TCT 通测检测
TESTING CENTRE TECHNOLOGY

TEST REPORT

FCC ID: 2AS78-MX9

Product: Smart remote controller (2.4G RF/BLE/Voice air mouse, mini keboard with touchpad)

Model No.: MX9

Additional Model: Please refer to page 5

Trade Mark: N/A

Report No.: TCT190428E006

Issued Date: May 08, 2019

Issued for:

Shenzhen Tianzun Technology Co., Ltd.

6th Floor, Building 65, Baotian Industrial Park, Chentian Community, Baoan District, Shenzhen, China

Issued By:

Shenzhen Tongce Testing Lab.

1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, China

TEL: +86-755-27673339

FAX: +86-755-27673332

Note: *This report shall not be reproduced except in full, without the written approval of Shenzhen Tongce Testing Lab. This document may be altered or revised by Shenzhen Tongce Testing Lab. personnel only, and shall be noted in the revision section of the document. The test results in the report only apply to the tested sample.*

TABLE OF CONTENTS

1. Test Certification 3
2. Test Result Summary 4
3. EUT Description 5
4. General Information 7
4.1. Test Environment and Mode 7
4.2. Description of Support Units 7
5. Facilities and Accreditations 8
5.1. Facilities 8
5.2. Location 8
5.3. Measurement Uncertainty 8
6. Test Results and Measurement Data 9
6.1. Antenna Requirement 9
6.2. Conducted Emission 10
6.3. Radiated Emission Measurement 14
6.4. 20dB Occupied Bandwidth 23
Appendix A: Photographs of Test Setup
Appendix B: Photographs of EUT

1. Test Certification

Product:	Smart remote controller (2.4G RF/BLE/Voice air mouse, mini keboard with touchpad)
Model No.:	MX9
Additional Model:	Please refer to page 5
Trade Mark:	**N/A**
Applicant:	Shenzhen Tianzun Technology Co., Ltd.
Address:	6th Floor, Building 65, Baotian Industrial Park, Chentian Community, Baoan District, Shenzhen, China
Manufacturer:	Shenzhen Tianzun Technology Co., Ltd.
Address:	6th Floor, Building 65, Baotian Industrial Park, Chentian Community, Baoan District, Shenzhen, China
Date of Test:	Apr. 29, 2019 - May 07, 2019
Applicable Standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.249 ANSI C63.10:2013

The above equipment has been tested by Shenzhen Tongce Testing Lab. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By: Kevin Huang ***Date:*** ***May 07, 2019***

Kevin Huang

Reviewed By: ***Date:*** ***May 08, 2019***

Beryl Zhao

Approved By: ***Date:*** ***May 08, 2019***

Tomsin

2. Test Result Summary

Requirement	CFR 47 Section	Result
Antenna Requirement	§15.203	PASS
AC Power Line Conducted Emission	§15.207	PASS
Field Strength of Fundamental	§15.249 (a)	PASS
Spurious Emissions	§15.249 (a) (d)/ §15.209	PASS
Band Edge	§15.249 (d)/ §15.205	PASS
20dB Occupied Bandwidth	§15.215 (c)	PASS

Note:

1. Pass: Test item meets the requirement.

2. Fail: Test item does not meet the requirement.

3. N/A: Test case does not apply to the test object.

4. The test result judgment is decided by the limit of test standard.

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

3. EUT Description

Product:	Smart remote controller (2.4G RF/BLE/Voice air mouse, mini keboard with touchpad)
Model No.:	MX9
Additional Model:	MX3, MX5, MX6, P1, P3, P5, P9, P9+, Q3, Q5, Q9, k57, TZ01, TZ02, TZ03, TZ05, TZ06, TZ08, TZ09, TZ10, TZ11, TZ12, TZ13, TZ15, TZ16, TZ18, TZ20, TZ21, TZ22, TZ23, TZ25, TZ26, TZ28, TL01, TL02, TL03, TL05, TL06, TL08, TL10, TL12, TL16, TL18, TL20, TL21, TL22, TL25, TL26, TL28, TL30
Trade Mark:	**N/A**
Hardware Version:	MX9 V1.3
Software Version:	MX9 V2.0
Operation Frequency:	2404MHz - 2480MHz
Number of Channel:	79
Modulation Technology:	GFSK
Antenna Type:	PCB Antenna
Antenna Gain:	-3dBi
Power Supply:	Rechargeable Li-ion battery DC 3.7V
Remark:	All models above are identical in interior structure, electrical circuits and components, and just model names are different for the marketing requirement.

Operation Frequency Each of Channel

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
2	2406MHz	12	2426MHz	22	2446MHz	32	2466MHz
3	2408MHz	13	2428MHz	23	2448MHz	33	2468MHz
4	2410MHz	14	2430MHz	24	2450MHz	34	2470MHz
5	2412MHz	15	2432MHz	25	2452MHz	35	2472MHz
6	2414MHz	16	2434MHz	26	2454MHz	36	2474MHz
7	2416MHz	17	2436MHz	27	2456MHz	37	2476MHz
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz
10	2422MHz	20	2442MHz	30	2462MHz		
Remark: Channel 1, 19 &39 have been tested for GFSK modulation mode.							

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2404MHz
The middle channel	2440MHz
The Highest channel	2480MHz

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

4. General Information

4.1. Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Engineering mode:	Keep the EUT in continuous transmitting by select channel
The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. 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, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case (Z axis) are shown in Test Results of the following pages.	

4.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
/	/	/	/	/

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

5. Facilities and Accreditations

5.1. Facilities

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

- FCC - Registration No.: 645098
  Shenzhen Tongce Testing Lab
  The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.
- IC - Registration No.: 10668A-1
  The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

5.2. Location

Shenzhen Tongce Testing Lab
Address: 1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, China
TEL: +86-755-27673339

5.3. Measurement Uncertainty

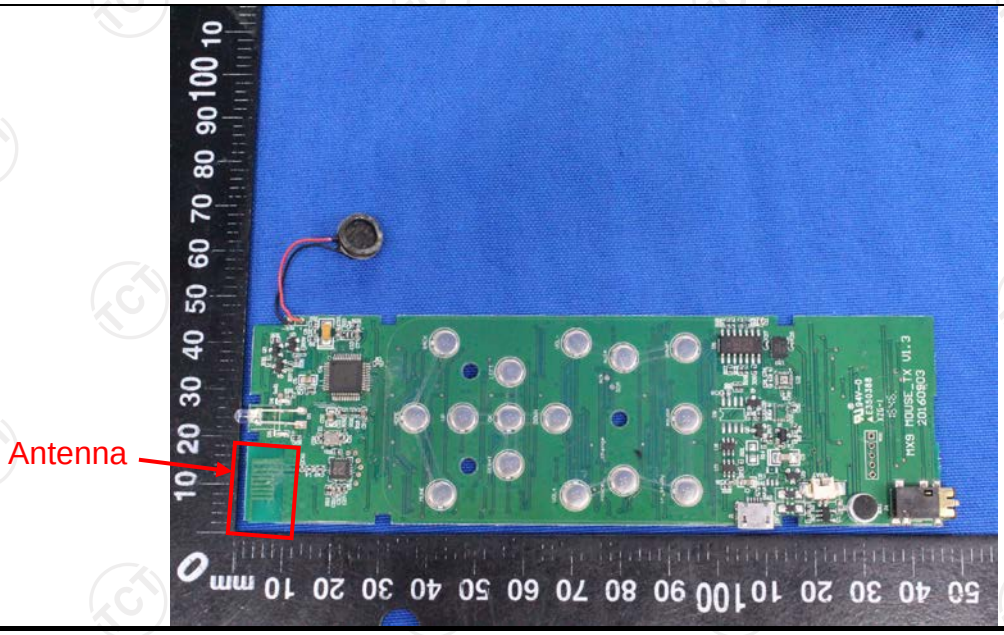
The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	±2.56dB
2	RF power, conducted	±0.12dB
3	Spurious emissions, conducted	±0.11dB
4	All emissions, radiated(<1GHz)	±3.92dB
5	All emissions, radiated(>1GHz)	±4.28dB
6	Temperature	±0.1°C
7	Humidity	±1.0%

6. Test Results and Measurement Data

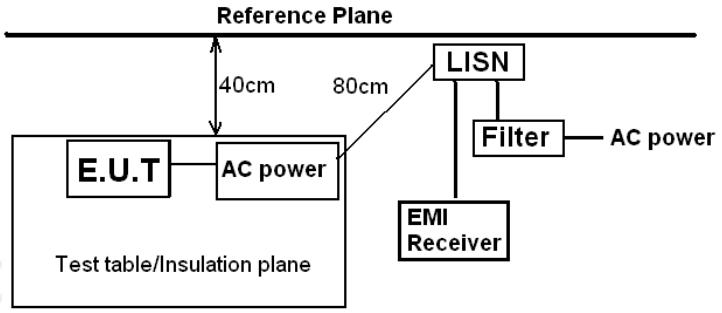
6.1. Antenna Requirement

Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: 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.	
E.U.T Antenna:	
The EUT antenna is PCB antenna which permanently attached, and the best case gain of the antenna is -3dBi.	



