

# EMC TEST REPORT



Report No.: 15071214-FCC-E

Supersede Report No.:N/A

Applicant	3Dconnexion	
Product Name	SpaceMouse Enterprise	
Main Model No.	3DX-600051	
Serial No.	3DX-700056 , 3DX-700058	
Test Standard	FCC Part 15 Subpart B Class B:2015, ANSI C63.4: 2014	
Test Date	December 09, 2015 to January 24, 2016	
Issue Date	February 16, 2016	
Test Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	
Equipment complied with the specification	<input checked="" type="checkbox"/>	
Equipment did not comply with the specification	<input type="checkbox"/>	
<i>Winnie Zhang</i>	<i>David Huang</i>	
Winnie Zhang 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**

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## Laboratories Introduction

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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

Test Report	15071214-FCC-E
Page	3 of 27

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# CONTENTS

1. REPORT REVISION HISTORY .....	5
2. CUSTOMER INFORMATION .....	5
3. TEST SITE INFORMATION.....	5
4. EQUIPMENT UNDER TEST (EUT) INFORMATION.....	6
5. TEST SUMMARY .....	7
6. MEASUREMENTS, EXAMINATION AND DERIVED RESULTS .....	8
6.1 AC POWER LINE CONDUCTED EMISSIONS.....	8
6.2 RADIATED EMISSIONS.....	14
ANNEX A. TEST INSTRUMENT.....	18
ANNEX B. EUT AND TEST SETUP PHOTOGRAPHS.....	19
ANNEX C. TEST SETUP AND SUPPORTING EQUIPMENT.....	23
ANNEX D. USER MANUAL / BLOCK DIAGRAM / SCHEMATICS / PARTLIST .....	26
ANNEX E. DECLARATION OF SIMILARITY.....	27

## 1. Report Revision History

Report No.	Report Version	Description	Issue Date
15071214-FCC-E	NONE	Original	January 12, 2016
15071214-FCC-E	V1	Change trade information	February 15, 2016
15071214-FCC-E	V2	Change version and declaration letter	February 16, 2016

## 2. Customer information

Applicant Name	3Dconnexion
Applicant Add	3Dconnexion SAM, 33, Rue du Portier, 98000 Monaco
Manufacturer	Xiamen Intretech Inc
Manufacturer Add	No. 588, Jiahe road, Xiamen, Fujian 361006, China

## 3. Test site information

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

## 4. Equipment under Test (EUT) Information

Description of EUT:	SpaceMouse Enterprise
Main Model:	3DX-600051
Serial Model:	3DX-700056 , 3DX-700058
Input Power:	5V
Equipment Category :	JBP
Port:	USB Port
Trade Name :	SpaceMouse Enterprise 3DX-70056 SpaceMouse Enterprise Kit 3DX-70058
FCC ID:	2AAHQ-SME
Date EUT received:	December 08, 2015
Test Date(s):	December 09, 2015 to January 24, 2016
Trade Name :	SpaceMouse Enterprise 3DX-70056 SpaceMouse Enterprise Kit 3DX-70058

## 5. Test Summary

The product was tested in accordance with the following specifications.

All testing has been performed according to below product classification:

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

### Measurement Uncertainty

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

## 6. Measurements, Examination And Derived Results

### 6.1 AC Power Line Conducted Emissions

Temperature	24°C
Relative Humidity	56%
Atmospheric Pressure	1023mbar
Test date :	January 23, 2016
Tested By :	Winnie Zhang

#### Requirement(s):

Spec	Item	Requirement	Applicable														
47CFR§15.107	a)	<p>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 [μ] H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequencies ranges.</p> <table border="1"> <thead> <tr> <th rowspan="2">Frequency ranges (MHz)</th> <th colspan="2">Limit (dBμV)</th> </tr> <tr> <th>QP</th> <th>Average</th> </tr> </thead> <tbody> <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> </tbody> </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	<input checked="" type="checkbox"/>
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	<p style="text-align: center;"> <b>Note: 1.Support units were connected to second LISN .</b>  <b>2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.</b> </p>
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Procedure	<ol style="list-style-type: none"> <li>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.</li> <li>The power supply for the EUT was fed through a 50Ω /50mH EUT LISN, connected to filtered mains.</li> </ol>
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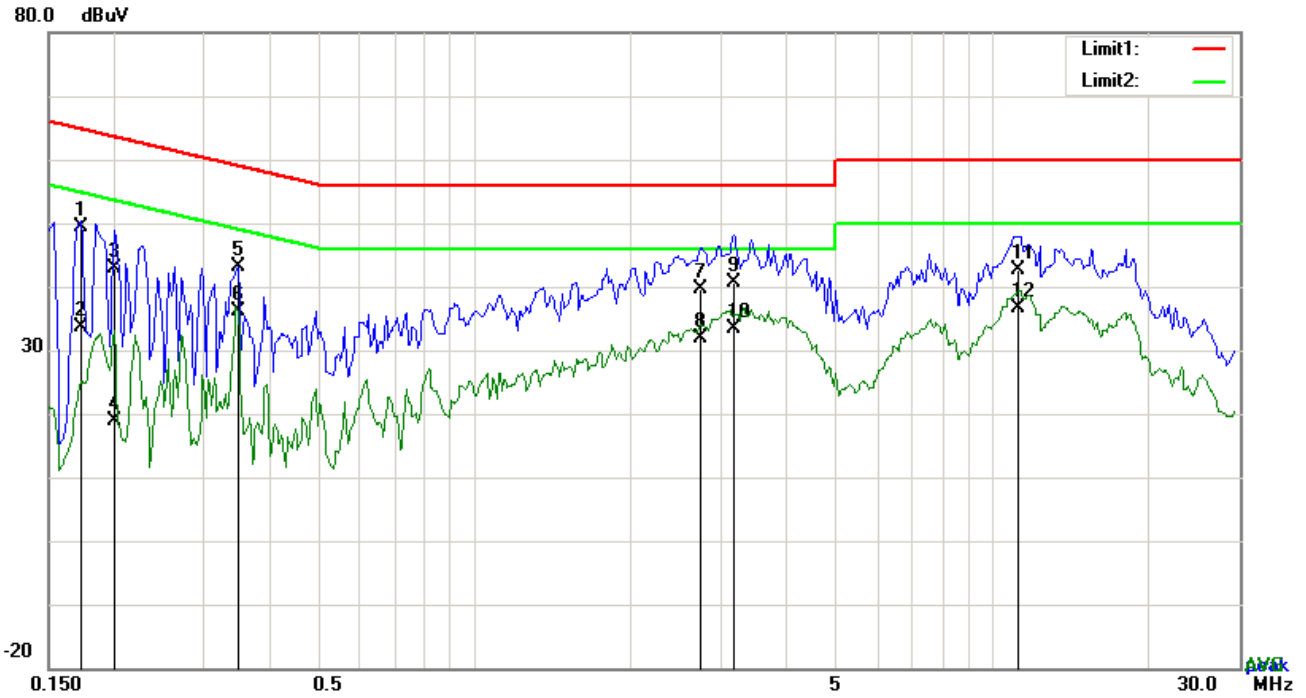
Test Report	15071214-FCC-E
Page	9 of 27

