



**TEST REPORT CONCERNING THE COMPLIANCE OF A
TRANSPONDER OPERATING ON 6.78 MHz,
BRAND AMB-it BV ,
MODEL TnetX Communicator
WITH 47 CFR PART 15 (JULY 10, 2008).**

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Industry Canada : 2932G-1
VCCI Registered : R-1518, C-1598
R&TTE, LVD, EMC Notified Body : 1856

TÜV Rheinland EPS B.V.
P.O. Box 15
9822 ZG Niekerk (NL)
Smidshornerweg 18
9822 TL Niekerk (NL)

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

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

MEASUREMENT/TECHNICAL REPORT

AMB-it BV
Model : TnetX Communicator

FCC ID: NXYTNETX

June 01, 2010

This report concerns:	Original grant/certification	Class 2 change	Verification
Equipment type:	DXX Low Power Communication Device Transmitter		
Report prepared by:	Name	: Richard van der Meer	
	Company name	: TÜV Rheinland EPS B.V.	
	Address	: Smidshornerweg 18	
	Postal code/city	: 9822 TL Niekerk	
	Mailing address	: P.O. Box 15	
	Postal code/city	: 9822 ZG Niekerk	
	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 (july 10, 2008) and the measurement procedures of ANSI C63.4-2003. TÜV Rheinland EPS B.V. at Niekerk, 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: June 01, 2010

Signature:



O. Hoekstra
Senior Engineer Telecom TÜV Rheinland EPS B.V.

Description of test item

Test item : Transponder
Manufacturer : AMB-it BV
Brand : MYLAPS
Model(s) : TnetX Communicator
Serial number(s) : 101145
Revision : Not applicable

Applicant information

Applicant's representative : Mr. B. van Rens & Mr. J. Willemse
Company : AMB-it BV (MYLAPS)
Address : Zuiderhoutlaan 4
Postal code : 2012PJ
City : Haarlem
Country : The Netherlands
Telephone number : +31 23 5291893
Telefax number : +31 23 5290156
Email : brens@amb-it.com & Jeroen.Willemse@mylaps.com <mailto:info@collis.nl>
Internet : www.mylaps.com

Test(s) performed

Location : Niekerk
Test(s) started : May 04,2010
Test(s) completed : May 04,2010
Purpose of test(s) : Equipment Authorization (Original grant/certification)
Test specification(s) : 47 CFR Part 15 (July 10, 2008)

Test engineer(s) : R. van der Meer



Report written by : R. van der Meer



Report date : June 01,2010

This report is in conformity with NEN-EN-ISO/IEC 17025: 2005
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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
2	Tested system details.....	5
2.1.1	Description of input and output ports.....	6
2.2	Test methodology.....	7
2.3	Test facility.....	7
2.4	Test conditions.....	7
3	System test configuration.....	8
3.1	Justification.....	8
3.2	EUT mode of operation.....	8
3.3	Special accessories.....	8
3.4	Equipment modifications.....	8
3.5	Product Labelling.....	8
3.6	Block diagram of the EUT.....	8
3.7	Schematics of the EUT.....	8
3.8	Part list of the EUT.....	8
4	Radiated emission data.....	9
4.1	Radiated field strength measurements (30 MHz – 1 GHz, E-field).....	9
4.2	Test equipment used (for reference see test equipment listing section 6).....	9
4.3	Radiated field strength measurements (frequency range of 0.009-30 MHz, H-field) Average values.....	10
4.4	Test equipment used (for reference see test equipment listing section 6).....	11
4.5	Radiated field strength measurements (frequency range of 0.009-30 MHz, H-field) Peak values.....	12
4.6	Test equipment used (for reference see test equipment listing section 6).....	12
5	Plot of the carrier bandwidth.....	14
5.1	Test equipment used (for reference see test equipment listing section 6).....	14
6	List of utilized test equipment.....	15

1 General information.

1.1 Product description.

1.1.1 Introduction.

The product tested is part of an inductive lap timing system used in racing cars.

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.

