

Test Report

Report No. : MTi260811012-0201E1
Date of issue : 2026-09-17
Applicant : Chug, Inc.
Product : Ring Remote
Model(s) : KPTR5
FCC ID : 2AO23-KPTR5

Shenzhen Microtest Co., Ltd.

TEST REPORT

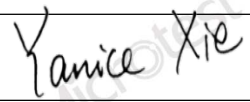
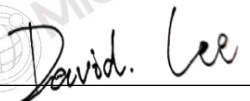
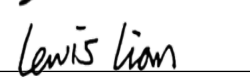
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Test Result Certification		
Applicant	Chug, Inc.	
Applicant Address	7157 Shady Oak Road Eden Prairie, MN 55344, United States	
Manufacturer	Chug, Inc.	
Manufacturer Address	7157 Shady Oak Road Eden Prairie, MN 55344, United States	
Factory	Guangdong Dahe Intelligent Electronic Technology Co., Ltd	
Factory Address	No. C06, Building 9, Zhen'an West Road, Xianggang Community, Chang'an Town (Zhen'an Science Park)	
Product description		
Product name	Ring Remote	
Trademark	Heyday, GEMS	
Model name	KPTR5	
Series Model(s)	N/A	
Standards	47 CFR Part 15.231	
Test Method	ANSI C63.10-2020+Cor.1-2023+C63.10a-2024+Errata to C63.10a-2024	
Testing Information		
Date of test	2026-08-19 to 2026-09-15	
Test result	Pass	
Prepared by:	Yanice Xie	
Reviewed by:	David Lee	
Approved by:	Lewis Lian	

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1 General Description

1.1 Description of the EUT

Product name:	Ring Remote
Model name:	KPTR5
Series Model(s):	N/A
Model difference:	N/A
Electrical rating:	Input: DC 5V Battery: DC 3.7V 25mAh
Accessories:	Cable: USB-A to USB-C 0.5m
Test sample(s) number:	MTi260811012-02-R001
RF specification	
Operating frequency range:	433.92MHz
Channel number:	1
Modulation type:	ASK
Antenna(s) type:	PCB Antenna
Antenna(s) gain:	2 dBi

1.2 Description of test modes

No.	Emission test modes
Mode1	TX

1.2.1 Operation channel list

Channel (MHz)
433.92

Test Channel List

Operation Band:

Channel (MHz)
433.92

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: EUT key

For power setting, refer to below table.

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1.3 Environmental Conditions

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

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

1.4 Description of support units

Support equipment list

Description	Model	Serial No.	Manufacturer
/	/	/	/

Support cable list

Description	Length (m)	From	To
/	/	/	/

1.5 Measurement uncertainty

Measurement	Uncertainty
Conducted emissions (AMN 150kHz~30MHz)	±3.1dB
Occupied channel bandwidth	±3 %
Time	±1 %
Radiated spurious emissions (30MHz~1GHz)	±4.7dB
Radiated spurious emissions (9kHz~30MHz)	±4.3dB
Radiated spurious emissions (above 1GHz)	±5.3dB
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.

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2 Summary of Test Result

No.	Item	Standard	Requirement	Result
1	Conducted Emission at AC power line	47 CFR Part 15.231	47 CFR 15.207(a)	Pass
2	20dB Bandwidth	47 CFR Part 15.231	47 CFR 15.231(c)	Pass
3	Dwell Time	47 CFR Part 15.231	47 CFR 15.231(a)(1) & (a)(2)	Pass
4	Duty Cycle	47 CFR Part 15.231	47 CFR 15.231(b) & (e)	Pass
5	Field Strength of The Fundamental Signal	47 CFR Part 15.231	47 CFR 15.231(b)	Pass
6	Radiated Emission (below 1GHz)	47 CFR Part 15.231	47 CFR 15.231	Pass
7	Radiated Emission (above 1GHz)	47 CFR Part 15.231	47 CFR 15.231	Pass

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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

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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	2026-03-10	2027-03-09
2	Artificial mains network	Schwarzbeck	NSLK 8127	183	2026-03-11	2027-03-10
3	Artificial Mains Network	Rohde & Schwarz	ESH2-Z5	100263	2026-03-10	2027-03-09
4	EMI Test Software	Farad	EZ-EMC	Ver. EMEC-3A1	/	/
Dwell Time Duty Cycle 20dB Bandwidth						
1	Wideband Radio Communication Tester	Rohde&schwarz	CMW500	149155	2026-03-09	2027-03-08
2	ESG Series Analog Signal Generator	Agilent	E4421B	GB40051240	2026-03-09	2027-03-08
3	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2026-03-10	2027-03-09
4	Synthesized Sweeper	Agilent	83752A	3610A01957	2026-03-10	2027-03-09
5	MXA Signal Analyzer	Agilent	N9020A	MY50143483	2026-03-09	2027-03-08
6	RF Control Unit	Tonscend	JS0806-1	19D8060152	2026-03-11	2027-03-10
7	Band Reject Filter Group	Tonscend	JS0806-F	19D8060160	2026-03-11	2027-03-10
8	ESG Vector Signal Generator	Agilent	N5182A	MY50143762	2026-03-10	2027-03-09
9	DC Power Supply	Agilent	E3632A	MY40027695	2026-03-09	2027-03-08
10	RF Test System	Tonscend	JS1120-3 Test System	V3.6.21	/	/
Field Strength of The Fundamental Signal Radiated Emission (below 1GHz)						
1	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2026-03-10	2027-03-09
2	TRILOG Broadband Antenna	schwarabeck	VULB 9163	9163-1338	2025-05-23	2027-05-22
3	Active Loop Antenna	Schwarzbeck	FMZB 1519 B	00066	2026-03-08	2028-03-07
4	Amplifier	Hewlett-Packard	8447F	3113A06184	2026-03-10	2027-03-09
5	EMI Test Software	Farad	EZ-EMC	Ver. EMEC-3A1	/	/
Radiated Emission (above 1GHz)						
1	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2026-03-10	2027-03-09
2	Double Ridged Broadband Horn	schwarabeck	BBHA 9120 D	2278	2025-05-27	2027-05-26

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No.	Equipment	Manufacturer	Model	Serial No.	Cal. date	Cal. Due
	Antenna					
3	Amplifier	Agilent	8449B	3008A01120	2026-03-10	2027-03-09
4	MXA signal analyzer	Agilent	N9020A	MY54440859	2026-03-10	2027-03-09
5	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2026-03-10	2027-03-09
6	Horn antenna	Schwarzbeck	BBHA 9170	00987	2025-05-27	2027-05-26
7	Pre-amplifier	Space-Dtronics	EWLAN18 40G	210405001	2026-03-11	2027-03-10
8	EMI Test Software	Farad	EZ-EMC	Ver. EMEC-3A1	/	/

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5 Radio Spectrum Matter Test Results (RF)

