

Report ID: XSIRAD_FCC.22853.doc

Date of Issue: 8/14/2012

Test specification:	Section 15.253(g), RF expe	Section 15.253(g), RF exposure				
Test procedure:	47 CFR, Section 1.1307(b)1					
Test mode:	Compliance	Verdict:				
Date:	1/19/2012	verdict.	PASS			
Temperature: 20.5 °C	Air Pressure: 1016 hPa	Relative Humidity: 46%	Power Supply: 120 VAC			
Remarks:						

7.7 RF exposure

7.7.1 General

This test was performed to determine the minimum safe distance between the transmitter antenna and human to avoid public exposure in excess of limits for general population (uncontrolled exposure). Specification test limits are given in Table 7.7.1.

Table 7.7.1 RF exposure limits

Frequency range, MHz	Power density
	W/m2
76000.0 – 77000.0	10

7.7.2 Safe distance calculation for fixed transmitter

The minimum safe distance was calculated from the following equation as provided in Table 7.7.2:

where S is power density in W/m², P is the transmitter output power in W, G is the transmitter antenna numeric gain and r is distance to transmit antenna in m.

With power density equal to the RF exposure limit the minimum safe distance was calculated according to the following equation: r = sqrt[PxG / (4xxS])

Table 7.7.2 Safe distance calculation

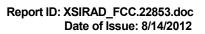
ASSIGNED FREQUENCY: **EQUIPMENT INTENDED USE:** 76000.0 - 77000.0 MHz Fixed*

Carrier frequency, MHz	Peak field strength, dB(pV/m)	Average field strength, dB(pV/m)	Field strength, V/m	Output ower, W	Power density, W/m	Safe m	Intended m	
76020.0	140.6	97.67	10.72	34.44	0.30	0.52	2.0	Pass
76500.0	141.6	95.75	12.02	43.36	0.38	0.59	2.0	Pass
76980 0	139 0	97 29	8 91	23 83	0.21	0 44	2.0	Pass

NOTE: RF exposure was calculated according to Peak Field Strength values obtained at 3 m test distance.

The Power density was calculated according to:
$$W/m^2 = \frac{(V/m)^2}{377}$$

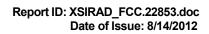
^{*}The equipment deemed fixed as intended for use at a distance of more than 2.0 m from humans.





