TEST REPORT

.

Applicant:	HUANG QI TOYS CO.,LTD
Address of Applicant:	13 New 1 Lane,Xinxiang Village,Guangyi Road, Chenghai Area, Shantou, China
Manufacturer:	HUANG QI TOYS CO.,LTD
Address of Manufacturer:	13 New 1 Lane,Xinxiang Village,Guangyi Road, Chenghai Area, Shantou, China

Equipment Under Test (EUT)

Product Name:	RC cars
Model No.:	MT1040, 6698, 6699, 6700, 6701, 6702, 6703, 6704, 6705, 6706, 6707, 6708, 6709, 6710, 6711, 6712, 6713, 6714, 6715, 6716, 6718, 6719, 6720, 6600, 6601, 6602, 6603, 6604, 6605, 6606, 6607, 6608, 6609, 6610, 6611, 6612, 6613, 6614, 6615, 6616, 6617, 6618, 7700, 7701, 7702, 7703, 7704, 7705, 7706, 7707, 7708, 7709, 7710, 7711, 7712, 7713, 7714, 7715, 7716, 8001, 8002, 8003, 8004, 8005, 8006, 8007, 8008, 8009, 8800, 8801, 8802, 8803, 8804, 8805, 8806, 8807, 8808, YY3101, YY3102, YY3103
FCC ID:	2ATZWHQMT1040
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.235
Date of sample receipt:	July 23, 2019
Date of Test:	July 24-August 22, 2019
Date of report issued:	August 23, 2019
Test Result :	PASS *

Authorized Signature:

Robinson Lo

Laboratory Manager

2 Version

Version No.	Date	Description
01	*August 23, 2019*	*Original*

Prepared By: Bill. Yuan ***Date:*** *August 23, 2019*

Project Engineer

Check By: ***Date:*** *August 23, 2019*

Reviewer

3 Contents

4 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	47 CFR Part 15, Subpart C 15.235	ANSI C63.10 (2013) Section 6.4	47 CFR Part 15, Subpart C 15.235(a)	Pass
Radiated Emissions	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(b) & 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	±3.8039dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 3.9679dB	(1)
Radiated Emission	1GHz ~ 26.5GHz	± 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:	RC cars
Model No.:	MT1040, 6698, 6699, 6700, 6701, 6702, 6703, 6704, 6705, 6706, 6707, 6708, 6709, 6710, 6711, 6712, 6713, 6714, 6715, 6716, 6718, 6719, 6720, 6600, 6601, 6602, 6603, 6604, 6605, 6606, 6607, 6608, 6609, 6610, 6611, 6612, 6613, 6614, 6615, 6616, 6617, 6618, 7700, 7701, 7702, 7703, 7704, 7705, 7706, 7707, 7708, 7709, 7710, 7711, 7712, 7713, 7714, 7715, 7716, 8001, 8002, 8003, 8004, 8005, 8006, 8007, 8008, 8009, 8800, 8801, 8802, 8803, 8804, 8805, 8806, 8807, 8808, YY3101, YY3102, YY3103
Test Model No:	MT1040
Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The differences are shell colour model name for commercial purpose.	
Serial No.:	TX: HY-168T/HY-168T-1 RX: HY-168R
Test sample(s) ID:	GTS201907000157-1
Sample(s) Status:	Normal sample
Operation Frequency:	49.86MHz
Channel Number:	1
Modulation:	ASK
Antenna type:	Integral antenna
Antenna gain:	0dBi(Max)
Power supply:	TX: 3.0Vdc (1.5V x 2 "AA" Size Batteries) RX: 3.6Vdc Rechargeable Li-ion Battery

Note: The report is for TX device only.

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)	61.05	62.40	60.71

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.

● **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. 26 2019	June. 25 2020
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 26 2019	June. 25 2020
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 26 2019	June. 25 2020
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 26 2019	June. 25 2020
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 26 2019	June. 25 2020
9	Coaxial Cable	GTS	N/A	GTS211	June. 26 2019	June. 25 2020
10	Coaxial cable	GTS	N/A	GTS210	June. 26 2019	June. 25 2020
11	Coaxial Cable	GTS	N/A	GTS212	June. 26 2019	June. 25 2020
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 26 2019	June. 25 2020
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 26 2019	June. 25 2020
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 26 2019	June. 25 2020
15	Band filter	Amindeon	82346	GTS219	June. 26 2019	June. 25 2020
16	Power Meter	Anritsu	ML2495A	GTS540	June. 26 2019	June. 25 2020
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 26 2019	June. 25 2020
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 26 2019	June. 25 2020
19	Splitter	Agilent	11636B	GTS237	June. 26 2019	June. 25 2020
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 26 2019	June. 25 2020
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. 26 2019	June. 25 2020

