

Electromagnetic Compatibility Test Report

FCC test results of an automatic dog brush, model EUT: Type 1

AC/DC adaptor: SYS1308-1809-W2E

Customer : DP Nederland B.V.
Biezenmortelsestraat 2
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Netherlands

Customer's representative : H. de Koning
In the capacity of : Manufacturer

Reference number : 15C00690RPT01

Status test report : Final

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1 Summary

A summary of the test results gained from testing the Automatic dog brush is shown in the table below.

	Standard	Class / level	Result (Pass/Fail)
Emission	47 CFR 15	B	Pass
Testplan	Not available	--	Not available

Note 1: The test results presented in this report relate only to the tested sample(s).

Note 2: The test results are based on the tested mode of operation(s), the applicable performance criteria and the acceptance criteria as specified by the customer.

Note 3: At the request of the customer are not all tests performed which are described by the standard.

The following table gives a summary of the results of the tests that have been carried out on the Automatic dog brush.

Test sequence	Test Description	Basic standard	EUT Modified during test (yes/no)	Result (Pass/Fail)
2	Conducted emission, test with a LISN	ANSI C63.4 (2009)	No	Pass
1	Radiated emission up to 1 GHz (SAC)	ANSI C63.4 (2009)	No	Pass
--	Radiated emission above 1 GHz (FAC)	ANSI C63.4 (2009)	--	NA

All tests are excluded from accreditation.

The table below shows details about tests that are not applicable.

Phenomenon	Comment
Radiated emission above 1 GHz (FAR)	The highest frequency of the internal sources of the EUT is less than 108MHz.

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3 Introduction

DARE!! Measurements is requested by DP Nederland B.V., to perform Electromagnetic Compatibility (EMC) tests.

The objective of the test was to assess the Automatic dog brush in accordance with the standards as mentioned in chapter 5 of this report. This report may only be used for this purpose.

At request of DP Nederland B.V., the EMC tests are carried out in order to find out whether the product complies with 47 CFR 15 of the FCC regulations for computers and other digital devices.

The test sample(s) were received on 2015 May, 20. Testing was performed on 2015 May, 20. The test report is issued on 2015 June, 1.

The tests are carried out at our facilities located in Woerden, The Netherlands.

The test results presented in this report relate only to the product tested.

In this report, the sample tested will be referred to as Equipment Under Test (EUT).

This report is in conformity with ISO 17025. However, the report is excluded from accreditation.

All tests as described in the applied standard(s) are carried out, unless otherwise specified in this report.

4 Explanation Status Report

- Final : Formally signed report, with a final conclusion. Changes in the report will lead to a new report with a new report number.
- Preliminary : Interim signed report, with a temporary conclusion. Test is not completed, for example due to missing information. Changes in the report will lead to an updated report with a new report number.

5 Standards and test plan

The EUT is assessed against the following requirements.

- Emission : 47 CFR 15
- : FCC Public Notice DA 09-2478
- : KDB Publication 714737
- Test plan : Not available

If available, a test plan is used as a supplement.

5.1 Test plan deviations

Not applicable.

6 Measurement Uncertainties

The reported expanded uncertainty of measurement is based on a standard uncertainty of measurement multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%, but excluding the contribution of the EUT. The expanded uncertainty of measurement has been determined in accordance with EN 55016-4-2 (2011).

7 EUT details

7.1 Condition of EUT on receipt

The condition of the EUT during reception was not damaged and fully functional.

7.2 Purpose, functional and physical description

Automatic dog brush.

The details for the EUT that is supplied for test, were as follows.

Description	Sample
Name	Automatic dog brush
Manufacturer	DP Nederland B.V.
Brand	DP Nederland
Model number	EUT: Type 1 AC/DC adaptor: SYS1308-1809-W2E
Serial number	Not available
Rating power	--
Rating amperage	AC/DC adaptor: 2A and EUT 2A
Rating voltage	AC/DC adaptor: 110V AC and EUT 7.4V DC
Rating frequency	60Hz
Dimensions (L*W*H [m])	20cm*12cm*25cm
Software release	Not applicable
Hardware release	Not applicable
Environment to be used	Household

7.3 Equipment authorization

The EUT can be authorized as verification.

