EMC TEST REPORT

Report No.: 15070539-FCC-E

Supersede Report No.: N/A

Applicant	Xiamen Highdart Electronic Information Co.,LTD.
Product Name	Crystal model tire pressure monitoring system
Model No.	TPMS-H6
Serial No.	TPMS-H5 、TPMS-H7、TPMS-H8、TPMS-H9、TPMS-10
Test Standard	FCC Part 15 Subpart B Class B:2014, ANSI C63.4: 2014
Test Date	July 11 to July 22, 2015
Issue Date	July 23, 2015
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Winnie Zhang	David Huang	
Winnie Zhang **Test Engineer**	**David Huang** **Checked By**	

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Test result presented in this test report is applicable to the tested sample only

Issued by:

SIEMIC (SHENZHEN-CHINA) LABORATORIES

Zone A, Floor 1, Building 2 Wan Ye Long Technology Park

South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China 518108

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Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.

In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC, RF/Wireless, SAR, Telecom
Canada	EMC, RF/Wireless, SAR, Telecom
Taiwan	EMC, RF, Telecom, SAR, Safety
Hong Kong	RF/Wireless, SAR, Telecom
Australia	EMC, RF, Telecom, SAR, Safety
Korea	EMI, EMS, RF, SAR, Telecom, Safety
Japan	EMI, RF/Wireless, SAR, Telecom
Singapore	EMC, RF, SAR, Telecom
Europe	EMC, RF, SAR, Telecom, Safety

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1. Report Revision History

Report No.	Report Version	Description	Issue Date
15070539-FCC-E	NONE	Original	July 23, 2015

2. Customer information

Applicant Name	Xiamen Highdart Electronic Information Co.,LTD.
Applicant Add	Room N403A Weiye Building,Pioneer Park,Torch High-Tech Zone,Xiamen,China
Manufacturer	Xiamen Highdart Electronic Information Co.,LTD.
Manufacturer Add	Room N403A Weiye Building,Pioneer Park,Torch High-Tech Zone,Xiamen,China

3. Test site information

Lab performing tests	SIEMIC (Shenzhen-China) LABORATORIES
Lab Address	Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China 518108
FCC Test Site No.	718246
IC Test Site No.	4842E-1
Test Software	Radiated Emission Program-To Shenzhen v2.0

4. Equipment under Test (EUT) Information

Description of EUT:	Crystal model tire pressure monitoring system
Main Model:	TPMS-H6
Serial Model:	TPMS-H5 、TPMS-H7、TPMS-H8、TPMS-H9、TPMS-10
Date EUT received:	July 11, 2015
Test Date(s):	July 11 to July 22, 2015
Equipment Category：	CYY
Antenna Gain:	2.15dBi
RF Operating Frequency (ies):	433.92MHZ
Port:	N/A
Input Power:	Battery:3.7V 900mAh
Trade Name :	N/A
FCC ID:	2AFEFH65581851

5. Test Summary

The product was tested in accordance with the following specifications.

All testing has been performed according to below product classification:

FCC Rules	Description of Test	Result
§15.107; ANSI C63.4: 2014	AC Power Line Conducted Emissions	Compliance
§15.109; ANSI C63.4: 2014	Radiated Emissions	Compliance

Measurement Uncertainty

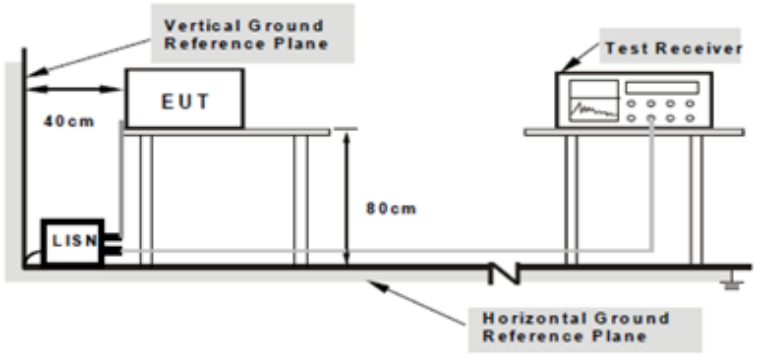
Emissions		
Test Item	**Description**	**Uncertainty**
Band Edge and Radiated Spurious Emissions	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
-	-	-

6. Measurements, Examination And Derived Results

6.1 AC Power Line Conducted Emissions

Temperature	23°C
Relative Humidity	55%
Atmospheric Pressure	1022mbar
Test date :	July 22, 2015
Tested By :	Winnie Zhang

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.107</td><td>a)</td><td>For Low-power radio-frequency devices 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, as measured using a 50 [mu] H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequencies ranges.
<table>
<tr><th rowspan="2">Frequency ranges (MHz)</th><th colspan="2">Limit (dBμV)</th></tr>
<tr><th>QP</th><th>Average</th></tr>
<tr><td>0.15 ~ 0.5</td><td>66 – 56</td><td>56 – 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><td>☑</td></tr>
<tr><td>Test Setup</td><td colspan="3"> 

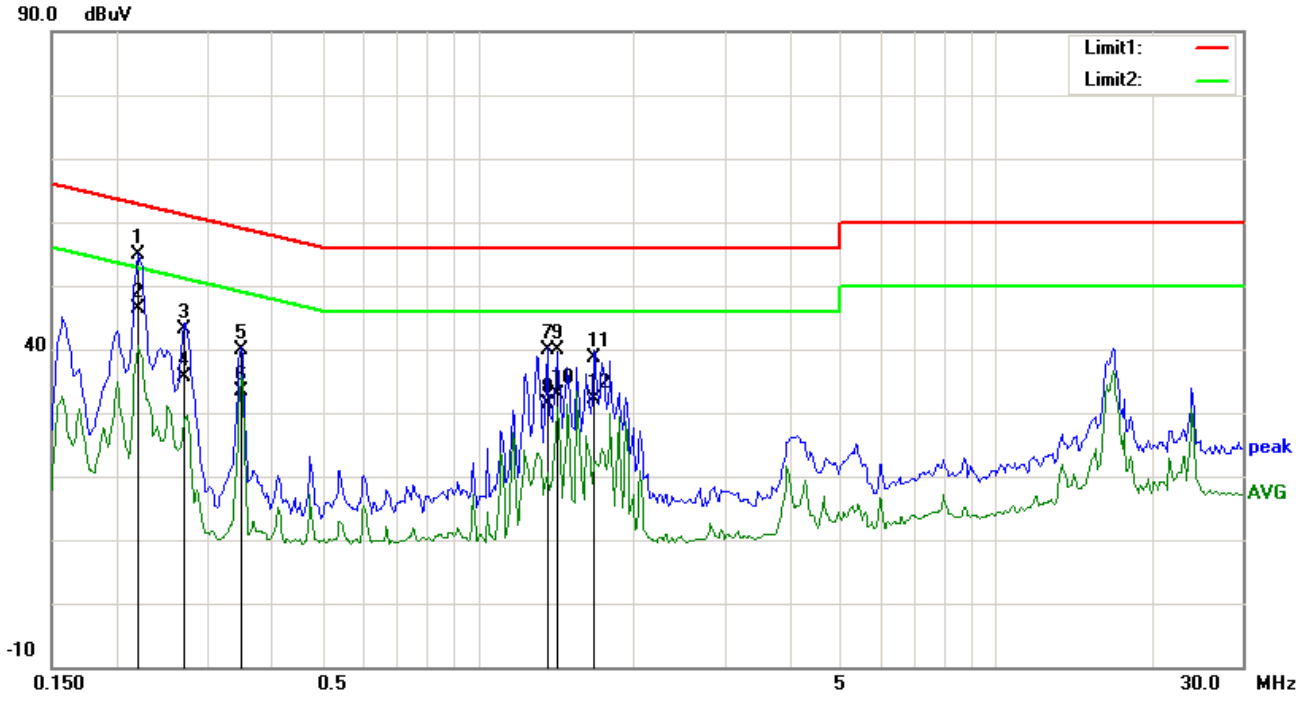
Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.</td></tr>
<tr><td>Procedure</td><td colspan="3">1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.
2. The power supply for the EUT was fed through a 50W/50mH EUT LISN, connected to filtered mains.</td></tr>
</table>

