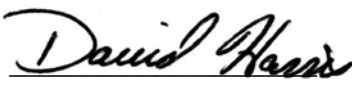


Report No	EF0764-2
Client	LS Starrett 121 Crescent Street Athol, MA 01331
Phone	978-249-3551
FRN	0014116503
	RSS-210 Issue 6; FCC Part 15.249
Model	1500-2
FCC ID	TV81500-2
IC	6164A-15002
Equipment Type	Low Power Communications Device Transmitter
Equipment Code	DXX
Emission Designator	K1D
Results	As detailed within this report
Prepared by	 David Harris – Test Engineer
Authorized by	 Michael Buchholz – EMC Manager
Issue Date	1/17/06
Conditions of issue	This Test Report is issued subject to the conditions stated in ‘terms and conditions’ section of this report.

Curtis-Straus LLC is accredited by the American Association for Laboratory Accreditation for the specific scope of accreditation under Certificate Number 1627-01. This report may contain data which is not covered by the A2LA accreditation.

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Summary

This test report supports an application for certification of a transmitter operating pursuant to 47 CFR 15.249 and RSS-210(A2.9). The product is the Router, MN 1500-2. It is a transmitter that operates at 916.5 MHz.

Test Methodology

Radiated emissions testing are performed according to the procedures specified in ANSI C63.4 (2003) and RSS-GEN. Emissions were maximized by rotating the device around three orthogonal axes as well as varying the test antenna's height and polarity. The environmental conditions are shown below.

Date	Temperature (°c)	Humidity (%)
10/13/05	23.4	43
10/19/05	24.7	34
10/28/05	23.4	25
10/31/05	24.9	27

Frequency range investigated: 0.15MHz – 10GHz

Measurement distance:	0.15 – 30MHz	Conducted
	30MHz – 3GHz	3m
	3 – 10GHz	1m

EUT antenna was varied and maximized during testing.

Statement of Conformity

The Router, MN 1500-2 has been found to conform to the following parts:

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 connector for this device is inaccessible to the user, see below.
	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 meets the AC Line conducted emissions requirements of 15.207.
	A2.9	15.249	The unit complies with the requirements of 15.249

The antenna is not hard wired to the PCB, but the connection is inside the box. See picture below.



EUT Configuration

EUT Configuration				
Work Order: F0764				
Company: LS Starrett				
Company Address: 121 Crescent Street Athol, MA 01331				
Contact: John Belliveau				
MN		SN		
EUT:				
Powered by 5Vdc Adapter 1500-2-N		Sample 1		
Unifive power supply UL310-0515		-		
Powered by 24VAC 1500-2-HN		Sample 1		
Small Unit, Powered by Battery 1500-2-SN		Sample 1		
EUT Description: Router				
EUT Max Frequency: 916.6MHz				
Support Equipment:		MN SN		
None				
EUT Cables:	Qty	Shielded?	Length	Ferrites
DC	1	No	2 m	None
24Vac Power Cable	1	No	3m	None
Unpopulated EUT Ports:		Qty	Reason	
None				
Software / Operating Mode Description:				
EUT was running in the transmit mode specified by the test. The modes available are: sleep, ASK transmit, OOK transmit, and receive. Unless otherwise stated the EUT was operating in ASK transmit mode which is the maximum transmitted power level mode.				

The differences for the Router models are the way that it is powered. For all models of the Router the transmitter portion of the unit is the same, therefore only spurious emissions testing was done on the 1500-2-HN, and SN. All Radio related testing and spurious emissions testing was done on the 1500-2-N.

Fundamental Measurement**LIMIT**

QuasiPeak: 93.9dBμV/m @ 3m [15.35(b)]

MEASUREMENTS

Fundamental											Curtis-Straus LLC		
Date: 13-Oct-05				Company: LS Starrett					Work Order: F0764				
Engineer: Mairaj Hussain				EUT Desc: Router MN 1500-2-N									
											Measurement Distance: 3 m		
Notes: RBW: 120KHz; VBW: 1MHz							EUT Max Freq: 916.6MHz						
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)	Margin (dB)	Result (Pass/Fail)	
Vpk	916.6	63.2	0.0	21.7	4.6	89.5				94.0	-4.5	Pass	
Table Result:		Pass	by	-4.5 dB				Worst Freq:		916.6 MHz			
Test Site: "F"		Pre-Amp: none		Cable: EMIR-04		Analyzer: Black		Antenna: Green					

Band Edge Measurements**LIMITS**

QuasiPeak limit: FCC Class B limits 46dBuV/m @ 3m [15.35(b)]

MEASUREMENTS

Band Edges											Curtis-Straus LLC		
Date: 13-Oct-05				Company: LS Starrett				Work Order: F0764					
Engineer: Mairaj Hussain				EUT Desc: Router MN 1500-2-N									
											Measurement Distance: 3 m		
Notes:											EUT Max Freq: 916.6MHz		
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)	Margin (dB)	Result (Pass/Fail)	
Vpk	902.0	18.8	20.7	21.6	4.5	24.2				46.0	-21.8	Pass	
Vpk	928.0	17.9	20.6	21.8	4.7	23.8				46.0	-22.2	Pass	
Table Result:		Pass		by		-21.8 dB		Worst Freq:		902.0 MHz			
Test Site: "F"		Pre-Amp: Green		Cable: EMIR-04		Analyzer: Black		Antenna: Green					

Radiated Spurious Emissions

LIMITS

Average (above 1000MHz): 500 μ V/m = 53.9dB μ V/m @ 3m [15.249(a), (b), and (d)]

QuasiPeak limit (30-1000MHz): FCC Class B limits @ 3m [15.35(b)]

Note: If Peak measurements meet Average limits, then Average measurements are not required.

