Shenzhen Huatongwei International Inspection Co., Ltd.
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TEST REPORT

Report Reference No. ..... :	**TRE1712005101**	R/C…….: 87351
FCC ID ..... :	**ULD-ICOGCX**	
Applicant's name ..... :	**ICO Products, LLC**	
Address.....:	5241 Secor Rd, Unit L Toledo, OH 43623, United States	
Manufacturer.....:	ICO Products, LLC	
Address.....:	5241 Secor Rd, Unit L Toledo, OH 43623, United States	
Test item description ..... :	**GCX OUTLAW REMOTE**	
Trade Mark .....:	ICOTEC	
Model/Type reference.....:	GCX OUTLAW REMOTE	
Listed Model(s) .....:	-	
Standard ..... :	**FCC CFR Title 47 Part 15 Subpart C Section 15.231**	
Date of receipt of test sample……..:	Dec. 06, 2017	
Date of testing……:	Dec. 07, 2017 - Dec. 15, 2017	
Date of issue……...:	Dec. 18, 2017	
Result..... ……..:	**PASS**	

Compiled by (position+printed name+signature)..:	File administrators Becky Liang	Becky Liang
Supervised by (position+printed name+signature)..:	Project Engineer Jeff Sun	Jeff Sun
Approved by (position+printed name+signature)..:	RF Manager Hans Hu	Hans Hu

Testing Laboratory Name ..... :	**Shenzhen Huatongwei International Inspection Co., Ltd**
Address.....:	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

Contents

1. TEST STANDARDS AND REPORT VERSION

1.1. Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.231: Periodic operation in the band 40.66–40.70 MHz and above 70 MHz.

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

1.2. Report version

Version No.	Date of issue	Description
00	Dec. 18, 2017	Original

2. TEST DESCRIPTION

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
Conducted Emissions	15.207	N/A
Radiated Spurious Emissions	15.205/15.209(a)/15.231(b)/15.35(c)	Pass
Deactivation Time	15.231(a)(1)	Pass
Duty Cycle	15.231	Pass
Occpied Bandwidth	15.231(c)	Pass

Note: The measurement uncertainty is not included in the test result.

3. SUMMARY

3.1. Client Information

Applicant:	ICO Products, LLC
Address:	5241 Secor Rd, Unit L Toledo, OH 43623, United States
Manufacturer:	ICO Products, LLC
Address:	5241 Secor Rd, Unit L Toledo, OH 43623, United States

3.2. Product Description

Name of EUT:	GCX OUTLAW REMOTE
Trade Mark:	ICOTEC
Model No.:	GCX OUTLAW REMOTE
Listed Model(s):	-
Power supply:	DC 6V
Adapter information:	-
Hardware version:	V9.1
Software version:	GCX remote HT32-V12
Operation frequency:	433.925MHz
Channel number:	1
Modulation Type:	ASK
Antenna type:	Integral Antenna
Antenna gain:	0 dBi

3.3. EUT operation mode

The EUT has been tested under typical operating condition. The Applicant provides software to control the EUT for staying in continous transmitting mode for testing. New battery is used during all test.

3.4. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- ● - supplied by the manufacturer
- ○ - supplied by the lab

	/	Manufacturer :	/
		Model No. :	/
	/	Manufacturer :	/
		Model No. :	/

3.5. Modifications

No modifications were implemented to meet testing criteria.

4. TEST ENVIRONMENT

4.1. Address of the test laboratory

Laboratory:Shenzhen Huatongwei International Inspection Co., Ltd.
Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China
Phone: 86-755-26748019 Fax: 86-755-26748089

4.2. Test Facility

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

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No. 3902.01

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 762235

Shenzhen Huatongwei International Inspection 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 762235.

IC-Registration No.: 5377B-1

Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B-1.

ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

4.3. Environmental conditions

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

Temperature:	15~35°C
Relative Humidity:	30~60 %
Air Pressure:	950~1050mba

4.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics;Part 1" and TR-100028-02 "Electromagnetic compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurementof mobile radio equipment characteristics;Part 2 " and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	1.60 dB	(1)
Radiated spurious emission 9KHz-40 GHz	2.20 dB	(1)
Conducted Emission 9KHz-30MHz	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.24 dB	(1)
Radiated Emissio 1~18GHz	5.16 dB	(1)
Radiated Emissio 18-40GHz	5.54 dB	(1)
Occupied Bandwidth	---------	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

4.5. Equipments Used during the Test

RF Conducted Method						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm-dd-yy)	Next Cal. (mm-dd-yy)
1	Signal and spectrum analyzer	R&S	FSV40	100048	11/11/2017	11/10/2018

Radiated Emissions						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm-dd-yy)	Next Cal. (mm-dd-yy)
1	Loop Antenna	R&S	HFH2-Z2	100020	11/20/2017	11/19/2020
2	Ultra-Broadband Antenna	SCHWARZBECK	VULB9163	538	4/5/2017	4/4/2020
3	Horn Antenna	SCHWARZBECK	9120D	1011	3/27/2017	3/26/2020
4	Preamplifier	SCHWARZBECK	BBV 9743	9743-0022	10/18/2017	10/17/2018
5	Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-248	10/18/2017	10/17/2018
6	EMI Test Receiver	R&S	ESCI	100900	11/11/2017	11/10/2018
7	Spectrum Analyzer	R&S	FSP40	100597	11/11/2017	11/10/2018
8	Turntable	Maturo Germany	TT2.0-1T	N/A	N/A	N/A
9	Antenna Mast	Maturo Germany	CAM-4.0-P-12	N/A	N/A	N/A
10	Test Software	R&S	ES-K1	N/A	N/A	N/A
11	Test Software	R&S	E3	N/A	N/A	N/A
12	RF Connection Cable	HUBER+SUHNER	RE-7-FL	N/A	11/21/2017	11/20/2018
13	RF Connection Cable	HUBER+SUHNER	RE-7-FH	N/A	11/21/2017	11/20/2018

The Cal.Interval was one year.

