

FCC Part 18 Measurement and Test Report

For

Eggtronic Engineering Srl

Via Giorgio Campagna 8 41126, Modena, Italy

FCC ID: 2ANP7TX010WLS5M001

Test Rule(s):	<u>FCC Part 18</u>
Product Description:	<u>Wheeless</u>
Tested Model:	<u>WLS5</u>
Report No.:	<u>STR17128275I-1</u>
Sample Receipt Date:	<u>2017-12-25</u>
Tested Date:	<u>2018-07-26 to 2018-08-14</u>
Issued Date:	<u>2018-08-14</u>
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM.Test Technology Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Eggtronic Engineering Srl
Address of applicant: Via Giorgio Campagna 8 41126, Modena, Italy

Manufacturer: Cyzon PCB Solutions
Address of manufacturer: Xinhua Road, Xinan Street, BaoAn District, Shenzhen, China

General Description of EUT	
Product Name:	Wheeless
Trade Name:	Eggtronic
Model No.:	WLS5
Adding Model(s):	/
<i>Note: The test data is gathered from a production sample, provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Frequency Range:	110~205KHz
Modulation Type:	ASK
Antenna Type:	Coil Antenna
Rated Voltage:	DC 5V (Wireless output)
Rated Current:	< 1A (Wireless output)
Rated Power:	< 5W (Wireless output)

1.2 Test Standards

The following report is prepared on behalf of Eggtronic Engineering Srl in accordance with FCC Part 18, Subpart C, and section 18.307 and 18.311 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 18, Subpart C, and section 18.307 and 18.311 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2014, 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.

1.4 Test Facility

FCC – Registration No.: 125990

Shenzhen SEM Test Technology Co., Ltd. Laboratory has been recognized to perform compliance testing on equipment subject to the Commissions Declaration Of Conformity (DOC). The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

1.5 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List:

Test Mode	Description	Remark
TM1	Charging	Wireless Output

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
Adapter	Dell Inc.	PSAI10R-050Q	/

Accessories Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
USB Cable	0.45	Shielded	Without Core

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
Conducted Emissions	Conducted	9-150kHz ± 3.74 dB
		0.15-30MHz ± 3.34 dB
Radiated Emissions	Radiated	30-200MHz ± 4.52 dB
		0.2-1GHz ± 5.56 dB
		1-6GHz ± 3.84 dB
		6-18GHz ± 3.92 dB

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2018-05-22	2019-05-21
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2018-05-22	2019-05-21
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2018-05-22	2019-05-21
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2018-05-22	2019-05-21
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2017-06-08	2020-06-07
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2017-06-08	2020-06-07
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2018-05-22	2019-05-21
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2018-05-22	2019-05-21
SEMT-C001	Cable	Zheng DI	LL142-07-07-10M(A)	/	2018-03-19	2019-03-18
SEMT-C002	Cable	Zheng DI	ZT40-2.92J-2.92J-6M	/	2018-03-19	2019-03-18
SEMT-C003	Cable	Zheng DI	ZT40-2.92J-2.92J-2.5M	/	2018-03-19	2019-03-18
SEMT-C004	Cable	Zheng DI	2M0RFC	/	2018-03-19	2019-03-18
SEMT-C005	Cable	Zheng DI	1M0RFC	/	2018-03-19	2019-03-18
SEMT-C006	Cable	Zheng DI	1M0RFC	/	2018-03-19	2019-03-18

2. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§ 18.307 (b)	Conducted Emission	Compliant
§ 18.305 (b)	Radiated Emission	Compliant

3. Conducted Emissions

3.1 Standard Applicable

According to FCC 18.307(b), the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies shall not exceed the limits in the following tables:

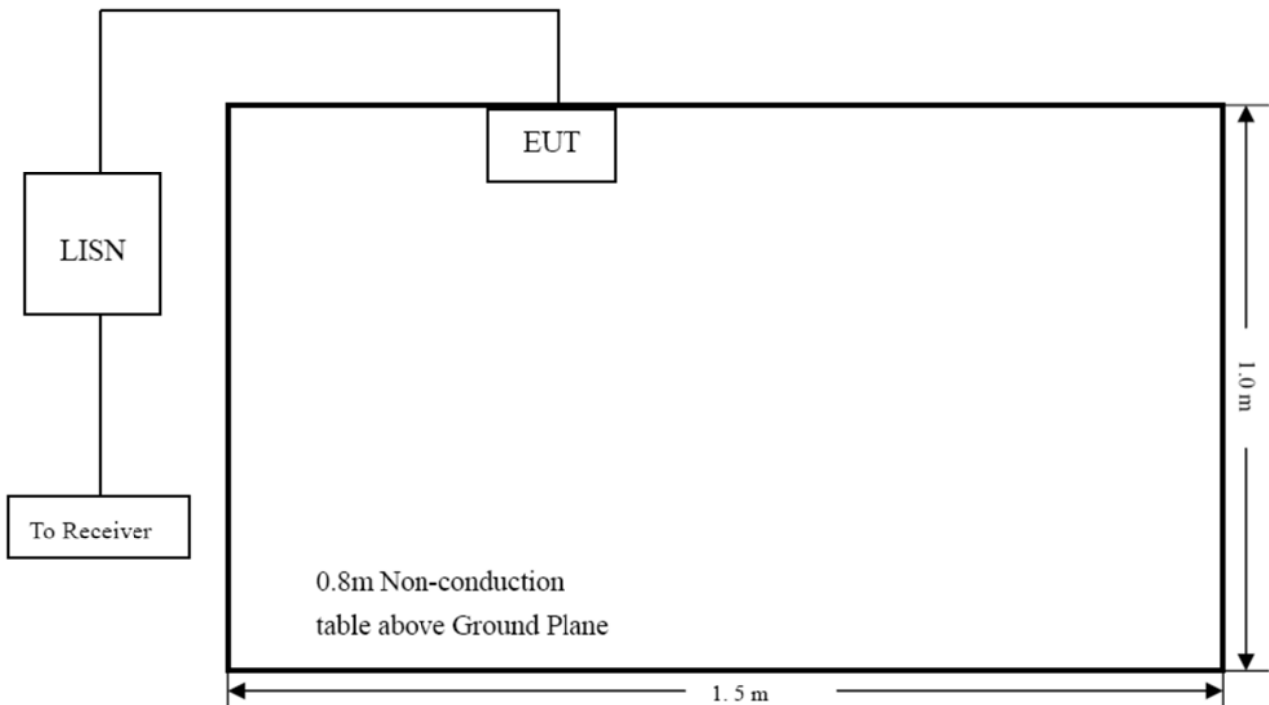
Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

3.2 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 18.307 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle. The spacing between the peripherals was 10 cm.

3.3 Basic Test Setup Block Diagram



3.4 Environmental Conditions

Temperature:	25° C
--------------	-------

Relative Humidity:	54%
ATM Pressure:	1016 mbar

3.5 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency 450 kHz
Stop Frequency..... 30 MHz
Sweep Speed Auto
IF Bandwidth..... 10 kHz
Quasi-Peak Adapter Bandwidth 9 kHz
Quasi-Peak Adapter Mode Normal