6.2.Conducted Emission

6.2.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Frequency Range:</td><td>150 kHz to 30 MHz</td></tr>
<tr><td>Receiver setup:</td><td>RBW=9 kHz, VBW=30 kHz, Sweep time=auto</td></tr>
<tr><td>Limits:</td><td>
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
</td></tr>
<tr><td>Test Setup:</td><td>


Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m
</td></tr>
<tr><td>Test Mode:</td><td>Refer to item 4.1</td></tr>
<tr><td>Test Procedure:</td><td>1. The E.U.T is connected to an adapter through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.</td></tr>
<tr><td>Test Result:</td><td>PASS</td></tr>
</table>

6.2.2. Test Instruments

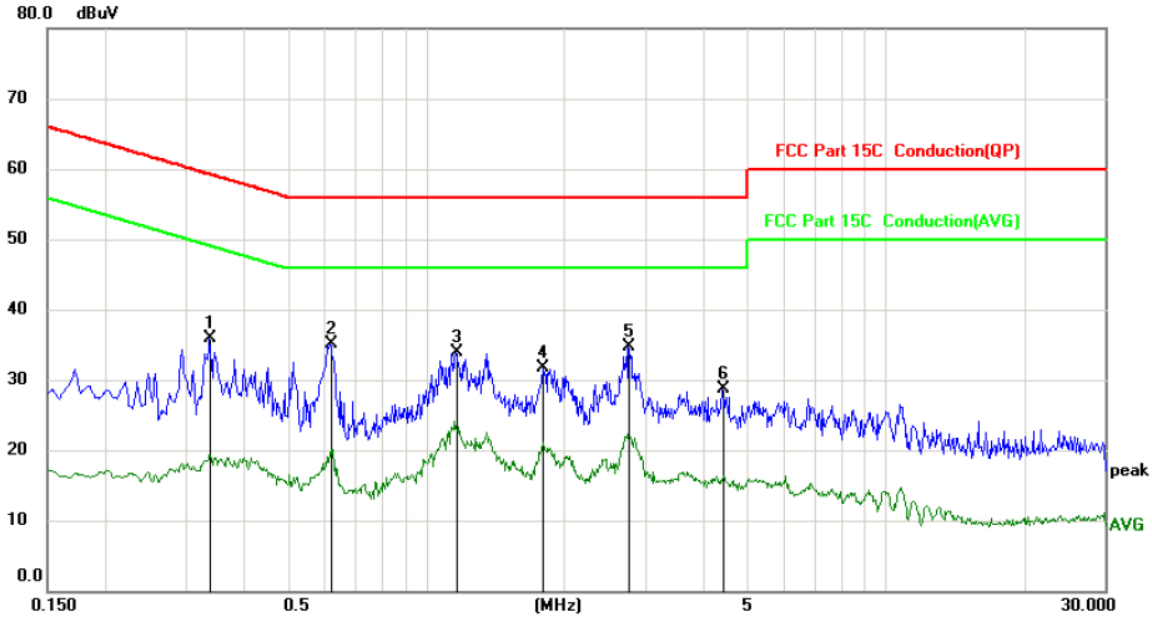
Conducted Emission Shielding Room Test Site (843)				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Test Receiver	R&S	ESPI	101402	Jul. 17, 2019
LISN	Schwarzbeck	NSLK 8126	8126453	Sep. 20, 2019
Coax cable (9KHz-30MHz)	TCT	CE-05	N/A	Sep. 16, 2019
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

6.2.3. Test data

Please refer to following diagram for individual

Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)



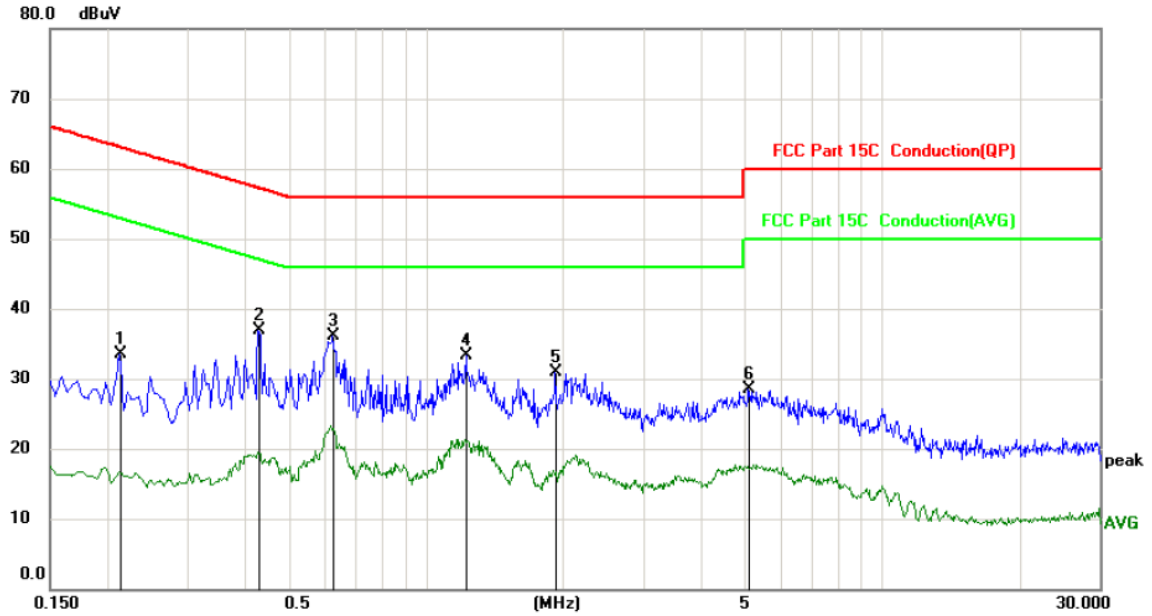
Site	Phase:	*L1*	Temperature: 25
Limit: FCC Part 15C Conduction(QP)	Power:		Humidity: 55 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3390	25.75	10.23	35.98	59.23	-23.25	peak	
2	*	0.6180	24.88	10.23	35.11	56.00	-20.89	peak	
3		1.1625	23.54	10.37	33.91	56.00	-22.09	peak	
4		1.7970	21.29	10.43	31.72	56.00	-24.28	peak	
5		2.7554	24.21	10.46	34.67	56.00	-21.33	peak	
6		4.4295	18.14	10.48	28.62	56.00	-27.38	peak	

Note:

Freq. = Emission frequency in MHz
Reading level (dBµV) = Receiver reading
Corr. Factor (dB) = LISN factor + Cable loss
Measurement (dBµV) = Reading level (dBµV) + Corr. Factor (dB)
Limit (dBµV) = Limit stated in standard
Margin (dB) = Measurement (dBµV) – Limits (dBµV)
Q.P. =Quasi-Peak
AVG =average
** is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.*

Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)



