

RF TEST REPORT



Report No.: 17071118-FCC-R

Supersede Report No.: N/A

Applicant	Shenzhen Youyuanhongye Electronic Co., Ltd.	
Product Name	Wireless Mouse	
Main Model	SPK7211	
Serial Model	SPK7211W, SPK7211B, SPK7211P, SPK7322, SPK7211PS, SPK7221B, SPK7221W, SPK7211BSC, SPK7402W, SPK7402B, SPK7402WS, SPK7402BS, SPK7211WSC, SPT6501W, SPT6501B, SPT6501BS, SPT6602, W1020, W1080, W1040, W1050, MW291, MW286, MW287, MW692, W1040X, GMW201, GW103, GW102-Pro, GW101-Pro, GW104, CW1260, CW6262, CW1261, MW2027, MW2082, MW2091, MW2022, MW2093, M2082, M2032, M2088, MW2032, M2108, M2022, M2087, M2030, MW2088, MW2092, MW2030, M2106.	
Test Standard	FCC Part 15.249: 2016; ANSI C63.10: 2013	
Test Date	October 21 to 30, 2017	
Issue Date	October 31, 2017	
Test Result	☒ Pass ☐ Fail	
Equipment complied with the specification	☒	
Equipment did not comply with the specification	☐	
Loren Luo Test Engineer	David Huang Checked By	
This test report may be reproduced in full only 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

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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
17071118-FCC-R	NONE	Original	October 31, 2017

2. Customer information

Applicant Name	Shenzhen Youyuanhongye Electronic Co., Ltd.
Applicant Add	Building 18, 4th Area, Huaidecuigang Industrial Park, Fuyong Street, Baoan District, Shenzhen City, P.R.China
Manufacturer	Shenzhen Youyuanhongye Electronic Co., Ltd.
Manufacturer Add	Building 18, 4th Area, Huaidecuigang Industrial Park, Fuyong Street, Baoan District, Shenzhen City, P.R.China

3. Test site information

Test Lab A:

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.	535293
IC Test Site No.	4842E-1
Test Software	Radiated Emission Program-To Shenzhen v2.0

Test Lab B:

Lab performing tests	SIEMIC (Nanjing-China) Laboratories
Lab Address	2-1 Longcang Avenue Yuhua Economic and Technology Development Park, Nanjing, China
FCC Test Site No.	694825
IC Test Site No.	4842B-1
Test Software	EZ_EMG(ver.lcp-03A1)

Note: We just perform Radiated Spurious Emission above 18GHz in the test Lab. B.

4. Equipment under Test (EUT) Information

Description of EUT:	Wireless Mouse
Main Model:	SPK7211
Serial Model:	SPK7211W, SPK7211B, SPK7211P, SPK7322, SPK7211PS, SPK7221B, SPK7221W, SPK7211BSC, SPK7402W, SPK7402B, SPK7402WS, SPK7402BS, SPK7211WSC, SPT6501W, SPT6501B, SPT6501BS, SPT6602, W1020, W1080, W1040, W1050, MW291, MW286, MW287, MW692, W1040X, GMW201, GW103, GW102-Pro, GW101-Pro, GW104, CW1260, CW6262, CW1261, MW2027, MW2082, MW2091, MW2022, MW2093, M2082, M2032, M2088, MW2032, M2108, M2022, M2087, M2030, MW2088, MW2092, MW2030, M2106.
Date EUT received:	October 20, 2017
Test Date(s):	October 21 to 30, 2017
Antenna Gain:	0 dBi
Antenna Type:	PCB antenna
Power:	75.58dB
Type of Modulation:	GFSK
RF Operating Frequency (ies):	2402-2480MHz
Number of Channels:	16CH
Input Power:	DC 1.5V
Trade Name :	N/A
FCC ID:	2AN4H-SPK7211

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
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.249(a), §15.249(d)	Radiated Fundamental / Radiated Spurious Emissions	Compliance
§15.249(a)	Field Strength Measurement	Compliance
§15.249©	20 dB Bandwidth	Compliance
§15.249(d)	Band Edge	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 Antenna Requirement

Standard Requirement:

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.
- c. Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

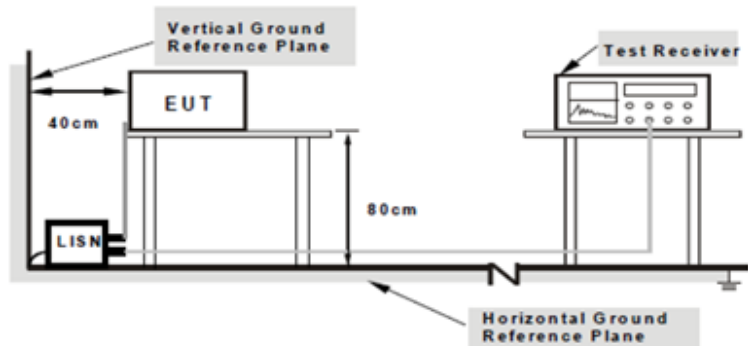
Antenna Connector Construction

A permanently attached PCB antenna, the gain is 0 dBi.

Test Result: Pass

6.2 AC Line Conducted Emissions

Temperature	26 °C
Relative Humidity	57%
Atmospheric Pressure	1025mbar
Test date :	October 25, 2017
Tested By :	Loren Luo

Spec	Item	Requirement	Applicable														
§15.207	a)	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>		Frequency ranges (MHz)	Limit (dBµV)		QP	Average	0.15 ~ 0.5	66 – 56	56 – 46	0.5 ~ 5	56	46	5 ~ 30	60	50
		Frequency ranges (MHz)			Limit (dBµV)												
				QP	Average												
		0.15 ~ 0.5		66 – 56	56 – 46												
0.5 ~ 5	56	46															
5 ~ 30	60	50															
Test Setup		 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.															
Procedure		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. 3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.															

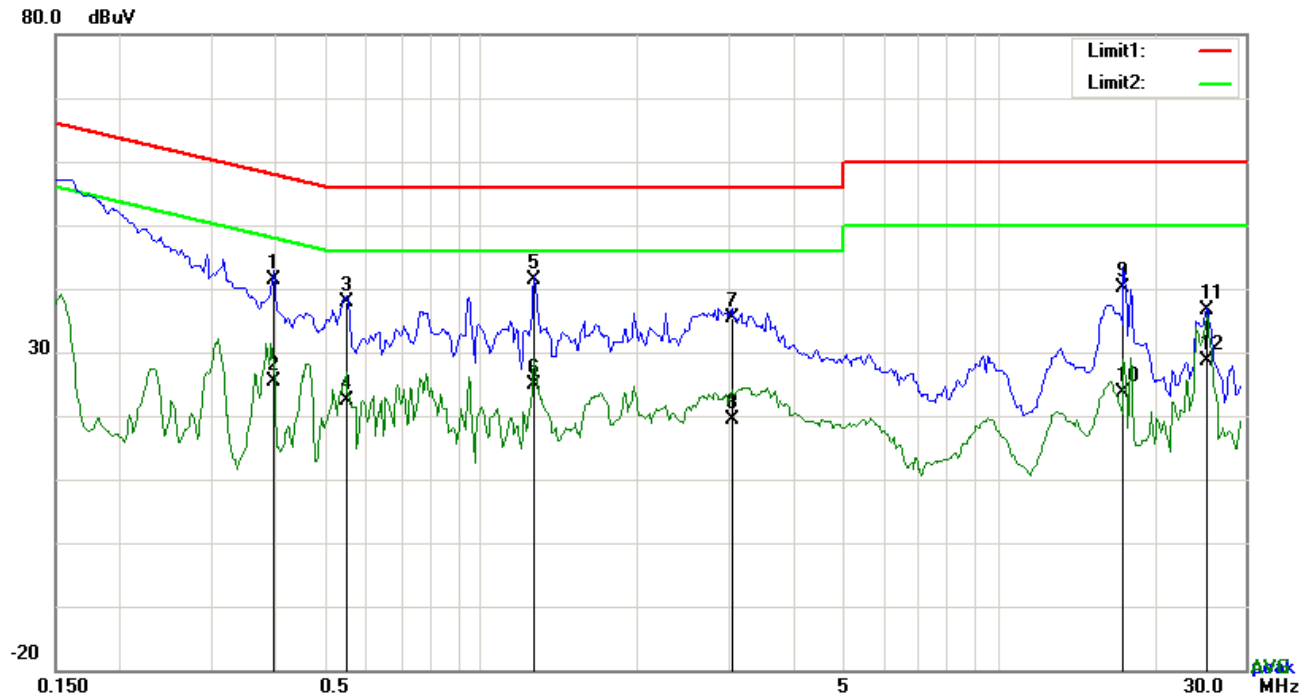
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	4. All other supporting equipment were powered separately from another main supply. 5. The EUT was switched on and allowed to warm up to its normal operating condition. 6. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) 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: 2.4G Mode

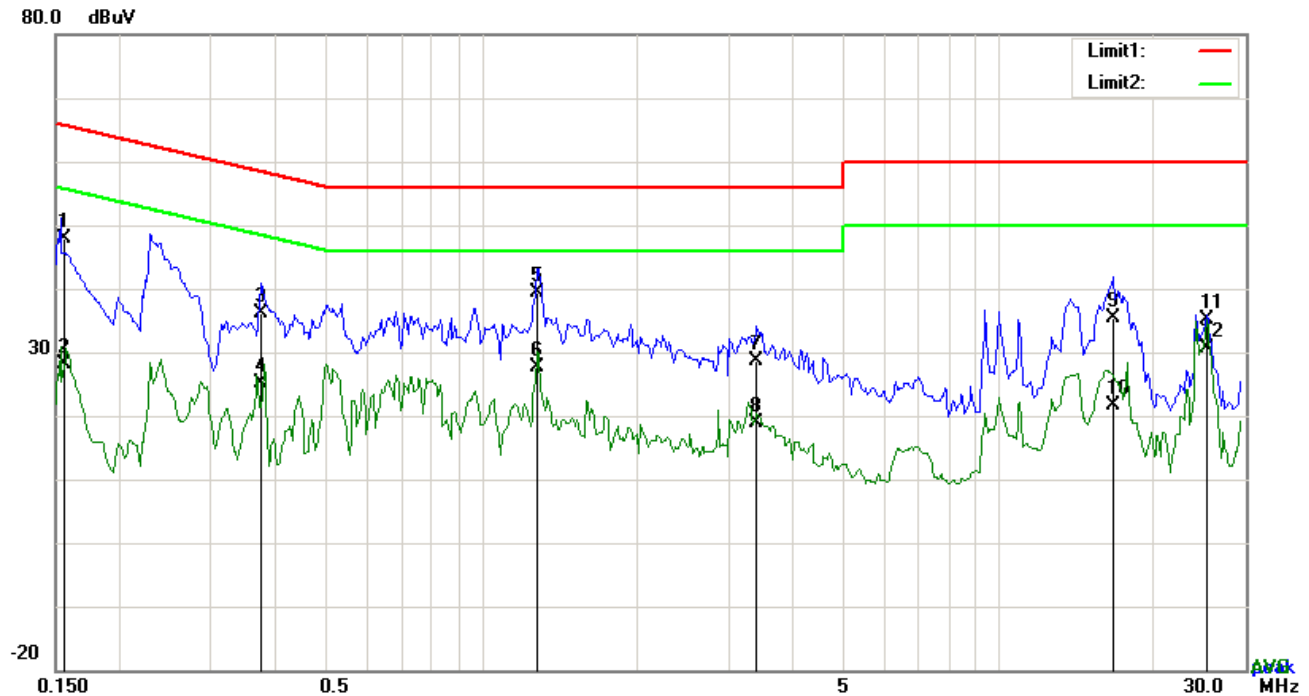


Test Data

Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	L1	0.3957	31.45	QP	10.03	41.48	57.94	-16.46
2	L1	0.3957	15.45	AVG	10.03	25.48	47.94	-22.46
3	L1	0.5517	27.90	QP	10.03	37.93	56.00	-18.07
4	L1	0.5517	12.33	AVG	10.03	22.36	46.00	-23.64
5	L1	1.2654	31.43	QP	10.03	41.46	56.00	-14.54
6	L1	1.2654	14.85	AVG	10.03	24.88	46.00	-21.12
7	L1	3.0576	25.24	QP	10.06	35.30	56.00	-20.70
8	L1	3.0576	9.25	AVG	10.06	19.31	46.00	-26.69
9	L1	17.4495	29.79	QP	10.26	40.05	60.00	-19.95
10	L1	17.4495	13.29	AVG	10.26	23.55	50.00	-26.45
11	L1	25.2300	26.19	QP	10.40	36.59	60.00	-23.41
12	L1	25.2300	18.33	AVG	10.40	28.73	50.00	-21.27