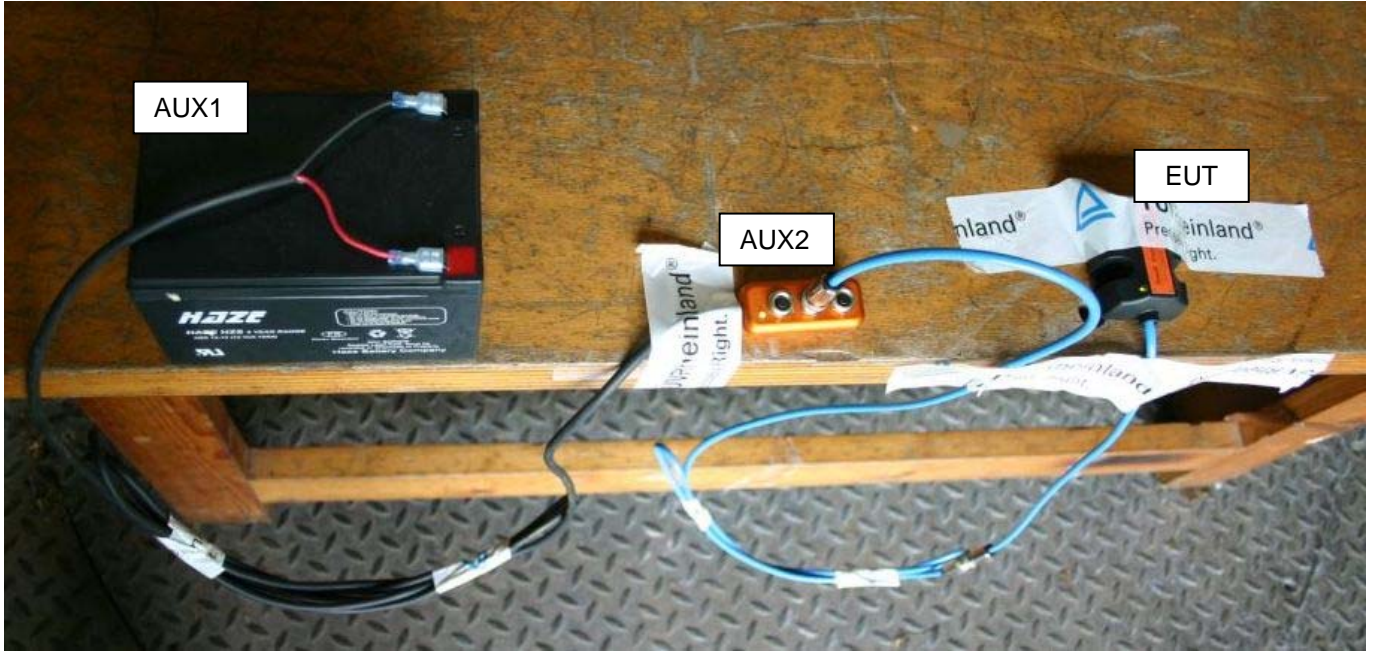
This test report supports the original grant/certification in equipment authorization files under FCC ID: NXYTNETX.

2 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	:	Transponder
Manufacturer	:	AMB-it B.V.
Brand	:	MYLAPS
Model	:	TnetX Communicator
Serial number	:	101145.
Operating frequency	:	6.78 MHz
Modulation	:	QPSK
Voltage input rating	:	12 Vdc
Voltage output rating	:	n.a.
Current input rating	:	100 mA @ 12 Vdc
Antenna	:	Internal
Remarks	:	N.a.
Interface cable(s)	:	N.a.
Operating configuration	:	Transponder is continually transmitting
AUX1	:	Battery pack
Manufacturer	:	Haze Battery Company
Brand	:	HAZE
Model	:	HZS
Serial number	:	HFK29
Remark	:	12 V/ 12 Ah, for testing purposes only, normally not supplied
AUX2	:	TnetX Break Out Box
Manufacturer	:	AMB-it B.V.
Brand	:	MYLAPS
Model	:	N.a.
Serial number	:	N.a.
Remark	:	Connects batterypack to EUT

N.a. means Not applicable



Photograph of the system

2.1.1 Description of input and output ports.

Number	Terminal	From	To	Remarks
1	Power supply	AUX1	EUT	12V
2	Interconnect	AUX2	EUT	12V

Figure 1. Basic set-up for testing

2.2 Test methodology.

The test methodology used is based on the requirements of 47 CFR Part 15 (july 10, 2008), sections 15.31, 15.35, 15.209 and 15.223.

