



# RF TEST REPORT

**Report No.:** SET2016-05190

**Product Name:** Remote control

**FCC ID:** 2AHZ9-13MR0863

**Model No. :** Series 7000-300

**Applicant:** American North Group Inc.

**Address:** Los Altos suite#1123 Mission Viejo, CA 92691 USA

**Dates of Testing:** 03/28/2016 — 04/10/2016

**Issued by:** CCIC-SET

**Lab Location:** Building 28/29, East of Shigu, Xili Industrial Zone, Xili Road,  
Nanshan District, Shenzhen, Guangdong, China

**Tel:** 86 755 26627338    **Fax:** 86 755 26627238

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## Test Report

**Product Name**.....: Remote control

**Brand Name**.....: Silky Rider

**Trade Name** .....: American North Group Inc.

**Applicant** .....: American North Group Inc.

**Applicant Address** .....: Los Altos suite#1123 Mission Viejo, CA 92691 USA

**Manufacturer** .....: Shenzhen C&D Electronics Co., Ltd

**Manufacturer Address** .....: The 9th floor of 9th A Building Baoneng technology park,  
Longhua Town, BaoAn District, Shenzhen, Guangdong,  
China

**Test Standards** .....: 47 CFR Part 15 Section 15.231:2015: Periodic operation  
in the band 40.66~40.70MHz and above 70MHz

**Test Result**.....: PASS

**Tested by** .....:

2016.04.12

Lu Lei, Test Engineer

**Reviewed by** .....:

2016.04.12

Zhu Qi, Senior Engineer

**Approved by**.....:

2016.04.12

Wu Lian, Manager

## TABLE OF CONTENTS

<b>1. GENERAL INFORMATION .....</b>	<b>4</b>
1.1. EUT Description .....	4
1.2. Test Standards and Results.....	5
1.3. Description of test Modes .....	6
1.4. Facilities and Accreditations .....	6
<b>2. 47 CFR PART 15C REQUIREMENTS.....</b>	<b>7</b>
2.1. Antenna requirement.....	7
2.2. 20dB Bandwidth .....	8
2.3. Periodic Operation .....	10
2.4. Radiated Spurious Emission .....	15
2.5. Conducted Emission .....	19
<b>3. LIST OF MEASURING EQUIPMENT .....</b>	<b>21</b>
<b>4. UNCERTAINTY OF EVALUATION .....</b>	<b>22</b>

Change History		
Issue	Date	Reason for change
1.0	2016.04.12	First edition

## 1. General Information

### 1.1. EUT Description

EUT Type	Remote control
Hardware Version	RF204A-TX-V1.1
Software Version	RF204A-V02
Power Supply	DC 12V
Operating Band	315MHz
Operation	Manually operated within 5 sec
Channel Number	1
Modulation Type	ASK
Antenna Type	Loop Antenna
Antenna Gain	0dBi

## 1.2. Test Standards and Results

The objective of the report is to perform testing according to FCC Rules Part 15.231 for the EUT FCC Certification:

No.	Identity	Document Title
1	47 CFR Part 15.231	Periodic operation in the band 40.66~40.70MHz and above 70MHz
2	ANSI C63.10-2009	American National Standard for Testing Unlicensed Wireless Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section in CFR 47	Description	Result
1	15.203	Antenna Requirement	PASS
2	15.207	Conducted Emissions	N/A
3	15.205(a) 15.209 15.231(a)	Radiated Spurious Emissions	PASS
4	15.231(a)	Periodic Operation	PASS
5	15.231(c)	20dB Bandwidth	PASS

N/A = Not Applicable

### 1.3. Description of test Modes

No.	Test Mode Description
1	Transmitting mode

Note:

1. All buttons of the EUT have been pre-tested, and only the data of the worst case recorded in the test report.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
3. After releasing the button, the device will automatically deactivate within 5 seconds no matter how long the button you pressed.

### 1.4. Facilities and Accreditations

#### 1.4.1. Facilities

##### **CNAS-Lab Code: L1659**

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. CCIC is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659. A 12.8\*6.8\*6.4 (m) fully anechoic chamber was used for the radiated spurious emissions test.

##### **FCC-Registration No.: 406086**

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. 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 our files. Registration 406086, valid time is until October 28, 2017.

##### **IC-Registration No.: 11185A-1**

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on July. 15, 2013, valid time is until July. 15, 2016.

#### 1.4.2. Test Environment Conditions

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

Temperature (°C):	15°C - 35°C
Relative Humidity (%):	30% -60%
Atmospheric Pressure (kPa):	86KPa-106KPa

## 2. 47 CFR Part 15C Requirements

### 2.1. Antenna requirement

#### 2.1.1. Applicable Standard

According to FCC 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

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

#### 2.1.2. Antenna Information

**Antenna Category:** Internal antenna

An Internal antenna was soldered to the antenna port of EUT via an adaptor cable, can't be removed.