Test Mode: 2.4G Mode

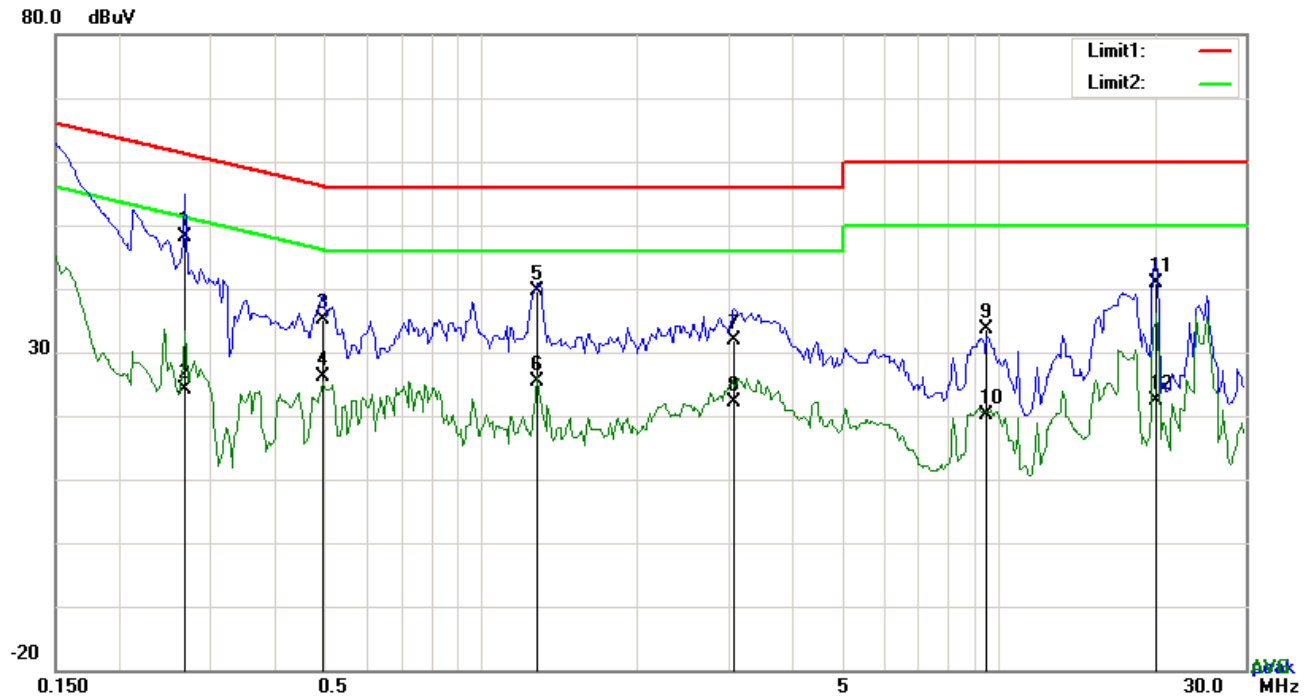


Test Data

Phase Neutral Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)
1	N	0.1557	37.89	QP	10.03	47.92	65.69	-17.77
2	N	0.1557	18.21	AVG	10.03	28.24	55.69	-27.45
3	N	0.3762	26.09	QP	10.03	36.12	58.36	-22.24
4	N	0.3762	15.20	AVG	10.03	25.23	48.36	-23.13
5	N	1.2888	29.29	QP	10.03	39.32	56.00	-16.68
6	N	1.2888	17.67	AVG	10.03	27.70	46.00	-18.30
7	N	3.4056	18.54	QP	10.06	28.60	56.00	-27.40
8	N	3.4056	8.84	AVG	10.06	18.90	46.00	-27.10
9	N	16.6539	25.14	QP	10.25	35.39	60.00	-24.61
10	N	16.6539	11.35	AVG	10.25	21.60	50.00	-28.40
11	N	25.2300	24.62	QP	10.40	35.02	60.00	-24.98
12	N	25.2300	20.15	AVG	10.40	30.55	50.00	-19.45

Test Mode: 2.4G Mode

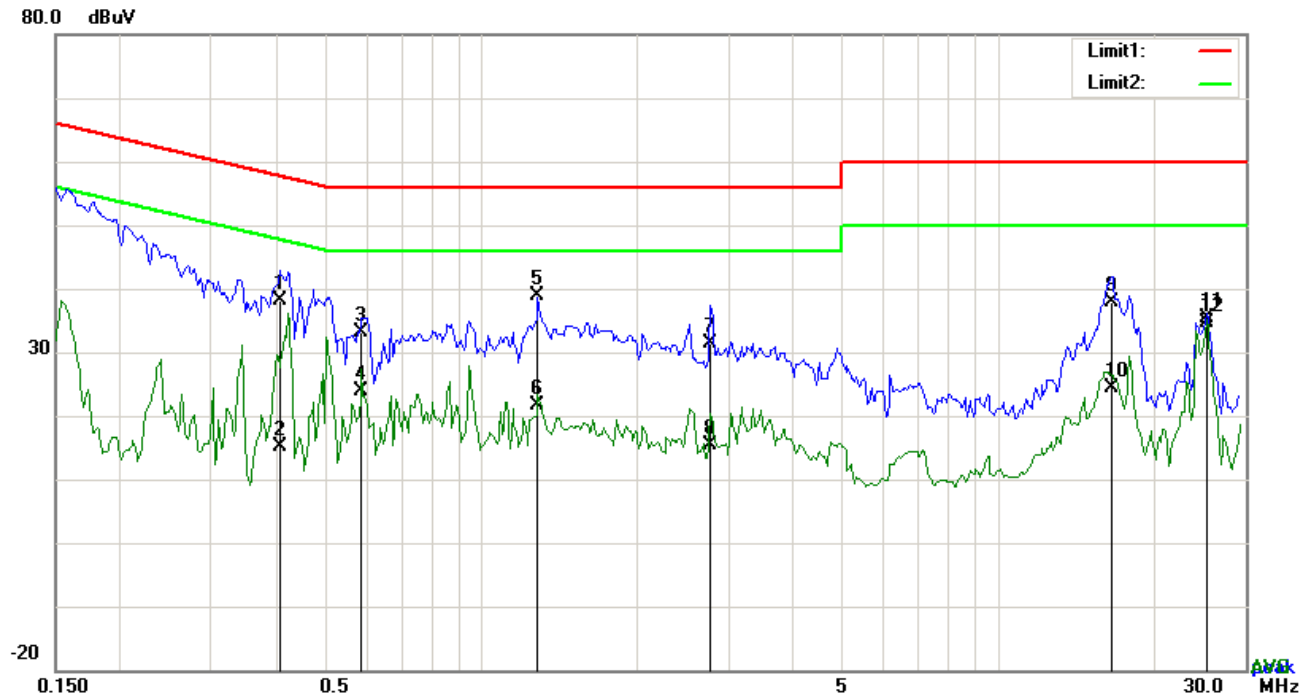


Test Data

Phase Line Plot at 240Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)
1	L1	0.2670	38.00	QP	10.03	48.03	61.21	-13.18
2	L1	0.2670	14.03	AVG	10.03	24.06	51.21	-27.15
3	L1	0.4932	25.11	QP	10.03	35.14	56.11	-20.97
4	L1	0.4932	16.18	AVG	10.03	26.21	46.11	-19.90
5	L1	1.2849	29.48	QP	10.03	39.51	56.00	-16.49
6	L1	1.2849	15.23	AVG	10.03	25.26	46.00	-20.74
7	L1	3.0741	21.85	QP	10.06	31.91	56.00	-24.09
8	L1	3.0741	12.19	AVG	10.06	22.25	46.00	-23.75
9	L1	9.4974	23.39	QP	10.14	33.53	60.00	-26.47
10	L1	9.4974	9.87	AVG	10.14	20.01	50.00	-29.99
11	L1	20.2224	30.68	QP	10.30	40.98	60.00	-19.02
12	L1	20.2224	11.99	AVG	10.30	22.29	50.00	-27.71

Test Mode: 2.4G Mode



Test Data

Phase Neutral Plot at 240Vac, 60Hz

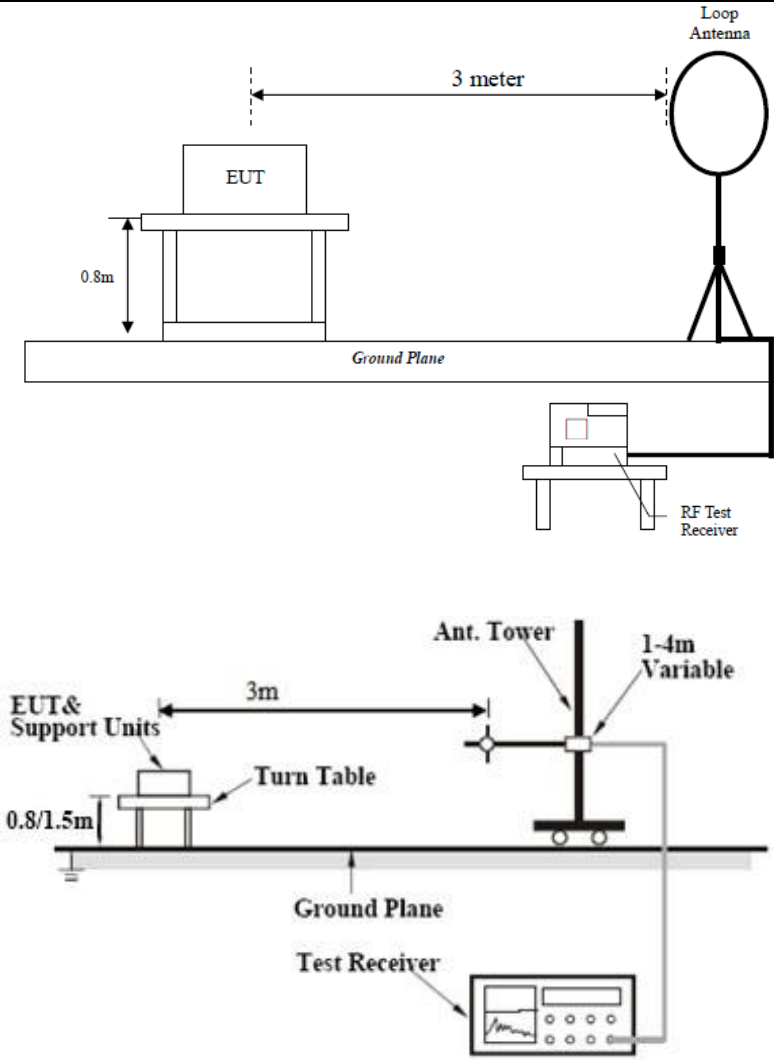
No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)
1	N	0.4074	28.11	QP	10.02	38.13	57.70	-19.57
2	N	0.4074	5.06	AVG	10.02	15.08	47.70	-32.62
3	N	0.5868	23.06	QP	10.02	33.08	56.00	-22.92
4	N	0.5868	13.97	AVG	10.02	23.99	46.00	-22.01
5	N	1.2849	28.91	QP	10.03	38.94	56.00	-17.06
6	N	1.2849	11.55	AVG	10.03	21.58	46.00	-24.42
7	N	2.7747	21.31	QP	10.05	31.36	56.00	-24.64
8	N	2.7747	5.37	AVG	10.05	15.42	46.00	-30.58
9	N	16.5720	27.74	QP	10.22	37.96	60.00	-22.04
10	N	16.5720	14.05	AVG	10.22	24.27	50.00	-25.73
11	N	25.2300	24.92	QP	10.34	35.26	60.00	-24.74
12	N	25.2300	24.21	AVG	10.34	34.55	50.00	-15.45

6.3 Radiated Spurious Emissions

Temperature	26°C
Relative Humidity	56%
Atmospheric Pressure	1022mbar
Test date :	October 26, 2017
Tested By :	Loren Luo

Requirement(s):

