CURTIS-STRAUS

Test Report

Report No	EI0852-3
Client	Onset Computer Corp. Glenn Greenough
Address	470 MacArthur Blvd. Bourne, MA 02532
Phone	508-759-950
Items tested FCC ID	W-TMB Hobonode Sensor WXFENDPOINT
Standards	FCC 47 CFR Part 15.249
Test Dates	August 26 - September 17, 2008
Results	As detailed within this report
Prepared by	Kyle Neffendorf – Test Engineer
Authorized by	Mairaj Hussain – EMC Supervisor
Issue Date	11/03/08
Conditions of Issue	This Test Report is issued subject to the conditions stated in the '*Conditions of Testing*' section on page 20 of this report.

Contents

Form Final Report REV 8-18-08 (DW)

Summary

This test report supports an application for certification of a transmitter operating pursuant to 47 CFR 15.249. The product is the W-TMB Hobonode Sensor. It is a transmitter which operates in the range 2400-2483.5MHz. Two versions of the hobonode were tested. The only difference between the two versions was the type of sensor attached to the sensor input.

The W-TMB Hobonode Sensor contains an on board antenna with no external connector.

Conducted emissions tests were not preformed as the product is battery powered.

Test Methodology

Testing was performed according to ANSI C63.4-2003. Radiated emissions were maximized by rotating the device around its vertical axis, as well as varying the test antenna's height and polarity. The device was mounted on a PVC pole similar to that of it's normal installation. Fresh batteries were used for all testing.

Frequency range investigated: 30MHz – 25GHz

Measurement distance for Radiated Emissions: 3m and 1m

Release Control Record

Issue No.	Reason for change	Date Issued
1	Original Release	December 11, 2008

Product Tested - Configuration Documentation

EUT Configuration

Work Order: I0852
Company: Onset Computer Corp.
Company Address: 470 MacArthur Boulevard
Bourne, MA 02532
Contact: Glenn Greenough

	MN	PN	SN
EUT:	W-TMB		10000

EUT Description: HoboNode: Temp
TX Frequency: 2405-2480MHz
EUT Max Frequency: 16MHz

Support Equipment:	MN	SN
None		

EUT Ports:

Port Label	Port Type	No. of ports	No. Populated	Cable Type	Shielded	Ferrites	Length	Max Length	In/Out NEBS Type	Unpopulated Reason
Sensor cable	N/A	N/A	All	2-wire	Yes	None	12ft	12ft		N/A

Software / Operating Mode Description:

EUT transmits data to the receiver once every minute

Performance Criteria:

Green LED's shall continue to flash, indicating a connection to the receiver. The laptop shall show no lost connection error.

Compliance Statement

RSS-GEN	RSS 210	Part 15	Comments
5.3		15.15(b)	There are no controls accessible to the user that vary the output power.
5.2		15.19	The label is shown in the label exhibit.
7.1.5		15.21	Information to the user is shown in the instruction manual exhibit.
		15.27	No special accessories are required for compliance.
7.1.4		15.203	The antenna for this device is hardwired to the PCB.
	2.6	15.205 15.209	The fundamental is not in a Restricted band and the spurious and harmonic emissions in the Restricted bands comply with the general emission limits of 15.209.
7.2.2		15.207	EUT is battery powered. So no line conducted emissions were taken.
	A2.9(a)	15.249(a)	The fundamental and harmonics meet the limits in 15.249(a)
	A2.9(b)	15.249(d)	Spurious emissions meet the limits in 15.209.
4.6.1			Occupied BW plot is provided.

Test Results

Spurious Radiated Emissions

Limit: Worst-case limits were used. (15.209(a))

Measurement: Quasi-peak readings were taken below 1000MHz, Peak readings were taken above 1000MHz

Adjusted Reading Sample Calculation:

Adjusted Reading = Reading – preamp factor + cable loss + antenna factor

15.1 = 23.0 - 22.6 + 12.9 + 1.8

Radiated Emissions Table — *Curtis-Straus LLC*

Date: 28-Aug-08 **Company:** Onset **Work Order:** I0852
Engineer: Kyle Neffendorf **EUT Desc:** Hobonodes **EUT Operating Voltage/Frequency:** 3V
Frequency Range: 30-1000MHz **Measurement Distance:** 3 m
Notes: One nodes Tx mode, one node Rx mode **EUT Max Freq:** 2.475GHz

Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	--- Limit (dBµV/m)	--- Margin (dB)	--- Result (Pass/Fail)	FCC 47 CFR Part 15.209 Limit (dBµV/m)	FCC 47 CFR Part 15.209 Margin (dB)	FCC 47 CFR Part 15.209 Result (Pass/Fail)
Vnf	112.0	23.0	22.6	12.9	1.8	15.1	---	---	---	43.5	-28.4	Pass
Vnf	120.0	19.3	22.6	13.8	1.9	12.4	---	---	---	43.5	-31.1	Pass
Vnf	128.0	26.4	22.7	13.9	2.0	19.6	---	---	---	43.5	-23.9	Pass
Vbb	177.7	31.9	22.6	11.5	2.4	23.2	---	---	---	43.5	-20.3	Pass
Vbb	182.0	26.5	22.6	11.4	2.5	17.8	---	---	---	43.5	-25.7	Pass
Vnf	225.0	21.1	22.7	11.6	2.8	12.8	---	---	---	46.0	-33.2	Pass

Table Result: Pass by -20.3 dB ***Worst Freq:*** 177.7 MHz

Test Site: "F" **Pre-Amp:** Blue **Cable:** EMIR-18 **Analyzer:** Green **Antenna:** Red-White

One node in Tx mode, 2nd node in Rx mode.

Radiated Emissions Table — *Curtis-Straus LLC*

Date: 26-Aug-08 **Company:** Onset **Work Order:** I0852
Engineer: Kyle Neffendorf **EUT Desc:** Hobonode **EUT Operating Voltage/Frequency:** 3V
Frequency Range: 1-18GHz **Measurement Distance:** 3 m
Notes: **EUT Max Freq:** 2.475GHz

Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	--- Limit (dBµV/m)	--- Margin (dB)	--- Result (Pass/Fail)	FCC 47 CFR Part 15.249 Limit (dBµV/m)	FCC 47 CFR Part 15.249 Margin (dB)	FCC 47 CFR Part 15.249 Result (Pass/Fail)
Vpk	4809.3	36.5	18.4	33.4	4.3	55.8	---	---	---	74.0	-18.2	Pass
Vav	4809.3	26.0	18.4	33.4	4.3	45.3	---	---	---	54.0	-8.7	Pass
Vpk	7213.7	36.0	17.6	36.2	5.4	60.0	---	---	---	74.0	-14.0	Pass
Vav	7213.7	25.6	17.6	36.2	5.4	49.6	---	---	---	54.0	-4.4	Pass

Table Result: Pass by -4.4 dB ***Worst Freq:*** 7213.7 MHz

Test Site: "F" **Pre-Amp:** White **Cable:** EMIR-HIGH-22 **Analyzer:** Gold **Antenna:** Black Horn

Radiated Emissions Table — *Curtis-Straus LLC*

Date: 26-Aug-08 **Company:** Onset **Work Order:** I0852
Engineer: Kyle Neffendorf **EUT Desc:** Hobonode **EUT Operating Voltage/Frequency:** 3V
Frequency Range: 18-25GHz **Measurement Distance:** 3 m
Notes: **EUT Max Freq:** 2.475GHz

Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	--- Limit (dBµV/m)	--- Margin (dB)	--- Result (Pass/Fail)	FCC 47 CFR Part 15.249 Limit (dBµV/m)	FCC 47 CFR Part 15.249 Margin (dB)	FCC 47 CFR Part 15.249 Result (Pass/Fail)
No Emissions Found			---	---	---	---	---	---	---	---	---	---

Table Result: --- by --- dB ***Worst Freq:*** --- MHz

Test Site: "F" **Pre-Amp:** White **Cable:** EMIR-HIGH-11 **Analyzer:** Gold **Antenna:** Black Horn

Fundamental Reading

Limit:
Average: 50mV/m = 94.0dBµV/m @ 3m [15.249]
Peak: 94.0dBµV/m + 20dB = 114.0dBµV/m @ 3m [15.35(b)]

Measurement:
Peak readings were taken, and duty cycle averaging factor was applied.

