RF TEST REPORT

Report No.: 17071339-FCC-R

Supersede Report No.: N/A

Applicant	3Dconnexion
Product Name	3Dconnexion Universal Receiver
Main Model	3DX-600055
Serial Model	3DX-700069
Test Standard	FCC Part 15.249: 2016; ANSI C63.10: 2013
Test Date	August 05 to December 18, 2017
Issue Date	December 18, 2017
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Loren Luo	David Huang	
Loren Luo 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

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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
17071339-FCC-R	NONE	Original	December 18, 2017

2. Customer information

Applicant Name	3Dconnexion
Applicant Add	33, Rue du Portier, 98000 Monaco
Manufacturer	3Dconnexion
Manufacturer Add	33, Rue du Portier, 98000 Monaco

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_EMC(ver.Icp-03A1)

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

4. Equipment under Test (EUT) Information

Description of EUT:	3Dconnexion Universal Receiver
Main Model:	3DX-600055
Serial Model:	3DX-700069
Date EUT received:	August 04, 2017
Test Date(s):	August 05 to December 18, 2017
Antenna Gain:	2.4G: -2.72dBi
Antenna Type:	Patch antenna
Power:	86.39dBuV/m
Type of Modulation:	2.4G: GFSK
RF Operating Frequency (ies):	2.4G: 2404-2477 MHz
Number of Channels:	40CH
Port:	USB Port
Input Power:	Battery: Model: 603450 Spec: 3.7V, 4.07Wh, 1100mAh Voltage: 4.2V
Trade Name :	3Dconnexion
FCC ID:	2AAHQ-UR

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

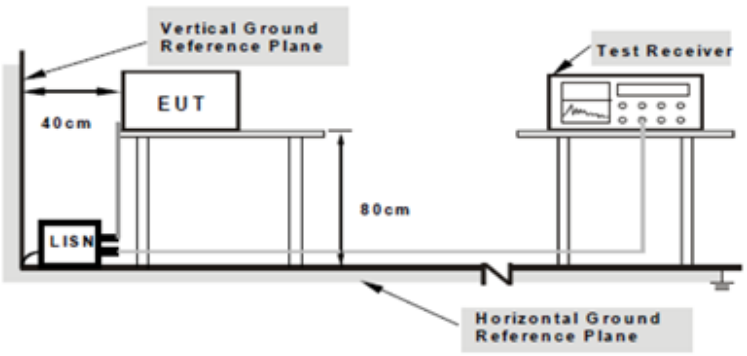
The EUT has 1 antenna:

A permanently attached Patch antenna for 2.4G the gain is -2.72dBi for 2.4G.

Test Result: Pass

6.2 AC Line Conducted Emissions

Temperature	25℃
Relative Humidity	53%
Atmospheric Pressure	1010mbar
Test date :	December 12, 2017
Tested By :	Loren Luo

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>§15.207</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"> 

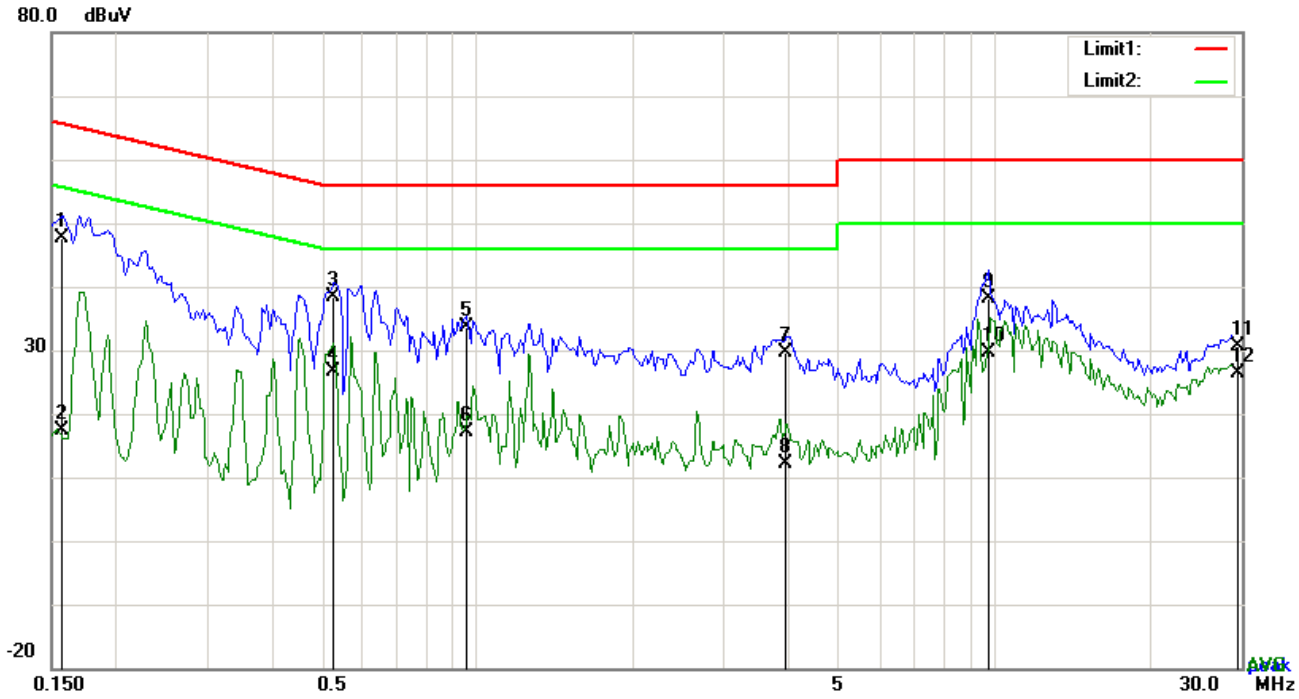
Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.</td></tr>
<tr><td>Procedure</td><td colspan="3">1. The EUT and supporting equipment were set up in accordance with the requirements of 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.
3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.</td></tr>
</table>

	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

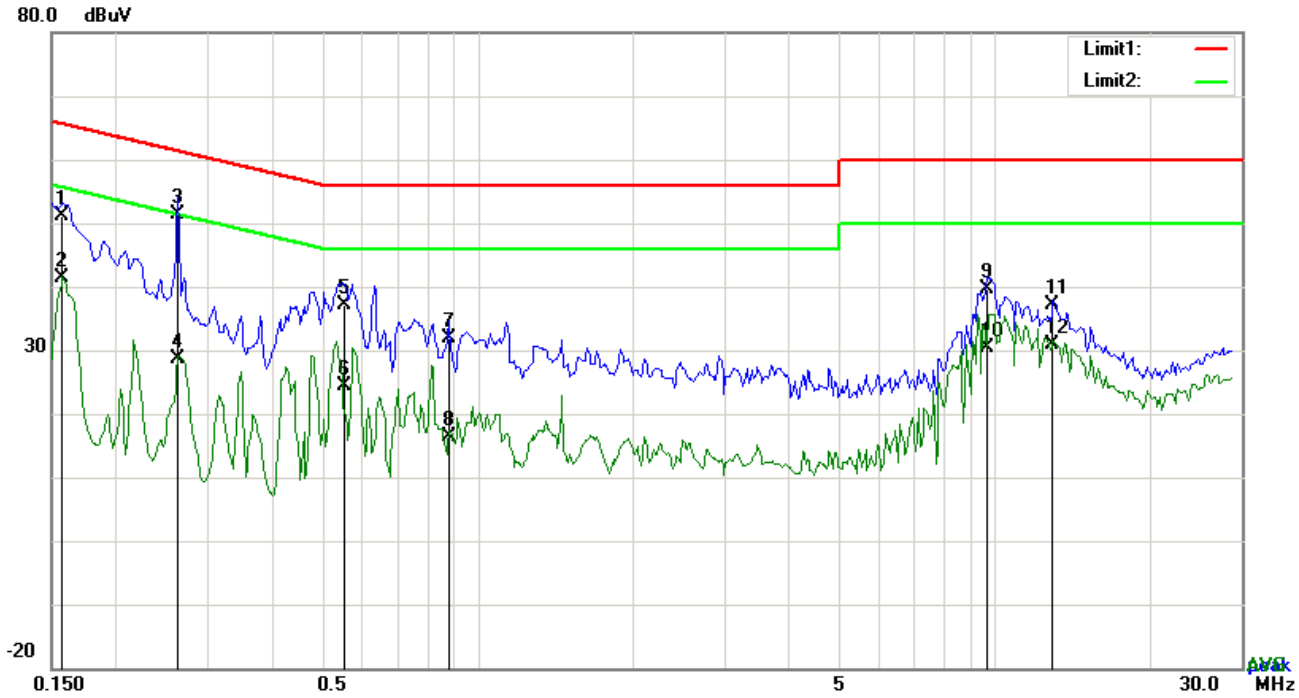


Test Data

Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)
1	L1	0.1578	37.50	QP	10.03	47.53	65.58	-18.05
2	L1	0.1578	7.29	AVG	10.03	17.32	55.58	-38.26
3	L1	0.5283	28.35	QP	10.03	38.38	56.00	-17.62
4	L1	0.5283	16.65	AVG	10.03	26.68	46.00	-19.32
5	L1	0.9534	23.49	QP	10.03	33.52	56.00	-22.48
6	L1	0.9534	7.10	AVG	10.03	17.13	46.00	-28.87
7	L1	3.9594	19.46	QP	10.07	29.53	56.00	-26.47
8	L1	3.9594	2.16	AVG	10.07	12.23	46.00	-33.77
9	L1	9.7236	27.90	QP	10.15	38.05	60.00	-21.95
10	L1	9.7236	19.50	AVG	10.15	29.65	50.00	-20.35
11	L1	29.6175	20.03	QP	10.48	30.51	60.00	-29.49
12	L1	29.6175	15.85	AVG	10.48	26.33	50.00	-23.67