8 APPENDIX A Test equipment and ancillaries used for tests

8 APPENDIX A Test equipment and ancillaries used for tests							
HL No	Description	Manufacturer	Model	Ser. No.	Last Cal./ Check	Due Cal./ Check	
0163	LISN FCC/VDE/50 Ohm/50 uH + 5 Ohm, MIL-STD-461E, CISPR 16-1	Electro-Metrics	ANS 25/2	1314	01-Jul-12	01-Jul-13	
0446	Antenna, Loop, Active, 10 kHz - 30 MHz	EMCO	6502	2857	03-Jul-12	03-Jul-13	
0521	EMI Receiver (Spectrum Analyzer) with RF filter section 9 kHz-6.5 GHz	Hewlett Packard	8546A	3617A 00319, 3448A002 53	29-Aug-11	29-Sep-12	
0604	Antenna BiconiLog Log-Periodic/T Bow- TIE, 26 - 2000 MHz	EMCO	3141	9611-1011	20-May-12	20-May-14	
0747	Mixer, Millimeter Wave Harmonic 90 - 140 GHZ	Oleson Microwave Labs	M08HW	F80429-1	19-Oct-10	19-Oct-13	
0768	Antenna Standard Gain Horn,18-26.5 GHz, WR-42, 25 dB gain	Quinstar Technology	QWH- 4200-BA	110	03-Feb-12	03-Feb-15	
0769	Antenna Standard Gain Horn, 26.5-40 GHz, WR28, 25 dB gain	Quinstar Technology	QWH- 2800-BA	112	03-Feb-12	03-Feb-15	
0770	Antenna Standard Gain Horn, 40-60 GHz WR-19, U-band Gain - 25 dB	Quinstar Technology	QWH- 1900-AA	118	19-Jul-12	19-Jul-13	
0771	Antenna Standard Gain Horn, 60-90 GHz, WR-12, Gain - 25 dB	Quinstar Technology	QWH- 1200-AA	111	19-Jul-12	19-Jul-13	
0772	Antenna Standard Gain Horn, 75-110 GHz, WR-10, Gain - 25 dB	Quinstar Technology	QWH- 0800-AA	110	19-Jul-12	19-Jul-13	
0787	Transient Limiter 9 kHz-200 MHz	Hewlett Packard	11947A	3107A018 77	18-Oct-11	18-Oct-12	
1194	Variac, 220 V/ 2.5 A	Matsunaga		2962	05-Apr-12	05-Apr-13	
1303	Transition waveguide ET28S -12R	Custom Microwave	ET28S - 12R	S0951	02-Aug-12	02-Aug-15	
1312	Mixer Millimeter Wave Harmonic 140-220 GHz	Oleson Microwave Labs	M05HW	G91112-1	19-Oct-10	19-Oct-13	
1425	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1426, HL1427	Agilent Technologies	8542E	3710A002 22, 3705A002 04	24-Aug-11	24-Aug-12	
1513	Cable RF, 8 m, BNC/BNC	Belden	M17/167 MIL-C-17	1513	01-Sep-11	01-Sep-12	
2358	Power Supply, 2 X 0-36VDC / 5A, 5VDC / 5A	Horizon Electronics	DHR3655 D	767469	08-Mar-12	08-Mar-13	
2883	Cable, 18 GHz N-type, M-F, 3 m	Bird Electronic Corp.	TC- MNFN-3.0	211539 003	04-Dec-11	04-Dec-12	
2909	Spectrum analyzer, ESA-E, 100 Hz to 26.5 GHz	Agilent Technologies	E4407B	MY414447 62	08-May-12	08-May-13	
3235	Harmonic mixer 40 to 60 GHz	Agilent Technologies	11970U	MY300301 82	18-Jul-10	18-Jul-13	
3286	Temperature Chamber, (-50 to +170) °C	Thermotron	EL-8-CH- 1-1-CO2	21-9048	11-Sep-11	11-Sep-12	
3295	Tapered transition, WR-28, UG-599 to WR-15, UG-385 (26.5-40 GHz to 50-75 GHz)	Quinstar Technology	QWP- AV0000	10381005	02-Aug-12	02-Aug-13	
3305	Harmonic mixer 50 to 75 GHz	Agilent Technologies	11970V	MY300301 49	18-Jul-10	18-Jul-13	
3306	Harmonic mixer 75 to 110 GHz	Agilent Technologies	11970W	MY252102 73	05-Aug-10	05-Aug-13	
3390	Microwave Cable Assembly, 26.5 GHz, 1.0 m, N type/N type	Suhner Sucoflex	104EA	3390	07-Feb-12	07-Feb-13	





HL No	Description	Manufacturer	Model	Ser. No.	Last Cal./ Check	Due Cal./ Check
3433	Test Cable , DC-18 GHz, 1.5 m, SMA - SMA	Mini-Circuits	CBL-5FT- SMSM+	25679	07-Mar-12	07-Mar-13
3434	Test Cable , DC-18 GHz, 1.5 m, SMA - SMA	Mini-Circuits	CBL-5FT- SMSM+	25683	07-Mar-12	07-Mar-13
3531	Amplifier, low noise, 2 to 8 GHz	Quinstar Technology	QLJ- 02084040 -J0	111590020 02	25-Dec-11	25-Dec-12
3535	Amplifier, low noise, 18 to 40 GHz	Quinstar Technology	QLJ- 18404537 -J0	111590030 01	10-Jul-12	10-Jul-13
3536	Antenna Standard Gain Horn, 90-140 GHz, WR-8, Midband Gain - 24 dB	Quinstar Technology	QWH- FPRR00	111590040 01	10-Jun-12	10-Jun-13
3612	Cable RF, 17.5 m, N type-N type	Teldor	RG-214/U	NA	01-Dec-11	01-Dec-12
3901	Microwave Cable Assembly, 40.0 GHz, 3.5 m, SMA/SMA	Huber-Suhner	SUCOFLE X 102A	1225/2A	08-Feb-12	08-Feb-13
4114	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz	ETS Lindgren	3117	00123515	23-Jan-12	23-Jan-13
4160	Preamplifier, 0.1 to 18 GHz, Gain 25 dB, N-type(f) in, N-type(m) out.	Agilent Technologies	87405C	MY470105 94	08-Aug-12	08-Aug-13
4278	Test Cable , DC-18 GHz, 4.6 m, N/M - N/M	Mini-Circuits	APC- 15FT- NMNM+	0755A	23-Nov-11	23-Nov-12
4279	Test Cable , DC-18 GHz, 4.6 m, N/M - N/M	Mini-Circuits	APC- 15FT- NMNM+	0757A	23-Nov-11	23-Nov-12





