

**TEST REPORT CONCERNING THE COMPLIANCE OF
SPEED RADAR ANTENNA
OPERATING IN THE FREQUENCYRANGE
24075 – 24175 MHz
BRAND Gatso,
MODEL RT2 Radar
WITH 47 CFR PART 15 (10-1-12 EDITION) AND THE
REQUIREMENTS OF INDUSTRY CANADA:
ICES-003 (ISSUE 5, AUGUST 2012)**

**12112102.fcc02
August 11, 2013**

FCC listed	: 90828
Industry Canada	: 2932G-2
R&TTE, LVD, EMC Notified Body	: 1856

**TÜV Rheinland EPS
P.O. Box 37
9350 AA Leek (NL)
Eiberkamp 10
9351 VT Leek (NL)**

Telephone: +31 594 505005
Telefax: +31 594 504804

Internet: www.tuv-eps.com
E-mail: info@tuv-eps.com

MEASUREMENT/TECHNICAL REPORT

Brand: Gatso
Model: RT2 Radar
FCC ID: TVO-RT2
IC: 6271A-RT2

This report concerns: Original grant/certification ~~Class 2 change~~ ~~Verification~~ ~~Verification~~

Equipment type: JBP Class B Computing Device Peripheral

Report prepared by:	Name	: R. van der Meer
	Company name	: TÜV Rheinland EPS
	Address	: Eiberkamp 10
	Postal code/city	: 9351 VT Leek
	Mailing address	: P.O. Box 37
	Postal code/city	: 9350 AA Leek
	Country	: The Netherlands
	Telephone number	: + 31 594 505 005
	Telefax number	: + 31 594 504 804
	E-mail	: info@tuv-eps.com

The data taken for this test and report herein was done in accordance with 47 CFR Part 15 (10-1-12 Edition), ICES-003 (ISSUE 5, AUGUST 2012) and the measurement procedures of ANSI C63.4-2009. TÜV Rheinland EPS at Leek, The Netherlands, certifies that the data is accurate and contains a true representation of the emission profile of the Equipment Under Test (EUT) on the date of the test as noted in the test report. I have reviewed the test report and find it to be an accurate description of the test(s) performed and the EUT so tested.

Date: August 16, 2013

Signature:



O. Hoekstra
Senior Engineer Telecom TÜV Rheinland EPS

Summary

The device under test does:

- fulfill the general approval requirements as identified in this test report
- not fulfill the general approval requirements as identified in this test report

Description of test item

Test item (EUT) : Speed Radar Antenna / JBP Class B Computing Device Peripheral
Manufacturer : Gatsometer B.V.
Brand : Gatso
Model : RT2 Radar
Serial number : 20120700011
FCC ID : TVO-RT2
IC : 6271A-RT2
Receipt date : July 26, 2013

Applicant information


Applicant's representative : Mr. Ben van de Pavert
Company : Gatsometer B.V.
Address : Claes Tillyweg 2
Postal code : 2031CW
City : Haarlem
Country : The Netherlands
Telephone number : +31 23 5255050
Telefax number : +31 23 5276961
E-mail : b.vandepavert@gatso.com


Test(s) performed

Location : Leek
Test(s) started : July 26, 2013
Test(s) completed : August 12, 2013
Purpose of test(s) : Equipment Authorization (Original grant/certification)

Test specification(s) : 47 CFR Part 15 (10-1-12 Edition), ICES-003 (ISSUE 5 AUGUST 2012) AND ANSI C63.4-2009

Compliance statement : The test has demonstrated that this unit complies with stipulated standards.

Test engineer(s) : R. van der Meer 

Report written by : R. van der Meer 

Report date : August 16, 2013

This report shall not be reproduced, except in full, without the written permission of TÜV Rheinland EPS.
The test results relate only to the item(s) tested.