MEASUREMENTS

Radiated Emissions Table							Curtis-Straus LLC					
Date: 19-Oct-05			Company: LS Starret				Work Order: F0764					
Engineer: David Harris			EUT Desc: Router MN 1500-2-SN									
Frequency Range: 30-1000MHz							Measurement Distance: 3 m					
Notes: Tested with Gateway MN 1500-1-M							EUT Max Freq: 916.6MHz					
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)	Margin (dB)	Result (Pass/Fail)
H	65.3	29.1	21.5	8.3	1.0	16.9				40.0	-23.1	Pass
Hbb	113.7	33.6	21.5	12.9	1.3	26.3				43.5	-17.2	Pass
V	117.88	38.5	21.5	13.5	1.4	31.9				43.5	-11.6	Pass
V	136.68	35.8	21.5	14.2	1.5	30.0				43.5	-13.5	Pass
V	332.151	26.5	21.3	14.7	2.4	22.3				46.0	-23.7	Pass
V	364.75	28.2	21.2	15.6	2.6	25.2				46.0	-20.8	Pass
V	562.8	28.2	21.0	18.9	3.4	29.5				46.0	-16.5	Pass
V	586.37	30.2	20.9	19.3	3.5	32.1				46.0	-13.9	Pass
V	846.97	29.7	20.6	22.3	4.4	35.8				46.0	-10.2	Pass
V	960.0	31.7	20.6	23.4	4.7	39.2				46.0	-6.8	Pass
V	1009.0	27.6	20.5	24.3	4.9	36.3				54.0	-17.7	Pass
Table Result:		Pass		by		-6.8 dB		Worst Freq:		960.0 MHz		
Test Site: "F"		Pre-Amp: Green		Cable: EMIR-04		Analyzer: Green		Antenna: Red-White				

Radiated Emissions Table										Curtis-Straus LLC		
Date: 19-Oct-05				Company: LS Starret						Work Order: F0764		
Engineer: David Harris				EUT Desc: Router MN 1500-2-N								
Frequency Range: 1-10GHz							Measurement Distance: 3 m					
Notes: Tested with Gateway MN 1500-1-M							EUT Max Freq: 916.6MHz					
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)	Margin (dB)	Result (Pass/Fail)
H	1065.0	42.5	38.3	25.6	1.3	31.1				54.0	-22.9	Pass
H	1260.0	40.0	38.2	26.1	1.5	29.4				54.0	-24.6	Pass
H	1597.0	39.7	39.1	27.1	1.8	29.5				54.0	-24.5	Pass
H	2064.0	50.1	39.4	28.9	2.0	41.6				54.0	-12.4	Pass
Table Result:		Pass	by		-12.4 dB					Worst Freq:		2064.0 MHz
Test Site: "F"		Pre-Amp: Brown		Cable: EMIR-HIGH 3		Analyzer: Green		Antenna: Orange Horn				

Radiated Emissions Table**Curtis-Straus LLC**

Date: 31-Oct-05			Company: LS Starrett					Work Order: F0764				
Engineer: David Harris			EUT Desc: Router MN 1500-2-N									
Frequency Range: 30-10000MHz							Measurement Distance: 3 m					
Notes: Tested in TX and RX mode. There was no change in emissions							EUT Max Freq: 916.3MHz					
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)	Margin (dB)	Result (Pass/Fail)
H	42.1	42.1	22.2	13.3	0.9	34.1				40.0	-5.9	Pass
H	57.0	41.9	22.2	7.6	1.0	28.3				40.0	-11.7	Pass
H	107.6	40.7	22.2	11.9	1.4	31.8				43.5	-11.7	Pass
V	110.0	34.6	22.2	12.1	1.4	25.9				43.5	-17.6	Pass
H	199.8	33.5	22.2	10.6	1.9	23.8				43.5	-19.7	Pass
V	202.2	29.0	22.2	10.7	1.9	19.4				43.5	-24.1	Pass
Table Result: Pass by -5.9 dB Worst Freq: 42.1 MHz												
Test Site: "M"		Pre-Amp: Blue		Cable: EMIR-02		Analyzer: White		Antenna: Green				

AC Line Conducted Emissions**LIMITS**

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

*Decreases with the logarithm of the frequency.

[47 CFR 15.207(a)]

MEASUREMENTS

AC Mains Conducted Emissions											Curtis-Straus LLC	
Date: 28-Oct-05			Company: LS Starrett					Work Order: F0764				
Engineer: David Harris			EUT Desc: Router MN 1500-2-N					Test Site: EMI 1				
Notes:												
LISN(s): Brown												
Range: 0.15-30MHz			Other Equipment: ---					Spectrum Analyzer: Red				
Frequency (MHz)	Q.P. Readings		Ave. Readings		Impedance Factor			FCC/CISPR B		FCC/CISPR B		Overall Result (Pass/Fail)
	QP1 (dBµV)	QP2 (dBµV)	AV1 (dBµV)	AV2 (dBµV)				qp Limit (dBµV)	qp Margin dB	AVE Limit (dBµV)	AVE Margin dB	
0.19	36.9	34.8	25.8	29.0	20.0			64.0	-7.1	54.0	-5.0	Pass
0.71	16.7	22.4	14.3	17.5	20.0			56.0	-13.6	46.0	-8.5	Pass
3.44	21.5	20.5	7.9	7.7	20.0			56.0	-14.6	46.0	-18.1	Pass
10.00	10.5	9.3			20.0			60.0	-29.6	50.0	-19.6	Pass
15.00	6.7	7.7			20.0			60.0	-32.3	50.0	-22.3	Pass
25.00	10.5	7.5			20.0			60.0	-29.5	50.0	-19.5	Pass
Table Result: Pass by -5.04 dB Worst Freq: 0.19 MHz												

Measurements were made using a 50 ohm, 50uH LISN.

