TEST REPORT

Application No.:	GZEM2001010364CR
Applicant:	Matsum Inc DBA Venture Heated Clothing
Address of Applicant:	3621 Serpentine Drive, Los Alamitos, CA 90720, USA
Manufacturer:	MEC Addheat Co.,Ltd.
Address of Manufacturer:	No.2-1, Alley 1, Ln.116, Zhuang-jing Rd.East Dist. Tainan City, Taiwan
Factory:	MEC Addheat (Kaiping) Co.,Ltd.
Address of Factory:	Building 7, West Block, NO.1, West Lake Second Road, Cuishanhu New District, Kai Ping City, Guangdong, China 529300
Equipment Under Test (EUT):	
FCC ID: 2AVJJ616R	
EUT Name:	616RC
Model No.:	616R Remote controller
Standard(s):	47 CFR Part 15, Subpart C 15.209
Date of Receipt:	2020-01-21
Date of Test:	2020-02-24 to 2020-03-06
Date of Issue:	2020-03-10
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Kobe Jian
EMC Laboratory Manager

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Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2020-03-10		Original

Authorized for issue by:				
Tested By		**Curry_Wu /Project Engineer**		2020-02-24 to 2020-03-06 **Date**
Checked By		**Ricky_Liu /Reviewer**		2020-03-10 **Date**

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2 Test Summary

Radio Spectrum Technical Requirement				
Item	**Standard**	**Method**	**Requirement**	**Result**
Antenna Requirement	47 CFR Part 15, Subpart C	N/A	47 CFR Part 15, Subpart C 15.203	Pass

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
20dB Bandwidth	47 CFR Part 15, Subpart C	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass
Field Strength of the Fundamental Signal	47 CFR Part 15, Subpart C	ANSI C63.10 (2013) Section 6.5	47 CFR Part 15, Subpart C 15.209	Pass
Radiated Emissions (9kHz-30MHz)	47 CFR Part 15, Subpart C	ANSI C63.10 (2013) Section 6.4&6.5	47 CFR Part 15, Subpart C 15.209	Pass
Radiated Emissions (30MHz-1GHz)	47 CFR Part 15, Subpart C	ANSI C63.10 (2013) Section 6.4&6.5	47 CFR Part 15, Subpart C 15.209	Pass

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4 General Information

4.1 Details of E.U.T.

Power Supply:	DC 3.7V supplied by internal battery(PT801525 0.85Wh 230mAh) DC 5V for charging**
Test Voltage:	DC 3.7V
Antenna Type	Integrated antenna
Channel Spacing	N/A
Number of Channels	1
Operation Frequency	125kHz
Remark**	The transmitter can not working when charging, So the conducted emissions test in not verified in this report.

4.2 Description of Support Units

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

RF

No.	Item	Measurement Uncertainty
1	Radio Frequency	±5.5 x 10^{-8}
2	Duty cycle	±0.57%
3	Occupied Bandwidth	±3%
4	RF Conducted power	±0.68dB
5	RF Power Density	±1.50dB
6	Conducted Spurious Emissions	±1.04dB
7	RF Radiated Power	±4.5dB (below 1GHz)
		±4.8dB (above 1GHz)
8	Radiated Spurious Emission Test	±4.5dB (30MHz-1GHz)
		±4.8dB (1GHz-18GHz)
9	Temperature	±0.4℃
10	Humidity	±1.3%
11	Supply Voltages	±1.5%
12	Time	±3%

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4.4 Test Location

All tests were performed at:

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No tests were sub-contracted.

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4.5 Test Facility

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

- **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

- **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to

ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

- **FCC Recognized 2.948 Listed Test Firm(Registration No.: 282399)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002.

- **FCC Recognized Accredited Test Firm(Registration No.: 486818)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818, Jul 13, 2017.

- **Industry Canada (Registration No.: 4620B, CAB identifier: CN0052)**

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

- **VCCI (Registration No.: R-12460, C-12584, G-10449 and T-11179)**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584，G-10449 and T-11179 respectively.

- **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2005, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

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4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

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5 Equipment List

20dB Bandwidth					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
EXA Signal Analzer	Agilent Technologies	N9010A	EMC2138	2019-11-18	2020-11-17
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS	0.8M	EMC2137	2019-11-02	2021-11-01

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DMM	Fluke	73	EMC0006	2019-07-16	2020-07-15
DMM	Fluke	73	EMC0007	2019-07-16	2020-07-15

