

TEST REPORT

Application No.: SZEM1906014735CR(SGS HK No.:T31920240076EM)
Applicant / Manufacturer: New-Ray Toys Co., Ltd.
Address of Applicant / Manufacturer: Unit 9-11, 12/F Houston Centre, 63 Mody Road, Tsimshatsui East, Kowloon, Hong Kong
Equipment Under Test (EUT):
EUT Name: Radio Control Series - Vehicles, Cars, Trucks, Monster Truck, Tanks, Motorcycles, ATV, Snowmobile, Fire Engine, Bus, Forklift, Construction, Volvo, Tractor
Model No.: 89413
Ref. No.: Please refer to section 2
Requested Age Grading: Ages 3 years old and up
Labeled Age Grading: 5+
Country of Origin: China
FCC ID: Q4S89413
Standard(s) : 47 CFR Part 15, Subpart C 15.227
Date of Receipt: 2019-06-03
Date of Test: 2019-06-04 to 2019-06-07
Date of Issue: 2019-06-10

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		2019-06-10		Original

Authorized for issue by:			
			
		Peter Geng /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 15.227	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 15.227	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass
Field Strength of the Fundamental Signal (15.227(a))	47 CFR Part 15, Subpart C 15.227	ANSI C63.10 (2013) Section 6.4	47 CFR Part 15, Subpart C 15.227(a)	Pass
Radiated Emissions (9kHz-30MHz)	47 CFR Part 15, Subpart C 15.227	ANSI C63.10 (2013) Section 6.4&6.5	47 CFR Part 15, Subpart C 15.227(b) & C 15.209	Pass
Radiated Emissions (30MHz-1GHz)	47 CFR Part 15, Subpart C 15.227	ANSI C63.10 (2013) Section 6.4&6.5	47 CFR Part 15, Subpart C 15.227(b) & C 15.209	Pass



Ref. No.:

88483	88785	88893	01953	88555	01956	01693	01963	00655	88893A	88893B	SS-00645
88003A	88213	87943	88713	87865	87913A	88753	88763	88773	88793	88515	SS-34143
00783	00817	00645C	88525	SS-88753	88233	88643B	SS-88233B	SS-34123	SS-34133	SS-33173	SS-66146A
SS-34153	SS-34183	SS-34173	SS-33153	SS-33123	89826	88793A	08605	SS-88243	87933	88703	88703
888131	87533I	88714	87843	88825A	88825B	88793B	SS-87943B	SS-33143	88133	01955	SS-00645C
88553	88815	88803	88215A	87193A	SS-88253	87913	SS-33033	SS-33043	SS-33133C	SS-87843A	AS-88853
61395I	61395	61505	61515	61525	87775	87533	87543	87563	87573	87533AST	76505
20063	20073	1993	2003	01785	AS-20063	SS-66226	SS-87290	SS-88233C	88643C	8616	8617
SS-66126A	66166A	66176A	66086A	66096A	SS-66146B	SS-66126B	88896A	88633	88704A	AS-88763	8867
66156	66166	66176	66086	66096	SS-87073	88896	AS-88525	SS-88763	SS-88773	SS-87283	8791
8848	8821	8864	8871	8855	8857	8753	8851	88813I	8618	85353	87863
8619	8870	886771	8793	8794	8786	8852	88896B	88853	88863	88873	88883
88673	88473	88704	88595	88613	87293	88704B	88825	88573	87893	SS-87933	87933A
89393	89403	89413	SS-87293	SS-88713A	SS-88713B	88853A	AS-87293	SS-08605			



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4 General Information

4.1 Details of E.U.T.

Power supply:	Remote: DC 4.5V by 3x1.5V "AA" batteries Receiver: DC 6V by 4x1.5V "AA" batteries This report is for Remote only and the Receiver had been evaluated under FCC SDOC.
Nominal Frequency:	27.145MHz
Sample Type:	Portable production
Antenna Type:	Integral

4.2 Description of Support Units

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 7.25 \times 10^{-8}$
2	Occupied Bandwidth	$\pm 3\%$
3	Radiated Spurious emission test	$\pm 4.5\text{dB}$ (Below 1GHz)
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:

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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

20dB Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2018-09-25	2019-09-24
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2018-09-27	2019-09-26
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2018-07-12	2019-07-11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2018-09-25	2019-09-24

