

TEST REPORT

Reference No...... : WTN23D07164977W
FCC ID : VJC-RW95CB
Applicant..... : Ad Hoc Electronics, LLC
Address..... : 115 S State St, Ste. B, Lindon, UT 84042, United States
Manufacturer : Ad Hoc Electronics, LLC
Address : 115 S State St, Ste. B, Lindon, UT 84042, United States
Product..... : Basic Wireless Switch Kit
Model(s) : RW9-5C-B
Standards : FCC Part 15 Subpart B
Date of Receipt sample : 2023-07-28
Date of Test : 2023-07-28 to 2023-08-01
Date of Issue..... : 2023-09-26
Test Result..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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2 Revision History

Test Report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTN23D07164977W	2023-07-28	2023-07-28 to 2023-08-01	2023-09-26	Original	-	Valid

3 General Information

3.1 General Description of E.U.T.

Product : Basic Wireless Switch Kit
Model(s)..... : RW9-5C-B
Model difference : N/A
Remark : N/A

3.2 Details of E.U.T.

Highest frequency generated ... : 902MHz
Technical data : AC 100-240V, 50/60Hz

3.3 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☐ Yes ☒ No

If Yes, list the related test items and lab information:

Test Lab: N/A

Lab address: N/A

Test items: N/A

3.4 Abnormalities from Standard Conditions

None.

3.5 Test Facility

The test facility has a test site registered with the following organizations:

ISED CAB identifier: CN0013. Test Firm Registration No.: 7760A.

Waltek Testing Group Co., Ltd. Has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration number 7760A, October 15, 2016.

FCC Designation No.: CN1201. Test Firm Registration No.: 523476.

Waltek Testing Group Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration number 523476, September 10, 2019.

4 Test Summary

Test Item	Test Requirement	Test Result
AC Power Line Conducted Emission (150kHz to 30MHz)	FCC Part 15 Subpart B	Pass
Disturbance voltage at the antenna terminals (30MHz to 2150MHz)	FCC Part 15 Subpart B	N/A
Radiated Emission (30MHz to 1GHz)	FCC Part 15 Subpart B	Pass
Radiated Emission (Above 1GHz) ¹	FCC Part 15 Subpart B	Pass

Remark:

Pass Test item meets the requirement

Fail Test item does not meet the requirement

N/A Test case does not apply to the test object

¹ according to 47 CFR 15.33(b), upper frequency of measurement range is 6GHz.

5 Equipment Used during Test

5.1 Equipment List

Conducted emissions from the AC mains power ports						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMI Test Receiver	R&S	ESCI	100947	2023-07-27	2024-07-26
2	LISN	R&S	ENV216	100115	2023-07-27	2024-07-26
3	Cable	Top	TYPE16(3.5M)	-	2023-07-27	2024-07-26
3m Semi-anechoic Chamber for Radiation (TDK)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	2023-04-24	2024-04-23
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2022-10-31	2023-10-30
3	Amplifier	ANRITSU	MH648A	M43381	2023-04-24	2024-04-23
4	Cable	HUBER+SUHNER	CBL2	525178	2023-04-24	2024-04-23
3m Semi-anechoic Chamber for Radiation, Above 1GHz						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Spectrum Analyzer	R&S	FSP	100091	2023-04-24	2024-04-23
2	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2023-02-02	2024-02-01
3	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2022-08-08	2023-08-07
4	Coaxial Cable (above 1GHz)	Top	1GHz-18GHz	NA	2023-02-02	2024-02-01

Test Software:

Test Item	Software name	Software version
Conduction disturbance Radiated Emission(3m)	EZ-EMC	EZ-EMC(RA-03A1-1)

5.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
/	/	/	/

5.3 Measurement Uncertainty

Parameter	Uncertainty (Note 1)
Temperature	$\pm 1^{\circ}\text{C}$
Humidity	$\pm 5\%$
DC and low frequency voltages	$\pm 3\%$
Conducted Emission (150kHz-30MHz)	$\pm 3.64\text{dB}$
Radiated Emission (30MHz-1000MHz)	$\pm 5.03\text{dB}$

Note 1: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

5.4 Test Mode

Test Item	Test Mode	Test Voltage
AC Power Line Conducted Emission (150KHz-30MHz)	Standby-120V	AC 120V/60Hz
	Standby-230V*	AC 230V/50Hz
	Half load mode-120V	AC 120V/60Hz
	Half load mode-230V	AC 230V/50Hz
	Full load mode-120V	AC 120V/60Hz
	Full load mode-230V	AC 230V/50Hz
Radiated Emissions (30MHz-1GHz)	Standby	AC 120V/60Hz
	Half load mode-120V	AC 120V/60Hz
	Half load mode-230V	AC 230V/50Hz
	Full load mode-120V*	AC 120V/60Hz
	Full load mode-230V	AC 230V/50Hz
Radiated Emissions (Above1GHz)	Standby	AC 120V/60Hz
	Half load mode-120V	AC 120V/60Hz
	Half load mode-230V	AC 230V/50Hz
	Full load mode-120V*	AC 120V/60Hz
	Full load mode-230V	AC 230V/50Hz
** shows the worst case mode which were recorded in this report.		

