FCC Test Report

Report No.: AGC05618151201FE03

FCC ID	:	2AG5R851067
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	12V 4 Channel Wireless Remote Control Module
BRAND NAME	:	ANZO USA
MODEL NAME	:	851067
CLIENT	:	C.G. Motor Sports Inc.
DATE OF ISSUE	:	Jan.04, 2016
STANDARD(S)	:	FCC Part 15 Rules
REPORT VERSION	:	V1.0

Attestation of ***G***lobal ***C***ompliance (Shenzhen) Co., Ltd

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jan.04, 2016	Valid	Original Report

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1. VERIFICATION OF CONFORMITY

Applicant	C.G. Motor Sports Inc.
Address	5150 Eucalyptus Ave, Chino, CA 91710, U.S.A.
Manufacturer	Luckystar Electronic Technology Co., Ltd.
Address	Qingzhou Development Zone, Xi'an Town, Gaoming District, Foshan, China
Product Designation	12V 4 Channel Wireless Remote Control Module
Brand Name	ANZO USA
Test Model:	851067
Date of test	Dec.29, 2015 to Dec.31, 2015
Deviation	None
Condition of Test Sample	Normal
Report Template	AGCRT-US-BR/RF (2013-03-01)

We hereby certify that:

The above equipment was tested by Dongguan Precise Testing Service Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2009) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part 15.231.

Tested by	Max Zhang(Zhang Yi)	Jan.04, 2016
Reviewed by	Rock Huang(Huang Dinglue)	Jan.04, 2016
Approved by	Solger Zhang(Zhang Hongyi) Authorized Officer	Jan.04, 2016

2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

Operation Frequency	315MHz
Field Strength(3m)	55.47dBuV/m(AV)@3m
Modulation	ASK
Number of channels	1
Hardware Version	V1.0
Software Version	N/A
Antenna Designation	Fixed antenna
Antenna Gain	0dBi
Power Supply	DC6.0V by Battery

2.2. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2AG5R851067** filing to comply with Section 15.231 of the FCC Part 15, Subpart C Rules.

2.3. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (2009). Radiated testing was performed at an antenna to EUT distance 3 meters.

2.4. SPECIAL ACCESSORIES

Refer to section 5.1.

2.5. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

3. 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.	Item	Uncertainty
1	Conducted Emission Test	±3.18dB
2	All emissions,radiated	±3.91dB
3	Temperature	±0.5°C
4	Humidity	±2%

4. 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.

5. SYSTEM TEST CONFIGURATION

5.1. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	12V 4 Channel Wireless	N/A	851067	N/A

5.2. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna Requirement	Compliant
§15.231(a)(1)	Manually	Compliant
§15.231(a)(2)	automatically	N/A
§15.231(a)(3)	periodic	N/A
§15.231(a)(4)	emergency(alarm)	N/A
§15.231(a)(5)	security	N/A
§15.231(b)	Average Factor	Compliant
§15.231(b) & §15.209	Field Strength of Fundamental and Spurious Emission	Compliant
§15.231(c)	Bandwidth	Compliant
§15.231(d)	Frequency Tolerance	N/A
§15.231(e)	Field Strength(periodic trasmitter)	N/A
§15.207	Conducted Emission	N/A

6. TEST FACILITY

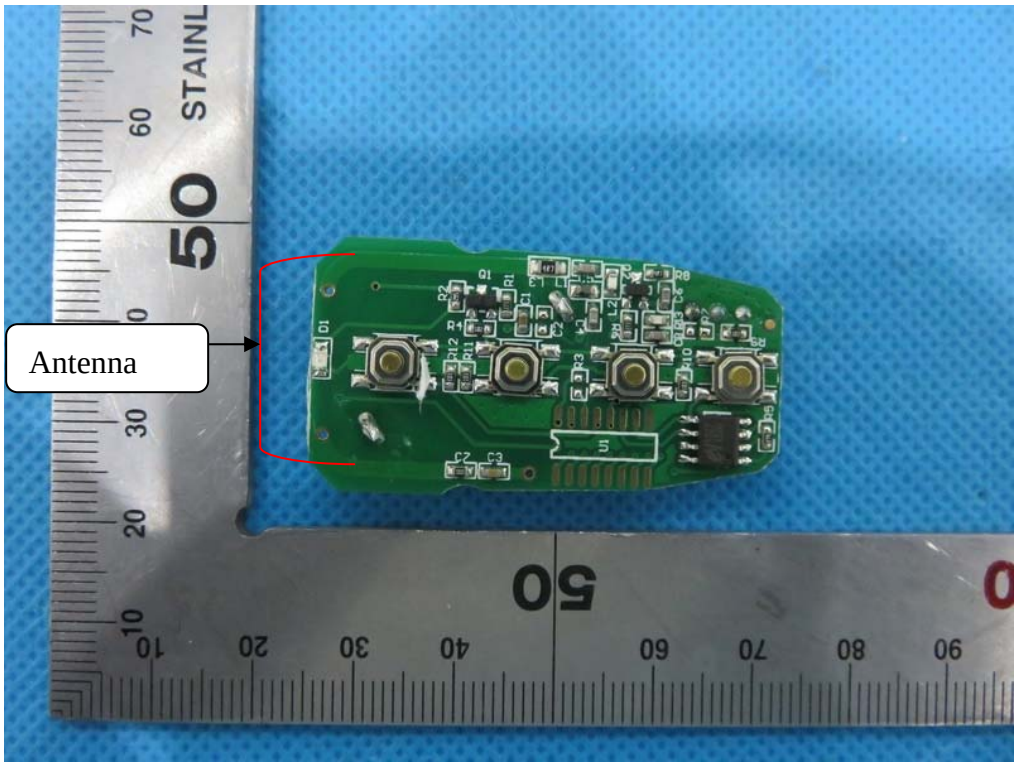
Site	Dongguan Precise Testing Service Co., Ltd.
Location	Building D,Baoding Technology Park,Guangming Road2,Dongcheng District, Dongguan, Guangdong, China,
FCC Registration No.	371540
Description	The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2009.

Radiated Emission Test Site					
Name of Equipment	**Manufacturer**	**Model Number**	**Serial Number**	**Last Calibration**	**Due Calibration**
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 4, 2015	July 3, 2016
Trilog Broadband Antenna (25M-1GHz)	SCHWARZBECK	VULB9160	9160-3355	July 4, 2015	July 3, 2016
Signal Amplifier	SCHWARZBECK	BBV 9475	9745-0013	July 4, 2015	July 3, 2016
RF Cable	SCHWARZBECK	AK9515E	96221	July 4, 2015	July 3, 2016
3m Anechoic Chamber	CHENGYU	966	PTS-001	June 6, 2015	June 5, 2016
MULTI-DEVICE Positioning Controller	Max-Full	MF-7802	MF780208339	N/A	N/A
Active loop antenna (9K-30MHz)	Schwarzbeck	FMZB1519	1519-038	June 6, 2015	June 5, 2016
Spectrum analyzer	Agilent	E4407B	MY46185649	June 6, 2015	June 5, 2016

7. ANTENNA REQUIREMENT

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.

