TEST REPORT

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Applicant:	Genius Factory, LLC
Address of Applicant:	21151 S. Western Ave #100, Torrance, California 90501, United States
Manufacturer/Factory:	Genius Factory, LLC
Address of Manufacturer/Factory:	21151 S. Western Ave #100, Torrance, California 90501, United States

Equipment Under Test (EUT)

Product Name:	27 mHz Transmitter and receiver
Model No.:	111-297
FCC ID:	2BK64-111-297
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.227
Date of sample receipt:	September 18, 2024
Date of Test:	September 19, 2024-October 14, 2024
Date of report issued:	October 14, 2024
Test Result :	PASS *

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

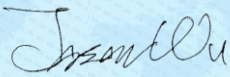
Authorized Signature:

Robinson Luo

Laboratory Manager

2 Version

Version No.	Date	Description
01	*October 14, 2024*	*Original*

Prepared By:  ***Date:*** *October 14, 2024*

Project Engineer

Check By:  ***Date:*** *October 14, 2024*

Reviewer

3 Contents

4 Test Summary

Test Item	Section in CFR 47	Result
Antenna Requirement	15.203/15.227	Pass
AC Power Line Conducted Emission	15.207	Pass
20dB Bandwidth	15.215(c)	Pass
Field Strength of the Fundamental Signal	15.227(a)	Pass
Radiated Emissions	15.227(b) & C 15.209	Pass

Remarks:

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *N/A: Not applicable. The product does not work while charging.*
3. *Test according to ANSI C63.10:2013*

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz-30MHz	3.1dB	(1)
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

5 General Information

5.1 General Description of EUT

Product Name:	27 mHz Transmitter and receiver
Model No.:	111-297
Serial No.:	N/A
Test sample(s) ID:	GTS2024090184-1
Sample(s) Status:	Engineer sample
Operation Frequency:	27.145MHz
Channel Number:	1
Modulation:	ASK
Antenna type:	Wire antenna
Antenna gain:	0dBi(Declared by applicant)
Power supply:	DC 3V

Remark:

1. Antenna gain information provided by the customer

2. The relevant information of the sample is provided by the entrusting company, and the laboratory is not responsible for its authenticity.

3. The report is for TX device only.

5.2 Test mode

Transmitter mode	Keep the EUT in continuously transmitting.

Pre-test mode.

GTS has verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:

Axis	X	Y	Z
Field Strength(dBuV/m)	55.67	56.28	54.27

Final Test Mode:

According to ANSI C63.10 standards, the test results are both the “worst case” and “worst setup”: Y axis (see the test setup photo)

5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number
GW	DC POWER SUPPLY	GPR-6030D	EF924756

5.4 Test Facility

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

● **FCC—Registration No.: 381383**

Designation Number: CN5029

Global United Technology Services Co., Ltd., Shenzhen 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 files.

● **ISED—Registration No.: 9079A**

CAB identifier: CN0091

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of ISED for radio equipment testing

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

6 Equipment List

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Jun. 22, 2024	Jun. 21, 2027
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Apr. 11, 2024	Apr. 10, 2025
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	GTS640	Mar. 19, 2023	Mar. 18, 2025
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	Apr. 17, 2023	Apr. 16, 2025
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	Apr. 11, 2024	Apr. 10, 2025
8	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov. 13, 2023	Nov.12, 2024
9	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	Apr. 11, 2024	Apr. 10, 2025
10	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	Apr. 11, 2024	Apr. 10, 2025
11	Horn Antenna (18-26.5GHz)	/	UG-598A/U	GTS664	Oct. 29, 2023	Oct. 28, 2024
12	Horn Antenna (26.5-40GHz)	A.H Systems	SAS-573	GTS665	Oct. 29, 2023	Oct. 28, 2024
13	FSV·Signal Analyzer (10Hz-40GHz)	Keysight	FSV-40-N	GTS666	Mar. 12, 2024	Mar. 11, 2025
14	Amplifier	/	LNA-1000-30S	GTS650	Apr. 11, 2024	Apr. 10, 2025
15	CDNE M2+M3-16A	HCT	30MHz-300MHz	GTS692	Nov. 08, 2023	Nov. 07, 2024
16	Wideband Amplifier	/	WDA-01004000-15P35	GTS602	Apr. 11, 2024	Apr. 10, 2025
17	Thermo meter	JINCHUANG	GSP-8A	GTS643	Apr. 18, 2024	Apr. 17, 2025
18	RE cable 1	GTS	N/A	GTS675	Jul. 02, 2024	Jul. 01, 2025
19	RE cable 2	GTS	N/A	GTS676	Jul. 02, 2024	Jul. 01, 2025
20	RE cable 3	GTS	N/A	GTS677	Jul. 02, 2024	Jul. 01, 2025
21	RE cable 4	GTS	N/A	GTS678	Jul. 02, 2024	Jul. 01, 2025
22	RE cable 5	GTS	N/A	GTS679	Jul. 02, 2024	Jul. 01, 2025
23	RE cable 6	GTS	N/A	GTS680	Jul. 02, 2024	Jul. 01, 2025
24	RE cable 7	GTS	N/A	GTS681	Jul. 05, 2024	Jul. 04, 2025
25	RE cable 8	GTS	N/A	GTS682	Jul. 05, 2024	Jul. 04, 2025