Spec	Requirement	Applicable																	
§15.209, §15.205, §15.249(a) & §15.249(d)	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. The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:	☒																	
	<table><tr><th>Fundamental frequency</th><th>Field strength of fundamental (millivolts/meter)</th><th>Field strength of harmonics (microvolts/meter)</th></tr><tr><td>902– 928 MHz</td><td>50</td><td>500</td></tr><tr><td>2400– 2483.5 MHz</td><td>50</td><td>500</td></tr><tr><td>5725– 5875 MHz</td><td>50</td><td>500</td></tr><tr><td>24.0– 24.25 GHz</td><td>250</td><td>2500</td></tr></table>		Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)	902– 928 MHz	50	500	2400– 2483.5 MHz	50	500	5725– 5875 MHz	50	500	24.0– 24.25 GHz	250	2500		
	Fundamental frequency		Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)															
	902– 928 MHz		50	500															
	2400– 2483.5 MHz		50	500															
	5725– 5875 MHz		50	500															
	24.0– 24.25 GHz		250	2500															
	(d) 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 §15.209, whichever is the lesser attenuation.																		
	<table><tr><th>Frequency range (MHz)</th><th>Field Strength (µV/m)</th></tr><tr><td>0.009~0.490</td><td>2400/F(KHz)</td></tr><tr><td>0.490~1.705</td><td>24000/F(KHz)</td></tr><tr><td>1.705~30.0</td><td>30</td></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>		Frequency range (MHz)	Field Strength (µV/m)	0.009~0.490	2400/F(KHz)	0.490~1.705	24000/F(KHz)	1.705~30.0	30	30 – 88	100	88 – 216	150	216 960	200	Above 960	500	
	Frequency range (MHz)		Field Strength (µV/m)																
0.009~0.490	2400/F(KHz)																		
0.490~1.705	24000/F(KHz)																		
1.705~30.0	30																		
30 – 88	100																		
88 – 216	150																		
216 960	200																		
Above 960	500																		

Test Setup	
Procedure	- Setup the configuration according to figure 1. Turn on EUT and make sure that it is in normal function - For emission frequencies measured below 1GHz, a pre-scan is performed in a shielded chamber to determine the accurate frequencies of higher emissions will be checked on a open test site. As the same purpose, for emission frequencies measured above 1GHZ, a pre-scan also be performed with a meter measuring distance before final test. - For emission frequencies measured below and above 1GHz, set the spectrum analyzer on a 100kHz and 1MHz resolution bandwidth respectively for each frequency measured in step 2. - The search antenna is to be raised and lowered over a range from 1 to 4m in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, the change the orientation of EUT on the test table over a range from 0 to 360°. With a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer.

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	Vary the antenna position again and record the highest value as a final reading. - Repeat step 4 until all frequencies need to be measured was complete. - Repeat step5 with search antenna in vertical polarized orientations.
Remark	
Result	☒ Pass ☐ Fail

Test Data ☒ Yes ☐ N/A
 Test Plot ☒ Yes (See below) ☐ N/A

Test Result:

Test Mode:	Transmitting Mode
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Frequency range: 9KHz - 30MHz

Freq. (MHz)	Detection value	Factor (dB/m)	Reading (dBuV/m)	Result (dBuV/m)	Limit@3m (dBuV/m)	Margin (dB)
--	--	--	--	--	--	>20
--	--	--	--	--	--	>20

Note:

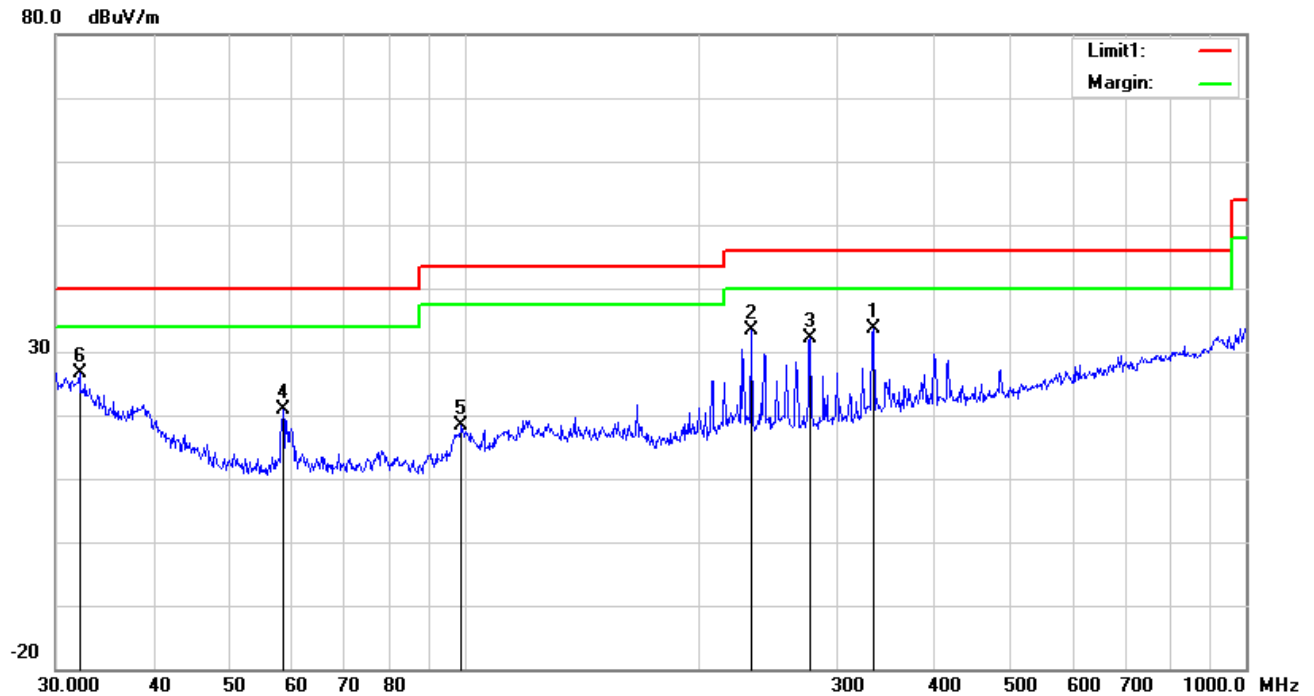
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance}/\text{test distance})$ (dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.

Test Mode: 2.4G Mode

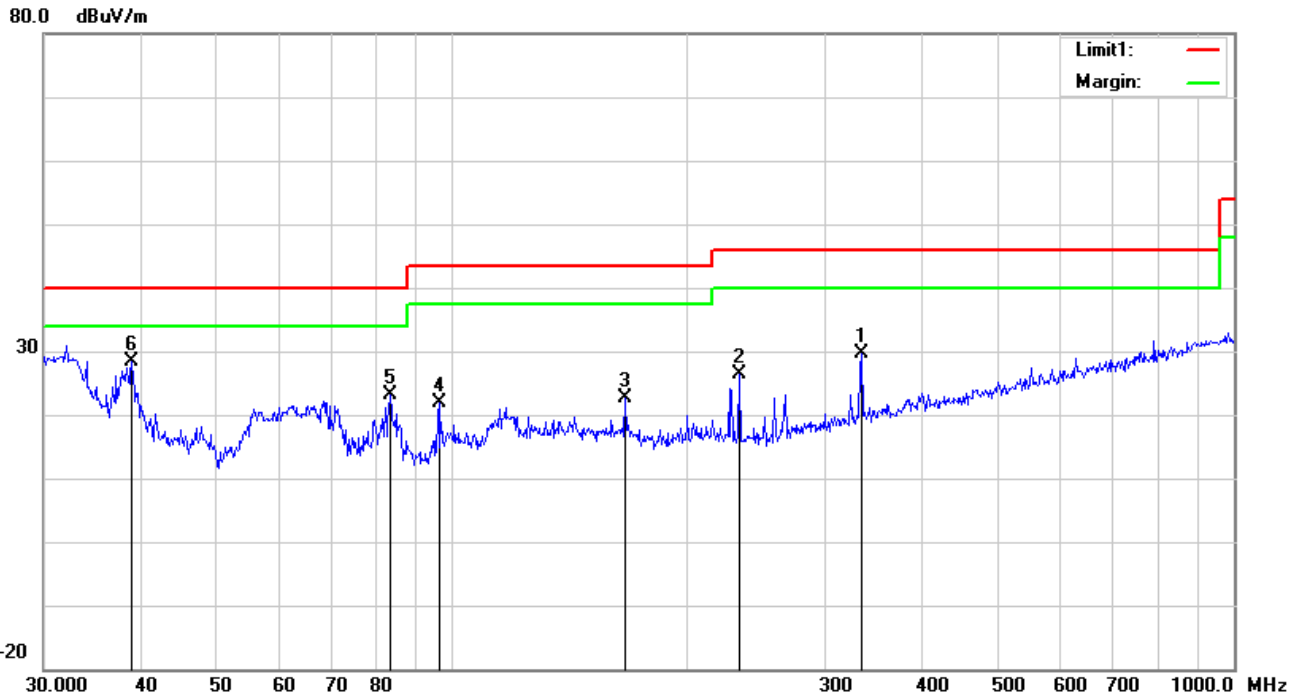
(Below 1GHz)



Test Data

Horizontal Polarity Plot @3m

No.	P/L	Frequency	Reading	Detect or	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
		(MHz)	(dBuV/m)		(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	H	333.6867	39.54	peak	14.31	22.20	1.96	33.61	46.00	-12.39	100	199
2	H	232.5318	42.46	peak	11.64	22.32	1.64	33.42	46.00	-12.58	100	278
3	H	277.0935	40.20	peak	12.59	22.29	1.75	32.25	46.00	-13.75	100	146
4	H	58.6126	35.06	peak	7.45	22.41	0.76	20.86	40.00	-19.14	100	202
5	H	99.1797	29.50	peak	10.20	22.32	1.10	18.48	43.50	-25.02	100	259
6	H	32.1795	28.62	peak	19.72	22.27	0.68	26.75	40.00	-13.25	100	1



Test Data

Vertical Polarity Plot @3m

No.	P/L	Frequency	Reading	Detect or	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degr ee
		(MHz)	(dBuV/m)		(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	()
1	V	333.6867	35.61	peak	14.31	22.20	1.96	29.68	46.00	-16.32	100	183
2	V	232.5318	35.52	peak	11.64	22.32	1.64	26.48	46.00	-19.52	100	32
3	V	166.0680	31.29	peak	12.11	22.26	1.37	22.51	43.50	-20.99	100	265
4	V	96.0986	33.62	peak	9.46	22.32	1.02	21.78	43.50	-21.72	200	54
5	V	83.2298	36.77	peak	7.73	22.39	1.06	23.17	40.00	-16.83	100	20
6	V	38.8879	35.22	peak	14.71	22.27	0.78	28.44	40.00	-11.56	100	284

Above 1GHz

Test Mode:	2.4G Mode
------------	-----------

Low Channel: GFSK Mode (Worst Case) (2402 MHz)

Frequency (MHz)	S.A. Reading (dBμV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4804	31.59	AV	V	33.39	7.22	48.46	23.74	54	-30.26
4804	32.45	AV	H	33.39	7.22	48.46	24.6	54	-29.4
4804	49.54	PK	V	33.39	7.22	48.46	41.69	74	-32.31
4804	48.26	PK	H	33.39	7.22	48.46	40.41	74	-33.59
1892.5	41.18	AV	V	26.68	4.85	46.54	26.17	54	-27.83
1892.5	40.62	AV	H	26.68	4.85	46.54	25.61	54	-28.39
1892.5	64.6	PK	V	26.68	4.85	46.54	49.59	74	-24.41
1892.5	65.15	PK	H	26.68	4.85	46.54	50.14	74	-23.86

Middle Channel: GFSK Mode (Worst Case) (2441 MHz)

Frequency (MHz)	S.A. Reading (dBμV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4882	31.7	AV	V	33.62	7.53	48.36	24.49	54	-29.51
4882	32.86	AV	H	33.62	7.53	48.36	25.65	54	-28.35
4882	49.36	PK	V	33.62	7.53	48.36	42.15	74	-31.85
4882	46.02	PK	H	33.62	7.53	48.36	38.81	74	-35.19
13299	13.07	AV	V	41.23	14.38	46.52	22.16	54	-31.84
13299	12.93	AV	H	41.23	14.38	46.52	22.02	54	-31.98
13299	30.97	PK	V	41.23	14.38	46.52	40.06	74	-33.94
13299	31.37	PK	H	41.23	14.38	46.52	40.46	74	-33.54

High Channel: GFSK Mode (Worst Case) (2480 MHz)

Frequency (MHz)	S.A. Reading (dBμV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4960	38.65	AV	V	33.89	7.86	48.31	32.09	54	-21.91
4960	36.6	AV	H	33.89	7.86	48.31	30.04	54	-23.96
4960	49.02	PK	V	33.89	7.86	48.31	42.46	74	-31.54
4960	48.3	PK	H	33.89	7.86	48.31	41.74	74	-32.26
9435	22.72	AV	V	39.26	9.34	47.85	23.47	54	-30.53
9435	21.81	AV	H	39.26	9.34	47.85	22.56	54	-31.44
9435	37.96	PK	V	39.26	9.34	47.85	38.71	74	-35.29
9435	39.98	PK	H	39.26	9.34	47.85	40.73	74	-33.27

Note:

1, The testing has been conformed to $10 \times 2480 \text{ MHz} = 24,800 \text{ MHz}$

2, All other emissions more than 30 dB below the limit

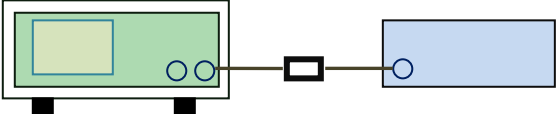
3, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

4, The radiated spurious test above 18GHz is subcontracted to SIEMIC (Nanjing-China) Laboratories. and found 30dB below the limit at least.

