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Electrical

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RADIO TEST REPORT

according to 47 CFR Part 15 subpart C §15.231 and subpart B
for
Electronics Line 3000 Ltd.
EQUIPMENT UNDER TEST:
Wireless keypad
Model: EL2620

Document ID: ELERAD_FCC.15673_EL2620_rev1.doc
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Contents

1 Project information

Description of equipment under test

Test items	Wireless keypad
Manufacturer	Electronics Line 3000 Ltd.
Brand name	Infinite
Types (Models)	EL2620
Equipment FCC code	DSR

Applicant information

Applicant's responsible person	Mr. Shaul Aviezer, Quality and Approvals Manager
Company	Electronics Line 3000 Ltd.
Address	58, Amal street
P.O.Box	3253
City	Petah Tikva
Postal code	49130
Country	Israel
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Telefax number	+972 3921 2224

Test performance

Project number:	15673
Location	Hermon Laboratories
Receipt date	September 4, 2003
Test completed	September 21, 2003
Purpose of test	Apparatus compliance verification in accordance with emission requirements
Test specification(s)	47CFR Part 15, subpart C, §15.231, §15.209, §15.205 and subpart B §15.109

2 Summary and signatures

The EUT, wireless keypad, was tested according to FCC part 15 subpart C, §§15.231, 15.209, part 15 §15.109 and found to comply with the standard requirements.

Test description	Specification reference	Tested by	Date tested	Test report paragraph	Verdict
Bandwidth of emission	15.231(c)	Mr. M. Nikishin, test engineer	October 26, 2003	4.1	Pass
Field strength of fundamental	15.231(b)(2)	Mr. Y. Neuman, test engineer	September 8, 2003	4.2	Pass
Field strength of spurious radiation	15.231(b)(3)	Mr. I. Fershtater, test engineer	September 14, 21, 2003	4.3	Pass
Radiated emissions	15.109	Mr. I. Fershtater, test engineer	September 11, 2003	4.4	Pass

Test report prepared by:

Mrs. M. Cherniavsky, MScEE, certification engineer _____

Test report approved by:

Mr. Michael Nikishin, MScEE, group leader _____

Mr. Edward Usoskin, PhD, C.E.O. _____

3 EUT description

3.1 General

The EUT, model number EL2620, is a wireless keypad transmitter operating at 418 MHz and designed for use with Electronics Line's "Infinite" control panel. The device utilizes integral, printed on PCB antenna and is powered by 9 V alkaline battery; its controller clock generates 4 MHz. The EL2620 general view is shown in Photograph 3.1.1.

3.1.1 EUT compliance with §15.231(a)(1) requirements

The EUT is manually activated transmitter, which sends data for 880 ms and stops automatically.
No periodic supervisory transmissions.

Photograph 3.1.1

EUT general view

4 Test results

4.1 Bandwidth of emission according to § 15.231 (c)

METHOD OF MEASUREMENT: ANSI 63.4 §13.1.7
DATE of TEST: October 26, 2003
RELATIVE HUMIDITY: 42 %
AMBIENT TEMPERATURE: 24°C
AIR PRESSURE: 1009 hPa
MODULATION: ON
DETECTOR USED: Peak

Carrier frequency MHz	Occupied bandwidth, kHz			Verdict
	Measured	Limit	Reference to plot in Annex A	
418	77.6	1045	No.1	Pass
Measurement uncertainty	0.21 ppm			

The maximum allowed occupied bandwidth was calculated as 0.0025 of the center frequency.

TEST PROCEDURE

The EUT was tested, being placed on a wooden 80 cm height table in typical installation position (as wall-mounted device). The spectrum trace data around transmitter fundamental frequency was obtained with the spectrum analyzer in "Max Hold" mode. The bandwidth value was determined between two points 20 dB down from the modulated carrier.