Table of contents

1	General information.....	5
1.1	Product description.....	5
1.1.1	Introduction.....	5
1.2	Related submittal(s) and/or Grant(s).....	5
1.2.1	General.....	5
1.3	Tested system details.....	5
1.3.1	Description of input and output ports.....	7
1.4	Test Summary.....	8
1.5	Test methodology.....	9
1.6	Test facility.....	9
1.7	Test conditions.....	9
2	System test configuration.....	10
2.1	Justification.....	10
2.2	EUT mode of operation.....	10
2.3	Test Software.....	10
2.4	Special accessories.....	10
2.5	Equipment modifications.....	10
2.6	Product Labeling.....	11
2.7	Block diagram of the EUT.....	11
2.8	Schematics of the EUT.....	11
2.9	Part list of the EUT.....	11
3	Radiated emission data.....	12
3.1	Radiated field strength measurements (30 MHz – 1 GHz, E-field).....	12
3.1.1	Test equipment used (for reference see test equipment listing).....	13
4	Conducted emission data.....	15
4.1	Conducted emission data of the EUT.....	15
4.2	Conducted emission data of the EUT.....	15
5	List of utilized test equipment.....	16

1 General information.

1.1 Product description.

1.1.1 Introduction.

The brand Gatso, model RT2 Radar (hereafter referred to as EUT), is used in the Speed Inforcement System and is designed to operate in the 24 GHz frequency band (24075 MHz to 24175 MHz). The EUT is a FSK modulated transmitter with shifts ± 1.9 MHz around the center frequency.

The content of this report and measurement results have not been changed other than the way of presenting the data.

1.2 Related submittal(s) and/or Grant(s).

1.2.1 General.

This test report supports the original grant/certification in equipment authorization (for the Digital Device part) files under registration number.

FCC ID: TVO-RT2 and IC: 6271A-RT2.

1.3 Tested system details.

Details and an overview of the system and all of its components, as it has been tested, may be found below.

EUT	:	Speed Radar Antenna
Manufacturer	:	Gatsometer B.V.
Brand	:	Gatso
Model	:	RT2 Radar
Serial number	:	20120700011
Voltage input rating	:	12Vdc (battery operated)
Voltage output rating	:	--
Current input rating	:	--
Antenna	:	Internal, declared Gain= 10.0 dBi
Remarks	:	See photos of the EUT on the next page
Auxiliary equipment (AUX1)	:	Multifunction DAC/Simulator
Manufacturer	:	National Instruments
Brand	:	National Instruments
Model	:	USB X Series
Serial number	:	--
Voltage input rating	:	10.8 – 15.0 VDC
Voltage output rating	:	--.
Remark	:	used to simulate vehicles
Auxiliary equipment 2 (AUX2)	:	Notebook computer with power supply adapter
Brand	:	Dell
Model	:	Latitude
Serial number	:	515XLQ1
Voltage input rating	:	12 Vdc
Current input rating	:	--
Remark	:	used for programming the EUT, property applicant

Auxiliary equipment 3 (AUX3)	:	CAN-USB connection device
Brand	:	PEAK System
Model	:	IPEH-002021
Serial number	:	111674
Current input rating	:	--
Voltage output rating	:	--
Current output rating	:	--
Remarks	:	used to convert CAN to USB
Auxiliary equipment 4 (AUX4)	:	DC Power Supply
Manufacturer	:	Delta Electronics B.V.
Brand	:	Delta
Model	:	E030-3
Voltage input rating	:	100 – 240 Vac
Current input rating	:	--
Voltage output rating	:	0 – 30 Vdc
Current output rating	:	3A max
Remarks	:	Power supply for EUT

