reported. All modes of operation of the EUT were investigated, and only the worst-case results are reported.					

### 6.7.2 Test Setup Diagram:



**6.7.3 Test Data:**

Mode1 / Polarization: Horizontal / Band: 5150-5250 MHz / BW: 20 / CH: L

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		10360.000	54.25	4.04	58.29	74.00	-15.71	peak
2	*	10360.000	45.62	4.04	49.66	54.00	-4.34	AVG
3		15540.000	7.32	47.56	54.88	74.00	-19.12	peak
4		15540.000	-1.82	47.56	45.74	54.00	-8.26	AVG

Mode1 / Polarization: Vertical / Band: 5150-5250 MHz / BW: 20 / CH: L

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		10360.000	48.64	4.04	52.68	74.00	-21.32	peak
2		10360.000	39.58	4.04	43.62	54.00	-10.38	AVG
3		15540.000	7.06	47.56	54.62	74.00	-19.38	peak
4	*	15540.000	-2.42	47.56	45.14	54.00	-8.86	AVG

Mode1 / Polarization: Horizontal / Band: 5150-5250 MHz / BW: 20 / CH: M

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		10400.000	54.37	3.79	58.16	74.00	-15.84	peak
2	*	10400.000	45.75	3.79	49.54	54.00	-4.46	AVG
3		15600.000	6.77	46.92	53.69	74.00	-20.31	peak
4		15600.000	-2.27	46.92	44.65	54.00	-9.35	AVG

Mode1 / Polarization: Vertical / Band: 5150-5250 MHz / BW: 20 / CH: M

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		10400.000	51.22	3.79	55.01	74.00	-18.99	peak
2	*	10400.000	42.53	3.79	46.32	54.00	-7.68	AVG
3		15600.000	7.01	46.92	53.93	74.00	-20.07	peak
4		15600.000	-2.16	46.92	44.76	54.00	-9.24	AVG



Mode1 / Polarization: Horizontal / Band: 5150-5250 MHz / BW: 20 / CH: H

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		10480.000	55.16	4.06	59.22	74.00	-14.78	peak
2	*	10480.000	46.14	4.06	50.20	54.00	-3.80	AVG
3		15720.000	7.27	46.86	54.13	74.00	-19.87	peak
4		15720.000	-1.70	46.86	45.16	54.00	-8.84	AVG

Mode1 / Polarization: Vertical / Band: 5150-5250 MHz / BW: 20 / CH: H

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		10480.000	49.47	4.06	53.53	74.00	-20.47	peak
2		10480.000	40.30	4.06	44.36	54.00	-9.64	AVG
3		15720.000	8.43	46.86	55.29	74.00	-18.71	peak
4	*	15720.000	-0.65	46.86	46.21	54.00	-7.79	AVG

Mode1 / Polarization: Horizontal / Band: 5725-5850 MHz / BW: 20 / CH: L

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		11490.000	8.58	48.62	57.20	74.00	-16.80	peak
2	*	11490.000	0.03	48.62	48.65	54.00	-5.35	AVG
3		17235.000	7.10	48.39	55.49	74.00	-18.51	peak
4		17235.000	-2.02	48.39	46.37	54.00	-7.63	AVG

Mode1 / Polarization: Vertical / Band: 5725-5850 MHz / BW: 20 / CH: L

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		11490.000	11.02	48.62	59.64	74.00	-14.36	peak
2	*	11490.000	1.64	48.62	50.26	54.00	-3.74	AVG
3		17235.000	6.58	48.39	54.97	74.00	-19.03	peak
4		17235.000	-3.01	48.39	45.38	54.00	-8.62	AVG

Mode1 / Polarization: Horizontal / Band: 5725-5850 MHz / BW: 20 / CH: M

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		11570.000	7.09	48.33	55.42	74.00	-18.58	peak
2		11570.000	-1.98	48.33	46.35	54.00	-7.65	AVG
3		17355.000	7.72	48.58	56.30	74.00	-17.70	peak
4	*	17355.000	-0.90	48.58	47.68	54.00	-6.32	AVG

Mode1 / Polarization: Vertical / Band: 5725-5850 MHz / BW: 20 / CH: M

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		11570.000	11.28	48.33	59.61	74.00	-14.39	peak
2	*	11570.000	2.41	48.33	50.74	54.00	-3.26	AVG
3		17355.000	7.05	48.58	55.63	74.00	-18.37	peak
4		17355.000	-2.20	48.58	46.38	54.00	-7.62	AVG

Mode1 / Polarization: Horizontal / Band: 5725-5850 MHz / BW: 20 / CH: H

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		11650.000	8.67	47.96	56.63	74.00	-17.37	peak
2	*	11650.000	-0.51	47.96	47.45	54.00	-6.55	AVG
3		17475.000	7.27	48.95	56.22	74.00	-17.78	peak
4		17475.000	-1.71	48.95	47.24	54.00	-6.76	AVG

Mode1 / Polarization: Vertical / Band: 5725-5850 MHz / BW: 20 / CH: H

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		11650.000	10.79	47.96	58.75	74.00	-15.25	peak
2	*	11650.000	1.40	47.96	49.36	54.00	-4.64	AVG
3		17475.000	7.88	48.95	56.83	74.00	-17.17	peak
4		17475.000	-1.27	48.95	47.68	54.00	-6.32	AVG