TEST EQUIPMENT USED:

HL 0026	HL 0337					

LIMIT § 15.231 (c)

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

4.2 Field strength of fundamental, § 15.231(b)(2)

METHOD OF MEASUREMENT:	ANSI 63.4 §13.1.5
DATE of TEST:	September 14, 2003
RELATIVE HUMIDITY:	42 %
AMBIENT TEMPERATURE:	24°C
AIR PRESSURE:	1011 hPa
TEST PERFORMED IN:	OATS
DISTANCE BETWEEN ANTENNA AND EUT:	3 m
MODULATION:	ON
ANTENNA TYPE:	Log periodic

	§ 15.231 (b)	§ 15.231 (e)
The EUT complies with the requirements of	X	

Peak detector

Frequency, MHz	Measured field strength, dB(µV/m)	Antenna polarization	Antenna height, m	Turntable position, (^{o})	Specification limit, dB(µV/m)	Margin, dB	Verdict
418.0	68.5	Vertical	1.5	95	80.3	11.8	Pass
Measurement uncertainty, dB	± 6.0						

Turntable position in degrees, EUT front panel = 0^o.
Margin = dB below (negative if above) specification limit.

LIMIT § 15.231 (b)

Fundamental frequency, MHz	Field strength of fundamental @ 3 m, dB(µV/m)
418	80.3

The above field strength limits are based on average limits.
The provisions of section 15.35 for limiting peak emissions apply.

TEST PROCEDURE

The EUT was tested, being placed on a wooden 80 cm height table, in typical installation position (as wall-mounted device).To find maximum radiation the turntable was rotated 360^o, measuring antenna height was changed from 1 to 4 m, and the antennas polarization was changed from vertical to horizontal.

TEST EQUIPMENT USED:

HL 0034	HL 0038	HL 0091	HL 0287	HL 0415	HL 0812	HL 1430

4.3 Field strength of spurious radiation, § 15.231(b)(3)

METHOD OF MEASUREMENT: ANSI 63.4 §13.1.4
DATE of TEST: September 14, 2003
RELATIVE HUMIDITY: 42 %
AMBIENT TEMPERATURE: 24°C
AIR PRESSURE: 1011 hPa
TEST PERFORMED IN: Anechoic chamber in 9 kHz to 2.9 GHz
OATS in 2.9 GHz to 4.2 GHz
DISTANCE BETWEEN ANTENNA AND EUT: 3 m
DETECTOR USED: Peak
MEASUREMENT UNCERTAINTY: ± 6 dB max

The frequency spectrum was investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to the tenth harmonic (4.2 GHz)

Test was performed with loop antenna

Frequency, MHz	Antenna polarization	RBW, kHz	VBW, kHz	Radiated emission, dB (μV/m)	Limit @ 3 m, dB(μV/m)	Margin, dB	Verdict
0.009 – 0.150	V	0.2	0.3	All emissions were found below the limit, refer to Plot No.2			Pass
0.150 - 30	V	9	30	All emissions were found below the limit, refer to Plot No.3			Pass

Test was performed with biconical antenna in 30 – 200 MHz range, with log periodic – in 200 to 1000 MHz range and with double ridged guide - in 1000 to 4200 MHz range

Frequency, MHz	Antenna polariz.	Antenna height, m	Turntable position, (^{o})	Radiated emissions, peak, dB (μV/m)	Limit (average) @ 3 m, dB (μV/m)	Margin, dB	Verdict
836.0	V, H	1.0	0	>20 dB below limit	60.3	>20	Pass
1254.0	V, H	1.0	0	>20 dB below limit	60.3	>20	Pass
1672.0	V	1.0	321	49.3	54.0	4.7	Pass
2090.0	V, H	1.0	0	>20 dB below limit	60.3	>20	Pass
2508.0	V, H	1.0	0	>20 dB below limit	60.3	>20	Pass

For full test results refer to Plots No. 4 to No.8.

Notes to table:

Antenna polarization: V- vertical, H- horizontal
Resolution bandwidth (RBW) and video bandwidth (VBW) settings are shown in the plots
Turntable position in degrees, EUT front panel = 0^o.
Margin = dB below (negative if above) specification limit.

TEST PROCEDURE

The EUT was tested, being placed on a wooden 80 cm height turntable, in typical installation position (as wall-mounted device).

9 kHz – 30 MHz frequency range. The loop antenna was positioned with its plane vertical. The loop center was 1 meter above the ground plane. To find maximum radiation the turntable was rotated 360° and the measuring antenna was rotated about its vertical axis.

30 MHz – 4.2 GHz frequency range. To find maximum radiation the turntable was rotated 360°, measuring antenna height was changed from 1 to 4 m, and the antennas polarization was changed from vertical to horizontal.

