FCC Test Report

Report No: FCS202007072

Issued for

Applicant:	Longbo toy factory
Address:	Shangcun Industrial Zone, Lianxia Town, Chenghai District, Shantou City
Product Name:	Toy remote control car
Brand Name:	N/A
Model Name:	MT1013-MT1029
Series Model:	Refer to page 9 .
FCC ID:	2AWZZ-LB168B

Issued By: Flux Compliance Service Laboratory
Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong yeWest Road Hi-Tech Industrial, Song shan lake Dongguan
Tel: 769-27280901 Fax:769-27280901 http://www.FCS-lab.com

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Revision History

Rev.	Issue Date	Effect Page	Contents
01	24 July 2020	All	Initial Issue

TEST RESULT CERTIFICATION

Applicant's Name ..... :	Longbo toy factory
Address ..... :	Shangcun Industrial Zone, Lianxia Town, Chenghai District, Shantou City
Manufacture's Name ..... :	Longbo toy factory
Address ..... :	Shangcun Industrial Zone, Lianxia Town, Chenghai District, Shantou City

Product Description

Product Name ..... :	Toy remote control car
Brand Name ..... :	N/A
Model Name ..... :	MT1013-MT1029
Series Model ..... :	Refer to page 9 .
Test Standards..... :	FCC Rules and Regulations Part 15 Subpart C 15.235
Test Procedure ..... :	ANSI C63.10:2013

This device described above has been tested FCS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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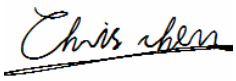
Date of Test.....:

Date (s) of performance of tests .:	15 July 2020 ~ 23 July 2020
Date of Issue .....:	24 July 2020
Test Result .....:	Pass

Prepared By : 

(Chris Chen/Engineer)

Approved By : 

(Brown Lu)

1. Summary of Test Results

Standard Section	Test Item	Judgment	Remark
FCC PART 15 C section 15.235	Radiated Emission	PASS	
FCC PART 15 C section 15.235	Occupied Bandwidth	PASS	

NOTE:
(1)" N/A" denotes test is not applicable in this Test Report

1.1 Test Laboratory

Company Name:	Flux Compliance Service Laboratory
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong yeWest Road Hi-Tech Industrial, Song shan lake Dongguan
Telephone:	+86-769-27280901
Fax:	+86-769-27280901
A2LA Accreditation No. :	

1.2 Measurement Uncertainty

The reported uncertainty of measurement **y ±U**,where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**,providing a level of confidence of approximately **95** %.

No.	Items	Uncertainty
1	RF output power, conducted	±0.71dB
2	Unwanted Emissions, conducted	±2.988 dB
3	Conducted Emission (9KHz-150KHz)	±4.13 dB
4	Conducted Emission (150KHz-30MHz)	±4.74 dB
5	All emissions,radiated(<1G) 30MHz-1000MHz	±5.2 dB
6	All emissions,radiated(>1G) 1000MHz -3000MHz	±4.66 dB
7	All emissions,radiated(<1G) 3000MHz -6000MHz	±5.31 dB

1.3 Test Environment Conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature rang:	20-26℃
Humidity range:	40-65%
Pressure range:	86-106Kpa

2. General Information

2.1 General Description of The EUT

Product Name	Toy remote control car
Trade Name	N/A
Model Name	MT1013-MT1029
Series Model	MT1093, MT1083, MT1073, MT1063, MT1053, MT1043, MT1099, MT1089, MT1079, MT1069, MT1059, MT1049, 168-1, 168-2, 168-3, 168-4, 168-5, 168-6, 168-7, 168-8, 168-9, 168-10, 168-11, 168-12, 168-13, 168-14, 168-15, 168-16, 168-17, 168-18, 168-19, 168-20, 168-21, 168-22, 168-23, 168-24, 168-25, 168-26, 168-27, 168-27, 168-29, 168-30, 168-31, 168-32, 168-33, 168-34, 168-35, 168-36, 168-37, 168-38, 168-39, 168-40, 168-41, 168-42, 168-43, 168-44, 168-45, 168-46, 168-47, 168-48, 168-49, 168-50, 168-51, 168-52, 168-53, 168-54, 168-55, 168-56, 168-57, 168-58, 168-59, 168-60, 168-61, 168-62, 168-63, 168-64, 168-65, 168-66, 168-67
Model Difference	N/A
Operation Frequency	49.860MHz
Modulation	FSK
Antenna Type	wire antenna, maximu PK gain: 0dBi
Adapter	N/A
Battery	DC 3.0 V (2 x 1.5 V 'AA' batteries)
Connecting I/O Port(s)	Please refer to the User's Manual
Note: For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.	