6 Emission Test Results

6.1 AC Power Line Conducted Emission, 150kHz to 30MHz

Test Requirement..... : FCC Part 15 Subpart B

Test Method..... : ANSI C63.4

Test Result : Pass

Frequency Range..... : 150kHz to 30MHz

Class..... : Class B

Limit..... :

Frequency (MHz)	Limit (dB μ V)	
	Quasi- peak	Average
0.15 to 0.5	66 to 56	56 to 46
0.5 to 5	56	46
5 to 30	60	50

6.1.1 E.U.T. Operation

Operating Environment:

Temperature..... : 23.1°C

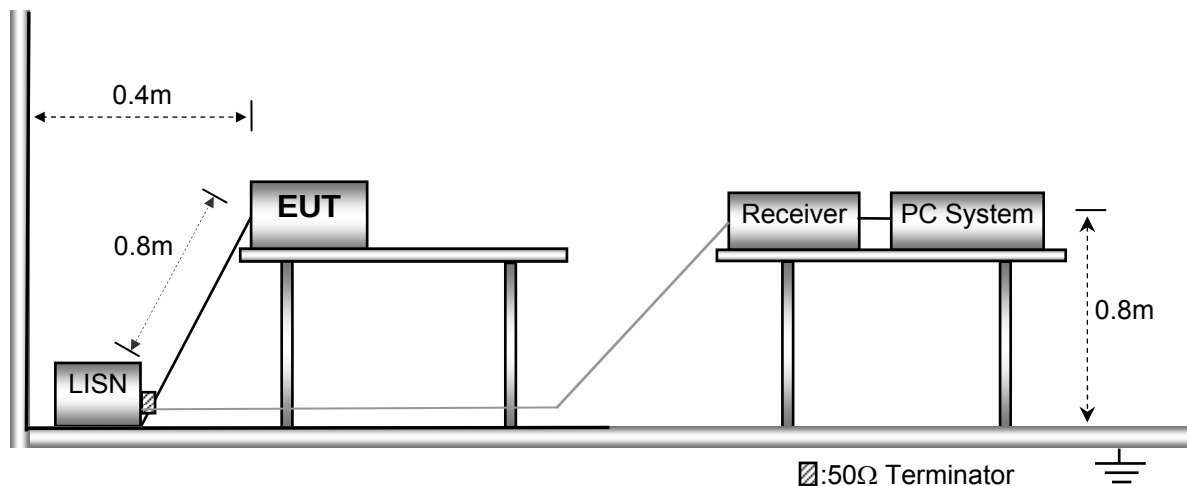
Humidity..... : 52.6%RH

Atmospheric Pressure : 101.2kPa

EUT Operation : Refer to section 5.4.

6.1.2 Block Diagram of Test Setup

The AC Power Line Conducted Emissions tests were performed in accordance with the ANSI C63.4 .

