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Report On

FCC Testing of the Vertex Telecom, Inc. DW33D Damai WiFi AC1750M
Dual Band Gigabit Router in accordance with FCC CFR 47 Part 15,
Subpart B

COMMERCIAL-IN-CONFIDENCE

FCC ID: 2AE7MRDW33D-E2

Document 57015092 Report 01 Issue 1

September 2015



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REPORT ON

FCC Testing of the
Vertex Telecom, Inc.
DW33D Damai WiFi AC1750M Dual Band Gigabit Router

Document 57015092 Report 01 Issue 1

September 2015

PREPARED FOR

Vertex Telecom, Inc.
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 'Zhang Chengxin'.

C Zhang
Manager

DATED

07 September 2015

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.
DW33D Damai WiFi AC1750M Dual Band Gigabit Router
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. DW33D Damai WiFi AC1750M Dual Band Gigabit Router to the requirements of FCC CFR 47 Part 15 Subpart B.

Testing was carried out in support of an application for FCC Grant of DW33D Damai WiFi AC1750M Dual Band Gigabit Router.

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	Damai WiFi AC1750M Dual Band Gigabit Router
Model Number(s)	DW33D
Serial Number(s)	RDW33DI0121150400025
Software Version	00.00.00.01
Hardware Version	DW33D V1.0
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15, Subpart B: 2014
Start of Test	17 July 2015
Finish of Test	17 July 2015
Name of Engineer(s)	G Zhao



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1.2 BRIEF SUMMARY OF RESULTS

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

Test	Spec Clause	Test Description	Result
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	
Manufacture	Vertex Telecom, Inc.
Product Name	Damai WiFi AC1750M Dual Band Gigabit Router
Product Type	DW33D
Serial Number	RDW33DI0121150400025
Radio Access Technology	WLAN
Hardware Version	DW33D V1.0
Software Version	00.00.00.01
Operating Frequency	2400MHz to 2483.5MHz, 5725MHz to 5850MHz
Transfer Rate	802.11b: 1Mbps, 2Mbps, 5.5Mbps, 11Mbps 802.11a/g: 6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps 802.11n: up to 450Mbps 802.11ac: up to 1299.9Mbps
Number of channel	For 2400MHz to 2483.5MHz 802.11b/g/n(20MHz): 11 802.11n(40MHz): 7 For 5725MHz to 5850MHz: 802.11a/11n(20MHz)/11ac(20MHz): 5 802.11n(40MHz)/11ac(40MHz): 2 802.11ac(80MHz): 1
Modulation Type	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11a/g: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Maximum Output Power (dBm)	Band 2400MHz to 2483.5MHz: 25dBm Band 5725MHz to 5850MHz: 19dBm
Antenna Gain (dBi)	Band 2400MHz to 2483.5MHz: 3dBi Band 5725MHz to 5850MHz: 5dBi
Antenna Number	3
FCC ID	2AE7MRDW33D-E2
Environment temperature range(s)	Minimum 0 °C Maximum +40 °C
DC Power source	12.0V
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	This Damai WiFi AC1750M Dual Band Gigabit Router is an indoor access, which operates on the frequency band 2400MHz to 2483.5MHz and band 5725MHz to 5850MHz.

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) DW33D is Damai WiFi AC1750M Dual Band Gigabit Router from Vertex Telecom, Inc.

There is only one model with Damai WiFi AC1750M Dual Band Gigabit Router for approval, which is DW33D. This Damai WiFi AC1750M Dual Band Gigabit Router is an indoor access, which operates on the frequency band 2400MHz to 2483.5MHz and band 5725MHz to 5825MHz. 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



Product Service

1.4.2 Test Configuration

Configuration 1: WLAN idle mode

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

The EUT was powered by 12.0 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 theVertex Telecom, Inc.
DW33D Damai WiFi AC1750M Dual Band Gigabit Router
in accordance with FCC CFR 47 Part 15 Subpart B



Product Service

2.1 CONDUCTED EMISSIONS

2.1.1 Specification Reference

FCC CFR 47 Part 15, Clause 15.107

2.1.2 Equipment Under Test

DW33D, S/N: RDW33DI0121150400025

2.1.3 Date of Test and Modification State

17 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 μ V	AV Limit dB μ 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 25.5°C

