Microtest
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Test Report

Report No.:	MTi240604003-05E3
Date of issue:	2024-07-12
Applicant:	Dongguan Huachuang Electronic Co.,Ltd.
Product name:	wireless carplay adapter
Model(s):	CP10, CP11,CP12, CP13, CP15, CP16, CP17, CP18, CP19, CP21,CP20, CP22, CP23, CP25, CP26, CP27, CP28, CP29, CP30,CP11C,CP12C, CP13C, CP15C, CP16C, CP17C, CP18C, CP19C, CP21C,CP20C, CP22C, CP23C, CP25C, CP26C, CP27C, CP28C, CP29C, CP30C, CP10C
FCC ID:	2BGM4-CP

Shenzhen Microtest Co., Ltd.

http://www.mtitest.cn

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Test Result Certification	
Applicant:	Dongguan Huachuang Electronic Co.,Ltd.
Address:	No. 35, Rongfu Road, Shangsha Community, Chang'an Town, Dongguan, Guangdong Province
Manufacturer:	Dongguan Huachuang Electronic Co.,Ltd.
Address:	No. 35, Rongfu Road, Shangsha Community, Chang'an Town, Dongguan, Guangdong Province
Product description	
Product name:	wireless carplay adapter
Trade mark:	N/A
Model name:	CP10
Series Model(s):	CP11,CP12, CP13, CP15, CP16, CP17, CP18, CP19, CP21,CP20, CP22, CP23, CP25, CP26, CP27, CP28, CP29, CP30,CP11C,CP12C, CP13C, CP15C, CP16C, CP17C, CP18C, CP19C, CP21C,CP20C, CP22C, CP23C, CP25C, CP26C, CP27C, CP28C, CP29C, CP30C, CP10C
Standards:	47 CFR Part 15E
Test Method:	KDB 789033 D02 General UNII Test Procedures New Rules v02r01 ANSI C63.10-2013
Date of Test	
Date of test:	2024-06-29 to 2024-07-10
Test result:	Pass

Test Engineer	:	Yanice Xie
		(Yanice.Xie)
Reviewed By	:	David. Lee
		(David Lee)
Approved By	:	Leon chen
		(Leon Chen)

1 General Description

1.1 Description of the EUT

Product name:	wireless carplay adapter
Model name:	CP10
Series Model(s):	CP11,CP12, CP13, CP15, CP16, CP17, CP18, CP19, CP21,CP20, CP22, CP23, CP25, CP26, CP27, CP28, CP29, CP30,CP11C,CP12C, CP13C, CP15C, CP16C, CP17C, CP18C, CP19C, CP21C,CP20C, CP22C, CP23C, CP25C, CP26C, CP27C, CP28C, CP29C, CP30C, CP10C
Model difference:	All the models are the same circuit and module, except the model name and appearance.
Electrical rating:	Input:DC 5V±0.2V 1.0A Output:DC 5V±0.2V 1.0A
Accessories:	N/A
Hardware version:	HC-CP10-V1.0
Software version:	24052301.D01
Test sample(s) number:	MTi240604003-05S1001
RF specification	
Operating frequency range:	802.11a/n(HT20): U-NII Band 1: 5180MHz to 5240MHz; U-NII Band 3: 5745MHz to 5825MHz; 802.11n(HT40): U-NII Band 1: 5190MHz to 5230MHz; U-NII Band 3: 5755MHz to 5795MHz;
Channel number:	802.11a/n(HT20): U-NII Band 1: 4; U-NII Band 3: 5; 802.11n(HT40): U-NII Band 1: 2; U-NII Band 3: 2;
Modulation type:	802.11a: OFDM(BPSK, QPSK, 16QAM, 64QAM); 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM);
Antenna(s) type:	PCB Antenna
Antenna(s) gain:	U-NII Band 1:-0.05 dBi, U-NII Band 3: 4.21 dBi

1.2 Description of test modes

No.	Emission test modes
Mode1	802.11a mode
Mode2	802.11n20 mode
Mode3	802.11n40 mode

1.2.1 Operation channel list

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

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

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-1:

Mode	LCH	MCH	HCH
802.11a	16	16	16
802.11n(HT20)	14	14	14
802.11n(HT40)	15	15	15

U-NII-3:

Mode	LCH	MCH	HCH
802.11a	9	9	9
802.11n(HT20)	8	8	8
802.11n(HT40)	8	8	8

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

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Support equipment list			
Description	Model	Serial No.	Manufacturer
Accumulator	55D23LX	/	CAMEL
Car Play	/	/	/
Support cable list			
Description	Length (m)	From	To
/	/	/	/

1.5 Measurement uncertainty

Measurement	Uncertainty
Time	±1 %
Occupied channel bandwidth	±3 %
RF output power, conducted	±1 dB
Power Spectral Density, conducted	±1 dB
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	Requirement	Result
1	Antenna requirement	Part 15.203	Pass
2	Duty Cycle	/	Pass
3	Emission bandwidth and occupied bandwidth	U-NII 1: No limits, only for report use. 47 CFR Part 15.407(e)	Pass
4	Maximum conducted output power	47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(3)(i)	Pass
5	Power spectral density	47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(3)(i)	Pass
6	Band edge emissions (Radiated)	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 15.407(b)(9)	Pass
8	Undesirable emission limits (above 1GHz)	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 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
Duty Cycle Emission bandwidth and occupied bandwidth Maximum conducted output power Power spectral density						
1	Wideband Radio Communication Tester	Rohde&schwarz	CMW500	149155	2024-03-20	2025-03-19
2	ESG Series Analog Ssignal Generator	Agilent	E4421B	GB40051240	2024-03-21	2025-03-20
3	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2024-03-21	2025-03-20
4	Synthesized Sweeper	Agilent	83752A	3610A01957	2024-03-21	2025-03-20
5	MXA Signal Analyzer	Agilent	N9020A	MY50143483	2024-03-21	2025-03-20
6	RF Control Unit	Tonscend	JS0806-1	19D8060152	2024-03-21	2025-03-20
7	Band Reject Filter Group	Tonscend	JS0806-F	19D8060160	2024-03-21	2025-03-20
8	ESG Vector Signal Generator	Agilent	N5182A	MY50143762	2024-03-20	2025-03-19
9	DC Power Supply	Agilent	E3632A	MY40027695	2024-03-21	2025-03-20
Band edge emissions (Radiated) Undesirable emission limits (above 1GHz)						
1	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2024-03-20	2025-03-19
2	Double Ridged Broadband Horn Antenna	schwarabeck	BBHA 9120 D	2278	2023-06-17	2025-06-16
3	Amplifier	Agilent	8449B	3008A01120	2024-03-20	2025-03-19
4	MXA signal analyzer	Agilent	N9020A	MY54440859	2024-03-21	2025-03-20
5	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2024-03-21	2025-03-20
6	Horn antenna	Schwarzbeck	BBHA 9170	00987	2023-06-17	2025-06-16
7	Pre-amplifier	Space-Dtronics	EWLAN1840 G	210405001	2024-03-21	2025-03-20
Undesirable emission limits (below 1GHz)						
1	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2024-03-20	2025-03-19
2	TRILOG Broadband Antenna	schwarabeck	VULB 9163	9163-1338	2023-06-11	2025-06-10
3	Active Loop Antenna	Schwarzbeck	FMZB 1519 B	00066	2024-03-23	2025-03-22
4	Amplifier	Hewlett-Packard	8447F	3113A06184	2024-03-20	2025-03-19

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.

5.1.1 Conclusion:

The antenna of the EUT is permanently attached. The EUT complies with the requirement of FCC PART 15.203.

6 Radio Spectrum Matter Test Results (RF)

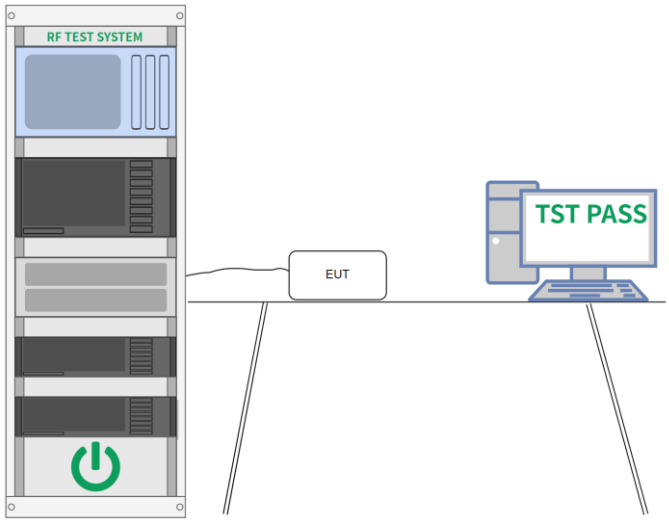
6.1 Duty Cycle

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 >= EBW if possible; otherwise, set RBW to the largest available value. iii) Set VBW >= 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:	30.8 °C	Humidity:	53.26 %	Atmospheric Pressure:	99 kPa
Pre test mode:	Mode1, Mode2, Mode3				
Final test mode:	Mode1, Mode2, Mode3				

6.1.2 Test Setup Diagram:



6.1.3 Test Data:

Please Refer to Appendix for Details.

6.2 Emission bandwidth and occupied bandwidth

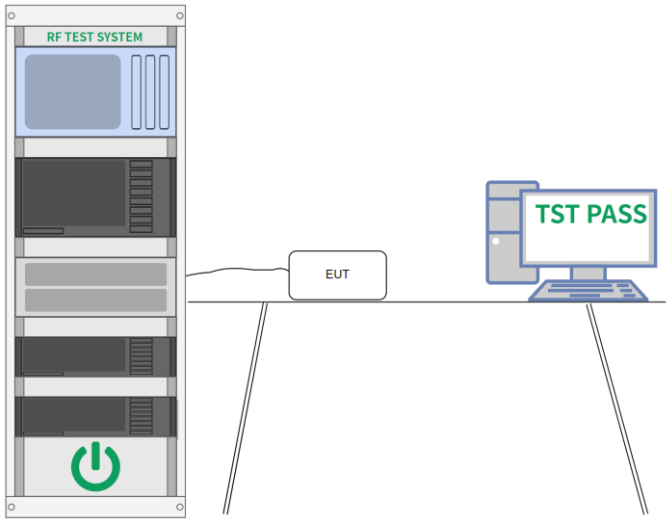
Test Requirement:	U-NII 1: No limits, only for report use. U-NII 3: 47 CFR Part 15.407(e)
Test Limit:	U-NII 1: No limits, only for report use. U-NII 3: Within the 5.725-5.850 GHz bands, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.
Test Method:	ANSI C63.10-2013, section 6.9 & 12.4 KDB 789033 D02, Clause C.2
Procedure:	Emission bandwidth: a) Set RBW = approximately 1% of the emission bandwidth. b) Set the VBW > RBW. c) Detector = peak. d) Trace mode = max hold. e) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the instrument. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%. Occupied bandwidth: 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. 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. 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 [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2. d) Step a) through step c) might require iteration to adjust within the specified range. 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. f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth. 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

	total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies. 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). 6 dB emission bandwidth: a) Set RBW = 100 kHz. b) Set the video bandwidth (VBW) ≥ 3 >= RBW. c) Detector = Peak. d) Trace mode = max hold. e) Sweep = auto couple. f) Allow the trace to stabilize. 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.

6.2.1 E.U.T. Operation:

Operating Environment:					
Temperature:	30.8 °C	Humidity:	53.26 %	Atmospheric Pressure:	99 kPa
Pre test mode:	Mode1, Mode2, Mode3				
Final test mode:	Mode1, Mode2, Mode3				

6.2.2 Test Setup Diagram:



6.2.3 Test Data:

Please Refer to Appendix for Details.

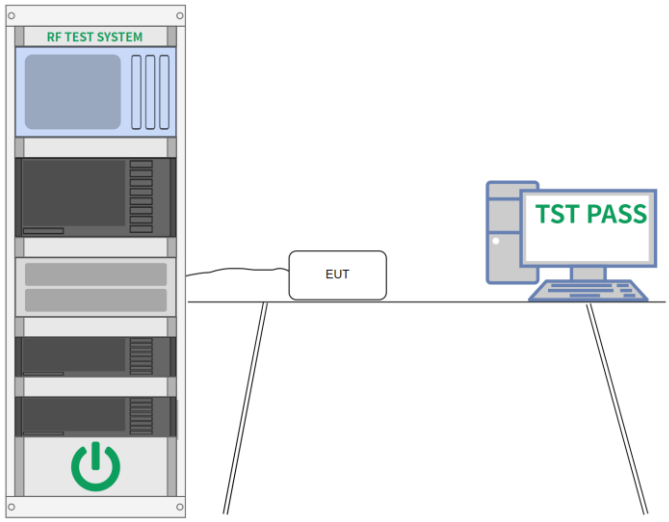
6.3 Maximum conducted output power

Test Requirement:	47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(3)(i)
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. 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. 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.
Test Method:	ANSI C63.10-2013, section 12.3
Procedure:	Refer to ANSI C63.10-2013 section 12.3

6.3.1 E.U.T. Operation:

Operating Environment:					
Temperature:	30.8 °C	Humidity:	53.26 %	Atmospheric Pressure:	99 kPa
Pre test mode:	Mode1, Mode2, Mode3				
Final test mode:	Mode1, Mode2, Mode3				

6.3.2 Test Setup Diagram:



6.3.3 Test Data:

Please Refer to Appendix for Details.

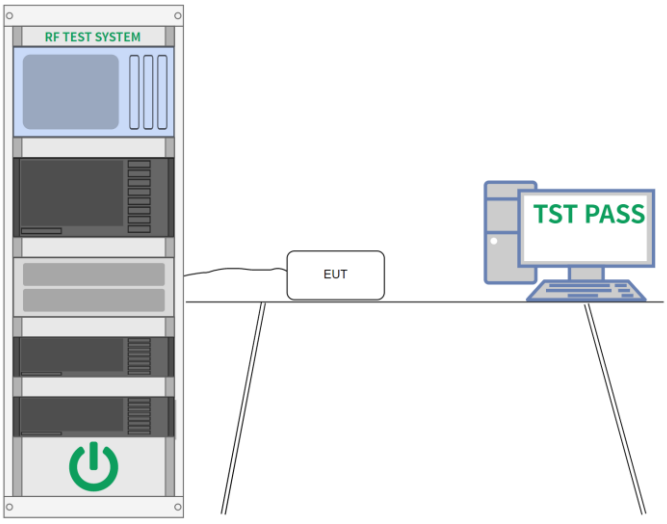
6.4 Power spectral density

Test Requirement:	47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(3)(i)
Test Limit:	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. 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. For the band 5.725-5.850 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. 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. 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.
Test Method:	ANSI C63.10-2013, section 12.5
Procedure:	Refer to ANSI C63.10-2013, section 12.5

6.4.1 E.U.T. Operation:

Operating Environment:					
Temperature:	30.8 °C	Humidity:	53.26 %	Atmospheric Pressure:	99 kPa
Pre test mode:	Mode1, Mode2, Mode3				
Final test mode:	Mode1, Mode2, Mode3				

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:	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 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.

MHz	MHz	MHz	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			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

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 § 15.209shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in § 15.209shall be demonstrated based on the average value of the measured emissions. The provisions in § 15.35apply to these measurements.

