

TEST REPORT

Application No.: SZEM1905014633CR
Applicant: ZHONGRUN ELECTRON & TOYS CO.LTD
Address of Applicant: Laimei Industrial Chenghai Borough, Shan Tou City Guangdong, China 515825
Manufacturer: ZHONGRUN ELECTRON & TOYS CO.LTD
Address of Manufacturer: Laimei Industrial Chenghai Borough, Shan Tou City Guangdong, China 515825
Equipment Under Test (EUT):
EUT Name: Walkie talkie series
Model No.: ZR55118, 310, 311, ZR205, ZR207, ZR502, ZR504, ZR601, ZR603ABC, ZR604ABC, ZR605ABC, ZR1129, ZR33115ABC, ZR33116ABC, ZR33124ABC, ZR55116, ZR55119ABCDE, ZR1132, ZR1133, ZR1134, ZR1135, ZR1136, ZR1137, ZR1138, ZR1139, ZR1140, ZR1141, ZR1142, ZR1143, ZR300, ZR301, ZR304AB, ZR305AB, ZE306AB, ZR307, ZR308, ZR309, ZR312, ZR313, ZR66881AB, ZR55114, ZR55114B, ZR1199AB, ZR1120AB, ZR1122, ZR1122B, ZR801, ZR802, ZR803, ZR804, ZR805, ZR806, ZR807, ZR303, ZR369 ♣
♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
FCC ID: XCQZRCT5511866
Standard(s) : 47 CFR Part 15, Subpart C 15.235
Date of Receipt: 2019-05-30
Date of Test: 2019-06-04 to 2019-06-06
Date of Issue: 2019-06-21

Test Result:	Pass*
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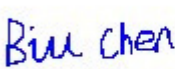
* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu

Keny Xu
EMC Laboratory Manager



Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2019-06-21		Original

Authorized for issue by:			
			
		Bill Chen /Project Engineer	
			
		Eric Fu /Reviewer	

2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.235	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 15.235	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass
Field Strength of the Fundamental Signal (15.235(a))	47 CFR Part 15, Subpart C 15.235	ANSI C63.10 (2013) Section 6.4	47 CFR Part 15, Subpart C 15.235	Pass
Radiated Emissions(9kHz-30MHz)	47 CFR Part 15, Subpart C 15.235	ANSI C63.10 (2013) Section 6.4 & 6.5	47 CFR Part 15, Subpart C 15.235 & 15.209	Pass
Radiated Emissions(30MHz-1GHz)	47 CFR Part 15, Subpart C 15.235	ANSI C63.10 (2013) Section 6.4 & 6.5	47 CFR Part 15, Subpart C 15.235 & 15.209	Pass

Declaration of EUT Family Grouping:

Model No.: ZR55118, 310, 311, ZR205, ZR207, ZR502, ZR504, ZR601, ZR603ABC, ZR604ABC, ZR605ABC, ZR1129, ZR33115ABC, ZR33116ABC, ZR33124ABC, ZR55116, ZR55119ABCDE, ZR1132, ZR1133, ZR1134, ZR1135, ZR1136, ZR1137, ZR1138, ZR1139, ZR1140, ZR1141, ZR1142, ZR1143, ZR300, ZR301, ZR304AB, ZR305AB, ZE306AB, ZR307, ZR308, ZR309, ZR312, ZR313, ZR66881AB, ZR55114, ZR55114B, ZR1199AB, ZR1120AB, ZR1122, ZR1122B, ZR801, ZR802, ZR803, ZR804, ZR805, ZR806, ZR807, ZR303, ZR369

Only the model ZR55118 was tested, since the electrical circuit design, layout, components used, internal wiring and functions were identical for the above models, with only difference on colour, appearance and packaging.



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4 General Information

4.1 Details of E.U.T.

Power supply:	Tx:DC 9.0V by 9.0V x 1"6F22" batteries
Operation Frequency:	49.86MHz
Modulation Type:	AM
Antenna Type:	Integra
Antenna Gain:	1.5dBi

4.2 Description of Support Units

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	20dB Bandwidth	$\pm 3\%$
2	E-Field	$\pm 4.5\text{dB}$
3	Radiated Spurious emission test	$\pm 4.5\text{dB}$
4	Temperature test	$\pm 1^\circ\text{C}$
5	Humidity test	$\pm 3\%$
6	Supply voltages	$\pm 1.5\%$
7	Time	$\pm 3\%$