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Radiated Emission						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. date (YYYY-MM-DD)	Cal.Due date (YYYY-MM-DD)
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	2019-10-20	2022-10-19
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100283	2020-01-10	2021-01-09
EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	100236	2020-01-10	2021-01-09
EMC2174	Trilog Broadband Antenna 30-1000MHz	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	0920	2018-09-06	2021-09-05
SEM003-18	Trilog Broadband Antenna 25-2000MHz	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	00666	2019-02-22	2022-02-22
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	2017-05-04	2020-05-03
EMC0518	Horn Antenna (1G~18G)	R& S	HF906	100096	2018-09-02	2021-09-01
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	2020-01-10	2021-01-09
EMC2065	Amplifier	HP	8447F	N/A	2019-05-29	2020-05-28
EMC2086	PRE AMPLIFIER MH648A	ANRITSU CORP	MH648A	N/A	2019-11-18	2020-11-17
EMC0523	Active Loop Antenna	EMCO	6502	42963	2018-03-05	2021-03-04
EMC2041	Broad-Band Horn Antenna (14)15-26.5(40)GHz	SCHWARZBECK MESS-ELEKTRONI	BBHA 9170	9170-375	2017-05-23	2020-05-22
EMC2079	High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	009	2020-01-10	2021-01-09
EMC2142	966 Anechoic Chamber	C.R.T	9mX6mX6m	NA	2017-12-19	2020-12-18
EMC2139	MXE EMI Receiver	Keysight	N9038A	MY57290121	2019-11-18	2020-11-17
EMC2138	EXA Signal Analyzer	Keysight	N9010A	MY57120105	2019-11-18	2020-11-17
EMC2069	2.4GHz Filter	Micro-Tronics	BRM 50702	149	2020-01-10	2021-01-09
EMC0530	10m Semi-Anechoic Chamber	ETS	N/A	N/A	2019-10-20	2022-10-19

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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

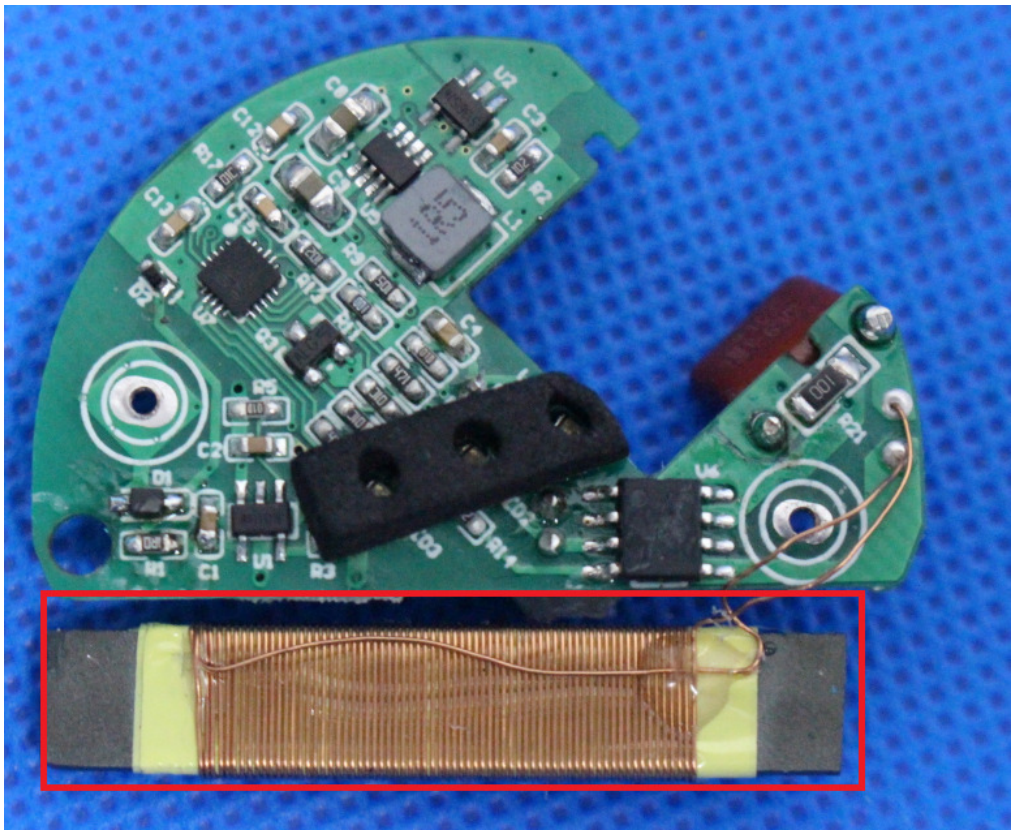
6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

6.1.2 Conclusion

Standard Requirement:

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 antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.



EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.

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7 Radio Spectrum Matter Test Results