##### Antenna General Information:

No.	EUT	Ant. Type	Gain(dBi)
1	Remote control		

#### 2.1.3. Result: comply

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

## 2.2. 20dB Bandwidth

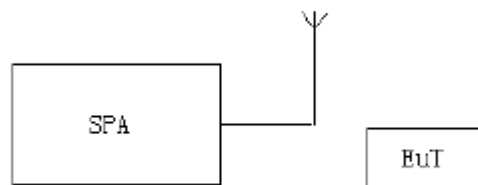
### 2.2.1. Limit of 20dB Bandwidth

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency.

### 2.2.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.2.3. Test Setup



### 2.2.4. Test Procedures

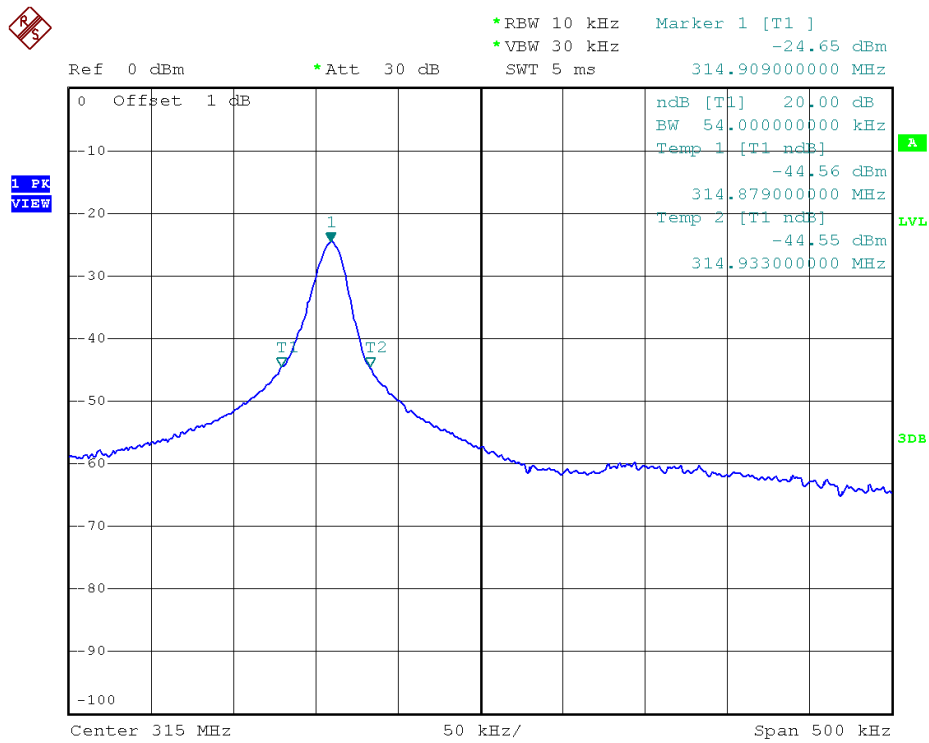
1. The transmitter output (antenna port) was connected to the spectrum analyzer. EUT and its simulators are placed on a table, let EUT working in test mode, then test it.
2. The bandwidth of the fundamental frequency was measure by spectrum analyser with 10kHz RBW and 30kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power 20dB.

### 2.2.5. Test Results of 20dB Bandwidth

Frequency (MHz)	20 dB Bandwidth (MHz)	Limits (MHz)	Result
315	0.054	$0.25\% * 315 = 0.7875$	PASS



## 2.2.6. Test Results (plots) of 6dB Bandwidth



## 2.3. Periodic Operation

### 2.3.1. Define of Periodic Operation

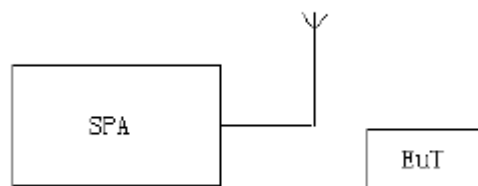
The duty cycle was determined by the following equation:

To calculate the actual field intensity, the duty cycle correction factor in decibel is needed for later use and can be obtained from following conversion

### 2.3.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.3.3. Test Setup



### 2.3.4. Test Procedure

1. The EUT was placed on a wooded table which is 0.8m height and close to receiver antenna of spectrum analyzer.
- 2 The spectrum analyzer resolution bandwidth was set to 1 MHz and video bandwidth was set to 1 MHz to encompass all significant spectral components during the test. The spectrum analyzer was operated in linear scale and zero span mode after tuning to the transmitter carrier frequency.