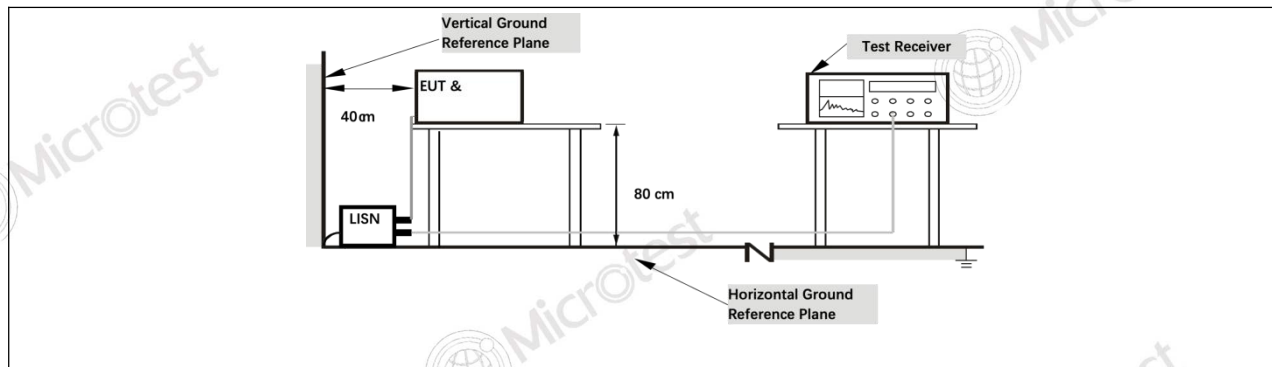
5.1 Conducted Emission at AC power line

Test Requirement:	Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN).		
Test Limit:	Frequency of emission (MHz)	Conducted limit (dB μ V)	
		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 C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 section 6.2		
Procedure:	Refer to ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices		

5.1.1 E.U.T. Operation:

Operating Environment:					
Temperature:	32 °C	Humidity:	27 %	Atmospheric Pressure:	98.6 kPa
Pre test mode:	Mode1				
Final test mode:	Mode1				

5.1.2 Test Setup Diagram:



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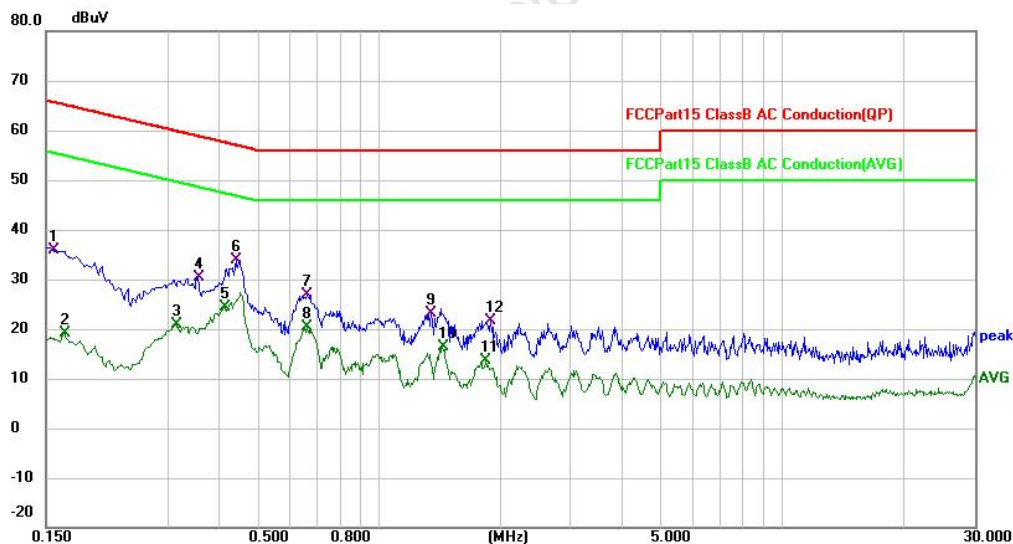
5.1.3 Test Data:

Measurement (dBμV) = Reading Level (dBμV) + Correct Factor (dB)

Correct Factor (dB) = LISN Factor + Cable Loss + Pulse Limiter Factor

Over (dB) = Measurement (dBμV) – Limit (dBμV)

Mode1 / Line: Line

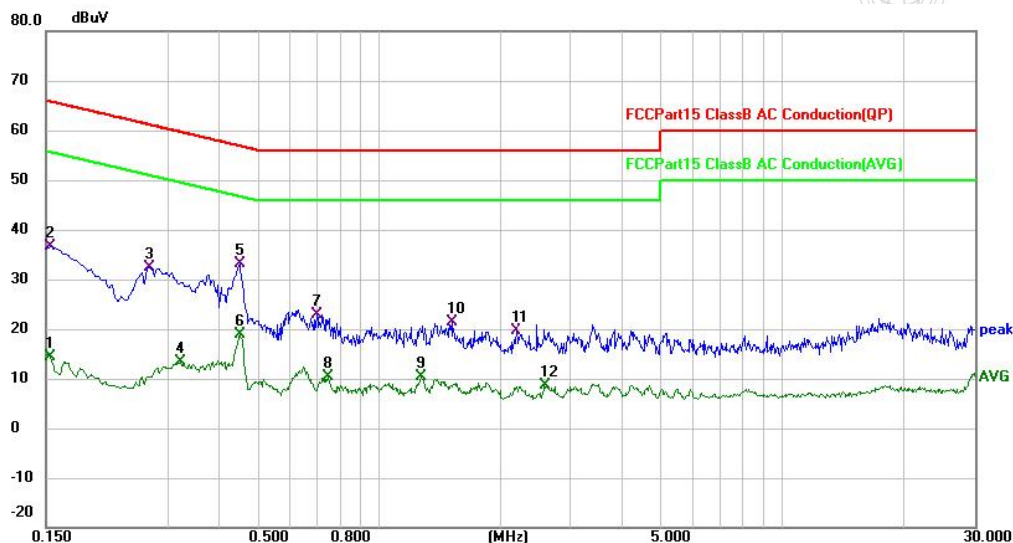


No.	Mk.	Freq. MHz	Reading Level dBμV	Correct Factor dB	Measure- ment dBμV	Limit dBμV	Over dB	Detector	Comment
1		0.1556	25.51	10.49	36.00	65.70	-29.70	QP	
2		0.1660	8.58	10.49	19.07	55.16	-36.09	AVG	
3		0.3140	10.34	10.52	20.86	49.86	-29.00	AVG	
4		0.3540	19.89	10.53	30.42	58.87	-28.45	QP	
5		0.4140	13.96	10.53	24.49	47.57	-23.08	AVG	
6	*	0.4420	23.44	10.55	33.99	57.02	-23.03	QP	
7		0.6620	16.41	10.58	26.99	56.00	-29.01	QP	
8		0.6620	9.71	10.58	20.29	46.00	-25.71	AVG	
9		1.3460	12.41	10.66	23.07	56.00	-32.93	QP	
10		1.4340	5.61	10.67	16.28	46.00	-29.72	AVG	
11		1.8420	2.79	10.73	13.52	46.00	-32.48	AVG	
12		1.8900	10.91	10.74	21.65	56.00	-34.35	QP	

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Mode1 / Line: Neutral



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1532	4.01	10.47	14.48	55.82	-41.34	AVG	
2		0.1539	26.15	10.47	36.62	65.79	-29.17	QP	
3		0.2700	21.94	10.50	32.44	61.12	-28.68	QP	
4		0.3220	2.74	10.52	13.26	49.66	-36.40	AVG	
5	*	0.4500	22.66	10.55	33.21	56.88	-23.67	QP	
6		0.4500	8.22	10.55	18.77	46.88	-28.11	AVG	
7		0.7019	12.38	10.59	22.97	56.00	-33.03	QP	
8		0.7500	-0.32	10.60	10.28	46.00	-35.72	AVG	
9		1.2740	-0.22	10.67	10.45	46.00	-35.55	AVG	
10		1.5140	10.77	10.70	21.47	56.00	-34.53	QP	
11		2.1900	8.80	10.76	19.56	56.00	-36.44	QP	
12		2.5860	-2.05	10.77	8.72	46.00	-37.28	AVG	