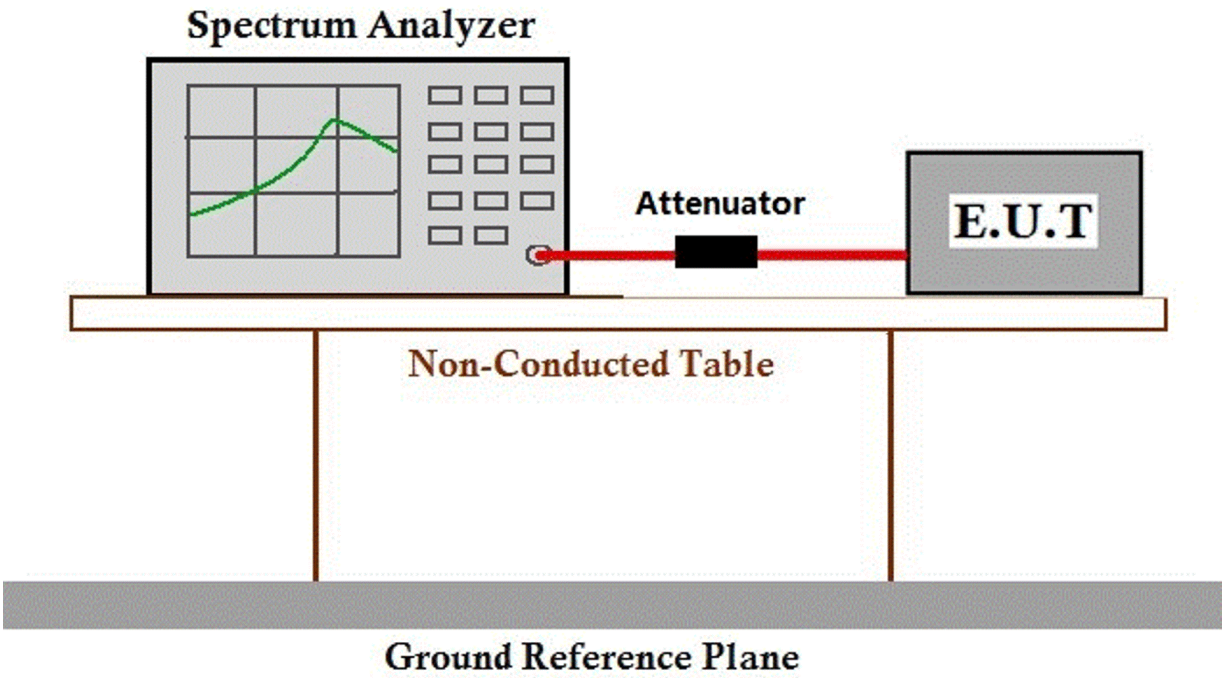
7.1 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.215
Test Method: ANSI C63.10 (2013) Section 6.9

7.1.1 E.U.T. Operation

Operating Environment:
Temperature: 23.9 °C Humidity: 53.3 % RH Atmospheric Pressure: 1020 mbar
Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

7.1.2 Test Setup Diagram



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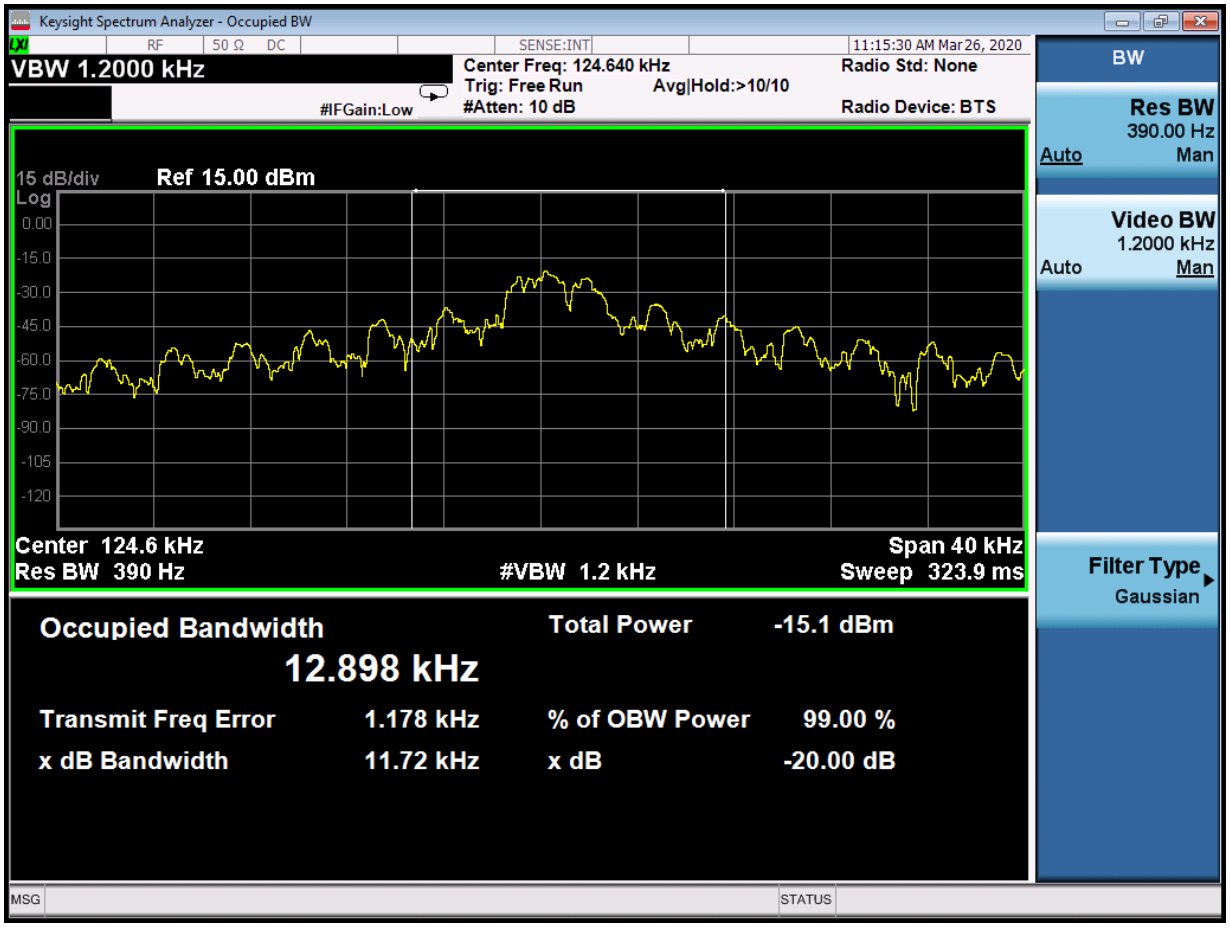
7.1.3 Measurement Procedure and Data