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. 26 2019	June. 25 2020
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 26 2019	June. 25 2020
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 26 2019	June. 25 2020
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 26 2019	June. 25 2020
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 26 2019	June. 25 2020
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 26 2019	June. 25 2020
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 26 2019	June. 25 2020
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 26 2019	June. 25 2020

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. 26 2019	June. 25 2020
2	Barometer	ChangChun	DYM3	GTS255	June. 26 2019	June. 25 2020

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

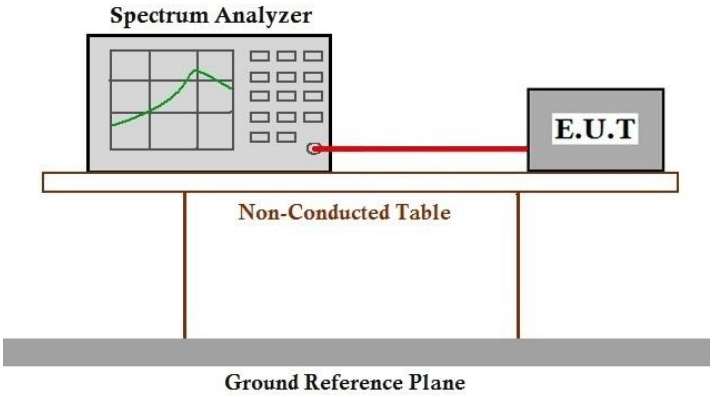
8.1.1 E.U.T. Operation

Operating Environment:

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

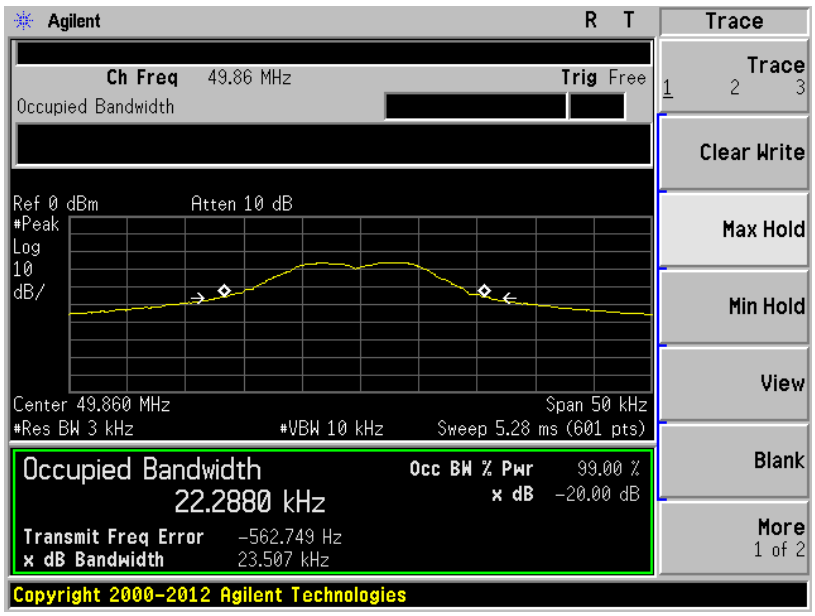
Test mode a:TX mode_Keep the EUT in transmitting with modulation mode.

8.1.2 Test Setup Diagram



8.1.3 Measurement Procedure and Data

Mode	Frequency (MHz)	-20dB Bandwidth (KHz)	Limit	Conclusion
TX	49.86	23.507	N/A	Pass



8.2 Field Strength of the Fundamental Signal

Test Requirement	47 CFR Part 15, Subpart C 15.235(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.

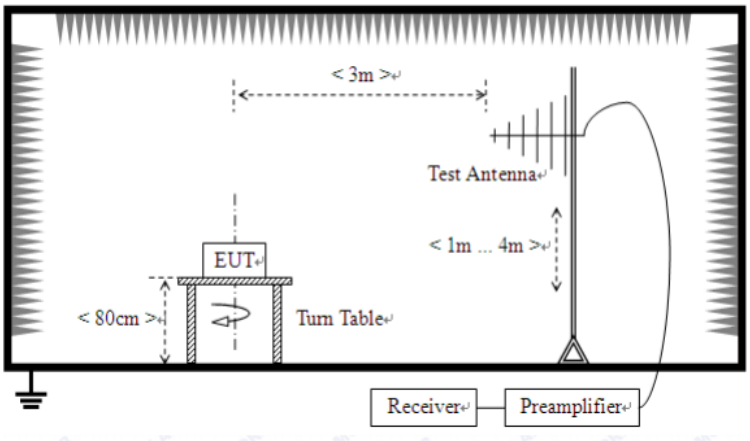
8.2.1 E.U.T. Operation

Operating Environment:

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

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

8.2.2 Test Setup Diagram



8.2.3 Measurement Procedure and Data

1. The EUT was placed on the top of a rotating table (0.8 meters for below 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. 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.
4. 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 and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.(RBW 100KHz VBW 300KHz for PK detector， RBW 120KHz for QP detector)

Measurement data:

Peak value:

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)	Polarization
49.86	81.23	12.30	0.77	36.17	58.13	100.00	-41.87	Horizontal
49.86	85.50	12.30	0.77	36.17	62.40	100.00	-37.60	Vertical

Average value:

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)	Polarization
49.86	71.56	12.30	0.77	36.17	48.46	80.00	-31.54	Horizontal
49.86	75.28	12.30	0.77	36.17	52.18	80.00	-27.82	Vertical

QP value:

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)	Polarization
49.81	49.40	12.30	0.77	36.17	26.30	40.00	-13.70	Horizontal
49.91	50.77	12.30	0.77	36.18	27.66	40.00	-12.34	Horizontal
49.81	51.12	12.30	0.77	36.17	28.02	40.00	-11.98	Vertical
49.91	52.95	12.30	0.77	36.18	29.84	40.00	-10.16	Vertical

Remark:

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

8.3 Radiated Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.235(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.		

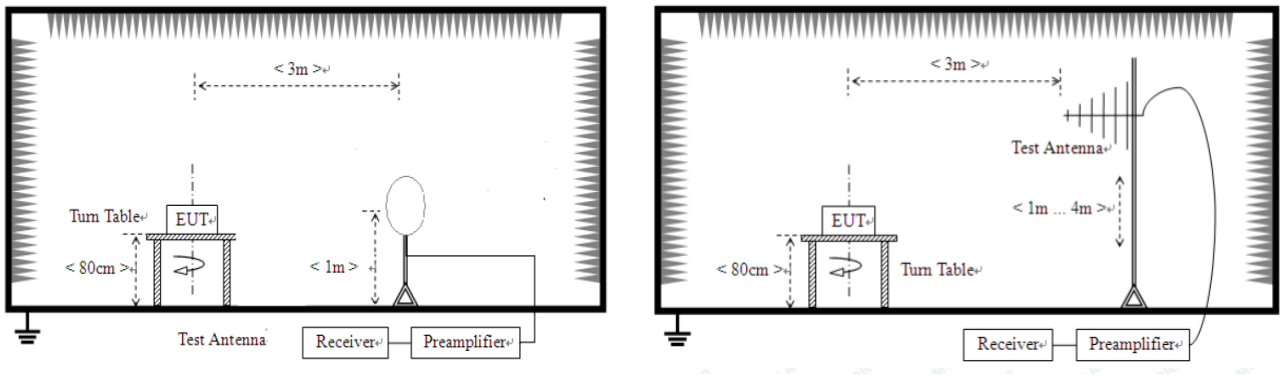
8.3.1 E.U.T. Operation

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.

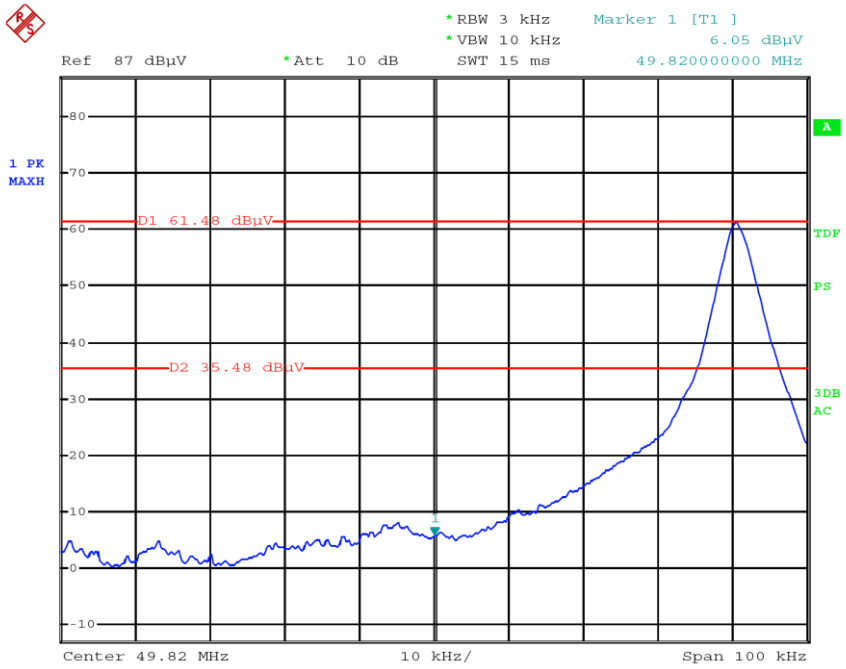
f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