## Photographs of the test setup

Refer to Appendix - Test Setup Photos

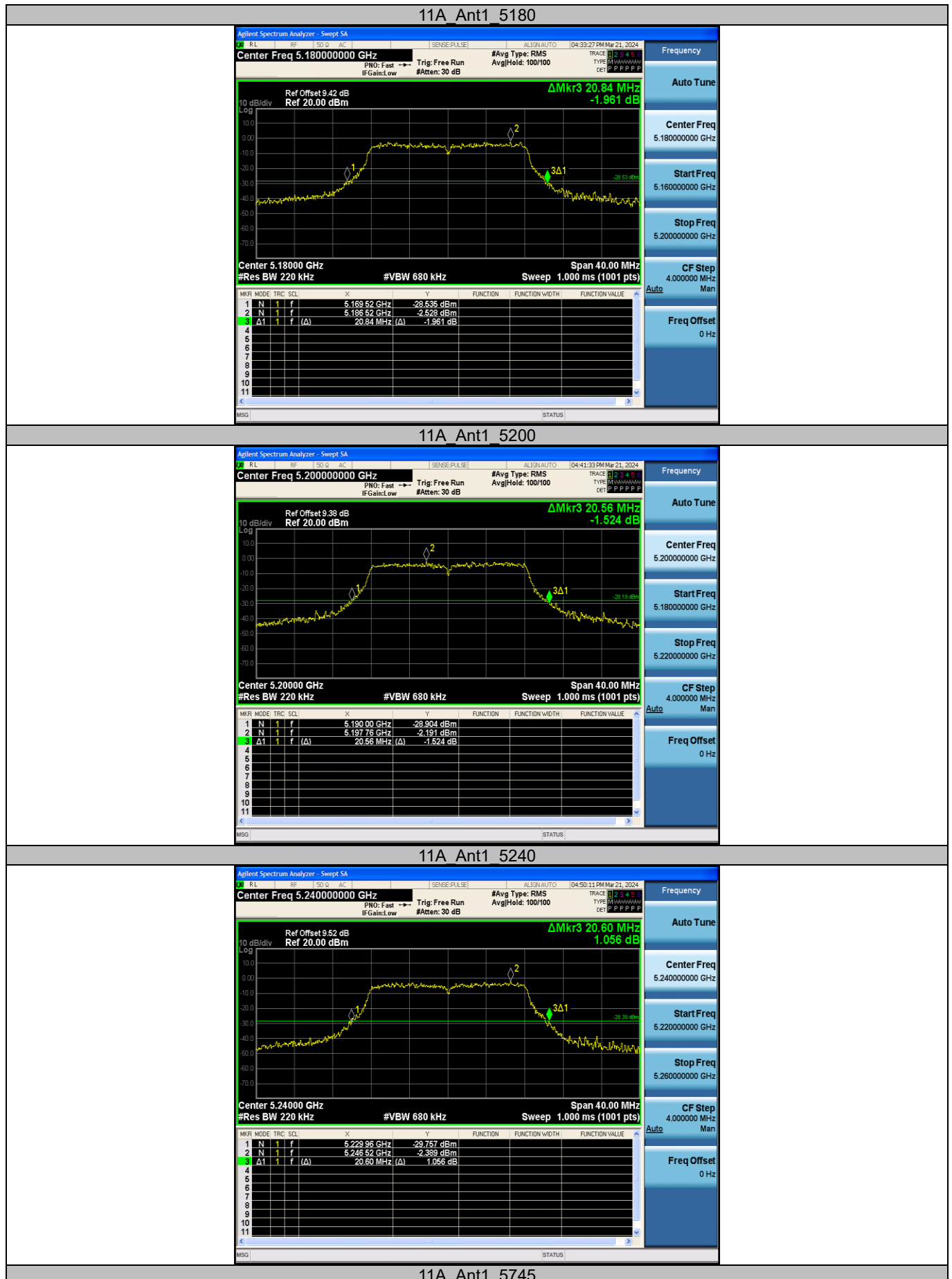
## Photographs of the EUT

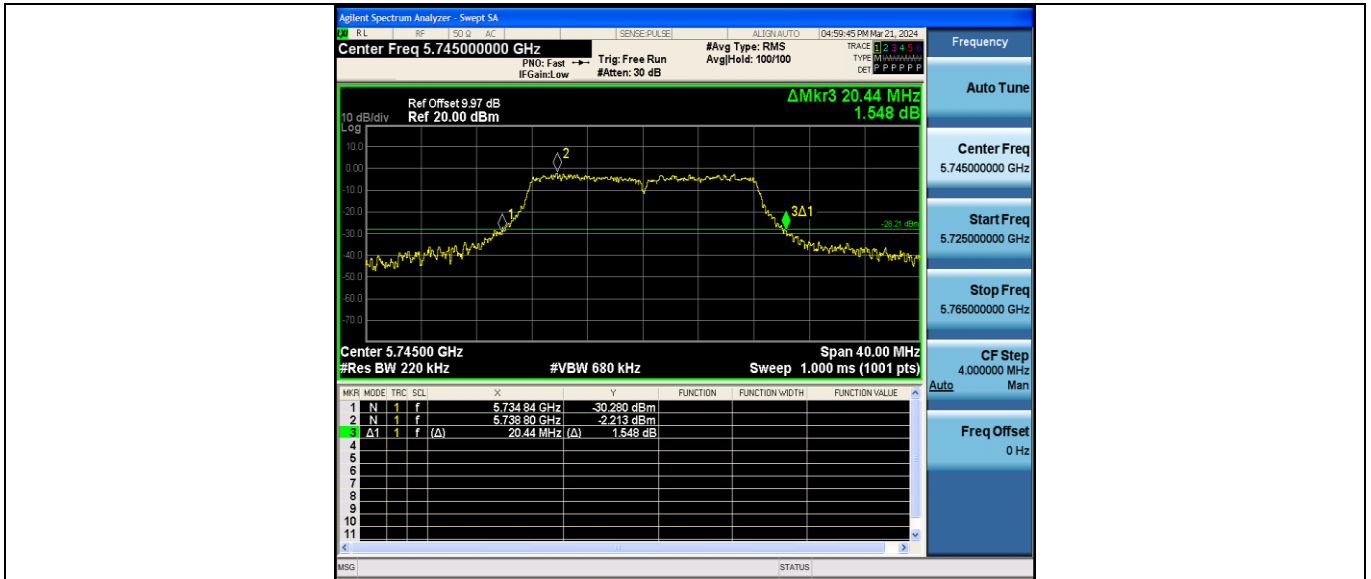
Refer to Appendix - EUT Photos

# Appendix

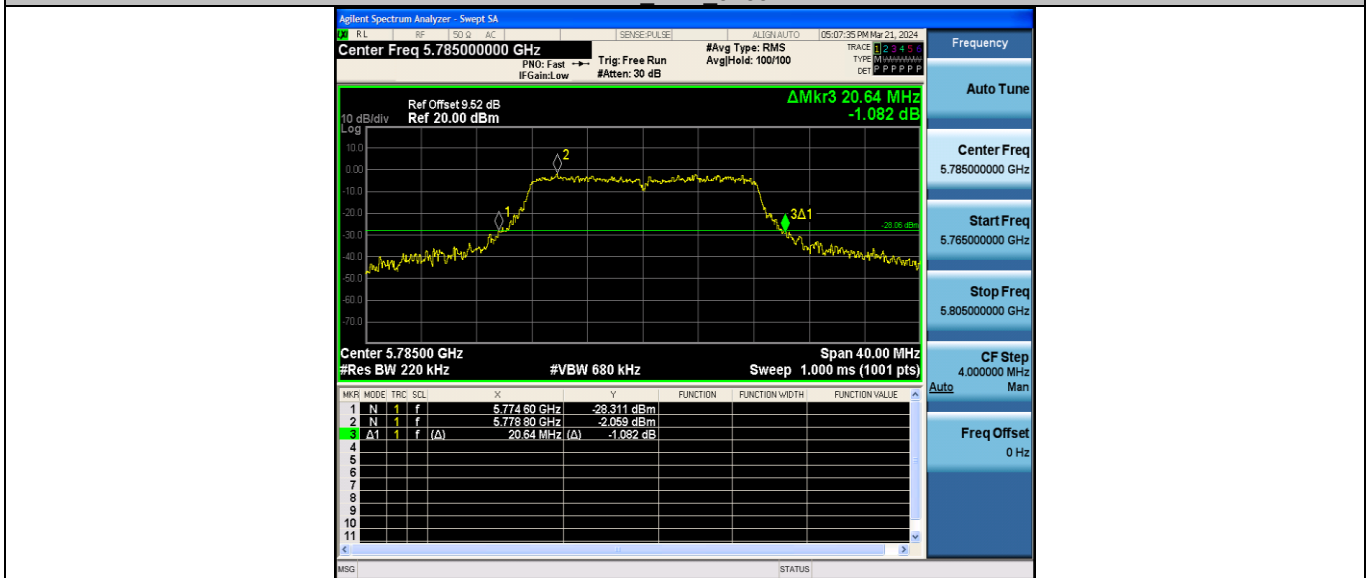
**Appendix A1: Emission Bandwidth  
 Test Result**

TestMode	Antenna	Frequency[MHz]	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	20.840	5169.520	5190.360	---	---
		5200	20.560	5190.000	5210.560	---	---
		5240	20.600	5229.960	5250.560	---	---
		5745	20.440	5734.840	5755.280	---	---
		5785	20.640	5774.600	5795.240	---	---
		5825	20.560	5814.600	5835.160	---	---
11N20SISO	Ant1	5180	21.200	5169.440	5190.640	---	---
		5200	20.640	5189.840	5210.480	---	---
		5240	21.240	5229.520	5250.760	---	---
		5745	21.160	5734.720	5755.880	---	---
		5785	20.960	5774.560	5795.520	---	---
		5825	21.000	5814.320	5835.320	---	---
11N40SISO	Ant1	5190	41.120	5169.600	5210.720	---	---
		5230	42.400	5208.800	5251.200	---	---
		5755	41.440	5733.960	5775.400	---	---
		5795	41.120	5774.440	5815.560	---	---
11AC20SISO	Ant1	5180	20.840	5169.560	5190.400	---	---
		5200	20.520	5189.880	5210.400	---	---
		5240	20.960	5229.840	5250.800	---	---
		5745	20.840	5734.720	5755.560	---	---
		5785	21.280	5774.480	5795.760	---	---
		5825	20.600	5814.680	5835.280	---	---
11AC40SISO	Ant1	5190	40.800	5169.600	5210.400	---	---
		5230	41.040	5209.440	5250.480	---	---
		5755	41.760	5734.120	5775.880	---	---
		5795	40.800	5774.760	5815.560	---	---
11AC80SISO	Ant1	5210	80.800	5170.160	5250.960	---	---
		5775	81.120	5734.840	5815.960	---	---