9 APPENDIX B Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Conducted emissions with LISN	9 kHz to 150 kHz: ± 3.9 dB
	150 kHz to 30 MHz: ± 3.8 dB
Radiated emissions at 3 m measuring distance Horizontal polarization	Biconilog antenna: ± 5.3 dB
	Biconical antenna: ± 5.0 dB
	Log periodic antenna: ± 5.3 dB
Vertical polarization	Double ridged horn antenna: ± 5.3 dB
Vertical polarization	Biconilog antenna: ± 6.0 dB
	Biconical antenna: ± 5.7 dB
	Log periodic antenna: ± 6.0 dB
	Double ridged horn antenna: ± 6.0 dB
Conducted emissions at RF antenna connector	9 kHz to 2.9 GHz: ± 2.6 dB
	2.9 GHz to 6.46 GHz: ± 3.5 dB
	6.46 GHz to 13.2 GHz: ± 4.3 dB
	13.2 GHz to 22.0 GHz: ± 5.0 dB
	22.0 GHz to 26.8 GHz: ± 5.5 dB
	26.8 GHz to 40.0 GHz: ± 4.8 dB

Hermon Laboratories is accredited by A2LA for calibration according to present requirements of ISO/IEC 17025 and NCSL Z540-1. The accreditation is granted to perform calibration of parameters that are listed in the Scope of Hermon Laboratories Accreditation.

Hermon Laboratories calibrates its reference and transfer standards by calibration laboratories accredited to ISO/IEC 17025 by a mutually recognized Accreditation Body or by a recognized national metrology institute. All reference and transfer standards used in the calibration system are traceable to national or international standards.

In-house calibration of all test and measurement equipment is performed on a regular basis according to Hermon Laboratories calibration procedures, manufacturer calibration/verification procedures or procedures defined in the relevant standards. The Hermon Laboratories test and measurement equipment is calibrated within the tolerances specified by the manufacturers and/or by the relevant standards.





10 APPENDIX C Test laboratory description

Tests were performed at Hermon Laboratories Ltd., which is a fully independent, private, EMC, safety, environmental and telecommunication testing facility.

Hermon Laboratories is listed by the Federal Communications Commission (USA) for all parts of Code of Federal Regulations 47 (CFR 47), Registration Numbers 90624 for OATS and 90623 for the anechoic chamber; by Industry Canada for electromagnetic emissions (file numbers IC 2186A-1 for OATS, IC 2186A-2 for anechoic chamber, IC 2186A-3 for full-anechoic chamber for RE measurements above 1 GHz), certified by VCCI, Japan (the registration numbers are R-808 for OATS, R-1082 for anechoic chamber, G-27 for full-anechoic chamber for RE measurements above 1 GHz, C-845 for conducted emissions site, T-1606 for conducted emissions at telecommunication ports), has a status of a Telefication - Listed Testing Laboratory, Certificate No. L138/00. The laboratory is accredited by American Association for Laboratory Accreditation (USA) according to ISO/IEC 17025 for electromagnetic compatibility, product safety, telecommunications testing and environmental simulation (for exact scope please refer to Certificate No. 839.01).

Address: P.O. Box 23, Binyamina 30500, Israel.

Telephone: +972 4628 8001 Fax: +972 4628 8277 e-mail: mail@hermonlabs.com website: www.hermonlabs.com

August 13, 2012

Person for contact: Mr. Alex Usoskin, CEO.

11 APPENDIX D Specification references

47CFR part 15: 2011 Radio Frequency Devices. Federal Register/Vol.77, No.156 Rules and Regulations

ANSI C63.2: 1996

American National Standard for InstrumentationElectromagnetic Noise and Field Strength, 10kHz to

40GHz-Specifications.

ANSI C63.4: 2009 American National Standard for Methods of Measurement of

Radio-Noise Emissions Electronic Equipment in the Range

of 9 kHz to from Low-Voltage Electrical and 40 GHz.





12 APPENDIX E Test equipment correction factors

Correction factor
Line impedance stabilization network
Model ANS-25/2, Electro-Metrics, HL 0163

Frequency, kHz	Correction factor, dB
10	4.9
15	2.86
20	1.83
25	1.25
30	0.91
35	0.69
40	0.53
50	0.35
60	0.25
70	0.18
80	0.14
90	0.11
100	0.09
125	0.06
150	0.04

The correction factor in dB is to be added to meter readings of an interference analyzer or a spectrum analyzer.