Voltage Variations

Voltage Variations				Curtis-Straus LLC		
Date: 31-Oct-05			Company: LS Starret			
Engineer: David Harris			EUT Desc: Router 1500-2-N			
Work Order: F0764						
Notes:						
Variation from Nominal (%)	Frequency (MHz)	Reading (dBμV)	Voltage (Vdc)	Difference (%)		Result
0	916.3	65.2	5.000			
+15	916.3	65.2	5.750	0.0		Pass
-15	916.3	65.0	4.250	0.3		Pass
Test Site: "EMC 1"		Analyzer: Blue		Antenna: Black Horn		

Voltage Variations				Curtis-Straus LLC		
Date: 31-Oct-05		Company: LS Starret				
Engineer: David Harris		EUT Desc: Router 1500-2-HN				
Work Order: F0764						
Notes:						
Variation from Nominal (%)	Frequency (MHz)	Reading (dBμV)	Voltage (Vdc)	Difference (%)		Result
0	916.3	65.5	24.000			
+15	916.3	65.8	27.600	0.5		Pass
-15	916.3	65.8	20.400	0.5		Pass
Test Site: "EMC 1"		Analyzer: Blue		Antenna: Black Horn		

Test Equipment Used

REV. 05-OCT-2005

SPECTRUM ANALYZERS / RECEIVERS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	9kHz-1.8GHz	8591E	HP	3441A03559	00024	I	13-JAN-2006
WHITE	9kHz-22GHz	8593E	HP	3547U01252	00022	I	08-MAR-2006
BLUE	9kHz-1.8GHz	8591E	HP	3223A00227	00070	I	03-NOV-2005
YELLOW	9kHz-2.9GHz	8594E	HP	3523A01958	00100	I	20-APR-2006
GREEN	9kHz-26.5GHz	8593E	HP	3829A03618	00143	I	02-AUG-2006
BLACK	9kHz-12.8GHz	8596E	HP	3710A00944	00337	I	27-DEC-2005
YELLOW-BLACK	20Hz-40.0MHz	3585A	HP	2504A05219	00030	I	Out of Service
TELECOM 3585A	20Hz-40.0MHz	3585A	HP	1750A02762	01067	I	04-FEB-2006
ORANGE	9kHz-26.5GHz	E4407B	HP	US39440975	00394	I	22-JUN-2006
EMI TEST RECEIVER	20-1000MHz	ESVS30	R&S	827957/001	01098	I	27-OCT-2005

LISNS/MEASUREMENT PROBES	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	10kHz-30MHz	8012-50-R-24-BNC	SOLAR	956348	00753	II	15-APR-2006
BLUE (DC)	10kHz-30MHz	8012-50-R-24-BNC	SOLAR	956349	00752	II	02-MAY-2006
YELLOW-BLACK	10kHz-30MHz	8012-50-R-24-BNC	SOLAR	984735	00248	II	15-APR-2006
ORANGE	10kHz-30MHz	8012-50-R-24-BNC	SOLAR	903707	00754	II	02-MAY-2006
GOLD (DC)	10kHz-30MHz	8012-50-R-24-BNC	SOLAR	984734	00247	II	02-MAY-2006
BROWN	10kHz-30MHz	8012-50-R-24-BNC	SOLAR	0411656	00986	II	04-MAY-2006
GREEN	10kHz-30MHz	8012-50-R-24-BNC	SOLAR	0411657	00987	II	04-MAY-2006
YELLOW	10kHz-30MHz	8012-50-R-24-BNC	SOLAR	0411658	1080	II	04-MAY-2006
WHITE-BLACK	10kHz-30MHz	8610-50-TS-100-N	SOLAR	972019	00678	II	15-APR-2006
BLACK	10kHz-30MHz	8610-50-TS-100-N	SOLAR	972017	00675	II	15-APR-2006
RED-BLACK	10kHz-30MHz	8610-50-TS-100-N	SOLAR	972016	00677	II	15-APR-2006
BLUE-BLACK	10kHz-30MHz	8610-50-TS-100-N	SOLAR	972018	00676	II	15-APR-2006
BLUE MONITORING PROBE	0.01-150MHz	91550-2	TEGAM	12350	00807	I	26-MAY-2007
YELLOW MONITORING PROBE	0.01-150MHz	91550-2	ETS	50972	00493	I	24-NOV-2005
GREEN CURRENT TRANSFORMER	40Hz-20MHz	150	PEARSON	10226	00793	I	07-APR-2007
BLUE CISPR LINE PROBE	150kHz- 30MHz	N/A	C-S	N/A	00805	II	08-JUN-2007
BLACK CISPR LINE PROBE	150kHz- 30MHz	N/A	C-S	N/A	NONE	II	08-JUN-2007
CISPR TELCO VOLTAGE PROBE	10kHz-30MHz	CS A/C-10	C-S	CS01	00296	II	30-SEP-2006
CISPR 22 TELCO ISN	9kHz-30MHz	FCC-TLISN-T4	FISCHER	20115	00746	I	26-OCT-2006