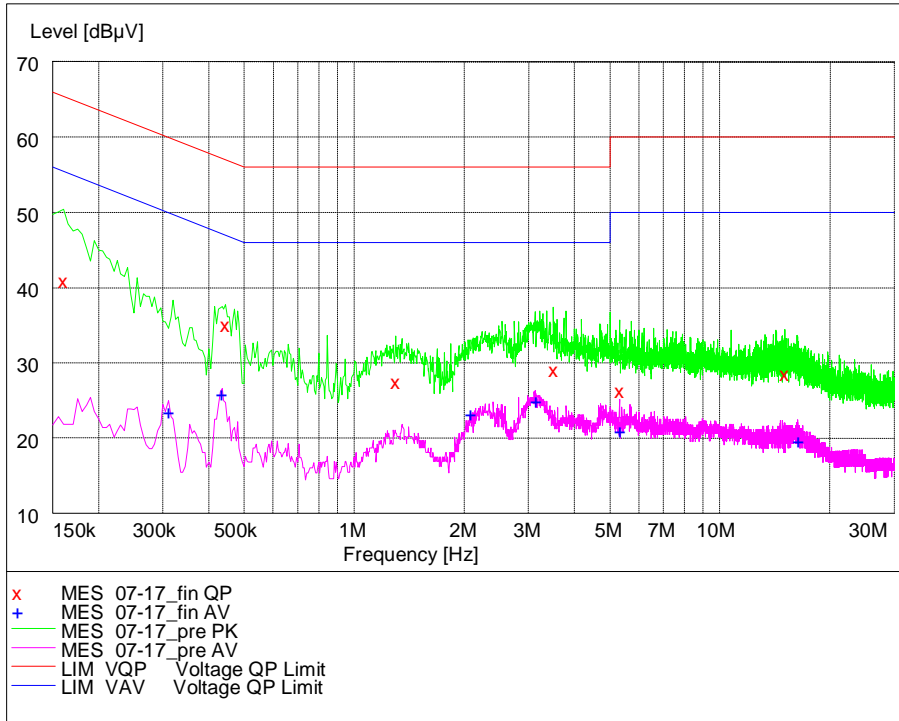
Relative Humidity 50.5%



2.1.7 Test Results

The test results are shown below.

L Line:



MEASUREMENT RESULT: "07-17_fin QP"

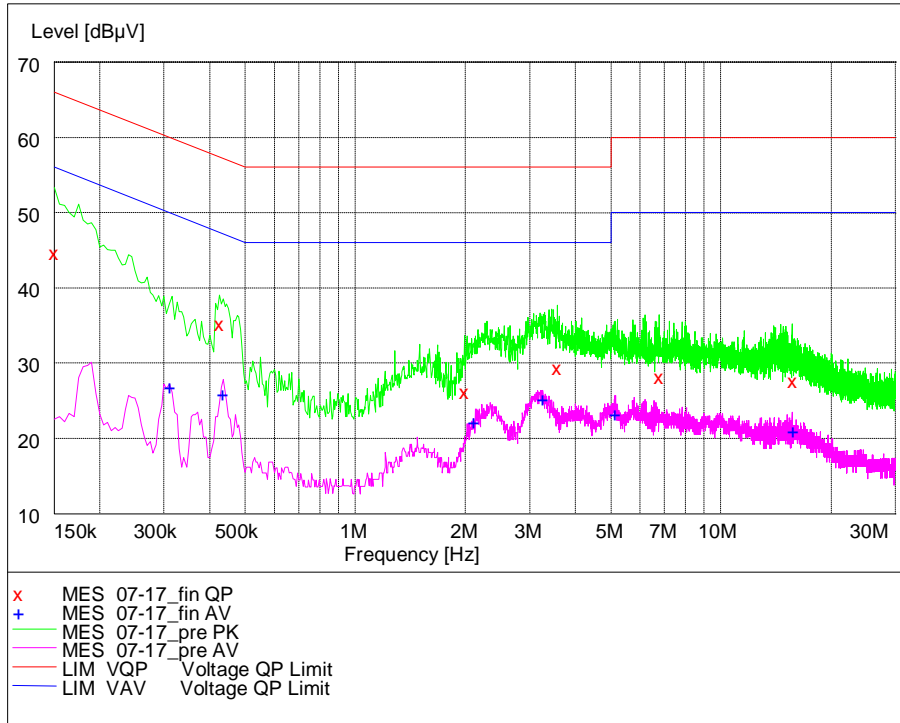
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB
0.160000	41.20	20.2	66	24.3
0.445000	35.30	20.1	57	21.6
1.300000	27.70	20.2	56	28.3
3.510000	29.40	20.3	56	26.6
5.325000	26.60	20.4	60	33.4
15.075000	28.80	20.7	60	31.2

