EMC TEST REPORT

Report No.: 17071339-FCC-E

Supersede Report No: N/A

Applicant	3Dconnexion
Product Name	3Dconnexion Universal Receiver
Model No.	3DX-600055
Serial No.	3DX-700069
Test Standard	FCC Part 15 Subpart B Class B:2016, ANSI C63.4: 2014
Test Date	August 05 to October 30, 2017
Issue Date	October 31, 2017
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Evans He	David Huang	
Test Engineer	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

Phone: +86 0755 2601 4629801 Email: China@siemic.com.cn

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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CONTENTS

1. Report Revision History

Report No.	Report Version	Description	Issue Date
17071339-FCC-E	NONE	Original	October 31, 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

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 of Radiated Emission	Radiated Emission Program-To Shenzhen v2.0
Test Software of Conducted Emission	EZ-EMC(ver.Icp-03A1)

4. Equipment under Test (EUT) Information

Description of EUT:	3Dconnexion Universal Receiver
Main Model:	3DX-600055
Serial Model:	3DX-700069
Antenna Gain:	2.4G: -2.72dBi
Antenna Type:	Patch antenna
Input Power:	Battery: Model: 603450 Spec: 3.7V, 4.07Wh, 1100mAh Voltage: 4.2V
Equipment Category：	JBP
Type of Modulation:	2.4G: GFSK
RF Operating Frequency (ies):	2.4G: 2404-2477 MHz
Number of Channels:	40CH
Port:	USB Port
Trade Name：	3Dconnexion
FCC ID:	2AAHQ-UR
Date EUT received:	August 04, 2017
Test Date(s):	August 05 to October 30, 2017

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

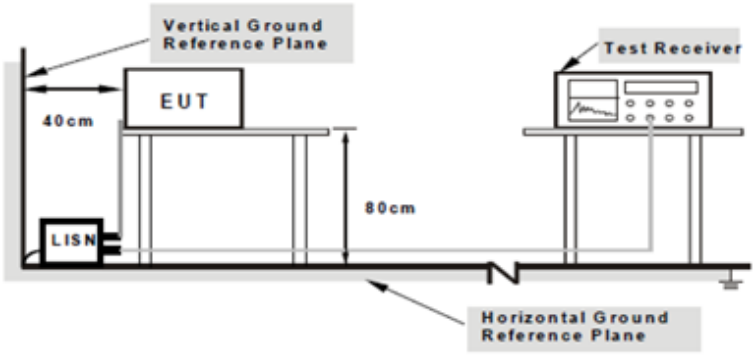
Parameter	Uncertainty
AC Power Line Conducted Emissions (150kHz~30MHz)	±3.11dB
Radiated Emission(30MHz~1GHz)	±5.12dB
Radiated Emission(1GHz~6GHz)	±5.34dB

6. Measurements, Examination And Derived Results

6.1 AC Power Line Conducted Emissions

Temperature	26℃
Relative Humidity	57%
Atmospheric Pressure	1025mbar
Test date :	October 25, 2017
Tested By :	Evans He

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"> 

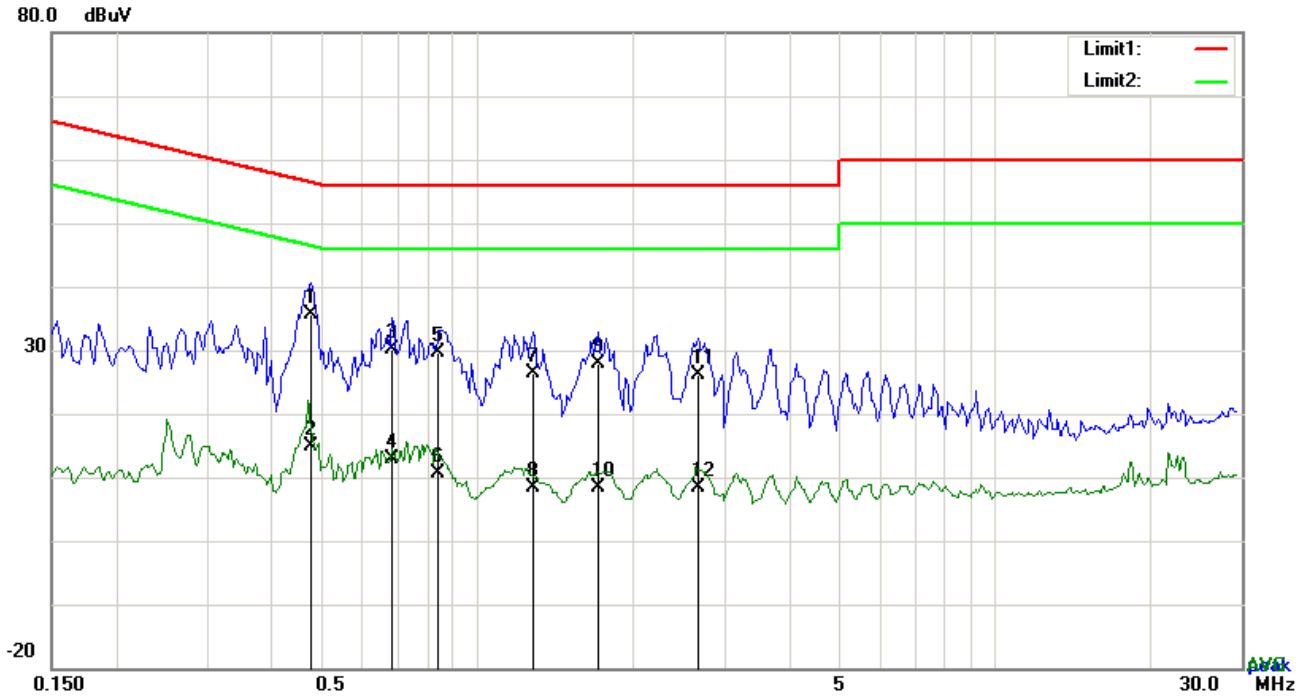
Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.</td></tr>
<tr><td>Procedure</td><td colspan="3">1. The EUT and supporting equipment were set up in accordance with the requirements of 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 50Ω /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 :	USB Mode