2.2 Channel List

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	49.860				

2.3 Assistant Equipment Used For Test

Assistant equipment	Manufacturer	Model number
/	/	/
/	/	/

2.4 Description of The Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Worst Mode	Description	Data Rate/Modulation
Mode 1	TX CH00	FSK

2.5 Block Digram

Showing The Configuration of System Tested

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters

NOTE:NEW BATTERY IS USED DURING ALL TEST

2.6 Equipments List

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESRP 3	FCS-E001	2020.05.31	2021.05.30
Signal Analyzer	R&S	FSV40-N	FCS-E012	2020.06.05	2021.06.04
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2020.03.11	2021.03.10
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2020.03.26	2021.03.25
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2020.05.31	2021.05.30
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2020.05.31	2021.05.30
Pre-Amplifier(0.1M-3GHz)	EMCI	EM330N	FCS-E004	2020.05.31	2021.05.30
Pre-Amplifier (1G-18GHz)	N/A	TSAMP-0518SE	FCS-E014	2020.03.03	2021.03.02
Temperature & Humidity	HTC-1	victor	FCS-E005	2020.05.31	2021.05.30

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	FCS-E020	2020.05.31	2021.05.30
LISN	R&S	ENV216	FCS-E007	2020.05.15	2021.05.14
LISN	ETS	3810/2NM	FCS-E009	2020.03.15	2021.03.14
Temperature & Humidity	HTC-1	victor	FCS-E008	2020.05.31	2021.05.30

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
MXA SIGNAL Analyzer	Keysight	N9020A	FCS-E015	2020.03.02	2021.03.01

3. . Antenna Requirement

Standard requirement

15.203 requirement:

For intentional device. According to 15.203. 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.

EUT Antenna

The antenna is an wire Antenna integrated and no consideration of replacement. The best case gain of the antenna is 0 dBi.

Test result: The unit does meet the FCC requirements.

4. 26dB Occupied Bandwidth

4.1 Limit

FCC Part 15 C section 15.235

4.2 Test Method:

ANSI C63.10: Clause 6.9

4.3 Test Procedure

(1) The useful radiated emission from the EUT was detected by the spectrum analyzer with peak detector. Record the 26 dB bandwidth of the carrier.

(2)The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector. The vertical Scale is set to 10dB per division. The horizontal scale is set to 20KHz per division. Read the down 20dB bandwidth of the carrier.

(3)Set the spectrum analyzer: start at 49.81MHz and stop at 49.91MHz

RBW	10KHz
VBW	30KHz
Detector Mode	Peak
Sweep time	Auto
Trace mode	Max hold

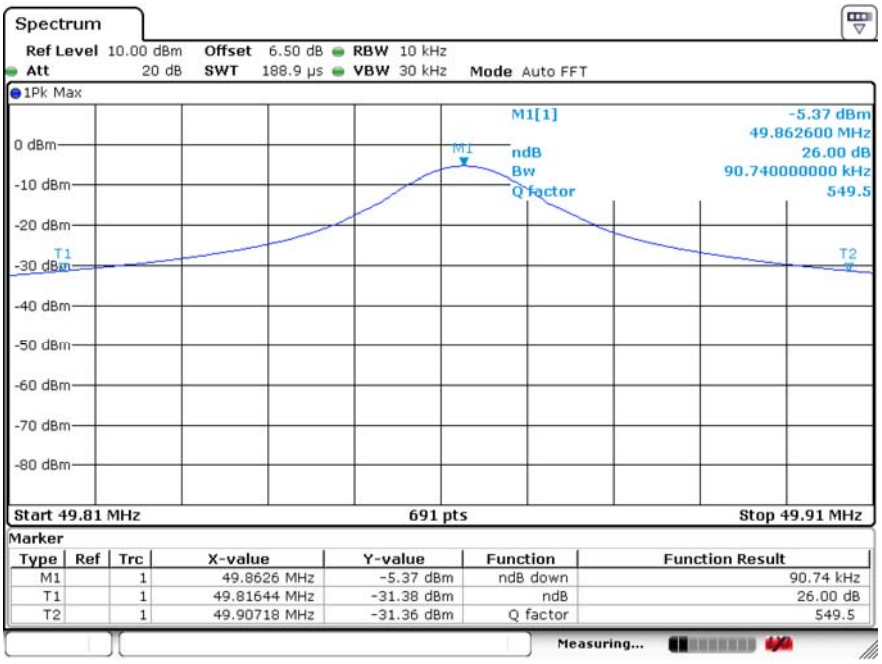
(4) Mark the peak frequency and -26dB points bandwidth.

4.4 Test Result

26dB bandwidth lower frequency: 49.81644MHz

26dB bandwidth upper frequency: 49.90718MHz

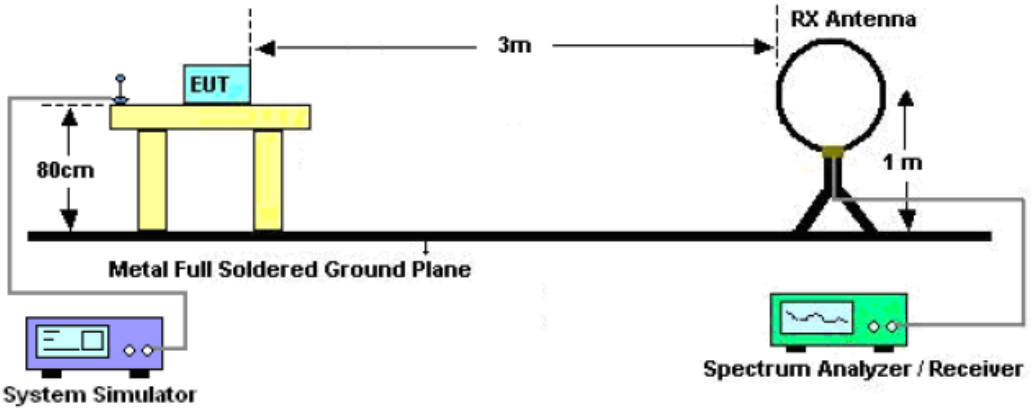
Test plot as below:



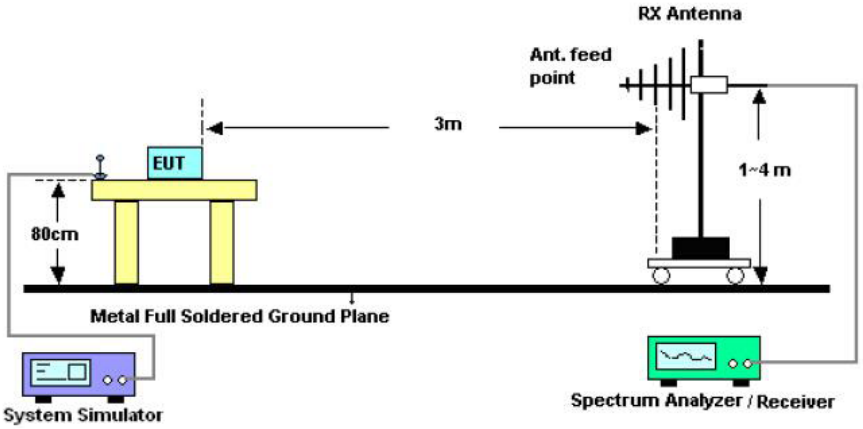
5. Radiated Spurious Emission

5.1 Block Diagram of Test Setup

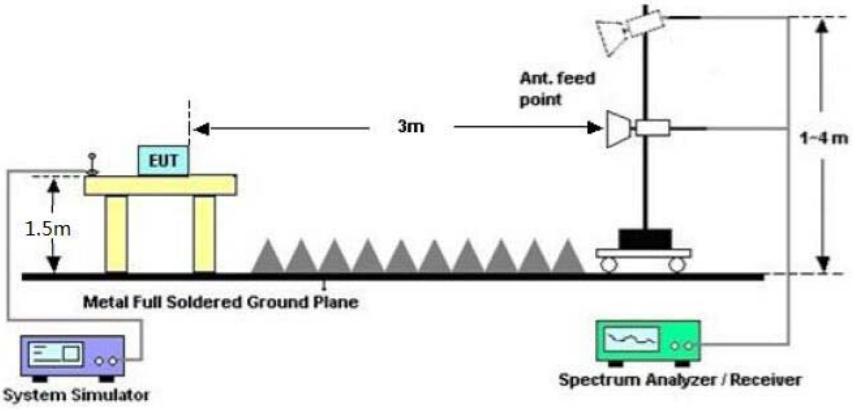
Radiated Emission Test-Setup Frequency Below 30MHz



Radiated Emission Test-Setup Frequency 30MHz-1000MHz



Radiated Emission Test-Setup Frequency Above 1000MHz



5.2 Requirements:

the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

15.235(a):The field strength of any emission within this band shall not exceed 10,000 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

15.235(b) :The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

Frequency(MHz)	Distance Meters	Field Strengths Limit	
		μV/m	dB(μV)/m
0.009~0.490	300	2400/F(KHz)	67.6-20log(F)
0.490~1.705	30	24000/F(KHz)	87.6-20log(F)
1.705~30.0	30	30	29.54
30~88	3	100	40.0
88~216	3	150	43.5
216~960	3	200	46.0
960~1000	3	500	54.0
Above 1000	3	74.0dBμV/m—Peak 54.0 dBμV/m--Average	

Remark:
(1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000MHz, radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30MHz, measurement may be performed at a distance closer than that specified, and the limit at closer measurement distance can be extrapolated by below formula:

All restriction band should comply with 15.209, other emission should be at least 20dB below the fundamental.

$Limit_{3m}$ (dBuV/m)= $Limit_{30m}$(dBuV/m) + 40Log(30m/3m)

5.3 Test Procedure

(1)EUT was place on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber for below 1G and 150 cm above the ground plane inside a semi-anechoic chamber for above 1G.
(2) Test antenna was located 3m from the EUT on an adjustable mast, and the antenna used asbelow table.

Test frequency range	Test antenna used	Test antenna distance
9kHz-30MHz	Active Loop antenna	3m
30MHz-1GHz	Trilog Broadband Antenna	3m
1GHz-18GHz	Double Ridged Horn Antenna(1GHz-18GHz)	3m
18GHz-40GHz	Horn Antenna(18GHz-40GHz)	3m

According ANSI C63.10:2013 clause 6.4.4.2 and 6,5.3, for measurements below 30 MHz, the loop antenna was positioned with its plane vertical from the EUT and rotated about its vertical axis for maximum response at each azimuth position around the EUT. And the loop antenna alsobe positioned with its plane horizontal at the specified distance from the EUT. The center of the loop is 1 m above the ground. for measurement above 30MHz, the trilog Broadband Antenna or Horn Antenna was located 3m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

(3) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9 kHz to 1GHz:

(a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1m to 4m (Except loop antenna, it's fixed 1m above ground.)

