

RF Test Report

For

Applicant name: GEOMATE POSITIONING PTE. LTD.
Address: 5 SHENTON WAY, #12-01, UIC BUILDING, SINGAPORE 068808
EUT name: Surveying System
Brand name: 
Model number: GS60
Series model number: N/A
FCC ID: 2A7ZC-GS60

Issued By

Company name: BTF Testing Lab (Shenzhen) Co., Ltd.
Address: Plant 101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, Guangdong, China

Report number: BTF260616R00704
Test standards: 47 CFR Part 15E
Test conclusion: Pass

Date of sample receipt: 2026-06-16
Test date: 2026-06-17 to 2026-08-03
Date of issue: 2026-08-18
Prepared by: Sean.He

Sean.He / Project engineer

Approved by



Ryan.CJ / EMC Manager

Note: All the test results in this report only related to the testing samples. Which can be duplicated completely for the legal use with approval of applicant; it shall not be reproduced except in full without the written approval of BTF Testing Lab (Shenzhen) Co., Ltd., All the objections should be raised within thirty days from the date of issue. To validate the report, you can contact us.

Revision History		
Version	Issue Date	Revisions Content
R_V0	2026-08-18	Original
<i>Note:</i> <i>Once the revision has been made, then previous versions reports are invalid.</i>		

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1 Introduction

1.1 Laboratory Location

Test location:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	Plant 101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, Guangdong, China
Phone number:	+86-0755-23146130
Fax number:	+86-0755-23146130

1.2 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Designation No.: CN1409**
BTF Testing Lab (Shenzhen) Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The test firm Registration No. is 695374.
- **CNAS - Registration No.: CNAS L17568**
BTF Testing Lab (Shenzhen) Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L17568.
- **A2LA - Registration No.: 6660.01**
BTF Testing Lab (Shenzhen) Co., Ltd. is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories.
- **ISED – CAB identifier.: CN0135**
The 3m Semi-anechoic chamber of BTF Testing Lab (Shenzhen) Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 27844.

1.3 Announcement

- (1) The test report reference to the report template version v0.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) This document may not be altered or revised in any way unless done so by BTF and all revisions are duly noted in the revisions section.
- (5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- (6) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.
- (7) All entrusted information in this report is provided by the client and has been confirmed through consultation with the client; The testing items for this report have been discussed and confirmed with the client, and our company is only responsible for the content reflected in the report.

2 Product Information

2.1 Application Information

Company name:	GEOMATE POSITIONING PTE. LTD.
Address:	5 SHENTON WAY, #12-01, UIC BUILDING, SINGAPORE 068808

2.2 Manufacturer Information

Company name:	GEOMATE POSITIONING PTE. LTD.
Address:	5 SHENTON WAY, #12-01, UIC BUILDING, SINGAPORE 068808

2.3 Factory Information

Company name:	GEOMATE POSITIONING PTE. LTD.
Address:	5 SHENTON WAY, #12-01, UIC BUILDING, SINGAPORE 068808

2.4 General Description of Equipment under Test (EUT)

EUT name:	Surveying System
Under test model name:	GS60
Series model name:	N/A
Description of model name differentiation:	N/A
AC adapter:	MODEL: EU204ASAR AC INPUT: 100-240Vac, 1.5A, 50-60Hz DC OUTPUT: C:5.0V $\Rightarrow$ 3.0A 15.0W or 9.0V $\Rightarrow$ 3.0A 27.0W or 12.0V $\Rightarrow$ 3.0A 36.0W or 15.0V $\Rightarrow$ 3.0A 45.0W or 20.0V $\Rightarrow$ 2.25A 45.0W A:5.0V $\Rightarrow$ 3.0A 15.0W or 9.0V $\Rightarrow$ 2.0A 18.0W or 12.0V $\Rightarrow$ 1.5A 18.0W C+A: (C: 5.0V $\Rightarrow$ 3.0A 15.0W or 9.0V $\Rightarrow$ 2.22A 19.98W or 12.0V $\Rightarrow$ 1.66A 19.92W or 15.0V $\Rightarrow$ 1.33A 19.95W or 20.0V $\Rightarrow$ 1.0A 20.0W) (A: 5.0V $\Rightarrow$ 2.0A 10.0W)
Ratings:	Input: 12-28.8V $\Rightarrow$ 2A Smart handle: Input: 5V $\Rightarrow$ 3A / 9V $\Rightarrow$ 3A / 15V $\Rightarrow$ 3A 3200mA / 46.08Wh

2.5 Technical Information

Operation Frequency:	802.11ac(HT20): U-NII Band 1: 5180MHz to 5240MHz; U-NII Band 3: 5745MHz to 5825MHz; 802.11ac(HT80): U-NII Band 1: 5210MHz; U-NII Band 3: 5775MHz
Channel numbers:	802.11ac(HT20): U-NII Band 1: 4; U-NII Band 3: 5; 802.11ac(HT80): U-NII Band 1: 1; U-NII Band 3: 1
Channel separation:	802.11ac(HT20): 20MHz 802.11ac(HT80): 80MHz
Modulation technology:	802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Maximum Conducted Power:	10.79dBm
Antenna type:	Internal Antenna
Antenna gain:	- Band: 1 Ant1: 3.47dBi; - Band: 3 Ant1: 3.70dBi;

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	/	/	/	/

U-NII Band 3

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

3 Summary of Test Results

3.1 Test Standards

The tests were performed according to following standards:

47 CFR Part 15E: Unlicensed National Information Infrastructure Devices

KDB 789033 D02 General U-NII Test Procedures New Rules v02r01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E.

3.2 Uncertainty of Test

Measurement	Value
Conducted Emission for LISN (150kHz ~ 30MHz)	±2.45 dB
Time	±5 %
Occupied Channel Bandwidth	±173.1Hz
RF output power, conducted	±0.66 dB
Power Spectral Density, conducted	±3.0 dB
Unwanted Emissions, conducted	±2.32 dB
Radiated Emission(1GHz~18GHz)	±4.80 dB
Radiated Emission(9kHz~30MHz)	±2.20 dB
Radiated Emission(30MHz~1GHz)	±4.94 dB
Radiated Emission (18GHz ~ 40GHz)	±5.08dB
The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

3.3 Summary of Test Result

Item	Standard	Requirement	Result
Antenna requirement	47 CFR Part 15E	Part 15.203	Pass
Conducted Emission at AC power line	47 CFR Part 15E	47 CFR Part 15.207(a)	Pass
Duty Cycle	47 CFR Part 15E		Pass
Emission bandwidth and occupied bandwidth	47 CFR Part 15E	U-NII 1, U-NII 2A, U-NII 2C: No limits, only for report use. 47 CFR Part 15.407(e)	Pass
Maximum conducted output power	47 CFR Part 15E	47 CFR Part 15.407(a)(1)(i) 47 CFR Part 15.407(a)(1)(ii) 47 CFR Part 15.407(a)(1)(iii) 47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(3)(i)	Pass
Power spectral density	47 CFR Part 15E	47 CFR Part 15.407(a)(1)(i) 47 CFR Part 15.407(a)(1)(ii) 47 CFR Part 15.407(a)(1)(iii)	Pass

		47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(3)(i)	
Frequency stability	47 CFR Part 15E	47 CFR Part 15.407(g)	Pass
Band edge emissions (Conducted)	47 CFR Part 15E	47 CFR Part 15.407(b)(1) 47 CFR Part 15.407(b)(4) 47 CFR Part 15.407(b)(10)	Pass
Band edge emissions (Radiated)	47 CFR Part 15E	47 CFR Part 15.407(b)(1) 47 CFR Part 15.407(b)(4) 47 CFR Part 15.407(b)(10)	Pass
Undesirable emission limits (below 1GHz)	47 CFR Part 15E	47 CFR Part 15.407(b)(9)	Pass
Undesirable emission limits (above 1GHz)	47 CFR Part 15E	47 CFR Part 15.407(b)(1) 47 CFR Part 15.407(b)(4) 47 CFR Part 15.407(b)(10)	Pass
Remark: 1. <i>Pass: Meet the requirements.</i> 2. <i>N/A: not applicable.</i>			