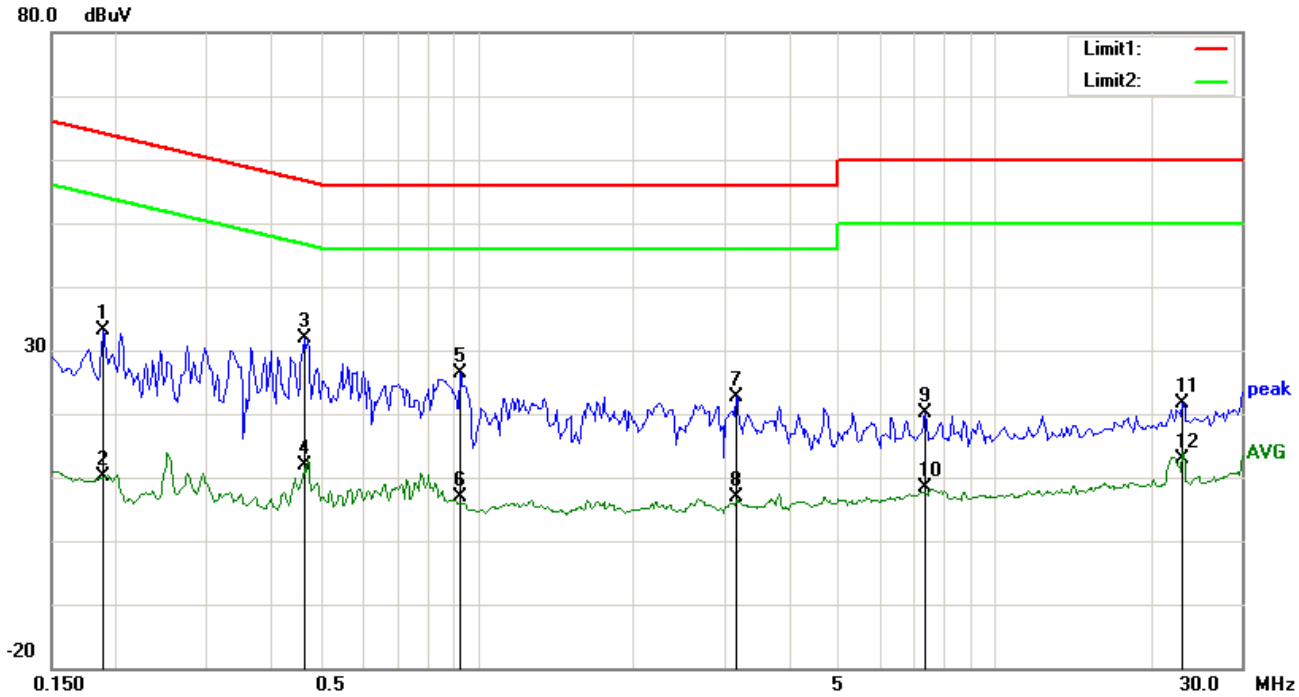


Test Data

Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	L1	0.4776	25.68	QP	10.03	35.71	56.38	-20.67
2	L1	0.4776	4.88	AVG	10.03	14.91	46.38	-31.47
3	L1	0.6843	20.08	QP	10.03	30.11	56.00	-25.89
4	L1	0.6843	2.76	AVG	10.03	12.79	46.00	-33.21
5	L1	0.8403	19.66	QP	10.03	29.69	56.00	-26.31
6	L1	0.8403	0.54	AVG	10.03	10.57	46.00	-35.43
7	L1	1.2771	16.43	QP	10.03	26.46	56.00	-29.54
8	L1	1.2771	-1.61	AVG	10.03	8.42	46.00	-37.58
9	L1	1.7139	17.82	QP	10.04	27.86	56.00	-28.14
10	L1	1.7139	-1.63	AVG	10.04	8.41	46.00	-37.59
11	L1	2.6733	16.09	QP	10.05	26.14	56.00	-29.86
12	L1	2.6733	-1.73	AVG	10.05	8.32	46.00	-37.68

Test Mode:	USB Mode

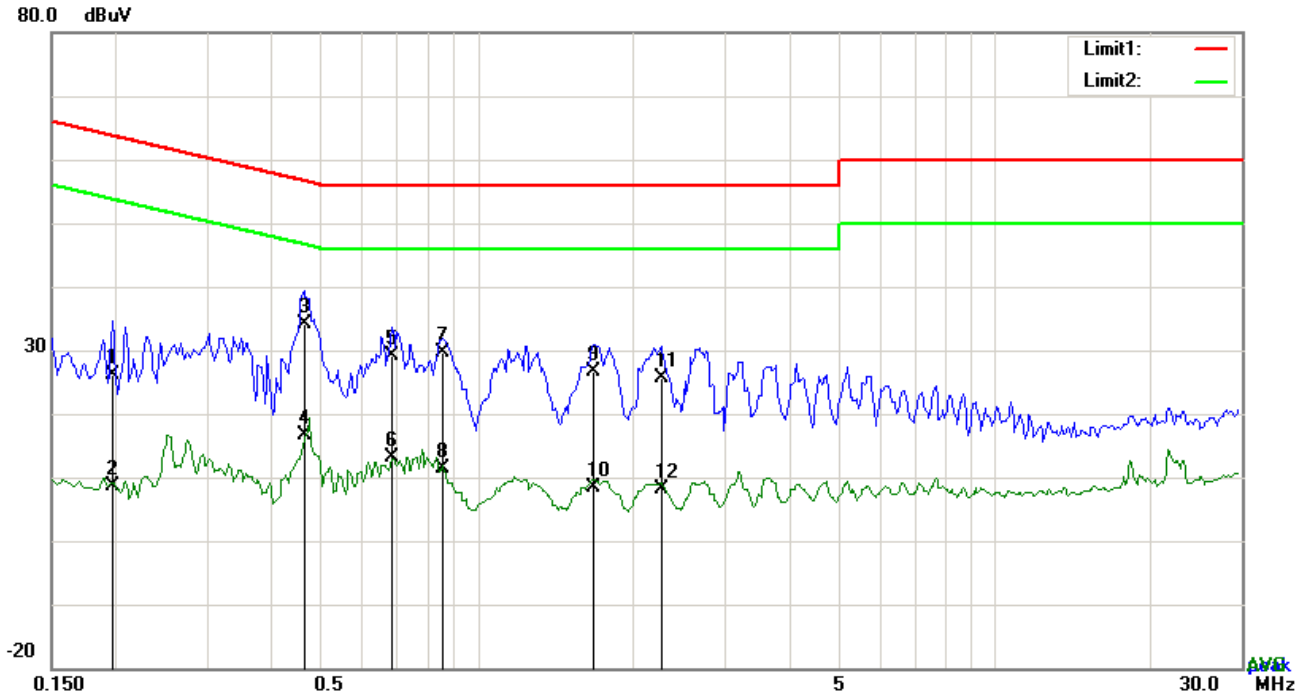


Test Data

Phase Neutral Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	N	0.1890	23.08	peak	10.02	33.10	64.08	-30.98
2	N	0.1890	0.23	peak	10.02	10.25	64.08	-53.83
3	N	0.4620	21.93	peak	10.02	31.95	56.66	-24.71
4	N	0.4620	1.87	peak	10.02	11.89	56.66	-44.77
5	N	0.9261	16.33	peak	10.03	26.36	56.00	-29.64
6	N	0.9261	-3.14	peak	10.03	6.89	56.00	-49.11
7	N	3.1716	12.69	peak	10.05	22.74	56.00	-33.26
8	N	3.1716	-3.11	peak	10.05	6.94	56.00	-49.06
9	N	7.3329	9.99	peak	10.10	20.09	60.00	-39.91
10	N	7.3329	-1.64	peak	10.10	8.46	60.00	-51.54
11	N	23.1318	11.41	peak	10.31	21.72	60.00	-38.28
12	N	23.1318	2.54	peak	10.31	12.85	60.00	-47.15

