TEST REPORT

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Applicant:	AOXIN TOYS FACTORY
Address of Applicant:	CHENGHAI DISTRICT, SHANTOU CITY, China
Manufacturer/Factory:	AOXIN TOYS FACTORY
Address of Manufacturer/Factory:	CHENGHAI DISTRICT, SHANTOU CITY, China
Equipment Under Test (EUT)	
Product Name:	Remote control car toy
Model No.:	PT2292, PT1936, 911-212C, 11610, 911-517A, PT2100, 11219, 11607,11608,11609, 112411911-211C, 911-213C, 911-89, 911-350A, 911-352A, 911-356A, 911-389A, 911-396A,138-16C, 911-516A, 911-515A, 911-312A, 911-369A, 911-375B, 911-356A, 911-516A, 112409, 112410
FCC ID:	2ATAA-AT668899
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.227
Date of sample receipt:	May 06, 2019
Date of Test:	May 07-23, 2019
Date of report issued:	May 24, 2019
Test Result :	PASS *

Authorized Signature:

Robinson Lo

Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
01	*May 24, 2019*	*Original*

Prepared By:	Bill. Yuan	***Date:***	*May 24, 2019*
	Project Engineer		
Check By:	Robinson Lo	***Date:***	*May 24, 2019*
	Reviewer		

3 Contents

Page

1 COVER PAGE 1

2 VERSION 2

3 CONTENTS 3

4 TEST SUMMARY 4

4.1 MEASUREMENT UNCERTAINTY 4

5 GENERAL INFORMATION 5

5.1 GENERAL DESCRIPTION OF EUT 5
5.2 TEST MODE 6
5.3 DESCRIPTION OF SUPPORT UNITS 6
5.4 TEST FACILITY 6
5.5 TEST LOCATION 6

6 EQUIPMENT LIST 7

7 RADIO SPECTRUM TECHNICAL REQUIREMENT 9

7.1 ANTENNA REQUIREMENT 9
7.1.1 Test Requirement: *9*
7.1.2 Conclusion *9*

8 RADIO SPECTRUM MATTER TEST RESULTS 10

8.1 20DB BANDWIDTH 10
8.1.1 E.U.T. Operation *10*
8.1.2 Test Setup Diagram *10*
8.1.3 Measurement Procedure and Data *10*
8.2 FIELD STRENGTH OF THE FUNDAMENTAL SIGNAL (15.227(A)) 11
8.2.1 E.U.T. Operation *11*
8.2.2 Test Setup Diagram *11*
8.2.3 Measurement Procedure and Data *11*
8.3 RADIATED EMISSIONS 13
8.3.1 E.U.T. Operation *14*
8.3.2 Test Setup Diagram *14*
8.3.3 Measurement Procedure and Data *14*

9 TEST SETUP PHOTO 18

10 EUT CONSTRUCTIONAL DETAILS 18

4 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	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

Remark:

Pass: The EUT complies with the essential requirements in the standard.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.54dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 5.34dB	(1)
Radiated Emission	1GHz ~ 26.5GHz	± 5.34dB	(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:	Remote control car toy
Model No.:	PT2292, PT1936, 911-212C, 11610, 911-517A, PT2100, 11219, 11607,11608,11609, 112411911-211C, 911-213C, 911-89, 911-350A, 911-352A, 911-356A, 911-389A, 911-396A,138-16C, 911-516A, 911-515A, 911-312A, 911-369A, 911-375B, 911-356A, 911-516A, 112409, 112410
Test Model No:	PT2292
Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The difference is model name for commercial purpose.	
Serial No.:	PT2292911212C
Test sample(s) ID:	GTS201905000004-1
Sample(s) Status:	Normal sample
Operation Frequency:	27.145MHz
Channel Number:	1
Modulation:	ASK
Antenna type:	Integral antenna
Antenna gain:	0dBi(Max)
Power supply:	TX: 4.5Vdc (1.5V x 3 "AA" Size Batteries) RX: 9.6Vdc Rechargeable Li-ion Battery

5.2 Test mode

Transmitter mode	Keep the EUT in continuously transmitting.
Remark: new battery is used during all test.	
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)	68.34	69.96	67.22

Final Test Mode:

According to ANSI C63.4 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

None.

