

# FCC REPORT

**Applicant:** Likk Technologies Inc.

**Address of Applicant:** 16112 NW 13 Ave. Suite A Miami, Florida 33169 USA.

**Equipment Under Test (EUT)**

**Product Name:** Water leak alarm

**Model No.:** S5

**FCC ID:** 2AWC7S5

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart B

**Date of sample receipt:** 25 May, 2020

**Date of Test:** 26 May, to 28 Jul., 2020

**Date of report issued:** 29 Jul., 2020

**Test Result:** PASS \*

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Bruce Zhang  
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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## 2 Version

Version No.	Date	Description
00	29 Jul., 2020	Original

Tested by:



Test Engineer

Date:

29 Jul., 2020

Reviewed by:



Project Engineer

Date:

29 Jul., 2020

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## 4 Test Summary

Test Item	Section in CFR 47	Result
Conducted Emission	Part 15.107	Pass
Radiated Emission	Part 15.109	Pass
<b>Remark:</b>		
1. Pass: The EUT complies with the essential requirements in the standard. 2. N/A: The EUT not applicable of the test item.		
Test Method:	ANSI C63.4:2014	

## 5 General Information

### 5.1 Client Information

Applicant:	Likk Technologies Inc.
Address:	16112 NW 13 Ave. Suite A Miami, Florida 33169 USA.
Manufacturer:	Shenzhen Hengxin Wulian Technology Co., Ltd.
Address:	2nd Floor, Building 2, Longfeng Industrial Park, Guanlantian, Longhua District, Shenzhen

### 5.2 General Description of E.U.T.

Product Name:	Water leak alarm
Model No.:	S5
Power supply:	Rechargeable Li-ion Battery DC3.7V-1000mAh
AC adapter:	Model: HX12H-1201000-AU-001 Input: AC100-240V, 50/60Hz, 0.5A Output: DC 12.0V, 1000mA
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

### 5.3 Test Mode and test samples plans

Operating mode	Detail description
Working mode	Keep the EUT in Working mode

The sample was placed 0.8m 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 are shown in Test Results of the following pages.

### 5.4 Measurement Uncertainty

Parameters	Expanded Uncertainty
Conducted Emission (9kHz ~ 30MHz)	±1.60 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	±3.12 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.32 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.16 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±3.20 dB (k=2)

## 5.5 Description of Support Units

N/A

## 5.6 Related Submittal(s) / Grant (s)

This is an original grant, no related submittals and grants.

## 5.7 Description of Cable Used

N/A

## 5.8 Additions to, deviations, or exclusions from the method

No

## 5.9 Laboratory Facility

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

● **FCC - Designation No.: CN1211**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

● **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

● **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <https://portal.a2la.org/scopepdf/4346-01.pdf>

## 5.10 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.

Address: No.110~116, Building B, Jinyuan Business Building, Xixiang Road,

Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755-23118282, Fax: +86-755-23116366

Email: [info@ccis-cb.com](mailto:info@ccis-cb.com), Website: <http://www.ccis-cb.com>

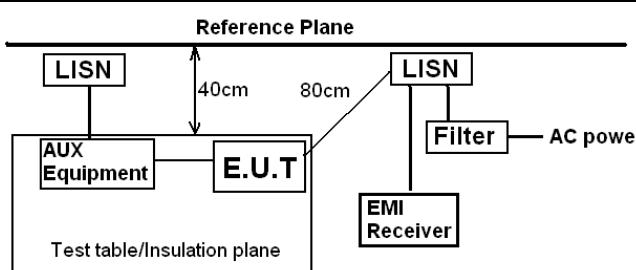
## 5.11 Test Instruments list

Radiated Emission:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	SAEMC	9m*6m*6m	966	07-22-2017	07-21-2020
				07-22-2020	07-21-2023
Loop Antenna	SCHWARZBECK	FMZB1519B	00044	03-07-2020	03-06-2021
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-07-2020	03-06-2021
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-07-2020	03-06-2021
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-22-2017	06-21-2020
				06-22-2020	06-21-2021
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170582	11-18-2019	11-17-2020
EMI Test Software	AUDIX	E3	Version: 6.110919b		
Pre-amplifier	HP	8447D	2944A09358	03-07-2020	03-06-2021
Pre-amplifier	CD	PAP-1G18	11804	03-07-2020	03-06-2021
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-05-2020	03-04-2021
Spectrum analyzer	Rohde & Schwarz	FSP40	100363	11-18-2019	11-17-2020
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-05-2020	03-04-2021
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-07-2020	03-06-2021
Cable	MICRO-COAX	MFR64639	K10742-5	03-07-2020	03-06-2021
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-07-2020	03-06-2021

