



Test Report

Report No	EG0562-2
Client	Bose Corporation 1 New York Ave Framingham, MA 01701
Phone	508-766-1514
FRN	0006179345
	RSS-210 Issue 6; 47 CFR 15.247
Model	SL2 Transmitter
FCC ID	A94YZUT
IC	3232-YZUT
Equipment Type	Digital Transmission System
Equipment Code	DTS
Results	As detailed within this report
Prepared by	 Evan Gould – Test Engineer
Authorized by	 Michael Buchholz – EMC Manager
Issue Date	6/19/06
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.

Table Of Contents

<i>Summary</i>	3
<i>Test Methodology</i>	3
<i>Statement of Conformity</i>	4
<i>EUT Configuration</i>	5
<i>Bandwidth</i>	6
<i>Peak Output Power</i>	8
<i>Power Spectral Density</i>	10
<i>Number of Hopping Channels</i>	12
<i>Time of Occupancy</i>	13
<i>Conducted Spurious Emissions</i>	15
<i>Receiver Conducted Spurious Emissions (IC Requirement)</i>	16
<i>Radiated Spurious Emissions</i>	17
<i>AC Line Conducted Emissions</i>	18
<i>Voltage Variations</i>	19
<i>Test Equipment Used</i>	20
<i>A2LA Accreditation</i>	26

Summary

This test report supports an application for certification of a transmitter operating pursuant to 47 CFR 15.247 and RSS-210(A8.3). The product is the Bose SL2 Wireless Surround Link transmitter unit (Model: SL2 Transmitter). It is a transceiver that operates in the range 5729-5846MHz. It is a hybrid system employing both spread spectrum and frequency hopping techniques.

Test Methodology

Radiated emissions testing is performed according to the procedures specified in ANSI C63.4 (2003) and RSS-GEN. Emissions were maximized by rotating the device around it's vertical axis as well as varying the test antenna's height and polarity. A 50ohm/50uH LISN was used for AC line conducted emissions measurements. The environmental conditions are shown below.

Date	Temperature (°C)	Humidity (%)
5/22/06	22.9	33
5/23/06	22.4	32
5/25/06	24.7	33
5/26/06	25.1	36

Frequency range investigated: 0.15MHz – 40GHz

Measurement distance:	0.15 – 30MHz	Conducted
	30MHz – 6GHz	3m
	6 – 40GHz	1m

The device operates with hopping tables consisting of 12 channels. The diagnostic firmware which was used during testing allowed the use of the absolute lowest and highest of all available channels. The channels used for testing were:

Low: 5729MHz
Mid: 5789MHz
High: 5846MHz

Statement of Conformity

The SL2 Transmitter has been found to conform to the following parts of 47 CFR, RSS-Gen, and RSS-210 as detailed below:

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.
		15.27	No special accessories are required for compliance.
	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.
	A8.3	15.247	The unit complies with the requirements of 15.247 and A8.3

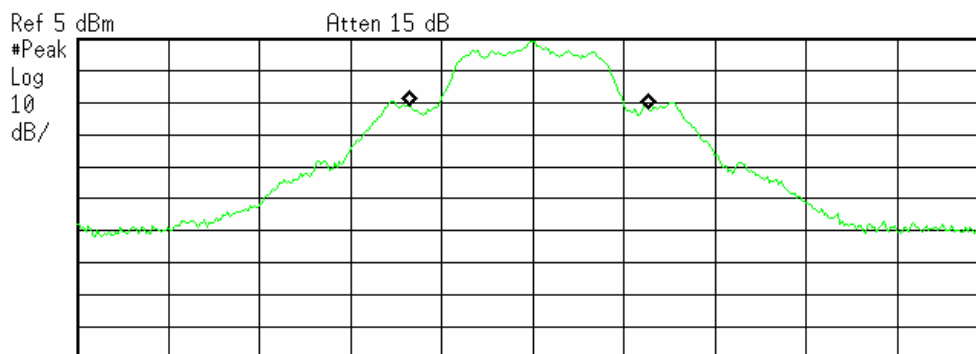
EUT Configuration

EUT Configuration				
Work Order: G0562				
Company: Bose Corporation				
Company Address: 1 New York Ave. Framingham, MA 01701				
Contact: Peter Boers				
Person Present: Peter Boers				
MN		SN		
EUT: SL2 Transmitter		T1		
EUT Description: SL2 Wireless Surround Link				
EUT Max Frequency: 5846MHz				
Support Equipment:		MN	SN	
Bose AC Adaptor	94PS-062A	291711-001		
Bose AMP	LIFESTYLE SA3	035004E33490008AC		
EUT Cables:	Qty	Shielded?	Length	Ferrites
DC power	1	No	2m	No
Input cable	1	No	5ft	No
Unpopulated EUT Ports:		Qty	Reason	
None				
Software / Operating Mode Description:				
Conducted Measurements: Running diagnostic firmware controlled through Hyper-terminal which allows channel selection, modulation, hopping function on/off.				
Radiated Measurements: Running production firmware, set up as a system with the SL2 Receiver, transmitting sound/music. Both the TX and RX functions of the device are active during constant communications.				

Bandwidth**Low Channel Bandwidth**

* Agilent 13:13:49 May 22, 2006

R L



Center 5.729 GHz

#Res BW 100 kHz

#VBW 300 kHz

Span 10 MHz

Sweep 4 ms (401 pts)

Occupied Bandwidth
2.6268 MHz

Occ BW % Pwr 99.00 %

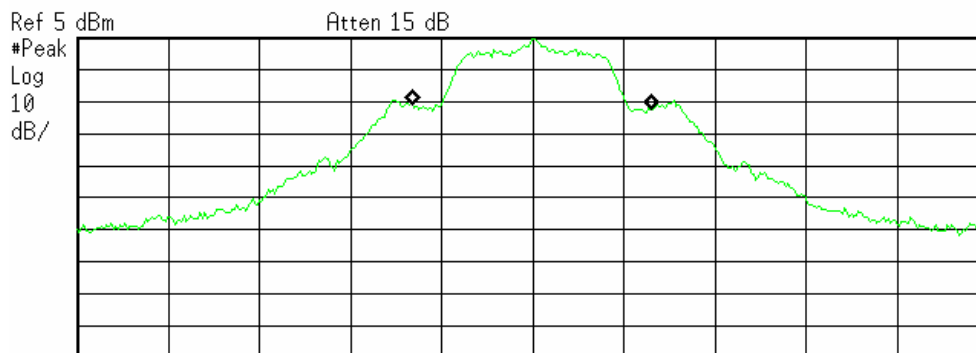
x dB -6.00 dB

Transmit Freq Error -27.915 kHz
x dB Bandwidth 1.550 MHz

Mid Channel Bandwidth

* Agilent 13:11:47 May 22, 2006

R L



Center 5.789 GHz

#Res BW 100 kHz

#VBW 300 kHz

Span 10 MHz

Sweep 4 ms (401 pts)