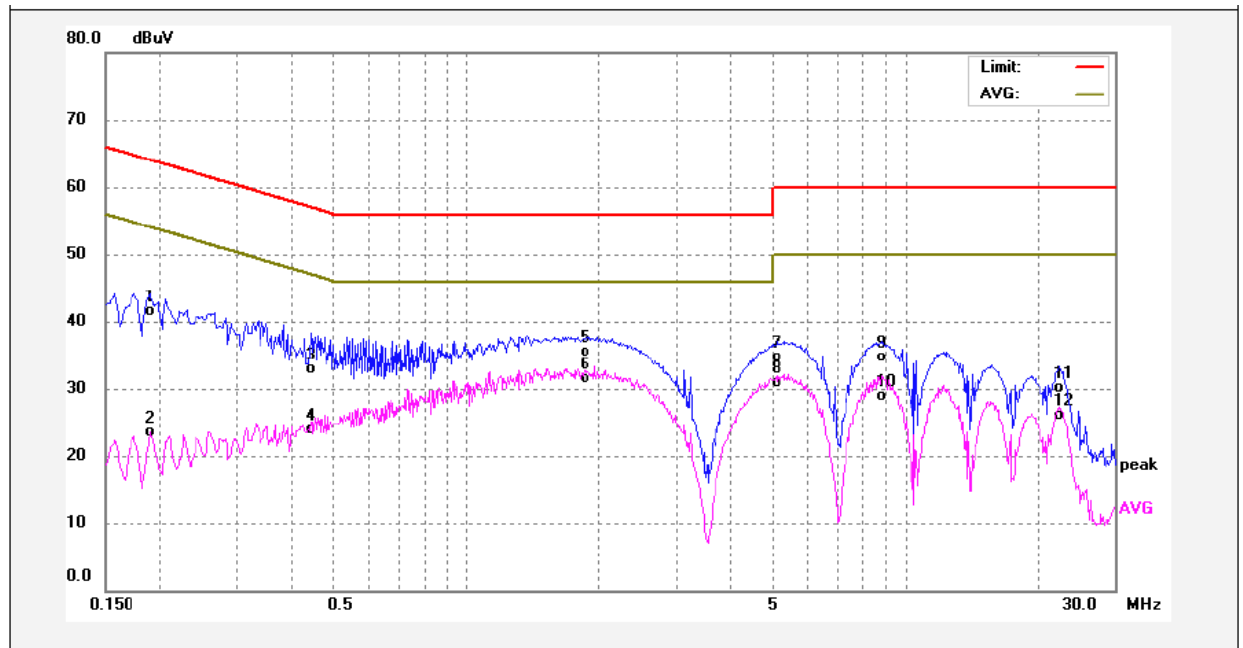


6.1.3 Measurement Data

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line. According to the data in section 6.1.4, the EUT complied with the FCC PART 15, SUBPART B standards.

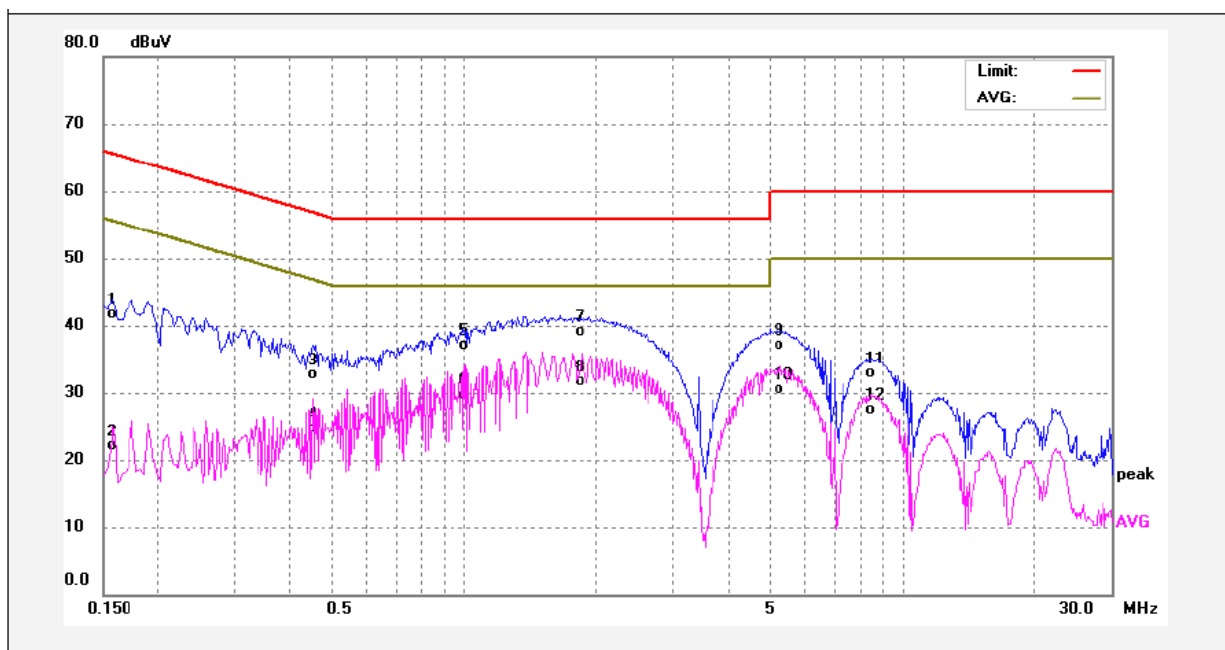
6.1.4 AC Power Line Conducted Emission Test Data