4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

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

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

RF conducted test					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
DC Power Supply	ZhaoXin	PS-3005D	SEM011-05	2018-09-25	2019-09-24
Spectrum Analyzer (20Hz-43GHz)	Rohde & Schwarz	FSU43	SEM004-08	2019-04-12	2020-04-11
Signal Generator (9kHz-40GHz)	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.6	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-01	2018-07-12	2019-07-11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SEM002-15	2019-04-01	2020-03-31

Field Strength of the Fundamental Signal (15.235(a))					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2018-07-12	2019-07-11
EMI Test Receiver	Agilent Technologies	N9038A	SEM004-05	2018-09-25	2019-09-24
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2019-04-01	2020-03-31

Radiated Emissions(30MHz-1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2018-07-12	2019-07-11
EMI Test Receiver	Agilent Technologies	N9038A	SEM004-05	2018-09-25	2019-09-24
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26



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Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2019-04-01	2020-03-31
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General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2018-09-27	2019-09-26
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2018-09-27	2019-09-26
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2018-09-27	2019-09-26
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2019-04-04	2020-04-03



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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 1.5dBi.

Antenna location: Refer to Appendix(Internal photos)



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7 Radio Spectrum Matter Test Results

7.1 20dB Bandwidth

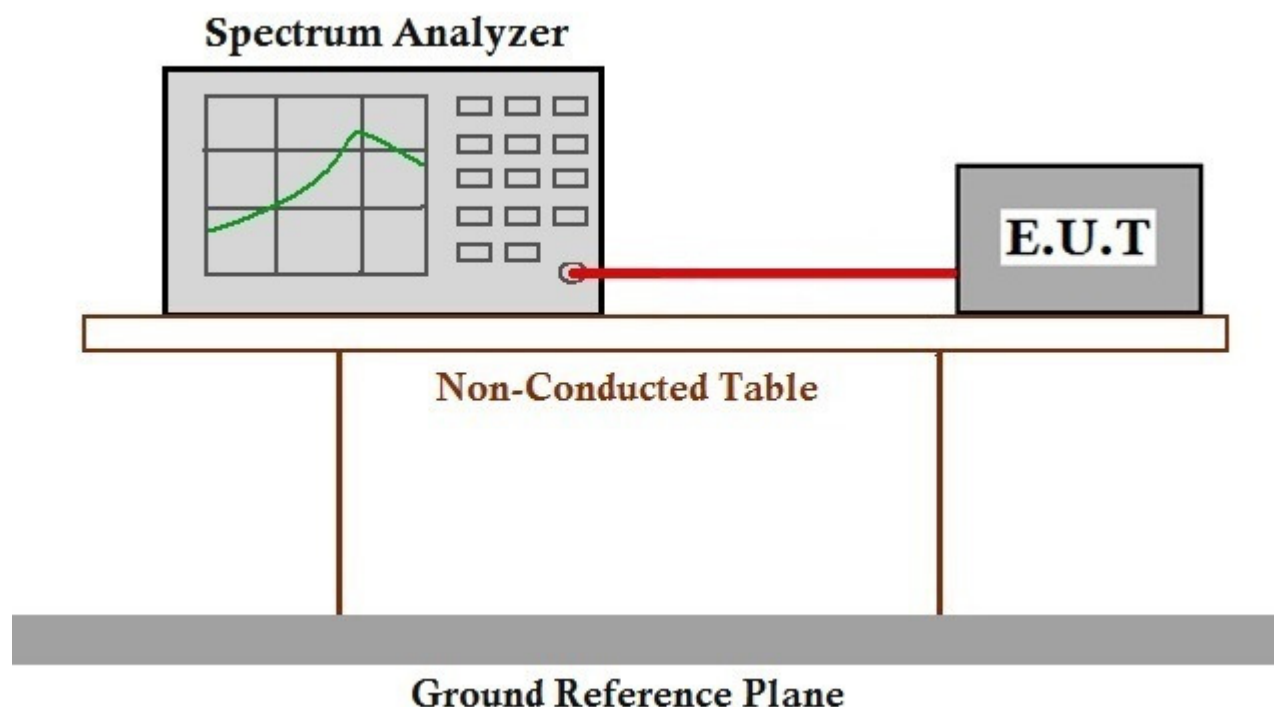
Test Requirement 47 CFR Part 15, Subpart C 15.215
Test Method: ANSI C63.10 (2013) Section 6.9