(b) Change work frequency or channel of device if practicable.

(c) Change modulation type of device if practicable.

(d) Change power supply range from 85% to 115% of the rated supply voltage

(e) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

Spectrum frequency from 9 kHz to 1 GHz (tenth harmonic of fundamental frequency) was investigated.

(4) For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to ANSI C63.10:2013 on Radiated Emission test.

(5) The emissions from 9 kHz to 1GHz were measured based on CISPR QP detector except for the frequency bands 9-90 kHz, 110-490 kHz, for emissions from 9 kHz-90 kHz,110 kHz-490 kHz and above 1 GHz were measured based on average detector, for emissions above 1 GHz, peak emissions also be measured and need comply with Peak limit.

(6) The emissions from 9 kHz to 1 GHz, QP or average values were measured with EMI receiver with below RBW

Frequency band	RBW
9 kHz-150 kHz	200 Hz
150 kHz-30 MHz	9 kHz
30 MHz-1 GHz	120 kHz

(7) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1 MHz, VBW is set at 3 MHz for Peak measure; RBW 1 MHz VBW 10 Hz for Average measure (according ANSI C63.10:2013 clause 4.1.4.2.2 procedure for average measure).

(8) X axis, Y axis, Z axis are tested, and worse setup X axis is reported

5.4 Test Result

Pass

All the emissions except fundamental emission from 9 kHz to 1 GHz were comply with 15.209 limits.

Fundamental emission:

Antenna polarization: Vertical:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
49.860	68.85	-6.00	62.85	100.0	-37.15	Peak
49.860	67.80	-6.00	61.80	80.0	-18.20	Average
Antenna polarization: Horizontal:						
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
49.860	72.22	-3.22	69.00	100.00	-31.00	Peak
49.860	70.34	-3.22	67.12	80.00	-12.88	Average

Band edges:

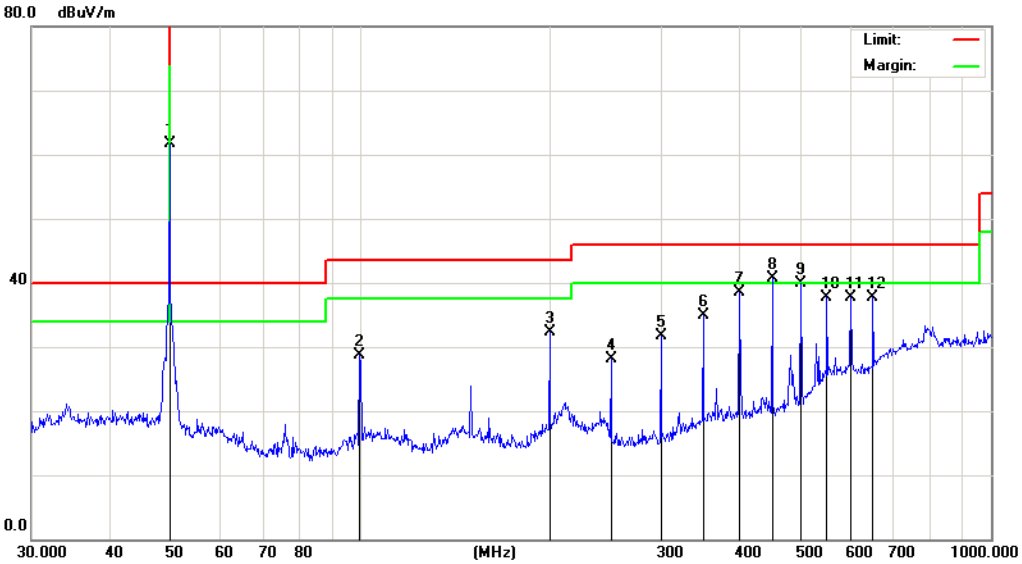
Antenna polarization: Vertical:						
Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
49.810	37.26	-5.98	31.28	40.00	-8.72	QP
49.910	37.88	-6.01	31.87	40.00	-8.13	QP
Antenna polarization: Horizontal:						
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
49.810	39.53	-3.21	36.32	40.00	-3.68	QP
49.910	40.15	-3.23	36.92	40.00	-3.08	QP

30 MHz~1 GHz Field Strength of Unwanted Emissions Measurement

Vertical:

Peak scan

Level (dBμV/m)