Occupied Bandwidth
2.6286 MHz

Occ BW % Pwr 99.00 %

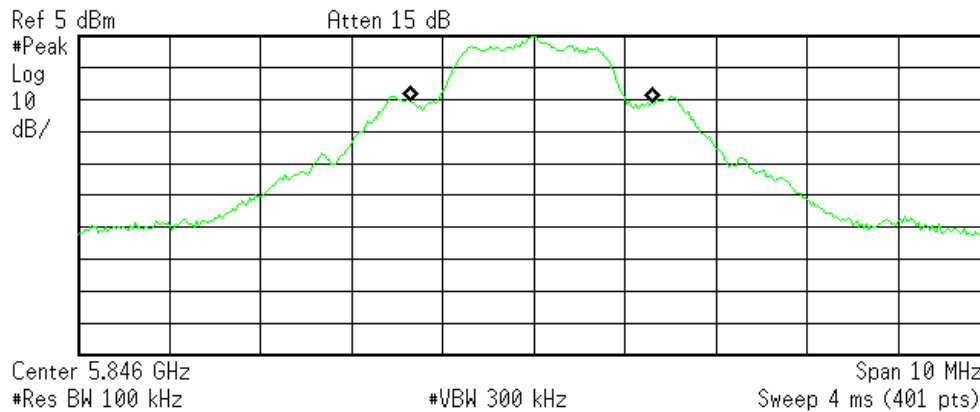
x dB -6.00 dB

Transmit Freq Error -2.589 kHz
x dB Bandwidth 1.563 MHz

High Channel Bandwidth

* Agilent 13:09:39 May 22, 2006

R L



Occupied Bandwidth
2.6461 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

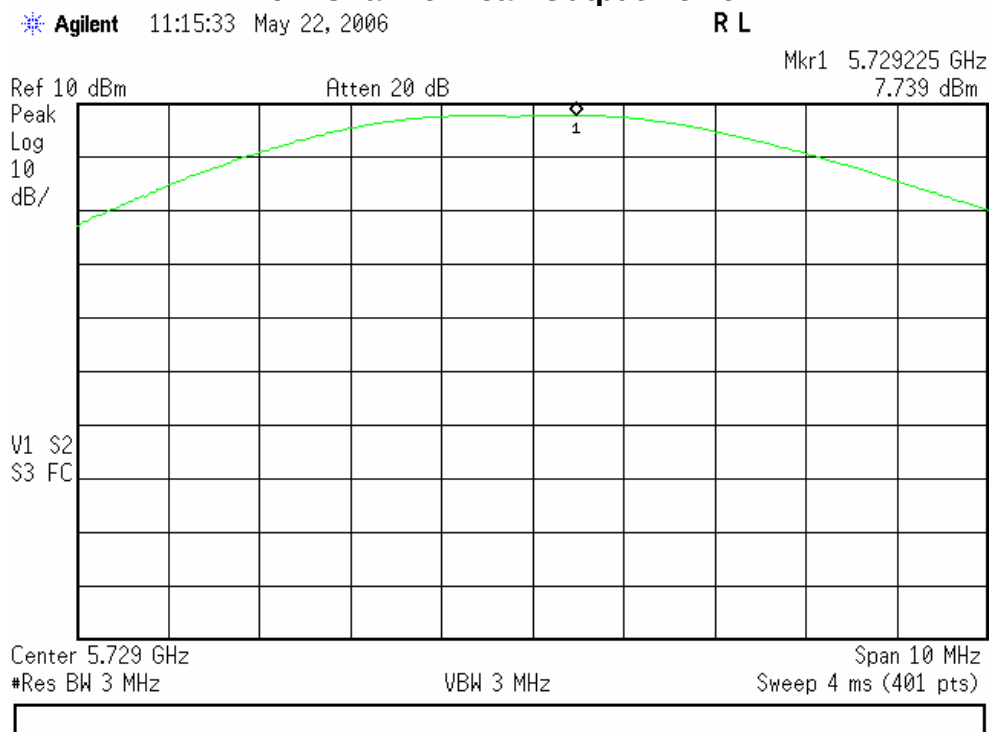
Transmit Freq Error -22.896 kHz
x dB Bandwidth 1.562 MHz

Peak Output Power**LIMIT**

1 Watt = 30dBm [15.247(b)(3)]

MEASUREMENTS

Peak Output Power			Curtis-Straus LLC		
Date: 22-May-06			Work Order: G0562		
Engineer: Evan Gould					
Company: Bose			EUT Desc: SL2 Transmitter		
Notes: RBW = 3MHz					
VBW = 3MHz					
Channel	Frequency (MHz)	Reading (dBm)	47 CFR 15.247(b)(3)		
			Limit (dBm)	Margin (dB)	Result (Pass/Fail)
Low	5729.0	7.7	30.0	-22.3	Pass
Mid	5789.0	7.8	30.0	-22.2	Pass
High	5846.0	8.2	30.0	-21.8	Pass
Test Site: RFI 3			Analyzer: Orange		

PLOTS**Low Channel Peak Output Power**

Mid Channel Peak Output Power

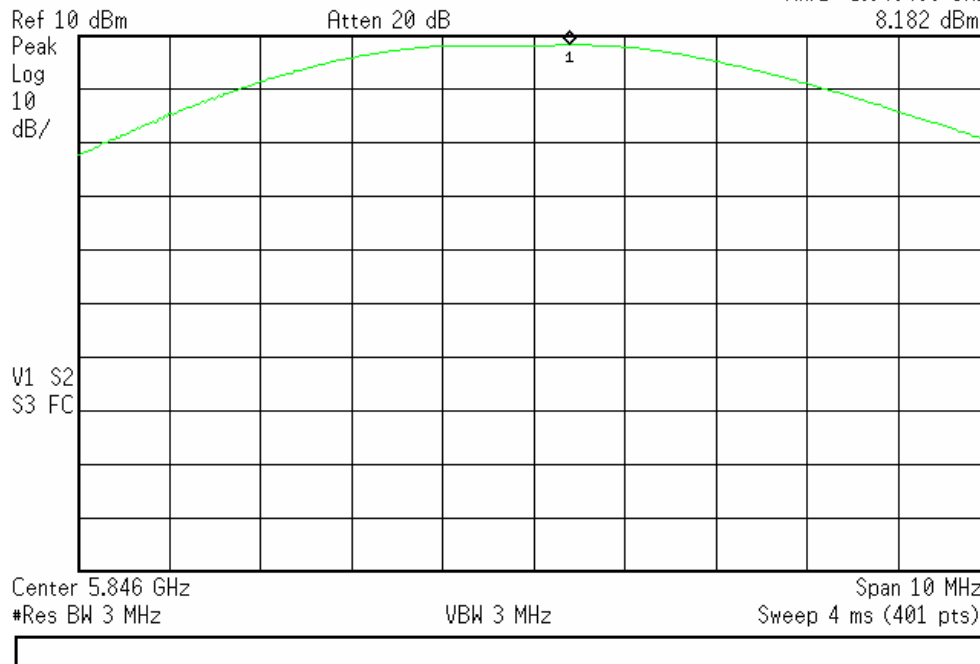
* Agilent 11:18:58 May 22, 2006

R L

Mkr1 5.789050 GHz
7.836 dBm**High Channel Peak Output Power**

* Agilent 11:22:56 May 22, 2006

R L

Mkr1 5.846400 GHz
8.182 dBm

Power Spectral Density**LIMIT**

8dBm in any 3kHz band [15.247(f)]

MEASUREMENTS

Power Spectral Density			Curtis-Straus LLC		
Date: 22-May-06			Work Order: G0562		
Engineer: Evan Gould					
Company: Bose			EUT Desc: SL2 Transmitter		
Notes: RBW = 3kHz					
VBW = 10kHz					
Channel	Frequency (MHz)	Reading (dBm)	47 CFR 15.247(f)		
			Limit (dBm)	Margin (dB)	Result (Pass/Fail)
Low	5729.0	2.4	8.0	-5.6	Pass
Mid	5789.0	2.5	8.0	-5.5	Pass
High	5846.0	2.9	8.0	-5.1	Pass
Test Site: RFI3			Analyzer: Orange		

PLOTS**Low Channel Power Spectral Density**

Agilent 14:29:52 May 22, 2006

R L

Mkr1 5.72874000 GHz

2.454 dBm

Ref 10 dBm

Atten 20 dB

Peak

Log

10

dB/

W1 S2

S3 FS

Center 5.729 GHz

#Res BW 3 kHz

VBW 10 kHz

Span 100 kHz

#Sweep 33 s (401 pts)

Mid Channel Power Spectral Density

* Agilent 14:25:53 May 22, 2006

R L

Mkr1 5.78864350 GHz
2.535 dBm

Ref 10 dBm

Atten 20 dB

Peak
Log
10
dB/W1 S2
S3 FS

Center 5.789 GHz

#Res BW 3 kHz

VBW 10 kHz

Span 100 kHz

#Sweep 33 s (401 pts)

High Channel Power Spectral Density

* Agilent 14:19:46 May 22, 2006

R L

Mkr1 5.84598650 GHz
2.924 dBm

Ref 10 dBm

Atten 20 dB

Peak
Log
10
dB/W1 S2
S3 FS

Center 5.846 GHz

#Res BW 3 kHz

VBW 10 kHz

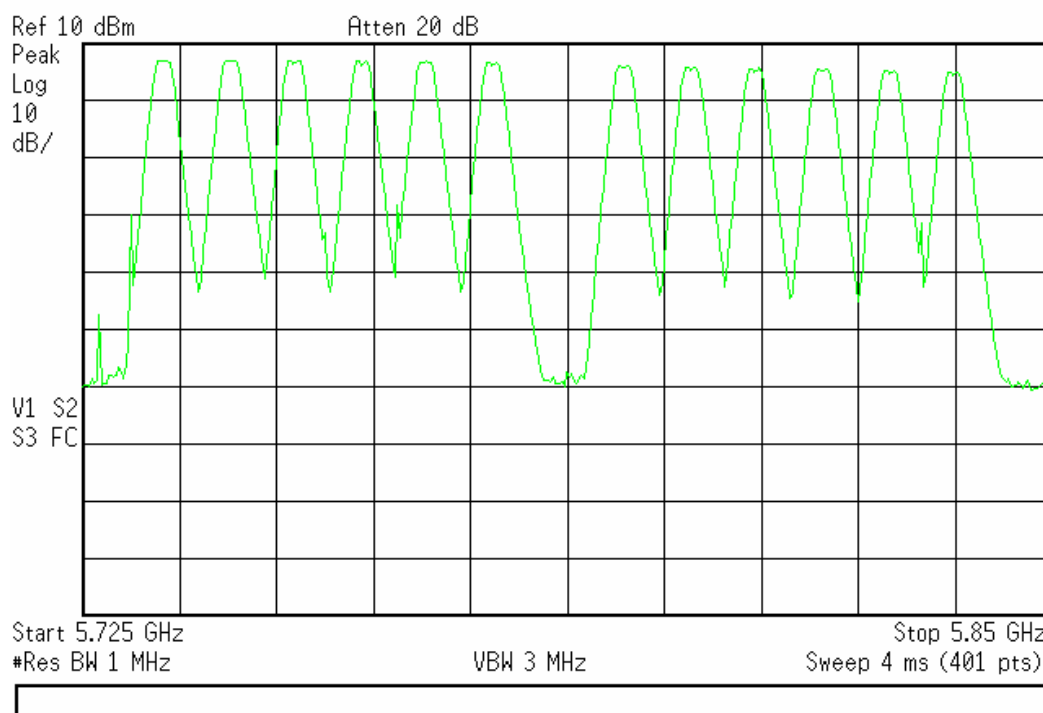
Span 100 kHz

#Sweep 33 s (401 pts)