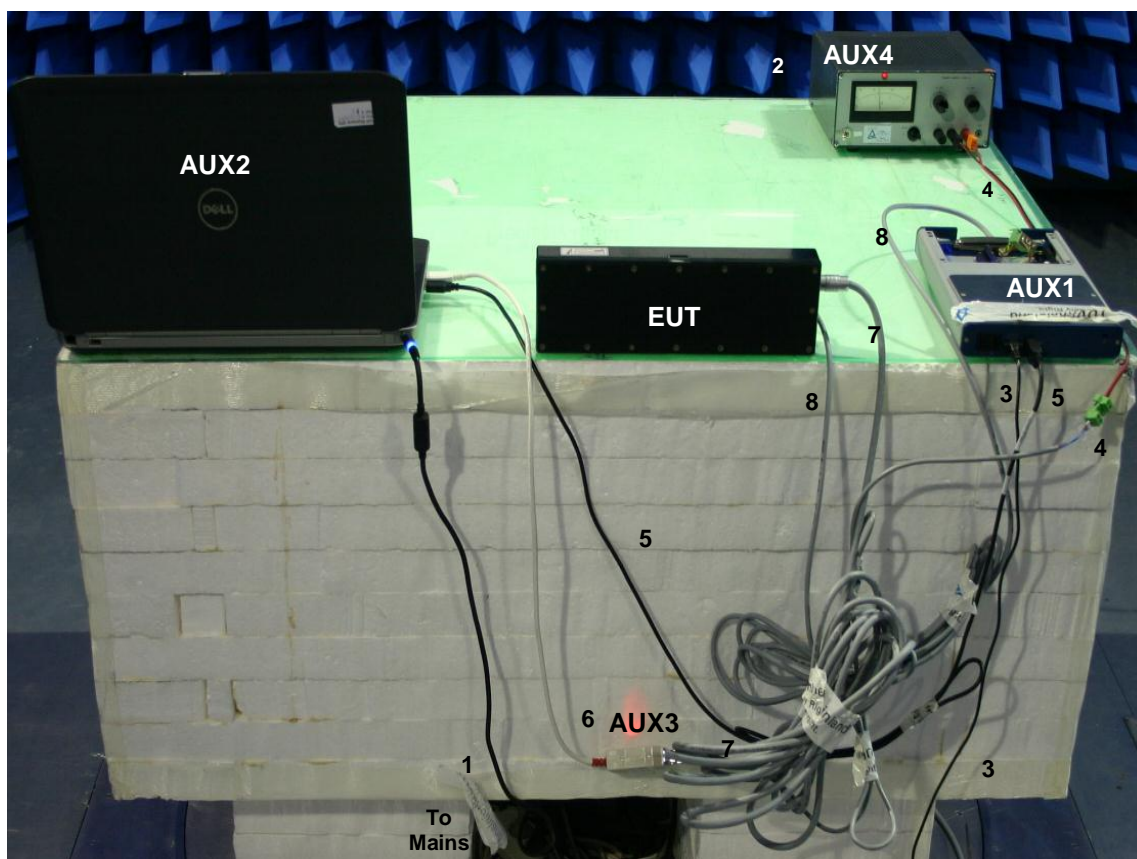


Photo 1: basic setup

1.3.1 Description of input and output ports.

Number	Terminal	From	To	Remarks	
1	Mains	Mains	AUX2	Unshielded cable <3m length	
2	Mains	Mains	AUX4	Unshielded cable <3m length	
3	Mains	Mains	AUX1	Unshielded cable <3m length	
4	12Vdc	AUX4	EUT	Unshielded cable <3m length	
5	comms	AUX1	AUX2-usb port 2	Shielded cable <3m length	
6	comms	AUX3	AUX2-usb port 1	Shielded cable <3m length	
7	Comms	AUX1	AUX3	Shielded cable <3m length	
8	comms	AUX1	EUT	Shielded cable <3m length	