Duty cycle averaging factor: 20*log(100ms duty cycle/100ms) = 20*log(8ms/100ms) = -21.9dB

8ms ON TIME was taken from the timing diagram provided.

Maximum factor of 20dB was used to correct raw reading.

Radiated Emissions Table — *Curtis-Straus LLC*

Date: 26-Aug-08 **Company:** Onset **Work Order:** I0852
Engineer: Kyle Neffendorf **EUT Desc:** Hobonode **EUT Operating Voltage/Frequency:** 3V
Frequency Range: 2.4-2.475GHz **Measurement Distance:** 3 m
Notes: RBW: 3MHz VBW: 3MHz **EUT Max Freq:** 2.475GHz

Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)				FCC Class B Limit (dBµV/m)	FCC Class B Margin (dB)	FCC Class B Result (Pass/Fail)
			---	---	---	---				---	---	---
Vpk	2474.6	66.6	0.0	29.1	2.9	98.6				113.9	-15.3	Pass
Vav	2474.6	46.6	0.0	29.1	2.9	78.6				93.9	-15.3	Pass
			---	---	---	---				---	---	---
Vpk	2439.6	66.5	0.0	29.0	2.9	98.4				113.9	-15.5	Pass
Vav	2439.6	46.5	0.0	29.0	2.9	78.4				93.9	-15.5	Pass
			---	---	---	---				---	---	---
Vpk	2404.6	69.1	0.0	28.9	2.9	100.9				113.9	-13.0	Pass
Vav	2404.6	49.1	0.0	28.9	2.9	80.9				93.9	-13.0	Pass
			---	---	---	---				---	---	---

Table Result: Pass by -13.0 dB ***Worst Freq:*** 2404.6 MHz
Test Site: "F" **Pre-Amp:** none **Cable:** EMIR-HIGH-22 **Analyzer:** Gold **Antenna:** Black Horn

Band Edge

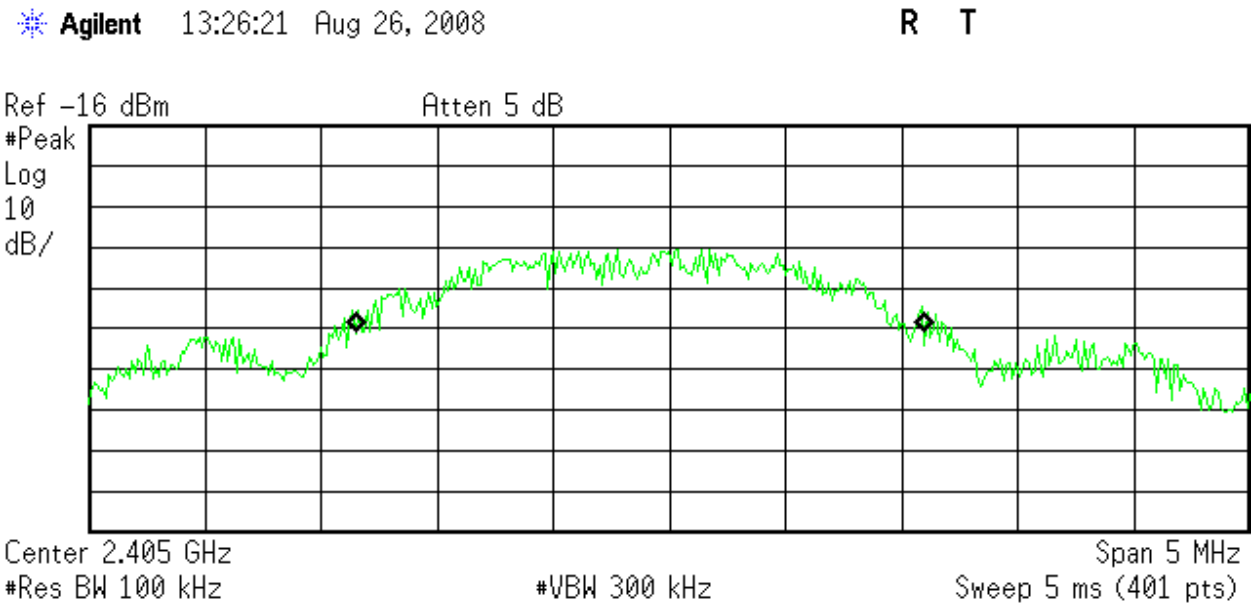
Radiated Emissions Table — *Curtis-Straus LLC*

Date: 26-Aug-08 **Company:** Onset **Work Order:** I0852
Engineer: Kyle Neffendorf **EUT Desc:** Hobonodes **EUT Operating Voltage/Frequency:** 3VDC
Frequency Range: 2400-2483.5MHz **Measurement Distance:** 3 m
Notes: RBW:1MHz VBW:3MHz **EUT Max Freq:** 2.475GHz

Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	--- Limit (dBµV/m)	--- Margin (dB)	--- Result (Pass/Fail)	FCC Class B Limit (dBµV/m)	FCC Class B Margin (dB)	FCC Class B Result (Pass/Fail)
Vpk	2400.0	46.9	18.5	28.9	2.9	60.2	---	---	---	74.0	-13.8	Pass
Vav	2400.0	36.5	18.5	28.9	2.9	49.8	---	---	---	54.0	-4.2	Pass
Vpk	2483.5	44.0	18.6	29.1	2.9	57.4	---	---	---	74.0	-16.6	Pass
Vav	2483.5	33.6	18.6	29.1	2.9	47.0	---	---	---	54.0	-7.0	Pass

Table Result: Pass by -4.2 dB ***Worst Freq:*** 2400.0 MHz
Test Site: "F" **Pre-Amp:** White **Cable:** EMIR-HIGH-22 **Analyzer:** Gold **Antenna:** Black Horn

Occupied Bandwidth



Measurement Uncertainty

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Expanded Uncertainty k=2	Maximum allowable uncertainty (ETSI)
Radiated Emissions (30-1000MHz)	5.6dB	N/A
Radiated Emissions (1-26.5GHz)	4.6dB	N/A
Radiated Emissions (above 26.5GHz)	4.9dB	N/A
Magnetic Radiated Emissions	5.6dB	N/A
Conducted Emissions	3.9dB	N/A
Telco Conducted Emissions (Current)	2.9dB	N/A
Telco Conducted Emissions (Voltage)	4.4dB	N/A
Electrostatic Discharge	11.5%	N/A
Radiated RF Immunity (Uniform Field)	1.6dB	N/A
Electrical Fast Transients	23.1%	N/A
Surge	23.1%	N/A
Conducted RF Immunity	3dB	N/A
Magnetic Immunity	12.8%	N/A
Dips and Interrupts	2.3V	N/A
Harmonics	3.5%	N/A
Flicker	3.5%	N/A
Radio frequency	8.2×10^{-8}	1×10^{-7}
RF power, conducted	0.7dB	0.75dB
Maximum frequency deviation: • Within 300Hz and 6kHz of audio frequency • Within 6kHz and 25kHz of audio frequency	• 1.2% • 0.1dB	• 5% • 3dB
Adjacent channel power	1.9dB	3dB
Conducted spurious emission of transmitter, valid up to 12.75GHz	0.7dB	3dB
Conducted emission of receivers	0.7dB	1dB
Radiated emission of transmitter, valid up to 26.5GHz	5.6dB	6dB
Radiated emission of transmitter, valid up to 80GHz	5.6dB	6dB
Radiated emission of receiver, valid up to 26.5GHz	5.6dB	6dB
Radiated emission of receiver, valid up to 80GHz	5.6dB	6dB
RF level uncertainty for a given BER	0.7dB	1dB
Humidity	2.31%	5%
Temperature	0.6°C	1.0°C
Time	0.8%	10%
RF Power Density, Conducted	2.2dB	3dB
DC and low frequency voltages	1.29%	3%
Voltage (AC, <10kHz)	1.29%	2%
Voltage (DC)	0.23%	1%
The above reflects a 95% confidence level		