Test Mode :	USB Mode

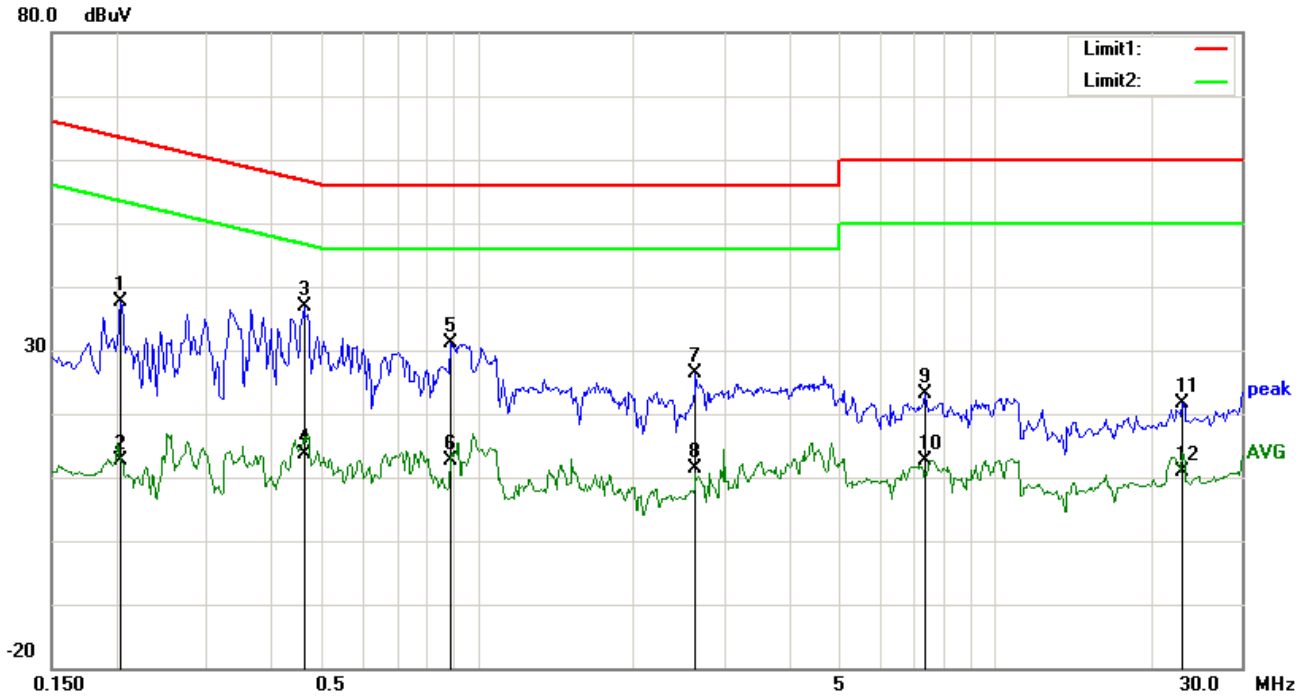


Test Data

Phase Line Plot at 240Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	L1	0.1968	16.15	QP	10.03	26.18	63.74	-37.56
2	L1	0.1968	-1.45	AVG	10.03	8.58	53.74	-45.16
3	L1	0.4620	24.19	QP	10.03	34.22	56.66	-22.44
4	L1	0.4620	6.58	AVG	10.03	16.61	46.66	-30.05
5	L1	0.6843	19.06	QP	10.03	29.09	56.00	-26.91
6	L1	0.6843	3.04	AVG	10.03	13.07	46.00	-32.93
7	L1	0.8559	19.66	QP	10.03	29.69	56.00	-26.31
8	L1	0.8559	1.27	AVG	10.03	11.30	46.00	-34.70
9	L1	1.6788	16.60	QP	10.04	26.64	56.00	-29.36
10	L1	1.6788	-1.69	AVG	10.04	8.35	46.00	-37.65
11	L1	2.2677	15.62	QP	10.05	25.67	56.00	-30.33
12	L1	2.2677	-1.97	AVG	10.05	8.08	46.00	-37.92

Test Mode :	USB Mode



Test Data

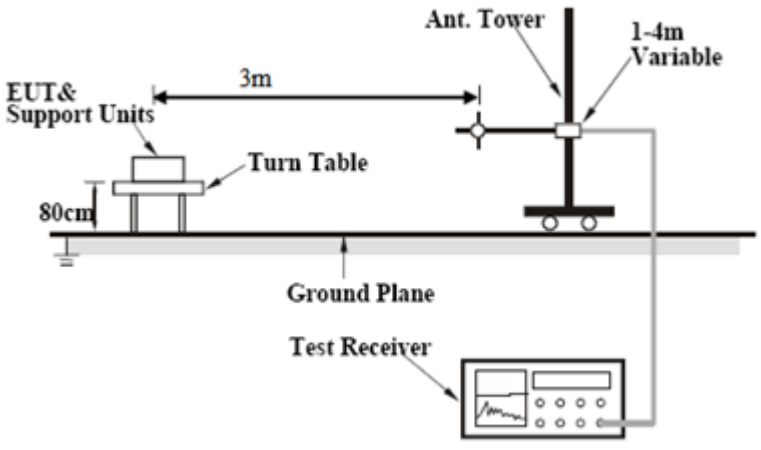
Phase Neutral Plot at 240Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	N	0.2046	27.63	peak	10.02	37.65	63.42	-25.77
2	N	0.2046	2.57	peak	10.02	12.59	63.42	-50.83
3	N	0.4620	26.93	peak	10.02	36.95	56.66	-19.71
4	N	0.4620	3.65	peak	10.02	13.67	56.66	-42.99
5	N	0.8850	21.14	peak	10.03	31.17	56.00	-24.83
6	N	0.8850	2.53	peak	10.03	12.56	56.00	-43.44
7	N	2.6360	16.36	peak	10.05	26.41	56.00	-29.59
8	N	2.6360	1.23	peak	10.05	11.28	56.00	-44.72
9	N	7.3329	12.99	peak	10.10	23.09	60.00	-36.91
10	N	7.3329	2.55	peak	10.10	12.65	60.00	-47.35
11	N	23.1318	11.41	peak	10.31	21.72	60.00	-38.28
12	N	23.1318	0.58	peak	10.31	10.89	60.00	-49.11

6.2 Radiated Emissions

Temperature	26℃
Relative Humidity	57%
Atmospheric Pressure	1025mbar
Test date :	October 25, 2017
Tested By :	Evans He

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.109(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>

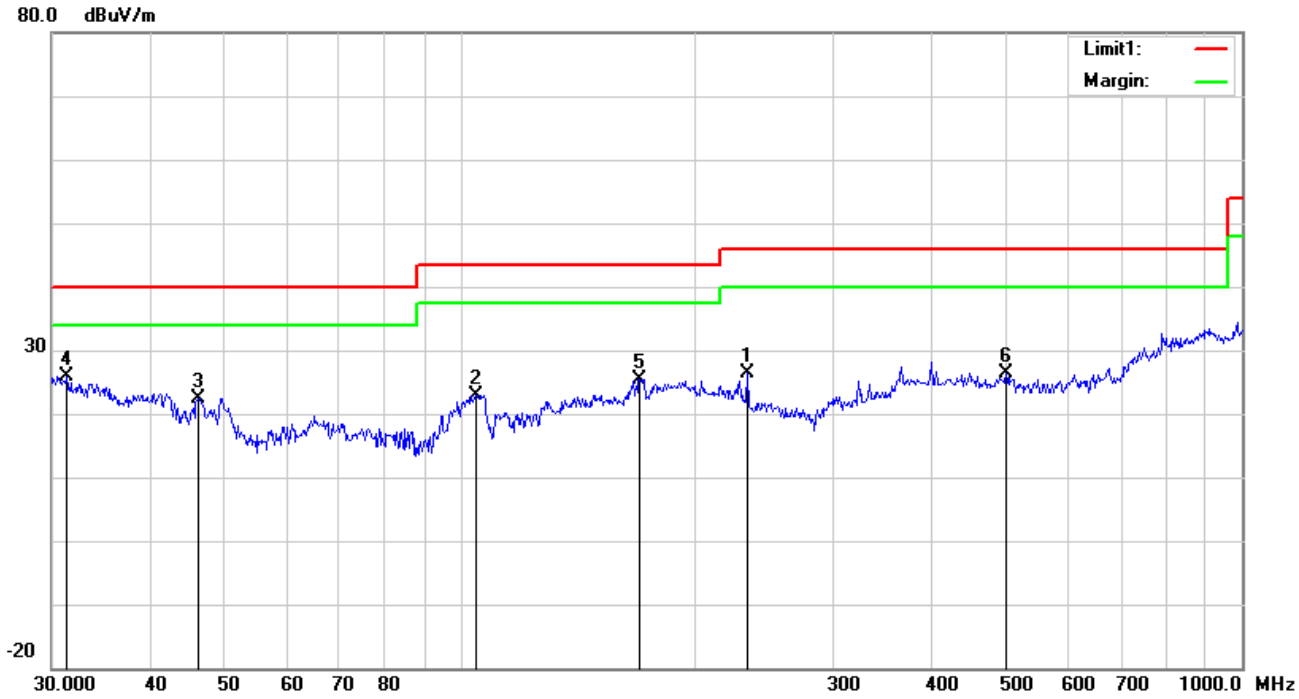
	over a full rotation of the EUT) was chosen. b. The EUT was then rotated to the direction that gave the maximum emission. c. Finally, the antenna height was adjusted to the height that gave the maximum emission. 3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 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 Mode :	USB Mode

