Microtest
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Test Report

Report No.:	MTi231221009-05E2
Date of issue:	2024-02-01
Applicant:	Shenzhen Zhaoyang Tianxia Technology CO., Ltd.
Product:	IP Camera
Model(s):	HX01, HX02, HX03, HX04, HX05, HX06, HX07, A01, A02, A03, A04, A05, A06, A07, A08
FCC ID:	2AP56-A01HX01

Shenzhen Microtest Co., Ltd.

http://www.mtitest.com

Address: 101, No. 7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Tel: (86-755)88850135 Fax: (86-755) 88850136 Web: www.mtitest.com E-mail: mti@51mti.com

Instructions

1. This test report shall not be partially reproduced without the written consent of the laboratory.

2. The test results in this test report are only responsible for the samples submitted

3. This test report is invalid without the seal and signature of the laboratory.

4. This test report is invalid if transferred, altered, or tampered with in any form without authorization.

5. Any objection to this test report shall be submitted to the laboratory within 15 days from the date of receipt of the report.

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Test Result Certification	
Applicant:	Shenzhen Zhaoyang Tianxia Technology CO., Ltd.
Address:	Room217, Building C1, Bantian International Center, Bantian Street, Longgang District, Shenzhen, China
Manufacturer:	Shenzhen Zhaoyang Shidai Technology Co., Ltd.
Address:	F6, Block F, JIN HENG RUN Industrial Park, Xintang, Fucheng Street, Longhua District, Shenzhen, China
Product description	
Product name:	IP Camera
Trademark:	SV3C
Model name:	HX01
Series Model(s):	HX02, HX03, HX04, HX05, HX06, HX07, A01, A02, A03, A04, A05, A06, A07, A08
Standards:	47 CFR Part 15E
Test Method:	ANSI C63.10-2013 KDB 789033 D02 General UNII Test Procedures New Rules v02r01
Date of Test	
Date of test:	2024-01-20 to 2024-01-30
Test result:	Pass

Test Engineer	:	Maleah Deng
		(Maleah Deng)
Reviewed By	:	Leon Chen
		(Leon Chen)
Approved By	:	Tom Xue
		(Tom Xue)

1 General Description

1.1 Description of the EUT

Product name:	IP Camera
Model name:	HX01
Series Model(s):	HX02, HX03, HX04, HX05, HX06, HX07, A01, A02, A03, A04, A05, A06, A07, A08
Model difference:	All the models are the same circuit and module, except the model name and color.
Electrical rating:	Input: DC 12V 2000mA
Accessories:	Adaptor: Model:LY030SPS-120200U Input: AC 100~240V 50/60HZ 0.8A Output: DC 12V 2A Cable: Lan cable
Hardware version:	SSC338Q+IMX415
Software version:	V22.1.11.25.3-20230616
Test sample(s) number:	MTi231221009-05S1001
RF specification	
Operating frequency range:	802.11a/n(HT20): U-NII Band 1: 5180MHz to 5240MHz;
Channel number:	802.11a/n(HT20):U-NII Band 1: 4;
Modulation type:	802.11a: OFDM(BPSK, QPSK, 16QAM, 64QAM); 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM);
Antenna(s) type:	SMA black antenna
Antenna(s) gain:	5dBi

1.2 Description of test modes

No.	Emission test modes
Mode1	802.11a mode
Mode2	802.11n(HT20) mode

1.2.1 Operation channel list

U-NII Band 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	/	/	/	/

Test Channel List

Bandwidth (MHz)	Lowest Channel (LCH) (MHz)	Middle Channel (MCH) (MHz)	Highest Channel (HCH) (MHz)
20	5180	5200	5240

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.

Software:	MPTOOL		
Mode	LCH	MCH	HCH
802.11a	90	90	90
802.11n(HT20)	90	90	90

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

ENV	Temperature (°C)	Voltage (V)
LTLV	0	13.2
NTNV	25	12
HTHV	50	10.8

1.4 Description of support units

Support equipment list			
Description	Model	Serial No.	Manufacturer
/	/	/	/
Support cable list			
Description	Length (m)	From	To
/	/	/	/

1.5 Measurement uncertainty

Measurement	Uncertainty
Conducted emissions (AMN 150kHz~30MHz)	±3.1dB
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	Conducted Emission at AC power line	47 CFR Part 15E	47 CFR Part 15.207(a)	Pass
3	Duty Cycle	47 CFR Part 15E		Pass
4	Maximum conducted output power	47 CFR Part 15E	47 CFR Part 47 CFR Part 15.407(a)(1)(iv) 47 CFR Part	Pass
5	Power spectral density	47 CFR Part 15E	47 CFR Part 47 CFR Part 15.407(a)(1)(iv) 47 CFR Part	Pass
6	Emission bandwidth and occupied bandwidth	47 CFR Part 15E	U-NII 1No limits, only for report use. 47 CFR Part 15.407(e)	Pass
7	Band edge emissions (Radiated)	47 CFR Part 15E	47 CFR Part 15.407(b)(1) 47 CFR Part 47 CFR Part 15.407(b)(10)	Pass
8	Undesirable emission limits (below 1GHz)	47 CFR Part 15E	47 CFR Part 15.407(b)(9)	Pass
9	Undesirable emission limits (above 1GHz)	47 CFR Part 15E	47 CFR Part 15.407(b)(1) 47 CFR Part 47 CFR Part 15.407(b)(10)	Pass

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
Conducted Emission at AC power line						
1	EMI Test Receiver	Rohde&schwarz	ESCI3	101368	2023-04-26	2024-04-25
2	Artificial mains network	Schwarzbeck	NSLK 8127	183	2023-05-05	2024-05-04
3	Artificial Mains Network	Rohde & Schwarz	ESH2-Z5	100263	2023-06-03	2024-06-02
Duty Cycle Maximum conducted output power Power spectral density Emission bandwidth and occupied bandwidth						
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.
Description of the antenna of EUT	The EUT antenna is External antenna (5dBi), In case of replacement of broken antenna the same antenna type must be used.
Conclusion:	The EUT complies with the requirement of § 15.203.

6 Radio Spectrum Matter Test Results (RF)

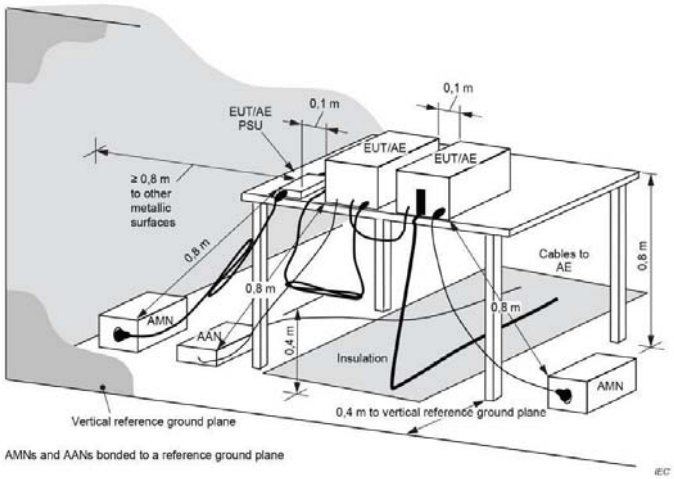
6.1 Conducted Emission at AC power line

Test Requirement:	47 CFR Part 15.207(a)
Test Limit:	Frequency of emission (MHz) / Conducted limit (dBμV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 *Decreases with the logarithm of the frequency.
Test Method:	ANSI C63.10-2013 section 6.2

6.1.1 E.U.T. Operation:

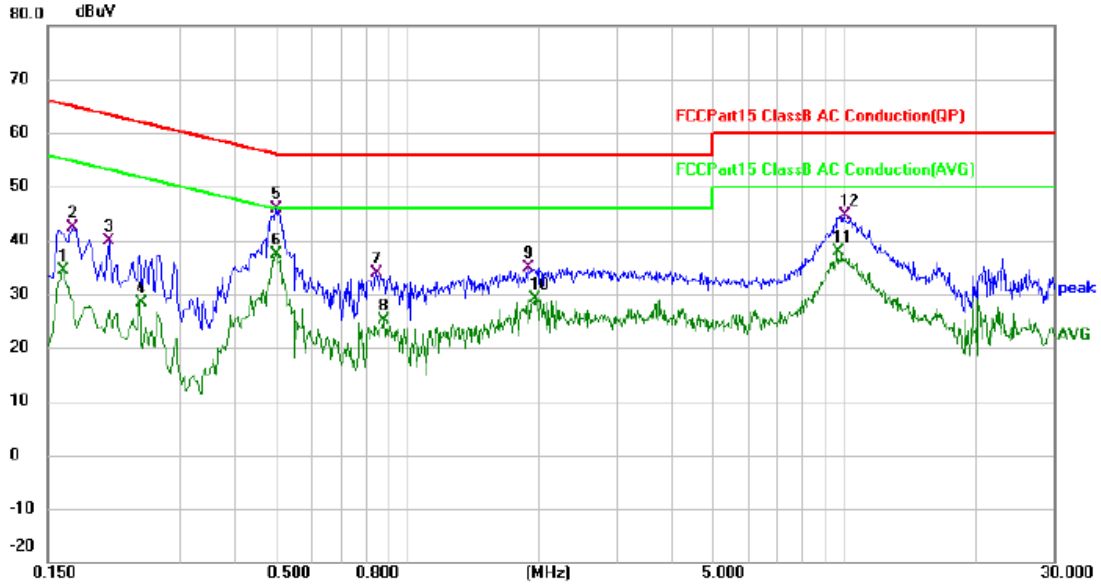
Operating Environment:					
Temperature:	23.1 °C	Humidity:	36 %	Atmospheric Pressure:	101 kPa
Pre test mode:	Mode1, Mode2				
Final test mode:	All of the listed pre-test mode were tested, only the data of the worst mode (Mode1) is recorded in the report				