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5.2 20dB Bandwidth

Test Requirement:	47 CFR 15.231(c)
Test Limit:	The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, section 6.9.2
Procedure:	a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five 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 video bandwidth (VBW) shall be approximately three times 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) Steps a) through c) might require iteration to adjust within the specified tolerances. e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target “-xx dB down” requirement; that is, if the requirement calls for measuring the -20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value. f) Set detection mode to peak and trace mode to max hold. g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value). h) Determine the “-xx dB down amplitude” using $[(\text{reference value}) - \text{xx}]$. Alternatively, this calculation may be made by using the marker-delta function of the instrument. i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j). j) Place two markers, one at the lowest frequency and the other at the highest

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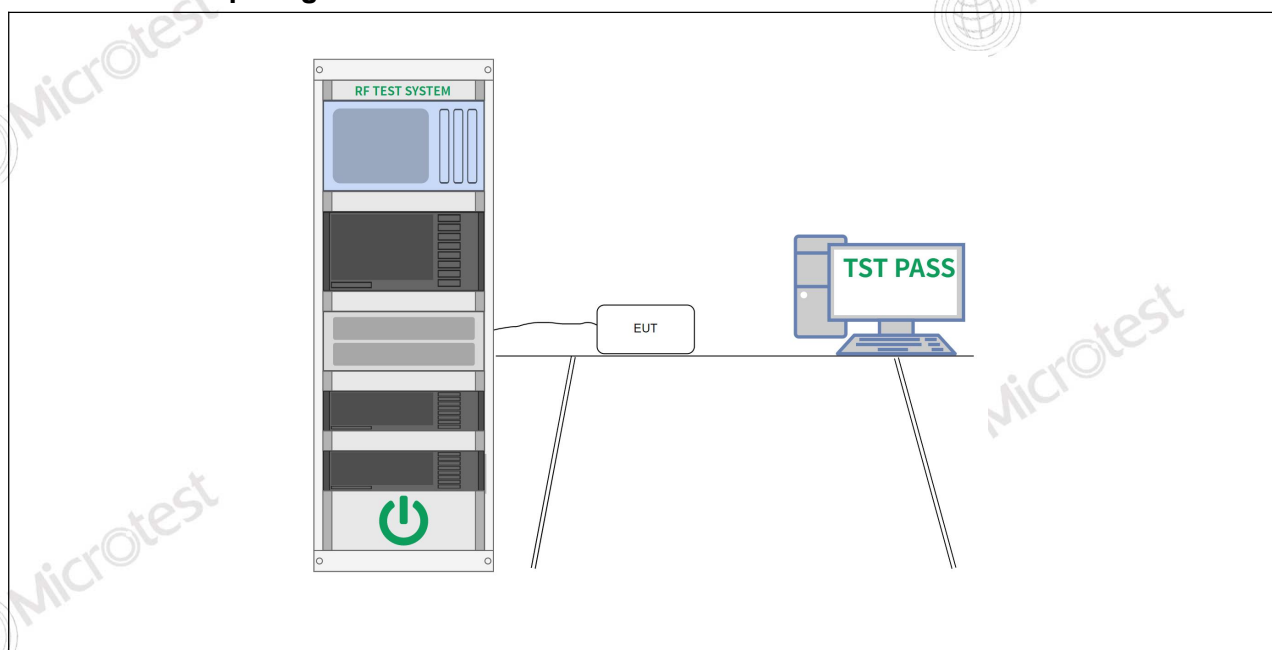
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	frequency of the envelope of the spectral display, such that each marker is at or slightly below the “íxx dB down amplitude” determined in step h). If a marker is below this “-xx dB down amplitude” value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the “íxx dB down amplitude” determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth. k) 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).
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5.2.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.2 °C	Humidity:	42.1 %	Atmospheric Pressure:	101 kPa
Pre test mode:	Mode1				
Final test mode:	Mode1				

5.2.2 Test Setup Diagram:



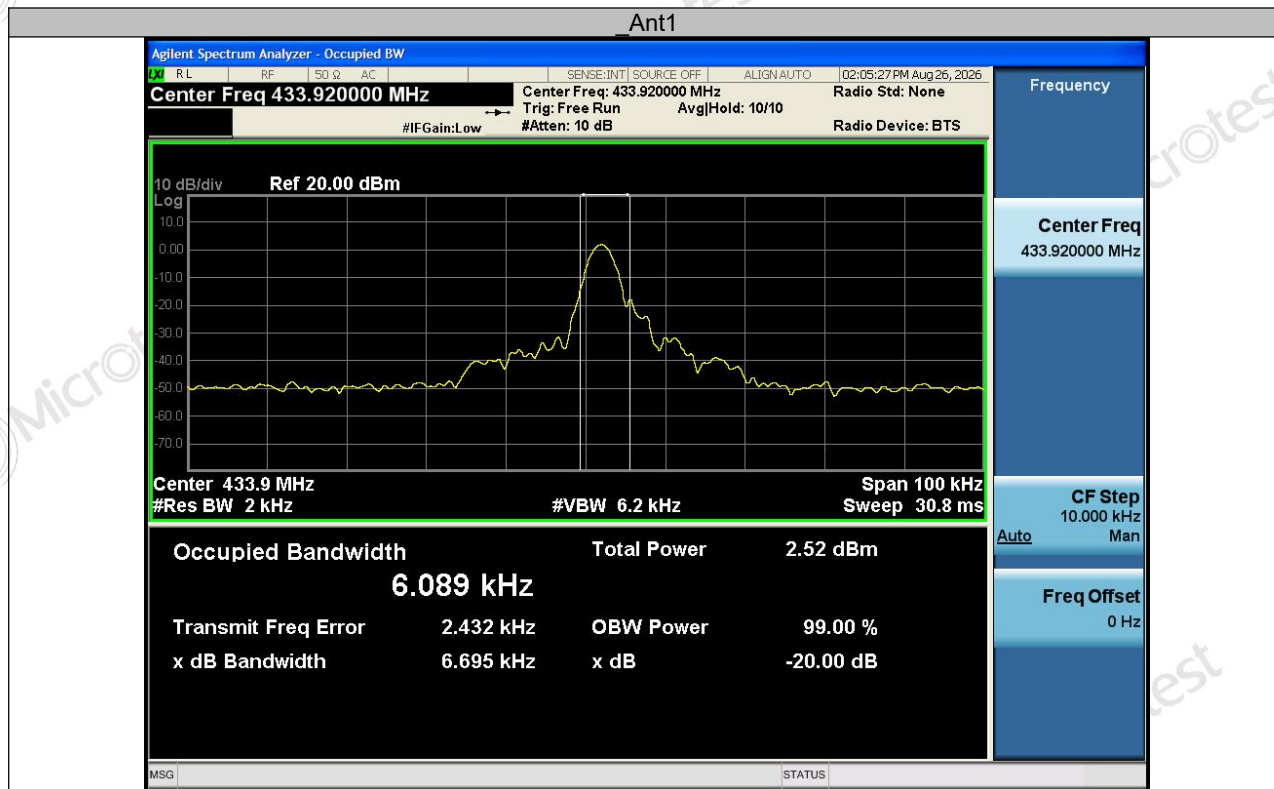
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5.2.3 Test Data:

Test Mode	Antenna	Frequency [MHz]	20db EBW [MHz]	Limit [MHz]	Verdict
/	Ant1	433.92	0.0067	1.08	PASS