3.4 Additions to, deviations, or exclusions from the method

None

4 Test Configuration

4.1 Test Equipment List

Conducted Emission at AC power line					
Test Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Test Software	Frad	EZ_EMC	Version: EMC-CON 3A1.1+	/	/
EMI Receiver	Rohde & Schwarz	ESCI3	101422	2025-10-17	2026-10-16
V-LISN	Schwarzbeck	NSLK 8127	01073	2025-08-23	2026-08-22
Coaxial Switcher	Schwarzbeck	CX210	CX210	/	/
Pulse Limiter	Schwarzbeck	VTSD 9561-F	00953	/	/
LISN-Cable	REBES Talent	LISN9K30M	21101580	2025-08-23	2026-08-22

Emission bandwidth and occupied bandwidth Maximum conducted output power Power spectral density Frequency stability Band edge emissions (Conducted) Duty Cycle					
Test Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Test Software	TST Pass	/	Version: 2.0	/	/
Cell Site Test Set	HP	8921A	US35010158	2025-10-17	2026-10-16
Spectrum Analyzer	Keysight	N9020A	MY50410020	2025-10-17	2026-10-16
ESG Vector Signal Generator	Agilent	E4438C	MY45094854	2025-10-17	2026-10-16
MXG Vector Signal Generator	Agilent	N5182A	MY46240163	2025-10-17	2026-10-16
Wideband Radio Communication Tester	Rohde&Schwarz	CMW500	161997	2025-10-17	2026-10-16
Programmable Constant Temperature And Humidity Test Chamber	ZZCKONG	ZZ-K02A	20210928007	2025-10-17	2026-10-16
DC Power Supply	Tongmen	etm-6050c	20211026123	2025-10-17	2026-10-16
RF Control Unit	Techy	TR1029-1	10291	2025-10-17	2026-10-16
RF Sensor Unit	Techy	TR1029-2	10292	2025-10-17	2026-10-16
RF shielding box	Yinuoxin Electronics	50*50*50 cm	050505M	2025-10-21	2026-10-20

Band edge emissions (Radiated) Undesirable emission limits (below 1GHz) Undesirable emission limits (above 1GHz)					
Test Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Test Software	Frad	EZ EMC	Version: FA-03A2 RE+	/	/
EMI Receiver	Rohde & Schwarz	ESCI7	101032	2025-10-17	2026-10-16
Signal Analyzer	Rohde & Schwarz	FSQ40	100010	2025-10-17	2026-10-16
Log periodic antenna	Schwarzbeck	VULB 9168	01328	2025-10-18	2026-10-17
Preamplifier (9kHz ~ 6GHz)	Schwarzbeck	BBV9744	00246	2026-05-10	2027-05-09
BELOW-Cable	REBES Talent	9K1G	21101576	2025-08-23	2026-08-22
Horn Antenna	Schwarzbeck	BBHA9120D	2597	2025-10-18	2026-10-17
Preamplifier (1GHz ~ 18GHz)	Schwarzbeck	BBV9718D	00008	2025-10-18	2026-10-17
Preamplifier	TSTPASS	LNA10180G45	TS2215007	2026-05-10	2027-05-09
ABOVE-Cable	REBES Talent	1~18G	21101558	2025-08-23	2026-08-22
Horn Antenna	SCHWARZBECK	BBHA9170	1157	2025-10-18	2026-10-17
Low Noise Pre-amplifier	Sket	LNPA_1840G-50	SK2022032902	2025-10-17	2026-10-16
ABOVE-Cable2	REBES Talent	18~40G	21101686	2025-08-23	2026-08-22
ABOVE-Cable1	REBES Talent	18~40G	21101687	2025-08-23	2026-08-22
Loop Antenna	SCHWARZBECK	FMZB 1519 B	00059	2025-06-25	2027-06-24
Filter	COM-MW	ZBSF6-M2400-2483.5-2990	08226825	2025-10-18	2026-10-17

4.2 Test Auxiliary Equipment

The EUT has been tested as an independent unit.

4.3 Test Modes

No.	Test Modes
TM1	802.11ac mode

4.4 Test Channel of EUT

Operation Band: 5150-5250 MHz

Bandwidth (MHz)	Lowest Channel (LCH) (MHz)	Middle Channel (MCH) (MHz)	Highest Channel (HCH) (MHz)
20	5180	5200	5240
80	/	5210	/

Operation Band: 5725-5850 MHz

Bandwidth (MHz)	Lowest Channel (LCH) (MHz)	Middle Channel (MCH) (MHz)	Highest Channel (HCH) (MHz)
20	5745	5785	5825
80	/	5775	/

4.5 Test software

Test software:	Version:	Power Class:
MobaXterm_Personal_25.2	V25.2	802.11ac: 64

5 Evaluation Results (Evaluation)

5.1 Antenna requirement

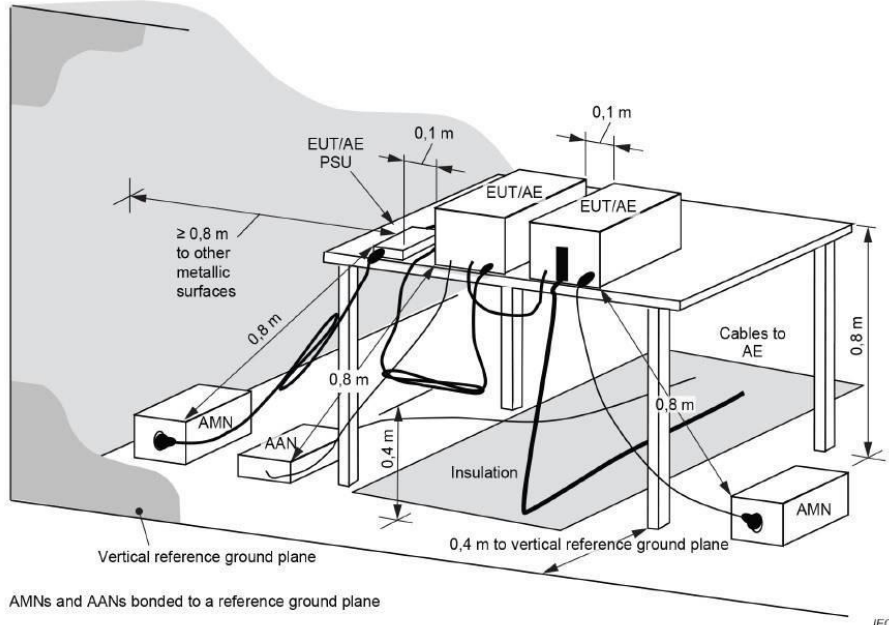
Test Requirement:	Refer to 47 CFR Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.
Operating Environment:	
Temperature:	22.5 °C
Humidity:	45.2 %
Atmospheric Pressure:	1010 mbar
Test voltage:	DC 12V

5.1.1 Conclusion

The antenna is an Internal antenna which permanently attached, and the best case gain of the antenna is (- Band: 1 Ant1: 3.47dBi; - Band: 3 Ant1: 3.70dBi;). See product internal photos for details.