6.1.2 Test Setup Diagram:



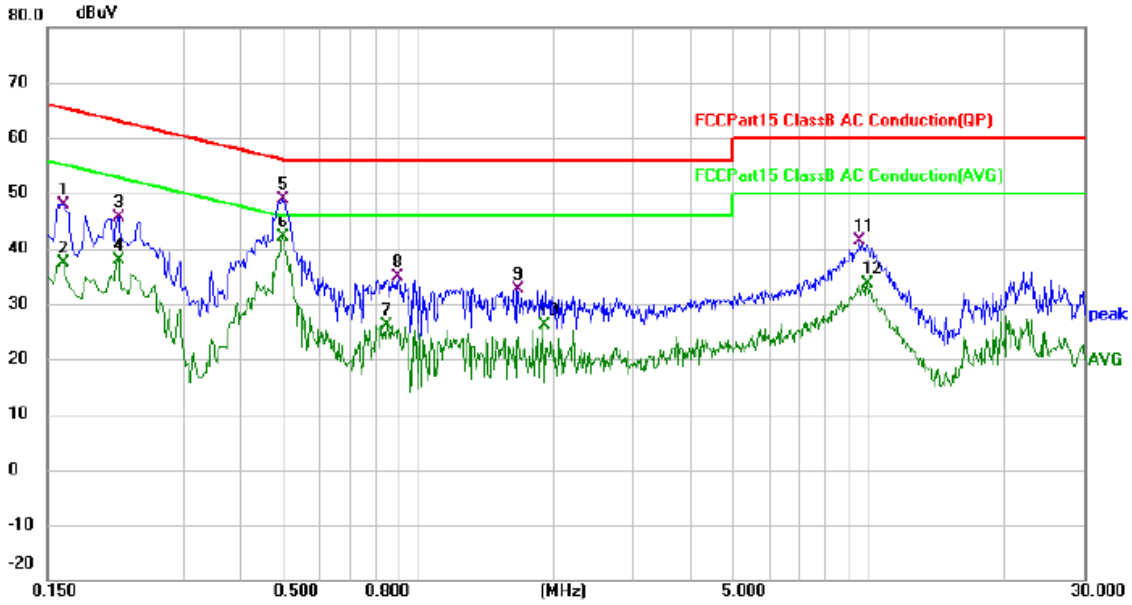
6.1.3 Test Data:

Mode1(AC 120V 60Hz) / Line: Line / BW: 20 / CH: L



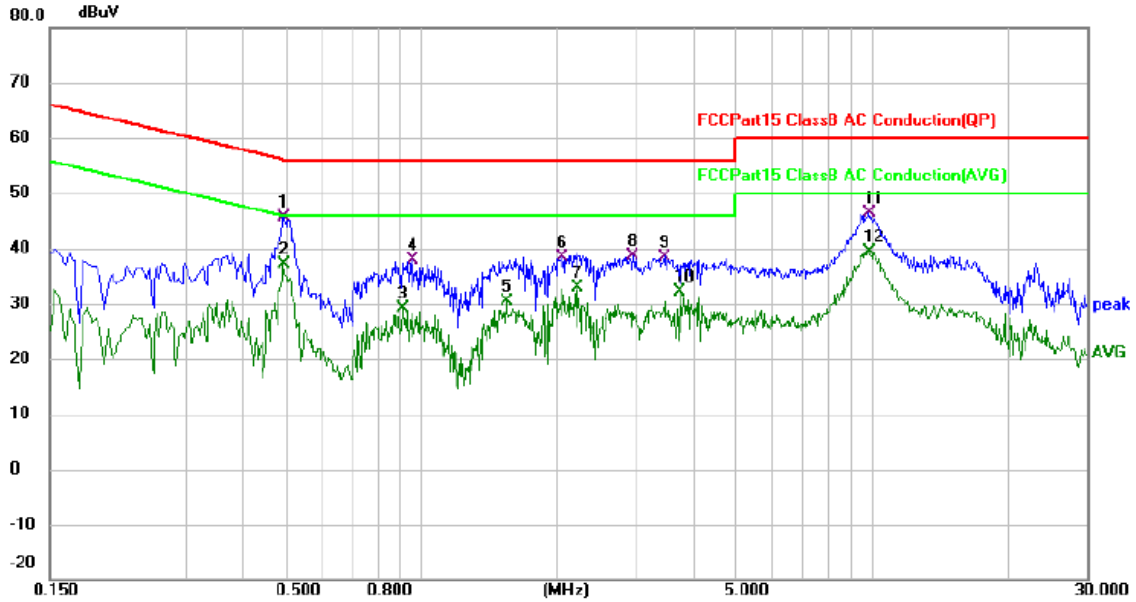
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1620	24.10	10.38	34.48	55.36	-20.88	AVG	
2		0.1700	31.89	10.38	42.27	64.96	-22.69	QP	
3		0.2060	29.11	10.80	39.91	63.37	-23.46	QP	
4		0.2420	17.42	10.88	28.30	52.03	-23.73	AVG	
5		0.4980	34.26	11.51	45.77	56.03	-10.26	QP	
6	*	0.4980	25.94	11.51	37.45	46.03	-8.58	AVG	
7		0.8460	21.65	12.29	33.94	56.00	-22.06	QP	
8		0.8820	12.88	12.35	25.23	46.00	-20.77	AVG	
9		1.8900	24.38	10.62	35.00	56.00	-21.00	QP	
10		1.9580	18.51	10.63	29.14	46.00	-16.86	AVG	
11		9.6459	27.10	10.74	37.84	50.00	-12.16	AVG	
12		9.9580	33.86	10.75	44.61	60.00	-15.39	QP	

Mode1(AC 120V 60Hz) / Line: Neutral / BW: 20 / CH: L



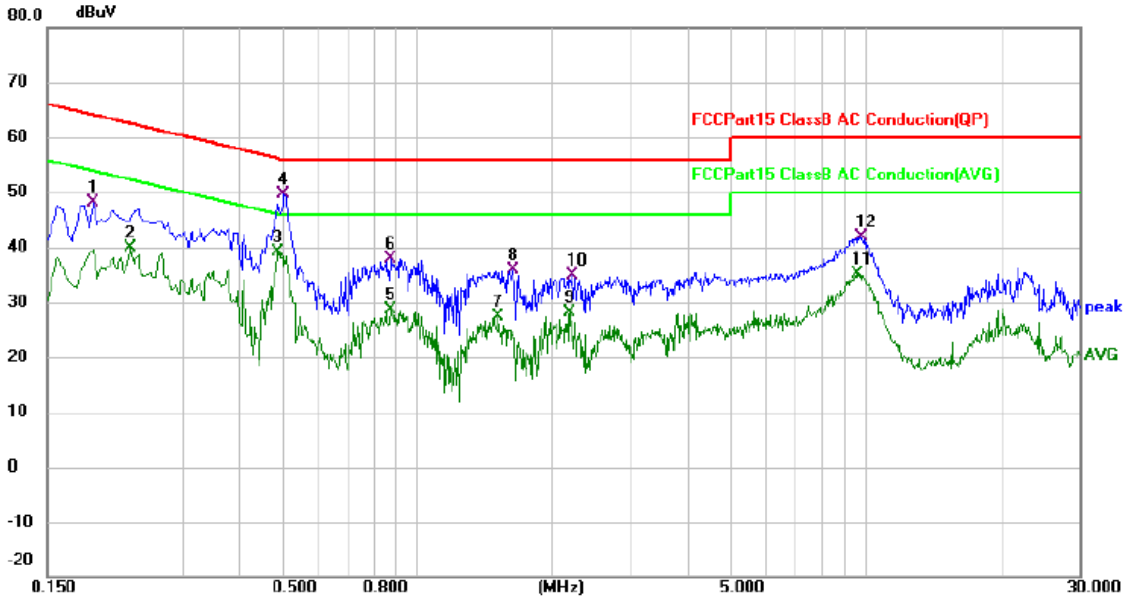
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1620	37.54	10.38	47.92	65.36	-17.44	QP	
2		0.1620	27.03	10.38	37.41	55.36	-17.95	AVG	
3		0.2140	34.79	10.81	45.60	63.05	-17.45	QP	
4		0.2140	27.16	10.81	37.97	53.05	-15.08	AVG	
5		0.4980	37.49	11.51	49.00	56.03	-7.03	QP	
6	*	0.4980	30.58	11.51	42.09	46.03	-3.94	AVG	
7		0.8500	13.96	12.29	26.25	46.00	-19.75	AVG	
8		0.9020	22.37	12.40	34.77	56.00	-21.23	QP	
9		1.6580	18.73	13.94	32.67	56.00	-23.33	QP	
10		1.8940	15.48	10.62	26.10	46.00	-19.90	AVG	
11		9.5259	30.56	10.74	41.30	60.00	-18.70	QP	
12		9.8659	22.77	10.75	33.52	50.00	-16.48	AVG	

Mode1(AC 240V 60Hz) / Line: Line / BW: 20 / CH: L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.4940	34.24	11.49	45.73	56.10	-10.37	QP	
2	*	0.4940	25.71	11.49	37.20	46.10	-8.90	AVG	
3		0.9100	16.70	12.42	29.12	46.00	-16.88	AVG	
4		0.9580	25.41	12.53	37.94	56.00	-18.06	QP	
5		1.5460	16.58	13.73	30.31	46.00	-15.69	AVG	
6		2.0460	27.67	10.63	38.30	56.00	-17.70	QP	
7		2.2060	22.25	10.64	32.89	46.00	-13.11	AVG	
8		2.9500	28.00	10.64	38.64	56.00	-17.36	QP	
9		3.4660	27.85	10.65	38.50	56.00	-17.50	QP	
10		3.7540	21.42	10.65	32.07	46.00	-13.93	AVG	
11		9.8219	35.70	10.75	46.45	60.00	-13.55	QP	
12		9.8219	28.64	10.75	39.39	50.00	-10.61	AVG	