	<ol style="list-style-type: none"> <li>3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.</li> <li>4. All other supporting equipment were powered separately from another main supply.</li> <li>5. The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>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.</li> <li>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.</li> <li>8. Step 7 was then repeated for the LIVE line (for AC mains) or DC line (for DC power).</li> </ol>
Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

Test Data     Yes                       N/A

Test Plot     Yes (See below)             N/A

**Test Mode : Running**

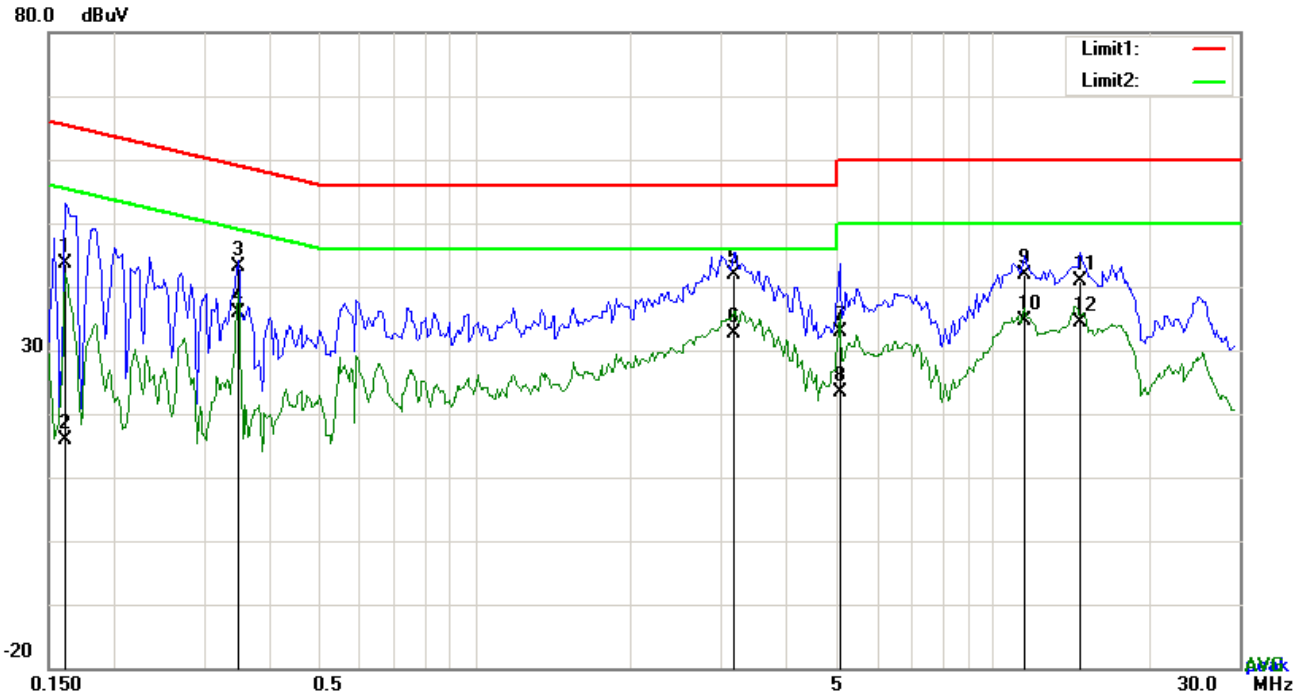


**Test Data**

**Phase Line Plot at 120Vac, 60Hz**

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	L1	0.1734	39.28	QP	10.03	49.31	64.80	-15.49
2	L1	0.1734	23.48	AVG	10.03	33.51	54.80	-21.29
3	L1	0.2007	32.87	QP	10.03	42.90	63.58	-20.68
4	L1	0.2007	8.74	AVG	10.03	18.77	53.58	-34.81
5	L1	0.3489	32.99	QP	10.03	43.02	58.99	-15.97
6	L1	0.3489	26.13	AVG	10.03	36.16	48.99	-12.83
7	L1	2.7318	29.51	QP	10.05	39.56	56.00	-16.44
8	L1	2.7318	21.89	AVG	10.05	31.94	46.00	-14.06
9	L1	3.1716	30.61	QP	10.06	40.67	56.00	-15.33
10	L1	3.1716	23.40	AVG	10.06	33.46	46.00	-12.54
11	L1	11.2017	32.51	QP	10.17	42.68	60.00	-17.32
12	L1	11.2017	26.44	AVG	10.17	36.61	50.00	-13.39