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	Jul. 12, 2022	Jul. 11, 2027
2	EMI Test Receiver	R&S	ESCI 7	GTS552	Apr. 11, 2024	Apr. 10, 2025
3	LISN	ROHDE & SCHWARZ	ENV216	GTS226	Apr. 11, 2024	Apr. 10, 2025
4	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
6	Thermo meter	JINCHUANG	GSP-8A	GTS642	Apr. 18, 2024	Apr. 17, 2025
7	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	Apr. 11, 2024	Apr. 10, 2025
8	ISN	SCHWARZBECK	NTFM 8158	GTS565	Apr. 11, 2024	Apr. 10, 2025
9	High voltage probe	SCHWARZBECK	TK9420	GTS537	Apr. 11, 2024	Apr. 10, 2025
10	Antenna end assembly	Weinschel	1870A	GTS560	Apr. 11, 2024	Apr. 10, 2025

RF Conducted Test:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	Apr. 13, 2024	Apr. 12, 2025
2	EMI Test Receiver	R&S	ESCI 7	GTS552	Apr. 13, 2024	Apr. 12, 2025
3	PSA Series Spectrum Analyzer	Agilent	E4440A	GTS536	Apr. 13, 2024	Apr. 12, 2025
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	Apr. 13, 2024	Apr. 12, 2025
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	Apr. 13, 2024	Apr. 12, 2025
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	Apr. 13, 2024	Apr. 12, 2025
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	Apr. 13, 2024	Apr. 12, 2025
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	Apr. 13, 2024	Apr. 12, 2025
9	Thermo meter	JINCHUANG	GSP-8A	GTS641	Apr. 18, 2024	Apr. 17, 2025

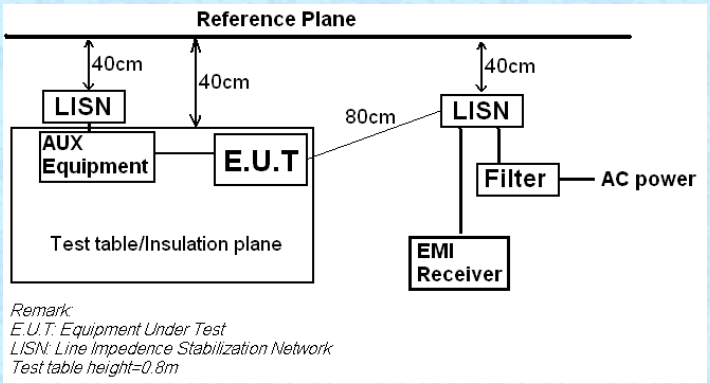
General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Barometer	KUMAO	SF132	GTS647	Apr. 18, 2024	Apr. 17, 2025