7.4 Potential sources of emission

The highest generated or used frequency of the EUT is <108MHz.

7.5 Interfaces to external objects

The cable connections to EUT and peripheral equipment during testing are displayed in the table below.

Description	Port Type	Type Of Cable	Cable Length	Fixing shield	Load at port
Power adaptor DC side	DC supply	Unshielded	1.8m (fixed length)	Not applicable	From EUT to power adaptor DC side
110V AC power adaptor	Undefined	Unshielded	No cable, connector to wall outlet.	Not applicable	Wall outlet

7.6 Test configuration

The EUT is tested as table top equipment.

According the specifications of the EUT, the upper frequency to be measured is 1GHz for Radiated Emission.

According the information of the customer, the class of emission is B.

8 Operating conditions during test

8.1 Test considerations

The EUT is considered as a category II apparatus.

8.2 Mode(s) of operation

The test mode(s) during testing were defined as:

Mode of operation	Description
Mode 1	The EUT brush motor is running continuously and also charging at the same time where the charging is monitored by the blue LED.

The applicant's representative was present to witness the testing.

The Appendixes of this report shows pictures of the test configuration during the tests.

9 Possible test case verdicts

- NA or not applicable : test does not apply to the EUT
- P(ass) : EUT does meet the requirement
- F(ail) : EUT does not meet the requirement
- U(ndetermined) : Pass or Fail could not be established
- NR or not requested : test is not requested by customer

During pass or fail decisions, the measurement uncertainty is not taken into account.

10 Test equipment

The instruments used to perform the tests are displayed in the Appendix.

11 Measurement software

The measurement software during testing was *DARE!!* Instruments Radimation version 2015.1.5.

12 Test results

12.1 Conducted emission, test with a LISN

12.1.1 Test method

The conducted emission tests at the supply port are carried out by means of a "Line Impedance Stabilisation Network" (LISN). The tests are recorded with a Spectrum Analyzer / EMI Receiver. The tests are carried out in accordance with the applied standard(s) (see chapter 5) and the basic standard ANSI C63.4 (2009), where the first standard takes precedence. The measured value is calculated by the following formula:

$$V = V_r + a_c + F_{AMN}$$

Where:

- V = Conducted Disturbance Level (measured value) [dB μ V]
- V_r = Receiver Indication (receiver reading) [dB μ V]
- a_c = Cable Loss (coax cable) [dB]
- F_{AMN} = Artificial Mains Network Loss (AMN) (LISN insertion loss) [dB]

12.1.2 Measurement Uncertainty

The measurement uncertainty during testing is displayed in the table below.