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7.2 Field Strength of the Fundamental Signal

Test Requirement 47 CFR Part 15, Subpart C 15.209
Test Method: ANSI C63.10 (2013) Section 6.5

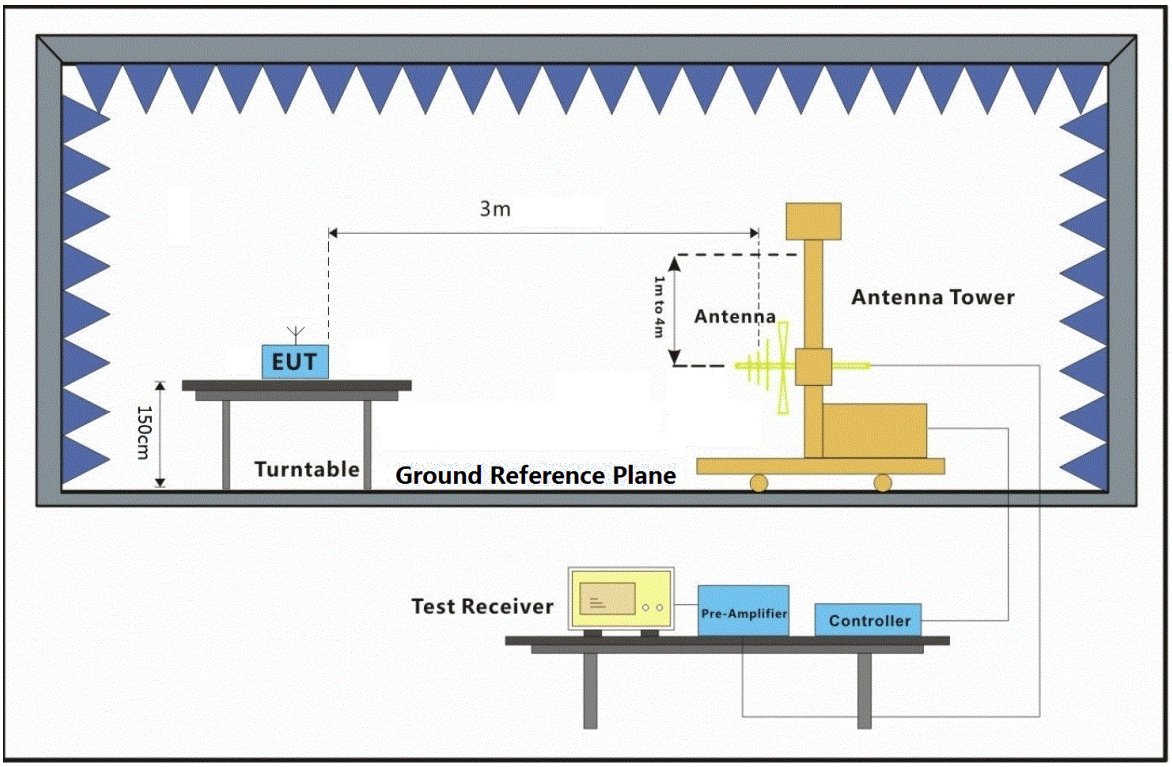
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 21 °C Humidity: 52 % RH Atmospheric Pressure: 1020 mbar

Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

7.2.2 Test Setup Diagram



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7.2.3 Measurement Procedure and Data

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground for below 1GHz 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 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, quasi-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 worse case.

i. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

The Field Strength of the Fundamental Signal level is refer to Clause 7.3 .

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7.3 Radiated Emissions (9kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.209
Test Method: ANSI C63.10 (2013) Section 6.4&6.5
Measurement Distance: 10m
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	3
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for above 1000MHz. Radiated emission limits above 1000MHz is based on measurements employing an average detector.		