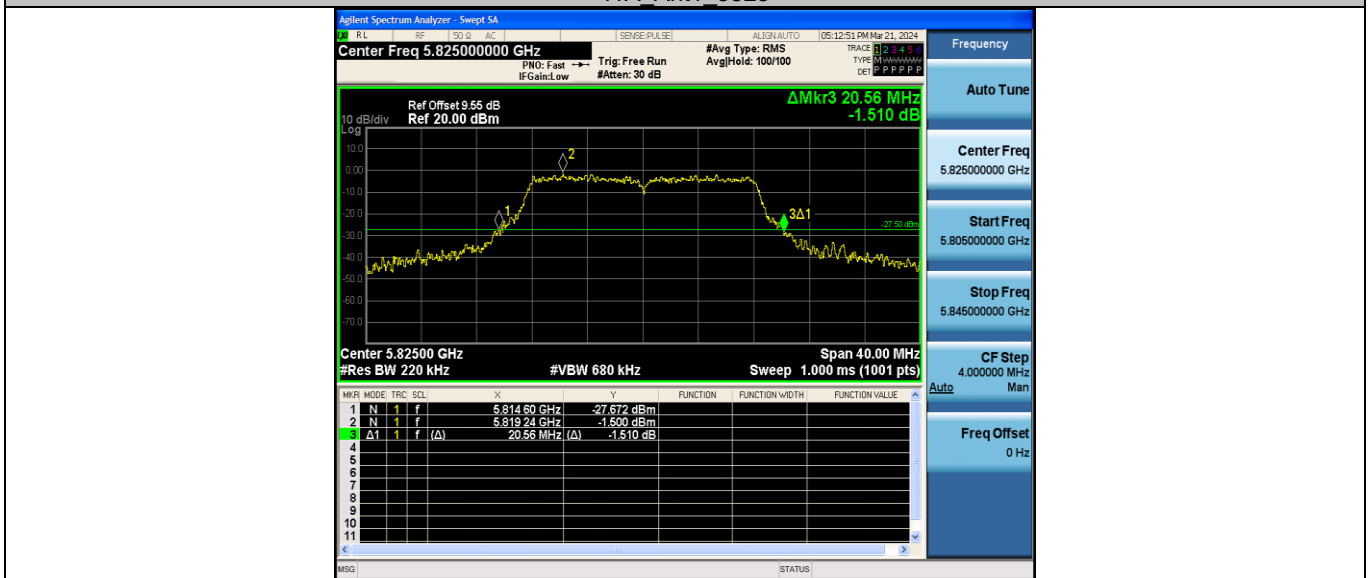
**Test Graphs**




11A Ant1 5785



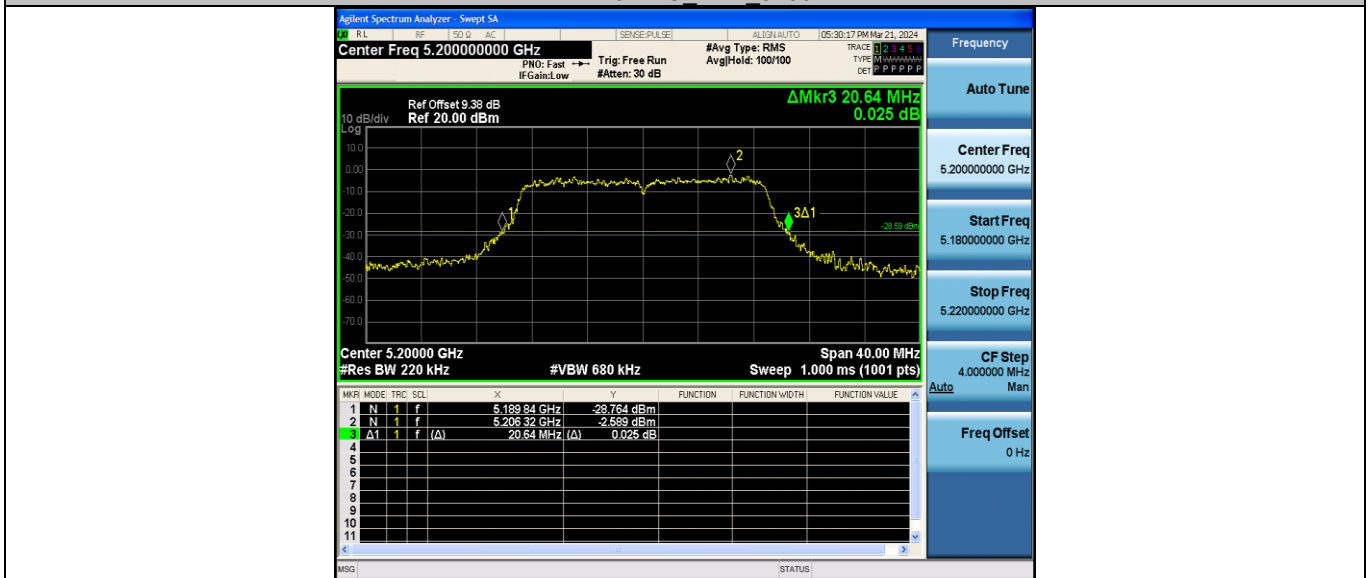
11A Ant1 5825



11N20SISO Ant1 5180



11N20SISO\_Ant1\_5200



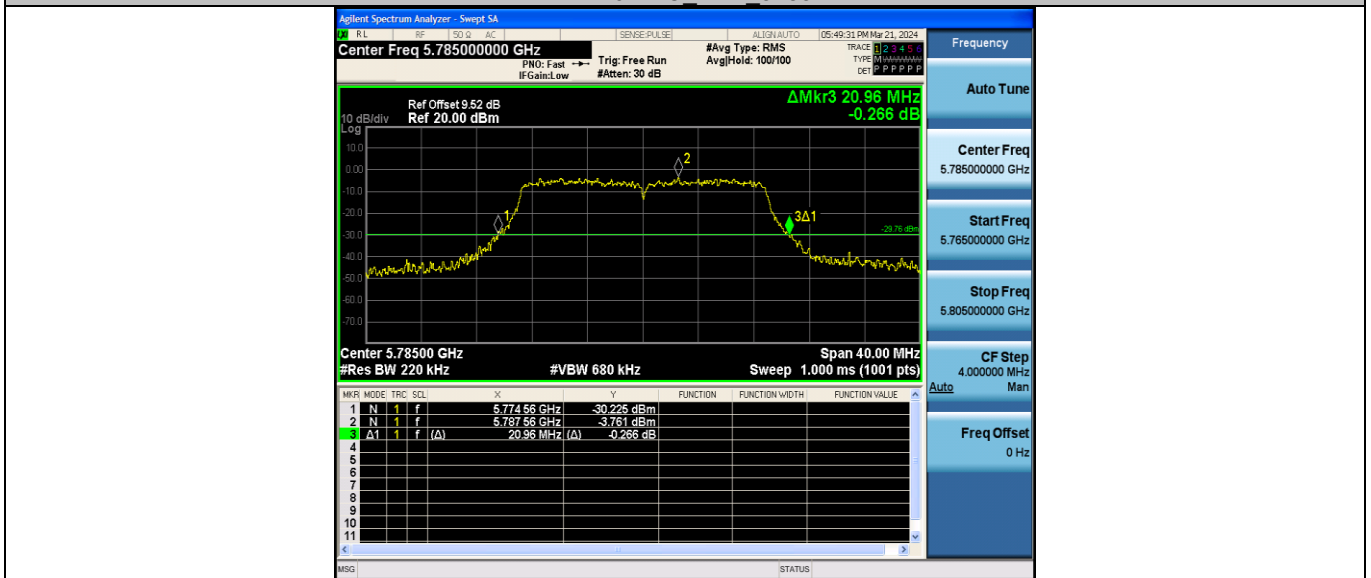
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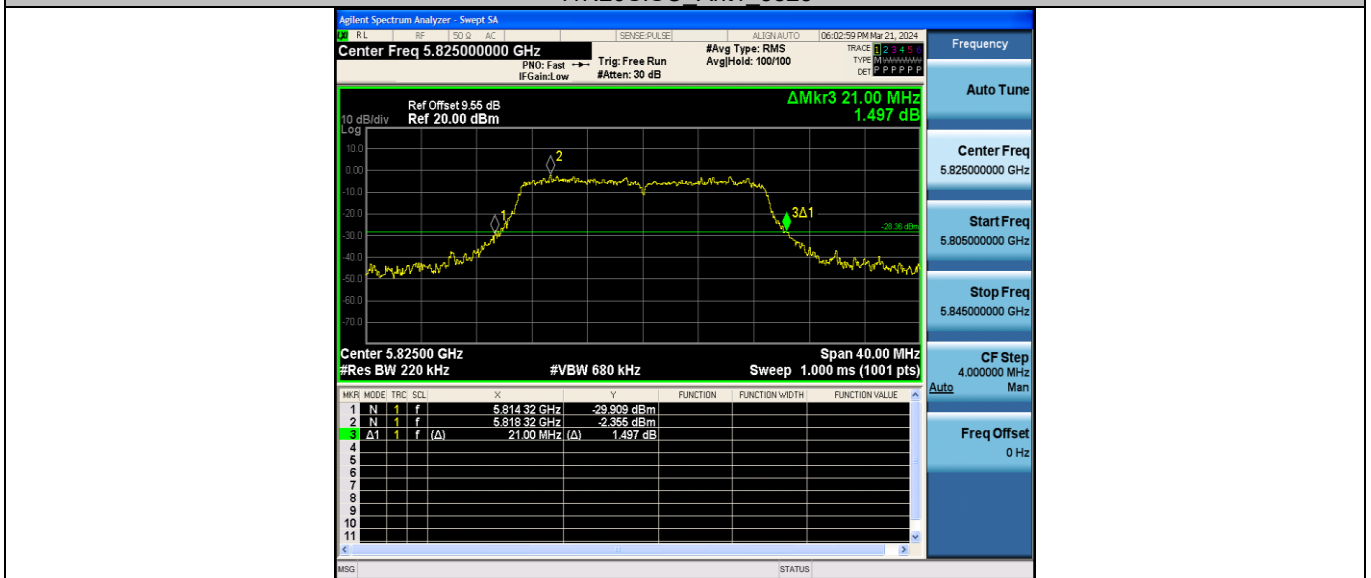
11N20SISO\_Ant1\_5745



11N20SISO\_Ant1\_5785

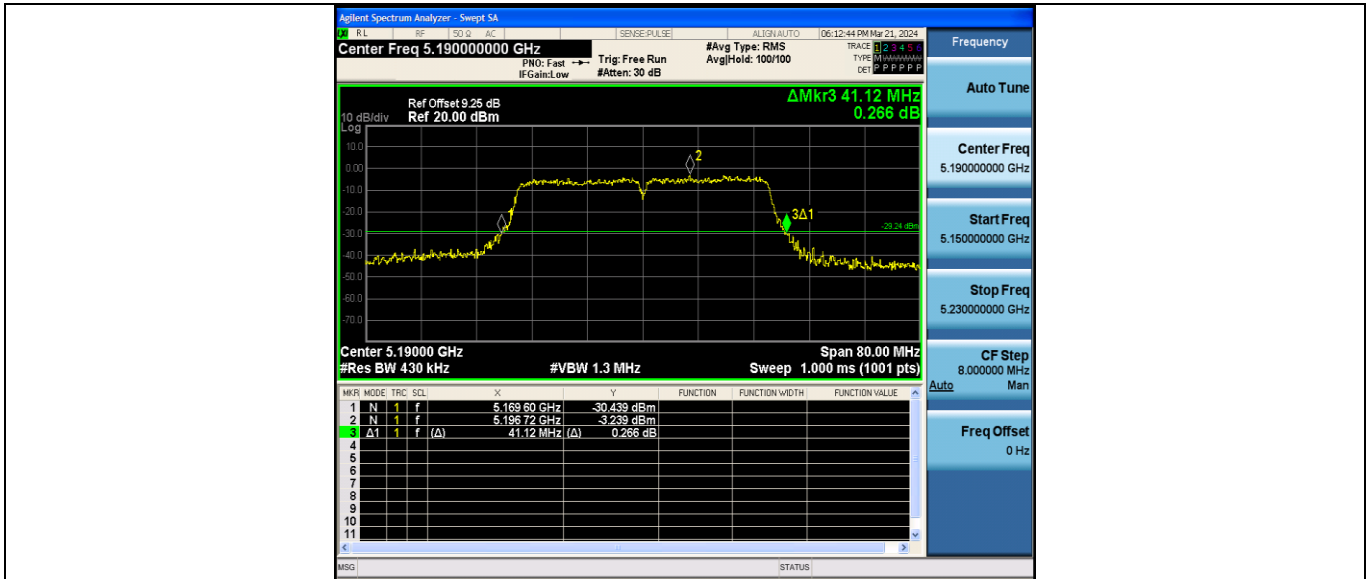


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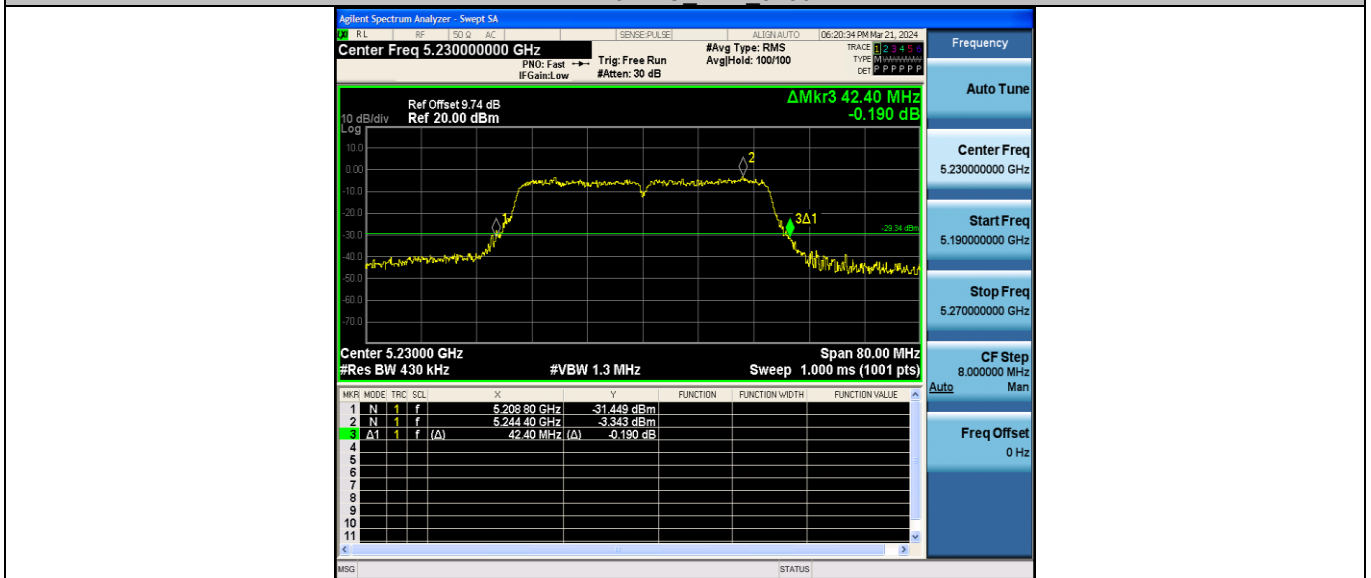