TEST EQUIPMENT USED IN ANECHOIC CHAMBER:

HL 0032	HL 0446	HL 0569	HL 1425	HL 1553	HL 1566	HL 1826
HL 1849	HL 1850	HL 1942	HL 1984	HL 2109		

TEST EQUIPMENT USED AT OPEN AREA TEST SITE:

HL 0034	HL 0038	HL 0091	HL 0287	HL 0415	HL 0812	HL 1200
HL 1424	HL 1430	HL 1942	HL 1984	HL 2254	HL 2259	HL 2273

4.4 Unintentional radiated emissions test according to §15.109

METHOD OF MEASUREMENT:	ANSI 63.4 §11.6 / ANSI 63.4 §12.1.4
DATE of TEST:	September 14, 2003
RELATIVE HUMIDITY:	42 %
AMBIENT TEMPERATURE:	24°C
AIR PRESSURE:	1011 hPa
TEST PERFROMED IN:	Anechoic chamber
DISTANCE BETWEEN ANTENNA AND EUT:	3 m
THE EUT WAS TESTED AS:	Table-top
FREQUENCY RANGE:	30 MHz – 1 GHz
DETECTOR TYPE:	Quasi-peak
RESOLUTION BANDWIDTH:	120 kHz
ANTENNA TYPE:	Biconical in 30 –200 MHz range Log periodic in 200 – 1000 MHz range

The EUT highest used frequency (not including operating frequency), MHz	Upper frequency of measurement range, MHz
Below 1.705	30
1.705 – 108	**1000**
108 – 500	2000
500 – 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

TEST RESULTS:

All the measured emissions were found at least 20 dB below specified limit, refer to Plots No.9, 10.

TEST PROCEDURE

The EUT was placed on a wooden 80 cm height table in typical installation position (as wall-mounted device). To find maximum radiation the turntable was rotated 360°, measuring antenna height was changed from 1 to 4 m, and the antennas polarization was changed from vertical to horizontal.

TEST EQUIPMENT USED:

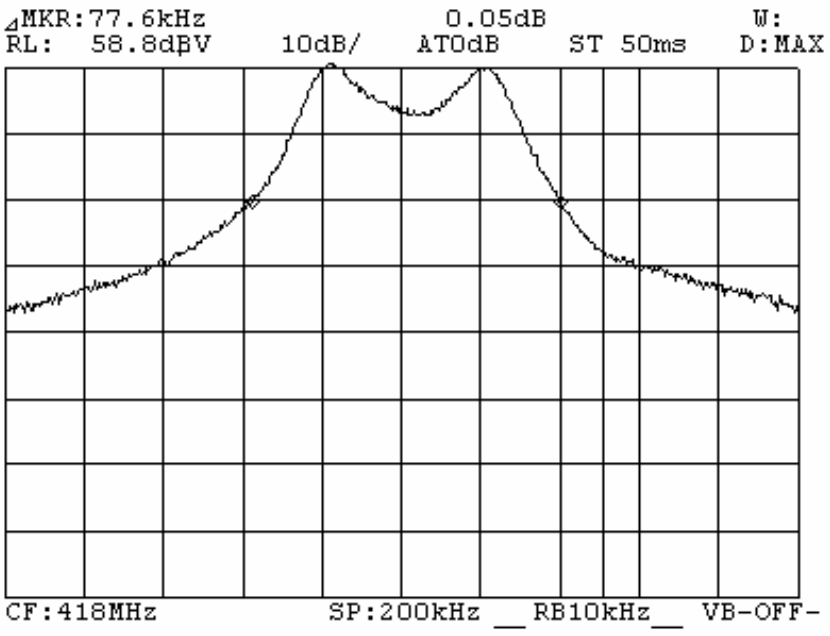
HL 0032	HL 0569	HL 1425	HL 1553	HL 1566	HL 1826	HL 1849
HL 1850	HL 2109					