OPEN AREA TEST SITE (OATS)	FCC CODE	IC CODE	VCCI CODE	CAT	CALIBRATION DUE
SITE F	93448	IC 2762-F	R-1688	II	04-APR-2007
SITE T	93448	IC 2762-T	R-905	II	14-AUG-2007
SITE A	93448	IC 2762-A	R-903	II	13-AUG-2007
SITE M	93448	IC 2762-M	R-904	II	19-MAR-2007

LINE CONDUCTED TEST SITES	FCC CODE	IC CODE	VCCI CODE	CAT	CALIBRATION DUE
EMI 1	93448	N/A	C-1801	II	01-MAY-2006
EMI 2	93448	N/A	C-1802	II	01-MAY-2006
EMI 3	93448	N/A	C-1803	II	01-MAY-2006

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	23-AUG-2006
MIXER / HORN	26.5-40 GHz	11970A/28-442-6	HP/ATM	3003A07825/A046903-01	1086	I	23-AUG-2006
MIXER / HORN	40-60 GHz	M19HW/A	OML	U30110-1	00821	I	02-MAR-2007
MIXER / HORN	60-90 GHz	M12HW/A	OML	E30110-1	00822	I	03-MAR-2007
MIXER / HORN	90-140 GHz	MO8HW/A	OML	F21206-1	00811	I	03-MAR-2007
MIXER / HORN	140-220 GHz	MO5HW/A	OML	G21206-1	00812	II	OUT OF CALIBRATION
DIPLEXER	40-220 GHz	DPL.26	OML	N/A	00813	I	03-MAR-2007

PREAMPS / ATTENUATORS / FILTERS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	0.10-2000MHz	ZFL-1000-LN	C-S	N/A	00798	II	08-APR-2006
BLUE	0.01-2000MHz	ZFL-1000-LN	C-S	N/A	00759	II	03-AUG-2006
BLUE-BLACK	0.01-2000MHz	ZFL-1000-LN	C-S	N/A	00800	II	10-FEB-2006
GREEN	0.01-2000MHz	ZFL-1000-LN	C-S	N/A	00802	II	21-JUL-2006
BLACK	0.01-2000MHz	ZFL-1000-LN	C-S	N/A	00799	II	25-AUG-2006

ORANGE	0.01-2000MHz	ZFL-1000-LN	C-S	N/A	00765	II	10-FEB-2006
WHITE	1-20GHz	SMC-12A	C-S	426643	00760	II	04-AUG-2006
BROWN	1-20GHz	PM2-38-218-4R5-17-15-SFF	C-S	PL1655	1132	II	27-JUN-2006
YELLOW-BLACK	1-20GHz	SMC-12A	C-S	535055	00801	II	25-AUG-2006
HF (YELLOW)	18-26.5GHz	AFS4-18002650-60-8P-4	C-S	467559	00758	II	23-AUG-2007
HIGH PASS FILTER	1-18 GHz	SPA-F-55204	K&L	36	00817	II	06-JAN-2006
LOW PASS FILTER	1-9 GHz	11SL10-4100/X4400-O/O	K&L	4	00816	II	06-JAN-2006
HF 20dB 50W ATTENUATOR	0.03-20 GHz	PE 7019-20	PASTERNAK	01	00791	II	10-MAY-2007
HF 30dB 50W ATTENUATOR	0.03-20 GHz	PE 7019-30	PASTERNAK	02	1168	II	10-MAY-2007
LOW FREQ LPF	10-100kHz	L200K1G1	MICROWAVE CIRCUITS	4460-01 DC0432	1019	II	OUT OF SERVICE
LOW FREQ LPF	10-100kHz	L200K1G1	MICROWAVE CIRCUITS	4777-01 DC0434	1088	II	30-AUG-2006

ANTENNAS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
GREEN BILOG	30-2000MHz	CBL6112B	CHASE	2742	00620	II	06-APR-2006
GREEN-BLACK BILOG	30-2000MHz	CBL6112B	CHASE	2412	00127	II	06-JAN-2006
GREEN-RED BILOG	30-2000MHz	CBL6112B	CHASE	2435	00990	II	OUT OF SERVICE
BLUE BILOG	30-1000MHz	3143	EMCO	1271	00803	II	06-MAY-2007
GRAY BILOG	20-2000MHz	3141	EMCO	9703-1038	00066	II	06-MAY-2007(EMI) / 05-AUG-2006(RFI)
YELLOW-BLACK BILOG	20-2000MHz	CBL6140A	CHASE	1112	00126	II	06-MAY-2007(EMI) / 12-AUG-2006(RFI)
RED-WHITE BILOG	30-2000MHz	JB1	SUNOL	A091604-1	01105	II	28-SEP-2006
RED-BLACK BILOG	30-2000MHz	JB1	SUNOL	A091604-2	01106	II	28-SEP-2006
YELLOW HORN	1-18GHz	3115	EMCO	9608-4898	00037	I	27-MAY-2007(EMI) / 05-JUN-2006 (RFI)
BLACK HORN	1-18GHz	3115	EMCO	9703-5148	00056	I	17-JUN-2007
ORANGE HORN	1-18GHz	3115	EMCO	0004-6123	00390	I	09-JUN-2007
HF (WHITE) HORN	18-26.5GHz	801-WLM	WAVELINE	00758	00758	I	26-AUG-2007
SMALL LOOP	9kHz-30MHz	PLA-130/A	ARA	1024	00755	I	23-FEB-2006
LARGE LOOP	20Hz-5MHz	6511	EMCO	9704-1154	00067	I	12-NOV-2005
ACTIVE MONOPOLE	30Hz-30MHz	3301B	EMCO	3824	00068	II	04-MAY-2006
INDUCTION COIL	50-60Hz	1000-4-8	C-S	N/A	00778	II	26-SEP-2007
ADJUSTABLE DIPOLE	30-1000MHz	3121C	EMCO	1370	00757	II	18-MAR-2007
ADJUSTABLE DIPOLE	30-1000MHz	3121C	EMCO	1371	00756	II	18-MAR-2007
RE101 LOOP SENSOR	30Hz-100kHz	RE101-13.3cm	C-S	N/A	00818	II	13-MAR-2007
RS101 RADIATING LOOP	30Hz-100kHz	RS101-12cm	C-S	N/A	00819	II	13-MAR-2007
RS101 LOOP SENSOR	30Hz-100kHz	RS101-4cm	C-S	N/A	00820	II	13-MAR-2007