7 Test results and Measurement Data

7.1 Antenna Requirement

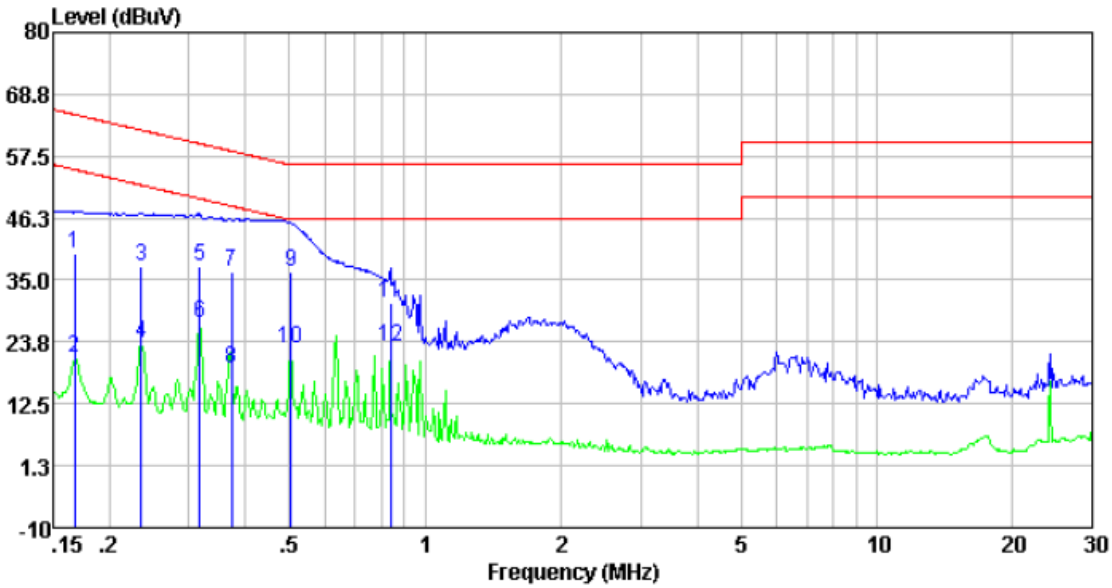
Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
E.U.T Antenna:	
The antenna is wire antenna, reference to the appendix II for details.	

7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207					
Test Method:	ANSI C63.10:2013					
Test Frequency Range:	150KHz to 30MHz					
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto					
Limit:	Frequency range (MHz)	Limit (dBuV)				
		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:						
Test procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

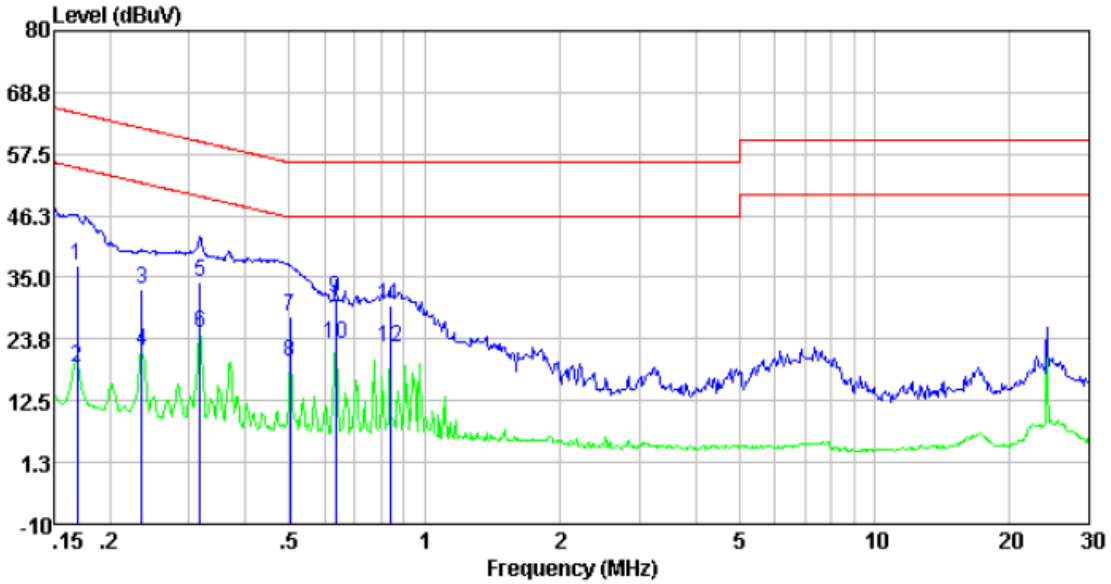
Measurement data:

Line:



Freq	Reading level	LISN/ISN factor	Cable loss	Level	Limit level	Over limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.17	29.91	9.90	0.01	39.82	65.08	-25.26	QP
0.17	10.89	9.90	0.01	20.80	55.08	-34.28	Average
0.24	28.03	9.58	0.01	37.62	62.26	-24.64	QP
0.24	13.99	9.58	0.01	23.58	52.26	-28.68	Average
0.32	27.74	9.65	0.01	37.40	59.80	-22.40	QP
0.32	17.40	9.65	0.01	27.06	49.80	-22.74	Average
0.37	27.04	9.61	0.01	36.66	58.43	-21.77	QP
0.37	9.17	9.61	0.01	18.79	48.43	-29.64	Average
0.50	26.73	9.86	0.01	36.60	56.00	-19.40	QP
0.50	12.52	9.86	0.01	22.39	46.00	-23.61	Average
0.84	21.05	9.74	0.03	30.82	56.00	-25.18	QP
0.84	13.22	9.74	0.03	22.99	46.00	-23.01	Average

Neutral:

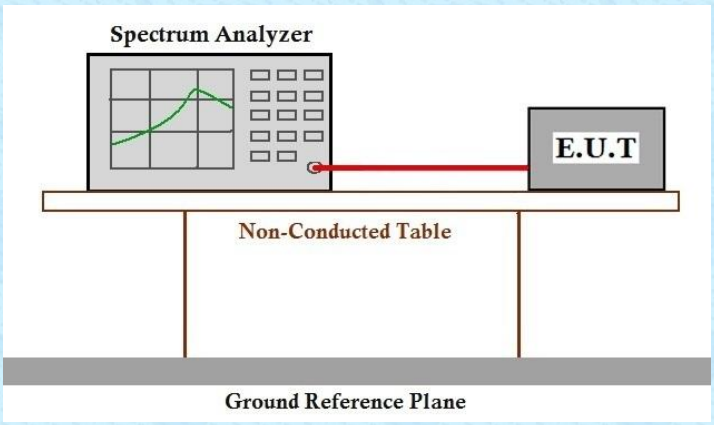


Freq	Reading level	LISN/ISN factor	Cable loss	Level	Limit level	Over limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.17	27.05	9.96	0.01	37.02	65.03	-28.01	QP
0.17	8.47	9.96	0.01	18.44	55.03	-36.59	Average
0.24	23.02	9.85	0.01	32.88	62.26	-29.38	QP
0.24	11.66	9.85	0.01	21.52	52.26	-30.74	Average
0.32	24.50	9.78	0.01	34.29	59.80	-25.51	QP
0.32	15.09	9.78	0.01	24.88	49.80	-24.92	Average
0.50	18.13	9.76	0.01	27.90	56.00	-28.10	QP
0.50	9.67	9.76	0.01	19.44	46.00	-26.56	Average
0.63	21.21	9.86	0.02	31.09	56.00	-24.91	QP
0.63	13.04	9.86	0.02	22.92	46.00	-23.08	Average
0.84	19.83	9.89	0.03	29.75	56.00	-26.25	QP
0.84	12.28	9.89	0.03	22.20	46.00	-23.80	Average

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss

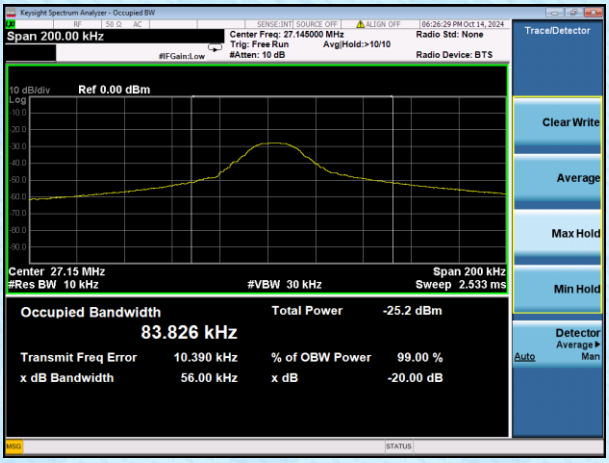
7.3 20dB Bandwidth

Test Requirement:	47 CFR Part 15, Subpart C 15.215(c)					
Test Method:	ANSI C63.10:2013					
Test setup:						
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1 012mbar
Test Instruments:	Refer to section 6 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					

