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Report On

EMC Evaluation of
Hunter Douglas Window Fashions
PV HUB Bluetooth Window Blind Remote Control

FCC Part 15 Subpart B: 2014

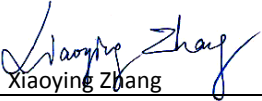
Report No. SD72101555-0115B

June 2015



America

TÜV SÜD America Inc., 10040 Mesa Rim Road, San Diego, CA 92121
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REPORT ON	Radio Testing of the Hunter Douglas Window Fashions PV HUB Bluetooth Window Blind Remote Control
TEST REPORT NUMBER	SD72101555-0115B
PREPARED FOR	Hunter Douglas Window Fashions One Duette Way, Boomfield, CO 80020
CONTACT PERSON	Felipe Cortés Engineering Supervisor (619) 216-6400 felipec@smkusa.com
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APPROVED BY	 Juan Manuel Gonzalez Name Authorized Signatory Title: Commercial/Wireless EMC Lab Manager
DATED	June 09, 2015



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Revision History

SD72101555-0115B Hunter Douglas Window Fashions PV HUB Bluetooth Window Blind Remote Control					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
06/09/2015	Initial Release				Juan Manuel Gonzalez



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SECTION 1

REPORT SUMMARY

EMC Evaluation of the
Hunter Douglas Window Fashions
PV HUB Bluetooth Window Blind Remote Control



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the PV HUB 1010512210 Bluetooth Window Blind Remote Control to the requirements of FCC Part 15 Subpart B.

Objective	To perform EMC Evaluation to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Hunter Douglas Window Fashions.
Model Name	PV HUB
Model Number(s)	1010512210
Serial Number(s)	N/A
Number of Samples Tested	1
Highest Frequency Generated or Used	>108 MHz
Test Specification/Issue/Date	FCC Part 15 Subpart B (01 October, 2014)
Start of Test	June 01, 2015
Finish of Test	June 01, 2015
Name of Engineer(s)	Xiaoying Zhang
Related Document(s)	None

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC Part 15 Subpart B is shown below.

Part 15	Test Description	Result	Comments/Base Standard
§15.107	Conducted Emission	Not Tested	Not applicable per customer test plan.
§15.109	Radiated Emission	Compliant	Class B requirement

1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) is a Hunter Douglas Window Fashions PV HUB Bluetooth Window Blind Remote Control as shown in the photograph below. The EUT is a two-way wireless device operating in the 2.4GHz ISM band that works as a bridge between Ethernet and a proprietary RF network.



Equipment Under Test

1.3.2 Labelling Requirement for Part 15 (Verification) Device

See FCC Publication Number: 784748 for details:

<https://apps.fcc.gov/oetcf/kdb/forms/FTSsearchResultPage.cfm?id=27980&switch=P>

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
Default	EUT on Idle mode connected to 5 VDC Power Supply.

1.4.2 EUT Exercise Software

None. No special software used to exercise the EUT.

1.4.3 Support Equipment and I/O cables

Manufacturer	Equipment/Cable	Model	Description
-	USB Cable	-	-
Hewlett Packard	DC Power Supply	E3610A	S/N: D802039

1.4.4 Simplified Test Configuration Diagram

None. Standalone device.

1.5 DEVIATIONS FROM THE STANDARD

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

1.6 MODIFICATION RECORD

Description of Modification	Modification Fitted By	Date Modification Fitted
Serial Number: N/A Proto type sample provided.		
-	-	-

The table above details modifications made to the EUT during the test programme. The modifications incorporated during each test (if relevant) are recorded on the appropriate test pages.

1.7 TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

For radiated emissions the equipment under test (EUT) was configured to measure its highest possible emission level. This level was based on the maximized cable configuration from exploratory testing per ANSI C63.4-2009. The test modes were adapted according to the Operating Instructions provided by the manufacturer/client.

1.8 TEST FACILITY LOCATION

1.8.1 TÜV SÜD America Inc. (Mira Mesa)

10040 Mesa Rim Road, San Diego, CA 92121-2912 (32.901268,-117.177681). Phone: 858 678 1400 Fax: 858 546 0364.

1.8.2 TÜV SÜD America Inc. (Rancho Bernardo)

Sony Electronics Inc., Building #8, 16530 Via Esprillo, San Diego, CA 92127-1708 (33.018644,-117.092409). Phone: 858 942 5542 Fax: 858 546 0364.