The EuT has fixed antenna, which accordance to the above sections, is considered sufficient to comply with the provisions of these sections. Please see EuT photo for details.



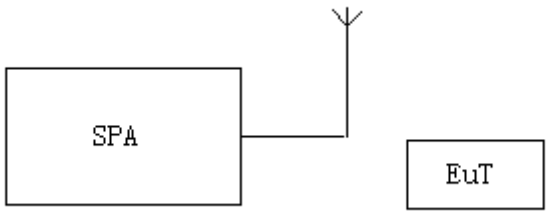
The requirements of section 15.203 are **FULFILLED**.

8. PROVISION FOR MOMENTARY OPERATION

8.1 MEASUREMENT PROCEDURE

1. Set the parameters of SPA as below:
   Centre frequency = Operation Frequency
   RBW=VBW=1MHz
   Span: 0Hz
   Sweep time: 10S
2. Set the EUT to transmit by manually operated. Use the “View” function of SPA to find the transmission time of being released.
3. Record the data and Reported.

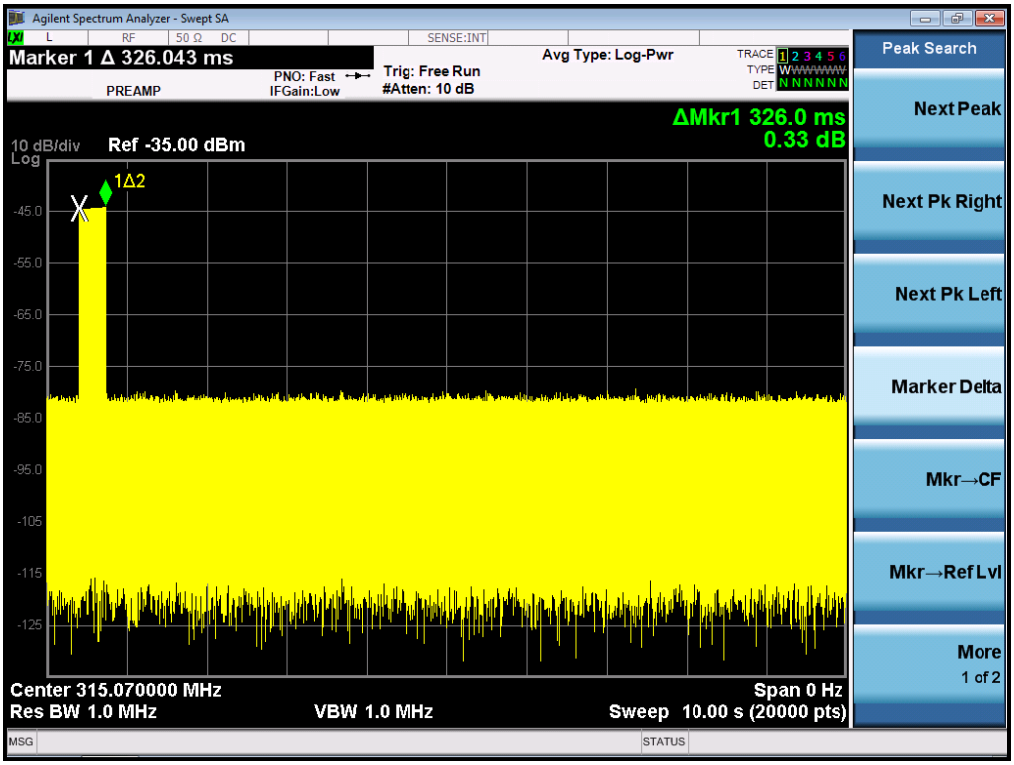
8.2 TEST SETUP



8.3 TEST RESULT

Test Mode: EUT @ 315MHz for RF Transmitter

The time of stopping transmission after switch releasing (s)	Limit (s)
0.326	5.00



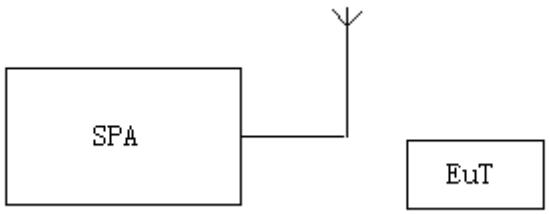
RESULT: PASS

9. DUTY CYCLE CORRECTION FACTOR

9.1 MEASUREMENT PROCEDURE

1. Set the parameters of SPA as below:
   Centre frequency = Operation Frequency
   RBW=VBW=3MHz
   Span: 0Hz
   Sweep time: more than two pulse trains or more than each type of pulse occupancy time
2. Set the EUT to transmit by manually operated. Use the “Delta mark” function of SPA to find the period time between two pulse trains and each type of pulse occupancy time.
3. Record the plots and Reported.