Number of Hopping Channels

* Agilent 09:56:57 May 22, 2006

R L



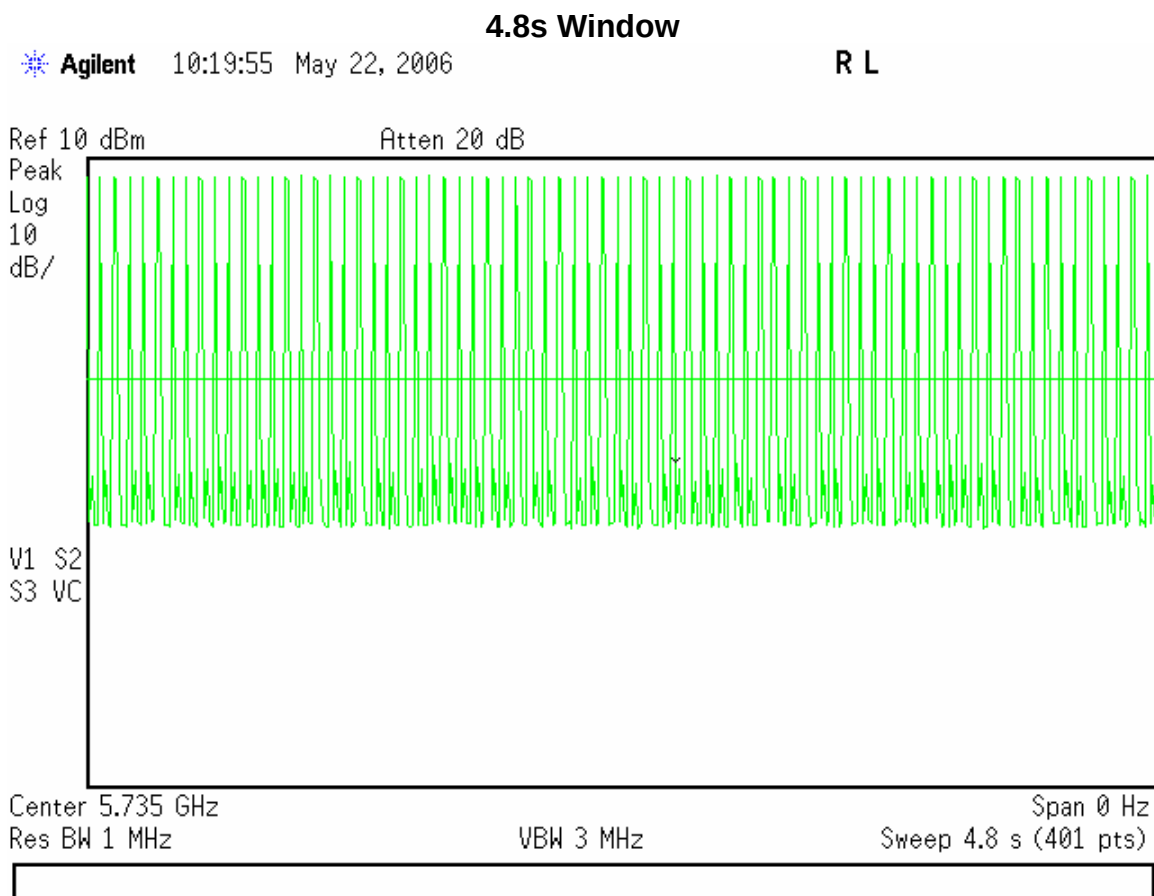
Since this is a hybrid device, there is no minimum number of hopping channels limit.

Time of Occupancy

LIMIT

Time of occupancy limited to an average of 0.4 seconds within a period of time equal to the number of hopping frequencies multiplied by 0.4. [15.247(f)]

Limit = 0.4s per (12 x 0.4)s = 0.4s per 4.8s



Note: There are 75 transmission bursts in the plot above.

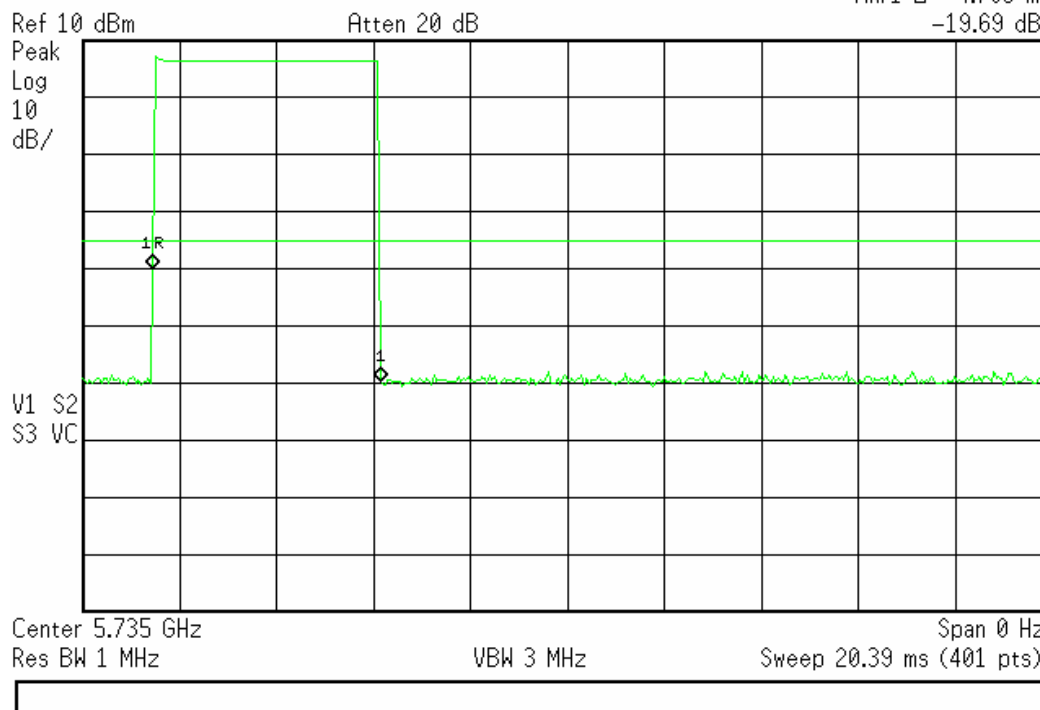
Individual Transmission Dwell Time

* Agilent 10:10:30 May 22, 2006

R L

Mkr1 Δ 4.793 ms

-19.69 dB



Time of Occupancy = $75 \times 4.79\text{ms} = 359.3\text{ms}$

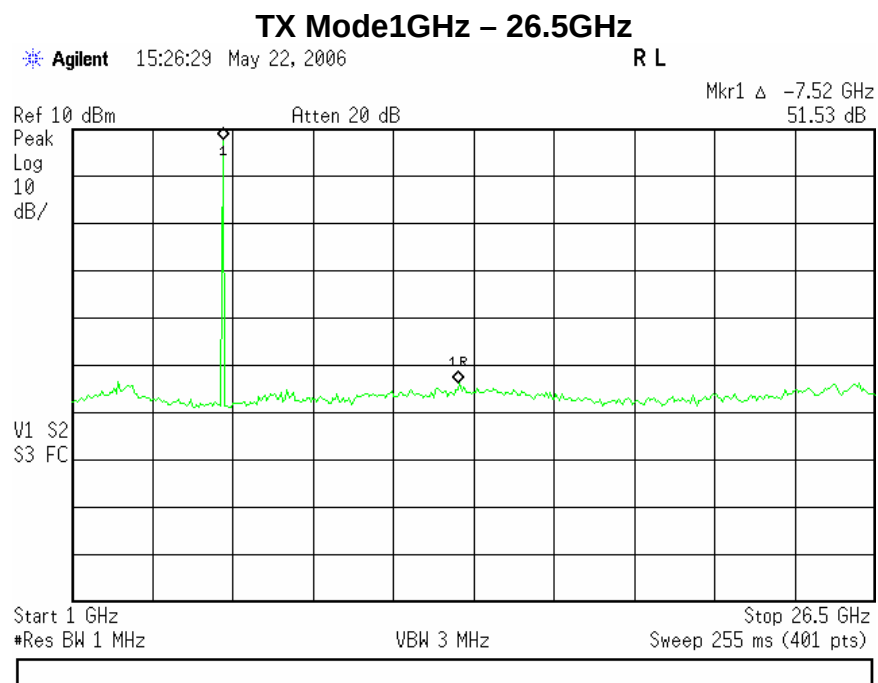
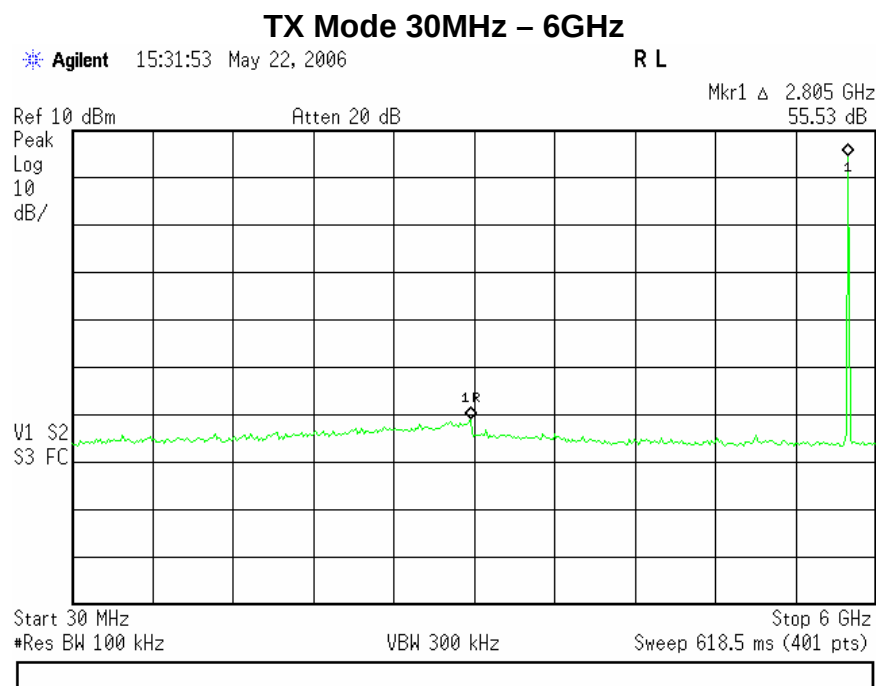
Time of Occupancy meets the limit of 0.4s (400ms).