3.6 Summary of Test Results/Plots

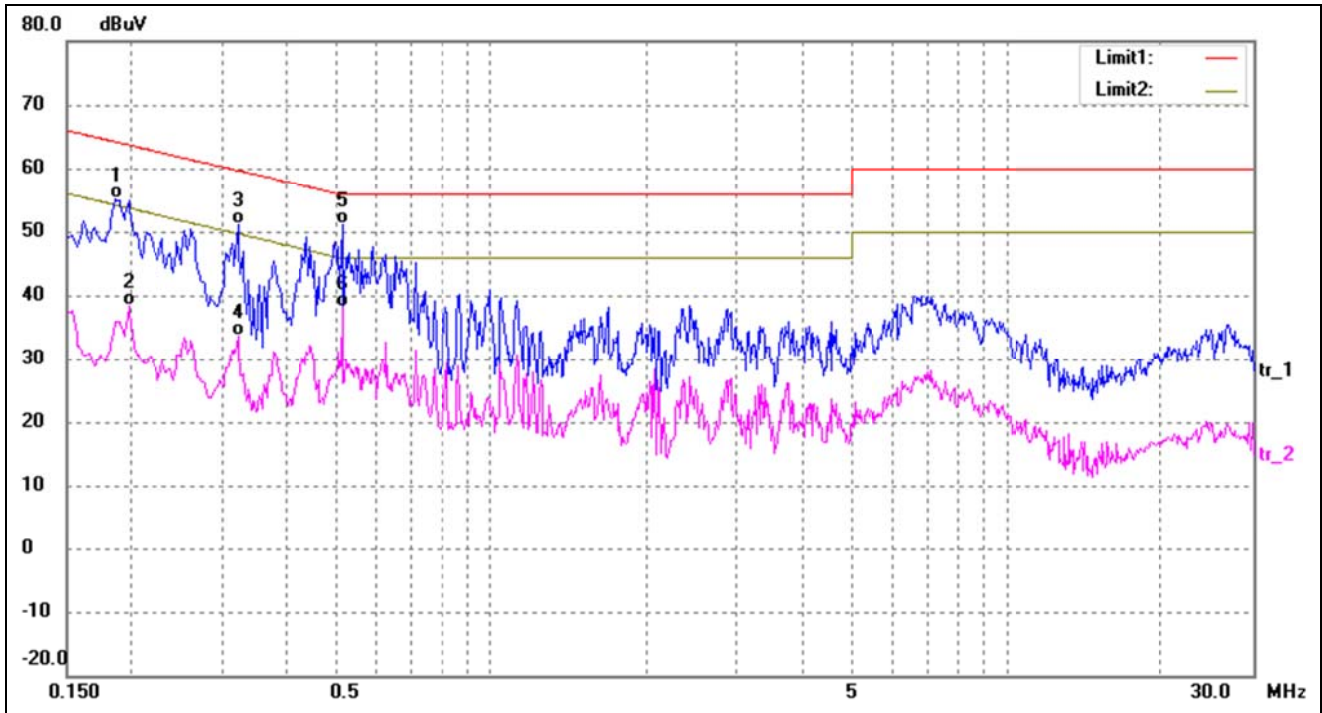
According to the data in this section, the EUT complied with the FCC Part 18C Conducted margin for a RF lighting device, with the *worst* margin reading of:

-4.97 dB at 0.514 MHz in the **Neutral, AVG** detector, 0.15-30MHz

Plot of Conducted Emissions Test Data

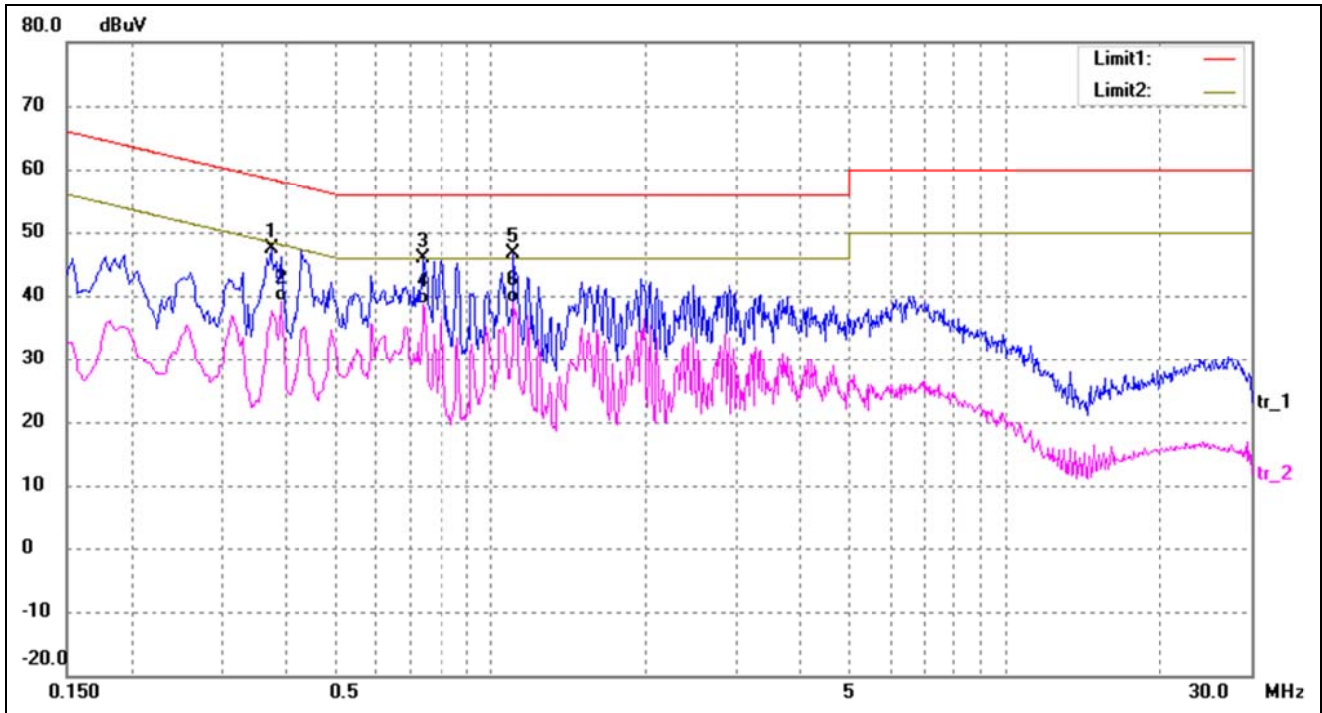
EUT: *Wheeless*
 Tested Model: *WLS5*
 Operating Condition: *TM1*
 Comment: *AC120V 60Hz*