	3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable. 4. All other supporting equipment were powered separately from another main supply. 5. The EUT was switched on and allowed to warm up to its normal operating condition. 6. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver. 7. High peaks, relative to the limit line, The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz. 8. Step 7 was then repeated for the LIVE line (for AC mains) or DC line (for DC power).
Remark	
Result	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Test Mode 1:	Running

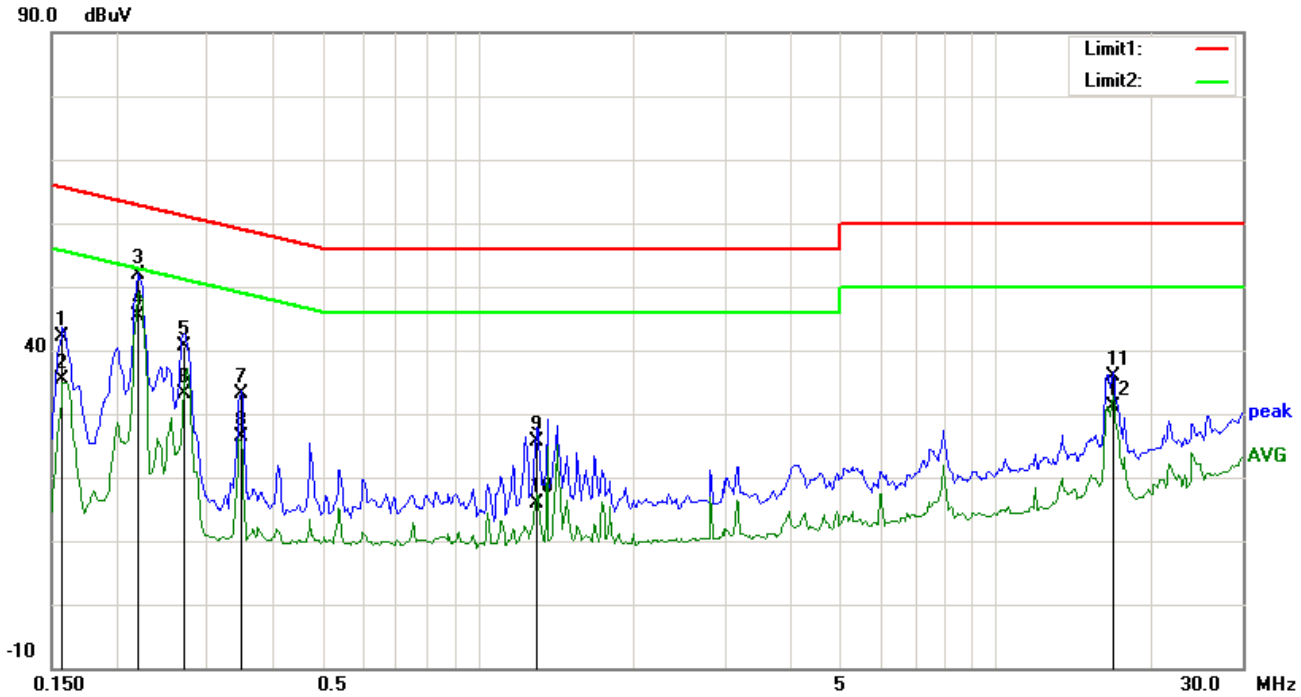


Test Data

Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Comment
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)	
1	L1	0.2208	41.93	QP	12.94	54.87	62.79	-7.92	
2	L1	0.2208	33.36	AVG	12.94	46.30	52.79	-6.49	
3	L1	0.2711	30.48	QP	12.75	43.23	61.08	-17.85	
4	L1	0.2711	22.92	AVG	12.75	35.67	51.08	-15.41	
5	L1	0.3492	27.42	QP	12.46	39.88	58.98	-19.10	
6	L1	0.3492	20.99	AVG	12.46	33.45	48.98	-15.53	
7	L1	1.3609	28.59	QP	11.40	39.99	56.00	-16.01	
8	L1	1.3609	20.03	AVG	11.40	31.43	46.00	-14.57	
9	L1	1.4234	28.36	QP	11.40	39.76	56.00	-16.24	
10	L1	1.4234	21.47	AVG	11.40	32.87	46.00	-13.13	
11	L1	1.6773	27.33	QP	11.40	38.73	56.00	-17.27	
12	L1	1.6773	20.77	AVG	11.40	32.17	46.00	-13.83	