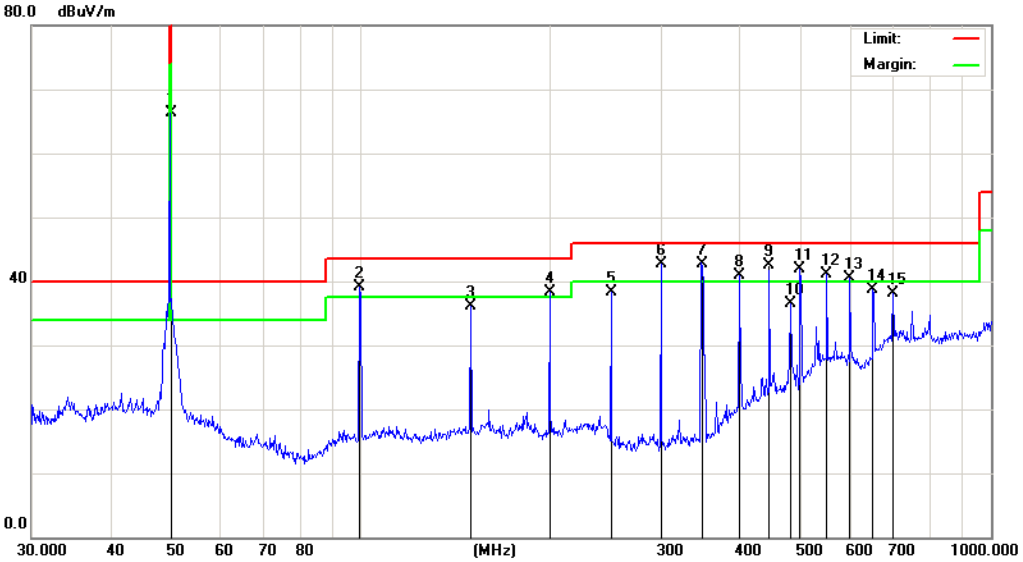
Quasi-peak measurement

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		49.8814	67.67	-6.00	61.67	80.00	-18.33	QP
2		99.5281	37.32	-8.70	28.62	43.50	-14.88	QP
3		199.2855	38.89	-6.59	32.30	43.50	-11.20	QP
4		249.4250	36.66	-8.65	28.01	46.00	-17.99	QP
5		299.3158	39.73	-8.07	31.66	46.00	-14.34	QP
6		349.2500	39.78	-4.89	34.89	46.00	-11.11	QP
7		399.0302	42.58	-4.07	38.51	46.00	-7.49	QP
8	*	449.5558	44.07	-3.34	40.73	46.00	-5.27	QP
9		499.4247	42.16	-2.28	39.88	46.00	-6.12	QP
10		549.0193	35.97	1.75	37.72	46.00	-8.28	QP
11		599.3212	34.40	3.30	37.70	46.00	-8.30	QP
12		649.6597	35.21	2.45	37.66	46.00	-8.34	QP

Horizontal:

Peak scan

Level (dBµV/m)



Quasi-peak measurement

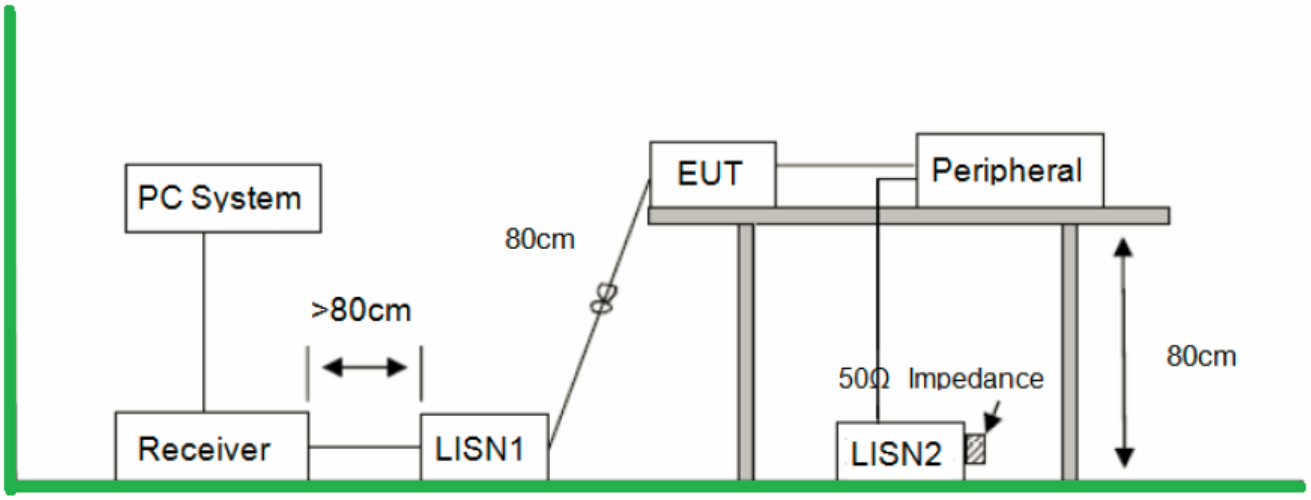
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		49.8814	69.53	-3.22	66.31	80.00	-13.69	QP
2	!	99.5281	46.90	-7.86	39.04	43.50	-4.46	QP
3		149.4857	42.86	-6.77	36.09	43.50	-7.41	QP
4	!	199.2855	45.61	-7.33	38.28	43.50	-5.22	QP
5		249.4250	47.03	-8.65	38.38	46.00	-7.62	QP
6	!	299.3158	51.06	-8.41	42.65	46.00	-3.35	QP
7	*	348.0274	49.93	-7.23	42.70	46.00	-3.30	QP
8	!	399.0300	43.84	-2.94	40.90	46.00	-5.10	QP
9	!	446.4114	43.07	-0.47	42.60	46.00	-3.40	QP
10		480.5276	35.85	0.56	36.41	46.00	-9.59	QP
11	!	497.6764	40.79	1.21	42.00	46.00	-4.00	QP
12	!	549.0193	36.48	4.62	41.10	46.00	-4.90	QP
13	!	597.2232	36.14	4.36	40.50	46.00	-5.50	QP

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
14		649.6597	34.66	4.14	38.80	46.00	-7.20	QP
15		699.3046	30.90	7.15	38.05	46.00	-7.95	QP

Remark:
According to 15.35 (b) When average radiated emission measurements are specified in the regulations, including emission measurements below 1000 MHz, there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules, e.g., see Section 15.255.