Test Specification: *Neutral*



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1860	45.23	9.81	55.04	64.21	-9.17	QP
2	0.1980	28.68	9.80	38.48	53.69	-15.21	AVG
3	0.3220	41.35	9.80	51.15	59.65	-8.50	QP
4	0.3220	23.87	9.80	33.67	49.65	-15.98	AVG
5*	0.5140	41.23	9.80	51.03	56.00	-4.97	QP
6	0.5140	28.31	9.80	38.11	46.00	-7.89	AVG

Test Specification: Line



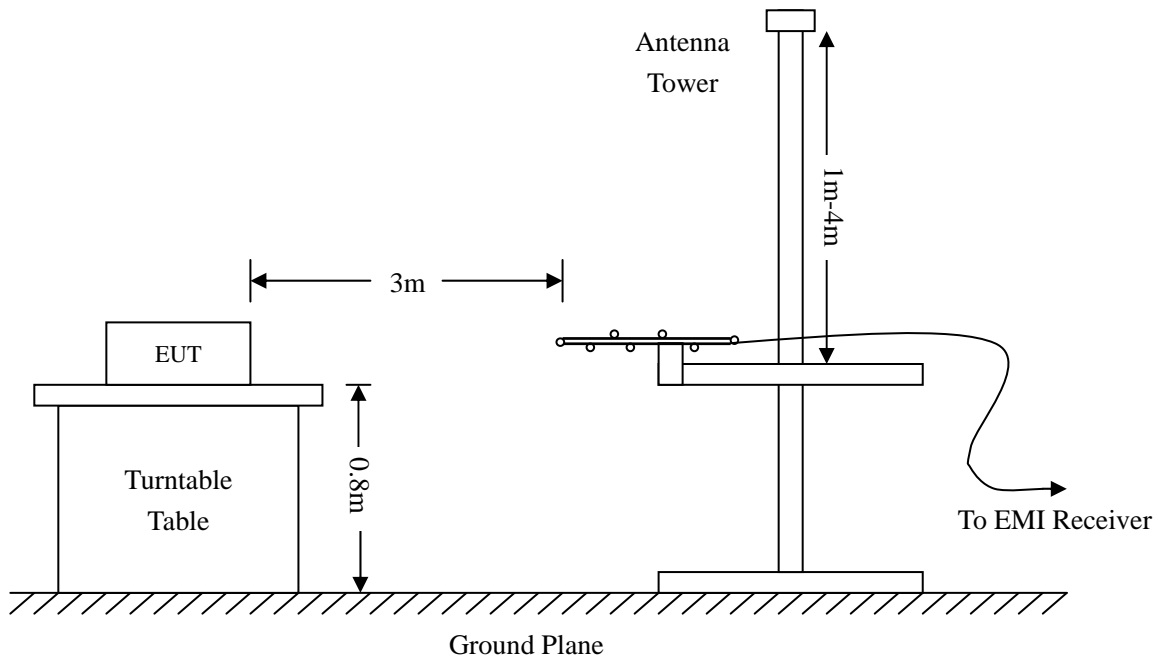
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.3740	37.60	9.80	47.40	58.41	-11.01	peak
2	0.3900	29.22	9.80	39.02	48.06	-9.04	AVG
3	0.7420	35.99	9.78	45.77	56.00	-10.23	peak
4	0.7420	28.86	9.78	38.64	46.00	-7.36	AVG
5	1.1100	36.87	9.76	46.63	56.00	-9.37	peak
6*	1.1100	29.22	9.76	38.98	46.00	-7.02	AVG

4. Radiated Emissions

4.1 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 18.305 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle. The spacing between the peripherals was 10 cm.