Conducted Emission:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
EMI Test Receiver	Rohde & Schwarz	ESCI	101189	03-05-2020	03-04-2021
Pulse Limiter	SCHWARZBECK	OSRAM 2306	9731	03-05-2020	03-04-2021
LISN	CHASE	MN2050D	1447	03-05-2020	03-04-2021
LISN	Rohde & Schwarz	ESH3-Z5	8438621/010	07-21-2017	07-20-2020
				07-21-2020	07-20-2021
Cable	HP	10503A	N/A	03-05-2020	03-04-2021
EMI Test Software	AUDIX	E3	Version: 6.110919b		

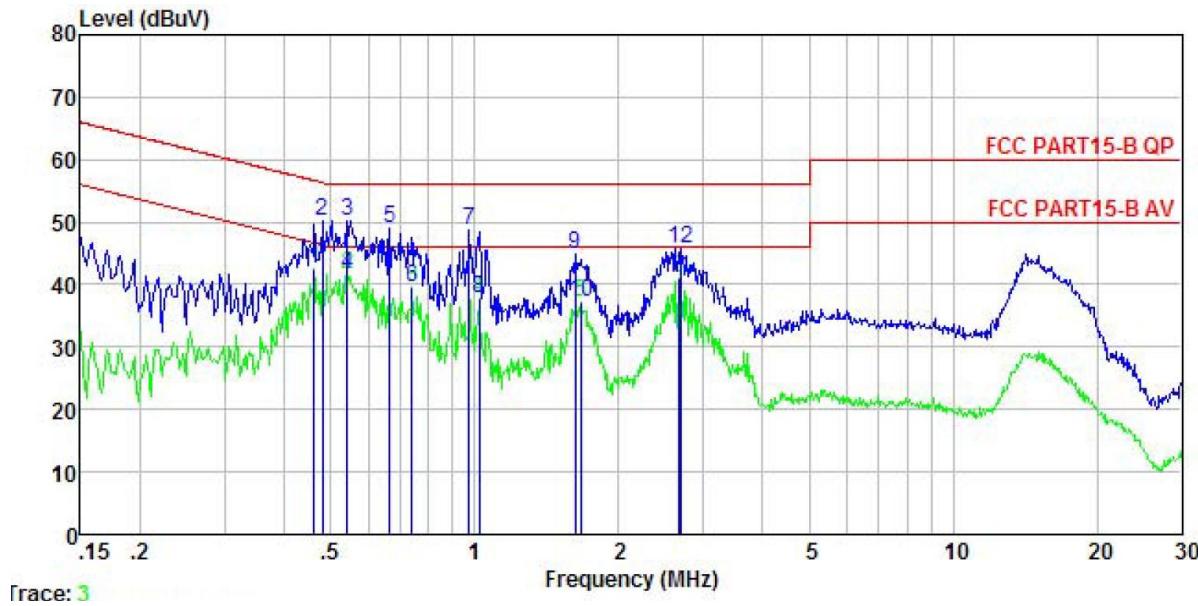
## 6 Test results and Measurement Data

### 6.1 Conducted Emission

Test Requirement:	FCC Part 15 B Section 15.107		
Test Frequency Range:	150kHz to 30MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9kHz, VBW=30kHz		
Limit:	Frequency range (MHz)		Limit (dB $\mu$ V)
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	0.5-30	60	50
* Decreases with the logarithm of the frequency.			
Test setup:	 <p><i>Remark:</i>  <i>E.U.T. Equipment Under Test</i>  <i>LISN: Line Impedance Stabilization Network</i>  <i>Test table height=0.8m</i></p>		
Test procedure	<ol style="list-style-type: none"> <li>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). They provide a 50ohm/50uH coupling impedance for the measuring equipment.</li> <li>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).</li> <li>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 C63.4(latest version) on conducted measurement.</li> </ol>		
Test Instruments:	Refer to section 5.11 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Pass		