Mode1(AC 240V 60Hz) / Line: Neutral / BW: 20 / CH: L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1900	37.47	10.76	48.23	64.04	-15.81	QP	
2		0.2300	28.93	10.85	39.78	52.45	-12.67	AVG	
3		0.4900	27.68	11.49	39.17	46.17	-7.00	AVG	
4	*	0.5060	38.10	11.53	49.63	56.00	-6.37	QP	
5		0.8740	16.27	12.33	28.60	46.00	-17.40	AVG	
6		0.8780	25.61	12.35	37.96	56.00	-18.04	QP	
7		1.5260	13.65	13.69	27.34	46.00	-18.66	AVG	
8		1.6420	22.06	13.90	35.96	56.00	-20.04	QP	
9		2.1980	17.38	10.64	28.02	46.00	-17.98	AVG	
10		2.2300	24.26	10.64	34.90	56.00	-21.10	QP	
11		9.5659	24.36	10.74	35.10	50.00	-14.90	AVG	
12		9.7180	31.15	10.74	41.89	60.00	-18.11	QP	

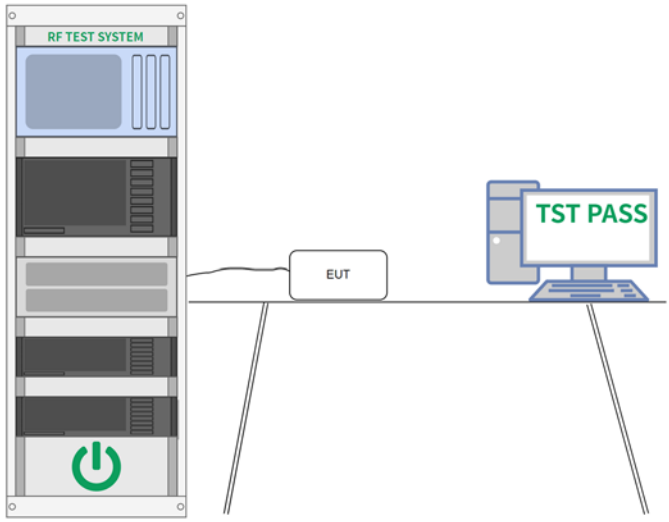
6.2 Duty Cycle

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.

6.2.1 E.U.T. Operation:

Operating Environment:					
Temperature:	25 °C	Humidity:	56 %	Atmospheric Pressure:	100 kPa
Pre test mode:	Mode1, Mode2				
Final test mode:	Mode1, Mode2				

6.2.2 Test Setup Diagram:



6.2.3 Test Data:

Please Refer to Appendix for Details.

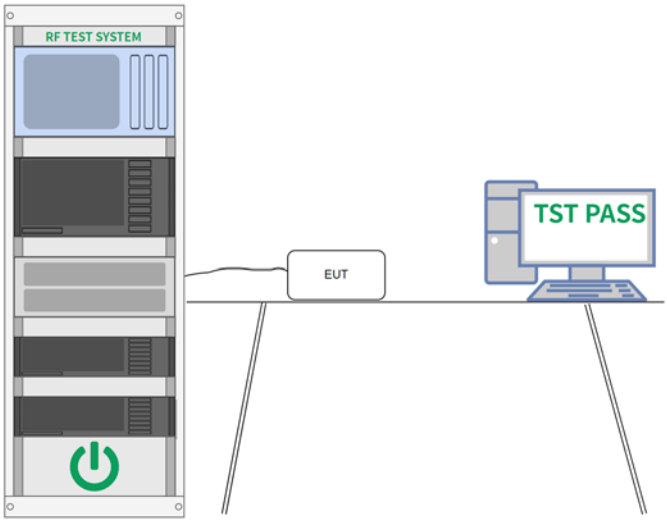
6.3 Maximum conducted output power

Test Requirement:	47 CFR Part 15.407(a)(1)(iv)
Test Limit:	For an outdoor 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm). 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. 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. 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. 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. 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. 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.
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:	25 °C	Humidity:	56 %	Atmospheric Pressure:	100 kPa
Pre test mode:	Mode1, Mode2				
Final test mode:	Mode1, Mode2				

6.3.2 Test Setup Diagram:



6.3.3 Test Data:

Please Refer to Appendix for Details.

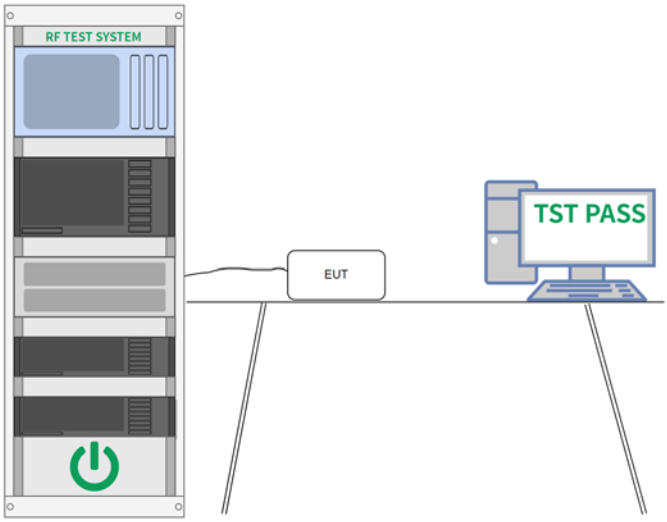
6.4 Power spectral density

Test Requirement:	47 CFR Part 15.407(a)(1)(iv)
Test Limit:	For an outdoor 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. 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 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. 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 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. 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. 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.
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:	25 °C	Humidity:	56 %	Atmospheric Pressure:	100 kPa
Pre test mode:	Mode1, Mode2				
Final test mode:	Mode1, Mode2				

6.4.2 Test Setup Diagram:



6.4.3 Test Data:

Please Refer to Appendix for Details.

6.5 Emission bandwidth and occupied bandwidth

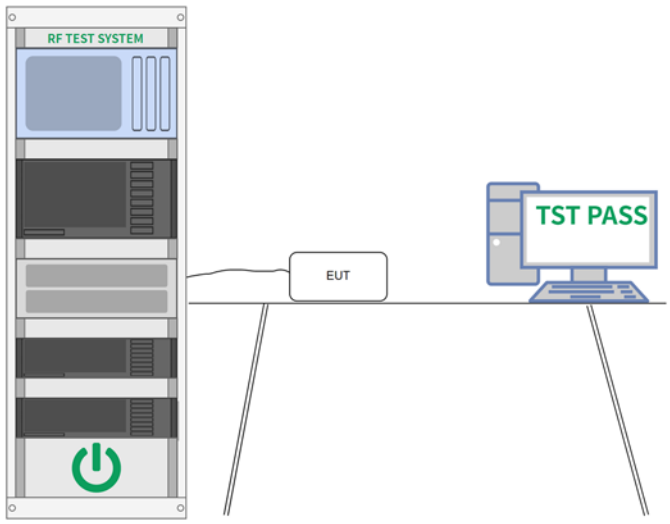
Test Requirement:	U-NII 1, U-NII 2A, U-NII 2C: No limits, only for report use.
Test Limit:	U-NII 1, U-NII 2A, U-NII 2C: No limits, only for report use.
Test Method:	ANSI C63.10-2013, section 6.9 & 12.4
Procedure:	Emission bandwidth: a) Set RBW = approximately 1% of the emission bandwidth. b) Set the 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).

6.5.1 E.U.T. Operation:

Operating Environment:					
Temperature:	25 °C	Humidity:	56 %	Atmospheric Pressure:	100 kPa
Pre test mode:	Mode1, Mode2				
Final test mode:	Mode1, Mode2				

6.5.2 Test Setup Diagram:



6.5.3 Test Data:

Please Refer to Appendix for Details.

6.6 Band edge emissions (Radiated)

Test Requirement:	47 CFR Part 15.407(b)(1) 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.

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:

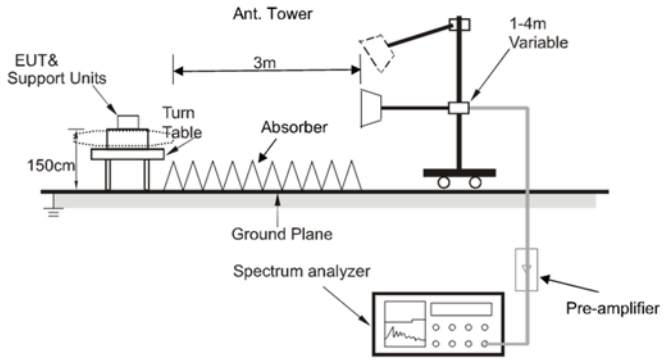
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100 **	3
88-216	150 **	3
216-960	200 **	3

	<table><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.
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.

6.6.1 E.U.T. Operation:

Operating Environment:					
Temperature:	28.9 °C	Humidity:	50.9 %	Atmospheric Pressure:	101 kPa
Pre test mode:	Mode1, Mode2				
Final test mode:	Mode1, Mode2				

6.6.2 Test Setup Diagram:



6.6.3 Test Data:

Mode1 / Polarization: Horizontal / 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	50.77	-8.46	42.31	74.00	-31.69	peak
2		4500.000	41.19	-8.46	32.73	54.00	-21.27	AVG
3		5150.000	60.17	-5.61	54.56	74.00	-19.44	peak
4	*	5150.000	43.75	-5.61	38.14	54.00	-15.86	AVG

Mode1 / Polarization: Vertical / 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	51.09	-8.46	42.63	74.00	-31.37	peak
2		4500.000	41.48	-8.46	33.02	54.00	-20.98	AVG
3		5150.000	54.89	-5.61	49.28	74.00	-24.72	peak
4	*	5150.000	41.60	-5.61	35.99	54.00	-18.01	AVG

Mode1 / Polarization: Horizontal / 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	51.31	-5.17	46.14	74.00	-27.86	peak
2	*	5350.000	40.42	-5.17	35.25	54.00	-18.75	AVG
3		5460.000	50.84	-5.16	45.68	74.00	-28.32	peak
4		5460.000	40.40	-5.16	35.24	54.00	-18.76	AVG