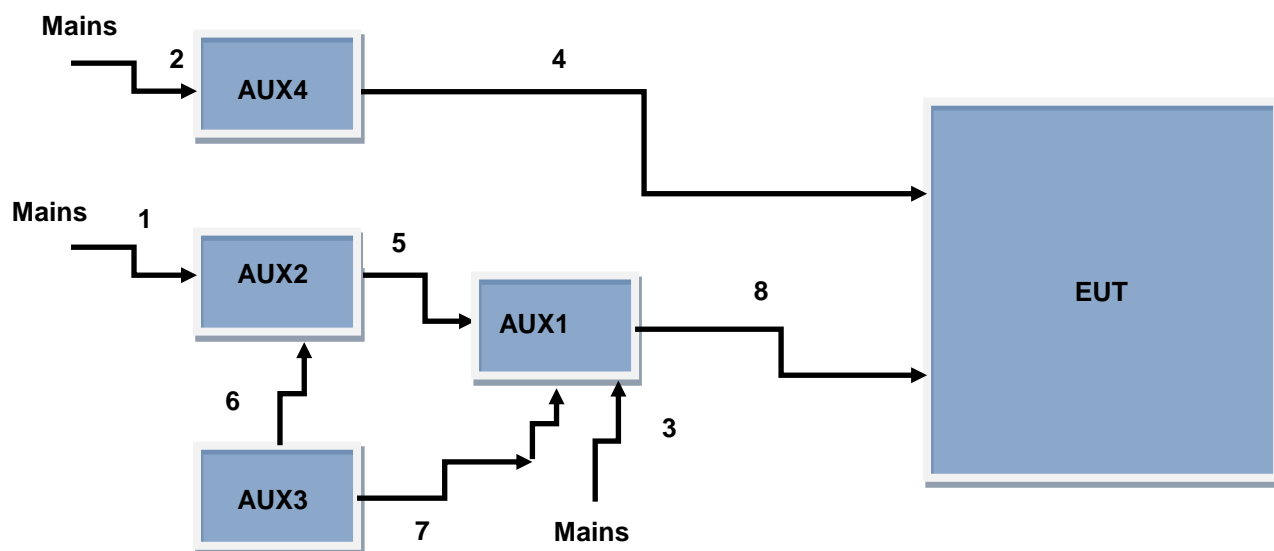


Figure 1. Basic set-up

1.4 Test Summary

The EUT was tested in accordance with the specifications given in Table 1 below.

Test Standard		Description	Page	Pass / Fail
47 CFR Part 15 (10-1-12 Edition)	ICES-0003 Issue 5 (AUGUST 2012)			
15.107(a) Class B	Section 5 Class B	Conducted emissions	15	Not applicable
15.109(a) Class B	Section 6 Class B	Radiated emissions	12 - 14	Pass

Table 1: Test specifications

Testmethods: ANSI C63.4:2009 and RSS-Gen Issue 3, December 2010

1.5 Test methodology.

The test methodology used is based on the requirements of 47 CFR Part 15 (10-1-12 Edition), sections 15.31, 15.35, 15.205, 15.107, 15.109 and ICES-003 Issue 5.

The test methods, which have been used, are based on ANSI C63.4: 2009.

Radiated emission tests above 30 MHz were performed at a measurement distance of 3 meters.

The receivers are switching automatically to the right bandwidth in accordance with CISPR 16. This is implemented in the receiver. The antenna factors are programmed in the test receiver. The receiver automatically calculates the appropriate correction factor for the utilized antenna and also the appropriate antenna factor for the cable loss. The total correction is automatically added to the measured value.

1.6 Test facility.

The Federal Communications Commission and Industry Canada has reviewed the technical characteristics of the test facilities at TÜV Rheinland EPS, located at Eiberkamp 10, 9351 VT Leek, The Netherlands, and has found these test facilities to be in compliance with the requirements of 47 CFR Part 15, section 2.948.

The description of the test facilities has been filed at the Office of the Federal Communications Commission under registration number 90828. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

The description of the test facilities has been filed to Industry Canada under registration number 2932G-2. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

1.7 Test conditions.

Normal test conditions:

Temperature (*)	: +15°C to +35°C
Relative humidity(*)	: 20 % to 75 %
Supply voltage	: 120Vac / 60Hz
Air pressure	: 950 – 1050 hPa

When it was impracticable to carry out the tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests are stated separately.

2 System test configuration.

2.1 Justification.

The system was configured for testing in a typical situation as a customer would normally use it. The test sample was configured by software as described in section 2.3 to enable continuous transmit in various modes (described in section 2.2).

The justification and manipulation of cables and equipment in order to simulate a worst-case behavior of the test setup has been carried out as prescribed in ANSI C63.10: 2009.

2.2 EUT mode of operation.

The EUT has been tested in the modes as described in table below

Test channel	Remark
Setting 1	Not used for USA and Canada
Setting 2	Frequency = 24080 MHz
Setting 3	Frequency = 24100 MHz
Setting 4	Not used for USA and Canada

Note: EUT is based on a free running VCO and actual frequency may differ.

2.3 Test Software

The applicant has provided the following testsoftware on AUX3 to enable control over testparameters. Only frequencies could be selected in the form of Setting 2 and Setting 3. Power level is set at maximum by default.

Testsoftware: TCAN Simulator

Version:

Use: turn EUT TX On/Off

Testsoftware: PCAN-view

Version:

Use: monitoring datatraffic

Testsoftware: RTxEmulator

Version:

Use: simulates a speeding vehicle

Testsoftware: CANopen Device Monitor

Version: 3.2.4

Use: setting the frequency

.

2.4 Special accessories.

No special accessories are used and/or needed to achieve compliance.

2.5 Equipment modifications.

No modifications have been made to the equipment.

2.6 Product Labeling

The product labeling information is available in the technical documentation package.

2.7 Block diagram of the EUT.

The block diagram is available in the technical documentation package.

2.8 Schematics of the EUT.

The schematics are available in the technical documentation package.

2.9 Part list of the EUT.

The part list is available in the technical documentation package.