Test Equipment Used

REV. 10-SEP-2008

SPECTRUM ANALYZERS / RECEIVERS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	9kHz-1.8GHz	8591E	Agilent	3441A03559	00024	I	25-FEB-2009
WHITE	9kHz-22GHz	8593E	Agilent	3547U01252	00022	I	31-OCT-2008
BLUE	9kHz-1.8GHz	8591E	Agilent	3223A00227	00070	I	01-OCT-2008
YELLOW	9kHz-2.9GHz	8594E	Agilent	3523A01958	00100	I	19-JUN-2009
GREEN	9kHz-26.5GHz	8593E	Agilent	3829A03618	00143	I	02-JUN-2009
BLACK	9kHz-12.8GHz	8596E	Agilent	3710A00944	00337	I	05-SEP-2009
TELECOM 3585A	20Hz-40.0MHz	3585A	Agilent	2504A05219	00030	I	09-APR-2009
GOLD	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	06-AUG-2009
REFERENCE EMI TEST RECEIVER	20-1000MHz	ESVS30	R&S	827957/001	01098	I	To be determined
RENTAL SA #1 (BROWN)	9kHz-26.5GHz	E4407B	Agilent	SG44210511	Rental	I	29-JAN-2009

LISNs/MEASUREMENT PROBES	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED LISN	9kHz-50MHz	8012-50-R-24-BNC	SOLAR	956348	00753	I	16-JUN-2009
BLUE LISN (DC)	50kHz-50MHz	8012-50-R-24-BNC	SOLAR	956349	00752	I	29-JUL-2009
YELLOW-BLACK LISN	30kHz-50MHz	8012-50-R-24-BNC	SOLAR	0411657	00248	I	28-MAY-2009
ORANGE LISN	9kHz-50MHz	8012-50-R-24-BNC	SOLAR	903707	00754	I	02-MAY-2009
GOLD LISN (DC)	9kHz-50MHz	8012-50-R-24-BNC	SOLAR	984734	00247	I	15-JUL-2009
BROWN LISN	9kHz-50MHz	8012-50-R-24-BNC	SOLAR	0411656	00986	I	15-JUL-2009
GREEN LISN	9kHz-50MHz	8012-50-R-24-BNC	SOLAR	984735	00987	I	20-MAR-2009
YELLOW LISN	9kHz-50MHz	8012-50-R-24-BNC	SOLAR	0411658	1080	I	28-MAY-2009
RENTAL SILVER LISN	9kHz-34MHz	8012-50-R-24-BNC	SOLAR	8379440	RENTAL	I	28-JUL-2009
WHITE-BLACK LISN	10kHz-30MHz	8610-50-TS-100-N	SOLAR	972019	00678	I	14-MAY-2009
BLACK LISN	10kHz-30MHz	8610-50-TS-100-N	SOLAR	972017	00675	I	30-JUN-2009
RED-BLACK LISN	10kHz-30MHz	8610-50-TS-100-N	SOLAR	972016	00677	I	30-JUN-2009
BLUE-BLACK LISN	10kHz-30MHz	8610-50-TS-100-N	SOLAR	972018	00676	I	14-MAY-2009
BLUE MONITORING PROBE	0.01-150MHz	91550-2	TEGAM	12350	00807	I	31-MAY-2009
YELLOW MONITORING PROBE	0.01-150MHz	91550-2	ETS	50972	00493	I	29-JAN-2010
BROWN MONITORING PROBE	0.01-250MHz	F-33-1	FISCHER	425	1110	I	23-JAN-2010
WHITE MONITORING PROBE	0.01-250MHz	CSP-8423-1	SCHAFFNER	510	1112	I	23-JAN-2010
GREEN CURRENT TRANSFORMER	40Hz-20MHz	150	PEARSON	10226	00793	I	19-APR-2009
BLUE CISPR LINE PROBE	10kHz-50MHz	N/A	C-S	N/A	00805	II	08-JUN-2009
BLACK CISPR LINE PROBE	10kHz-50MHz	N/A	C-S	N/A	1254	II	08-JUN-2009
CISPR TELCO VOLTAGE PROBE	10kHz-30MHz	CS A/C-10	C-S	CS01	00296	II	11-AUG-2009
CISPR 22 TELCO ISN	9kHz-30MHz	FCC-TLISN-T4	FISCHER	20115	00746	I	15-NOV-2008

OPEN AREA TEST SITES (OATS)	FCC CODE	IC CODE	VCCI CODE	CAT	CALIBRATION DUE
SITE F	93448	2762A-1	R-1688	II	27-JUL-2010
SITE T	93448	2762A-2	R-905	II	06-DEC-2009
SITE A	93448	2762A-4	R-903	II	04-DEC-2009
SITE M	93448	2762A-5	R-904	II	25-JUN-2010
SITE J	93448	2762A-3	R-2377	II	06-MAY-2010

CONDUCTED TEST SITES (MAINS / TELCO)	FCC CODE	IC CODE	VCCI CODE	CAT	CALIBRATION DUE
EMI 1	93448	N/A	C-1801, T-268	III	NA
EMI 2	93448	N/A	C-1802, T-269	III	NA
EMI 3	93448	N/A	C-1803, T-270	III	NA
EMI 4	93448	N/A	C-3013, T-391	III	NA

MIXERS/DIPLEXERS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
MIXER / HORN	26.5-40 GHz	11970A/28-442-6	HP/ATM	2332A01695/A046903-01	1087	I	01-OCT-2009
MIXER / HORN	26.5-40 GHz	11970A/28-442-6	HP/ATM	3003A07825/A046903-01	1086	I	19-SEP-2008
MIXER / HORN	40-60 GHz	M19HW/A	OML	U30110-1	00821	I	29-JUN-2009
MIXER	33-50 GHz	11970Q	HP	3003A03155	00104	I	28-NOV-2009
MIXER / HORN	50-75 GHz	11970V /QWH-VPRROO	HP/QUINSTAR	2521A01197/8794001	1179	I	28-NOV-2009
MIXER	75-110 GHz	11970W	HP	2521A01334	00105	I	28-NOV-2009
MIXER / HORN	60-90 GHz	M12HW/A	OML	E30110-1	00822	I	29-JUN-2009
MIXER / HORN	90-140 GHz	MO8HW/A	OML	F21206-1	00811	I	29-JUN-2009
MIXER / HORN	140-220 GHz	MO5HW/A	OML	G21206-1	00812	I	29-JUN-2009
DIPLEXER	40-220 GHz	DPL.26	OML	N/A	00813	I	29-JUN-2009

ABSORBING CLAMPS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
FISCHER CLAMP	30-1000MHZ	F-201-23MM	FISCHER	10	00081	I	29-JAN-2010

HARMONIC & FLICKER ANALYZER	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
10001I/2 AC POWER SYSTEM	(2) 500I	CALIFORNIA INSTRUMENTS	HK53687/HK53688	00376	II	04-MAR-2009