4.2 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency	30 MHz
Stop Frequency	1000 MHz
Sweep Speed	Auto
Quasi-Peak Adapter Bandwidth	120 kHz
Quasi-Peak Adapter Mode	Normal

4.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} - \text{Corr. Factor}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit for a RF lighting

device. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 18.305 Limit}$$

4.4 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	55 %
ATM Pressure:	1011 mbar

4.5 Summary of Test Results/Plots

According to the data, the EUT complied with the FCC Part 18.305 rule, and had the worst margin of:

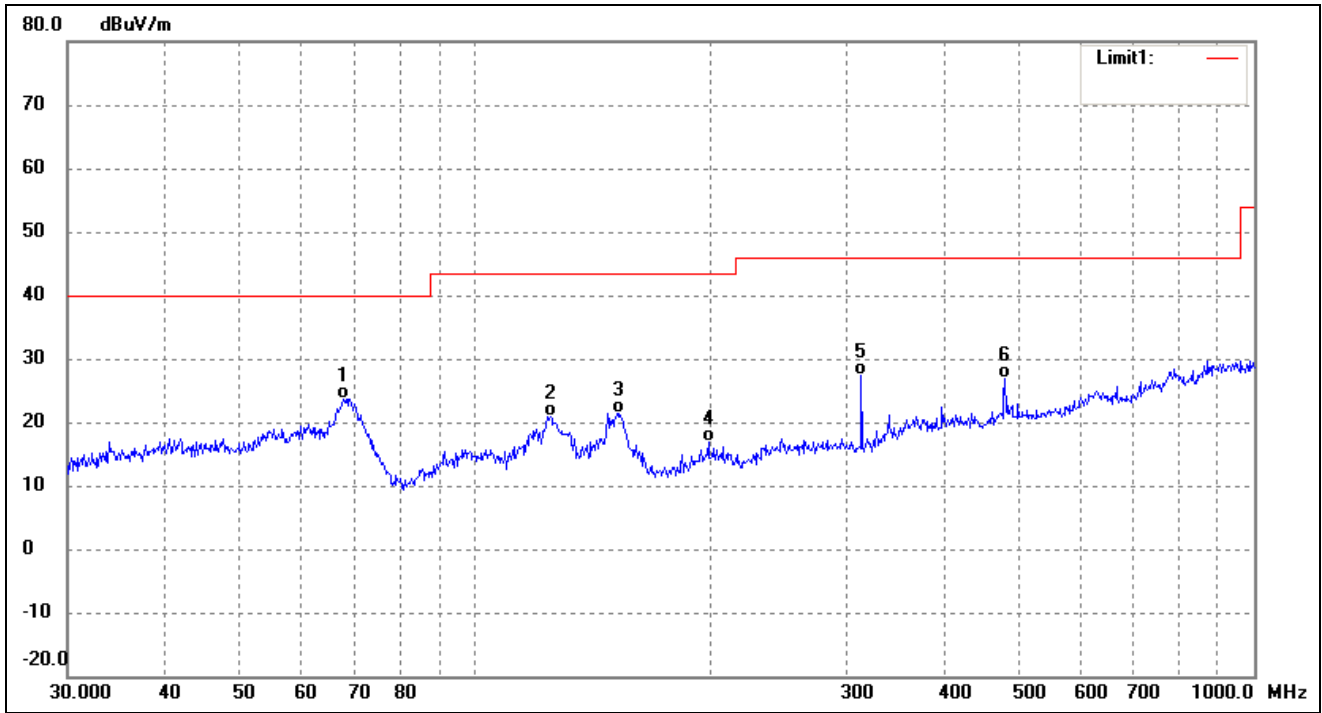
-14.58 dB at 36.1272 MHz in the Vertical polarization QP detector, 9kHz to 1 GHz, 3Meters