Test Mode 1:	Running

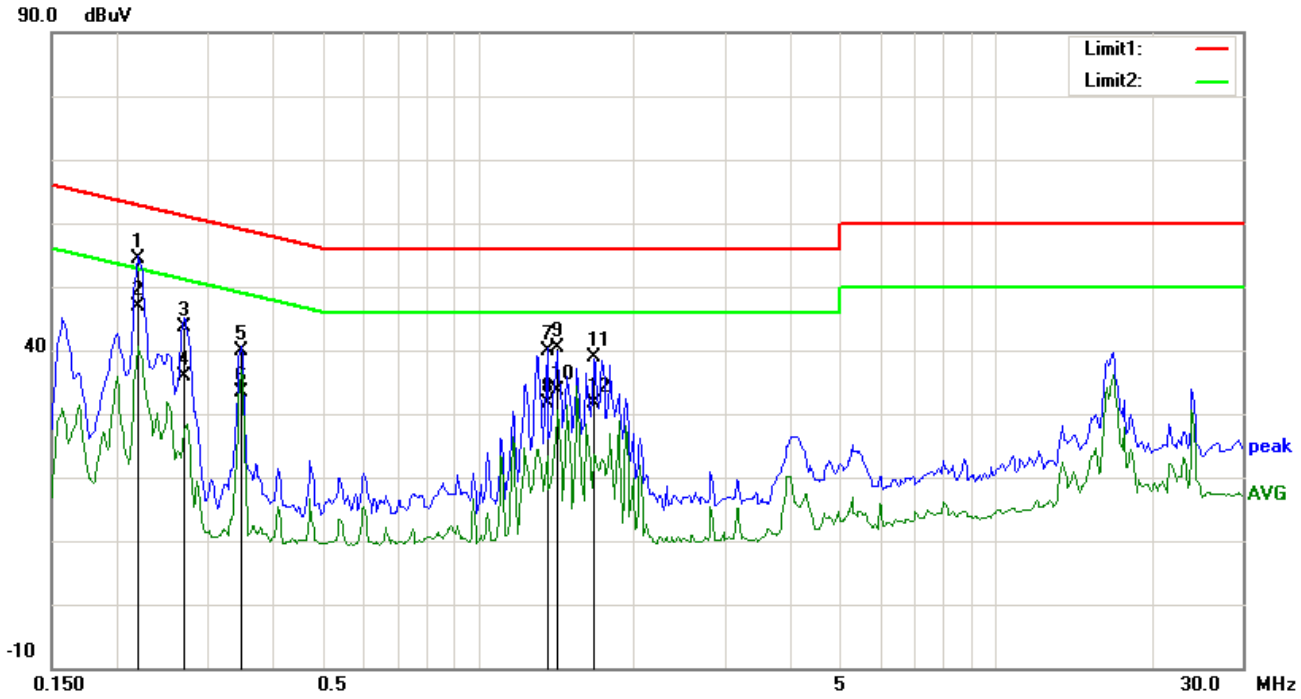


Test Data

Phase Neutral Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Comment
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)	
1	N	0.1578	29.08	QP	13.17	42.25	65.58	-23.33	
2	N	0.1578	22.14	AVG	13.17	35.31	55.58	-20.27	
3	N	0.2203	39.00	QP	12.94	51.94	62.81	-10.87	
4	N	0.2203	32.43	AVG	12.94	45.37	52.81	-7.44	
5	N	0.2711	27.89	QP	12.75	40.64	61.08	-20.44	
6	N	0.2711	20.45	AVG	12.75	33.20	51.08	-17.88	
7	N	0.3492	20.62	QP	12.46	33.08	58.98	-25.90	
8	N	0.3492	14.03	AVG	12.46	26.49	48.98	-22.49	
9	N	1.3023	14.22	QP	11.44	25.66	56.00	-30.34	
10	N	1.3023	4.46	AVG	11.44	15.90	46.00	-30.10	
11	N	16.8398	21.47	QP	14.50	35.97	60.00	-24.03	
12	N	16.8398	16.72	AVG	14.50	31.22	50.00	-18.78	

Test Mode 1:	Running

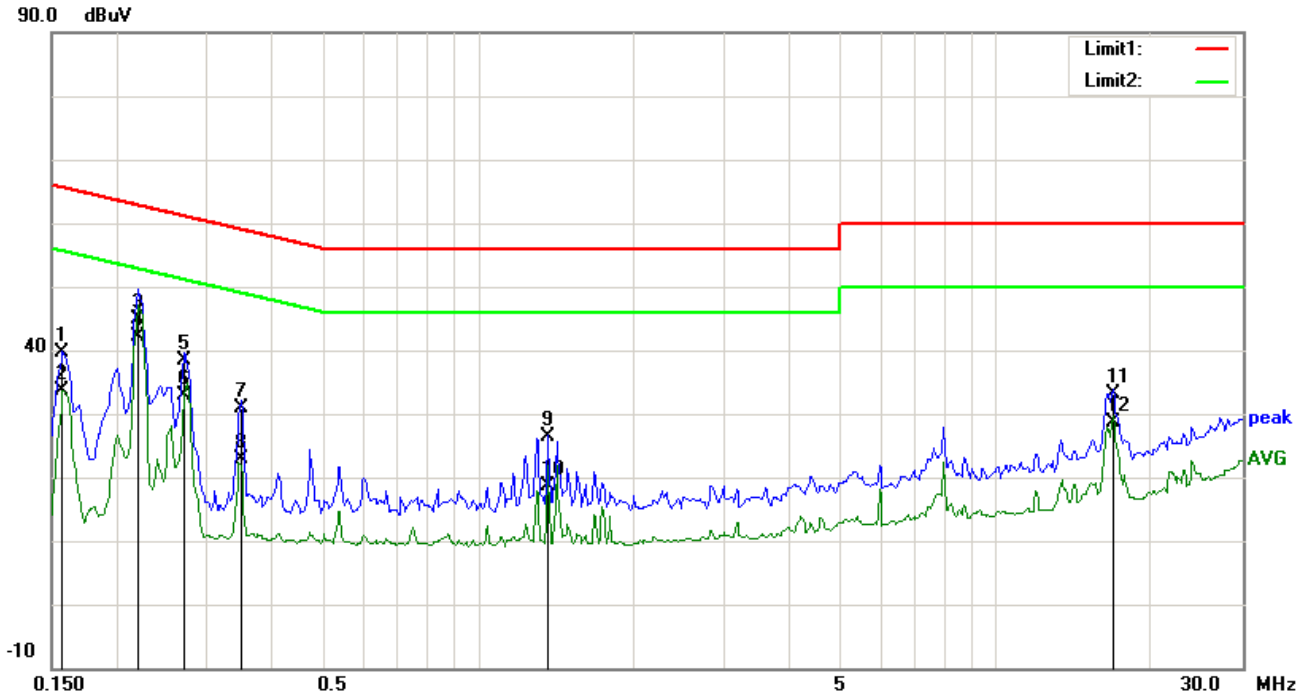


Test Data

Phase Line Plot at 240Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Comment
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)	
1	L1	0.2203	41.43	QP	12.94	54.37	62.81	-8.44	
2	L1	0.2203	33.91	AVG	12.94	46.85	52.81	-5.96	
3	L1	0.2711	30.92	QP	12.75	43.67	61.08	-17.41	
4	L1	0.2711	23.24	AVG	12.75	35.99	51.08	-15.09	
5	L1	0.3492	27.38	QP	12.46	39.84	58.98	-19.14	
6	L1	0.3492	20.94	AVG	12.46	33.40	48.98	-15.58	
7	L1	1.3609	28.59	QP	11.40	39.99	56.00	-16.01	
8	L1	1.3609	20.26	AVG	11.40	31.66	46.00	-14.34	
9	L1	1.4234	29.09	QP	11.40	40.49	56.00	-15.51	
10	L1	1.4234	22.25	AVG	11.40	33.65	46.00	-12.35	
11	L1	1.6773	27.54	QP	11.40	38.94	56.00	-17.06	
12	L1	1.6773	20.13	AVG	11.40	31.53	46.00	-14.47	

Test Mode 1:	Running



Test Data

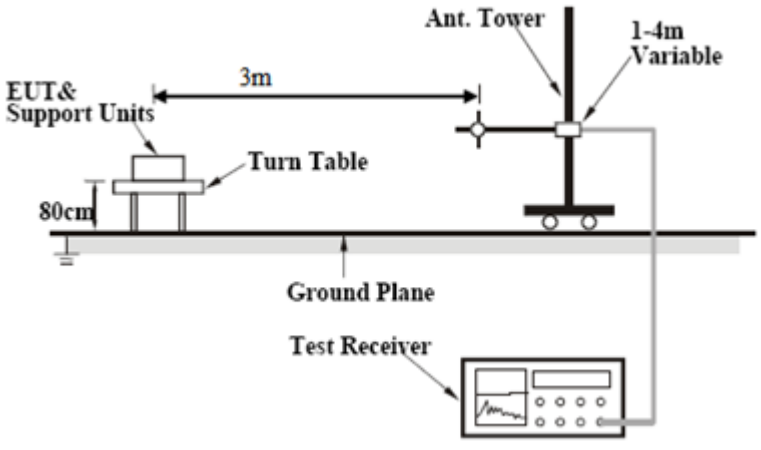
Phase Neutral Plot at 240Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Comment
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)	
1	N	0.1578	26.45	QP	13.17	39.62	65.58	-25.96	
2	N	0.1578	20.42	AVG	13.17	33.59	55.58	-21.99	
3	N	0.2203	31.98	QP	12.94	44.92	62.81	-17.89	
4	N	0.2203	29.24	AVG	12.94	42.18	52.81	-10.63	
5	N	0.2711	25.58	QP	12.75	38.33	61.08	-22.75	
6	N	0.2711	20.01	AVG	12.75	32.76	51.08	-18.32	
7	N	0.3492	18.35	QP	12.46	30.81	58.98	-28.17	
8	N	0.3492	10.48	AVG	12.46	22.94	48.98	-26.04	
9	N	1.3609	14.96	QP	11.45	26.41	56.00	-29.59	
10	N	1.3609	7.21	AVG	11.45	18.66	46.00	-27.34	
11	N	16.8398	18.59	QP	14.50	33.09	60.00	-26.91	
12	N	16.8398	14.01	AVG	14.50	28.51	50.00	-21.49	