## Measurement data:

<b>Product name:</b>	Water leak alarm	<b>Product model:</b>	S5
<b>Test by:</b>	YT	<b>Test mode:</b>	Working mode
<b>Test frequency:</b>	150 kHz ~ 30 MHz	<b>Phase:</b>	Line
<b>Test voltage:</b>	AC 120 V/60 Hz	<b>Environment:</b>	Temp: 22.5°C Huni: 55%

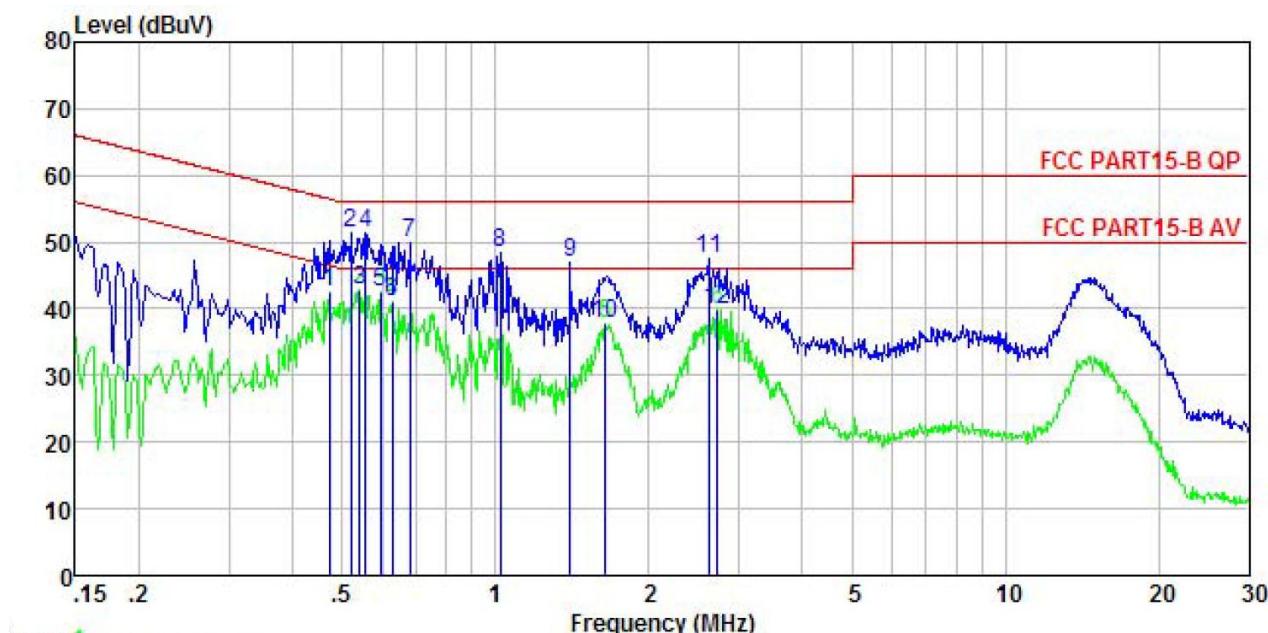


Freq	Read	LISN	Aux	Cable	Limit	Over	Remark	
	MHz	dBuV	dB	dB		dBuV		
1	0.461	32.23	-0.45	-0.06	10.74	42.46	46.67	-4.21 Average
2	0.481	40.19	-0.44	-0.24	10.75	50.26	56.32	-6.06 QP
3	0.541	40.28	-0.45	-0.36	10.76	50.23	56.00	-5.77 QP
4	0.541	31.75	-0.45	-0.36	10.76	41.70	46.00	-4.30 Average
5	0.665	39.12	-0.51	-0.39	10.77	48.99	56.00	-7.01 QP
6	0.739	29.59	-0.54	-0.28	10.79	39.56	46.00	-6.44 Average
7	0.974	38.19	-0.61	0.38	10.86	48.82	56.00	-7.18 QP
8	1.021	27.23	-0.62	0.44	10.87	37.92	46.00	-8.08 Average
9	1.619	34.54	-0.54	-0.08	10.93	44.85	56.00	-11.15 QP
10	1.662	26.86	-0.54	-0.11	10.94	37.15	46.00	-8.85 Average
11	2.664	30.68	-0.45	-0.24	10.93	40.92	46.00	-5.08 Average
12	2.707	35.53	-0.45	-0.24	10.93	45.77	56.00	-10.23 QP

## Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss.

<b>Product name:</b>	Water leak alarm	<b>Product model:</b>	S5