7.1.1 E.U.T. Operation

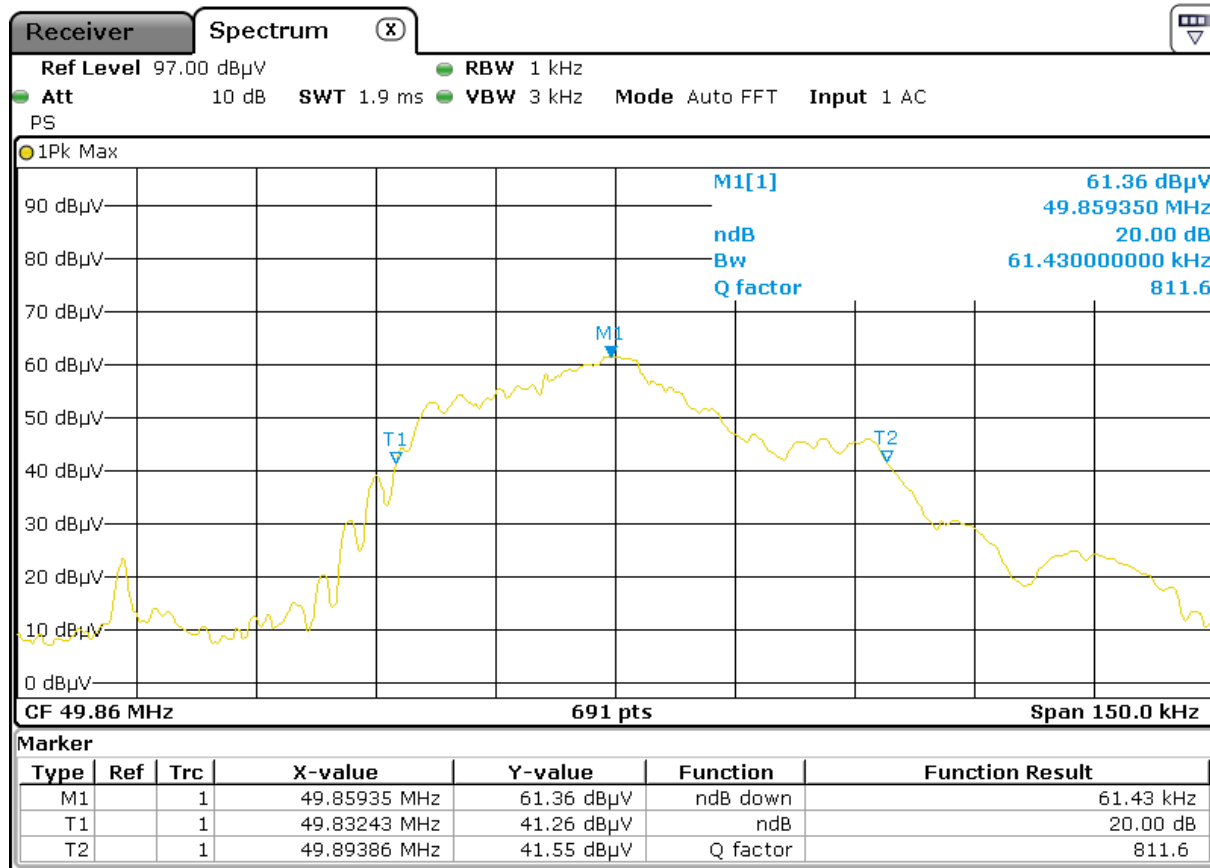
Operating Environment:

Temperature: 24.9 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar
Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data



7.2 Field Strength of the Fundamental Signal (15.235(a))

Test Requirement 47 CFR Part 15, Subpart C 15.235
Test Method: ANSI C63.10 (2013) Section 6.4
Measurement Distance: 3m
Limit: ≤ 10000 microvolts/meter at 3 meters, the emission limit is based on measurement instrumentation employing an average Detector. The provisions in § 15.35 for limiting peak emissions apply.