5. TEST CONDITIONS AND RESULTS

5.1. Antenna requirement

Requirement

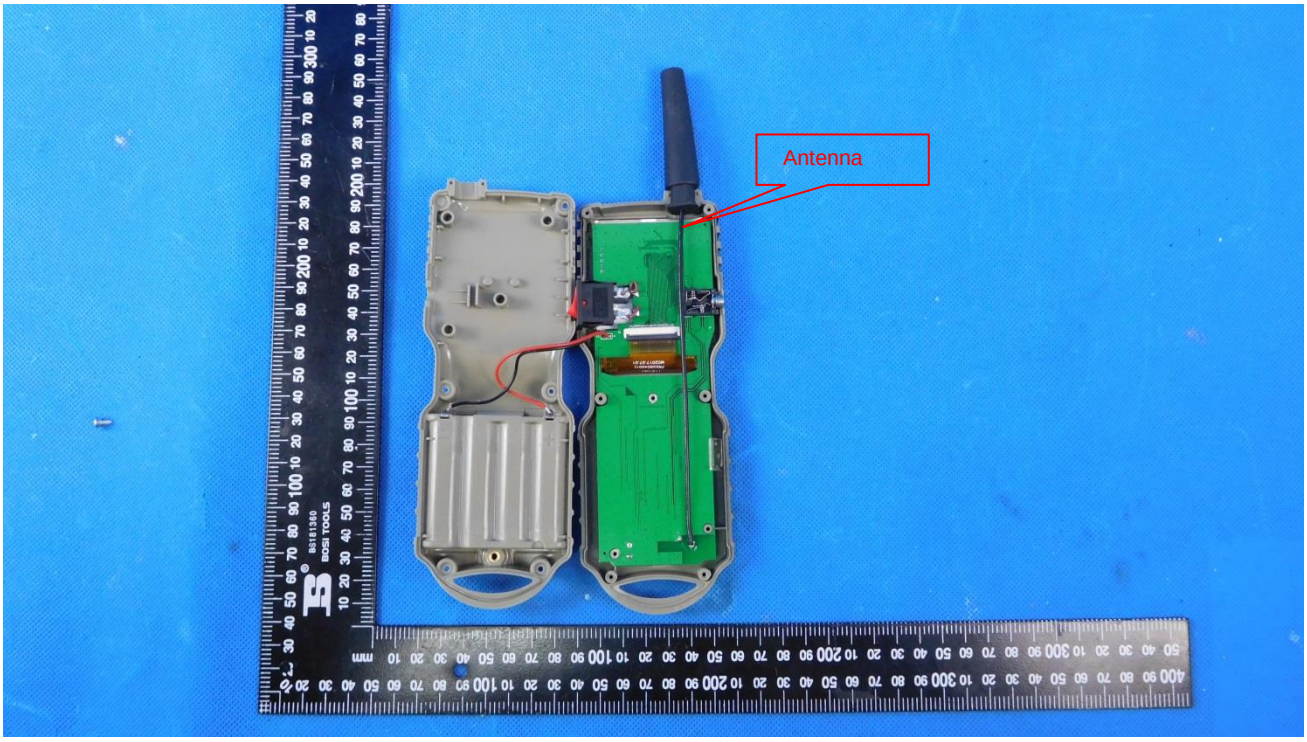
FCC CFR Title 47 Part 15 Subpart C Section 15.203:

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

The antenna is integral antenna, the best case gain of the antenna is 0dBi



5.2. Conducted Emission (AC Main)

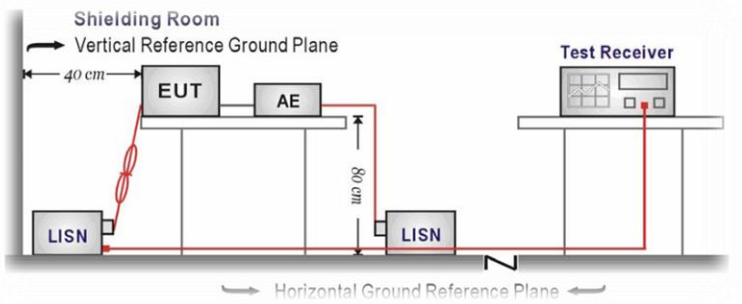
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207:

Frequency range (MHz)	Limit (dBuV)	
	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 frequency.

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was setup according to ANSI C63.10:2013 for compliance to FCC 47CFR 15.247 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above theconducting ground plane. The vertical conducting plane was located 40 cm to the rear of theEUT. All other surfaces of EUT were at least 80 cm from any other grounded conductingsurface.
3. The EUT and simulators are connected to the main power through a line impedancestabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for themeasuring equipment.
4. The peripheral devices are also connected to the main power through aLISN. (Please refer to the block diagram of the test setup and photographs)
5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor,was individually connected through a LISN to the input power source.
6. The excess length of the power cord between the EUT and the LISN receptacle were foldedback and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHzusing a receiver bandwidth of 9 kHz.
8. During the above scans, the emissions were maximized by cable manipulation.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☐ **Passed** ☒ **Not Applicable**

5.3. Radiated Emission

LIMIT

The field strength of emissions from intentional radiators operated **average value** under this section shall not exceed the following

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
260 - 470 MHz	3,750 to 12,500 **	375 to 1,250 **

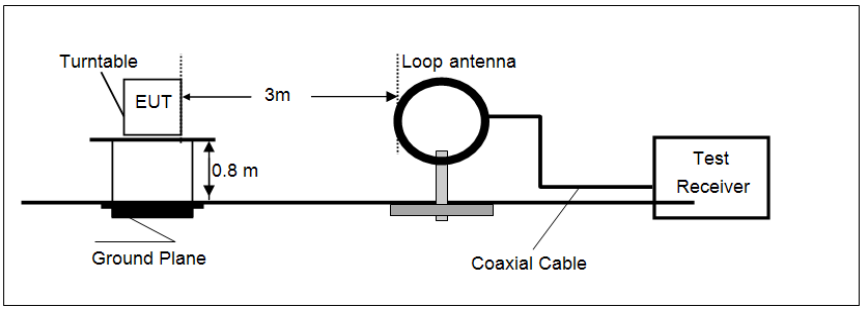
** linear interpolations
F is **433.925**MHz
Field strength of fundamental: μV/m at 3 meters = 41.6667(F) - 7083.3420
Field strength of harmonics: μV/m at 3 meters = 4.16667(F) – 708.3342