Live Line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Remark
1	0.1900	31.78	9.63	41.41	64.03	-22.62	QP	
2	0.1900	13.83	9.63	23.46	54.03	-30.57	AVG	
3	0.4420	23.26	9.66	32.92	57.02	-24.10	QP	
4	0.4420	14.20	9.66	23.86	47.02	-23.16	AVG	
5	1.8660	25.86	9.72	35.58	56.00	-20.42	QP	
6	1.8660	21.88	9.72	31.60	46.00	-14.40	AVG	
7	5.0980	24.92	9.81	34.73	60.00	-25.27	QP	
8	5.0980	21.08	9.81	30.89	50.00	-19.11	AVG	
9	8.8660	24.75	9.96	34.71	60.00	-25.29	QP	
10	8.8660	18.94	9.96	28.90	50.00	-21.10	AVG	
11	22.4580	19.30	10.90	30.20	60.00	-29.80	QP	
12	22.4580	15.26	10.90	26.16	50.00	-23.84	AVG	

Neutral Line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1580	32.08	9.65	41.73	65.56	-23.83	QP	
2	0.1580	12.53	9.65	22.18	55.56	-33.38	AVG	
3	0.4500	23.10	9.67	32.77	56.87	-24.10	QP	
4	0.4500	15.02	9.67	24.69	46.87	-22.18	AVG	
5	1.0100	27.37	9.69	37.06	56.00	-18.94	QP	
6	1.0100	19.97	9.69	29.66	46.00	-16.34	AVG	
7	1.8580	29.45	9.73	39.18	56.00	-16.82	QP	
8	1.8580	21.88	9.73	31.61	46.00	-14.39	AVG	
9	5.2740	27.27	9.84	37.11	60.00	-22.89	QP	
10	5.2740	20.63	9.84	30.47	50.00	-19.53	AVG	
11	8.4180	22.98	9.96	32.94	60.00	-27.06	QP	
12	8.4180	17.57	9.96	27.53	50.00	-22.47	AVG	

6.2 Radiation Emission, 30MHz to 1000MHz

Test Requirement..... : FCC Part 15 Subpart B
 Test Method..... : ANSI C63.4
 Test Result : Pass
 Frequency Range..... : 30MHz to 1000MHz
 Class..... : Class B
 Limit :

Frequency (MHz)	Distance (Meter)	Limit (dB μ V/m)
		Quasi-peak
30 to 88	3	40
88 to 216	3	43.5
216 to 960	3	46
960 to 1000	3	54

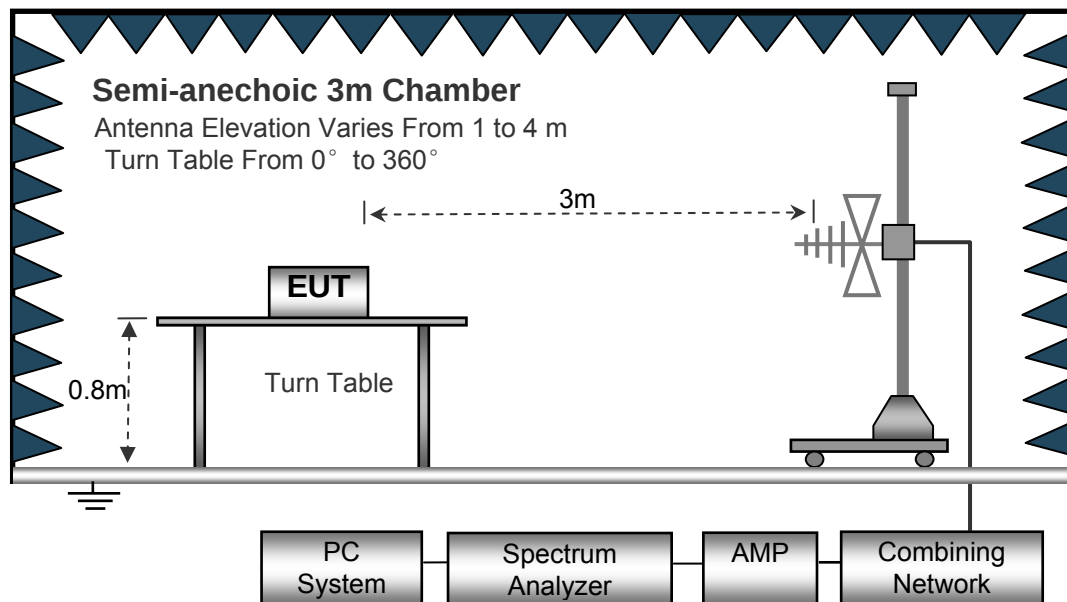
6.2.1 E.U.T. Operation

Operating Environment:

Temperature..... : 22.5°C
 Humidity..... : 52.6%RH
 Atmospheric Pressure : 101.8kPa
 EUT Operation : Refer to section 5.4.