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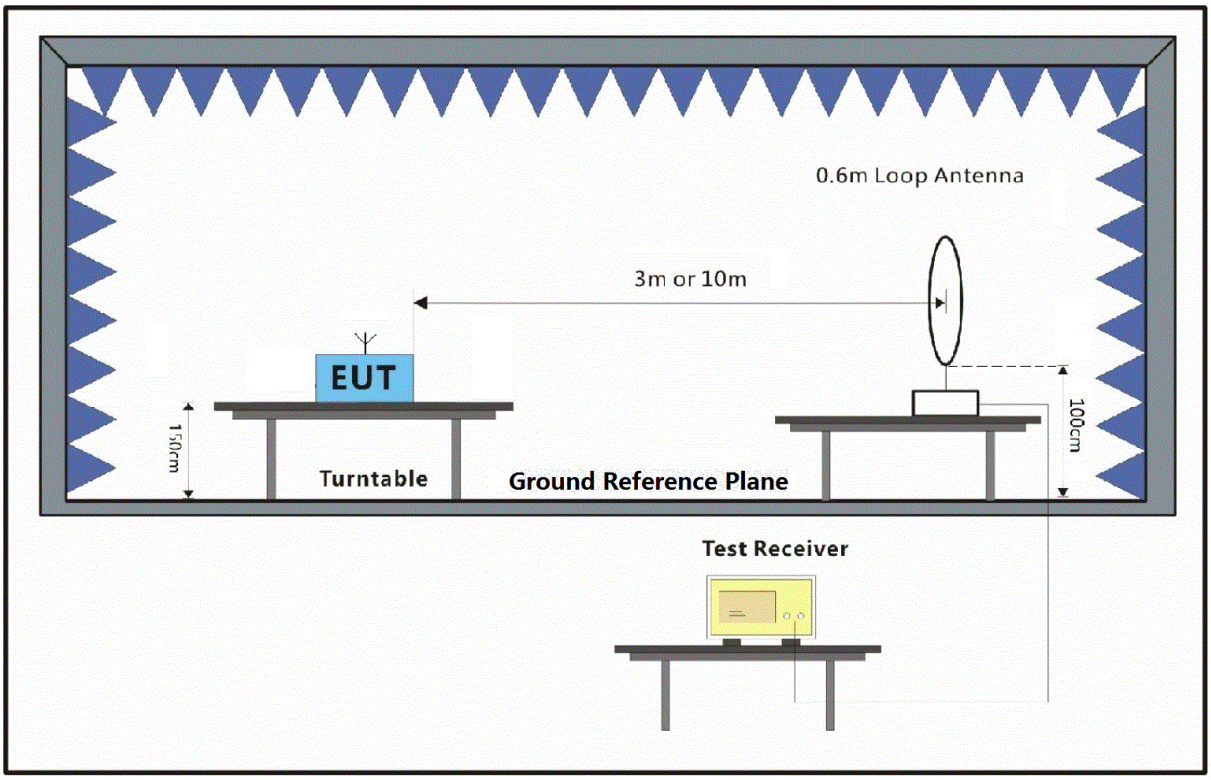
7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 21 °C Humidity: 52 % RH Atmospheric Pressure: 1020 mbar

Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.

Measured Level l=Read Level + Antenna Factor + Cable Loss - Preamp Factor

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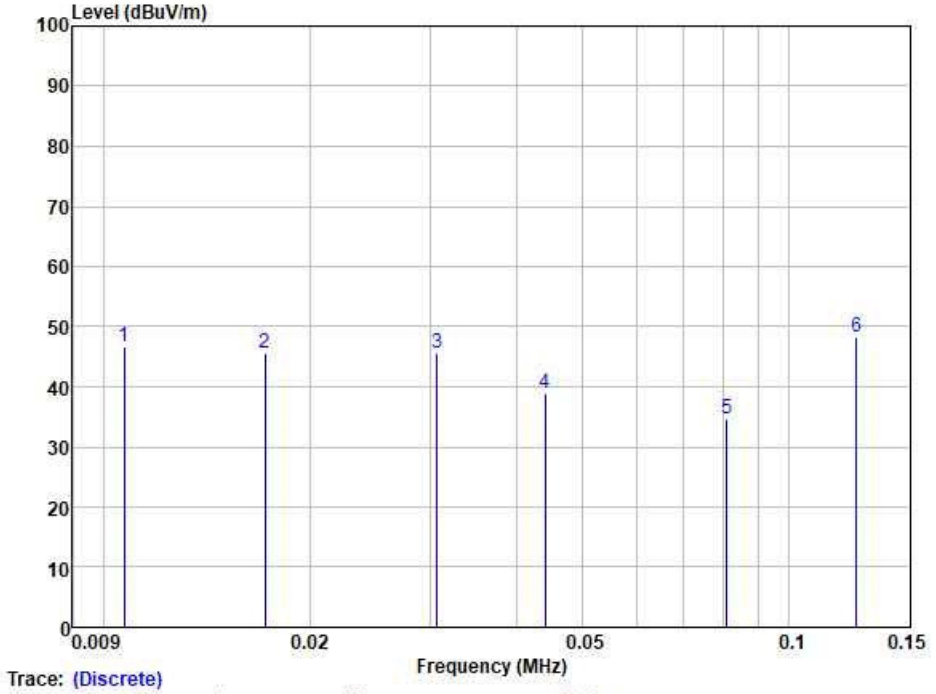