Frequency	U
9 kHz – 150 kHz	± 4.0 dB
150 kHz – 30 MHz	± 3.6 dB

12.1.3 Requirements

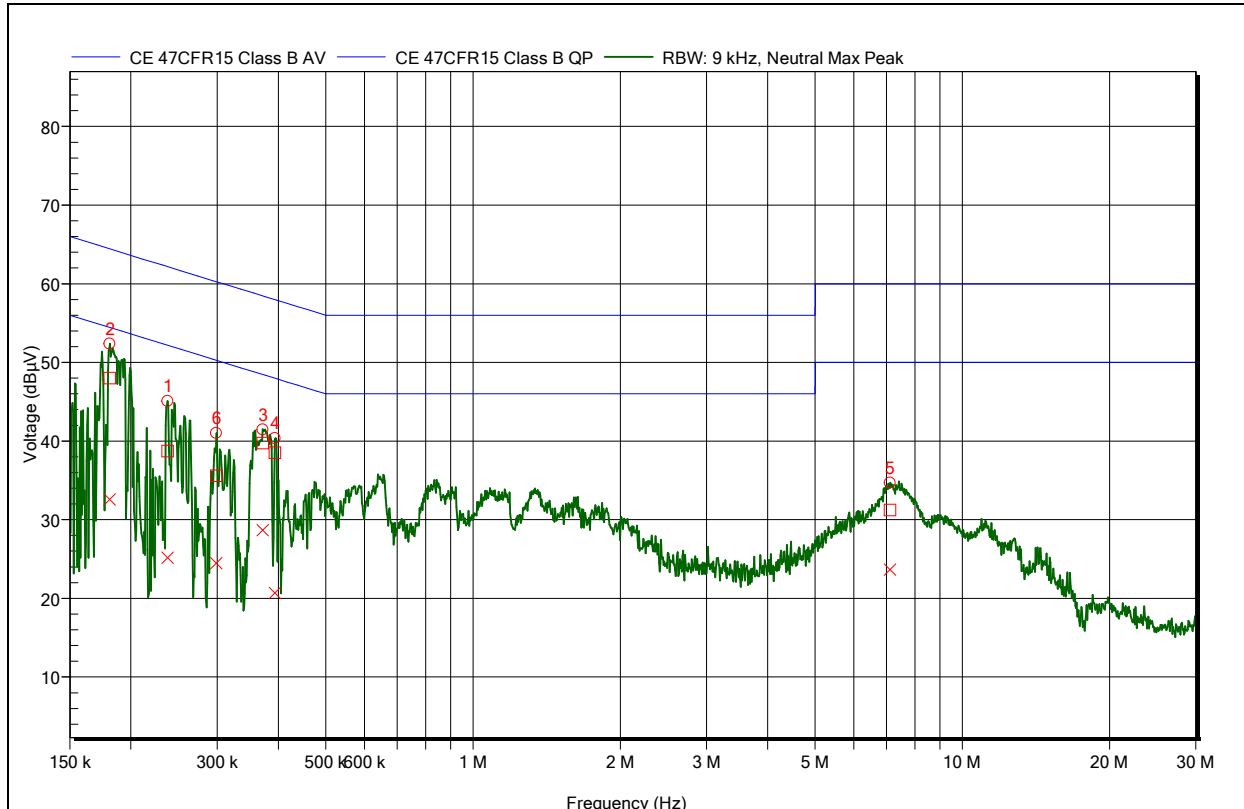
The requirements are laid down in the table below.

Frequency band	QP Limit class A	AV Limit class A	QP Limit class B	AV Limit class B
150 kHz - 500 kHz	79 dB μ V	66 dB μ V	66-56 ¹ dB μ V	56-46 ¹ dB μ V
500 kHz - 5 MHz	73 dB μ V	60 dB μ V	56 dB μ V	46 dB μ V
5 MHz - 30 MHz	73 dB μ V	60 dB μ V	60 dB μ V	50 dB μ V

¹ Decreasing linear with log of frequency.

Result Conducted Emission LISN 150 kHz to 30 MHz

PIN number:	15C00690	Resolution Bandwidth:	9 kHz
Test ID:	24	Video Bandwidth:	1 MHz
Mode of operation:	Mode 1	Line:	Neutral



