TEST REPORT

Applicant	SHANTOU ZINGO HOBBY CO.,LTD
Address	Fengxin Industrial Zone，Fengxiang Street，Chenghai District，Shantou, Guangdong,China

Manufacturer or Supplier	SHANTOU ZINGO HOBBY CO.,LTD
Address	Fengxin Industrial Zone，Fengxiang Street，Chenghai District，Shantou, Guangdong,China
Product	Toy RC Monster Rockslide 1:24
Brand Name	N/A
Model	ZG2019A
Additional Model & Model Difference	N/A
Date of tests	Mar. 07 to Mar. 15, 2019

the tests have been carried out according to the requirements of the following standard:

☒ **FCC Part 15, Subpart C, Section 15.235**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Tested by Evans He Project Engineer / EMC Department	Approved by David Huang Supervisor/ EMC Department
Evans He	David Huang Date: Mar. 15,2019

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF 190201N015	Original release	Mar. 15, 2019

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.235)				TEST LAB
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK	
§15.207 (a)	Conducted Emission	N/A	EUT is powered by battery	
§15.209 §15.235(a)	Radiated Emission	PASS	Compliant	B
§15.235(b)	Measured Bandwidth	PASS	Compliant	A
§15.203	Antenna Requirement	N/A	No antenna connector is used	

NOTE: Test Lab Information For Reference:

Lab A:

BUREAU VERITAS SHENZHEN CO., LTD. DONGGUAN BRANCH

Lab address: Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao'an District Shenzhen, Guangdong, 518108, People's Republic of China

Lab B:

BUREAU VERITAS SHENZHEN CO., LTD. DONGGUAN BRANCH

Lab address: No. 34, Chenwulu Section, Guantai Rd., Houjie Town, DongguanCity,Guangdong 523942, China

2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Radiated emissions	30MHz ~ 1GHz	5.12dB
	1GHz ~ 18GHz	5.34dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Note：The above uncertainty is Lab A.

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Radiated emissions	30MHz ~ 1GHz	4.04dB
	1GHz ~ 18GHz	5.02dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Note：The above uncertainty is Lab B.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Toy RC Monster Rockslide 1:24
MODEL NO.	ZG2019A
FCC ID	2ASGEZG2019A49
NOMINAL VOLTAGE	DC 9V from Battery
MODULATION TYPE	AM
OPERATING FREQUENCY	49.860MHz
NUMBER OF CHANNEL	1
ANTENNA TYPE	Chip Antenna with 0dBi gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions, but only the worst case was shown in test report.
3. Please refer to the EUT photo document (Reference No.: 190201N015) for detailed product photo.

3.2 DESCRIPTION OF TEST MODES

The EUT was tested under the following mode.

FREQUENCY	TEST MODE
49.860MHz	Transmitting

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C, 15.235

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards. This is a single application for certification of a transmitter. The receiver for this transmitter is authorized by Declaration of Conformity procedure

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit without any other necessary accessories or support units.

4 TEST TYPES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

FREQUENCIES (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

According to §15.235(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Peak] [μV/m]	Field Strength of Fundamental Emission [Average] [μV/m]
49.82 – 49.90	100,000 (100 dBμV/m)	10,000 (80 dBμV/m)

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 TEST INSTRUMENTS

Instrument	Model	Serial #	Cal Date	Cal Due
Agilent ESA-E SERIES SPECTRUM ANALYZER	E4407B	MY45108319	Feb 11, 19	Feb. 10, 20
EMI test receiver	ESL6	1300.5001K06-100262-eQ	Jan, 05, 19	Jan. 04, 20
SYNTHESIZED SIGNAL GENERATOR	8665B	3744A01293	Jan, 05, 19	Jan. 04, 20
Bilog Antenna (30MHz~6GHz)	JB6	A110712	Feb 08, 19	Feb. 07, 20
Bilog Antenna (30MHz~2GHz)	JB1	A112017	Jan 26, 19	Jan. 25, 20
A-INFOMW Horn Antenna (1~18GHz)	AH-118	71259	Jan 26, 19	Jan. 25, 20
Pre-Amplifier (100MHz-26.5GHz)	EMC 012645	980077	May 18, 18	May 17, 19
Pre-Amplifier (18GHz-40GHz)	EMC 184045	980102	Nov. 08,18	Nov. 07,19
EMCO Horn Antenna (1~18GHz)	AH-118	71283	Feb 02, 19	Feb. 01, 20
OPT 010 AMPLIFIER (0.1~1300MHz)	8447E	2727A02430	Dec. 09, 18	Dec. 08, 19
Microwave Preamplifier (0.5 ~ 18GHz)	PAM-118	443008	Dec. 09, 18	Dec. 08, 19
Large Loop Antenna	RF300	Rf300	Dec. 09, 18	Dec. 08, 19
Universal Radio Communication Tester	CMU200	121393	Feb 11, 19	Feb. 10, 20
Positioning Controller	UC3000	MF780208282	Dec. 09, 18	Dec. 08, 19
Test Software	EZ-EMC	ver.Icp-03A1	N/A	N/A