6.2 Radiated Emissions

Temperature	23°C
Relative Humidity	55%
Atmospheric Pressure	1022mbar
Test date :	July 22, 2015
Tested By :	Winnie Zhang

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.107(d)</td><td>a)</td><td>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges
<table>
<tr><th>Frequency range (MHz)</th><th>Field Strength (μV/m)</th></tr>
<tr><td>30 – 88</td><td>100</td></tr>
<tr><td>88 – 216</td><td>150</td></tr>
<tr><td>216 960</td><td>200</td></tr>
<tr><td>Above 960</td><td>500</td></tr>
</table></td><td>☑</td></tr>
<tr><td>Test Setup</td><td colspan="3"> 
</td></tr>
<tr><td>Procedure</td><td colspan="3">1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
a. Vertical or horizontal polarization (whichever gave the higher emission level</td></tr>
</table>

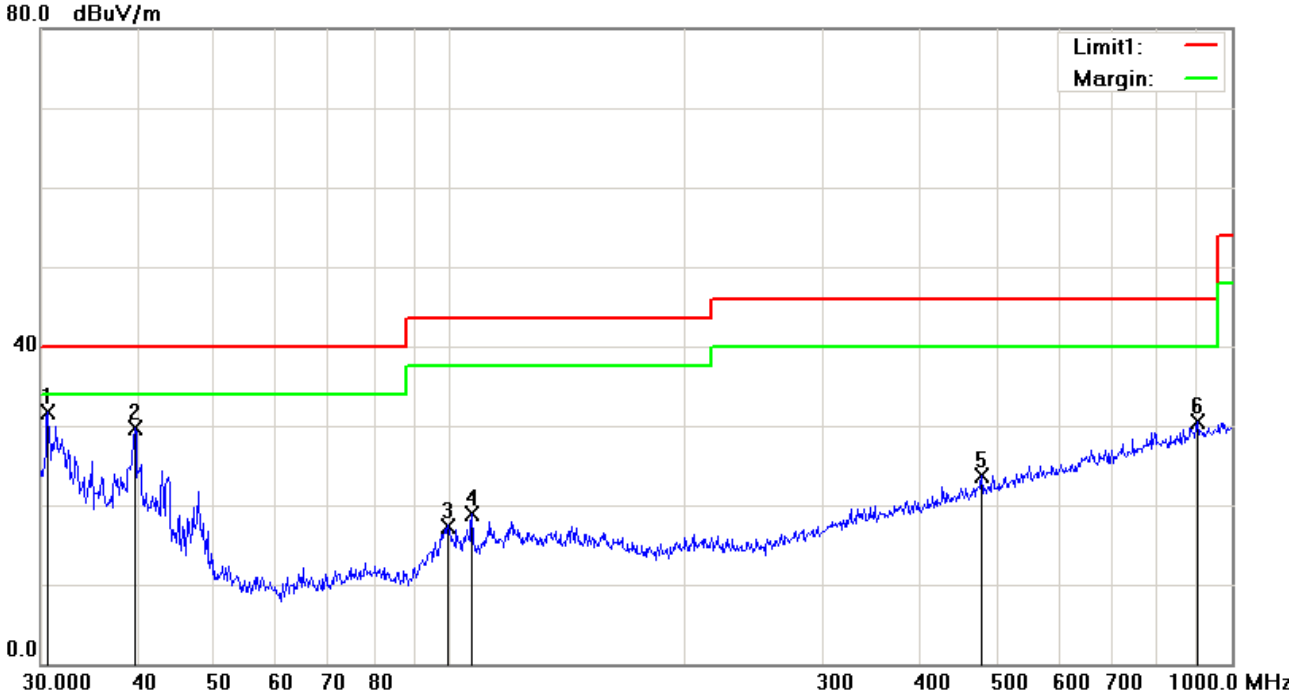
	over a full rotation of the EUT) was chosen. b. The EUT was then rotated to the direction that gave the maximum emission. c. Finally, the antenna height was adjusted to the height that gave the maximum emission. 3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz. 4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak measurement at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth with Peak detection for Average Measurement as below at frequency above 1GHz. ■ 1 kHz (Duty cycle < 98%) □ 10 Hz (Duty cycle > 98%) 5. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.
Remark	
Result	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Test Mode1:	Powered by Battery