6 Radio Spectrum Matter Test Results (RF)

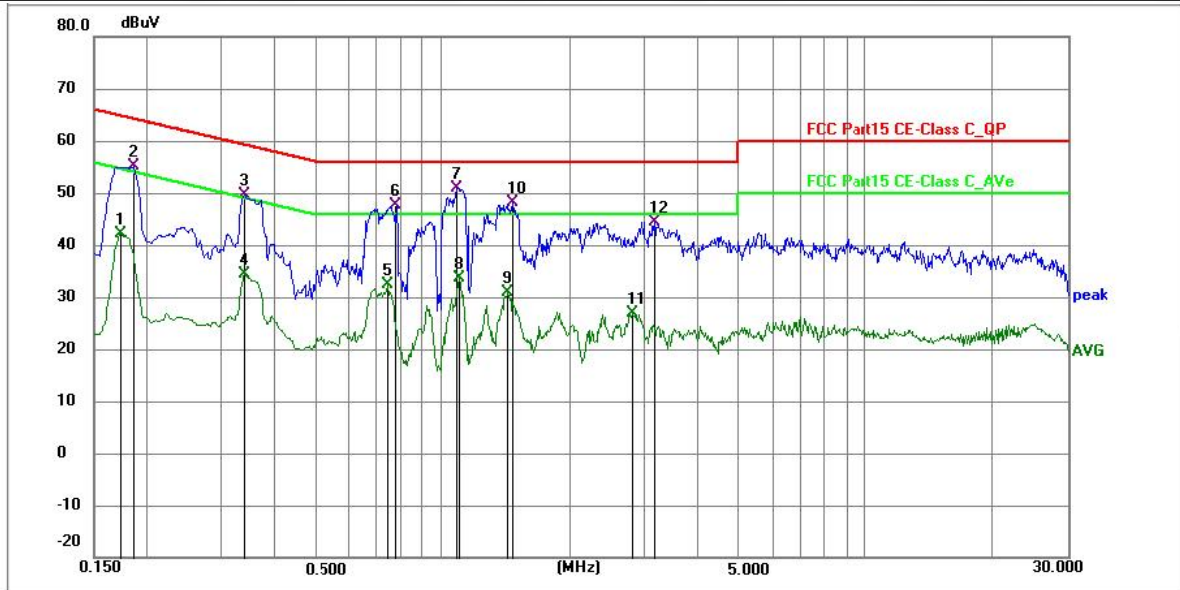
6.1 Conducted Emission at AC power line

Test Requirement:	47 CFR Part 15.207(a)		
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 section 6.2		
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 Setup:	 The diagram illustrates the test setup for conducted emission testing. It shows a table with two EUT/AE units and a PSU. Dimensions include 0.1 m for the units, 0.8 m for the table height, and 0.4 m for the distance to the ground plane. Labels include AMN, AAN, and IEC.		
Operating Environment:			
Temperature:	23.7 °C		
Humidity:	46.4 %		
Atmospheric Pressure:	1010 mbar		
Test voltage:	DC 12V		

6.1.1 Test Data

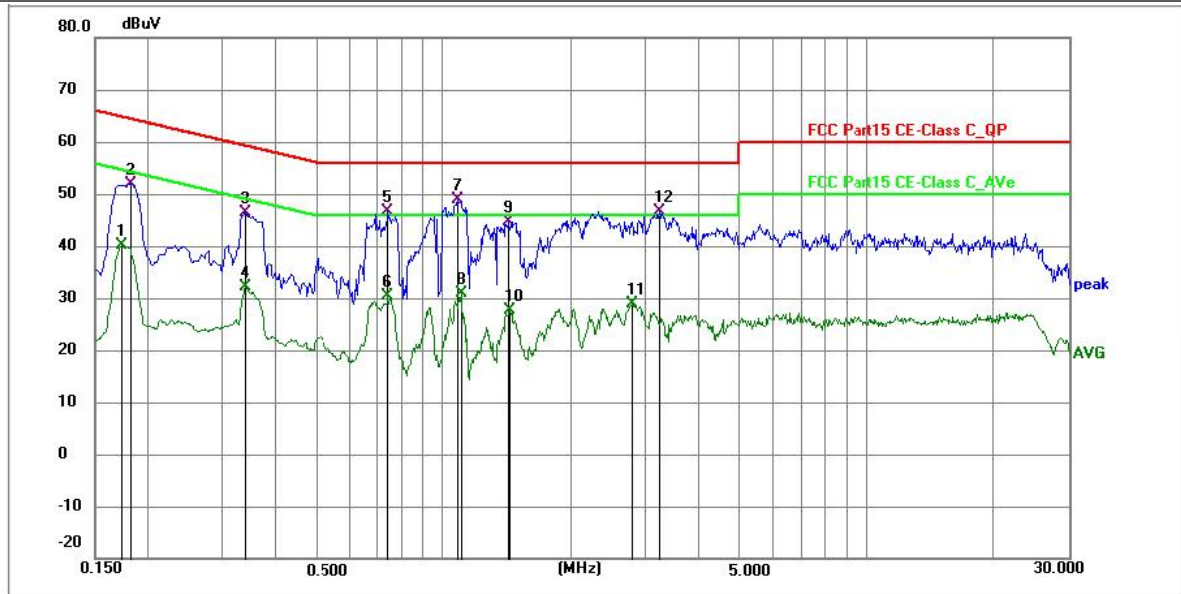
Remark: The report only reflects the test data of worst mode.

TM1 / Line: Line / Band: 5150-5250 MHz / BW: 20 / CH: L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1724	32.01	10.21	42.22	54.84	-12.62	AVG	P	
2	0.1860	44.85	10.18	55.03	64.21	-9.18	QP	P	
3	0.3390	39.51	10.13	49.64	59.23	-9.59	QP	P	
4	0.3390	24.16	10.13	34.29	49.23	-14.94	AVG	P	
5	0.7440	22.29	10.16	32.45	46.00	-13.55	AVG	P	
6	0.7799	37.62	10.11	47.73	56.00	-8.27	QP	P	
7 *	1.0859	40.61	10.18	50.79	56.00	-5.21	QP	P	
8	1.0950	23.37	10.18	33.55	46.00	-12.45	AVG	P	
9	1.4325	20.56	10.22	30.78	46.00	-15.22	AVG	P	
10	1.4640	37.82	10.23	48.05	56.00	-7.95	QP	P	
11	2.8230	16.71	10.22	26.93	46.00	-19.07	AVG	P	
12	3.1650	34.13	10.23	44.36	56.00	-11.64	QP	P	

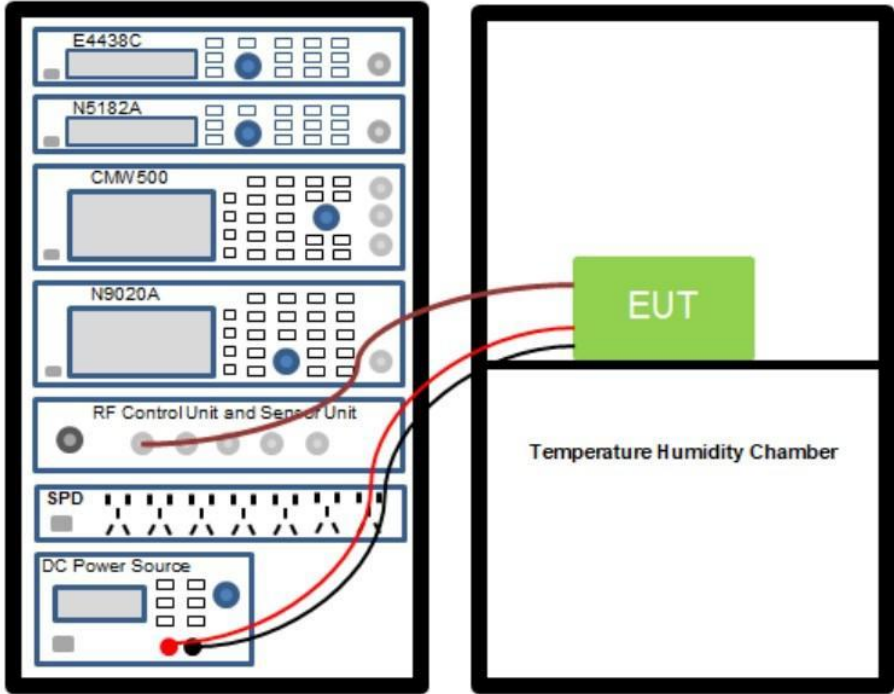
TM1 / Line: Neutral / Band: 5150-5250 MHz / BW: 20 / CH: L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1725	30.05	10.11	40.16	54.84	-14.68	AVG	P	
2	0.1815	41.86	10.11	51.97	64.42	-12.45	QP	P	
3	0.3390	36.32	10.12	46.44	59.23	-12.79	QP	P	
4	0.3390	21.98	10.12	32.10	49.23	-17.13	AVG	P	
5	0.7395	36.59	10.15	46.74	56.00	-9.26	QP	P	
6	0.7395	20.19	10.15	30.34	46.00	-15.66	AVG	P	
7 *	1.0815	38.67	10.17	48.84	56.00	-7.16	QP	P	
8	1.1040	20.74	10.17	30.91	46.00	-15.09	AVG	P	
9	1.4280	34.41	10.19	44.60	56.00	-11.40	QP	P	
10	1.4370	17.44	10.19	27.63	46.00	-18.37	AVG	P	
11	2.7915	18.64	10.24	28.88	46.00	-17.12	AVG	P	
12	3.2370	36.46	10.26	46.72	56.00	-9.28	QP	P	