Test Mode:	2.4G Mode

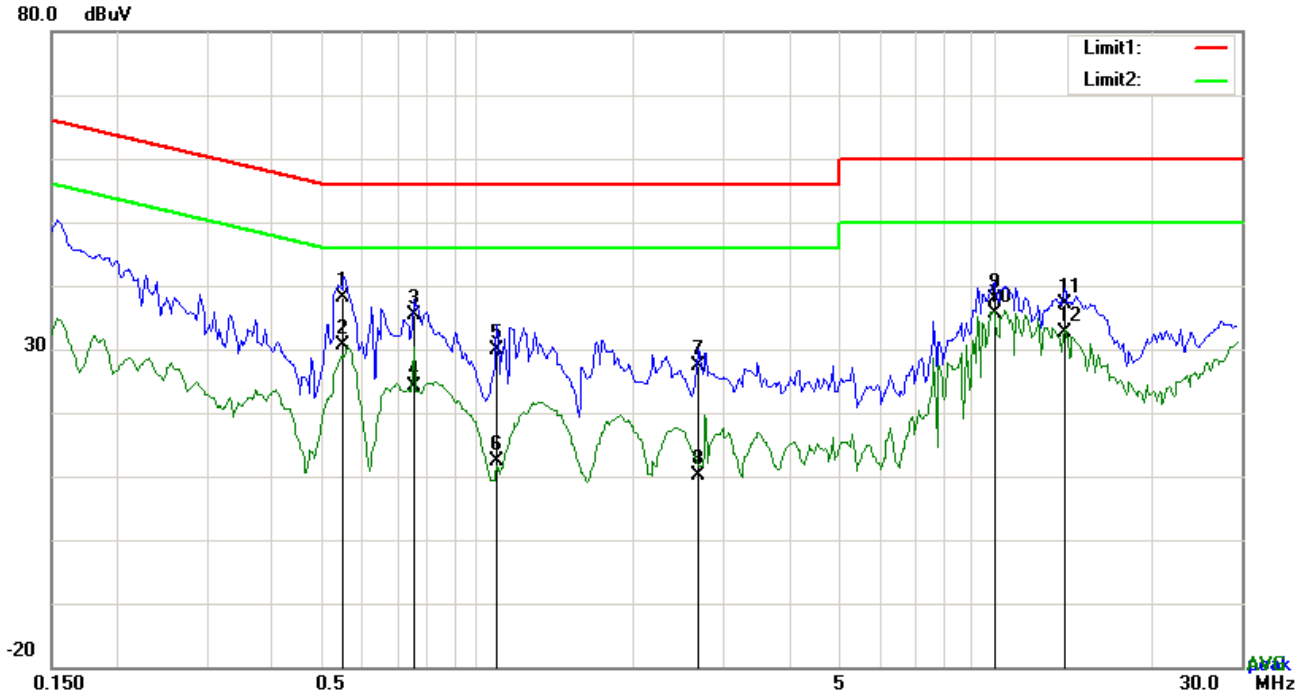


Test Data

Phase Neutral Plot at 120Vac, 60Hz

No.	P/L	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)
1	N	0.1578	41.18	QP	10.03	51.21	65.58	-14.37
2	N	0.1578	31.23	AVG	10.03	41.26	55.58	-14.32
3	N	0.2631	41.31	QP	10.03	51.34	61.33	-9.99
4	N	0.2631	18.48	AVG	10.03	28.51	51.33	-22.82
5	N	0.5523	27.14	QP	10.03	37.17	56.00	-18.83
6	N	0.5523	14.33	AVG	10.03	24.36	46.00	-21.64
7	N	0.8832	21.86	QP	10.03	31.89	56.00	-24.11
8	N	0.8832	6.29	AVG	10.03	16.32	46.00	-29.68
9	N	9.6846	29.38	QP	10.15	39.53	60.00	-20.47
10	N	9.6846	20.30	AVG	10.15	30.45	50.00	-19.55
11	N	12.9489	26.87	QP	10.19	37.06	60.00	-22.94
12	N	12.9489	20.75	AVG	10.19	30.94	50.00	-19.06

Test Mode:	2.4G Mode

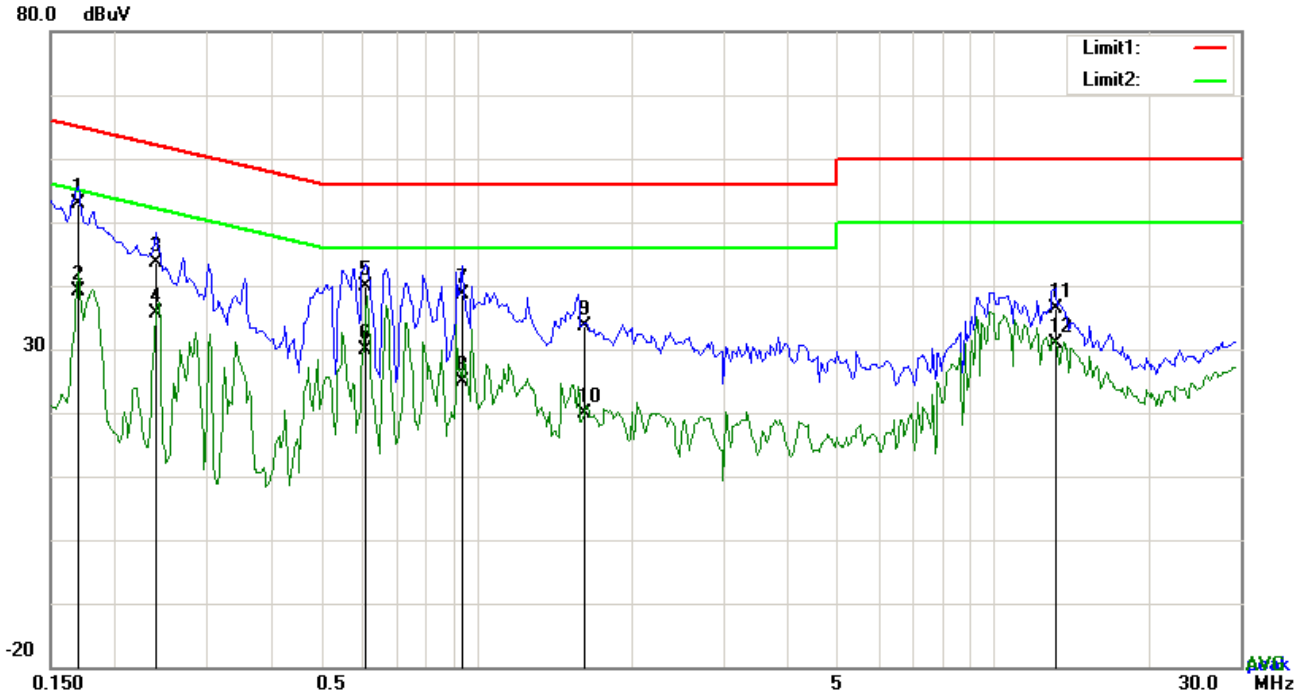


Test Data

Phase Line Plot at 240Vac, 60Hz

No.	P/L	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)
1	L1	0.5517	28.07	QP	10.03	38.10	56.00	-17.90
2	L1	0.5517	20.63	AVG	10.03	30.66	46.00	-15.34
3	L1	0.7545	25.47	QP	10.03	35.50	56.00	-20.50
4	L1	0.7545	14.04	AVG	10.03	24.07	46.00	-21.93
5	L1	1.0899	19.91	QP	10.03	29.94	56.00	-26.06
6	L1	1.0899	2.35	AVG	10.03	12.38	46.00	-33.62
7	L1	2.6694	17.37	QP	10.05	27.42	56.00	-28.58
8	L1	2.6694	0.05	AVG	10.05	10.10	46.00	-35.90
9	L1	9.9849	27.78	QP	10.15	37.93	60.00	-22.07
10	L1	9.9849	25.48	AVG	10.15	35.63	50.00	-14.37
11	L1	13.6392	26.88	QP	10.20	37.08	60.00	-22.92
12	L1	13.6392	22.37	AVG	10.20	32.57	50.00	-17.43

Test Mode:	2.4G Mode



Test Data

Phase Neutral Plot at 240Vac, 60Hz

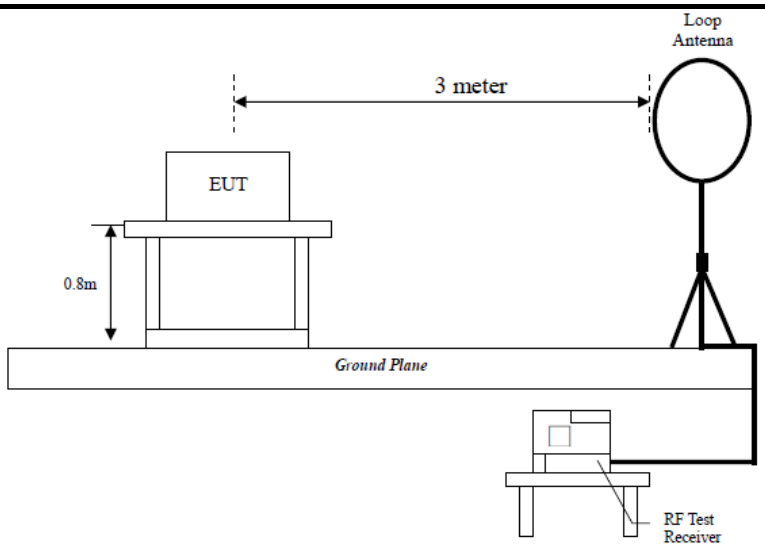
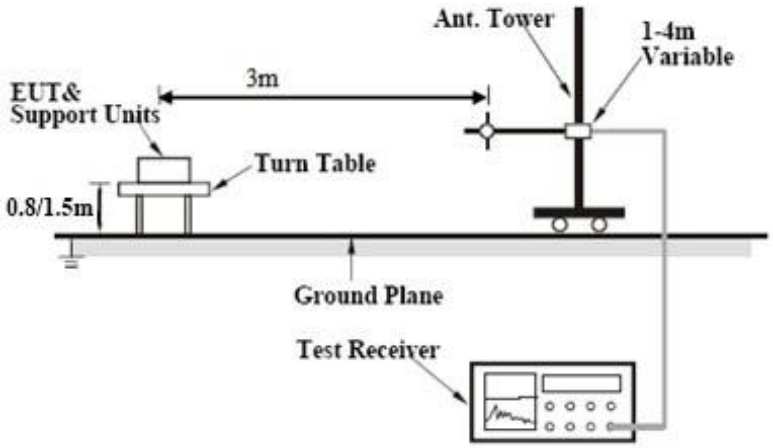
No.	P/L	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)
1	N	0.1695	42.91	QP	10.02	52.93	64.98	-12.05
2	N	0.1695	29.21	AVG	10.02	39.23	54.98	-15.75
3	N	0.2397	33.54	QP	10.02	43.56	62.11	-18.55
4	N	0.2397	25.68	AVG	10.02	35.70	52.11	-16.41
5	N	0.6102	29.88	QP	10.02	39.90	56.00	-16.10
6	N	0.6102	19.76	AVG	10.02	29.78	46.00	-16.22
7	N	0.9417	28.68	QP	10.03	38.71	56.00	-17.29
8	N	0.9417	14.96	AVG	10.03	24.99	46.00	-21.01
9	N	1.6125	23.60	QP	10.04	33.64	56.00	-22.36
10	N	1.6125	9.90	AVG	10.04	19.94	46.00	-26.06
11	N	13.1439	26.23	QP	10.18	36.41	60.00	-23.59
12	N	13.1439	20.82	AVG	10.18	31.00	50.00	-19.00

6.3 Radiated Spurious Emissions

Temperature	25℃
Relative Humidity	53%
Atmospheric Pressure	1010mbar
Test date :	December 12, 2017
Tested By :	Loren Luo

Requirement(s):

<table>
<tr><th>Spec</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>§15.209, §15.205, §15.249(a) & §15.249(d)</td><td>
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>
(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>
</td><td>☑</td></tr>
</table>

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.