NOTE:

1. The test was performed in 966 Chamber.
2. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
3. The horn antenna is used only for the measurement of emission frequency above1GHz if tested.
4. The FCC Site Registration No. is 749762.

Remark: The above instruments are owned by lab A

Instrument	Model	Serial #	Cal Date	Cal Due
EMI Test Receiver	ESU40	100449	Mar. 21,18	Mar. 20,19
Bilog Antenna	CBL 6111D	30643	Aug.11,18	Aug. 10,19
Amplifier	BPA-530	100220	Apr. 18,18	Apr. 18,19
Test software	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
Horn Antenna	3117	00062558	Jul. 21, 18	Jul. 20, 19
EMI Test Receiver	ESU40	100449	Mar. 21,18	Mar. 20,19
Broadband Preamplifier (1~18GHz)	BBV9718	305	Apr. 18,18	Apr. 18,19
Pre-Amplifier (18GHz-40GHz)	EMC 184045	980102	Nov. 09,18	Nov. 08,19
Test Software	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A

NOTE: 1. The test was performed at 966 Chamber (a 3m Semi-anechoic chamber).

2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

Remark: The above instruments are owned by lab B

4.1.3 TEST PROCEDURES

The basic test procedure was in accordance with ANSI C63.10 (section 6).

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters Semi-anechoic chamber room. 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 height of antenna 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 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using new battery. The turntable was rotated to maximize the emission level.

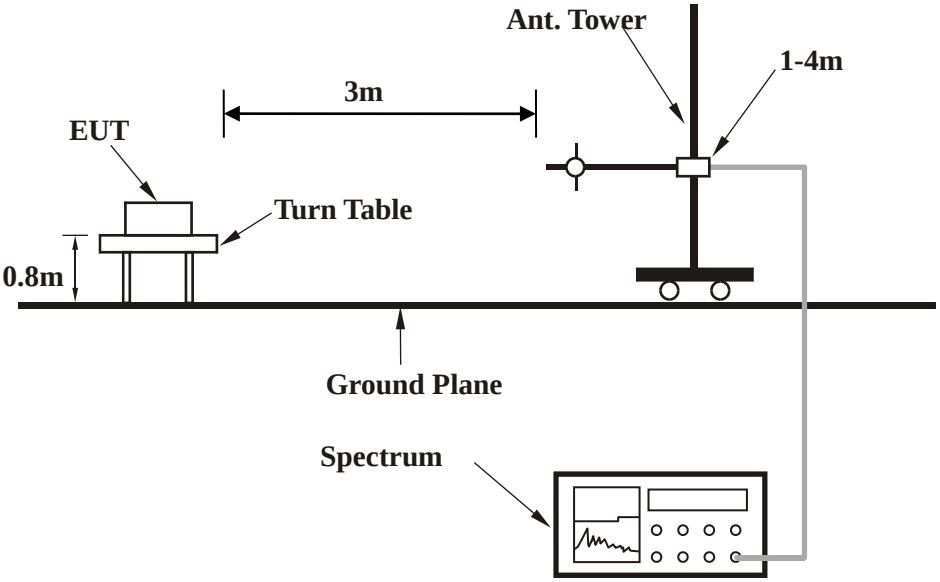
.**NOTE:**

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
3. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
4. Margin value = Emission level – Limit value.
5. Fundamental AV value =PK Emission +AV factor.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT OPERATING CONDITIONS

a. Turned on the power of equipment.
b. Hold down the TX of button, and then the EUT was operating.
c. EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

4.1.7 TEST RESULTS

FIELD STRENGTH OF FUNDAMENTAL

No.	Freq. (MHz)	Antenna Polarization	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	49.86(PK)	V	-13.13	86.13	73	100	-27
2	49.86(AV)	V	-4.51	-	68.49	80	-11.51
3	49.86(PK)	H	-13.13	75.06	61.93	100	-38.07
4	49.86(AV)	H	-4.51	-	57.42	80	-22.58