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

Terms And Conditions

Paragraph 1. SERVICES. LABORATORY will:

- 1.1 Use the degree of care and skill ordinarily exercised by and consistent with the standards of the profession.
- 1.2 Perform all technical services in substantial accordance with the generally accepted laboratory principles and practices.
- 1.3 Retain all pertinent records relating to the services performed for a period of three (3) years following submission of the report describing such services, during which period the records will be made available to CLIENT upon reasonable request.

Paragraph 2. CLIENT'S RESPONSIBILITIES. CLIENT or his authorized representative will:

- 2.1 Provide LABORATORY with all plans, schematics, specifications, addenda, change orders, drawings and other information for the proper performance of technical services.
- 2.2 Designate a person to act as CLIENT's representative with respect to LABORATORY's services to be performed on behalf of the CLIENT; such person or firm to have complete authority to transmit instructions, receive information and data, interpret and define CLIENT's policies and decisions with respect to the LABORATORY's work on behalf of the CLIENT and to order, at CLIENT's expense, such technical services as may be required.
- 2.3 Designate a person who is authorized to receive copies of LABORATORY's reports.
- 2.4 Undertake the following:
 - (a) Secure and deliver to LABORATORY, without cost to LABORATORY, preliminary representative samples of the equipment proposed to require technical services, together with any relevant data.
 - (b) Furnish such labor and equipment needed by LABORATORY to handle samples at the LABORATORY and to facilitate the specified technical services.

Paragraph 3. GENERAL CONDITIONS:

- 3.1 LABORATORY, by the performance of services covered hereunder, does not in any way assume any of those duties or responsibilities customarily vested in the CLIENT, its employees, or any other party, agency or authority.
- 3.2 LABORATORY shall not be responsible for acts of omissions of any other party or parties involved in the design, manufacture or maintenance of the equipment or the failure of any employee, contractor or subcontractor to undertake any aspect of equipment's design, manufacture or maintenance.
- 3.3 LABORATORY is not authorized to revoke, alter, release, enlarge or release any requirement of the equipment's design, manufacture or maintenance unless specifically authorized by CLIENT or his authorized representative.
- 3.4 THE ONLY WARRANTY MADE BY LABORATORY IN CONNECTION WITH ITS SERVICE PERFORMED HEREUNDER IS THAT IT WILL USE THAT DEGREE OF CARE AND SKILL AS SET FORTH IN PARAGRAPH 1 ABOVE. NO OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE OR INTENDED FOR SERVICES PROVIDED HEREUNDER.
- 3.5 Where the LABORATORY indicates that additional testing is advisable to obtain more valid or useful data, and where such testing has not been authorized, CLIENT agrees to view such test reports as inconclusive and preliminary.
- 3.6 The LABORATORY will supply technical service and prepare a report based solely on the sample submitted to the LABORATORY by the CLIENT. The CLIENT understands that application of the data to other devices is highly speculative and should be applied with extreme caution.
- 3.7 The LABORATORY agrees to exercise ordinary care in receiving, preserving and shipping (F.O.B. Littleton, MA) any sample to be tested, but assumes no responsibility for damages, either direct or consequential, which arise from loss, damage or destruction of the samples due to the act of examination, modification or testing, or technical services or circumstances beyond LABORATORY's control.
- 3.8 The LABORATORY will hold samples for thirty (30) days after tests are completed, or until the CLIENT's outstanding debts to the LABORATORY are satisfied, whichever is later.
- 3.9 The CLIENT recognizes that generally accepted error variances apply and agrees to consider such error variances in its use of test data.
- 3.10 It is agreed between LABORATORY and CLIENT that no distribution of any tests, reports or analysis other than that described below shall be made to any third party without the prior written consent of both parties unless such distribution is mandated by operation of law. It is agreed that tests, reports, or analysis results may be disclosed to third party auditors of the laboratory at the laboratory facility in the course of accreditation maintenance audits. No reference to reports or technical services of the LABORATORY shall be made in any advertising or promotional literature without the express written permission of the LABORATORY.
- 3.11 The CLIENT acknowledges that all employees of LABORATORY operate under employment contracts with the LABORATORY and CLIENT agrees not to solicit employment of such employees or to solicit information related to other clients from said employees.
- 3.12 In recognition of the relative risks and benefits of the project to both CLIENT and LABORATORY, the risks have been allocated such that the CLIENT agrees, to the fullest extent permitted by law, to limit the liability of the LABORATORY to the CLIENT for any and all claims, losses, costs, damages of any nature whatsoever or claims expenses from any cause or causes, including attorneys' fees and costs and expert witness fees and costs, so that the total aggregate liability of the LABORATORY to the CLIENT shall not exceed \$100,000, or the LABORATORY'S total fee for services rendered on this project, whichever is greater. It is intended that this limitation apply to any and all liability or cause of action however alleged or arising, unless otherwise prohibited by law.