	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

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:

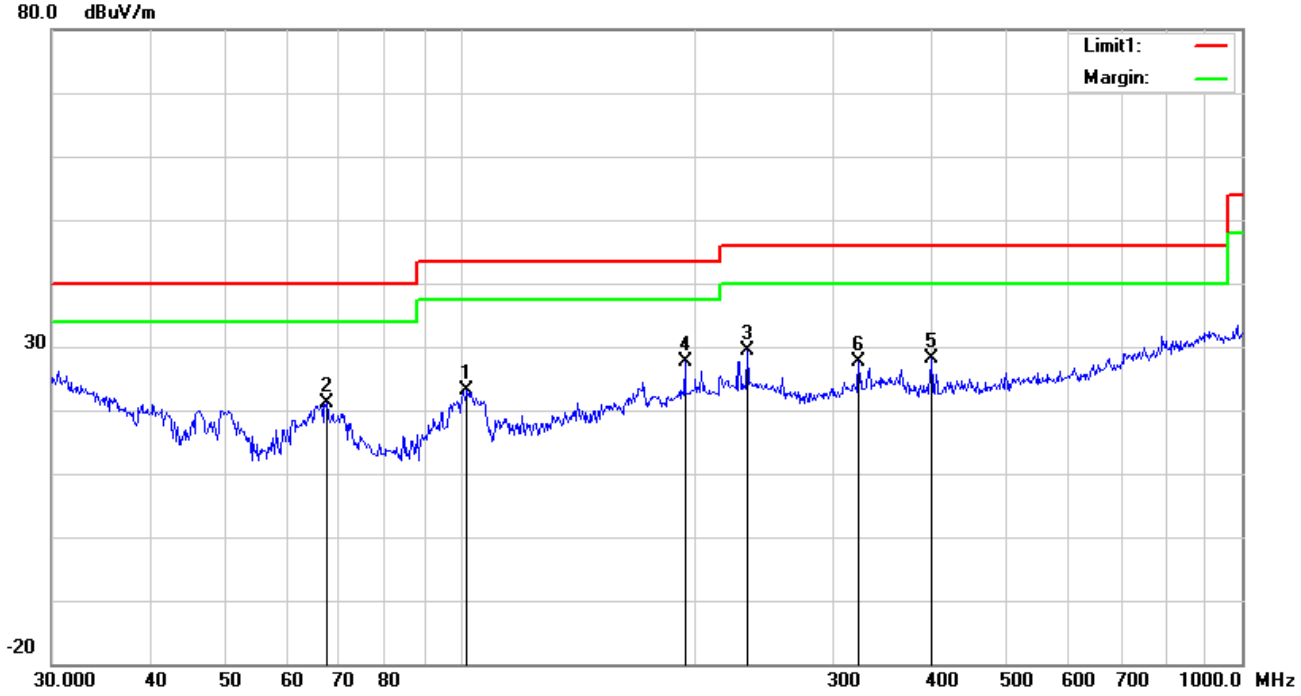
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =40 log (specific distance/test distance)(dB);

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

Test Mode:	2.4G Mode

30MHz -1GHz

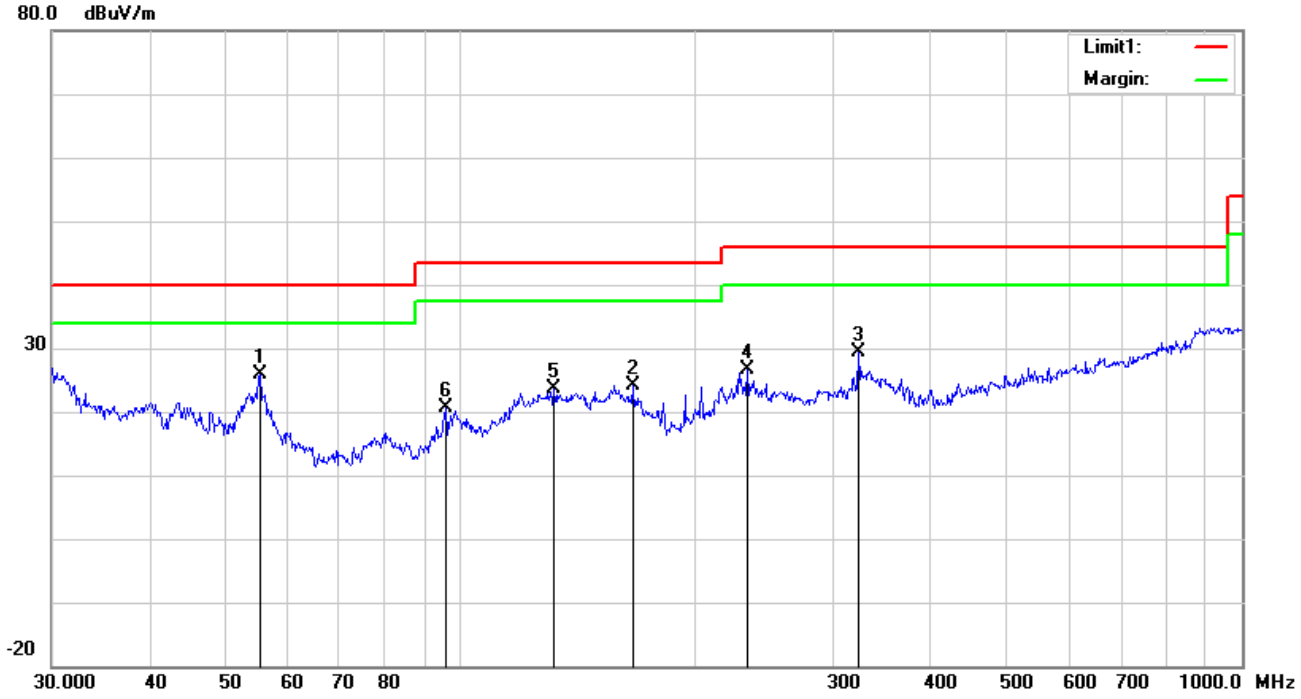


Test Data

Vertical Polarity Plot @3m

No.	P/L	Frequency	Reading	Detector	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	102.0014	33.45	peak	10.75	22.32	1.13	23.01	43.50	-20.49	100	97
2	H	67.4382	34.88	peak	7.67	22.39	0.93	21.09	40.00	-18.91	100	145
3	H	233.3487	38.48	peak	11.63	22.32	1.65	29.44	46.00	-16.56	100	317
4	H	193.7728	36.59	peak	11.76	22.34	1.54	27.55	43.50	-15.95	100	277
5	H	400.4319	32.42	peak	15.71	22.01	2.01	28.13	46.00	-17.87	100	359
6	H	323.3204	33.73	peak	14.09	22.22	1.91	27.51	46.00	-18.49	100	45

30MHz -1GHz



Test Data

Horizontal Polarity Plot @3m

No.	P/L	Frequency	Reading	Detector	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	V	55.4147	39.70	peak	7.80	22.40	0.78	25.88	40.00	-14.12	100	257
2	V	166.0680	32.88	peak	12.11	22.26	1.37	24.10	43.50	-19.40	100	85
3	V	323.3204	35.54	peak	14.09	22.22	1.91	29.32	46.00	-16.68	100	250
4	V	232.5318	35.61	peak	11.64	22.32	1.64	26.57	46.00	-19.43	100	77
5	V	131.7577	31.63	peak	13.14	22.39	1.21	23.59	43.50	-19.91	100	339
6	V	95.7622	32.46	peak	9.38	22.32	1.01	20.53	43.50	-22.97	200	325

Above 1GHz

Test Mode:	2.4G Mode

Low Channel (2404 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)
4808	38.17	AV	V	33.39	7.22	48.46	30.32	54	-23.68
4808	37.66	AV	H	33.39	7.22	48.46	29.81	54	-24.19
4808	46.82	PK	V	33.39	7.22	48.46	38.97	74	-35.03
4808	46.44	PK	H	33.39	7.22	48.46	38.59	74	-35.41
6348	23.77	AV	V	35.52	7.83	48.71	18.41	54	-35.59
6348	25.11	AV	H	35.52	7.83	48.71	19.75	54	-34.25
6348	42.18	PK	V	35.52	7.83	48.71	36.82	74	-37.18
6348	41.69	PK	H	35.52	7.83	48.71	36.33	74	-37.67

Middle Channel (2442 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)
4884	38.08	AV	V	33.62	7.53	48.36	30.87	54	-23.13
4884	38.77	AV	H	33.62	7.53	48.36	31.56	54	-22.44
4884	47.08	PK	V	33.62	7.53	48.36	39.87	74	-34.13
4884	46.57	PK	H	33.62	7.53	48.36	39.36	74	-34.64
10912	24.32	AV	V	39.57	10.98	47.08	27.79	54	-26.21
10912	25.51	AV	H	39.57	10.98	47.08	28.98	54	-25.02
10912	42.64	PK	V	39.57	10.98	47.08	46.11	74	-27.89
10912	40.48	PK	H	39.57	10.98	47.08	43.95	74	-30.05

