

#### Shenzhen CTA Testing Technology Co., Ltd.

Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

### TEST REPORT FCC Rules and Regulations Part PART 15.249

Report Reference No.....: CTA22022800501

FCC ID...... 2A5B9-TK0001

Compiled by

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Date of issue...... Mar .03, 2022

Testing Laboratory Name ...... Shenzhen CTA Testing Technology Co., Ltd.

Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community,

Fuhai Street, Bao'an District, Shenzhen, China

CTATESTIN

Applicant's name...... ShenZhen Huan Qiu Trading Development Co., Ltd

303C,3rd Floor,Lizhi Building,No.11 Jianshe Road,Pinghu Street, Address.....Longgang District,Shenzhen,Guangdong

Standard ...... FCC Rules and Regulations Part PART 15.249

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Test item description ...... RC Tank Toy

Trade Mark .....N/A

Manufacturer ...... ShenZhen Huan Qiu Trading Development Co., Ltd

CTA TESTING

Model/Type reference.....TK0001

Listed Models ...... Q85

Modulation ...... GFSK

Ratings...... DC 3.0V From Battery

Result......PASS

CTATE

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#### TEST REPORT

: RC Tank Toy **Equipment under Test** 

Model /Type : TK0001

Listed Models Q85

CTATESTINApplicant ShenZhen Huan Qiu Trading Development Co., Ltd

303C,3rd Floor,Lizhi Building,No.11 Jianshe Road,Pinghu Street,

Longgang District, Shenzhen, Guangdong

: ShenZhen Huan Qiu Trading Development Co., Ltd Manufacturer

: 303C,3rd Floor,Lizhi Building,No.11 Jianshe Road,Pinghu Street, Address

Longgang District, Shenzhen, Guangdong

	STING	
CTATA	STING	
6.7	Test Result:	PASS

The test report merely corresponds to the test sample.

it is not policy. It is not permitted to copy extracts of these test result without the written permission of the test

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#### 1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.249: Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5875 MHz, and 24.0 - 24.25 GHz.

ANSI C63.10:2013: American National Standard for Testing Unlicensed Wireless Devices

ANSI C63.4: 2014: –American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz Range of 9 kHz to 40GHz

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#### 2. SUMMARY

#### 2.1. General Remarks

2.1. General Remarks			
Date of receipt of test sample	are it	Feb. 20, 2022	STING
	( G ( F)		TE3'
Testing commenced on		Feb. 20, 2022	CTA
			(34)
Testing concluded on	:	Mar. 03, 2022	

# 2.2. Product Description

Name of EUT	RC Tank Toy	
Model Number	TK0001	
Power Rating	DC 3.0V From Battery	
Sample ID:	CTA220228005-1#(Engineer sample)	ESTI
Sample 1D.	CTA220228005-2#(Normal sample)	CTATE
Operation frequency	2405.3MHz	CONT.
Modulation	GFSK(FHSS)	To war milit
Antenna Type	PCB antenna	
Antenna Gain	0dB(Max)	

Power supply system	utilised	CTATES	STING	
Power supply voltage		○ 230V / 50 Hz	○ 120V / 60Hz	
		○ 12 V DC	O 24 V DC	
		Other (specified in	blank below)	CTA

## CTATESTING 2.4. Short description of the Equipment under Test (EUT)

This is a RC Tank Toy

For more details, refer to the user's manual of the EUT.

#### 2.5. EUT operation mode

The Applicant use Key to control the EUT for staying in continuous transmitting and receiving mode for testing .There is 1 channels provided to the EUT. Channel 01 was selected to test.

Channel	Frequency (MHz)
01	2410

Test frequency:

01	2410	
TATEST		
Channel	Frequency (MHz)	CTING
01	2410	53.
	CAN CAN	

#### 2.6. Block Diagram of Test Setup

CTATESTING **EUT** 

#### 2.7. Modifications

. to med No modifications were implemented to meet testing criteria.