The general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table

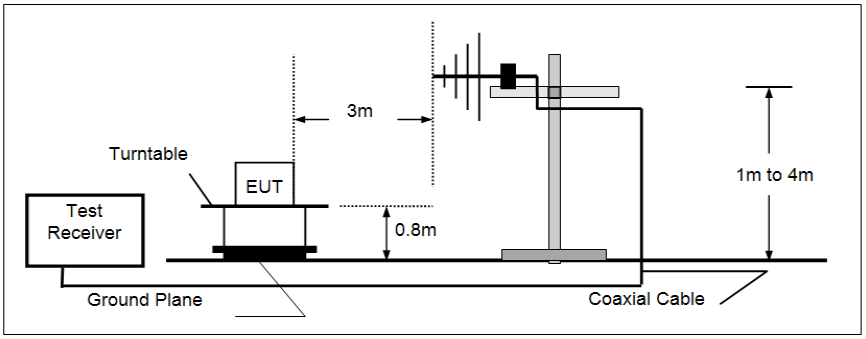
Frequency (MHz)	Distance(Meters)	Radiated(dBμV/m)	Radiated(μV/m)
0.009 - 0.490	300	20*log(2400/F(kHz))	2400/F(kHz)
0.490 - 1.705	30	20*log(24000/F(kHz))	24000/F(kHz)
1.705 - 30.0	30	29.54	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

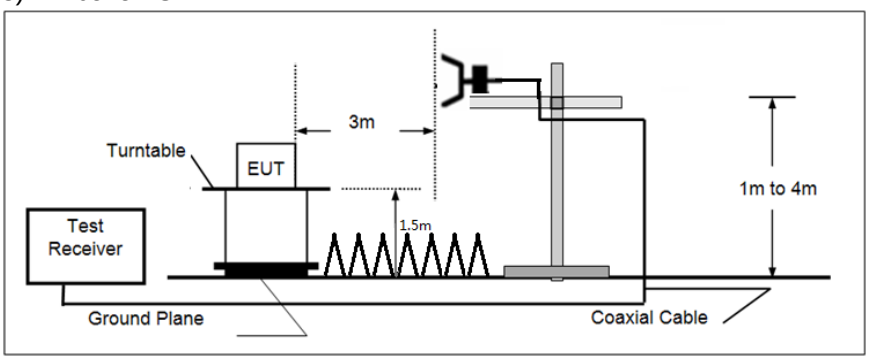
1) 9KHz ~30MHz



2) 30MHz ~ 1GHz



3) Above 1GHz



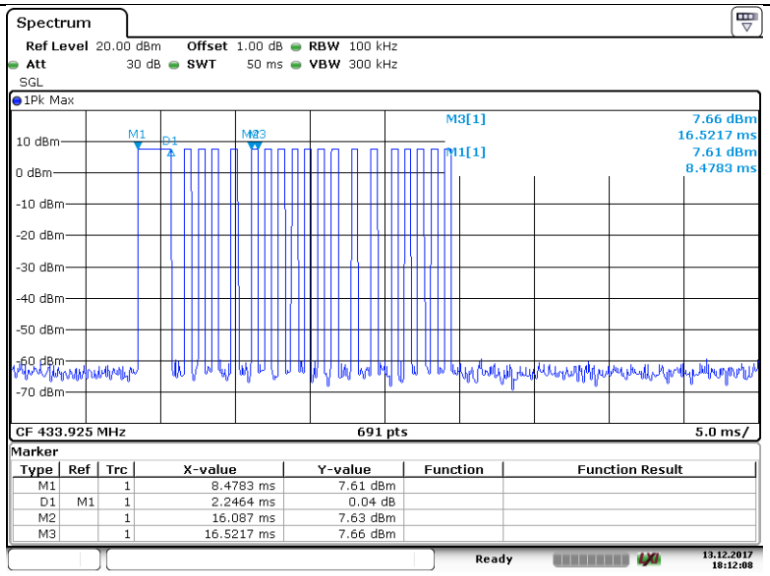
TEST PROCEDURE

1. The EUT was tested according to ANSI C63.10:2013 requirements.
2. The EUT is placed on a turn table which is 0.8/1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT waspositioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. Thisis repeated for both horizontal and vertical polarization of the antenna.

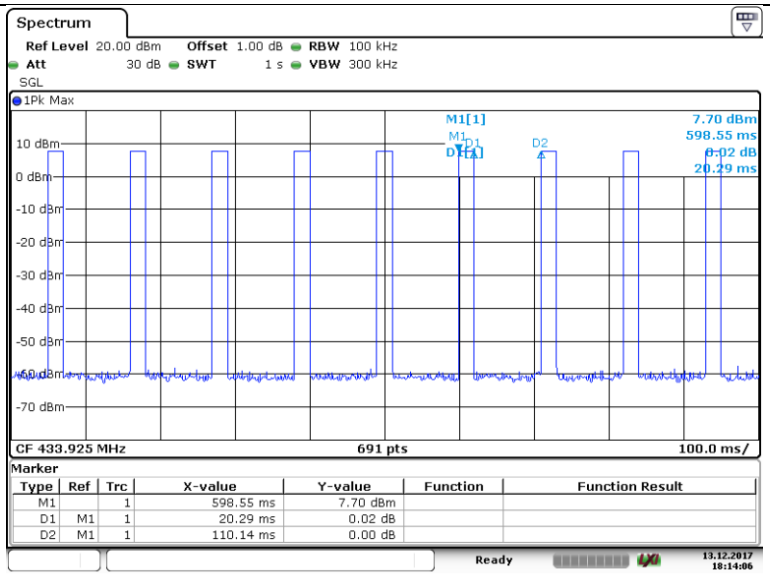
TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Pulse 1		Pulse 2		T_{on} (ms)	T_{all} (ms)
Time / pulse (ms)	Quantity	Time / pulse (ms)	Quantity		
2.2464	1	0.4347	18	10.071	100
Duty cycle factor (dB)= 20log (T_{on} / T_{all}) (dB) = -19.94(dB)					