**Test Mode : Running**

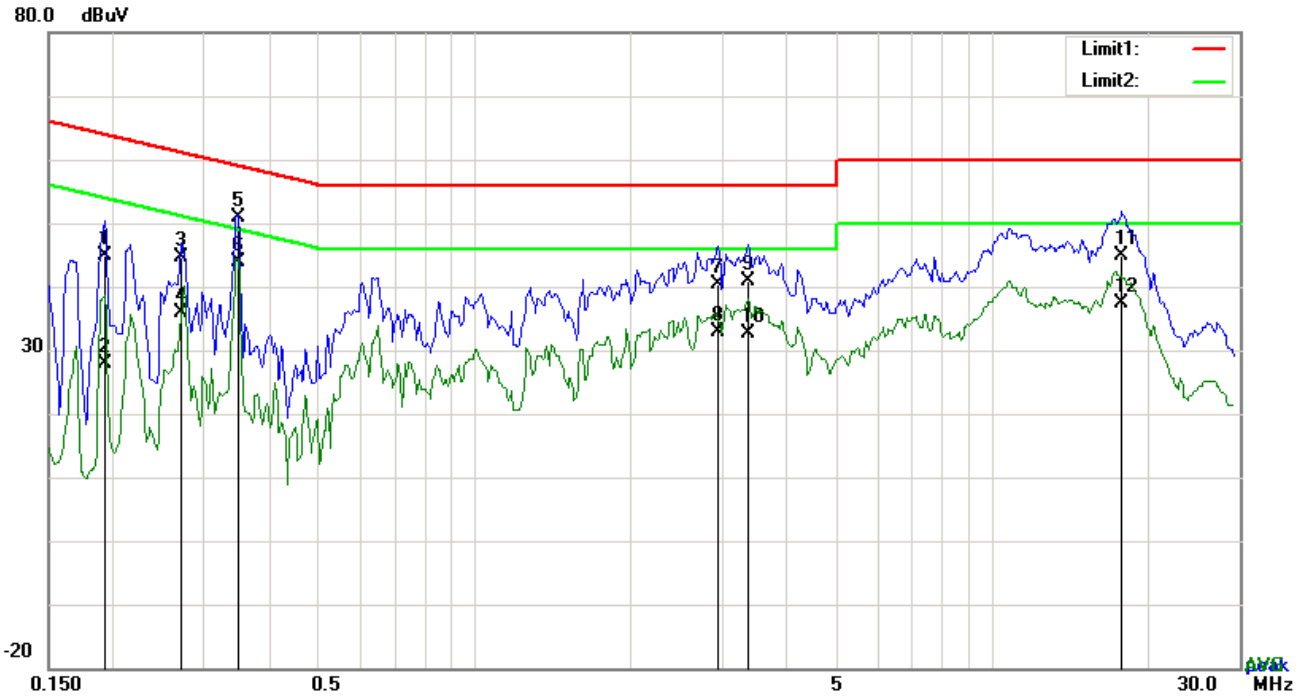


**Test Data**

**Phase Neutral Plot at 120Vac, 60Hz**

No.	P/L	Frequency (MHz)	Reading (dBuV)	Detector	Corrected (dB}	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	N	0.1617	33.67	QP	10.02	43.69	65.38	-21.69
2	N	0.1617	5.94	AVG	10.02	15.96	55.38	-39.42
3	N	0.3489	33.06	QP	10.02	43.08	58.99	-15.91
4	N	0.3489	25.97	AVG	10.02	35.99	48.99	-13.00
5	N	3.1716	31.89	QP	10.05	41.94	56.00	-14.06
6	N	3.1716	22.67	AVG	10.05	32.72	46.00	-13.28
7	N	5.0592	22.69	QP	10.07	32.76	60.00	-27.24
8	N	5.0592	13.35	AVG	10.07	23.42	50.00	-26.58
9	N	11.5449	31.72	QP	10.16	41.88	60.00	-18.12
10	N	11.5449	24.46	AVG	10.16	34.62	50.00	-15.38
11	N	14.7546	30.76	QP	10.20	40.96	60.00	-19.04
12	N	14.7546	24.22	AVG	10.20	34.42	50.00	-15.58