5.4 Test Facility

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

● **FCC —Registration No.: 381383**

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. Registration 381383.

● **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2.

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 301-309, 3/F., 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	July. 03 2015	July. 02 2020
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	June. 27 2018	June. 26 2019
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 27 2018	June. 26 2019
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 27 2018	June. 26 2019
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 27 2018	June. 26 2019
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 27 2018	June. 26 2019
9	Coaxial Cable	GTS	N/A	GTS211	June. 27 2018	June. 26 2019
10	Coaxial cable	GTS	N/A	GTS210	June. 27 2018	June. 26 2019
11	Coaxial Cable	GTS	N/A	GTS212	June. 27 2018	June. 26 2019
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 27 2018	June. 26 2019
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 27 2018	June. 26 2019
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 27 2018	June. 26 2019
15	Band filter	Amindeon	82346	GTS219	June. 27 2018	June. 26 2019
16	Power Meter	Anritsu	ML2495A	GTS540	June. 27 2018	June. 26 2019
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 27 2018	June. 26 2019
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 27 2018	June. 26 2019
19	Splitter	Agilent	11636B	GTS237	June. 27 2018	June. 26 2019
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 27 2018	June. 26 2019
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 20 2018	Oct. 19 2019
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 20 2018	Oct. 19 2019
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 20 2018	Oct. 19 2019
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 27 2018	June. 26 2019

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	June. 27 2018	June. 26 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 27 2018	June. 26 2019
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 27 2018	June. 26 2019
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 27 2018	June. 26 2019
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 27 2018	June. 26 2019
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 27 2018	June. 26 2019
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 27 2018	June. 26 2019

General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 27 2018	June. 26 2019
2	Barometer	ChangChun	DYM3	GTS255	June. 27 2018	June. 26 2019

7 Radio Spectrum Technical Requirement

7.1 Antenna Requirement

7.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

7.1.2 Conclusion

Standard Requirment:

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 Integral antenna, the best case gain of the antenna is 0dBi, reference to the appendix II for details.

8 Radio Spectrum Matter Test Results

8.1 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.215

Test Method: ANSI C63.10 (2013) Section 6.9

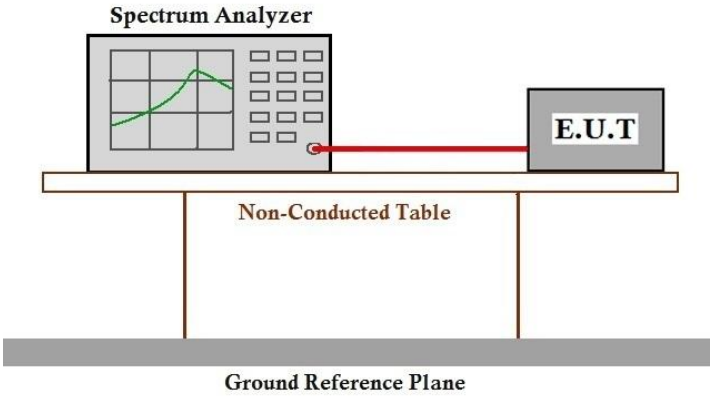
8.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1005 mbar