Note:Margin=Level-Limit=Reading+factor-Limit=Reading+LISN+Cable loss-Limit

6.2 Duty Cycle

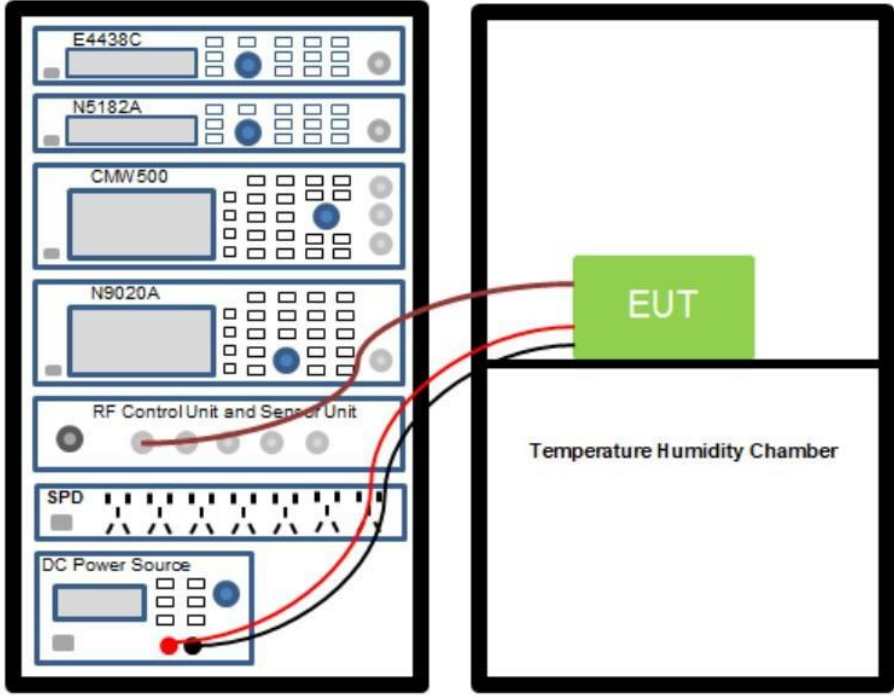
Test Requirement:	All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x, and maximum-power transmission duration, T, are required for each tested mode of operation.
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 section 12.2 (b)
Test Limit:	No limits, only for report use.
Procedure:	i) Set the center frequency of the instrument to the center frequency of the transmission. ii) Set RBW $\geq$ EBW if possible; otherwise, set RBW to the largest available value. iii) Set VBW $\geq$ RBW. iv) Set detector = peak. v) The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$, where T is defined in item a1) of 12.2, and the number of sweep points across duration T exceeds 100.
Test Setup:	
Operating Environment:	
Temperature:	24.2 °C
Humidity:	51 %
Atmospheric Pressure:	1010 mbar
Test voltage:	DC 12V

6.2.1 Test Data

Please Refer to Appendix for Details.

6.3 Emission bandwidth and occupied bandwidth

Test Requirement:	U-NII 1, U-NII 2A, U-NII 2C: No limits, only for report use. U-NII 3, U-NII 4: 47 CFR Part 15.407(e)
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, section 6.9 & 12.5 KDB 789033 D02, Clause C.2
Test Limit:	U-NII 1, U-NII 2A, U-NII 2C: No limits, only for report use. U-NII 3, U-NII 4: Within the 5.725-5.850 GHz and 5.850-5.895 GHz bands, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.
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

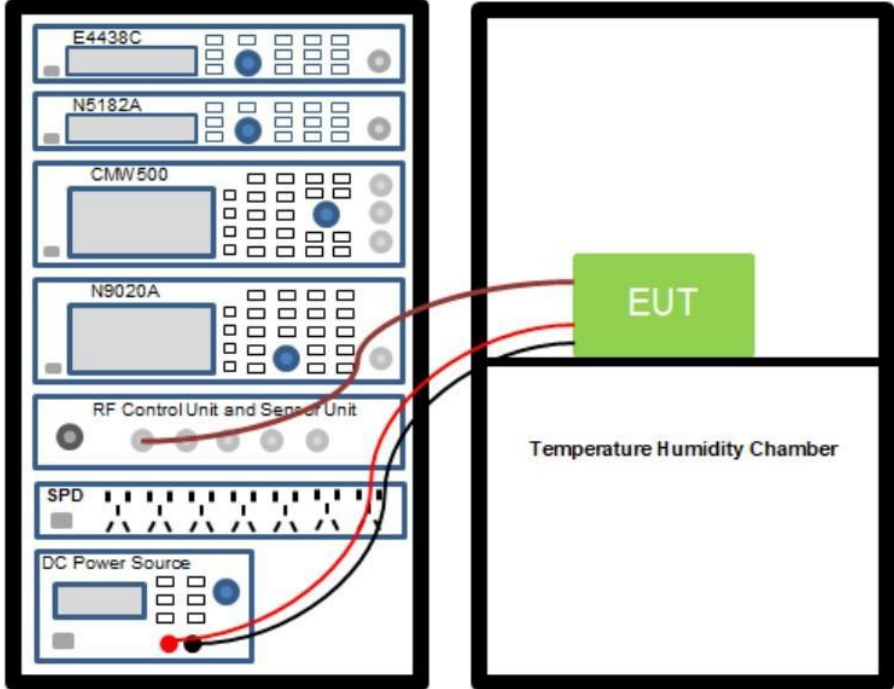
	the difference between these two frequencies. h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s). 6 dB emission bandwidth: a) Set RBW = 100 kHz. b) Set the video bandwidth (VBW) $\geq 3 \times$ 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.
Test Setup:	
Operating Environment:	
Temperature:	22.8 °C
Humidity:	46.3 %
Atmospheric Pressure:	1010 mbar
Test voltage:	DC 12V

6.3.1 Test Data

Please Refer to Appendix for Details.

6.4 Maximum conducted output power

Test Requirement:	47 CFR Part 15.407(a)(1)(i) 47 CFR Part 15.407(a)(1)(ii) 47 CFR Part 15.407(a)(1)(iii) 47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(3)(i)
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, section 12.4
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. 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