MEASUREMENT RESULT: "07-17_fin AV"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB
0.310000	23.90	20.1	50	26.0
0.435000	26.10	20.1	47	21.1
2.085000	23.50	20.3	46	22.5
3.125000	25.30	20.3	46	20.7
5.325000	21.20	20.4	50	28.8
16.365000	20.00	20.8	50	30.0



N Line:



MEASUREMENT RESULT: "07-17_fin QP"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB
0.150000	44.90	20.1	66	21.1
0.425000	35.50	20.1	57	21.9
1.990000	26.50	20.3	56	29.5
3.570000	29.70	20.3	56	26.3
6.770000	28.50	20.5	60	31.5
15.655000	27.90	20.8	60	32.1

MEASUREMENT RESULT: "07-17_fin AV"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB
0.310000	27.20	20.1	50	22.7
0.435000	26.30	20.1	47	20.8
2.105000	22.50	20.3	46	23.5
3.260000	25.60	20.3	46	20.4
5.135000	23.60	20.4	50	26.4
15.655000	21.40	20.8	50	28.6

Remarks

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



Product Service

2.2 RADIATED EMISSIONS

2.2.1 Specification Reference

FCC CFR 47 Part 15, Clause 15.109

2.2.2 Equipment Under Test

DW33D, S/N: RDW33DI0121150400025

2.2.3 Date of Test and Modification State

17 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

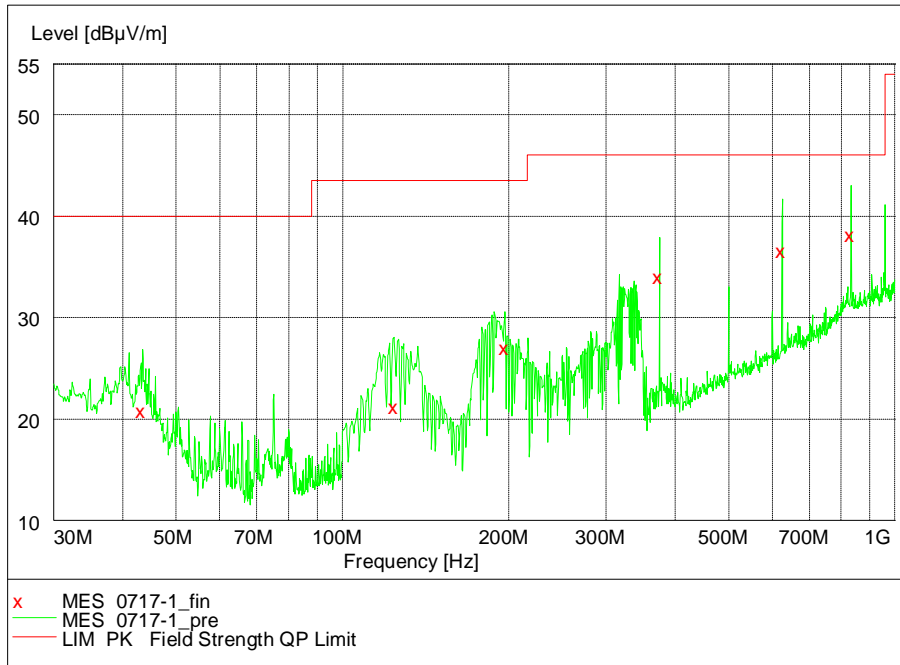
Ambient Temperature 25.5°C

Relative Humidity 50.5%



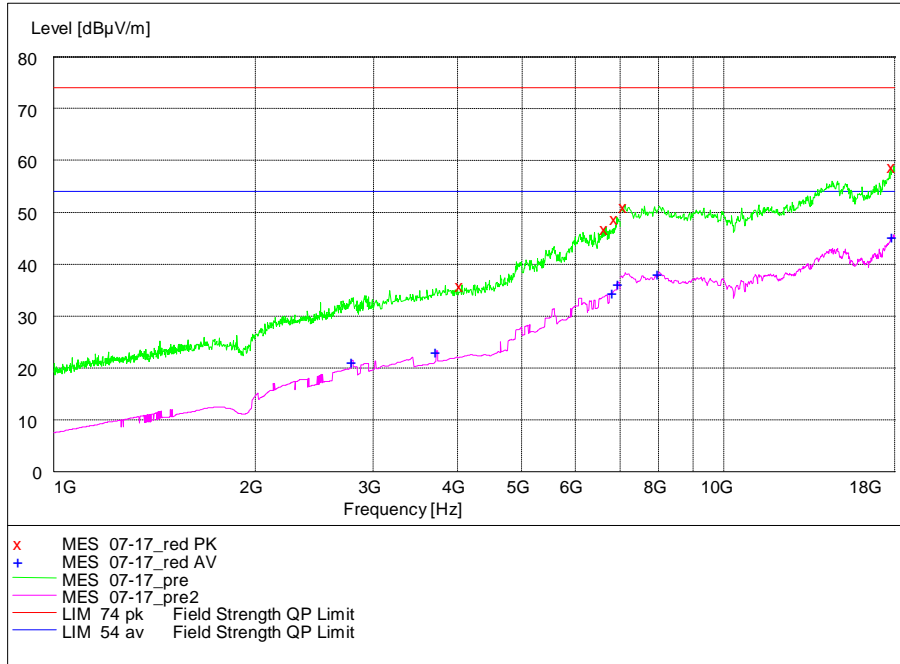
2.2.7 Test Results

The test plots are shown below.



MEASUREMENT RESULT: "0717-1_PK"

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
43.440000	21.00	13.5	40.0	19.0	100.0	270.00	VERTICAL
124.480000	21.40	9.4	43.5	22.1	200.0	270.00	HORIZONTAL
197.440000	27.30	8.2	43.5	16.2	100.0	270.00	HORIZONTAL
374.980000	34.30	14.7	46.0	11.7	100.0	180.00	VERTICAL