The test methods, which have been used, are based on ANSI C63.4: 2003.

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

Radiated emission tests below 30 MHz were performed at a measurement distance of 3 meters. To calculate the field strength level from these results to the appropriate distance at which the limit is specified, the appropriate extrapolation factor is used.

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.

2.3 Test facility.

The Federal Communications Commission and Industry Canada has reviewed the technical characteristics of the test facilities at TÜV Rheinland EPS B.V., located in Niekerk, 9822 TL Smidshornerweg 18, The Netherlands, and has found these test facilities to be in compliance with the requirements of 47 CFR Part 15, section 2.948 (10-1-06 edition).

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-1. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

2.4 Test conditions.

Normal test conditions:

Temperature (*)	: +15°C to +35°C
Relative humidity(*)	: 20 % to 75 %
Supply voltage	: 12V battery (new full battery is used for testing)
Air pressure	: 950 – 1050 hPa

*When is 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.

3 System test configuration.

3.1 Justification.

The system was configured for testing in a typical fashion (as a customer would normally use it).

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 C63.4: 2003.

3.2 EUT mode of operation.

The EUT has been tested while continuously transmitting. The intentional radiator tests (47 CFR Part 15 sections, 15.209 and 15.223) have been performed with a complete functioning EUT with a new battery as power supply.

3.3 Special accessories.

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

3.4 Equipment modifications.

No modifications have been made to the equipment in order to achieve compliance.

3.5 Product Labelling

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

3.6 Block diagram of the EUT.

The block diagram is available in the technical documentation package.

3.7 Schematics of the EUT.

The schematics are available in the technical documentation package.

3.8 Part list of the EUT.

The part list is available in the technical documentation package.

4 Radiated emission data.

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

Frequency (MHz)	Measurement results @3m Vertical (dBuV/m)	Measurement results @3m Horizontal (dBuV/m)	Correction factor (dB)	Measurement results @3m Vertical After correction (dBuV/m)	Measurement results @3m Horizontal After correction (dBuV/m)	Limits @3m (dBuV/m)	Pass/Fail
32.86	11.5	7.3	17.9	29.4	25.2	40.0	Pass
54.73	16.4	12.5	8.1	24.5	20.6	40.0	Pass
79.03	7.5	6.3	9.0	16.5	15.3	40.0	Pass
433.81	5.6	5.6	22.4	28.0	28.0	46.0	Pass
531.01	6.2	6.0	26.1	32.3	32.1	46.0	Pass
579.61	15	10.3	26.9	41.9	37.2	46.0	Pass
625.78	7.3	7.3	27.3	34.6	34.3	46.0	Pass
771.58	7.2	7.2	30.7	37.9	37.9	46.0	Pass
817.75	7.1	7.1	31.4	38.5	38.5	46.0	Pass
963.55	6.9	6.9	34.7	41.6	41.6	54.0	Pass

Table 1 Radiated emissions of the EUT.

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15 section 15.209 with the EUT operating on 6.78 MHz are depicted in Table 1.

Notes:

- Field strength values of radiated emissions at frequencies not listed in the table above are more than 20 dB below the applicable limit.
- Measurement uncertainty is ± 5.0 dB
- The reported field strength values are the worst case values at the indicated frequency. The EUT was varied in three positions, the antenna was varied in horizontal and vertical orientations and also in height (between 1m and 4m).
- A Quasi-peak detector was used with a resolution bandwidth of 120 kHz, except for frequencies above 960 MHz where an average detector was used.