Paragraph 4. INSURANCE:

- 4.1 LABORATORY shall secure and maintain throughout the full period of the services provided to the CLIENT adequate insurance to protect it from claims under applicable Workmen's Compensation Acts and also shall maintain one million dollars of general liability coverage to cover claims for bodily injury, death or property damage as may arise from the performance of its services.
- 4.2 The CLIENT hereby warrants that it has sufficient insurance to protect its employees adequately under applicable Workmen's Compensation Acts and for bodily injury, death, or property damage.
- 4.3 No insurance of whatever kind or type, which may be carried by either party is to be considered as in any way limiting any other party's responsibility for damages resulting from their operations or for furnishing work and materials.

Paragraph 5. PAYMENT:

- 5.1 CLIENT shall pay to LABORATORY such fees for services as previously agreed, orally or in writing, within 30 days of presentment of a bill for such services performed. In the event CLIENT ordered, orally or in writing, services but such services were not assigned a rate for billing, such services shall be billed at the LABORATORY's reasonable and customary rate.
- 5.2 CLIENT shall be responsible for all shipping, customs and other expenses related to services provided by LABORATORY to the CLIENT, and shall fully insure any test sample or other equipment provided to LABORATORY by the CLIENT.
- 5.3 Amounts overdue from CLIENT to LABORATORY shall be charged interest at a rate of 1½% per month.

Paragraph 6. ISO/IEC GUIDE 17025 ADDITIONS:

- 6.1 CLIENT agrees that this test report will not be reproduced except in full, without written approval from the LABORATORY.
- 6.2 CLIENT agrees that this test report shall not be used to claim product endorsement by A2LA or ANSI or any agency of the U.S. Government.
- 6.3 CLIENT agrees that test results presented herein relate only to the sample tested by the LABORATORY.

A2LA Accreditation

[illegible]