Measurement data:

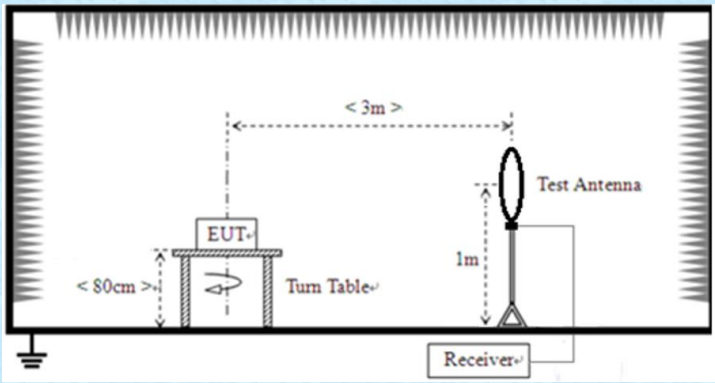
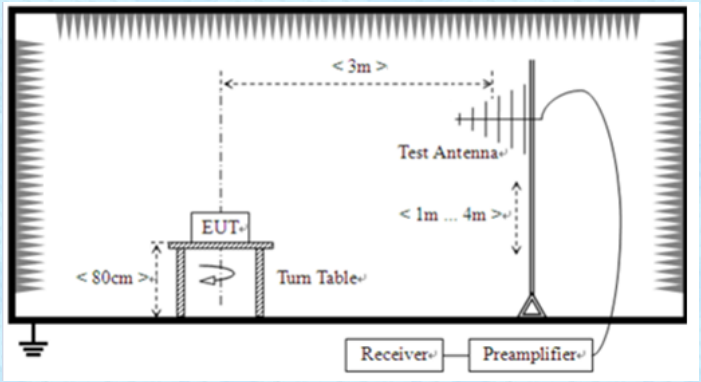
Mode	Frequency (MHz)	-20dB Bandwidth (KHz)	Limit	Conclusion
TX	27.145	56.00	N/A	Pass

Test plot as follows:



7.4 Field Strength of the Fundamental Signal and Radiated Emissions

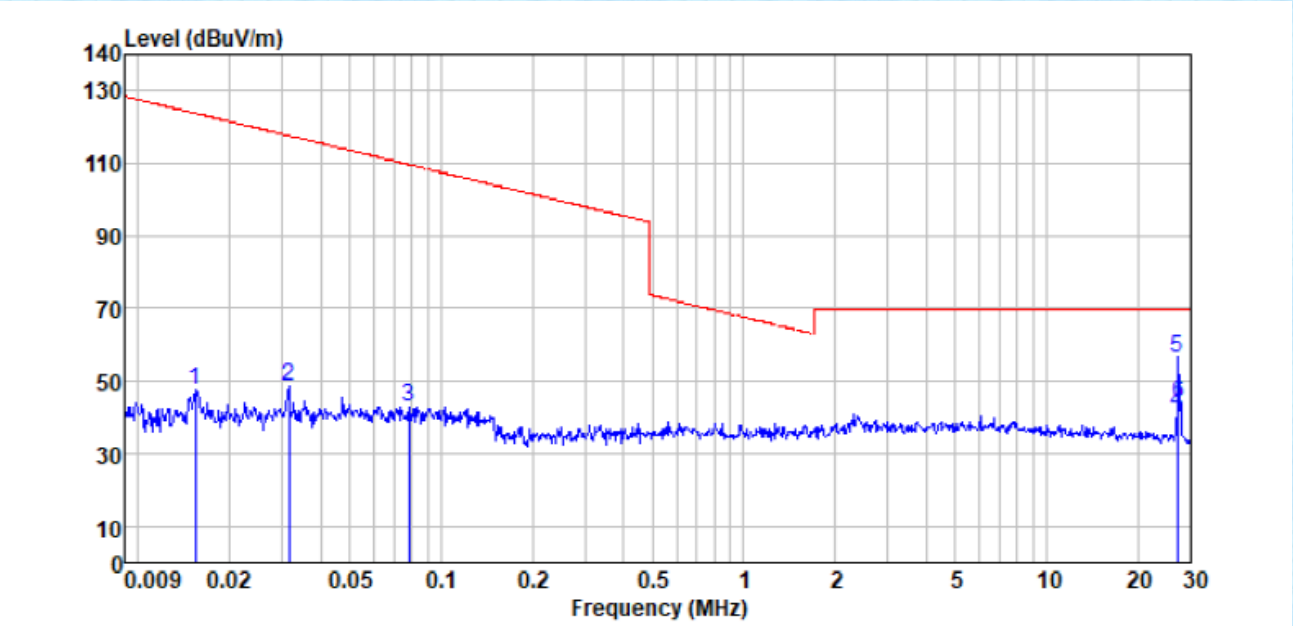
<table>
<tr><td>Test Requirement:</td><td>47 CFR Part 15, Subpart C 15.227(a), 15.227(b) & 15.209</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td>9kHz to 1000MHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Limit:
(Field strength of the fundamental signal)</td><td>
<table>
<tr><th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr>
<tr><td rowspan="2">26.96-27.28MHz</td><td>80</td><td>Average Value</td></tr>
<tr><td>100</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(Radiated Emissions)</td><td>
<table>
<tr><th>Frequency(MHz)</th><th>Field strength (microvolts/meter)</th><th>Measurement distance(meters)</th></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>30</td></tr>
<tr><td colspan="3">Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz and 110-490kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.</td></tr>
<tr><th>Frequency(MHz)</th><th>Field strength (microvolts/meter)</th><th>Measurement distance(meters)</th></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>
<tr><td colspan="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.</td></tr>
</table>
</td></tr>
</table>