625.250501	36.80	15.9	46.0	9.2	100.0	180.00	VERTICAL
833.667335	38.40	23.5	46.0	7.6	300.0	180.00	HORIZONTAL



MEASUREMENT RESULT: "07-17_PK"

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
4066.132265	36.11	13.7	74.0	37.9	200.0	270.00	HORIZONTAL
6679.358717	47.08	22.0	74.0	26.9	100.0	180.00	VERTICAL
6919.839679	49.04	23.1	74.0	25.0	100.0	0.00	VERTICAL
7132.264529	51.42	-7.2	74.0	22.6	200.0	180.00	HORIZONTAL
17911.823647	58.94	12.1	74.0	15.1	200.0	90.00	HORIZONTAL

MEASUREMENT RESULT: "07-17_AV"

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
2800.801603	21.50	8.2	54.0	32.5	100.0	0.00	VERTICAL
3737.474950	23.33	12.9	54.0	30.7	200.0	90.00	VERTICAL
6863.727455	34.87	22.9	54.0	19.1	100.0	0.00	VERTICAL
6983.967936	36.57	23.2	54.0	17.4	100.0	0.00	VERTICAL
8014.028056	38.49	-5.9	54.0	15.5	100.0	270.00	VERTICAL
17911.823647	45.59	12.1	54.0	8.4	100.0	180.00	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
Conducted Emission				
EMI Receiver	Rohde & Schwarz	ESIB7	100280	15-Aug-2016
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
Receiver Emission				
EMI Receiver	Rohde & Schwarz	ESI 40	100015	19-Aug-2016
Ultra log test antenna	Rohde & Schwarz	HL562	100167	19-Aug-2016
Double-RidgedWave-guide Horn Antenna	Rohde & Schwarz	HF 906	100029	19-Aug-2016
Pyramidal Horn Antenna	EMCO	3160-09	760840	19-Aug-2016
Pyramidal Horn Antenna	EMCO	3160-10	808234	19-Aug-2016
Antenna master	Frankonia	MA 260	-	19-Aug-2016
Relay Switch Unit	Rohde & Schwarz	331.1601.31	338965002	TU
Semi Anechoic Chamber	Frankonia	23.18m×16.88m ×9.60m	-	19-Aug-2016
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