<b>Test by:</b>	YT	<b>Test mode:</b>	Working mode
<b>Test frequency:</b>	150 kHz ~ 30 MHz	<b>Phase:</b>	Neutral
<b>Test voltage:</b>	AC 120 V/60 Hz	<b>Environment:</b>	Temp: 22.5°C Huni: 55%

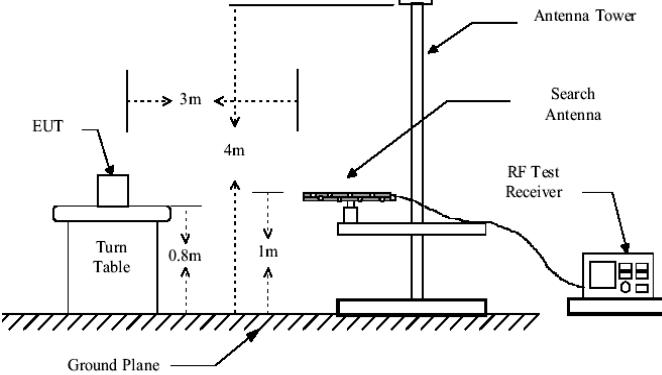
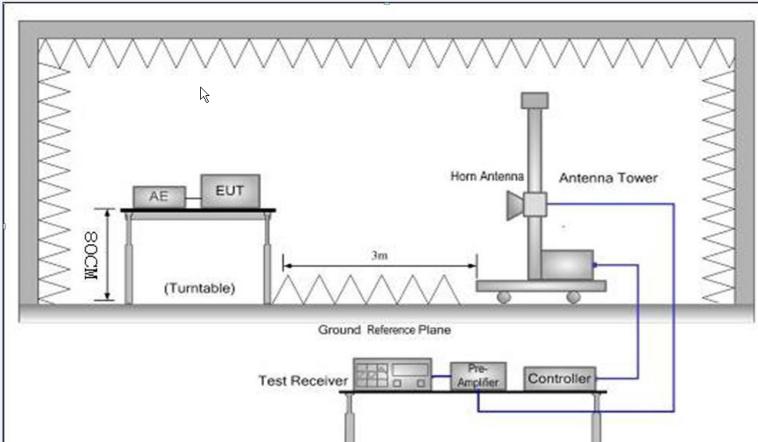


Freq	Read	LISN	Aux	Cable	Limit	Over		
	Level	Factor	Factor	Loss	Level	Line	Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB
1	0.471	32.33	-0.64	0.01	10.75	42.45	46.49	-4.04 Average
2	0.521	41.27	-0.65	0.03	10.76	51.41	56.00	-4.59 QP
3	0.541	32.55	-0.65	0.03	10.76	42.69	46.00	-3.31 Average
4	0.555	41.14	-0.65	0.03	10.76	51.28	56.00	-4.72 QP
5	0.595	32.42	-0.64	0.04	10.77	42.59	46.00	-3.41 Average
6	0.627	30.90	-0.64	0.04	10.77	41.07	46.00	-4.93 Average
7	0.679	39.60	-0.64	0.04	10.77	49.77	56.00	-6.23 QP
8	1.021	38.09	-0.68	0.08	10.87	48.36	56.00	-7.64 QP
9	1.403	36.58	-0.69	0.12	10.91	46.92	56.00	-9.08 QP
10	1.645	27.48	-0.70	0.14	10.93	37.85	46.00	-8.15 Average
11	2.622	36.96	-0.67	0.27	10.93	47.49	56.00	-8.51 QP
12	2.721	29.43	-0.66	0.28	10.93	39.98	46.00	-6.02 Average

### Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + IISN Factor + Cable Loss.