Test Graphs



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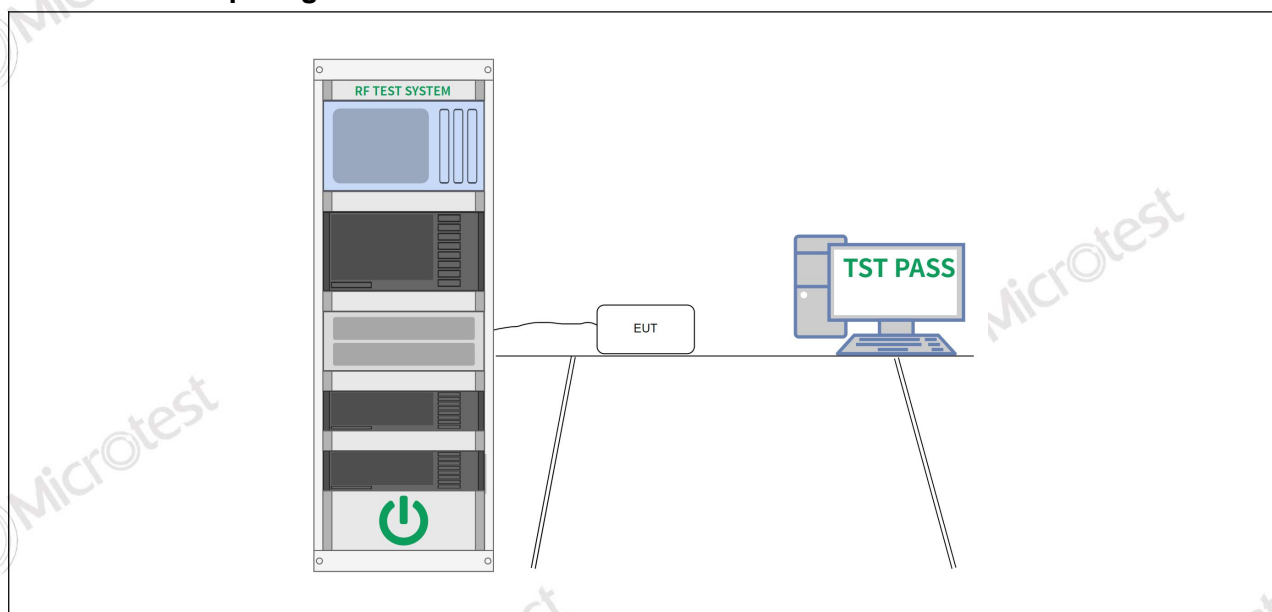
5.3 Dwell Time

Test Requirement:	47 CFR 15.231(a)(1) & (a)(2)
Test Limit:	(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released. (2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, Section 7.4
Procedure:	For evaluation of periodic operation characteristics, the following procedure may be used: a) Trigger the spectrum analyzer sweep on the RF waveform of the unlicensed wireless device. b) Set the spectrum analyzer sweep time greater than the specified time for periodic operation. c) Manually activate and deactivate the unlicensed wireless device and confirm that it ceases transmission within the specified time of deactivation. d) Document the test results. e) Verify and document that periodic transmissions at regular predetermined intervals do not exist, except where regulatory requirements allow polling or supervision transmissions, including data, to determine system integrity. Compliance is addressed by an attestation supported by the equipment theory of operation.

5.3.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.2 °C	Humidity:	42.1 %	Atmospheric Pressure:	101 kPa
Pre test mode:	Mode1				
Final test mode:	Mode1				

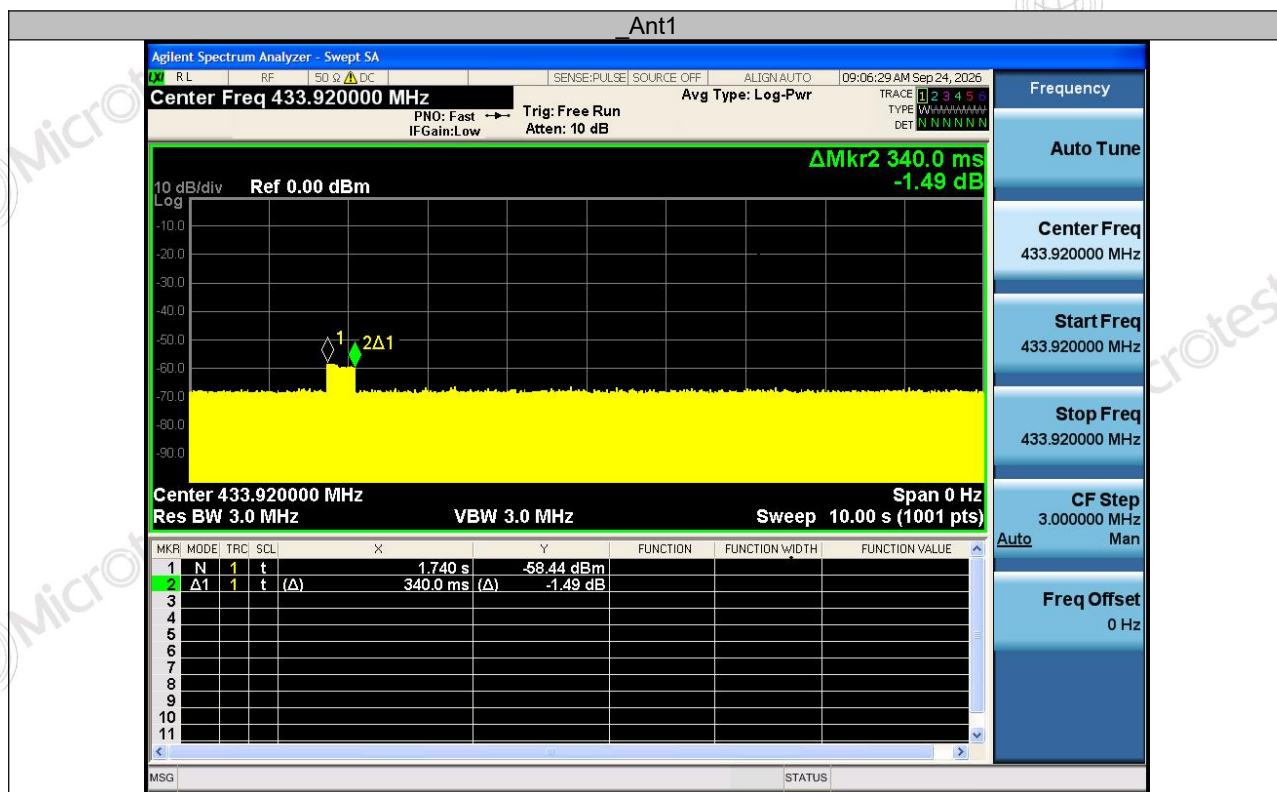
5.3.2 Test Setup Diagram:



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5.3.3 Test Data:



Result: Pass, the EUT had automatically deactivated transmission within 5 seconds.