LIMIT § 15.109

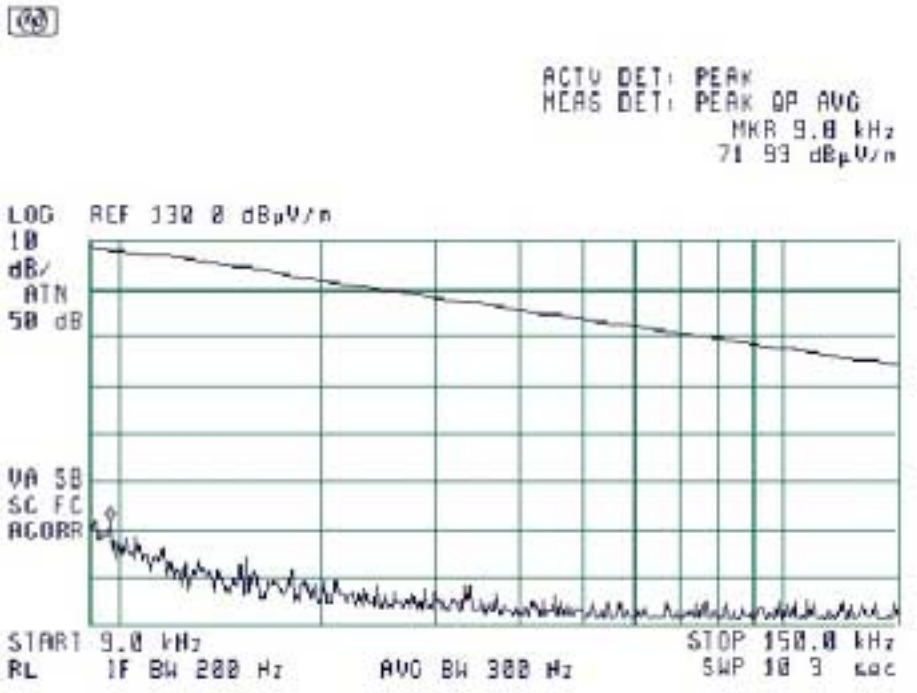
Frequency, MHz	Class B equipment @ 3 m dB(μV/m)
30 - 88	40
88 - 216	43.5
216 - 960	46
960 - 5000	54

Appendix A - Plots

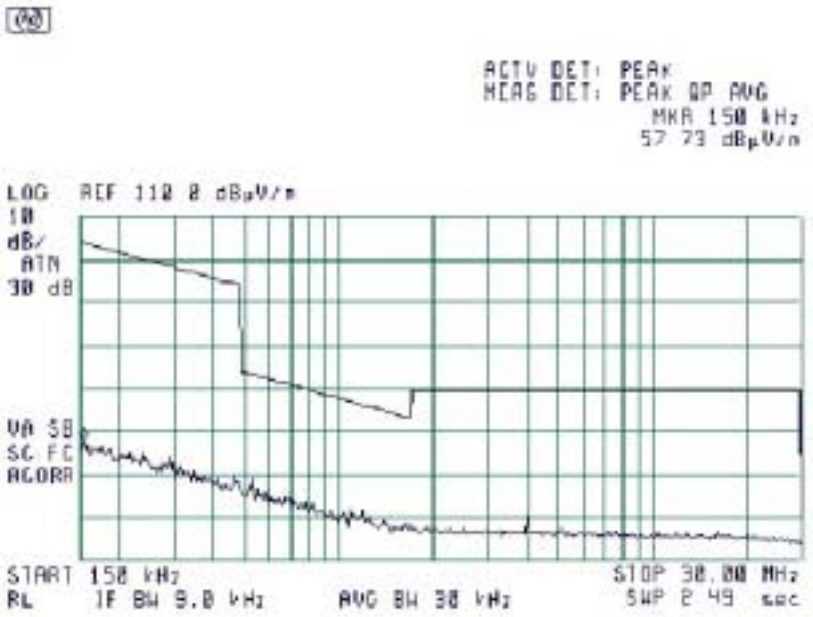
Plot No.1
Occupied bandwidth measurement test result