Mode1 / Polarization: Vertical / 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	50.20	-5.17	45.03	74.00	-28.97	peak
2		5350.000	40.04	-5.17	34.87	54.00	-19.13	AVG
3		5460.000	50.05	-5.16	44.89	74.00	-29.11	peak
4	*	5460.000	40.48	-5.16	35.32	54.00	-18.68	AVG

Mode2 / Polarization: Horizontal / 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	51.07	-8.46	42.61	74.00	-31.39	peak
2		4500.000	41.25	-8.46	32.79	54.00	-21.21	AVG
3		5150.000	61.46	-5.61	55.85	74.00	-18.15	peak
4	*	5150.000	44.54	-5.61	38.93	54.00	-15.07	AVG

Mode2 / Polarization: Vertical / 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	51.69	-8.46	43.23	74.00	-30.77	peak
2		4500.000	41.55	-8.46	33.09	54.00	-20.91	AVG
3		5150.000	55.52	-5.61	49.91	74.00	-24.09	peak
4	*	5150.000	41.79	-5.61	36.18	54.00	-17.82	AVG

Mode2 / Polarization: Horizontal / 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	50.85	-5.17	45.68	74.00	-28.32	peak
2		5350.000	40.50	-5.17	35.33	54.00	-18.67	AVG
3		5460.000	50.31	-5.16	45.15	74.00	-28.85	peak
4	*	5460.000	40.52	-5.16	35.36	54.00	-18.64	AVG

Mode2 / Polarization: Vertical / 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	50.05	-5.17	44.88	74.00	-29.12	peak
2		5350.000	39.93	-5.17	34.76	54.00	-19.24	AVG
3		5460.000	50.88	-5.16	45.72	74.00	-28.28	peak
4	*	5460.000	40.45	-5.16	35.29	54.00	-18.71	AVG

6.7 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>

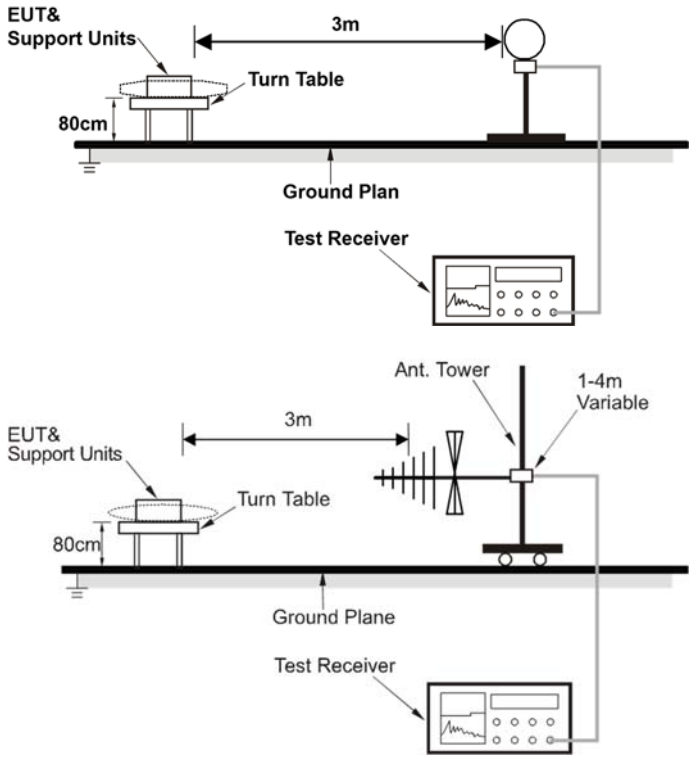
	Remark: 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor 2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions 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.

6.7.1 E.U.T. Operation:

Operating Environment:

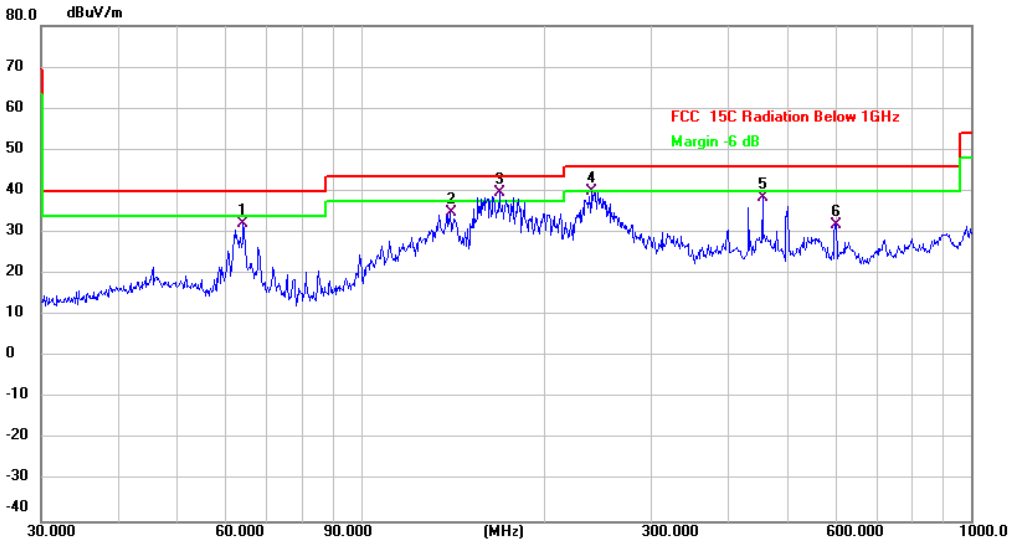
Temperature:	28.9 °C	Humidity:	50.9 %	Atmospheric Pressure:	101 kPa
Pre test mode:	Mode1, Mode2				
Final test mode:	All of the listed pre-test mode were tested, only the data of the worst mode (Mode1) is recorded in the report				
Note: The amplitude of spurious emissions which are attenuated more than 20 dB below the limits are not reported. There were no emissions found below 30MHz within 20dB of the limit.					

6.7.2 Test Setup Diagram:



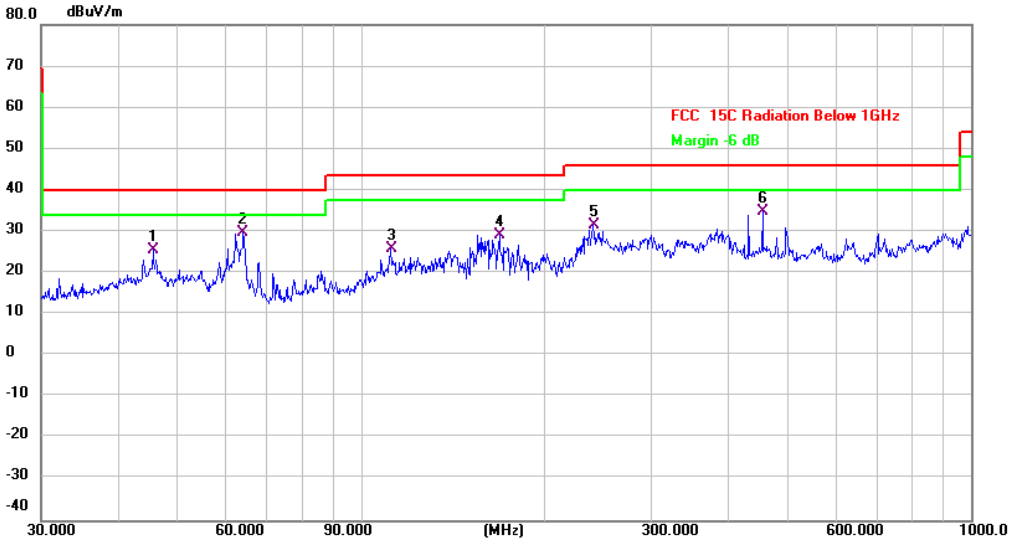
6.7.3 Test Data:

Mode1 / Polarization: Horizontal / 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		64.2074	42.27	-10.25	32.02	40.00	-7.98	QP	
2		139.8508	44.50	-9.76	34.74	43.50	-8.76	QP	
3	*	168.4138	50.76	-11.01	39.75	43.50	-3.75	QP	
4	!	239.1473	47.01	-6.92	40.09	46.00	-5.91	QP	
5		455.9058	42.61	-4.07	38.54	46.00	-7.46	QP	
6		601.4265	34.95	-2.99	31.96	46.00	-14.04	QP	

Mode1 / Polarization: Vertical / 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		45.6948	32.72	-7.29	25.43	40.00	-14.57	QP	
2	*	64.2074	39.86	-10.25	29.61	40.00	-10.39	QP	
3		111.7380	33.53	-7.68	25.85	43.50	-17.65	QP	
4		168.4138	40.19	-11.01	29.18	43.50	-14.32	QP	
5		240.8304	38.69	-7.03	31.66	46.00	-14.34	QP	
6		455.9058	38.97	-4.07	34.90	46.00	-11.10	QP	

6.8 Undesirable emission limits (above 1GHz)

Test Requirement:	47 CFR Part 15.407(b)(1) 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.

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

	<table><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.
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.