Below 1GHz

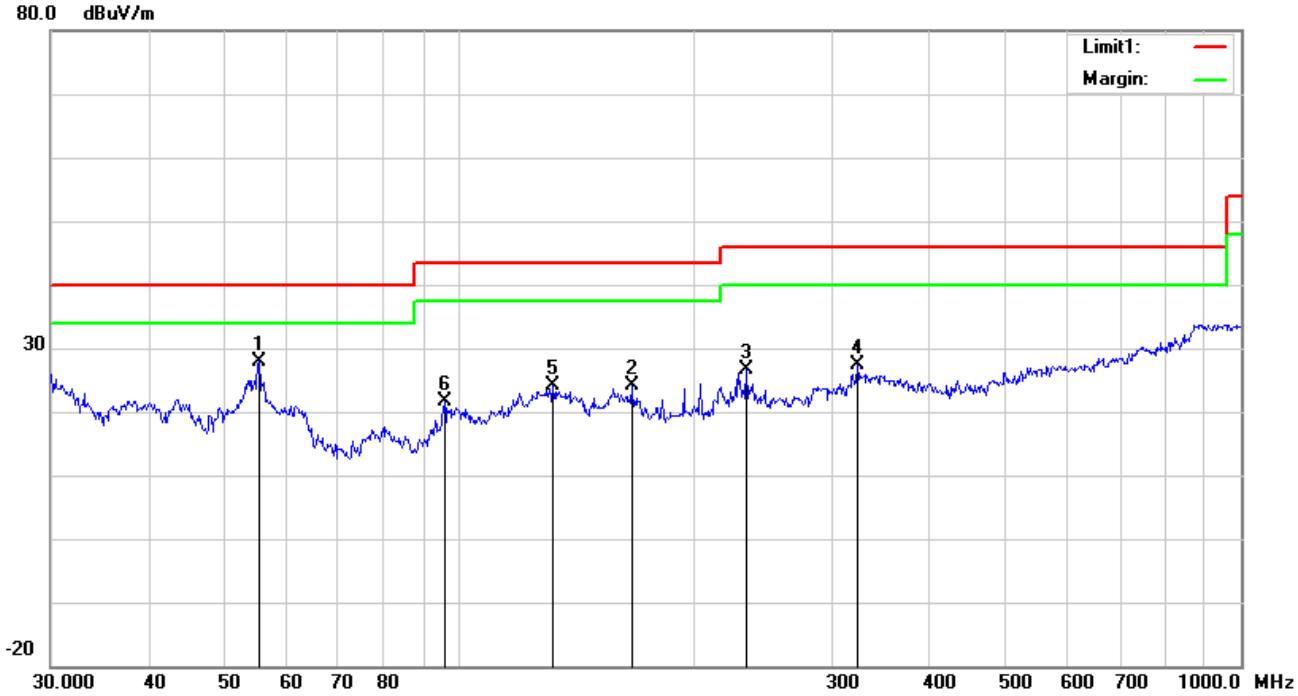


Test Data

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	H	233.3487	35.48	peak	11.63	22.32	1.65	26.44	46.00	-19.56	100	239
2	H	104.9033	32.87	peak	11.26	22.33	1.14	22.94	43.50	-20.56	100	339
3	H	46.1780	33.83	peak	10.08	22.31	0.76	22.36	40.00	-17.64	100	270
4	H	31.3992	27.26	peak	20.32	22.27	0.66	25.97	40.00	-14.03	100	105
5	H	169.5990	34.45	peak	11.83	22.26	1.36	25.38	43.50	-18.12	100	282
6	H	499.4247	28.04	peak	17.69	21.81	2.42	26.34	46.00	-19.66	100	217

Below 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	V	55.4147	41.70	peak	7.80	22.40	0.78	27.88	40.00	-12.12	100	140
2	V	166.0680	32.88	peak	12.11	22.26	1.37	24.10	43.50	-19.40	100	298
3	V	232.5318	35.61	peak	11.64	22.32	1.64	26.57	46.00	-19.43	100	144
4	V	323.3204	33.54	peak	14.09	22.22	1.91	27.32	46.00	-18.68	100	99
5	V	131.7577	32.13	peak	13.14	22.39	1.21	24.09	43.50	-19.41	100	342
6	V	95.7622	33.46	peak	9.38	22.32	1.01	21.53	43.50	-21.97	100	56

Above 1GHz

Frequency (MHz)	Read_level (dBμV/m)	Azimuth	Height (cm)	Polarity (H/V)	Level (dBμV/m)	Factors (dB)	Limit (dBμV/m)	Margin (dB)	Detector (PK/AV)
2237.03	62.37	22	100	V	-14.94	47.43	74	-26.57	PK
1375.57	66.43	39	100	V	-18.71	47.72	74	-26.28	PK
1314.86	68.54	283	100	V	-19.92	48.62	74	-25.38	PK
2478.52	57.95	268	100	H	-14.13	43.82	74	-30.18	PK
1380.92	66.9	147	100	H	-18.78	48.12	74	-25.88	PK
1317.87	65.65	235	100	H	-19.53	46.12	74	-27.88	PK

*Note1: The highest frequency of the EUT is 2477 MHz, so the testing has been conformed to 5*2477MHz =12,385MHz.*

Note2: The frequency that above 3GHz is mainly from the environment noise.

Note3: The AV measurement performed, more than 20dB below limit so AV test data was not presented.

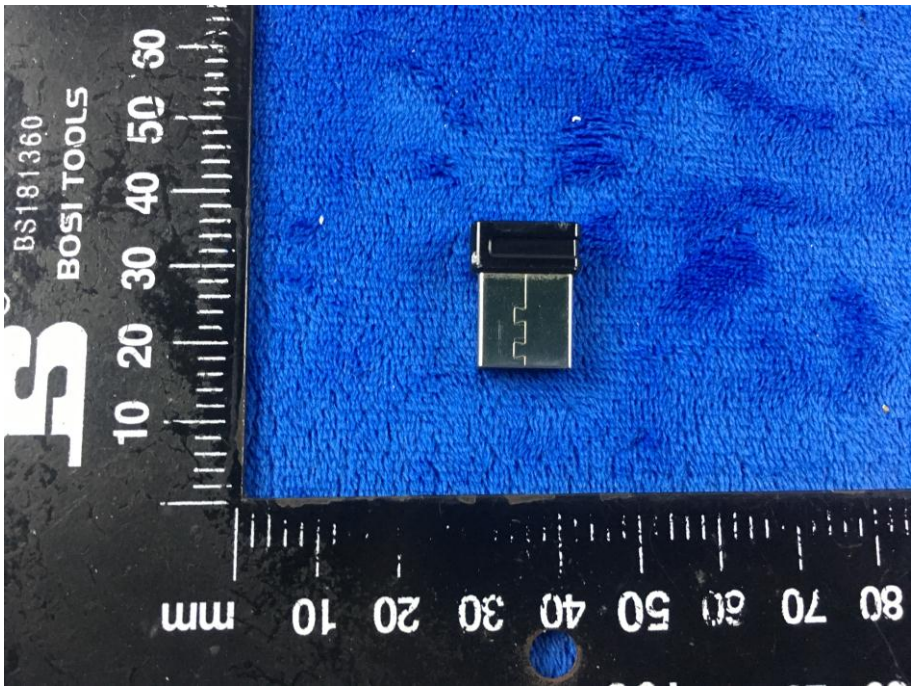
Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted Emissions					
EMI test receiver	ESCS30	8471241027	09/15/2017	09/14/2018	☑
Line Impedance Stabilization Network	LI-125A	191106	09/23/2017	09/22/2018	☑
Line Impedance Stabilization Network	LI-125A	191107	09/23/2017	09/22/2018	☑
LISN	ISN T800	34373	09/23/2017	09/22/2018	☑
Transient Limiter	LIT-153	531118	08/30/2017	08/29/2018	☑
Radiated Emissions					
EMI test receiver	ESL6	100262	09/15/2017	09/14/2018	☑
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	08/30/2017	08/29/2018	☑
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/23/2017	03/22/2018	☑
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/19/2017	09/18/2018	☑
Double Ridge Horn Antenna	AH-118	71259	09/22/2017	09/21/2018	☑