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5.4 Duty Cycle

Test Requirement:	47 CFR 15.231(b) & (e)
Test Limit:	No limit, only for Report Use.
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, Section 7.5
Procedure:	a) Adjust and configure any EUT switches, controls, or input data streams to ensure that the EUT is transmitting or encoded to obtain the “worst-case” pulse ON time. b) Couple the final radio frequency output signal to the input of a spectrum analyzer. This may be performed by a radiated, direct connection (i.e., conducted) or by a “near-field” coupling method. The signal received shall be of sufficient level to trigger adequately the spectrum analyzer sweep display. NOTE—If the bandwidth of the pulse is greater than the RBW of the spectrum analyzer, then a similar measurement may be performed using a wideband digital storage oscilloscope (DSO). c) Adjust the center frequency of the spectrum analyzer to the center of the RF signal. d) Set the spectrum analyzer for ZERO SPAN. e) Adjust the SWEEP TIME to obtain at least a 100 ms period of time on the horizontal display axis of the spectrum analyzer. f) If the pulse train is periodic (i.e., consists of a series of pulses that repeat in a characteristic pattern over a constant time period), and the period (T) is less than or equal to 100 ms, then: 1) Set the TRIGGER on the spectrum analyzer to capture at least one period of the pulse train, including any blanking intervals. 2) Determine the total maximum pulse “ON time” (t_{ON}) over one period of the pulse train. An example of a periodic pulse train and the associated period is shown in Figure 14. If the pulse train contains pulses of different widths, then t_{ON} is determined by summing the duration of all of the pulses within the pulse train [i.e., $t_{ON} = \Sigma(t_1 + t_2 + \dots t_n)$]. 3) The duty cycle is then determined by dividing the total maximum “ON time” by the period of the pulse train (t_{ON}/T). g) If the pulse train is nonperiodic or is periodic with a period that exceeds 100 ms, or as an alternative to step f), then: 1) Set the TRIGGER on the spectrum analyzer to capture the greatest amount of pulse “ON time” over 100 ms. 2) Find the 100 ms period that contains the maximum “on time”; this may require summing the duration of multiple pulses as described in step f2). 3) Determine the duty cycle by dividing the total maximum “ON time” by 100 ms ($t_{ON}/100\text{ ms}$).

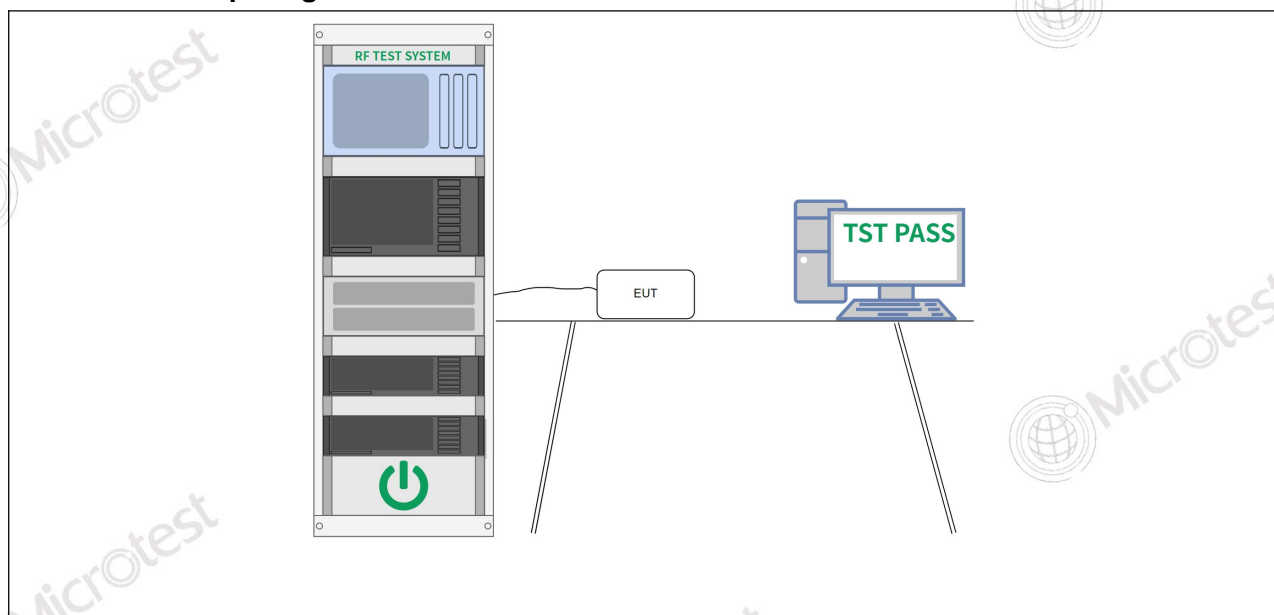
5.4.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.2 °C	Humidity:	42.1 %	Atmospheric Pressure:	101 kPa
Pre test mode:	Mode1				
Final test mode:	Mode1				

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5.4.2 Test Setup Diagram:



5.4.3 Test Data:

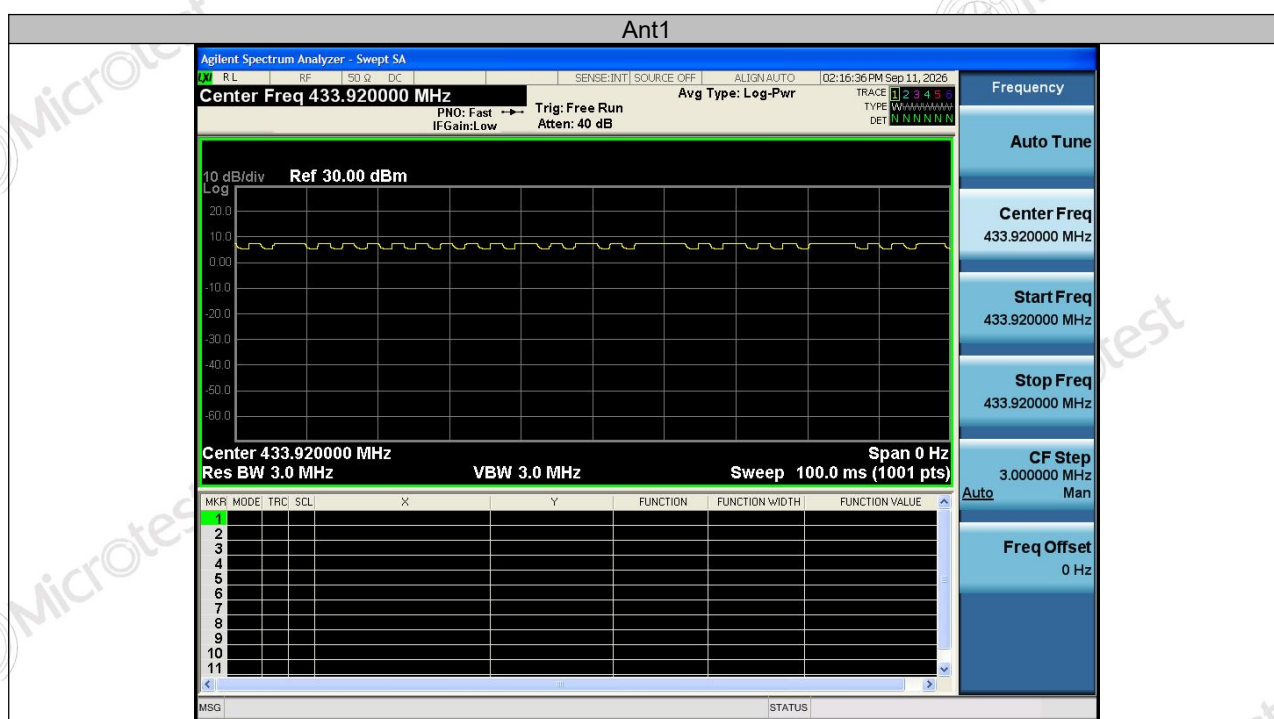
Test Mode	Antenna	Frequency [MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Factor
/	Ant1	433.92	100	100	1	0

Notes:

Duty Cycle [%] = Transmission Duration [ms] / Transmission Period [ms] * 100

Factor = 20 * log (Duty Cycle)

Test Graphs



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5.5 Field Strength of The Fundamental Signal

Test Requirement:	47 CFR 15.231(b)		
Test Limit:	Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
	40.66-40.70	2,250	225
	70-130	1,250	125
	130-174	¹ 1,250 to 3,750	¹ 125 to 375
	174-260	3,750	375
	260-470	¹ 3,750 to 12,500	¹ 375 to 1,250
	Above 470	12,500	1,250
	¹ Linear interpolations.		
(1) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.			
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, Section 6.5		
Procedure:	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. 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.		