1.9 TEST FACILITY REGISTRATION

1.9.1 FCC – Registration No.: US1146

TUV SUD America Inc. (San Diego), is an accredited test facility with the site description report on file and has met all the requirements specified in §2.948 of the FCC rules. The acceptance letter from the FCC is maintained in our files and the Registration is US1146.

1.9.2 Industry Canada (IC) Registration No.: 3067A

The 10m Semi-anechoic chamber of TÜV SÜD America Inc. (San Diego) has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No. 3067A.

1.9.3 BSMI – Laboratory Code: SL2-IN-E-028R (US0102)

TÜV Product Service Inc. (San Diego) is a recognized EMC testing laboratory by the BSMI under the MRA (Mutual Recognition Arrangement) with the United States. Accreditation includes CNS 13438 up to 6GHz.

1.9.4 VCCI – Registration No. A-0132

TÜV SÜD America Inc. (San Diego) is a VCCI registered measurement facility which includes radiated field strength measurement, radiated field strength measurement above 1GHz, mains port interference measurement and telecommunication port interference measurement.

SECTION 2

TEST DETAILS

EMC Evaluation of the
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2.1 RADIATED EMISSION

2.1.1 Specification Reference

Part 15 Subpart B §15.109(a)

2.1.2 Standard Applicable

(a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of emission (MHz)	Field Strength (microvolts/meter)
30-88	100
88-216	150
216-960	200
Above 960	500

2.1.3 Equipment Under Test and Modification State

Serial No: N/A / Default Test Configuration

2.1.4 Date of Test/Initial of test personnel who performed the test

June 01, 2015 / XYZ

2.1.5 Test Equipment Used

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

2.1.6 Environmental Conditions

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

Ambient Temperature	25.9 °C
Relative Humidity	43.7 %
ATM Pressure	98.9 kPa

2.1.7 Additional Observations

- The spectrum was searched from 30MHz to the 5th harmonic (up to 18GHz presented) and verified to Class B limits.
- Verification was performed at 3 meters.
- Measurement was done using EMC32 V8.53 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.2.8 for sample computation.

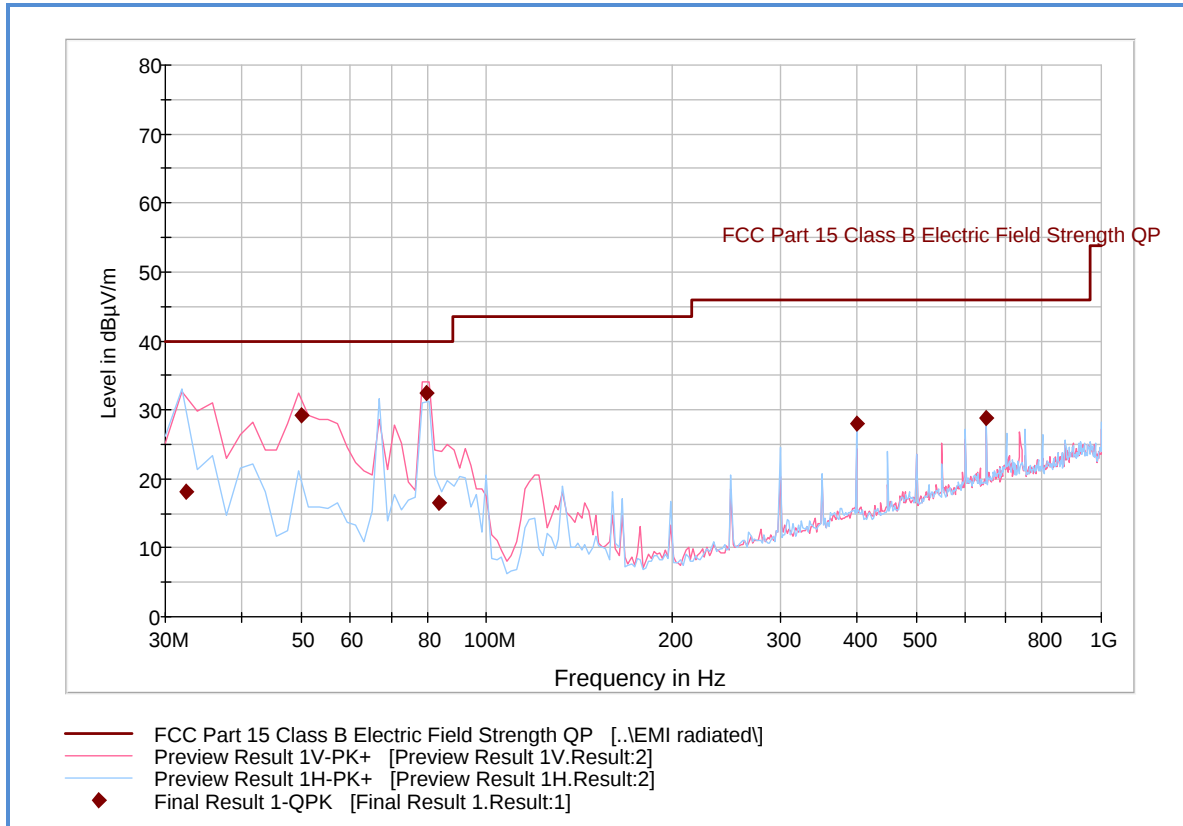
2.1.8 Sample Computation (Radiated Emission)