6.2.2 Block Diagram of Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4.

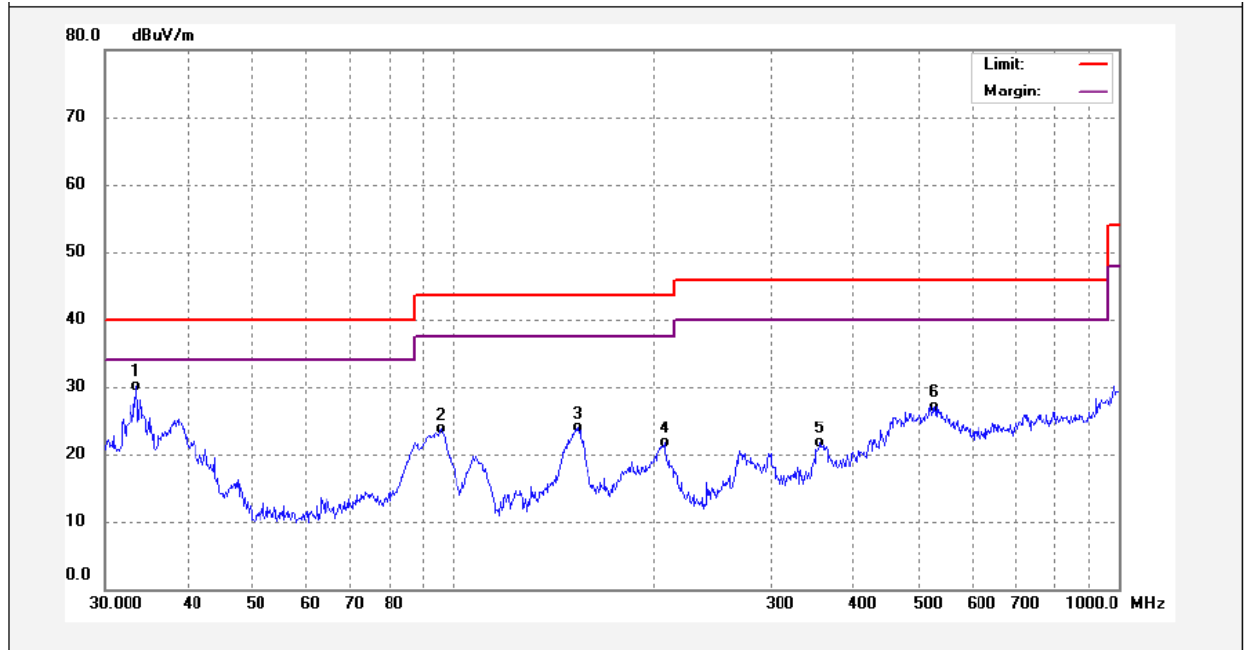


6.2.3 Measurement Data

The maximised peak emissions from the EUT was scanned and measured for both the Antenna Vertical Polarization and Antenna Horizontal Polarization. Quasi-peak measurements were performed if peak emissions were within 6dB of the Quasi-peak limit line.