HERMON LABORATORIES

Antenna Factor Active Loop Antenna

EMC Systems, 6502, S/N 0446 Test model 2857, HL

Frequency, MHz	Magnetic Antenna Factor, dB(S/m)	Electric Antenna Factor, dB(1/m)
0.009	-32.8	18.7
0.010	-33.8	17.7
0.020	-38.3	13.2
0.050	-41.1	10.4
0.075	-41.3	10.2
0.100	-41.6	9.9
0.150	-41.7	9.8
0.250	-41.6	9.9
0.500	-41.8	9.7
0.750	-41.9	9.6
1.000	-41.4	10.1
2.000	-41.5	10.0
3.000	-41.4	10.1
4.000	-41.4	10.1
5.000	-41.5	10.0
10.000	-41.9	9.6
15.000	-41.9	9.6
20.000	-42.2	9.3
25.000	-42.8	8.7
30.000	-44.0	7.5

Antennaacto d(S/) s to Antenna factor in dB(1/			ce e ete ead						
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	m i	added r	iv r m r r	in in B(
					V	nv	i in	fi I in n i	in

Antenna factor Standard gain horn antenna Quinstar Technology Model QWH, Ser.No.112, HL 0768, 0769, 0770, 0771, 0772

Frequency min,	Frequency max,	Antenna factor,
GHz	GHz	dB(1/m)
18.000	26.500	32.01
26.500	40.000	35.48
40.000	60.000	39.03
60.000	90.000	42.55
90.000	140.000	46.23
140.000	220.000	50.11

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μ V) to convert it into field intensity in dB(μ V/m).





Antenna factor Biconilog antenna EMCO Model 3141 Ser.No.1011, HL 0604

Frequency,	Antenna factor,	Frequency,	Antenna factor,	Frequency,	Antenna factor,
MHz	dB(1/m)	MHz	dB(1/m)	MHz	dB(1/m)
26	7.8	580	20.6	1320	27.8
28	7.8	600	21.3	1340	28.3
30	7.8	620	21.5	1360	28.2
40	7.2	640	21.2	1380	27.9
60	7.1	660	21.4	1400	27.9
70	8.5	680	21.9	1420	27.9
80	9.4	700	22.2	1440	27.8
90	9.8	720	22.2	1460	27.8
100	9.7	740	22.1	1480	28.0
110	9.3	760	22.3	1500	28.5
120	8.8	780	22.6	1520	28.9
130	8.7	800	22.7	1540	29.6
140	9.2	820	22.9	1560	29.8
150	9.8	840	23.1	1580	29.6
160	10.2	860	23.4	1600	29.5
170	10.4	880	23.8	1620	29.3
180	10.4	900	24.1	1640	29.2
190	10.3	920	24.1	1660	29.4
200	10.6	940	24.0	1680	29.6
220	11.6	960	24.1	1700	29.8
240	12.4	980	24.5	1720	30.3
260	12.8	1000	24.9	1740	30.8
280	13.7	1020	25.0	1760	31.1
300	14.7	1040	25.2	1780	31.0
320	15.2	1060	25.4	1800	30.9
340	15.4	1080	25.6	1820	30.7
360	16.1	1100	25.7	1840	30.6
380	16.4	1120	26.0	1860	30.6
400	16.6	1140	26.4	1880	30.6
420	16.7	1160	27.0	1900	30.6
440	17.0	1180	27.0	1920	30.7
460	17.7	1200	26.7	1940	30.9
480	18.1	1220	26.5	1960	31.2
500	18.5	1240	26.5	1980	31.6
520	19.1	1260	26.5	2000	32.0
540	19.5	1280	26.6		
560	19.8	1300	27.0		

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μ V) to convert it into field strength in dB(μ V/m).

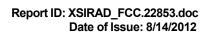




Antenna factor
Double-ridged waveguide horn antenna
ETS Lindgren, Model 3117, serial number: 00123515, HL 4114

		Antenna factor, dB/m	
Frequency, MHz	Measured	Manufacturer	Deviation
1000	28.0	28.4	-0.4
1500	28.0	27.4	0.6
2000	31.2	30.9	0.3
2500	32.5	33.4	-0.9
3000	32.9	32.6	0.3
3500	32.7	32.8	-0.1
4000	33.1	33.4	-0.3
4500	33.8	33.9	-0.1
5000	33.8	34.1	-0.3
5500	34.4	34.5	-0.1
6000	35.0	35.2	-0.2
6500	35.4	35.5	-0.1
7000	35.7	35.7	0.0
7500	35.9	35.7	0.2
8000	35.8	35.8	0.0
8500	35.9	35.8	0.1
9000	36.3	36.2	0.1
9500	36.6	36.6	0.0
10000	37.1	37.1	0.0
10500	37.6	37.5	0.1
11000	37.9	37.7	0.2
11500	38.5	38.1	0.4
12000	39.2	38.7	0.5
12500	39.0	38.9	0.1
13000	39.1	39.1	0.0
13500	38.9	38.8	0.1
14000	39.0	38.8	0.2
14500	39.6	39.9	-0.3
15000	39.9	39.7	0.2
15500	39.9	40.1	-0.2
16000	40.7	40.8	-0.1
16500	41.3	41.8	-0.5
17000	42.5	42.1	0.4
17500	41.3	41.2	0.1
18000	41.4	40.9	0.5