Field Strength of the Fundamental Signal (15.227(a))					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2018-03-31	2021-03-30
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM029-01	2018-07-12	2019-07-11
EMI Test Receiver (9kHz-7GHz)	Rohde & Schwarz	ESR	SEM004-03	2019-04-01	2020-03-31
Trilog-Broadband Antenna (30MHz-1GHz)	Schwarzbeck	VULB9168	SEM003-18	2016-06-29	2019-06-28
Pre-amplifier	Sonoma Instrument Co	310N	SEM005-04	2019-04-12	2020-04-11
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21

Radiated Emissions(9kHz-30MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2018-03-31	2021-03-30
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM029-01	2018-07-12	2019-07-11
EMI Test Receiver (9kHz-7GHz)	Rohde & Schwarz	ESR	SEM004-03	2019-04-01	2020-03-31
Trilog-Broadband Antenna (30MHz-1GHz)	Schwarzbeck	VULB9168	SEM003-18	2016-06-29	2019-06-28
Pre-amplifier	Sonoma Instrument Co	310N	SEM005-04	2019-04-12	2020-04-11



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Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21
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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
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2019-04-01	2020-03-31

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



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.

Antenna location: Refer to Appendix (external photos)



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7 Radio Spectrum Matter Test Results

7.1 20dB Bandwidth

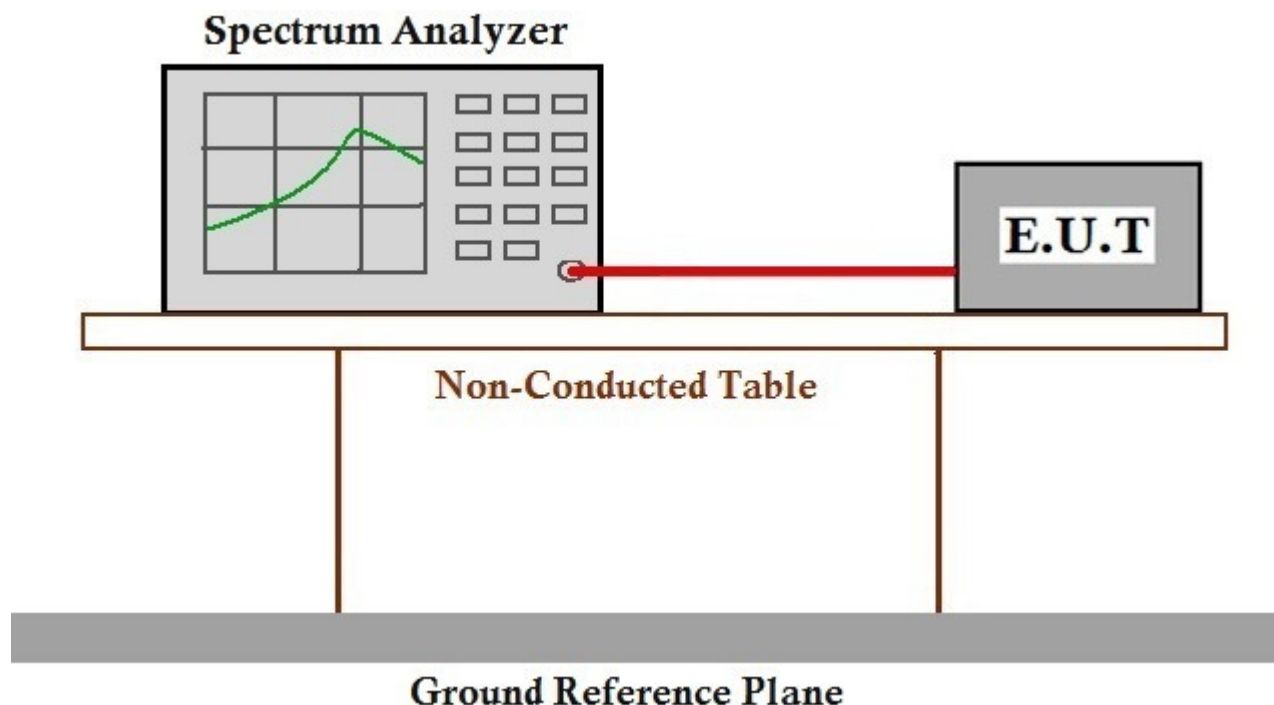
Test Requirement 47 CFR Part 15, Subpart C 15.215
Test Method: ANSI C63.10 (2013) Section 6.9