3 Radiated emission data.

3.1 Requirements:

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

Freq. [MHz]	Limit [μV/m]	Limit [dBμV/m]
30 – 88	100	40.0
88 – 216	150	43.05
216 – 960	200	46.0
Above 960	500	54.0

3.2 Testresults, Radiated field strength measurements (30 MHz – 1 GHz, E-field)

Freq. [MHz]	Antenna Orientation	Level QP [dBμV/m]	Limit [dBμV/m]	Margin [dB]
148.34	Vertical	30.8	43.5	Pass
299.66	Vertical	26.9	46.0	Pass
400.54	Vertical	16.1	46.0	Pass
499.48	Vertical	23.1	46.0	Pass
538.28	Vertical	25.8	46.0	Pass
800.18	Vertical	23.6	46.0	Pass

Table 2 Radiated emissions of the EUT

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15 section 15.205, 15.109(a) and ICES-003 are depicted in Table 2. See notes on the next page.

Notes:

1. Field strength values of radiated emissions at frequencies not listed in the table above are more than 20 dB below the applicable limit.
2. Measurement uncertainty is ± 5.0 dB.
3. The EUT was varied in three positions, the measuring antenna was varied in horizontal and vertical orientations and also around its axis and height. The reported value is the worst case found at the reported frequency.
4. Tested with EUT in operation modes as described in section 2.2, worst case values noted.
5. A Quasi-peak detector was used with a bandwidth of 120 kHz.

