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# Report On

FCC Testing of the Vertex Telecom, Inc. DB1016US DamaiBox1.0+ in accordance with FCC CFR 47 Part 15, Subpart B

COMMERCIAL-IN-CONFIDENCE

FCC ID: 2AE7M-DB1016

Document 57015091 Report 01 Issue 1

July 2015





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**REPORT ON**

FCC Testing of the  
Vertex Telecom, Inc.  
DB1016US DamaiBox1.0+

Document 57015091 Report 01 Issue 1

July 2015

**PREPARED FOR**

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980 Corporate Center Dr, Pomona, CA 91768, USA

**PREPARED BY**

A handwritten signature in black ink that reads 'Zhao Guiying'.

**G Zhao**  
Engineer

**APPROVED BY**

A handwritten signature in black ink that reads 'Chang Cheng Xiu'.

**C Zhang**  
Manager

**DATED**

03 August 2015

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**ENGINEERING STATEMENT**

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on one sample equipment to demonstrate limited compliance with FCC CFR 47 Part 15, Subpart B. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

A handwritten signature in black ink that reads 'Zhao Guiying'.

**G Zhao**



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## **SECTION 1**

### **REPORT SUMMARY**

FCC Testing of the Vertex Telecom, Inc. DB1016US DamaiBox1.0+  
in accordance with FCC CFR 47 Part 15, Subpart B



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## 1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Vertex Telecom, Inc. DB1016US DamaiBox1.0+ to the requirements of FCC CFR 47 Part 15 Subpart B.

Testing was carried out in support of an application for FCC Grant of DB1016US DamaiBox1.0+.

Objective	To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Vertex Telecom, Inc.
Product Name	DamaiBox1.0+
Model Number(s)	DB1016US
Serial Number(s)	DMA30905140900022
Software Version	VT.40.04.01
Hardware Version	24230511
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15, Subpart B: 2014
Start of Test	21 July 2015
Finish of Test	22 July 2015
Name of Engineer(s)	G Zhao

**1.2 BRIEF SUMMARY OF RESULTS**

A brief summary of results in accordance with FCC CFR 47 Part 15, Subpart B, is shown below.

<b>Test</b>	<b>Spec Clause</b>	<b>Test Description</b>	<b>Result</b>
2.1	15.107	Conducted Emissions AC Power Port	Pass
2.2	15.109	Radiated Emissions	Pass



## 1.3 DECLARATION OF BUILD STATUS

MAIN EUT		
<b>Manufacture</b>	Vertex Telecom, Inc.	
<b>Product Name</b>	DamaiBox1.0+	
<b>Product Type</b>	DB1016US	
<b>Serial Number</b>	DMA30905140900022	
<b>Radio Access Technology</b>	WLAN	
<b>Hardware Version</b>	24230511	
<b>Software Version</b>	VT.40.04.01	
<b>Operating Frequency</b>	2400MHz to 2483.5MHz	
<b>Transfer Rate</b>	802.11b: 1Mbps, 2Mbps, 5.5Mbps, 11Mbps 802.11g: 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps 802.11n HT20 and HT40: MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7	
<b>Number of Channel</b>	802.11b/g/n HT20: 11 802.11n HT40: 9	
<b>Modulation Type</b>	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n HT20 and HT40: OFDM (64QAM, 16QAM, QPSK, BPSK)	
<b>Maximum Output Power (dBm)</b>	20dBm	
<b>Antenna Gain (dBi)</b>	5	
<b>FCC ID</b>	2AE7M-DB1016	
<b>Environment Temperature Range(s) in Operation</b>	Minimum	Maximum
	-20°C	+45°C
<b>DC Power Source</b>	5.0V	
<b>Technical Description (a brief description of the intended use and operation)</b>	This is a DamaiBox1.0+ could communication with indoor access point by wireless mode, which operates on the frequency band 2400MHz to 2483.5MHz. Also, it can be connected to TV by HDMI cable, and to indoor access point by network cable.	