Measuring equipment raw measurement (db μ V) @ 30 MHz			24.4
Correction Factor (dB)	Asset# 1066 (cable)	0.3	-12.6
	Asset# 1172 (cable)	0.3	
	Asset# 1016 (preamplifier)	-30.7	
	Asset# 1175(cable)	0.3	
	Asset# 1002 (antenna)	17.2	
Reported QuasiPeak Final Measurement (db μ V/m) @ 30MHz			11.8

2.1.9 Test Results

Compliant. See attached plots.

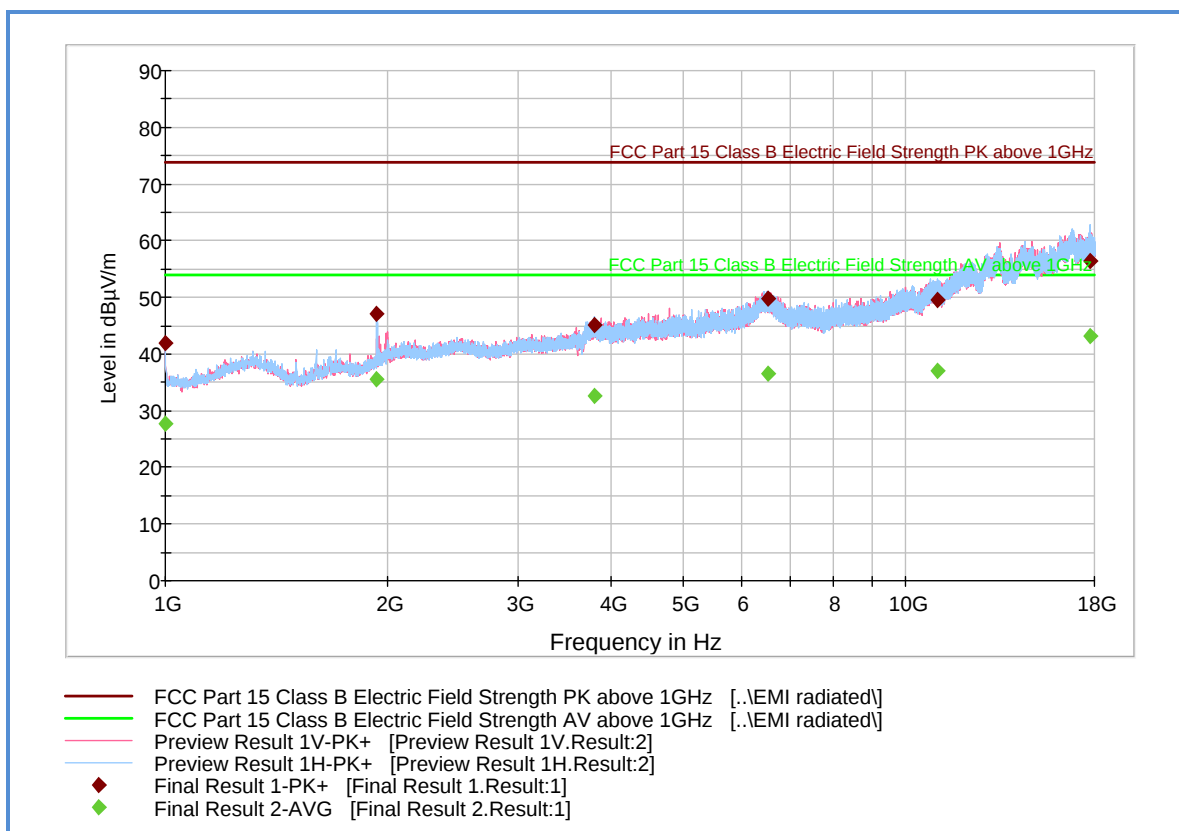
2.1.10 Below 1GHz Radiated Emission Test