4.2 Test equipment used (for reference see test equipment listing section 6).

99069	99070	99071	99107	99608	99609	99547	99699
15633							

Test engineer

Signature :



Name : Richard van der Meer

Date : May 04,2010

4.3 Radiated field strength measurements (frequency range of 0.009-30 MHz, H-field) Average values.

Frequency (MHz)	(a) Measurement results (dB μ V)	(b) Antenna factor	(c) Cable loss	(d) Distance extrapolation factor 3m to 30m	Detector	Measurement results (calculated = a+b+c-d)	Limits Part 15.223/15.209
	3 meters	dB	dB	dB		dB(μ V)/m	dB(μ V)/m
6.774	14	19.6	1	40	Average	-5.4	23.5
6.780	20.5	19.6	1	40	Average	1.1	23.5
6.79	23.1	19.6	1	40	Average	3.7	23.5
6.80	14	19.6	1	40	Average	-5.4	23.5
6.85	15	19.6	1	40	Average	-4.4	23.5
6.86	15	19.6	1	40	Average	-4.4	23.5
6.87	13	19.6	1	40	Average	-6.4	23.5
6.88	12.5	19.6	1	40	Average	-6.9	23.5
6.89	12.5	19.6	1	40	Average	-6.9	23.5
6.90	14.7	19.6	1	40	Average	-4.7	23.5
6.91 up to 6.99	10	19.6	1	40	Average	-14.1	23.5
7.1	6	19.6	1	40	Average	-13.4	23.5
7.5	3	19.6	1	40	Average	-16.4	23.5
8.0	1.5	19.6	1	40	Average	-17.9	23.5
13	-1	19.7	1	40	Qp	-20.3	29.5
14	-1	19.7	1	40	Qp	-20.3	29.5
17.6	-2	20.0	1	40	Qp	-21.0	29.5
30	-2	19.4	1	40	Qp	-21.6	29.5

Table 2a Radiated emissions of the EUT.

The results of the radiated emission tests in the frequency range 0.009 – 30 MHz, carried out in accordance with 47 CFR Part 15 section 15.209 and 15.223 with the EUT operating in continuous transmit mode on 6.78 MHz, are depicted in Table 2a.

Notes:

1. Calculated measurement results are obtained by using the 40 dB/decade extrapolation factor and the antenna factor and cable loss is included. For instance the corrected value for 6.79 MHz is calculated as:
Measurement result + Antenna Factor + Cable loss – Extrapolation Factor =>
23.1 dBuV + 19.6 dB + 1 dB – 40 dB = 3.7 dBuV/m.
2. Frequency range:
 - a. 9- 90 kHz Average detector used during measurements
 - b. 110-490 kHz Average detector used during measurements
 - c. 490 kHz – 1705 kHz Quasi peak detector used during measurements
 - d. 1705 kHz – 10 MHz Average detector used during measurements
 - e. 10 MHz – 30 MHz Quasi peak detector used during measurements
3. A resolution bandwidth of 9kHz was used during testing
4. Field strength values of radiated emissions at frequencies in the frequency range 0.009 – 30 MHz not listed in Table 2a are more than 20 dB below the applicable limit.

5. The EUT was varied in three positions, the loop antenna was varied in horizontal and vertical orientations and also around it's axis. The reported value is the worst case found at the reported frequency.
6. Measurement uncertainty is ± 5.0 dB

4.4 Test equipment used (for reference see test equipment listing section 6).

99069	99070	99071	99107	15453	99609	99547	99699
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Test engineer

Signature :