No responsibility will be accepted by TÜV SÜD Certification and Testing (China) Co., Ltd. Beijing Branch as to the accuracy of the information declared in this document by the manufacturer.



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## 1.4 PRODUCT INFORMATION

### 1.4.1 Technical Description

The Equipment Under Test (EUT) DB1016US is DamaiBox1.0+ from Vertex Telecom, Inc.

There is only one model with DamaiBox1.0+ for approval, which is DB1016US. This is a DamaiBox1.0+ could communication with indoor access point by wireless mode, which operates on the frequency band 2400MHz to 2483.5MHz. Also, it can be connected to TV through HDMI cable, and to indoor access point by network cable. A full technical description is held by Vertex Telecom, Inc.

The Equipment Under Test is shown in the photograph below. A full technical description can be found in the Manufacturers documentation.



Equipment Under Test





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**1.4.2 Test Configuration**

Configuration : 2.4 GHz WLAN

The EUT was configured in accordance with FCC CFR 47 Part 15, Subpart B.

The EUT was powered by 5.0 VDC with power supply.

**1.5 TEST CONDITIONS**

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions.

**1.6 DEVIATIONS FROM THE STANDARD**

No deviations from the applicable test standards or test plan were made during testing.

**1.7 MODIFICATION RECORD**

Mode State 0 - No modifications were made to the EUT during testing.

**1.8 ALTERNATIVE TEST SITE**

Testing has been performed under the following site:

FCC Accreditation 910917:  
The State Radio Monitoring Centre, No.80 Beilishi Road Xicheng District Beijing, China.



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## **SECTION 2**

### **TEST DETAILS**

FCC Testing of the Vertex Telecom, Inc. DB1016US DamaiBox1.0+  
in accordance with FCC CFR 47 Part 15 Subpart B



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## 2.1 CONDUCTED EMISSIONS

### 2.1.1 Specification Reference

FCC CFR 47 Part 15, Clause 15.107

### 2.1.2 Equipment Under Test

DB1016US, S/N: DMA30905140900022

### 2.1.3 Date of Test and Modification State

21 July 2015 – Modification State 0

### 2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.1.5 Test Method and limit

The test was applied in accordance with the requirements in clause 15.107 of FCC CFR 47 Part 15, Subpart B.

The test was performed in a shield room, and EUT was placed on a table, which was 0.8m above ground plane. The power line of the EUT was connected to the AC mains through a line Impedance Stabilization Network (LISN).

A EMI test receiver was used to test the emissions from both sides of AC line. The conducted emission is scanned over the frequency from 150KHz to 30MHz with peak detector. A final measurement is performed with quasi-peak detector and average detector.

#### Limit:

Frequency MHz	QP Limit dB $\mu$ V	AV Limit dB $\mu$ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