## 6.2 Radiated Emission

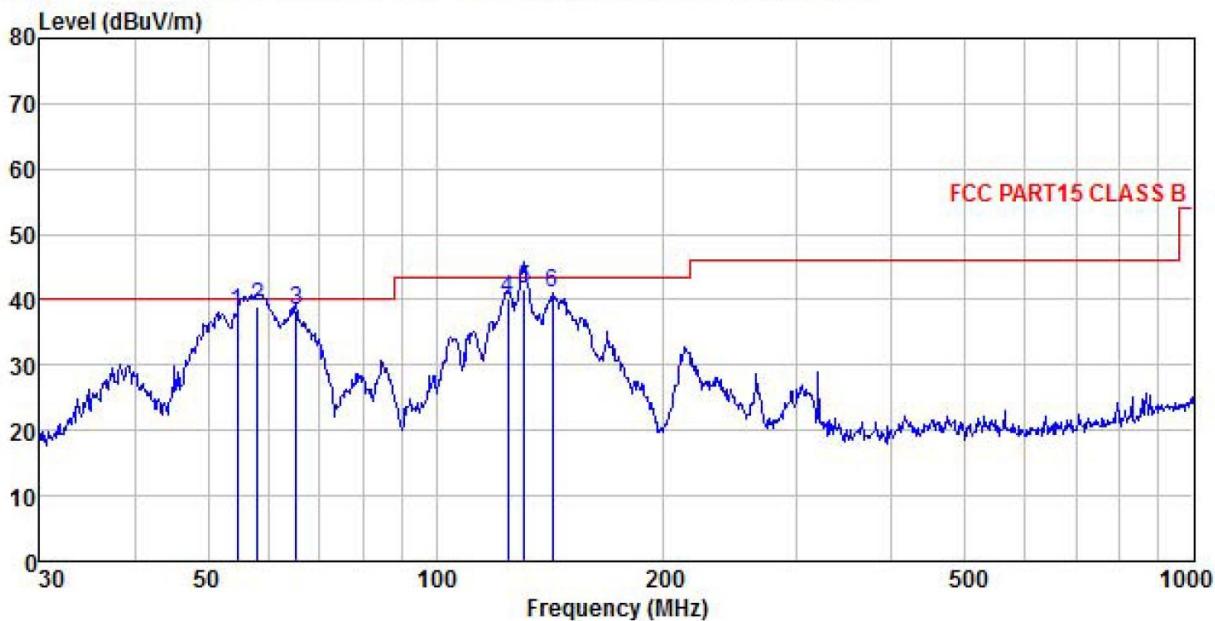
Test Requirement:	FCC Part 15 B Section 15.109													
Test Frequency Range:	30MHz to 6000MHz													
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)													
Receiver setup:	Frequency	Detector	RBW	VBW	Remark									
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value									
	Above 1GHz	Peak	1MHz	3MHz	Peak Value									
Limit:	RMS	1MHz	3MHz	Average	Value									
	Frequency	Limit (dBuV/m @3m)		Remark										
	30MHz-88MHz	40.0		Quasi-peak Value										
	88MHz-216MHz	43.5		Quasi-peak Value										
	216MHz-960MHz	46.0		Quasi-peak Value										
	960MHz-1GHz	54.0		Quasi-peak Value										
Test setup:	Above 1GHz													
	Below 1GHz													
														
														
Test Procedure:	<ol style="list-style-type: none"> <li>The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>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 the measurement.</li> </ol>													

	<ol style="list-style-type: none"><li>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.</li><li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li><li>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.</li></ol>
Test Instruments:	Refer to section 5.11 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Remark:	All of the observed value above 6GHz were the noise floor , which were not recorded