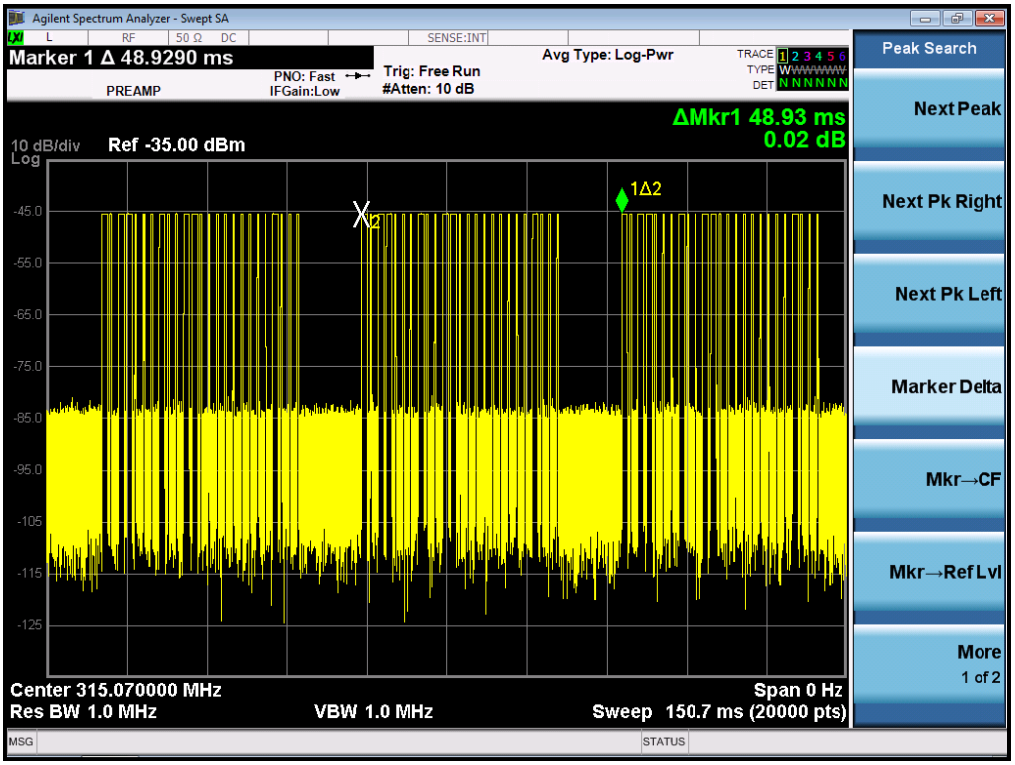
9.2 TEST SETUP

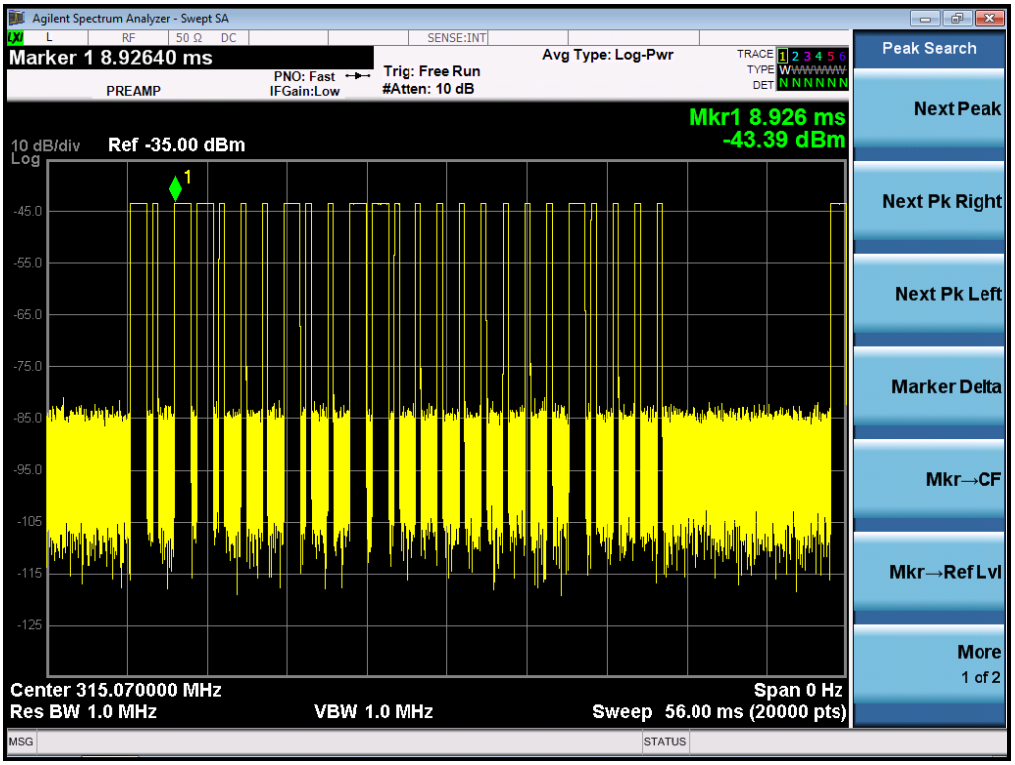


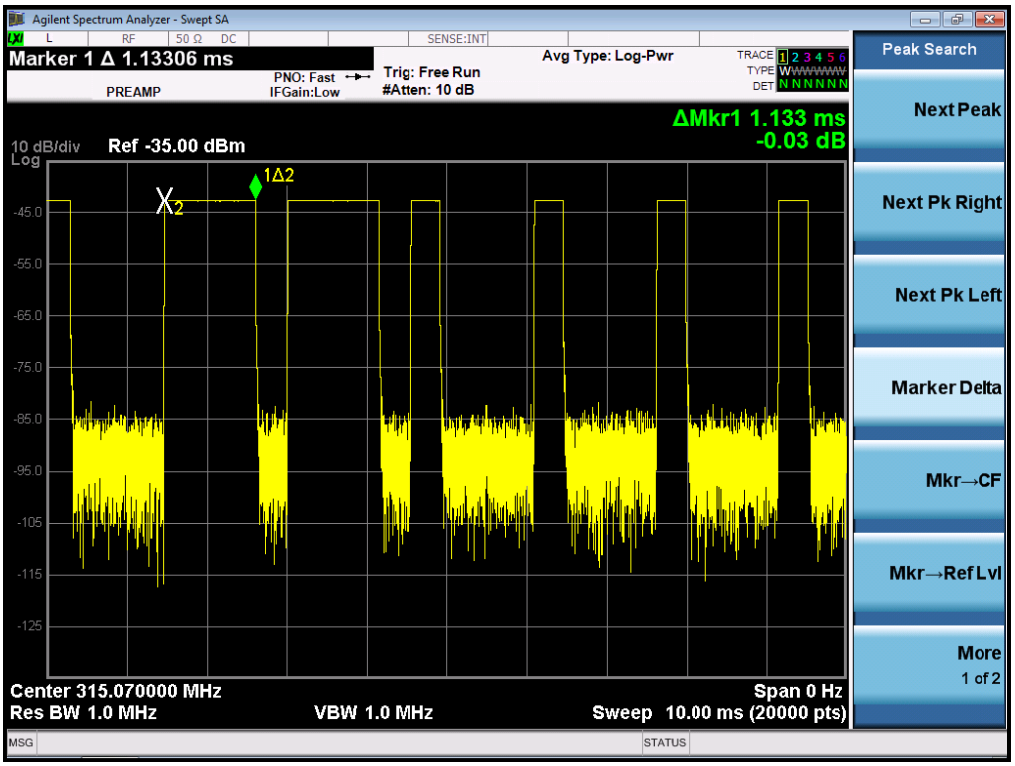
9.3 TEST RESULT

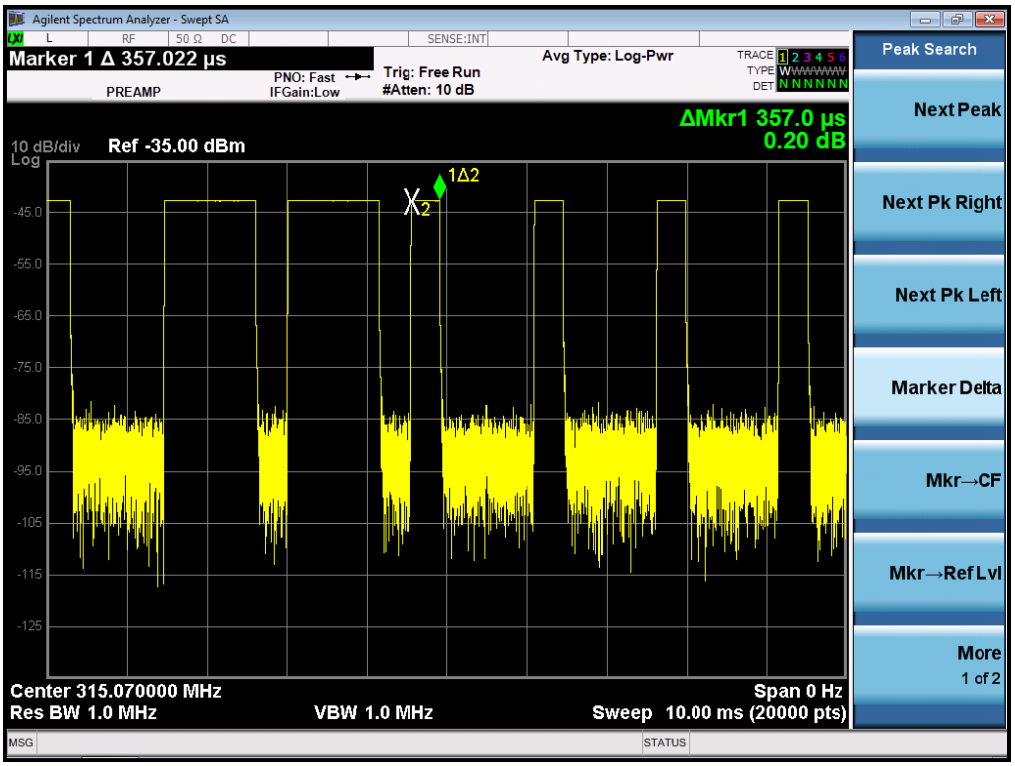
Test Mode: EUT @ 315MHz for RF Transmitter

Duty Cycle:	(1.133ms*7+0.357ms*18)/48.93ms=0.2934
Duty Cycle Correction Factor:	20lg(0.2934)=-10.65dB






Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 1.13306 ms
PNO: Fast
IFGain:Low
PREAMP
Trig: Free Run
#Atten: 10 dB
Avg Type: Log-Pwr
ΔMkr1 1.133 ms
-0.03 dB
10 dB/div
Log
Ref -35.00 dBm
1Δ2
Center 315.070000 MHz
Res BW 1.0 MHz
VBW 1.0 MHz
Span 0 Hz
Sweep 10.00 ms (20000 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2


Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 357.022 µs
PNO: Fast
IFGain:Low
PREAMP
Trig: Free Run
#Atten: 10 dB
Avg Type: Log-Pwr
ΔMkr1 357.0 µs
0.20 dB
10 dB/div
Log
Ref -35.00 dBm
1Δ2
Center 315.070000 MHz
Res BW 1.0 MHz
VBW 1.0 MHz
Span 0 Hz
Sweep 10.00 ms (20000 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

10. RADIATED EMISSION