\*Decreasing linearly with logarithm of the frequency

### 2.1.6 Environmental Conditions

Ambient Temperature 24.5°C

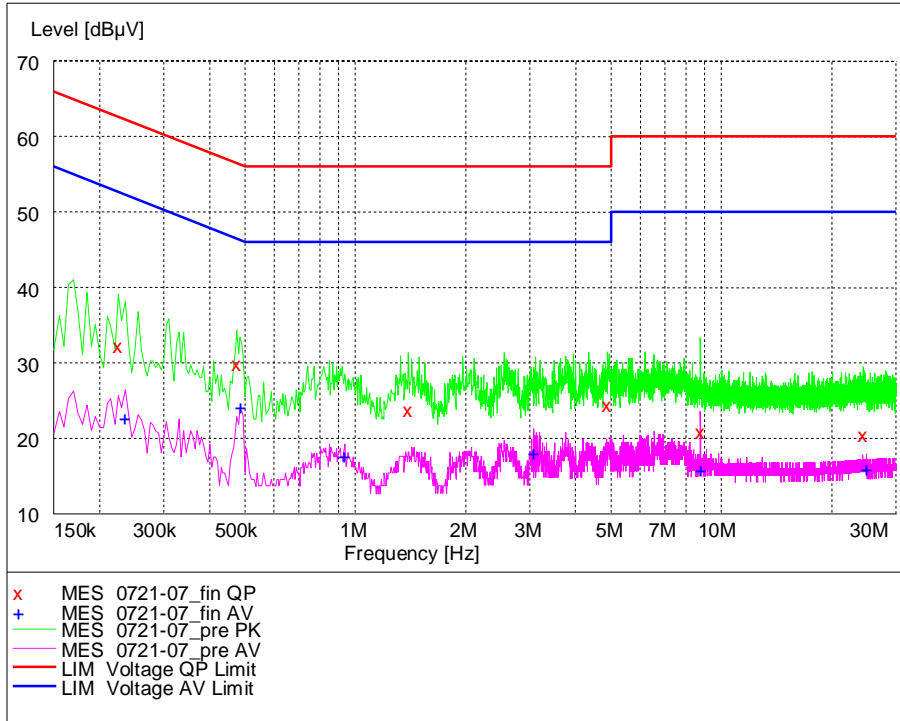
Relative Humidity 53.0%



**2.1.7 Test Results**

The test results are shown below.

L Line:



**MEASUREMENT RESULT: "0721-07\_fin QP"**

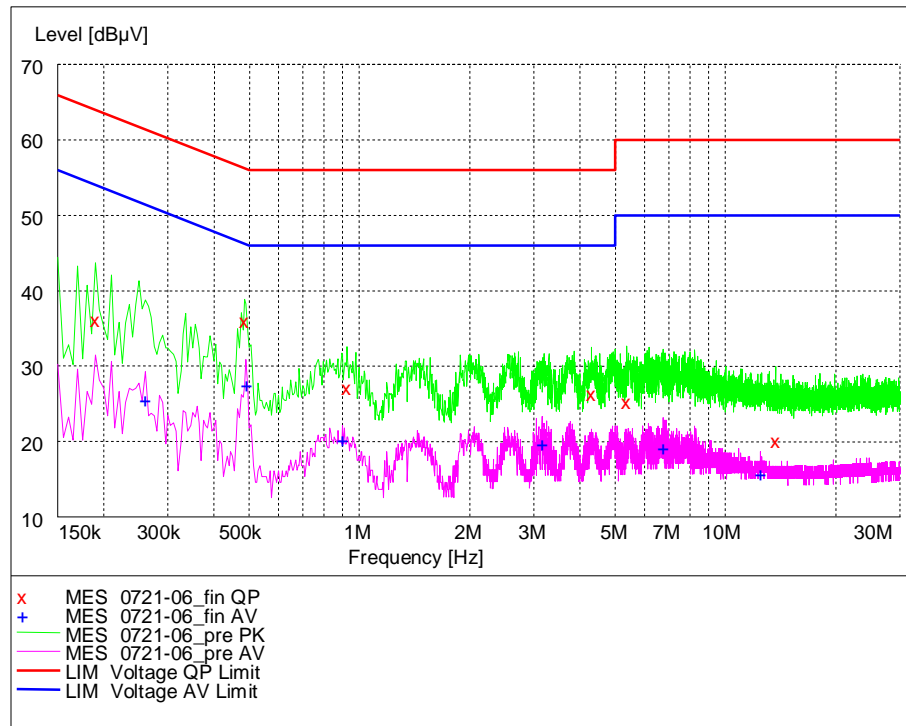
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB
0.225000	32.50	20.1	63	30.1
0.475000	30.10	20.1	56	26.3
1.395000	23.90	20.2	56	32.1
4.895000	24.70	20.4	56	31.3
8.780000	21.00	20.5	60	39.0
24.405000	20.60	21.1	60	39.4