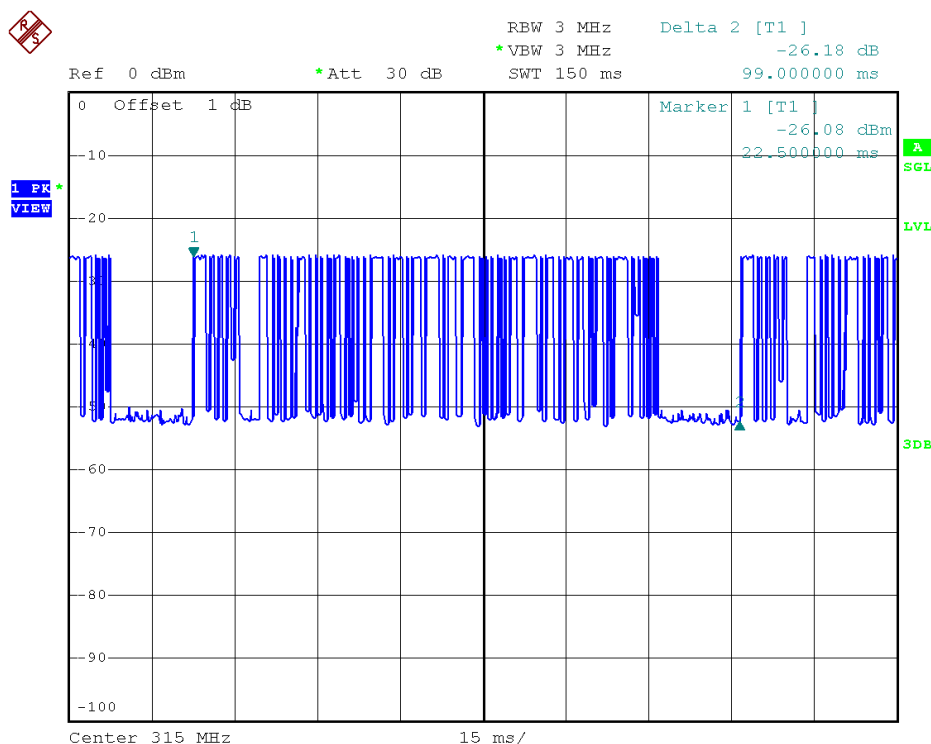
### 2.3.5. Test Results

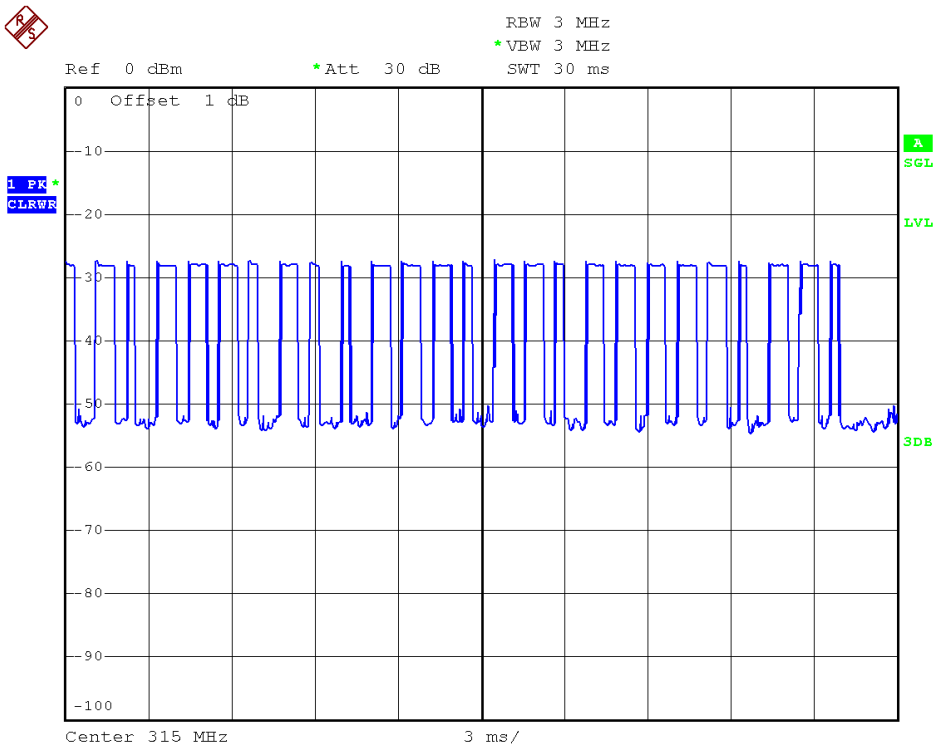
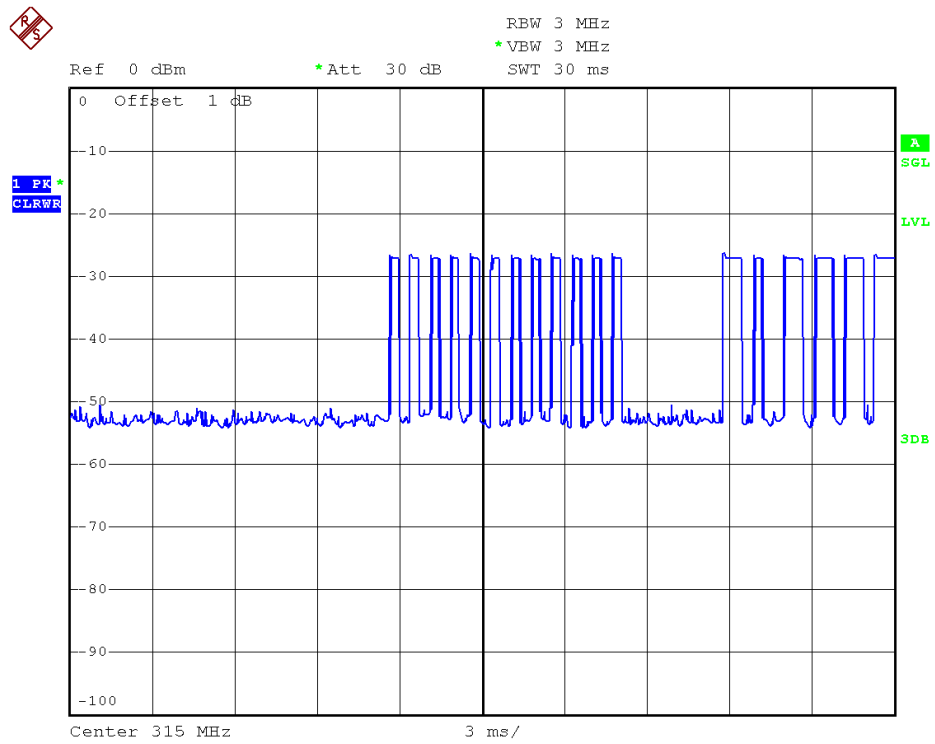
Duty Cycle(%)=Total On interval in a complete pulse train/ Length of a complete pulse train \*100 %