Below 1GHz



Test Data

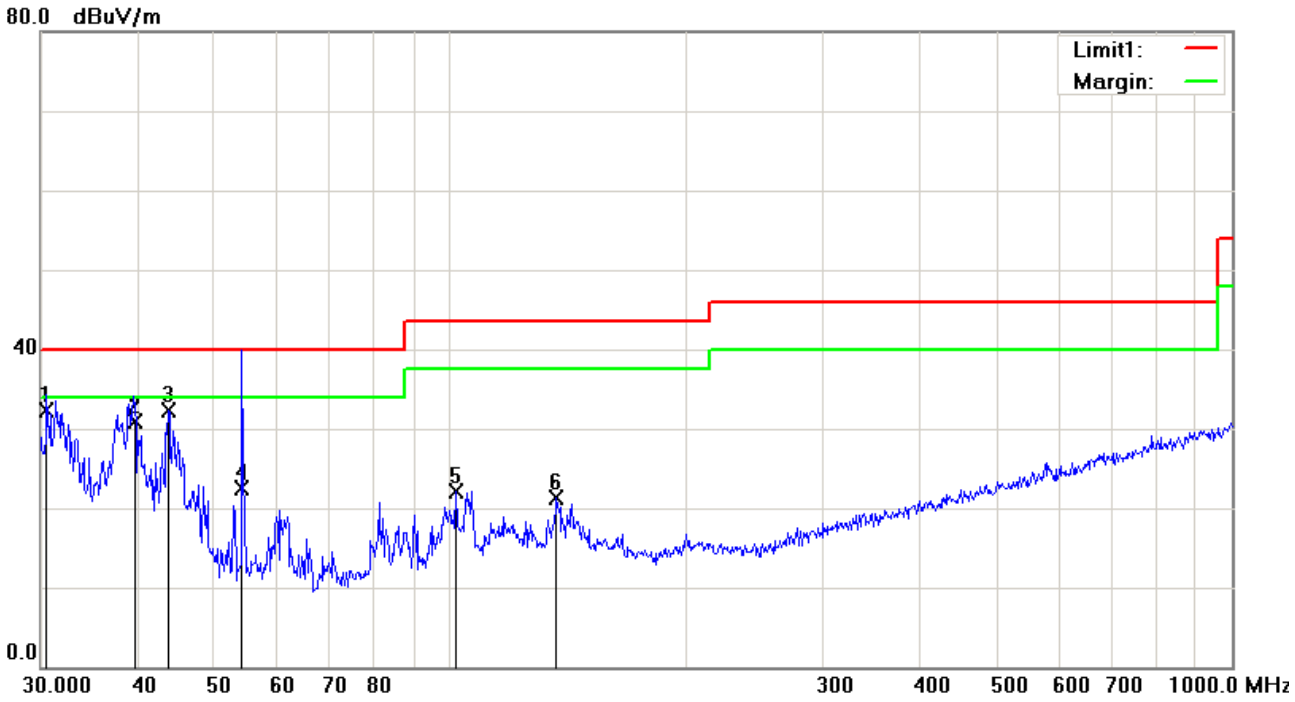
Horizontal Polarity Plot @3m

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree	Comment
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	( )	
1	H	30.6379	32.50	peak	-0.73	31.77	40.00	-8.23	151	0	
2	H	39.5757	36.92	peak	-7.28	29.64	40.00	-10.36	100	0	
3	H	99.5281	28.32	peak	-10.92	17.40	43.50	-26.10	100	358	
4	H	106.7587	28.46	peak	-9.60	18.86	43.50	-24.64	200	246	
5	H	478.8456	25.92	peak	-2.27	23.65	46.00	-22.35	100	177	
6	H	903.3094	25.69	peak	4.73	30.42	46.00	-15.58	100	192	

Above 1GHz

Note: The frequency that above 1GHz is mainly from the environment noise.

Below 1GHz



Test Data

Vertical Polarity Plot @3m

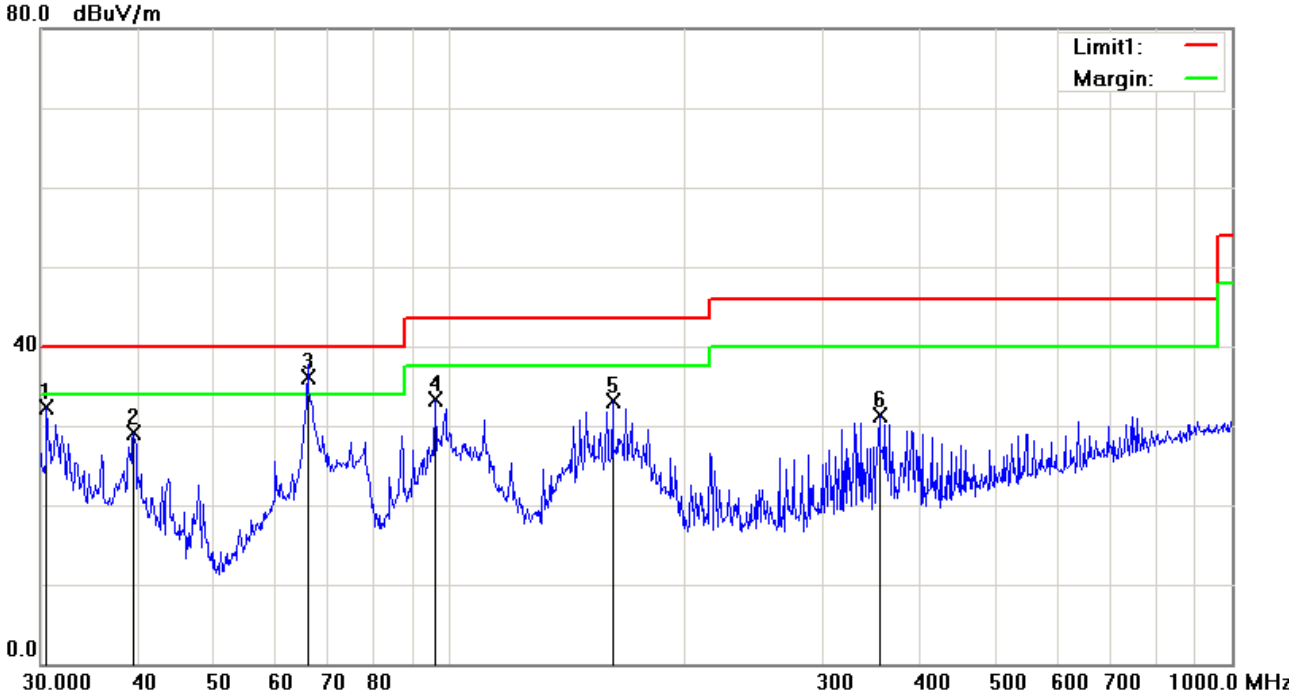
No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree	Comment
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	( )	
1	V	30.5306	32.87	QP	-0.66	32.21	40.00	-7.79	149	0	
2	V	39.6746	38.26	QP	-7.35	30.91	40.00	-9.09	100	351	
3	V	43.6585	42.42	peak	-10.04	32.38	40.00	-7.62	106	0	
4	V	53.9193	36.20	QP	-13.64	22.56	40.00	-17.44	100	216	
5	V	101.6443	32.67	peak	-10.50	22.17	43.50	-21.33	151	0	
6	V	136.9392	29.71	peak	-8.35	21.36	43.50	-22.14	100	340	

Above 1GHz

Note: The frequency that above 1GHz is mainly from the environment noise.