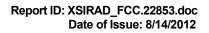
Antenna factor is to be added to receiver meter reading in $dB(\mu V)$ to convert to field strength in $dB(\mu V)$ meter)





Cable loss Cable coaxial, Bird, 18 GHz, N-type, M-F, model TC-MNFN-3.0, S/N 211539 003 HL 2883

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.06	5750	1.70	12000	2.46
30	0.12	6000	1.75	12250	2.48
100	0.21	6250	1.80	12500	2.52
250	0.34	6500	1.81	12750	2.50
500	0.47	6750	1.86	13000	2.54
750	0.59	7000	1.86	13250	2.48
1000	0.67	7250	1.92	13500	2.63
1250	0.76	7500	1.96	13750	2.65
1500	0.84	7750	1.98	14000	2.72
1750	0.92	8000	2.02	14250	2.67
2000	0.98	8250	2.03	14500	2.70
2250	1.05	8500	2.05	14750	2.72
2500	1.12	8750	2.11	15000	2.79
2750	1.17	9000	2.17	15250	2.80
3000	1.22	9250	2.17	15500	2.83
3250	1.27	9500	2.20	15750	2.75
3500	1.33	9750	2.19	16000	2.82
3750	1.38	10000	2.22	16250	2.85
4000	1.42	10250	2.25	16500	2.90
4250	1.46	10500	2.30	16750	2.89
4500	1.51	10750	2.28	17000	2.88
4750	1.54	11000	2.32	17250	2.85
5000	1.59	11250	2.34	17500	2.96
5250	1.62	11500	2.39	17750	3.04
5500	1.65	11750	2.42	18000	3.04





Cable loss Cable coaxial, Microwave Cable Assembly, 104EA, 18 GHz, 1.0 m Suhner Sucoflex, HL 3390

Sunner Sucoffex, HL 3390								
Erogueneu	Cable	Frequency,	Cable	Ero au on ov	Cable	Eroguene.	Cable	
Frequency, MHz	loss' dB	MHz	loss' dB	Frequency, MHz	loss, dB	Frequency, MHz	loss, dB	
10	0.03	4800	0.55	9800	0.89	14900	1.07	
30	0.04	4900	0.56	9900	0.89	15000	1.07	
50	0.05	5000	0.57	10000	0.86	15100	1.08	
100	0.07	5100	0.58	10100	0.86	15200	1.07	
200	0.10	5200	0.58	10200	0.88	15300	1.09	
300	0.12	5300	0.59	10300	0.92	15400	1.10	
400	0.14	5400	0.59	10400	0.94	15500	1.10	
500	0.16	5500	0.60	10500	0.96	15600	1.12	
600	0.17	5600	0.61	10600	0.93	15700	1.15	
700	0.18	5700	0.61	10700	0.89	15800	1.15	
800	0.20	5800	0.63	10800	0.89	15900	1.17	
900	0.21	5900	0.63	10900	0.88	16000	1.14	
1000	0.23	6000	0.64	11000	0.92	16100	1.14	
1100	0.24	6100	0.64	11100	0.91	16200	1.15	
1200	0.25	6200	0.64	11200	0.89	16300	1.14	
1300	0.27	6300	0.65	11300	0.88	16400	1.13	
1400	0.28	6400	0.65	11400	0.88	16500	1.13	
1500	0.28	6500	0.66	11500	0.90	16600	1.13	
1600	0.30	6600	0.67	11600	0.94	16700	1.14	
1700	0.31	6700	0.67	11700	0.96	16800	1.14	
1800	0.32	6800	0.67	11800	0.92	16900	1.14	
1900	0.33	6900	0.68	11900	0.92	17000	1.14	
2000	0.34	7000	0.67	12000	0.91	17100	1.15	
2100	0.35	7100	0.68	12100	0.92	17200	1.14	
2200	0.35	7200	0.69	12200	0.95	17300	1.15	
2300	0.36	7300	0.69	12300	0.98	17400	1.15	
2400	0.37	7400	0.68	12400	0.96	17500	1.16	
2500	0.39	7500	0.69	12500	0.99	17600	1.16	
2600	0.40	7600	0.70	12600	0.96	17700	1.16	
2700	0.41	7700	0.71	12700	0.93	17800	1.19	
2800	0.42	7800	0.72	12800	0.94	17900	1.21	
2900	0.42	7900	0.72	12900	0.98	18000	1.25	
3000	0.43	8000	0.72	13000	0.99			
3100	0.44	8100	0.73	13100	0.99			
3200	0.45	8200	0.74	13200	0.99			
3300	0.46	8300	0.75	13300	0.99			
3400	0.46	8400	0.74	13400	1.00			
3500	0.47	8500	0.73	13500	1.02			
3600	0.47	8600	0.73	13600	1.05			
3700	0.47	8700	0.75	13700	1.03			
3800	0.49	8800	0.77	13800	1.02			
3900	0.49	8900	0.77	13900	1.03			
4000	0.50	9000	0.77	14000	1.03			
4100	0.51	9100	0.77	14100	1.05			
4200	0.52	9200	0.78	14200	1.05			
4300	0.52	9300	0.80	14300	1.04			
4400	0.53	9400	0.82	14400	1.03			
4500	0.53	9500	0.82	14600	1.06			
4600	0.54	9600	0.83	14700	1.07			
4700	0.56	9700	0.89	14800	1.08			