**Test Mode :** Running

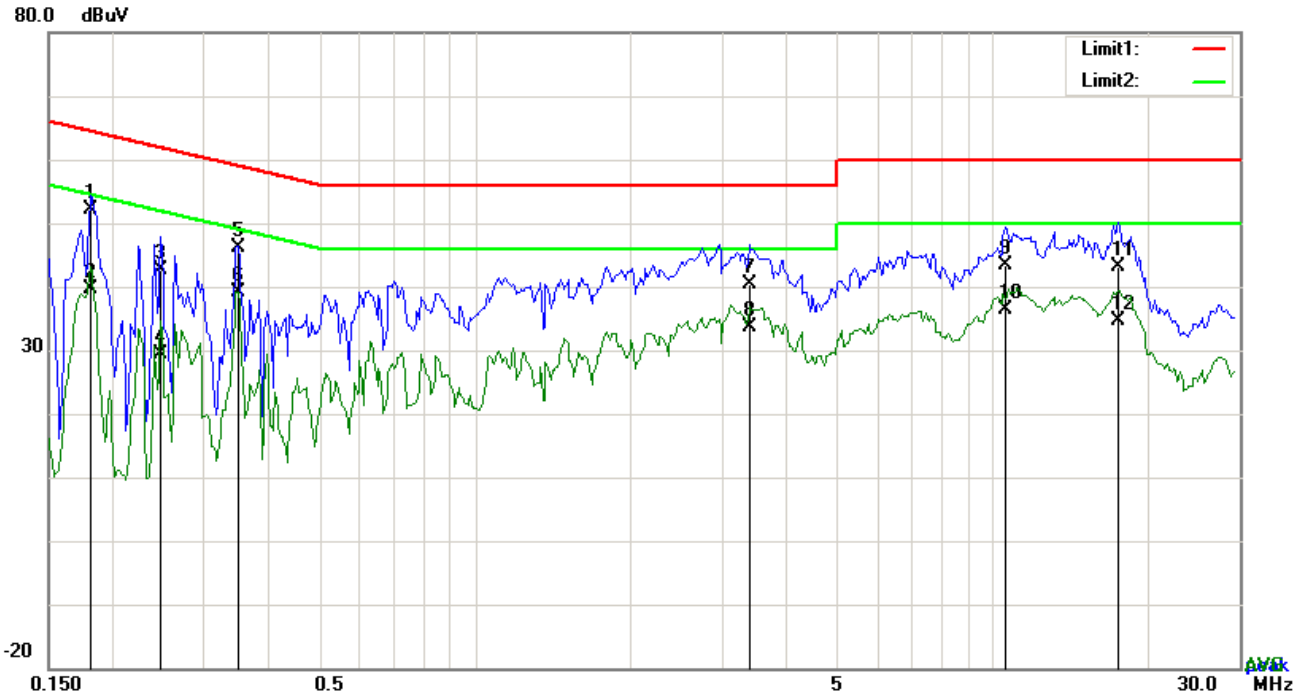


**Test Data**

**Phase Line Plot at 240Vac, 60Hz**

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	L1	0.1929	34.73	QP	10.03	44.76	63.91	-19.15
2	L1	0.1929	17.88	AVG	10.03	27.91	53.91	-26.00
3	L1	0.2709	34.66	QP	10.03	44.69	61.09	-16.40
4	L1	0.2709	25.76	AVG	10.03	35.79	51.09	-15.30
5	L1	0.3489	40.79	QP	10.03	50.82	58.99	-8.17
6	L1	0.3489	33.73	AVG	10.03	43.76	48.99	-5.23
7	L1	2.9541	30.37	QP	10.05	40.42	56.00	-15.58
8	L1	2.9541	22.83	AVG	10.05	32.88	46.00	-13.12
9	L1	3.3705	30.93	QP	10.06	40.99	56.00	-15.01
10	L1	3.3705	22.66	AVG	10.06	32.72	46.00	-13.28
11	L1	17.8005	34.55	QP	10.27	44.82	60.00	-15.18
12	L1	17.8005	27.06	AVG	10.27	37.33	50.00	-12.67

**Test Mode :** Running



**Test Data**

**Phase Neutral Plot at 240Vac, 60Hz**

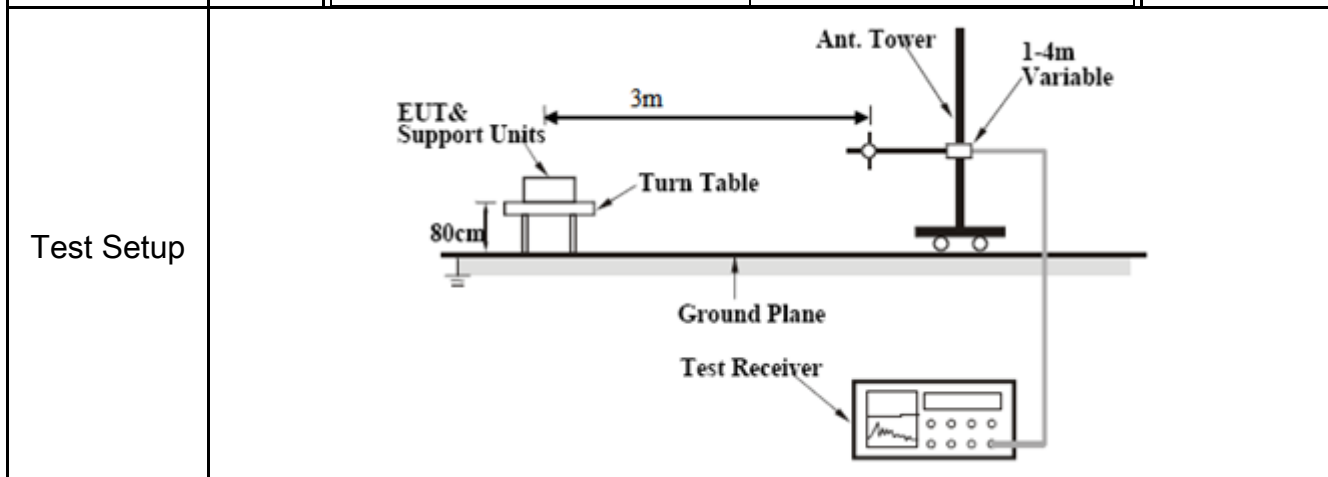
No.	P/L	Frequency (MHz)	Reading (dBuV)	Detector	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	N	0.1812	42.02	QP	10.02	52.04	64.43	-12.39
2	N	0.1812	29.69	AVG	10.02	39.71	54.43	-14.72
3	N	0.2475	32.64	QP	10.02	42.66	61.84	-19.18
4	N	0.2475	19.48	AVG	10.02	29.50	51.84	-22.34
5	N	0.3489	36.16	QP	10.02	46.18	58.99	-12.81
6	N	0.3489	29.14	AVG	10.02	39.16	48.99	-9.83
7	N	3.3861	30.41	QP	10.05	40.46	56.00	-15.54
8	N	3.3861	23.50	AVG	10.05	33.55	46.00	-12.45
9	N	10.5933	33.18	QP	10.15	43.33	60.00	-16.67
10	N	10.5933	26.26	AVG	10.15	36.41	50.00	-13.59
11	N	17.5470	32.79	QP	10.23	43.02	60.00	-16.98
12	N	17.5470	24.43	AVG	10.23	34.66	50.00	-15.34

## 6.2 Radiated Emissions

Temperature	24°C
Relative Humidity	56%
Atmospheric Pressure	1023mbar
Test date :	January 23, 2016
Tested By :	Winnie Zhang

### Requirement(s):

Spec	Item	Requirement	Applicable										
47CFR§15.109(d)	a)	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	<input checked="" type="checkbox"/>										
		<table border="1"> <thead> <tr> <th>Frequency range (MHz)</th> <th>Field Strength (<math>\mu\text{V}/\text{m}</math>)</th> </tr> </thead> <tbody> <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> </tbody> </table>		Frequency range (MHz)	Field Strength ( $\mu\text{V}/\text{m}$ )	30 – 88	100	88 – 216	150	216 960	200	Above 960	500
		Frequency range (MHz)		Field Strength ( $\mu\text{V}/\text{m}$ )									
		30 – 88		100									
		88 – 216		150									
216 960	200												
Above 960	500												



Procedure	<ol style="list-style-type: none"> <li>1. The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>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: <ol style="list-style-type: none"> <li>a. Vertical or horizontal polarization (whichever gave the higher emission level</li> </ol> </li> </ol>
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Test Report	15071214-FCC-E
Page	15 of 27

	<p>over a full rotation of the EUT) was chosen.</p> <p>b. The EUT was then rotated to the direction that gave the maximum emission.</p> <p>c. Finally, the antenna height was adjusted to the height that gave the maximum emission.</p> <p>3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz.</p> <p>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 &lt; 98%) □ 10 Hz (Duty cycle &gt; 98%)</p> <p>5. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</p>
Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