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	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: - 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.
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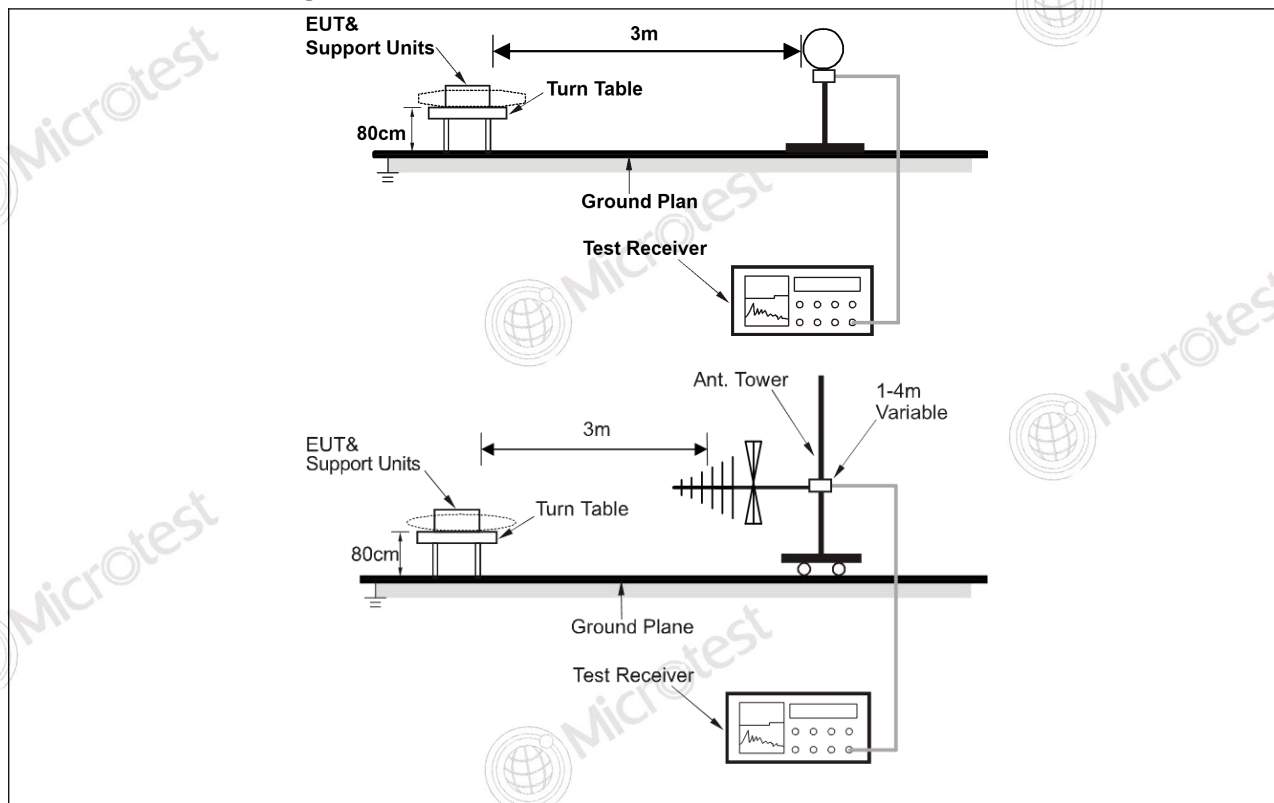
5.5.1 E.U.T. Operation:

Operating Environment:					
Temperature:	24 °C	Humidity:	45 %	Atmospheric Pressure:	101 kPa
Pre test mode:	Mode1				
Final test mode:	Mode1				

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5.5.2 Test Setup Diagram:



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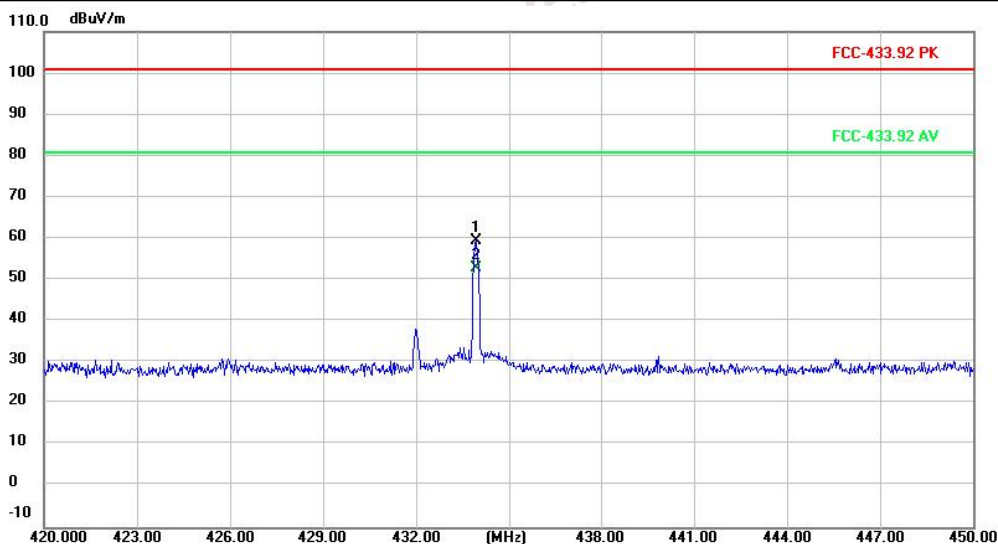
5.5.3 Test Data:

Measurement (dBμV/m) = Reading Level (dBμV) + Correct Factor (dB)

Correct Factor (dB)= Antenna Factor+ Cable Loss- Preamplifier Factor

Over (dB) = Measurement (dBμV/m) – Limit (dBμV/m)

Mode1 / Polarization: Horizontal

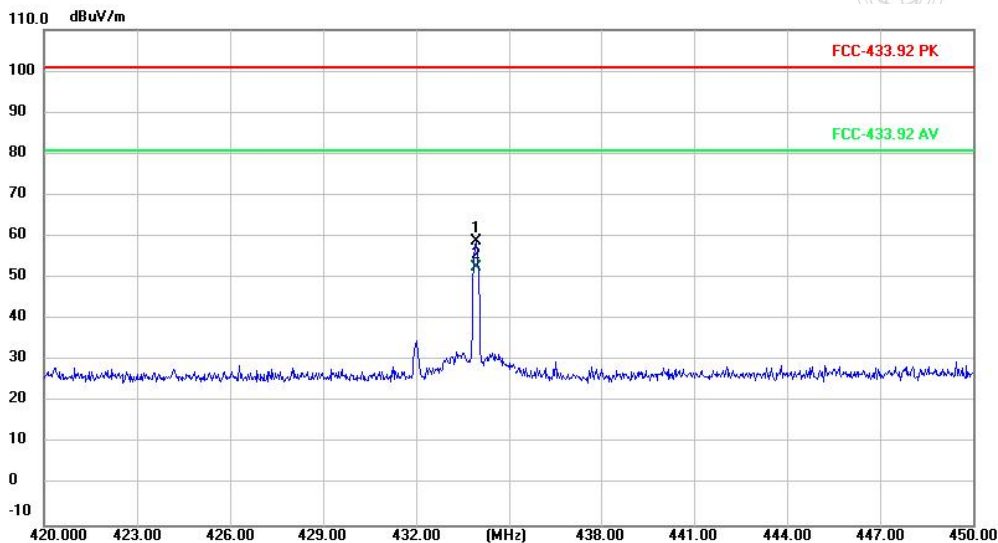


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		433.9200	63.19	-3.70	59.49	100.82	-41.33	peak	
2	*	433.9200	56.68	-3.70	52.98	80.82	-27.84	AVG	