6.4 Field Strength Measurement

Temperature	26 °C
Relative Humidity	56%
Atmospheric Pressure	1022mbar
Test date :	October 26, 2017
Tested By :	Loren Luo

Requirement(s):

Spec	Requirement	Applicable															
§15.249(a)	<table border="1"> <thead> <tr> <th>Fundamental frequency</th><th>Field strength of fundamental (millivolts/ meter)</th><th>Field strength of harmonics (microvolts/ meter)</th></tr> </thead> <tbody> <tr> <td>902–928 MHz</td><td>50</td><td>500</td></tr> <tr> <td>2400–2483.5 MHz</td><td>50</td><td>500</td></tr> <tr> <td>5725–5875 MHz</td><td>50</td><td>500</td></tr> <tr> <td>24.0–24.25 GHz</td><td>250</td><td>2500</td></tr> </tbody> </table>	Fundamental frequency	Field strength of fundamental (millivolts/ meter)	Field strength of harmonics (microvolts/ meter)	902–928 MHz	50	500	2400–2483.5 MHz	50	500	5725–5875 MHz	50	500	24.0–24.25 GHz	250	2500	☒
Fundamental frequency	Field strength of fundamental (millivolts/ meter)	Field strength of harmonics (microvolts/ meter)															
902–928 MHz	50	500															
2400–2483.5 MHz	50	500															
5725–5875 MHz	50	500															
24.0–24.25 GHz	250	2500															
Test Setup	 Spectrum Analyzer EUT																
Test Procedure	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 § 15.209, whichever is the lesser attenuation.																
Remark																	
Result	☒ Pass ☐ Fail																

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test Mode:	2.4G Mode
-------------------	------------------

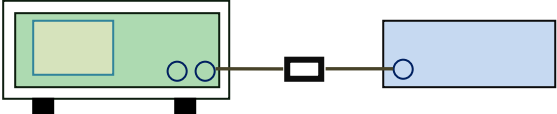
Field Strength Measurement

P/L	Frequency	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB/m)	(dB)	
H	2402	92.7	-18.1	74.6	114	-39.4	peak
H	2402	78.68	-18.1	60.58	94	-33.42	AVG
V	2402	84.5	-18.1	66.4	114	-47.6	peak
V	2402	72.84	-18.1	54.74	94	-39.26	AVG
H	2441	93.63	-18.05	75.58	114	-38.42	peak
H	2441	75.35	-18.05	57.3	94	-36.7	AVG
V	2441	79.48	-18.05	61.43	114	-52.57	peak
V	2441	64.31	-18.05	46.26	94	-47.74	AVG
H	2480	76.95	-18.03	58.92	114	-55.08	peak
H	2480	62.3	-18.03	44.27	94	-49.73	AVG
V	2480	79.19	-18.03	61.16	114	-52.84	peak
V	2480	62.55	-18.03	44.52	94	-49.48	AVG

6.5 20dB Bandwidth Testing

Temperature	26 °C
Relative Humidity	56%
Atmospheric Pressure	1022mbar
Test date :	October 26, 2017
Tested By :	Loren Luo

Requirement(s):

Spec	Item	Requirement	Applicable
§15.215(c)	a)	Radiated Emissions Measurement Uncertainty All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 1GHz (3m & 10m) & 1GHz above (3m) is +5.6/-4.5dB.	☒
Test Setup	 Spectrum Analyzer EUT		
Test Procedure	- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator. - Position the EUT on the test table without connection to measurement instrument. Turn on the EUT. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value. - Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth. - Repeat above procedures until all frequencies measured were complete.		
Remark			

Result	☒ Pass	☐ Fail
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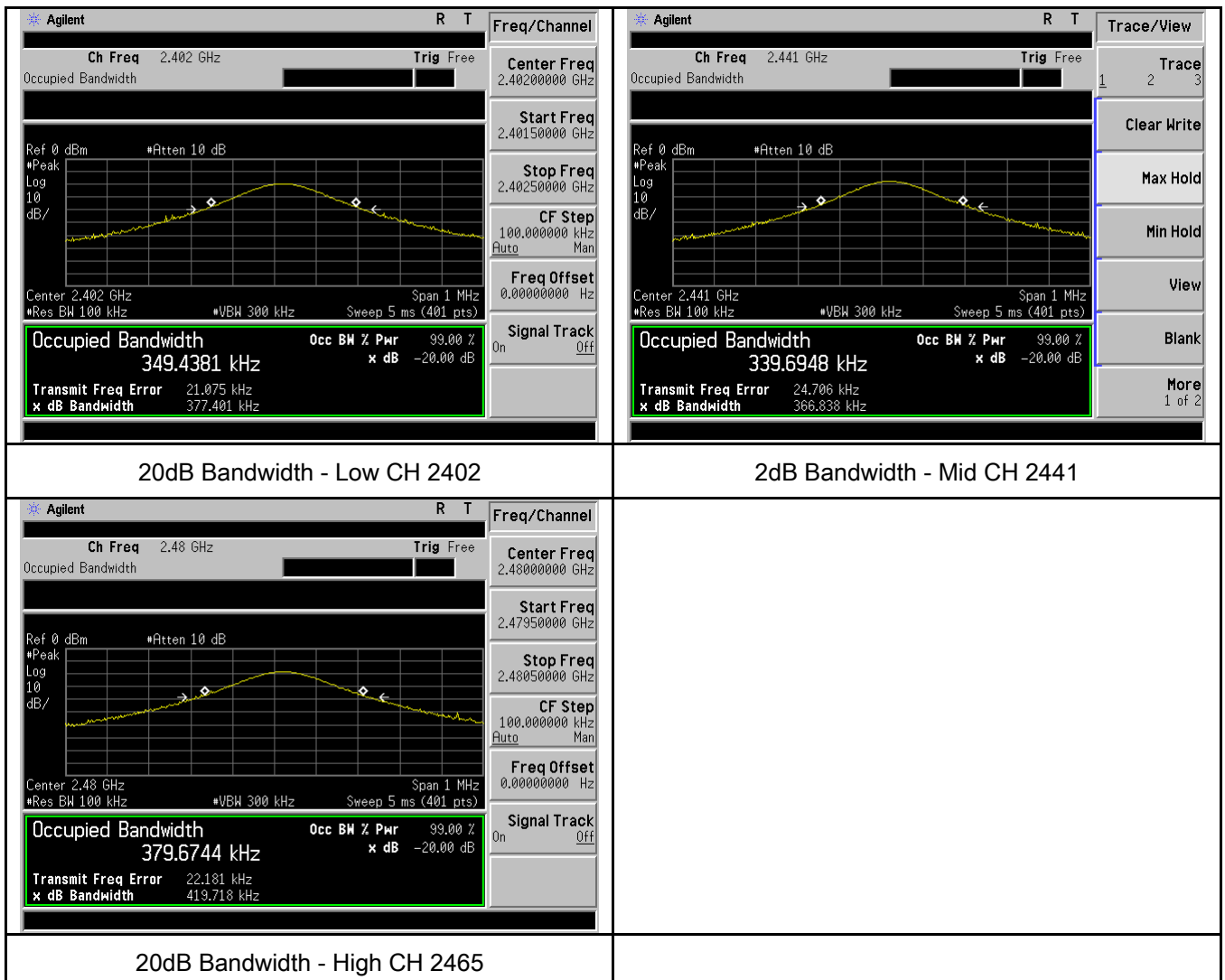
Test Data	☒ Yes	☐ N/A
Test Plot	☒ Yes (See below)	☐ N/A

20dB Bandwidth measurement result

CH	Fundamental Frequency (MHz)	20dB Bandwidth (MHz)	Result
Low	2402	0.377	Pass
Middle	2441	0.366	Pass
High	2480	0.419	Pass

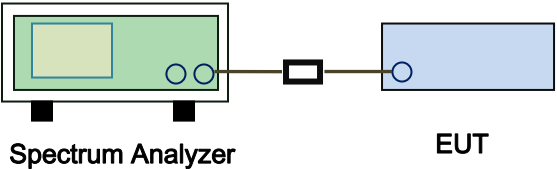
Test Plots

20dB Bandwidth measurement result



6.6 Band Edge

Temperature	23 °C
Relative Humidity	54%
Atmospheric Pressure	1020mbar
Test date :	October 28, 2017
Tested By :	Loren Luo

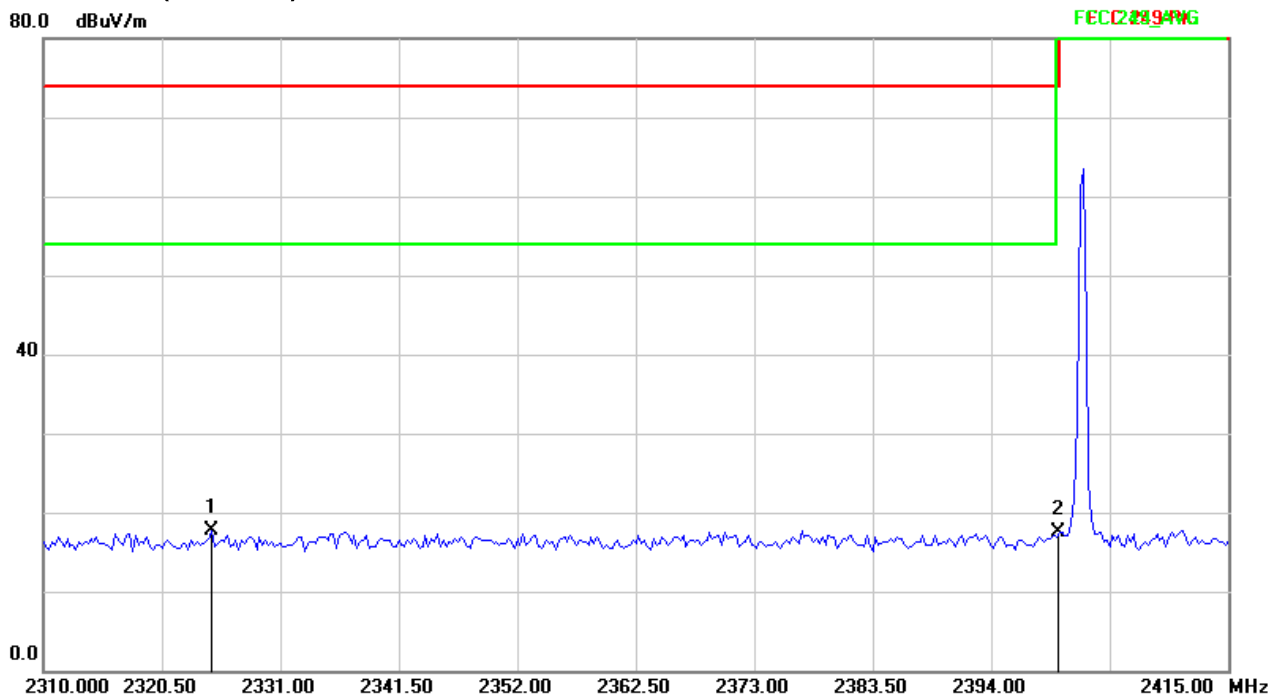
Spec	Item	Requirement	Applicable
§15.249(d)	a)	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.	☒
Test Setup	 Spectrum Analyzer EUT		
Test Procedure	- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator. - Position the EUT without connection to measurement instrument. Put it on the Rotated table and turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range. - Set both RBW and VBW of spectrum analyzer to 1MHz. - Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency. - Repeat above procedures until all measured frequencies were complete.		
Remark			
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