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:

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

** 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.
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.

Test Method: ANSI C63.10-2013, section 12.7.4, 12.7.6, 12.7.7

Procedure:

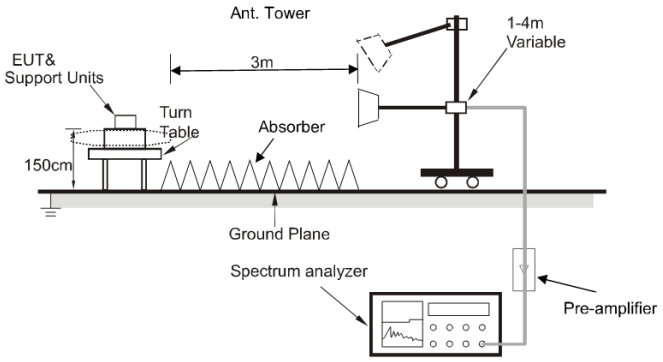
Above 1GHz:
a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (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.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
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.
g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
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.
i. Repeat above procedures until all frequencies measured was complete.
Remark:
1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
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.
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. 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				
Final test mode:	Mode1, Mode2, Mode3				
Note: All other emissions are attenuated 20dB below the limit, so does not recorded					

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	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		4500.000	52.89	-8.74	44.15	74.00	-29.85	peak
2		4500.000	43.17	-8.74	34.43	54.00	-19.57	AVG
3		5150.000	69.23	-6.13	63.10	74.00	-10.90	peak
4	*	5150.000	55.97	-6.13	49.84	54.00	-4.16	AVG

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

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		4500.000	51.60	-8.74	42.86	74.00	-31.14	peak
2		4500.000	43.32	-8.74	34.58	54.00	-19.42	AVG
3		5150.000	57.43	-6.13	51.30	74.00	-22.70	peak
4	*	5150.000	46.31	-6.13	40.18	54.00	-13.82	AVG

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

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		5350.000	56.01	-5.63	50.38	74.00	-23.62	peak
2	*	5350.000	46.27	-5.63	40.64	54.00	-13.36	AVG
3		5460.000	56.11	-5.63	50.48	74.00	-23.52	peak
4		5460.000	46.13	-5.63	40.50	54.00	-13.50	AVG

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

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		5350.000	54.08	-5.63	48.45	74.00	-25.55	peak
2		5350.000	44.37	-5.63	38.74	54.00	-15.26	AVG
3		5460.000	55.88	-5.63	50.25	74.00	-23.75	peak
4	*	5460.000	45.22	-5.63	39.59	54.00	-14.41	AVG

Mode2 / Polarization: Horizontal / Band: 5150-5250 MHz / BW: 20 / CH: L

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		4500.000	51.79	-8.74	43.05	74.00	-30.95	peak
2		4500.000	43.33	-8.74	34.59	54.00	-19.41	AVG
3		5150.000	63.98	-6.13	57.85	74.00	-16.15	peak
4	*	5150.000	53.38	-6.13	47.25	54.00	-6.75	AVG

Mode2 / Polarization: Vertical / Band: 5150-5250 MHz / BW: 20 / CH: L

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		4500.000	52.66	-8.74	43.92	74.00	-30.08	peak
2		4500.000	43.23	-8.74	34.49	54.00	-19.51	AVG
3		5150.000	54.78	-6.13	48.65	74.00	-25.35	peak
4	*	5150.000	45.89	-6.13	39.76	54.00	-14.24	AVG

Mode2 / Polarization: Horizontal / Band: 5150-5250 MHz / BW: 20 / CH: H

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		5350.000	55.67	-5.63	50.04	74.00	-23.96	peak
2	*	5350.000	46.41	-5.63	40.78	54.00	-13.22	AVG
3		5460.000	55.35	-5.63	49.72	74.00	-24.28	peak
4		5460.000	45.93	-5.63	40.30	54.00	-13.70	AVG

Mode2 / Polarization: Vertical / Band: 5150-5250 MHz / BW: 20 / CH: H

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		5350.000	53.78	-5.63	48.15	74.00	-25.85	peak
2		5350.000	44.18	-5.63	38.55	54.00	-15.45	AVG
3		5460.000	53.57	-5.63	47.94	74.00	-26.06	peak
4	*	5460.000	45.20	-5.63	39.57	54.00	-14.43	AVG

Mode3 / Polarization: Horizontal / Band: 5150-5250 MHz / BW: 40 / CH: L

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		4500.000	52.90	-8.74	44.16	74.00	-29.84	peak
2		4500.000	43.12	-8.74	34.38	54.00	-19.62	AVG
3		5150.000	67.02	-6.13	60.89	74.00	-13.11	peak
4	*	5150.000	55.86	-6.13	49.73	54.00	-4.27	AVG

Mode3 / Polarization: Vertical / Band: 5150-5250 MHz / BW: 40 / CH: L

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		4500.000	52.54	-8.74	43.80	74.00	-30.20	peak
2		4500.000	43.42	-8.74	34.68	54.00	-19.32	AVG
3		5150.000	57.30	-6.13	51.17	74.00	-22.83	peak
4	*	5150.000	46.50	-6.13	40.37	54.00	-13.63	AVG

Mode3 / Polarization: Horizontal / Band: 5150-5250 MHz / BW: 40 / CH: H

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		5350.000	56.88	-5.63	51.25	74.00	-22.75	peak
2	*	5350.000	46.61	-5.63	40.98	54.00	-13.02	AVG
3		5460.000	56.20	-5.63	50.57	74.00	-23.43	peak
4		5460.000	46.49	-5.63	40.86	54.00	-13.14	AVG

Mode3 / Polarization: Vertical / Band: 5150-5250 MHz / BW: 40 / CH: H

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		5350.000	54.78	-5.63	49.15	74.00	-24.85	peak
2		5350.000	44.17	-5.63	38.54	54.00	-15.46	AVG
3		5460.000	54.62	-5.63	48.99	74.00	-25.01	peak
4	*	5460.000	45.19	-5.63	39.56	54.00	-14.44	AVG

6.6 Undesirable emission limits (below 1GHz)

<table>
<tr><td>Test Requirement:</td><td>47 CFR Part 15.407(b)(9)</td></tr>
<tr><td>Test Limit:</td><td>Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209.

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:
<table>
<tr><th>Frequency (MHz)</th><th>Field strength (microvolts/meter)</th><th>Measurement distance (meters)</th></tr>
<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>
</table>
** 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.
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.</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10-2013, section 12.7.4, 12.7.5</td></tr>
<tr><td>Procedure:</td><td>Below 1GHz:
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.
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.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (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.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
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.
g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
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.
i. Repeat above procedures until all frequencies measured was complete.</td></tr>
</table>

	Remark: 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor 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. 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. Above 1GHz: 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. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (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. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 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. g. Test the EUT in the lowest channel, the middle channel, the Highest channel. 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. i. Repeat above procedures until all frequencies measured was complete. Remark: 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor 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. 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. 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.

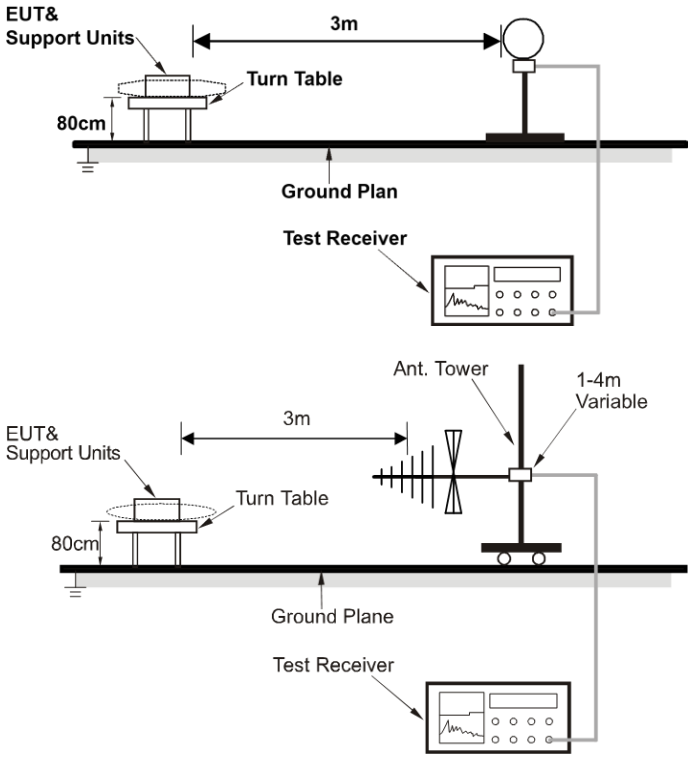
6.6.1 E.U.T. Operation:

Operating Environment:

Temperature:	24 °C	Humidity:	54 %	Atmospheric Pressure:	101 kPa
Pre test mode:	Mode1, Mode2, Mode3				
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:
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.
There were no emissions found below 30MHz within 20dB of the limit.

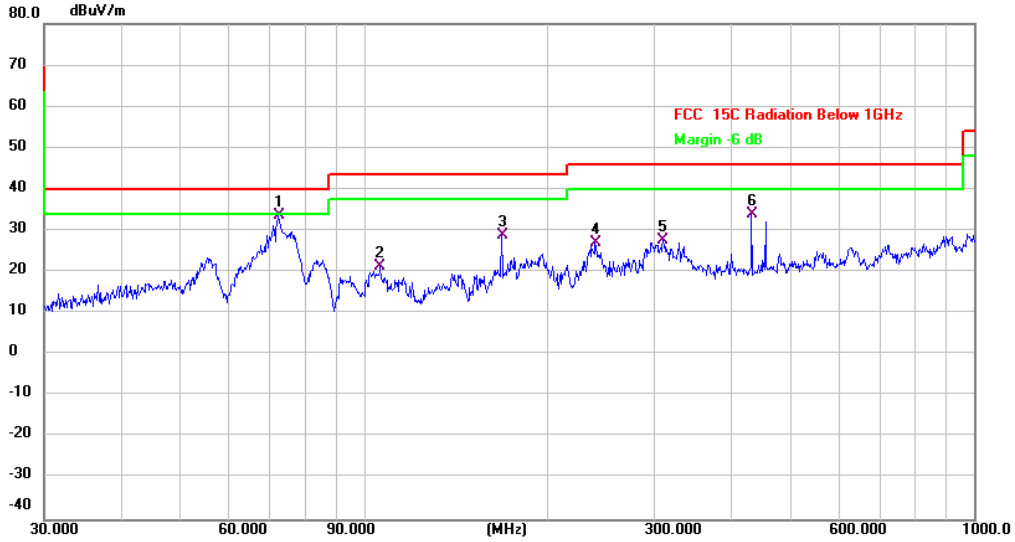
6.6.2 Test Setup Diagram:



6.6.3 Test Data:

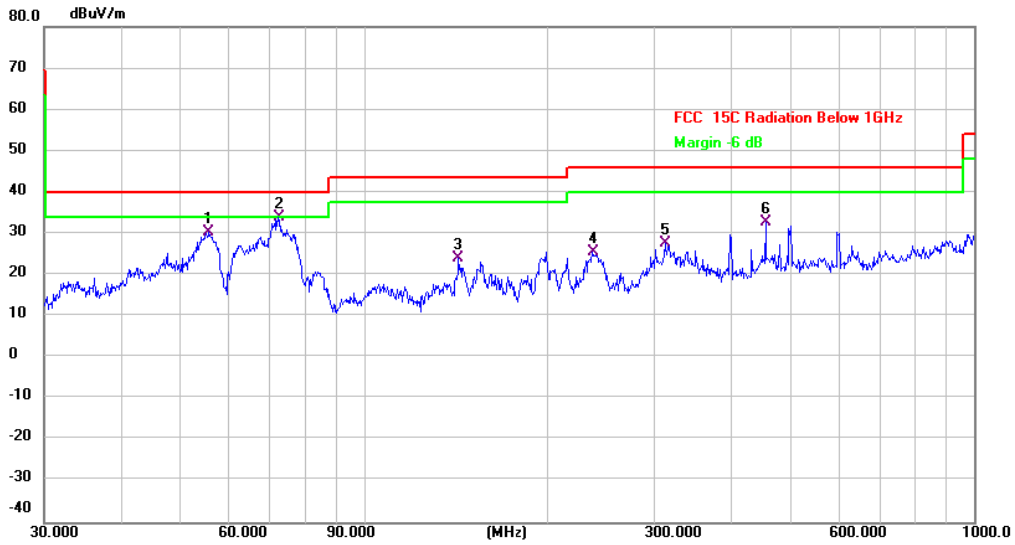
CP10:

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



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	72.3376	45.11	-11.36	33.75	40.00	-6.25	QP	
2		106.3850	28.52	-7.09	21.43	43.50	-22.07	QP	
3		167.8243	39.82	-11.04	28.78	43.50	-14.72	QP	
4		239.9874	33.87	-6.91	26.96	46.00	-19.04	QP	
5		309.9977	33.17	-5.63	27.54	46.00	-18.46	QP	
6		432.5457	38.94	-5.13	33.81	46.00	-12.19	QP	

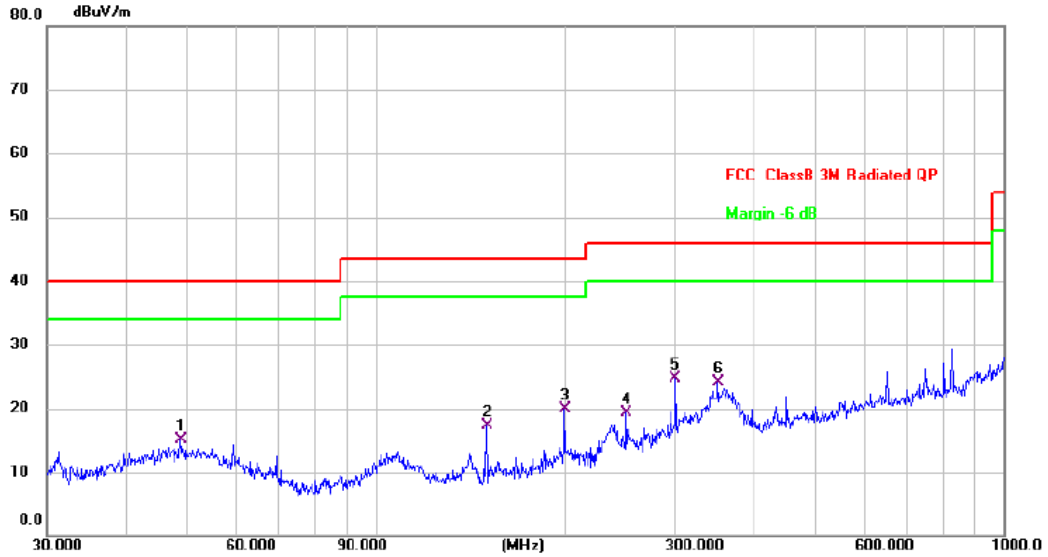
Mode1 / Polarization: Vertical / Band: 5150-5250 MHz / BW: 20 / CH: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		55.8047	39.62	-9.14	30.48	40.00	-9.52	QP	
2	*	72.3376	45.23	-11.36	33.87	40.00	-6.13	QP	
3		142.8243	33.96	-9.78	24.18	43.50	-19.32	QP	
4		237.4760	32.62	-7.01	25.61	46.00	-20.39	QP	
5		312.1794	33.87	-6.12	27.75	46.00	-18.25	QP	
6		455.9058	36.91	-4.11	32.80	46.00	-13.20	QP	

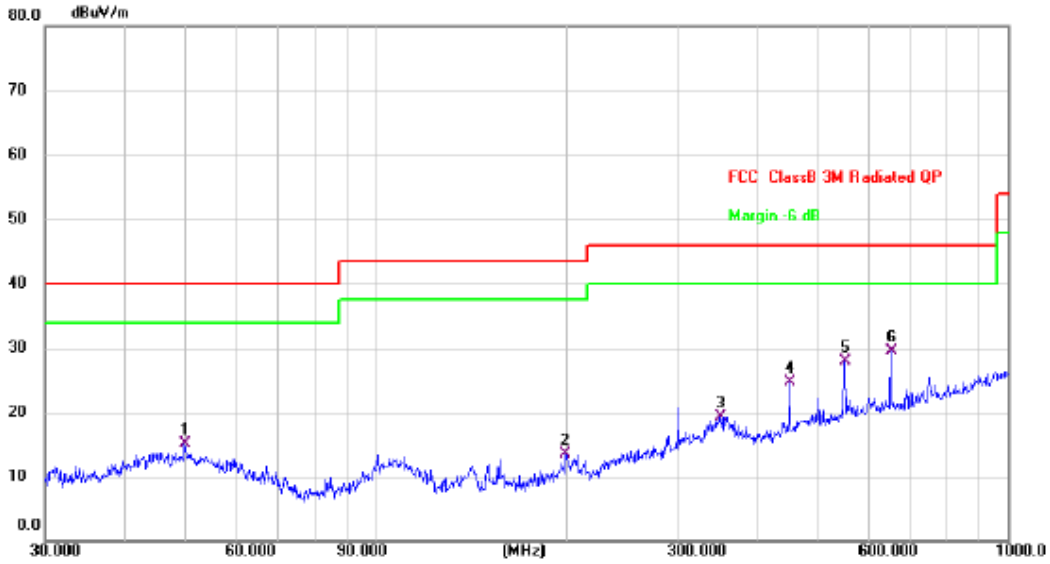
CP20:

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



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		48.8429	27.38	-12.23	15.15	40.00	-24.85	QP	
2		150.0108	32.72	-15.42	17.30	43.50	-26.20	QP	
3		199.9856	31.86	-11.95	19.91	43.50	-23.59	QP	
4		250.3012	30.85	-11.50	19.35	46.00	-26.65	QP	
5	*	300.3672	34.49	-9.83	24.66	46.00	-21.34	QP	
6		350.4768	32.84	-8.77	24.07	46.00	-21.93	QP	

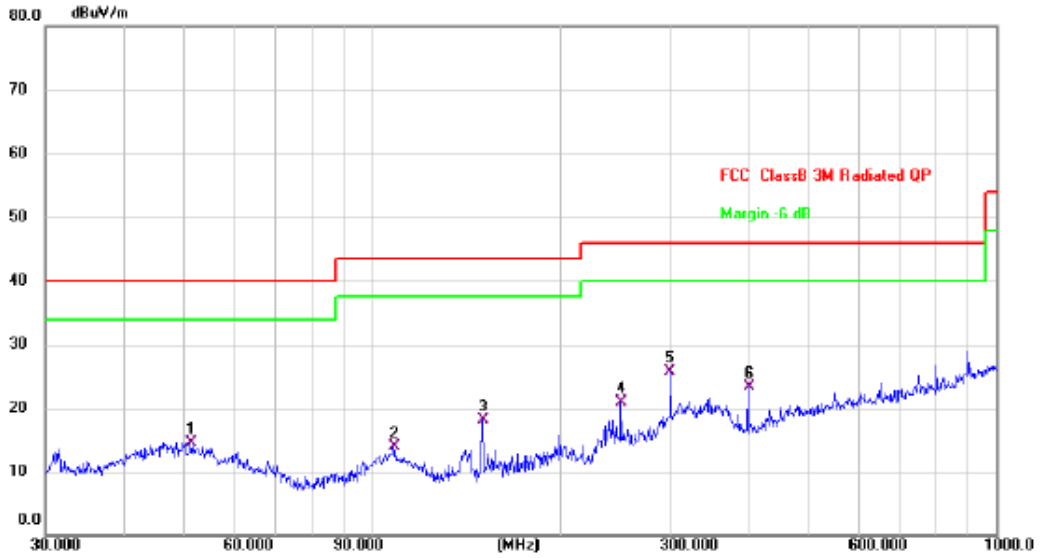
Mode1 / Polarization: Vertical/ Band: 5150-5250 MHz / BW: 20 / CH: H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		49.8814	27.30	-12.26	15.04	40.00	-24.96	QP	
2		199.2855	25.39	-11.95	13.44	43.50	-30.06	QP	
3		350.4768	28.13	-8.77	19.36	46.00	-26.64	QP	
4		451.1350	32.45	-7.76	24.69	46.00	-21.31	QP	
5		550.9480	33.56	-5.61	27.95	46.00	-18.05	QP	
6	*	651.9417	33.44	-4.00	29.44	46.00	-16.56	QP	

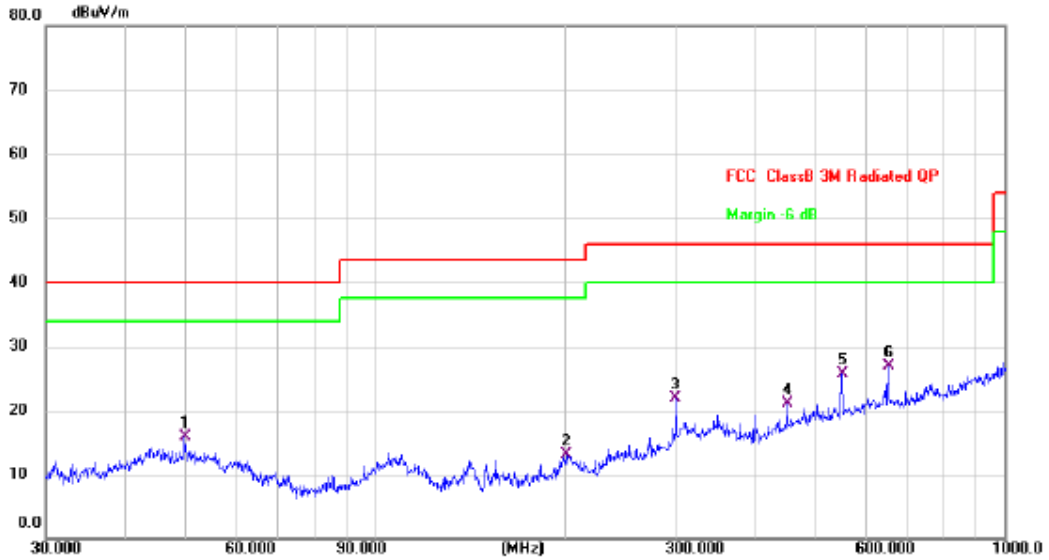
CP11:

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



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		51.3005	26.81	-12.24	14.57	40.00	-25.43	QP	
2		108.2667	26.55	-12.68	13.87	43.50	-29.63	QP	
3		150.0108	33.55	-15.42	18.13	43.50	-25.37	QP	
4		250.3012	32.36	-11.50	20.86	46.00	-25.14	QP	
5	*	300.3672	35.53	-9.83	25.70	46.00	-20.30	QP	
6		400.4319	32.35	-9.00	23.35	46.00	-22.65	QP	

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



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		49.8814	28.10	-12.26	15.84	40.00	-24.16	QP	
2		201.3930	25.01	-12.00	13.01	43.50	-30.49	QP	
3		300.3672	31.78	-9.83	21.95	46.00	-24.05	QP	
4		451.1350	28.93	-7.76	21.17	46.00	-24.83	QP	
5		550.9480	31.25	-5.61	25.64	46.00	-20.36	QP	
6	*	651.9417	30.99	-4.00	26.99	46.00	-19.01	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:	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 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.

MHz	MHz	MHz	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			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

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 § 15.209shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in § 15.209shall be demonstrated based on the average value of the measured emissions. The provisions in § 15.35apply to these measurements.

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:

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

** 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.
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.

Test Method: ANSI C63.10-2013, section 12.7.4, 12.7.6, 12.7.7

Procedure:

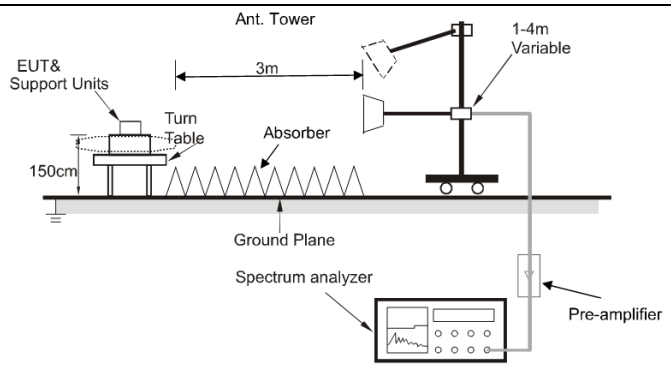
Above 1GHz:
a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (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.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
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.
g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
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.
i. Repeat above procedures until all frequencies measured was complete.
Remark:
1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
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.
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. 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				
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.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		10360.000	47.00	3.46	50.46	74.00	-23.54	peak
2		10360.000	36.90	3.46	40.36	54.00	-13.64	AVG
3		15540.000	6.41	47.26	53.67	74.00	-20.33	peak
4	*	15540.000	-3.64	47.26	43.62	54.00	-10.38	AVG

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

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		10360.000	47.88	3.46	51.34	74.00	-22.66	peak
2		10360.000	37.90	3.46	41.36	54.00	-12.64	AVG
3		15540.000	6.10	47.26	53.36	74.00	-20.64	peak
4	*	15540.000	-3.61	47.26	43.65	54.00	-10.35	AVG

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

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		10400.000	47.90	3.13	51.03	74.00	-22.97	peak
2		10400.000	38.23	3.13	41.36	54.00	-12.64	AVG
3		15600.000	6.55	46.52	53.07	74.00	-20.93	peak
4	*	15600.000	-3.27	46.52	43.25	54.00	-10.75	AVG

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

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		10400.000	47.96	3.13	51.09	74.00	-22.91	peak
2		10400.000	38.19	3.13	41.32	54.00	-12.68	AVG
3		15600.000	7.18	46.52	53.70	74.00	-20.30	peak
4	*	15600.000	-3.26	46.52	43.26	54.00	-10.74	AVG

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

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		10480.000	49.48	3.56	53.04	74.00	-20.96	peak
2		10480.000	39.69	3.56	43.25	54.00	-10.75	AVG
3		15720.000	7.83	46.46	54.29	74.00	-19.71	peak
4	*	15720.000	-1.77	46.46	44.69	54.00	-9.31	AVG

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

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		10480.000	48.77	3.56	52.33	74.00	-21.67	peak
2		10480.000	39.09	3.56	42.65	54.00	-11.35	AVG
3		15720.000	8.06	46.46	54.52	74.00	-19.48	peak
4	*	15720.000	-2.10	46.46	44.36	54.00	-9.64	AVG

Photographs of the test setup

Refer to Appendix - Test Setup Photos

Photographs of the EUT

Refer to Appendix - EUT Photos

Appendix

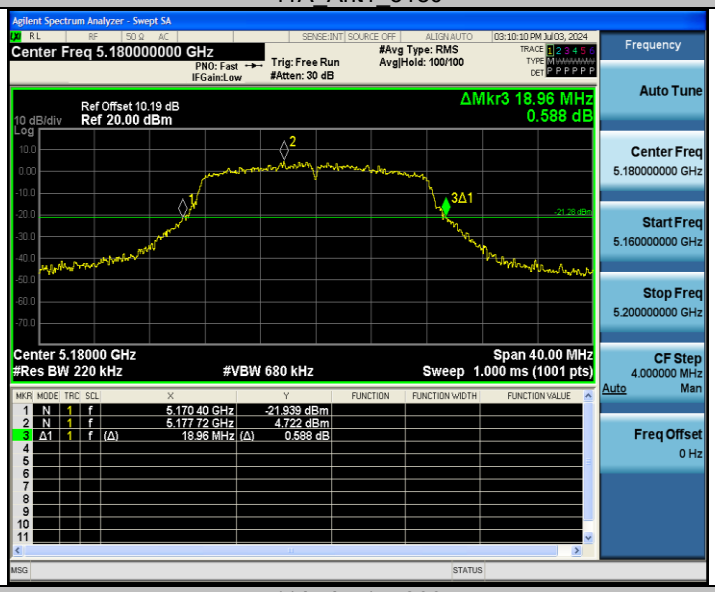
Appendix A1: Emission bandwidth (26dB bandwidth)

Test Result

Test Mode	Antenna	Frequency [MHz]	26db EBW [MHz]
11A	Ant1	5180	18.960
		5200	19.200
		5240	19.480
		5745	19.320
		5785	19.120
		5825	18.960
11N20SISO	Ant1	5180	20.040
		5200	20.440
		5240	20.600
		5745	20.160
		5785	20.120
		5825	20.240
11N40SISO	Ant1	5190	37.920
		5230	38.080
		5755	38.080
		5795	38.000

Test Graphs

11A_Ant1_5180



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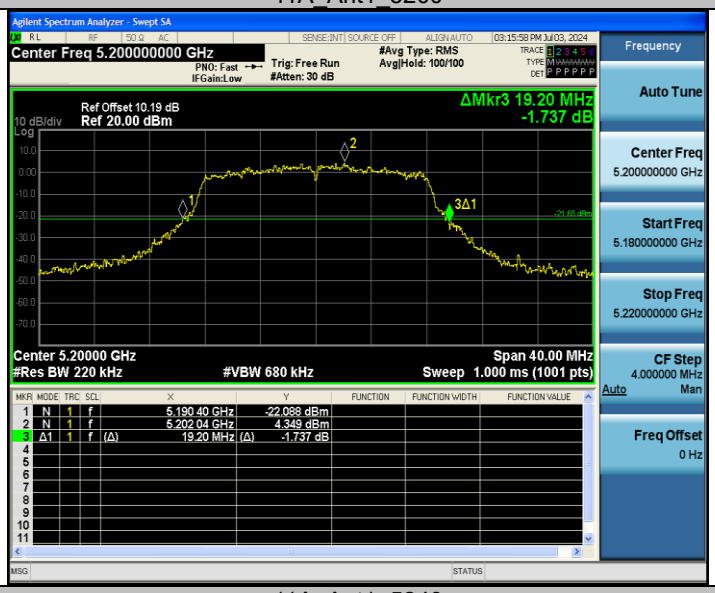

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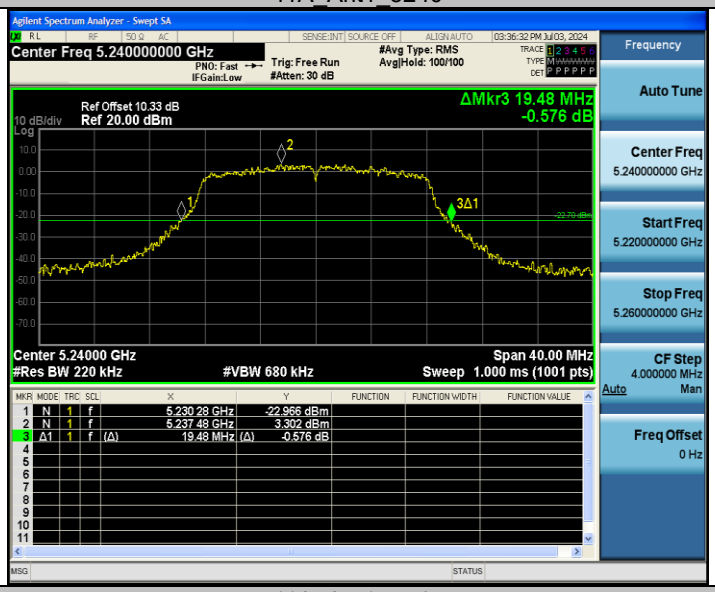
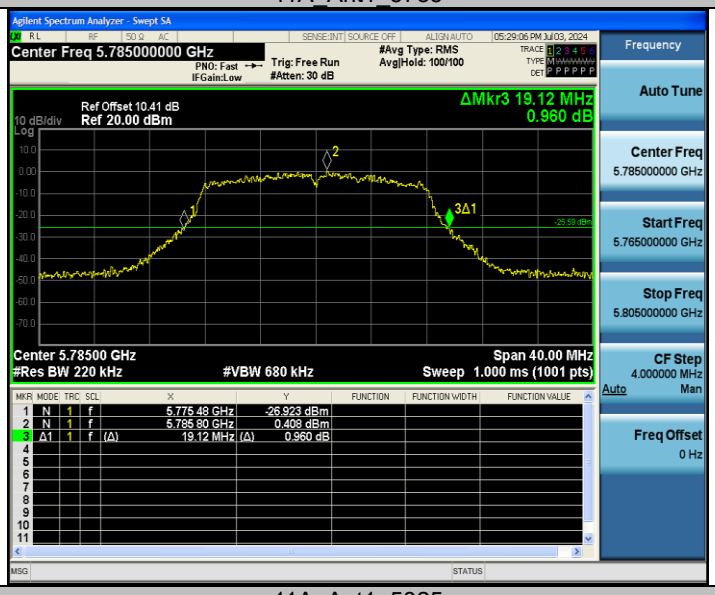