Test setup:	Below 30MHz  Below 1GHz 
Test Procedure:	Below 30MHz: 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 fixed at one meter d. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. e. 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. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report. Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Facto 30Mhz-1000MHz: 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. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report. Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	50%	Press.:	1 010mbar
Test voltage:	DC 3V					
Test results:	Pass					

Measurement data:

9kHz~30MHz



No. Mk.	Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
1	0.015	26.28	21.08	0.16	0.00	47.52	123.87	-76.35	PK
2	0.031	27.71	20.80	0.17	0.00	48.68	117.67	-68.99	PK
3	0.078	22.33	20.26	0.20	0.00	42.79	109.71	-66.92	PK
4	26.960	19.03	21.19	0.98	0.00	41.20	69.54	-28.34	QP
5*	27.145	34.12	21.17	0.99	0.00	56.28	100.00	-43.72	PK
6	27.280	21.54	21.14	0.99	0.00	43.67	69.54	-25.87	QP

Remarks:

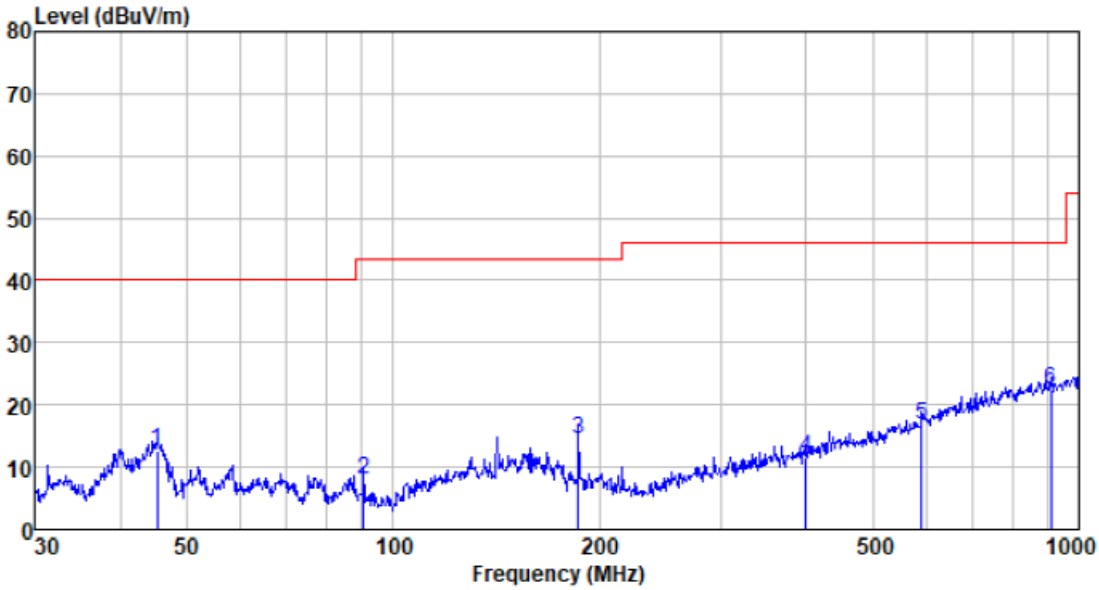
1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
   Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