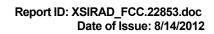


Cable loss Test Cable, Mini-Circuits, CBL-5FT-SMSM+, SMA-SMA, 18 GHz, 1.5 m Mini-Circuits, HL 3433

Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10.0	0.06	9000	2.01
100	0.17	9500	2.06
500	0.41	10000	2.05
1000	0.58	10500	2.18
1500	0.72	11000	2.26
2000	0.86	11500	2.28
2500	0.96	12000	2.43
3000	1.04	12500	2.53
3500	1.13	13000	2.52
4000	1.23	13500	2.56
4500	1.31	14000	2.60
5000	1.41	14500	2.59
5500	1.49	15000	2.67
6000	1.55	15500	2.76
6500	1.63	16000	2.86
7000	1.71	16500	2.91
7500	1.78	17000	2.95
8000	1.86	17500	3.02
8500	1.92	18000	3.07

Cable loss Test Cable, Mini-Circuits, CBL-5FT-SMSM+, SMA-SMA, 18 GHz, 1.5 m, S/N 25683 Mini-Circuits, HL 3434

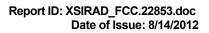
Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10.0	0.06	9000	1.96
100	0.16	9500	2.01
500	0.40	10000	2.01
1000	0.57	10500	2.14
1500	0.72	11000	2.21
2000	0.85	11500	2.24
2500	0.95	12000	2.36
3000	1.03	12500	2.47
3500	1.11	13000	2.46
4000	1.21	13500	2.50
4500	1.29	14000	2.53
5000	1.39	14500	2.53
5500	1.46	15000	2.62
6000	1.52	15500	2.70
6500	1.60	16000	2.80
7000	1.68	16500	2.86
7500	1.75	17000	2.88
8000	1.83	17500	2.94
8500	1.88	18000	3.00





Cable loss Cable coaxial, RG-214/U, N type-N type, 17 m Teldor, HL 3612

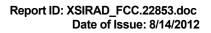
Frequency, GHz	Cable loss, dB
0.1	0.05
0.1	
0.5	0.07
1	0.10
3	0.22
5	0.29
10	0.39
30	0.68
50	0.90
100	1.27
150	1.58
200	1.80
250	2.12
300	2.36
350	2.60
400	2.82
450	2.99
500	3.23
550	3.40
600	3.56
650	3.71
700	3.90
750	4.04
800	4.23
850	4.39
900	4.55
950	4.65
1000	4.79





Cable loss Microwave Cable Assembly, Huber-Suhner, 40 GHz, 3.5 m, SMA-SMA, S/N 1225/2A HL 3901