11A_Ant1_5745

11A_Ant1_5785



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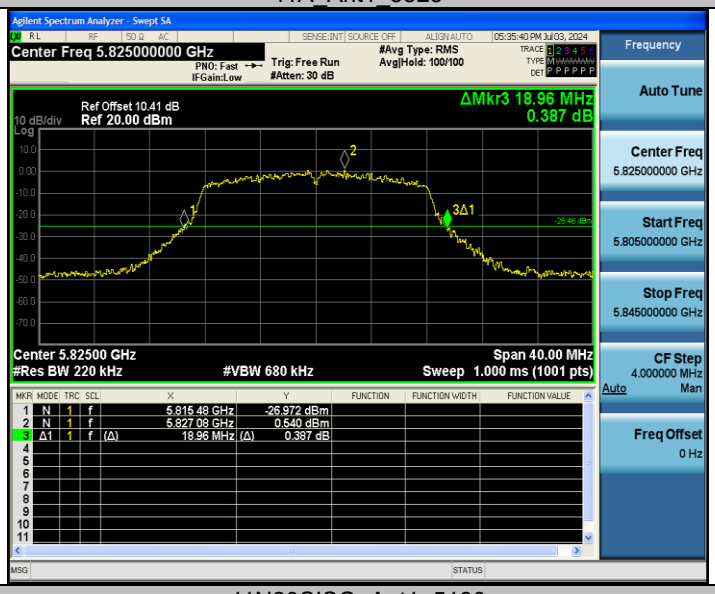

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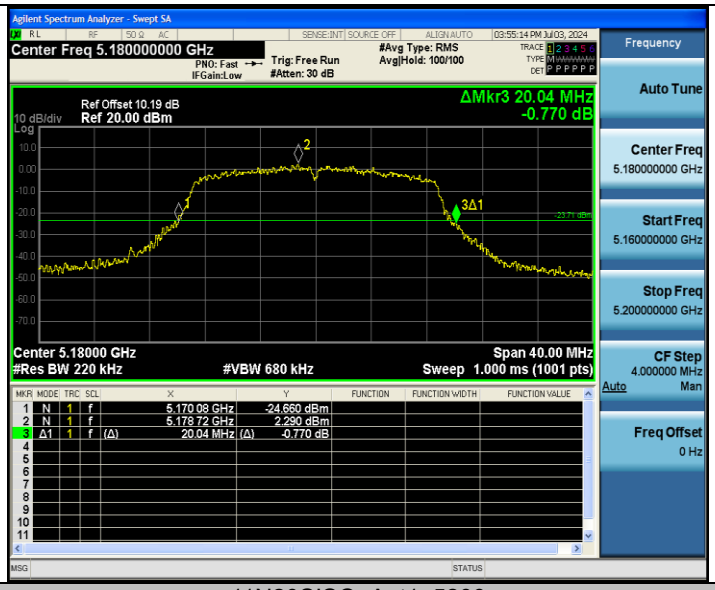

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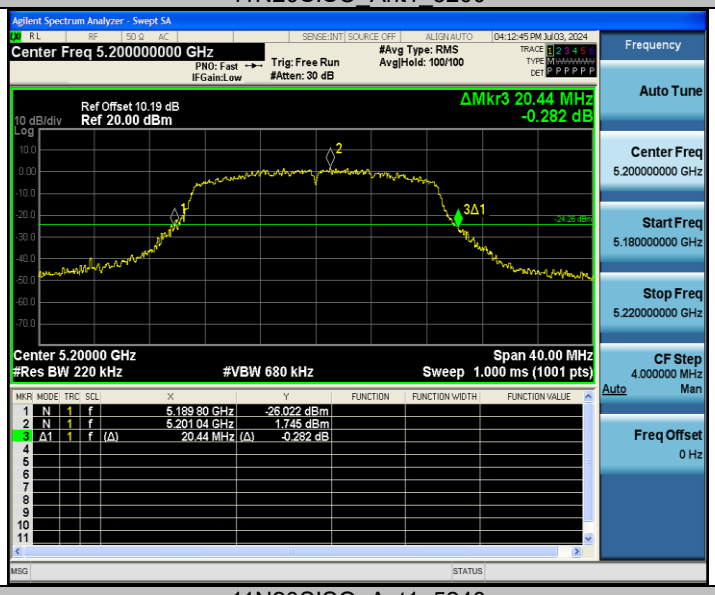
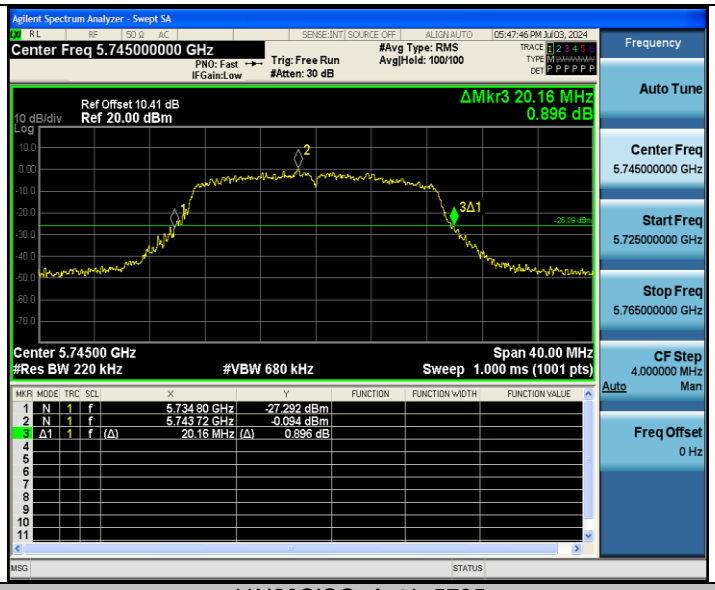


11N20SISO_Ant1_5240

11N20SISO_Ant1_5745



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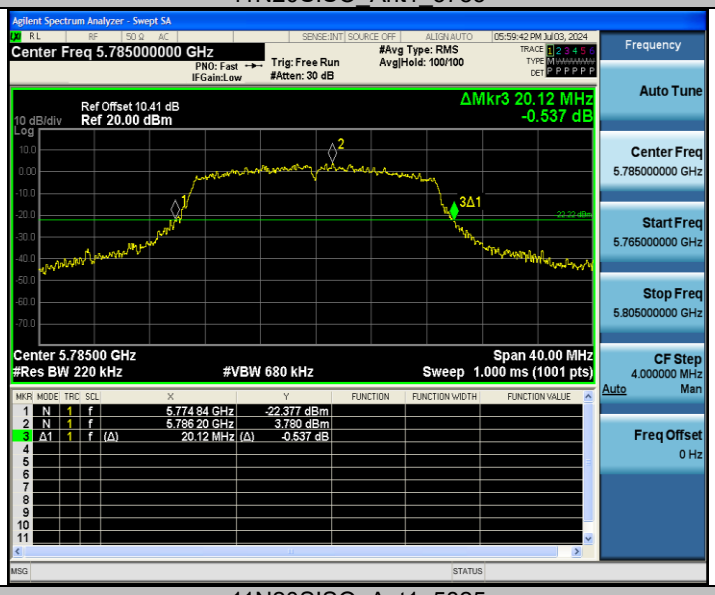

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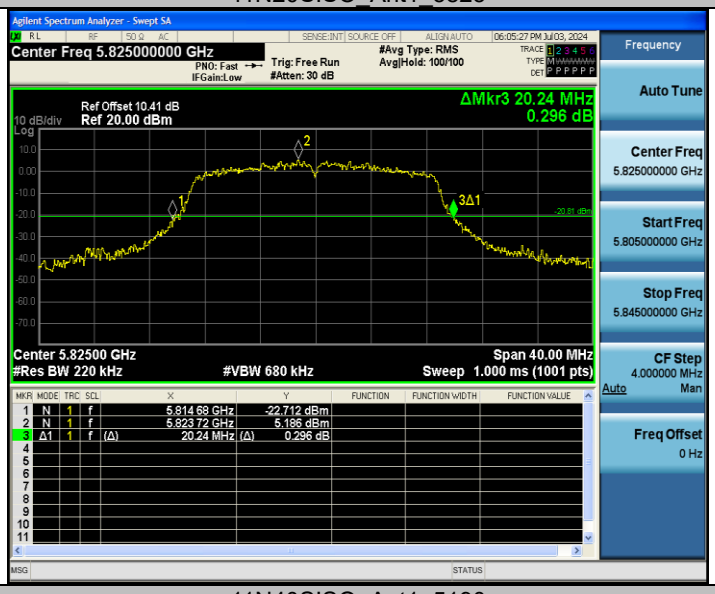
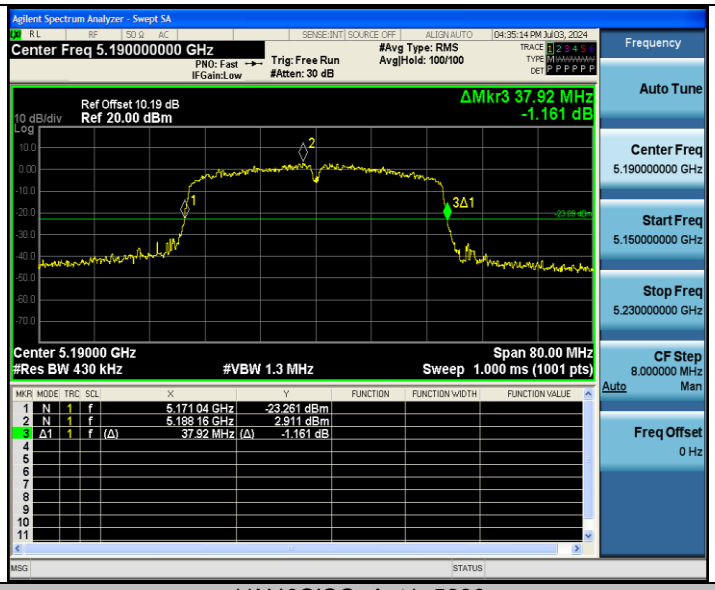


11N40SISO_Ant1_5190



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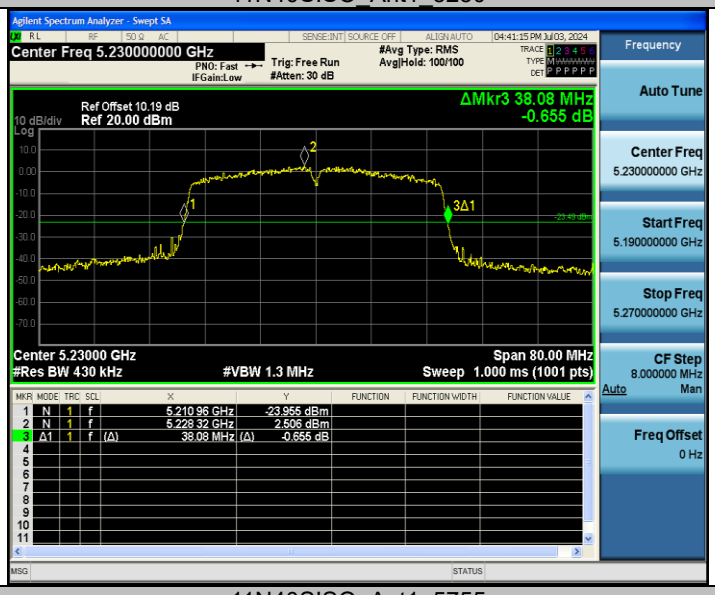

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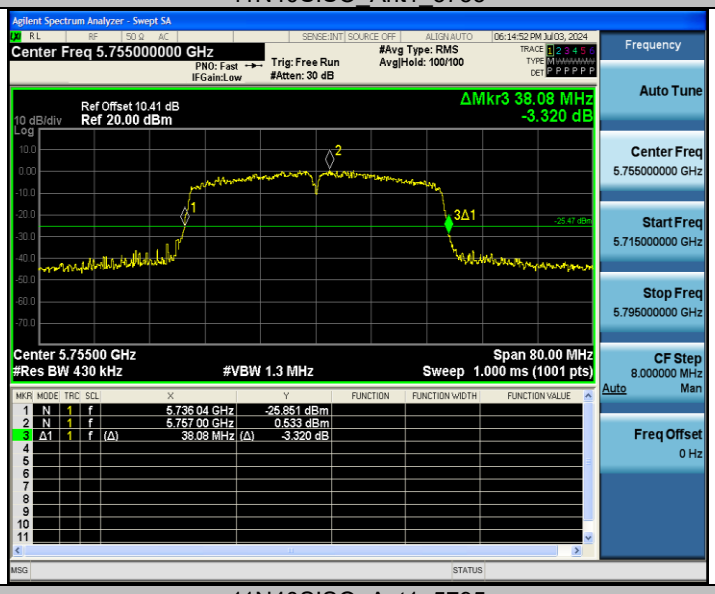


11N40SISO_Ant1_5795

Agilent Spectrum Analyzer - Swept SA
Center Freq 5.795000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 100/100
06:21:19 PM Jul 03, 2024
Ref Offset 10.41 dB
10 dB/div
Ref 20.00 dBm
ΔMkr3 38.00 MHz
0.088 dB
Center 5.79500 GHz
#Res BW 430 kHz
#VBW 1.3 MHz
Span 80.00 MHz
Sweep 1.000 ms (1001 pts)
1 N 1 f 5.776 04 GHz -23.383 dBm
2 N 1 f 5.793 16 GHz 3.906 dBm
3 Δ1 1 f (Δ) 38.00 MHz (Δ) 0.088 dB
Frequency
Auto Tune
Center Freq
5.795000000 GHz
Start Freq
5.755000000 GHz
Stop Freq
5.835000000 GHz
CF Step
8.000000 MHz
Auto Man
Freq Offset
0 Hz

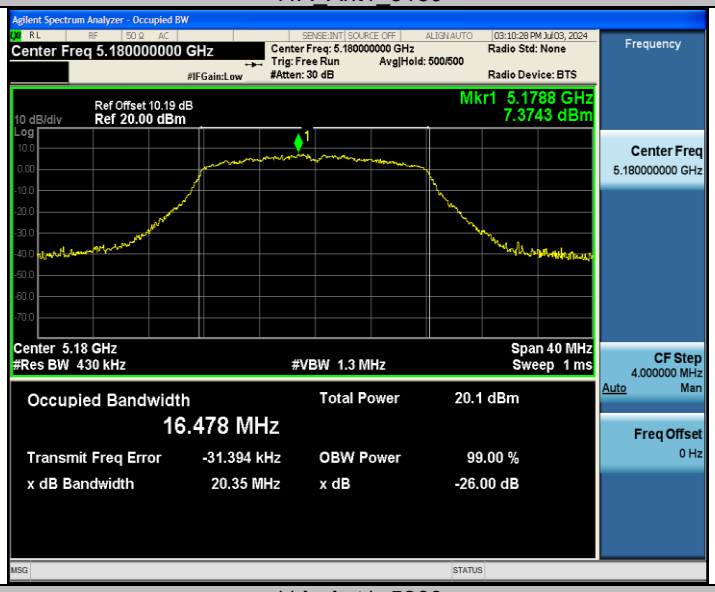
6.8 Appendix A2: Occupied channel bandwidth

6.8.1 Test Result

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	16.478	5171.7296	5188.2076	---	---
		5200	16.506	5191.7848	5208.2908	---	---
		5240	16.514	5231.7213	5248.2353	---	---
		5745	16.501	5736.7089	5753.2099	---	---
		5785	16.476	5776.7164	5793.1924	---	---
		5825	16.419	5816.7743	5833.1933	---	---
11N20SISO	Ant1	5180	17.572	5171.1559	5188.7279	---	---
		5200	17.555	5191.2166	5208.7716	---	---
		5240	17.572	5231.1773	5248.7493	---	---
		5745	17.609	5736.1163	5753.7253	---	---
		5785	17.583	5776.1186	5793.7016	---	---
		5825	17.554	5816.1860	5833.7400	---	---
11N40SISO	Ant1	5190	35.408	5172.2593	5207.6673	---	---
		5230	35.321	5212.2731	5247.5941	---	---
		5755	35.431	5737.2277	5772.6587	---	---
		5795	35.414	5777.2126	5812.6266	---	---