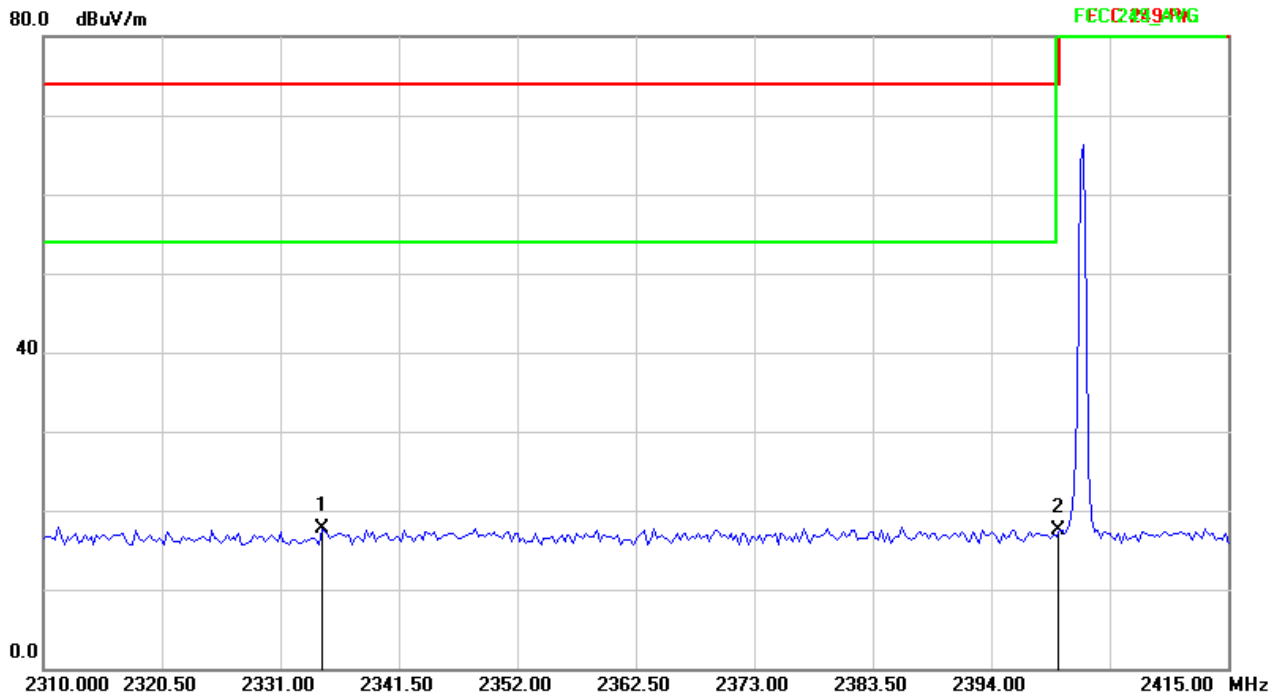
Test Plots

Low Channel (2402 MHz)



Test Data

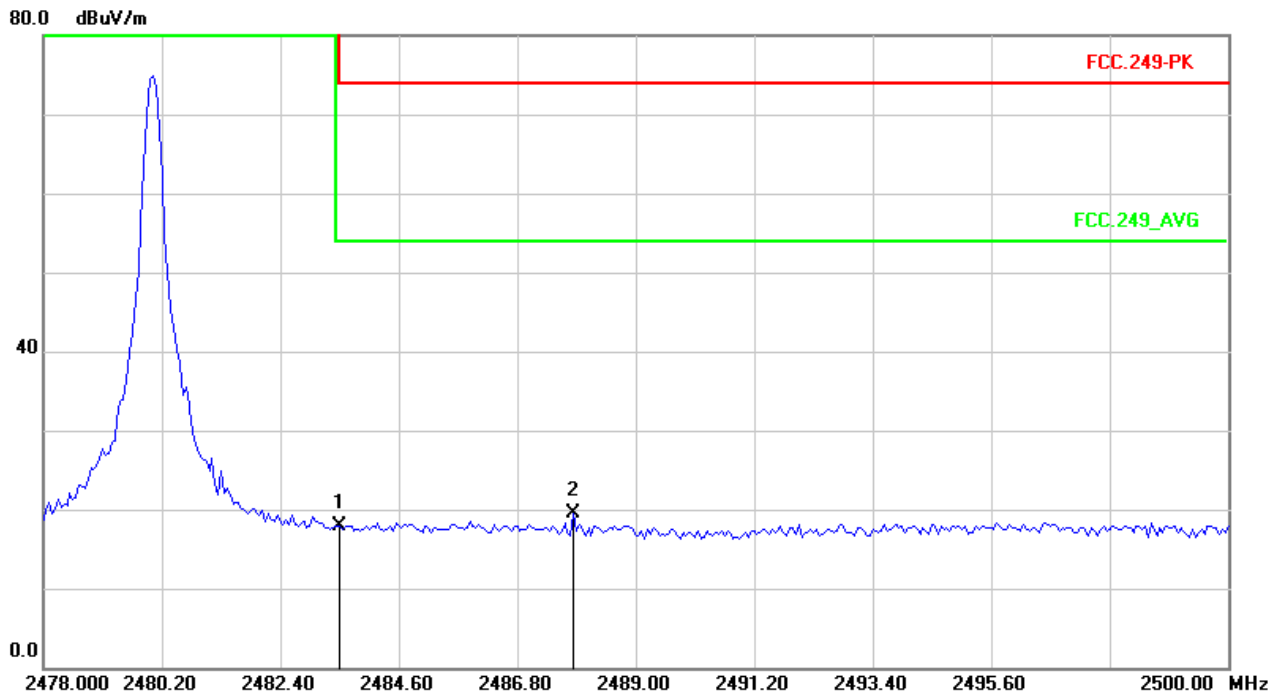
No.	P/L	Frequency	Reading Level	Correct Factor	Measurement	Limit	Over	Detect or	Height	Degree
		(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB/m)	(dB)		(cm)	(°)
1	H	2324.963	35.83	-18.17	17.66	74.00	-56.34	peak	180	346
2	H	2400.000	35.63	-18.10	17.53	74.00	-56.47	peak	180	276



Test Data

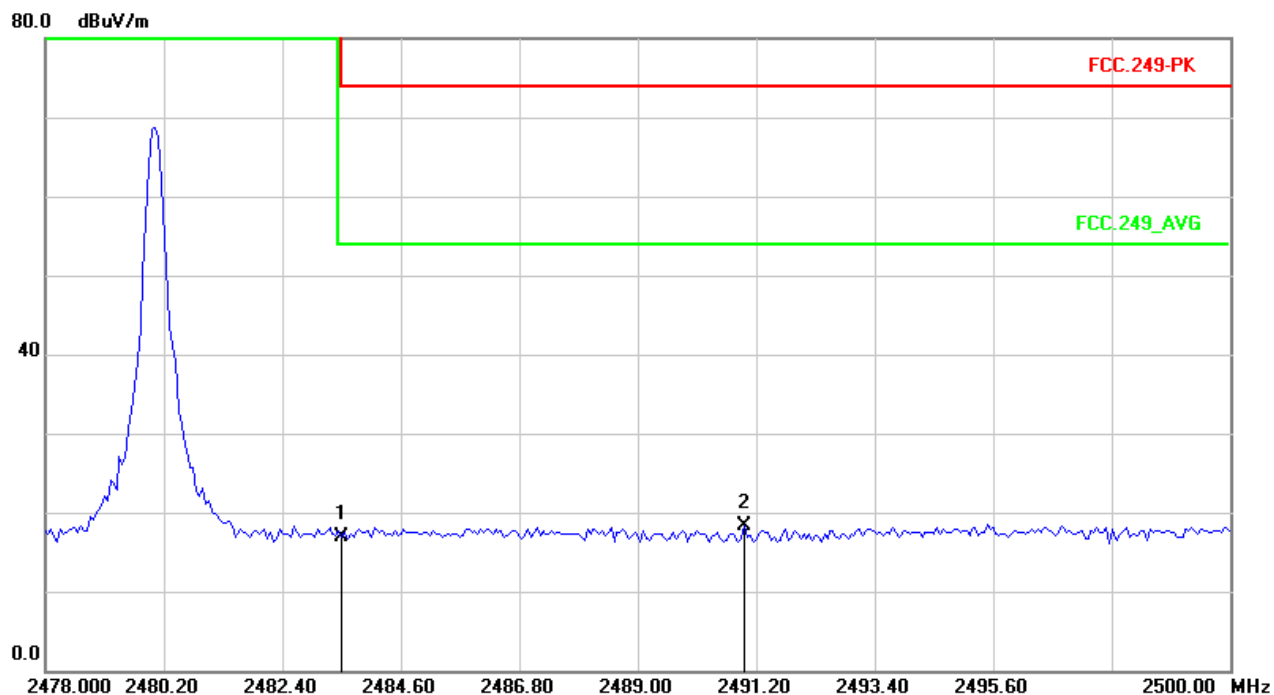
No.	P/L	Frequency	Reading Level	Correct Factor	Measurement	Limit	Over	Detect or	Height	Degree
		(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB/m)	(dB)		(cm)	(°)
1	V	2334.675	35.86	-18.16	17.70	74.00	-56.30	peak	180	364
2	V	2400.000	35.51	-18.10	17.41	74.00	-56.59	peak	180	267

High Channel (2480 MHz)



Test Data

No.	P/L	Frequency	Reading	Correct	Measur	Limit	Over	Detect	Height	Degree
		(MHz)	Level	Factor	ement			or	(cm)	()
			(dBuV/m)	(dB)	(dBuV/m)	(dB/m)	(dB)			
1	H	2483.500	35.83	-18.01	17.82	74.00	-56.18	peak	149	265
2	H	2487.845	37.50	-18.01	19.49	74.00	-54.51	peak	198	325



Test Data

No.	P/L	Frequency (MHz)	Reading Level (dBuV/m)	Correct Factor (dB)	Measur ement (dBuV/ m)	Limit (dB/m)	Over (dB)	Detect or	Height (cm)	Degree (°)
1	V	2483.500	34.90	-18.01	16.89	74.00	-57.11	peak	196	323
2	V	2490.980	36.40	-18.01	18.39	74.00	-55.61	peak	176	259

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted					
EMI test receiver	ESCS30	8471241027	09/15/2017	09/14/2018	☒
Line Impedance	LI-125A	191106	09/23/2017	09/22/2018	☒
Line Impedance	LI-125A	191107	09/23/2017	09/22/2018	☒
ISN	ISN T800	34373	09/23/2017	09/22/2018	☒
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/22/2017	09/21/2018	☒
Transient Limiter	LIT-153	531118	08/30/2017	08/29/2018	☒
RF conducted test					
Agilent ESA-E SERIES	E4407B	MY45108319	09/15/2017	09/14/2018	☒
Power Splitter	1#	1#	08/30/2017	08/29/2018	☒
DC Power Supply	E3640A	MY40004013	09/15/2017	09/14/2018	☒
Radiated Emissions					
EMI test receiver	ESL6	100262	09/15/2017	09/14/2018	☒
Positioning Controller	UC3000	MF780208282	11/17/2017	11/16/2018	☒
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	08/30/2017	08/29/2018	☒
Active Antenna (9kHz-30MHz)	AL-130	121031	10/12/2017	10/11/2018	☒
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/23/2017	03/22/2018	☒
Active Antenna (9kHz-30MHz)	AL-130	121031	10/12/2017	10/11/2018	☒
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/19/2017	09/18/2018	☒
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/22/2017	09/21/2018	☒