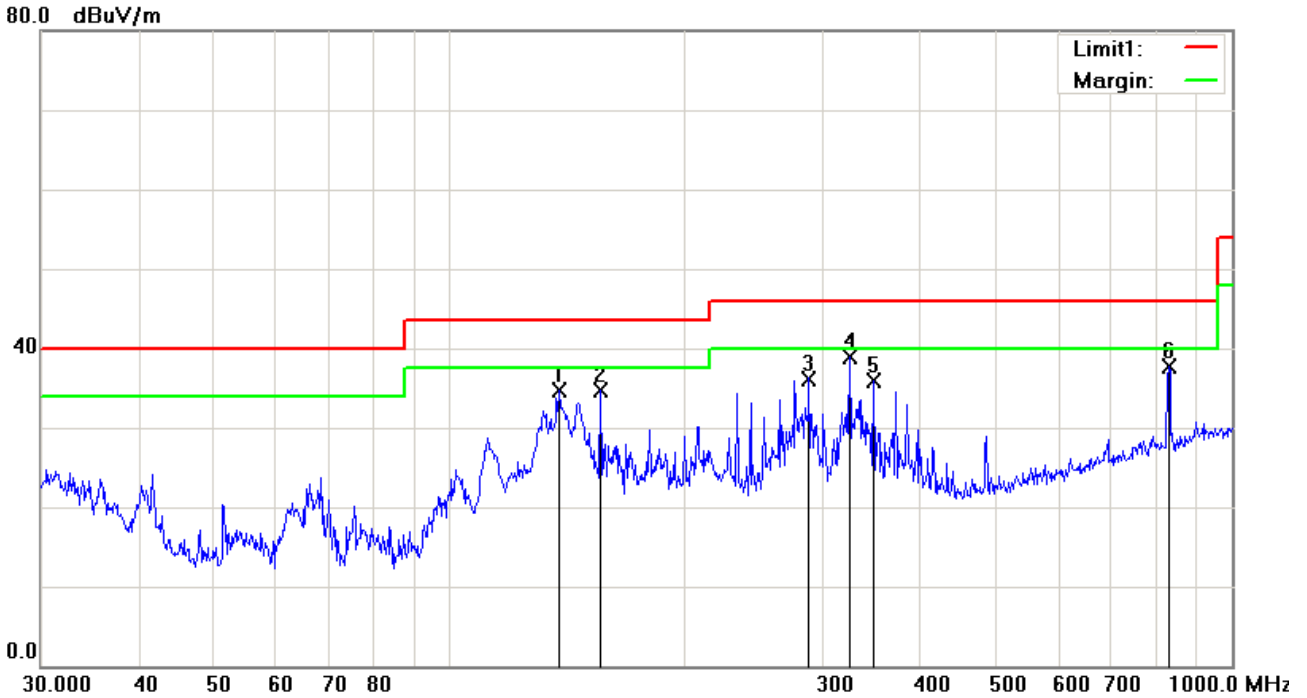
Test Data     Yes                       N/A

Test Plot     Yes (See below)             N/A

**Note : The Highest Working Frequency of EUT is 32MHz.**

**Test Mode : Running**

**Below 1GHz**



**Test Data**

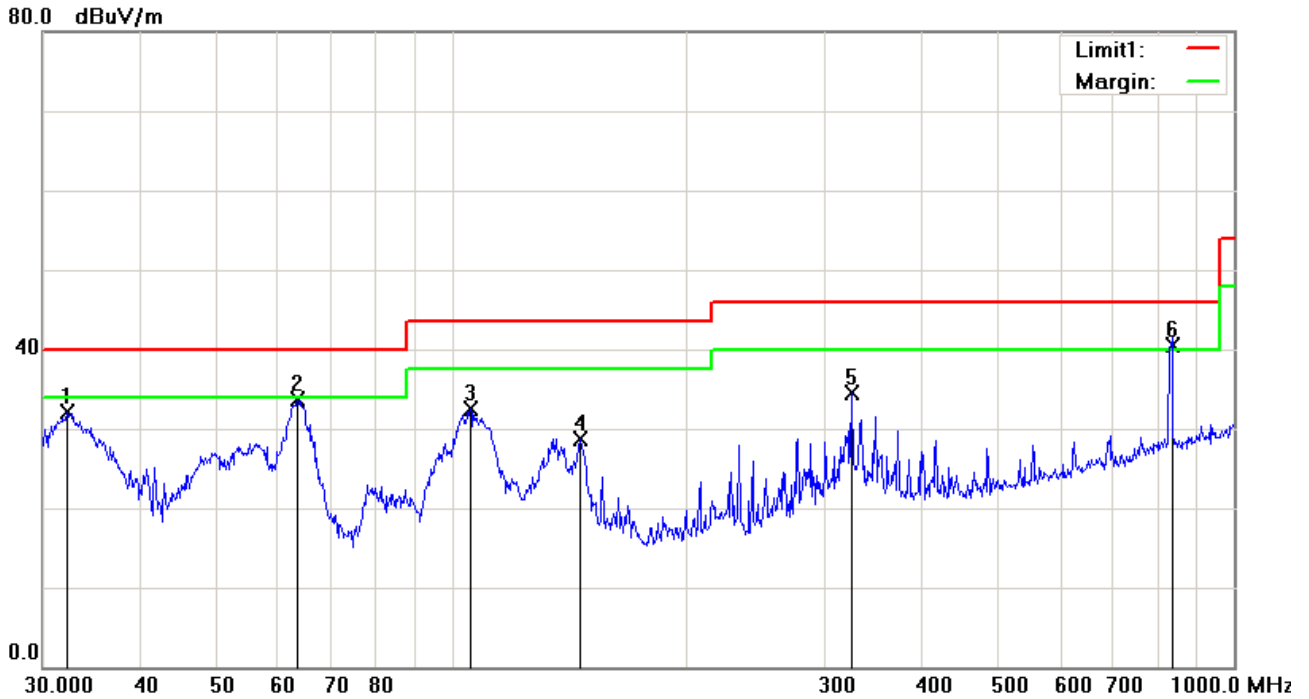
**Horizontal Polarity Plot @3m**

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	( ° )
1	H	137.9029	43.19	peak	-8.40	34.79	43.50	-8.71	100	130
2	H	155.9101	43.12	peak	-8.33	34.79	43.50	-8.71	100	145
3	H	287.9904	43.65	peak	-7.45	36.20	46.00	-9.80	100	21
4	H	324.4561	45.07	peak	-6.20	38.87	46.00	-7.13	100	115
5	H	348.0274	41.41	peak	-5.52	35.89	46.00	-10.11	100	100
6	H	830.4002	34.10	peak	3.57	37.67	46.00	-8.33	100	66