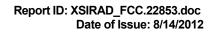
Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB
10	0.09	9500	4.29	21000	6.67
100	0.41	10000	4.40	22000	6.92
500	0.93	10500	4.52	23000	7.00
1000	1.33	11000	4.64	24000	7.18
1500	1.63	11500	4.76	25000	7.29
2000	1.90	12000	4.87	26000	7.55
2500	2.12	12500	4.99	27000	7.70
3000	2.33	13000	5.11	28000	7.88
3500	2.50	13500	5.20	29000	8.02
4000	2.67	14000	5.31	30000	8.15
4500	2.82	14500	5.42	31000	8.35
5000	2.99	15000	5.51	32000	8.40
5500	3.16	15500	5.58	33000	8.62
6000	3.32	16000	5.68	34000	8.73
6500	3.51	16500	5.78	35000	8.78
7000	3.65	17000	5.91	36000	8.94
7500	3.79	17500	5.99	37000	9.21
8000	3.92	18000	6.07	38000	9.37
8500	4.04	19000	6.36	39000	9.45
9000	4.18	20000	6.49	40000	9.52





Cable loss Test cable, Mini-Circuits, S/N 0755A, 18 GHz, 4.6 m, N/M - N/M APC-15FT-NMNM+, HL 4278

	APC-15F I -NMNM+, HL 4278							
Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	
10	0.24	5000	4.25	10200	6.52	15400	8.40	
30	0.24	5100	4.29	10300	6.57	15500	8.42	
50	0.20	5200	4.32	10400	6.59	15600	8.46	
100	0.50	5300	4.38	10500	6.61	15700	8.50	
200	0.72	5400	4.41	10600	6.64	15800	8.52	
300	0.90	5500	4.46	10700	6.64	15900	8.56	
400	1.06	5600		10800	6.65	16000	8.61	
500			4.51					
600	1.20 1.32	5700 5800	4.56 4.59	10900	6.68 6.68	16100 16200	8.64 8.66	
				11000 11100				
700 800	1.44 1.54	5900 6000	4.64 4.69	11200	6.69 6.70	16300 16400	8.70	
900	1.64	6100			6.74		8.73 8.74	
			4.72	11300		16500		
1000	1.74	6200	4.77	11400	6.78	16600	8.75	
1100	1.83	6300	4.80	11500	6.81	16700	8.78	
1200	1.92	6400	4.83	11600	6.84	16800	8.79	
1300	2.01	6500	4.89	11700	6.87	16900	8.81	
1400	2.09	6600	4.90	11800	6.92	17000	8.85	
1500	2.18	6700	4.95	11900	6.98	17100	8.90	
1600	2.25	6800	5.01	12000	7.02	17200	8.95	
1700	2.33	6900	4.99	12100	7.08	17300	8.99	
1800	2.39	7000	5.04	12200	7.15	17400	9.03	
1900	2.47	7100	5.11	12300	7.20	17500	9.07	
2000	2.53	7200	5.14	12400	7.26	17600	9.11	
2100	2.60	7300	5.21	12500	7.31	17700	9.15	
2200	2.67	7400	5.29	12600	7.36	17800	9.19	
2300	2.73	7500	5.33	12700	7.41	17900	9.24	
2400	2.80	7600	5.38	12800	7.46	18000	9.28	
2500	2.87	7700	5.46	12900	7.51			
2600	2.93	7800	5.52	13000	7.55			
2700	3.00	7900	5.58	13100	7.59			
2800	3.06	8000	5.64	13200	7.65			
2900	3.12	8100	5.69	13300	7.69			
3000	3.18	8200	5.75	13400	7.72			
3100	3.24	8300	5.80	13500	7.78			
3200	3.30	8400	5.84	13600	7.82			
3300	3.35	8500	5.90	13700	7.86			
3400	3.42	8600	5.97	13800	7.91			
3500	3.46	8700	5.99	13900	7.96			
3600	3.52	8800	6.04	14000	8.01			
3700	3.57	8900	6.10	14100	8.06			
3800	3.61	9000	6.13	14200	8.10			
3900	3.67	9100	6.17	14300	8.13			
4000	3.71	9200	6.23	14400	8.16			
4100	3.77	9300	6.27	14500	8.19			
4200	3.83	9400	6.30	14600	8.21			
4300	3.89	9500	6.35	14700	8.23			
4400	3.94	9600	6.37	14800	8.26			
4500	4.00	9700	6.40	14900	8.28			
4600	4.05	9800	6.44	15000	8.30			
4700	4.10	9900	6.45	15100	8.33			
4800	4.16	10000	6.47	15200	8.35			
4900	4.19	10100	6.50	15300	8.37			
7300	7.10	10 100	0.00	10000	0.07	l .	i	





Cable loss Test cable, Mini-Circuits, S/N 0757A, 18 GHz, 4.6 m, N/M - N/M APC-15FT-NMNM+, HL 4279