Pulse 1

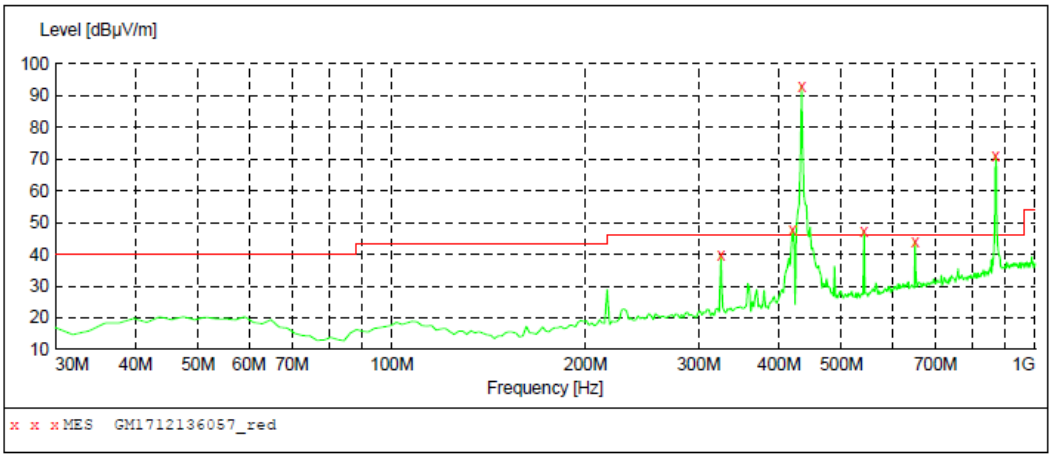


$T_{on} + T_{off}$

■ **9kHz ~ 30MHz**

The EUT was pre-scanned the frequency band (9KHz~30MHz), found the radiated level lower than the limit, so don't show on the report.

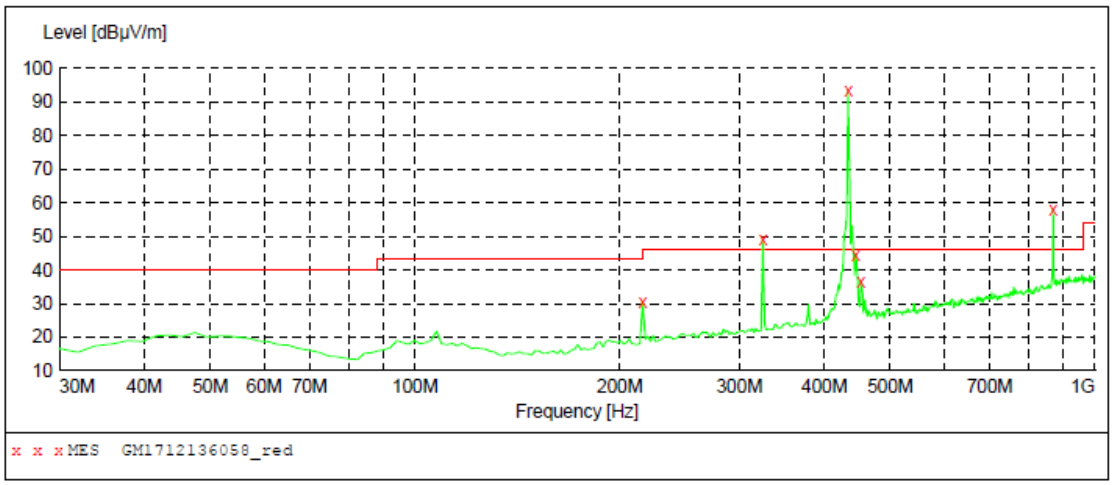
■ **30MHz~ 1000MHz**



Frequency (MHz)	Level (dBuV/m)	Transd	FCC Limit (dBµV/m)	Margin (dB)	Detector	Polarization
324.88	39.70	-6.5	46.00	6.30	QP	Vertical
419.94	43.80	-3.70	46.00	2.20	QP	Vertical
433.52	93.10	-3.5	100.82	7.72	PEAK	Vertical
542.16	40.46	-0.90	46.00	5.54	QP	Vertical
650.80	42.00	1.7	46.00	4.00	QP	Vertical
868.08	71.20	6.0	80.82	9.62	PEAK	Vertical

Frequency (MHz)	Peak Level (dBuV/m)	Duty cycle factor	AV Level (dBuV/m)	FCC Limit (dBµV/m)	Margin (dB)	Polarization
433.52	93.10	-19.94	73.16	80.82	7.66	Vertical
868.08	71.20	-19.94	51.26	60.82	9.56	Vertical

Note:Duty cycle factor = 20log (Duty cycle)=-19.94(dB)