Product Service

SECTION 4

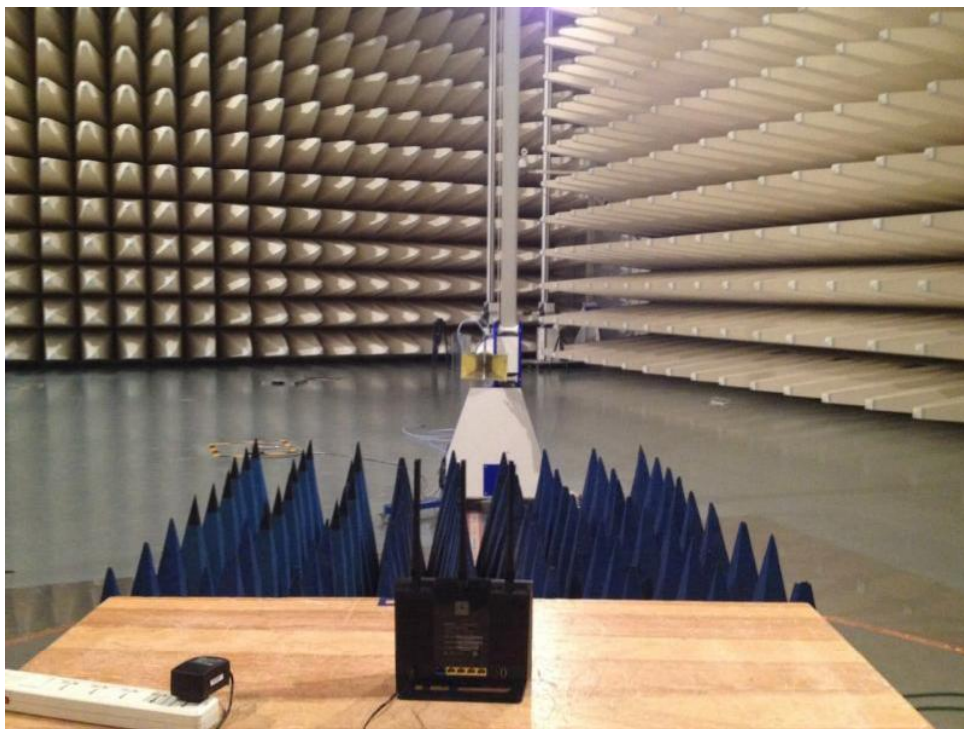
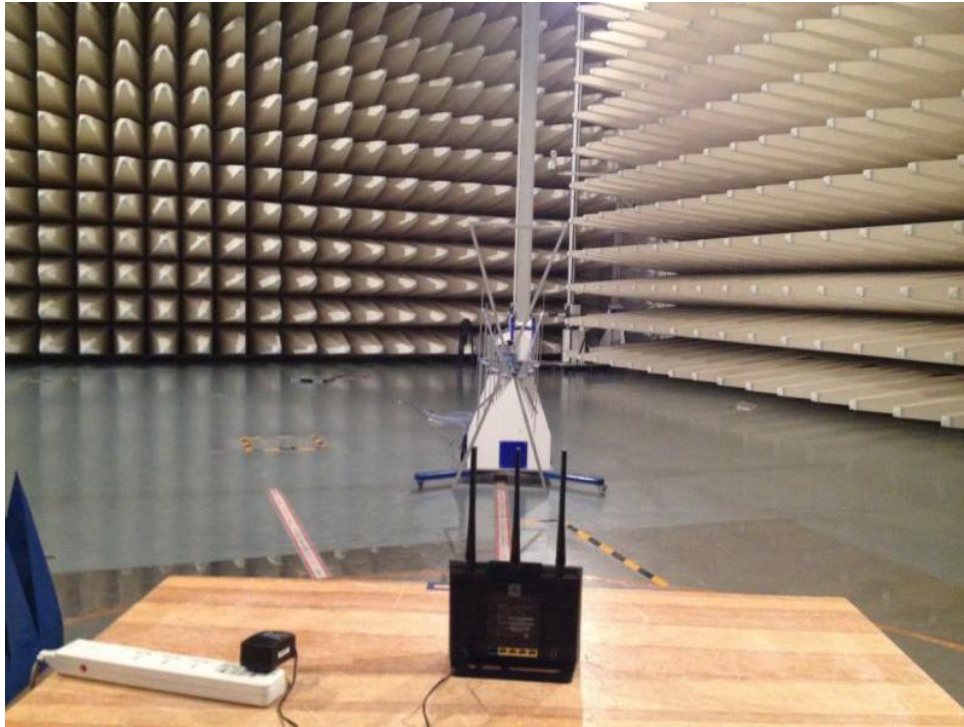
EUT PHOTOGRAPH



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

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