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

Plot of Radiated Emissions Test Data (30MHz to 1GHz)

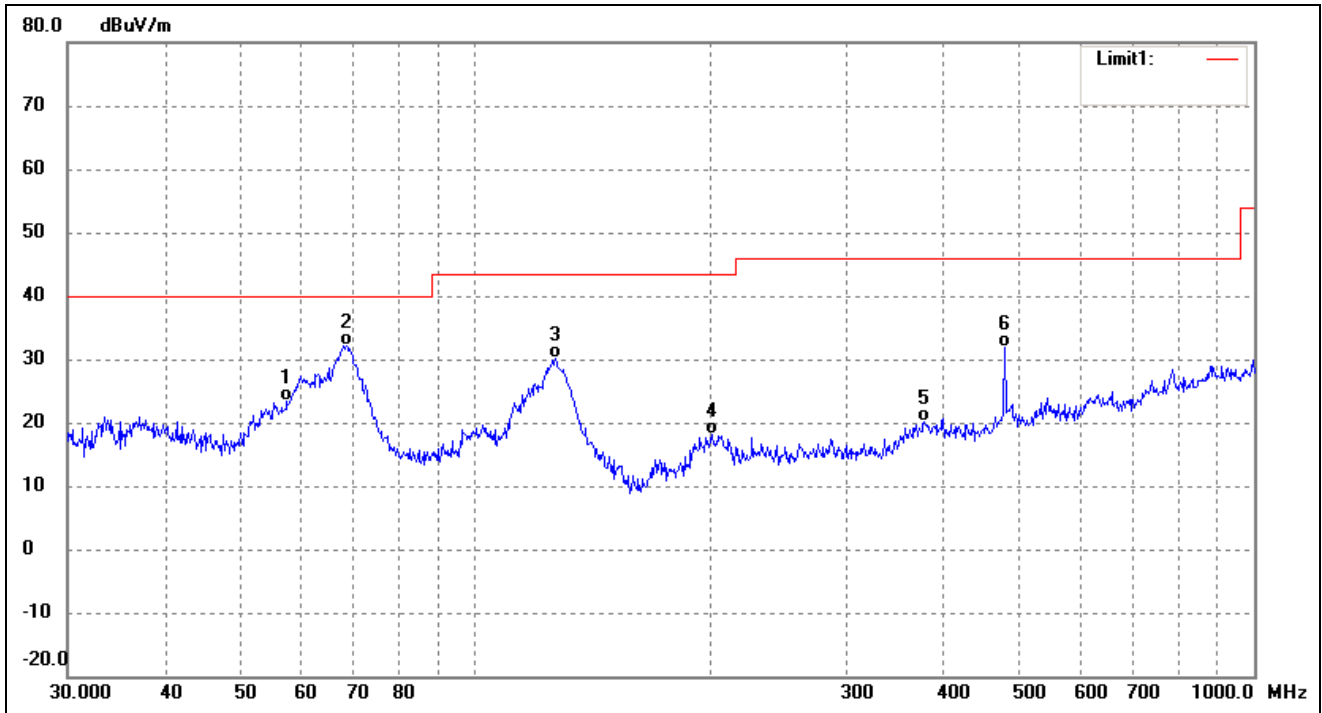
EUT: *Wheelless*
 Tested Model: *WLS5*
 Operating Condition: *TM1*
 Comment: *AC120V 60Hz*