Detected Peaks

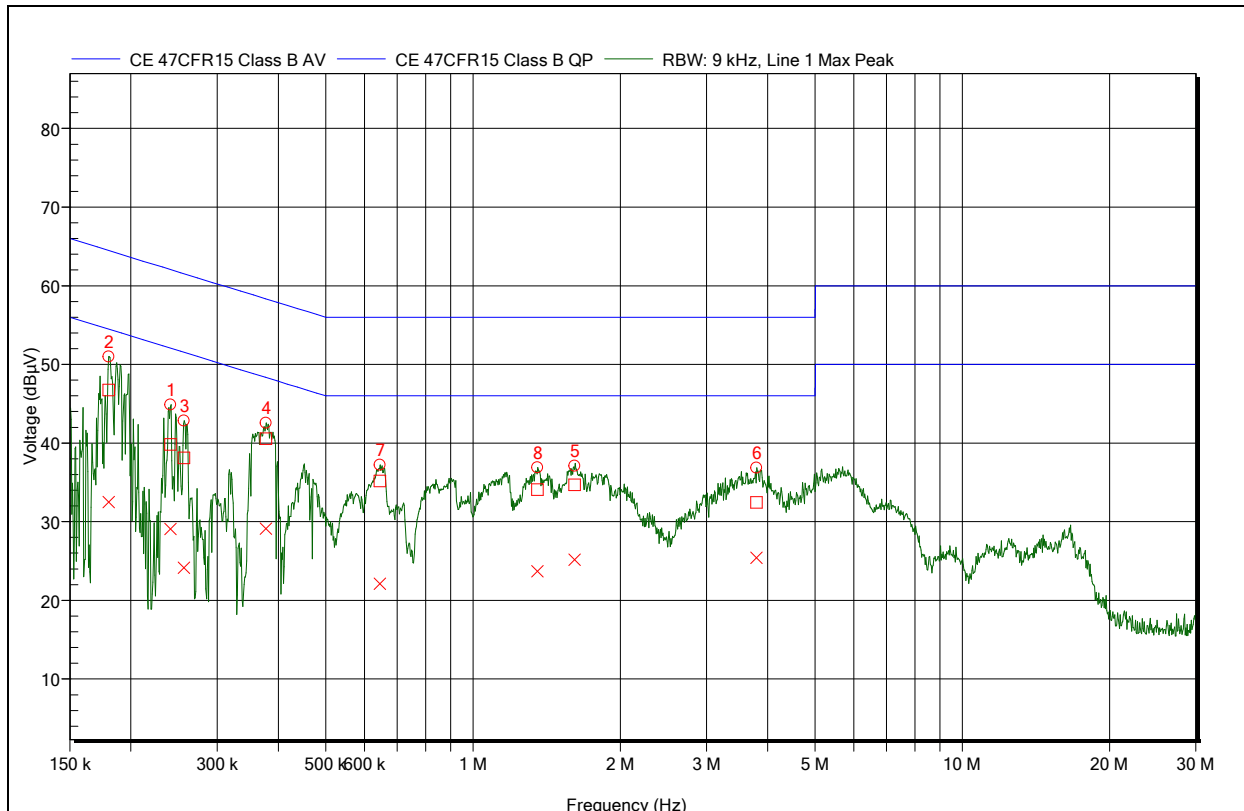
Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Average	Average Limit	Status
1	237.606 kHz	38.7 dBµV	62.2 dBµV	25.2 dBµV	52.2 dBµV	Pass
2	180.935 kHz	48 dBµV	64.4 dBµV	32.6 dBµV	54.4 dBµV	Pass
3	371.564 kHz	39.8 dBµV	58.5 dBµV	28.7 dBµV	48.5 dBµV	Pass
4	393.928 kHz	38.5 dBµV	58 dBµV	20.7 dBµV	48 dBµV	Pass
5	7.113 MHz	31.2 dBµV	60 dBµV	23.7 dBµV	50 dBµV	Pass
6	298.851 kHz	35.6 dBµV	60.3 dBµV	24.5 dBµV	50.3 dBµV	Pass

Remarks

Pass.

Result Conducted Emission LISN 150 kHz to 30 MHz

PIN number:	15C00690	Resolution Bandwidth:	9 kHz
Test ID:	25	Video Bandwidth:	1 MHz
Mode of operation:	Mode 1	Line:	Line 1



Detected Peaks

Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Average	Average Limit	Status
1	240.905 kHz	39.8 dBµV	62.1 dBµV	29.1 dBµV	52.1 dBµV	Pass
2	180.085 kHz	46.8 dBµV	64.5 dBµV	32.5 dBµV	54.5 dBµV	Pass
3	256.747 kHz	38.1 dBµV	61.5 dBµV	24.1 dBµV	51.5 dBµV	Pass
4	377.686 kHz	40.6 dBµV	58.3 dBµV	29.1 dBµV	48.3 dBµV	Pass
5	1.613 MHz	34.7 dBµV	56 dBµV	25.2 dBµV	46 dBµV	Pass
6	3.792 MHz	32.4 dBµV	56 dBµV	25.4 dBµV	46 dBµV	Pass
7	645.587 kHz	35.2 dBµV	56 dBµV	22.1 dBµV	46 dBµV	Pass
8	1.355 MHz	34.1 dBµV	56 dBµV	23.7 dBµV	46 dBµV	Pass

Remarks

Pass.