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

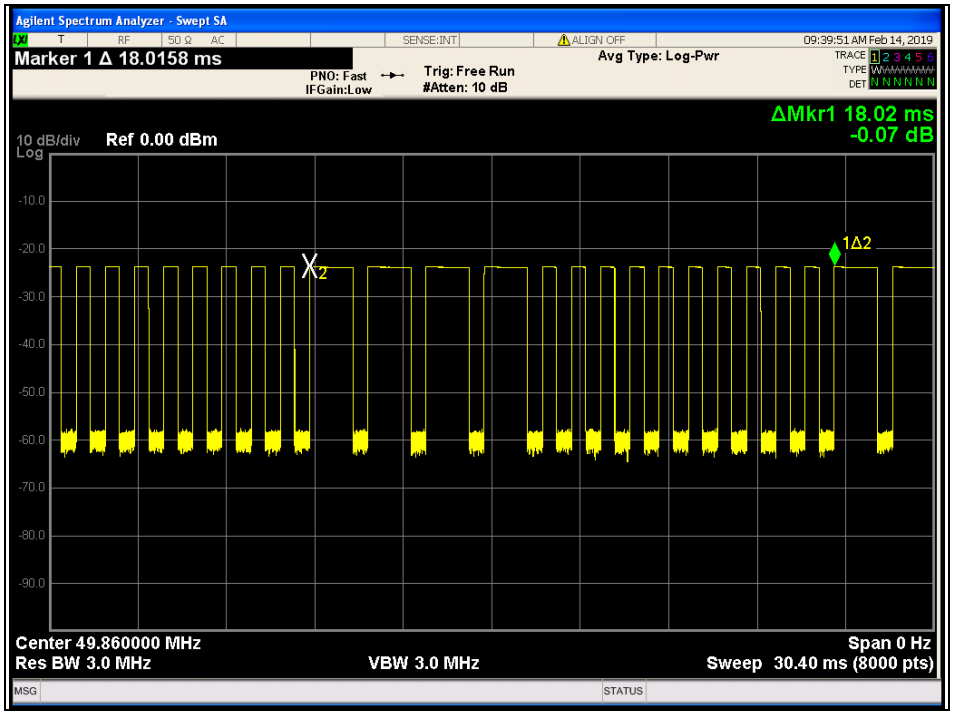
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The average value of fundamental frequency is: Average value = Peak value +AV factor, where the AV factor is calculated from following formula: AV factor=20 log (Duty cycle) = 20 log (59.5%) = -4.51dB.

Tp = 18.02ms

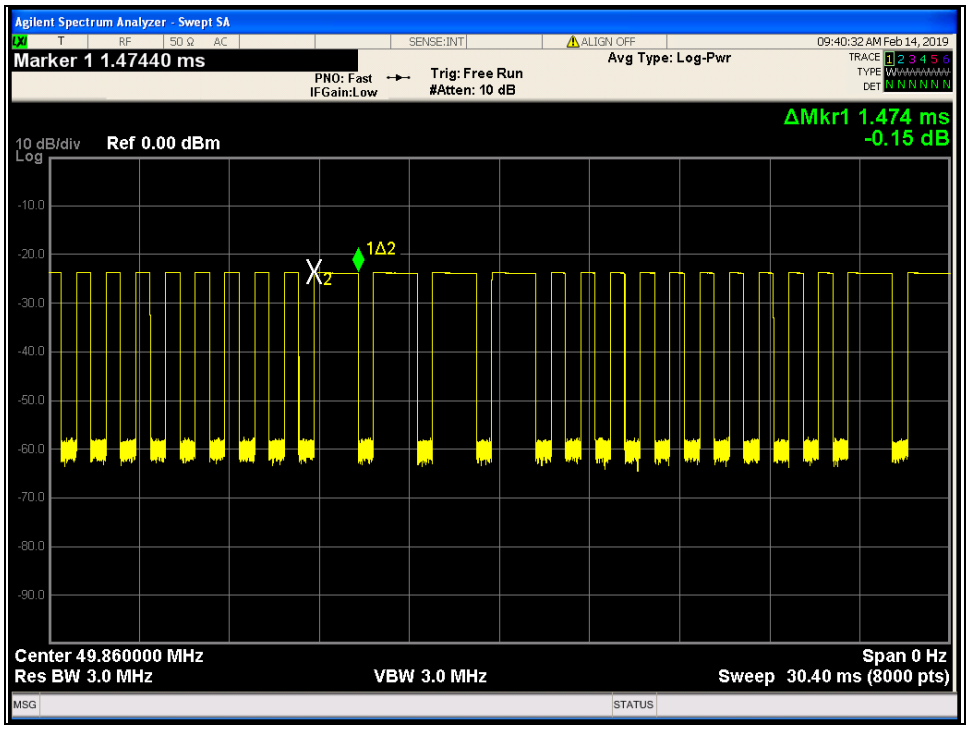
Ton = Ton1 * Number+ Ton2 * Number =4*1.474+10*0.4826 = 10.722ms