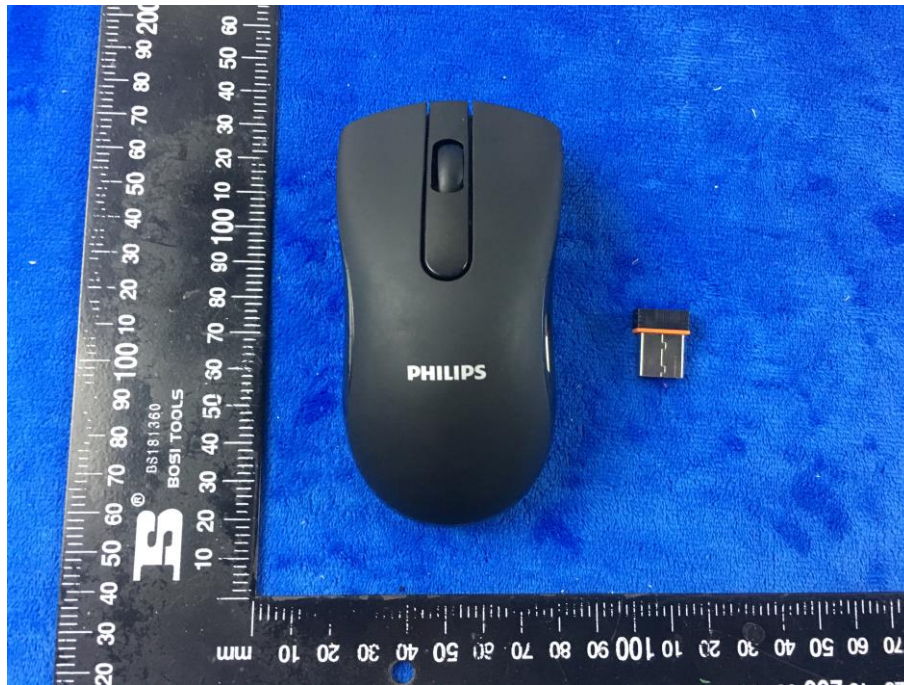
Test Report No.	17071118-FCC-R
Page	35 of 52

Universal Radio Communication Tester	CMU200	121393	09/23/2017	09/22/2018	☒
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Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo

Whole Package View



EUT - Front View (TX)



EUT - Rear View (TX)



EUT - Top View (TX)



EUT - Bottom View (TX)



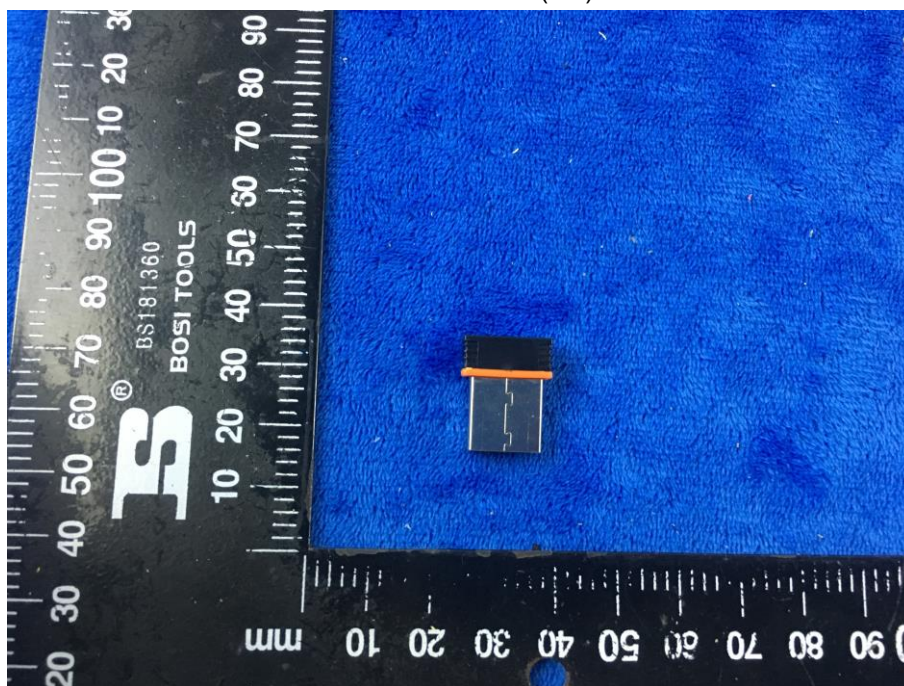
EUT - Left View (TX)



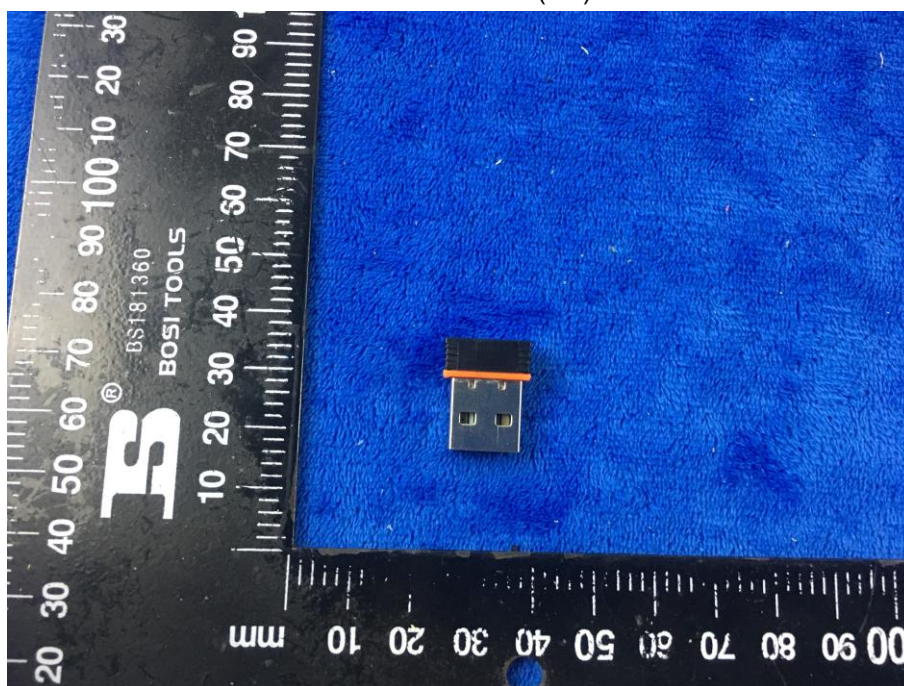
EUT - Right View (TX)



EUT - Front View (RX)



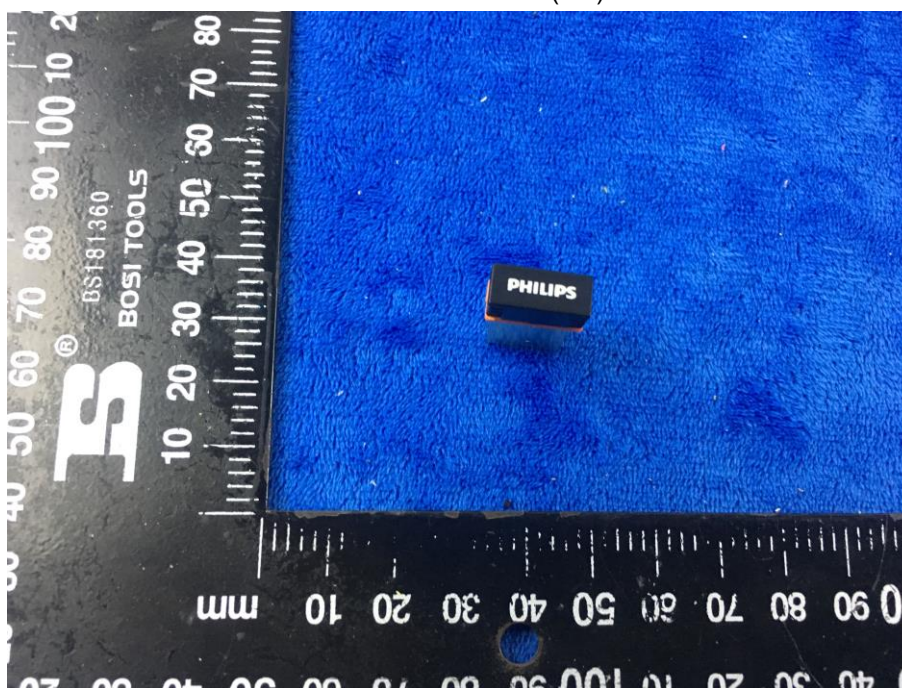
EUT - Rear View (RX)



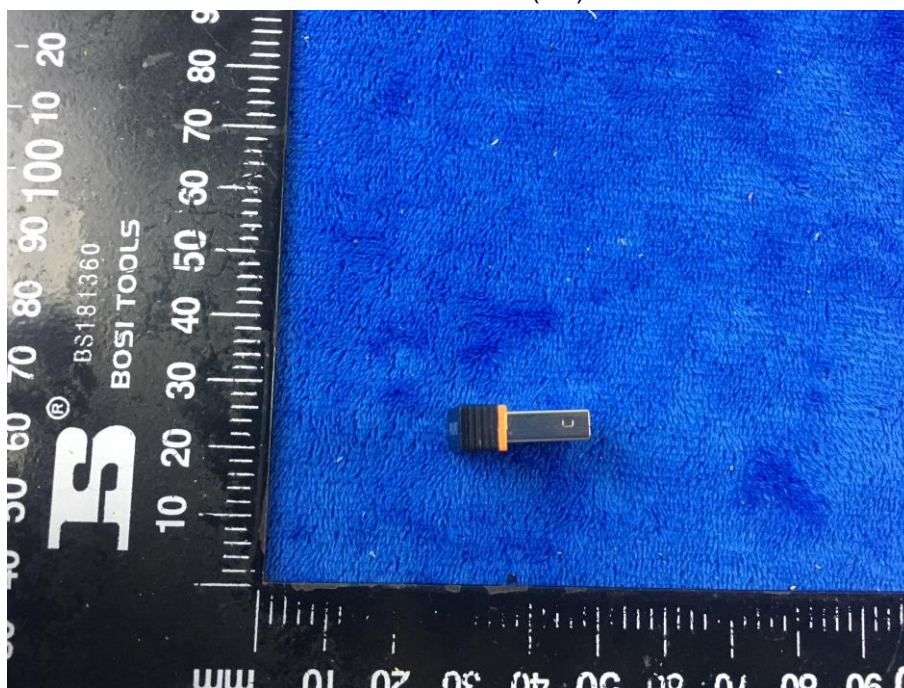
EUT - Top View (RX)



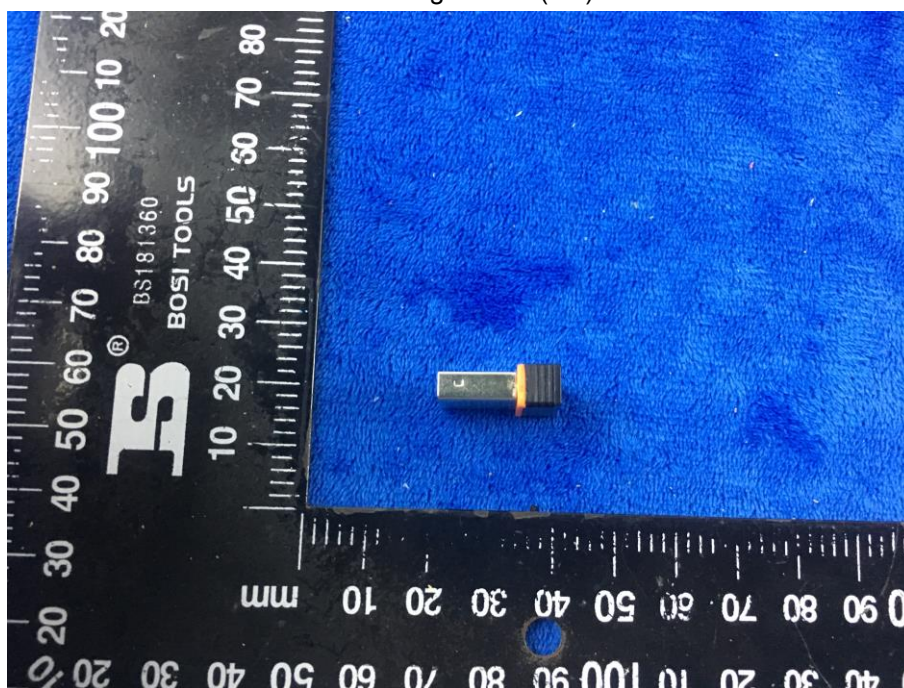
EUT - Bottom View (RX)