10.1. MEASUREMENT PROCEDURE

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions below 1GHz, use 120KHz RBW and VBW>=3RBW for QP reading.
7. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
8. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 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 values.
9. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
10. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
11. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.
12. Only the worst case is reported.

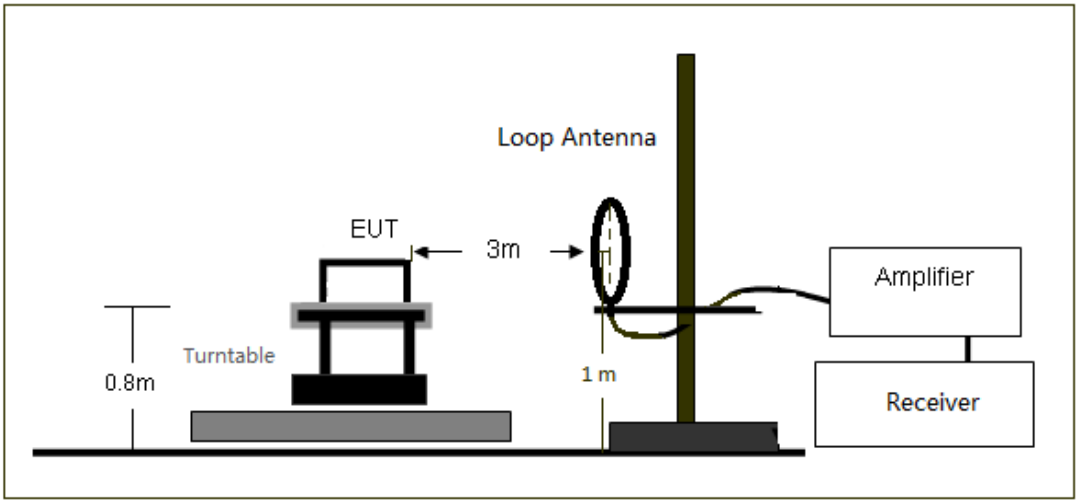
The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RBW 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RBW 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RBW 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/1MHz for Peak, 1MHz/10Hz for Average

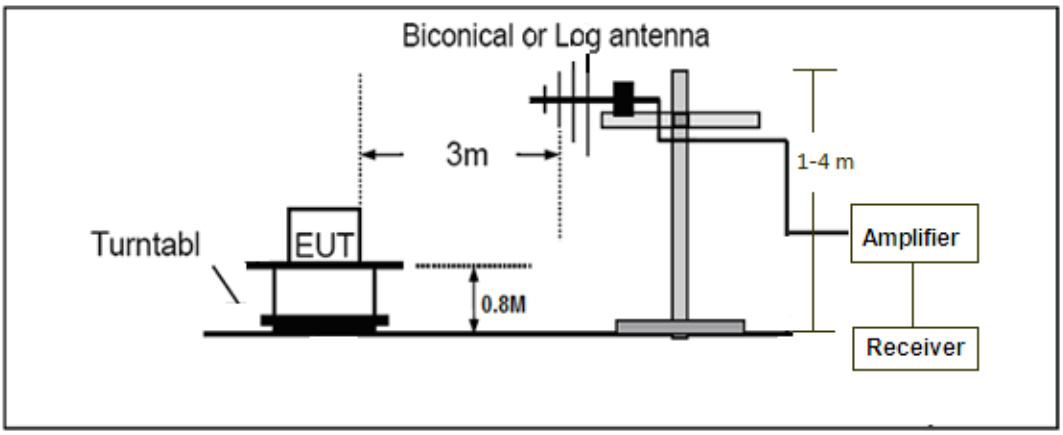
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RBW 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RBW 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RBW 120KHz for QP