	APC-15FT-NMNM+, HL 4279								
Frequency, MHz	Cable I aB'	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB	Frequency, MHz	Cable loss, dB		
10	0.26	5000	4.23	10200	6.47	15400	8.46		
30	0.26	5100	4.28	10300	6.53	15500	8.49		
50	0.34	5200	4.32	10400	6.57	15600	8.50		
100	0.50	5300	4.37	10500	6.59	15700	8.53		
200	0.72	5400	4.41	10600	6.62	15800	8.56		
300	0.90	5500	4.46	10700	6.64	15900	8.60		
400	1.05	5600	4.51	10800	6.66	16000	8.62		
500	1.20	5700	4.57	10900	6.69	16100	8.65		
600	1.31	5800	4.61	11000	6.69	16200	8.68		
700	1.44	5900	4.64	11100	6.70	16300	8.70		
800	1.53	6000	4.70	11200	6.72	16400	8.72		
900	1.63	6100	4.75	11300	6.74	16500	8.76		
1000	1.74	6200	4.76	11400	6.79	16600	8.77		
1100	1.83	6300	4.82	11500	6.83	16700	8.78		
1200	1.92	6400	4.83	11600	6.85	16800	8.82		
1300	2.01	6500	4.88	11700	6.89	16900	8.85		
1400	2.09	6600	4.90	11800	6.94	17000	8.91		
1500	2.17	6700	4.95	11900	7.00	17100	8.94		
1600	2.25	6800	5.01	12000	7.04	17200	8.98		
1700	2.33	6900	4.98	12100	7.10	17300	9.03		
1800	2.39	7000	5.03	12200	7.18	17400	9.05		
1900	2.47	7100	5.11	12300	7.23	17500	9.08		
2000	2.53	7200	5.13	12400	7.29	17600	9.10		
2100	2.60	7300	5.20	12500	7.34	17700	9.12		
2200	2.67	7400	5.28	12600	7.39	17800	9.14		
2300	2.74	7500	5.33	12700	7.45	17900	9.17		
2400	2.80	7600	5.37	12800	7.49	18000	9.21		
2500	2.87	7700	5.44	12900	7.53				
2600	2.92	7800	5.52	13000	7.58				
2700	3.00	7900	5.56	13100	7.62				
2800	3.06	8000	5.63	13200	7.67				
2900	3.12	8100	5.67	13300	7.71				
3000	3.18	8200	5.71	13400	7.74				
3100	3.24	8300	5.76	13500	7.79				
3200	3.30	8400	5.79	13600	7.82				
3300	3.35	8500	5.85	13700	7.84				
3400	3.41	8600	5.88	13800	7.87				
3500	3.46	8700	5.92	13900	7.90				
3600	3.51	8800	5.96	14000	7.94				
3700	3.56	8900	6.02	14100	7.98				
3800	3.61	9000	6.05	14200	8.01				
3900	3.66	9100	6.08	14300	8.05				
4000	3.71	9200	6.15	14400	8.10				
4100	3.77	9300	6.18	14500	8.12				
4200	3.83	9400	6.20	14600	8.16				
4300	3.89	9500	6.25	14700	8.22				
4400	3.94	9600	6.28	14800	8.26				
4500	3.99	9700	6.31	14900	8.29				
4600	4.05	9800	6.35	15000	8.33				
4700	4.09	9900	6.37	15100	8.39				
4800	4.15	10000	6.40	15200	8.41				
4900	4.19	10100	6.45	15300	8.44				

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13 APPENDIX F Abbreviations and acronyms

A ampere

AC alternating current
A/m ampere per meter
AM amplitude modulation
AVRG average (detector)
CBW channel bandwidth

cm centimeter dB decibel

 $\begin{array}{ll} \text{dBm} & \text{decibel referred to one milliwatt} \\ \text{dB}({}_{\mu}\text{V}) & \text{decibel referred to one microvolt} \end{array}$

 $dB(\mu V/m) \qquad \qquad decibel \ referred \ to \ one \ microvolt \ per \ meter \\ decibel \ referred \ to \ one \ microampere$

DC direct current EBW emission bandwidth

EIRP equivalent isotropically radiated power

ERP effective radiated power EUT equipment under test

F frequency
GHz gigahertz
GND ground
H height

HL Hermon laboratories

Hz hertz k kilo kHz kilohertz LO local oscillator

m meter MHz megahertz minute min mm millimeter millisecond ms μS microsecond NA not applicable narrow band NB open area test site OATS

S2 Ohm

QP quasi-peak

PM pulse modulation

PS power supply

RE radiated emission

RF radio frequency

rms root mean square

Rx receive s second T temperature Tx transmit V volt

VA volt-ampere

END OF DOCUMENT