#### 3. TEST ENVIRONMENT

#### 3.1. Address of the test laboratory

#### Shenzhen CTA Testing Technology Co., Ltd.

Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Baoʻan District, Shenzhen, China

#### 3.2. Test Facility

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

FCC-Registration No.: 517856 Designation Number: CN1318

Shenzhen CTA Testing Technology Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

#### Industry Canada Registration Number. Is: 27890 CAB identifier: CN0127

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

A2LA-Lab Cert. No.: 6534.01

Shenzhen CTA Testing Technology Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

#### 3.3. Environmental conditions

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

#### Radiated Emission:

Temperature:	23 ° C
Humidity:	48 %
NG	
Atmospheric pressure:	950-1050mbar

# AC Main Conducted testing:

3	
Temperature:	24 ° C
CIT	
Humidity:	45 %
	Status C
Atmospheric pressure:	950-1050mbar

#### Conducted testing:

bonducted testing:	
Temperature:	24 ° C
Humidity:	45 %
STILL	
Atmospheric pressure:	950-1050mbar
	CTATESTING

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#### 3.4. Summary of measurement results

FCC PART 15.249				
FCC Part 15.249(a) Field Strength of Fundamental PAS				
FCC Part 15.209	Spurious Emission	PASS		
FCC Part 15.209 Band edge		PASS		
FCC Part 15.215(c)	20dB bandwidth	PASS		
FCC Part 15.207	Conducted Emission	N/A		
FCC Part 15.203	Antenna Requirement	PASS		

### 3.5. Statement of the measurement uncertainty

Measurement Uncertainty

Conducted Emission Expanded Uncertainty = 2.23dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz) = 3.08dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz) = 4.42dB, k=2
Radiated emission expanded uncertainty(Above 1GHz) = 4.06dB, k=2

#### 3.6. Equipments Used during the Test

	Test Equipment	Manufacturer	Model No.	Equipment No.	Calibration Date	Calibration Due Date
	LISN	R&S	ENV216	CTA-308	2021/08/06	2022/08/05
	LISN	R&S	ENV216	CTA-314	2021/08/06	2022/08/05
	EMI Test Receiver	R&S	ESPI	CTA-307	2021/08/06	2022/08/05
	EMI Test Receiver	R&S	ESCI	CTA-306	2021/08/06	2022/08/05
	Spectrum Analyzer	Agilent	N9020A	CTA-301	2021/08/06	2022/08/05
CTATE	Spectrum Analyzer	R&S	FSP	CTA-337	2021/08/06	2022/08/05
	Vector Signal generator	Agilent	N5182A	CTA-305	2021/08/06	2022/08/05
	Analog Signal Generator	R&S	SML03	CTA-304	2021/08/06	2022/08/05
	Universal Radio Communication	CMW500	R&S	CTA-302	2021/08/06	2022/08/05
G	Temperature and humidity meter	Chigo	ZG-7020	CTA-326	2021/08/06	2022/08/05
	Ultra-Broadband Antenna	Schwarzbeck	VULB9163	CTA-310	2021/08/07	2022/08/06
	Horn Antenna	Schwarzbeck	BBHA 9120D	CTA-309	2021/08/07	2022/08/06
	Loop Antenna	Zhinan	ZN30900C	CTA-311	2021/08/07	2022/08/06
	Horn Antenna	Beijing Hangwei Dayang	OBH100400	CTA-336	2021/08/06	2022/08/05
	Amplifier	Schwarzbeck	BBV 9745	CTA-312	2021/08/06	2022/08/05
	Amplifier	Taiwan chengyi	EMC051845B	CTA-313	2021/08/06	2022/08/05
	Directional coupler	NARDA	4226-10	CTA-303	2021/08/06	2022/08/05
	High-Pass Filter	XingBo	XBLBQ-GTA18	CTA-402	2021/08/06	2022/08/05
CTATE	STING	-ING				

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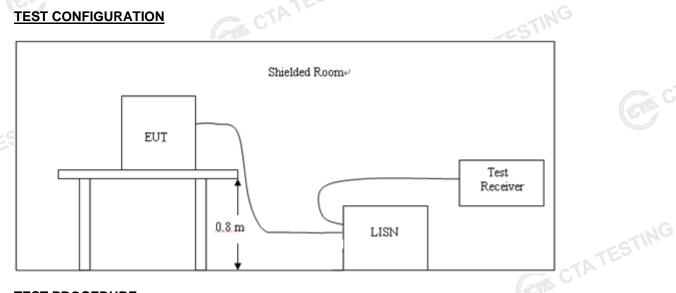
High-Pass Filter	XingBo	XBLBQ-GTA27	CTA-403	2021/08/06	2022/08/05
Automated filter bank	Tonscend	JS0806-F	CTA-404	2021/08/06	2022/08/05
Power Sensor	Agilent	U2021XA	CTA-405	2021/08/06	2022/08/05
Amplifier	Schwarzbeck	BBV9719	CTA-406	2021/08/06	2022/08/05
Note: The Cal.Interval	was one year.		GM CT	ATESTING	