Trace: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	0.011	53.34	21.30	0.00	28.08	46.56	------	------	VERTICAL	
2	0.017	56.80	16.90	0.00	28.22	45.48	------	------	VERTICAL	
3	0.031	59.73	14.61	0.00	28.82	45.52	------	------	VERTICAL	
4	0.044	55.38	12.75	0.00	29.20	38.93	------	------	VERTICAL	
5	0.081	51.62	12.40	0.00	29.41	34.61	------	------	VERTICAL	
6	0.125	65.30	12.40	0.00	29.45	48.25	------	------	VERTICAL	

Frequency (MHz)	Level @10m	Limit @30m	Limit @300m	Convert Factor	Level @ 30m	Level @ 300m	Over limit
0.011	46.56	-	46.78	59.08	-	-12.52	-59.30
0.017	45.48	-	43.00	59.08	-	-13.6	-56.60
0.031	45.52	-	37.78	59.08	-	-13.56	-51.34
0.044	38.93	-	34.74	59.08	-	-20.15	-54.89
0.081	34.61	-	29.43	59.08	-	-24.47	-53.90
0.125	48.25	-	25.67	59.08	-	-10.83	-36.50

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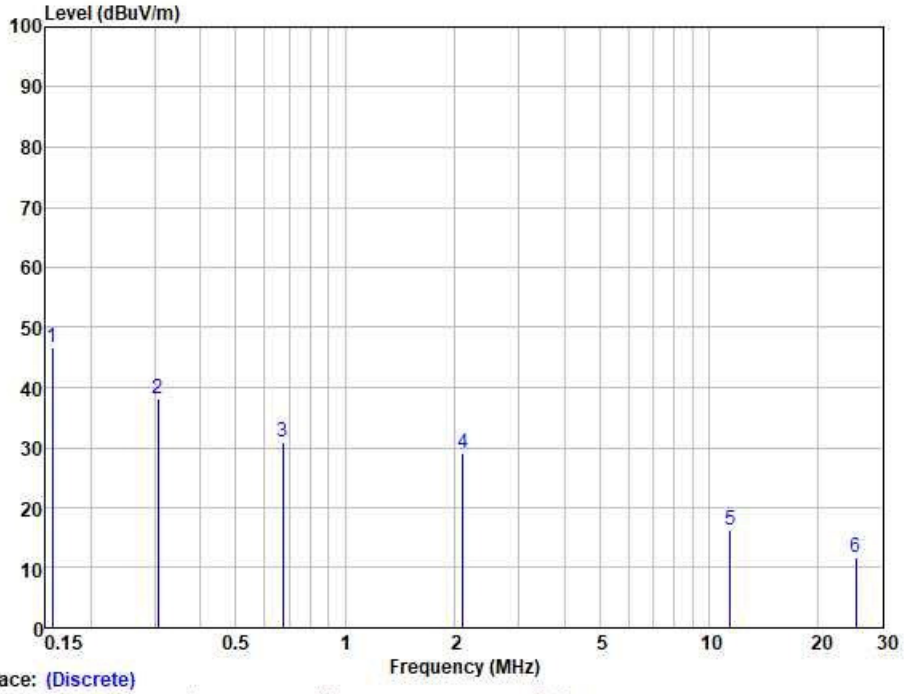

Trace: (Discrete)

	Freq	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	0.156	63.66	12.40	0.00	29.44	46.62	------	------	VERTICAL	
2	0.305	55.14	12.26	0.10	29.42	38.08	------	------	VERTICAL	
3	0.672	48.04	12.18	0.10	29.39	30.93	------	------	VERTICAL	
4	2.110	45.67	12.55	0.11	29.36	28.97	------	------	VERTICAL	
5	11.438	34.47	10.65	0.34	29.28	16.18	------	------	VERTICAL	
6	25.321	29.51	10.56	0.89	29.18	11.78	------	------	VERTICAL	

Frequency (MHz)	Level @10m	Limit @30m	Limit @300m	Convert Factor	Level @ 30m	Level @ 300m	Over limit
0.156	46.62	-	23.74	59.08		-12.46	-36.20
0.305	38.08	-	17.92	59.08		-21	-38.92
0.672	30.93	31.06		19.08	11.85		-19.21
2.110	28.97	29.54		19.08	9.89		-19.65
11.438	16.18	29.54		19.08	-2.9		-32.44
25.231	11.78	29.54		19.08	-7.3		-36.84

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7.4 Radiated Emissions (30MHz-1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.209
Test Method: ANSI C63.10 (2013) Section 6.4&6.5
Measurement Distance: 3m