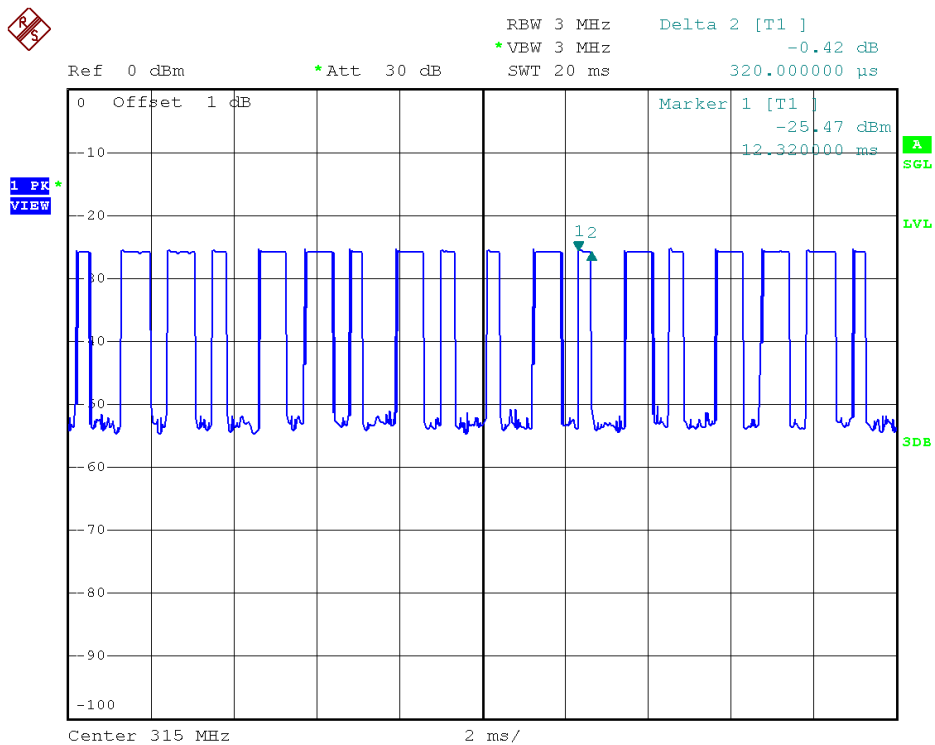
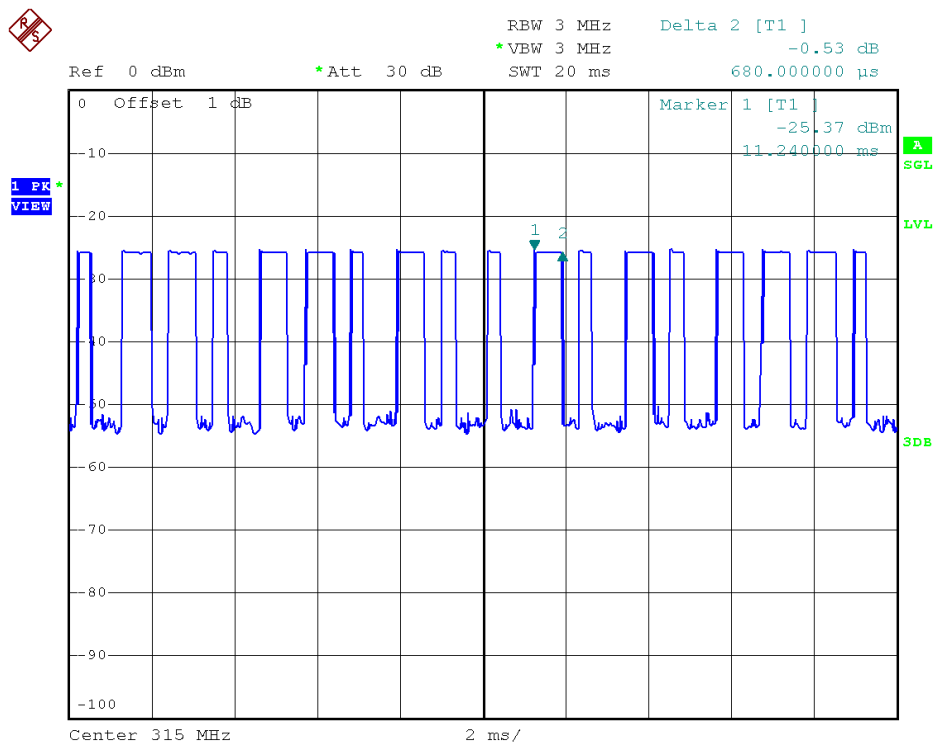
Duty Cycle Correction Factor(dB)=20 \* Log (Duty Cycle(%))