Conducted Spurious Emissions

LIMIT

20dB down from fundamental [15.247(d)]

PLOTS



There are no emissions within 20 dB of the fundamental peak.

Receiver Conducted Spurious Emissions (IC Requirement)**LIMITS**

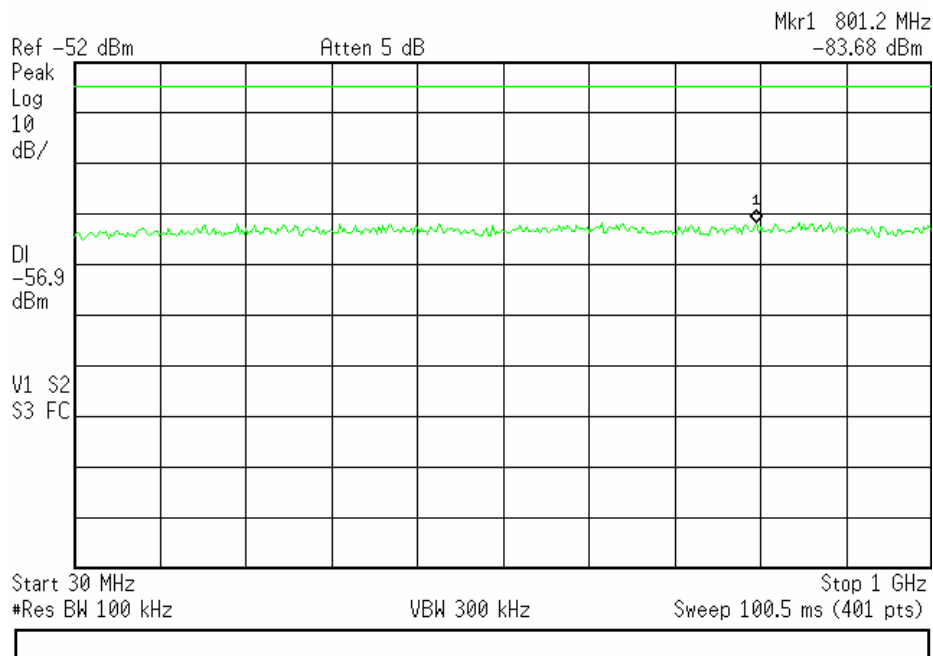
2nW (-56.9dBm) in the range 30-1000MHz

5nW (-53.0dBm) above 1GHz [RSS-Gen Issue 1 Section 6b]

PLOTS**RX Mode 30MHz to 1000MHz**

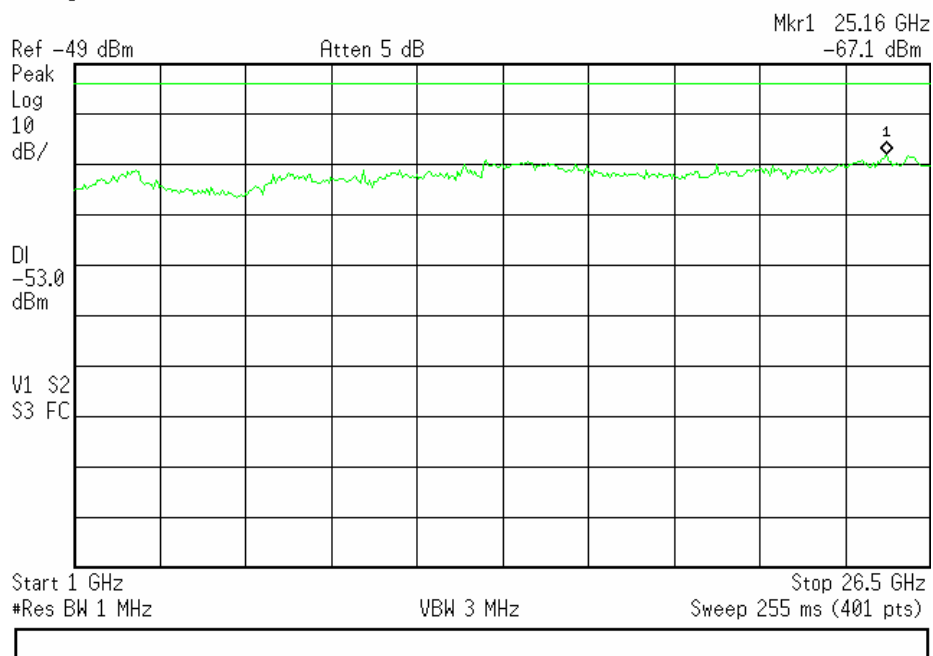
Agilent 15:47:29 May 22, 2006

R L

**RX Mode 1GHz to 26.5GHz**

Agilent 16:09:35 May 22, 2006

R L



Radiated Spurious Emissions

LIMITS

"...radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a)" [15.247(d)]

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

MEASUREMENTS

Radiated Emissions Table							Curtis-Straus LLC		
Date: 23-May-06 25-May-06		Company: Bose			Work Order: G0562				
Engineer: Evan Gould		EUT Desc: SL2 Transmitter							
Frequency Range: 30-1000MHz					Measurement Distance: 3 m				
Notes:					RBW: 120kHz				
Test Site: "T"					VBW: 300kHz				
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBμV/m)	47 CFR 15.209		
							Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)
Vbb	124.7	44.0	22.2	14.4	0.9	37.1	43.5	-6.4	Pass
V	159.7	41.3	22.2	12.6	1.1	32.8	43.5	-10.7	Pass
H	184.3	40.8	22.2	11.4	1.3	31.3	43.5	-12.2	Pass
H	208.9	38.4	22.2	11.4	1.6	29.2	43.5	-14.3	Pass
H	233.5	43.9	22.2	11.8	1.7	35.2	46.0	-10.8	Pass
H	270.3	44.6	22.2	13.6	2.0	38.0	46.0	-8.0	Pass
H	294.9	46.5	22.2	13.9	2.1	40.3	46.0	-5.7	Pass
H	319.5	46.0	22.1	14.2	2.2	40.3	46.0	-5.7	Pass
H	344.1	45.9	22.1	15.0	2.4	41.2	46.0	-4.8	Pass
Table Result:		Pass	by	-4.8 dB		Worst Freq:		344.1 MHz	
30-1000MHz >>		Pre-Amp: Blue		Cable: EMIR-08		Analyzer: Black		Antenna: Red-White	
1-18GHz >>		Pre-Amp: Yellow-Blk		Cable: EMIR HIGH-02		Analyzer: Orange		Antenna: Orange Horn	
18-26.5GHz >>		Pre-Amp: Yellow		Cable: EMIR HIGH-02		Analyzer: Orange		Antenna: White Horn	
26.5-40GHz >>				Cable: EMIR HIGH-02, 05		Analyzer: Orange		Antenna: 26.5-40GHz	

AC Line Conducted Emissions**LIMITS**

Frequency of emission (MHz)	Quasi-peak limit (dB μ V)	Average limit (dB μ V)
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: 25-May-06			Company: Bose			Work Order: G0562					
Engineer: Evan Gould			EUT Desc: SL2 Transmitter			Test Site: EMI 1					
Notes:								RBW: 9kHz			
ment Device:			Yellow LISN			VBW: 30kHz					
Range: 0.15-30MHz			Spectrum Analyzer: Blue								
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
0.15	24.5	25.8	10.8	10.1	21.3	66.0	-18.9	56.0	-23.9	Pass	
2.38	8.7	11.1			20.2	56.0	-24.7	46.0	-14.7	Pass	
9.92	7.1	8.0			20.3	60.0	-31.7	50.0	-21.7	Pass	
15.00	8.4	9.6			20.4	60.0	-30.0	50.0	-20.0	Pass	
22.00	7.6	7.0			20.3	60.0	-32.1	50.0	-22.1	Pass	
26.20	8.2	9.4			20.4	60.0	-30.2	50.0	-20.2	Pass	
Table Result:		Pass	by		-14.70 dB	Worst Freq:			2.38 MHz		