12.2 Radiated emission up to 1 GHz (SAC)

12.2.1 Test method

The radiated emission tests are carried out in a Semi Anechoic Chamber (SAC). The tests are recorded with a Spectrum Analyzer / EMI Receiver. The test method is in accordance with the applied standard(s) (see chapter 5) and with the basic standard ANSI C63.4 (2009) and paragraph 15.31 (f) (1) of 47 CFR 15, where the first standard takes precedence. The measured value is calculated by the following formula:

$$E = V_r + a_c + F_a$$

Where:

- E = Field Strength (measured value) [dB μ V/m]
- V_r = Receiver Indication (receiver reading) [dB μ V]
- a_c = Cable Loss (coax cable) [dB]
- F_a = Antenna Factor (antenna) [dB/m]

12.2.2 Measurement Uncertainty

The measurement uncertainty during testing is displayed in the table below.

Frequency	U _{SAC}
30 MHz – 200 MHz:	± 5.0 dB
200 MHz – 1000 MHz:	± 6.4 dB

12.2.3 Requirements

The requirements according CISPR 22 (Third edition) are laid down in the table below.

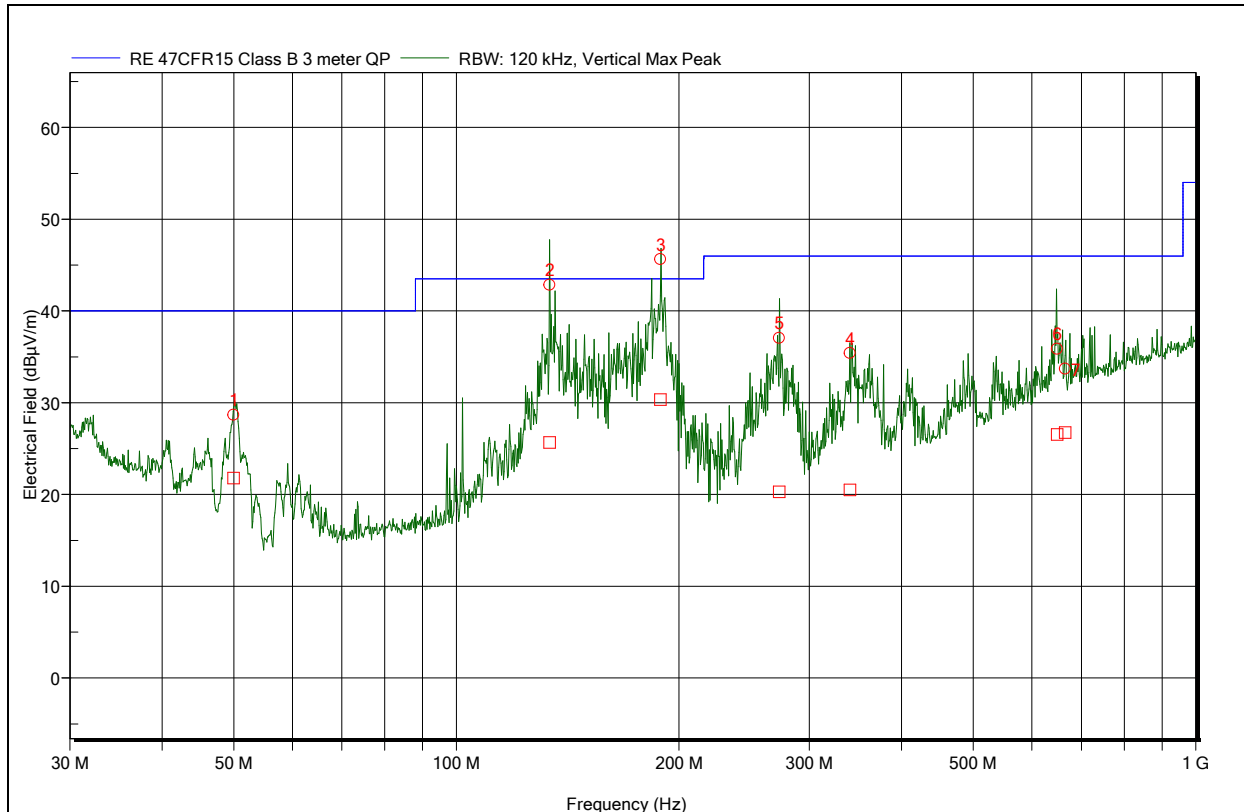
Frequency band	QP class A @ 3m	QP class B @ 3m
30 MHz - 230 MHz	50 dB μ V/m	40 dB μ V/m
230 MHz - 1 GHz	57 dB μ V/m	47 dB μ V/m