6.8.1 E.U.T. Operation:

Operating Environment:					
Temperature:	28.9 °C	Humidity:	50.9 %	Atmospheric Pressure:	101 kPa
Pre test mode:	Mode1, Mode2				
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				

6.8.2 Test Data:

Mode1 / Polarization: Horizontal / BW: 20 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	10360.000	52.65	4.04	56.69	68.20	-11.51	peak
2 *	10360.000	43.84	4.04	47.88	54.00	-6.12	AVG
3	15540.000	7.12	47.56	54.68	68.20	-13.52	peak
4	15540.000	-3.21	47.56	44.35	54.00	-9.65	AVG

Mode1 / Polarization: Vertical / BW: 20 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	10360.000	55.87	4.04	59.91	68.20	-8.29	peak
2 *	10360.000	45.64	4.04	49.68	54.00	-4.32	AVG
3	15540.000	7.91	47.56	55.47	68.20	-12.73	peak
4	15540.000	-2.22	47.56	45.34	54.00	-8.66	AVG

Mode1 / Polarization: Horizontal / BW: 20 / CH: M

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	10400.000	52.15	3.79	55.94	68.20	-12.26	peak
2 *	10400.000	41.48	3.79	45.27	54.00	-8.73	AVG
3	15600.000	6.62	46.92	53.54	68.20	-14.66	peak
4	15600.000	-3.27	46.92	43.65	54.00	-10.35	AVG

Mode1 / Polarization: Vertical / BW: 20 / CH: M

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	10400.000	56.72	3.79	60.51	68.20	-7.69	peak
2 *	10400.000	46.33	3.79	50.12	54.00	-3.88	AVG
3	15600.000	9.31	46.92	56.23	68.20	-11.97	peak
4	15600.000	-1.65	46.92	45.27	54.00	-8.73	AVG

Mode1 / Polarization: Horizontal / BW: 20 / CH: H

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	10480.000	52.43	4.06	56.49	68.20	-11.71	peak
2 *	10480.000	42.26	4.06	46.32	54.00	-7.68	AVG
3	15720.000	7.90	46.86	54.76	68.20	-13.44	peak
4	15720.000	-2.31	46.86	44.55	54.00	-9.45	AVG

Mode1 / Polarization: Vertical / BW: 20 / CH: H

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	10480.000	56.66	4.06	60.72	68.20	-7.48	peak
2 *	10480.000	46.06	4.06	50.12	54.00	-3.88	AVG
3	15720.000	9.54	46.86	56.40	68.20	-11.80	peak
4	15720.000	-0.51	46.86	46.35	54.00	-7.65	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	26.360
		5200	25.120
		5240	27.200
11N20SISO	Ant1	5180	25.840
		5200	24.800
		5240	21.080

Test Graphs

11A_Ant1_5180

11A_Ant1_5200

11A_Ant1_5240

11N20SISO_Ant1_5180

11N20SISO_Ant1_5200

11N20SISO_Ant1_5240

1.1 Appendix A2: Occupied channel bandwidth

1.1.1 Test Result

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	16.794	5171.7089	5188.5029	---	---
		5200	16.912	5191.6360	5208.5480	---	---
		5240	16.813	5231.5945	5248.4075	---	---
11N20SISO	Ant1	5180	17.909	5171.1636	5189.0726	---	---
		5200	17.784	5191.1673	5208.9513	---	---
		5240	17.761	5231.1493	5248.9103	---	---

1.1.2 Test Graphs

11A_Ant1_5180

11A_Ant1_5200

11A_Ant1_5240

11N20SISO_Ant1_5180

11N20SISO_Ant1_5200

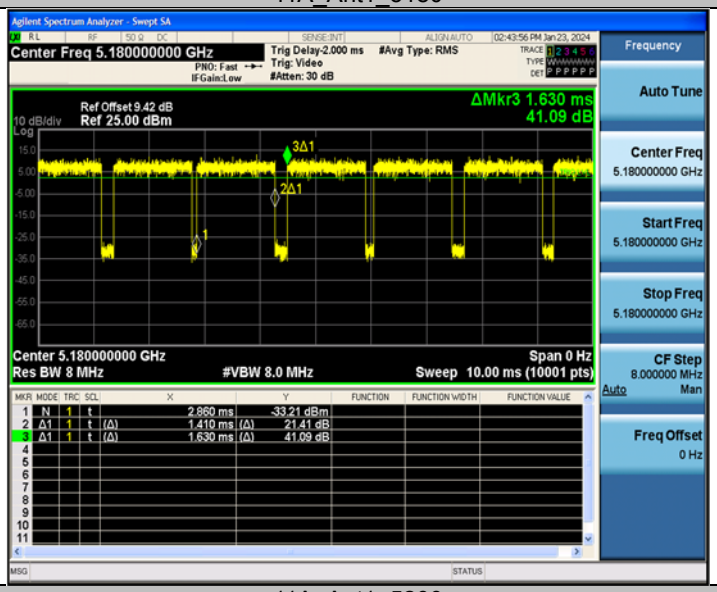
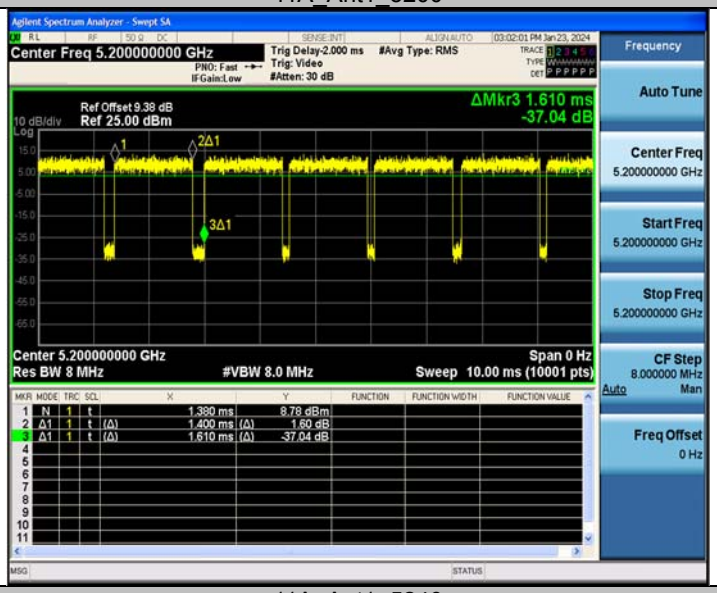
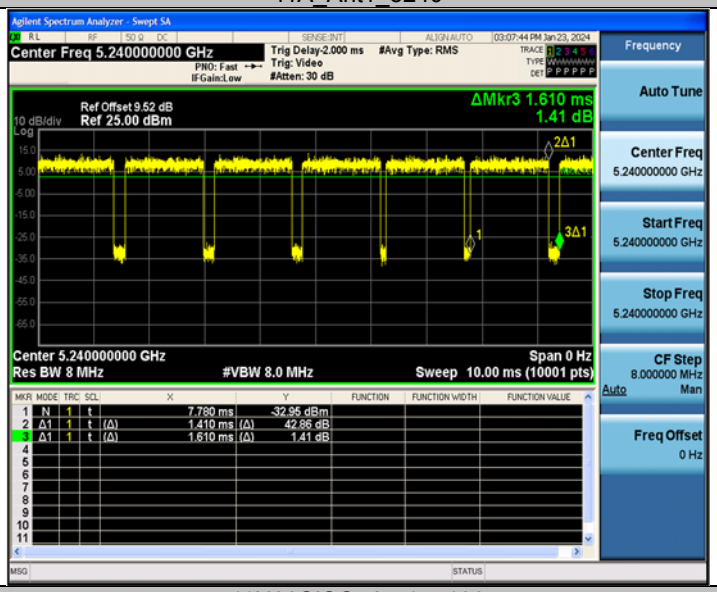
11N20SISO_Ant1_5240

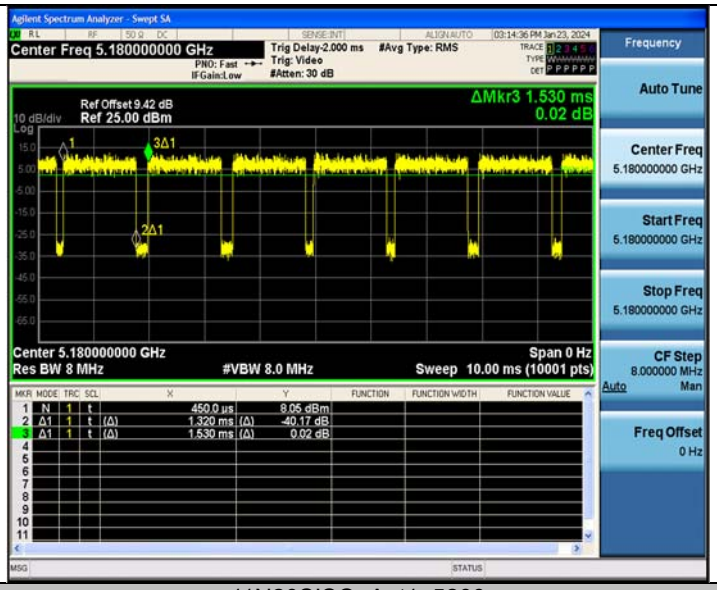
Appendix B: Duty Cycle

Test Result

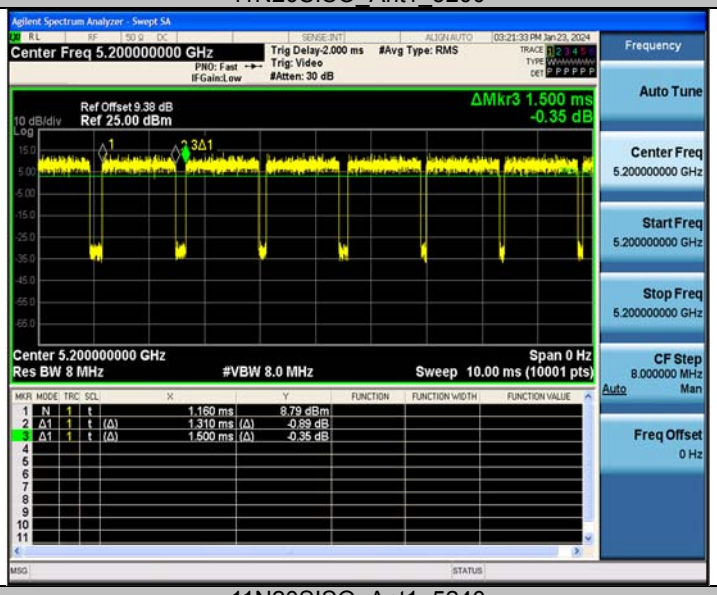
Test Mode	Antenna	Frequency [MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
11A	Ant1	5180	1.41	1.63	86.50
		5200	1.40	1.61	86.96
		5240	1.41	1.61	87.58
11N20SISO	Ant1	5180	1.32	1.53	86.27
		5200	1.31	1.50	87.33
		5240	1.31	1.52	86.18