10.2. TEST SETUP

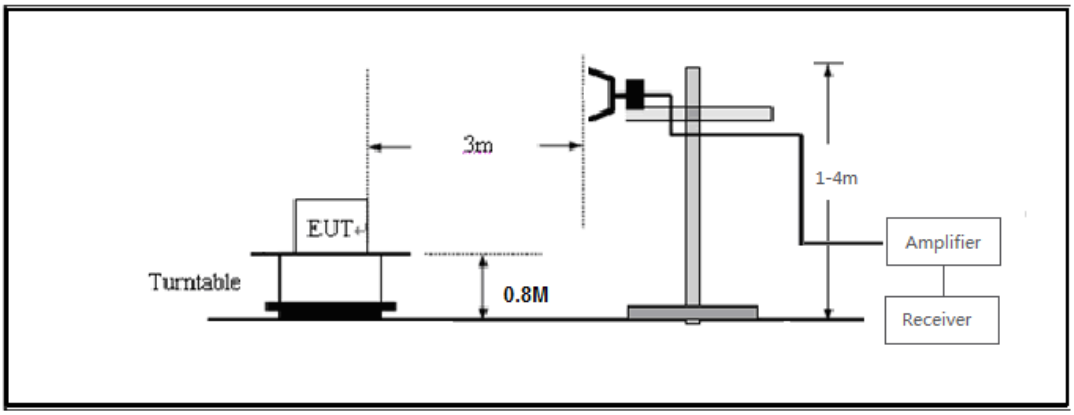
RADIATED EMISSION TEST SETUP BELOW 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



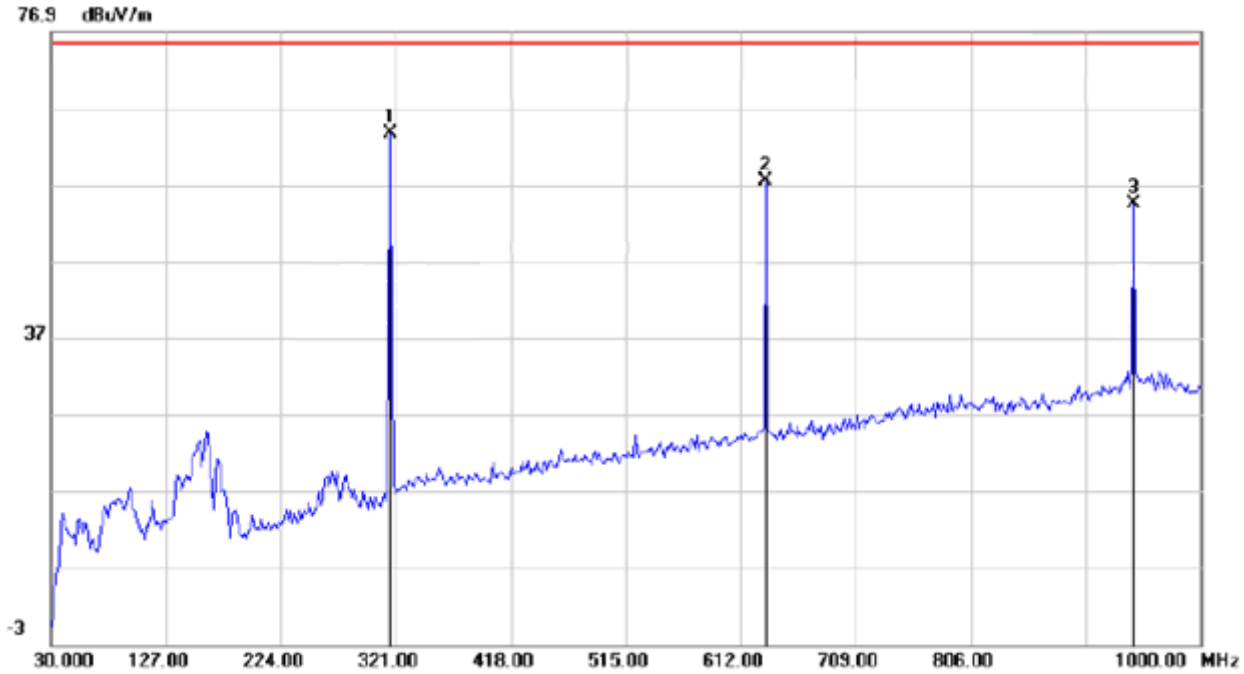
10.3. TEST RESULT

Test Mode: EUT @ 315MHz for RF Transmitter

RADIATED EMISSION BELOW 30MHz

No emission found between lowest internal used/generated frequencies to 30MHz.

RADIATED EMISSION BELOW 1GHZ-Horizontal



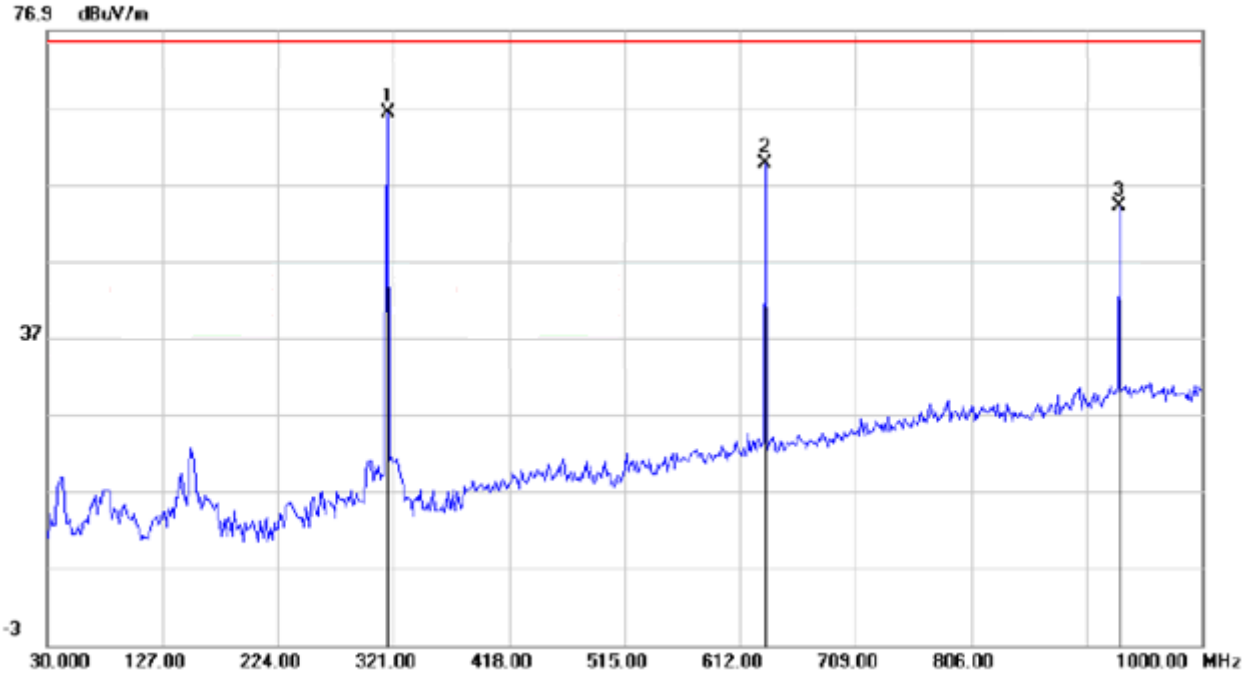
PK list

Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) PK	Margin dB	Pass/Fail	Height cm	Angle deg
315.180	H	47.11	16.49	63.60	95.60	32.00	Pass	200.0	146.8
630.430	H	33.53	23.81	57.34	75.60	18.26	Pass	200.0	63.2
945.680	H	24.60	29.82	54.42	75.60	21.18	Pass	100.0	47.0