Duty Cycle = Ton / Tp * 100% = 10.722/18.02=59.5%

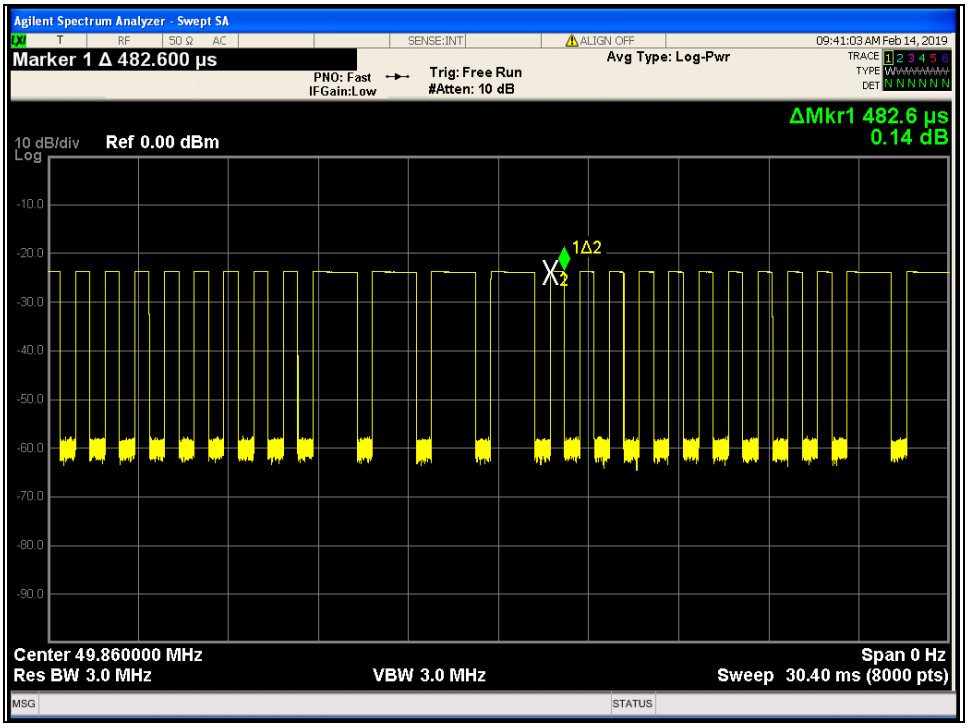
Tp=18.02ms



Ton1=1.474ms



Ton2= 0.4826ms



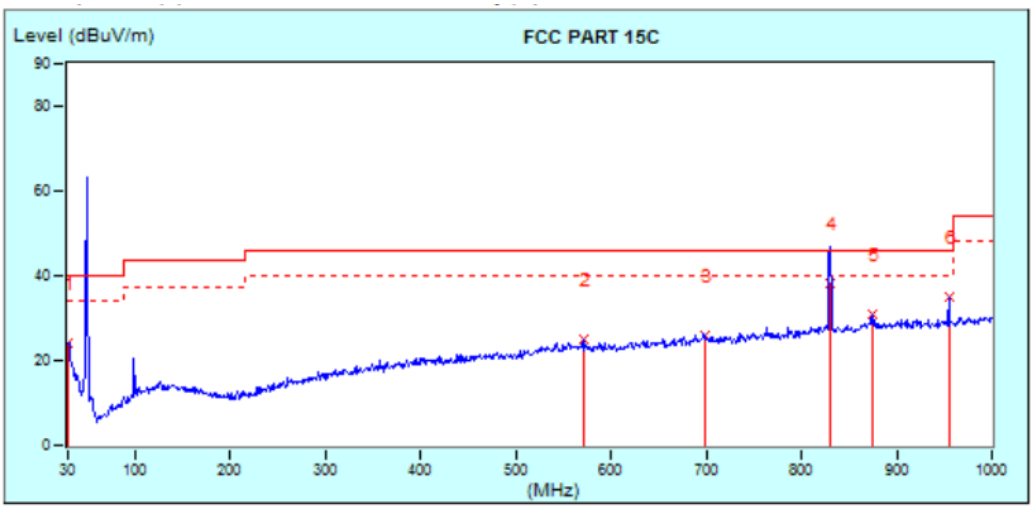
FREQUENCY RANGE	9KHz ~ 1GHz	DETECTOR FUNCTION	Quasi-Peak (QP)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 m