The requirements according 47CFR15 are laid down in the table below.

Frequency band	QP class A @ 3m	QP class B @ 3m
30 MHz - 88 MHz	49,5 dB μ V/m 300 μ V/m	40 dB μ V/m 100 μ V/m
88 MHz - 216 MHz	54 dB μ V/m 500 μ V/m	43,5 dB μ V/m 150 μ V/m
216 MHz – 960 MHz	56,9 dB μ V/m 700 μ V/m	46 dB μ V/m 200 μ V/m
960 MHz – 1 GHz	60 dB μ V/m 1000 μ V/m	54 dB μ V/m 500 μ V/m

Result Radiated Emission Semi Anechoic Chamber 30 MHz to 1 GHz Vertical

PIN number:	15C00690	Resolution Bandwidth:	120 kHz
Test ID:	22	Video Bandwidth:	1 MHz
Mode of operation:	Mode 1	Antenna Height:	1 - 4 m
Antenna Distance:	3 m		



Detected Peaks

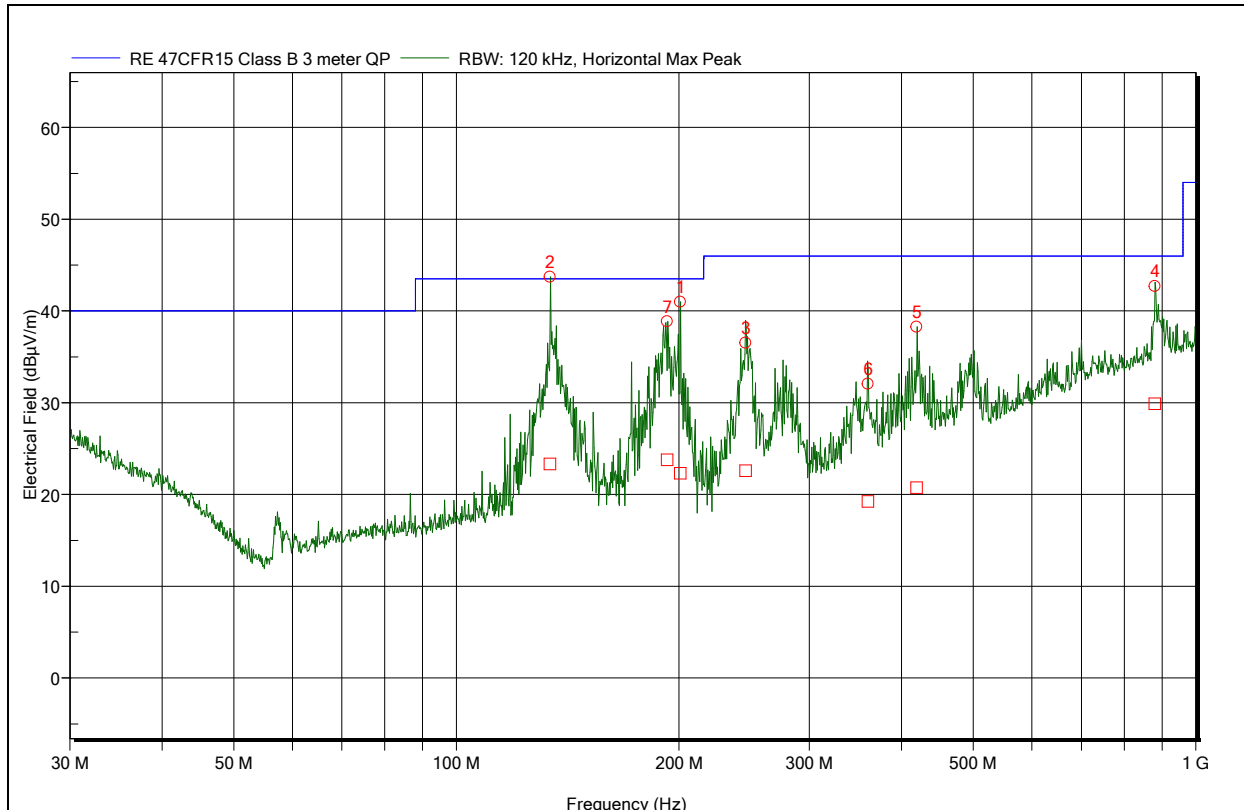
Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Angle	Height	Status
1	49.953 MHz	21.8 dBµV/m	40 dBµV/m	46 Degree	99.7 cm	Pass
2	133.698 MHz	25.7 dBµV/m	43.5 dBµV/m	4 Degree	1.5 m	Pass
3	188.743 MHz	30.4 dBµV/m	43.5 dBµV/m	-41 Degree	98.1 cm	Pass
4	340.410 MHz	20.5 dBµV/m	46 dBµV/m	-19 Degree	1.5 m	Pass
5	273.227 MHz	20.3 dBµV/m	46 dBµV/m	116 Degree	2 m	Pass
6	648.784 MHz	26.5 dBµV/m	46 dBµV/m	206 Degree	1.3 m	Pass
7	665.344 MHz	26.8 dBµV/m	46 dBµV/m	228 Degree	1.2 m	Pass