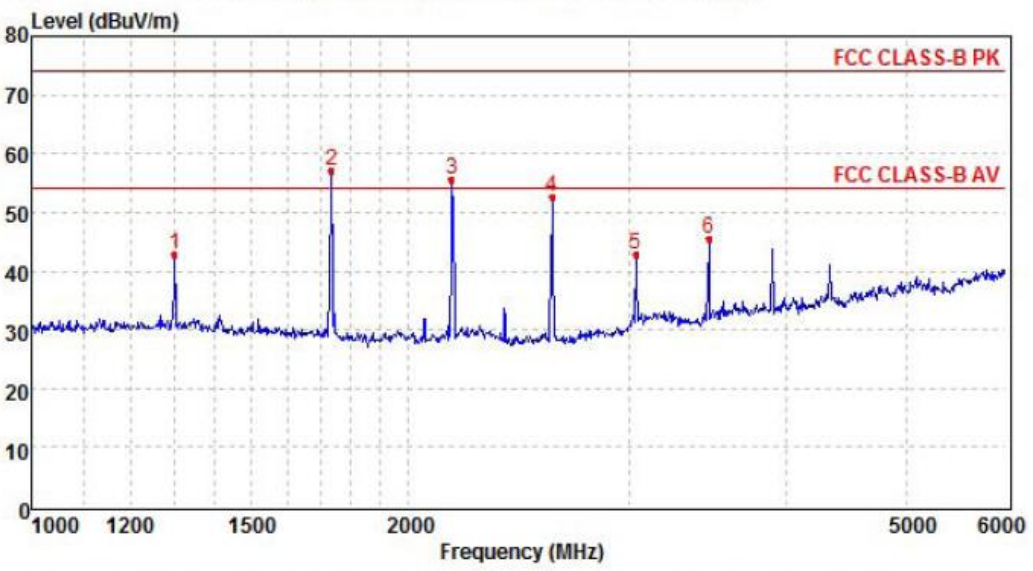


Frequency (MHz)	Level (dBuV/m)	Transd	FCC Limit (dBµV/m)	Margin (dB)	Detector	Polarization
216.24	30.50	-10.2	46.00	15.50	QP	Horizontal
324.88	43.61	-6.5	46.00	2.39	QP	Horizontal
433.52	93.30	-3.5	100.82	7.52	PEAK	Horizontal
445.16	40.36	-3.3	46.00	5.64	QP	Horizontal
452.92	36.60	-3.2	46.00	9.40	QP	Horizontal
868.08	58.20	6.0	80.82	22.62	PEAK	Horizontal

Frequency (MHz)	Peak Level (dBuV/m)	Duty cycle factor	AV Level (dBuV/m)	FCC Limit (dBµV/m)	Margin (dB)	Polarization
433.52	93.30	-19.94	73.36	80.82	7.46	Horizontal
868.08	58.20	-19.94	38.26	60.82	22.56	Horizontal

Note:Duty cycle factor = 20log (Duty cycle)=-19.94(dB)

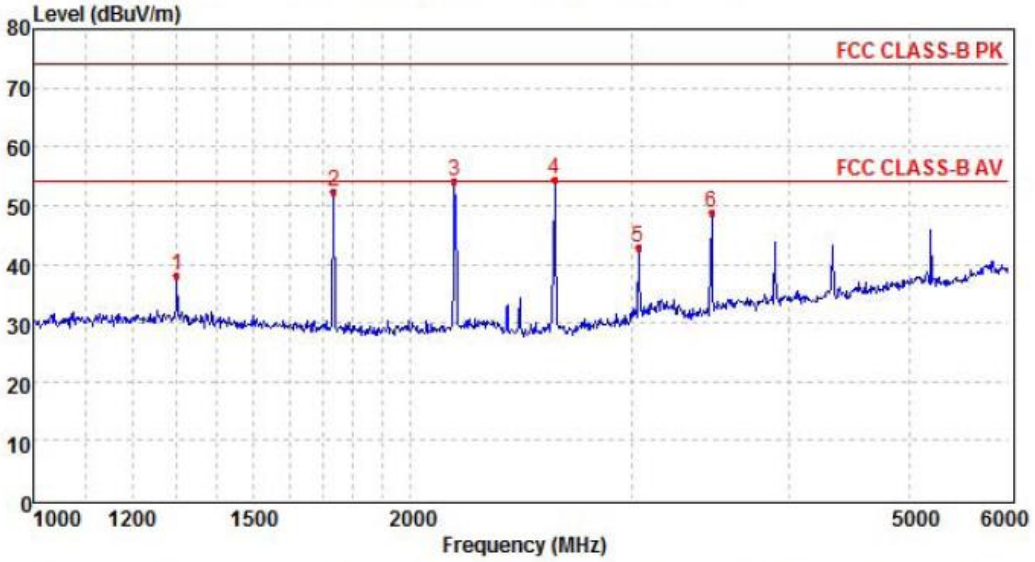
■ **1GHz~ 6GHz**



Mark	Frequency MHZ	Reading dBuv/m	Antenna dB	Cable dB	Preamp dB	Level dBuv/m	Limit dBuv/m	Over limit	Remark
1	1301.33	48.3	26.2	4.8	36.5	42.8	74.0	-31.2	Peak
2	1736.48	63.0	25.3	5.8	37.0	57.1	74.0	-16.9	Peak
3	2168.51	59.3	27.3	6.4	37.3	55.7	74.0	-18.3	Peak
4	2603.35	55.9	27.8	6.9	37.8	52.8	74.0	-21.2	Peak
5	3037.06	45.0	28.7	7.5	38.2	43.0	74.0	-31.0	Peak
6	3473.88	46.9	28.8	8.1	38.4	45.4	74.0	-28.6	Peak

Frequency (MHz)	Peak Level (dBuV/m)	Duty cycle factor	AV Level (dBuV/m)	FCC Limit (dBμV/m)	Margin (dB)	Polarization
1301.33	42.80	-19.94	22.86	60.82	37.96	Vertical
1736.48	57.10	-19.94	37.16	60.82	23.66	Vertical
2168.51	55.70	-19.94	35.76	60.82	25.06	Vertical
2603.35	52.80	-19.94	32.86	60.82	27.96	Vertical
3037.06	43.00	-19.94	23.06	60.82	37.76	Vertical
3473.88	45.40	-19.94	25.46	60.82	35.36	Vertical

Note:Duty cycle factor = 20log (Duty cycle)=-19.94(dB)



Mark	Frequency MHZ	Reading dBuv/m	Antenna dB	Cable dB	Preamp dB	Level dBuv/m	Limit dBuv/m	Over limit	Remark
1	1301.33	43.6	26.2	4.8	36.5	38.1	74.0	-35.9	Peak
2	1736.48	58.2	25.3	5.8	37.0	52.3	74.0	-21.7	Peak
3	2168.51	57.7	27.3	6.4	37.3	54.1	74.0	-19.9	Peak
4	2603.35	57.5	27.8	6.9	37.8	54.4	74.0	-19.6	Peak
5	3037.06	44.9	28.7	7.5	38.2	42.9	74.0	-31.1	Peak
6	3473.88	50.3	28.8	8.1	38.4	48.8	74.0	-25.2	Peak

Frequency (MHz)	Peak Level (dBuV/m)	Duty cycle factor	AV Level (dBuV/m)	FCC Limit (dBμV/m)	Margin (dB)	Polarization
1301.33	38.10	-19.94	18.16	60.82	42.66	Horizontal
1736.48	52.30	-19.94	32.36	60.82	28.46	Horizontal
2168.51	54.10	-19.94	34.16	60.82	26.66	Horizontal
2603.35	54.40	-19.94	34.46	60.82	26.36	Horizontal
3037.06	42.90	-19.94	22.96	60.82	37.86	Horizontal
3473.88	48.80	-19.94	28.86	60.82	31.96	Horizontal