6. Power Line Conducted Emission

6.1 Block Diagram of Test Setup



6.2 Limit

Frequency	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150KHz-500KHz	66 ~ 56*	56 ~ 46*
500KHz-5MHz	56	46
5MHz-30MHz	60	50

Note 1: * Decreasing linearly with logarithm of frequency.
Note 2: The lower limit shall apply at the transition frequencies

6.3 Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 10.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission

level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 kHz.

6.4 Test Result

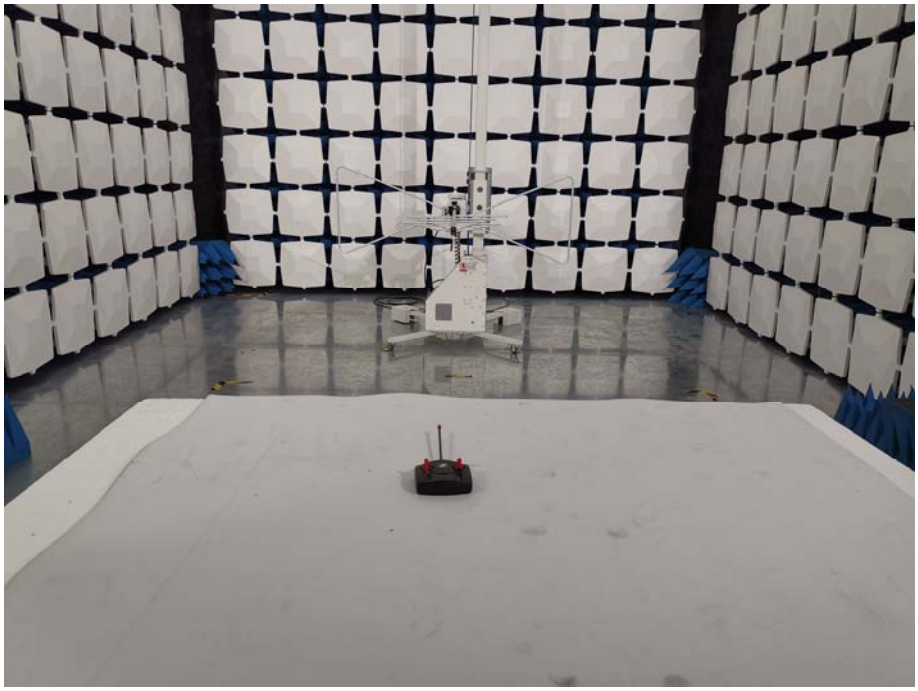
N/A

6.5 Original Test data

N/A

EUT TEST PHOTO

Radiated Measurement Photos



APPENDIX-PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS

Model No.: MT1013-MT1029

Photo 1

Photo 2

Photo 3