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#### 4. TEST CONDITIONS AND RESULTS

#### 4.1. AC Power Conducted Emission

#### **TEST CONFIGURATION**



#### **TEST PROCEDURE**

- 1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
- 2. Support equipment, if needed, was placed as per ANSI C63.10.
- 3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4, If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5, All support equipments received AC power from a second LISN, if any.
- 6, The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

#### **AC Power Conducted Emission Limit**

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following:

Frequency range (MHz)	Limit (dBuV)				
Frequency range (MHZ)	Quasi-peak	Average			
0.15-0.5	66 to 56*	56 to 46*			
0.5-5	56	46			
5-30	60	50			
* Decreases with the logarithm of the freque	ency.	10000			

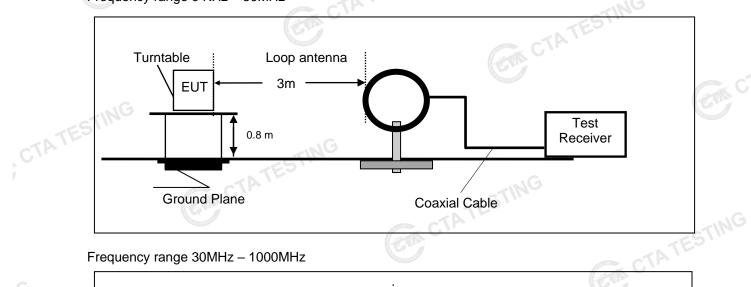
#### TEST RESULTS

The EUT is Powered by the Battery, So this test item is not applicable for the EUT. CTATESTING Report No.: CTA22022800501 Page 11 of 23

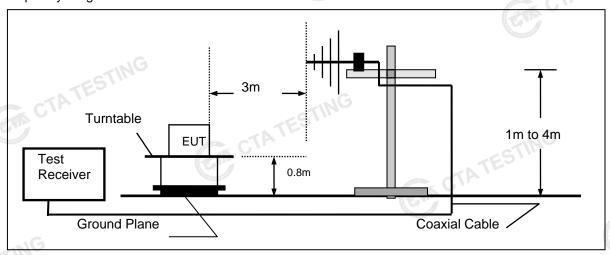
#### 4.2. Radiated Emission and Band Edges

#### **TEST CONFIGURATION**

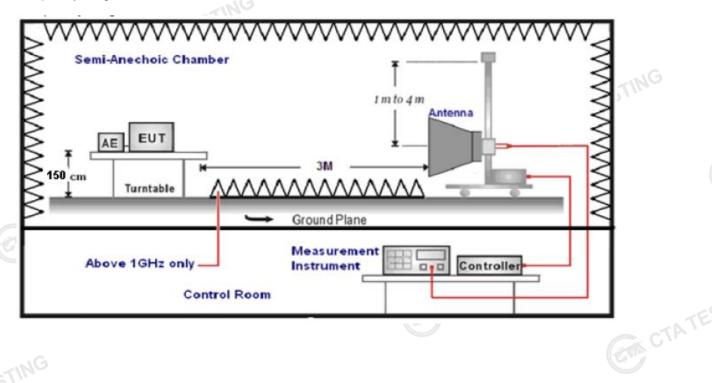
Frequency range 9 KHz - 30MHz



Frequency range 30MHz - 1000MHz



Frequency range above 1GHz-25GHz



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#### **TEST PROCEDURE**

- 1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz -25GHz.
- Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0°C to 360°C to acquire the highest emissions from EUT.
- 3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- Repeat above procedures until all frequency measurements have been completed.
- The EUT minimum operation frequency was 26MHz and maximum operation frequency was 1910MHz.so radiated emission test frequency band from 9KHz to 25GHz.
- 6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Ultra-Broadband Antenna	3
1GHz-18GHz	Double Ridged Horn Antenna	3
18GHz-25GHz	Horn Anternna	1

Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QPC
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

#### Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

### FS = RA + AF + CL - AG

	~711
Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

Transd=AF +CL-AG

#### **RADIATION LIMIT**

According 15.249, the field strength of emissions from intentional radiators operated within 2400MHz-2483.5 MHz shall not exceed 94dBµV/m (50mV/m):

FCC PART 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply CTATES with the radiated emission limits specified in §15.209(a)

#### Radiated emission limits

Frequency (MHz)	Distance (Meters)	Radiated (dBµV/m)	Radiated (µV/m)	
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)	
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)	
1.705-30	3	20log(30)+ 40log(30/3)	30	
30-88	3	40.0	100	
88-216	3 (1)	43.5	150	
216-960	3	46.0	200	
Above 960	3	54.0	500	
TEST RESULTS Remark:			Com C	AT