Test Specification: *Horizontal*



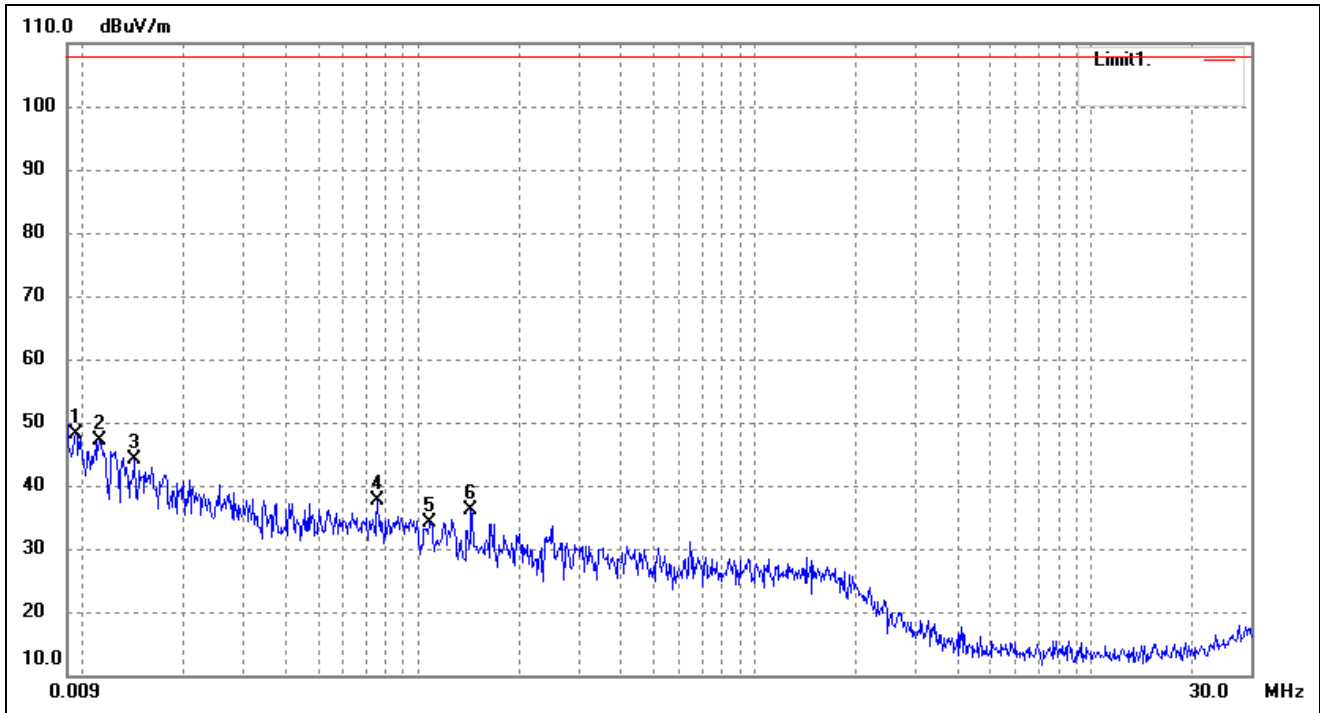
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	67.9129	37.83	-14.13	23.70	40.00	-16.30	47	100	QP
2	125.0066	34.83	-13.98	20.85	43.50	-22.65	85	100	QP
3	152.6641	36.45	-14.97	21.48	43.50	-22.02	76	100	QP
4	199.2855	28.46	-11.69	16.77	43.50	-26.73	94	100	QP
5	313.2760	36.96	-9.68	27.28	46.00	-18.72	53	100	QP
6	478.8456	32.37	-5.42	26.95	46.00	-19.05	225	100	QP

Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	57.3923	36.30	-12.83	23.47	40.00	-16.53	54	100	QP
2	68.3908	48.03	-15.84	32.19	40.00	-7.81	75	100	QP
3	126.7723	44.12	-14.07	30.05	43.50	-13.45	125	100	QP
4	201.3930	29.89	-11.66	18.23	43.50	-25.27	258	100	QP
5	377.2591	27.30	-7.13	20.17	46.00	-25.83	246	100	QP
6	478.8456	37.30	-5.42	31.88	46.00	-14.12	108	100	QP

Radiated Emissions 9kHz to 30MHz:



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	0.0095	53.75	-5.63	48.12	108.00	-59.88			peak
2	0.0112	52.83	-5.77	47.06	108.00	-60.94			peak
3	0.0143	50.42	-6.27	44.15	108.00	-63.85			peak
4	0.0754	45.76	-8.12	37.64	108.00	-70.36			peak
5	0.1077	39.98	-5.87	34.11	108.00	-73.89			peak
6	0.1431	41.59	-5.43	36.16	108.00	-71.84			peak

5. Occupied Bandwidth

5.1 Standard Applicable

According to 15.205, 99% emission bandwidth.

5.2 Test Procedure

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

5.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

5.4 Summary of Test Results/Plots

Test Channel(kHz)	20dB Emission Bandwidth(kHz)
150	72.54