Site	Phase: N	Temperature: 25	
Limit: FCC Part 15C Conduction(QP)	Power:	Humidity: 55 %	

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2130	23.28	10.23	33.51	63.09	-29.58	peak	
2		0.4290	26.67	10.22	36.89	57.27	-20.38	peak	
3	*	0.6270	25.94	10.23	36.17	56.00	-19.83	peak	
4		1.2255	22.93	10.38	33.31	56.00	-22.69	peak	
5		1.9185	20.43	10.44	30.87	56.00	-25.13	peak	
6		5.1045	18.04	10.48	28.52	60.00	-31.48	peak	

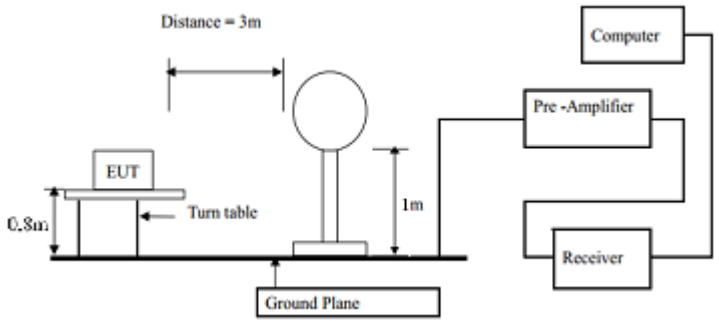
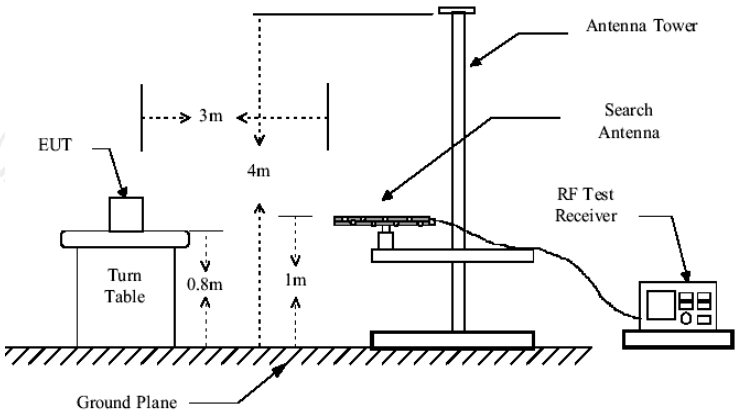
Note:

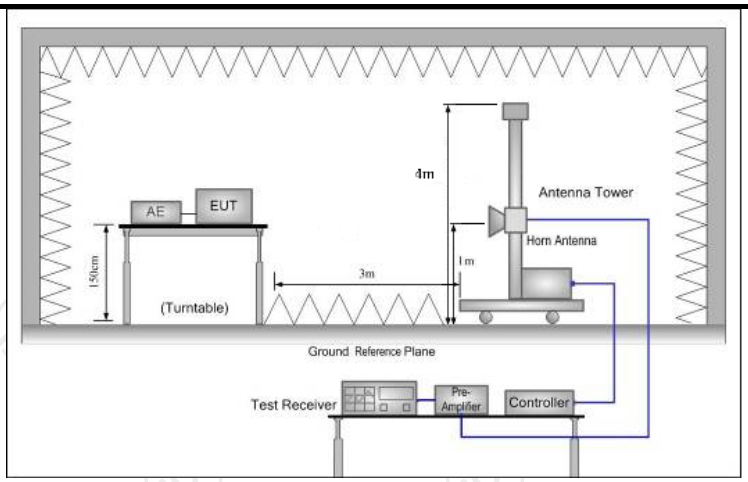
Freq. = Emission frequency in MHz
Reading level (dBµV) = Receiver reading
Corr. Factor (dB) = LISN factor + Cable loss
Measurement (dBµV) = Reading level (dBµV) + Corr. Factor (dB)
Limit (dBµV) = Limit stated in standard
Margin (dB) = Measurement (dBµV) – Limits (dBµV)
Q.P. =Quasi-Peak AVG =average
** is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.*

6.3.Radiated Emission Measurement

6.3.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Frequency Range:</td><td>9 kHz to 25 GHz</td></tr>
<tr><td>Measurement Distance:</td><td>3 m</td></tr>
<tr><td>Antenna Polarization:</td><td>Horizontal & Vertical</td></tr>
<tr><td>Receiver Setup:</td><td><table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>9kHz- 150kHz</td><td>Quasi-peak</td><td>200Hz</td><td>1kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>150kHz-30MHz</td><td>Quasi-peak</td><td>9kHz</td><td>30kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr>
</table></td></tr>
<tr><td>Limit(Field strength of the fundamental signal):</td><td><table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td rowspan="2">2400MHz-2483.5MHz</td><td>94.00</td><td>Average Value</td></tr>
<tr><td>114.00</td><td>Peak Value</td></tr>
</table></td></tr>
<tr><td>Limit(Spurious Emissions):</td><td><table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td>0.009-0.490</td><td>2400/F(KHz)</td><td>Quasi-peak Value</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(KHz)</td><td>Quasi-peak Value</td></tr>
<tr><td>1.705-30</td><td>30</td><td>Quasi-peak Value</td></tr>
<tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr>
<tr><td>74.0</td><td>Peak Value</td></tr>
</table></td></tr>
<tr><td>Limit (band edge) :</td><td>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 Section 15.209, whichever is the lesser attenuation.</td></tr>
<tr><td>Test Procedure:</td><td>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber in below 1GHz, 1.5m above the ground in above 1GHz. 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. The antenna height 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</td></tr>
</table>

	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 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test setup:	For radiated emissions below 30MHz  30MHz to 1GHz  Above 1GHz (The diagram below shows the test setup that is utilized to make the measurements for emission from 1GHz to the tenth harmonic of the highest fundamental frequency or to 40GHz emissions, whichever is lower.)

	
Test results:	PASS

6.3.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Test Receiver	ROHDE&SCHWARZ	ESIB7	100197	Jul. 17, 2019
Spectrum Analyzer	ROHDE&SCHWARZ	FSQ40	200061	Sep. 20, 2019
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Sep. 16, 2019
Pre-amplifier	HP	8447D	2727A05017	Sep. 16, 2019
Loop antenna	ZHINAN	ZN30900A	12024	Oct. 20, 2019
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep. 02, 2019
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Oct. 20, 2019
Horn Antenna	A-INFO	LB-180400-KF	J211020657	Sep. 16, 2019
Antenna Mast	Keleto	RE-AM	N/A	N/A
Coax cable (9KHz-1GHz)	TCT	RE-low-01	N/A	Sep. 16, 2019
Coax cable (9KHz-40GHz)	TCT	RE-high-02	N/A	Sep. 16, 2019
Coax cable (9KHz-1GHz)	TCT	RE-low-03	N/A	Sep. 16, 2019
Coax cable (9KHz-40GHz)	TCT	RE-high-04	N/A	Sep. 16, 2019
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

6.3.3. Test Data

Field Strength of Fundamental

Frequency (MHz)	Peak reading (dBuV/m)	Correction Factor	Emission PK/AV (dBuV/m)	Horizontal /Vertical	Limits PK/AV (dBuV/m)	Margin (dB)
2404	92.54	-4.2	88.34(PK)	H	114/94	-25.66
2404	78.69	-4.2	74.49(AV)	H	114/94	-19.51
2440	90.82	-4.2	86.62(PK)	H	114/94	-27.38
2440	76.43	-4.2	72.23(AV)	H	114/94	-21.77
2480	89.41	-4.2	85.21(PK)	H	114/94	-28.79
2480	75.18	-4.2	70.98(AV)	H	114/94	-23.02
2404	91.59	-4.2	87.39(PK)	V	114/94	-26.61
2404	76.38	-4.2	72.18(AV)	V	114/94	-21.82
2440	89.42	-4.2	85.22(PK)	V	114/94	-27.78
2440	75.25	-4.2	71.05(AV)	V	114/94	-22.95
2480	88.36	-4.2	84.16(PK)	V	114/94	-29.84
2480	74.48	-4.2	70.28(AV)	V	114/94	-23.72