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



**Below 1GHz**



**Test Data**

**Vertical Polarity Plot @3m**

No.	P/L	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	V	32.2925	34.08	peak	-1.96	32.12	40.00	-7.88	100	86
2	V	63.5356	47.71	peak	-14.08	33.63	40.00	-6.37	100	98
3	V	105.6415	42.27	peak	-9.79	32.48	43.50	-11.02	100	255
4	V	145.8611	37.17	peak	-8.46	28.71	43.50	-14.79	100	199
5	V	324.4561	40.74	peak	-6.20	34.54	46.00	-11.46	100	359
6	V	833.3171	36.91	QP	3.61	40.52	46.00	-5.48	100	42

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

## Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
<b>AC Line Conducted Emissions</b>					
EMI test receiver	ESCS30	8471241027	09/17/2015	09/16/2016	<input checked="" type="checkbox"/>
Line Impedance Stabilization Network	LI-125A	191106	09/25/2015	09/24/2016	<input checked="" type="checkbox"/>
Line Impedance Stabilization Network	LI-125A	191107	09/25/2015	09/24/2016	<input checked="" type="checkbox"/>
LISN	ISN T800	34373	09/25/2015	09/24/2016	<input checked="" type="checkbox"/>
Transient Limiter	LIT-153	531118	09/01/2015	08/31/2016	<input checked="" type="checkbox"/>
<b>Radiated Emissions</b>					
EMI test receiver	ESL6	100262	09/17/2015	09/16/2016	<input checked="" type="checkbox"/>
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/01/2015	08/31/2016	<input checked="" type="checkbox"/>
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/25/2015	03/24/2016	<input checked="" type="checkbox"/>
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/21/2015	09/20/2016	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna	AH-118	71259	09/24/2015	09/23/2016	<input checked="" type="checkbox"/>