Voltage Variations

Voltage Variations FCC 15.31(e)	
Work Order: G0562 Company: Bose EUT: SL2 Transmitter Date: 5/26/2006	
Engineer: Evan Gould Analyzer: Orange Voltage Spec: 120VAC	
RBW: 1MHz	VBW: 3MHz
Voltage	RF Level
VAC	dBm
102	8.4
138	8.4

Test Equipment Used

REV. 24-MAY-2006

SPECTRUM ANALYZERS / RECEIVERS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	9kHz-1.8GHz	8591E	HP	3441A03559	00024	I	30-DEC-2006
WHITE	9kHz-22GHz	8593E	HP	3547U01252	00022	I	14-MAR-2007
BLUE	9kHz-1.8GHz	8591E	HP	3223A00227	00070	I	14-DEC-2006
YELLOW	9kHz-2.9GHz	8594E	HP	3523A01958	00100	I	Out of Calibration
GREEN	9kHz-26.5GHz	8593E	HP	3829A03618	00143	I	21-NOV-2006
BLACK	9kHz-12.8GHz	8596E	HP	3710A00944	00337	I	02-NOV-2006
TELECOM 3585A	20Hz-40.0MHz	3585A	HP	2504A05219	00030	I	07-FEB-2007
TELECOM 3585A	20Hz-40.0MHz	3585A	HP	1750A03418	00558	1	Out of Calibration
TELECOM 3585A	20Hz-40.0MHz	3585A	HP	1750A02762	01067	I	01-MAR-2007
ORANGE	9kHz-26.5GHz	E4407B	HP	US39440975	00394	I	01-DEC-2006
BROWN (RENTAL)	9kHz-26.5GHz	E4407B	HP	SG44210511	Rental	1	05-JAN-2007
EMI TEST RECEIVER	20-1000MHz	ESVS30	R&S	827957/001	01098	I	27-OCT-2006

LISNs/MEASUREMENT PROBES	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	10kHz-30MHz	8012-50-R-24-BNC	SOLAR	956348	00753	II	05-MAY-2007
BLUE (DC)	10kHz-30MHz	8012-50-R-24-BNC	SOLAR	956349	00752	II	05-MAY-2007
YELLOW-BLACK	10kHz-30MHz	8012-50-R-24-BNC	SOLAR	984735	00248	II	05-MAY-2007
ORANGE	10kHz-30MHz	8012-50-R-24-BNC	SOLAR	903707	00754	II	05-MAY-2007
GOLD (DC)	10kHz-30MHz	8012-50-R-24-BNC	SOLAR	984734	00247	II	05-MAY-2007
BROWN	10kHz-30MHz	8012-50-R-24-BNC	SOLAR	0411656	00986	II	05-MAY-2007
GREEN	10kHz-30MHz	8012-50-R-24-BNC	SOLAR	0411657	00987	II	08-MAY-2007
YELLOW	10kHz-30MHz	8012-50-R-24-BNC	SOLAR	0411658	1080	II	05-MAY-2007
WHITE-BLACK	10kHz-30MHz	8610-50-TS-100-N	SOLAR	972019	00678	II	05-MAY-2007
BLACK	10kHz-30MHz	8610-50-TS-100-N	SOLAR	972017	00675	II	05-MAY-2007
RED-BLACK	10kHz-30MHz	8610-50-TS-100-N	SOLAR	972016	00677	II	05-MAY-2007
BLUE-BLACK	10kHz-30MHz	8610-50-TS-100-N	SOLAR	972018	00676	II	05-MAY-2007
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	23-JAN-2008
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
SITE J	93448	IC 2762A-10		II	11-APR-2008

LINE CONDUCTED TEST SITES	FCC CODE	IC CODE	VCCI CODE	CAT	CALIBRATION DUE
EMI 1	93448	N/A	C-1801	III	NA
EMI 2	93448	N/A	C-1802	III	NA
EMI 3	93448	N/A	C-1803	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	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	33-50 GHz	11970Q	HP	3003A03155	00104	I	08-NOV-2007
MIXER / HORN	50-75 GHz	11970V / QWH-VPRROO	HP/QUINSTAR	2521A01197/8794001	1179	I	15-NOV-2007
MIXER	75-110 GHz	11970W	HP	2521A01334	00105	I	22-NOV-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	
DIPLEXER	40-220 GHz	DPL.26	OML	N/A	00813	I	03-MAR-2007

ABSORBING CLAMPS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
FISCHER CLAMP	30-1000MHz	F-201-23MM	FISCHER	10	00081	I	20-JAN-2008

HARMONIC & FLICKER ANALYZER	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
HFTS	HP6842A	HP	3531A-00169	00738	II	30-DEC-2007
10001I/2 AC POWER SYSTEM	(2) 500I	CALIFORNIA INSTRUMENTS	HK53687/HK53688	00376	II	09-JAN-2008

PREAMPS / ATTENUATORS / FILTERS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	0.10-2000MHz	ZFL-1000-LN	C-S	N/A	00798	II	05-APR-2007
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	04-JAN-2007
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	28-DEC-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	14-APR-2007
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	05-JAN-2008
LOW PASS FILTER	1-9 GHz	11SL10-4100/X4400-O/O	K&L	4	00816	II	05-JAN-2008
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	OUT OF SERVICE

ANTENNAS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
GREEN BILOG	30-2000MHz	CBL6112B	CHASE	2742	00620	II	13-JAN-2008
GREEN-BLACK BILOG	30-2000MHz	CBL6112B	CHASE	2412	00127	II	13-JAN-2008
GREEN-RED BILOG	30-2000MHz	CBL6112B	CHASE	2435	00990	I	12-APR-2008
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	11-APR-2008
RED-BLACK BILOG	30-2000MHz	JB1	SUNOL	A091604-2	01106	II	11-APR-2008
RED-BROWN BILOG	30-2000MHz	JB1	SUNOL	A0032406	1218	I	30-MAR-2008
YELLOW HORN	1-18GHz	3115	EMCO	9608-4898	00037	I	27-MAY-2007(EMI) / 18-MAY-2007 (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	10kHz-30MHz	PLA-130/A	ARA	1024	00755	I	22-FEB-2008
LARGE LOOP	20Hz-5MHz	6511	EMCO	9704-1154	00067	I	23-JAN-2008
ACTIVE MONOPOLE	30Hz-30MHz	3301B	EMCO	3824	00068	II	07-APR-2007
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

EFT	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
EFT DIRECT COUPLING CAP	N/A	C-S	01	00794	II	06-FEB-2008

ESD GENERATORS	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
GREEN	NSG435	SCHAFFNER	000839	00763	I	02-MAR-2007
RED	NSG435	SCHAFFNER	001625	00762	I	06-JAN-2007
YELLOW	930D	ETS	201	00673	I	18-AUG-2007

BEST EMC-2	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
BLUE	711-1100	SCHAFFNER	199824-002SC	00117	II	16-JUN-2006 (SURGE) / 03-AUG-2006 (D+I) / 05-AUG-2006 (EFT)
RED	711-1100	SCHAFFNER	200122-074SC	00623	II	31-MAR-2007 (SURGE / D+I) / 07-APR-2007 (EFT)

CHAMBERS AND STRIPLINE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RFI 1 CHAMBER	3 METER COMPACT	PANASHIELD	N/A	00797	II	12-AUG-2006
RFI 2 CHAMBER	04' x 07' SHIELDING SYSTEM	LINDGREN	13329	00795	II	05-AUG-2006
RFI 3 STRIPLINE	N/A	C-S	N/A	00796	III	NA
ENVIRONMENTAL (SAFETY)	ECL5	B-M-A INC.	2041	00029	I	11-JAN-2007

AMPLIFIERS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	0.5-1000MHz	10W1000B	AR	18708	00032	II	05-AUG-2006 (RFI2) / 12-AUG-2006 (RFI1)
GREEN	0.5-1000MHz	10W1000B	AR	23423	00123	II	05-AUG-2006 (RFI2)
BLUE	0.01-250MHz	75A250	AR	19165	00039	II	09-JAN-2007 (EUCRFI) / 10-DEC-2006 (NEBS CRFI)
BLACK	0.01-250MHz	75A250	AR	23411	00122	II	10-JAN-2007 (EU CRFI) / 10-DEC-2006 (NEBS CRFI)
ORANGE	0.01-250MHz	75A250	AR	26827	00367	II	/ 05-AUG-2006 (RFI2)
BROWN 150W	0.1-250MHz	150A250	AR	313454	RENTAL	II	10-JAN-2007 (EU CRFI) / 10-DEC-2006 (NEBS CRFI)/
GTC 1-2.6	1.0-2.6 GHz	GRF5016A	GTC	1221	RENTAL	II	12-AUG-2006 (RFI1)
HUGHES 10W	2.0-4.0GHz	1177H01	HUGHES	055	RENTAL	II	NOT CALIBRATED
HUGHES 10W	4.0-8.0GHz	8010H02F	HUGHES	240	RENTAL	II	18-MAY-2007
HUGHES 10W	8-10.0GHz	80108	HUGHES	138	RENTAL	II	18-MAY-2007
HP489A	1.0-2.0GHz	HP489A	HP	449-00762	00971	II	OUT OF SERVICE
HUGHES 10W	1.0-2.0GHz	1177H09	HUGHES	272	RENTAL	II	OUT OF SERVICE
HUGHES 10W	2.0-4.0GHz	1177H01	HUGHES	137	RENTAL	II	OUT OF SERVICE
HUGHES 10W	4.0-8.0GHz	1177H02	HUGHES	092	RENTAL	II	OUT OF SERVICE
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	01-MAR-2007
GREEN	0.01-1000MHz	HI-4422	HOLADAY	97363	00136	I	26-AUG-2006
BLUE	0.01-1000MHz	HI-4422	HOLADAY	95696	01100	I	25-MAR-2007