Spurious Emissions

Frequency Range (9 kHz-30MHz)

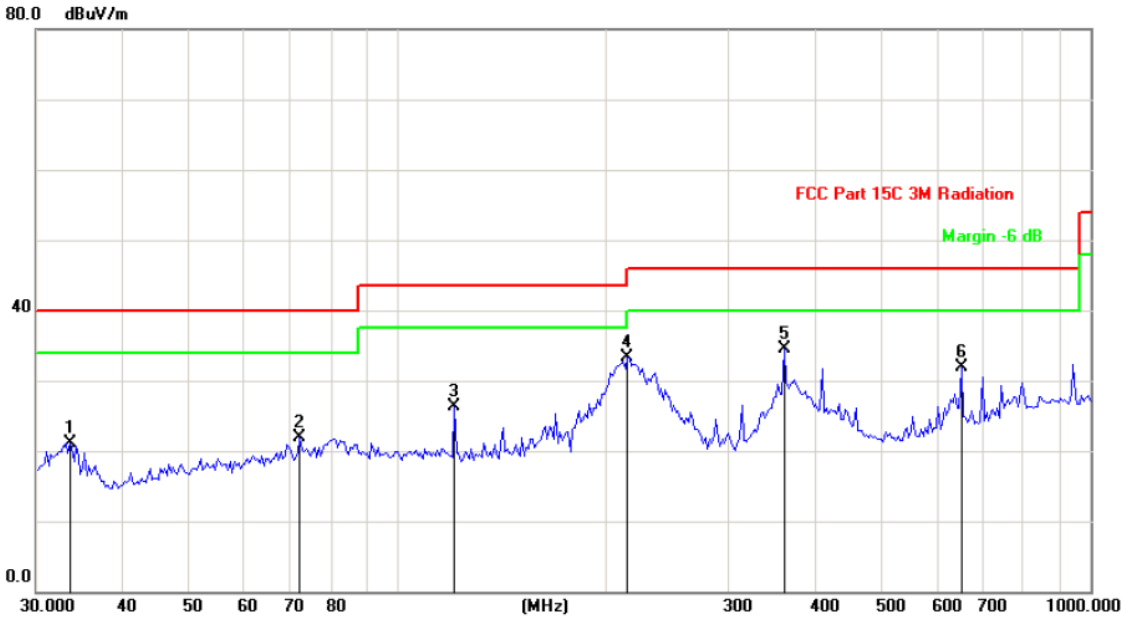
Frequency (MHz)	Level@3m (dBμV/m)	Limit@3m (dBμV/m)
--	--	--
--	--	--
--	--	--
--	--	--

Note: *1. Emission Level=Reading+ Cable loss-Antenna factor-Amp factor*

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement.

Frequency Range (30MHz-1GHz)

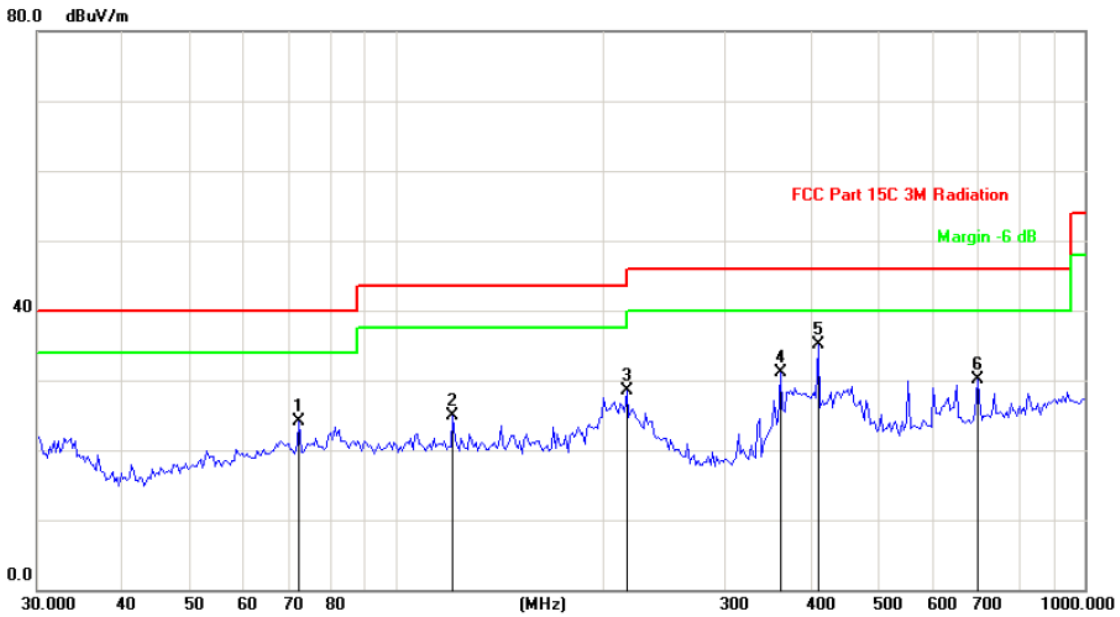
Horizontal:



Site	Polarization: *Horizontal*	Temperature:	25
Limit: FCC Part 15C 3M Radiation	Power: DC 3.7V	Humidity:	55 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		33.5700	32.22	-11.02	21.20	40.00	-18.80	peak	100	185	
2		72.2111	37.76	-15.87	21.89	40.00	-18.11	peak	100	96	
3		120.6118	38.13	-11.78	26.35	43.50	-17.15	peak	100	84	
4	*	214.6063	46.82	-13.59	33.23	43.50	-10.27	peak	100	297	
5		360.9775	44.05	-9.53	34.52	46.00	-11.48	peak	100	62	
6		651.3831	37.41	-5.57	31.84	46.00	-14.16	peak	100	286	

Vertical:



Site | Polarization: *Vertical* | Temperature: 25

Limit: FCC Part 15C 3M Radiation | Power: DC 3.7V | Humidity: 55 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		72.2111	40.01	-15.87	24.14	40.00	-15.86	peak	100	188	
2		120.6118	36.61	-11.78	24.83	43.50	-18.67	peak	100	99	
3		216.1197	41.98	-13.55	28.43	46.00	-17.57	peak	100	63	
4		360.9775	40.72	-9.53	31.19	46.00	-14.81	peak	100	295	
5	*	409.6506	43.92	-8.83	35.09	46.00	-10.91	peak	100	65	
6		698.8035	35.60	-5.47	30.13	46.00	-15.87	peak	100	281	

Note: *Measurements were conducted in all channels (high, middle, low), and the worst case (low channel) was submitted only.*

Above 1GHz

Low channel: 2404 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
4808.00	H	49.52	---	-3.94	45.58	---	74.00	54.00	-8.42
7212.00	H	43.25	---	0.52	43.77	---	74.00	54.00	-10.23
---	---	---	---	---	---	---	---	---	---
2387.50	V	50.69	---	-4.2	46.49	---	74.00	54.00	-7.51
4808.00	V	48.62	---	-3.94	44.68	---	74.00	54.00	-9.32
7212.00	V	45.27	---	0.52	45.79	---	74.00	54.00	-8.21
---	---	---	---	---	---	---	---	---	---

Middle channel: 2440 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
4880.00	H	48.51	---	-3.98	44.53	---	74.00	54.00	-9.47
7320.00	H	45.43	---	0.57	46.00	---	74.00	54.00	-8.00
---	---	---	---	---	---	---	---	---	---
4880.00	V	48.76	---	-3.98	44.78	---	74.00	54.00	-9.22
7320.00	V	44.81	---	0.57	45.38	---	74.00	54.00	-8.62
---	---	---	---	---	---	---	---	---	---