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Mode1 / Polarization: Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		433.9200	62.46	-3.70	58.76	100.82	-42.06	peak	
2	*	433.9200	56.37	-3.70	52.67	80.82	-28.15	AVG	

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Mode1 / Polarization: Horizontal / CH: H



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Mode1 / Polarization: Vertical / CH: H



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5.6 Radiated Emission (below 1GHz)

Test Requirement:	47 CFR 15.231		
Test Limit:	Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
	0.009-0.490	2400/F(kHz)	300
	0.490-1.705	24000/F(kHz)	30
	1.705-30.0	30	30
	30-88	100 **	3
	88-216	150 **	3
	216-960	200 **	3
	Above 960	500	3
	** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241. In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.		
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, Section 6.5		
Procedure:	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. 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		

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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.

5.6.1 E.U.T. Operation:

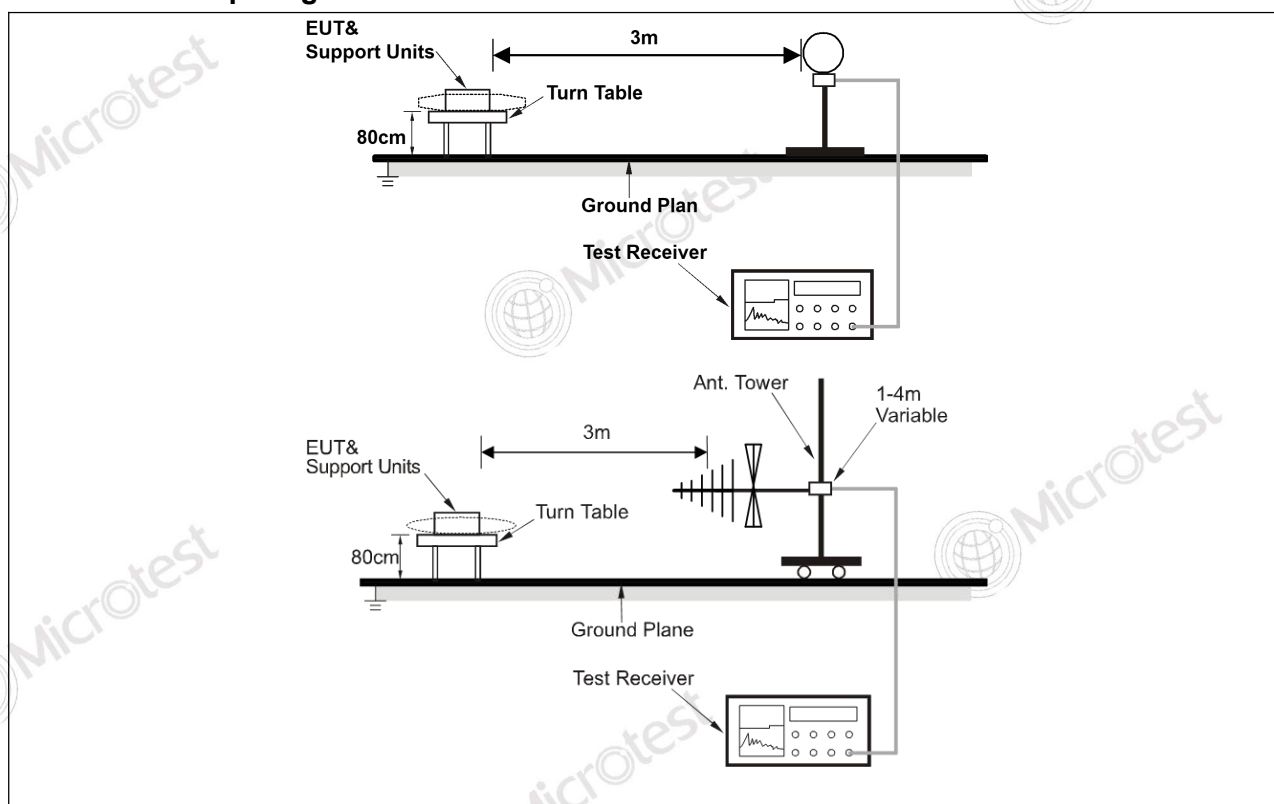
Operating Environment:

Temperature:	24 °C	Humidity:	45 %	Atmospheric Pressure:	101 kPa
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Pre test mode:	Mode1
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Final test mode:	Mode1
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5.6.2 Test Setup Diagram:



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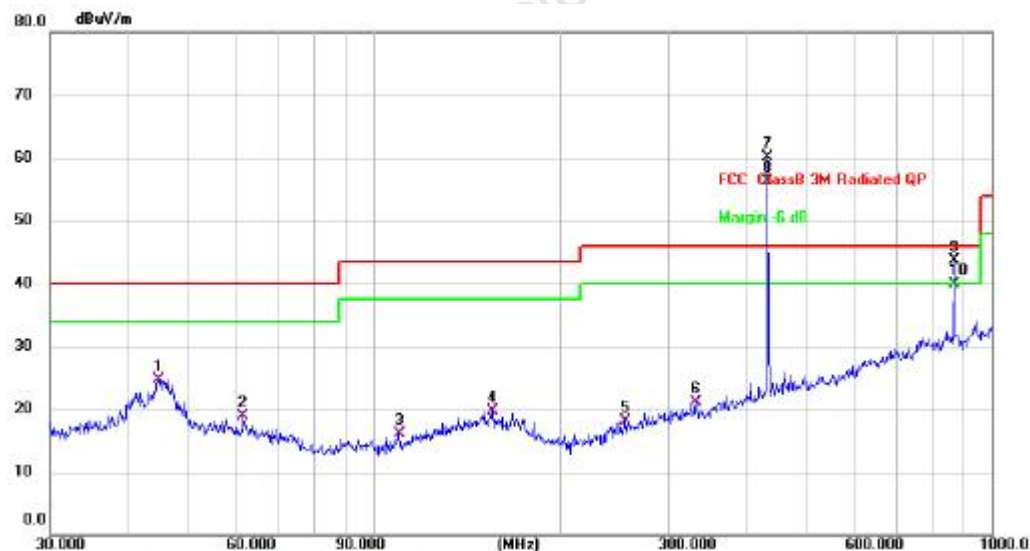
5.6.3 Test Data:

Measurement (dBμV/m) = Reading Level (dBμV) + Correct Factor (dB)

Correct Factor (dB) = Antenna Factor + Cable Loss - Preamplifier Factor

Over (dB) = Measurement (dBμV/m) - Limit (dBμV/m)