ETS EN 300 386-2 1997, 1998, ETS EN 300 386 2000 v1.2.1, 2001 v1.3.1 ETS 300 132-1 1996 ETS 300 132-2 1996 ETR 283 1997 <i>EU radio standards</i> (ETS) EN 300 385 v1.2.1: 1998, 1999 EN 300 330 v1.2.1: 1998, 1999 ETS 300 328 1996 ETS EN 300 440 v1.2.1 1999 EN 301 893:2002 v1.2.1 ETS 300 836-1:1998 EN301 489-17:2002 v1.2.1	Electromagnetic compatibility and radio spectrum matters (ERM); Telecommunication network equipment; Electromagnetic compatibility (EMC) requirements; Part 2: Product family standard. Equipment Engineering (EE); Power supply interface at the input to telecommunications equipment; Part 1: Operated by alternating current (ac) derived from direct current (dc) sources Equipment Engineering (EE); Power supply interface at the input to telecommunications equipment; Part 2: Operated by direct current (dc) Equipment Engineering (EE); Transient voltages at Interface A on telecommunications direct current (DC) power distributions. Electromagnetic compatibility and Radio spectrum matters (ERM); Electromagnetic Compatibility (EMC) standard for fixed radio links and ancillary equipment (ETS) Electromagnetic compatibility and Radio spectrum matters (ERM); Short range devices (SRD); Technical characteristics and test methods for radio equipment in the range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz Radio Equipment and Systems (RES); Wideband transmission systems; Technical characteristics and test conditions for data transmission equipment operating in the 2,4 GHz ISM band and using spread spectrum modulation techniques Electromagnetic compatibility and Radio spectrum matters (ERM); Short range devices; Technical characteristics and test methods for radio equipment to be used in the 1 Ghz to 40 Ghz frequency range Broadband Radio Access Networks (BRAN); 5 GHz (draft) high performance RLAN; Harmonized EN covering Essential requirements of article 3.2 of the R&TTE Directive Broadband Radio Access Networks (BRAN); High Performance Radio Local Area Network (HIPERLAN) Type 1; Conformance testing specification; Part 1: Radio Type approval and Radio Frequency (RF) conformance test specification Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for 2,4 GHz wideband transmission systems and 5 GHz high performance RLAN equipment	EN 300 328-2:2001 v1.2.1 EN 301 489-1:2002 EN 60669-2-1:2002 <i>Canada Radio Standards</i> Canadian GL-36 1995 Canadian RSS-119 1999, 2000 Issue 6 Canadian RSS-134 1996 & 2000, Issue 1 Rev 1 Canadian RSS-210 2000 Issue 3, RFS29 1998 <i>FCC Standards</i> 47 CFR FCC low power transmitters operating on frequencies below 1 GHz, emergency alert systems, unintentional radiators and ISM devices. 47 CFR FCC low power transmitters operating on frequencies above 1 GHz, with the exception of spread spectrum devices. 47 CFR FCC Unlicensed Personal Scope A3 Communications System (PCS) devices 47 CFR FCC Unlicensed National Scope A4 Information Infrastructure devices and low power transmitters using spread spectrum techniques. 47 CFR FCC Personal mobile Scope B1 Radio Services in the following FCC Rule Parts 22, 24, 25, 27. 47 CFR FCC General Mobile Radio Scope Services in the following FCC Rule Parts 22, 74, 90, 95, 97. 47 CFR FCC Maritime and Aviation Scope RadioServices in 47 CFR Parts 80 and 87 47 CFR FCC Microwave Radio Services B4 Scope in 47 CFR Parts 21, 74 and 101. Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband Transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using spread spectrum modulation techniques; Part 2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements Switches for household and similar fixed electrical installations -- Part 2-1: Particular requirements -- Electronic switches Industry Canada -- technical requirements for low power Devices in the 2400 -- 2483.5 MHz band. Industry Canada -- Land mobile and fixed radio Transmitters and receivers, 27.41 to 960.0 MHz Industry Canada -- 900 MHz narrowband personal communications services Industry Canada -- Low power license-exempt radio 2001 Issue 5 communication devices Specification for Restricted Radiation Radio Apparatus (New Zealand) Scope A1 Scope A2 B1 B2 B3 B4	
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FCC/OST MP-5 1986 GR-1089-CORE: 1997, 1999 issue 2/ 2002 Issue 3 <i>ANSI EMC Standards</i> ANSI C63.4: 1992, 1999, 2001, 2003 ANSI C63.5 1988 <i>IEEE EMC Standards</i> IEEE C62.41: 1980, 1991 <i>Swedish EMC Standards</i> BAKOM 3336.3 1995 <i>South African EMC standards other than CISPR equivalents</i> SABS 1718-1: 1996 <i>Japanese VCCI Standards</i> VCCI V-3/99.05 1999 VCCI V-4/99.05 1999 Telecommunications Telecommunications Registration; General test methods; Lightning surge; Drop testing; Balance testing; Signal power (metallic and longitudinal); Frequency measurements; Pulse templates; Leakage testing; Impedance testing; Hearing Aid Compatibility testing (<i>excluding volume control</i>); Protocol analysis and Jitter testing. Telecom Standards FCC 47 CFR Part 68 Telephone CS-03 Issue 8 1996 through amendment 5 TIA/EIA TSB31-B 1998	FCC (Federal Communications Commission) methods Of measurement of radio noise emissions from industrial, scientific and medical equipment. Bellcore electromagnetic compatibility and electrical safety -- Generic criteria for network telecommunications equipment. American National Standard for methods of measurement of radio-noise emissions for low-voltage electrical and electronic equipment in the range of 9 kHz to 40GHz. American National Standard for electromagnetic compatibility -- radiated emissions measurements in electromagnetic interference (EMI) control -- calibration of antennas. IEEE recommended practice on surge voltages in low-voltage AC power circuits Electromagnetic compatibility and electrical safety (EMC & S) for wired terminal equipment. Harmonization document information over the OFCOM requirements. South African Bureau of Standards: Specification for Gaming equipment. Part 1: Casino equipment. Technical Requirements Instruction for Test Conditions for Requirement under Test	TIA/EIA-IS-968 TIA/EIA-IS-883 TIA-968-A T1.TRQ.6-2001 Canada VDSL Issue 1 January 2003 AS/ACIF S002-2001 AS/ACIF S016-2001 AS/ACIF S031-2001 AS/ACIF S038-2001 AS/ACIF S043-2001 ITU-T G.703 HKTA 2028 HKTA 2029 TBR 1 : 1995 TBR 2 : 1997 Telecommunications Telephone Terminal Equipment Technical Requirements for Connection of Terminal Equipment to the Telephone Network Telecommunications Telephone Terminal Equipment Supplemental Technical Requirements for Connection of Stutter Dial Tone Detection Devices and ADSL Modems to the Telephone Network Telecommunications Telephone Terminal Equipment Technical Requirements for Connection of Terminal Equipment to the Telephone Network Technical Requirements for SHDSL, HDSL2, HDSL4 Digital Subscriber Line Terminal Equipment to Prevent Harm to the Telephone Network Industry Terminal Attachment Program Requirements and Test Methods for Very-High-Bit-Rate Digital Subscriber Line (VDSL) Terminal Equipment Analogue interworking and non-interference requirements for Customer Equipment for connection to the Public Switched Telephone Network Requirements for Customer Equipment for connection to hierarchical digital interfaces Requirements for ISDN Basic Access Interface Requirements for ISDN Primary Rate Access Interface