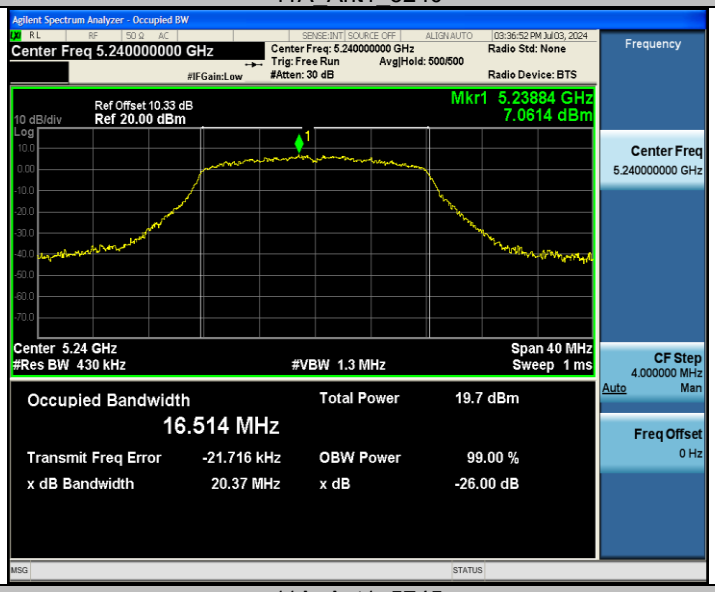
6.8.2 Test Graphs

11A_Ant1_5180



11A_Ant1_5200

11A_Ant1_5240



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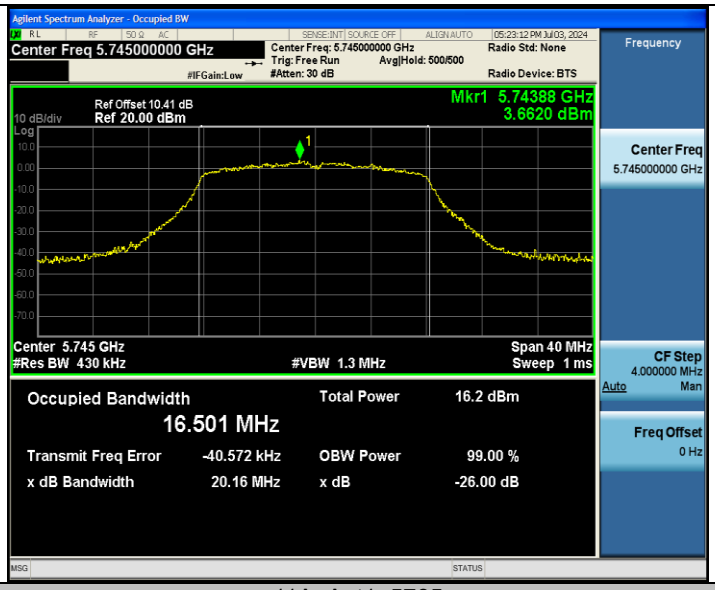

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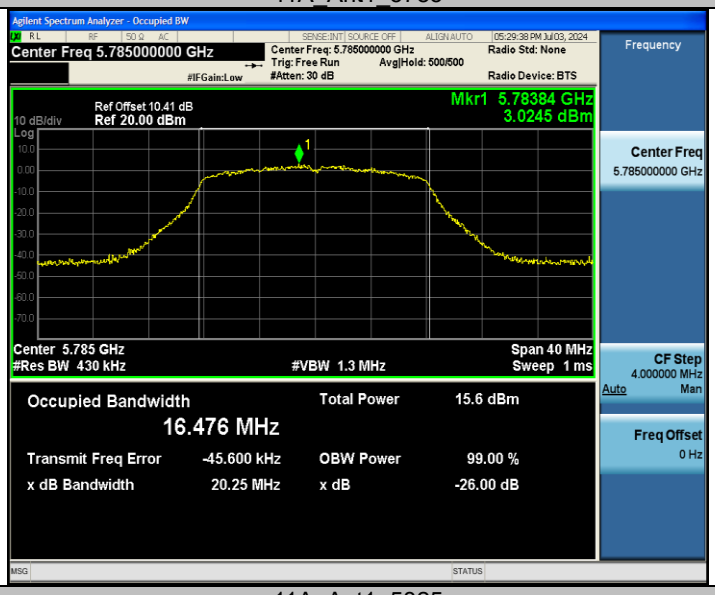

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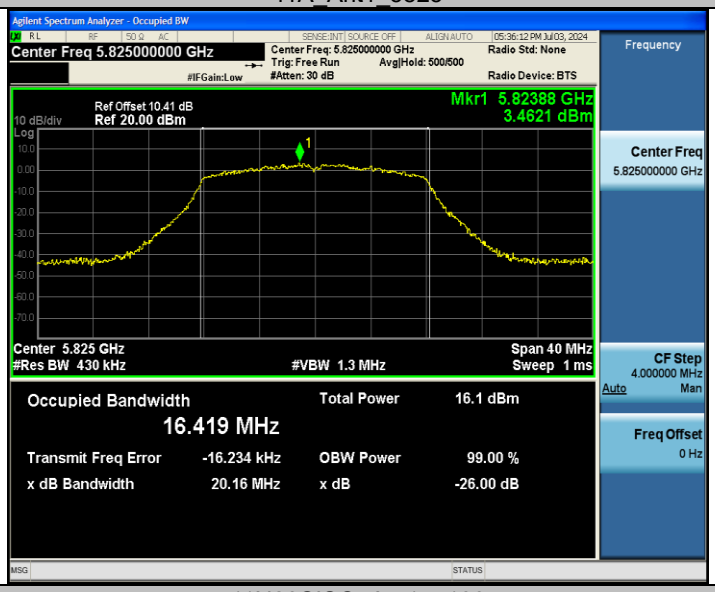

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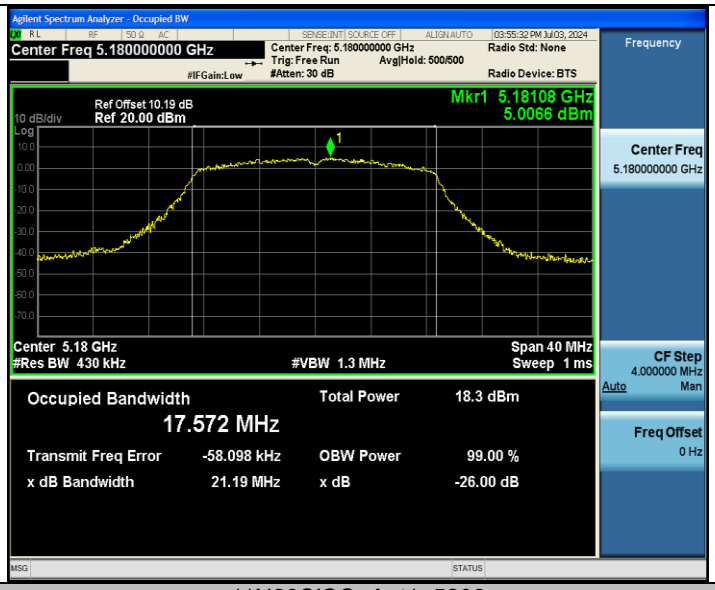

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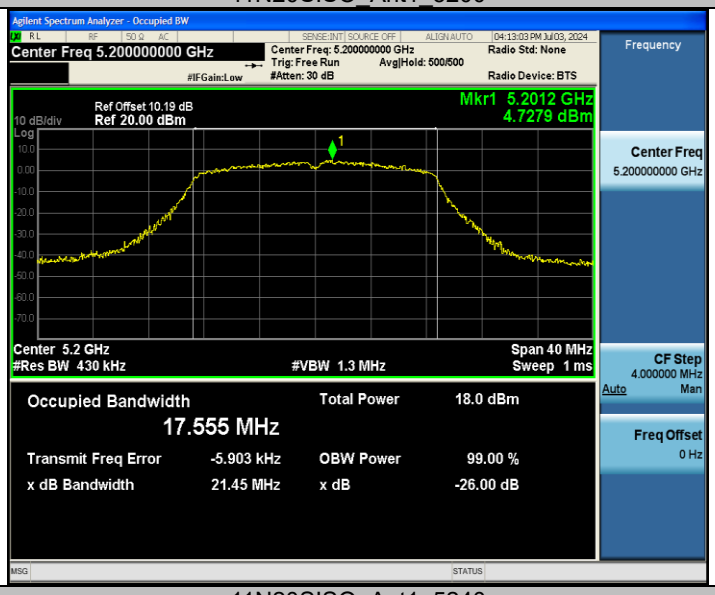

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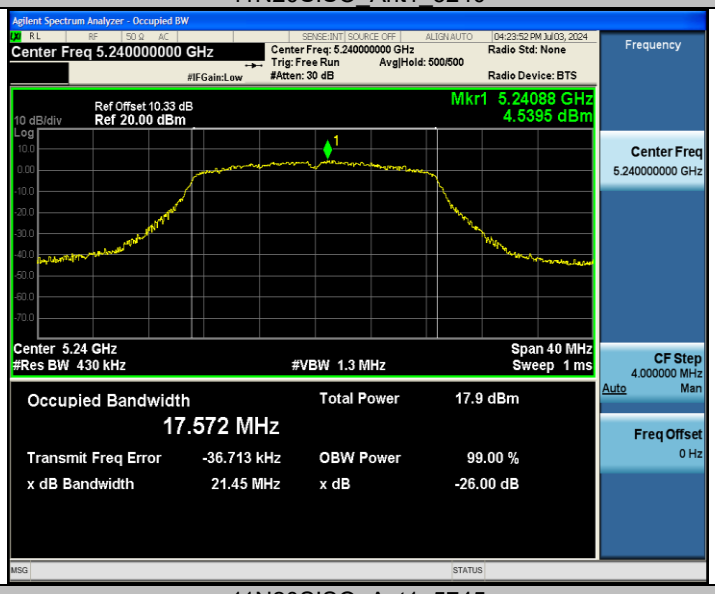
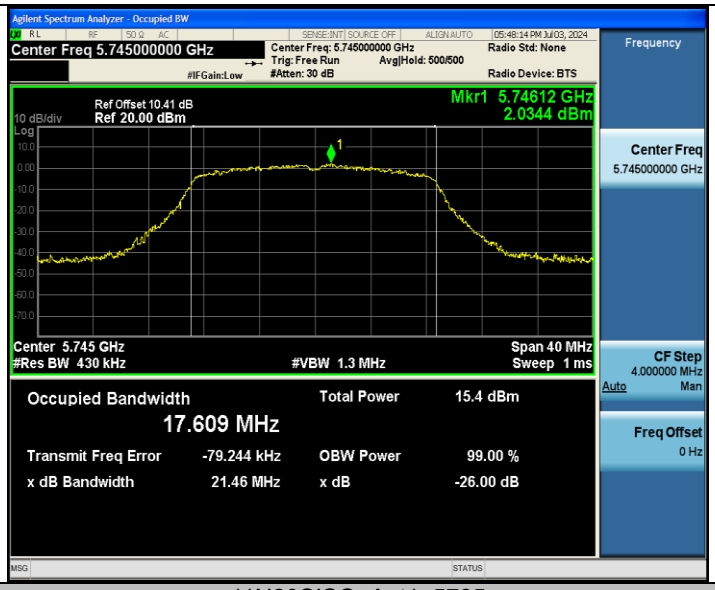


11N20SISO_Ant1_5745



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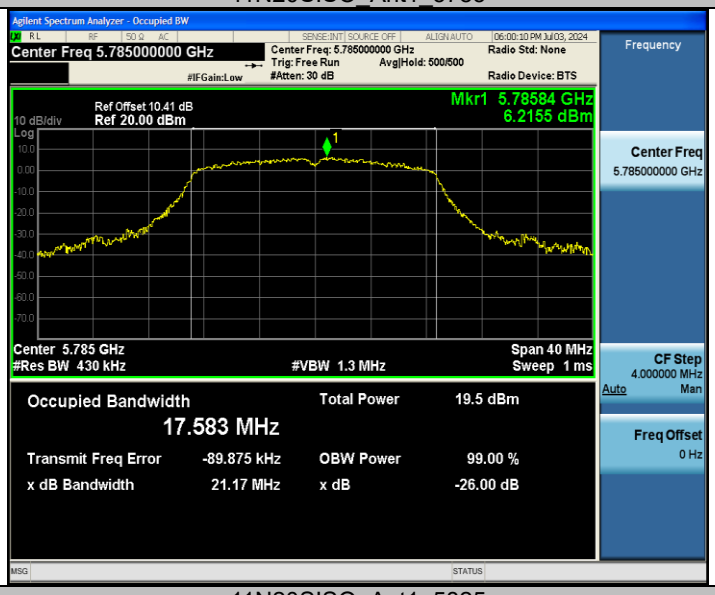

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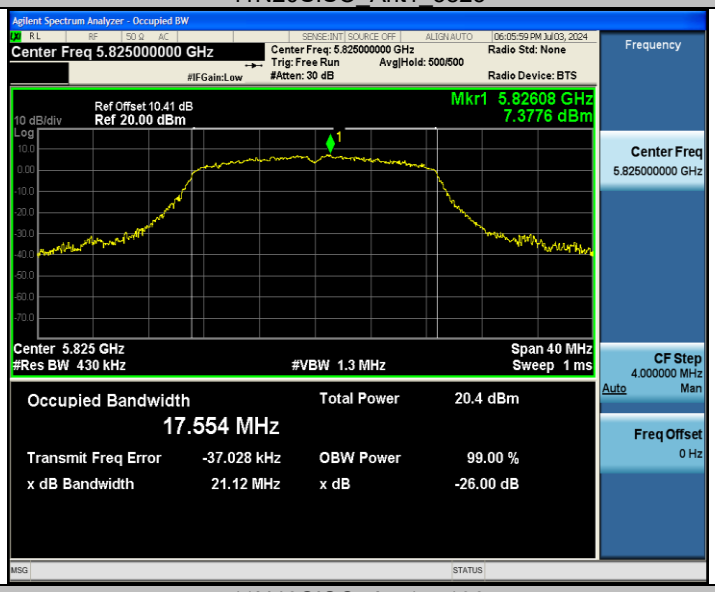
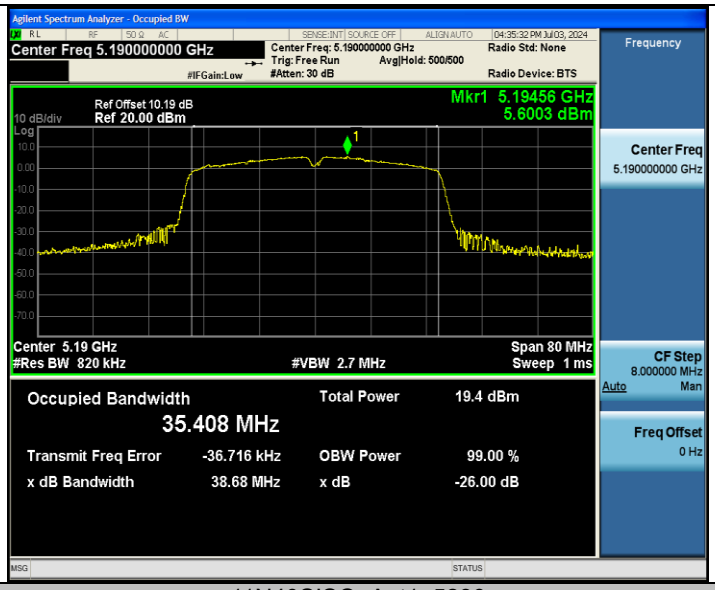
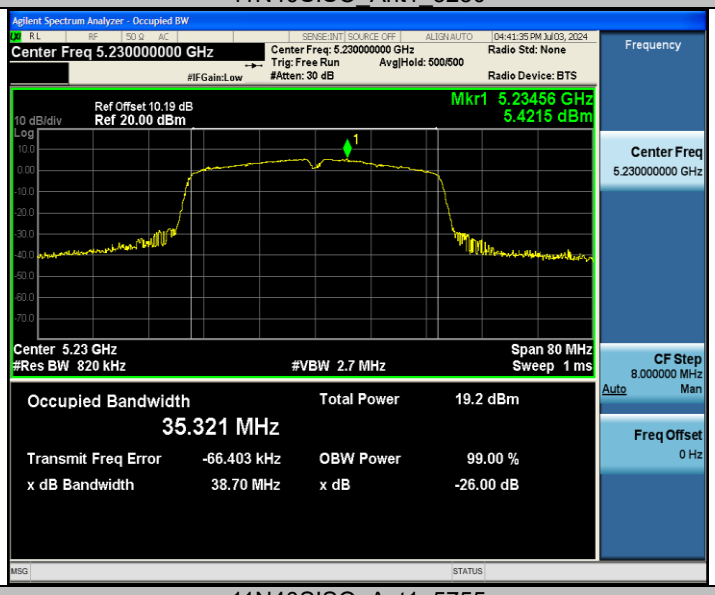