	No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	30.00	-10.13	34.10	23.97	40.00	-16.03	200	34
	2	571.04	-5.89	30.67	24.78	46.00	-21.22	200	17
	3	699.30	-3.97	29.90	25.93	46.00	-20.07	200	0
*	4	829.71	-1.53	39.93	38.40	46.00	-7.60	100	235
	5	873.90	-0.87	31.62	30.75	46.00	-15.25	200	0
	6	954.73	-0.27	35.45	35.18	46.00	-10.82	200	1

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.



This data is for evaluation purposes only. It cannot be used for EMC approvals unless it contains the approved signature.
If you have any questions regarding the test data, you can write your comments to DGService@cn.bureauveritas.com

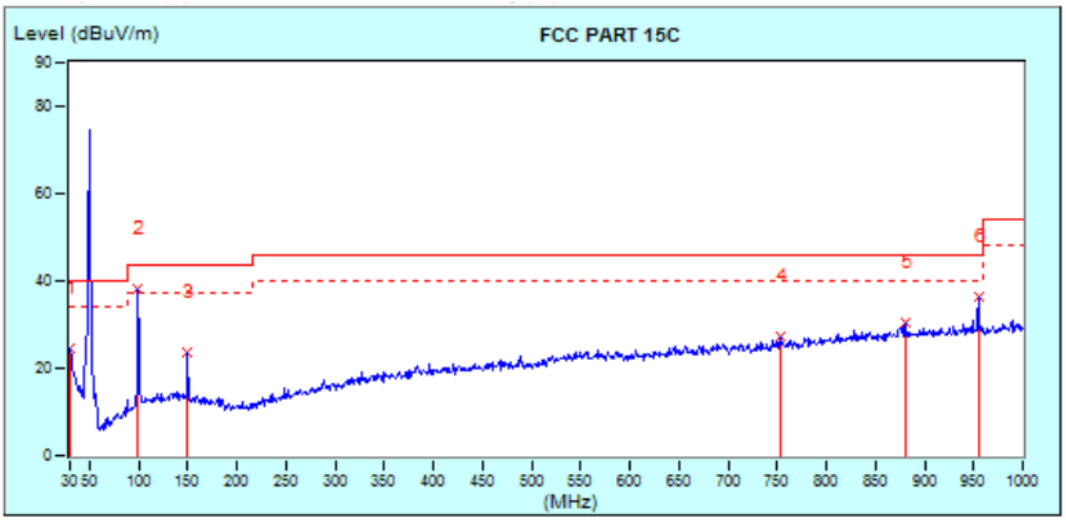
FREQUENCY RANGE	9KHz ~ 1GHz	DETECTOR FUNCTION	Quasi-Peak (QP)

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 m

	No.	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower / Table cm	deg
	1	30.00	-10.13	34.58	24.45	40.00	-15.55	100	0
*	2	98.98	-18.15	56.23	38.08	43.50	-5.42	100	0
	3	149.63	-16.21	39.87	23.66	43.50	-19.84	100	0
	4	753.19	-3.38	30.71	27.33	46.00	-18.67	100	0
	5	880.37	-0.78	31.22	30.44	46.00	-15.56	100	0
	6	954.73	-0.27	36.77	36.50	46.00	-9.50	100	0

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.



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4.2 BANDWIDTH MEASUREMENT

4.2.1 LIMITS OF BANDWIDTH MEASUREMENT

The field strength of any emissions appearing between the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 26 dB below the level of the unmodulated carrier or to the general limits in Section 15.209.