EUT - Left View (RX)



EUT - Right View (RX)

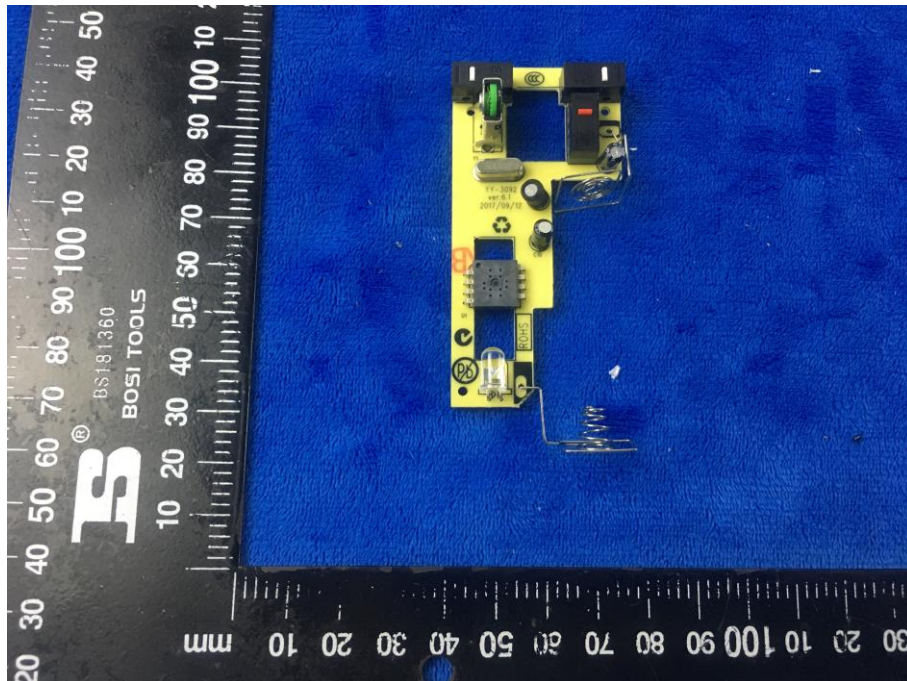


Annex B.ii. Photograph: EUT Internal Photo

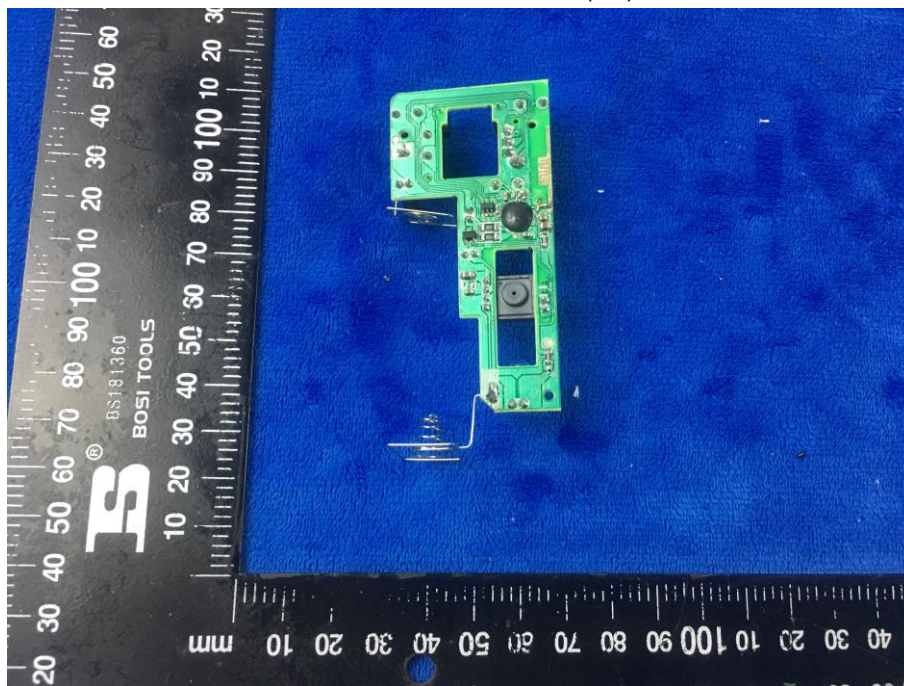
Cover Off - Top View 1 (TX)



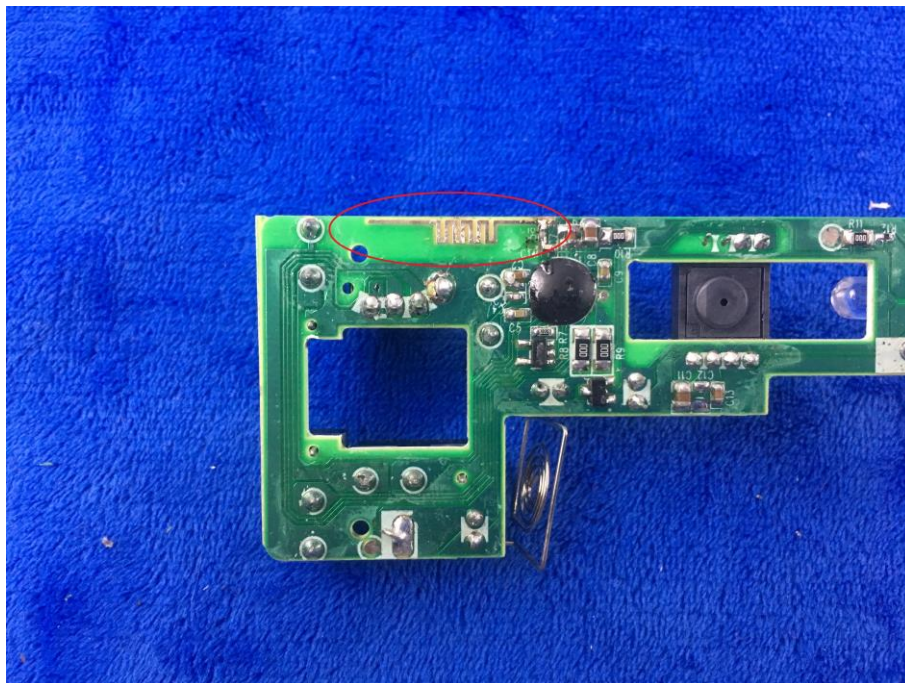
Mainboard - Front View (TX)



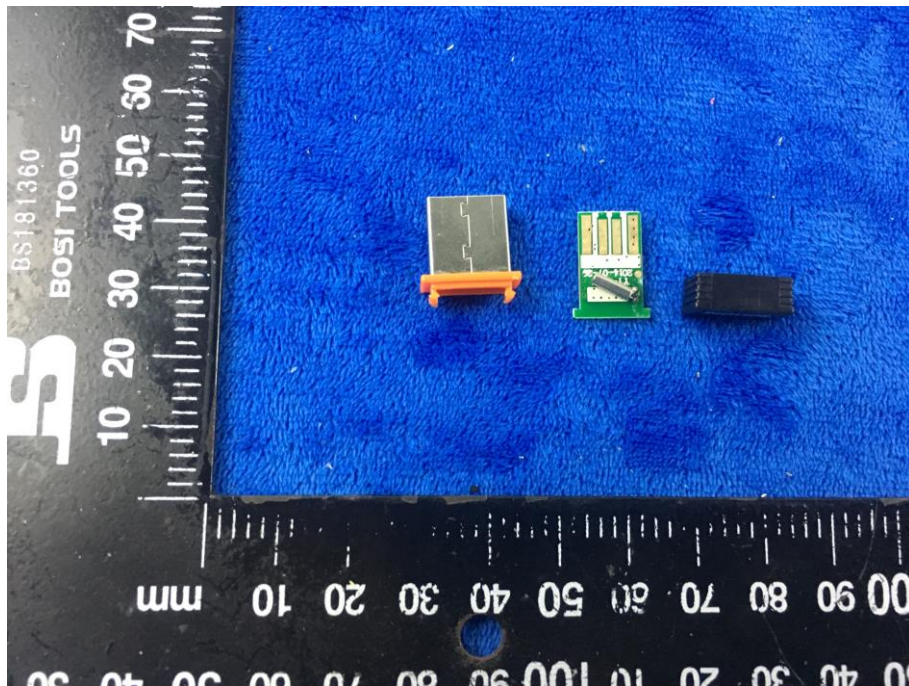
Mainboard – Rear View (TX)



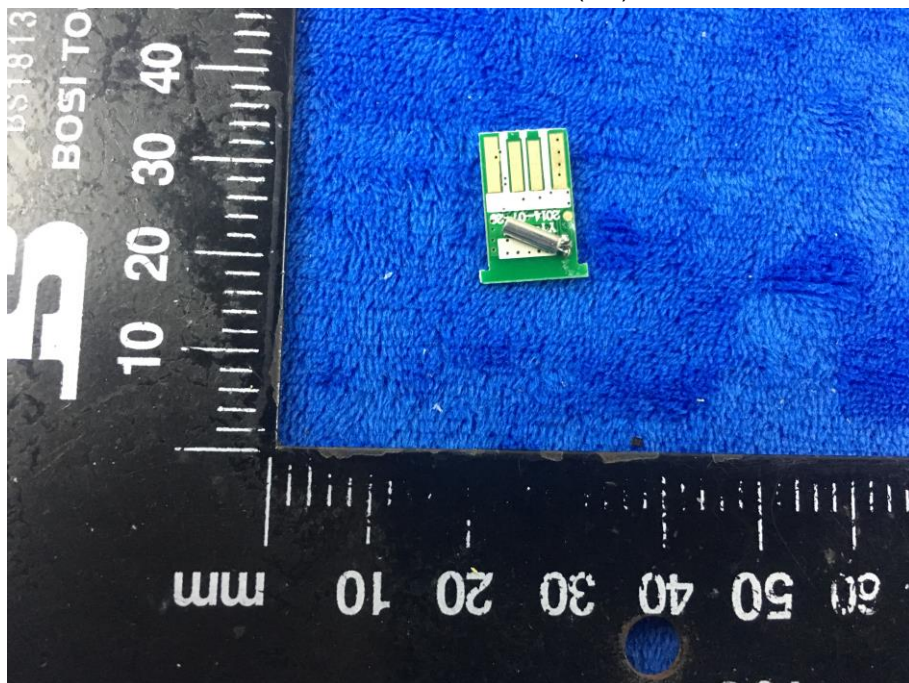
Antenna View (TX)



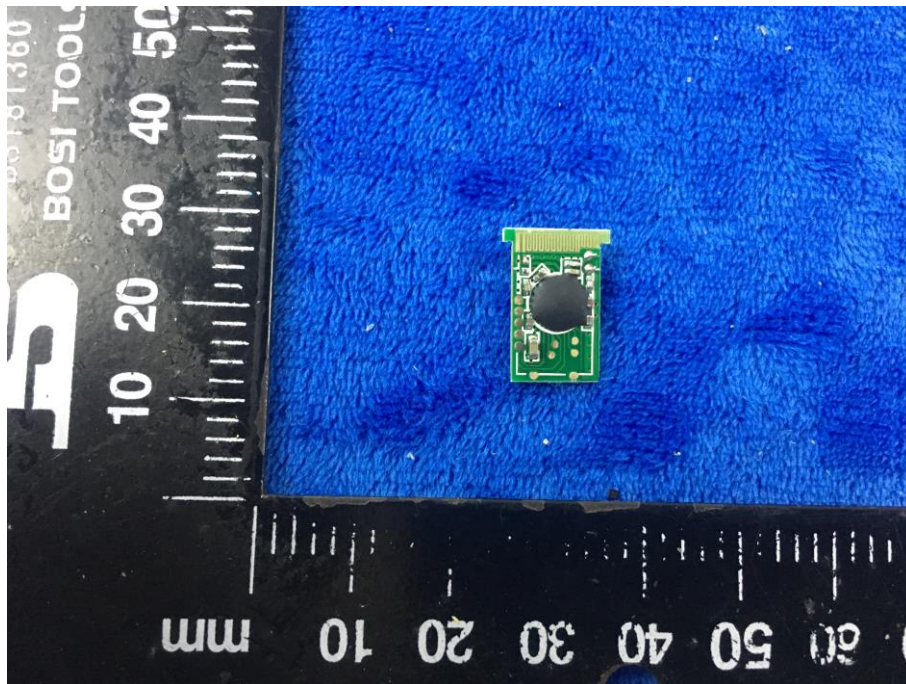
Cover Off - Top View (RX)