Quasi-Peak Data

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
32.440000	18.2	1000.0	120.000	143.0	H	204.0	-12.8	21.8	40.0
49.998878	29.2	1000.0	120.000	100.0	V	231.0	-19.9	10.8	40.0
79.981082	32.5	1000.0	120.000	133.0	V	175.0	-22.0	7.5	40.0
83.692745	16.6	1000.0	120.000	150.0	V	231.0	-21.7	23.4	40.0
400.018677	28.1	1000.0	120.000	100.0	H	98.0	-9.0	17.9	46.0
650.020200	28.8	1000.0	120.000	106.0	H	69.0	-3.8	17.2	46.0

2.1.11 Above 1GHz Radiated Emission Test



Peak Data

Frequency (MHz)	Max Peak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1000.400000	42.0	1000.0	1000.000	401.6	H	170.0	-7.2	31.9	73.9
1932.366667	47.2	1000.0	1000.000	298.3	H	164.0	-2.3	26.7	73.9
3794.633333	45.2	1000.0	1000.000	115.8	H	-9.0	4.9	28.7	73.9
6528.966667	49.7	1000.0	1000.000	102.8	H	-7.0	11.2	24.2	73.9
11035.50000	49.4	1000.0	1000.000	164.6	H	212.0	14.8	24.5	73.9
17774.83333	56.3	1000.0	1000.000	190.6	H	13.0	23.0	17.6	73.9