Total transmission time(ms)	99ms
Length of a complete transmission period(ms)	0.68/0.32
Duty Cycle(%)	$(21*0.32+22*0.68)/99=21.9\%$
Duty Cycle Correction Factor(dB)	-13.2

Refer to the duty cycle plot (as below), This device meets the FCC requirement. Length of a complete pulse train: Remark: FCC part15.35(c) required that a complete pulse train is more than 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.



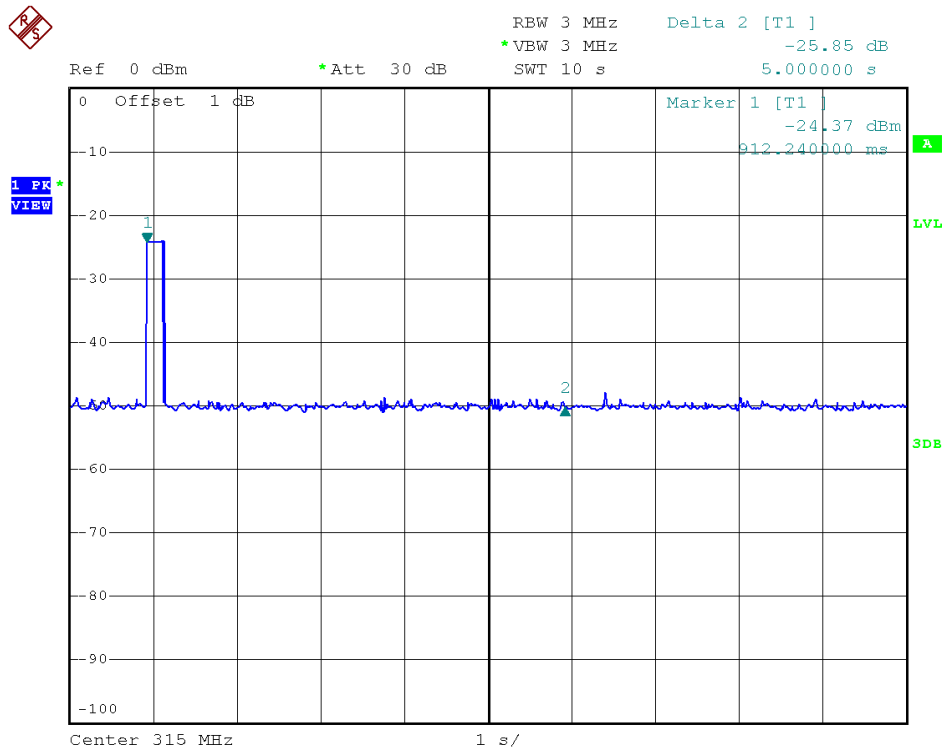






FCC Part15.231(a) (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

(2)A transmitter activated automatically shall cease transmission within 5 seconds after activation.



## 2.4. Radiated Spurious Emission

### 2.4.1. Limit of Radiated Spurious Emission

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table:

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009 - 0.490	300	$20 \cdot \log(2400/F(\text{kHz}))$	$2400/F(\text{kHz})$
0.490 - 1.705	30	$20 \cdot \log(24000/F(\text{kHz}))$	$24000/F(\text{kHz})$
1.705 - 30.0	30	29.54	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