**MEASUREMENT RESULT: "0721-07\_fin AV"**

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB
0.235000	23.00	20.1	52	29.3
0.485000	24.30	20.2	46	21.9
0.935000	18.00	20.2	46	28.0
3.080000	18.40	20.3	46	27.6
8.780000	16.10	20.5	50	33.9
24.925000	16.20	21.1	50	33.8



N Line:



**MEASUREMENT RESULT: "0721-06\_fin QP"**

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB
0.190000	36.50	20.1	64	27.5
0.485000	36.20	20.2	56	20.1
0.925000	27.50	20.2	56	28.5
4.305000	26.60	20.3	56	29.4
5.380000	25.50	20.4	60	34.5
13.695000	20.30	20.7	60	39.7

**MEASUREMENT RESULT: "0721-06\_fin AV"**

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB
0.260000	25.80	20.1	51	25.6
0.490000	27.80	20.2	46	18.3
0.900000	20.60	20.1	46	25.4
3.155000	20.00	20.3	46	26.0
6.760000	19.50	20.5	50	30.5
12.495000	16.00	20.7	50	34.0

Remarks

The results of test did not exceed the limits at the measured frequencies.



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**2.2 RADIATED EMISSIONS**

**2.2.1 Specification Reference**

FCC CFR 47 Part 15, Clause 15.109

**2.2.2 Equipment Under Test**

DB1016US, S/N: DMA30905140900022

**2.2.3 Date of Test and Modification State**

21 July 2015 – Modification State 0

**2.2.4 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

**2.2.5 Test Method and Limit**

The test was applied in accordance with the requirements in clause 15.109 of FCC CFR 47 Part 15, Subpart B.

The test was performed in a shield room, and EUT was placed on a turntable, which was 0.8m above ground plane. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

The EUT was set 3m away from the receiving antenna, which was varied from 1m to 4m to find out the highest emissions. Both horizontal and vertical polarizations of antenna were set in the measurement.

**Limit:**

Frequency MHz	Field Strength uV/m	Field Strength dBµV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