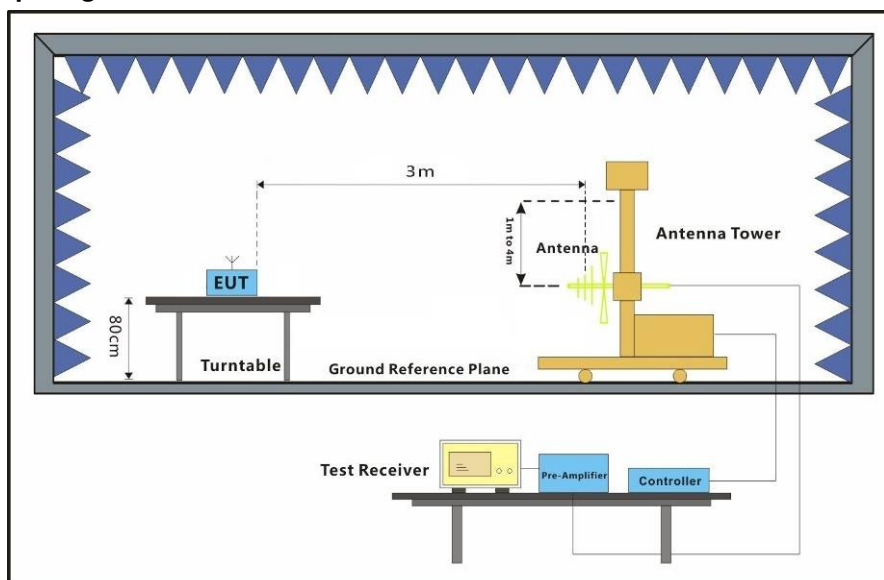


7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 24.9 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar
Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

7.2.2 Test Setup Diagram

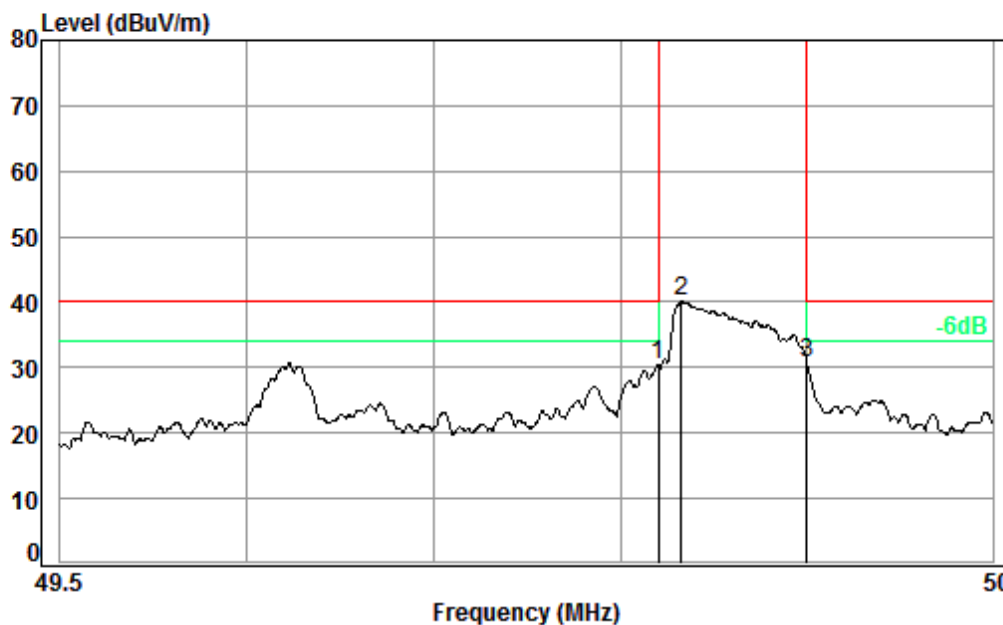


7.2.3 Measurement Procedure and Data

- 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.
- 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, quasi-peak or average method as specified and then reported in a data sheet.
- 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