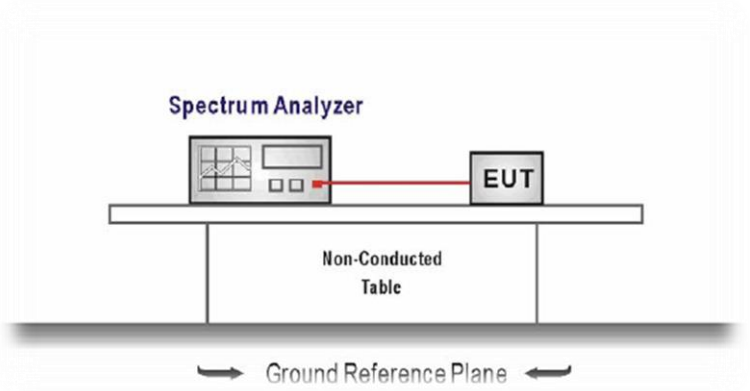
Note:Duty cycle factor = 20log (Duty cycle)=-19.94(dB)

5.4. 20 dB Occpied Bandwidth

LIMIT

The bandwidth of the emission shall be no wider than 0.25% of the center frequency

TEST CONFIGURATION



TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:
   Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a operation channel
   RBW≥1% of the 20 dB bandwidth, VBW ≥ RBW
   Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

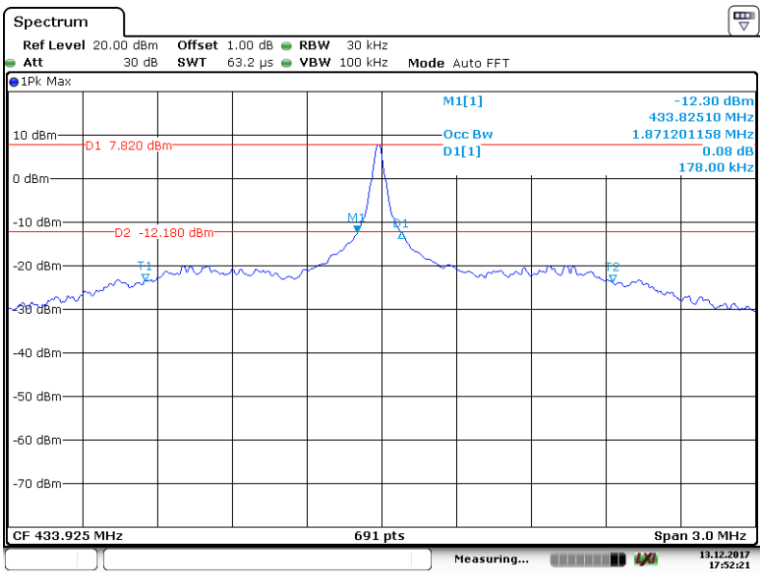
TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Channel Frequency(MHz)	20dB Bandwidth(kHz)	Limit (MHz)	Result
433.925	178.00	0.25%*=1.0848	PASS

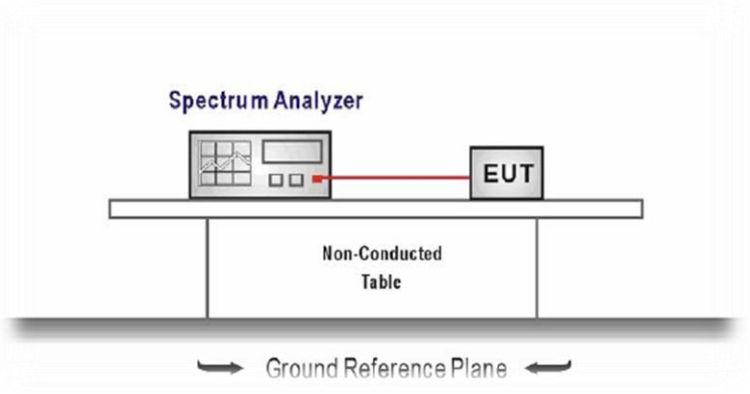


5.5. Deactivation Time

LIMIT

A manually operated transmitter shall employ a switch that will auto-matically deactivate the transmitter within not more than 5 seconds of being released.

TEST CONFIGURATION



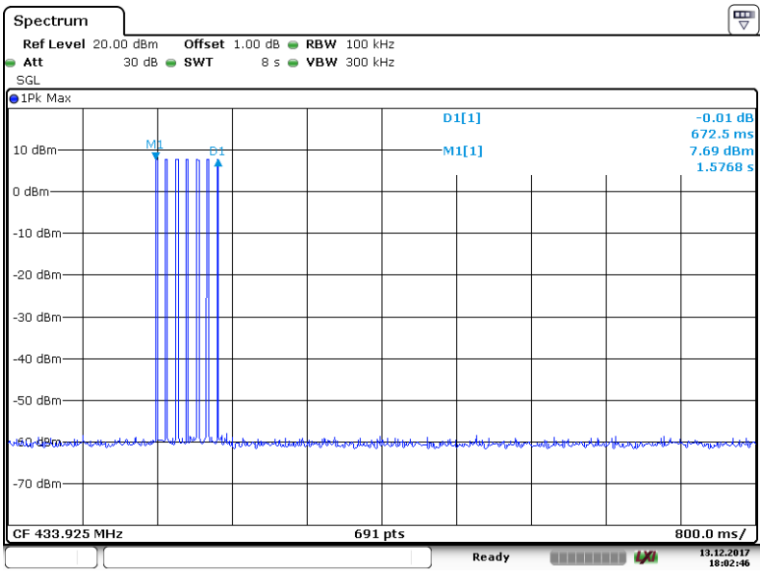
TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:
   Frequency=Center carrier frequency
   RBW=100KHz, VBW=300KHz, Span= 0,
   Sweep time= 10second, Detector function = peak, Trace = single
4. Measure and record the results in the test report.