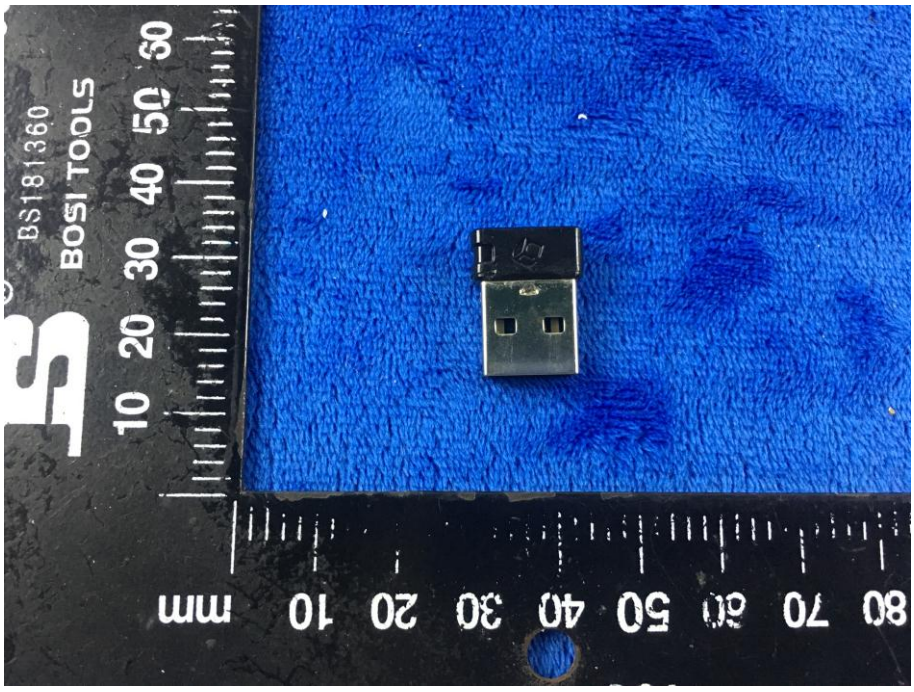
Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo

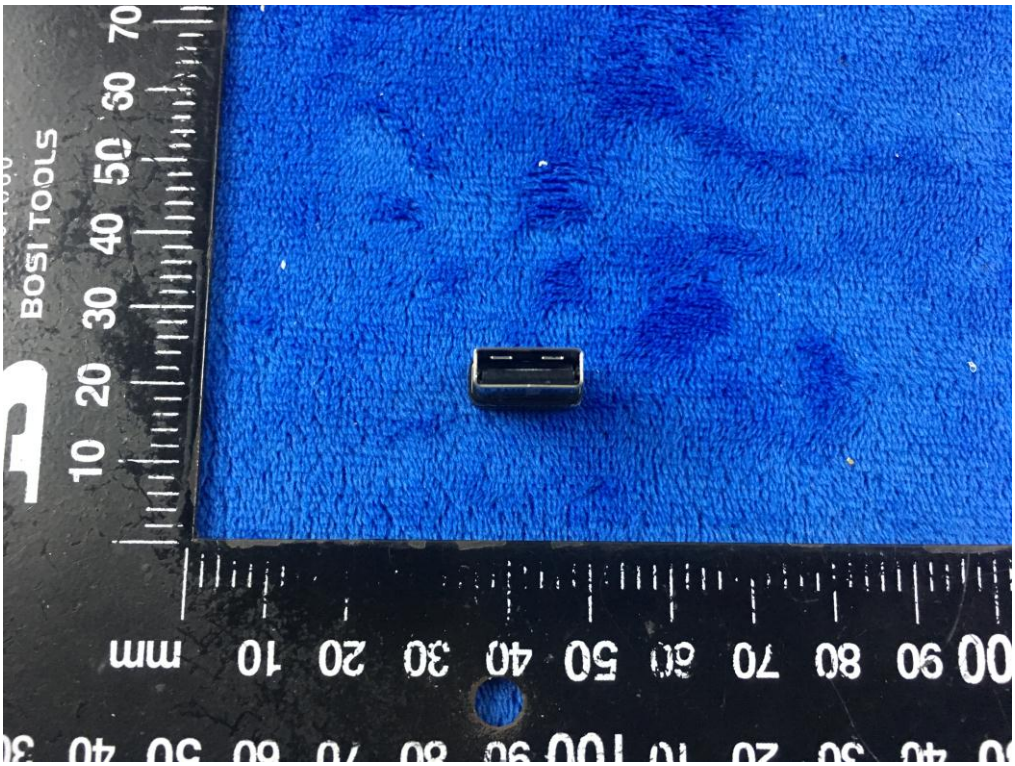
EUT - Front View



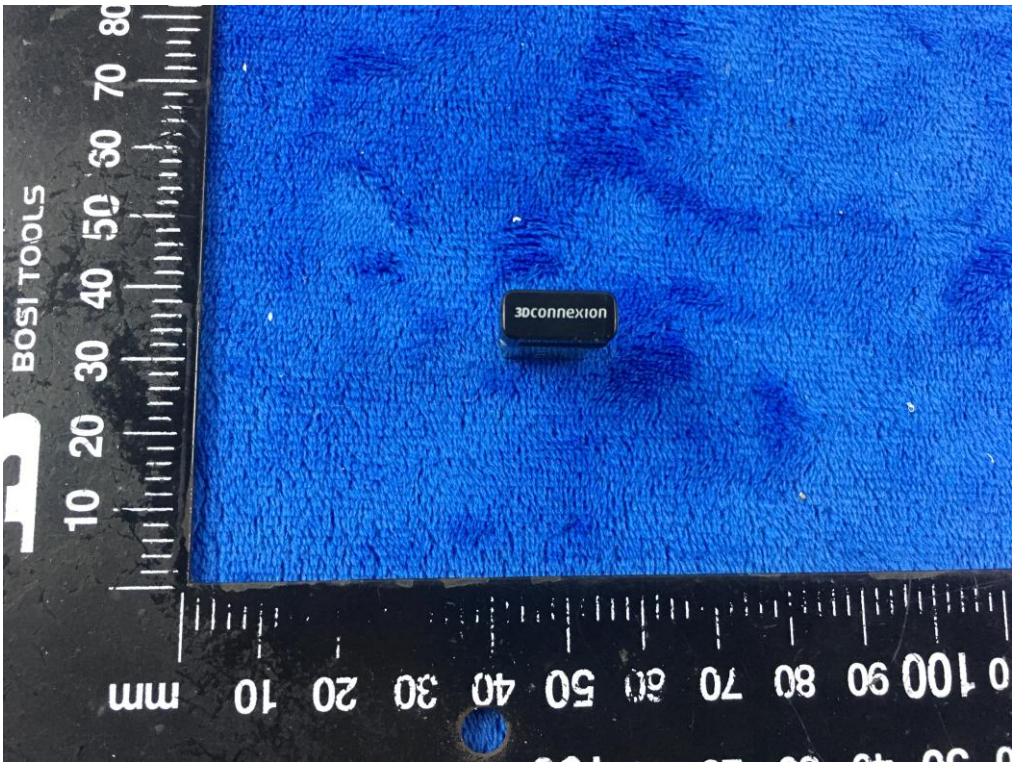
EUT - Rear View



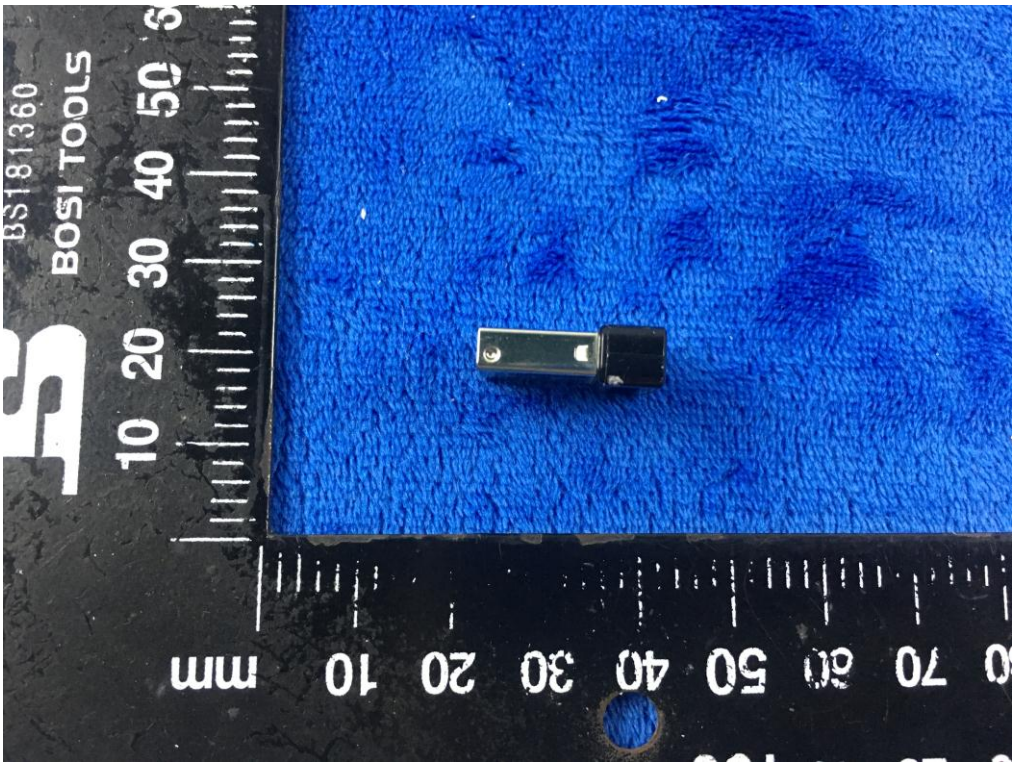
EUT – Top View



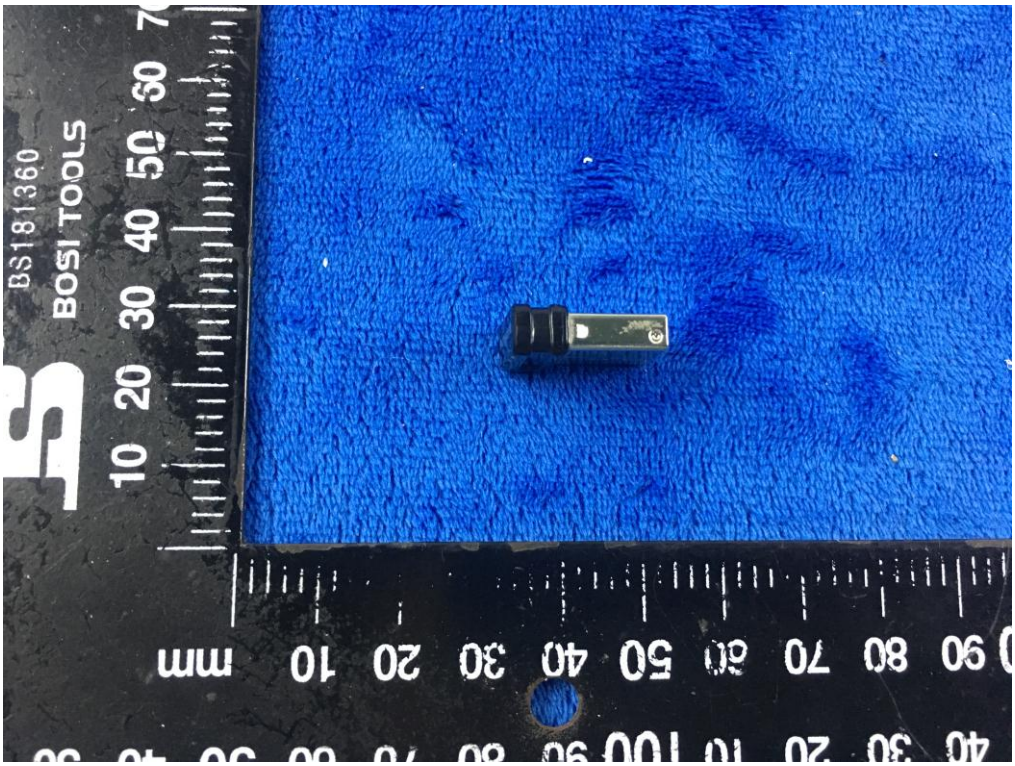
EUT - Bottom View



EUT - Left View

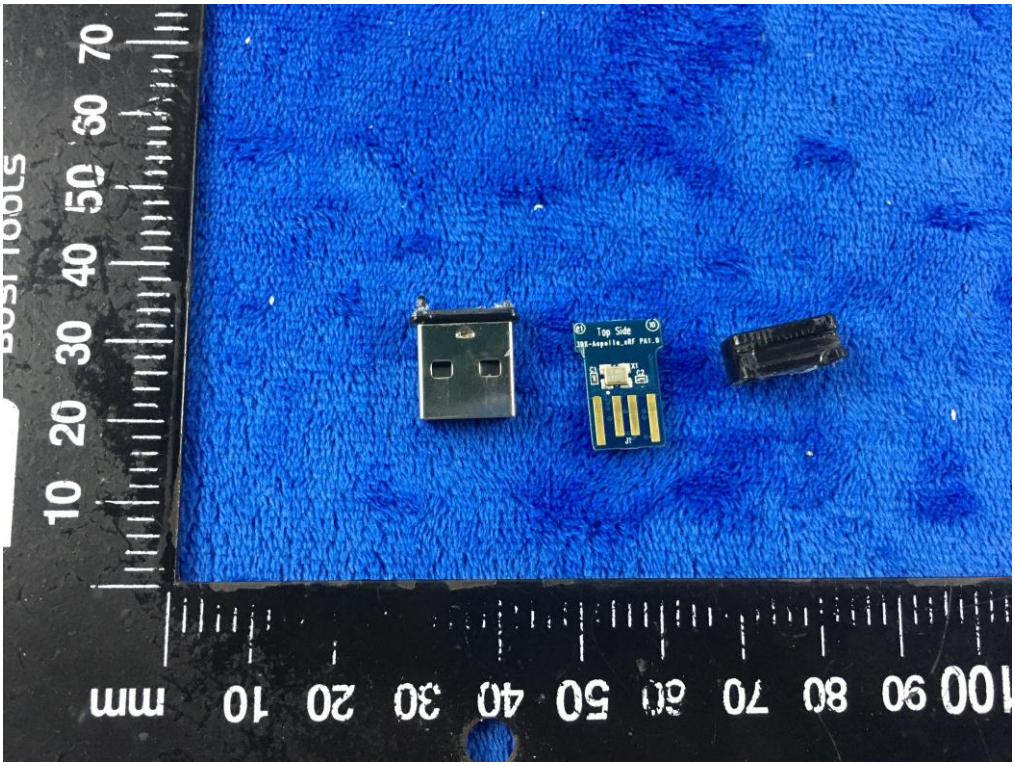


EUT - Right View

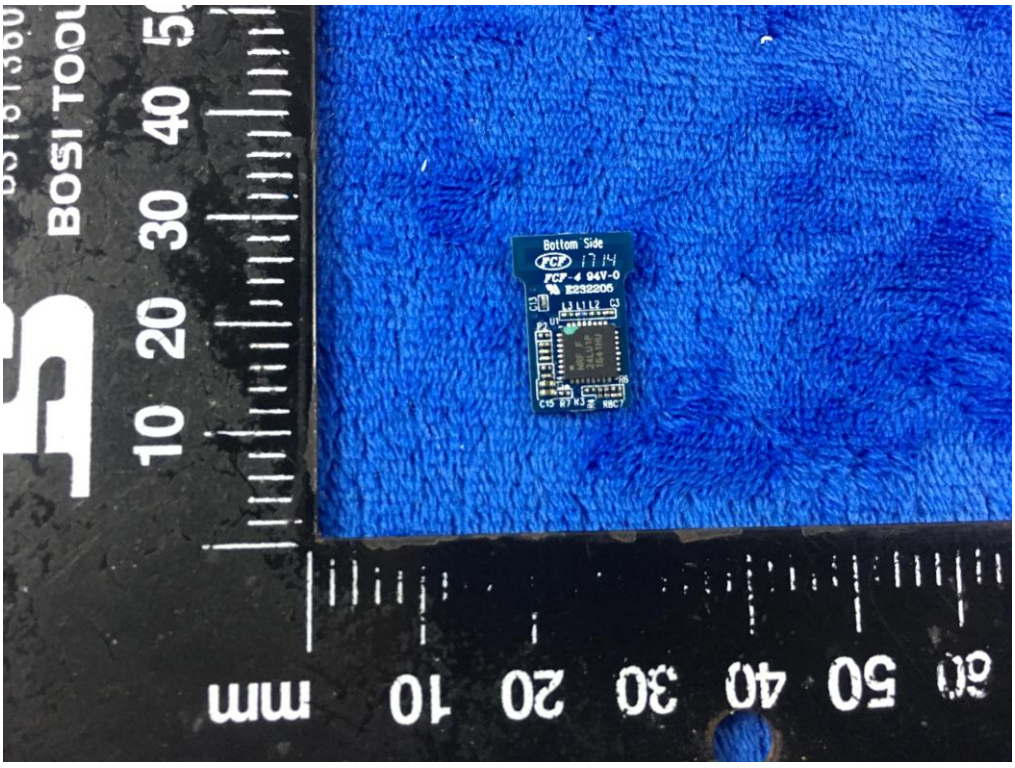