Test Mode2:	Powered by Adapter

Below 1GHz



Test Data

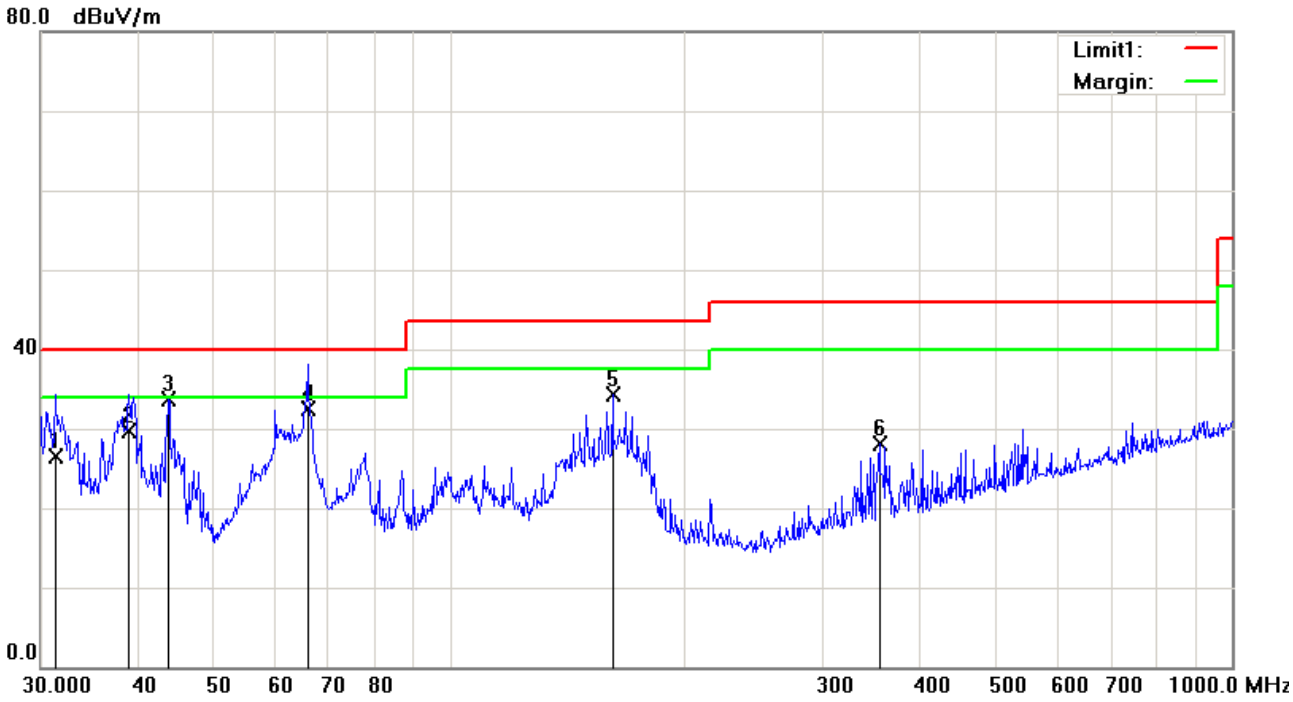
Horizontal Polarity Plot @3m

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree	Comment
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	( )	
1	H	30.5306	32.98	peak	-0.66	32.32	40.00	-7.68	145	0	
2	H	39.4372	36.23	peak	-7.18	29.05	40.00	-10.95	100	359	
3	H	65.8630	49.98	QP	-13.90	36.08	40.00	-3.92	214	317	
4	H	95.7622	45.21	peak	-11.93	33.28	43.50	-10.22	200	97	
5	H	161.4742	41.41	peak	-8.40	33.01	43.50	-10.49	200	108	
6	H	354.1831	36.65	peak	-5.36	31.29	46.00	-14.71	100	296	

Above 1GHz

Note: The frequency that above 1GHz is mainly from the environment noise.

Below 1GHz



Test Data

Vertical Polarity Plot @3m

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree	Comment
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	( )	
1	V	31.2893	27.80	QP	-1.20	26.60	40.00	-13.40	200	149	
2	V	38.8879	36.48	QP	-6.78	29.70	40.00	-10.30	100	175	
3	V	43.6585	43.73	peak	-10.04	33.69	40.00	-6.31	121	0	
4	V	65.8031	46.40	QP	-13.90	32.50	40.00	-7.50	100	281	
5	V	161.4742	42.61	peak	-8.40	34.21	43.50	-9.29	100	243	
6	V	354.1831	33.45	peak	-5.36	28.09	46.00	-17.91	100	182	

Above 1GHz

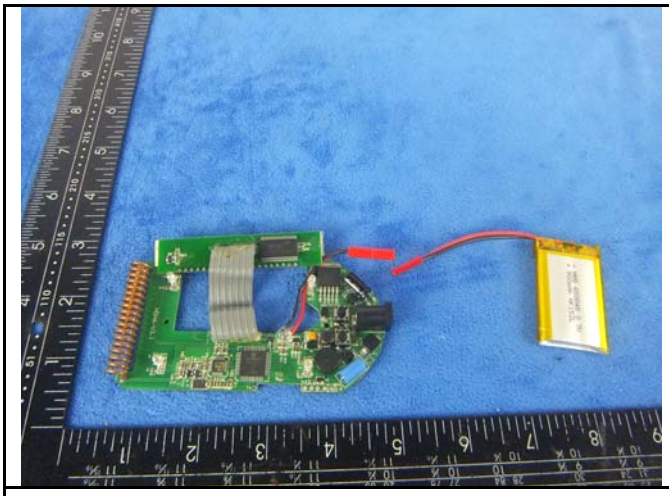
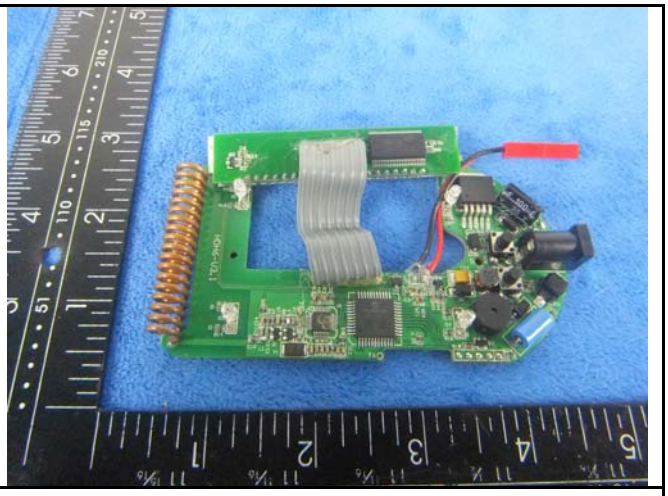
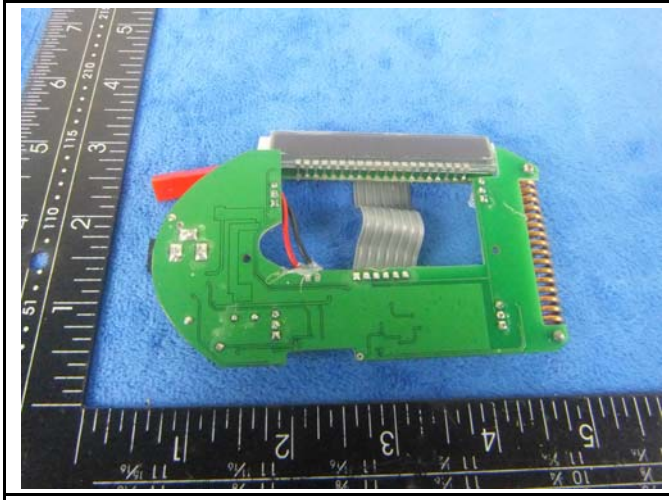
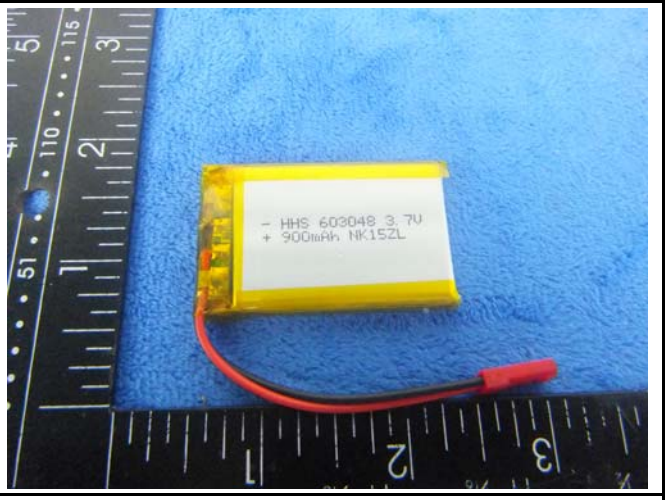
Note: The frequency that above 1GHz is mainly from the environment noise.