PREAMPS /COUPLERS ATTENUATORS / FILTERS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	0.009-2000MHZ	ZFL-1000-LN	C-S	N/A	00798	II	04-APR-2009
BLUE	0.009-2000MHZ	ZFL-1000-LN	C-S	N/A	00759	II	04-APR-2009
BLUE-BLACK	0.009-2000MHZ	ZFL-1000-LN	C-S	N/A	00800	II	30-MAY-2009
GREEN	0.009-2000MHZ	ZFL-1000-LN	C-S	N/A	00802	II	04-APR-2009
BLACK	0.009-2000MHZ	ZFL-1000-LN	C-S	N/A	00799	II	14-AUG-2009
ORANGE	0.009-2000MHZ	ZFL-1000-LN	C-S	N/A	00765	II	30-MAY-2009
RED-WHITE	0.009-2000MHZ	ZFL-1000-LN	C-S	N/A	1258	II	04-APR-2009
WHITE	1-18GHZ	SMC-12A	C-S	426643	00760	II	08-JUL-2009
BROWN	1-20GHZ	PM2-38-218-4R5-17-15-SFF	C-S	PL1655	1132	II	04-JUN-2009
RED-GREEN	1-20GHZ	PM2-38-218-4R5-17-15-SFF	C-S	N/A	1256	II	18-AUG-2009
RED-BLUE	1-20GHZ	PE2-38-218-4R5-17-15-SFF	C-S	PL3177	1257	II	29-APR-2009
HF (YELLOW)	18-26.5GHZ	AFS4-18002650-60-8P-4	C-S	467559	1266	I	01-OCT-2009
HIGH PASS FILTER	0.03-20 GHZ	SPA-F-55204	K&L	36	00817	II	08-JAN-2010
LOW PASS FILTER	0.03-18 GHZ	11SL10-4100/X4400-O/O	K&L	4	00816	II	08-JAN-2010
HIGH PASS FILTER	0.03-6.5 GHZ	11SH10-1000/T3000-0/0	K&L	1	1310	II	08-JAN-2010
HIGH PASS FILTER	0.03-14.5 GHZ	11SH10-3000/T9000-0/0	K&L	1	1311	II	08-JAN-2010
HIGH PASS FILTER	0.03-8 GHZ	VHP-19	MINI-CIRCUITS	NA	1287	II	08-JAN-2010
HIGH PASS FILTER	0.03-9 GHZ	VHP-16	MINI-CIRCUITS	NA	1288	II	08-JAN-2010
HF 20DB 50W ATTENUATOR	0.03-20 GHZ	PE 7019-20	PASTERNACK	01	00791	II	08-MAY-2009
HF 30DB 50W ATTENUATOR	0.03-20 GHZ	PE 7019-30	PASTERNACK	02	1168	II	08-MAY-2009
40DB 100W ATTENUATOR	0.09-2000MHZ	BW-40N100W+	MINI-CIRCUITS	V N014900638	1231	II	06-NOV-2008
RFI-LOW 130 KHZ LPF	10-100KHZ PASS	130 KHZ LPF	KIWA	NA	1235	II	17-APR-2009
50W HF DIRECT. COUPLER	1-20GHZ	DC7420	AR	0325960	1307	II	06-NOV-2008
500W DIRECT. COUPLER	0.009-2000MHZ	C6277-10	WERLATONE	41911	1264	II	06-NOV-2008
200W DIRECT. COUPLER	0.009-2000MHZ	C5571-10	WERLATONE	23098	1185	II	06-NOV-2008

ANTENNAS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
GREEN BILOG	30-2000MHZ	CBL6112B	CHASE	2742	00620	II	13-FEB-2010
GREEN-BLACK BILOG	30-2000MHZ	CBL6112B	CHASE	2412	00127	II	13-FEB-2010
GREEN-RED BILOG	30-2000MHZ	CBL6112B	CHASE	2435	00990	I	22-APR-2010
BLUE BILOG	30-1000MHZ	3143	EMCO	1271	00803	II	06-MAY-2009
GRAY BILOG	20-2000MHZ	3141	EMCO	9703-1038	00066	II	07-MAY-2009(EMI) / 07-FEB-2009(RFI2)
YELLOW-BLACK BILOG	20-2000MHZ	CBL6140A	CHASE	1112	00126	II	07-MAY-2009(EMI) / 14-AUG-2009(RFI1)
RED-WHITE BILOG	30-2000MHZ	JB1	SUNOL	A091604-1	01105	I	07-NOV-2008
RED-BLACK BILOG	30-2000MHZ	JB1	SUNOL	A091604-2	01106	I	20-OCT-2008
RED-BROWN BILOG	30-2000MHZ	JB1	SUNOL	A0032406	1218	I	11-AUG-2010
YELLOW HORN	1-18GHZ	3115	EMCO	9608-4898	00037	I	31-MAY-2009(EMI) / 22-MAY-2009 (RFI)
BLACK HORN	1-18GHZ	3115	EMCO	9703-5148	00056	I	22-JUN-2009(EMI) / 22-MAY-2009 (RFI)
ORANGE HORN	1-18GHZ	3115	EMCO	0004-6123	00390	I	12-JUN-2009 (EMI) / 16-MAY-2009 (RFI)
HF (WHITE) HORN	18-26.5GHZ	801-WLM	WAVELINE	00758	00758	I	01-OCT-2008
SMALL LOOP	10KHZ-30MHZ	PLA-130/A	ARA	1024	00755	I	05-MAR-2010
LARGE LOOP	20HZ-5MHZ	6511	EMCO	9704-1154	00067	I	20-FEB-2010
RENTAL 6509 LOOP	1KHZ-30MHZ	6509	EMCO	1503	RENTAL	I	04-FEB-2010
ACTIVE MONOPOLE	30HZ-30MHZ	3301B	EMCO	3824	00068	II	06-JUN-2009
INDUCTION COIL	50-60HZ	1000-4-8	C-S	N/A	00778	II	08-MAY-2010
INDUCTION COIL	50-60HZ	1000-4-8	C-S	N/A	1314	II	08-MAY-2010
ADJUSTABLE DIPOLE	30-1000MHZ	3121C	EMCO	1370	00757	I	26-OCT-2008
ADJUSTABLE DIPOLE	30-1000MHZ	3121C	EMCO	1371	00756	I	09-NOV-2008
RE101 LOOP SENSOR	30HZ-100KHZ	RE101-13.3CM	C-S	N/A	00818	II	22-MAR-2009
RS101 RADIATING LOOP	30HZ-100KHZ	RS101-12CM	C-S	N/A	00819	II	22-MAR-2009
RS101 LOOP SENSOR	30HZ-100KHZ	RS101-4CM	C-S	N/A	00820	II	22-MAR-2009

EFT	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
CAS 3025 BURST VERIFICATION ATTENUATORS	INA 265A/266	SCHAFFNER	20096	00947	II	31-JUL-2010
EFT DIRECT COUPLING CAP	N/A	C-S	01	00794	II	19-AUG-2008
MODULA6150	MODULA6150	TESEQ	34525	1268	I	OUT FOR CAL
RED BESTEMC-2	711-1100	SCHAFFNER	200122-074SC	00623	II	27-FEB-2009

ESD GENERATORS	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
GREEN	NSG435	SCHAFFNER	000839	00763	I	12-NOV-2008
RED	NSG435	SCHAFFNER	001625	00762	I	13-MAR-2009
YELLOW	930D	ETS	201	00673	I	27-SEP-2009

DIPS AND INTERRUPTS	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
MODULA6150	MODULA6150	TESEQ	34525	1268	I	OUT FOR CAL
INA 6502 AUTOMATIC STEPTRANSFORMER	INA 6502	TESEQ	105	1269	I	OUT FOR CAL
RED BESTEMC-2	711-1100	SCHAFFNER	200122-074SC	00623	II	27-FEB-2009
ECOMPACT4	ECOMPACT4	HAEFELY	155858	RENTAL	II	11-FEB-2009

CHAMBERS AND STRIPLINE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RFI 1 CHAMBER	3 METER COMPACT	PANASHIELD	N/A	00797	II	14-AUG-2009
RFI 2 CHAMBER	04' X 07' SHIELDING SYSTEM	LINDGREN	13329	00795	II	07-FEB-2009
RFI 3 STRIPLINE	N/A	C-S	N/A	00796	III	NA
ENVIRONMENTAL (SAFETY)	ECL5	B-M-A INC.	2041	00029	I	03-JAN-2009
ENVIRONMENTAL (SAFETY)	SGTH-31S	B-M-A INC.	2245	00321	I	03-JAN-2009