SIGNAL GENERATORS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	0.09-2000MHz	HP8648B	HP	3847U02192	00366	I	28-FEB-2007
BLUE	0.1-1000MHz	HP8648A	HP	3426A00548	00034	I	25-AUG-2006
GREEN	0.09-2000MHz	HP8648B	HP	3623A02072	00125	I	17-OCT-2006
ORANGE	0.1-1000MHz	HP8648B	HP	3537A01210	00025	I	24-JUN-2006
BLACK (TELECOM)	0.01Hz-15MHz	HP33120A	HP	US36004674	00766	I	OUT OF SERVICE
YELLOW	0.01Hz-15MHz	HP33120A	HP	US36014119	00249	I	OUT OF SERVICE
BROWN	0.01Hz-15MHz	HP33120A	HP	US36016621	1211	I	23-NOV-2006
WHITE (NEW)	0.01Hz-15MHz	HP33120A	HP	US36048143	1219	1	10-MAY-2007
BLUE-WHITE	0.1Hz-13MHz	HP3312A	HP	1432A07632	00775	I	11-MAR-2007
SWEEPER	0.01-20.0GHz	HP83752A	HP	3610A01133	00087	II	02-MAY-2007
AM/FM STEREO SIG. GEN.	0.1-170MHz	LG3236	LEADER	3687301	00959	I	30-AUG-2006
IMPULSE GENERATOR	1-100Hz	CIG-25	ELECTRO-METRICS	290	00942	I	05-AUG-2006

BULK INJECTION CLAMPS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
GREEN	0.01-100MHz	95236-1	ETS	50215	00118	II	08-JUL-2006 (EU) / 10-DEC-2006 (NEBS)
RED	0.01-100MHz	95236-1	ETS	34026	1020	II	08-JUL-2006 (EU) / 10-DEC-2006 (NEBS)

CDN NETWORKS	RANGE	MN	MFR	ASSET	CAT	CALIBRATION DUE
BLACK	0.10-100MHz	20A M-2 (DC)	C-S	00783	II	08-JUL-2006
BLUE	0.10-100MHz	15A M-3	C-S	00806	II	10-JAN-2007
ORANGE	0.10-100MHz	15A M-2	C-S	00786	II	08-JUL-2006
RED	0.10-100MHz	15A M-3	C-S	00780	II	10-JAN-2007
WHITE	0.10-100MHz	15A M-3	C-S	00782	II	08-JUL-2006
YELLOW-BLACK	0.10-100MHz	15A M-3	C-S	00784	II	10-JAN-2007
GREEN	0.10-100MHz	30A M-3	C-S	00779	II	08-JUL-2006
YELLOW	0.10-100MHz	30A M-5	C-S	00804	II	08-JUL-2006
BLUE-WHITE	0.10-100MHz	15A M-5	C-S	00788	II	08-JUL-2006
BROWN	0.10-100MHz	M-3	C-S	1169	II	10-JAN-2007
BROWN-WHITE	0.10-100MHz	M-3	C-S	1170	II	10-JAN-2007
BROWN-BLACK	0.10-100MHz	M-2 (DC)	C-S	1171	II	10-JAN-2007
RED-BLACK	0.10-100MHz	M-2 (DC)	C-S	1177	II	10-MAY-2007
YELLOW (RES)	0.10-100MHz	100Ω RESISTOR NWK (M-1)	C-S	00810	II	05-OCT-2006
GREEN (RES)	0.10-100MHz	100Ω RESISTOR NWK (M-1)	C-S	1172	II	30-JAN-2007

OSCILLOSCOPES	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
EMC 100MHz	TDS 220	TEKTRONIX	C036986	1166	I	26-AUG-2006
ESD REFERENCE 1GHZ	TDS 684B	TEKTRONIX	B011287	RENTAL	1	31-MAR-2007
PRODUCT SAFETY 100 MHz	TDS 340	TEKTRONIX	B012357	00737	I	06-OCT-2006
TELECOM 100 MHz	54645A	HP/AGILENT	US36320452	00103	I	06-JUL-2006

ANSI T1.315	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE	
SBC NOISE CART		C-S			III	CALIBRATION NOT REQUIRED	
SBC TRANSIENT CART		C-S			III	WAVESHAPE VERIFIED BEFORE USE	
RMS VOLTMETERS/CURRENT CLAMP	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE	
TRUE-RMS MULTIMETER	79III	FLUKE	71700298	00769	I	25-OCT-2006	
TRUE-RMS MULTIMETER (REFERENCE)	177	FLUKE	83390024	00973	I	21-MAR-2007	
TRUE-RMS MULTIMETER	177	FLUKE	83390025	00974	I	10-MAR-2007	
TRUE-RMS MULTIMETER (TELECOM)	177	FLUKE	83430419	00975	I	21-MAR-2007	
TRUE-RMS CLAMP METER (SAFETY)	36	FLUKE	68805882	00700	I	OUT OF SERVICE	
SURGE GENERATORS	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE	
TRANSIENT WAVEFORM MONITOR	TWM-5	CDI	003982	00323	II	07-JUN-2006	
UNIVERSAL SURGE GENERATOR	M5	CDI	003966	00324	II	09-JUN-2006	
THREE PHASE COUPLING NWK	3CN	CDI	003455	00325	II	09-JUN-2006	
1.2x50uS PLUGIN MODULE	1.2x50uS PLUGIN	CDI	N/A	00842	II	09-JUN-2006	
10x160uS PLUGIN MODULE	10x160uS PLUGIN	C-S	N/A	00843	II	09-JUN-2006	
10x560uS PLUGIN MODULE	10x560uS PLUGIN	C-S	N/A	00841	II	09-JUN-2006	
PSURGE CONTROLLER MODULE	PSURGE 8000	HAEFELY	150267	00879	II	13-JUN-2006	
COUPLING/DECOUPLING MODULE	PCD 900	HAEFELY	149213	00880	II	13-JUN-2006	
IMPULSE MODULE	PIM 900	HAEFELY	149202	00881	II	13-JUN-2006	
HIGH VOLTAGE CAP NWK 5kVDC, 18uF	CS-HVCC	C-S	01	00772	II	28-SEP-2006	
NEBS SURGE GENERATOR	N/A	C-S	N/A	00088	II	08-JUN-2006	
2x10uS SURGE GENERATOR	2x10uS	C-S	N/A	00846	II	09-JUN-2006	
10x700uS SURGE GENERATOR	10x700uS	C-S	N/A	00847	II	09-JUN-2006	
12 PAIR SURGE RESISTOR MODULE	N/A	C-S	N/A	00768	II	30-SEP-2006	
POWER/NOISE METERS	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE	
POWER METER	435B	HP	2445A11012	00773	I	12-APR-2007	
POWER METER	437B	HP	2912A01367	01099	I	12-APR-2007	
POWER SENSOR	8481A	HP	2702A61351	00774	I	12-APR-2007	
PSOPHOMETER	2429	BRUEL & KJAER	1237642	00585	II	14-FEB-2007	
TRANSMISSION LINE TESTER (DBRNC)	185T	AMREL	998658	00823	II	16-MAR-2007	
OVERVOLTAGE CHAMBERS	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE	
72kW POWER FAULT SIMULATOR	OV1	C-S	N/A	00792	II	31-MAR-2007	
POWER FAULT SIMULATOR	OV2	C-S	N/A	00116	II	31-MAR-2007	
DIPOLE TAPE MEASURES	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE	
26FT TAPE #1	2338CME	LUFKIN	C3166-1	00776	I	13-MAR-2007	
26FT TAPE #2	2338CME	LUFKIN	C3166-2	00777	I	13-MAR-2007	
METEOROLOGICAL METERS	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE	
TEMP./HUMIDITY/ATM. PRESSURE GAUGE	7400 PERCEPTION II	DAVIS	N/A	00965	II	08-FEB-2007	
TEMPERATURE /HUMIDITY GAUGE	THG-912	HUGER	4000562	00789	I	01-FEB-2007	
WEATHER CLOCK (PRESSURE ONLY)	BA928	OREGON SCIENTIFIC	C3166-1	00831	I	02-FEB-2007	
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.