AV list

Frequency MHz	Polarization	PK Level dB(uV/m)	Duty Cycle Correction Factor: dB	AV Level dB(uV/m)	Limit dB(uV/m) AV	Margin dB	Pass/Fail	Remark
315.180	H	63.60	-10.65	52.95	75.60	22.65	Pass	Fundamental
630.430	H	57.34	-10.65	46.69	55.60	8.91	Pass	Harmonic
945.680	H	54.42	-10.65	43.77	55.60	11.83	Pass	Harmonic

RADIATED EMISSION BELOW 1GHZ-Vertical



PK list

Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) PK	Margin dB	Pass/Fail	Height cm	Angle deg
315.180	V	49.63	16.49	66.12	95.60	29.48	Pass	100.0	301.2
630.430	V	36.17	23.47	59.64	75.60	15.96	Pass	200.0	94.2
945.680	V	24.52	29.46	53.98	75.60	21.62	Pass	100.0	272.3

AV list

Frequency MHz	Polarization	PK Level dB(uV/m)	Duty Cycle Correction Factor: dB	AV Level dB(uV/m)	Limit dB(uV/m) AV	Margin dB	Pass/Fail	Remark
315.180	V	66.12	-10.65	55.47	75.60	20.13	Pass	Fundamental
630.430	V	59.64	-10.65	48.99	55.60	6.61	Pass	Harmonic
945.680	V	53.98	-10.65	43.33	55.60	12.27	Pass	Harmonic

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.

2. AV Level = PK Level + Duty cycle correction factor.

3. The “Factor” value can be calculated automatically by software of measurement system.

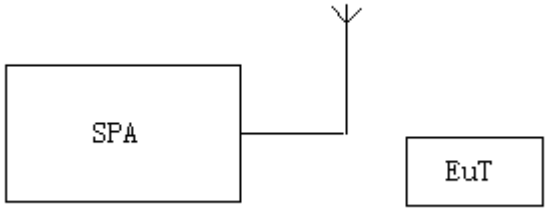
4. Emissions of frequency range from 1GHz to 4GHz have 20dB margin. No recording in the test report.

11. BANDWIDTH

11.1. MEASUREMENT PROCEDURE

1. Set the parameters of SPA as below:
   Centre frequency = Operation Frequency
   RBW=10KHz
   VBW=30KHz
   Span: 500kHz
   Sweep time: Auto
2. Set the EUT to continue transmitting mode. Allow the trace to stabilize. Use the “N dB down” function of SPA to define the bandwidth.
3. Record the plots and Reported.