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 24.8 °C Humidity: 40.2 % RH Atmospheric Pressure: 1005 mbar
Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

7.1.2 Test Setup Diagram



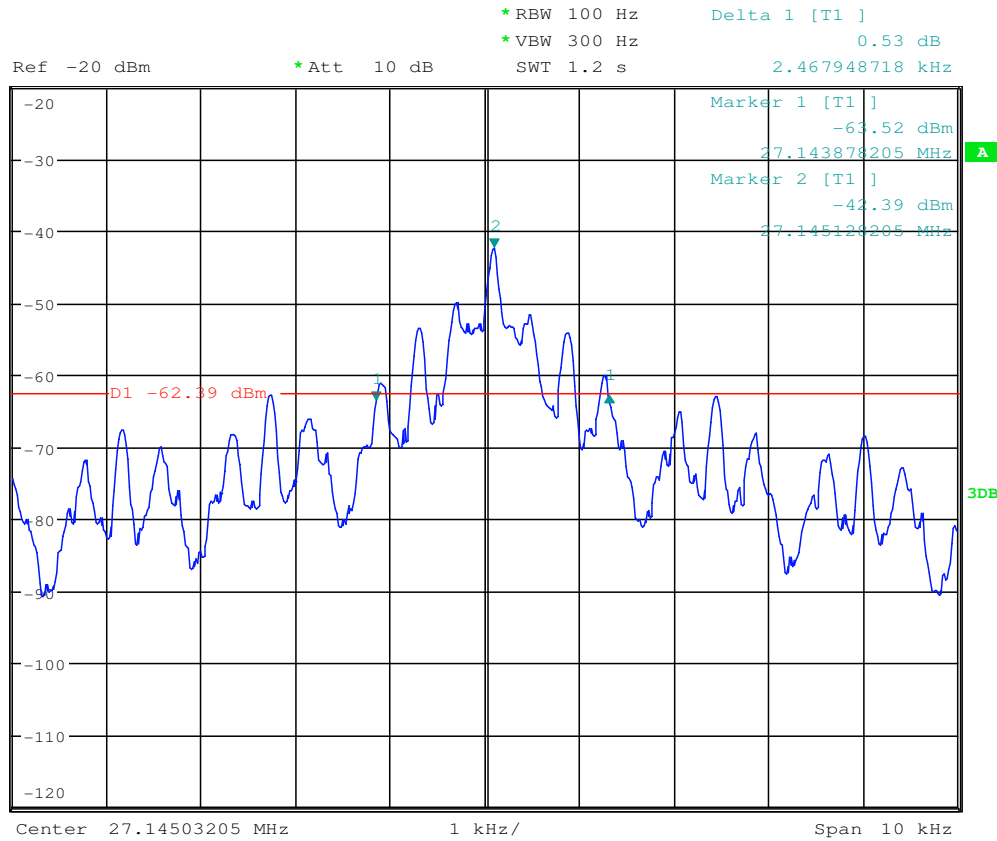
7.1.3 Measurement Procedure and Data



Mode:a



1 PK
VIEW



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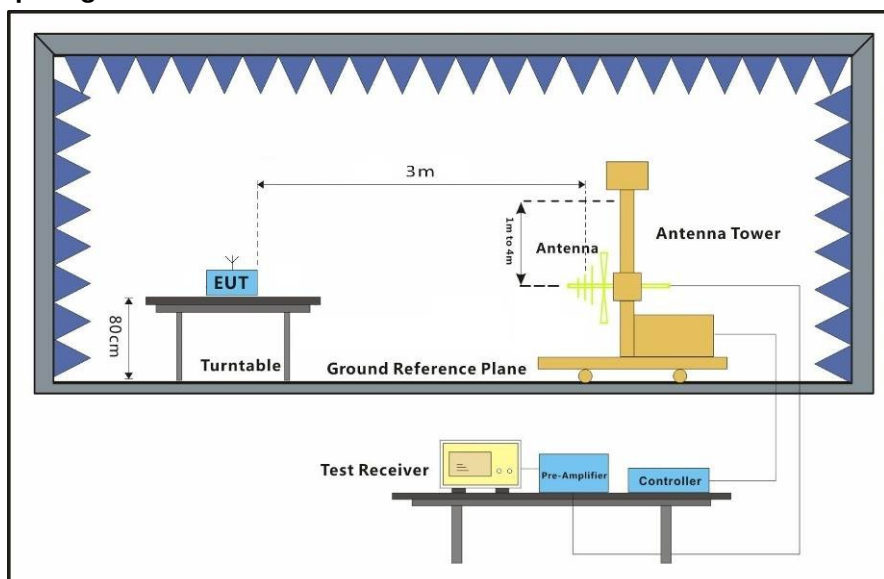
7.2 Field Strength of the Fundamental Signal (15.227(a))