High Channel (2477 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)
4954	36.79	AV	V	33.89	7.86	48.31	30.23	54	-23.77
4954	38.15	AV	H	33.89	7.86	48.31	31.59	54	-22.41
4954	47.9	PK	V	33.89	7.86	48.31	41.34	74	-32.66
4954	46.96	PK	H	33.89	7.86	48.31	40.4	74	-33.6
17804	24.75	AV	V	41.99	17.02	46.02	37.74	54	-16.26
17804	24.56	AV	H	41.99	17.02	46.02	37.55	54	-16.45
17804	41.44	PK	V	41.99	17.02	46.02	54.43	74	-19.57
17804	41.06	PK	H	41.99	17.02	46.02	54.05	74	-19.95

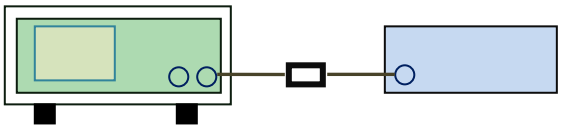
Note:

*1, The testing has been conformed to 10*2477MHz=24,770MHz*
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℃
Relative Humidity	55%
Atmospheric Pressure	1017mbar
Test date :	December 18, 2017
Tested By :	Loren Luo

Requirement(s):

Spec	Requirement	Applicable
§15.249(a)	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		
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

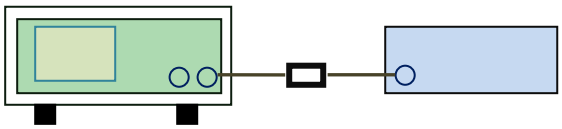
Field Strength Measurement

P/L	Frequency	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB/m)	(dB)	
H	2404	100.29	-13.9	86.39	114	-27.61	peak
H	2404	85.54	-13.9	71.64	94	-22.36	AVG
V	2404	96.19	-13.9	82.29	114	-31.71	peak
V	2404	83.41	-13.9	69.51	94	-24.49	AVG
H	2442	96.46	-13.82	82.64	114	-31.36	peak
H	2442	82	-13.82	68.18	94	-25.82	AVG
V	2442	94.16	-13.82	80.34	114	-33.66	peak
V	2442	82.97	-13.82	69.15	94	-24.85	AVG
H	2477	92.73	-13.71	79.02	114	-34.98	peak
H	2477	81.88	-13.71	68.17	94	-25.83	AVG
V	2477	91.21	-13.71	77.50	114	-36.5	peak
V	2477	79.63	-13.71	65.92	94	-28.08	AVG

6.5 20dB Bandwidth Testing

Temperature	26℃
Relative Humidity	55%
Atmospheric Pressure	1017mbar
Test date :	December 18, 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			
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

Test Data ☑ Yes ☐ N/A

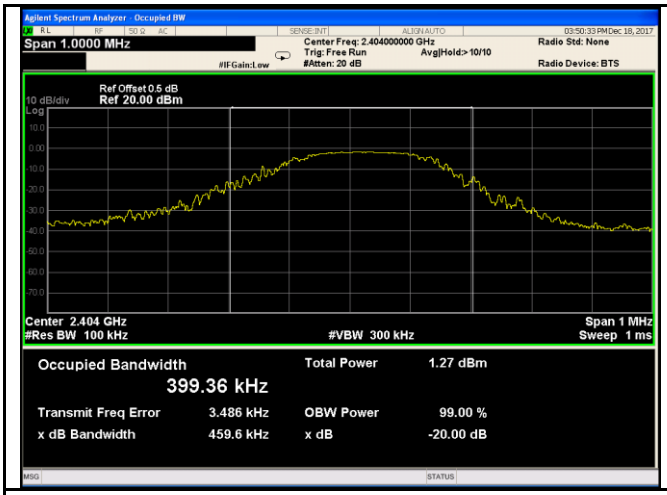
Test Plot ☑ Yes (See below) ☐ N/A

20dB Bandwidth measurement result

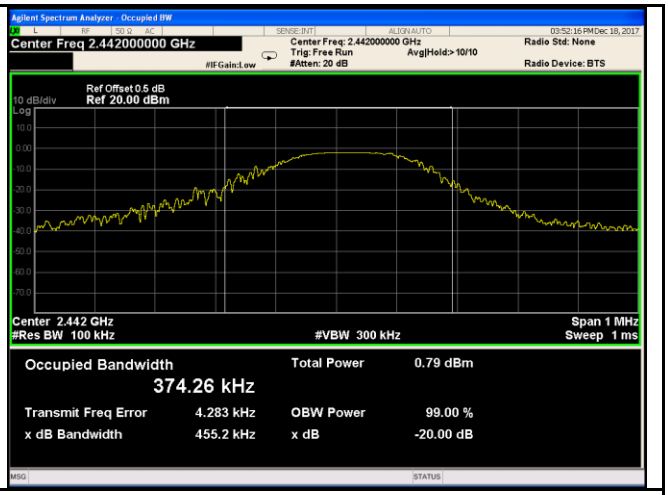
CH	Fundamental Frequency (MHz)	20dB Bandwidth (MHz)	Result
Low	2404	0.460	Pass
Middle	2442	0.455	Pass
High	2477	0.469	Pass

Test Plots

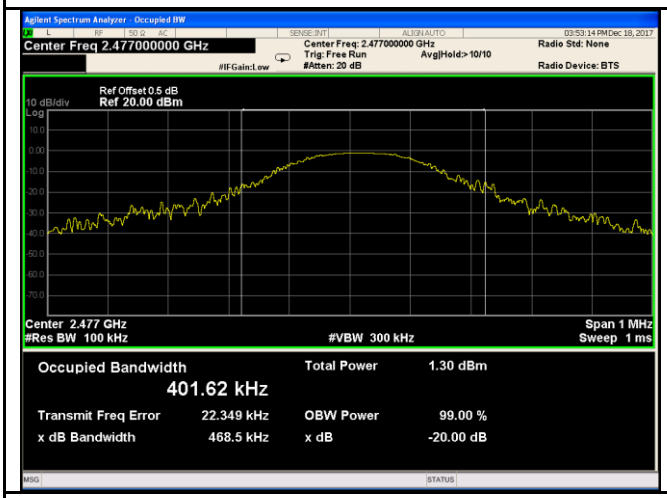
20dB Bandwidth measurement result



20dB Bandwidth - Low CH 2404



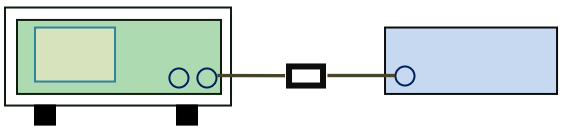
20dB Bandwidth - Middle CH 2442



20dB Bandwidth - High CH 2477

6.6 Band Edge

Temperature	26℃
Relative Humidity	55%
Atmospheric Pressure	1017mbar
Test date :	December 18, 2017
Tested By :	Loren Luo

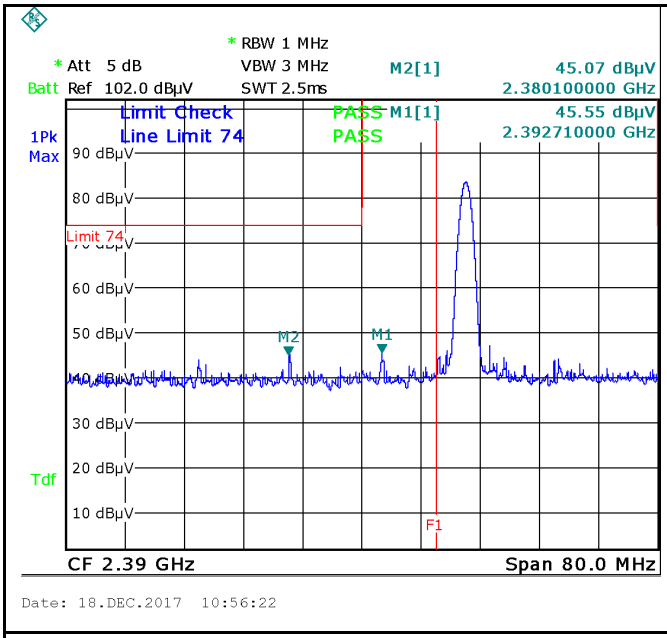
Spec	Item	Requirement	Applicable
§15.249(d)	a)	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.	☑
Test Setup			
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

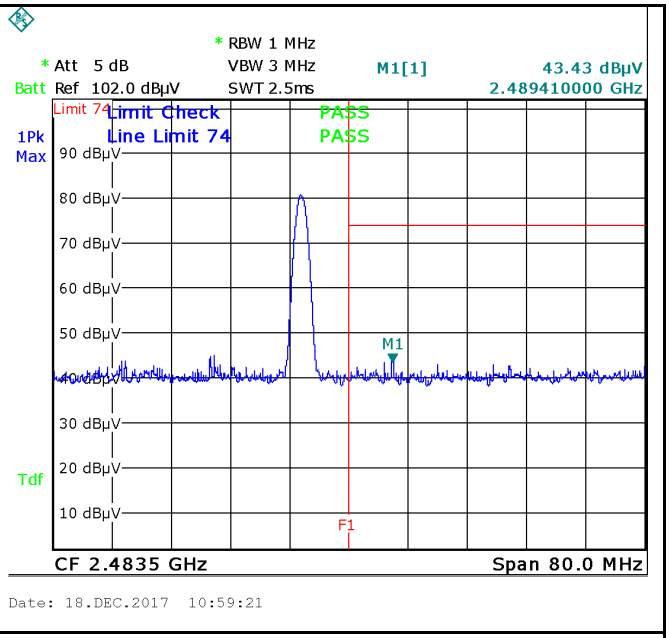
Test Plots

Band Edge measurement result



Band Edge, Left Side (Peak)

Note: F1 is frequency 2390MHz; F2 is frequency 2400MHz



Band Edge, Right Side (Peak)

Note: F1 is frequency 2483.5MHz

Note: (no need if PK value less than the AV limit)

Note: (no need if PK value less than the AV limit)

Band Edge, Left Side-AV

Band Edge, Right Side-AV

Note: Both Horizontal and vertical polarities were investigated.