High channel: 2480 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
4960.00	H	48.57	---	-3.98	44.59	---	74.00	54.00	-9.41
7440.00	H	46.01	---	0.57	46.58	---	74.00	54.00	-7.42
---	---	---	---	---	---	---	---	---	---
4960.00	V	49.85	---	-3.98	45.87	---	74.00	54.00	-8.13
7440.00	V	43.66	---	0.57	44.23	---	74.00	54.00	-9.77
---	---	---	---	---	---	---	---	---	---

Note:

1. *Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier*
2. *Margin (dB) = Emission Level (Peak) (dBμV/m)-Average limit (dBμV/m)*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
4. *Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.*
5. *Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.*

Band Edge Requirement

Low channel: 2404 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
2390	H	48.27		-4.2	44.07		74.00	---	-29.93
2390	H		37.49	-4.2		33.29	---	54.00	-20.71
---	---	---	---	---	---	---	---	---	---
2400	H	53.19	---	-4.2	48.99	---	74.00	---	-25.01
2400	H	---	42.56	-4.2	---	38.36	---	54.00	-15.64
---	---	---	---	---	---	---	---	---	---
2390	V	50.63		-4.2	46.43		74.00	---	-27.57
2390	V		34.86	-4.2	30.66		---	54.00	-23.34
---	---	---	---	---	---	---	---	---	---
2400	V	55.72	---	-4.2	51.52	---	74.00	---	-22.48
2400	V	---	39.78	-4.2	---	35.58	---	54.00	-18.42
---	---	---	---	---	---	---	---	---	---

High channel: 2480 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
2483.5	H	56.02	---	-4.2	51.82	---	74.00	---	-22.18
2483.5	H	---	41.63	-4.2	---	37.43	---	54.00	-16.57
---	---	---	---	---	---	---	---	---	

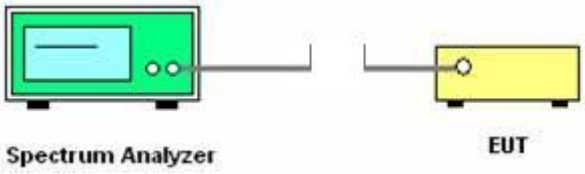
2483.5	V	55.65	---	-4.2	51.45	---	74.00	---	-22.55
2483.5	V	---	40.82	-4.2	---	36.62	---	54.00	-17.38
---	---	---	---	---	---	---	---	---	---

Note:

1. *Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier*
2. *Margin (dB) = Emission Level (Peak/Average)(dBμV/m)-(Peak/Average) limit (dBμV/m)*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
4. *Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.*
5. *Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.*

6.4.20dB Occupied Bandwidth

6.4.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.215(c)
Test Method:	ANSI C63.10: 2013
Limit:	N/A
	1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT. 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. Use the following spectrum analyzer settings for 20dB Bandwidth measurement. Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping 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 setup:	
Test Mode:	Transmitting mode with modulation
Test results:	PASS

6.4.2. Test Instruments

RF Test Room				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	R&S	FSU	200054	Sep. 20, 2019

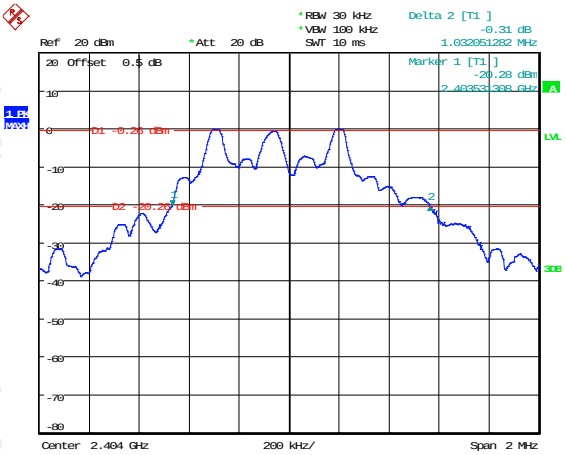
Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

6.4.3. Test data

Test Channel	20dB Occupy Bandwidth (kHz)	Limit	Conclusion
Lowest	1032.05	---	PASS
Middle	862.18	---	PASS
Highest	1201.92	---	PASS

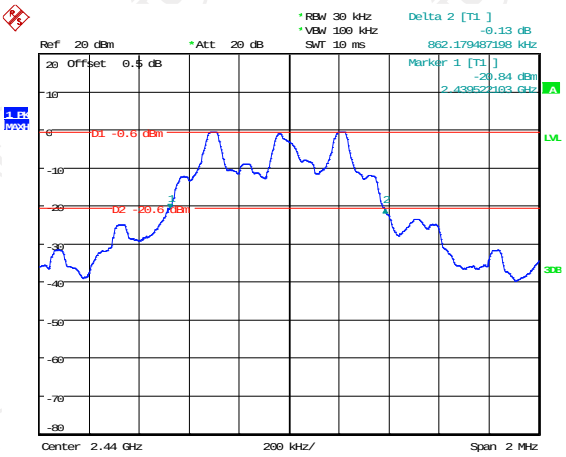
Test plots as follows:

Lowest channel



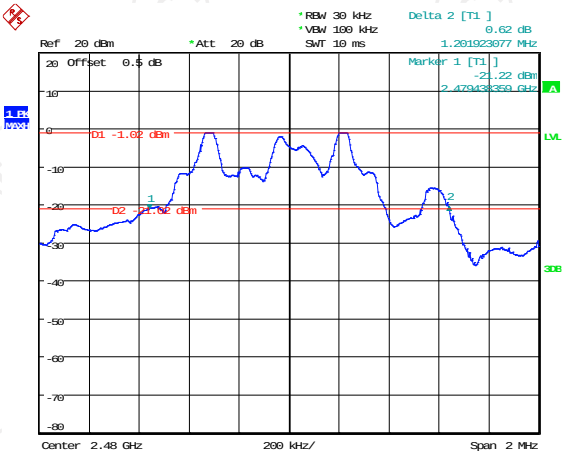
Date: 28.APR.2019 16:54:20

Middle channel



Date: 28.APR.2019 17:01:23

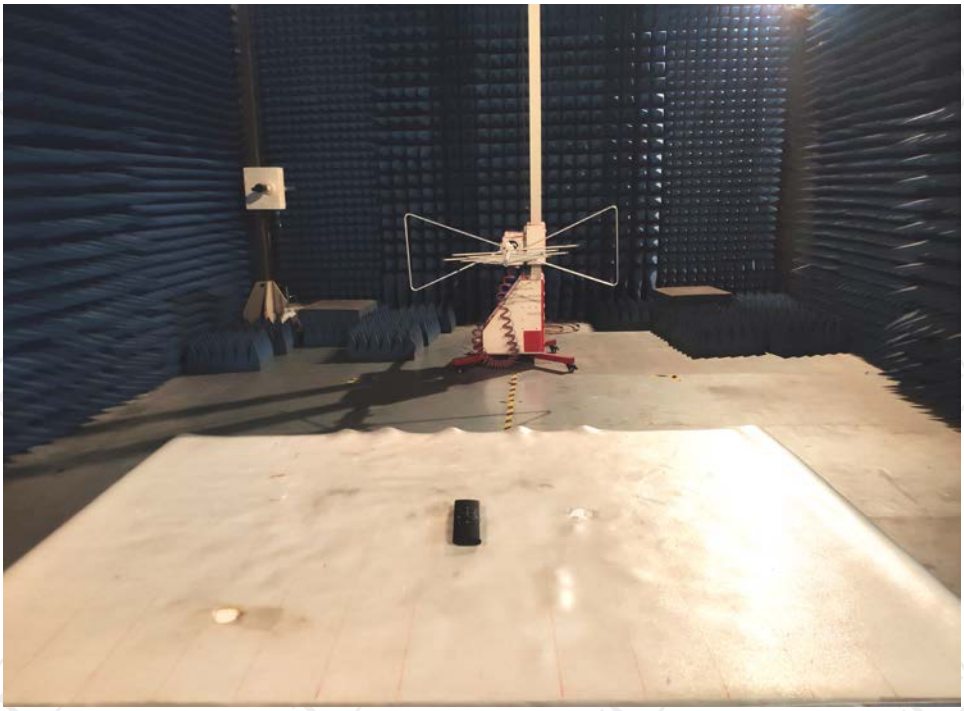
Highest channel

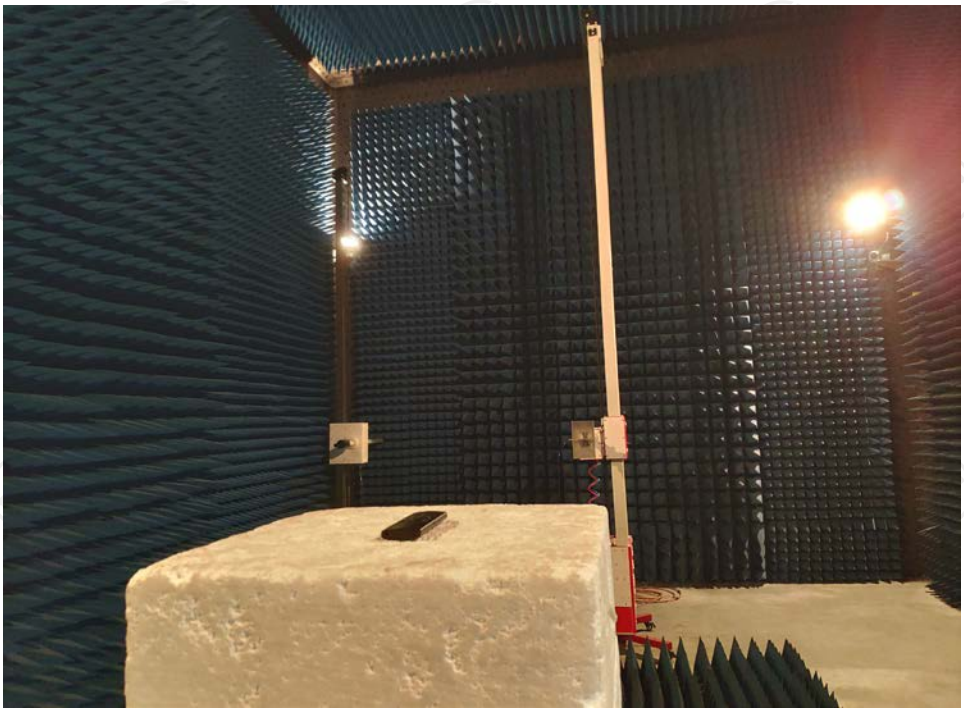


Date: 28.APR.2019 17:06:35

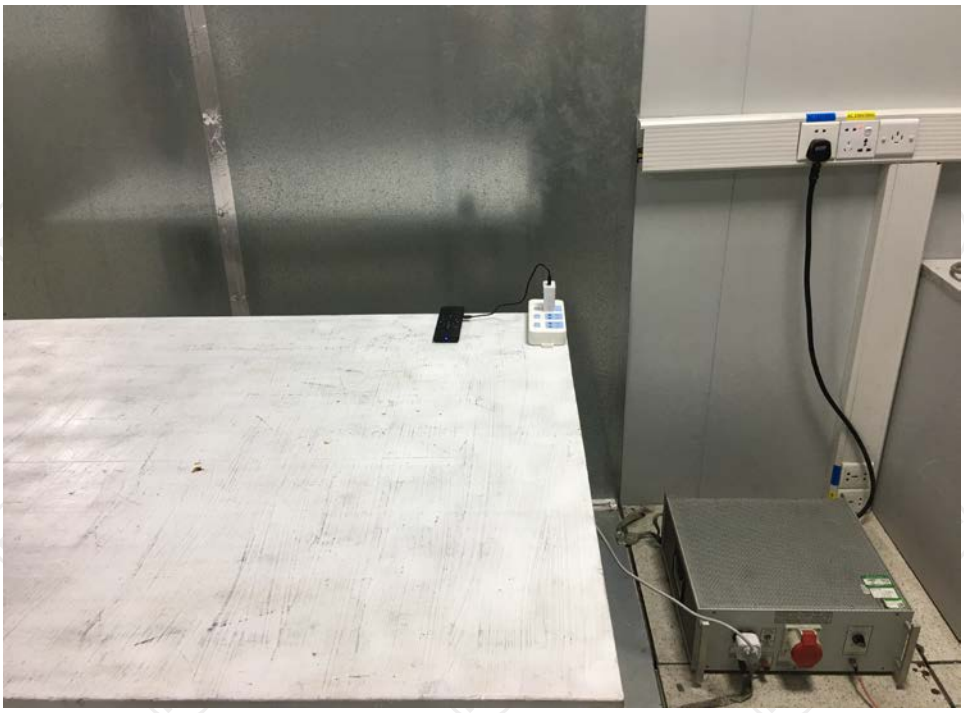
Appendix A: Photographs of Test Setup

Product: Smart remote controller (2.4G RF/BLE/Voice air mouse, mini keboard with touchpad)
Model: MX9
Radiated Emission





Conducted Emission

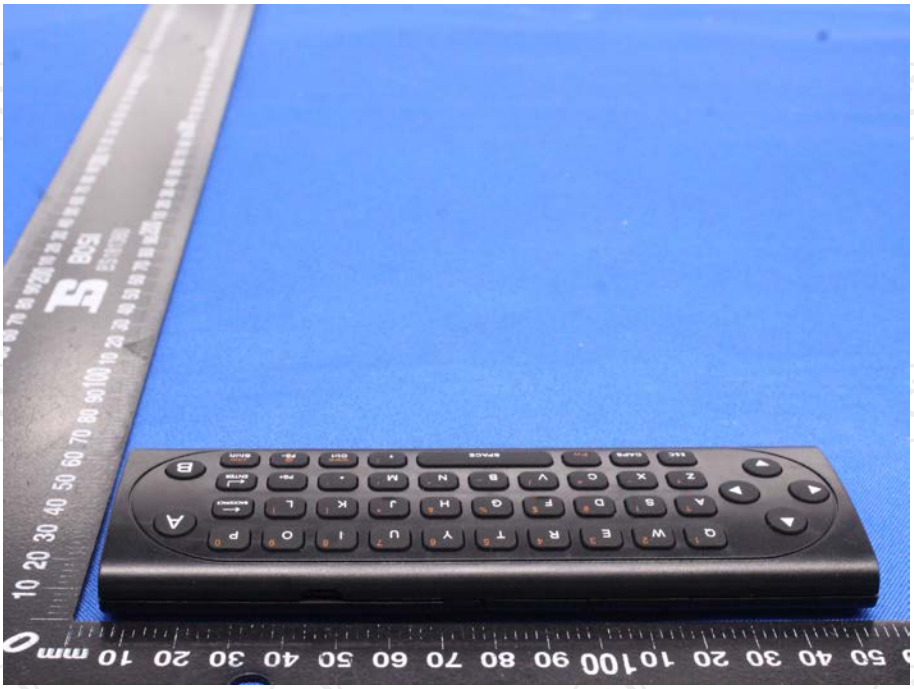


Appendix B: Photographs of EUT

Product: Smart remote controller (2.4G RF/BLE/Voice air mouse, mini keboard with touchpad)