Remark: CTATESTING

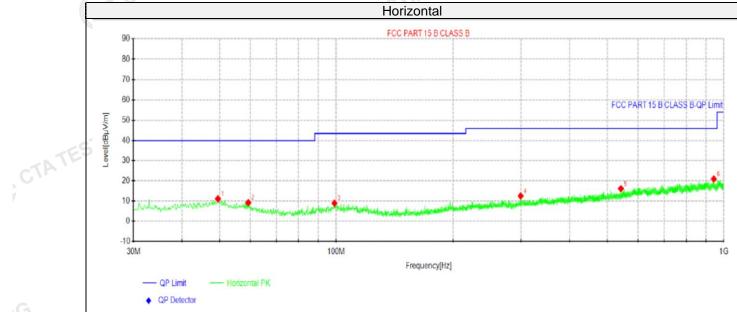
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(CVA)

- This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
- 2. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.

#### For 30MHz-1GHz



Sus	Suspected Data List											
NC	Freq.	Reading	Level	Factor	Limit	Margin	Height	Angle	Delevity			
INC	MHz]	[dBµ∨]	[dBµV/m]	[dB/m]	[dBµV/m]	[dB]	[cm]	[°]	Polarity			
1	49.5212	27.22	11.12	-16.10	40.00	28.88	100	344	Horizontal			
2	59.3425	27.32	9.25	-18.07	40.00	30.75	100	157	Horizontal			
3	98.9912	27.46	8.94	-18.52	43.50	34.56	100	247	Horizontal			
4	299.175	29.89	12.54	-17.35	46.00	33.46	100	327	Horizontal			
5	542.402	29.89	16.14	-13.75	46.00	29.86	100	141	Horizontal			
6	941.678	29.88	20.93	-8.95	46.00	25.07	100	116	Horizontal			

Note:1).Level ( $dB\mu V/m$ )= Reading ( $dB\mu V$ )+ Factor (dB/m)

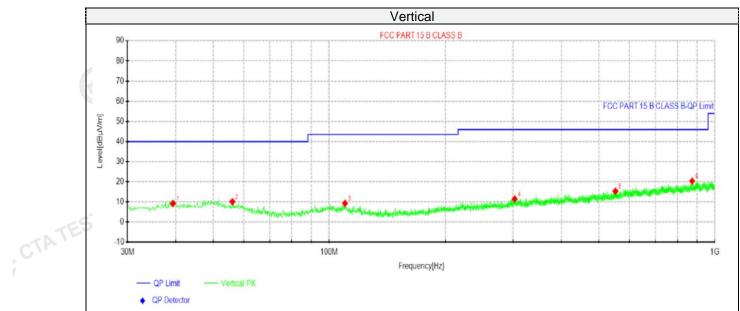
2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)





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Suspected Data List										
NO.	Freq.	Reading	Level	Factor	Limit	Margin	Height	Angle	Polarity	
NO.	[MHz]	[dBµ∨]	[dBµV/m]	[dB/m]	[dBµV/m]	[dB]	[cm]	[°]	Folanty	
1	39.3362	26.47	9.23	-17.24	40.00	30.77	100	277	Vertical	
2	56.0688	27.50	10.14	-17.36	40.00	29.86	100	360	Vertical	
3	109.903	28.17	9.32	-18.85	43.50	34.18	100	17	Vertical	
4	302.691	28.81	11.50	-17.31	46.00	34.50	100	106	Vertical	
5	552.102	28.99	15.38	-13.61	46.00	30.62	100	138	Vertical	
6	873.051	29.98	20.36	-9.62	46.00	25.64	100	58	Vertical	

Note:1).Level  $(dB\mu V/m)$ = Reading  $(dB\mu V)$ + Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBu)//m) | Lovel (dBu)//m)

3). Margin(dB) = Limit (dB $\mu$ V/m) - Level (dB $\mu$ V/m)

CTATE

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For 1GHz to 25GHz

GFSK (above 1GHz)