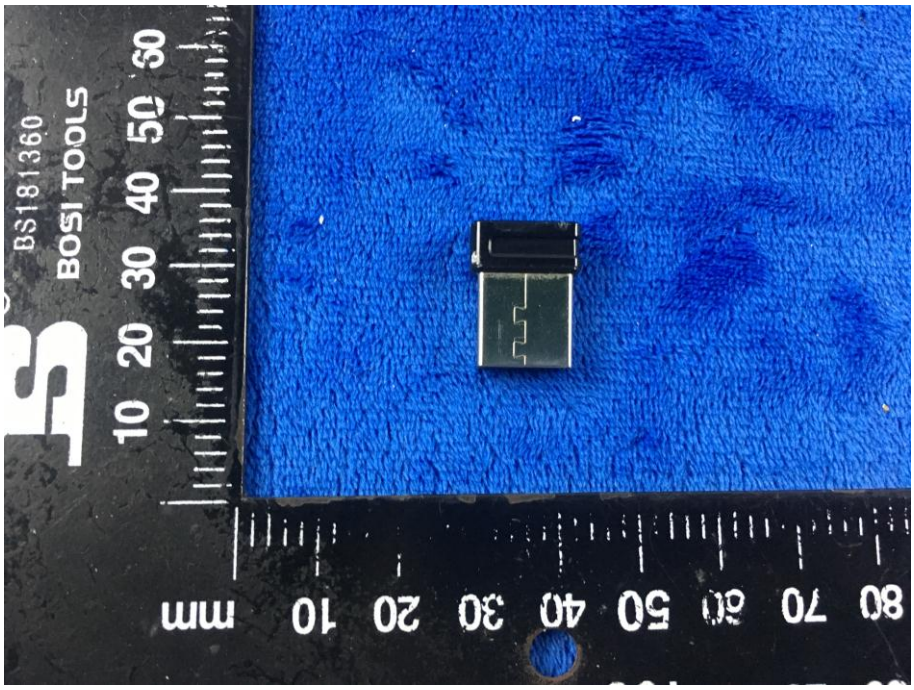
Annex A. TEST INSTRUMENT

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	☑
Universal Radio Communication Tester	CMU200	121393	09/23/2017	09/22/2018	☑

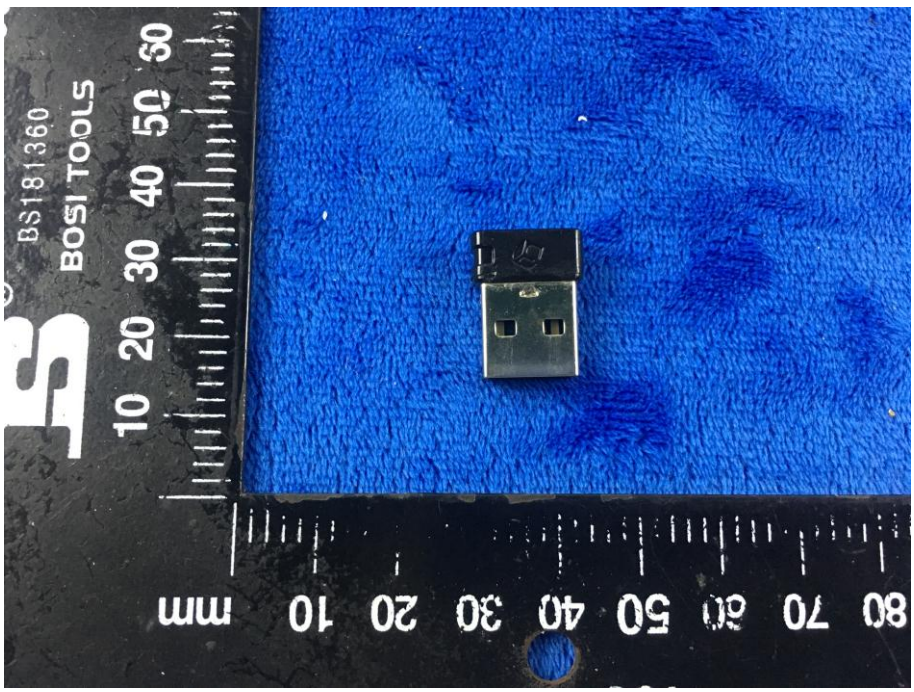
Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo

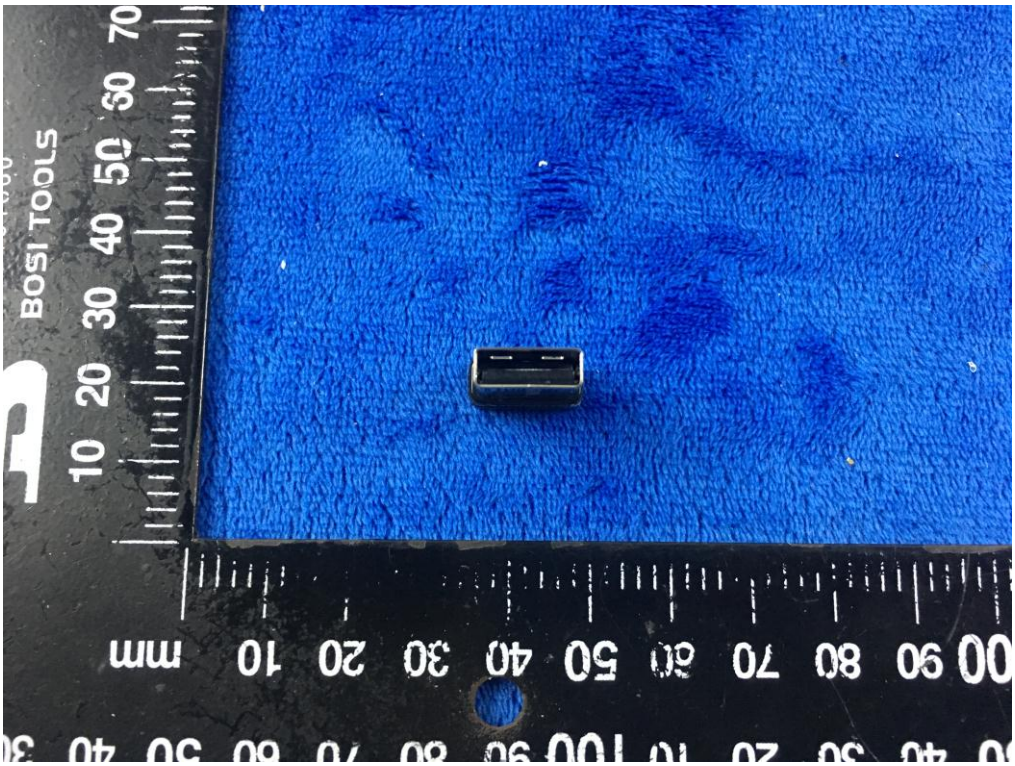
EUT - Front View



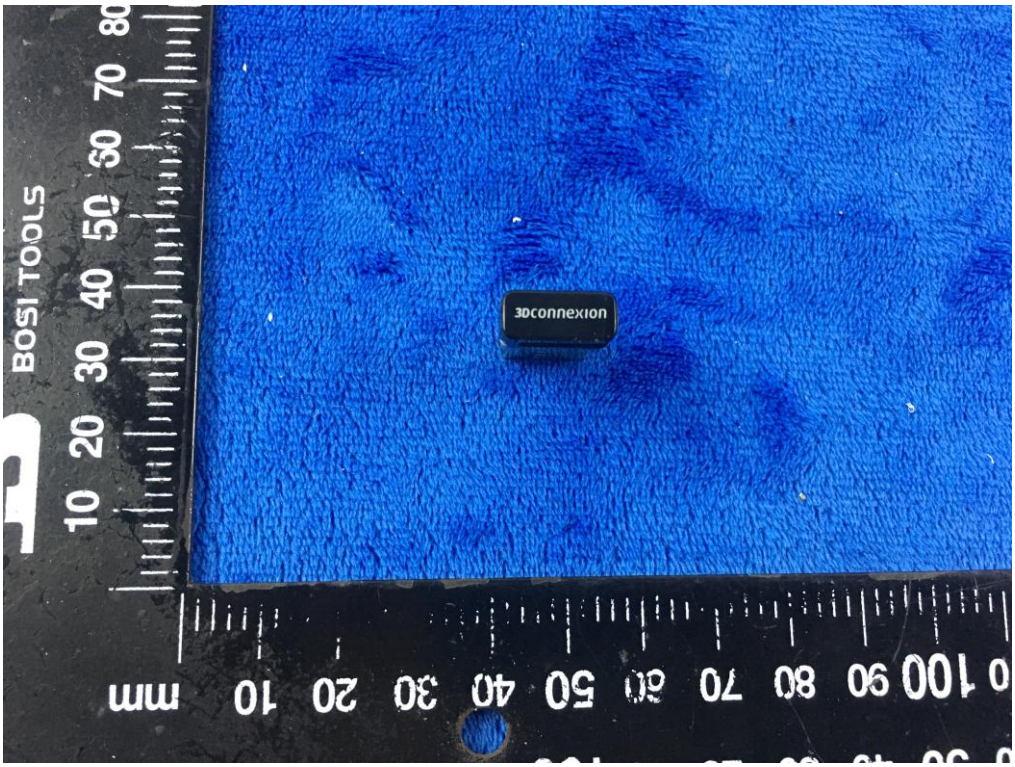
EUT - Rear View



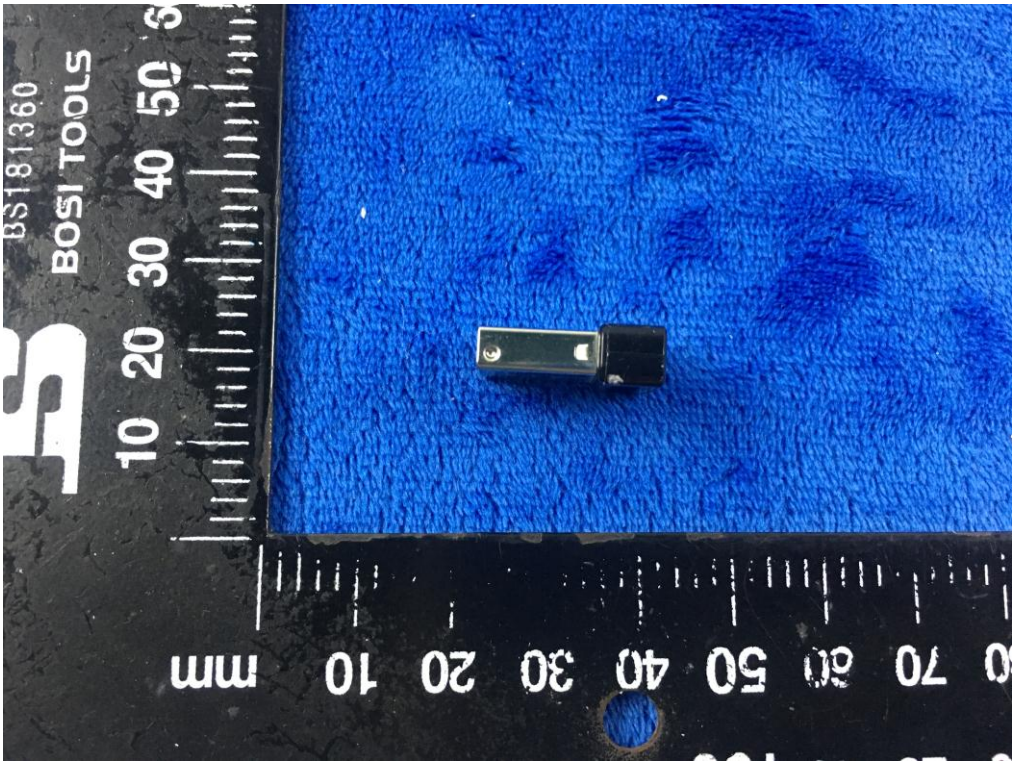
EUT – Top View



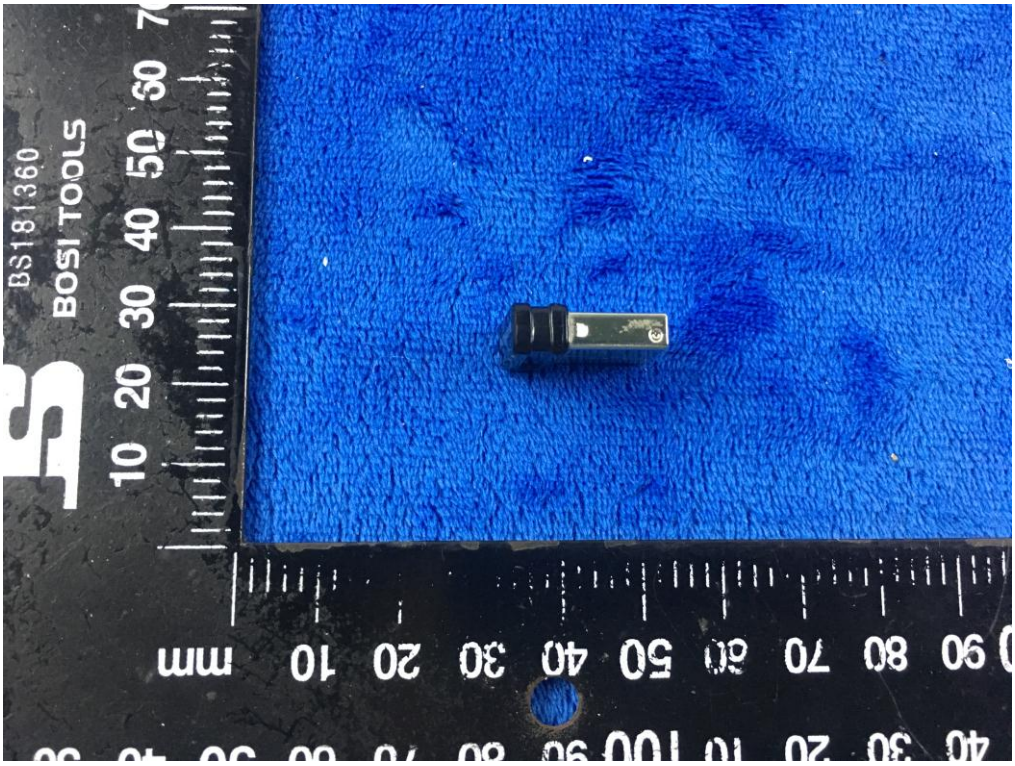
EUT - Bottom View



EUT - Left View

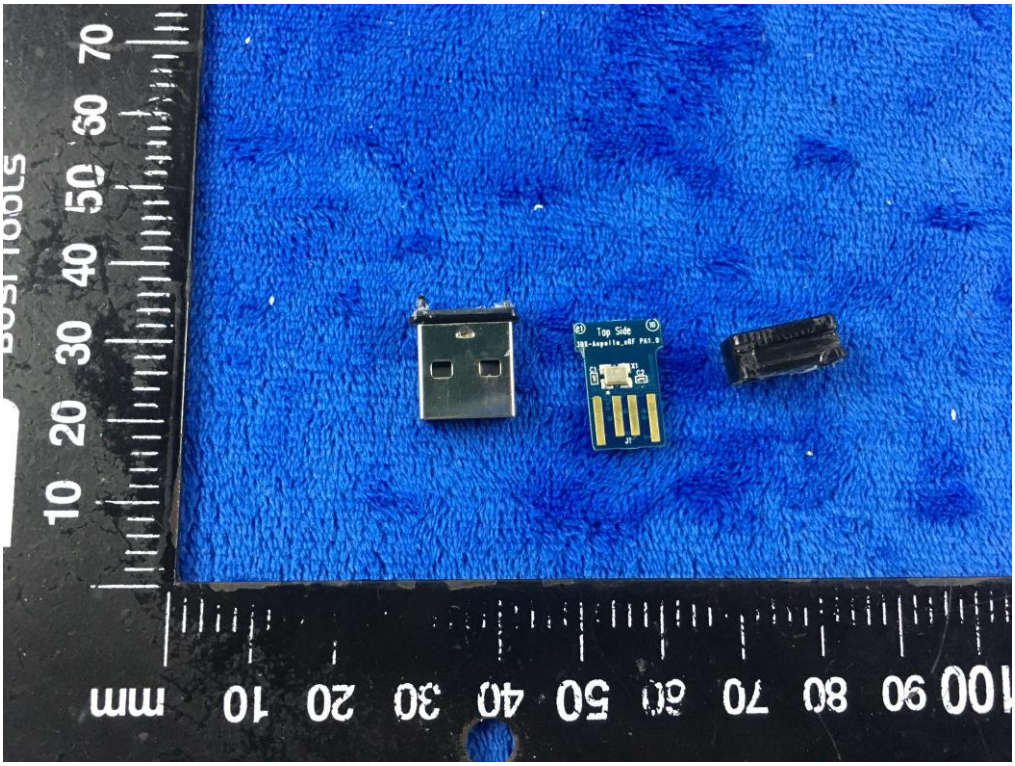


EUT - Right View

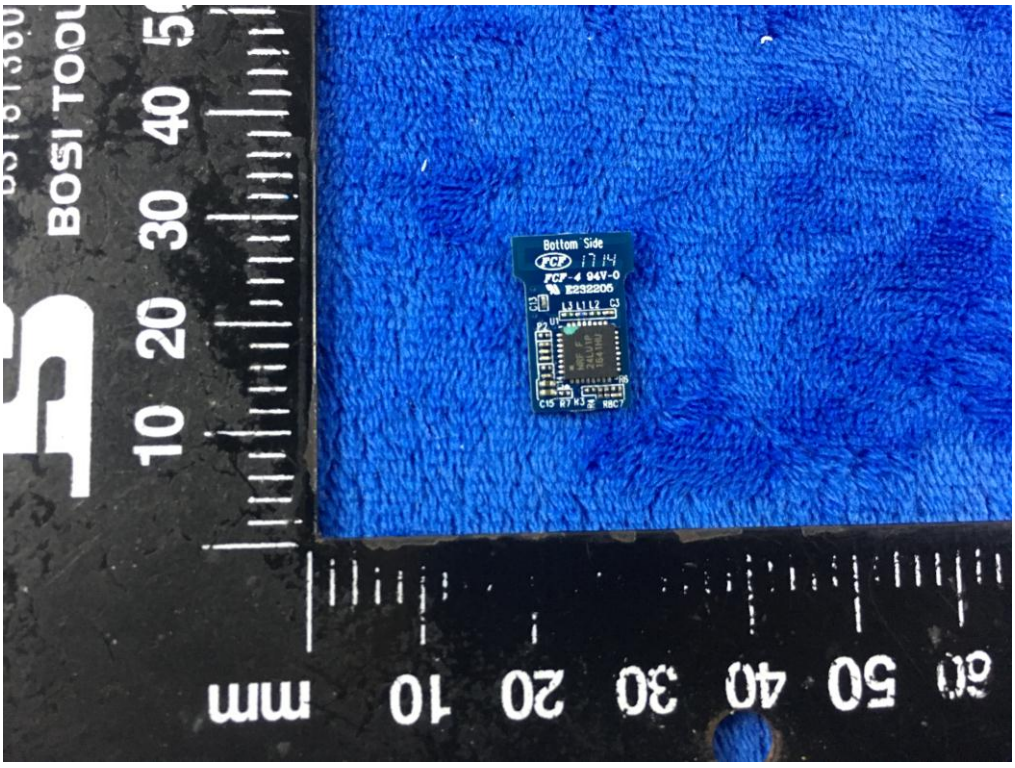


Annex B.ii. Photograph: EUT Internal Photo