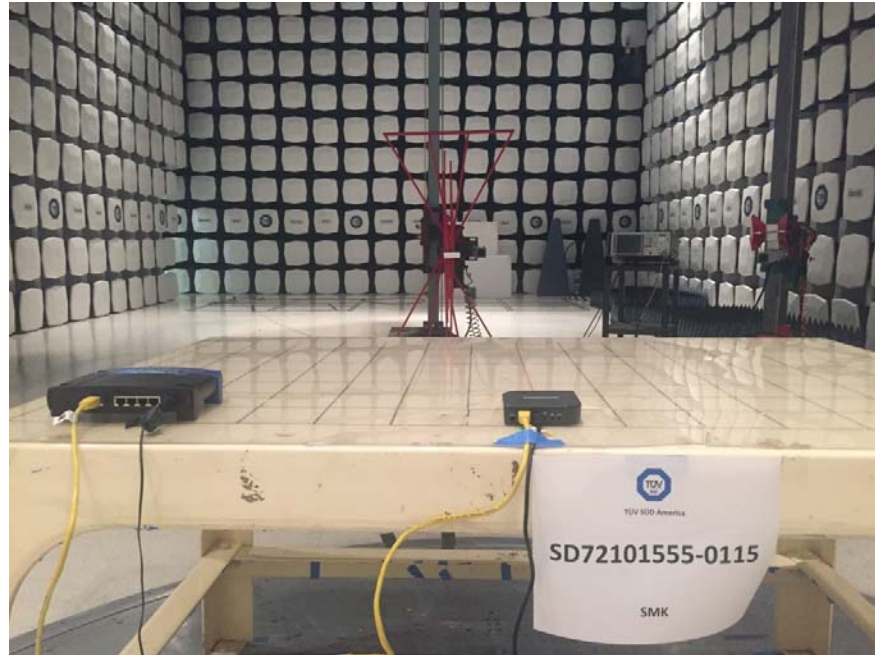
Average Data

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1000.400000	27.6	1000.0	1000.000	401.6	H	170.0	-7.2	26.3	53.9
1932.366667	35.6	1000.0	1000.000	298.3	H	164.0	-2.3	18.3	53.9
3794.633333	32.6	1000.0	1000.000	115.8	H	-9.0	4.9	21.3	53.9
6528.966667	36.5	1000.0	1000.000	102.8	H	-7.0	11.2	17.4	53.9
11035.50000	37.1	1000.0	1000.000	164.6	H	212.0	14.8	16.8	53.9
17774.83333	43.1	1000.0	1000.000	190.6	H	13.0	23.0	10.8	53.9

2.1.12 Test Setup Photo (Below 1GHz Front)



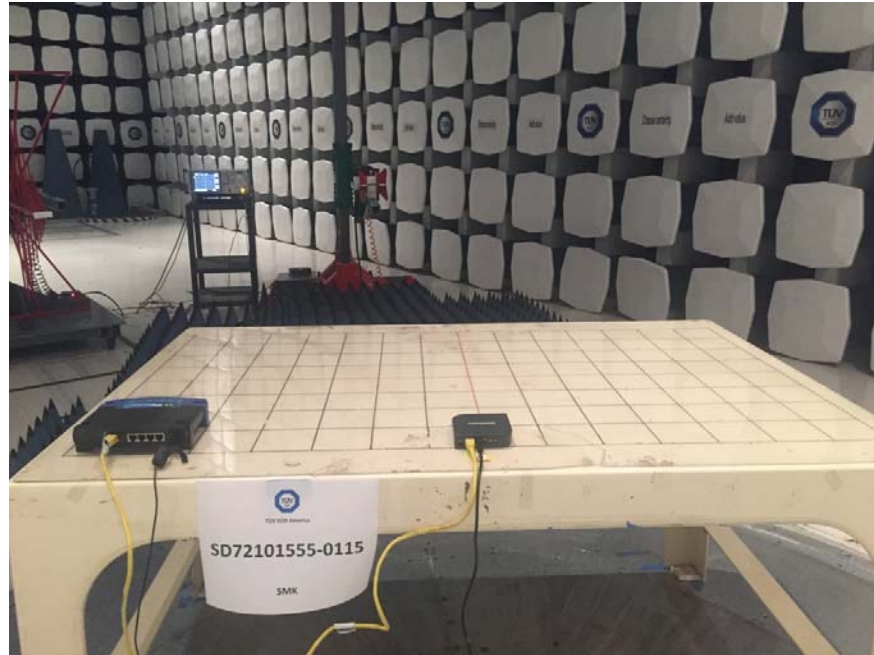
2.1.13 Test Setup Photo (Below 1GHz Back)



2.1.14 Test Setup Photo (Above 1GHz Front)



2.1.15 Test Setup Photo (Above 1GHz Back)



SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

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

ID Number (SDGE/SDRB)	Test Equipment	Type	Serial Number	Manufacturer	Cal Date	Cal Due Date
Radiated Emissions						
1040	EMI Test Receiver	ESIB40	100292	Rhode & Schwarz	08/29/14	08/29/15
1002	Bilog Antenna	3142C	00058717	ETS-Lindgren	01/30/14	01/30/16
1016	Pre-amplifier	PAM-0202	187	PAM	12/10/14	12/10/15
1051	Double-ridged waveguide horn antenna	3115	9408-4329	EMCO	02/28/14	02/28/16
8628	Pre-amplifier	QLJ 01182835-JO	8986002	QuinStar Technologies Inc.	03/20/15	03/20/16
1049	EMI Test Receiver	ESU	100133	Rhode & Schwarz	03/11/15	03/11/16
Miscellaneous						
	Test Software	EMC32	V8.53	Rhode & Schwarz	N/A	