## Measurement Data:

## Below 1GHz:

Product Name:	Water leak alarm	Product Model:	S5
Test By:	YT	Test mode:	Working mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	AC 120/60Hz	Environment:	Temp: 24°C Huni: 57%

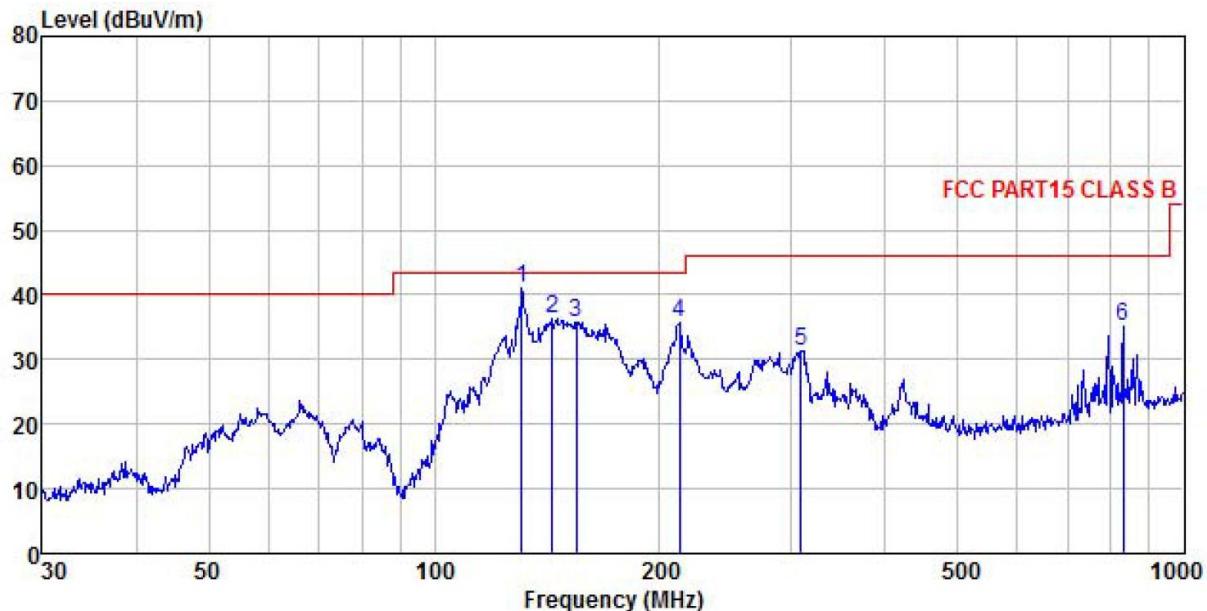


Freq	Read	Antenna	Cable	Aux	Preamp	Limit	Over	Line	Limit	Remark
	Freq	Level	Factor	Loss	Factor					
1	54.643	56.14	11.44	0.41	0.00	29.80	38.19	40.00	-1.81	
2	58.203	57.22	10.98	0.42	0.00	29.78	38.84	40.00	-1.16	
3	65.343	57.89	9.83	0.43	0.00	29.76	38.39	40.00	-1.61	
4	124.569	57.64	11.34	0.58	0.00	29.36	40.20	43.50	-3.30	
5	130.837	58.38	12.11	0.59	0.00	29.32	41.76	43.50	-1.74	
6	142.324	55.74	13.85	0.60	0.00	29.26	40.93	43.50	-2.57	

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. The Aux Factor is a notch filter switch box loss, this item is not used.

<b>Product Name:</b>	Water leak alarm	<b>Product Model:</b>	S5
<b>Test By:</b>	YT	<b>Test mode:</b>	Working mode
<b>Test Frequency:</b>	30 MHz ~ 1 GHz	<b>Polarization:</b>	Horizontal
<b>Test Voltage:</b>	AC 120/60Hz	<b>Environment:</b>	Temp: 24°C Huni: 57%