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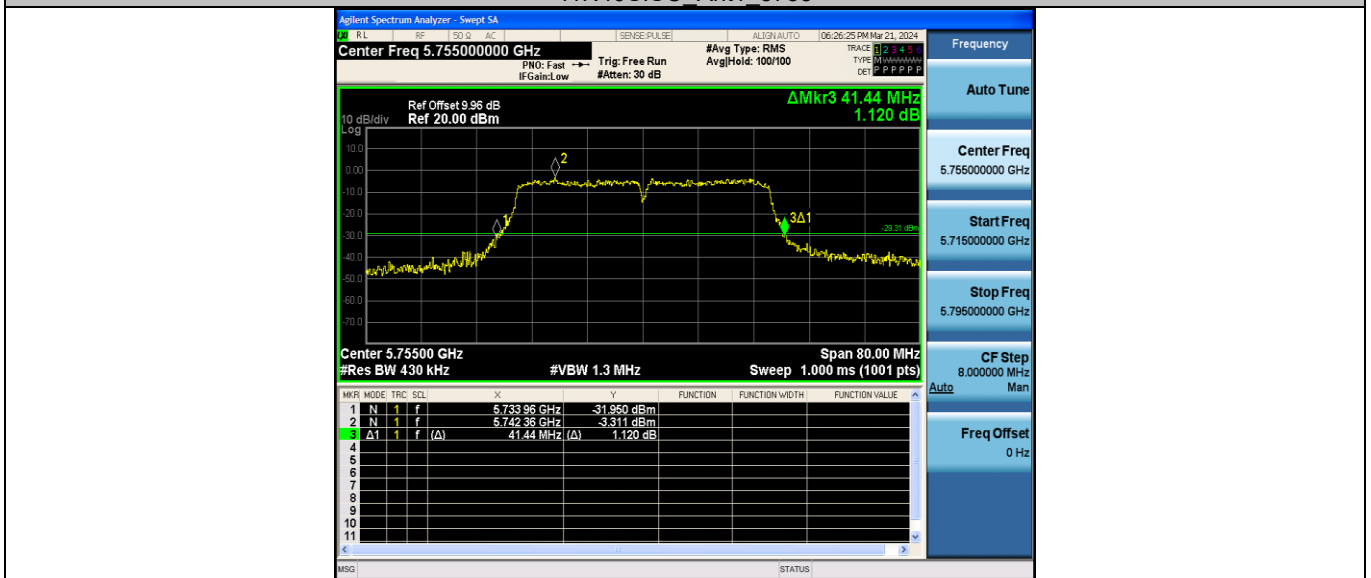