11N40SISO_Ant1_5190

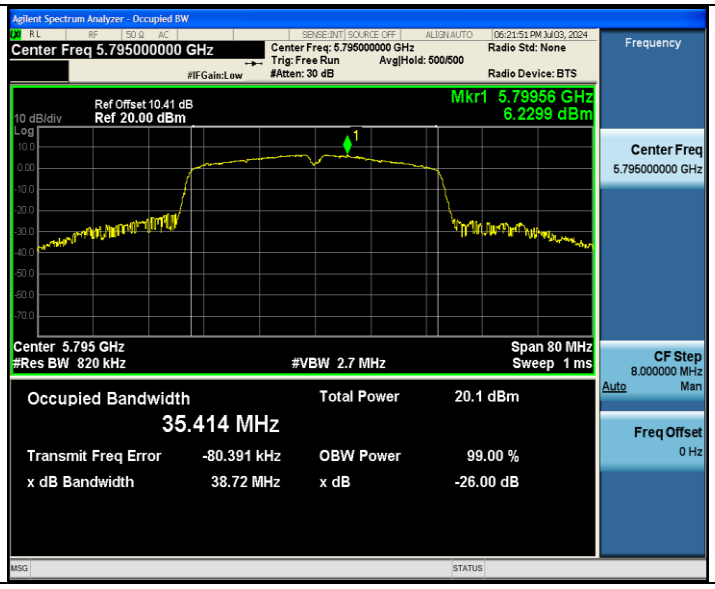


11N40SISO_Ant1_5230



11N40SISO_Ant1_5755

11N40SISO_Ant1_5795


Agilent Spectrum Analyzer - Occupied BW
Center Freq 5.795000000 GHz
Center Freq: 5.795000000 GHz
Trig: Free Run
Avg|Hold: 500/500
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
06:21:51 PM Jul 03, 2024
Frequency
Ref Offset 10.41 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 5.79956 GHz
6.2299 dBm
Center 5.795 GHz
#Res BW 820 kHz
#VBW 2.7 MHz
Span 80 MHz
Sweep 1 ms
Occupied Bandwidth
35.414 MHz
Total Power 20.1 dBm
Transmit Freq Error -80.391 kHz
OBW Power 99.00 %
x dB Bandwidth 38.72 MHz
x dB -26.00 dB
Center Freq
5.795000000 GHz
CF Step
8.000000 MHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS

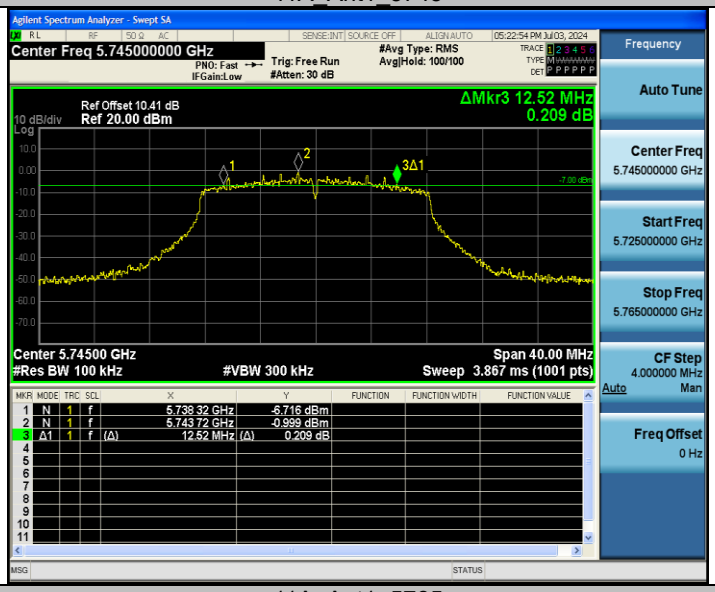
6.9 Appendix A3: Min emission bandwidth

6.9.1 Test Result B4

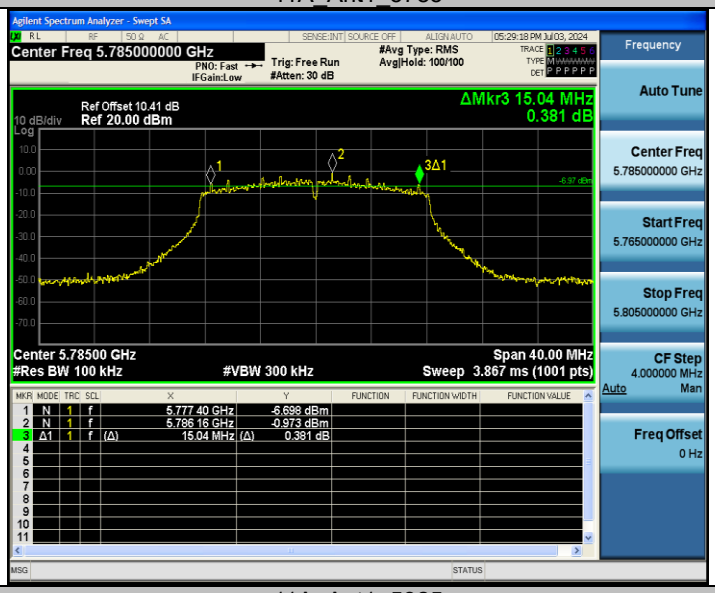
TestMode	Antenna	Freq(MHz)	6db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5745	12.520	5738.320	5750.840	0.5	PASS
		5785	15.040	5777.400	5792.440	0.5	PASS
		5825	12.560	5818.640	5831.200	0.5	PASS
11N20SISO	Ant1	5745	14.000	5737.440	5751.440	0.5	PASS
		5785	15.120	5777.360	5792.480	0.5	PASS
		5825	10.960	5818.600	5829.560	0.5	PASS
11N40SISO	Ant1	5755	32.560	5738.680	5771.240	0.5	PASS
		5795	30.080	5779.880	5809.960	0.5	PASS