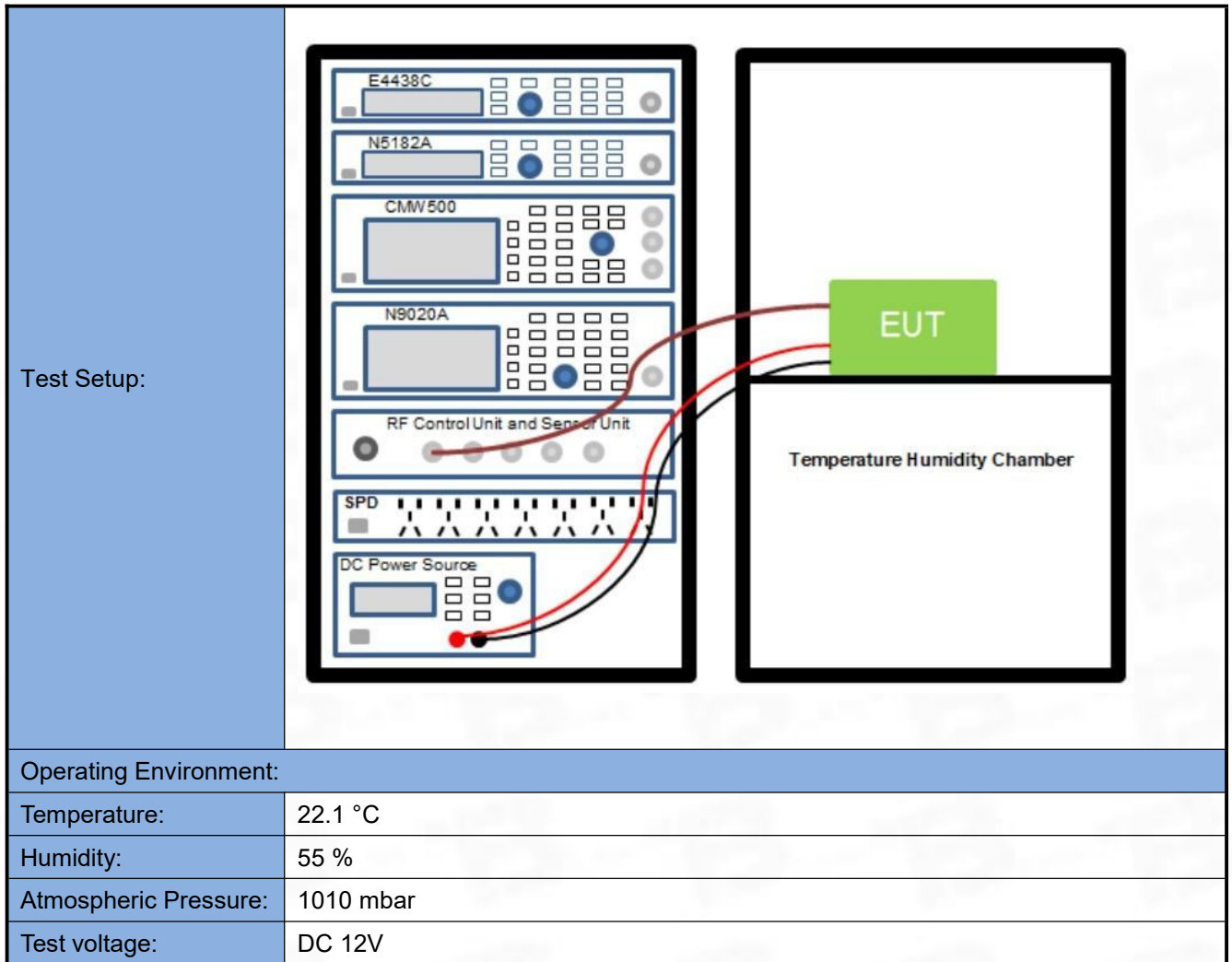
	installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
Procedure:	Refer to ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 section 12.4
Test Setup:	
Operating Environment:	
Temperature:	23.1 °C
Humidity:	50.3 %
Atmospheric Pressure:	1010 mbar
Test voltage:	DC 12V

6.4.1 Test Data

Please Refer to Appendix for Details.

6.5 Power spectral density

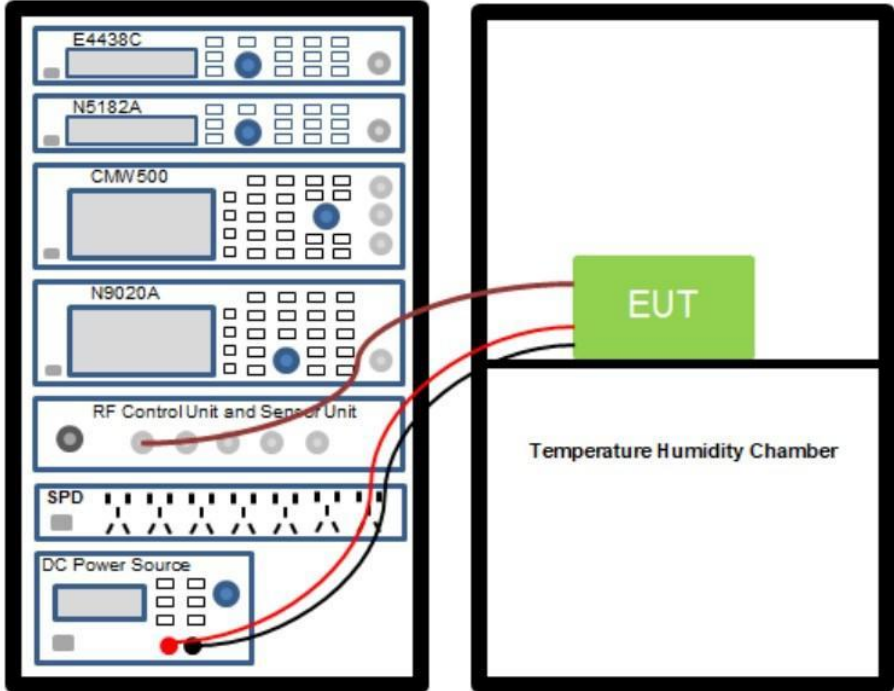
Test Requirement:	47 CFR Part 15.407(a)(1)(i) 47 CFR Part 15.407(a)(1)(ii) 47 CFR Part 15.407(a)(1)(iii) 47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(3)(i)
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, section 12.6
Test Limit:	For an outdoor access point operating 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. 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.
Procedure:	Refer to ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, section 12.6



6.5.1 Test Data

Please Refer to Appendix for Details.

6.6 Frequency stability

Test Requirement:	47 CFR Part 15.407(g)
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, section 6.8
Test Limit:	Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.
Procedure:	Refer to ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 section 6.8
Test Setup:	
Operating Environment:	
Temperature:	22.3 °C
Humidity:	47.6 %
Atmospheric Pressure:	1010 mbar
Test voltage:	DC 12V

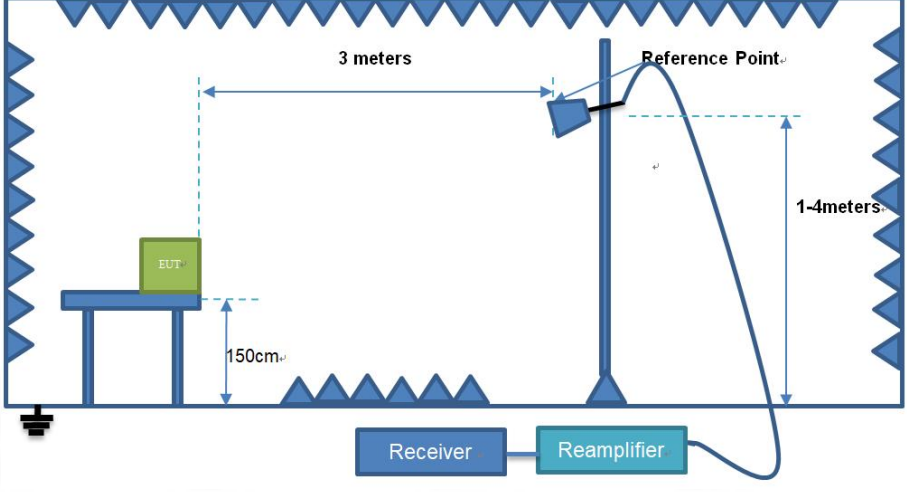
6.6.1 Test Data

Please Refer to Appendix for Details.

6.7 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 Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, section 12.7.4, 12.7.6, 12.7.7		
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
	0.090-0.110	16.42-16.423	399.9-410
	¹ 0.495-0.505	16.69475-16.69525	608-614
	2.1735-2.1905	16.80425-16.80475	960-1240
	4.125-4.128	25.5-25.67	1300-1427
	4.17725-4.17775	37.5-38.25	1435-1626.5
	4.20725-4.20775	73-74.6	1645.5-1646.5
	6.215-6.218	74.8-75.2	1660-1710
	6.26775-6.26825	108-121.94	1718.8-1722.2
	6.31175-6.31225	123-138	2200-2300
	8.291-8.294	149.9-150.05	2310-2390
	8.362-8.366	156.52475-156.52525	2483.5-2500
	8.37625-8.38675	156.7-156.9	2690-2900
	8.41425-8.41475	162.0125-167.17	3260-3267
	12.29-12.293	167.72-173.2	3332-3339
	12.51975-12.52025	240-285	3345.8-3358
	12.57675-12.57725	322-335.4	3600-4400
	13.36-13.41		(²)
	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 § 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in § 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in § 15.35 apply to these measurements.		
	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.		
Procedure:	Above 1GHz: - 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. - The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. - 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. - 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. - The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. - 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. - Test the EUT in the lowest channel, the middle channel, the Highest channel. - 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. - Repeat above procedures until all frequencies measured was complete. Remark: - Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor - 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. - 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. - 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.		