11N40SISO\_Ant1\_5230



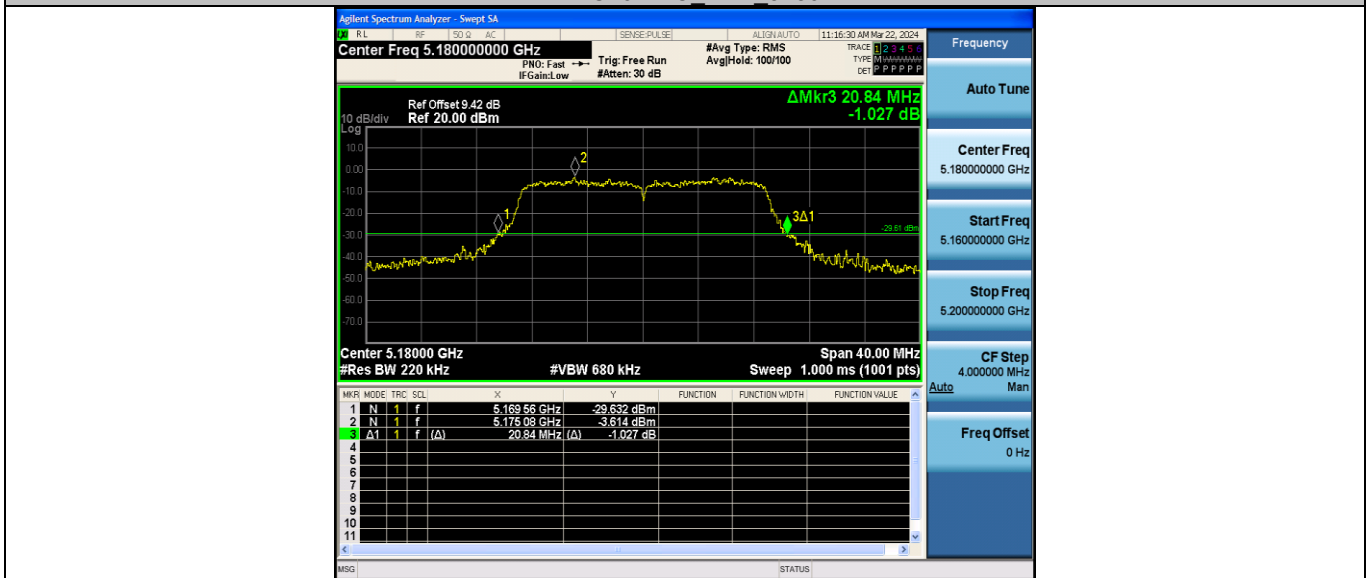
11N40SISO\_Ant1\_5755



11N40SISO\_Ant1\_5795



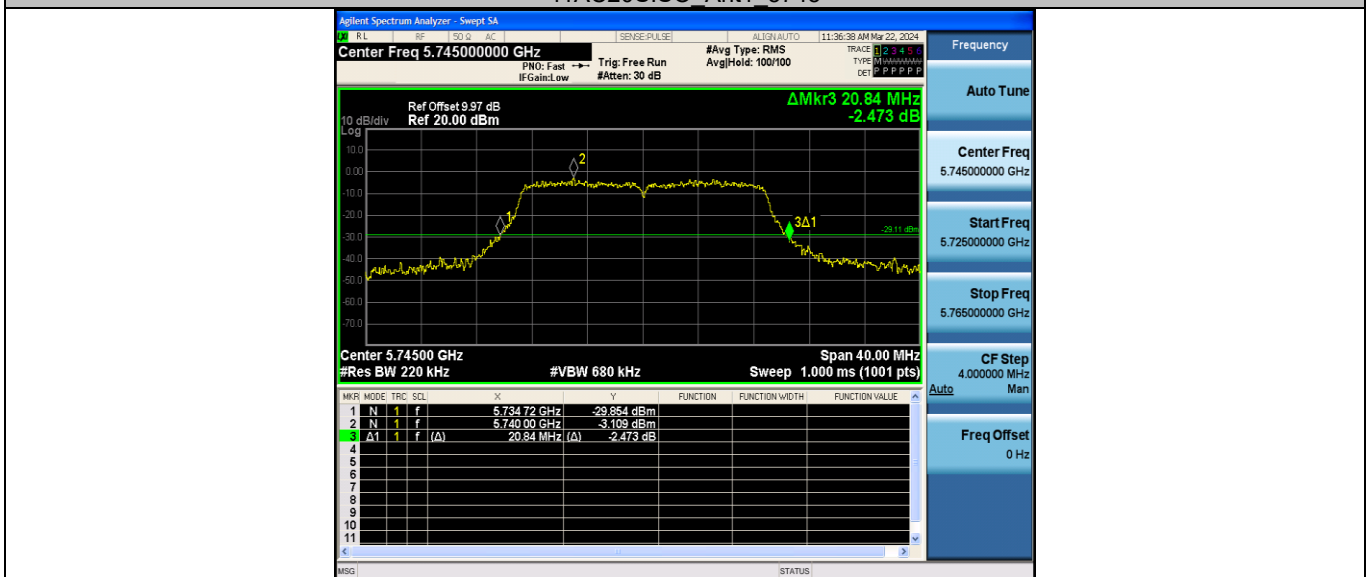
11AC20SISO\_Ant1\_5180



11AC20SISO\_Ant1\_5200

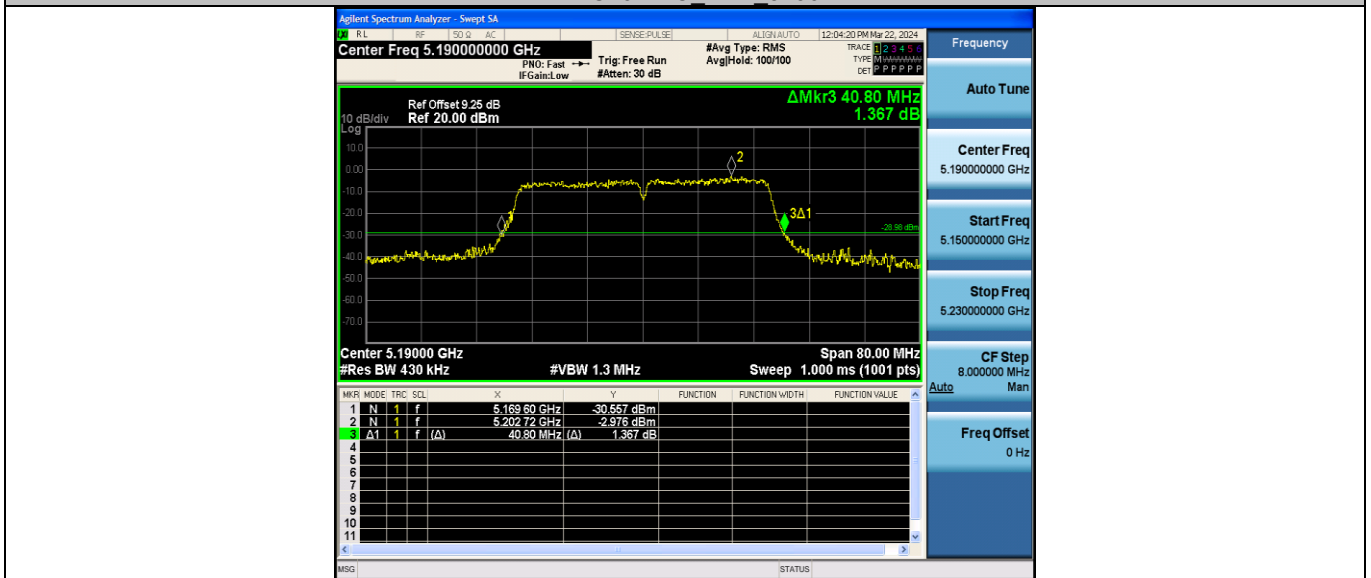


11AC20SISO\_Ant1\_5240





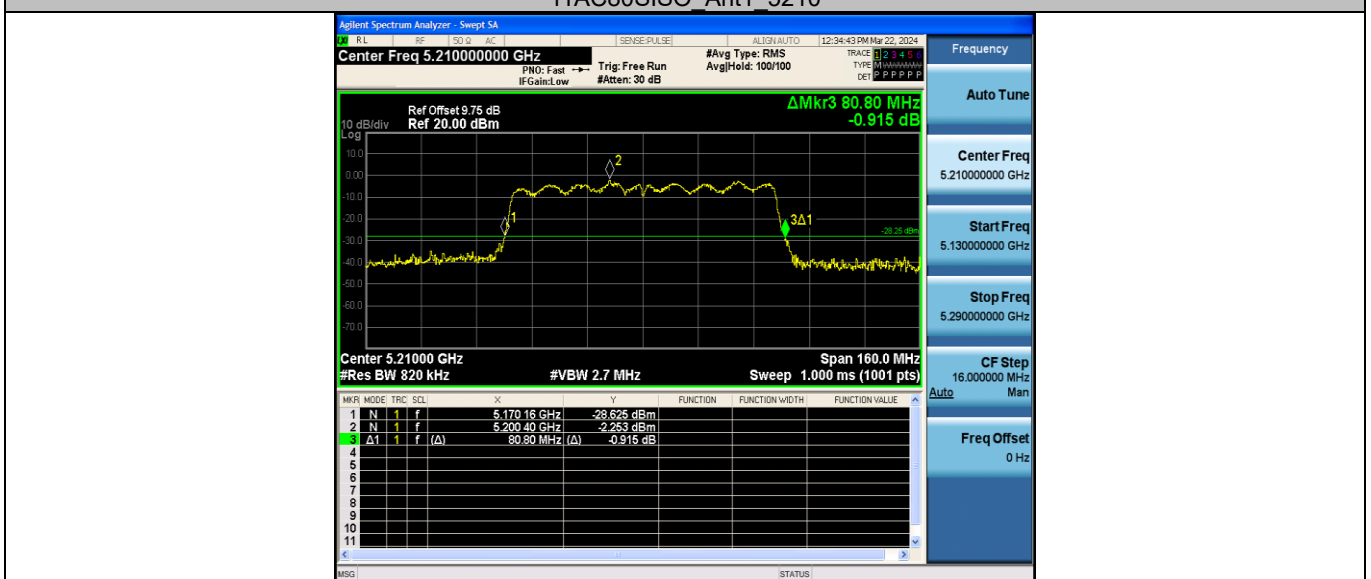
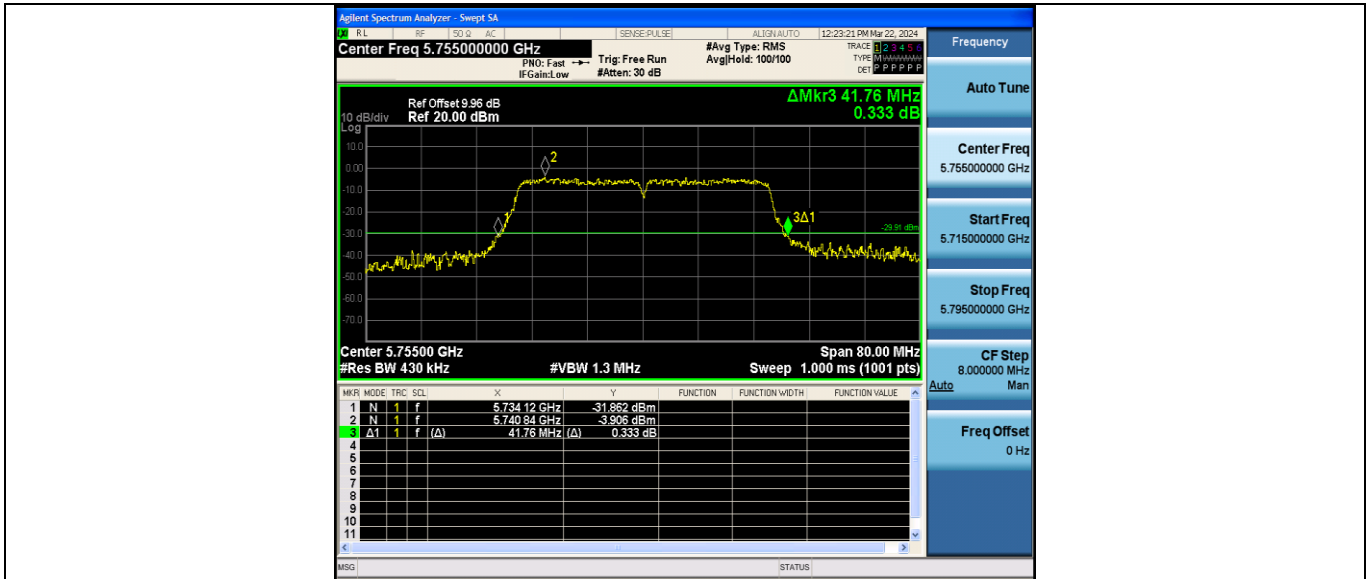
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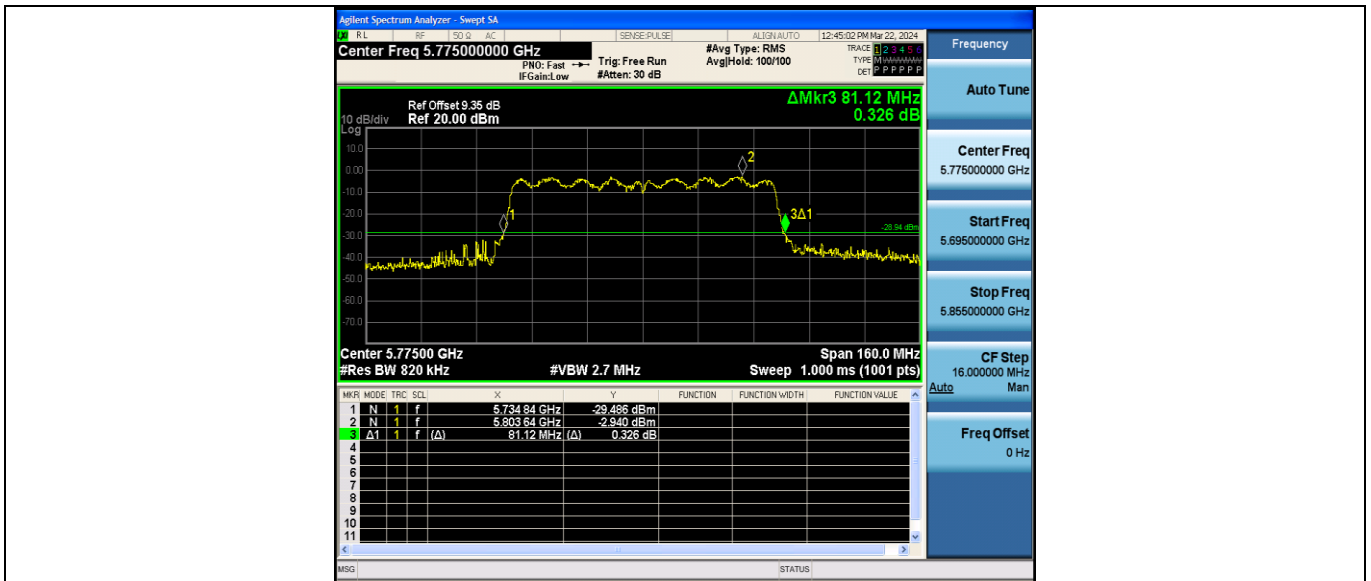