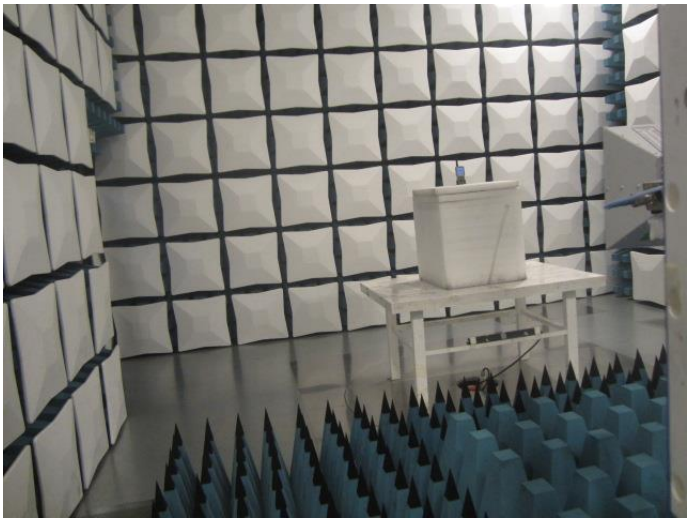
TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Frequency (MHz)	One transmission time (second)	Limit (second)	Result
433.925	0.6725	5	Pass

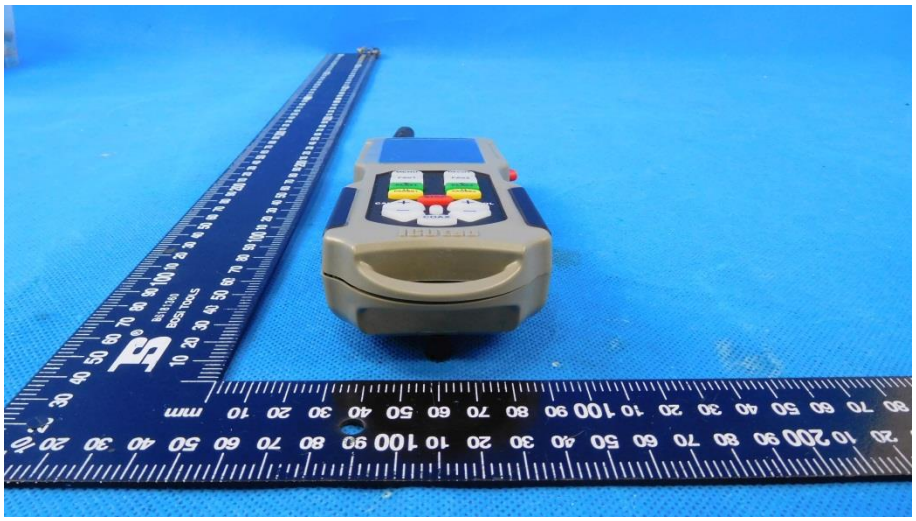


6. Test Setup Photos of the EUT

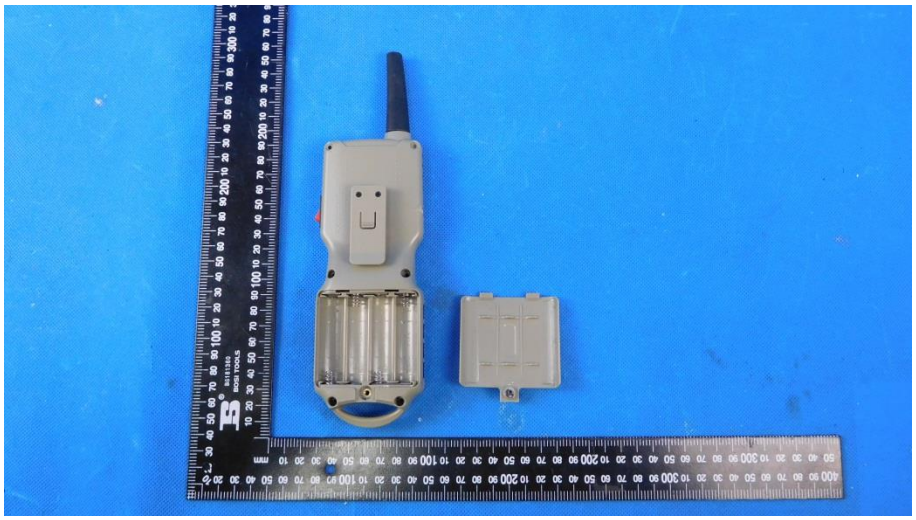


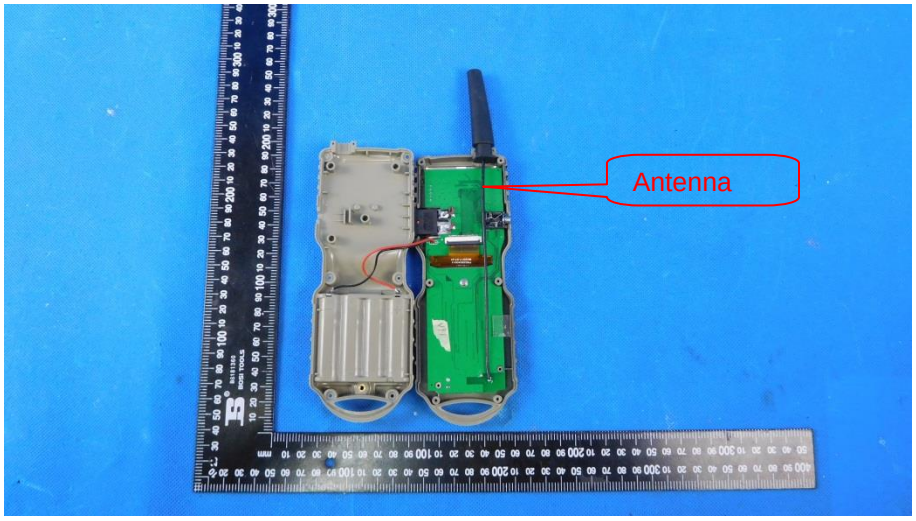
7. External and Internal Photos of the EUT