FREQUENCY (MHz)	Limits [MHz]
49.860	within 49.81~49.91

4.2.2 TEST INSTRUMENTS

Instrument	Model	Serial #	Cal Date	Cal Due
Agilent ESA-E SERIES SPECTRUM ANALYZER	E4407B	MY45108319	Feb. 11, 19	Feb. 10, 20
EMI test receiver	ESL6	1300.5001K06-100262-eQ	Jan. 05, 19	Jan. 04, 20
Power Splitter	1#	1#	Dec. 09, 18	Dec. 08, 19
SYNTHESIZED SIGNAL GENERATOR	8665B	3744A01293	Jan. 05, 19	Jan. 04, 20
DC Power Supply	E3640A	MY40004013	Jan. 05, 19	Jan. 04, 20
A-INFOMW Horn Antenna (1~18GHz)	AH-118	71259	Jan. 26, 19	Jan. 25, 20
Pre-Amplifier (100MHz-26.5GHz)	EMC 012645	980077	May 18, 18	May 17, 19
OPT 010 AMPLIFIER (0.1~1300MHz)	8447E	2727A02430	Dec. 09, 18	Dec. 08, 19
Attenuator	MINI	N/A	Dec. 09, 18	Dec. 08, 19
Test Software	EZ-EMC	ver.Icp-03A1	N/A	N/A

NOTE:

1. The test was performed in RF Oven room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

4.2.3 TEST PROCEDURE

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

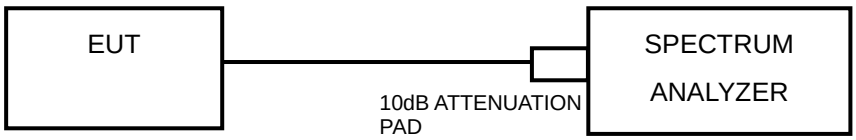
c. Measure the frequency difference of two frequencies that were attenuated 26dB from the reference level. Record the frequency difference as the emission bandwidth.

d. Repeat above procedures until all frequencies measured were complete.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



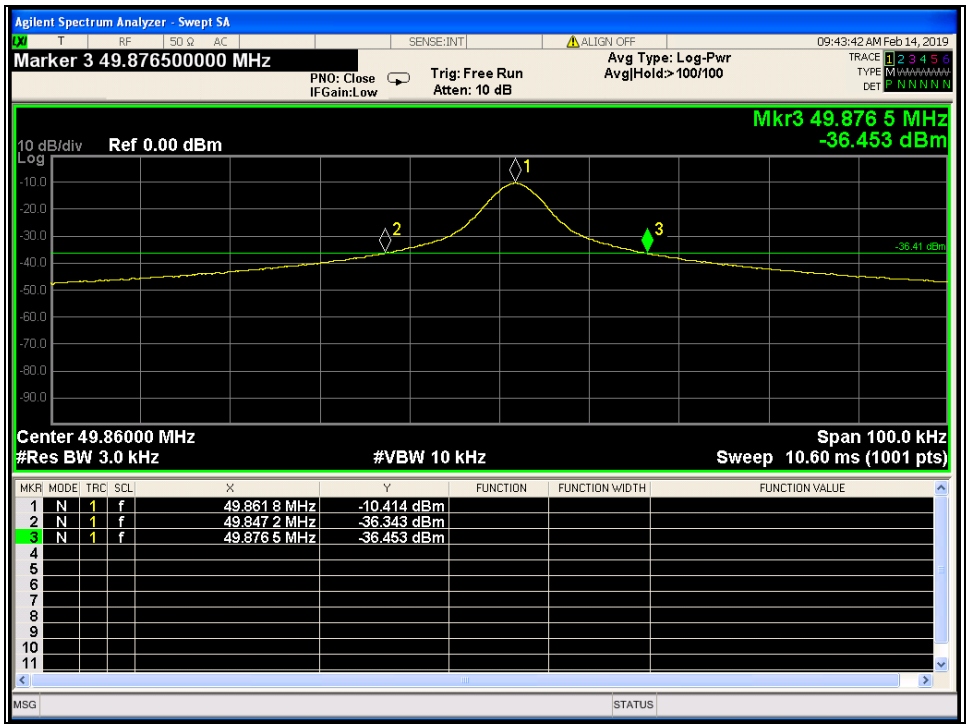
4.2.6 EUT OPERATING CONDITIONS

Same as item 4.1.6

4.2.7 TEST RESULTS

Lower & Upper Test Frequency Point (MHz)	Test Frequency (MHz)	P/F
Lower	49.847	PASS
Upper	49.876	PASS

Test Data:



5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

6 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---