**Annex B. EUT And Test Setup Photographs**

**Annex B.i. Photograph: EUT External Photo**



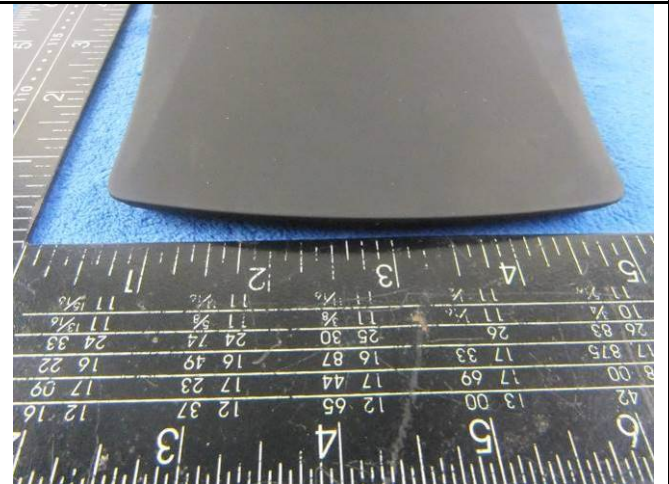
EUT(P/N :3DX-600051) - Front View



EUT(P/N :3DX-600051) - Rear View



EUT(P/N :3DX-600051) - Top View



EUT(P/N :3DX-600051) - Bottom View



EUT(P/N :3DX-600051)- Left View



EUT(P/N :3DX-600051) - Right View



**Annex B.ii. Photograph: EUT Internal Photo**



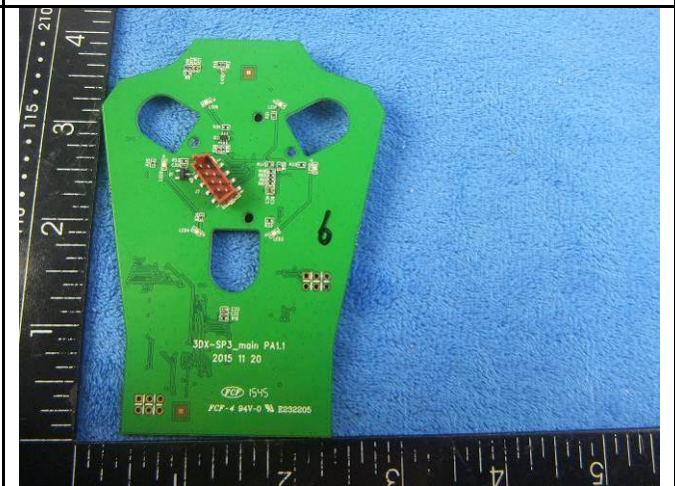
EUT - Uncover Front View 1



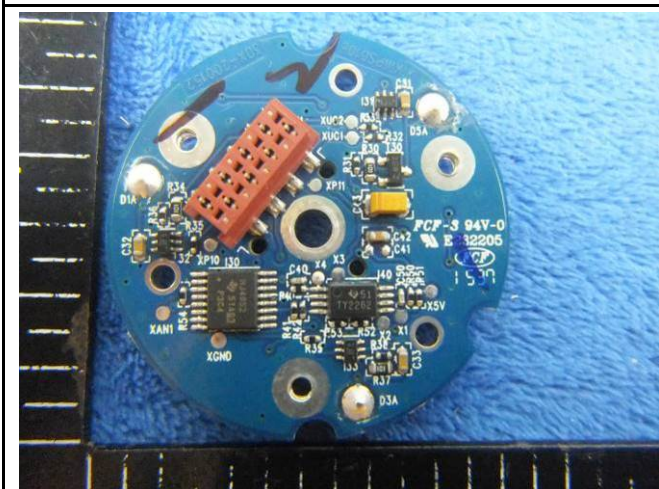
EUT - Uncover Front View 2



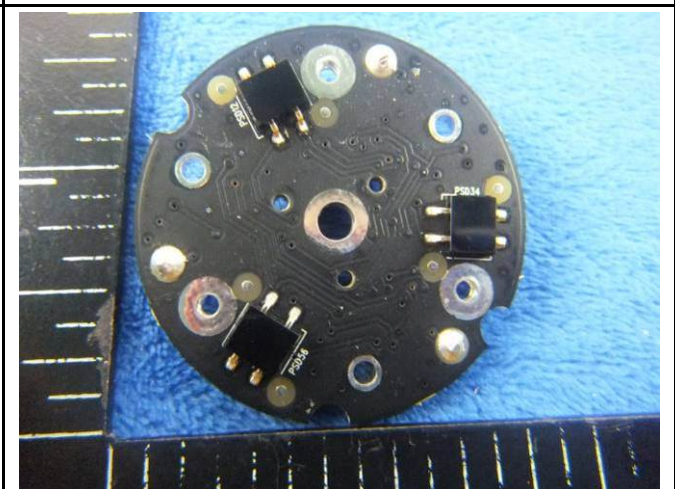
Mainboard Board Top View



Mainboard Board Bottom View



Mini Mainboard Board Top View

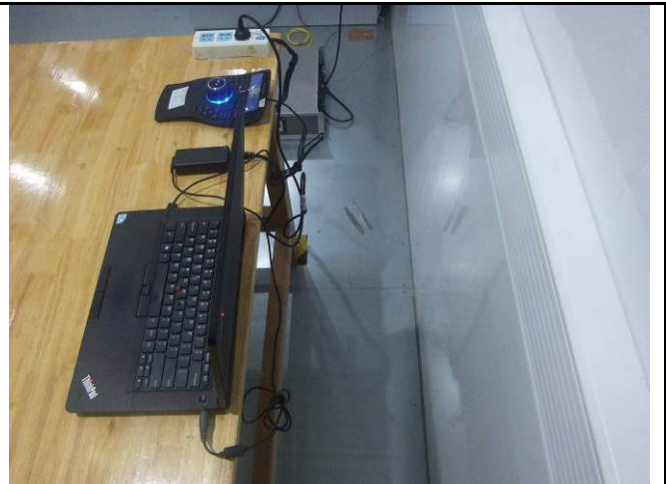


Mini Mainboard Board Bottom View

**Annex B.iii. Photograph: Test Setup Photo**



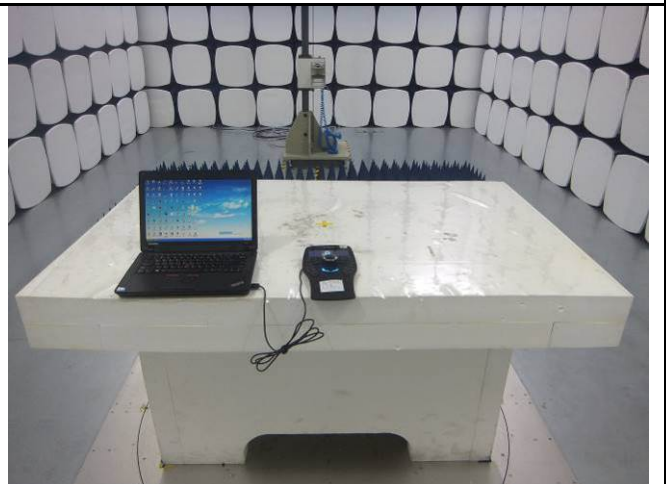
Conducted Emissions Test Setup – Front View



Conducted Emissions Test Setup – Side View



Radiated Emissions Test Setup Below 1GHz



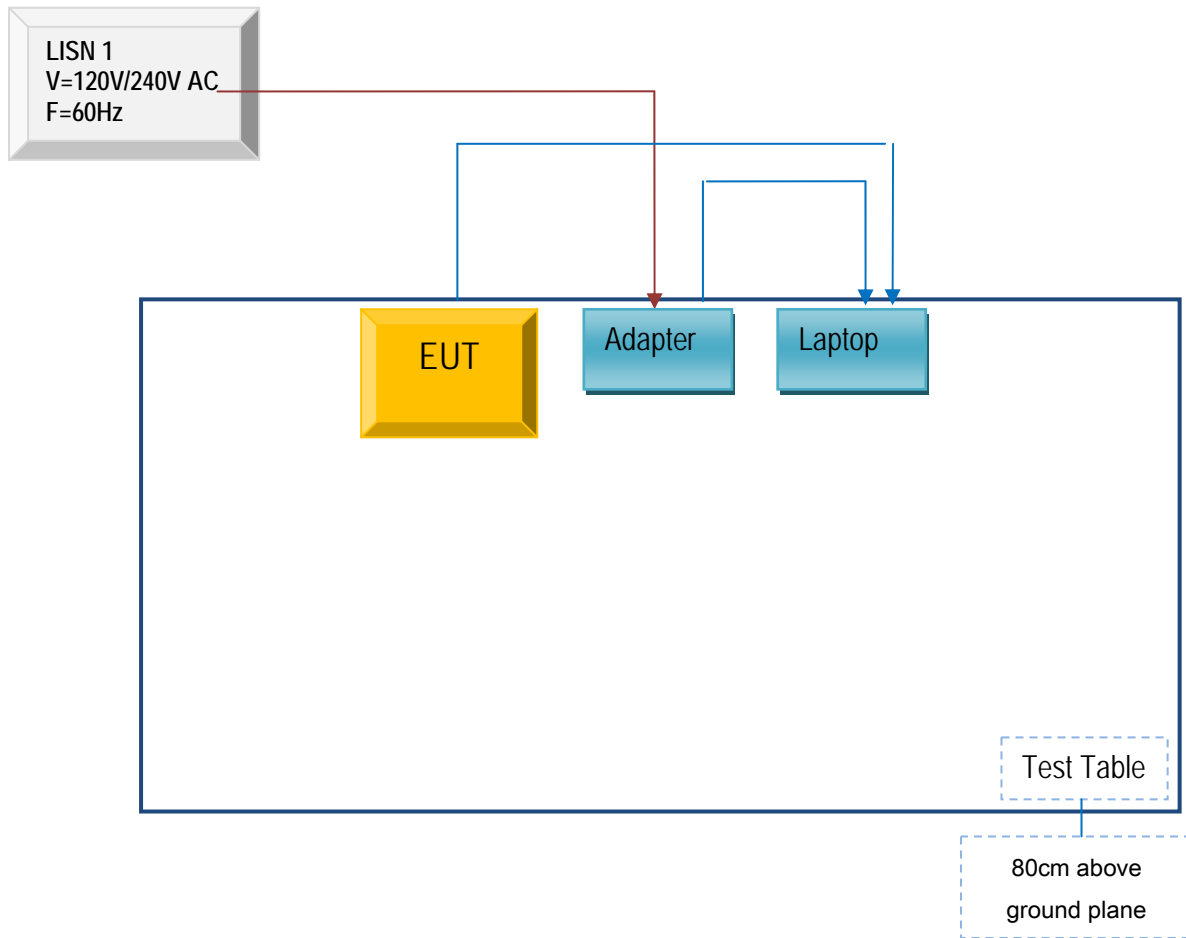
Radiated Emissions Test Setup Above 1GHz