Remarks

Pass.

Result Radiated Emission Semi Anechoic Chamber 30 MHz to 1 GHz Horizontal

PIN number:	15C00690	Resolution Bandwidth:	120 kHz
Test ID:	23	Video Bandwidth:	1 MHz
Mode of operation:	Mode 1	Antenna Height:	1 - 4 m
Antenna Distance:	3 m		



Detected Peaks

Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Angle	Height	Status
1	200.741 MHz	22.3 dBµV/m	43.5 dBµV/m	-19 Degree	1.5 m	Pass
2	133.771 MHz	23.3 dBµV/m	43.5 dBµV/m	139 Degree	3.3 m	Pass
3	246.130 MHz	22.6 dBµV/m	46 dBµV/m	-19 Degree	1 m	Pass
4	879.812 MHz	29.9 dBµV/m	46 dBµV/m	-87 Degree	98.1 cm	Pass
5	419.006 MHz	20.7 dBµV/m	46 dBµV/m	158 Degree	1.3 m	Pass
6	360.068 MHz	19.2 dBµV/m	46 dBµV/m	-21 Degree	1.8 m	Pass
7	192.660 MHz	23.8 dBµV/m	43.5 dBµV/m	26 Degree	1.8 m	Pass

Remarks

Pass.

13 Conclusion

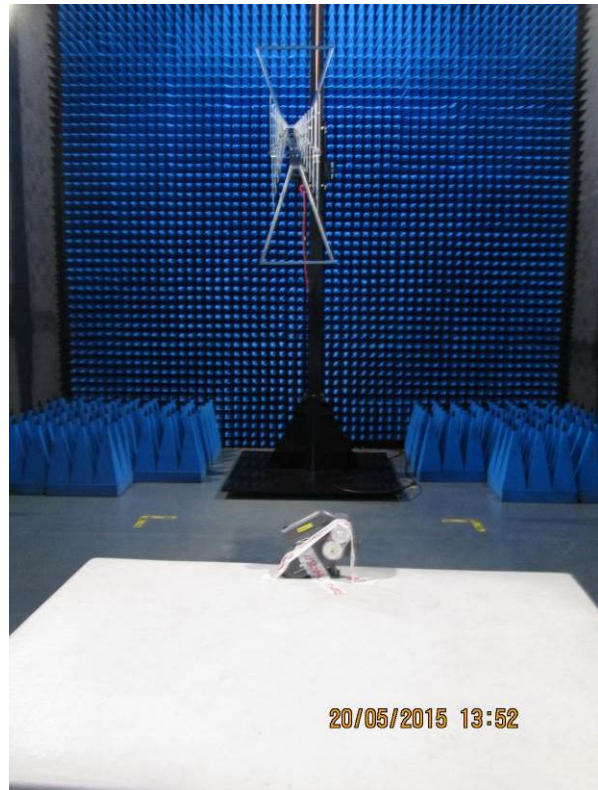
The Automatic dog brush meets the emission limits of an Unintentional Radiator as described in 47 CFR 15, class B Digital Device.

It is the responsibility of the manufacturer to ensure, that all of the following products are equal to the measured sample. And as such ensure, that all manufactured Automatic dog brushes are in compliance with the standards as mentioned above.

14 Appendix A: Pictures of EUT



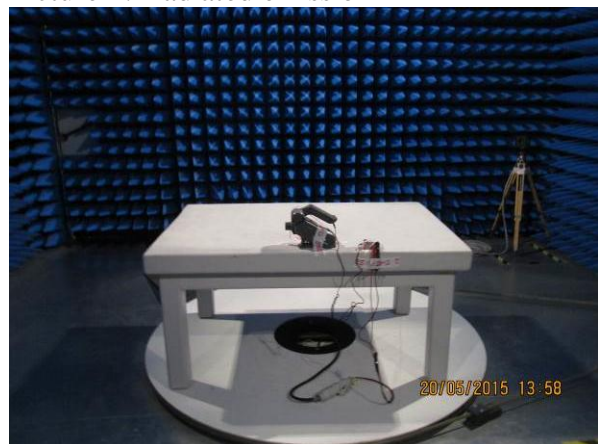