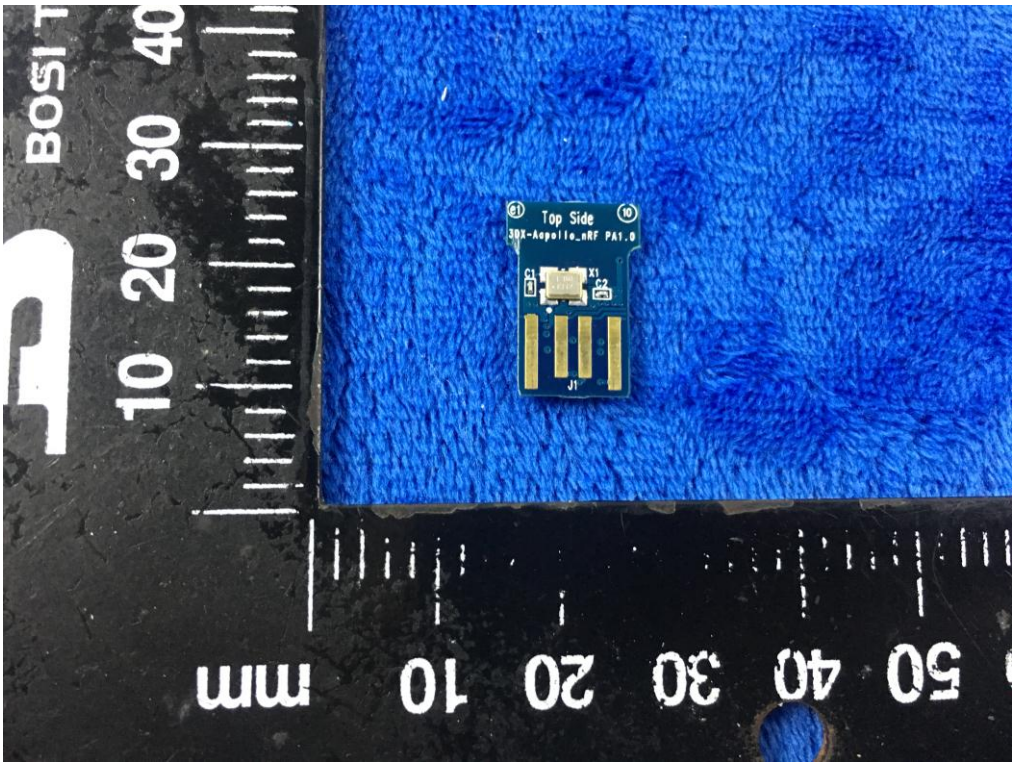
Cover Off - Top View



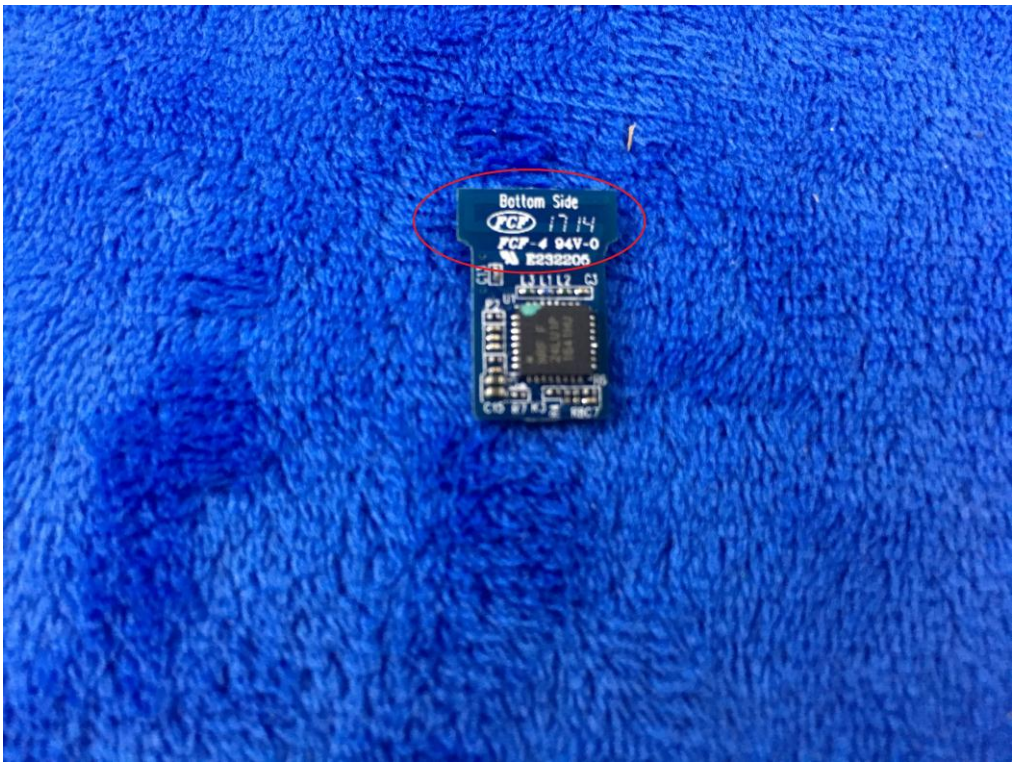
Mainboard - Front View



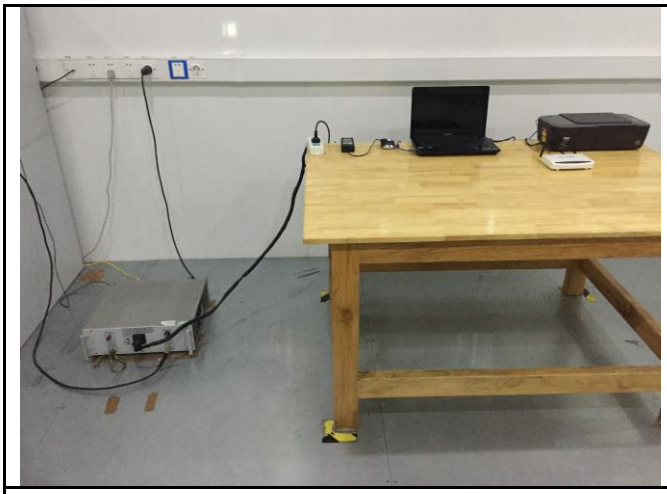
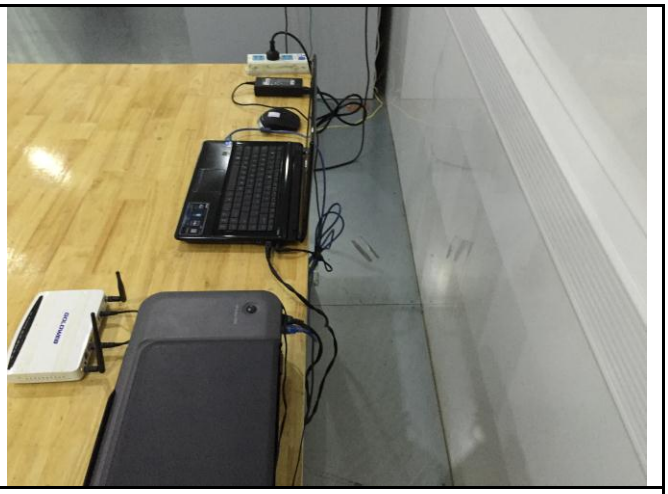
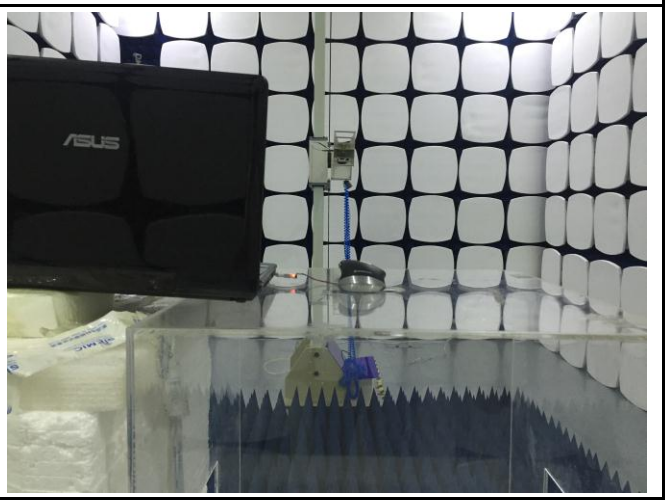
Mainboard - Rear View



BT – Antenna View



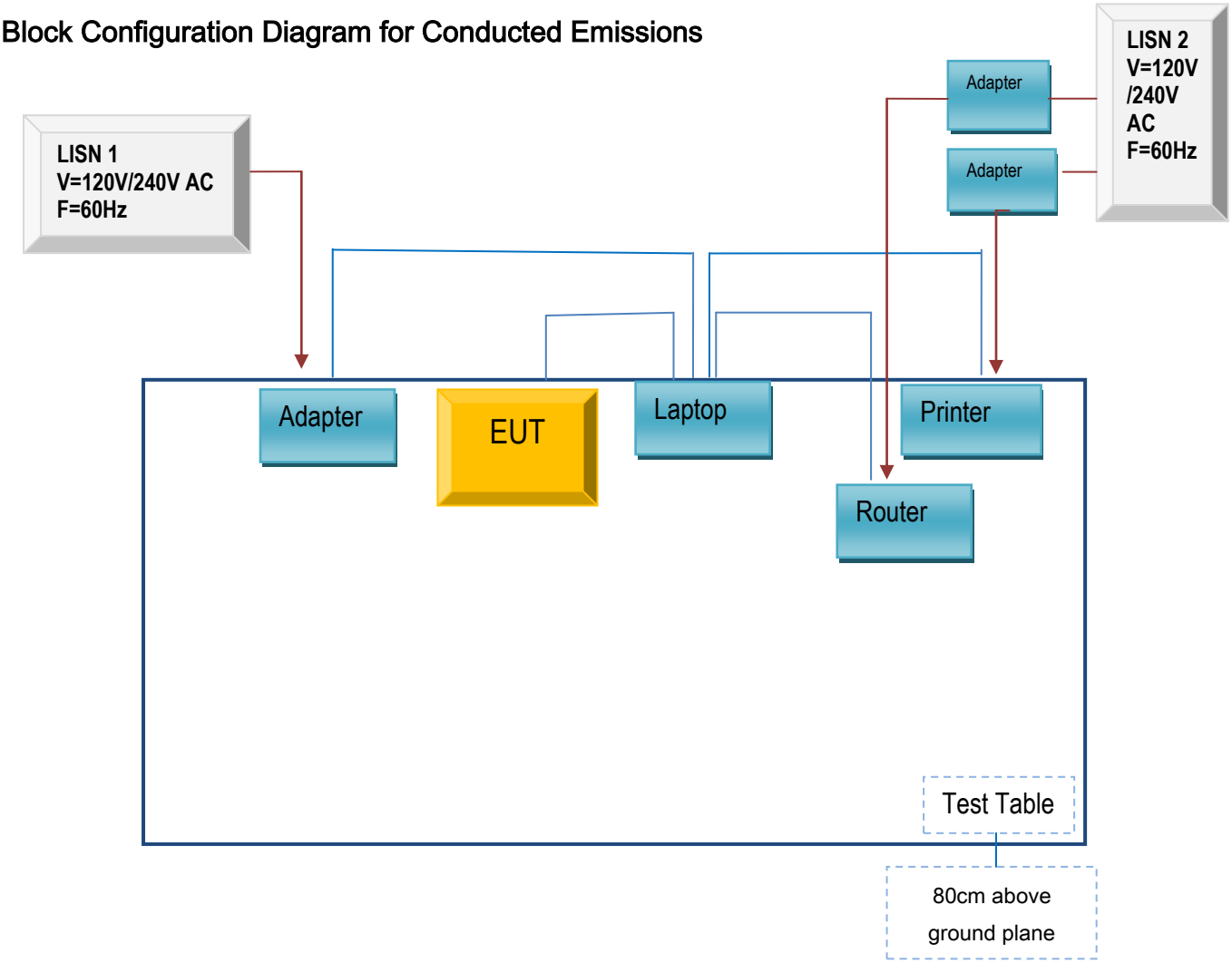
Annex B.iii. Photograph: Test Setup Photo