3.2 MEASUREMENT UNCERTAINTY

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

3.2.1 Radiated Emission Measurements (Below 1GHz)

Contribution		Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.45	0.26	0.07
2	Cables	Rectangular	0.50	0.29	0.08
3	Preamp	Rectangular	0.50	0.29	0.08
4	Antenna	Rectangular	0.75	0.43	0.19
5	Site	Rectangular	3.89	2.25	5.04
6	EUT Setup	Rectangular	1.00	0.58	0.33
Combined Uncertainty (u_c):					2.41
Coverage Factor (k):					2
Expanded Uncertainty:					4.82

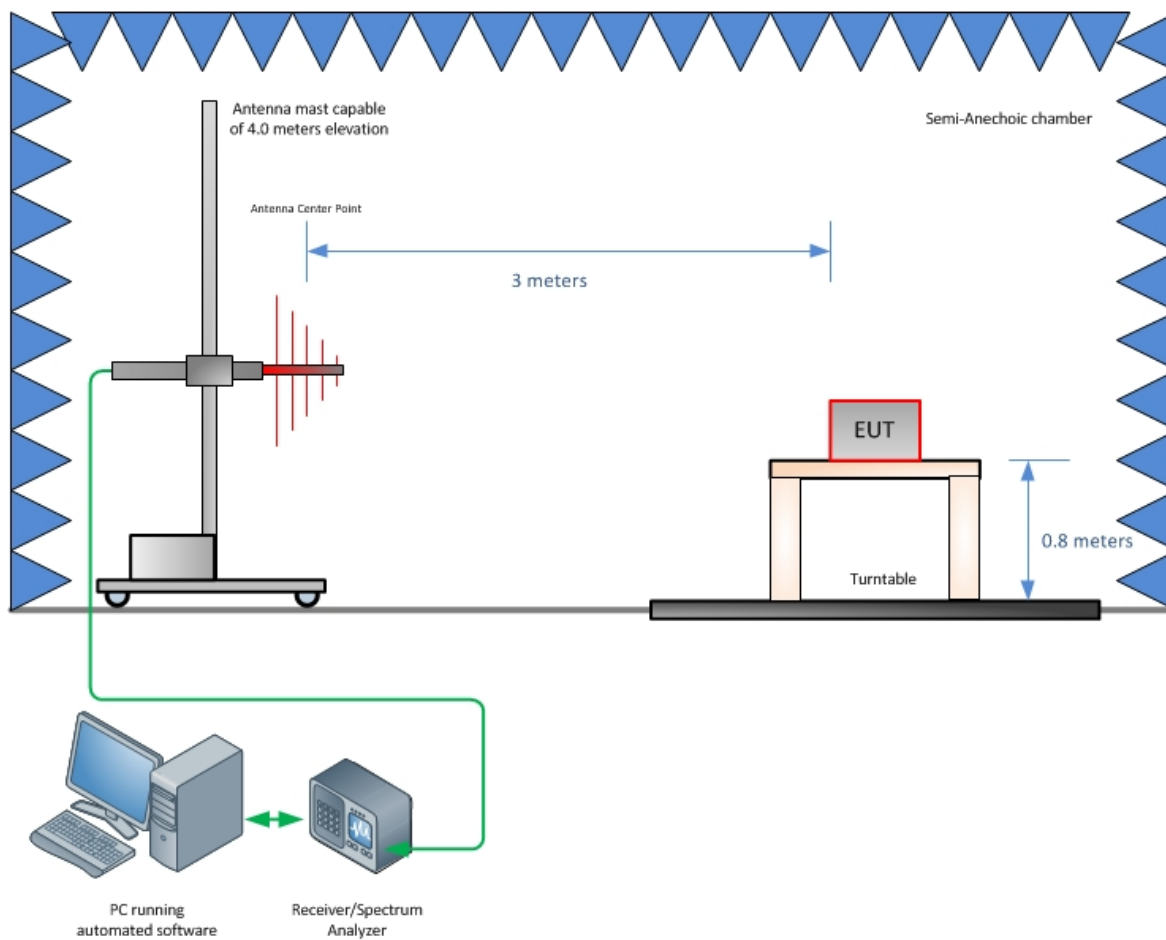
3.2.2 Radiated Emission Measurements (Above 1GHz)