Annex B.ii. Photograph: EUT Internal Photo

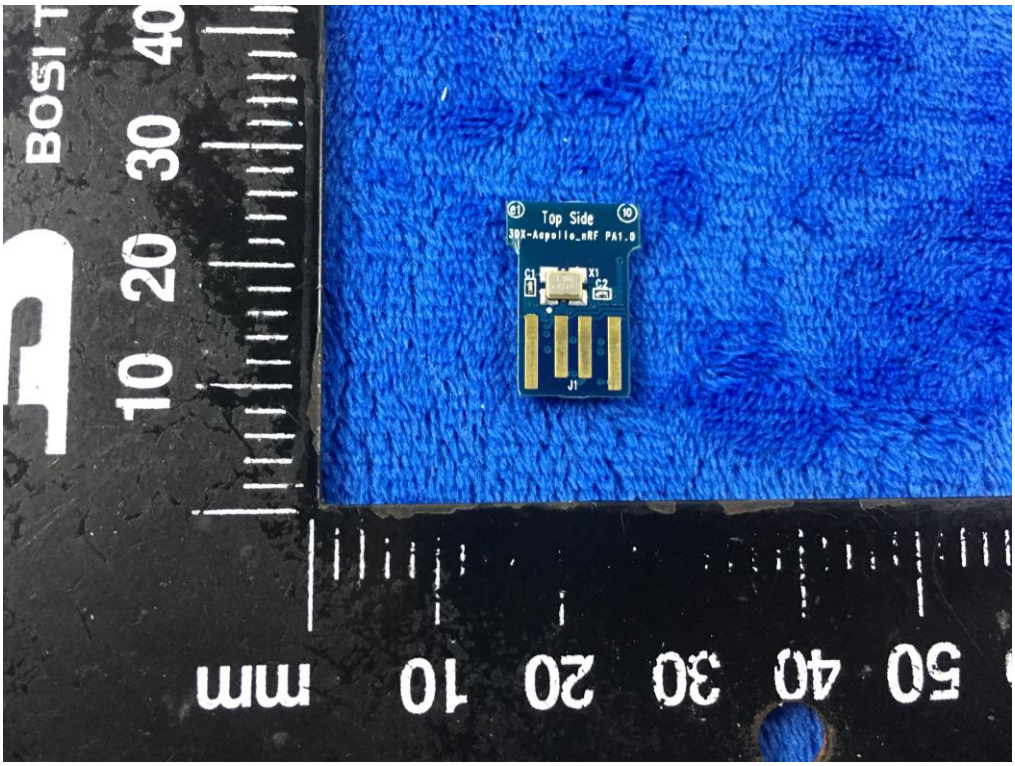
Cover Off - Top View



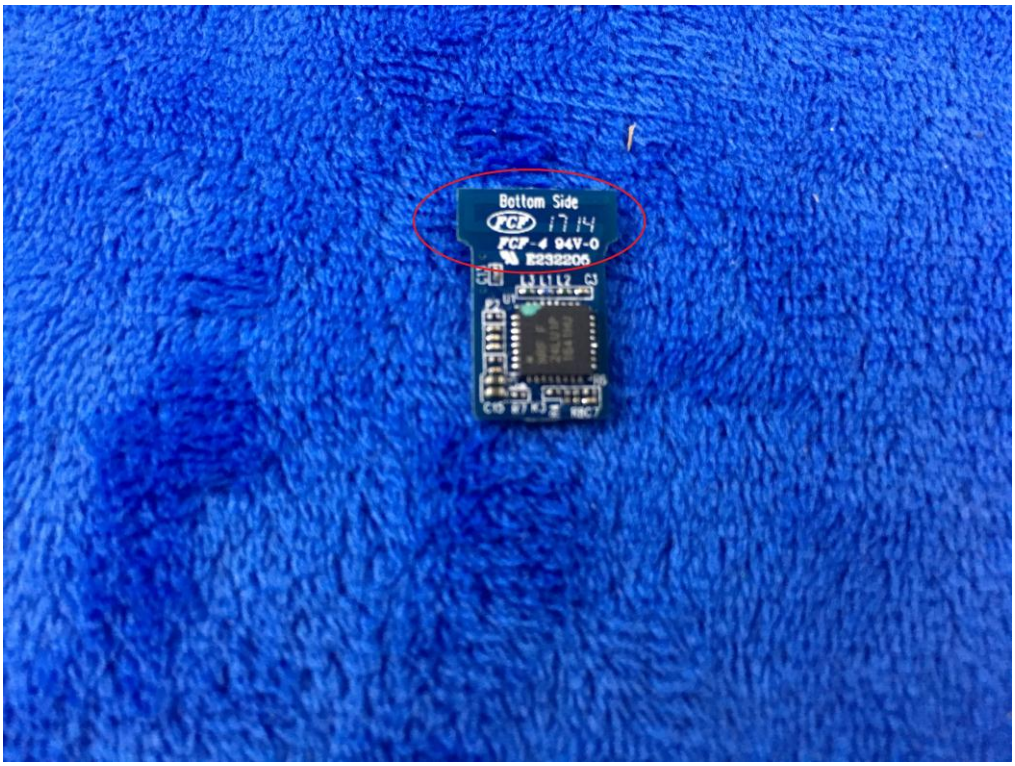
Mainboard - Front View



Mainboard - Rear View



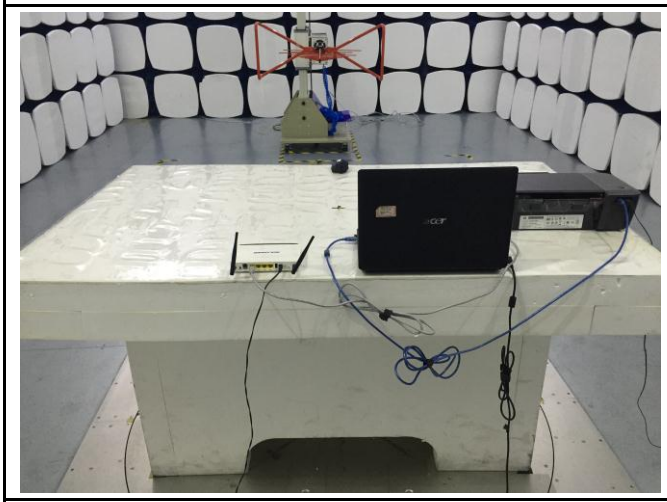
BT – Antenna View



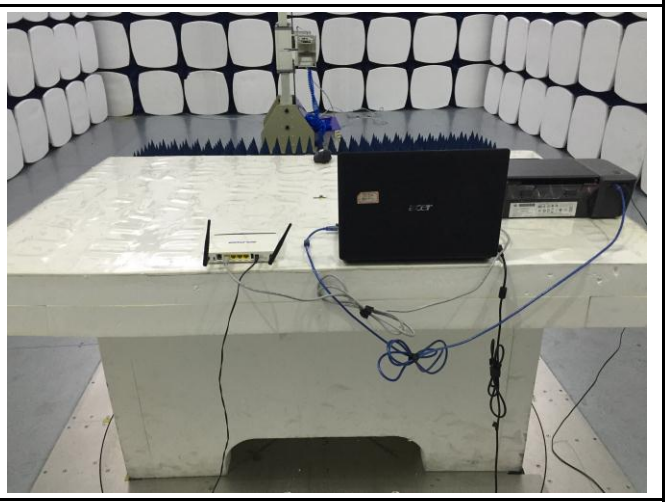
Annex B.iii. Photograph: Test Setup Photo