AMPLIFIERS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	0.5-1000MHZ	10W1000B	AR	18708	00032	II	OUT OF CAL / FEEDBACK ONLY
GREEN	0.5-1000MHZ	10W1000B	AR	23423	00123	II	07-FEB-2009 (RFI2)
BLUE	0.01-100MHZ	75A250	AR	19165	00039	II	09-JUN-09 (NEBS CRFI) / 24-JUN-2009 (EU CRFI)
BLACK	0.01-100MHZ	75A250	AR	23411	00122	II	09-JUN-09 (NEBS CRFI) / 24-JUN-2009 (EU CRFI)
ORANGE	0.01-100MHZ	75A250	AR	26827	00367	II	09-JUN-09 (NEBS CRFI) / 24-JUN-2009 (EU CRFI)
BROWN 150W	0.1-250MHZ	150A250	AR	313454	1255	II	07-FEB-2009 (RFI2)
YELLOW 150W	80-1000MHZ	150W1000	AR	0324607	1253	II	13-AUG-2009 (RFI1)
500W AMP	0.1-250MHZ	500A250	AR	0326385	1297	II	14-AUG-2009 (RFI1)
GTC 1-2.6	1.0-2.6 GHZ	GRF5016A	GTC	1221	RENTAL	II	16-MAY-2009 (ORANGE HORN) / 22-MAY-2009 (BLK AND YELLOW)
HUGHES 10W	2.0-4.0GHZ	1177H01	HUGHES	055	RENTAL	II	16-MAY-2009 (ORANGE HORN) / 22-MAY-2009 (BLK AND YELLOW)
HUGHES 10W	4.0-8.0GHZ	8010H02F	HUGHES	240	RENTAL	II	OUT OF SERVICE
HUGHES 10W	4.0-8.0 GHZ	8010H02F	HUGHES	197	RENTAL	II	11-AUG-2009 (ORANGE, BLACK AND YELLOW HORNS)
HUGHES 10W	8-10.0GHZ	80108	HUGHES	138	RENTAL	II	16-MAY-2009 (ORANGE HORN) / 22-MAY-2009 (BLK AND YELLOW)
HP495A	7.0-10.0GHZ	HP495A	HP	304-00237	00086	II	OUT OF SERVICE (SPARE)
AUDIO AMP	AUDIO FREQ	MPA-200	RADIO SHACK	700438	NONE	III	NA
AUDIO AMP	AUDIO FREQ	MPA-200	RADIO SHACK	708545	00862	III	NA

FIELD PROBES	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	0.01-1000MHZ	HI-4422	HOLADAY	90369	00031	I	24-MAR-2009
GREEN	0.01-1000MHZ	HI-4422	HOLADAY	97363	00136	I	09-NOV-2008
BLUE	0.01-1000MHZ	HI-4422	HOLADAY	95696	01100	I	01-MAY-2009
Reference Laser Field Probe	0.1-6000MHZ	FL7006 Star Probe	AR	321700	1252	I	31-JAN-2010
MICROWAVE SURVEY METER	2450MHZ	HI-1501	HOLADAY	00075464	1244	|	Calibrate Before Use
GAUSSMETER (ELF METER)	25Hz–1kHz	4080	SYPRIS	114173	1305	I	02-MAY-2009

SIGNAL GENERATORS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	0.09-2000MHZ	HP8648B	Agilent	3847U02192	00366	I	07-MAY-2009
BLUE	0.1-1000MHZ	HP8648A	Agilent	3426A00548	00034	I	26-SEP-2008
GREEN	0.09-2000MHZ	HP8648B	Agilent	3623A02072	00125	I	21-OCT-2008
ORANGE	0.1-1000MHZ	HP8648B	Agilent	3537A01210	00025	I	12-JUN-2009
BROWN	0.01HZ-15MHZ	HP33120A	Agilent	US36016621	1211	I	OUT OF SERVICE
WHITE	0.01HZ-15MHZ	HP33120A	Agilent	US36048143	1219	I	22-MAY-2009
BROWN-WHITE	0.01HZ-15MHZ	HP33120A	Agilent	SG40019842	1232	I	13-NOV-2008
BLUE-WHITE	0.1HZ-13MHZ	HP3312A	Agilent	1432A07632	00775	I	26-MAR-2009
RFI-HIGH SWEEPER	0.01-20.0GHZ	HP83752A	Agilent	3610A01133	00087	II	15-MAY-2009
REFERENCE SWEEPER	0.01-26.5GHZ	HP8673D	Agilent	3146A01212	1317	I	22-MAY-2009
AM/FM STEREO SIG. GEN.	0.1-170MHZ	LG3236	LEADER	3687301	00959	I	To be determined
IMPULSE GENERATOR	1-100HZ	CIG-25	ELECTRO-METRICS	290	00942	I	To be determined

BULK INJECTION CLAMPS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
GREEN (NEBS CRFI)	0.01-30MHZ	95236-1	ETS	50215	00118	II	09-JUN-09 (BLUE, BLACK & ORANGE AMP)
GREEN (EU CRFI)	0.10-100MHZ	95236-1	ETS	50215	00118	II	24-JUN-09 (BLUE, BLACK & ORANGE AMP)
RED (NEBS CRFI)	0.01-30MHZ	95236-1	ETS	34026	1020	II	09-JUN-09 (BLUE, BLACK & ORANGE AMP)
RED (EU CRFI)	0.10-100MHZ	95236-1	ETS	34026	1020	II	24-JUN-09 (BLUE, BLACK & ORANGE AMP)
RED (RTCA/DO-160E)	0.01-2MHZ	95236-1	ETS	34026	1020	II	10-JAN-2010 (BLACK)
BLUE (RTCA/DO-160E)	2-450MHZ	9142-1N	SOLAR	063824	1237	II	10-JAN-2010 (RED)

ANSI T1.315	MFR	ASSET	CAT	CALIBRATION DUE
SBC NOISE CART	C-S	1285	III	CALIBRATION NOT REQUIRED
SBC TRANSIENT CART	C-S	1286	III	WAVESHAPE VERIFIED BEFORE USE

OSCILLOSCOPES	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
EMC 100MHZ	TDS 220	TEKTRONIX	C036986	1166	I	15-MAY-2009
ESD REFERENCE 1GHZ	TDS 684B	TEKTRONIX	B011287	RENTAL	I	07-MAY-2009
400MHZ E*SCOPE	TDS 3044B	TEKTRONIX	C010074	1275	I	11-JUL-2009
PRODUCT SAFETY 100 MHZ	TDS 340	TEKTRONIX	B012357	00737	I	17-OCT-2008
TELECOM 100 MHZ	54645A	HP/AGILENT	US36320452	00103	I	21-SEP-2008
DIFFERENTIAL PROBE	4222	PROBEMASTER	07-134	1296	I	10-OCT-2008
500MHZ 10X PROBE	P6139A	TEKTRONIX	NA	1280	I	19-JUL-2009
500MHZ 10X PROBE	P6139A	TEKTRONIX	NA	1281	I	19-JUL-2009
REFERENCE 500MHZ 10X PROBE	P6139A	TEKTRONIX	NA	1282	I	11-JUL-2009
REFERENCE 500MHZ 10X PROBE	P6139A	TEKTRONIX	NA	1319	I	11-JUL-2009
500MHZ 10X PROBE	P6139A	TEKTRONIX	NA	1283	I	19-JUL-2009
REFERENCE HV 1000X PROBE	P6015A	TEKTRONIX	B056555	1277	I	11-JUL-2009
REFERENCE HV 1000X PROBE	P6015A	TEKTRONIX	B056590	1278	I	11-JUL-2009

CDN NETWORKS	RANGE	MN	MFR	ASSET	CAT	CALIBRATION DUE
BLUE	0.10-100MHZ	20A M-3	C-S	00806	II	24-JUN-09 (BLUE, BLACK & ORANGE AMP)
RED	0.10-100MHZ	15A M-3	C-S	00780	II	24-JUN-09 (BLUE, BLACK & ORANGE AMP)
YELLOW-BLACK	0.10-100MHZ	15A M-3	C-S	00784	II	24-JUN-09 (BLUE, BLACK & ORANGE AMP)
GREEN	0.10-100MHZ	30A M-3	C-S	00779	II	24-JUN-09 (BLUE, BLACK & ORANGE AMP)
YELLOW	0.10-100MHZ	30A M-5	C-S	00804	II	14-AUG-2009 (BLK AMP) 15-AUG-2009 (BLE & ORNGE)
BROWN	0.10-100MHZ	M-3	C-S	1169	II	24-JUN-09 (BLUE, BLACK & ORANGE AMP)
BROWN-WHITE	0.10-100MHZ	M-3	C-S	1170	II	24-JUN-09 (BLUE, BLACK & ORANGE AMP)
BROWN-BLACK	0.10-100MHZ	M-2 (DC)	C-S	1171	II	24-JUN-09 (BLUE, BLACK & ORANGE AMP)
RED-BLACK	0.10-100MHZ	M-2 (DC)	C-S	1177	II	24-JUN-09 (BLUE, BLACK & ORANGE AMP)
GREEN-WHITE	0.10-100MHZ	M-2 (DC)	C-S	1259	II	24-JUN-09 (BLUE, BLACK & ORANGE AMP)
YELLOW (RES)	0.10-100MHZ	100Ω RESISTOR	C-S	00810	II	24-JUN-09 (BLUE, BLACK & ORANGE AMP)
GREEN (RES)	0.10-100MHZ	100Ω RESISTOR	C-S	1172	II	24-JUN-09 (BLUE, BLACK & ORANGE AMP)
ARTIFICIAL HAND	510Ω / 220PF	CS-AH	C-S	1262	II	26-JUN-2009
ARTIFICIAL HAND	510Ω / 220PF	CS-AH	C-S	1263	II	26-JUN-2009