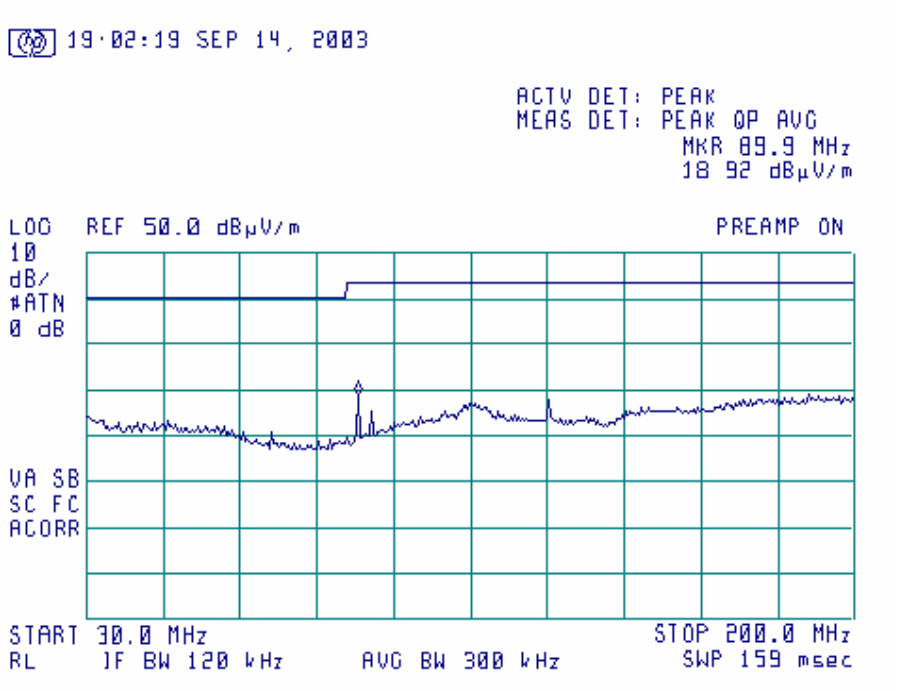
Plot No.2
Spurious emissions measurement test results in anechoic chamber in 9 – 150 kHz range, vertical and horizontal antenna polarization



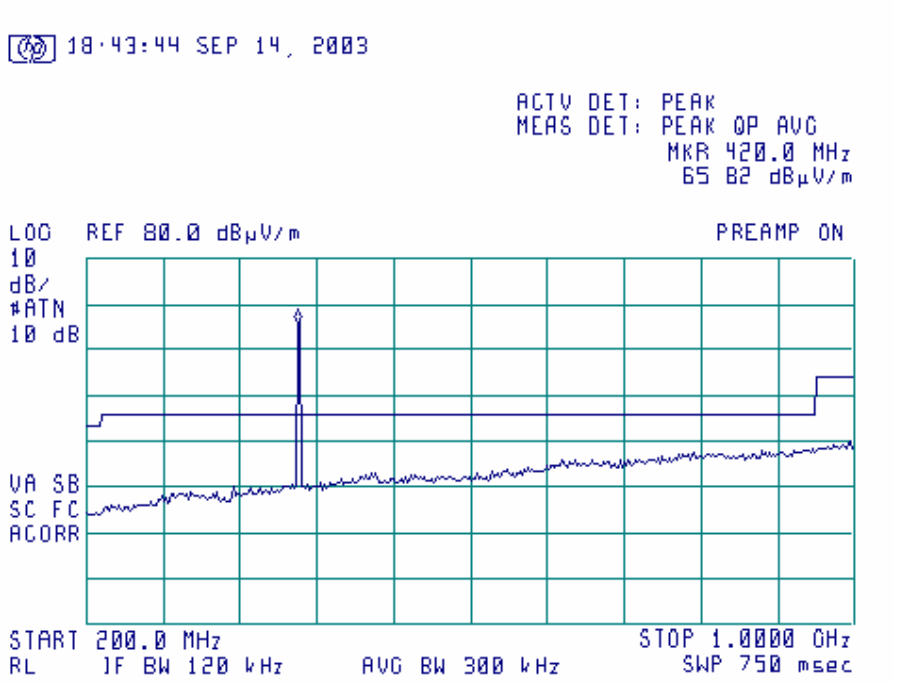
Plot No.3
Spurious emissions measurement test results in anechoic chamber in 150 kHz – 30 MHz range, vertical and horizontal antenna polarization