Test Requirement 47 CFR Part 15, Subpart C 15.227(a)
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: 24.3 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar
Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

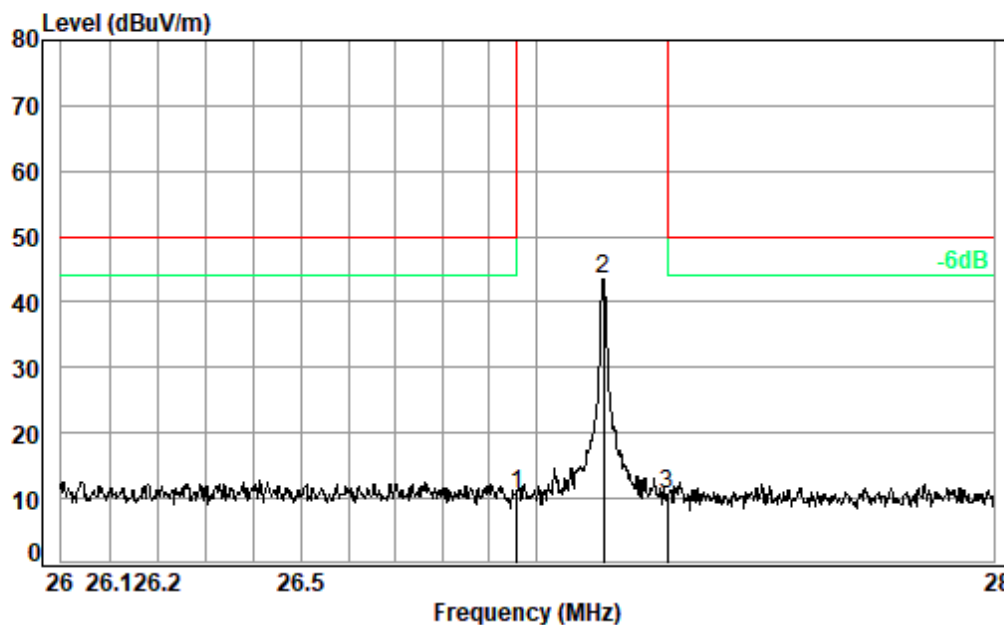
7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

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.