Mainboard - Front View (RX)



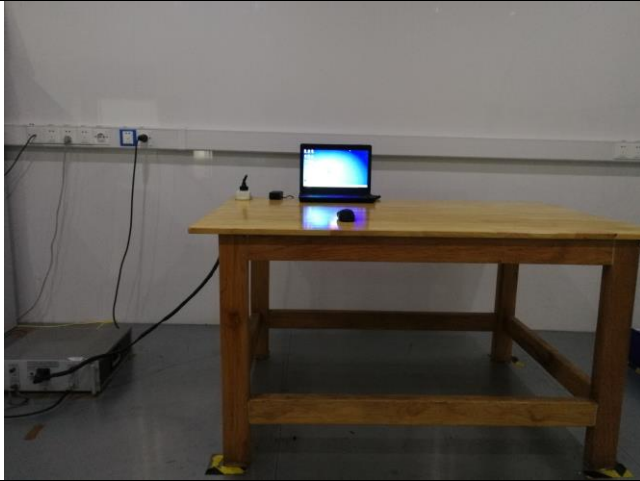
Mainboard – Rear View (RX)



Antenna View (RX)



Annex B.iii. Photograph: Test Setup Photo



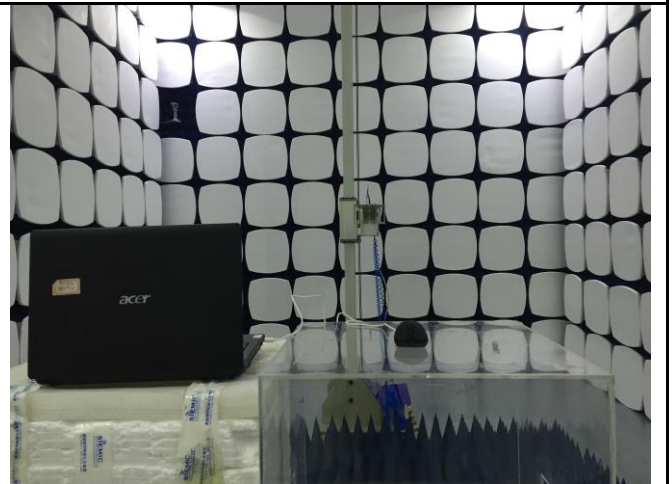
Conducted Emissions Test Setup Front View



Conducted Emissions Test Setup Side View



Radiated Spurious Emissions Test Setup Below 1GHz

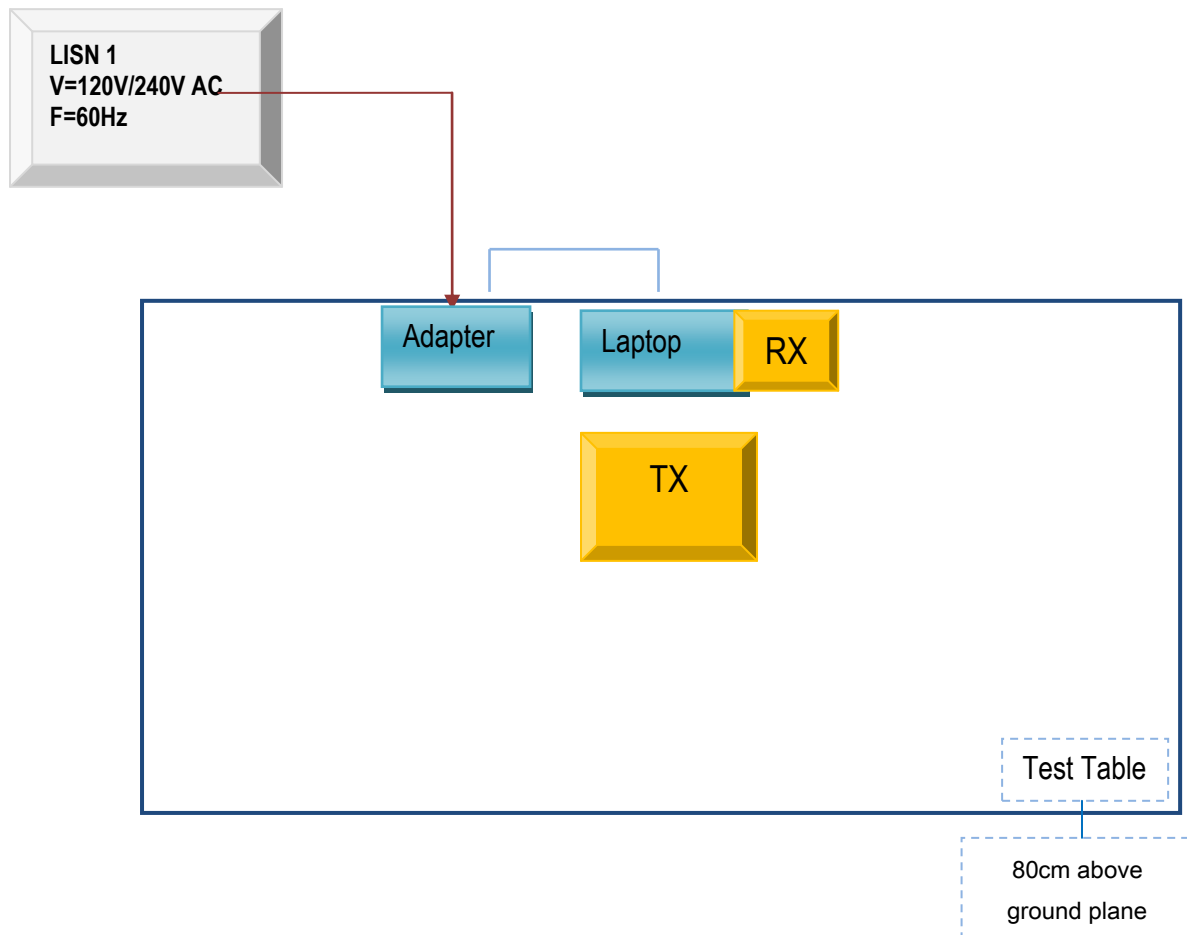


Radiated Spurious Emissions Test Setup Above 1GHz

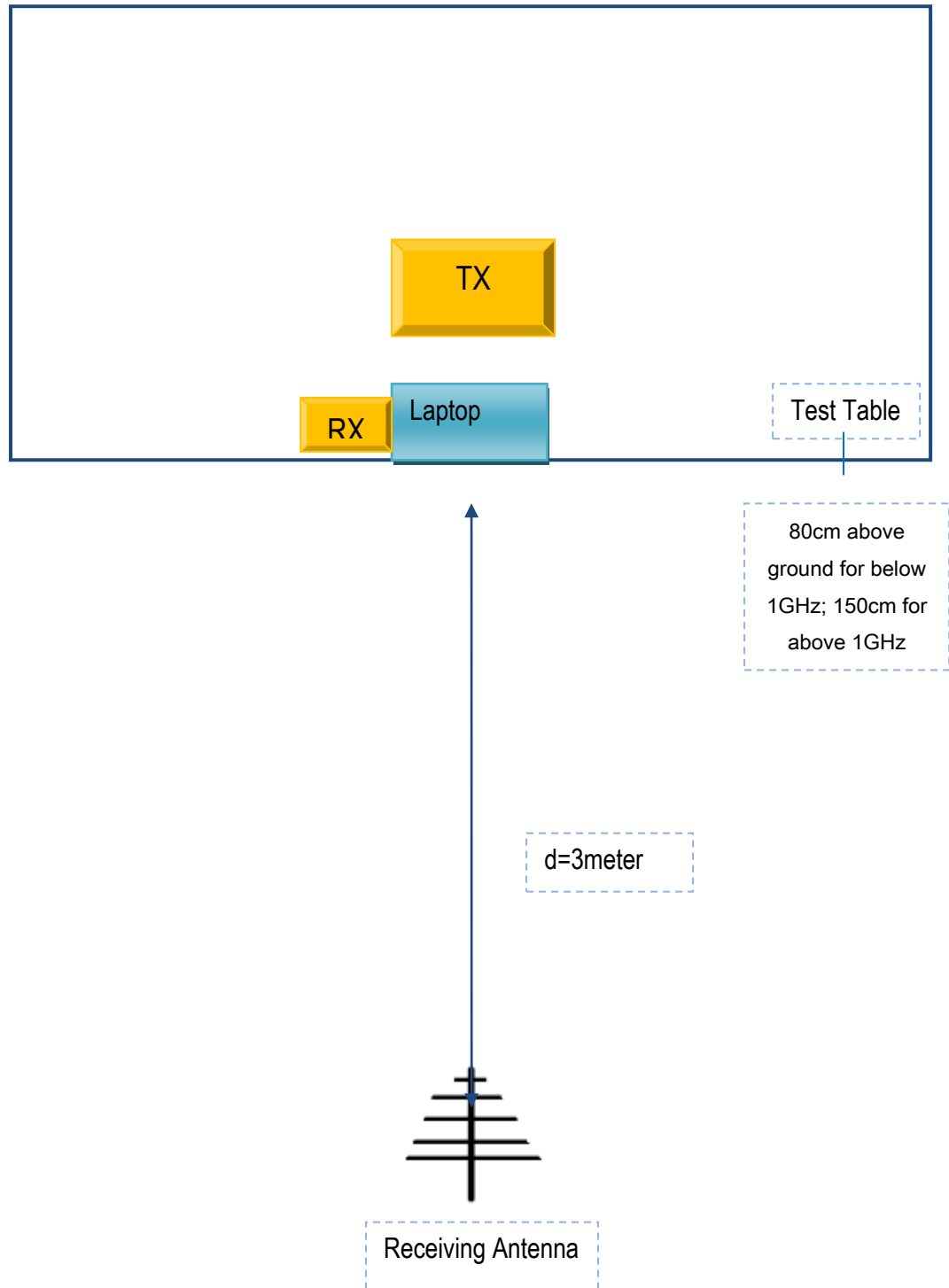
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

Block Configuration Diagram for AC Line Conducted Emissions



Block Configuration Diagram for Radiated Emissions



Annex C. ii. SUPPORTING EQUIPMENT DESCRIPTION

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

Manufacturer	Equipment Description	Model	Serial No.
Lenovo	Laptop	E40	N/A
Lenovo	AC Adapter	42T4416	21D9JU

Test Report No.	17071118-FCC-R
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Annex D. User Manual / Block Diagram / Schematics / Partlist

Please see attachment

Annex E. DECLARATION OF SIMILARITY

Shenzhen Youyuanhongye Electronic Co., Ltd.

Family models declaration letter.

2017-11-01

We

Shenzhen Youyuanhongye Electronic Co., Ltd.

Of

18th Building,Zhengfeng South Road,No.4 Unit Huaide Cuigang Industrial Park,Fuyong
Street,Bao'an District,Shenzhen City,P.R.China.

Product: Wireless Mouse

Model Name: **SPK7211**

Serial Model: SPK7211W, SPK7211B, SPK7211P, SPK7322, SPK7211PS,
SPK7221B, SPK7221W, SPK7211BSC, SPK7402W, SPK7402B, SPK7402WS,
SPK7402BS, SPK7211WSC, SPT6501W, SPT6501B, SPT6501BS, SPT6602,
W1020, W1080, W1040, W1050, MW291, MW286, MW287, MW692, W1040X,
GMW201, GW103, GW102-Pro, GW101-Pro, GW104, CW1260, CW6262, CW1261,
MW2027, MW2082, MW2091, MW2022, MW2093, M2082, M2032, M2088,
MW2032, M2108, M2022, M2087, M2030, MW2088, MW2092, MW2030, M2106.

All the model are the same circuit and RF module,except model names.

Thanks

Sincerely,

Signature *xingliao Xie*

Name: xingliao xie Date: 2017-11-01

Title: Manager