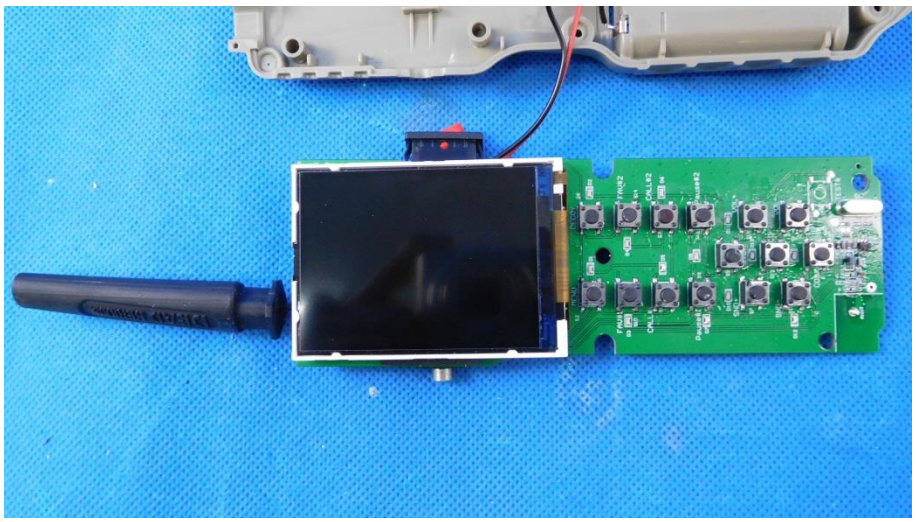
External photos of EUT

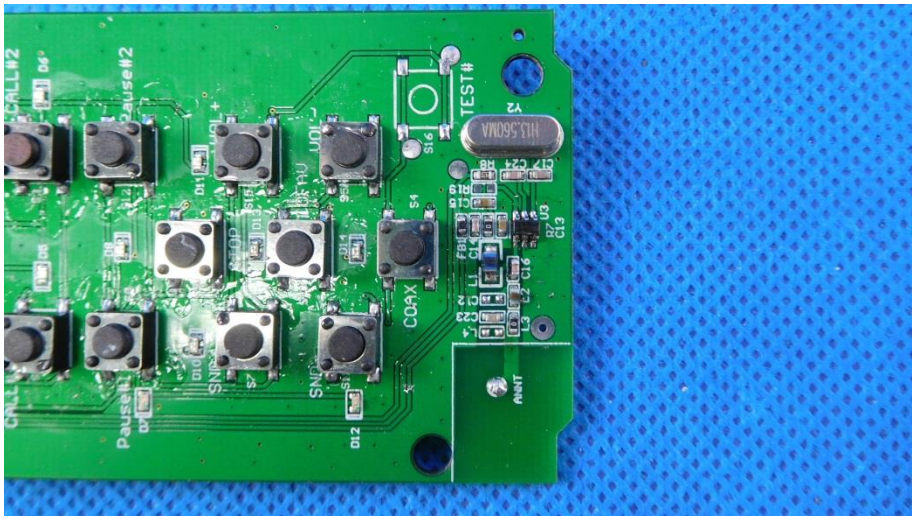


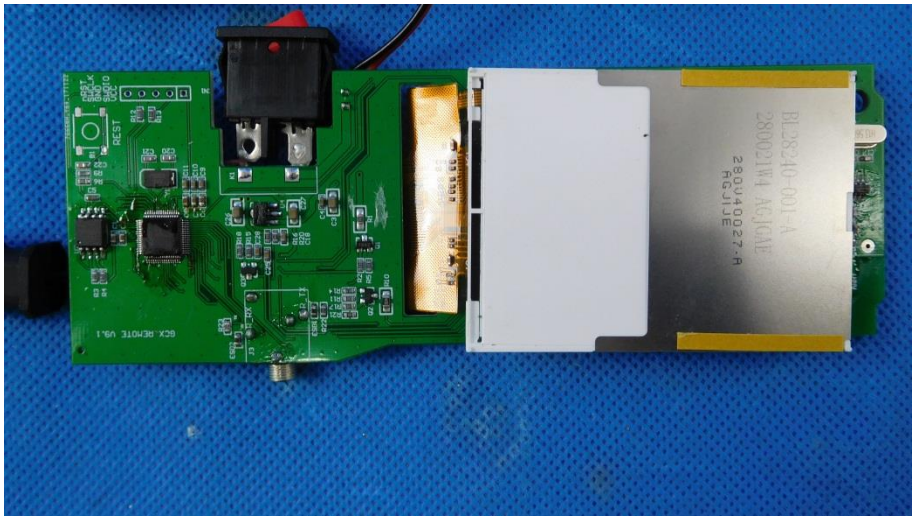
Internal photos of EUT

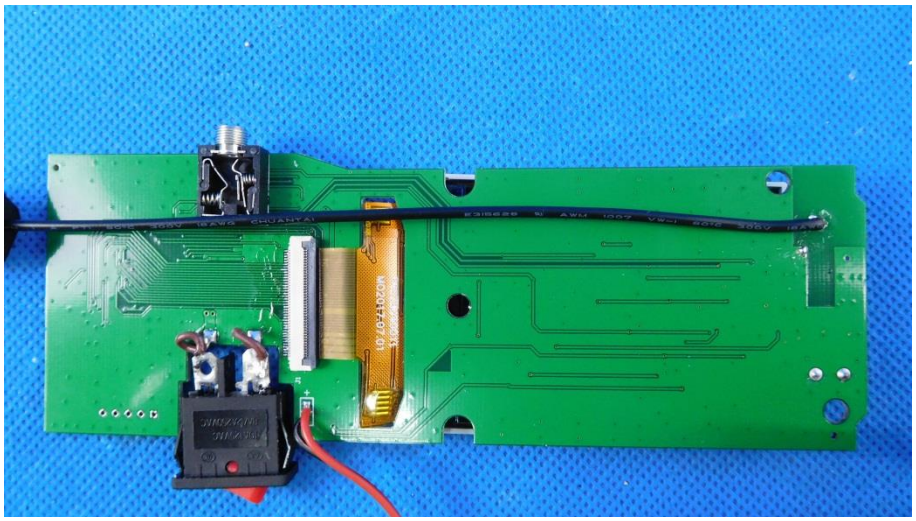












.....End of Report.....