Test Graphs

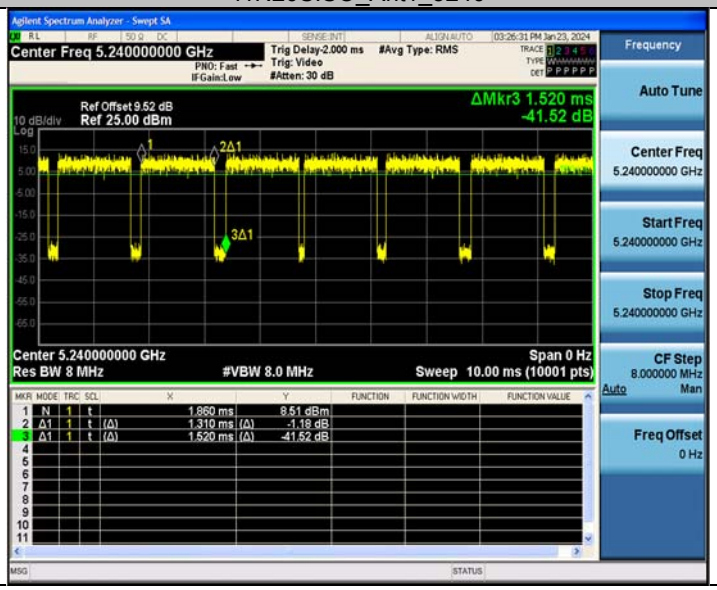
11A_Ant1_5180

11A_Ant1_5200

11A_Ant1_5240

11N20SISO_Ant1_5180



11N20SISO_Ant1_5200



11N20SISO_Ant1_5240



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	4.55	86.50	0.63	5.18	≤23.98	10.18	PASS
		5200	4.09	86.96	0.61	4.70	≤23.98	9.70	PASS
		5240	5.42	87.58	0.58	6.00	≤23.98	11.00	PASS
11N20SISO	Ant1	5180	4.55	86.27	0.64	5.19	≤23.98	10.19	PASS
		5200	5.44	87.33	0.59	6.03	≤23.98	11.03	PASS
		5240	5.51	86.18	0.65	6.16	≤23.98	11.16	PASS

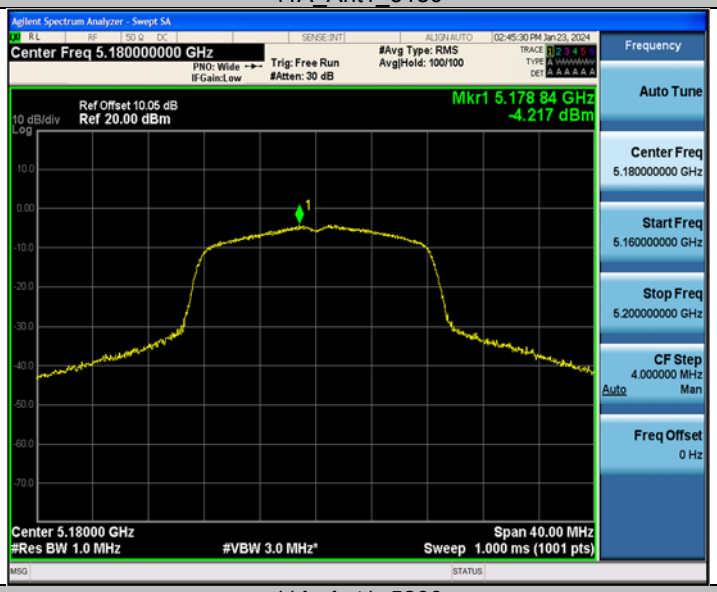
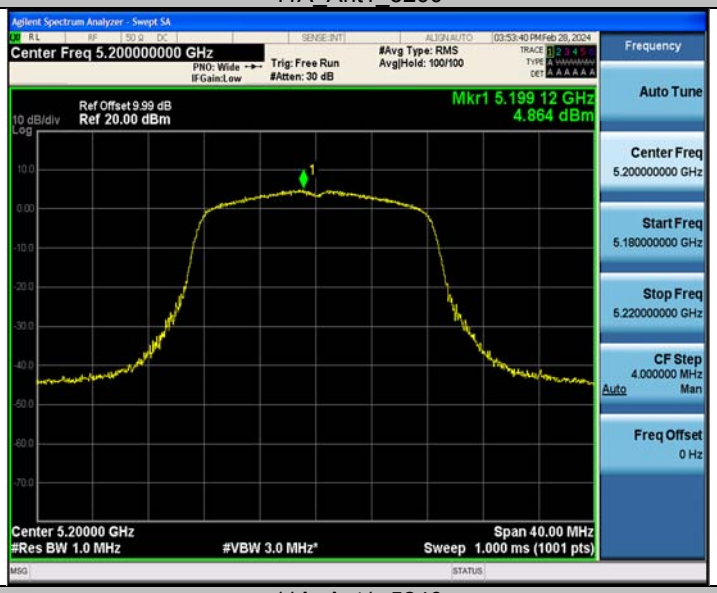
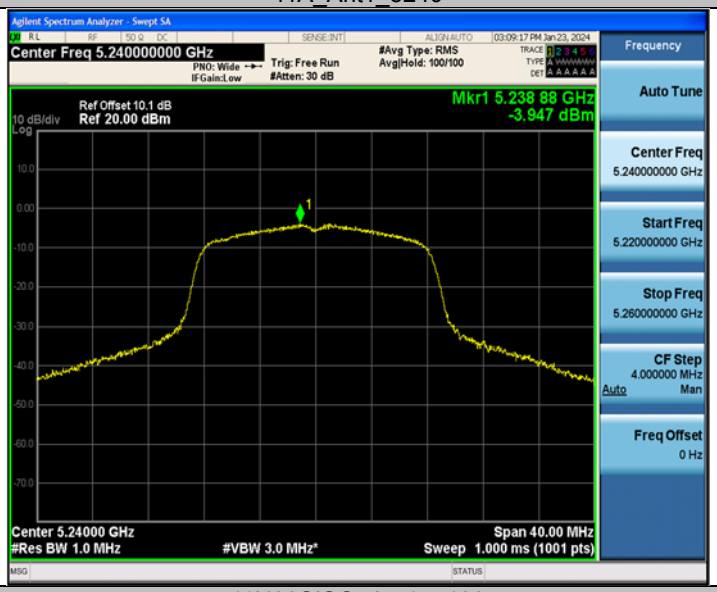
Appendix D: Maximum power spectral density

Test Result

Test Mode	Antenna	Frequency [MHz]	Result [dBm/MHz]	Limit [dBm/MHz]	Verdict
11A	Ant1	5180	-4.22	≤11.00	PASS
		5200	4.86	≤11.00	PASS
		5240	-3.95	≤11.00	PASS
11N20SISO	Ant1	5180	-5.13	≤11.00	PASS
		5200	-3.73	≤11.00	PASS
		5240	-3.70	≤11.00	PASS

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

Test Graphs

11A_Ant1_5180

11A_Ant1_5200

11A_Ant1_5240

11N20SISO_Ant1_5180

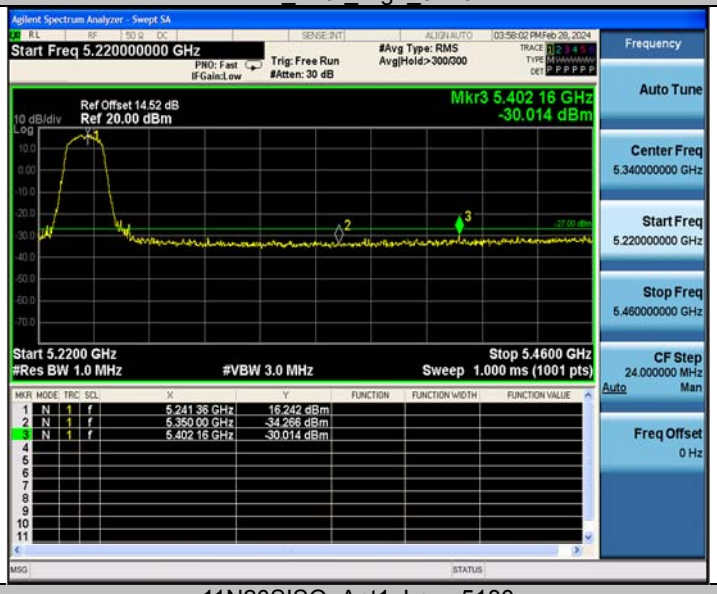
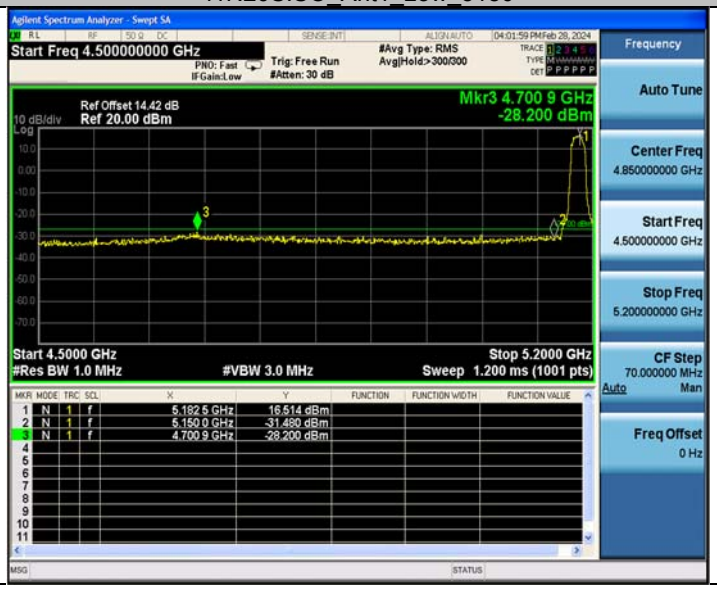
11N20SISO_Ant1_5200