Mode1 / Polarization: Horizontal

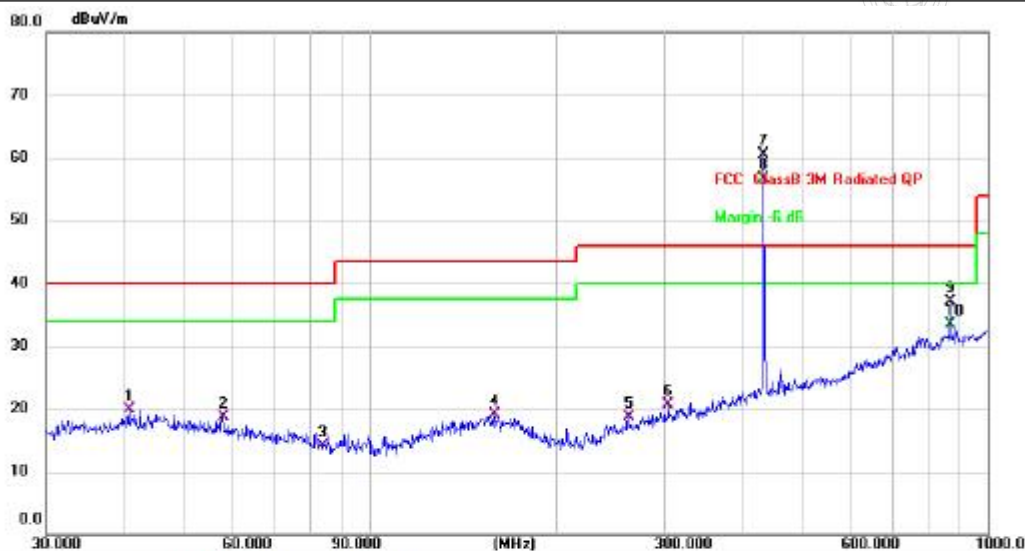


No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBμV	dB	dBμV/m	dBμV/m	dB		
1	44.9006	33.28	-8.53	24.75	40.00	-15.25	QP	
2	61.5618	28.51	-9.54	18.97	40.00	-21.03	QP	
3	109.7960	27.40	-11.29	16.11	43.50	-27.39	QP	
4	155.9101	27.11	-7.31	19.80	43.50	-23.70	QP	
5	254.7284	26.44	-8.37	18.07	46.00	-27.93	QP	
6	332.5187	27.28	-6.08	21.20	46.00	-24.80	QP	
7 *	433.9200	63.80	-3.70	60.10	46.00	14.10	peak	
8 X	433.9200	60.07	-3.70	56.37	46.00	10.37	AVG	
9 !	867.8400	39.04	4.66	43.70	46.00	-2.30	peak	
10 X	867.8400	35.19	4.66	39.85	46.00	-6.15	AVG	

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Mode1 / Polarization: Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		40.8446	28.09	-8.27	19.82	40.00	-20.18	QP	
2		57.7962	27.91	-9.27	18.64	40.00	-21.36	QP	
3		84.0000	27.10	-12.91	14.19	40.00	-25.81	QP	
4		158.6677	26.66	-7.56	19.10	43.50	-24.40	QP	
5		261.9753	26.90	-8.15	18.75	46.00	-27.25	QP	
6		304.6099	27.23	-6.47	20.76	46.00	-25.24	QP	
7	*	433.9200	64.16	-3.70	60.46	46.00	14.46	peak	
8	X	433.9200	60.45	-3.70	56.75	46.00	10.75	AVG	
9		867.8400	32.38	4.66	37.04	46.00	-8.96	peak	
10	X	867.8400	28.90	4.66	33.56	46.00	-12.44	AVG	

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5.7 Radiated Emission (above 1GHz)

Test Requirement:	47 CFR 15.231		
Test Limit:	Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
	0.009-0.490	2400/F(kHz)	300
	0.490-1.705	24000/F(kHz)	30
	1.705-30.0	30	30
	30-88	100 **	3
	88-216	150 **	3
	216-960	200 **	3
	Above 960	500	3
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241. In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.			
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, Section 6.6		
Procedure:	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.		

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	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.
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5.7.1 E.U.T. Operation:

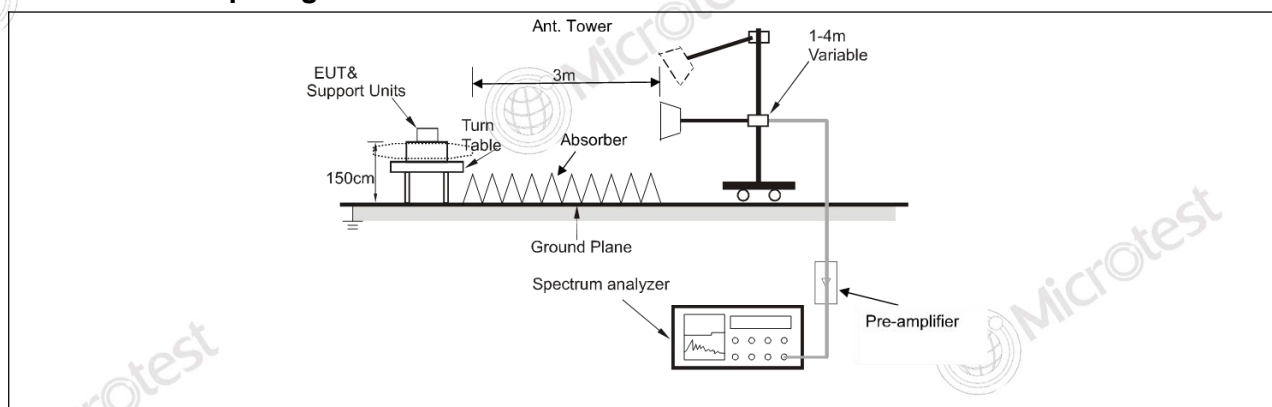
Operating Environment:

Temperature:	24 °C	Humidity:	45 %	Atmospheric Pressure:	101 kPa
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Pre test mode: Mode1

Final test mode: Mode1

5.7.2 Test Setup Diagram:



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5.7.3 Test Data:

Measurement (dBμV/m) = Reading Level (dBμV) + Correct Factor (dB)

Correct Factor (dB) = Antenna Factor + Cable Loss - Preamplifier Factor

Over (dB) = Measurement (dBμV/m) – Limit (dBμV/m)

Mode1 / Polarization: Horizontal

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBμV	dB	dBμV/m	dBμV/m	dB	Detector
1		1301.760	46.05	-7.21	38.84	74.00	-35.16	peak
2		1301.760	41.22	-7.21	34.01	54.00	-19.99	AVG
3		1735.680	58.42	-5.38	53.04	74.00	-20.96	peak
4	*	1735.680	53.58	-5.38	48.20	54.00	-5.80	AVG
5		2169.600	46.61	-3.94	42.67	74.00	-31.33	peak
6		2169.600	51.46	-3.94	47.52	54.00	-6.48	AVG

Mode1 / Polarization: Vertical

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBμV	dB	dBμV/m	dBμV/m	dB	Detector
1		1301.760	45.23	-7.21	38.02	74.00	-35.98	peak
2		1301.760	41.47	-7.21	34.26	54.00	-19.74	AVG
3		1735.680	51.62	-5.38	46.24	74.00	-27.76	peak
4		1735.680	46.39	-5.38	41.01	54.00	-12.99	AVG
5		2169.600	52.75	-3.94	48.81	74.00	-25.19	peak
6	*	2169.600	47.44	-3.94	43.50	54.00	-10.50	AVG

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Photographs of the test setup

Refer to Appendix - Test Setup Photos

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Photographs of the EUT

Refer to Appendix - EUT Photos

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Statement

1. This report is invalid without the seal and signature of the laboratory.
2. The test results of this report are only responsible for the samples submitted. Client shall be responsible for representativeness of the sample and authenticity of the material.
3. The report shall not be partially reproduced without the written consent of the Laboratory.
4. This report is invalid if transferred, altered or tampered with in any form without authorization.
5. The observations or tests with special mark fall outside the scope of accreditation, and are only used for purpose of commission, research, training, internal quality control etc.
6. Any objection to this report shall be submitted to the laboratory within 15 days from the date of receipt of the report.

***** END OF REPORT *****