Test Setup:	 The diagram illustrates the test setup within an anechoic chamber. An Equipment Under Test (EUT) is placed on a table at a height of 150cm. A reference point is marked at a distance of 3 meters from the EUT and a height of 1.4 meters. A receiver and reamplifier are connected to the setup.
Operating Environment:	
Temperature:	23.3 °C
Humidity:	54.2 %
Atmospheric Pressure:	1010 mbar
Test voltage:	DC 12V

6.7.1 Test Data

Remark: The report only reflects the test data of worst mode.

Band 1: 5180 MHz - 5240 MHz							
Test Channel: Lowest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
5097.679	47.30	5.35	52.65	74.00	-21.35	Peak	Pass
5097.679	36.04	5.35	41.39	54.00	-12.61	AV	Pass
5150.000	49.97	5.33	55.30	74.00	-18.70	Peak	Pass
5150.000	39.03	5.33	44.36	54.00	-9.64	AV	Pass
Test Channel: Lowest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
5097.679	46.55	5.28	51.83	74.00	-22.17	Peak	Pass
5097.679	37.48	5.28	42.76	54.00	-11.24	AV	Pass
5150.000	49.49	5.33	54.82	74.00	-19.18	Peak	Pass
5150.000	39.44	5.33	44.77	54.00	-9.23	AV	Pass
Test Channel: Highest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
5350.000	46.72	5.45	52.17	74.00	-21.83	Peak	Pass
5350.000	37.24	5.45	42.69	54.00	-11.31	AV	Pass
5460.000	51.35	5.52	56.87	74.00	-17.13	Peak	Pass
5460.000	40.72	5.52	46.24	54.00	-7.76	AV	Pass
Test Channel: Highest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
5350.000	47.61	5.45	53.06	74.00	-20.94	Peak	Pass
5350.000	38.56	5.45	44.01	54.00	-9.99	AV	Pass
5460.000	50.23	5.52	55.75	74.00	-18.25	Peak	Pass
5460.000	38.20	5.52	43.72	54.00	-10.28	AV	Pass

Band 3: 5745 MHz - 5825 MHz							
Test Channel: Lowest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
5650.000	44.93	5.63	50.56	68.20	-17.64	Peak	Pass
5700.000	47.63	5.70	53.33	105.20	-51.87	Peak	Pass
5720.000	48.23	5.66	53.89	110.80	-56.91	Peak	Pass
5725.000	50.23	5.66	55.89	122.20	-66.31	Peak	Pass
Test Channel: Lowest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
5650.000	44.15	5.63	49.78	68.20	-18.42	Peak	Pass
5700.000	47.18	5.70	52.88	105.20	-52.32	Peak	Pass
5720.000	48.71	5.66	54.37	110.80	-56.43	Peak	Pass
5725.000	50.71	5.66	56.37	122.20	-65.83	Peak	Pass
Test Channel: Highest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
5850.000	52.72	5.73	58.45	122.20	-63.75	Peak	Pass
5855.000	50.72	5.72	56.44	110.80	-54.36	Peak	Pass
5875.000	50.57	5.70	56.27	105.20	-48.93	Peak	Pass
5925.000	46.17	5.66	51.83	68.20	-16.37	Peak	Pass
Test Channel: Highest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
5850.000	52.44	5.73	58.17	122.20	-64.03	Peak	Pass
5855.000	50.44	5.72	56.16	110.80	-54.64	Peak	Pass
5875.000	49.68	5.70	55.38	105.20	-49.82	Peak	Pass
5925.000	46.13	5.66	51.79	68.20	-16.41	Peak	Pass

Note:Margin=Level-Limit=Reading+factor-Limit=Reading+Antenna factor+ cable loss -Limit

6.8 Undesirable emission limits (below 1GHz)

Test Requirement:	47 CFR Part 15.407(b)(9)																									
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, section 12.7.4, 12.7.5																									
Test Limit:	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 border="1"> <thead> <tr> <th>Frequency (MHz)</th><th>Field strength (microvolts/meter)</th><th>Measurement distance (meters)</th></tr> </thead> <tbody> <tr> <td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr> <tr> <td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr> <tr> <td>1.705-30.0</td><td>30</td><td>30</td></tr> <tr> <td>30-88</td><td>100 **</td><td>3</td></tr> <tr> <td>88-216</td><td>150 **</td><td>3</td></tr> <tr> <td>216-960</td><td>200 **</td><td>3</td></tr> <tr> <td>Above 960</td><td>500</td><td>3</td></tr> </tbody> </table> ** 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.		Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)	0.009-0.490	2400/F(kHz)	300	0.490-1.705	24000/F(kHz)	30	1.705-30.0	30	30	30-88	100 **	3	88-216	150 **	3	216-960	200 **	3	Above 960	500	3
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)																								
0.009-0.490	2400/F(kHz)	300																								
0.490-1.705	24000/F(kHz)	30																								
1.705-30.0	30	30																								
30-88	100 **	3																								
88-216	150 **	3																								
216-960	200 **	3																								
Above 960	500	3																								
Procedure:	Below 1GHz: - 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. - 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. - 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. - 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. - The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. - 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. - Test the EUT in the lowest channel, the middle channel, the Highest channel. - 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. - Repeat above procedures until all frequencies measured was complete. Remark: - Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor - 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.

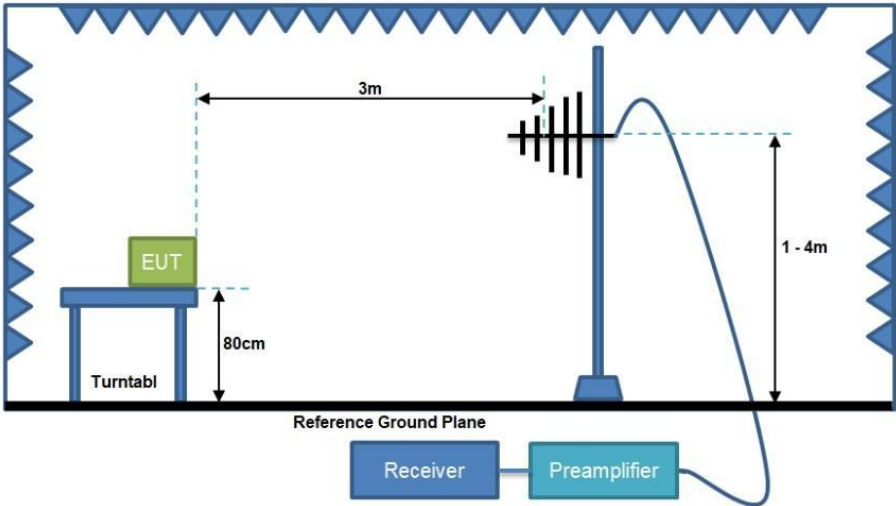
Remark:

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.

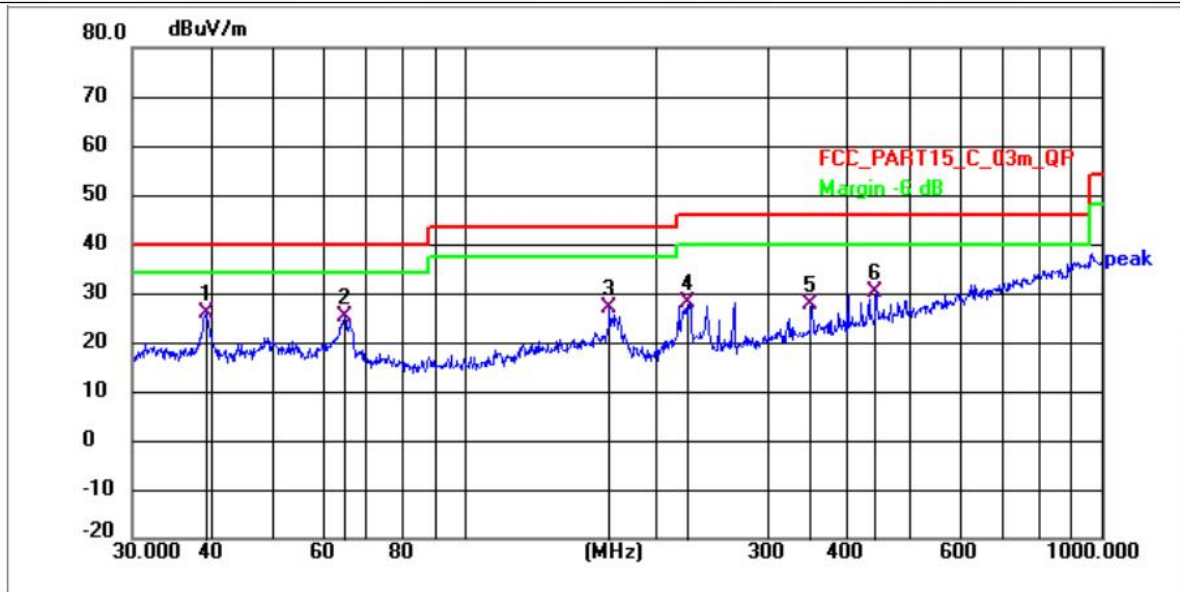
3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions 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.