RMS VOLTMETERS/CURRENT CLAMP	MN	MNFR	SN	ASSET	CAT	CALIBRATION DUE
TRUE-RMS MULTIMETER	79III	FLUKE	71700298	00769	I	06-FEB-2009
TRUE RMS MULTIMETER	179	FLUKE	89280616	1228	I	04-SEP-2008
TRUE-RMS MULTIMETER	177	FLUKE	83390024	00973	I	22-MAR-2009
TRUE-RMS MULTIMETER (REFERENCE)	177	FLUKE	83390025	00974	I	11-MAR-2009
TRUE-RMS MULTIMETER (D RAND)	177	FLUKE	91320460	1226	1	11-MAR-2009
TRUE-RMS MULTIMETER	177	FLUKE	83430419	00975	I	31-MAR-2009
AC/DC CURRENT PROBE	A622	TEKTRONIX	08DD 6275DV	1246	I	12-MAR-2009
CURRENT SHUNT	200A50MV	SIMPSON	NA	1290	I	25-AUG-2010

POWER/NOISE METERS	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
POWER METER	435B	HP	2445A11012	00773	I	07-MAY-2009
POWER METER	437B	HP	2912A01367	01099	I	06-MAY-2009
POWER SENSOR	8481A	HP	2702A61351	00774	I	06-MAY-2009
POWER METER	4232A	BOONTON	11000	1260	I	29-AUG-2009
POWER SENSOR	51013-4E	BOONTON	34457	1261	I	29-AUG-2009
PSOPHOMETER	2429	BRUEL & KJAER	1237642	00585	II	23-FEB-2009
TRANSMISSION LINE TESTER (DBRNC)	185T	AMREL	18507030010	1236	II	04-APR-2009
TRANSMISSION LINE TESTER (DBRNC)	185T	AMREL	998658	00823	II	04-APR-2009
THD, POWER &HARMONIC ANALYZER	NANOVIP PLUS	ELCONTROL ENERGY	15925	00250	I	04-SEP-2009
CURRENT CLAMP FOR NANOVIP	MN 13-EL	ELCONTROL ENERGY	NA	1293	I	04-SEP-2009

OVERVOLTAGE CHAMBERS	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
72KW POWER FAULT SIMULATOR	OV1	C-S	N/A	00792	III	N/A
POWER FAULT SIMULATOR	OV2	C-S	N/A	00116	III	N/A

DIPOLE TAPE MEASURES	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
26FT TAPE #1	2338CME	LUFKIN	C3166-1	00776	II	22-MAR-2009
26FT TAPE #2	2338CME	LUFKIN	C3166-2	00777	II	22-MAR-2009

SURGE GENERATORS	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
TRANSIENT WAVEFORM MONITOR	TWM-5	CDI	003982	00323	II	03-JUN-2009
UNIVERSAL SURGE GENERATOR	M5	CDI	003966	00324	II	CAL BEFORE USE
THREE PHASE COUPLING NWK	3CN	CDI	003455	00325	II	CAL BEFORE USE
1.2X50US PLUGIN MODULE	1.2X50US PLUGIN	CDI	N/A	00842	II	CAL BEFORE USE
10X160US PLUGIN MODULE	10X160US PLUGIN	C-S	N/A	00843	II	CAL BEFORE USE
10X560US PLUGIN MODULE	10X560US PLUGIN	C-S	N/A	00841	II	CAL BEFORE USE
PSURGE CONTROLLER MODULE	PSURGE 8000	HAEFELY	150267	00879	II	01-JUL-2009
COUPLING/DECOUPLING MODULE	PCD 900	HAEFELY	149213	00880	II	01-JUL-2009
IMPULSE MODULE	PIM 900	HAEFELY	149202	00881	II	01-JUL-2009
HIGH VOLTAGE CAP NWK 5KVDC, 18µF	CS-HVCC	C-S	01	00772	II	16-APR-2009
NEBS SURGE GENERATOR (LIMITED CAL)	N/A	C-S	N/A	00088	II	17-JUN-2009
2X10US SURGE GENERATOR	2X10US	C-S	N/A	00846	II	CAL BEFORE USE
10X700US SURGE GENERATOR	10X700US	C-S	N/A	00847	II	CAL BEFORE USE
12 PAIR SURGE RESISTOR MODULE	N/A	C-S	N/A	00768	II	17-JUN-2009
VSS 500-M	TSS 500 M12 S2	EMTEST	V0502100032	1155	II	CAL BEFORE USE
TSS 500-M	TSS500 M10	EMTEST	V0502100031	1156	II	CAL BEFORE USE
NSG 2050 SURGE GENERATOR	NSG 2050	TESEQ	200720-605LU	1273	II	30-JUL-2009
PNW 2050 1.2X50 IMPULSE NETWORK	PNW 2050	TESEQ	200711-604LU	1279	II	30-JUL-2009
CDN 133 3 PHASE COUPLING NETWORK	CDN 133	TESEQ	34416	1274	II	30-JUL-2009
MODULA6150	MODULA6150	TESEQ	34525	1268	I	OUT FOR CAL
RED BESTEMC-2	711-1100	SCHAFFNER	200122-074SC	00623	II	27-FEB-2009
SURGE CURRENT MONITOR	CM-1-L	ION PHYSICS	896730	1276	II	26-AUG-2008
ECOMPACT4	ECOMPACT4	HAEFELY	155858	RENTAL	II	11-FEB-2009

METEOROLOGICAL METERS	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
TEMP./HUMIDITY/ATM. PRESSURE GAUGE	7400 PERCEPTION II	DAVIS	N/A	00965	II	OUT OF SERVICE
TEMPERATURE /HUMIDITY GAUGE	THG-912	HUGER	4000562	00789	I	31-JAN-2009
WEATHER CLOCK (PRESSURE ONLY)	BA928	OREGON SCIENTIFIC	C3166-1	00831	I	08-FEB-2009
OFFICE HYGRO/THERMOMETER	35519-044	CONTROL COMPANY	72436083	1336	I	07-AUG-2009
HYGRO/THERMOMETER (SITE A)	35519-044	CONTROL COMPANY	72457628	1337	I	14-AUG-2009
HYGRO/THERMOMETER (EMI3)	35519-044	CONTROL COMPANY	72457729	1338	I	14-AUG-2009
HYGRO/THERMOMETER (EMI4)	35519-044	CONTROL COMPANY	72457728	1339	I	14-AUG-2009
HYGRO/THERMOMETER (EMI2)	35519-044	CONTROL COMPANY	72457719	1340	I	14-AUG-2009
HYGRO/THERMOMETER (OV1)	35519-044	CONTROL COMPANY	72457633	1341	I	14-AUG-2009
HYGRO/THERMOMETER (SITE F)	35519-044	CONTROL COMPANY	72457631	1342	I	14-AUG-2009
HYGRO/THERMOMETER (SITE M)	35519-044	CONTROL COMPANY	72457758	1343	I	14-AUG-2009
HYGRO/THERMOMETER (EMI1)	35519-044	CONTROL COMPANY	72457730	1344	I	14-AUG-2009
HYGRO/THERMOMETER (RFI1)	35519-044	CONTROL COMPANY	72457635	1334	I	26-NOV-2009
HYGRO/THERMOMETER (RFI2)	35519-044	CONTROL COMPANY	72457738	1335	I	26-NOV-2009
HYGRO/THERMOMETER (RFI3)	35519-044	CONTROL COMPANY	72457642	1345	I	14-AUG-2009
HYGRO/THERMOMETER (EMC 1-2)	35519-044	CONTROL COMPANY	72457636	1346	I	14-AUG-2009
HYGRO/THERMOMETER (SITE T)	35519-044	CONTROL COMPANY	72457639	1347	I	14-AUG-2009
HYGRO/THERMOMETER (EMC 3-4)	35519-044	CONTROL COMPANY	72457647	1348	I	14-AUG-2009
THERMOCOUPLE MODULE(FOR DMM)	80TK	FLUKE	93410013	1308	I	20-NOV-2008
THERMOCOUPLE MODULE (FOR DMM)	80TK	FLUKE	93410017	1309	I	20-NOV-2008