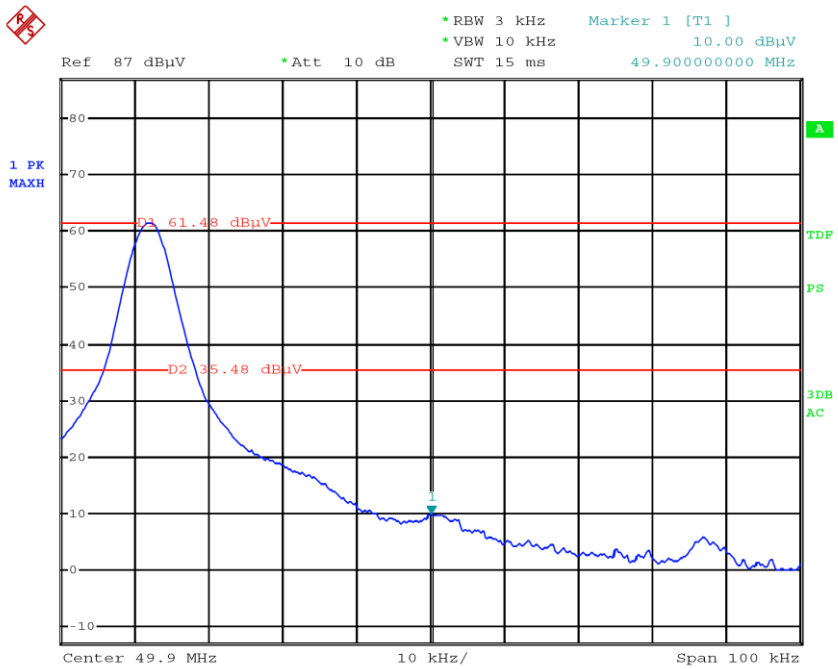
g. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

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

Band edges:

Measurement data:





Spurious Emissions:

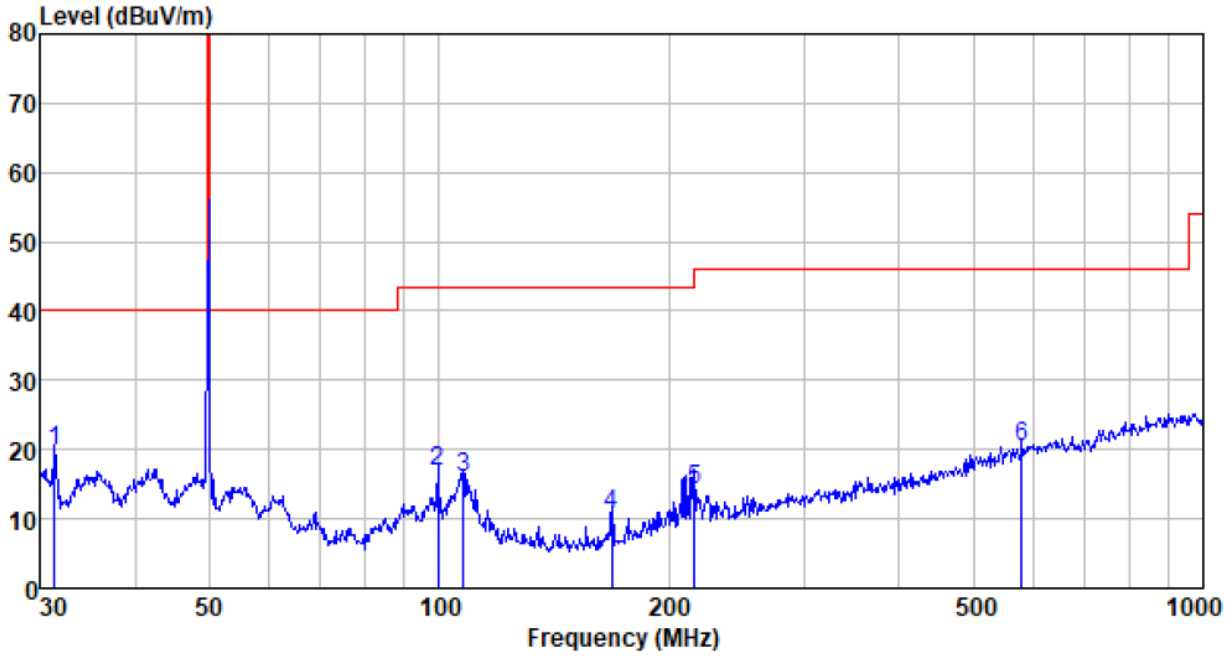
Measurement data:

9 kHz ~ 30 MHz

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

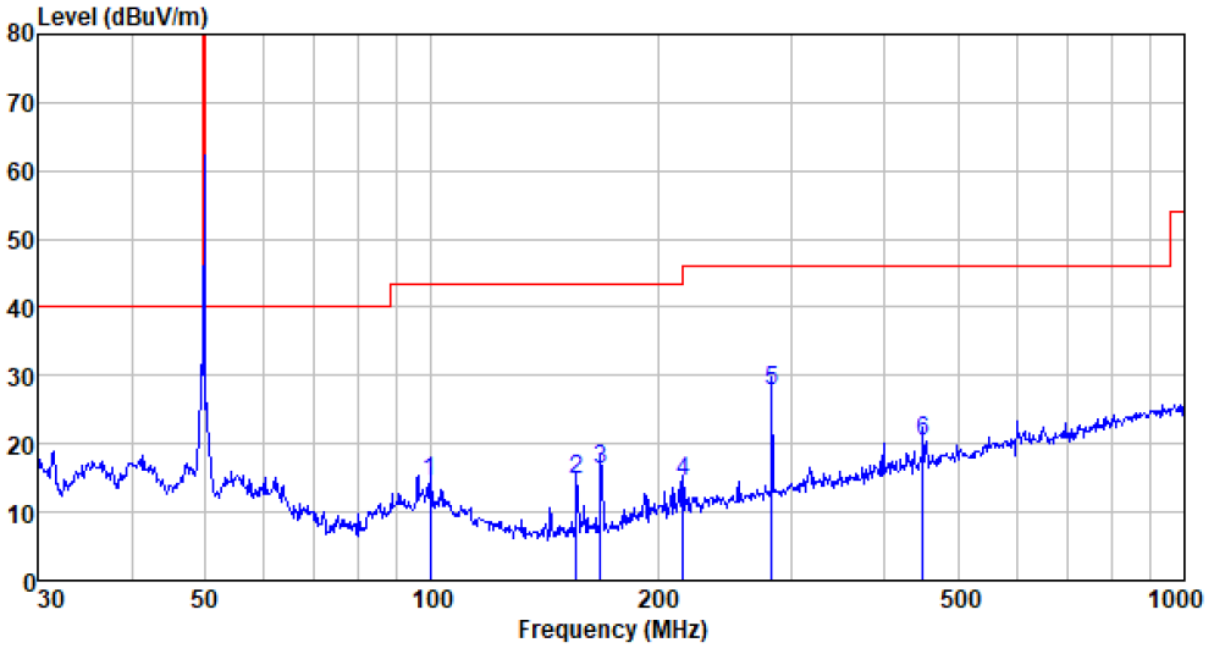
■ **30MHz~1GHz**

Mode:	**Transmitting mode**	**Test by:**	**Bill**
Temp./Hum.(%H):	**25℃/55%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
31.399	43.06	11.23	0.57	35.11	19.75	40.00	-20.25	QP
99.728	40.19	12.20	1.19	36.72	16.86	43.50	-26.64	QP
107.510	40.06	11.36	1.26	36.78	15.90	43.50	-27.60	QP
168.414	37.76	8.47	1.68	37.18	10.73	43.50	-32.77	QP
216.024	38.53	11.02	1.93	37.35	14.13	46.00	-31.87	QP
578.670	35.15	19.06	3.64	37.53	20.32	46.00	-25.68	QP

Mode:	Transmitting mode	Test by:	Bill
Temp./Hum.(%H):	25℃/55%RH	Polarization:	Vertical



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
99.728	37.80	12.20	1.19	36.72	14.47	43.50	-29.03	QP
155.910	42.16	8.05	1.60	37.11	14.70	43.50	-28.80	QP
167.824	43.38	8.46	1.67	37.18	16.33	43.50	-27.17	QP
216.024	38.81	11.02	1.93	37.35	14.41	46.00	-31.59	QP
282.985	49.67	13.13	2.28	37.41	27.67	46.00	-18.33	QP
449.556	38.39	16.36	3.08	37.51	20.32	46.00	-25.68	QP

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 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------