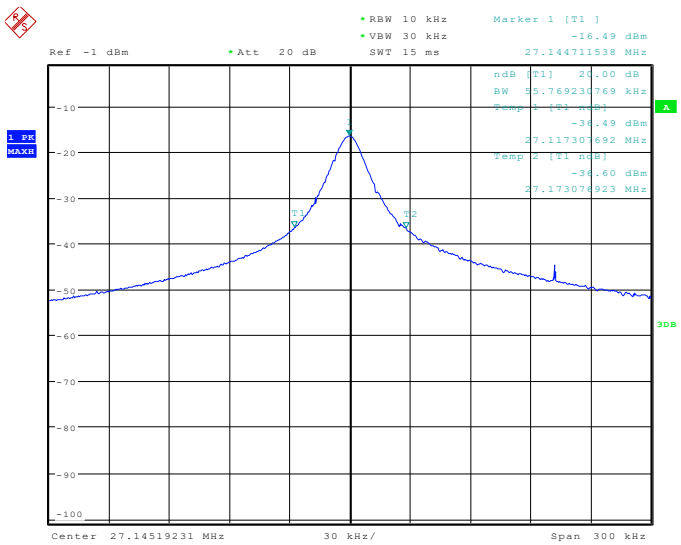
Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

8.1.2 Test Setup Diagram



8.1.3 Measurement Procedure and Data

Mode	Frequency（MHz）	-20dB Bandwidth(KHz)	Limit	Conclusion
TX	27.145	55.77	N/A	Pass



8.2 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.

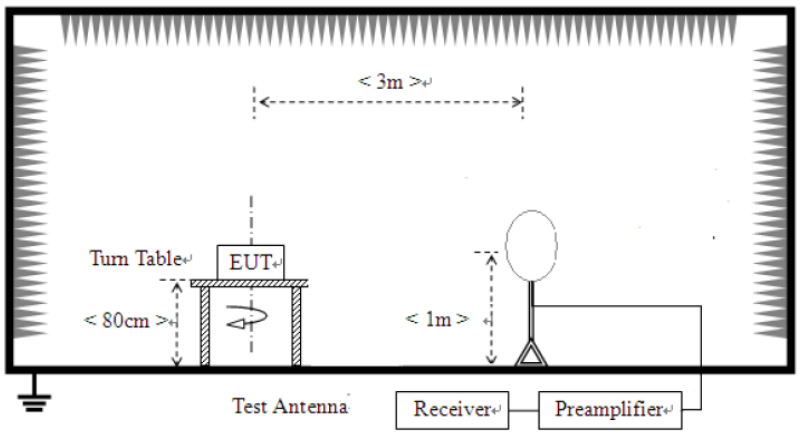
8.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1000 mbar

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

8.2.2 Test Setup Diagram



8.2.3 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.

Measurement data:

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
27.145	91.25	10.51	0.65	32.45	69.96	100.00	-30.04	Peak
26.96	41.62	10.51	0.64	32.45	20.32	69.54	-49.22	QP
27.28	42.51	10.51	0.65	32.45	21.22	69.54	-48.32	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) 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.

8.3 Radiated Emissions

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)
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.		

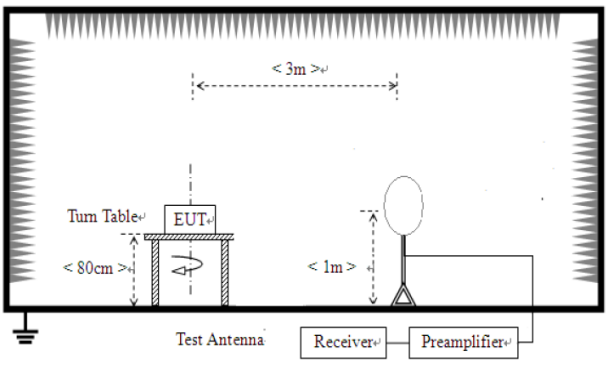
8.3.1 E.U.T. Operation

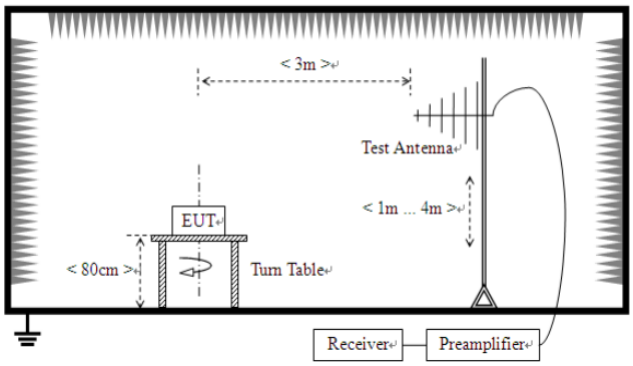
Operating Environment:

Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1000 mbar

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

8.3.2 Test Setup Diagram





8.3.3 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.