CONSUMABLES	SPEC.	MFR	STOCK/MN	ASSET	CAT	CALIBRATION DUE
NEBS CHEESECLOTH	26-28M/KG	ED&D	ACC-01	N/A	III	N/A
NEBS CARBON BLOCK	3-MIL-GAP 1KV SURGE	RELIABLE	3AB	N/A	III	N/A

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Jurisdictional Labeling and Required Instruction Manual Inserts

FCC Requirements

Required Equipment Authorization for Device Type

Type of Device	Equipment Authorization Required
TV broadcast receiver	Verification
FM broadcast receiver	Verification
CB receiver	Declaration of Conformity or Certification
Superregenerative receiver	Declaration of Conformity or Certification
Scanning receiver	Certification
Radar detector	Certification
All other receivers subject to part 15	Declaration of Conformity or Certification
TV interface device	Declaration of Conformity or Certification
Cable system terminal device	Declaration of Conformity
Stand-alone cable input selector switch	Verification
Class B personal computers and peripherals	Declaration of Conformity or Certification
CPU boards and internal power supplies used with Class B personal computers	Declaration of Conformity or Certification
Class B personal computers assembled using authorized CPU boards or power supplies	Declaration of Conformity
Class B external switching power supplies	Verification
Other Class B digital devices & peripherals	Verification
Class A digital devices, peripherals & external switching power supplies	Verification
Access Broadband over Power Line (Access BPL)	Certification
All other devices	Verification

FCC Required labeling for Verified Devices 47 CFR Part 15.19

Verified devices must have the following label permanently affixed in a location accessible to the user:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

No distinction is made between Class A or Class B devices on the label.

When the device is so small or for such use that it is not practicable to place label on it, the information shall be placed in a prominent location in the instruction manual supplied to the user or, alternatively, shall be placed on the container in which the device is marketed.

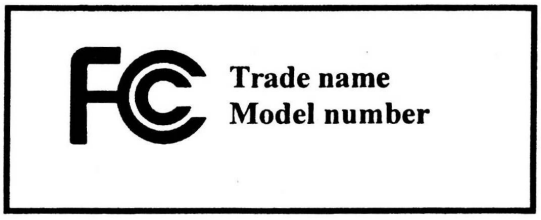
Where a device is constructed in two or more sections connected by wires and marketed together, the label is only required to be affixed to the main control unit.

FCC Required labeling for Class B Personal Computers and Peripherals Devices 47 CFR Part 15.19 subject to Declaration of Conformity

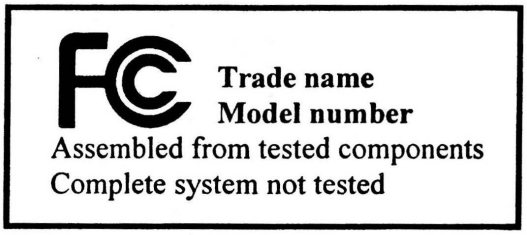
Personal computers and peripherals subject to authorization under a Declaration of Conformity shall be labeled as follows:

(1) The label shall be located in a conspicuous location on the device and shall contain the unique identification described in Section 2.1074 and the following logo:

(i) If the product is authorized based on testing of the product or system:



(ii) If the product is authorized based on assembly using separately authorized components and the resulting product is not separately tested:



(2) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (b)(1) of this section on it, such as for a CPU board or a plug-in circuit board peripheral device, the text associated with the logo may be placed in a prominent location in the instruction manual or pamphlet supplied to the user. However, the unique identification (trade name and model number) and the logo must be displayed on the device.

(3) The label shall not be a stick-on, paper label. The label on these products shall be permanently affixed to the product and shall be readily visible to the purchaser at the time of purchase, as described in Section 2.925(d). "Permanently affixed" means that the label is etched, engraved, stamped, silk-screened, indelibly printed, or otherwise permanently marked on a permanently attached part of the equipment or on a nameplate of metal, plastic, or other material fastened to the equipment by welding, riveting, or a permanent adhesive. The label must be designed to last the expected lifetime of the equipment in the environment in which the equipment may be operated and must not be readily detachable.

FCC Required Instruction Manual Inserts CFR 47 Part 15.21 and 15.105

The user's manual must caution the user that changes or modifications not expressly approved by the manufacturer could void the user's FCC granted authority to operate the equipment. In addition the following information should be inserted:

(a) For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: this equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

(c) The provisions of paragraphs (a) and (b) of this section do not apply to digital devices exempted from the technical standards under the provisions of § 15.103.

(d) For systems incorporating several digital devices, the statement shown in paragraph (a) or (b) of this section needs to be contained only in the instruction manual for the main control unit.

Our facility codes can be found in the *Test Equipment Used* Section starting on page 9.

Canadian Requirements

Digital products and ISM products must be labeled by a notice in French and English. The notice **must** take the form of a label on the product. As an alternative, where it is not feasible to label the product due to product size or other consideration, the notice must be reproduced in the manual. Note that considerations such as product appearance are not considered to meet the feasibility test. The notice must state that the product is in compliance with Canadian Interference-Causing Equipment regulations and may be in your own words. A suggested text is:

For ITE products:

This Class A or B digital apparatus complies with Canadian ICES-003.
Cet appareil numerique de la classe A or B est conforme a la norme NMB-003 du Canada.

For ISM products:

This ISM apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.
Ce generateur de frequence radio ISM respecte toutes les exigences du Reglement sur le materiel brouilleur du Canada.

Although the ITE limits are different from the FCC in some minor ways, equipment which complies with the FCC limits is considered by Industry Canada to be compliant with the Canadian rules. For ITE, equipment in compliance with either FCC Part 15 or CISPR 22 is considered to meet ICES-003. ISM equipment limits are the same as the EU EN55011 emission limits. Reports must be kept on file for review by the appropriate Canadian Minister for a period of five years.

Our facility codes can be found in the *Test Equipment Used* Section starting on page 9.

Conditions Of Testing

[Bureau Veritas Consumer Products Services, Inc., a Massachusetts corporation], and/or its affiliates (collectively, the "Company") will conduct, at the request of the Submitter ("**Client**"), the tests specified on the submitted Test Request Form or equivalent in accordance with, and subject to, the following terms and conditions (collectively, "**Conditions**"):