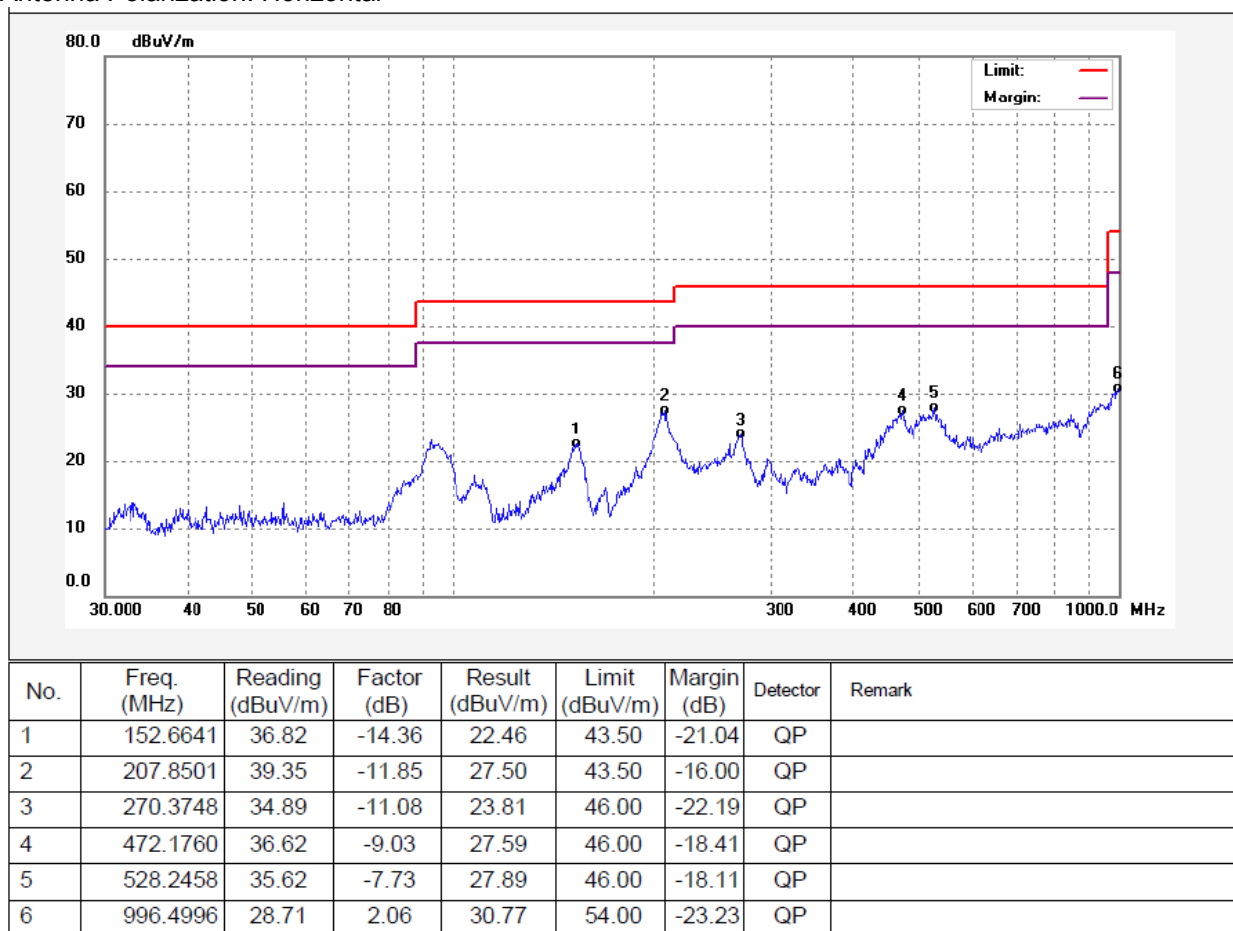
6.2.4 Radiated Emission Test Data, 30MHz to 1000MHz

Antenna Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	33.4449	47.26	-17.15	30.11	40.00	-9.89	QP	
2	95.7622	42.87	-19.22	23.65	43.50	-19.85	QP	
3	153.7385	38.35	-14.36	23.99	43.50	-19.51	QP	
4	207.8501	38.33	-16.55	21.78	43.50	-21.72	QP	
5	355.4273	34.61	-12.85	21.76	46.00	-24.24	QP	
6	528.2458	34.91	-7.73	27.18	46.00	-18.82	QP	

Antenna Polarization: Horizontal



6.3 Radiation Emission, Above 1000MHz

Test Requirement..... : FCC Part 15 Subpart B
 Test Method..... : ANSI C63.4
 Test Result : Pass
 Frequency Range..... : Above 1GHz
 Class. : Class B
 Limit. :

Frequency Range (MHz)	Distance (Meter)	Average Limit dB(uV/m)	Peak Limit (dBuV/m)
Above 1GHz	3	54	74