Mode:a; Polarization:Horizontal



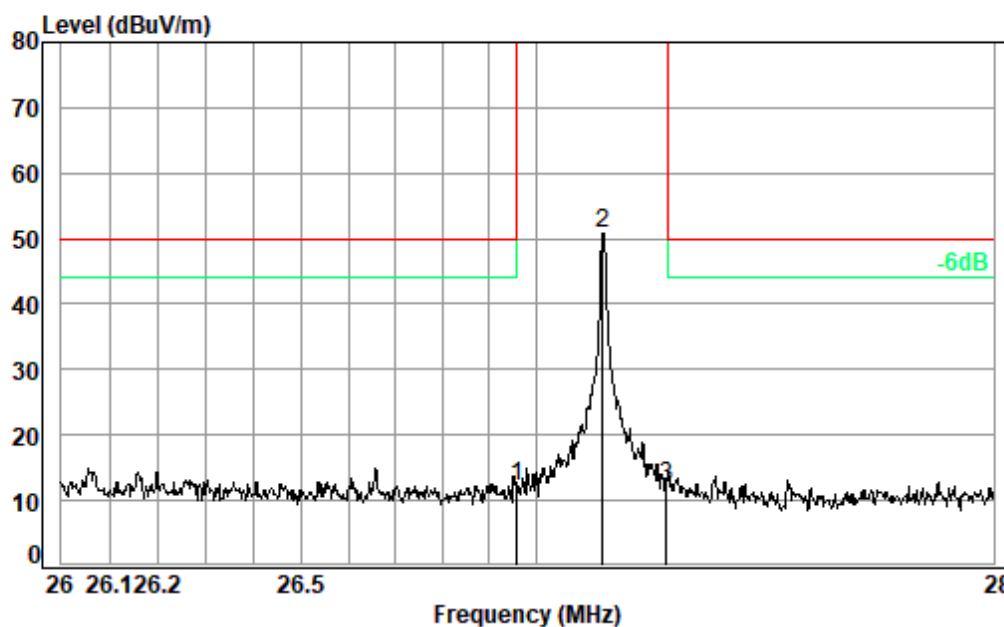
Condition: 3m HORIZONTAL

Job No. : 14735CR

Test Mode: a

		Cable	Ant	Preamp	Read		Limit	Over
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	pp	26.96	0.60	23.31	27.74	14.48	10.65	50.00 -39.35
2		27.15	0.60	23.22	27.74	47.54	43.62	100.00 -56.38
3		27.28	0.60	23.15	27.74	14.49	10.50	50.00 -39.50

Mode:a; Polarization:Vertical



Condition: 3m VERTICAL

Job No. : 14735CR

Test Mode: a

		Cable	Ant	Preamp	Read		Limit	Over
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	pp	26.96	0.60	23.31	27.74	16.02	12.19	50.00 -37.81
2		27.14	0.60	23.22	27.74	54.63	50.71	100.00 -49.29
3		27.28	0.60	23.15	27.74	16.06	12.07	50.00 -37.93

7.3 Radiated Emissions(9kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.227(b) & 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	30
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 the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, 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.

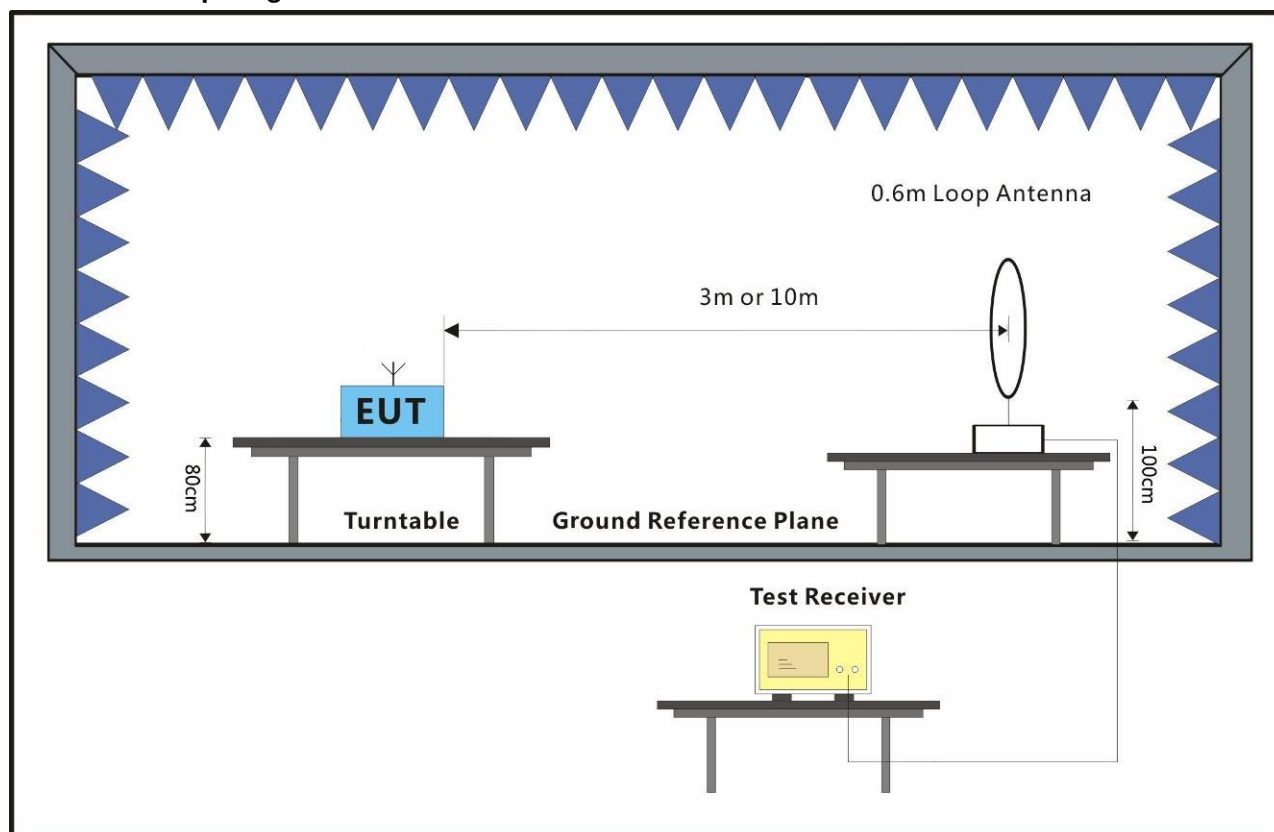
7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 23 °C Humidity: 54 % 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

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.