Contribution		Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.57	0.33	0.11
2	Cables	Rectangular	0.70	0.40	0.16
3	Preamp	Rectangular	0.50	0.29	0.08
4	Antenna	Rectangular	0.37	0.21	0.05
5	Site	Rectangular	3.89	2.25	5.04
6	EUT Setup	Rectangular	1.00	0.58	0.33
Combined Uncertainty (u_c):					2.40
Coverage Factor (k):					2
Expanded Uncertainty:					4.81

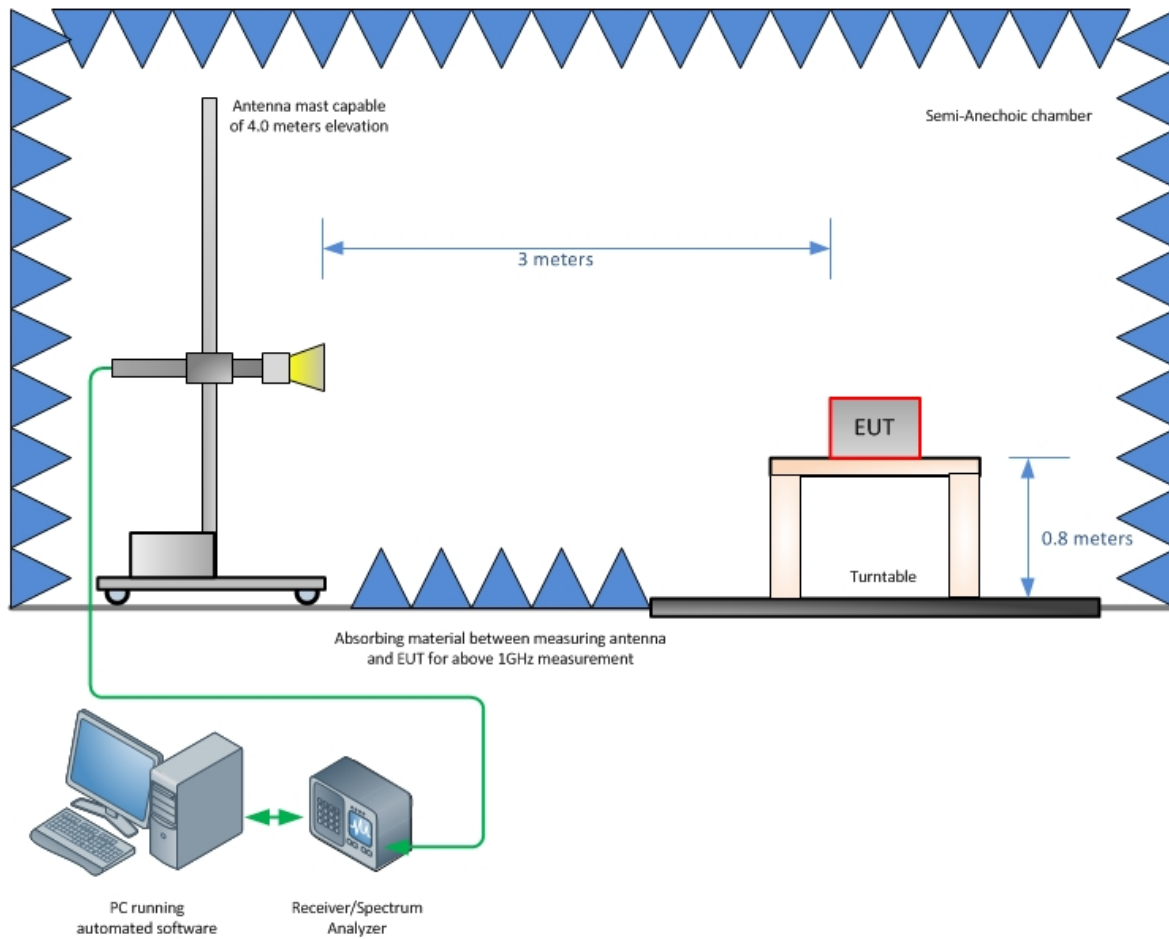
SECTION 4

DIAGRAM OF TEST SETUP

4.1 TEST SETUP DIAGRAM



Radiated Emission Test Setup (Below 1GHz)



Radiated Emission Test Setup (Above 1GHz)

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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