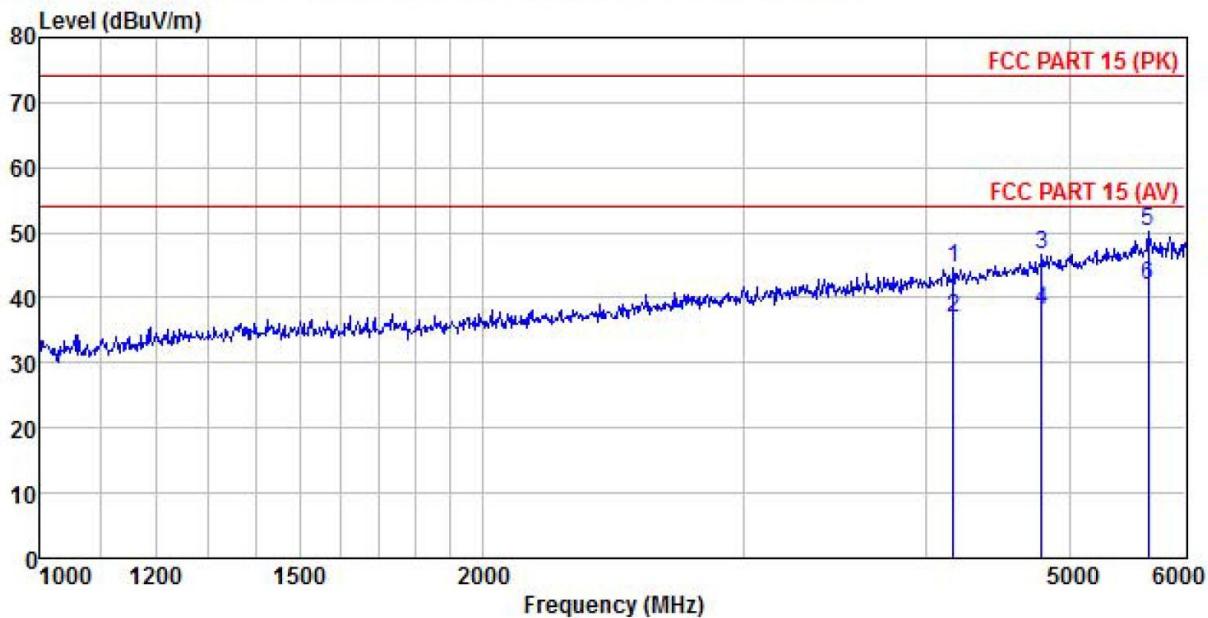
Freq	Read Antenna Level Factor		Cable Loss	Aux Factor	Preamp Factor	Level	Limit Line	Over Limit	Over Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	130.837	57.51	12.11	0.59	0.00	29.32	40.89	43.50	-2.61 QP
2	143.830	51.18	13.88	0.61	0.00	29.25	36.42	43.50	-7.08 QP
3	154.821	49.97	14.40	0.62	0.00	29.18	35.81	43.50	-7.69 QP
4	212.270	45.46	18.35	0.73	0.00	28.75	35.79	43.50	-7.71 QP
5	308.913	40.15	18.72	0.87	0.00	28.47	31.27	46.00	-14.73 QP
6	830.400	40.70	21.21	1.42	0.00	28.08	35.25	46.00	-10.75 QP

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. The Aux Factor is a notch filter switch box loss, this item is not used.

## Above 1GHz:

<b>Product Name:</b>	Water leak alarm	<b>Product Model:</b>	S5
<b>Test By:</b>	YT	<b>Test mode:</b>	Working mode
<b>Test Frequency:</b>	1 GHz ~ 6 GHz	<b>Polarization:</b>	Vertical
<b>Test Voltage:</b>	AC 120/60Hz	<b>Environment:</b>	Temp: 24°C Huni: 57%