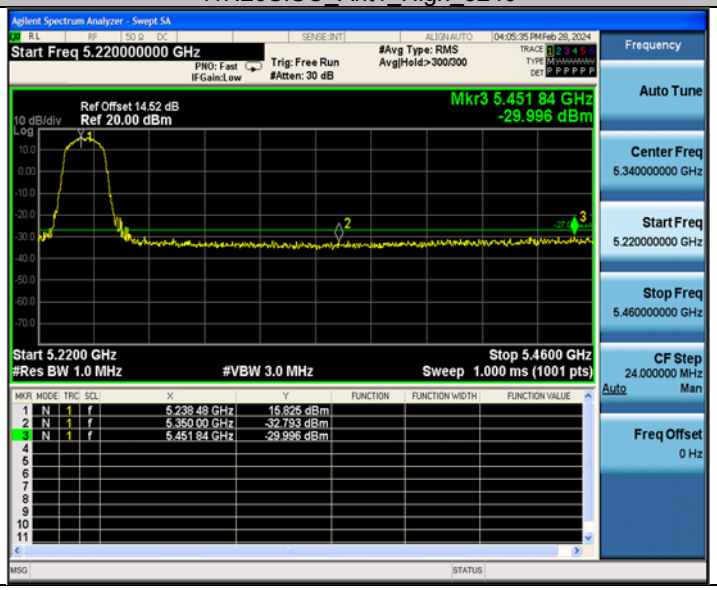
11N20SISO_Ant1_5240

Appendix E: Band edge measurements

Test Graphs B1

11A_Ant1_Low_5180

11A_Ant1_High_5240

11N20SISO_Ant1_Low_5180


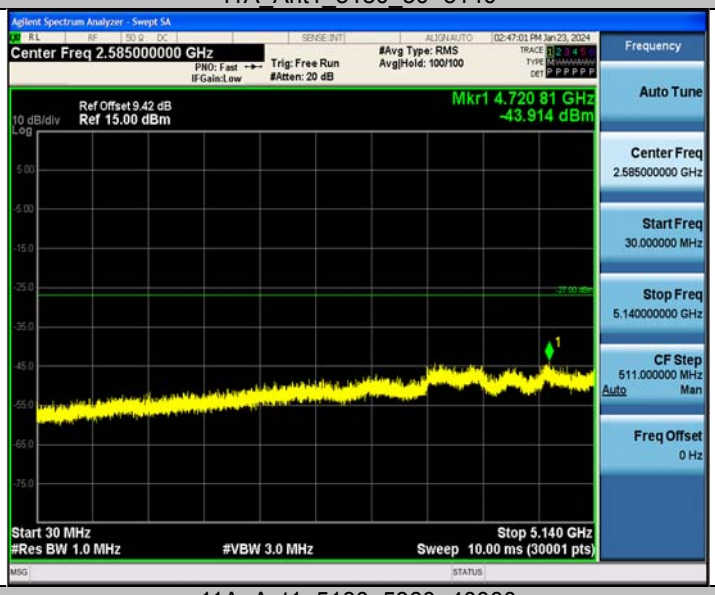
11N20SISO_Ant1_High_5240


Note: The antenna gain and cable loss is compensated in the test plot.

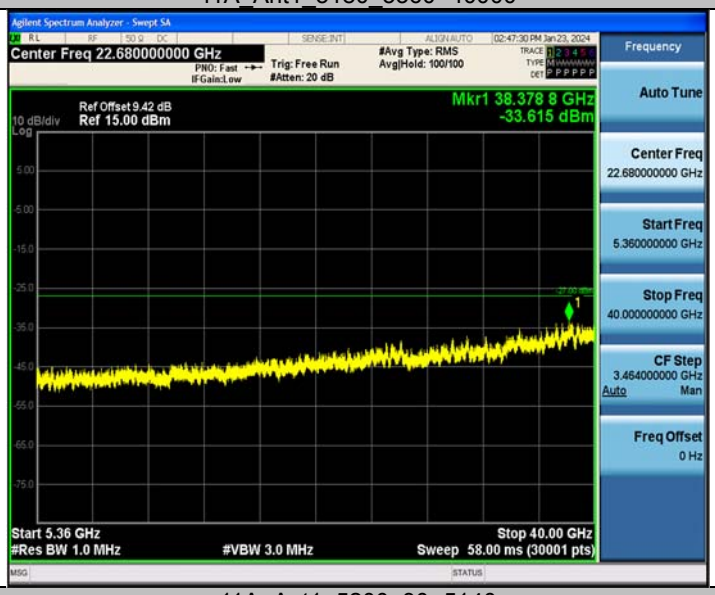
Appendix F: Conducted Spurious Emission

Test Graphs

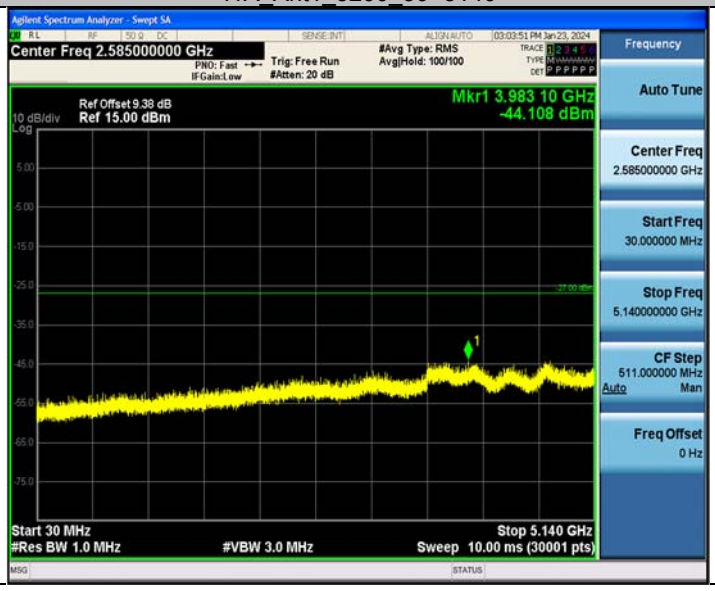
11A_Ant1_5180_30~5140

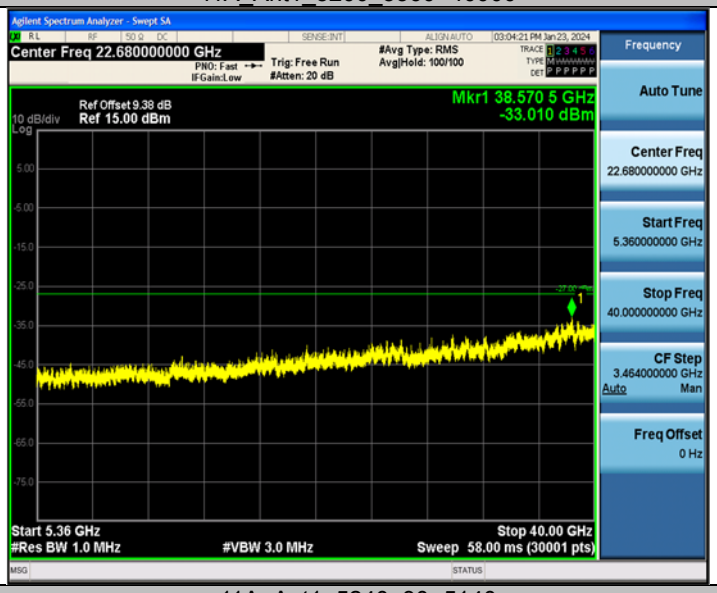
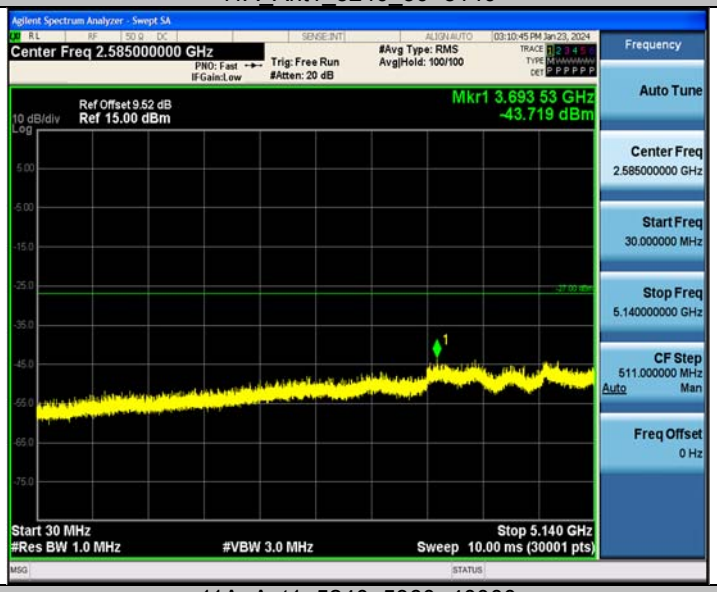
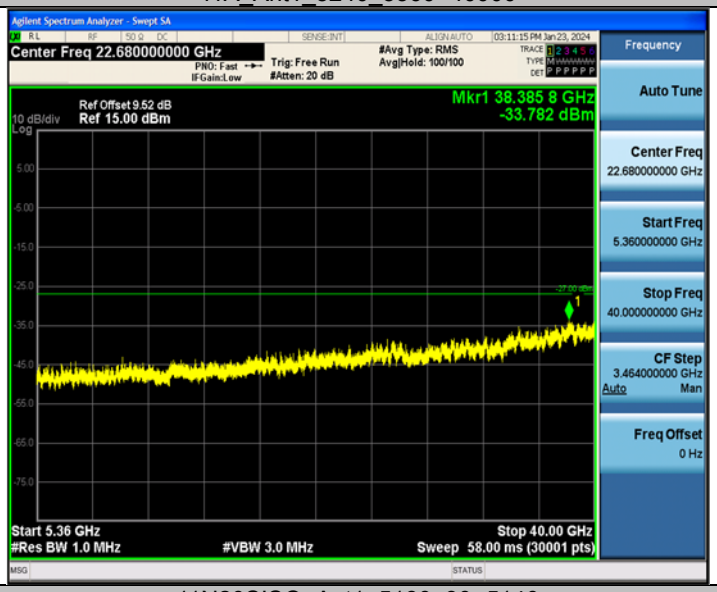