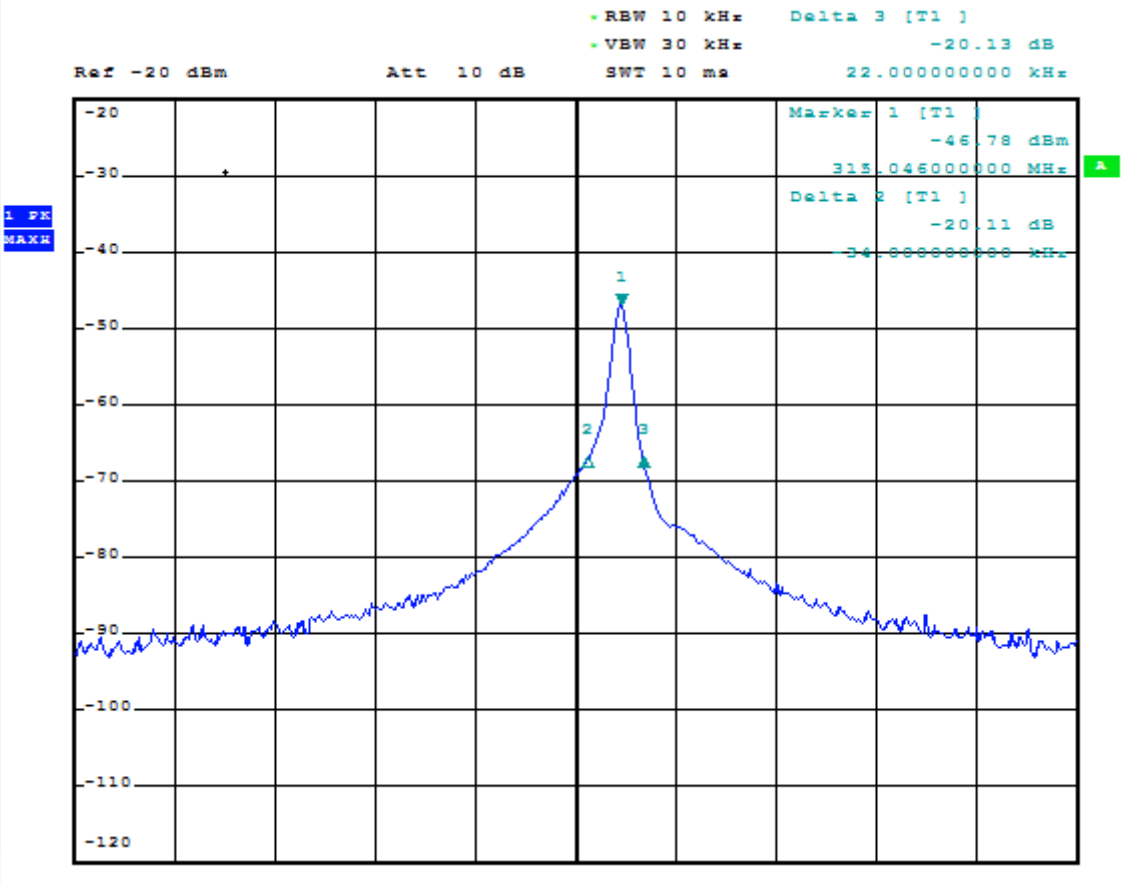
11.2. TEST SETUP



11.3. TEST RESULT

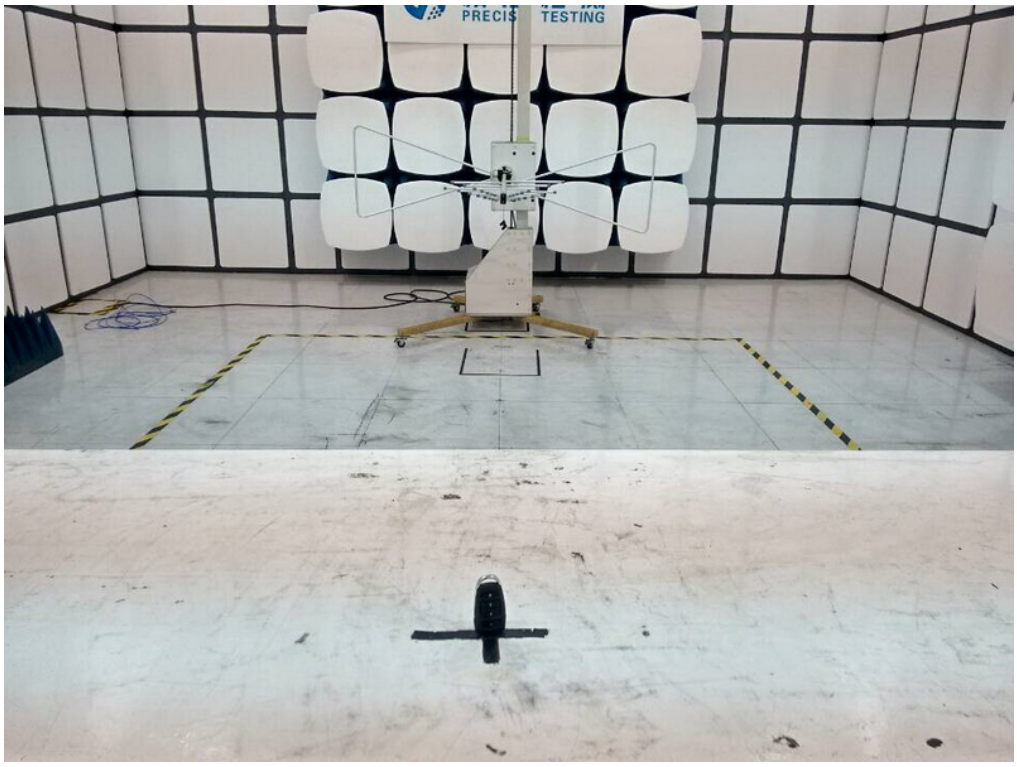
Test Mode: EUT @ 315MHz for RF Transmitter

-20dB bandwidth	LIMIT	RESULT
56kHz	787.5KHz	Pass
Note: Limit= Operation Frequency ×0.25%		