Test Setup:	
Operating Environment:	
Temperature:	23.7 °C
Humidity:	49.9 %
Atmospheric Pressure:	1010 mbar
Test voltage:	DC 12V

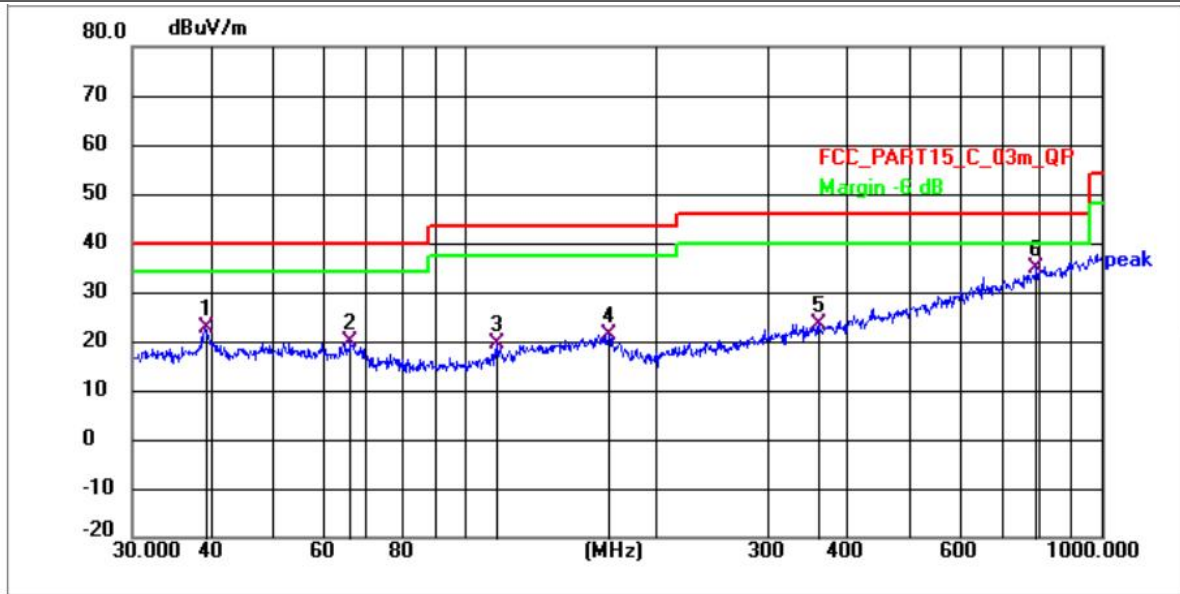
6.8.1 Test Data

TM1 / Polarization: Horizontal / Band: 5150-5250 MHz / BW: 20 / CH: L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	39.0930	35.61	-9.69	25.92	40.00	-14.08	QP	Pass
2	64.7728	36.34	-11.13	25.21	40.00	-14.79	QP	Pass
3	168.1188	35.18	-8.39	26.79	43.50	-16.71	QP	Pass
4	224.9133	38.08	-10.05	28.03	46.00	-17.97	QP	Pass
5	349.8628	32.98	-5.27	27.71	46.00	-18.29	QP	Pass
6	442.5177	32.21	-2.10	30.11	46.00	-15.89	QP	Pass

TM1 / Polarization: Vertical / Band: 5150-5250 MHz / BW: 20 / CH: L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	39.0245	32.39	-9.76	22.63	40.00	-17.37	QP	Pass
2	65.9184	30.96	-11.03	19.93	40.00	-20.07	QP	Pass
3	112.3272	29.12	-9.71	19.41	43.50	-24.09	QP	Pass
4	168.1188	29.74	-8.39	21.35	43.50	-22.15	QP	Pass
5	359.1860	28.51	-5.06	23.45	46.00	-22.55	QP	Pass
6 *	789.2338	29.03	5.66	34.69	46.00	-11.31	QP	Pass

6.9 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 Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, section 12.7.4, 12.7.6, 12.7.7		
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
	0.090-0.110	16.42-16.423	399.9-410
	¹ 0.495-0.505	16.69475-16.69525	608-614
	2.1735-2.1905	16.80425-16.80475	960-1240
	4.125-4.128	25.5-25.67	1300-1427
	4.17725-4.17775	37.5-38.25	1435-1626.5
	4.20725-4.20775	73-74.6	1645.5-1646.5
	6.215-6.218	74.8-75.2	1660-1710
	6.26775-6.26825	108-121.94	1718.8-1722.2
	6.31175-6.31225	123-138	2200-2300
	8.291-8.294	149.9-150.05	2310-2390
	8.362-8.366	156.52475-156.52525	2483.5-2500
	8.37625-8.38675	156.7-156.9	2690-2900
	8.41425-8.41475	162.0125-167.17	3260-3267
	12.29-12.293	167.72-173.2	3332-3339
	12.51975-12.52025	240-285	3345.8-3358
	12.57675-12.57725	322-335.4	3600-4400
	13.36-13.41		(²)
	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 § 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in § 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in § 15.35 apply to these measurements.		
	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.			
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.		
	Operating Environment:		
Temperature:	26 °C		
Humidity:	52.7 %		
Atmospheric Pressure:	1010 mbar		
Test voltage:	DC 12V		

6.9.1 Test Data

Remark: The report only reflects the test data of worst mode.

Band 1: 5150 MHz - 5250 MHz							
Test Channel: Lowest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
10360.00	92.24	-45.18	47.06	68.20	-21.14	Peak	Pass
10360.00	--	--	--	48.20	--	AVG	Pass
15540.00	87.61	-42.94	44.67	74.00	-29.33	Peak	Pass
15540.00	78.97	-42.94	36.03	54.00	-17.97	AVG	Pass
Test Channel: Lowest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
10360.00	91.75	-45.12	46.63	68.20	-21.57	Peak	Pass
10360.00	--	--	--	48.20	--	AVG	Pass
15540.00	87.12	-42.88	44.24	74.00	-29.76	Peak	Pass
15540.00	78.48	-42.94	35.54	54.00	-18.46	AVG	Pass
Test Channel: Middle channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
10400.00	92.58	-45.18	47.40	68.20	-20.80	Peak	Pass
10400.00	--	--	--	48.20	--	AVG	Pass
15600.00	87.95	-42.94	45.01	74.00	-28.99	Peak	Pass
15600.00	79.31	-42.94	36.37	54.00	-17.63	AVG	Pass
Test Channel: Middle channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
10400.00	92.13	-45.18	46.95	68.20	-21.25	Peak	Pass
10400.00	--	--	--	48.20	--	AVG	Pass
15600.00	87.50	-42.94	44.56	74.00	-29.44	Peak	Pass
15600.00	78.86	-42.94	35.92	54.00	-18.08	AVG	Pass
Test Channel: Highest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result

10480.00	93.50	-45.07	48.43	68.20	-19.77	Peak	Pass
10480.00	--	--	--	48.20	--	AVG	Pass
15720.00	88.87	-42.83	46.04	74.00	-27.96	Peak	Pass
15720.00	80.23	-42.94	37.29	54.00	-16.71	AVG	Pass
Test Channel: Highest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
10480.00	93.11	-45.07	48.04	68.20	-20.16	Peak	Pass
10480.00	--	--	--	48.20	--	AVG	Pass
15720.00	88.48	-42.83	45.65	74.00	-28.35	Peak	Pass
15720.00	79.84	-42.94	36.90	54.00	-17.10	AVG	Pass
Remark: Test frequency up to 40GHz and the emission levels of other frequencies are lower than the limit 20dB, not show in test report. Note:Margin=Level - Limit = Reading + factor - Limit = Reading + Antenna factor+cable loss - amplifier gain - Limit							