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Conducted Emissions Test Setup Front View</td><td>Conducted Emissions Test Setup Side View</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Radiated Spurious Emissions Test Setup Below 1GHz</td><td>Radiated Spurious Emissions Test Setup Above 1GHz</td></tr>
</table>

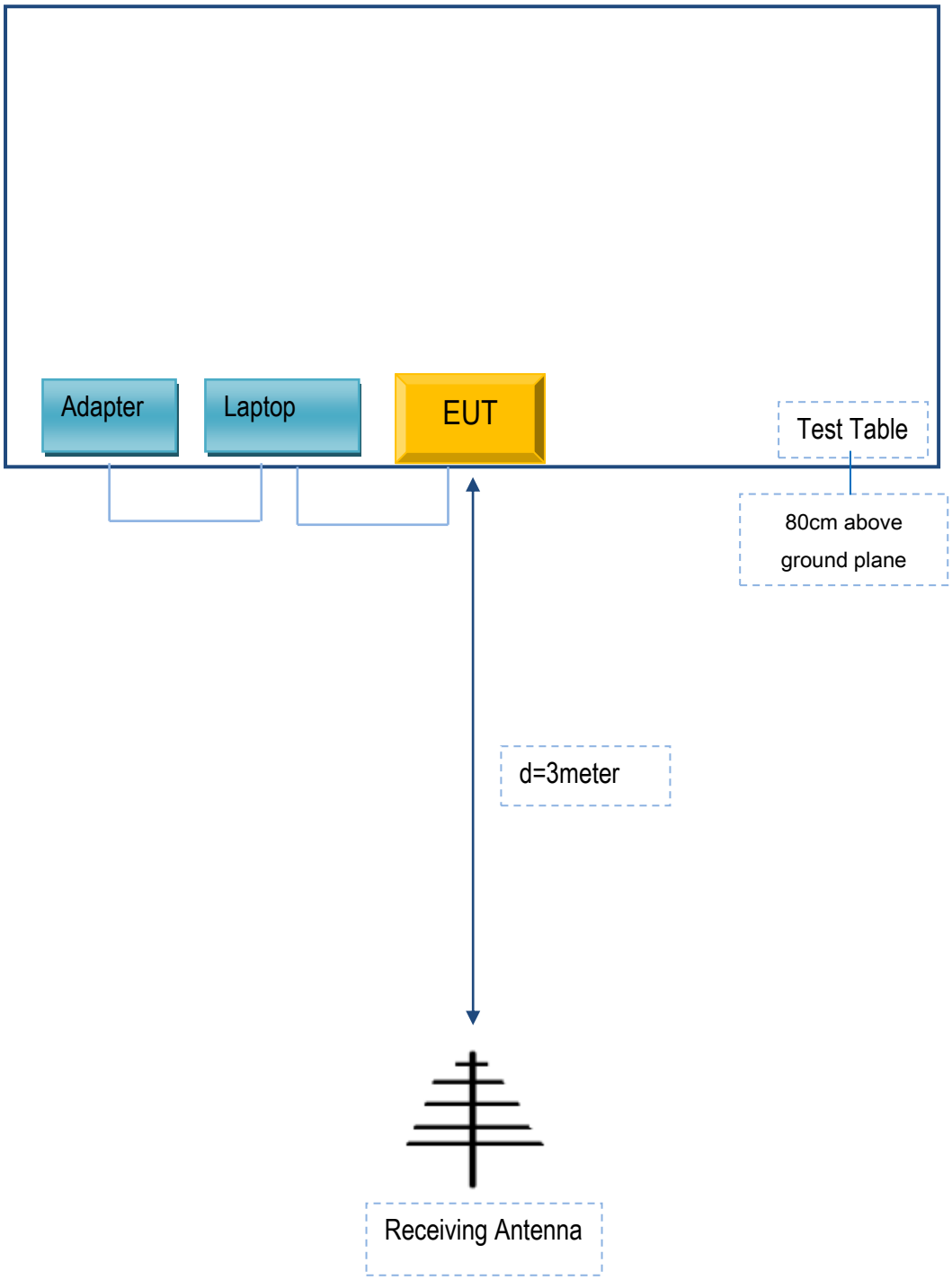
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

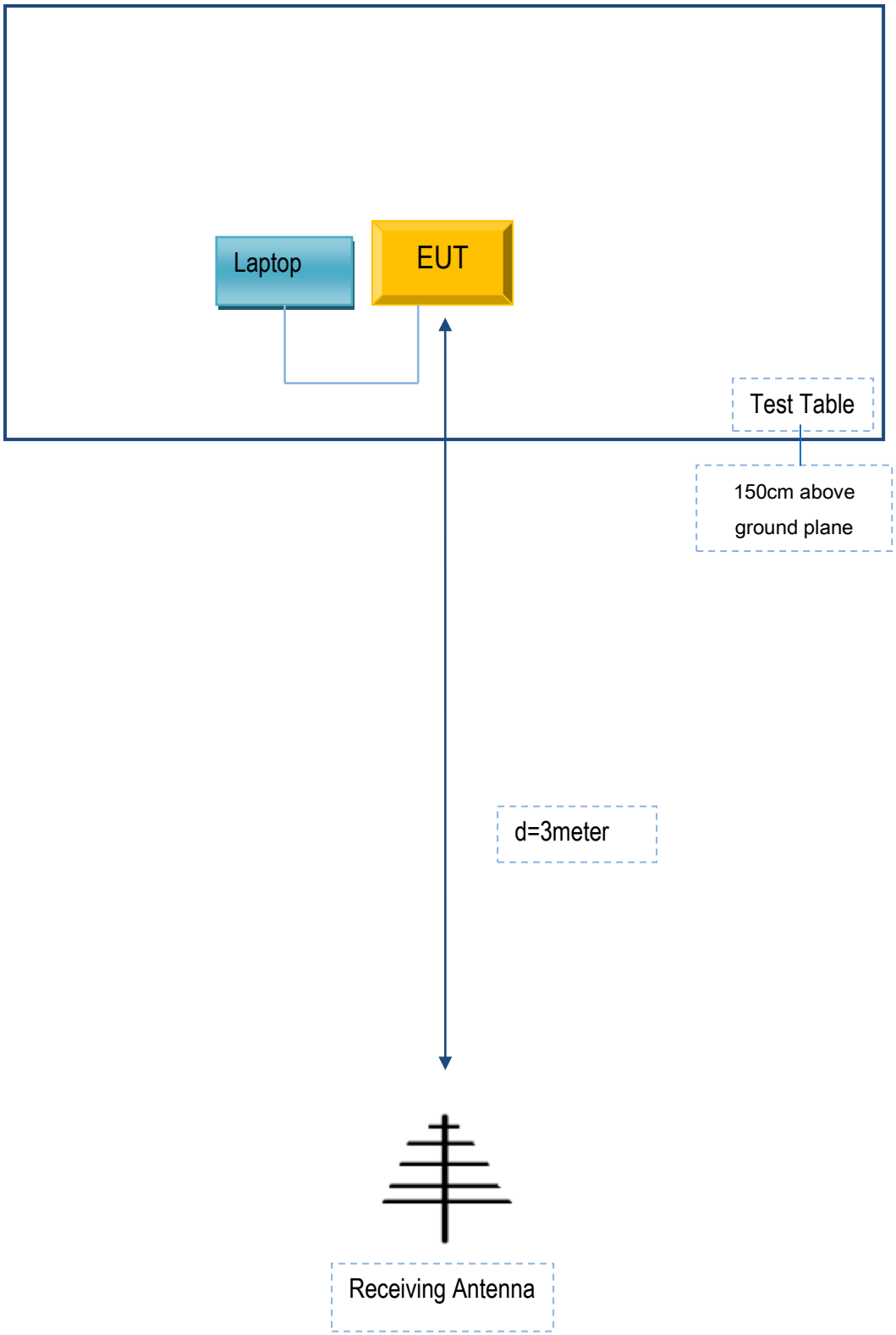
Block Configuration Diagram for Conducted Emissions



Block Configuration Diagram for Radiated Emissions （Below 1GHz）.



Block Configuration Diagram for Radiated Emissions （Above 1GHz）.



Annex C. il. SUPPORTING EQUIPMENT DESCRIPTION

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

Supporting Equipment:

Manufacturer	Equipment Description	Model	Serial No
Lenovo	Laptop	E40	LR-1EHRX
GOLDWEB	Router	R102	1202032094
Lenovo	AC Adapter	42T4416	21D9JU
HP	Printer	VCVRA-1003	CN36M19JWX
DELL	Mouse	E100	912NMTUT41481
BULL	Socket	GN-403	GN201203

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
USB Cable	Un-shielding	No	2m	N/A
USB Cable	Un-shielding	No	2m	N/A
RJ45 Cable	Un-shielding	No	2m	N/A
Router Power cable	Un-shielding	No	2m	N/A
Printer Power cable	Un-shielding	No	2m	N/A
Power Cable	Un-shielding	No	0.8m	N/A

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

Please see attachment

Annex E. DECLARATION OF SIMILARITY

3D Connexion

To: SIEMIC

Declaration Letter

Dear Sir,

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

Model No: 3DX-600055
Serial Model No: 3DX-700069
Trade Name: 3Dconnexion

We declare that : 3DX-600055, 3DX-700069 all models the same PCB and Appearance shape, accessories ,the difference of these is listed as below:

Main Model No	Serial Model No	Difference
3DX-600055	3DX-700069	3DX-600055 is Product model 3DX-700069 is Market model

Thank you!

Sincerely,

Client's signature :

Client's name: Xiaobing lin
Title: Manager
Date:11/22/2017
Contact information : 3Dconnexion
Address : 33,Rue du Portier,9800 Monaco.