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 where 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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A2LA Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025:1999

CURTIS-STRAUS¹
527 Great Road
Littleton, MA 01460
Barry Quinlan Phone: 978-486-8880
ELECTRICAL

Valid until: July 31, 2007

Certificate Number: 1627.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following Electromagnetic Compatibility (EMC), Telecommunications, and Product Safety tests:

Electromagnetic Compatibility (EMC)

Radiated emissions testing (electric and magnetic fields)*; Conducted emissions testing (voltage and current)*; Electrostatic Discharge testing*; Electrical Fast Transient testing*; Radiated Immunity testing*; Conducted Immunity testing*; Lightning Immunity testing*; Voltage Dips*, Interrupts and Voltage Variations testing*; Magnetic Immunity testing*; RF Power measurements*; Frequency Stability Measurements*; Longitudinal Induction measurements*; Harmonic emissions testing*; Light flicker testing*; Low frequency disturbance voltage testing*; Disturbance Power measurements*; Power Cross Overvoltage testing*;

Test Type	Test Method(s)
Emissions	
Radiated and Conducted Emissions	FCC 47 CFR Parts 15 & 18; C63.4; CISPR 22; EN55022; SABS CISPR 22; AS/NZS CISPR 22; AS/NZS 3548; Canada ICES-003; CNS13438; KN22; CISPR 11; EN 55011; SABS CISPR 11; AS/NZS CISPR 11; AS/NZS 2064; Canada ICES-001; CNS13803; KN11; CISPR 13; EN 55013; SABS CISPR 13; AS/NZS CISPR 13; AS/NZS 1053; KN13; CISPR 14-1; EN 55014-1; SABS CISPR 14; AS/NZS CISPR 14; AS/NZS 1044; CNS 13439; KN14; CISPR 15; EN 55015; KN15; GR-1089-CORE; CSA C108.8-M1983;
Harmonics	EN 61000-3-2; AS/NZS 61000.3.2
Flicker	EN 61000-3-3; AS/NZS 61000.3.3

1 Note: This accreditation covers testing performed at the laboratory listed above and the satellite facility located at 168 Ayer Rd, Littleton, MA 01460 and, for test types marked with an asterisk, at other sites as defined in "A2LA specific criteria for the accreditation of site testing and site calibration laboratories."

(A2LA Cert. No. 1627.01) 3/20/06

Page 1 of 10

Other Radio Standards	RTTE 01 (DGT-Taiwan);
FCC Standards and Test methods Support TCB Status—	
FCC Scope A – Unlicensed Radio Frequency Devices	
A1	1. 47 CFR Parts 11, 15 and 18 2. FCC MP-5, 3. ANSI C63.4-2003,
A2	1. 47 CFR Part 15, 2. ANSI C63.4-2003,
A3	1. 47 CFR Part 15, 2. ANSI C63.17-1998, 3. ANSI C63.4-2003,
A4	1. 47 CFR Part 15, 2. ANSI C63.4-2003,
FCC Scope B – Licensed Radio Service Equipment	
B1	1. 47 CFR Parts 2, 22, 24, 25, and 27 2. ANSI/TIA-603-C (2004)
B2	1. 47 CFR Parts 2, 22, 74, 90, 95, and 97 2. ANSI/TIA-603-C (2004)
B3	1. 47 CFR Parts 2, 80, and 87 2. ANSI/TIA-603-C (2004)
B4	1. 47 CFR Parts 2, 21, 74, and 101 2. ANSI/TIA-603-C (2004)

Country Specific Standards and Other	
ITU EMC Standards	K.20; K.21; K.41; K.44
Swedish EMC Standards	BAKOM 3336.3
South African EMC Standards other than CISPR equivalents	SABS 1718-1; SANS 211/SABS CISPR 11; SANS 224/SABS CISPR 24; SANS 213/SABS CISPR 13; SANS 2200; SANS214-1/SABS CISPR 14-1; SANS214-2/SABS CISPR 14-2; SANS 215/SABS CISPR 15; SANS 222/SABS CISPR 22
Hong Kong EMC Standards	HKTA 1006; HKTA 1007; HKTA 1008; HKTA 1010; HKTA 1015; HKTA 1026; HKTA 1035; HKTA 1039; HKTA 1041; HKTA 1042; HKTA 1045
Singapore EMC Standards	IDA TS SRD; IDA TS EMC
Japanese VCCI Standards	VCCI V-3, VCCI V-4

(A2LA Cert. No. 1627.01) 3/20/06

Page 3 of 10

Immunity	
Electrostatic Discharge (ESD)	EN 61000-4-2; AS/NZS 61000.4.2; KN61000-4-2
Radiated Immunity (RFI)	EN 61000-4-3, AS/NZS 61000.4.3; KN61000-4-3
Electrical Fast Transient Bursts (EFT)	EN 61000-4-4; AS/NZS 61000.4.4; KN61000-4-4
Surge	EN 61000-4-5, AS/NZS 61000.4.5; KN61000-4-5
Conducted Immunity	EN 61000-4-6, AS/NZS 61000.4.6; KN61000-4-6
Magnetic Immunity	EN 61000-4-8; AS/NZS 61000.4.8; KN61000-4-8
Voltage Dips and Interrupts	EN 61000-4-11; KN61000-4-11
Low Frequency Conducted Disturbances	EN 61000-2-2

Family Product or Industry Specific Specifications including emissions and/or immunity	GR-1089-CORE; GR-78-CORE (ESD) EN50081-1; EN50081-2; EN50082-2; EN50082-1; EN 61000-6-1; EN 61000-6-2; EN 61000-6-3; EN 61000-6-4; EN 50091-2; EN 55024; CISPR 24 EN 55103-1; EN 55103-2; EN 61326; EN 61547; EN 50130-4; EN 50083-2; EN 60601-1-2; EN 60601-2-2; EN 60601-2-24; EN 60601-2-32; EN 60601-2-38; EN 60601-2-47; IEC 1800-3; EN 61800-3; EN 55020; CISPR 20; EN 60555 Part 2; EN 60555 Part 3; ETS 300 386-1; EN 300 386-2; EN 300 386, ETS 300 132-1; ETS 300 132-2; EN 60669-2-1; AS/NZS 3200.1.2; CNS 13783-1; ETR 283; C62.41
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Radiocommunications	
EU R&TTE Radio Standards;	EN 300 220-1; EN 300 220-3; EN 300 330-1; EN 300 330-2; EN 300 440-1; EN 300 440-2; EN 300 328; EN 300 385; EN 301 893
EU R&TTE EMC Standards	EN 300 339; EN 301 489-01; EN 301 489-03; EN 301 489-17
Canada Radio Standards	RSS-102; RSS-117; RSS-118; RSS-119; RSS-123; RSS-125; RSS-128; RSS-129; RSS-130; RSS-131; RSS-132; RSS-133; RSS-134; RSS-135; RSS-136; RSS-137; RSS-138; RSS-141; RSS-142; RSS-170; RSS-181; RSS-182; RSS-187; RSS-188; RSS-191; RSS-192; RSS-193; RSS-195; RSS-210; RSS-212; RSS-213; RSS-215; RSS-243; RSS-GEN; RSS-310; GL-36;
Australia/New Zealand Radio Standards	AS/NZS 4268; AS/NZS 4771; RFS29; Radiocommunications (Data Transmission Equipment Using Spread Spectrum Modulation Techniques); Radiocommunications (Spread Spectrum Devices); Radiocommunications (Short Range Devices); Radiocommunications (Low Interference Potential Devices);

(A2LA Cert. No. 1627.01) 3/20/06

Page 2 of 10

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 (excluding volume control)*; Protocol analysis* and Jitter testing*.

Telecom Standards	Title
North American standards FCC 47 CFR Part 68 Telephone Terminal Equipment CS-03 Issue 9	Connection of terminal equipment to the telephone network. Analog and Digital Equipment. TCB Scope C1. Specification for terminal equipment, terminal systems, Network protection devices, connection arrangements and hearing aids compatibility.
TIA/EIA TSB31-B 1998	Bulletin Part 68 Rationale and Measurement Guidelines (Feb 1998)
TIA-968-A, A1, A2, A3	Telecommunications Telephone Terminal Equipment Technical Requirements for Connection of Terminal Equipment to the Telephone Network
T1.TRQ.6-2001	Technical Requirements for SHDSL, HDSL2, HDSL4 Digital Subscriber Line Terminal Equipment to Prevent Harm to the Telephone Network Industry
Australia standards AS/ACIF S002-2001	Analogue interworking and non-interference requirements for Customer Equipment for connection to the Public Switched Telephone Network
AS/ACIF S016-2001	Requirements for Customer Equipment for connection to hierarchical digital interfaces
AS/ACIF S031-2001 AS/ACIF S038-2001 AS/ACIF S043-2001	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 Voice band
International standards ITU-T G.703	Physical/electrical characteristics of hierarchical Digital interfaces
Hong Kong standards HKTA 2011	Network Connection Specification for Connection of Customer Premises Equipment (CPE) to Direct Exchange Lines (DEL) of the Public Switched Telephone Network (PSTN) in Hong Kong
HKTA 2014	Network Connection Specification for Connection of Customer Premises Equipment (CPE) to the Public Telecommunications Network (PTN) in Hong Kong using ISDN Basic Rate Access (BRA) based on ITU-T Recommendations