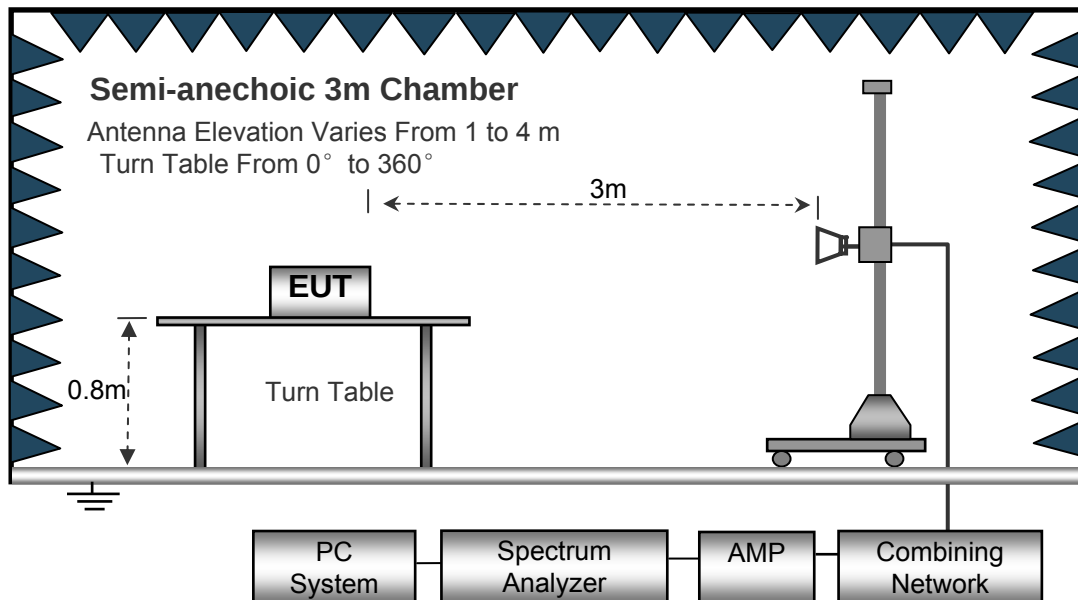
6.3.1 E.U.T. Operation

Operating Environment:

Temperature : 24°C
 Humidity : 55.3%RH
 Atmospheric Pressure : 101.8kPa
 EUT Operation : Refer to section 5.4.

6.3.2 Block Diagram of Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4.

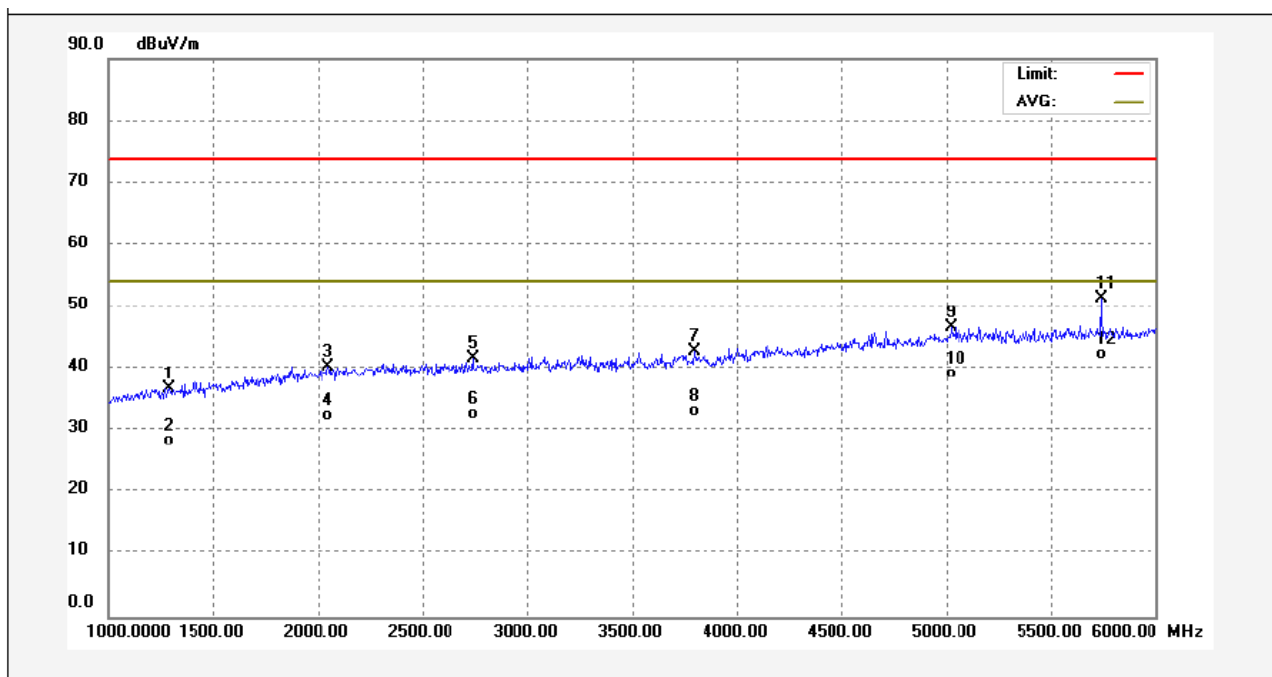


6.3.3 Measurement Data

The maximised peak emissions from the EUT was scanned and measured for both the Antenna Vertical Polarization and Antenna Horizontal Polarization. Average measurements were performed if peak emissions were within 6dB of the average limit line