Conducted Emissions Test Setup – Front View

Conducted Emissions Test Setup – Side View



Radiated Emissions Test Setup Below 1GHz



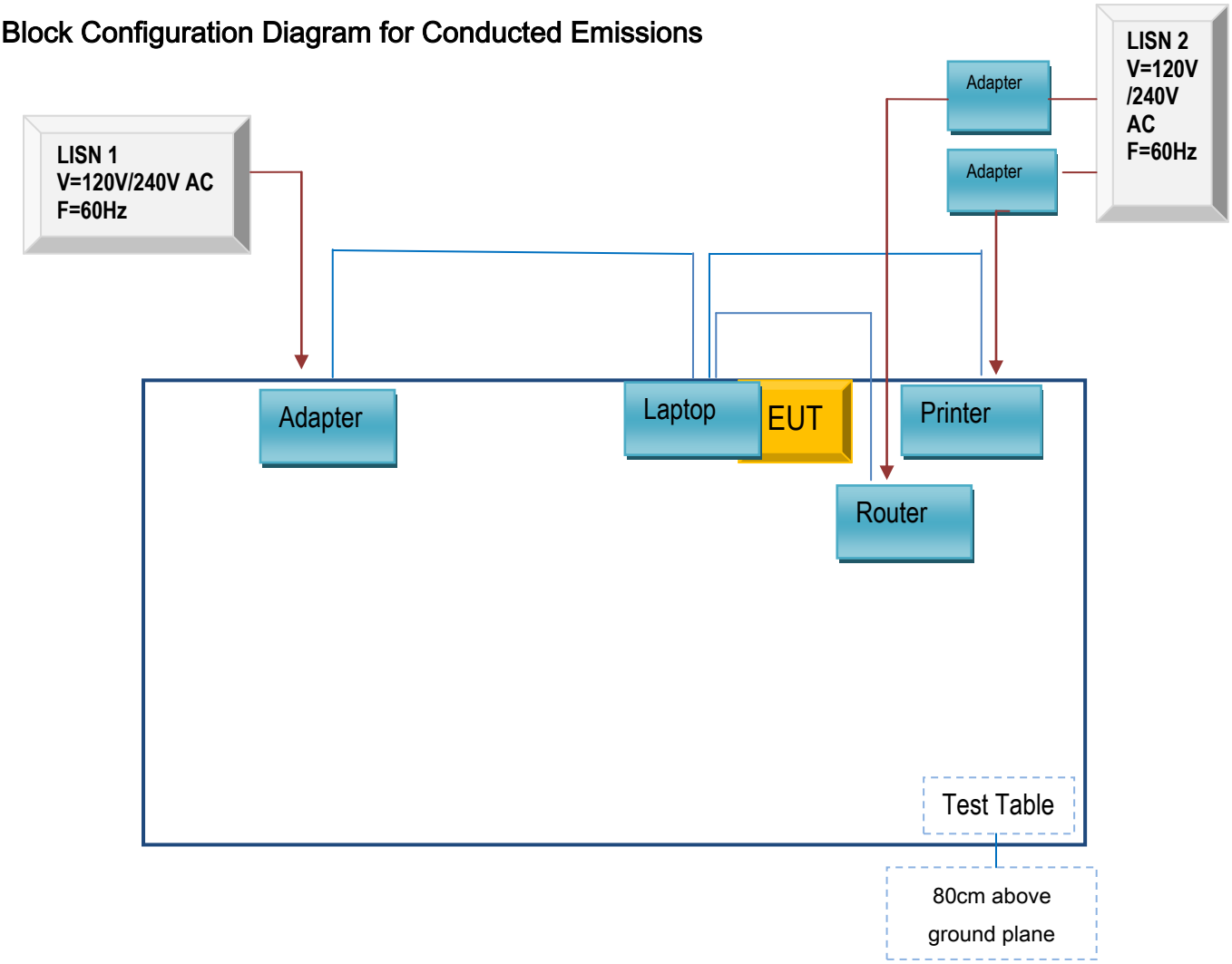
Radiated Emissions Test Setup Above 1GHz

Close-up

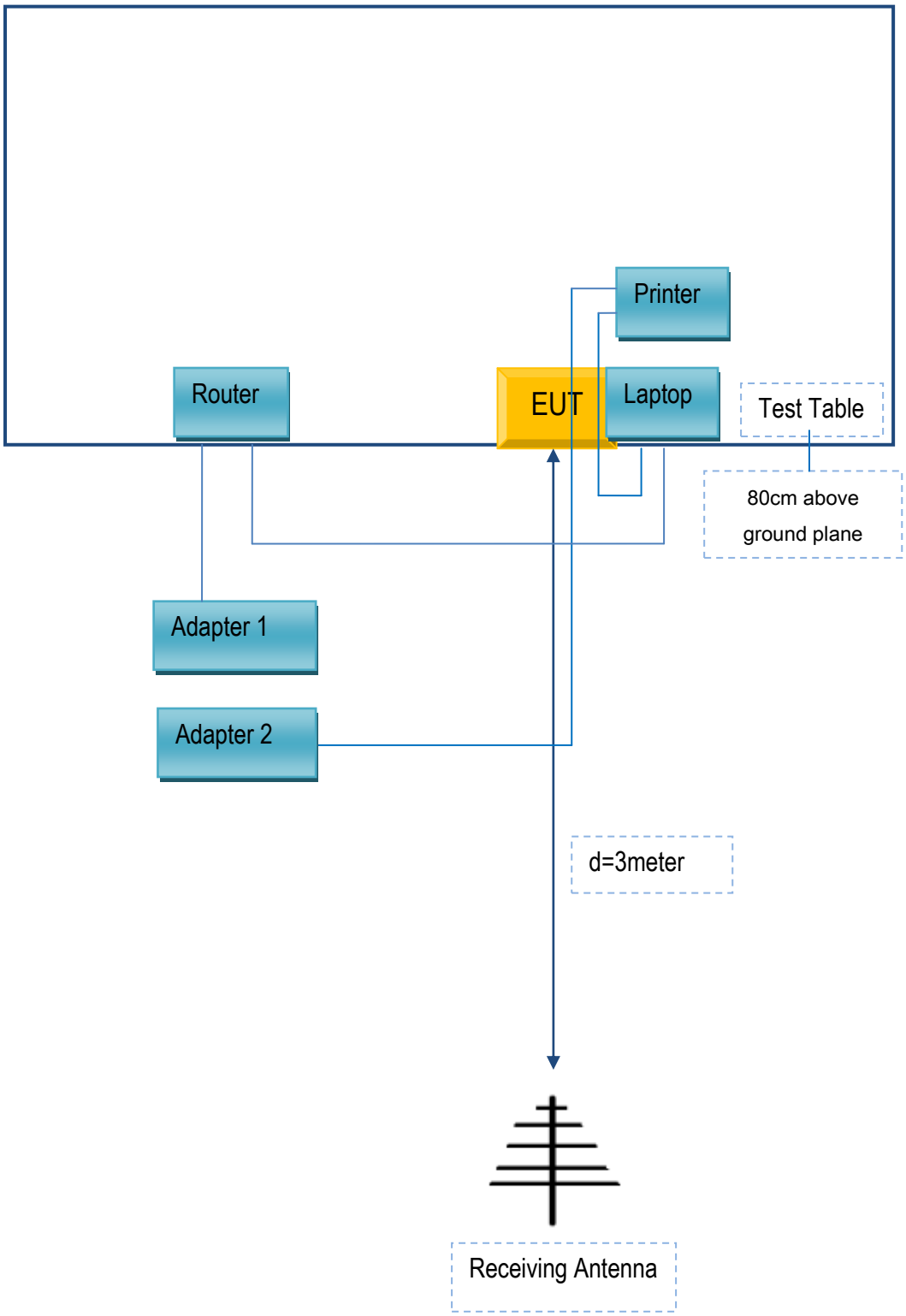
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

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.

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
BULL	Socket	GN-403	GN201203

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
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 the 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.