Requirements for Customer Equipment for Connection to a Metallic Local Loop Interface of a Telecommunications Network --- Part 1: General Part 2: Broadband Part 3: DC, Low Frequency AC and Voiceband Physical/electrical characteristics of hierarchical Digital interfaces Network connection specification for connection of CPE to the PTNs in Hong Kong using digital leased circuits at data rate of 1544 kbit/s Network connection specification for connection of CPE to the PTNs in Hong Kong using digital leased circuits at data rate of 2048 kbit/s Attachment requirements for terminal equipment to be connected to circuit switched data networks and leased circuits using a CCITT Recommendation X.21 interface, or at an interface physically, functionally and electrically compatible with CCITT Recommendation X.21 but operating at any data signaling rate up to, and including, 1 984 kbit/s Attachment requirements for Data Terminal Equipment (DTE) to connect to Packet Switched Public Data Networks (PSPDNs) for CCITT Recommendation X.25 interfaces at data signaling rates up to 1 920 kbit/s utilizing interfaces derived from CCITT Recommendations X.21 and X.21 bit	
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TBR 3 : 1995 + Amdt : 1997 TBR 4 : 1995 + Amdt : 1997 TBR 012 : 1993 + Amdt : 1996 TBR 013 : 1996 TBR 21 : 1998 TBR 24 : 1997 Australia TS 002 : 1997 TS 016 : 1997 TS 031 : 1997 TS 038 : 1997 AS/ACIF S043.2:2001 Product Safety General test methods; Input tests; Electric strength tests; Impulse tests; Permanency of marking tests; Accessibility tests; Energy Hazard measurements; Capacitor discharge tests; Humidity conditioning; Earthing tests; Limited power source measurements; Stability tests; Steel ball tests; Lithium Battery Reverse Current measurements; Leakage current tests; Transformer abnormal tests; Telecom leakage tests; Over voltage/power cross tests (excluding x-ray tests). <u>Product Safety Standards</u> Specific Product Safety Standards IEC 950 1991 UL 1950 1998 CSA C22.2 No.950-95 UL 60950 2000 (A2LA Cert. No. 1627.01) 11/28/05	Integrated Services Digital Network (ISDN); Attachment requirements for terminal equipment to connect to an ISDN using ISDN basic access Integrated Services Digital Network (ISDN); Attachment requirements for terminal equipment to connect to an ISDN using ISDN primary rate access Business Telecommunications (BT); Open Network Provision (ONP) technical requirements; 2 048 kbit/s digital unstructured leased line (D2048U) Attachment requirements for terminal equipment Business Telecommunications (BTC); 2 048 kbit/s digital structured leased lines (D2048S); Attachment requirements for terminal equipment interface Terminal Equipment (TE); Attachment requirements for pan-European approval for connection to the analogue Public Switched Telephone Networks (PSTNs) of TE (excluding TE supporting the voice telephony service) in which network addressing, if provided, is by means of Dual Tone Multi Frequency (DTMF) signaling Business Telecommunications (BTC); 34 Mbit/s digital Unstructured and structured leased lines (D34U and D34S); Attachment requirements for terminal equipment interface Analogue Interworking and Non interference Requirements for Customer Equipment Connected to the Public Switched Telephone Network General Requirements for Customer Equipment Connected to Hierarchical Digital Interfaces Requirements for ISDN Basic Access Interface Requirements for ISDN Primary Rate Access Interface Requirements for Customer Equipment for connection to a metallic loop interface of a Telecommunications Network – Part 2 Broadband Title Safety of information technology equipment including Includes Amendments 1, 2, 3, and 4 electrical business equipment. Safety of information technology equipment, including electrical business equipment. Safety of Information Technology Equipment (UL 1950) Safety of information technology equipment	IEC 60950 2000 EN 60950 1997, 1998, 2000 IEC 60950-1 2001 UL 60950-1 2003 CSA C22.2 No. 60950-00 CSA C22.2 No. 60950-1 03 AS/NZS 3260 1993 AS/NZS 3260 Supp 1 1996 ACA TS 001 1997 UL 1459 1995 IEC 1010-1 1990 IEC 61010-1 1993 EN 61010-1 1993, 2001 IEC 61010-1 2001 UL 61010B-1 2003 UL 3101-1 1993 CAN/CSA 1010-1 1999 (Including AM 2) UL 3111-1 1996 UL 3121-1 1995 IEC 60601-1 1995 EN 60601-1 1995 (Including AM 2) UL 2601-1 1997 IEC 60065 1998, 2000 ANSI/UL 6500: 1998 CAN/CSA 60065-00 AS/NZS 3250 1995 AS/NZS 60065 2000 Canadian C22.2 No. 1-94 (1-98) 1998 EN 60065 1994 IEC 60825 1990 EN 60825-1 1994 IEC 60825-1 2001 IEC 60825-2 2000-5 IEC 60825-4 1997-11 IEC 60335-1 1995 (Including AM2 – 1997 & AM 12 – 1997) EN 60335-1 2001 UL 60335-1 1998 CAN/CSA E335-1 1994	Safety of information technology equipment Safety of information technology equipment, including Electrical business equipment. Approval and test specification – Safety of information technology equipment including electrical business Equipment. Approval and test specification – Safety of information technology equipment including electrical business equipment – Alphabetical reference index to IEC 950 (Supplement to AS/NZS 3260:1993) Australian Communications Authority – Safety requirements for customer equipment. Telephone Equipment Safety requirements for electrical equipment for measurement, control and laboratory use, Part 1: General requirements. Safety requirements for electrical equipment for measurement, control and laboratory use, Part 1: General requirements. Electrical equipment for laboratory use Part 1: General requirements. Electrical measuring and test equipment. Part 1: General requirements. Medical electrical equipment. Part 1: General requirements for safety. Medical electrical equipment Medical electrical equipment. Part 1: General Requirements for safety. Audio, video and similar electronic apparatus – Safety requirements Audio/video and musical instrument apparatus for Household, commercial and similar general use Australian/New Zealand Standard – Approval and test Specification – Mains operated electronic and related Equipment for household and similar general use Audio, video and similar electronic equipment. Consumer and 1994, commercial products Safety requirements for main operated electronic and related apparatus for household and similar general use. Radiation safety of laser products, equipment Classification, requirements and user's guide Safety of laser products Part 1: equipment Classification, requirements and user's guide. Safety of laser products – Part 2: Safety of optical communication systems Safety of laser products – Part 4: Laser guards Safety of household and similar electrical appliances Part 1: General requirements
UL 61010A-1 : 2002 EN 61010-1 : 2001 AS/NZS 60950 : 2000 Environmental² <u>Environmental Standards</u> GR-63-CORE ETS 300 019 (vibration up to 1000Hz)	Electrical equipment for laboratory use; part 1: General requirements Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements Safety information technology equipment Title NEBS Requirements: Physical Protection Environmental conditions and environmental tests For telecommunications equipment	(A2LA Cert. No. 1627.01) 11/28/05	Page 10 of 11
² Environmental testing is performed at the satellite facility located at 168 Ayer Rd, Littleton, MA 01460 (A2LA Cert. No. 1627.01) 11/28/05	Page 11 of 11		