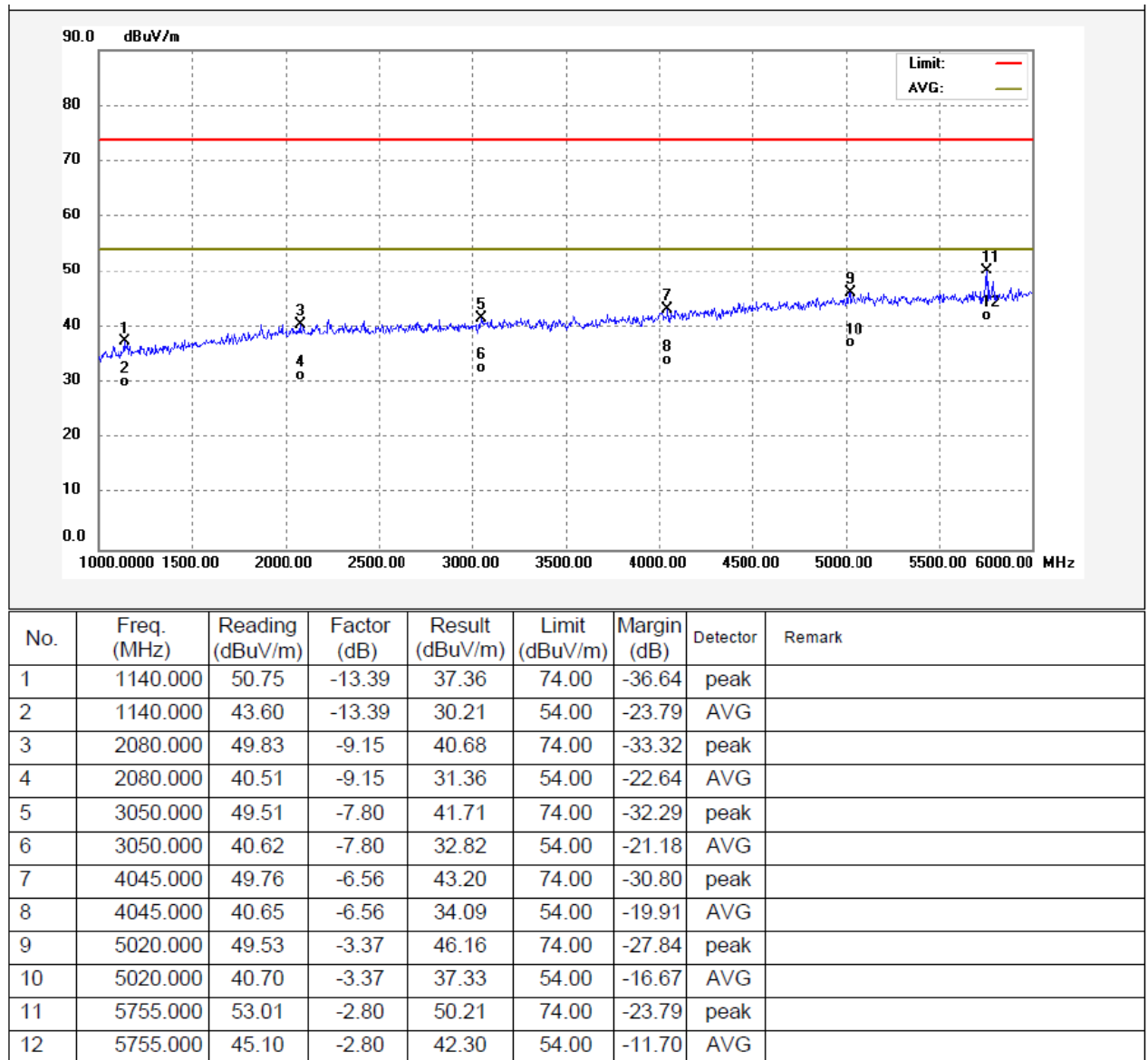
6.3.4 Radiated Emission test data, Above 1000MHz

Antenna Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	1290.000	49.57	-12.68	36.89	74.00	-37.11	peak	
2	1290.000	41.03	-12.68	28.35	54.00	-25.65	AVG	
3	2050.000	49.65	-9.20	40.45	74.00	-33.55	peak	
4	2050.000	41.66	-9.20	32.46	54.00	-21.54	AVG	
5	2740.000	49.82	-8.12	41.70	74.00	-32.30	peak	
6	2740.000	40.86	-8.12	32.74	54.00	-21.26	AVG	
7	3795.000	49.86	-7.10	42.76	74.00	-31.24	peak	
8	3795.000	40.19	-7.10	33.09	54.00	-20.91	AVG	
9	5025.000	50.08	-3.37	46.71	74.00	-27.29	peak	
10	5025.000	42.65	-3.37	39.28	54.00	-14.72	AVG	
11	5740.000	54.15	-2.82	51.33	74.00	-22.67	peak	
12	5740.000	45.16	-2.82	42.34	54.00	-11.66	AVG	

Antenna Polarization: Horizontal



7 Photographs of Test Setup and EUT.

Note: Please refer to appendix: Appendix-RW9-5C-B-Photos.

=====End of Report=====