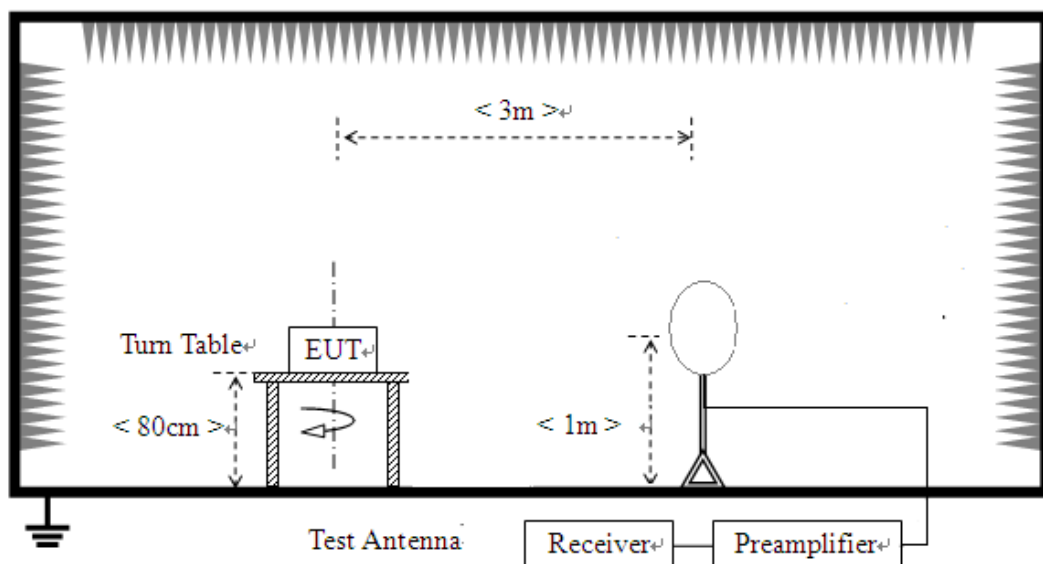
Frequency (MHz)	Fundamental Limit (μV/m) at 3m	Fundamental Limit (dBμV/m) at 3m
40.66~40.70	2250	67
70~130	1250	61.9
130~174	1250~3750	61.9~71.5
174~260	3750	71.5
260~470	3750~12500	71.5~81.9
Above 470	12500	81.9

### 2.4.2. Measuring Instruments

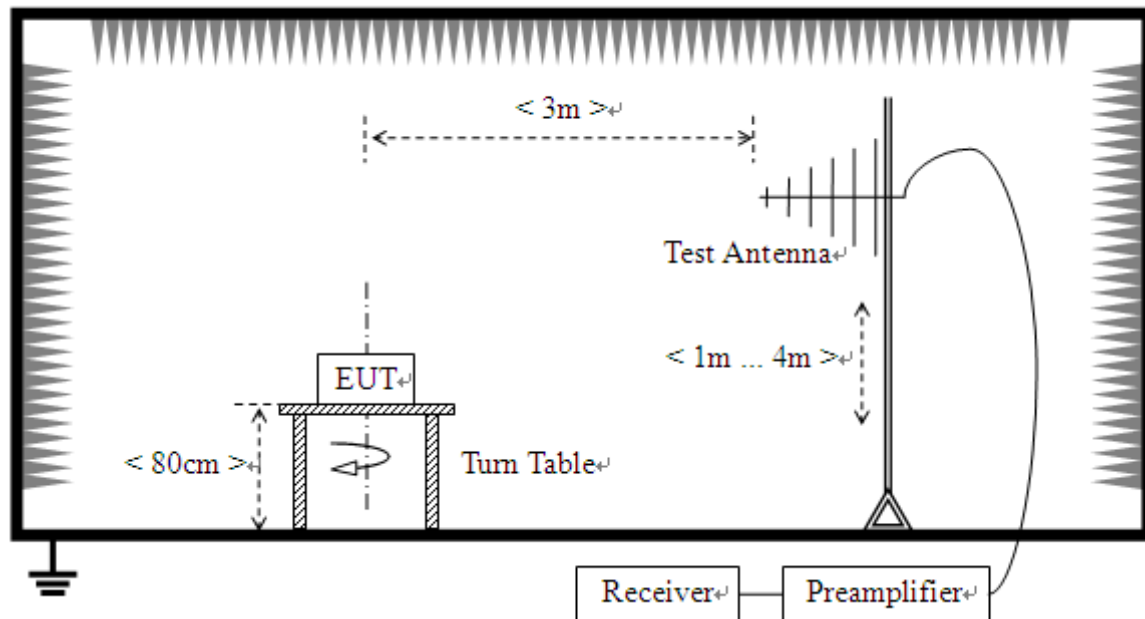
The measuring equipment is listed in the section 3 of this test report.