Picture 1: Conducted emission



Picture 2: Radiated emission



Picture 3: Conducted emission test setup



Picture 4: Radiated emission test setup

15 Appendix B: Equipment List

Conducted Emission LISN 150 kHz to 30 MHz

Description	Brand	Model	Serial	ID	Last Calibration	Calibration interval
Test site Conducted Emission, Einstein	DARE!! Consultancy	-	-	1572	-	-
Spectrum analyzer / Receiver	R&S	ESU8	100428	1556	9/7/2014	2 years
LISN 50Ohm/50uH + 50Ohm, 3-, 16A, incl. 10 dB Att.	Schwarzbeck+Micircuits	NSLK 8126 + BW-N10W5	506+-	1607+1608	4/11/2014	3 years
Power Source	California Instruments	5001iX	55707	1324	6/2/2014	5 years
Cable RF-coaxial, CE LISN Einstein (EMC)	DARE!! Consultancy	-	-	1226	1/4/2014	1 year

Radiated Emission Semi Anechoic Chamber 30 MHz to 1 GHz

Description	Brand	Model	Serial	ID	Last Calibration	Calibration interval
Anechoic room, semi	Siepel	Hermes 3	-	1494	31/1/2014	3 years
Spectrum analyzer / Receiver	R&S	ESU26	100011	1465	15/2/2013	2 years
Antenna mast	DARE!! Instruments	Raditower	-	1496	-	-
Turn table	DARE!! Development	Raditurn	-	1367	-	-
Antenna, 30 - 3000 MHz	Rohde & Schwarz	HL562	100543	1527	7/4/2014	1 year
Power Source	California Instruments	5001iX	55707	1324	6/2/2014	5 years
Cable RF-coaxial, set, RE Cavendish (EMC)	DARE!! Consultancy	-	-	1478	1/9/2014	1 year