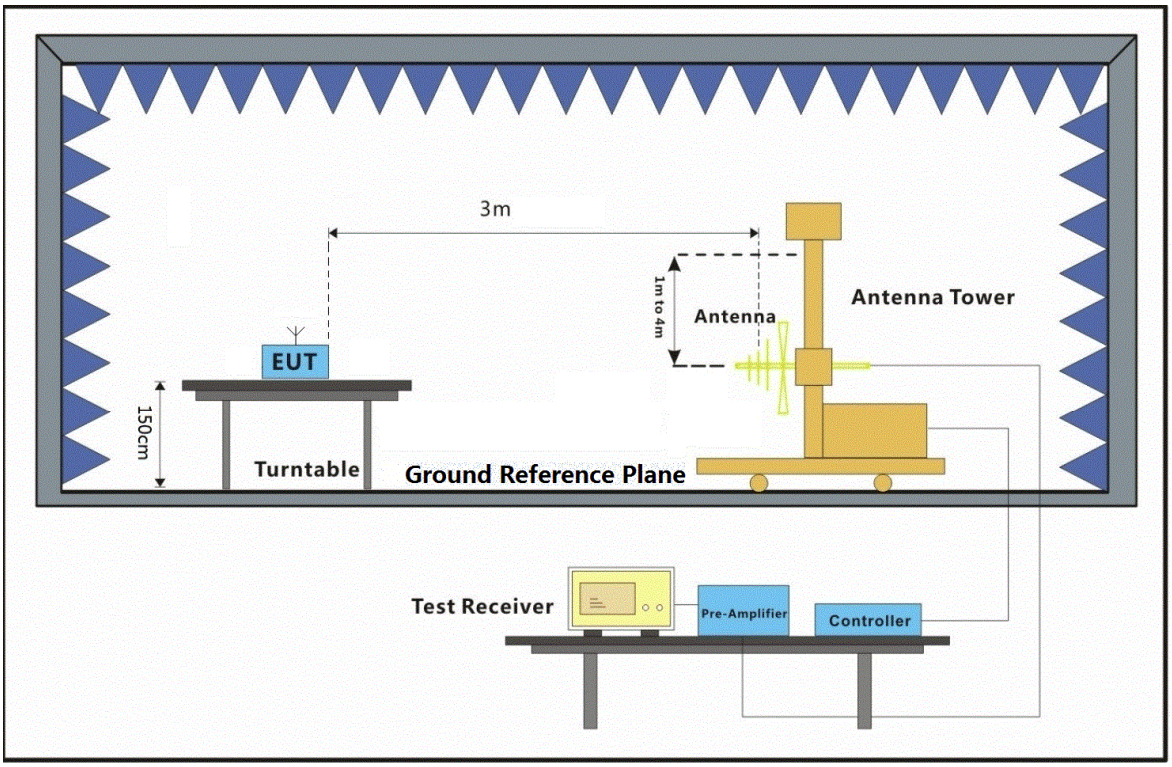
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 21 °C Humidity: 52 % RH Atmospheric Pressure: 1020 mbar

Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

7.4.2 Test Setup Diagram



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7.4.3 Measurement Procedure and Data

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground for below 1GHz 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 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, quasi-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 worse case.

i. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

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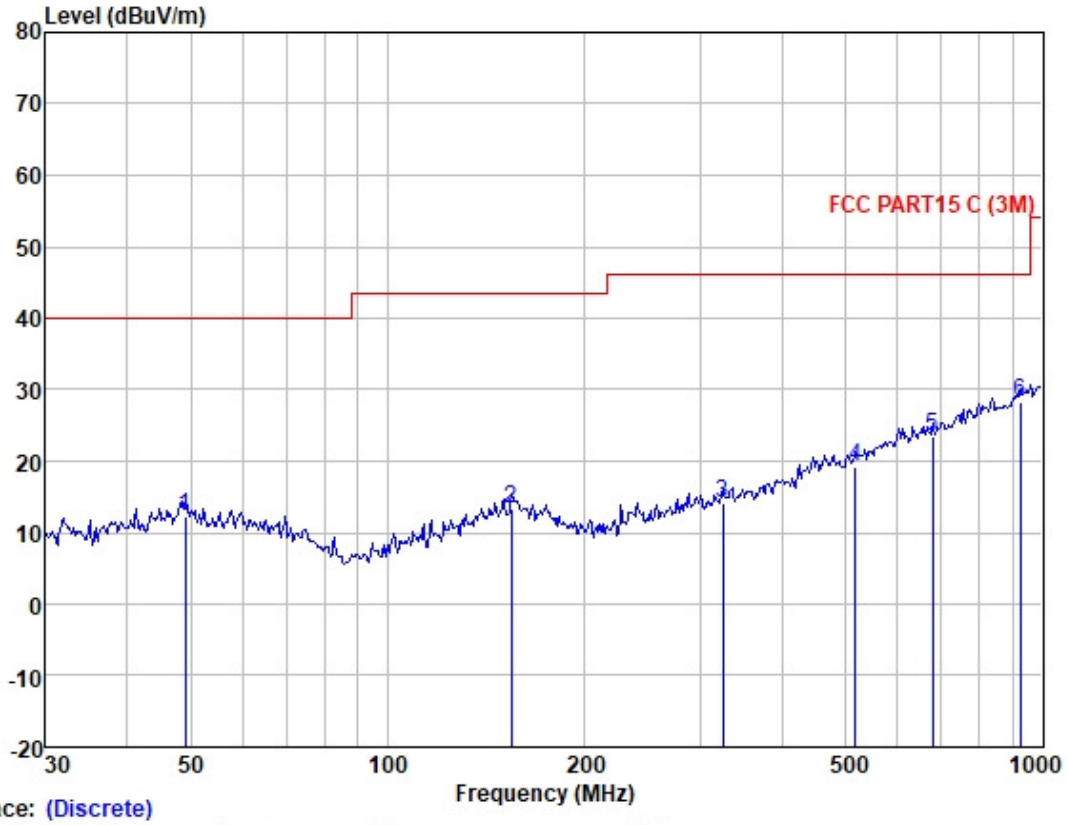