Freque	Frequency(MHz):		2405.3		Polarity:		HORIZONTAL		
Frequency (MHz)	Le	ssion vel V/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre- amplifier (dB)	Correction Factor (dB/m)
2405.30	106.13	PK	114	7.87	117.42	27.45	3.42	42.16	-11.29
2405.30	83.54	AV	94	10.46	94.83	27.45	3.42	42.16	-11.29
4810.60	53.33	PK	74	20.67	57.85	32.38	5.12	42.02	-4.52
4810.60	43.80	AV	54	10.20	48.32	32.38	5.12	42.02	-4.52
7215.90	50.01	PK	74	23.99	50.53	36.62	6.48	43.62	-0.52
7215.90	37.95	AV	54	16.05	38.47	36.62	6.48	43.62	-0.52

Freque	Frequency(MHz):		2405.3		Polarity:		VERTICAL		
Frequency (MHz)	Emis Lev (dBu		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre- amplifier (dB)	Correction Factor (dB/m)
2405.30	103.92	PK	114	10.08	115.21	27.45	3.42	42.16	-11.29
2405.30	81.99	AV	94	12.01	93.28	27.45	3.42	42.16	-11.29
4810.60	52.41	PK	74	21.59	56.93	32.38	5.12	42.02	-4.52
4810.60	43.60	ΑV	54	10.40	48.12	32.38	5.12	42.02	-4.52
7215.90	50.95	PK	74	23.05	51.47	36.62	6.48	43.62	-0.52
7215.90	38.06	AV	54	15.94	38.58	36.62	6.48	43.62	-0.52

#### 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)- Pre-amplifier
- 3. Margin value = Limit value- Emission level.
- 4. -- Mean the PK detector measured value is below average limit.
- 5. The other emission levels were very low against the limit.



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#### Results of Band Edges Test (Radiated)

Freque	ncy(MHz)	):	240	)5.3	Pola	arity:	Н	ORIZONTA	\L
Frequency (MHz)	Le	ssion vel V/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre- amplifier (dB)	Correction Factor (dB/m)
2390.00	58.74	PK	74	15.26	69.16	27.42	4.31	42.15	-10.42
2390.00	41.83	AV	54	12.17	52.25	27.42	4.31	42.15	-10.42
Freque	ncy(MHz)	):	240	)5.3	Pola	arity:		VERTICAL	
Frequency (MHz)	Le	ssion vel V/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre- amplifier (dB)	Correction Factor (dB/m)
2390.00	59.06	PK	74	14.94	69.48	27.42	4.31	42.15	-10.42
2390.00	42.45	AV	54	11.55	52.87	27.42	4.31	42.15	-10.42
Freque	ncy(MHz)	):	2405.3		Polarity:		HORIZONTAL		
Frequency (MHz)	Le	ssion vel V/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre- amplifier (dB)	Correction Factor (dB/m)
2483.50	58.10	PK	74	15.90	68.21	27.7	4.47	42.28	-10.11
2483.50	40.27	AV	54	13.73	50.38	27.7	4.47	42.28	-10.11
Freque	Frequency(MHz):		240	)5.3	Pola	arity:	VERTICAL		
Frequency (MHz)	Le	ssion vel V/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre- amplifier (dB)	Correction Factor (dB/m)
2483.50	58.60	PK	74	15.40	68.71	27.7	4.47	42.28	-10.11

#### Note:

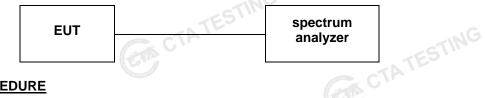
- 1) Emission level (dBuV/m) = Meter Reading+ antenna Factor+ cable loss- preamp factor.
- 2) Margin value = Limits-Emission level.
- 3) -- Mean the PK detector measured value is below average limit.
- 4) The other emission levels were very low against the limit.
- 5) RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.



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#### 4.3. 20dB Bandwidth Measurement

#### **TEST CONFIGURATION**



#### **TEST PROCEDURE**

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with source.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

#### LIMIT

#### **TEST RESULTS**

N/A		CTATE		ESTING
TEST RESULTS				CTATE
Modulation	Channel	20dB bandwidth (MHz)	Result	
GFSK	01	1.946	PASS	

Note: 1. The test results including the cable lose.



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#### 4.4. Antenna Requirement

#### Standard Applicable

For intentional device, according to FCC 47 CFR Section 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.

And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than CTATE 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

#### **Antenna Information**

The maximum gain of antenna was 0.0 dBi.

Remark: The antenna gain is provided by the customer, if the data provided by the customer is not accurate, Shenzhen CTA Testing Technology Co., Ltd. does not assume any responsibility. CTATES!

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## 5. Test Setup Photos of the EUT CTATES





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### 6. Test Photos of the EUT

CTATES:







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