Mode:a; Polarization:Horizontal



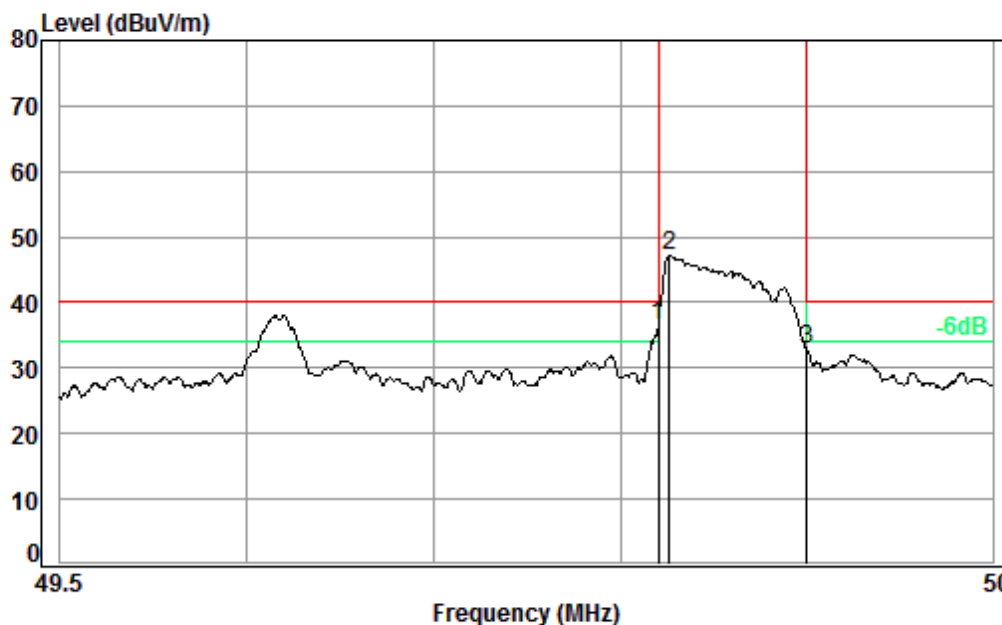
Condition: 3m HORIZONTAL

Job No. : 14633CR

Test mode: a

		Cable	Ant	Preamp	Read	Limit	Over
	Freq	Loss	Factor	Factor	Level	Level	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m
1	49.82	0.80	14.25	27.60	42.88	30.33	40.00
2	49.83	0.80	14.25	27.60	52.59	40.04	100.00
3 pp	49.90	0.80	14.23	27.60	43.21	30.64	40.00

Mode:a; Polarization:Vertical



Condition: 3m VERTICAL

Job No. : 14633CR

Test mode: a

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	49.82	0.80	14.25	27.60	49.12	36.57	40.00	-3.43
2	49.83	0.80	14.25	27.60	59.60	47.05	100.00	-52.95
3	49.90	0.80	14.23	27.60	45.36	32.79	40.00	-7.21

Remark:

- 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

7.3 Radiated Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.235 & 15.209
Test Method: ANSI C63.10 (2013) Section 6.4 & 6.5
Measurement Distance: 3m
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

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.

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
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.

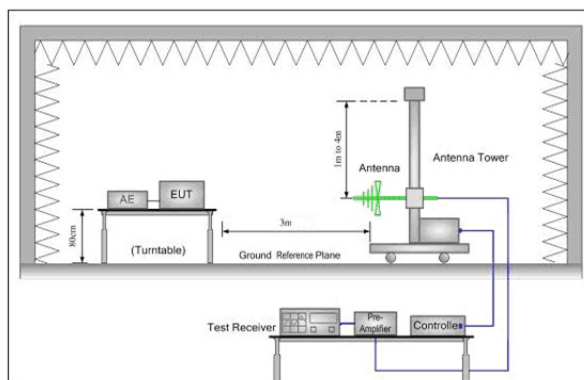
7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 24.9 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar

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

7.3.2 Test Setup Diagram

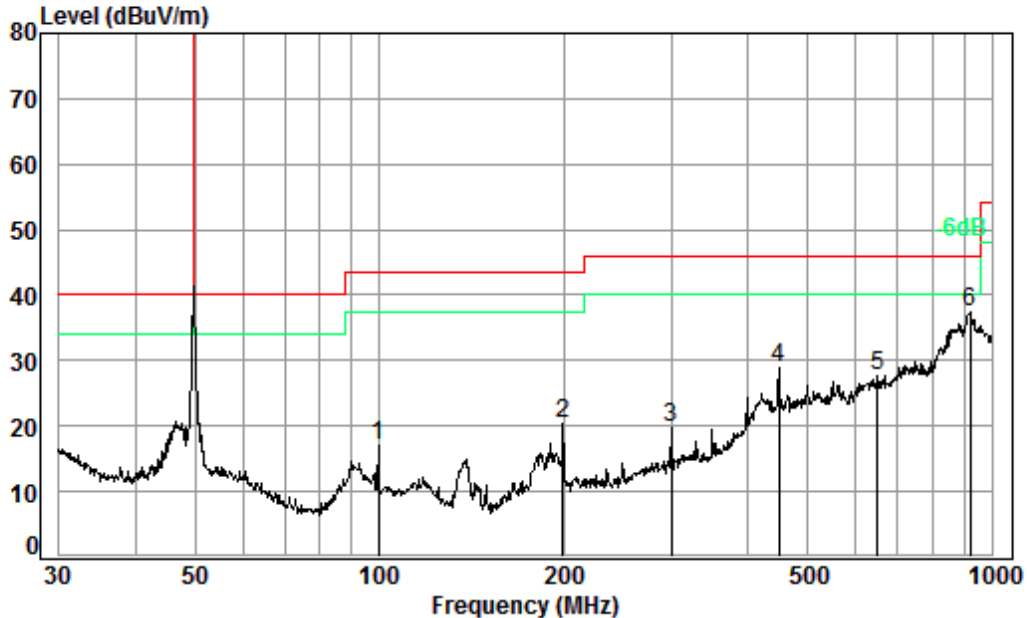


7.3.3 Measurement Procedure and Data

- 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



Mode:a; Polarization:Horizontal



Condition: 3m HORIZONTAL

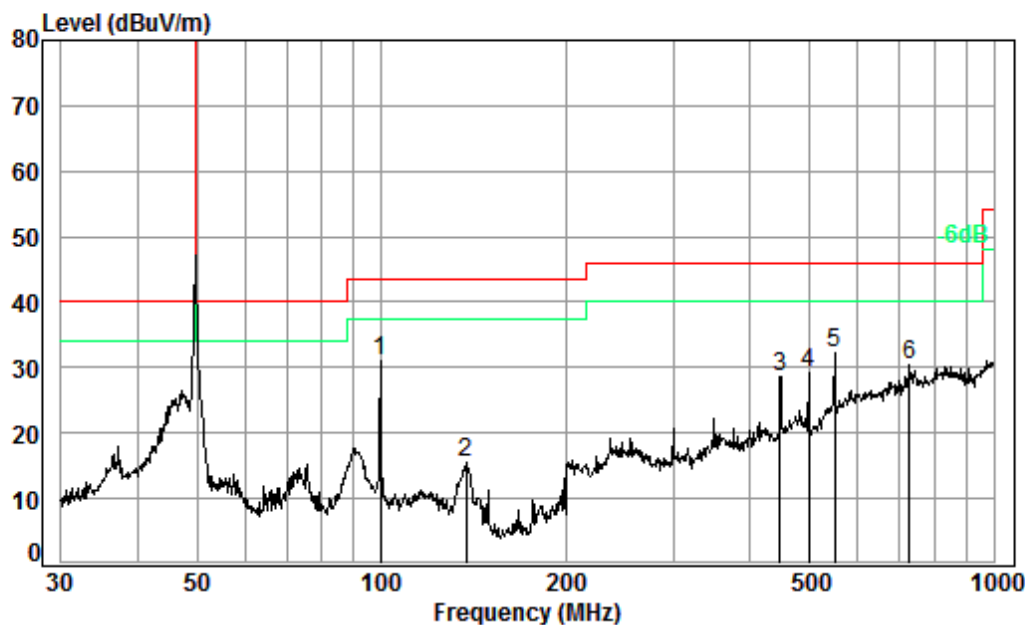
Job No. : 14633CR

Test mode: a

		Cable	Ant	Preamp	Read	Limit	Over
	Freq	Loss	Factor	Factor	Level	Line	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB
1	99.53	1.19	13.96	27.51	29.41	17.05	43.50 -26.45
2	199.29	1.40	16.48	27.53	29.88	20.23	43.50 -23.27
3	299.32	1.89	19.57	27.54	25.74	19.66	46.00 -26.34
4	449.56	2.41	23.55	27.81	30.89	29.04	46.00 -16.96
5	649.66	2.81	27.27	27.62	25.21	27.67	46.00 -18.33
6 pp	922.52	3.62	29.92	27.00	31.02	37.56	46.00 -8.44



Mode:a; Polarization:Vertical



Condition: 3m VERTICAL
Job No. : 14633CR
Test mode: a

		Cable	Ant	Preamp	Read	Limit	Over
	Freq	Loss	Factor	Factor	Level	Level	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB
1 pp	99.53	1.19	13.96	27.51	43.52	31.16	43.50 -12.34
2	137.42	1.29	13.63	27.52	28.20	15.60	43.50 -27.90
3	447.98	2.40	23.52	27.81	30.35	28.46	46.00 -17.54
4	499.42	2.59	24.59	27.88	29.97	29.27	46.00 -16.73
5	549.02	2.65	25.63	27.79	31.86	32.35	46.00 -13.65
6	729.36	2.99	28.08	27.51	27.01	30.57	46.00 -15.43

Remark:

The disturbance below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.



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8 Photographs

8.1 Test Setup

Refer to Setup Photos

8.2 EUT Constructional Details (EUT Photos)

Refer to EUT external and internal photos

- End of the Report -



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