**2.2.6 Environmental Conditions**

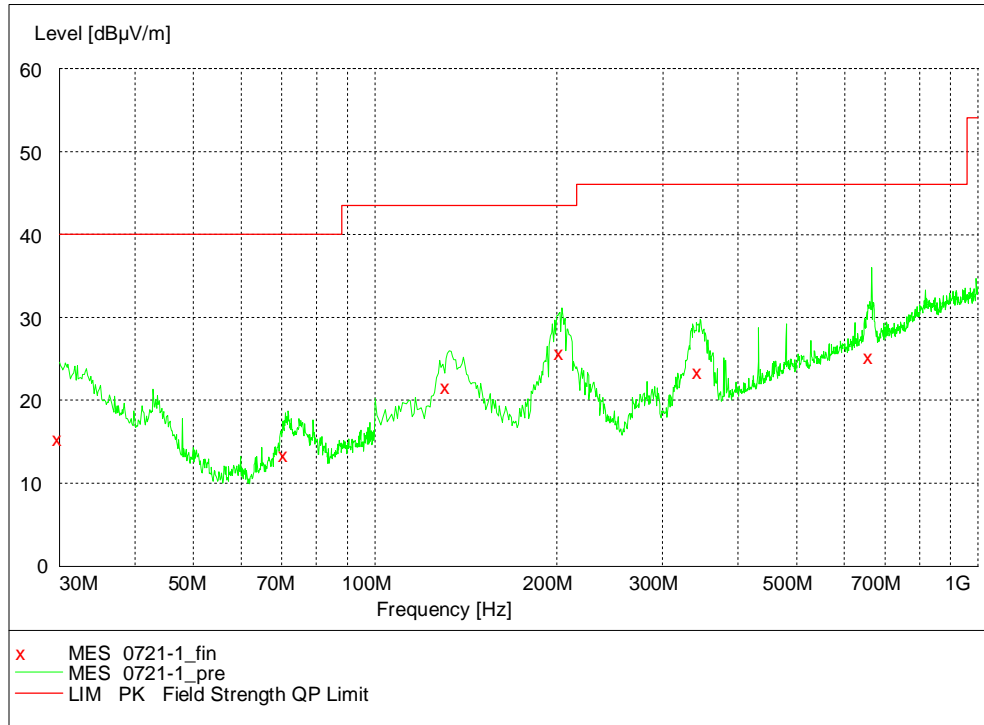
Ambient Temperature 24.5°C

Relative Humidity 53.0%



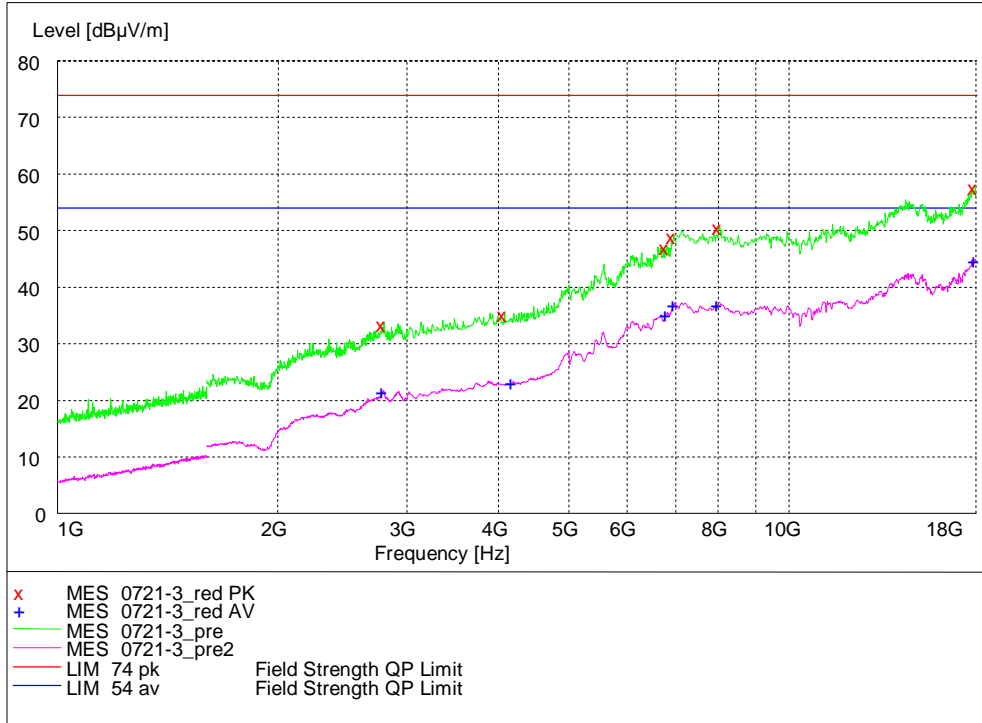
**2.2.7 Test Results**

The test plots are shown below.



**MEASUREMENT RESULT: "0721-1\_PK"**

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
30.120000	15.50	15.3	40.0	24.5	100.0	270.00	VERTICAL
71.220000	13.50	7.1	40.0	26.5	100.0	180.00	VERTICAL
132.520000	21.80	8.8	43.5	21.7	200.0	0.00	HORIZONTAL
204.160000	25.90	8.4	43.5	17.6	100.0	90.00	HORIZONTAL
345.640000	23.50	13.6	46.0	22.5	100.0	0.00	HORIZONTAL
665.060000	25.40	21.4	46.0	20.6	100.0	0.00	VERTICAL