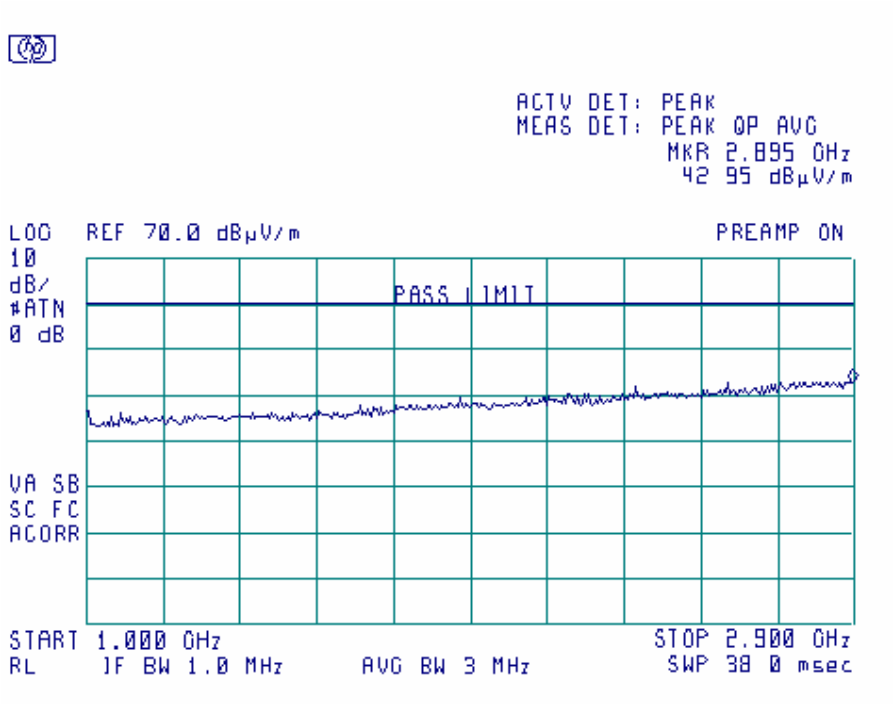
Plot No.4
Spurious emissions measurement test results in anechoic chamber in 30 - 200 MHz range, vertical and horizontal antenna polarization



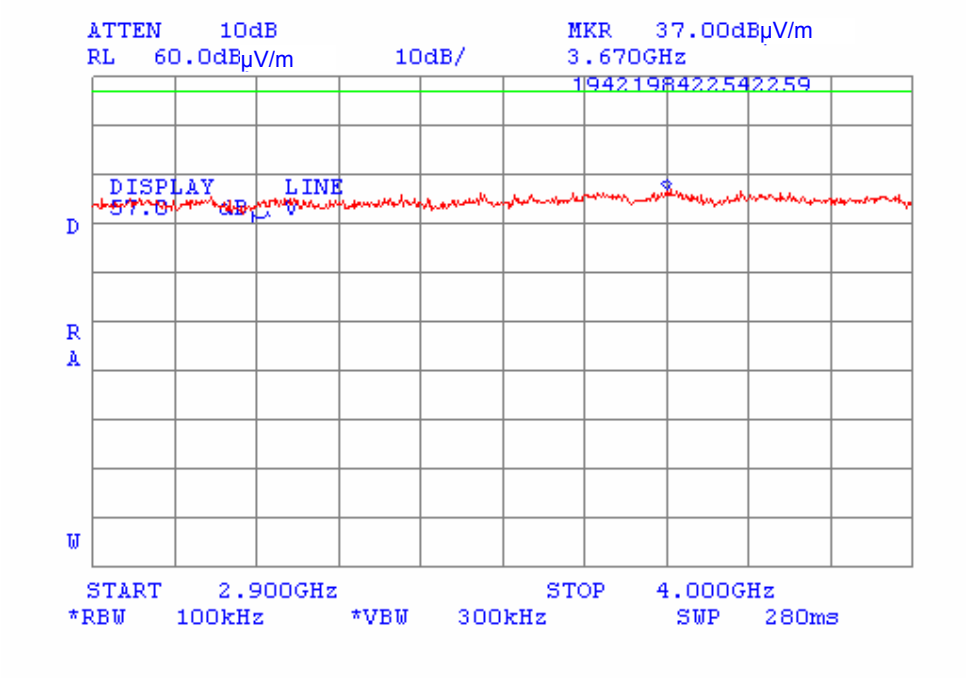
Plot No.5
Spurious emissions measurement test results in anechoic chamber in 200 – 1000 MHz range, vertical and horizontal antenna polarization