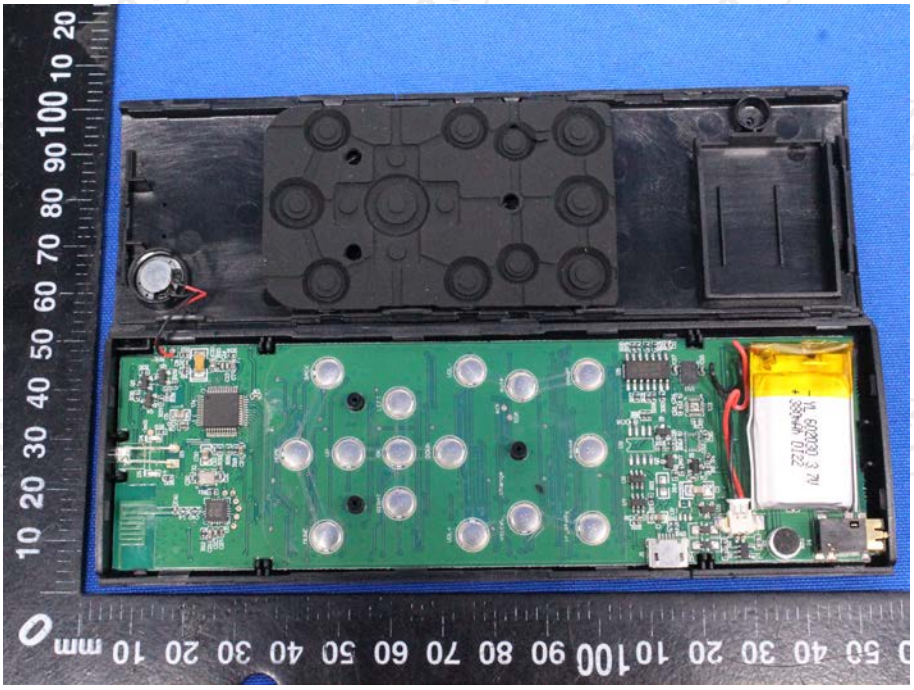
Model: MX9

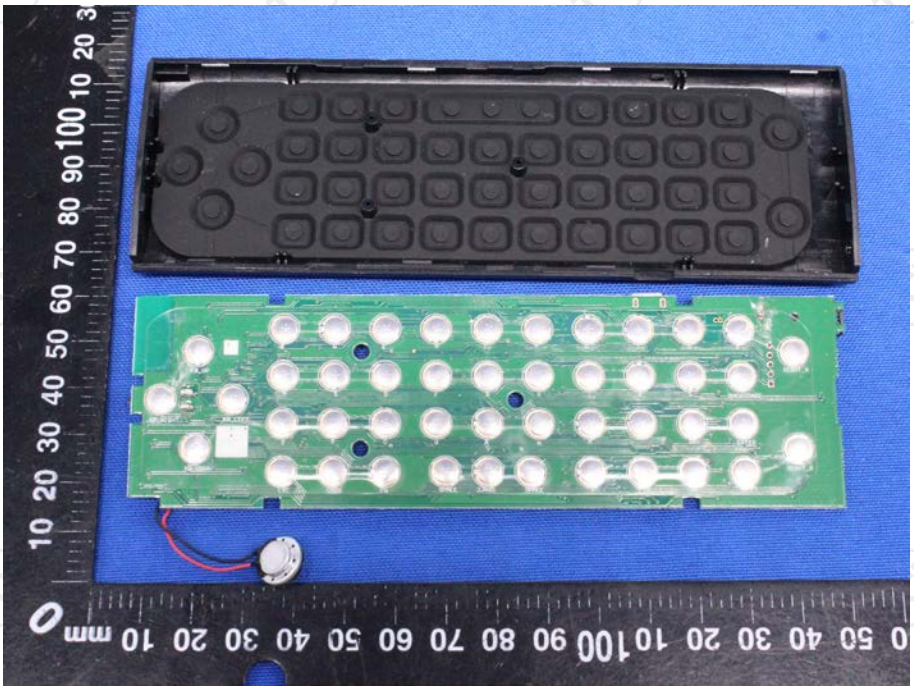
External Photos

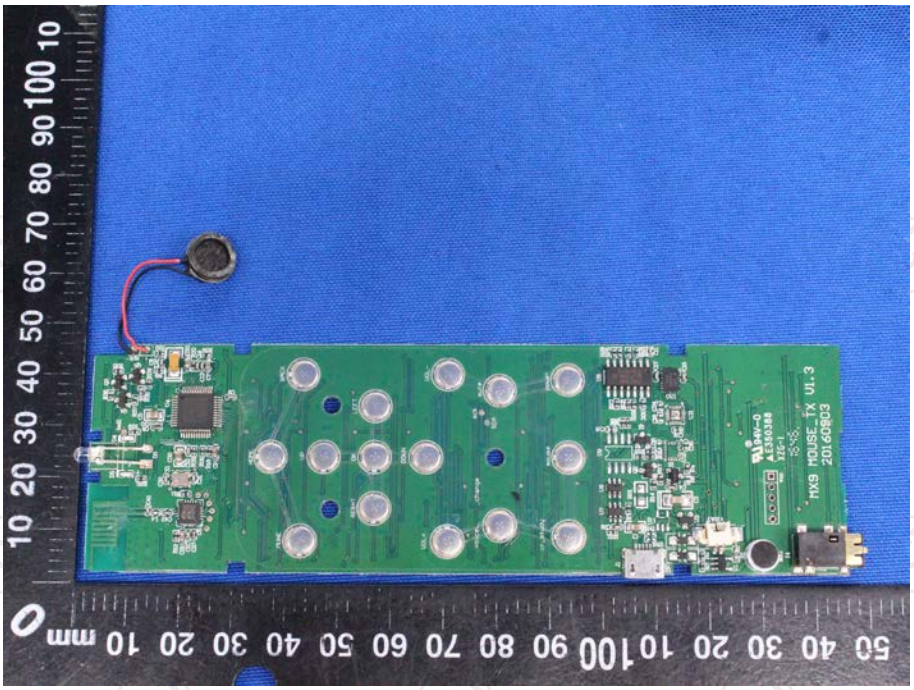


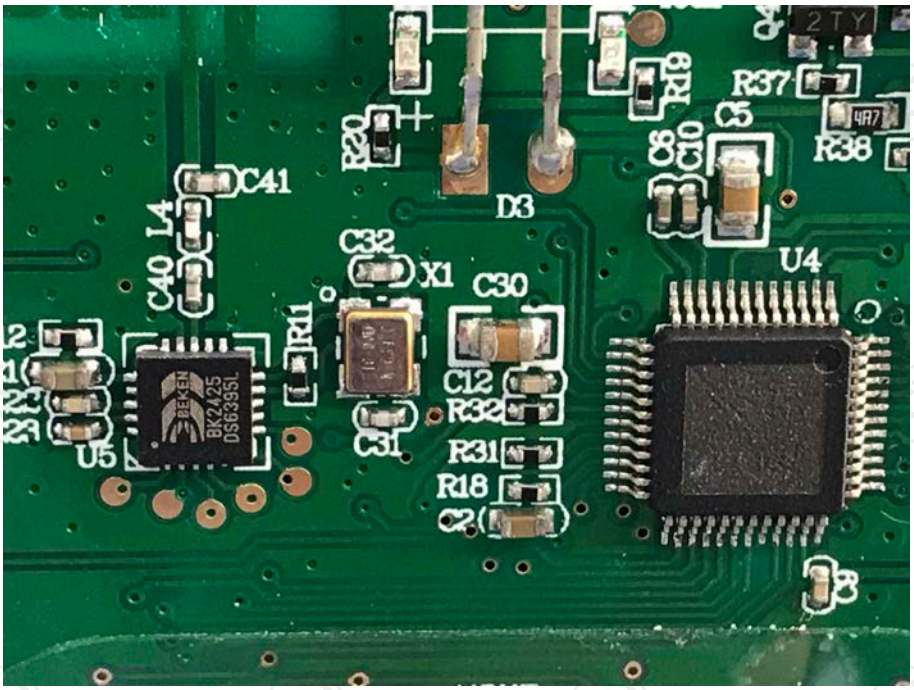
ESC
CAPS
Fn
SPACE
Ctrl
Shift
ENTER
A
B

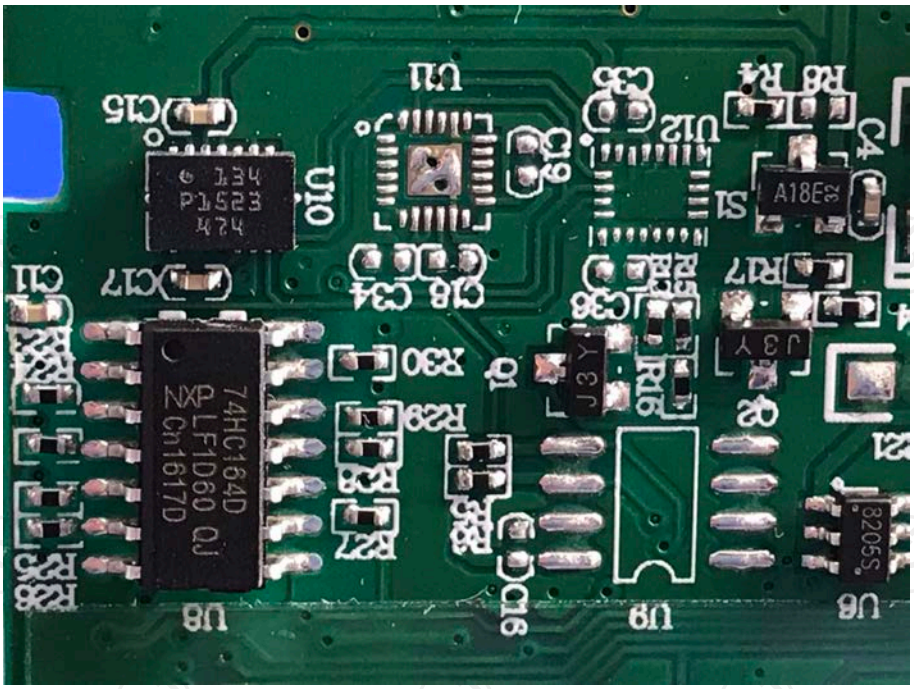
Product: Smart remote controller (2.4G RF/BLE/Voice air mouse, mini keboard with touchpad)