### 2.4.3. Test Setup

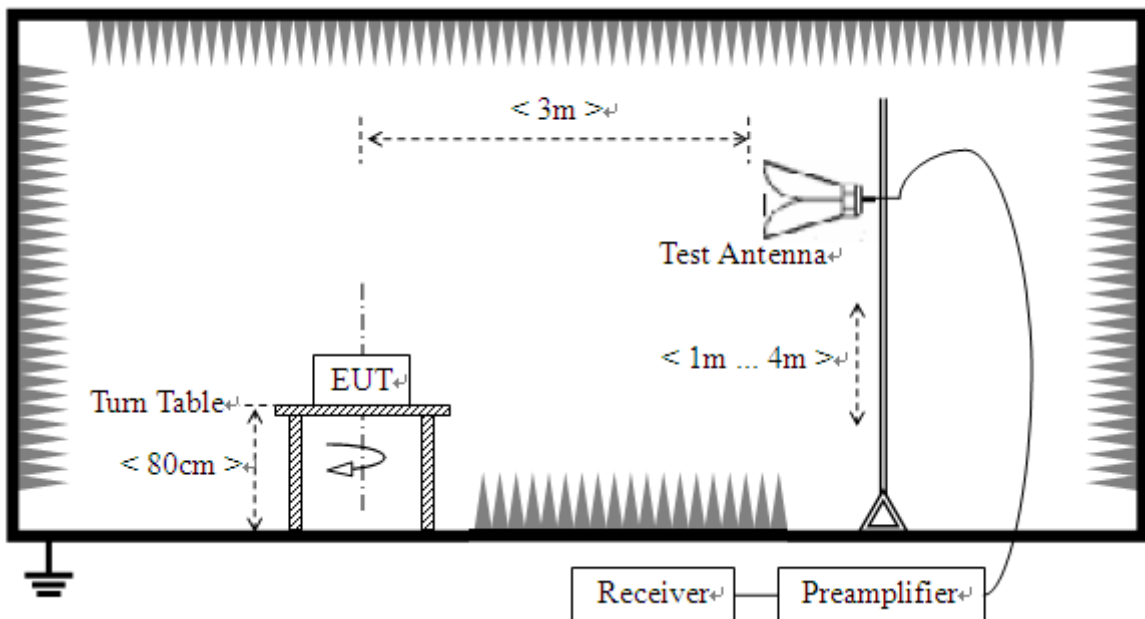
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





#### **2.4.4. Test Procedures**

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. 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. Height of receiving 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.
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 rotatable 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.
6. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported.  
  
Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

### 2.4.5. Test Results of Radiated Spurious Emission

AV = Peak +20Log (duty cycle)

Test Frequency: Below 30MHz

The measurements were more than 20 dB below the limit and not reported.

Frequency (MHz)	Receiver Reading (dBμV)	Detector (PK/QP/Ave)	Table Angle (Degree)	RX Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
				Height (m)	Polar (H/V)				
315.00	77.59	PK	324	1.5	H	-7.31	60.65	95.62	-34.97
315.00	84.66	PK	241	1.4	V	-7.31	64.32	95.62	-31.30
630.00	60.17	PK	245	1.3	H	0.04	54.36	75.62	-21.26
630.00	66.07	PK	207	1.2	V	0.04	54.23	75.62	-21.39
945.00	55.89	PK	167	1.3	H	-16.38	55.06	75.62	-20.56
945.00	53.35	PK	152	1.4	V	-16.38	54.29	75.62	-21.33
2725.20	54.26	PK	123	1.4	H	-14.87	53.52	74.00	-20.48
2725.20	57.23	PK	59	1.3	V	-14.87	55.67	74.00	-18.33

Frequency (MHz)	PK (dBμV/m)	Table Angle (Degree)	RX Antenna		Duty cycle Factor (dB)	AV (dBμV/m)	Limit (dBμV/m)	Margin (dB)
			Height (m)	Polar (H/V)				
315.00	60.65	324	1.5	H	-13.2	47.45	75.62	-28.17
315.00	64.32	241	1.4	V	-13.2	51.12	75.62	-24.50
630.00	54.36	245	1.3	H	-13.2	41.16	55.62	-14.46
630.00	54.23	207	1.2	V	-13.2	41.03	55.62	-14.59
945.00	55.06	167	1.3	H	-13.2	41.86	55.62	-13.76
945.00	54.29	152	1.4	V	-13.2	41.09	55.62	-14.53
2725.20	53.52	123	1.4	H	-13.2	40.32	54.00	-13.68
2725.20	55.67	59	1.3	V	-13.2	42.47	54.00	-11.53

Note: Pulse Desensitization Correction Factor

Pulse Width (PW) =21.68ms

2/PW=2/99ms=0.092KHz

RBW (100 KHz)>2/PW (0.092 KHz)