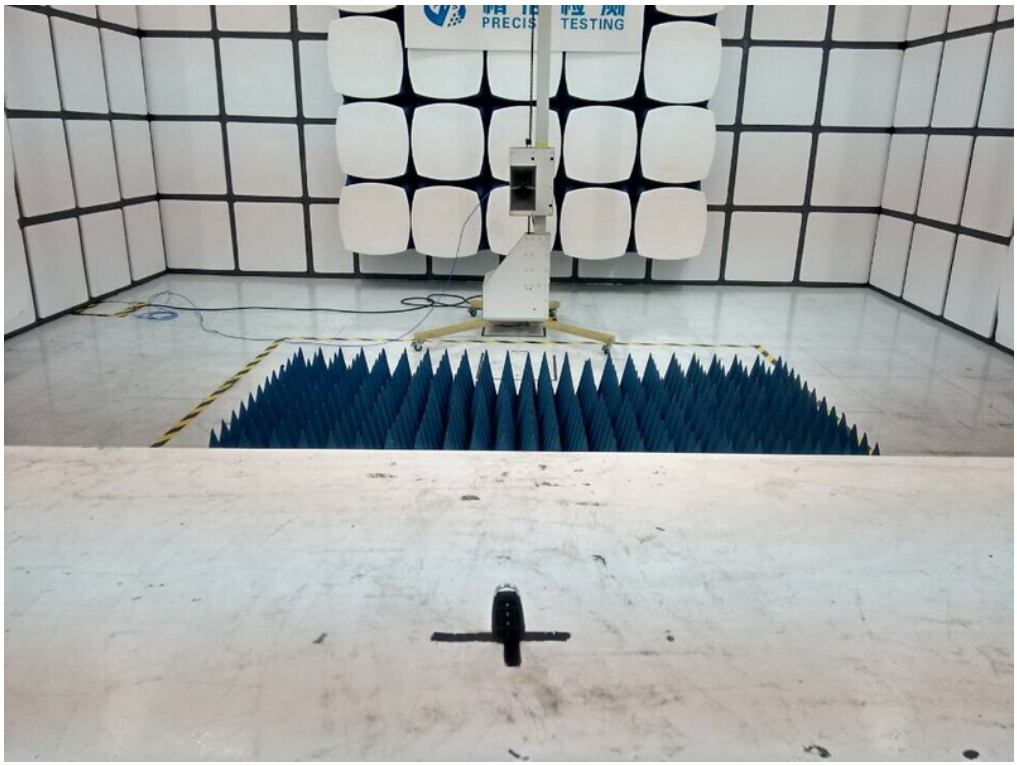


APPENDIX A: PHOTOGRAPHS OF TEST SETUP

RADIATED EMISSION TEST SETUP BELOW 1GHz



RADIATED EMISSION TEST SETUP ABOVE 1GHz



APPENDIX B: PHOTOGRAPHS OF EUT

TOP VIEW OF EUT

BOTTOM VIEW OF EUT

FRONT VIEW OF EUT

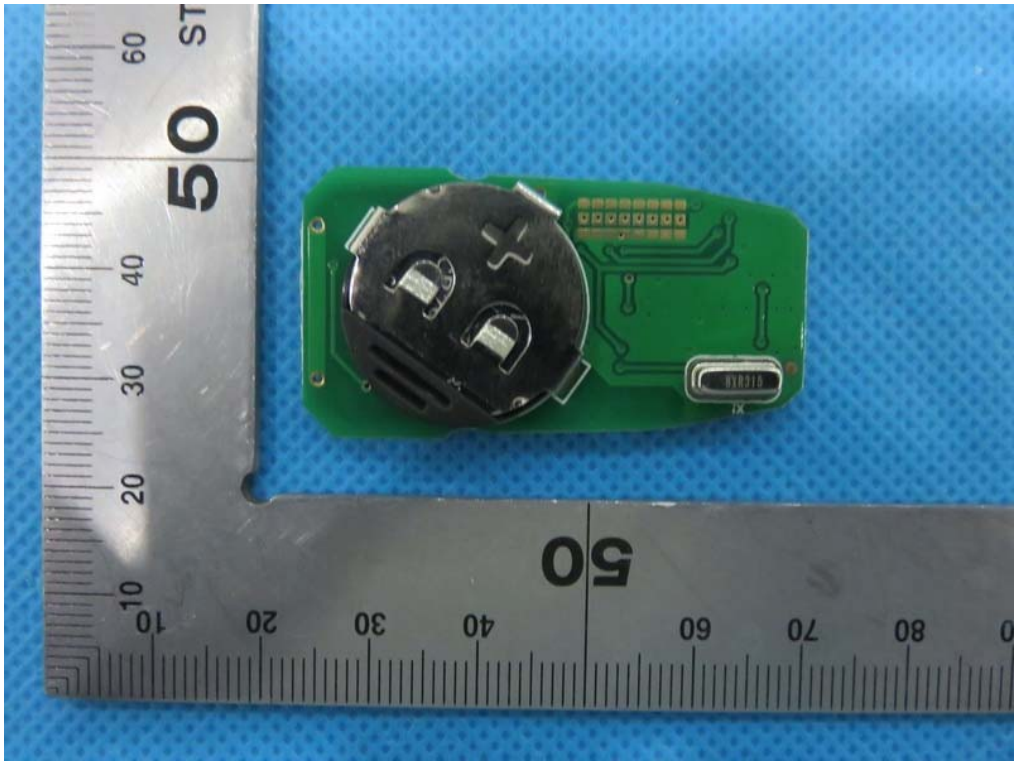
BACK VIEW OF EUT

LEFT VIEW OF EUT

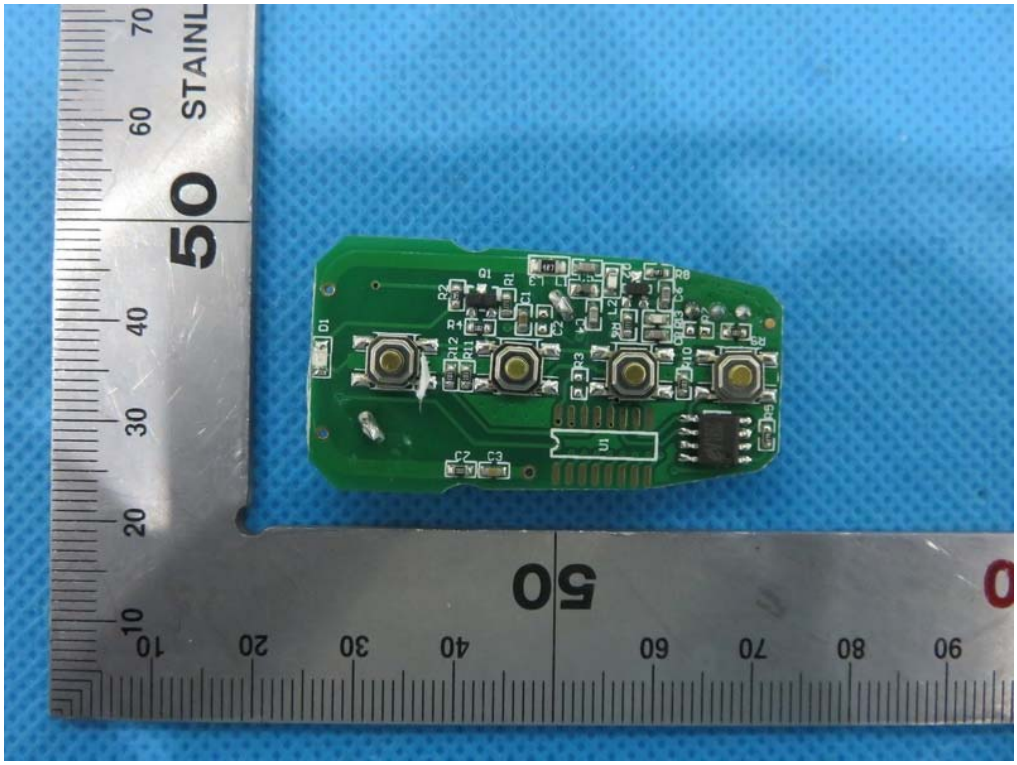
RIGHT VIEW OF EUT

OPEN VIEW OF EUT

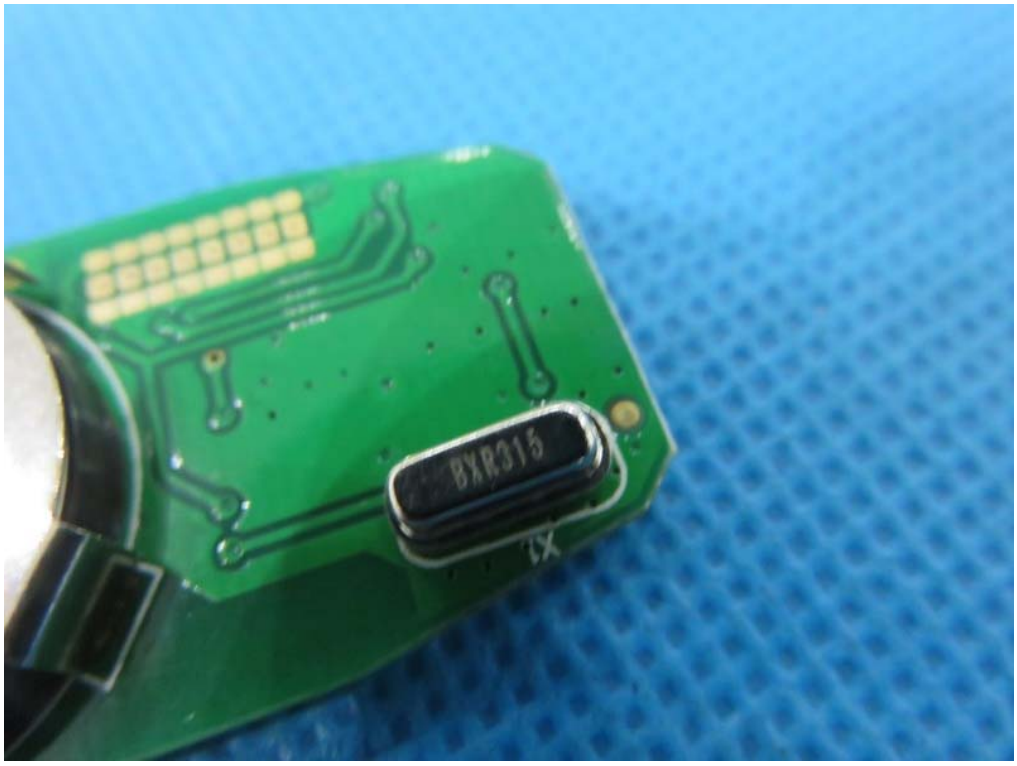
INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



INTERNAL VIEW OF EUT-3



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