Trace: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	49.014	24.37	13.95	1.19	27.17	12.34	40.00	-27.66	HORIZONTAL	QP
2	154.279	24.44	13.78	2.09	26.87	13.44	43.50	-30.06	HORIZONTAL	QP
3	324.456	24.32	14.40	3.01	27.54	14.19	46.00	-31.81	HORIZONTAL	QP
4	517.248	25.31	18.17	3.84	28.05	19.27	46.00	-26.73	HORIZONTAL	QP
5	679.960	25.85	20.80	4.88	28.10	23.43	46.00	-22.57	HORIZONTAL	QP
6	925.756	25.78	23.73	6.63	27.89	28.25	46.00	-17.75	HORIZONTAL	QP

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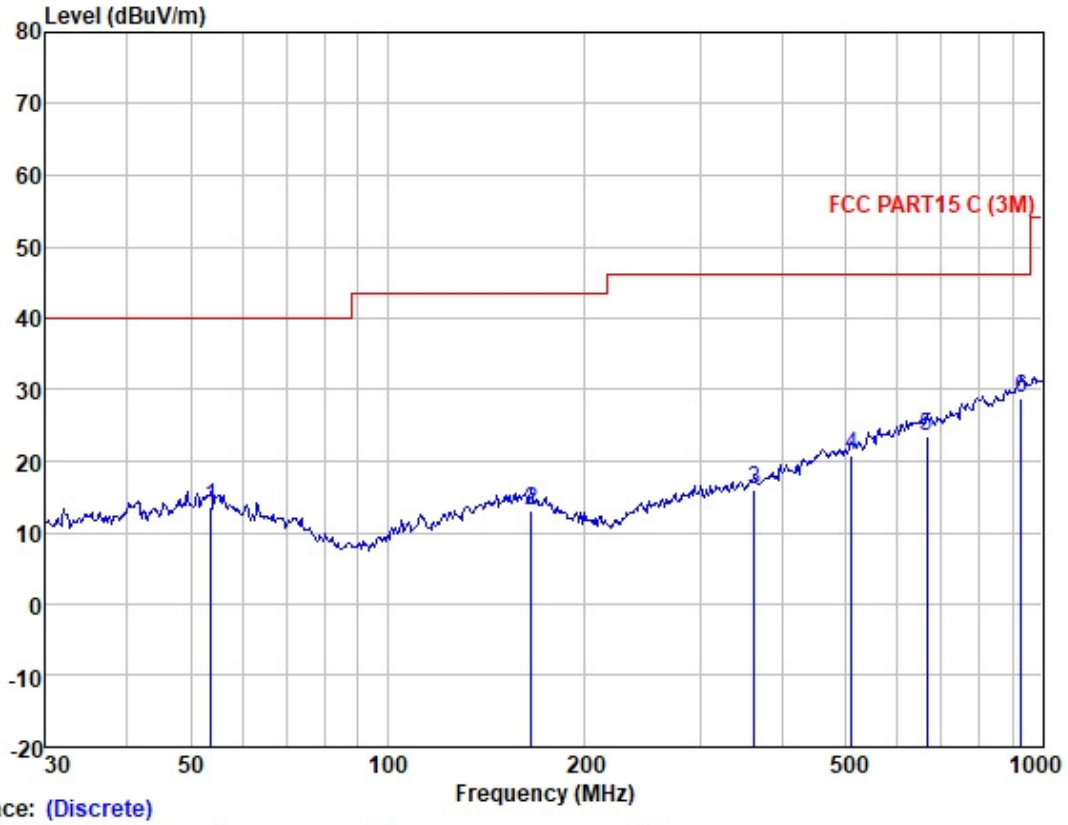

Trace: (Discrete)

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	53.693	25.78	13.83	1.25	27.17	13.69	40.00	-26.31	VERTICAL	QP
2	165.487	24.32	13.42	2.19	26.84	13.09	43.50	-30.41	VERTICAL	QP
3	362.985	25.55	14.95	3.33	27.79	16.04	46.00	-29.96	VERTICAL	QP
4	510.044	26.88	18.10	3.76	28.05	20.69	46.00	-25.31	VERTICAL	QP
5	665.804	25.93	20.65	4.90	28.10	23.38	46.00	-22.62	VERTICAL	QP
6	929.008	25.93	23.80	6.82	27.88	28.67	46.00	-17.33	VERTICAL	QP

--End of Report--

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