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted Emissions					
EMI test receiver	ESCS30	8471241027	09/18/2014	09/17/2015	☑
Line Impedance Stabilization Network	LI-125A	191106	09/26/2014	09/25/2015	☑
Line Impedance Stabilization Network	LI-125A	191107	09/26/2014	09/25/2015	☑
LISN	ISN T800	34373	09/26/2014	09/25/2015	☑
Transient Limiter	LIT-153	531118	09/02/2014	09/01/2015	☑
Radiated Emissions					
EMI test receiver	ESL6	100262	09/18/2014	09/17/2015	☑
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/02/2014	09/01/2015	☑
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/25/2015	03/24/2016	☑
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/22/2014	09/21/2015	☑
Double Ridge Horn Antenna	AH-118	71259	09/25/2014	09/24/2015	☑

Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT Photo

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Whole Package - Top View</td><td>EUT - Front View</td></tr>
<tr><td>  </td><td> 
</td></tr>
<tr><td>EUT - Rear View</td><td>Battery - Top View</td></tr>
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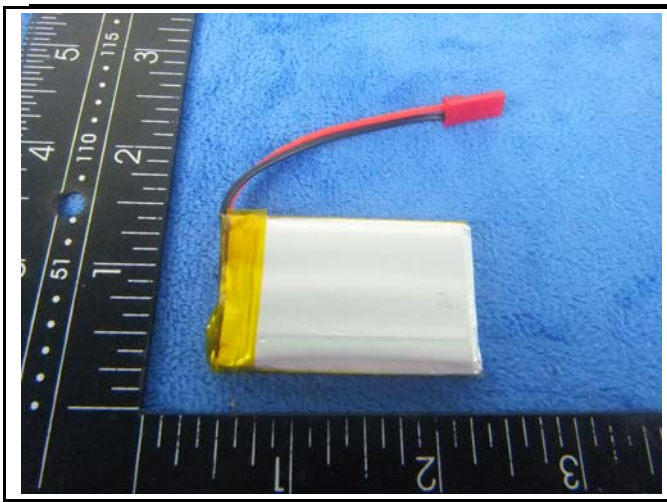
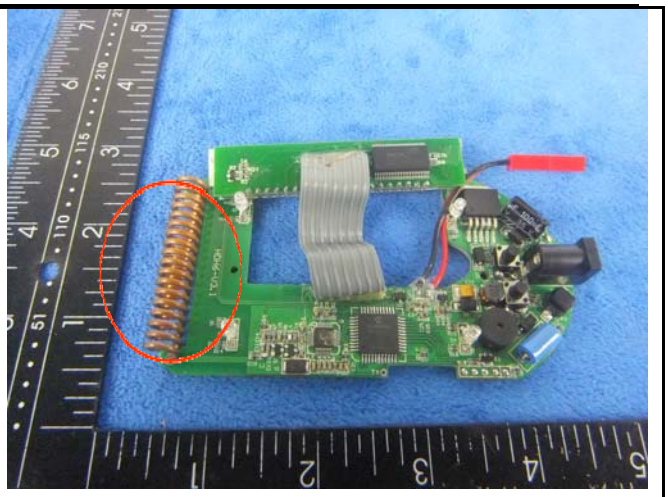
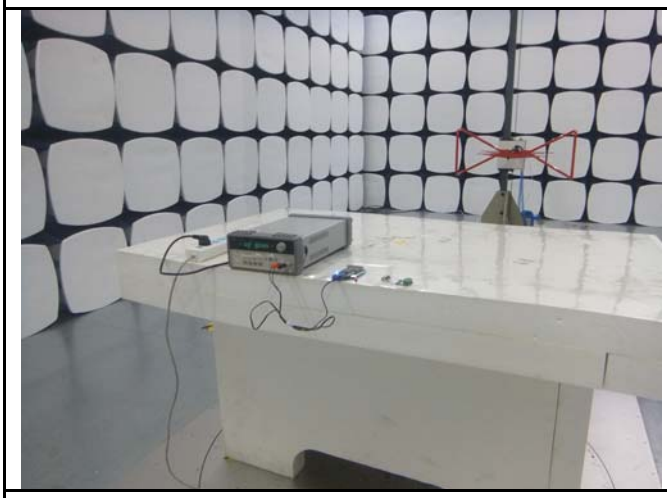
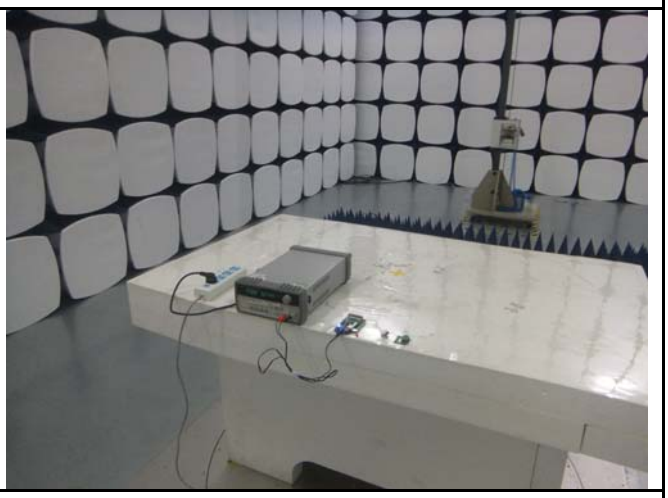
	
Battery - Bottom View	Antenna-View

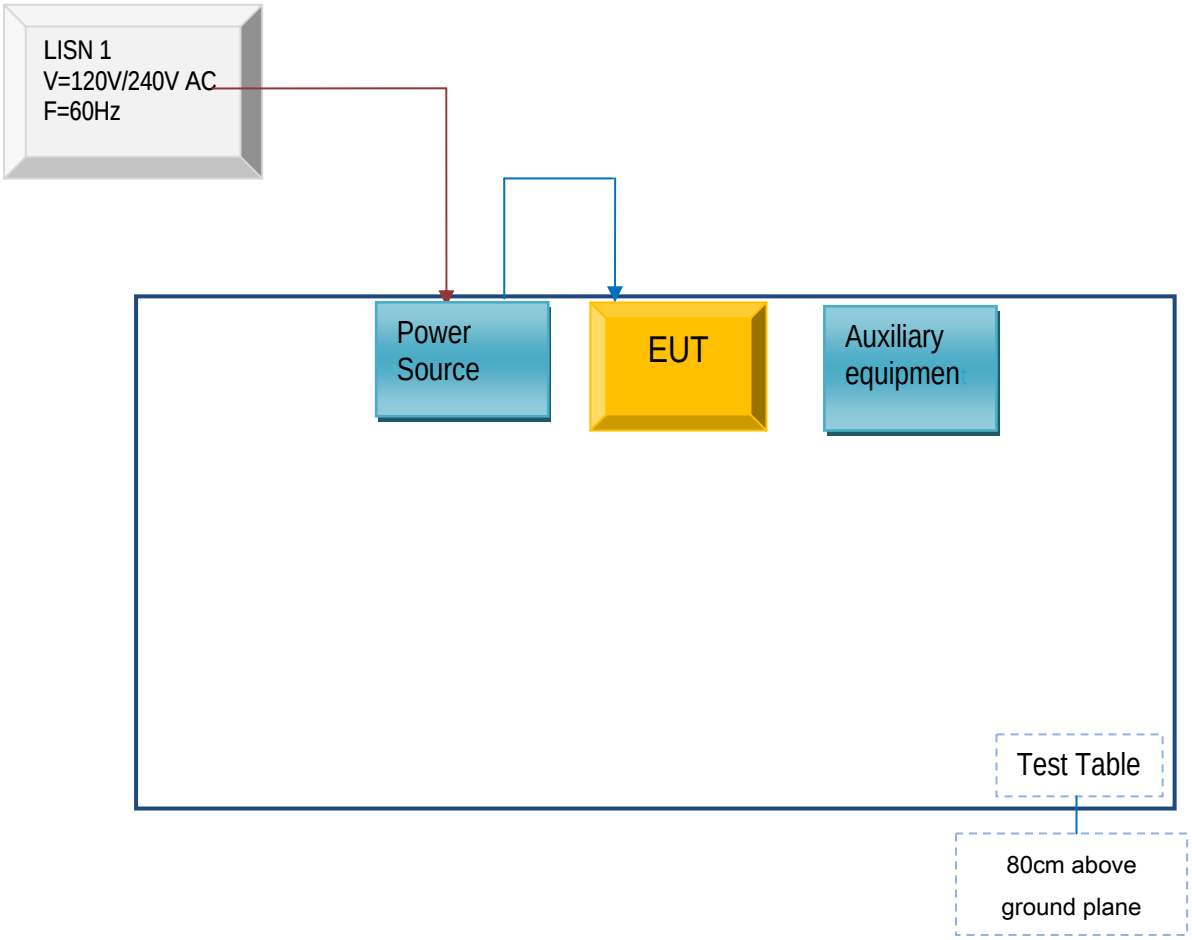
Annex B.iii. Photograph: Test Setup Photo