Name : R. van der Meer

Date : May 04,2010

4.5 Radiated field strength measurements (frequency range of 0.009-30 MHz, H-field) Peak values.

Frequency (MHz)	(a) Measurement results (dB μ V)	(b) Antenna factor	(c) Cable loss	(d) Distance extrapolation factor 3m to 30m	Detector	Measurement results (calculated = a+b+c-d)	Limits Part 15.223
	3 meters	dB	dB	dB		dB(μ V)/m	dB(μ V)/m
6.774	34.0	19.6	1	40	Pk	14.6	43.5
6.780	33.9	19.6	1	40	Pk	14.5	43.5
6.79	34.1	19.6	1	40	Pk	14.7	43.5
6.80	34.0	19.6	1	40	Pk	14.6	43.5
6.85	35.0	19.6	1	40	Pk	15.6	43.5
6.86	35.0	19.6	1	40	Pk	15.6	43.5
6.87	33.6	19.6	1	40	Pk	14.2	43.5
6.88	32.8	19.6	1	40	Pk	13.4	43.5
6.89	32.0	19.6	1	40	Pk	12.6	43.5
6.90	32.2	19.6	1	40	Pk	12.8	43.5
6.91 up to 6.99	29.6	19.6	1	40	Pk	10.2	43.5
7.1	23.8	19.6	1	40	Pk	4.4	43.5
7.5	18.0	19.6	1	40	Pk	-1.4	43.5
8.0	11.5	19.6	1	40	Pk	-7.9	43.5

Table 2b Radiated emissions of the EUT using a Peak detector.

The results of the radiated emission tests in the frequency range 0.009 – 30 MHz, carried out in accordance with 47 CFR Part 15 section 15.223 and 15.35 for peak emissions with the EUT operating in continuous transmit mode on 6.78 MHz, are depicted in Table 2b.

Notes:

1. Calculated measurement results are obtained by using the 40 dB/decade extrapolation factor and the antenna factor and cable loss is included. For instance the corrected value for 6.79 MHz is calculated as: Measurement result + Antenna Factor + Cable loss – Extrapolation Factor => 34.1 dBuV + 19.6 dB + 1 dB – 40 dB = 14.7 dBuV/m.
2. A resolution bandwidth of 9kHz was used during testing
3. Field strength values of radiated emissions at frequencies in the frequency range 0.009 – 30 MHz not listed in Table 2b are more than 20 dB below the applicable limit
4. The EUT was varied in three positions, the loop antenna was varied in horizontal and vertical orientations and also around it's axis. The reported value is the worst case found at the reported frequency.
5. Measurement uncertainty is ± 5.0 dB

4.6 Test equipment used (for reference see test equipment listing section 6).

99069	99070	99071	99107	15453	99609	99547	99699
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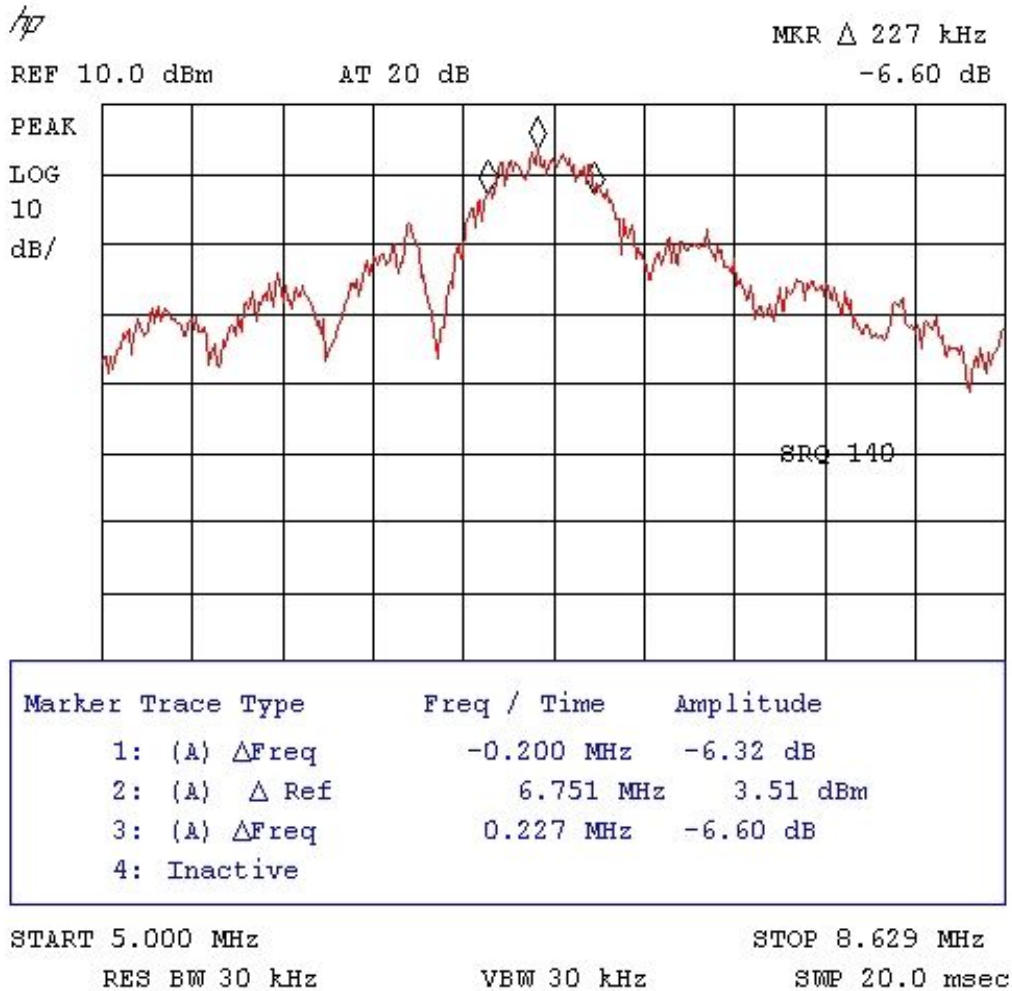
Test engineer