1. All orders for tests are subject to acceptance by the Company, and no order will constitute a binding commitment of the Company unless and until such order is accepted by it, as evidenced by the issuance of a written report ("**Test Report**") by the Company. The Test Report is issued solely by the Company, is intended for the exclusive use of Client and shall not be published, used for advertising purposes, copied or replicated for distribution to any other person or entity or otherwise publicly disclosed without the prior written consent of the Company. By submitting a request for services to the Company, Client consents to the disclosure to accreditation bodies of those records of Client relevant to the accreditation body's assessment of the Company's competence and compliance with relevant accreditation criteria. The Company shall not be liable for any loss or damage whatsoever resulting from the failure of the Company to provide its services within any time period for completion estimated by the Company. If Client anticipates using the Test Report in any legal proceeding, arbitration, dispute resolution forum or other proceeding, it shall so notify the Company prior to submitting the Test Report in such proceeding. The Company has no obligation to provide a fact or expert witness at such proceeding unless the Company agrees in advance to do so for a separate and additional fee.
2. The Test Report will set forth the findings of the Company solely with respect to the test samples identified therein. Unless specifically and expressly indicated in the Test Report, the results set forth in such Test Report are not intended to be indicative or representative of the quality or characteristics of the lot from which a test sample is taken, and Client shall not rely upon the Test Report as being so indicative or representative of the lot or of the tested product in general. The Test Report will reflect the findings of the Company at the time of testing only, and the Company shall have no obligation to update the Test Report after its issuance. The Test Report will set forth the results of the tests performed by the Company based upon the written information provided to the Company. The Test Report will be based solely on the samples and written information submitted to the Company by Client, and the Company shall not be obligated to conduct any independent investigation or inquiry with respect thereto.
3. The Company may, in its sole discretion, destroy samples which have been furnished to the Company for testing and which have not been destroyed in the course of testing. The Company may delegate the performance of all or a portion of the services contemplated hereunder to an affiliate, agent or subcontractor of the Company, and Client consents to such delegation.
4. These Conditions and the Test Report represent the entire understanding of the parties hereto with respect to the subject matter hereof and of the Test Report, and no modification, variance or extrapolation with respect thereto shall be permitted without the prior written consent of the Company.
5. The names, service marks, trademarks and copyrights of the Company and its affiliates, including the names "**BUREAU VERITAS**," "**BUREAU VERITAS CONSUMER PRODUCTS SERVICES**," "**BVCPS**", "**MTL**", "**ACTS**", "**MTL-ACTS**" and **CURTIS-STRAUS** (collectively, the "**Marks**") are and shall remain the sole property of the Company or its affiliates and shall not be used by Client except solely to the extent that Client obtains the prior written approval of the Company and then only in the manner prescribed by the Company. Client shall not contest the validity of the Marks or take any action that might impair the value or goodwill associated with the Marks or the image or reputation of the Company or its affiliates.
6. Payment in full shall be due 30 days after the date of invoice. Interest shall be due on overdue amounts from the due date until paid at an interest rate of 1.5% per month or, if less, the maximum rate permitted by law. The Company reserves the right, at any time and from time to time, to revoke any credit extended to Client. Client shall reimburse the Company for any costs it incurs in collecting past due amounts, including court costs and fees and expenses of attorneys and collection agencies. The Test Report may not be used or relied upon by Client if and for so long as Client fails to pay when due any invoice issued by the Company or any affiliate of it to Client or any affiliate or subsidiary of Client together with interest and penalties, if any, accrued thereon.
7. The Company disclaims any and all responsibility or liability arising out of or in connection with e-mail transmissions of such information.
8. Client understands and agrees that the Company is neither an insurer nor a guarantor, that the Company does not take the place of Client or any designer, manufacturer, agent, buyer, distributor or transportation or shipping company, and that the Company disclaims all liability in such capacities. Client further understands that if it seeks assurance against loss or damage, it should obtain appropriate insurance.
9. Client agrees that the Company, by providing the services, does not take the place of Client nor any third party, nor does the Company release them from any of their obligations, nor does the Company otherwise assume, abridge, abrogate or undertake to discharge any duty of any third party to Client or any duty of Client or any third party to any other third party, and Client will not release any third party from its obligations and duties with respect to the tested goods.
10. Client shall, on a timely basis, (a) provide adequate instructions to the Company in order to enable the Company to perform properly its services, (b) provide, or cause Client's suppliers and contractors to provide, the Company with all documents necessary to enable the Company to perform its services, (c) furnish the Company with all relevant information regarding Client's intended use and purposes of the tested goods, (d) advise the Company of essential dates and deadlines relevant to the tested goods and (e) fully exercise all rights and remedies available to Client against third parties in respect of the tested goods.
11. The Company shall undertake due care and ordinary skill in the performance of its services to Client, and the Company shall accept responsibility only were such skill has not been exercised and, even in such event, only to the extent of the limitation of liability set forth herein.
12. If Client desires to assert a claim arising from or relating to (i) the performance, purported performance or non-performance of any services by the Company or (ii) the sale, resale, manufacture, distribution or use of any tested goods, it must submit that claim to the Company in a writing that sets forth with particularity the basis for such claim within 60 days from discovery of the potential claim and not more than six months after the date of issuance of the Test Report to Client. Client waives any and all such claims including, without limitation, claims that the Test Report is inaccurate, incomplete or misleading or that additional or different testing is required, unless and then only to the extent that Client submits a written claim to the Company within both such time periods.
13. CLIENT SHALL, EXCEPT TO THE EXTENT OF COMPANY'S LIABILITY TO CLIENT HEREUNDER (WHICH IN NO EVENT SHALL EXCEED THE LIMITATION OF LIABILITY HEREIN), HOLD HARMLESS AND INDEMNIFY THE COMPANY, ITS

AFFILIATES AND THEIR RESPECTIVE DIRECTORS, OFFICERS, EMPLOYEES, AGENTS AND SUBCONTRACTORS AGAINST ALL ACTUAL OR ALLEGED THIRD PARTY CLAIMS FOR LOSS, DAMAGE OR EXPENSE OF WHATSOEVER NATURE AND HOWSOEVER ARISING FROM OR RELATING TO (i) THE PERFORMANCE, PURPORTED PERFORMANCE OR NON-PERFORMANCE OF ANY SERVICES BY THE COMPANY OR (ii) THE SALE, RESALE, MANUFACTURE, DISTRIBUTION OR USE OF ANY TESTED GOODS.

14. EXCEPT AS MAY OTHERWISE BE EXPRESSLY AGREED TO IN WRITING BY THE COMPANY AND NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN OR IN ANY TEST REPORT, NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, IS MADE.

15. (A) IN NO EVENT WHATSOEVER SHALL THE COMPANY BE LIABLE FOR ANY CONSEQUENTIAL, SPECIAL, INCIDENTAL, EXEMPLARY OR PUNITIVE DAMAGES IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE TEST REPORT OR THE SERVICES PROVIDED BY THE COMPANY HEREUNDER, INCLUDING WITHOUT LIMITATION LOSS OF OR DAMAGE TO PROPERTY; LOSS OF INCOME, PROFIT OR USE; OR ANY CLAIMS OR DEMANDS MADE AGAINST CLIENT OR ANY OTHER PERSON BY ANY THIRD PARTY IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE SERVICES PROVIDED BY THE COMPANY HEREUNDER.

(B)NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN, AND IN RECOGNITION OF THE RELATIVE RISKS AND BENEFITS TO CLIENT AND THE COMPANY ASSOCIATED WITH THE TESTING SERVICES CONTEMPLATED HEREBY, THE RISKS HAVE BEEN ALLOCATED SUCH THAT UNDER NO CIRCUMSTANCES WHATSOEVER SHALL THE LIABILITY OF THE COMPANY TO CLIENT OR ANY THIRD PARTY IN RESPECT OF ANY CLAIM FOR LOSS, DAMAGE OR EXPENSE, OF WHATSOEVER NATURE OR MAGNITUDE, AND HOWSOEVER ARISING, EXCEED AN AMOUNT EQUAL TO FIVE (5) TIMES THE AMOUNT OF THE FEES PAID TO THE COMPANY FOR THE SPECIFIC SERVICES WHICH GAVE RISE TO SUCH CLAIM OR U.S.$10,000, WHICHEVER IS THE LESSER AMOUNT.

16. The Company shall not be liable for any loss or damage resulting from any delay or failure in performance of its obligations hereunder resulting directly or indirectly from any event of force majeure or any event outside the control of the Company. If any such event occurs, the Company may immediately cancel or suspend its performance hereunder without incurring any liability whatsoever to Client.

17. Company's services, including these Conditions, shall be governed by, and construed in accordance with, the local laws of the country where the Company performs the tests or, in the case of tests performed in the United States of America, the laws of Massachusetts without regard to conflicts of laws principles. If any aspect(s) of these Conditions is found to be illegal or unenforceable, the validity, legality and enforceability of all remaining aspects of these Conditions shall not in any way be affected or impaired thereby. Any proceeding related to the subject matter hereof shall be brought, if at all, in the courts of the country where the Company performs the tests or, in the case of tests performed in the United States of America, in the courts of Massachusetts. Client waives the right to interpose any counterclaim or setoffs of any nature in any litigation arising hereunder.

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