18-40G:

Test Channel: Lowest channel, Test Polarization: Vertical								
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	27076.402	84.38	-50.66	33.72	54.00	-20.28	AVG	P
2	27090.819	92.64	-50.65	41.99	74.00	-32.01	peak	P
3 *	34013.669	82.09	-47.59	34.50	54.00	-19.50	AVG	P
4	34113.399	91.22	-47.51	43.71	74.00	-30.29	peak	P
Test Channel: Lowest channel, Test Polarization: Horizontal								
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	26775.407	89.84	-50.62	39.22	54.00	-14.78	AVG	P
2	26875.365	97.30	-50.64	46.66	74.00	-27.34	peak	P
3	34469.349	95.42	-47.20	48.22	74.00	-25.78	peak	P
4	34690.240	86.04	-47.01	39.03	54.00	-14.97	AVG	P
Test Channel: Middle channel, Test Polarization: Vertical								

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	27977.493	82.42	-50.52	31.90	54.00	-22.10	AVG	P
2	28216.799	90.75	-50.50	40.25	74.00	-33.75	peak	P
3 *	34460.176	83.02	-47.22	35.80	54.00	-18.20	AVG	P
4	34478.525	92.53	-47.20	45.33	74.00	-28.67	peak	P

Test Channel: Middle channel, Test Polarization: Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	27732.834	86.41	-50.56	35.85	74.00	-38.15	peak	P
2	27858.602	79.50	-50.54	28.96	54.00	-25.04	AVG	P
3 *	32953.231	82.13	-48.62	33.51	54.00	-20.49	AVG	P
4	33041.057	92.03	-48.55	43.48	74.00	-30.52	peak	P

Test Channel: Highest channel, Test Polarization: Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	27119.677	91.87	-50.65	41.22	74.00	-32.78	peak	P
2 *	27191.955	83.55	-50.64	32.91	54.00	-21.09	AVG	P
3	33528.297	87.43	-48.07	39.36	74.00	-34.64	peak	P
4	33528.297	78.29	-48.07	30.22	54.00	-23.78	AVG	P

Test Channel: Highest channel, Test Polarization: Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	26597.834	89.17	-50.59	38.58	74.00	-35.42	peak	P
2	26597.834	81.57	-50.59	30.98	54.00	-23.02	AVG	P
3	34552.018	91.87	-47.14	44.73	74.00	-29.27	peak	P
4 *	34754.932	81.53	-46.96	34.57	54.00	-19.43	AVG	P

Note: Margin = Level - Limit = Reading + factor - Limit = Reading + Antenna factor + cable loss - amplifier gain - Limit

Band 3: 5725 MHz - 5825 MHz							
Test Channel: Lowest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
11490.00	89.61	-44.70	44.91	74.00	-29.09	Peak	Pass
11490.00	78.91	-44.70	34.21	54.00	-19.79	AVG	Pass
17235.00	84.52	-40.61	43.91	68.20	-24.29	Peak	Pass
17235.00	--	--	--	48.20	--	AVG	Pass
Test Channel: Lowest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
11490.00	89.89	-44.70	45.19	74.00	-28.81	Peak	Pass
11490.00	79.19	-44.70	34.49	54.00	-19.51	AVG	Pass
17235.00	84.80	-40.61	44.19	68.20	-24.01	Peak	Pass
17235.00	--	--	--	48.20	--	AVG	Pass
Test Channel: Middle channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
11570.00	90.74	-44.64	46.10	74.00	-27.90	Peak	Pass
11570.00	80.04	-44.70	35.34	54.00	-18.66	AVG	Pass
17355.00	85.65	-40.55	45.10	68.20	-23.10	Peak	Pass
17355.00	--	--	--	48.20	--	AVG	Pass
Test Channel: Middle channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
11570.00	90.28	-44.64	45.64	74.00	-28.36	Peak	Pass
11570.00	79.58	-44.70	34.88	54.00	-19.12	AVG	Pass
17355.00	85.19	-40.55	44.64	68.20	-23.56	Peak	Pass
17355.00	--	--	--	48.20	--	AVG	Pass
Test Channel: Highest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
11650.00	89.78	-44.59	45.19	74.00	-28.81	Peak	Pass
11650.00	79.08	-44.70	34.38	54.00	-19.62	AVG	Pass

17475.00	84.69	-40.50	44.19	68.20	-24.01	Peak	Pass
17475.00	--	--	--	48.20	--	AVG	Pass
Test Channel: Highest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
11650.00	89.43	-44.59	44.84	74.00	-29.16	Peak	Pass
11650.00	78.73	-44.70	34.03	54.00	-19.97	AVG	Pass
17475.00	84.34	-40.50	43.84	68.20	-24.36	Peak	Pass
17475.00	--	--	--	48.20	--	AVG	Pass
Remark: Test frequency up to 40GHz and the emission levels of other frequencies are lower than the limit 20dB, not show in test report. Note: Margin=Level - Limit = Reading + factor - Limit = Reading + Antenna factor+cable loss - amplifier gain - Limit							

18-40G:

Test Channel: Lowest channel, Test Polarization: Vertical								
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	27858.602	82.03	-50.54	31.49	54.00	-22.51	AVG	P
2	27947.723	91.19	-50.52	40.67	74.00	-33.33	peak	P
3	33412.487	91.76	-48.19	43.57	74.00	-30.43	peak	P
4 *	33581.884	83.61	-48.02	35.59	54.00	-18.41	AVG	P
Test Channel: Lowest channel, Test Polarization: Horizontal								
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	26260.189	85.45	-50.52	34.93	54.00	-19.07	AVG	P
2	26407.378	94.08	-50.56	43.52	74.00	-30.48	peak	P
3 *	34690.240	82.54	-47.01	35.53	54.00	-18.47	AVG	P
4	34727.192	91.63	-46.99	44.64	74.00	-29.36	peak	P
Test Channel: Middle channel, Test Polarization: Vertical								
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	27977.493	82.42	-50.52	31.90	54.00	-22.10	AVG	P
2	28216.799	90.75	-50.50	40.25	74.00	-33.75	peak	P
3 *	34460.176	83.02	-47.22	35.80	54.00	-18.20	AVG	P
4	34478.525	92.53	-47.20	45.33	74.00	-28.67	peak	P
Test Channel: Middle channel, Test Polarization: Horizontal								

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	27541.580	77.48	-50.59	26.89	54.00	-27.11	AVG	P
2	27563.581	85.01	-50.58	34.43	74.00	-39.57	peak	P
3 *	32233.232	82.44	-49.12	33.32	54.00	-20.68	AVG	P
4	32276.157	92.39	-49.09	43.30	74.00	-30.70	peak	P

Test Channel: Highest channel, Test Polarization: Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	26162.519	89.33	-50.50	38.83	74.00	-35.17	peak	P
2	26225.265	80.55	-50.52	30.03	54.00	-23.97	AVG	P
3	33941.321	89.11	-47.66	41.45	74.00	-32.55	peak	P
4 *	33941.321	80.06	-47.66	32.40	54.00	-21.60	AVG	P

Test Channel: Highest channel, Test Polarization: Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	26647.436	88.99	-50.60	38.39	74.00	-35.61	peak	P
2	26697.129	81.81	-50.61	31.20	54.00	-22.80	AVG	P
3 *	32918.166	81.99	-48.65	33.34	54.00	-20.66	AVG	P
4	33243.944	91.14	-48.35	42.79	74.00	-31.21	peak	P

Note:Margin=Level-Limit=Reading+factor-Limit=Reading+Antenna factor+ cable loss -amplifier gain-Limit

7 Test Setup Photos

Please refer to Appendix I Test Setup Photos.

8 EUT Constructional Details (EUT Photos)

Please refer to Appendix II External Photos and Appendix III Internal Photos.



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-- END OF REPORT --