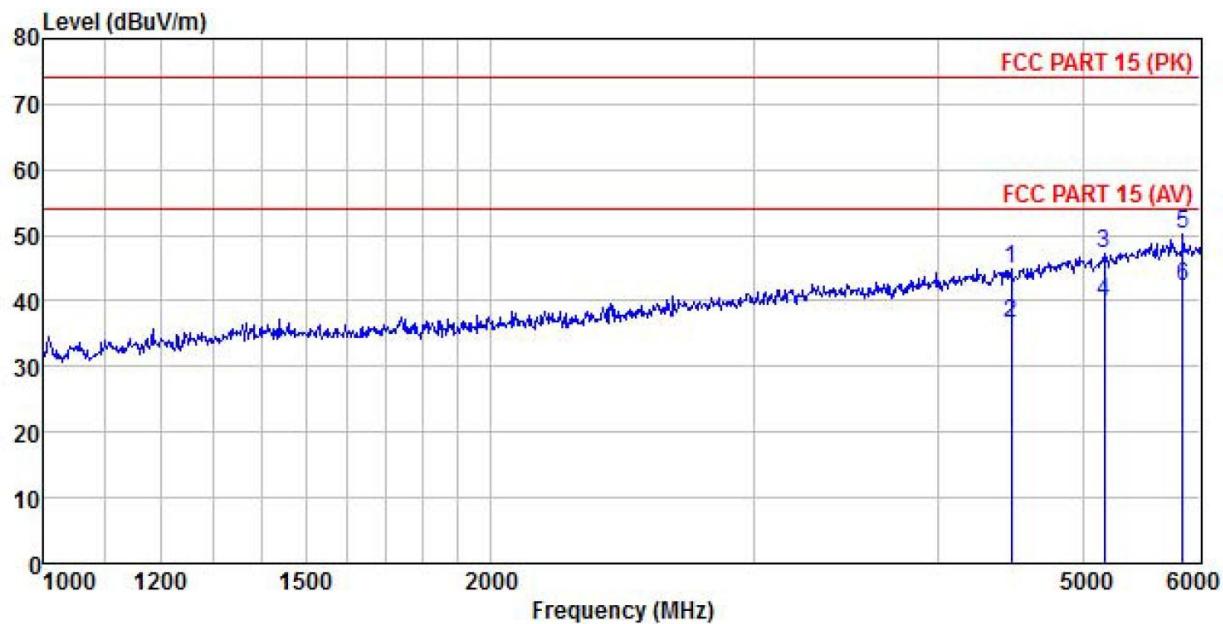


Freq	Read	Antenna	Cable	Aux	Preamp	Limit	Over	Line	Limit	Remark
	Freq	Level	Factor	Loss	Factor					
MHz	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	4170.485	48.50	29.58	5.90	2.26	41.81	44.43	74.00	-29.57	Peak
2	4170.485	40.93	29.58	5.90	2.26	41.81	36.86	54.00	-17.14	Average
3	4787.449	48.88	30.75	6.39	2.44	41.83	46.63	74.00	-27.37	Peak
4	4787.449	40.33	30.75	6.39	2.44	41.83	38.08	54.00	-15.92	Average
5	5655.516	49.87	32.36	7.07	2.70	41.85	50.15	74.00	-23.85	Peak
6	5655.516	41.74	32.36	7.07	2.70	41.85	42.02	54.00	-11.98	Average

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

<b>Product Name:</b>	Water leak alarm	<b>Product Model:</b>	S5
<b>Test By:</b>	YT	<b>Test mode:</b>	Working mode
<b>Test Frequency:</b>	1 GHz ~ 6 GHz	<b>Polarization:</b>	Horizontal
<b>Test Voltage:</b>	AC 120/60Hz	<b>Environment:</b>	Temp: 24°C Huni: 57%



Freq MHz	ReadAntenna		Cable Loss	Aux Factor	Preamp Factor	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Remark
	Freq MHz	Level dBuV	Factor						
1 4472.336	48.53	30.06	6.11	2.34	42.03	45.01	74.00	-28.99	Peak
2 4472.336	40.14	30.06	6.11	2.34	42.03	36.62	54.00	-17.38	Average
3 5170.883	48.48	31.57	6.71	2.55	41.94	47.37	74.00	-26.63	Peak
4 5170.883	40.95	31.57	6.71	2.55	41.94	39.84	54.00	-14.16	Average
5 5840.889	49.75	32.44	7.16	2.75	42.03	50.07	74.00	-23.93	Peak
6 5840.889	41.92	32.44	7.16	2.75	42.03	42.24	54.00	-11.76	Average

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.