	
Conducted Emissions Test Setup – Front View	Conducted Emissions Test Setup – Side View
	
Radiated Spurious Emissions Test Setup Below 1GHz	Radiated Spurious Emissions Test Setup Above 1GHz
	
Radiated Spurious Emissions Test Setup Below 1GHz (Battery Mode)	Radiated Spurious Emissions Test Setup Above 1GHz(Battery Mode)

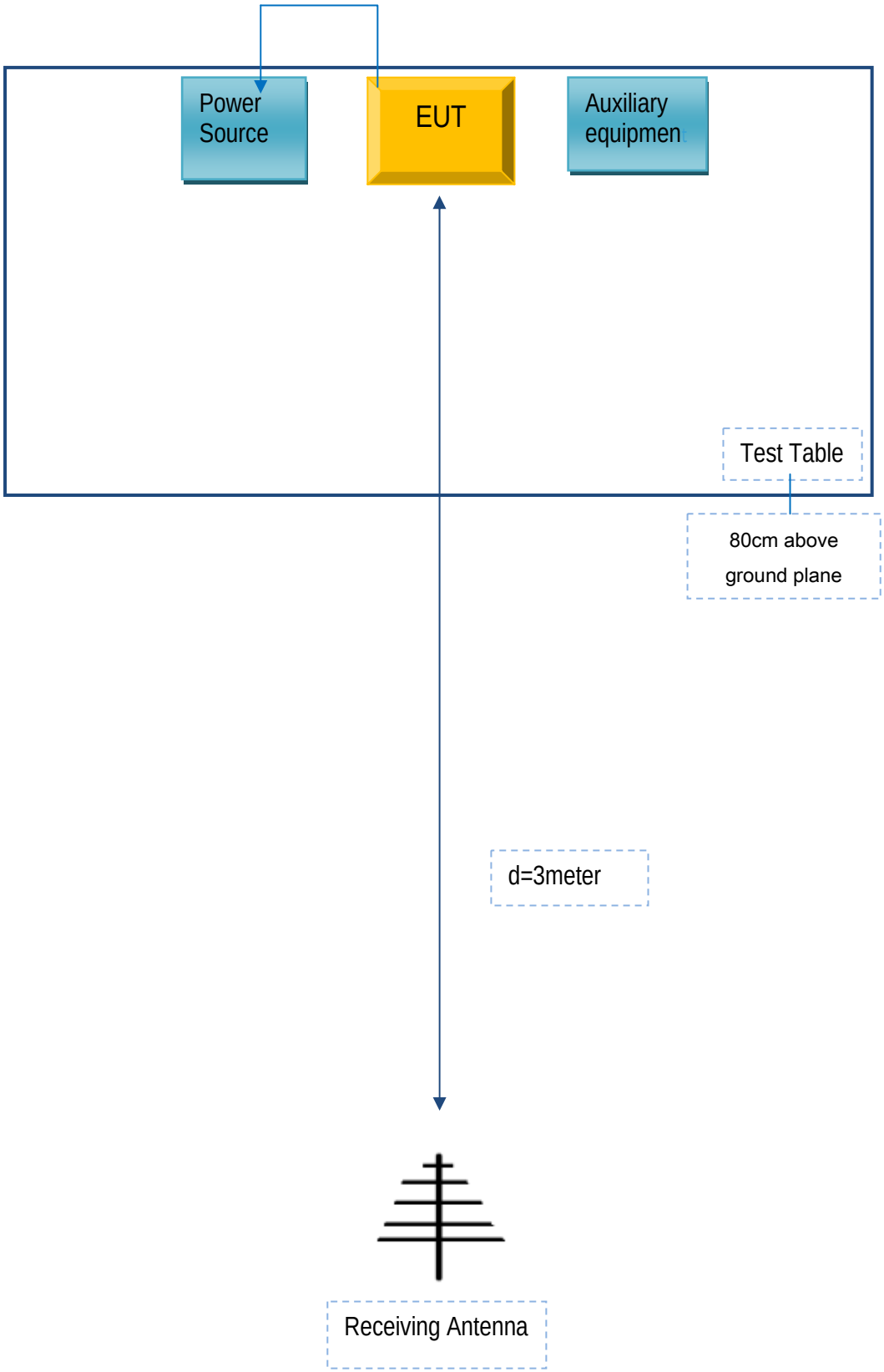
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

Block Configuration Diagram for Conducted Emissions



Block Configuration Diagram for Radiated Emissions



Annex C. il. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

Manufacturer	Equipment Description	Model	Calibration Date	Calibration Due Date
Agilent	DC Power Source	E3640A	N/A	N/A
Xiamen Highdart Electronic Information Co.,LTD.	Wireless Tire Pressure Sensor	TPMS-S1	N/A	N/A

Annex D. User Manual / Block Diagram / Schematics / Partlist

Please see Attachment

Annex E. DECLARATION OF SIMILARITY

Xiamen Highdart Electronic Information Co.,LTD.

To: 775 Montague Expressway Mlpitas,CA 95035,USA

Declaration Letter

Dear Sir,

For our business issue and marketing requirement, we would like to list 6 model numbers on The FCC reports, as following:

Model No.: TPMS-H6、TPMS-H5 、TPMS-H7、TPMS-H8、TPMS-H9、TPMS-10

We declare that : TPMS-H6、TPMS-H5 、TPMS-H7、TPMS-H8、TPMS-H9、TPMS-10, All models the same PCB and Appearance shape, accessories ,the difference of these is listed as below:

Main Model No	Serial Model No	Difference
TPMS-H6	TPMS-H5 、TPMS-H7 、TPMS-H8 、TPMS-H9 、TPMS-10	The model No. are different

Thank you!

Sincerely,

Client's signature: Ji Xiaowu

Client's name / title: Ji Xiaowu Manager

Contact information : 0592-5581851

Address : Room N403A Weiye Building,Pioneer Park,Torch High-Tech Zone,Xiamen,China