2) *: Field Strength of the Fundamental Signal.

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. So, only the above measurement data were shown in the report.

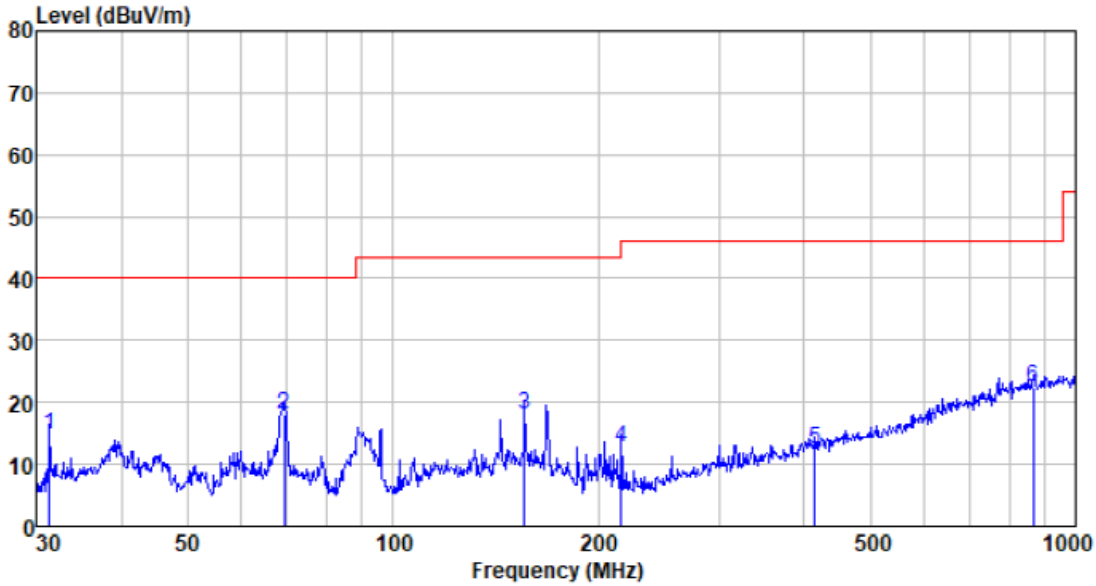
30MHz~1GHz

Mode:	Transmitting mode	Polarization:	Horizontal



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
45.217	30.20	13.48	1.33	32.30	12.71	40.00	-27.29	QP
90.537	30.00	8.65	1.78	32.46	7.97	43.50	-35.53	QP
186.441	33.20	10.96	2.76	32.41	14.51	43.50	-28.99	QP
400.432	25.04	14.81	3.88	32.25	11.48	46.00	-34.52	QP
588.905	25.44	18.68	4.58	31.87	16.83	46.00	-29.17	QP
909.667	24.57	23.19	5.76	31.10	22.42	46.00	-23.58	QP

Mode:	Transmitting mode	Polarization:	Vertical



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
31.399	33.34	12.50	1.13	32.30	14.67	40.00	-25.33	QP
69.357	37.85	10.86	1.64	32.38	17.97	40.00	-22.03	QP
155.910	33.20	14.80	2.52	32.44	18.08	43.50	-25.42	QP
216.024	32.31	9.76	2.96	32.38	12.65	46.00	-33.35	QP
414.722	25.61	15.09	3.93	32.24	12.39	46.00	-33.61	QP
866.088	25.28	22.72	5.65	31.10	22.55	46.00	-23.45	QP

Remark:

1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

------End------