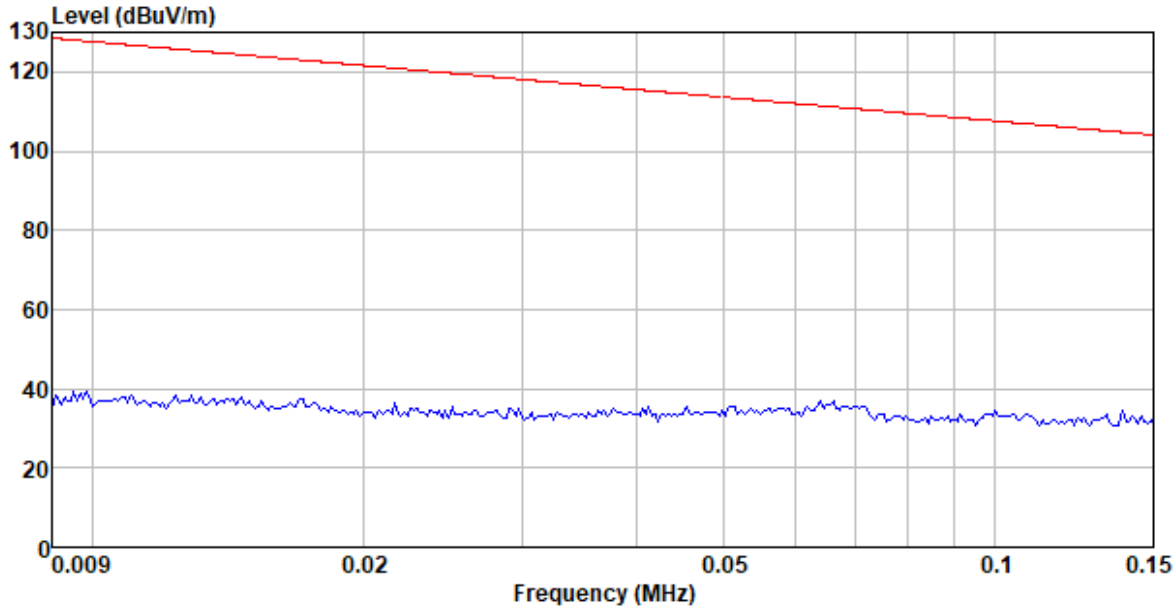
Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Measurement data:

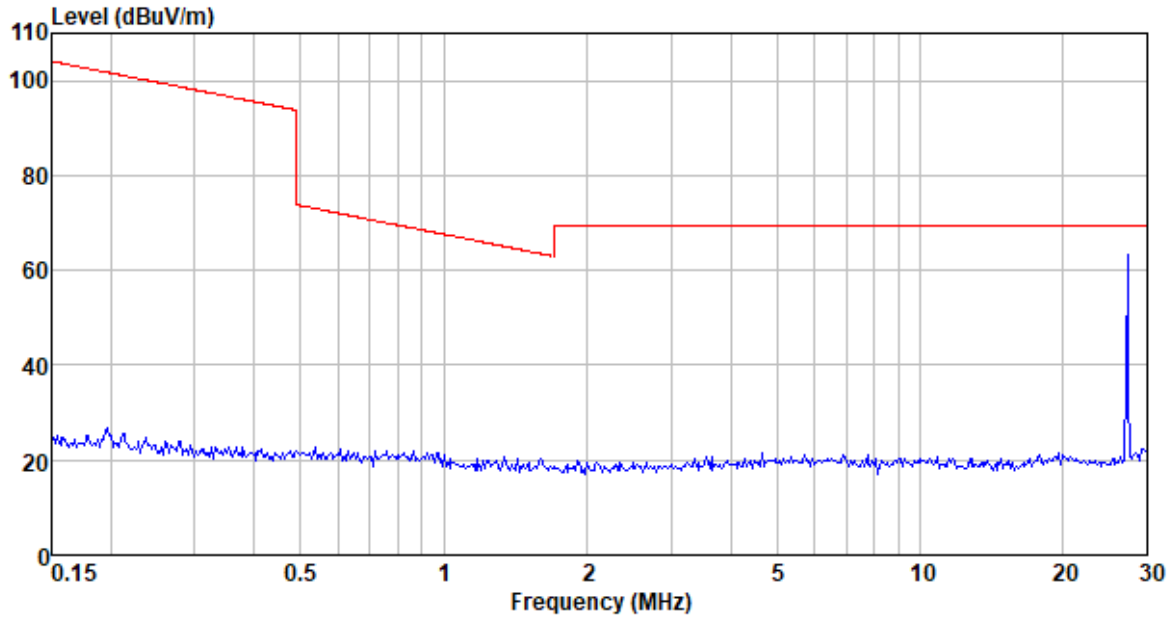
Remark:

Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

■ **9kHz~150kHz**

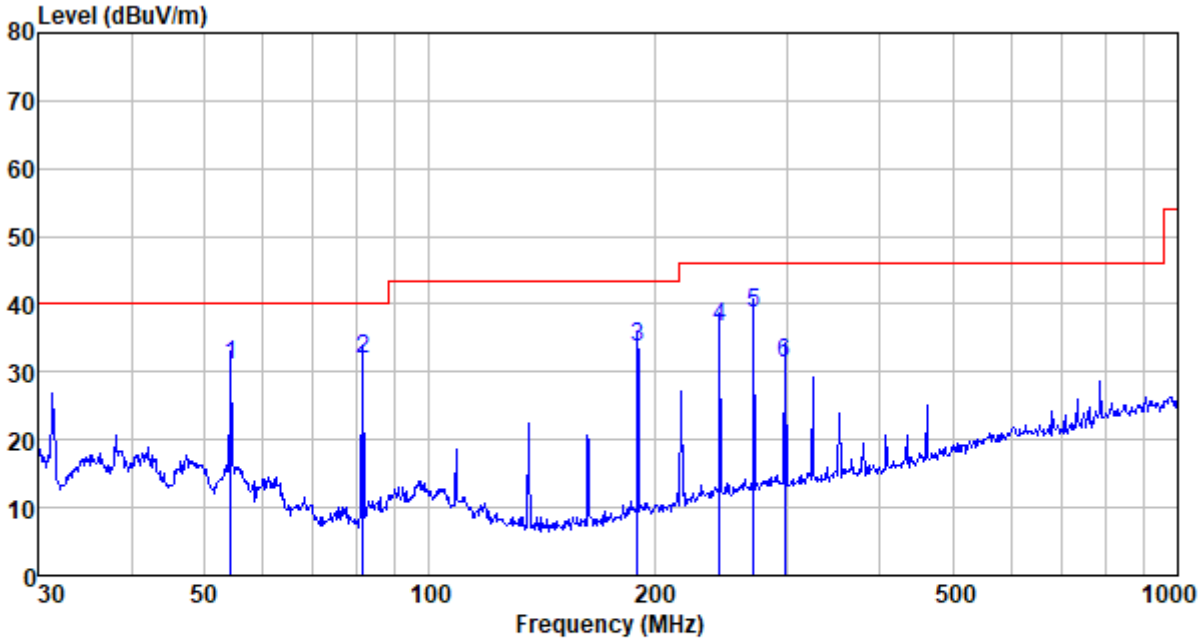


■ **150kHz~30MHz**



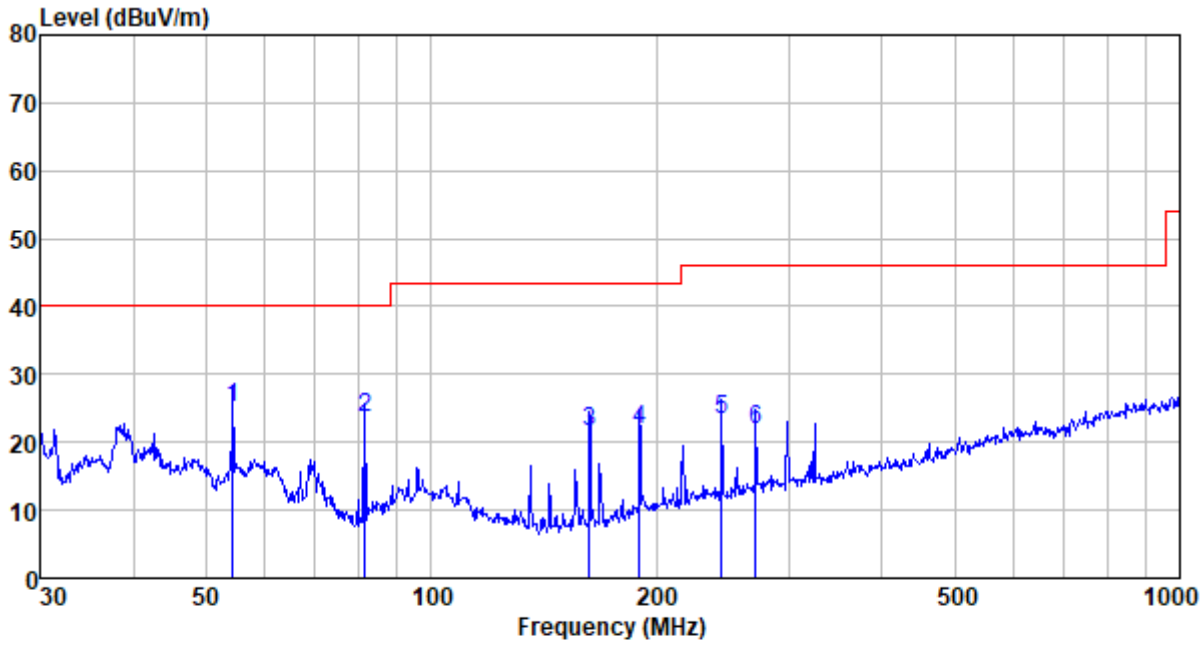
■ **30MHz~1GHz**

Mode:	**Transmitting mode**	**Test by:**	**Bill**
Temp./Hum.(%H):	**26℃/56%RH**	**Polarization:**	**Horizontal**



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
54.261	54.55	11.85	0.81	36.24	30.97	40.00	-9.03	QP
81.497	59.45	7.91	1.04	36.56	31.84	40.00	-8.16	QP
189.739	59.33	9.90	1.79	37.28	33.74	43.50	-9.76	QP
244.232	60.01	11.96	2.09	37.37	36.69	46.00	-9.31	QP
271.325	61.01	12.80	2.23	37.40	38.64	46.00	-7.36	QP
298.268	52.88	13.56	2.35	37.42	31.37	46.00	-14.63	QP

Mode:	**Transmitting mode**	**Test by:**	**Bill**
Temp./Hum.(%H):	**26℃/56%RH**	**Polarization:**	**Vertical**



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
54.261	48.61	11.85	0.81	36.24	25.03	40.00	-14.97	QP
81.497	51.26	7.91	1.04	36.56	23.65	40.00	-16.35	QP
162.611	48.72	8.36	1.65	37.15	21.58	43.50	-21.92	QP
189.739	47.34	9.90	1.79	37.28	21.75	43.50	-21.75	QP
244.232	46.65	11.96	2.09	37.37	23.33	46.00	-22.67	QP
271.325	44.07	12.80	2.23	37.40	21.70	46.00	-24.30	QP

Remark:

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

9 Test Setup Photo

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

10 EUT Constructional Details

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

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