(A2LA Cert. No. 1627.01) 3/20/06

Page 4 of 10

<u>Telecom Standards</u> HKTA 2028 HKTA 2029 HKTA 2030 HKTA 2031 HKTA 2032 HKTA 2033 <u>European standards</u> TBR 1: 1995 TBR 2: 1997 TBR 3: 1995 + Amdt : 1997 TBR 4: 1995 + Amdt : 1997 TBR 012: 1993 + Amdt : 1996 TBR 013: 1996 (A2LA Cert. No. 1627.01) 3/20/06	<u>Title</u> 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 Network Connection Specification for Connection of Customer Premises Equipment (CPE) to the Public Telecommunications Network (PTN) in Hong Kong using Digital Leased Circuits at nx64 kbit/s Network Connection Specification for Connection of Customer Premises Equipment (CPE) to the Public Telecommunications Network (PTN) in Hong Kong using Digital Leased Circuits below 64 kbit/s Network Connection Specification for Connection of Customer Premises Equipment (CPE) to the Public Telecommunications Networks in Hong Kong using Asymmetric Digital Subscriber Lines (ADSL) based on ITU-T Recommendation G.992.1 Network Connection Specification for Connection of Customer Premises Equipment (CPE) to Fixed Telecommunications Networks in Hong Kong using Splitterless Asymmetric Digital Subscriber Lines (ADSL) based on ITU-T Recommendation G.992.2 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 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 Page 5 of 10	<u>European standards (cont'd)</u> TBR 21: 1998 TBR 24: 1997 <u>Taiwan standards (DGT)</u> ADSL01 ID0002 IS6100 PSTN01 (non-voice only) <u>New Zealand standards</u> PTC 200 (non-voice only) PTC 217 TNA 117 PTC 270 <u>Singapore Standards</u> IDA TS ADSL IDA TS ADSL 2 IDA TS DLCN 1 IDA TS ISDN 1 IDA TS ISDN 2 IDA TS PSTN (non-voice only) <u>South Africa standards</u> TE-001 (non-voice only) 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 Asymmetric Digital Subscriber Line Terminal Equipment and POTS Splitter Technical Specifications DS1 Equipment Type Approval Guidelines ISDN Terminal Equipment Technical Specifications Technical Specifications for Terminal Equipment for Connection to Public Switched Telephone Network Requirements for Connection of Customer Equipment to Analogue Lines Requirements for Bandwidth Management Devices Telecom 2048 kbit/s Standard Network Interface Interim arrangements for ADSL CPE Type Approval Specification for Asymmetric Digital Subscriber Line (Full-rate ADSL) Modems Type Approval Specification for Asymmetric Digital Subscriber Line Splitterless (G-Lite) Modems Type Approval Specification for Digital Interfaces based on hierarchical bit rates of 2048 kbit/s, 34 368 kbit/s and 139 264 kbit/s Type Approval Specification for connection of Terminal Equipment to Integrated Services Digital Network (ISDN) Basic Access Type Approval Specification for connection of Terminal Equipment to Integrated Services Digital Network (ISDN) Primary Rate Access (PRA) Type Approval Specification for connection of Terminal Equipment to Public Switched Telephone Network (PSTN) Standard for Telecommunication Line Terminal Equipment (TLTE) for Connection to the Public Switched Telephone Network (PSTN) Page 6 of 10
<u>Product Safety</u> General test methods: Power input*, Permanence of marking*, Accessibility*, Permissibly limits*, Energy hazard measurement*, SELV circuits*, TNV limits*, Limited current*, Capacitor Discharge / voltage limitation*, Ring signal*, Humidity conditioning*, Creepage / Clearance / Distance thru Insulation (excluding CTI)*, Limited power measurement*, Ground Bond/Earthing*, Ground continuity*, Temperature*, Stability*, Applied force*, Steel sphere impact*, Mold stress*, Battery reverse current*, Ball pressure*, Leakage current*, Component abnormal*, Electric strength*, Impulse*, Overvoltage*, Acoustic sound pressure*, 130mm / 20mm flame*, Needle flame*, Hot flaming oil*, Locked rotor/motor armature*, Vibration, Bump, Drop*, Strain relief*, Torque*, Insulation resistance*, Sound level*, Handle loading*, Liquid overflow*, Spillage*, Liquid leakage*, Transformer shorts/overloads*, Rain test*, Wall mount*, Laser radiation (excluding x-ray)*, Voltage surge*, Functionality*, Protective impedance abnormal*, Capacitor short circuit abnormal*, Output abnormal*, Multi-supply abnormal*, Cooling abnormal*, Heating device abnormal*, Interlock abnormal*, Rigidity*, Cleaning* <u>Product Safety Standards</u> <u>Specific Product Safety Standards</u> UL 60950 2000 IEC 60950 1999 EN 60950 2000 IEC 60950-1 2001 UL 60950-1 2003 CSA C22.2 No. 60950-00 CSA C22.2 No. 60950-1 03 IEC 61010-1 1993 EN 61010-1 1993, 2001 IEC 61010-1 2001 UL 61010B-1 2003 CAN/CSA 1010-1 1999 (Including AM 2) 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 60065 2000 Canadian C22.2 No. 1-94 (1-98) 1994, 1998 EN 60065 1994 IEC 60825 1990 EN 60825-1 1994 (A2LA Cert. No. 1627.01) 3/20/06	<u>Title</u> 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 Performance standard for laser products Safety of household and similar electrical appliances Part 1: General requirements 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 Information Technology Equipment – Safety – Part 1: General Requirements Information Technology Equipment – Safety – General requirements Electrical Equipment for Measurement, Control and Laboratory Use; Part 1: General Requirements Medical Electrical Equipment, Part 1: General Requirements for Safety Medical Electrical Equipment - Part 1: General Requirements For Safety 1: Collateral Standard: Safety Requirements For Medical Electrical Systems Medical Electrical Equipment - Part 1: General Requirements For Safety – Section 1-1. Collateral Standard: Safety Requirements For Medical Electrical Systems Audio, Video and Similar Electronic Apparatus – Safety Requirements Audio, Video and Similar Electronic Apparatus – Safety Requirements Audio, Video and Similar Electronic Apparatus – Safety Requirements Audio, Video and Similar Electronic Apparatus – Safety Requirements Safety of Machinery – Electrical Equipment of Machines – Part 1: Specification for General Requirements Compliance Test Specification – Safety and Electrical Protection Requirements for Subscriber Equipment Connected to the Public Telecommunications Networks In Hong Kong Page 7 of 10	<u>Product Safety Standards</u> IEC 60825-1 2001 IEC 60825-2 2000-5 IEC 60825-4 1997-11 21 CFR 1040.10 IEC 60335-1 1995 (Including AM2 – 1997 & AM 12 – 1997) EN 60335-1 2001 UL 60335-1 1998 CAN/CSA E335-1 1994 UL 61010A-1: 2002 EN 61010-1: 2001 AS/NZS 60950: 2000 EN 60950-1: 2001 AS/NZS 60950-1: 2003 UL 61010 -1: 2004 UL 60601-1: 2003 IEC 60601-1-1: 2000 EN 60601-1-1: 2001 UL 60065: 2003 CSA 60065: 2003 IEC 60065: 2001 EN 60065: 2002 EN 60204 -1: 1998 HKTA 2001 (A2LA Cert. No. 1627.01) 3/20/06

<i>Environmental Simulation</i>			Note 1. For standards or methods listed on the scope of accreditation without a revision date, laboratories are expected to be competent in the use of the current version within one year of the date of publication of the standard test method or upon the date specified by the standard test method originator when the originator has implementation authority. When a superseded standard or method is required for an accredited test, the scope will include the superseded date/version. For those that support the TCB/CB status of the organization acting as a certifier on behalf of the FCC or IC the expectation is currency within 30 days of Federal Register publication of changes for FCC and 30 days after IC website update. This note shall not be construed as an Accreditation Body implication to adopt a more current standard than is required in a regulation or code (i.e. the legal requirement) which is adopted by the lab under their responsibility. * On-site test service is available for this technology, test, or method.
<u>Test Technology</u>	<u>Test Standard</u>	<u>Supporting Standards</u>	
Accessibility*	IEC 60529	IP-0x thru IP-6x	
Acoustic Noise*	GR-63-CORE Sec 4.6		
Airborne Contaminants	GR-63-CORE Sec 4.5	MFG & Hygroscopic Dust	
Altitude	GR-63-CORE Sec 4.1.3		
Cold Start*	ETS 300 019	IEC 60068-2-1	
Drip	IEC 60529	IP-x1 & IP-x2	
Drops*	ETS 300 019	IEC 60068-2-32	
	GR-63-CORE Sec 4.3		
Dust	IEC 60529	IP-5x & IP-6x	
Firearms Resistance Testing	GR-487		
Fire Resistance	ANSI.T1.319		
	GR-63-CORE Sec 4.2	Fire & Needle Flame	
Heat Dissipation*	GR-63-CORE Sec 4.1.4		
Illumination	GR-63-CORE Sec 4.7		
Operational Temperature & Humidity (OpTH)*	ETS 300 019	IEC 60068-2-1 IEC 60068-2-2 IEC 60068-2-14 IEC 60068-2-56	
Salt Fog & Spray	GR-63-CORE Sec 4.1.2		
Spatial*	ASTM B117		
Spraying-Splashing	GR-63-CORE Sec 2.0 & 3.0	IP-x3 & IP-x4	
Storage (Temperature & Humidity)*	IEC 60529	IEC 60068-2-1 IEC 60068-2-2 IEC 60068-2-14 IEC 60068-2-30 IEC 60068-2-56	
	ETS 300 019		
Vibration	GR-63-CORE Sec 4.1.1	IEC 60068-2-6	
	ETS 300 019	IEC 60068-2-27 IEC 60068-2-29 IEC 60068-2-32 IEC 60068-2-57 IEC 60068-2-64	
		Earthquake, Office & Transportation	
Water Immersion	IEC 60529	IP-x7 & IP-x8	
Water Jet	IEC 60529	IP-x5 & IP-x6	
(A2LA Cert. No. 1627.01) 3/20/06			(A2LA Cert. No. 1627.01) 3/20/06
Page 9 of 10			Page 10 of 10