11AC40SISO\_Ant1\_5230



11AC40SISO\_Ant1\_5755



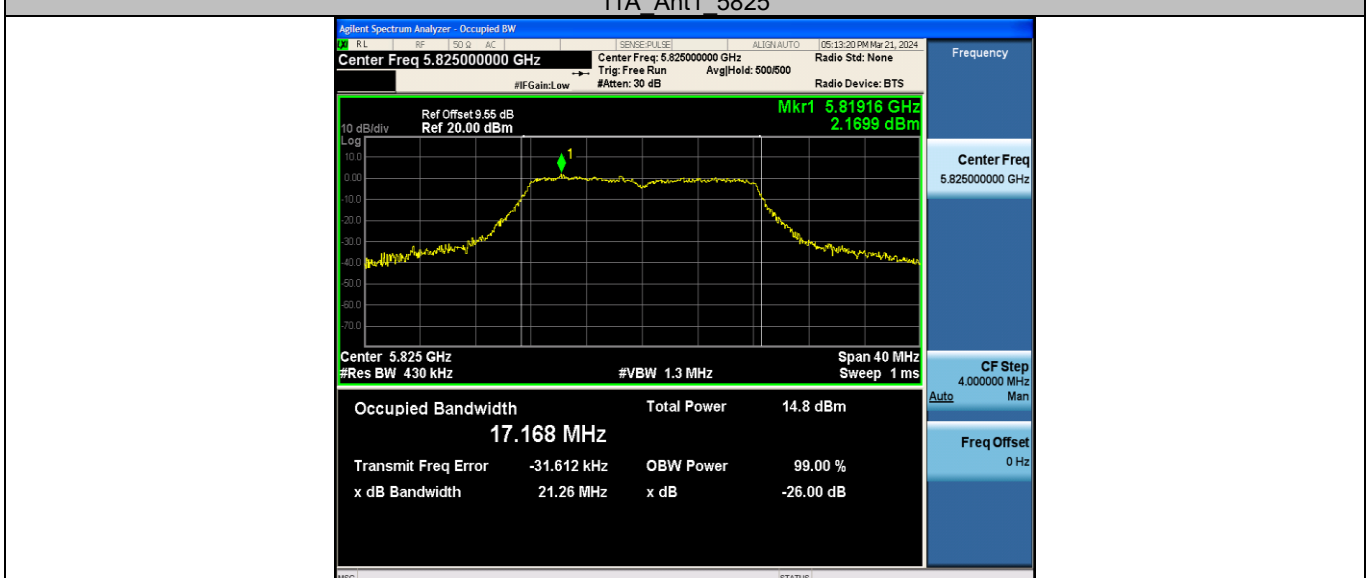
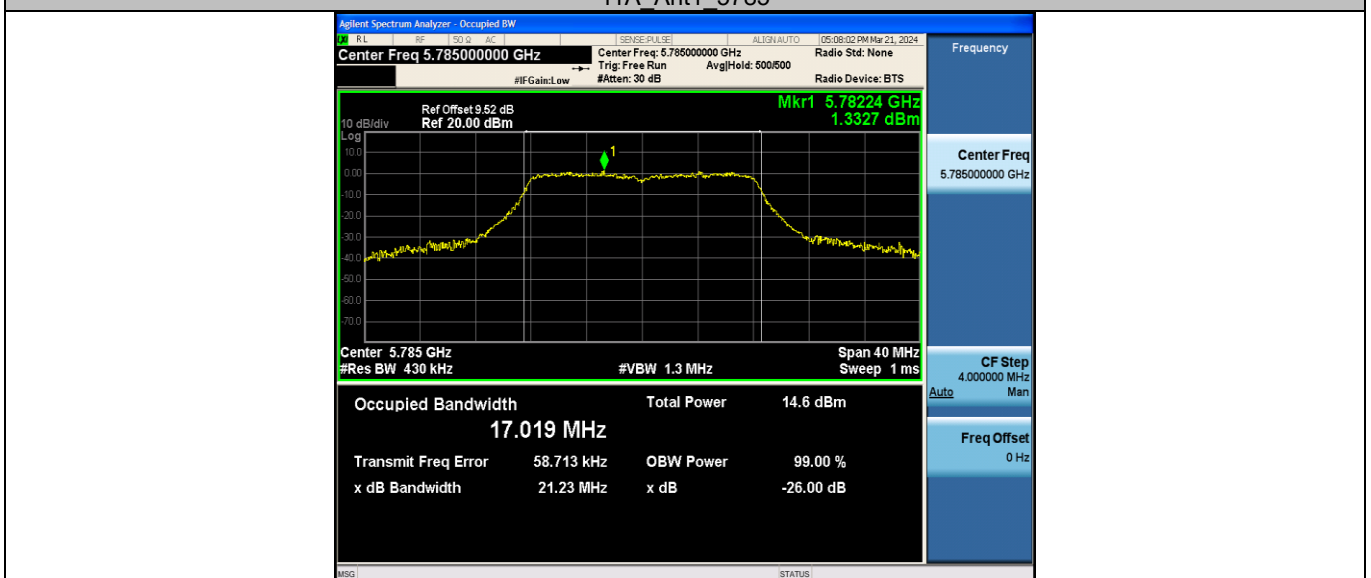
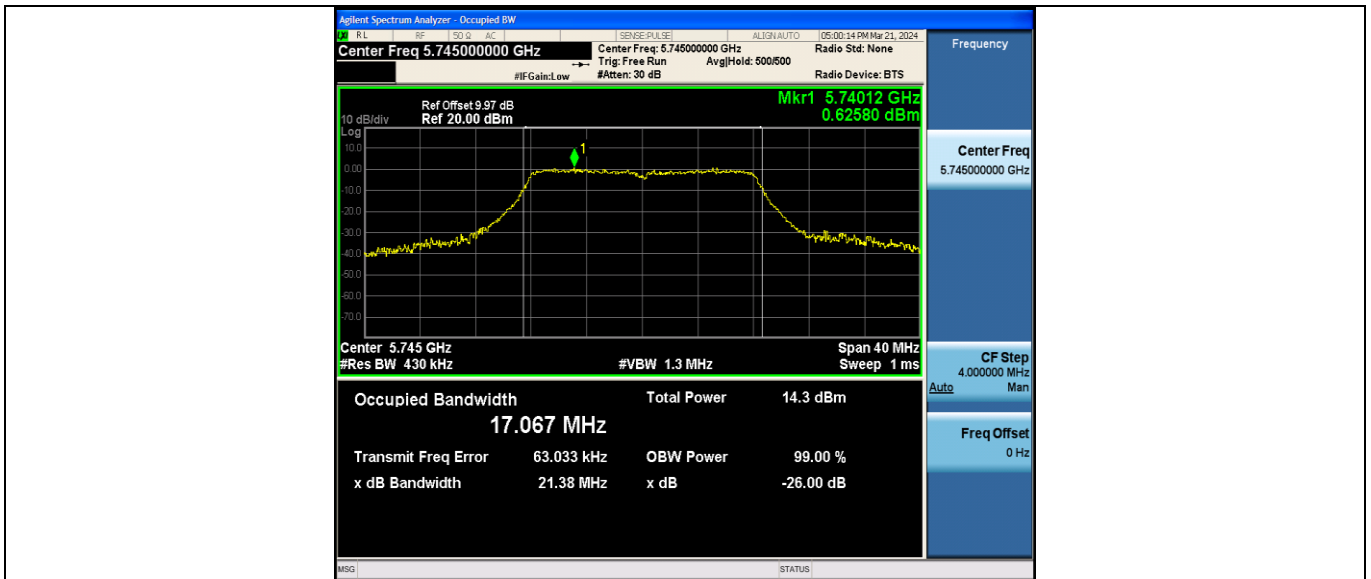


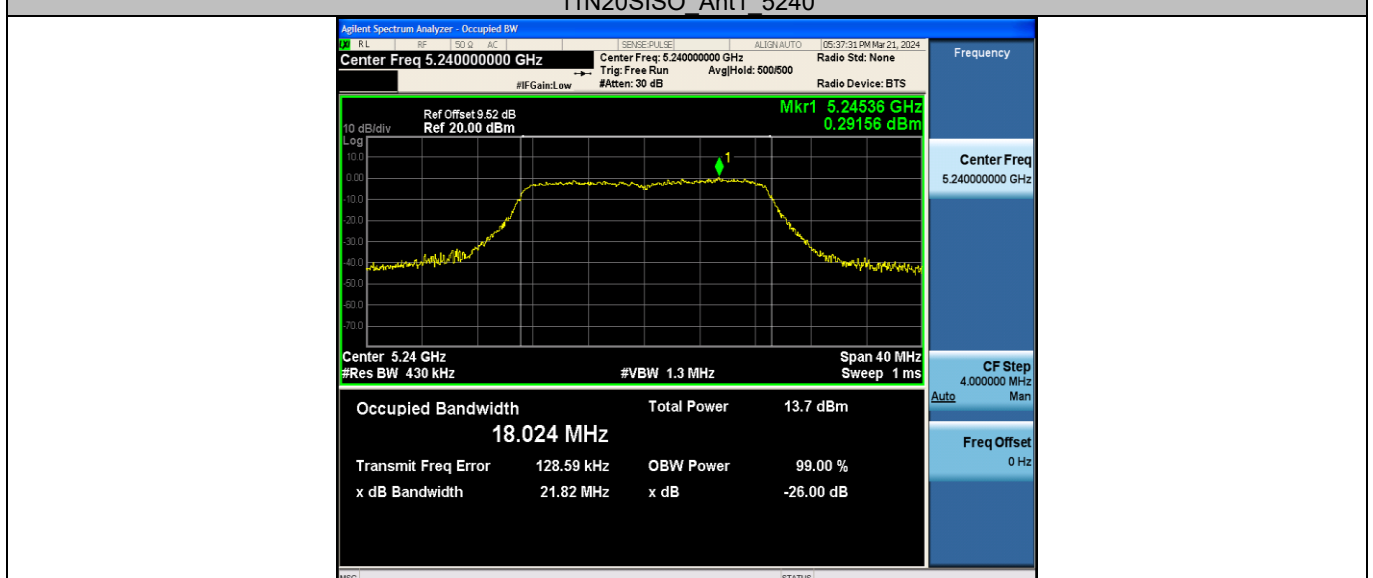
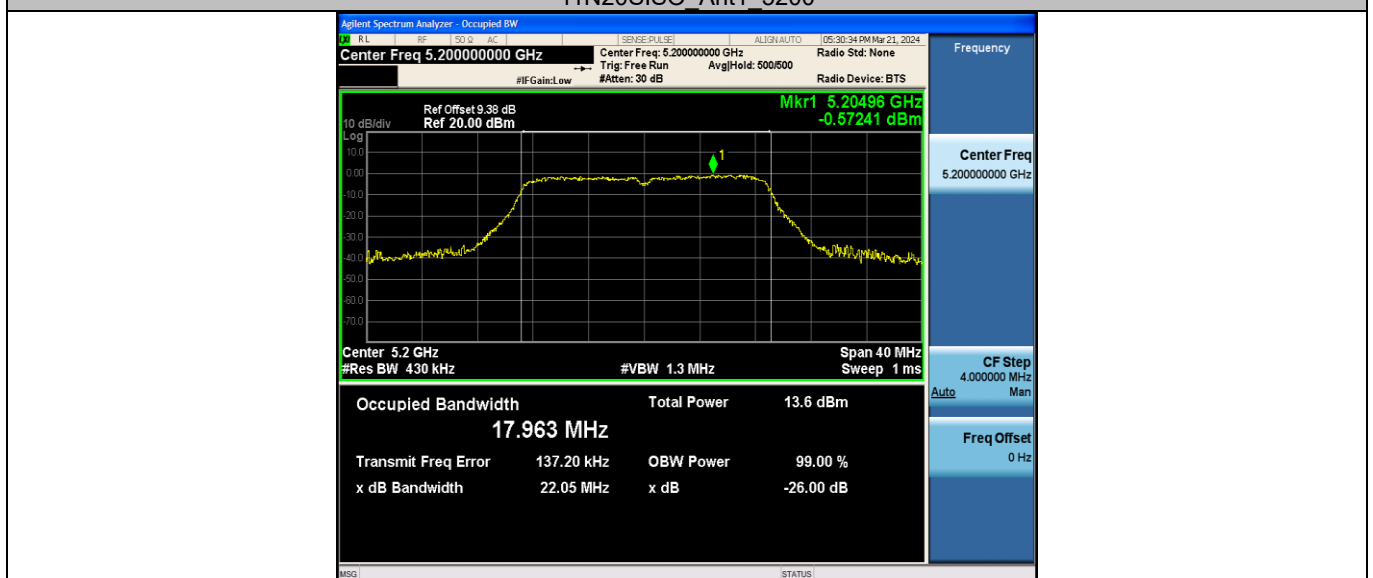
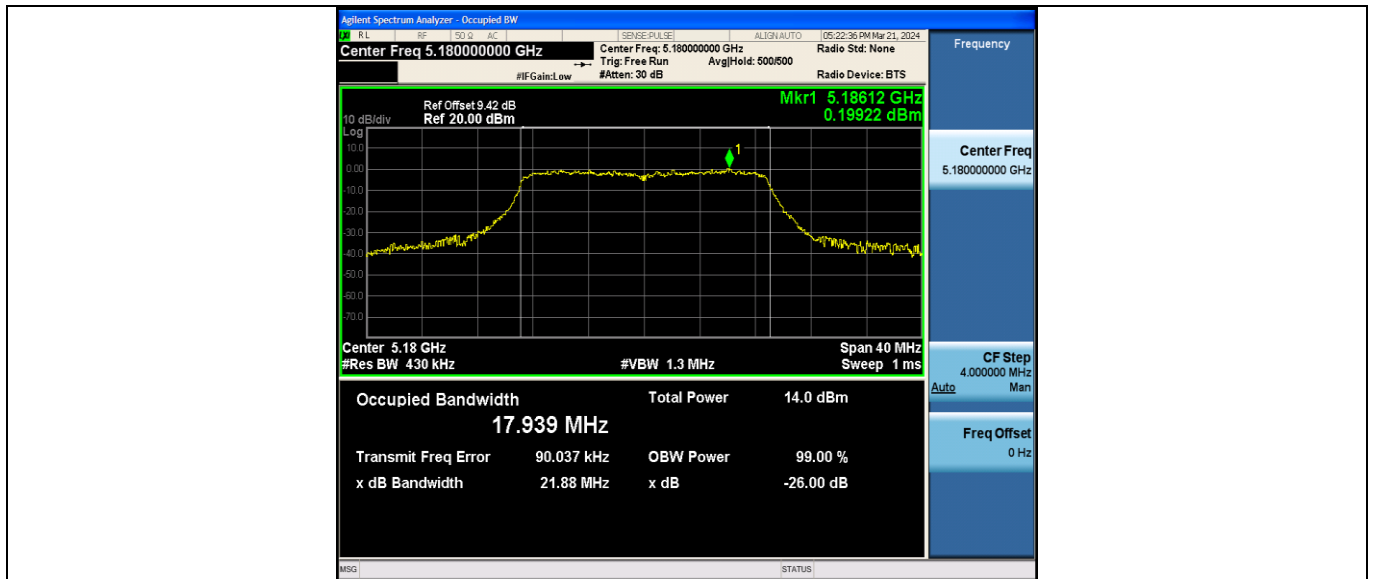
**Appendix A2: Occupied channel bandwidth**
**Test Result**