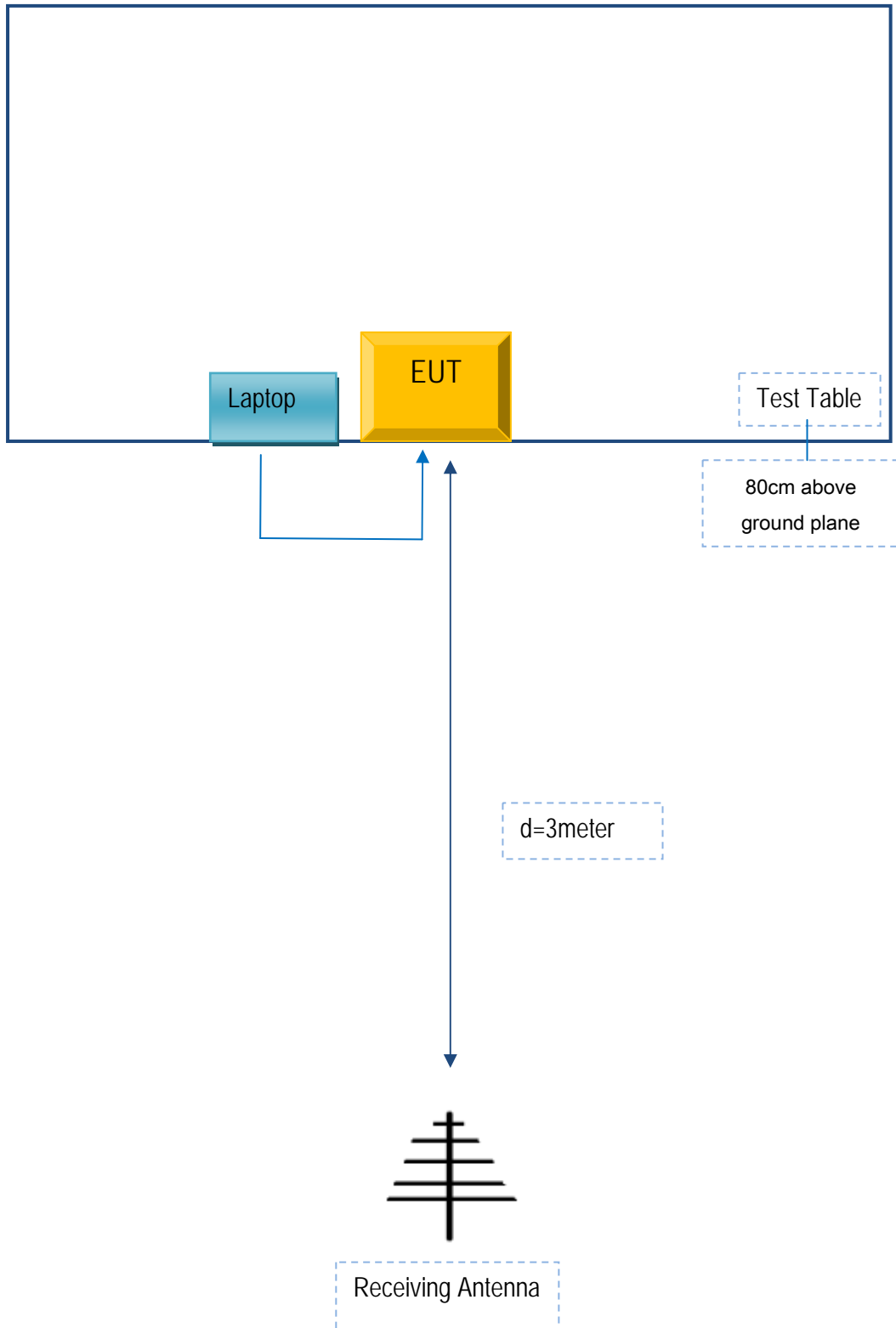
## Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

### Annex C.ii. TEST SET UP BLOCK

#### Block Configuration Diagram for Conducted Emissions



### Block Configuration Diagram for Radiated Emissions





**Annex C. ii. 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

Test Report	15071214-FCC-E
Page	26 of 27

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

N/A

Test Report	15071214-FCC-E
Page	27 of 27

## Annex E. DECLARATION OF SIMILARITY



To: 775 Montague Expressway Milpitas, CA 95035, USA

### Declaration Letter

We declare that the PCB and Appearance shape of 3DX-600051, 3DX-700056, and 3DX-700058 are the exactly same. They are identical in circuitry, electrical, mechanical, physical, and shape construction. The only difference is the model number for our business issue and marketing requirement.

FCC ID:2AAHQ-SME

Sincerely,

Client's signature:

A handwritten signature in blue ink, appearing to be "Xiaobing Lin".

Client's name / title: Xiaobing Lin / Compliance Manager

Contact information / address: 3Dconnexion SAM, 33, Rue du Portier, 98000 Monaco