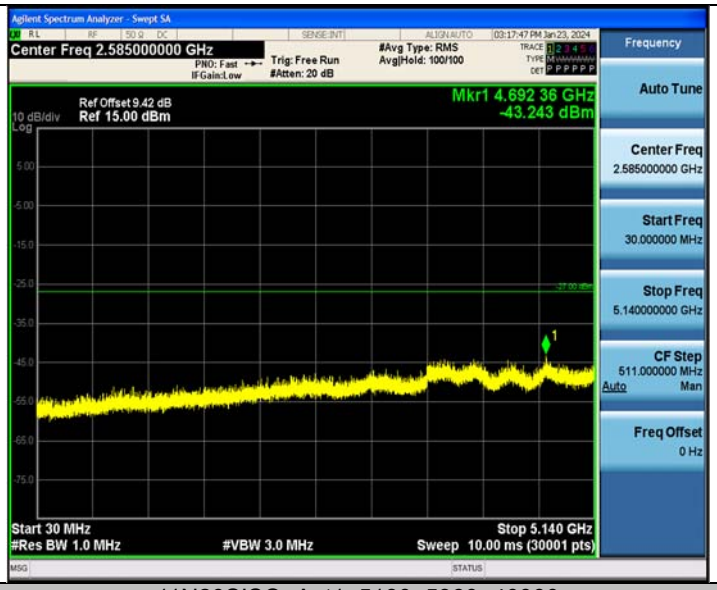
11A_Ant1_5180_5360~40000



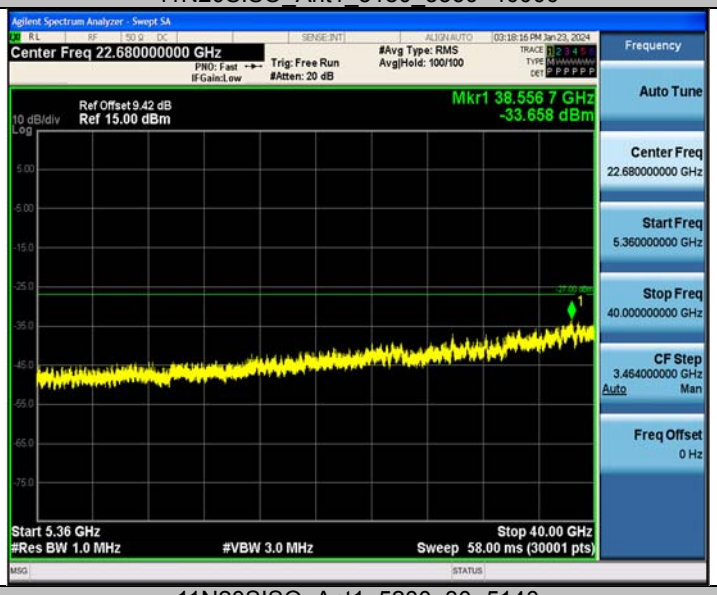
11A_Ant1_5200_30~5140



11A_Ant1_5200_5360~40000

11A_Ant1_5240_30~5140

11A_Ant1_5240_5360~40000

11N20SISO_Ant1_5180_30~5140

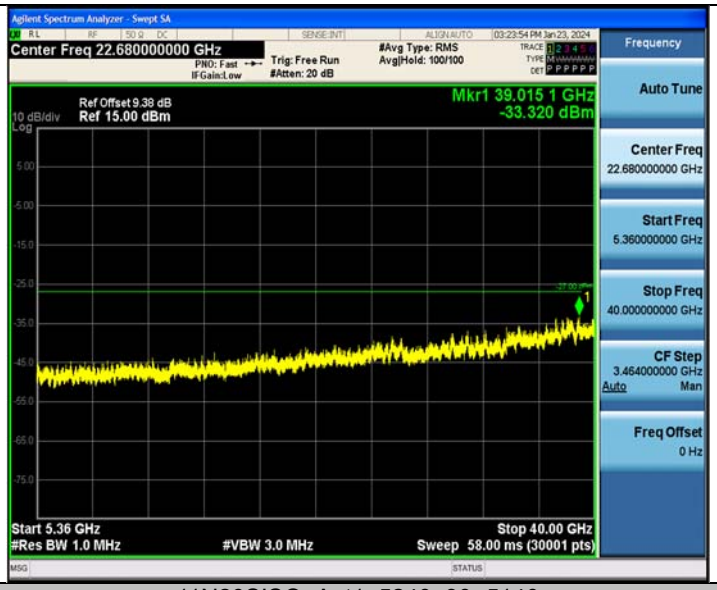


11N20SISO_Ant1_5180_5360~40000

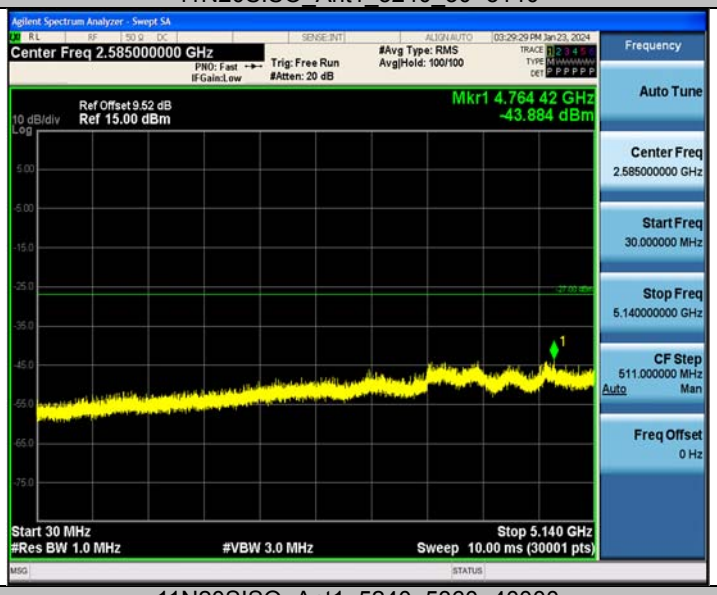


11N20SISO_Ant1_5200_30~5140

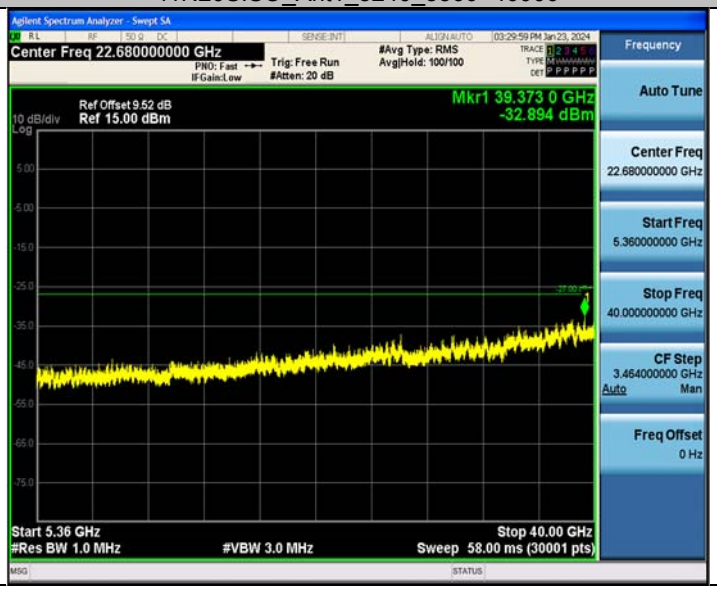
11N20SISO_Ant1_5200_5360~40000



11N20SISO_Ant1_5240_30~5140



11N20SISO_Ant1_5240_5360~40000



Note: The antenna gain and cable loss is compensated in the test plot.

Appendix G: Frequency Stability

Test Result

Voltage								
Test Mode	Antenna	Frequency [MHz]	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
11A	Ant1	5180	NV	NT	-14000	-2.703	20	PASS
			LV	NT	20000.00	3.861004	20	PASS
			HV	NT	20000.00	3.861004	20	PASS
		5200	NV	NT	-19000	-3.654	20	PASS
			LV	NT	20000.00	3.846154	20	PASS
			HV	NT	40000.00	7.692308	20	PASS
		5240	NV	NT	20000.00	3.816794	20	PASS
			LV	NT	20000.00	3.816794	20	PASS
			HV	NT	-17500	-3.340	20	PASS

Temperature								
Test Mode	Antenna	Frequency [MHz]	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
11A	Ant1	5180	NV	-30	20000.00	3.861004	20	PASS
			NV	-20	-18000	-3.462	20	PASS
			NV	-10	20000.00	3.861004	20	PASS
			NV	0	0.00	0.000000	20	PASS
			NV	10	40000.00	7.722008	20	PASS
			NV	20	40000.00	7.722008	20	PASS
			NV	30	20000.00	3.861004	20	PASS
			NV	40	-17000	-3.282	20	PASS
			NV	50	20000.00	3.861004	20	PASS
		5200	NV	-30	-18000	-3.462	20	PASS
			NV	-20	20000.00	3.846154	20	PASS
			NV	-10	20000.00	3.846154	20	PASS
			NV	0	40000.00	7.692308	20	PASS
			NV	10	20000.00	3.846154	20	PASS
			NV	20	20000.00	3.846154	20	PASS
			NV	30	20000.00	3.846154	20	PASS
			NV	40	20000.00	3.846154	20	PASS
			NV	50	0.00	0.000000	20	PASS
		5240	NV	-30	20000.00	3.816794	20	PASS
			NV	-20	20000.00	3.816794	20	PASS
			NV	-10	-17500	-3.340	20	PASS
			NV	0	40000.00	7.633588	20	PASS
			NV	10	40000.00	7.633588	20	PASS
			NV	20	20000.00	3.816794	20	PASS
			NV	30	20000.00	3.816794	20	PASS
			NV	40	20000.00	3.816794	20	PASS
			NV	50	20000.00	3.816794	20	PASS

----End of Report----