Therefore PDCF is not need

## 2.5. Conducted Emission

### 2.5.1. Limit of Conducted Emission

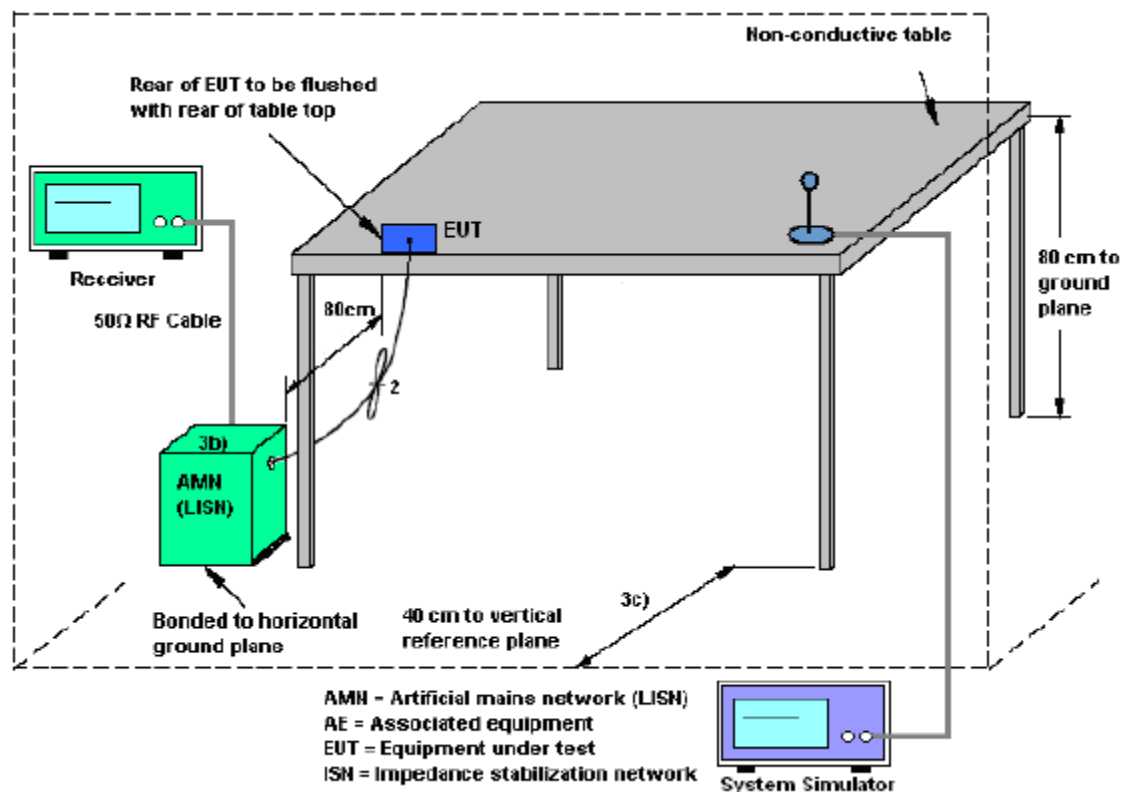
For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency range (MHz)	Conducted Limit (dB $\mu$ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

### 2.5.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.5.3. Test Setup



#### **2.5.4. Test Procedures**

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

#### **2.5.5. Test Result**

The EUT is battery powered; there is no need to do this testing.

### 3. List of measuring equipment

Description	Manufacturer	Model	Serial No.	Test Date	Due Date	Remark
EMI Test Receiver	R&S	ESIB26	A0304218	2015.06.02	2016.06.01	Radiation
Full-Anechoic Chamber	Albatross	12.8m*6.8m *6.4m	A0412372	2015.06.02	2016.06.01	Radiation
Loop Antenna	Schwarz beck	HFH2-Z2	100047	2015.06.02	2016.06.01	Radiation
Bilog Antenna	Schwarzbeck	VULB 9163	9163-274	2015.06.02	2016.06.01	Radiation
Double ridge horn antenna	R&S	HF906	100150	2015.06.02	2016.06.01	Radiation
Ultra-wideband antenna	R&S	HL562	100089	2015.06.02	2016.06.01	Radiation
Test Antenna – Horn (18-26.5GHz)	ETS	3160-09	A0902607	2015.06.02	2016.06.01	Radiation
Amplifier 20M~3GHz	R&S	PAP-0203H	22018	2015.06.02	2016.06.01	Radiation
Ampilier 1G~18GHz	R&S	MITEQ AFS42-0010 1800	25-S-42	2015.06.02	2016.06.01	Radiation
Ampilier 18G~40GHz	R&S	JS42-180026 00-28-5A	12111.0980.00	2015.06.02	2016.06.01	Radiation
Spectrum Analyzer	R&S	FSP40	1164.4391.40	2015.07.07	2016.07.06	Conducted
Power Meter	R&S	NRP2	1020.1809.02	2015.06.02	2016.06.01	Conducted
Power Sensor	R&S	NRP-Z81	823.3618.03	2015.06.02	2016.06.01	Conducted
LISN	ROHDE&SC HWARZ	ESH2-Z5	A0304221	2015.06.02	2016.06.01	Conducted
Test Receiver	R&S	ESCS30	A0304260	2015.06.02	2016.06.01	Conducted
Cable	SUNHNER	SUCOFLEX 100	/	2015.06.02	2016.06.01	Radiation
Cable	SUNHNER	SUCOFLEX 104	/	2015.06.02	2016.06.01	Radiation

#### 4. Uncertainty of Evaluation

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
Conducted emissions	9kHz~30MHz	2.35dB
Radiated emissions	30MHz~1000MHz	2.45dB
	1G~18GHz	2.21dB
	18G~40GHz	1.96dB

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

**\*\* END OF REPORT \*\***