Photo 4

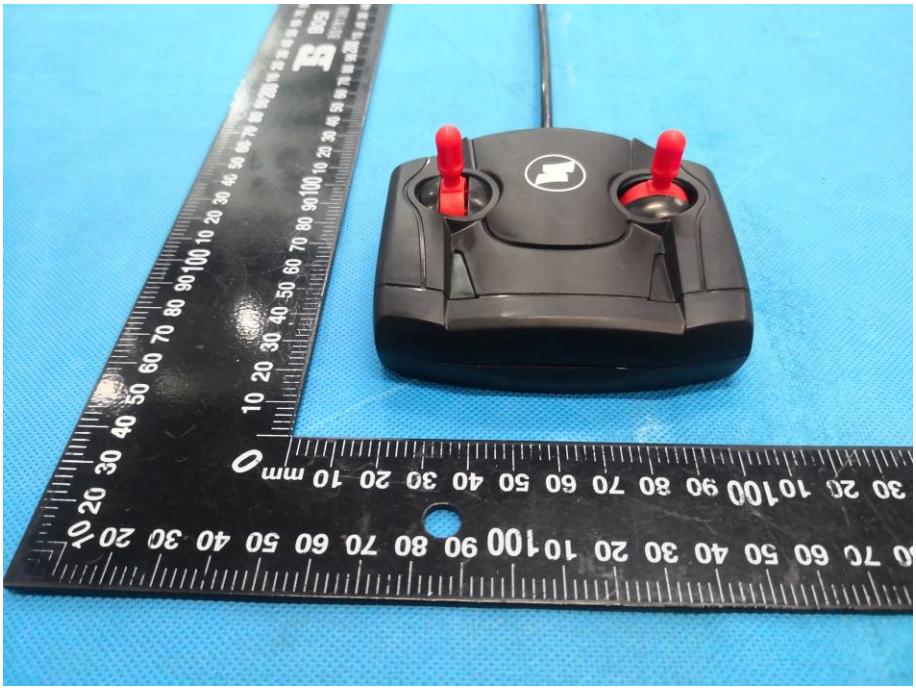


Photo 5

Photo 6

Photo 7

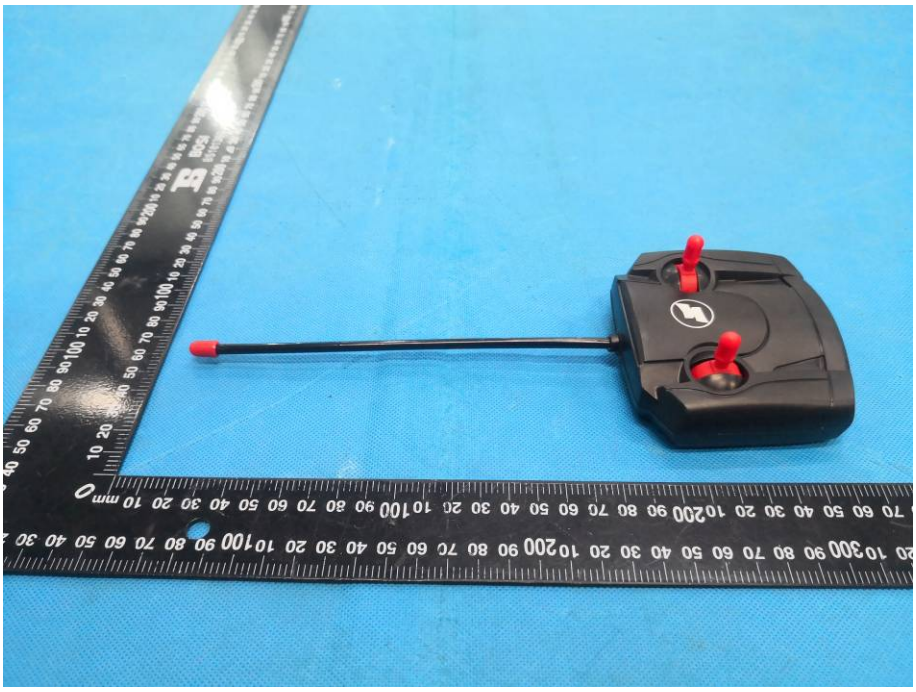


Photo 8

Photo 9

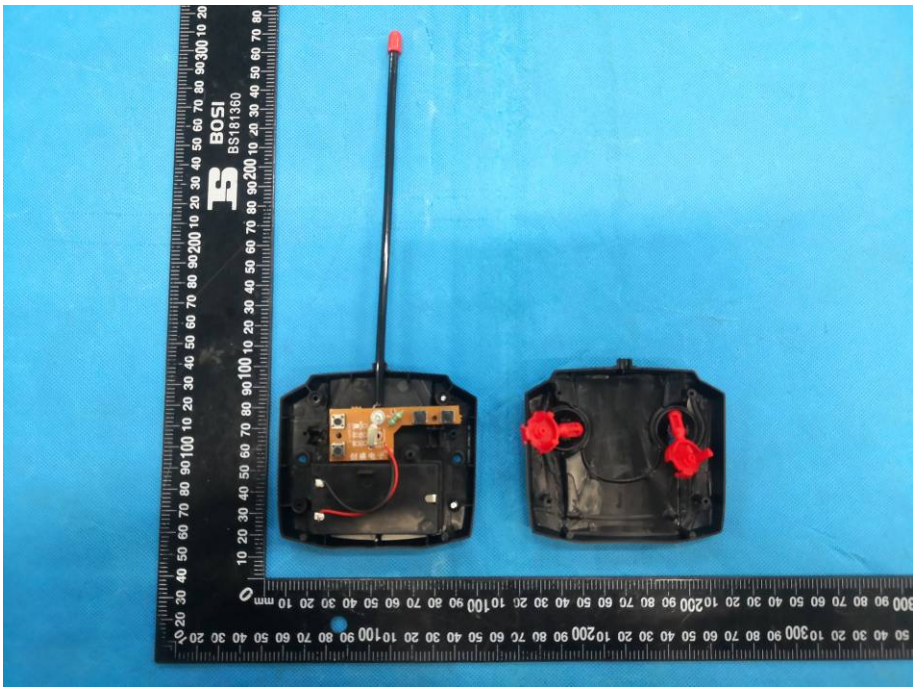


Photo 10

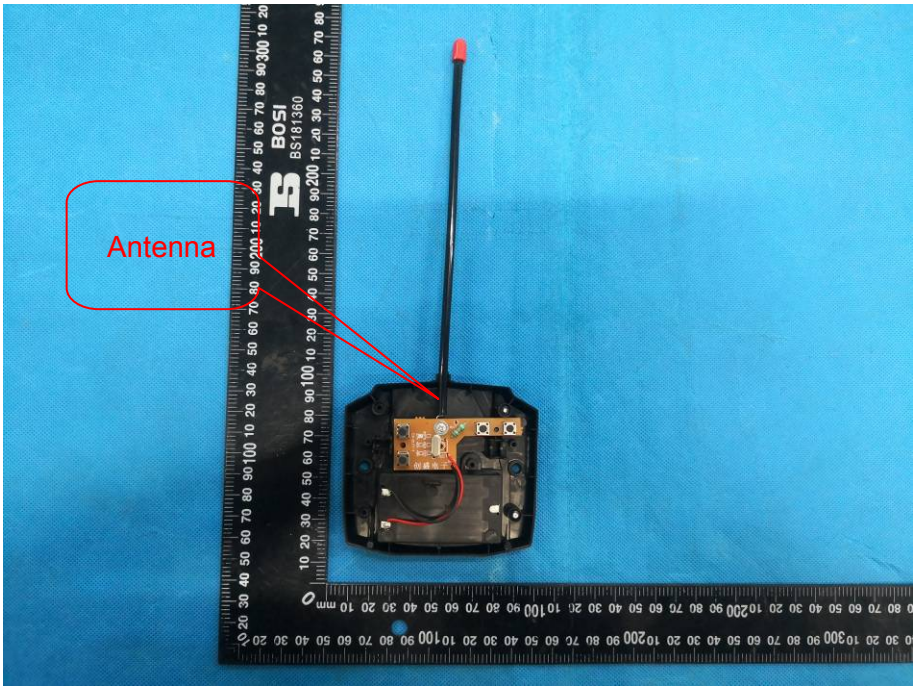


Photo 11

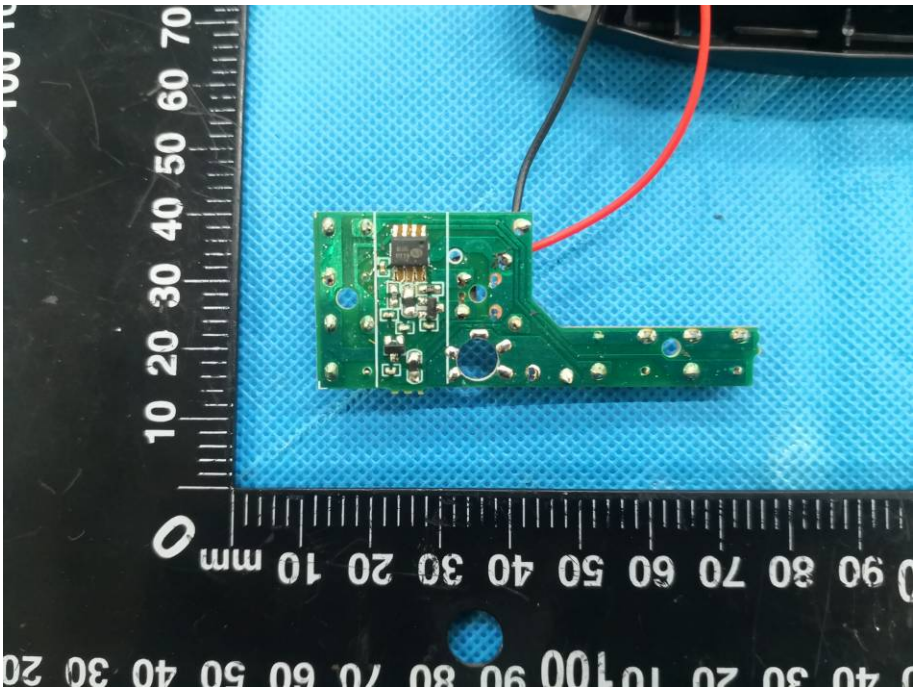
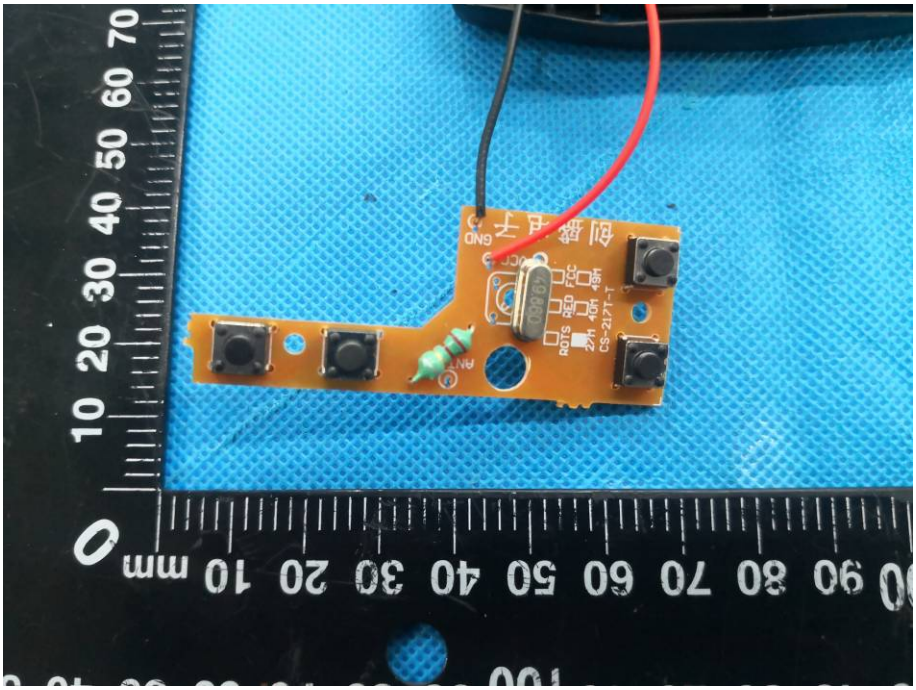


Photo 12



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