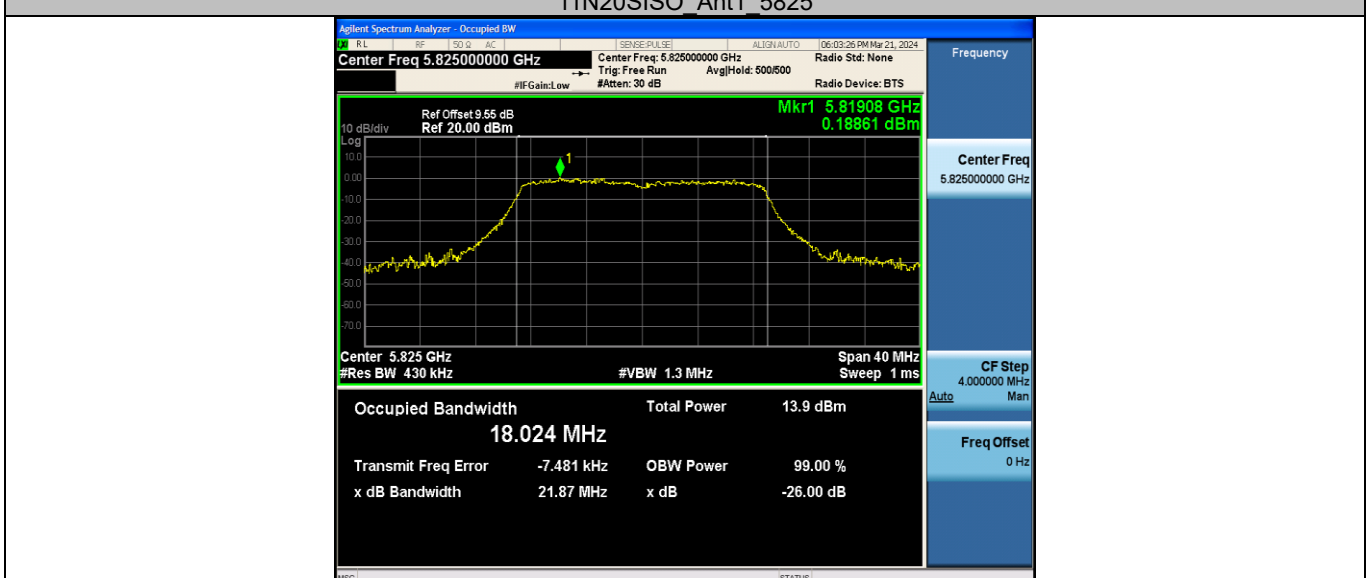
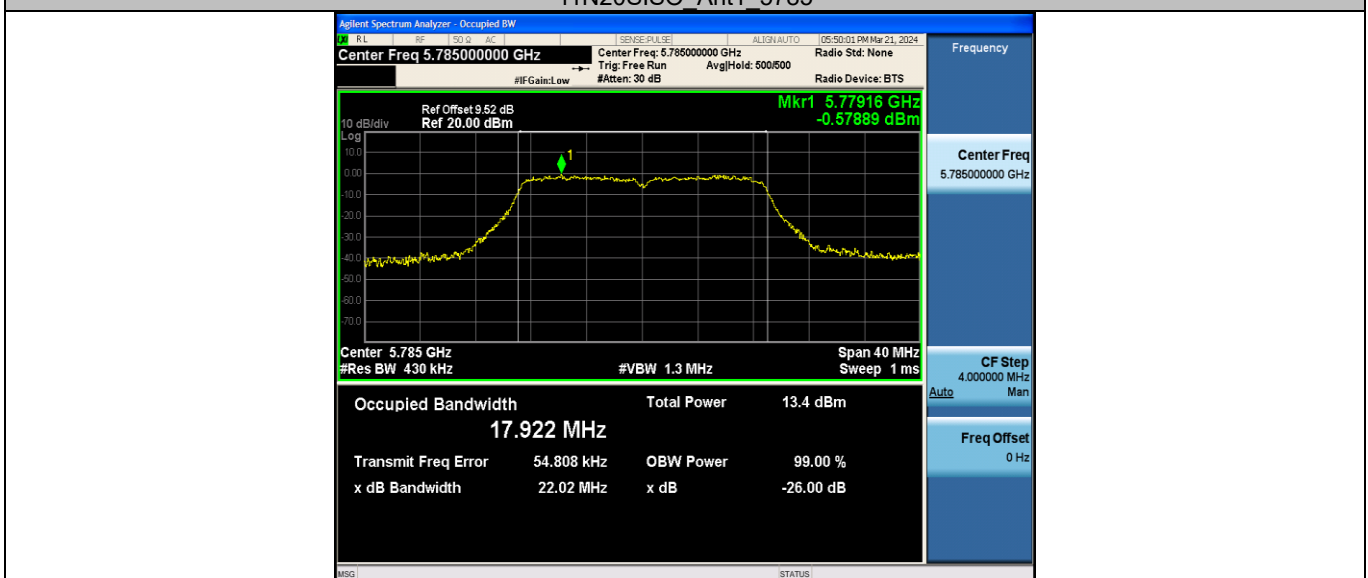
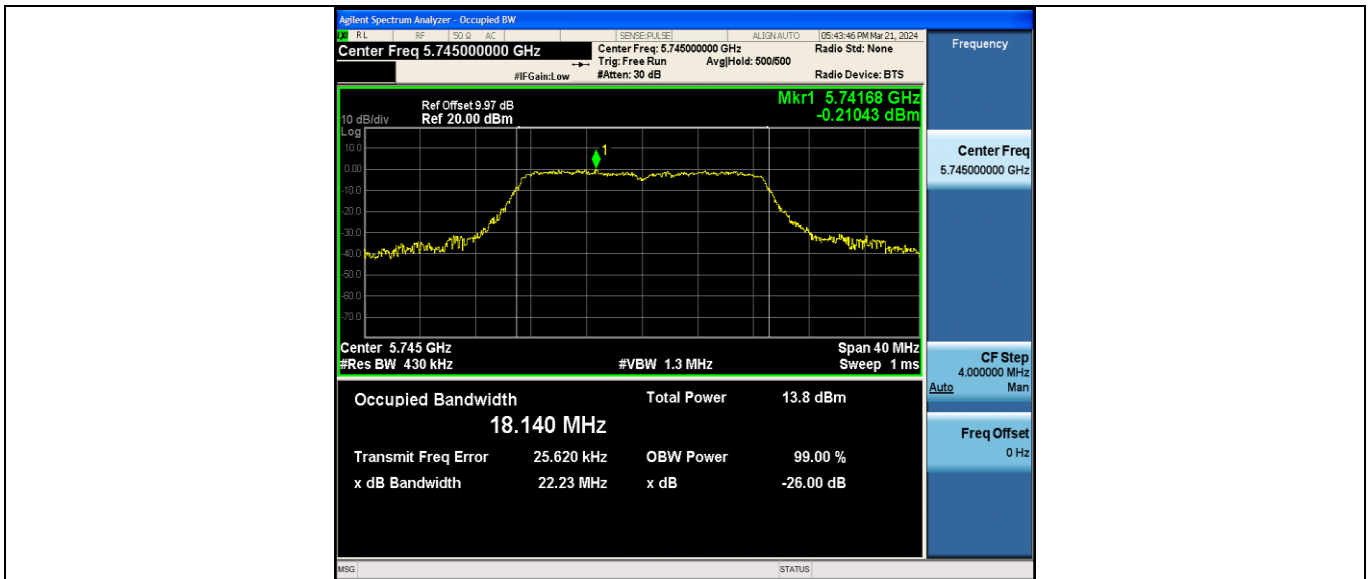
TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	17.087	5171.4725	5188.5595	---	---
		5200	17.009	5191.6191	5208.6281	---	---
		5240	16.988	5231.5857	5248.5737	---	---
		5745	17.067	5736.5295	5753.5965	---	---
		5785	17.019	5776.5492	5793.5682	---	---
		5825	17.168	5816.3844	5833.5524	---	---
11N20SISO	Ant1	5180	17.939	5171.1205	5189.0595	---	---
		5200	17.963	5191.1557	5209.1187	---	---
		5240	18.024	5231.1166	5249.1406	---	---
		5745	18.140	5735.9556	5754.0956	---	---
		5785	17.922	5776.0938	5794.0158	---	---
		5825	18.024	5815.9805	5834.0045	---	---
11N40SISO	Ant1	5190	36.558	5171.8040	5208.3620	---	---
		5230	36.715	5211.6932	5248.4082	---	---
		5755	36.577	5736.8393	5773.4163	---	---
		5795	36.495	5776.8485	5813.3435	---	---
11AC20SISO	Ant1	5180	18.014	5171.1081	5189.1221	---	---
		5200	17.897	5191.1400	5209.0370	---	---
		5240	18.024	5231.0985	5249.1225	---	---
		5745	17.973	5736.0386	5754.0116	---	---
		5785	17.954	5776.0708	5794.0248	---	---
		5825	18.019	5816.0151	5834.0341	---	---
11AC40SISO	Ant1	5190	36.522	5171.9052	5208.4272	---	---
		5230	36.534	5211.8667	5248.4007	---	---
		5755	36.655	5736.7544	5773.4094	---	---
		5795	36.480	5776.9320	5813.4120	---	---
11AC80SISO	Ant1	5210	75.437	5172.6683	5248.1053	---	---
		5775	75.626	5737.3534	5812.9794	---	---