**MEASUREMENT RESULT: "0721-3\_PK"**

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
2792.384770	33.86	8.1	74.0	40.1	100.0	270.00	VERTICAL
4082.164329	35.42	13.7	74.0	38.6	200.0	270.00	VERTICAL
6807.615230	47.31	22.2	74.0	26.7	200.0	90.00	HORIZONTAL
6951.903808	49.27	23.1	74.0	24.7	200.0	270.00	VERTICAL
8036.072144	50.66	-5.9	74.0	23.3	200.0	90.00	HORIZONTAL
17955.911824	57.90	12.3	74.0	16.1	200.0	270.00	VERTICAL

**MEASUREMENT RESULT: "0721-3\_AV"**

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth	Polarisation
2789.579158	21.80	8.1	54.0	32.2	100.0	0.00	VERTICAL
4194.388778	23.37	14.1	54.0	30.6	100.0	0.00	VERTICAL
6815.631263	35.53	22.3	54.0	18.5	100.0	180.00	HORIZONTAL
6975.951904	37.25	23.2	54.0	16.8	100.0	90.00	VERTICAL
8014.028056	37.37	-5.9	54.0	16.6	100.0	0.00	VERTICAL
17977.955912	45.01	12.4	54.0	9.0	100.0	0.00	VERTICAL

Remarks

The Radiated Emissions of the EUT did not exceed the limit during test.





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### **SECTION 3**

#### **TEST EQUIPMENT USED**



### 3.1 TEST EQUIPMENT USED

Lists of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	Serial No.	Calibration Due
<b>Conducted Emission</b>				
EMI Receiver	Rohde & Schwarz	ESIB7	100280	15-Aug-2015
LISN	AFJ	LS16C	16011306281	01-Apr-2016
Digital Multi-meter	FLUKE	179	91820401	14-Dec-2015
Thermo-hygrometer	AZ Instruments	8705	9151665	10-Dec-2015
<b>Receiver Emission</b>				
EMI Receiver	Rohde & Schwarz	ESI 40	100015	19-Aug-2015
Ultra log test antenna	Rohde & Schwarz	HL562	100167	19-Aug-2015
Double-Ridged Wave-guide Horn Antenna	Rohde & Schwarz	HF 906	100029	19-Aug-2015
Pyramidal Horn Antenna	EMCO	3160-09	760840	19-Aug-2015
Pyramidal Horn Antenna	EMCO	3160-10	808234	19-Aug-2015
Antenna master	Frankonia	MA 260	-	19-Aug-2014
Relay Switch Unit	Rohde & Schwarz	331.1601.31	338965002	TU
Semi Anechoic Chamber	Frankonia	23.18m×16.88m ×9.60m	-	19-Aug-2015
Digital Multi-meter	FLUKE	179	91820401	14-Dec-2015
Thermo-hygrometer	AZ Instruments	8705	9151665	10-Dec-2015



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### 3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Discipline	Frequency / Parameter	MU
Conducted Emissions	QP detector	3.34 dB
	AV detector	3.39 dB
Radiated Emissions, Bilog Antenna, AOATS	30MHz to1GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*