6.9.2 Test Graphs B4

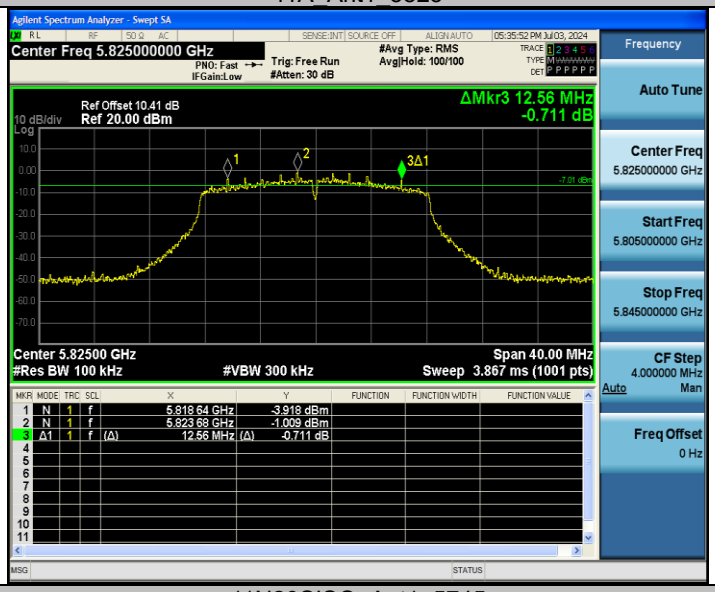
11A_Ant1_5745



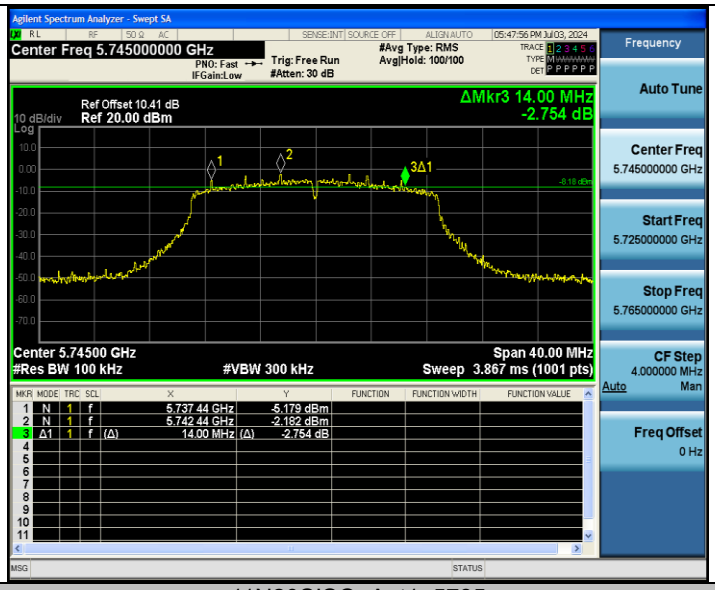
11A_Ant1_5785



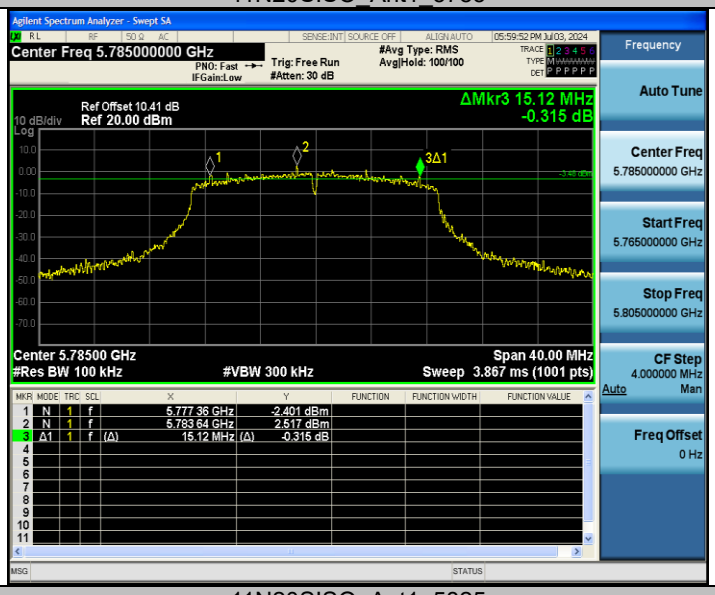
11A_Ant1_5825



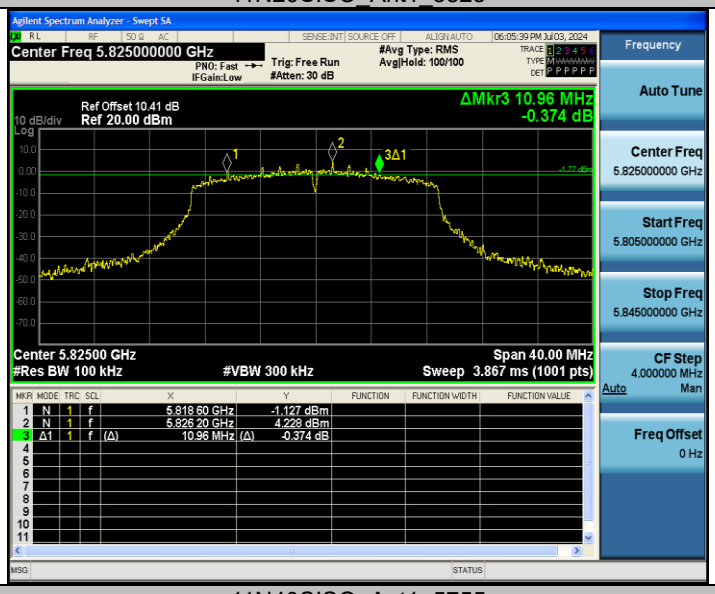
11N20SISO_Ant1_5745



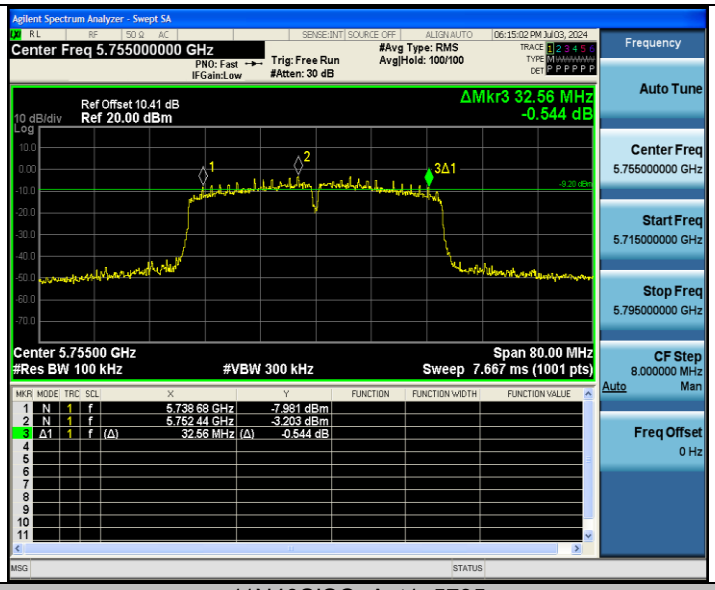
11N20SISO_Ant1_5785



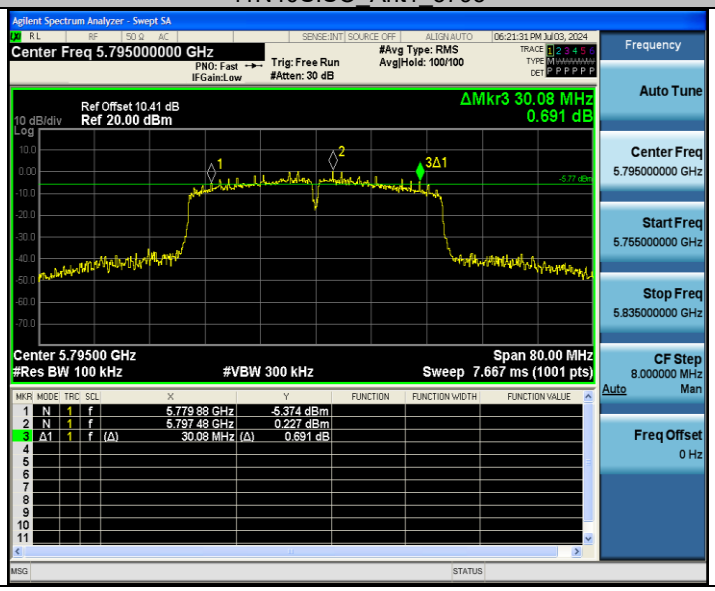
11N20SISO_Ant1_5825



11N40SISO_Ant1_5755



11N40SISO_Ant1_5795



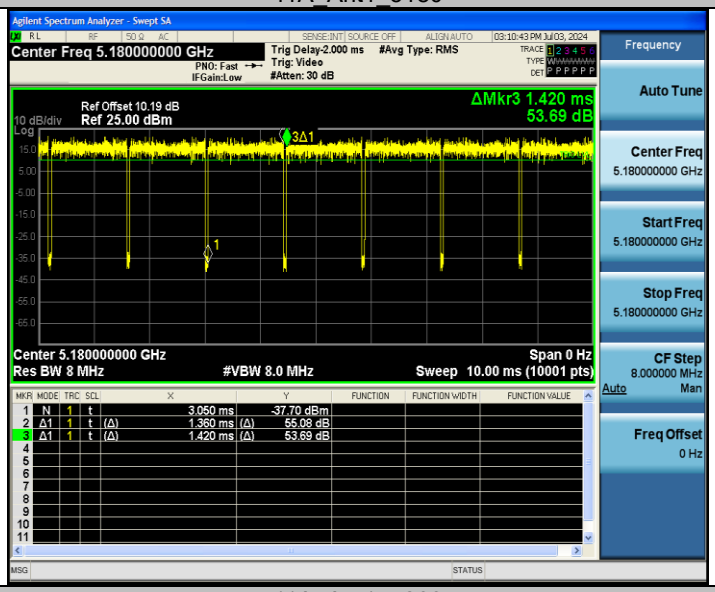
Appendix B: Duty Cycle

Test Result

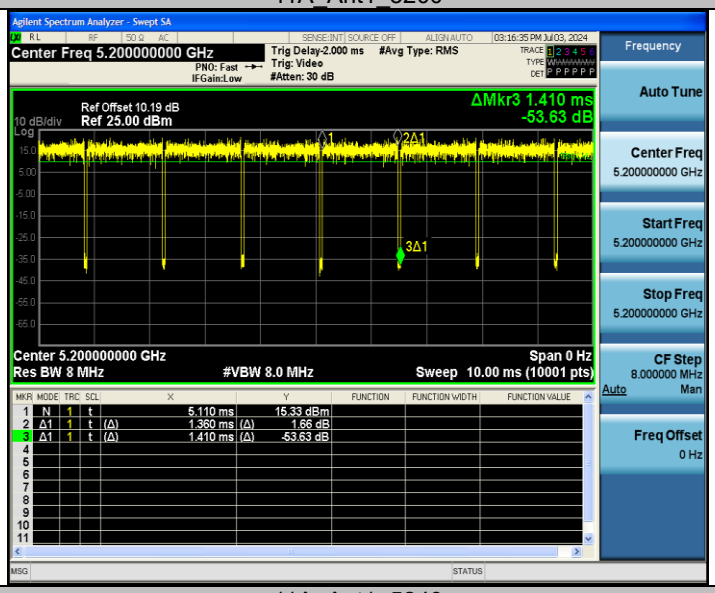
Test Mode	Antenna	Frequency [MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
11A	Ant1	5180	1.36	1.42	95.77
		5200	1.36	1.41	96.45
		5240	1.36	1.41	96.45
		5745	1.36	1.42	95.77
		5785	1.36	1.41	96.45
		5825	1.36	1.41	96.45
11N20SISO	Ant1	5180	1.27	1.33	95.49
		5200	1.27	1.32	96.21
		5240	1.27	1.32	96.21
		5745	1.27	1.33	95.49
		5785	1.27	1.33	95.49
		5825	1.27	1.32	96.21
11N40SISO	Ant1	5190	0.63	0.69	91.30
		5230	0.63	0.68	92.65
		5755	0.63	0.69	91.30
		5795	0.63	0.68	92.65