Signature :

Name : R. van der Meer

Date : May 04,2010

5 Plot of the carrier bandwidth



Plot 1: 6 dB bandwidth of the carrier, actual bandwidth is 0.427 MHz, which is less than 10% of the center frequency there for the 23.5 dBuV/m limit for radiated emissions is applicable according to 47 CFR Part 15. 223

5.1 Test equipment used (for reference see test equipment listing section 6).

15275	99683	99616					
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Test engineer

Signature :

Name : R. van der Meer

Date : May 04,2010

6 List of utilized test equipment.

Inventory number	Description	Brand	Model	Last cal.	Next cal.
15453	Loop antenna	Chase	HLA6120	05/2009	05/2010
12513	LISN	EMCO	3625/2	01/2010	01/2012
12640	Temperature chamber	Heraeus	VEM03/500	01/2010	01/2011
15275	Spectrum analyzer	HP	8594E	10/2009	10/2010
15633	Biconilog Testantenna	Chase	CBL 6111B	02/2010	02/2011
99069	Coax 5m RG213 OATS	NMi Certin B.V.	KABEL 5M OATS	11/2009	11/2010
99070	Coax 15m RG213 OATS	NMi Certin B.V.	KABEL 15M OATS	11/2009	11/2010
99071	Coax OATS ground	NMi Certin B.V.	KABEL GROND OATS	11/2009	11/2010
99107	Controller OATS	Heinrich Deisel	4630-100	NA	NA
99538	Spectrum analyzer	R&S	FSP40	04/2010	04/2011
99547	Temperature-Humiditymeter	Europe supplies	WS-7082	10/2009	10/2010
99580	OATS	Comtest	FCC listed: 90828	08/2008	08/2011
99608	Controller (OATS)	EMCS	DOC202	NA	NA
99609	Antenna mast	EMCS	AP-4702C	NA	NA
99613	Temperature-Humiditymeter	Europe supplies	WS-7082	10/2009	10/2010
99616	Laptop (with plot software)	IBM	Lenovo 9456-HTG	NA	NA
99651	Variac	NA	Vast Activa: 08-9510	NA	NA
99699	Measurement Receiver	R&S	ESCI	12/2009	12/2010
99683	Loop antenna, 6cm	NA	7405-901	9/2009	09/2010

NA= Not Applicable