Model: MX9
Internal Photos

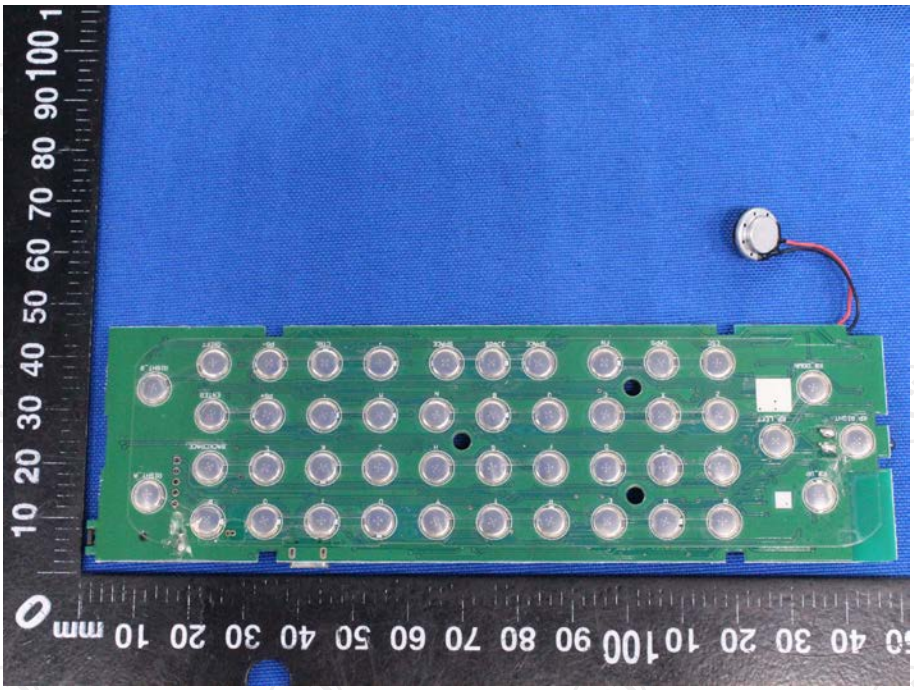


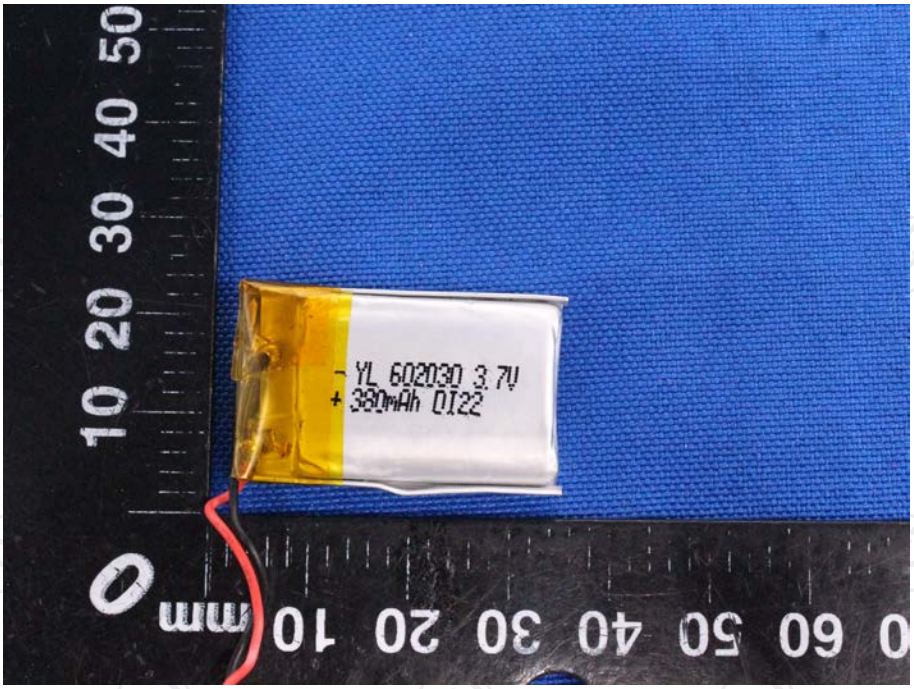


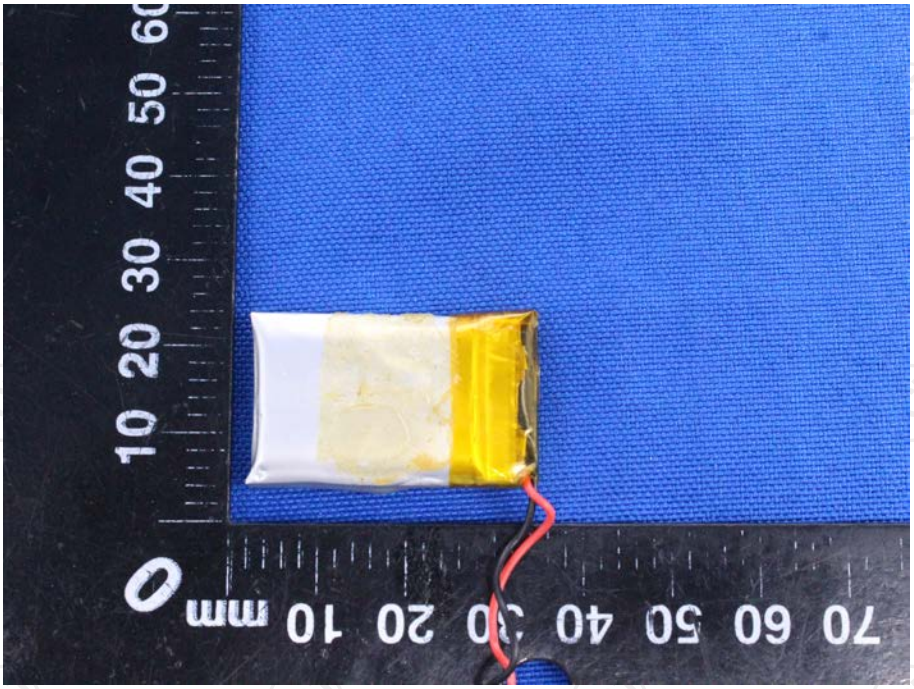



R20
D3
R19
R37
C5
R38
C41
L4
C40
C32
X1
C30
U4
R11
C12
R32
C31
R31
R18
U5
BK2425
DS6395L


74HC164D
NXP LF1D60 QJ
Cn1617D
A18E







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