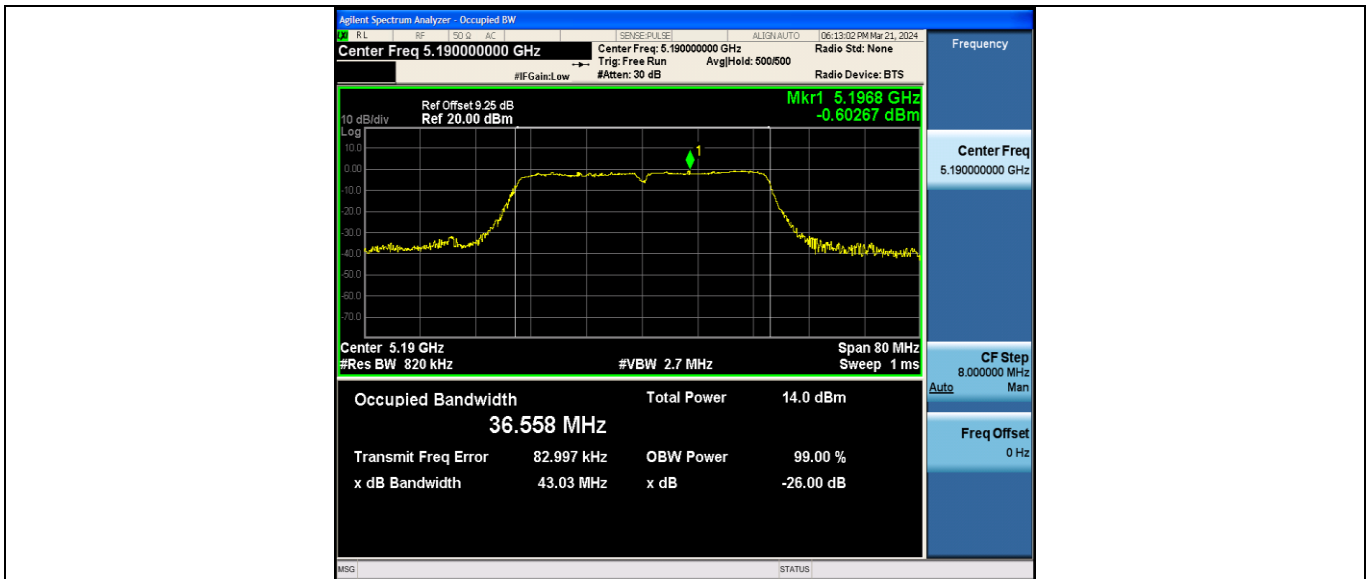
**Test Graphs**



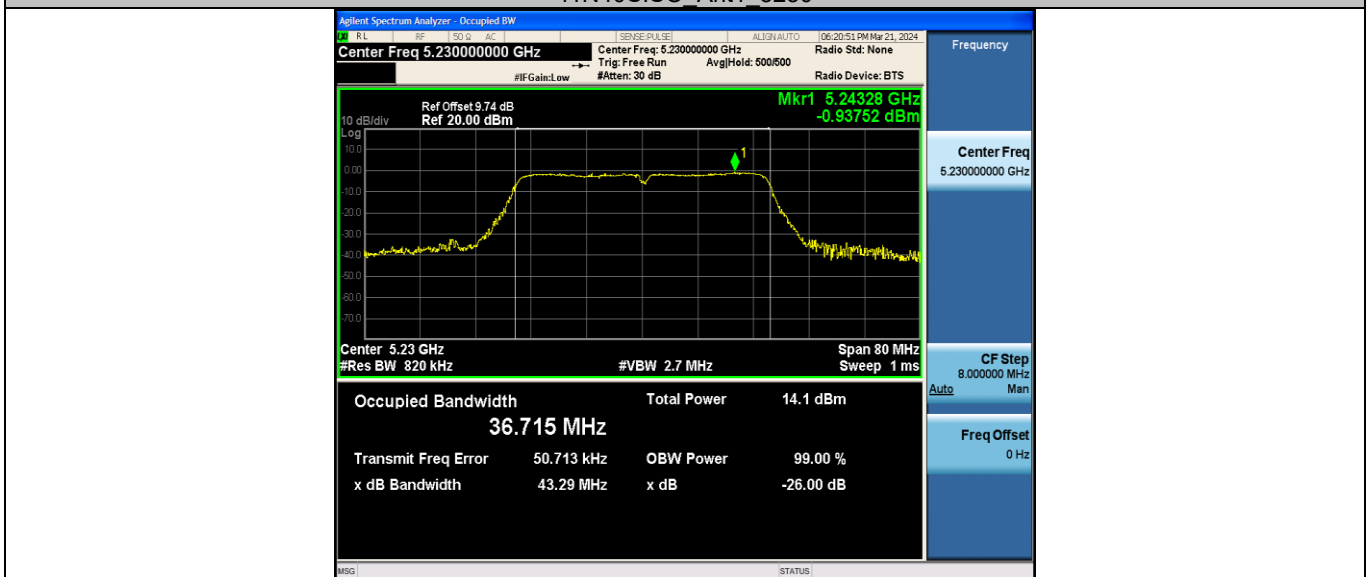





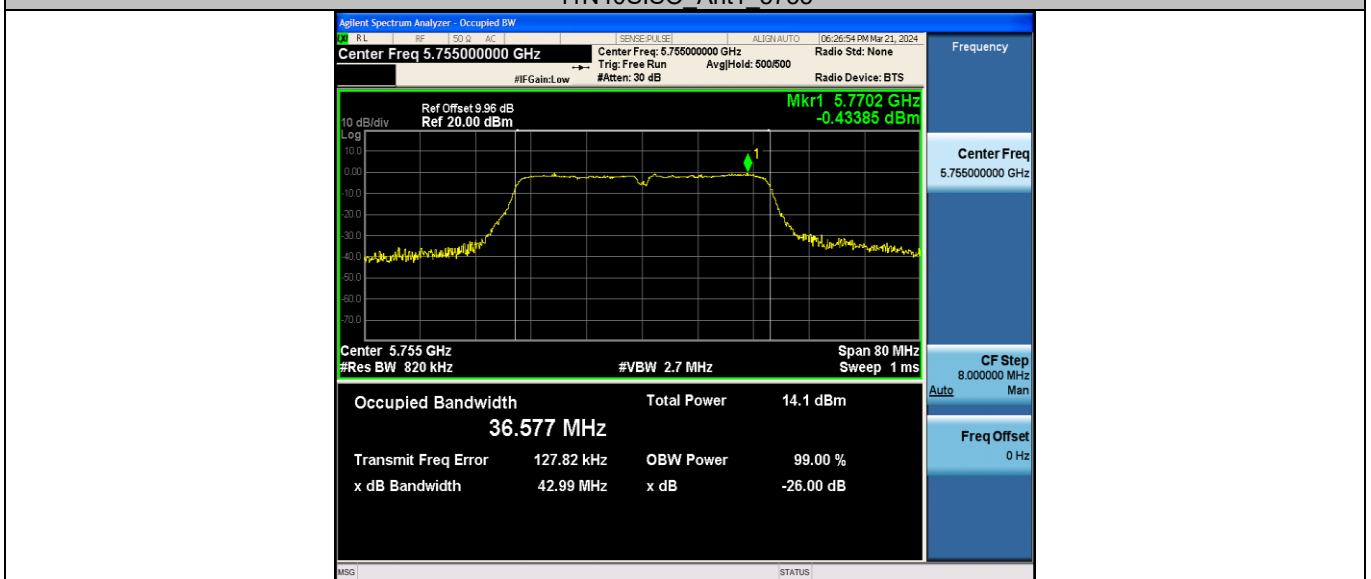




11N40SISO\_Ant1\_5230



11N40SISO\_Ant1\_5755



11N40SISO\_Ant1\_5795