3.2.1 Test equipment used (for reference see test equipment listing).

99608	99699	99609	99861	99858	99580/99847	99877	99045	99161

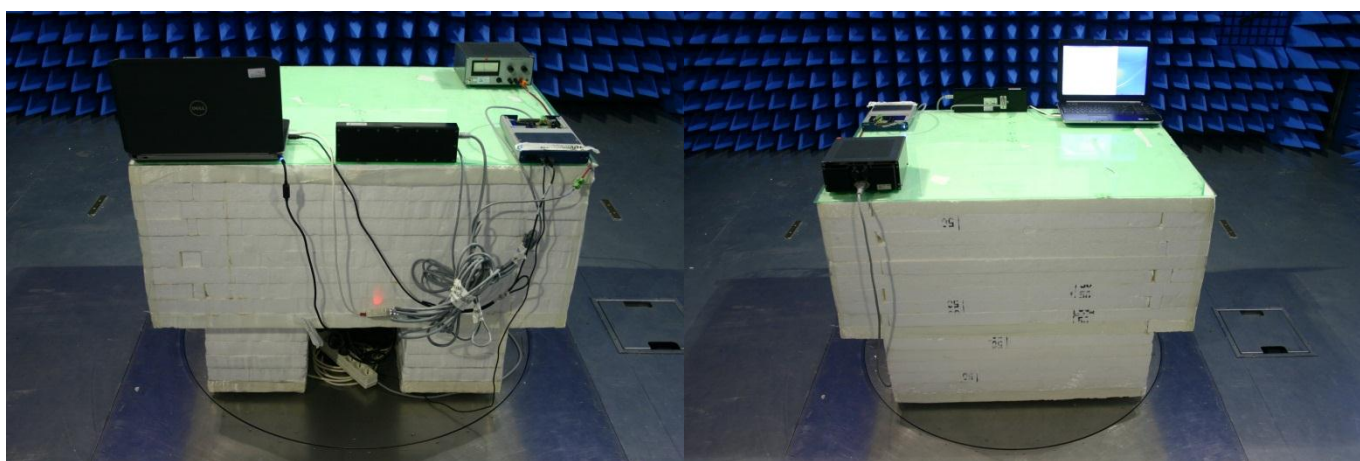
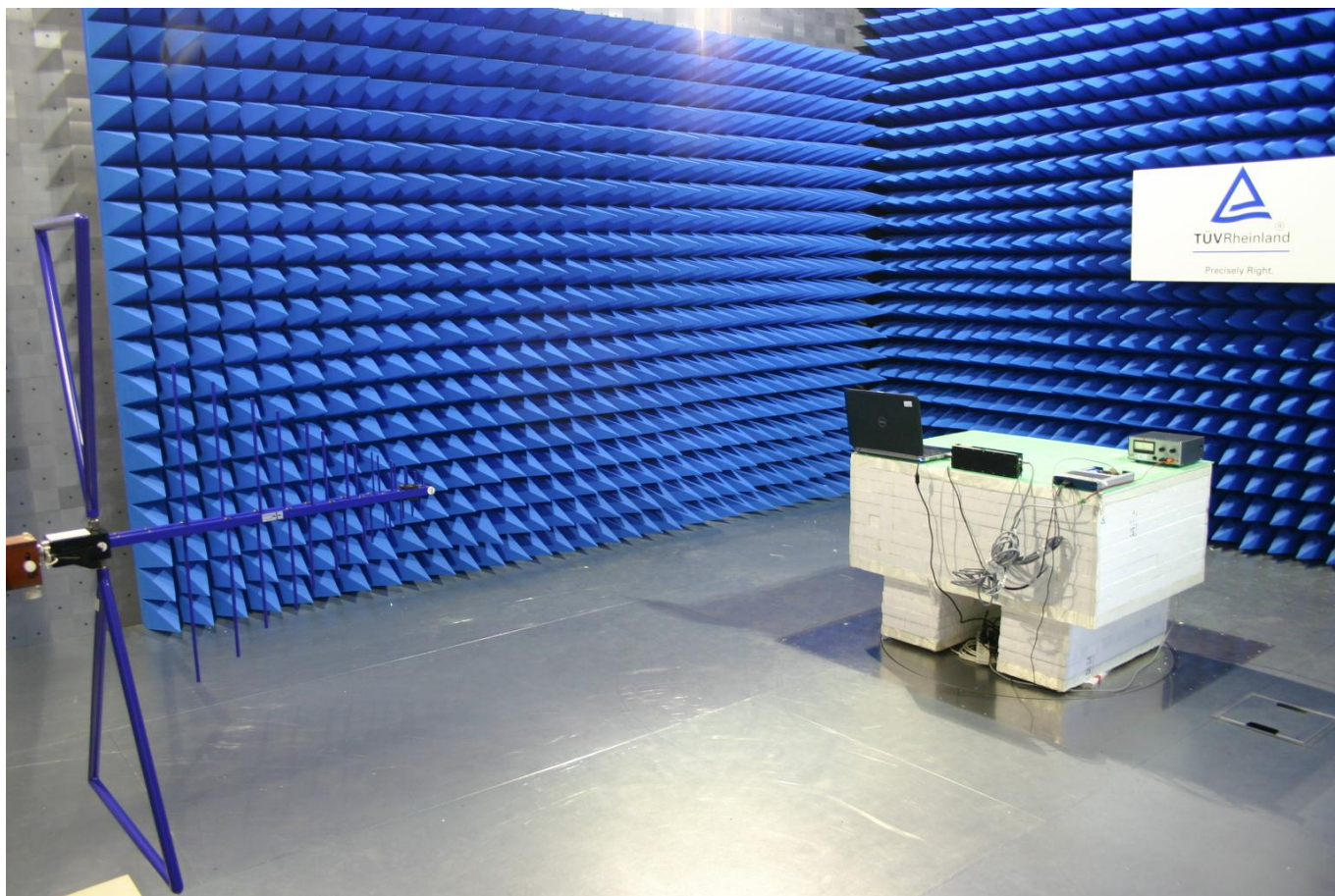
Test engineer

Signature :



Name : R. van der Meer

Date : 08-08-2013



Testsetup photographs

4 Conducted emission data.

4.1 Conducted emission data of the EUT.

4.2 Conducted emission data of the EUT

Not Applicable, EUT is battery operated only.

5 List of utilized test equipment.

Inventory number	Description	Brand	Model	Last cal.	Next cal.
99045	Power Supply	Delta	E030-3	04/2013	04/2014
99877	Biconilog Test antenna	Chase	CBL 6111D	06-2013	06-2014
99161	Variac 250V 6A	RFT	LTS006	NA	NA
99580/99847	Semi Anechoic Room	Siepel	FCC listed: 90828 IC: 2935G-2	12-2011	12-2014
99609	Antenna mast	EMCS	AP-4702C	NA	NA
99608	Antenna mast controller	EMCS	DOC202	NA	NA
99852/ 99855	Temperature-Humiditymeter	Extech	SD500	02-2012	02-2014
99861	Controller turntable	Maturo	SCU/088/8090811	NA	NA
99699	Measuring receiver	R&S	ESCI	03-2013	03-26-2014

NA= Not Applicable