Remark: all tests margins are more than 10 dB relative to the limit, so it is not reported and it is deemed to comply with the requirement.



7.4 Radiated Emissions(30MHz-1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.227(b) & C 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)
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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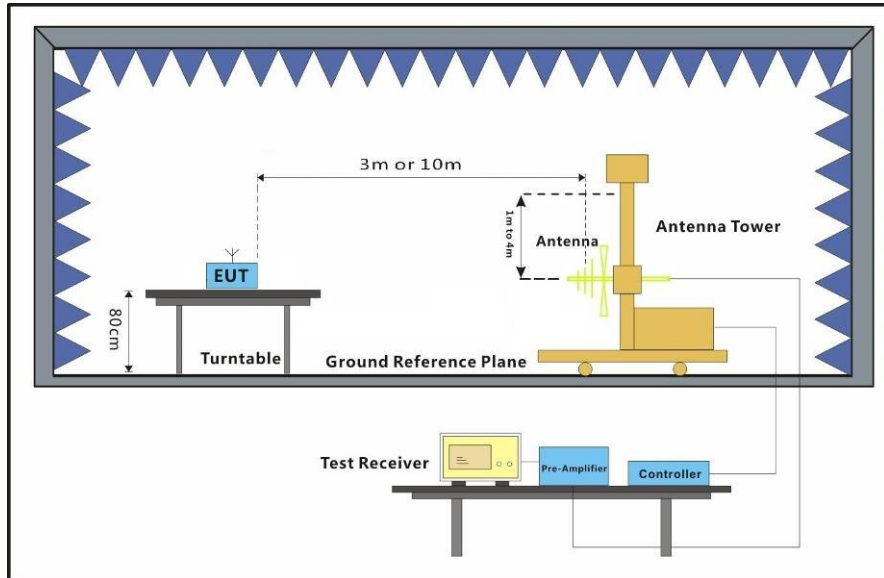
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 24.3 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar

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

7.4.2 Test Setup Diagram

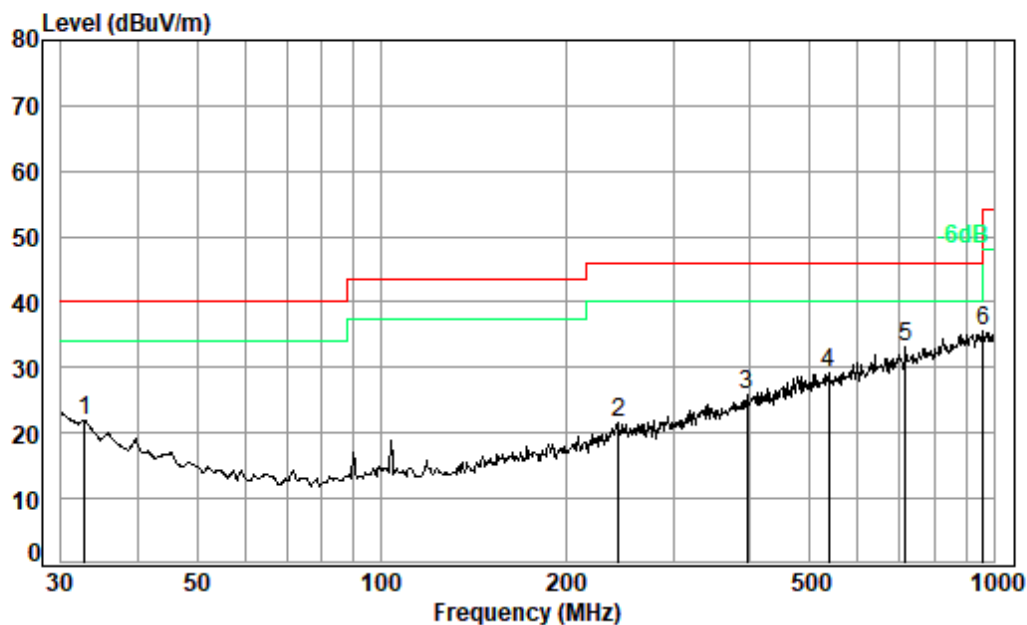


7.4.3 Measurement Procedure and Data

- 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



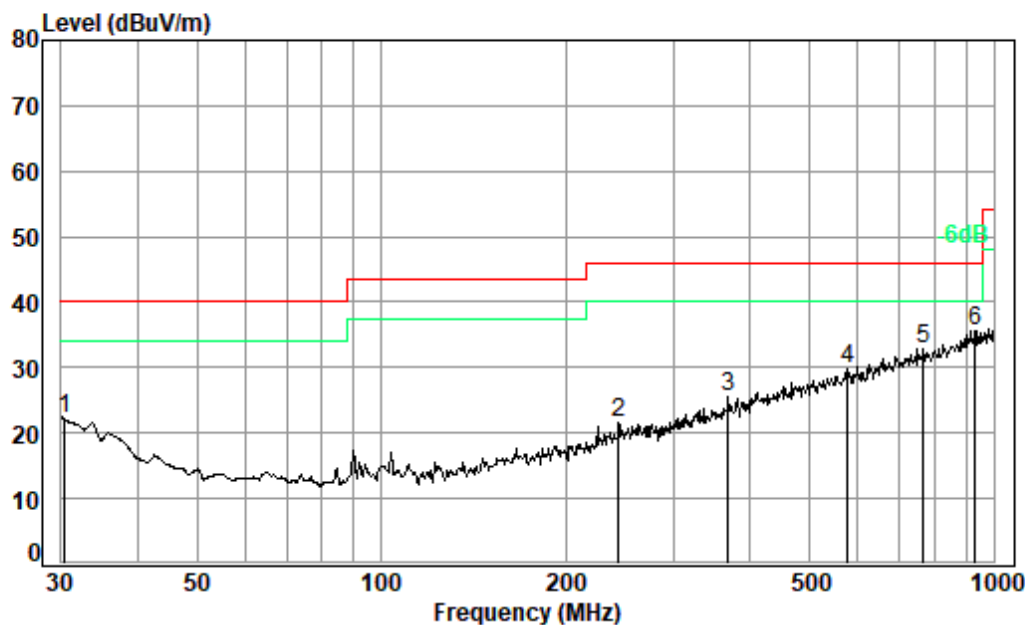
Condition: 3m HORIZONTAL

Job No. : 14735CR

Test Mode: a

	Freq	Cable	Ant	Preamp	Read	Limit	Over
	MHz	Loss	Factor	Factor	Level	Line	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB
1	32.84	0.60	20.93	27.72	28.24	22.05	40.00 -17.95
2	243.55	1.64	18.86	27.03	28.27	21.74	46.00 -24.26
3	395.73	2.19	22.30	27.40	28.71	25.80	46.00 -20.20
4	537.71	2.64	25.40	27.97	28.98	29.05	46.00 -16.95
5 pp	717.40	2.96	28.01	27.89	30.07	33.15	46.00 -12.85
6	960.65	3.66	30.11	27.06	28.76	35.47	54.00 -18.53

Mode:a; Polarization:Vertical



Condition: 3m VERTICAL

Job No. : 14735CR

Test Mode: a

	Freq	Cable	Ant	Preamp	Read	Limit	Over
	MHz	Loss	Factor	Factor	Level	Line	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB
1	30.42	0.60	22.26	27.73	26.96	22.09	40.00 -17.91
2	243.55	1.64	18.86	27.03	28.25	21.72	46.00 -24.28
3	367.88	2.11	21.59	27.27	29.19	25.62	46.00 -20.38
4	576.32	2.68	26.16	28.10	29.05	29.79	46.00 -16.21
5	766.11	3.11	28.31	27.79	29.26	32.89	46.00 -13.11
6 pp	933.01	3.63	29.97	27.16	29.14	35.58	46.00 -10.42



8 Photographs

8.1 Test Setup

Please refer to setup photos.

8.2 EUT Constructional Details (EUT Photos)

Please refer to external and internal photos for details.

- End of the Report -