\* In accordance with CISPR 16-4



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## **SECTION 4**

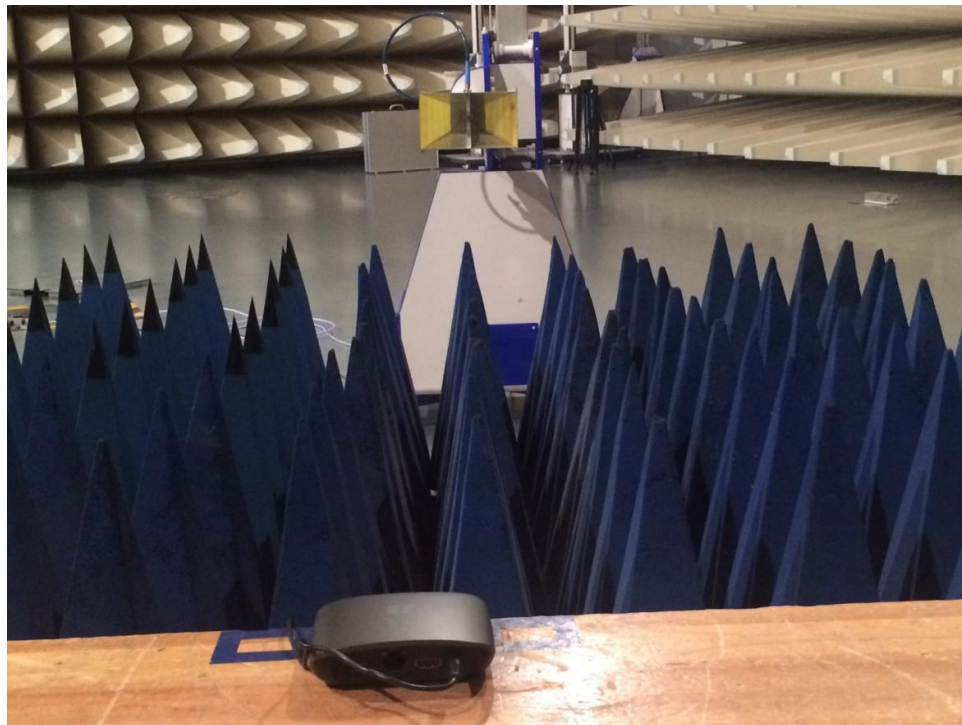
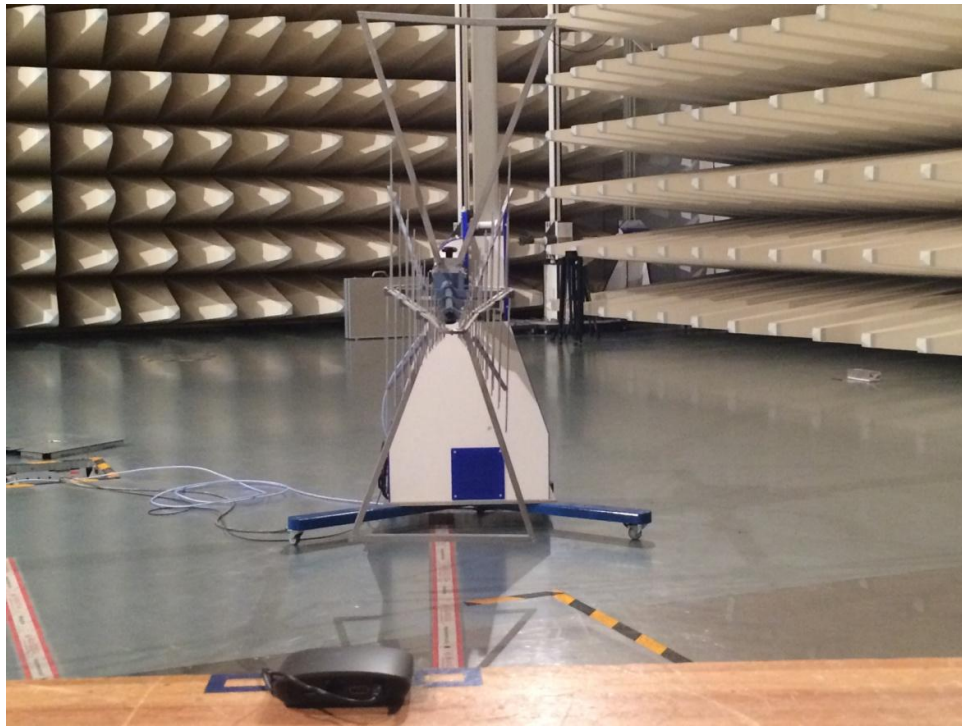
### **EUT PHOTOGRAPH**



#### 4.1 TEST SETUP PHOTOS



Conducted Emission Test Setup



Radiated Emissions Test Setup



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## **SECTION 5**

### **ACCREDITATION, DISCLAIMERS AND COPYRIGHT**



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## 5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

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