Test Graphs

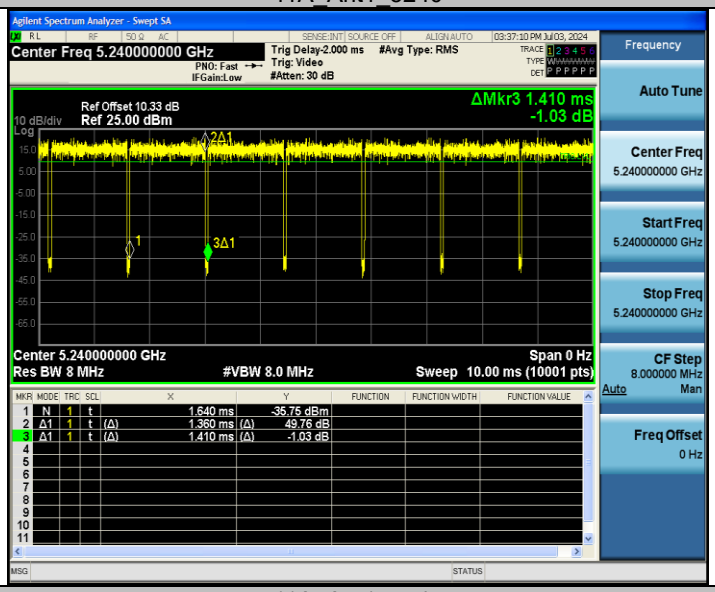
11A_Ant1_5180



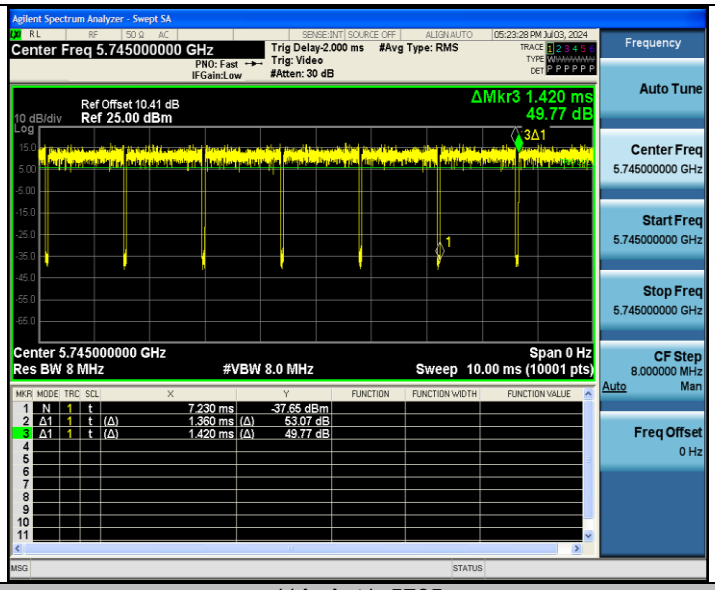
11A_Ant1_5200



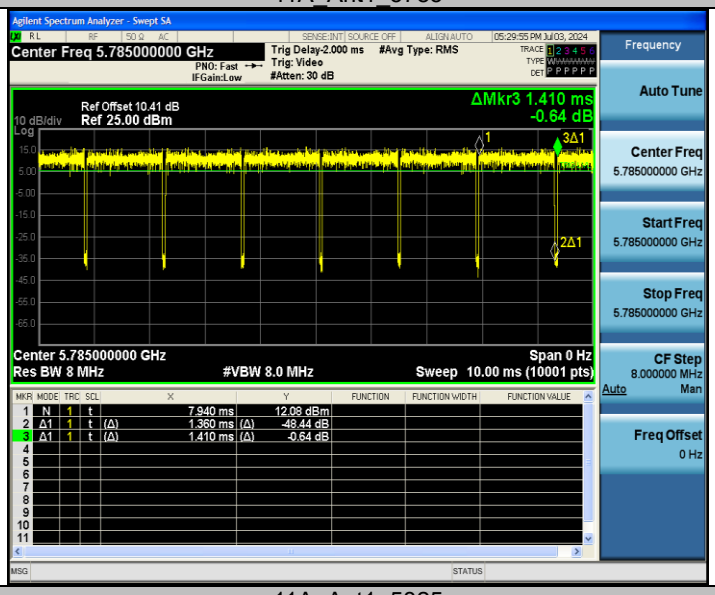
11A_Ant1_5240



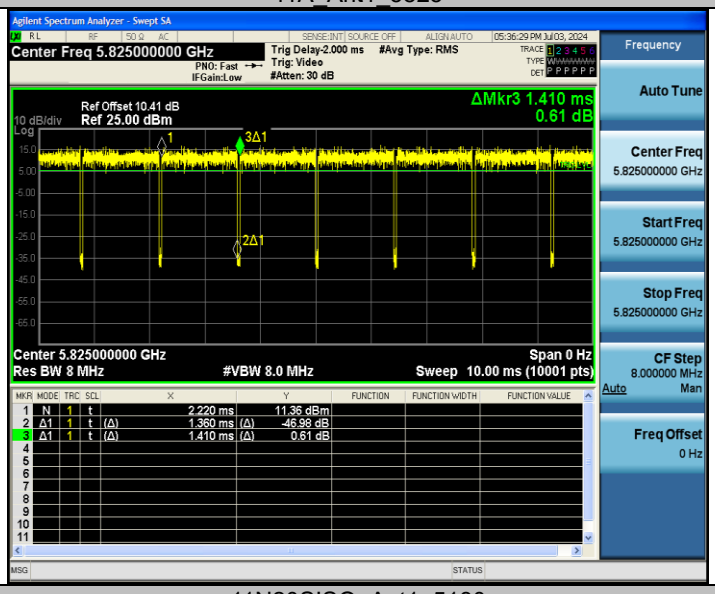
11A_Ant1_5745



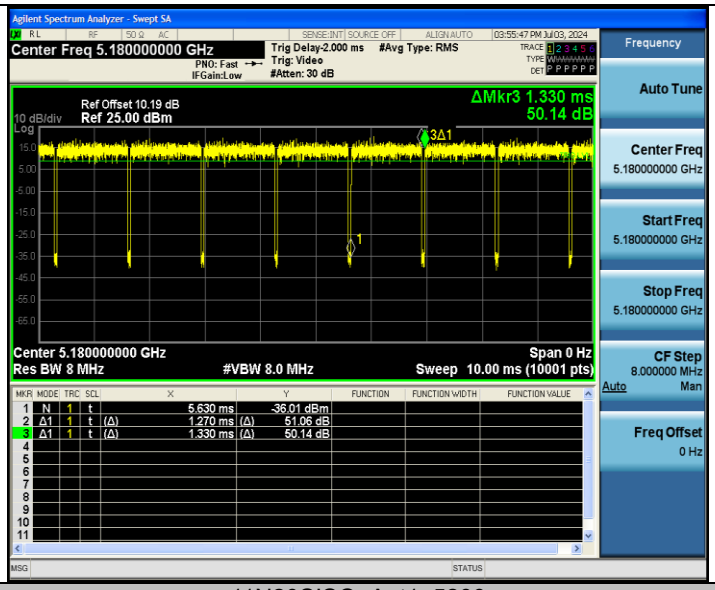
11A_Ant1_5785



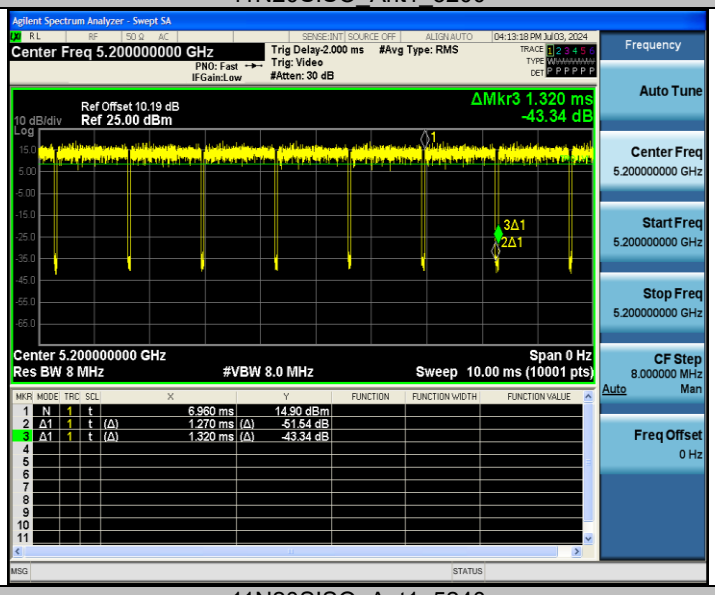
11A_Ant1_5825



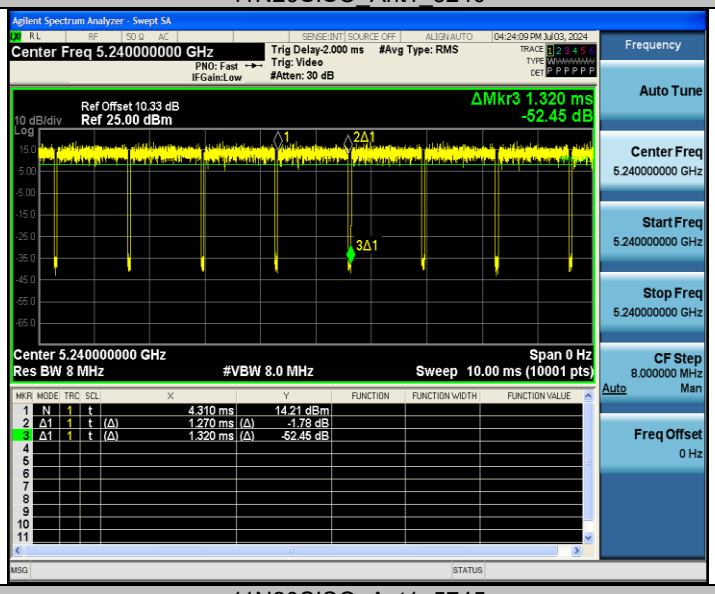
11N20SISO_Ant1_5180



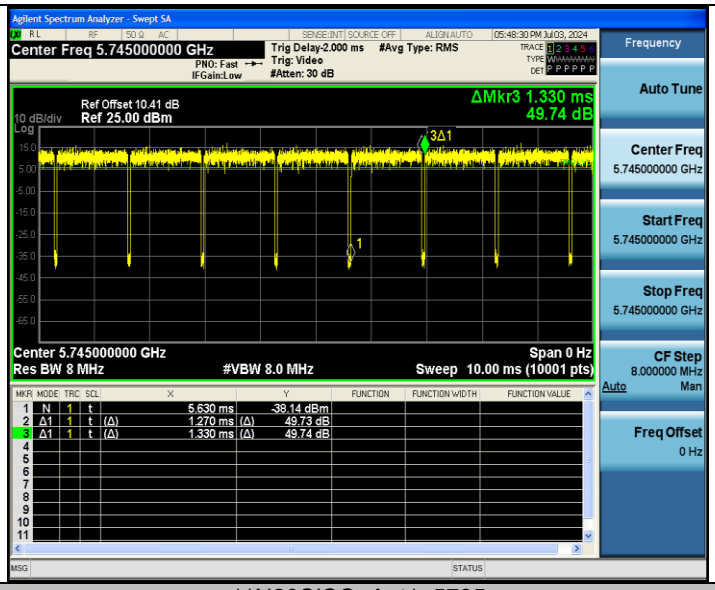
11N20SISO_Ant1_5200



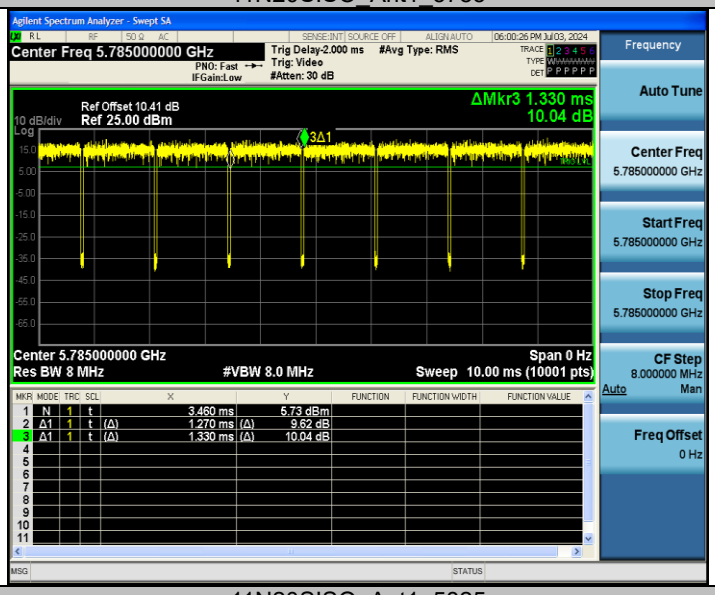
11N20SISO_Ant1_5240



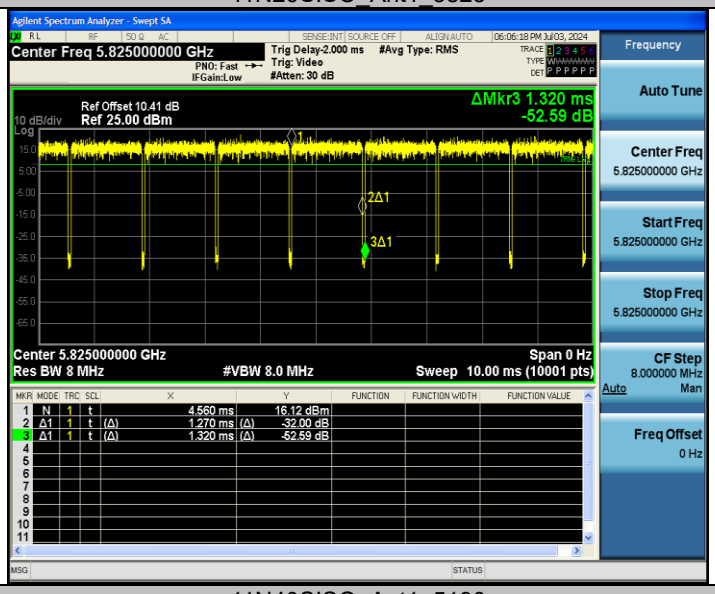
11N20SISO_Ant1_5745



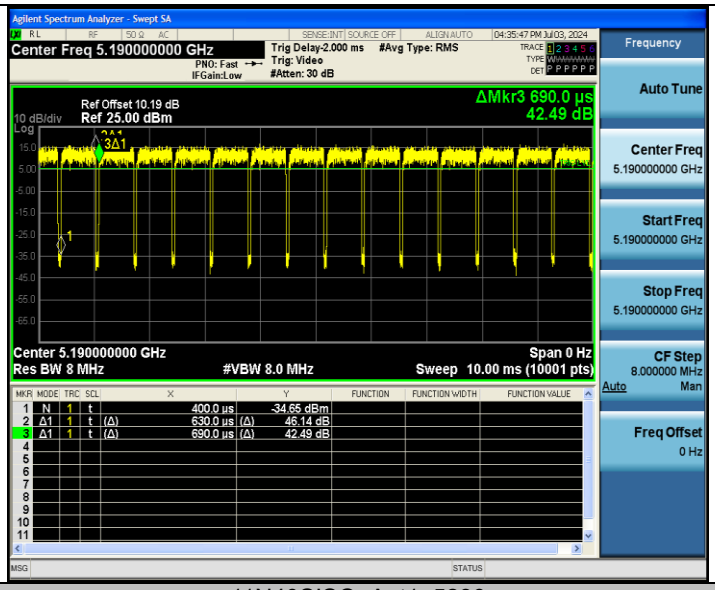
11N20SISO_Ant1_5785



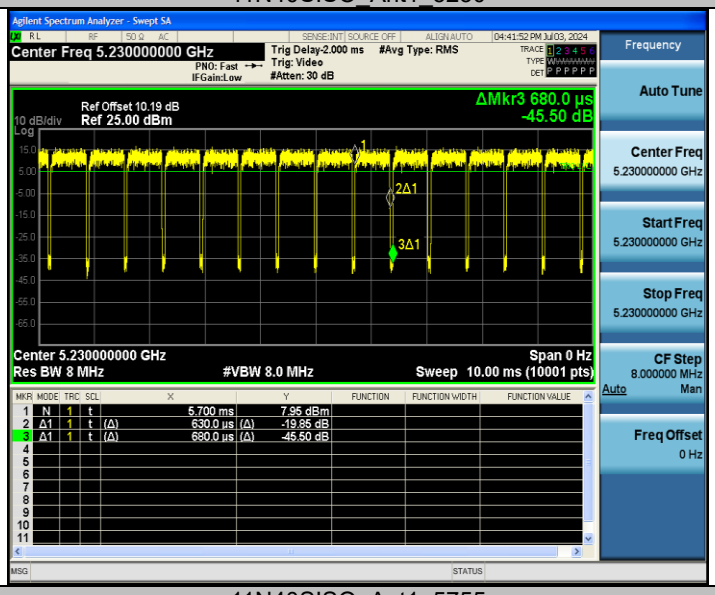
11N20SISO_Ant1_5825



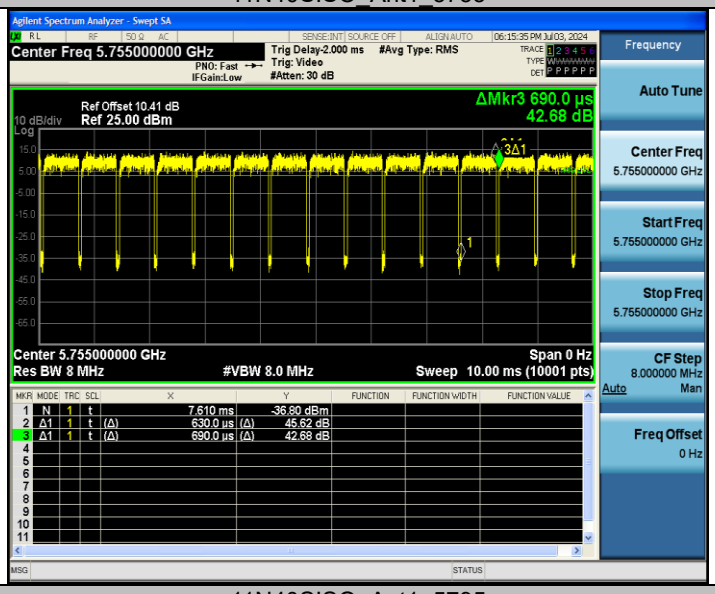
11N40SISO_Ant1_5190



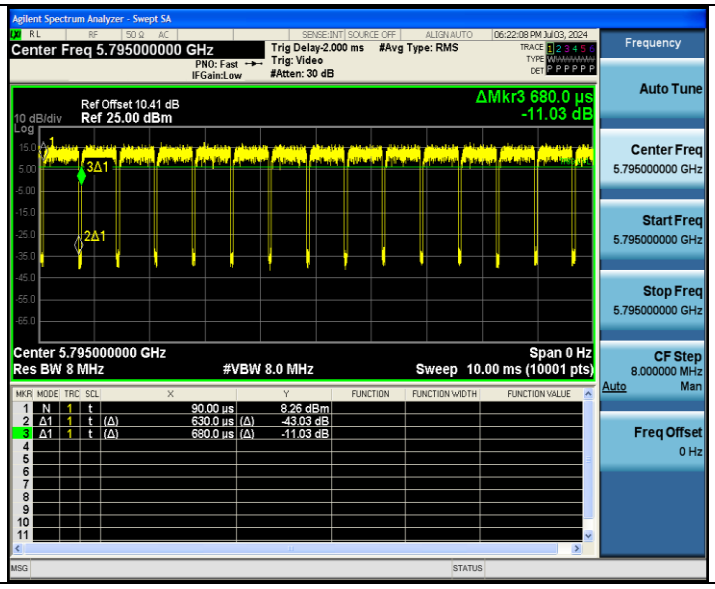
11N40SISO_Ant1_5230



11N40SISO_Ant1_5755



11N40SISO_Ant1_5795


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.795000000 GHz
Trig Delay-2.000 ms
#Avg Type: RMS
Trig: Video
#Atten: 30 dB
PNO: Fast
IFGain:Low
06:22:08 PM Jul 03, 2024
Ref Offset 10.41 dB
10 dB/div
Ref 25.00 dBm
ΔMkr3 680.0 µs
-11.03 dB
3Δ1
2Δ1
Center 5.795000000 GHz
Span 0 Hz
Res BW 8 MHz
#VBW 8.0 MHz
Sweep 10.00 ms (10001 pts)
1 N 1 t 90.00 µs 8.26 dBm
2 Δ1 1 t (Δ) 630.0 µs (Δ) -43.03 dB
3 Δ1 1 t (Δ) 680.0 µs (Δ) -11.03 dB
Frequency
Auto Tune
Center Freq
5.795000000 GHz
Start Freq
5.795000000 GHz
Stop Freq
5.795000000 GHz
CF Step
8.000000 MHz
Auto
Man
Freq Offset
0 Hz

Appendix C: Maximum conducted output power

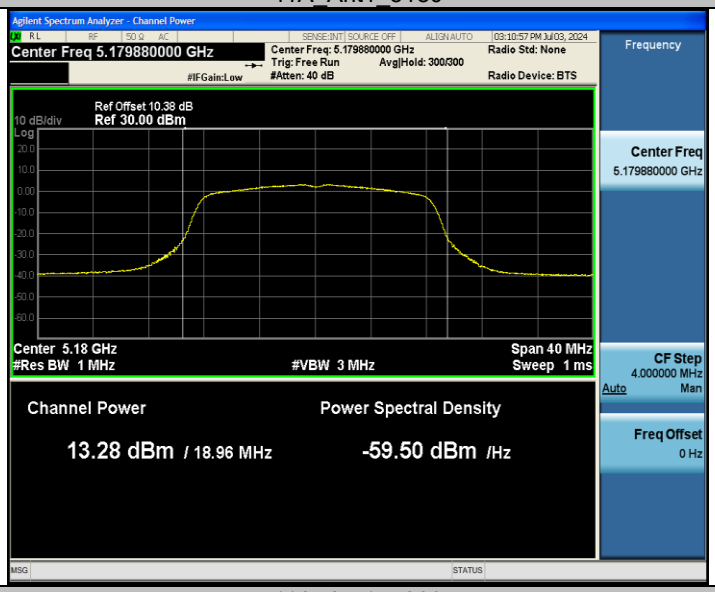
Test Result Channel Power

Test Mode	Antenna	Frequency [MHz]	Channel Power [dBm]	Duty Cycle [%]	DC Factor [dBm]	Result [dBm]	Limit [dBm]	EIRP [dBm]	Verdict
11A	Ant1	5180	13.09	95.77	0.19	13.28	≤23.98	13.23	PASS
		5200	12.92	96.45	0.16	13.08	≤23.98	13.03	PASS
		5240	12.70	96.45	0.16	12.86	≤23.98	12.81	PASS
		5745	9.05	95.77	0.19	9.24	≤30.00	13.45	PASS
		5785	8.58	96.45	0.16	8.74	≤30.00	12.95	PASS
		5825	8.90	96.45	0.16	9.06	≤30.00	13.27	PASS
11N20SISO	Ant1	5180	11.42	95.49	0.20	11.62	≤23.98	11.57	PASS
		5200	11.18	96.21	0.17	11.35	≤23.98	11.30	PASS
		5240	10.96	96.21	0.17	11.13	≤23.98	11.08	PASS
		5745	8.55	95.49	0.20	8.75	≤30.00	12.96	PASS
		5785	12.78	95.49	0.20	12.98	≤30.00	17.19	PASS
		5825	13.52	96.21	0.17	13.69	≤30.00	17.90	PASS
11N40SISO	Ant1	5190	11.70	91.30	0.40	12.10	≤23.98	12.05	PASS
		5230	11.56	92.65	0.33	11.89	≤23.98	11.84	PASS
		5755	9.37	91.30	0.40	9.77	≤30.00	13.98	PASS
		5795	12.45	92.65	0.33	12.78	≤30.00	16.99	PASS

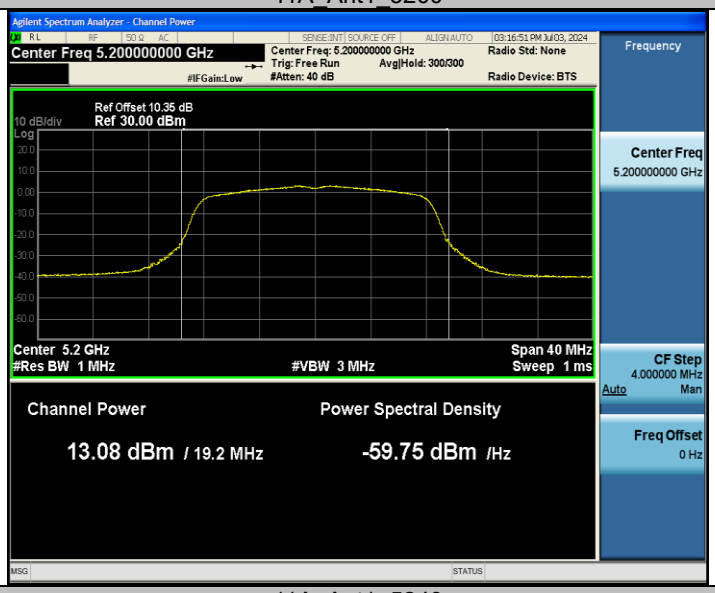
Note：The Duty Cycle Factor is compensated in the graph.

Test Graphs

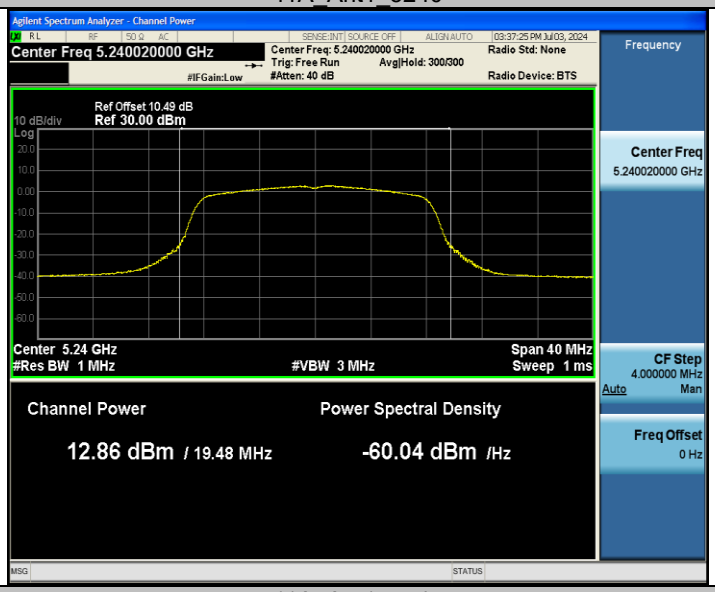
11A_Ant1_5180



11A_Ant1_5200



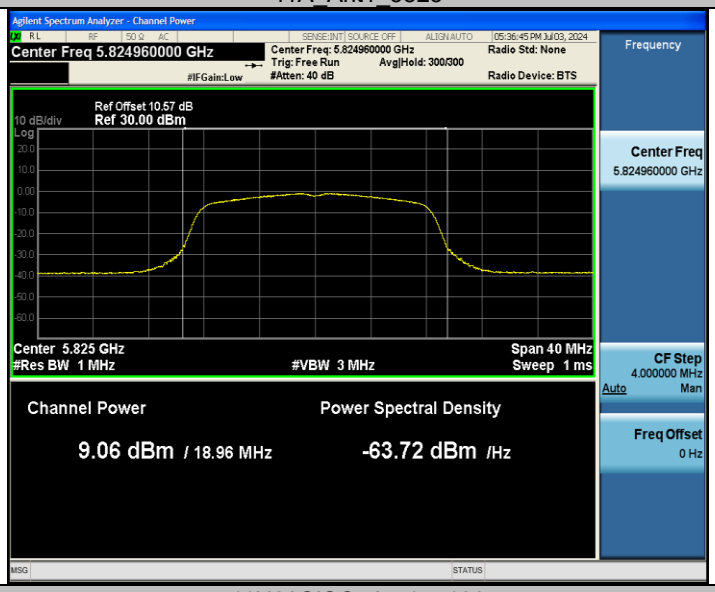
11A_Ant1_5240



11A_Ant1_5745

11A_Ant1_5785

11A_Ant1_5825



11N20SISO_Ant1_5180