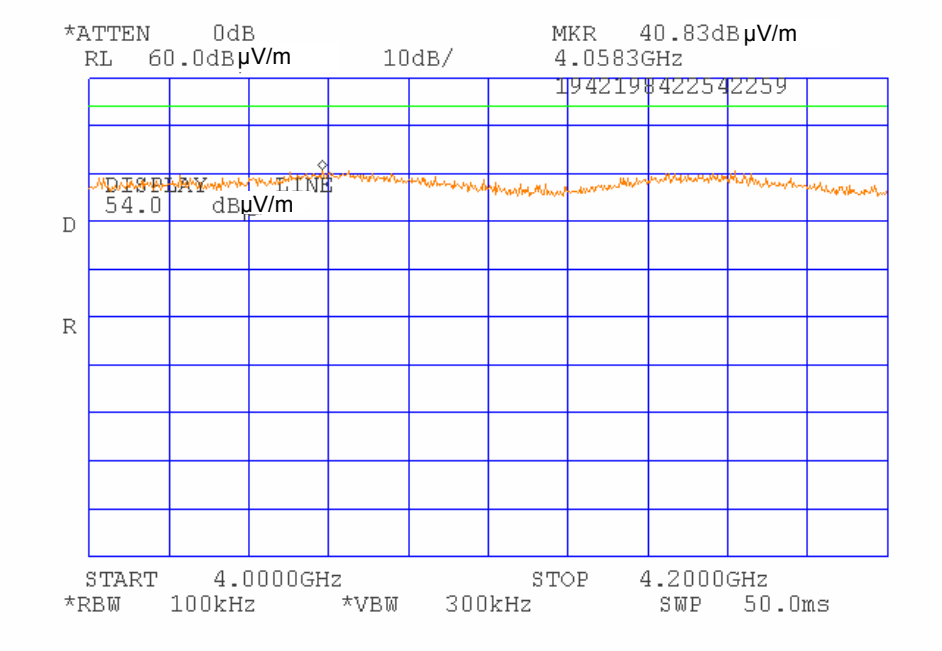
Plot No.6
Spurious emissions measurement test results in anechoic chamber in 1000 – 2900 MHz range, vertical and horizontal antenna polarization



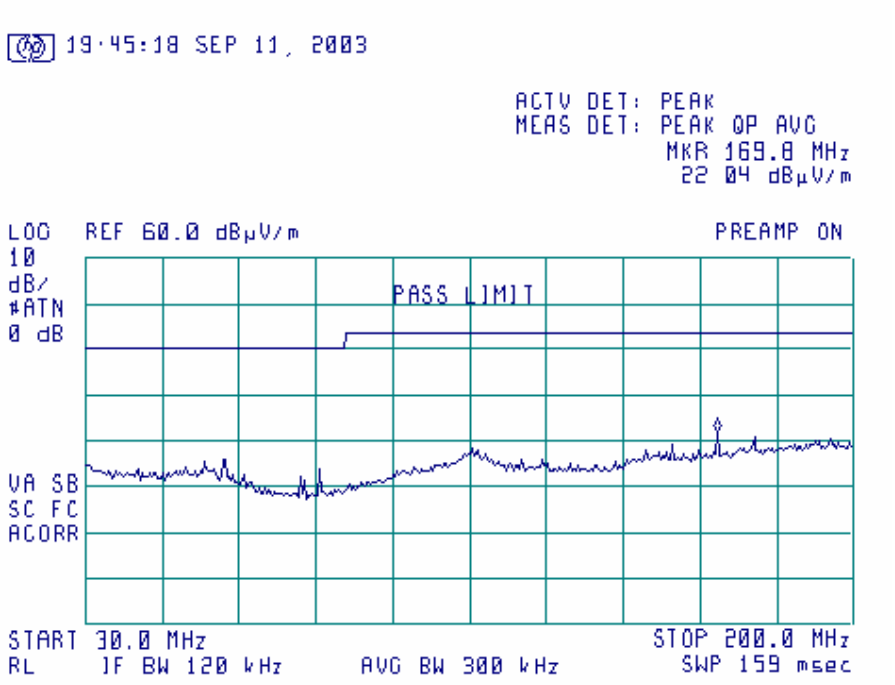
Plot No.7
Spurious emissions measurement test results at OATS in 2.9 GHz - 4.0 GHz range, vertical and horizontal antenna polarization



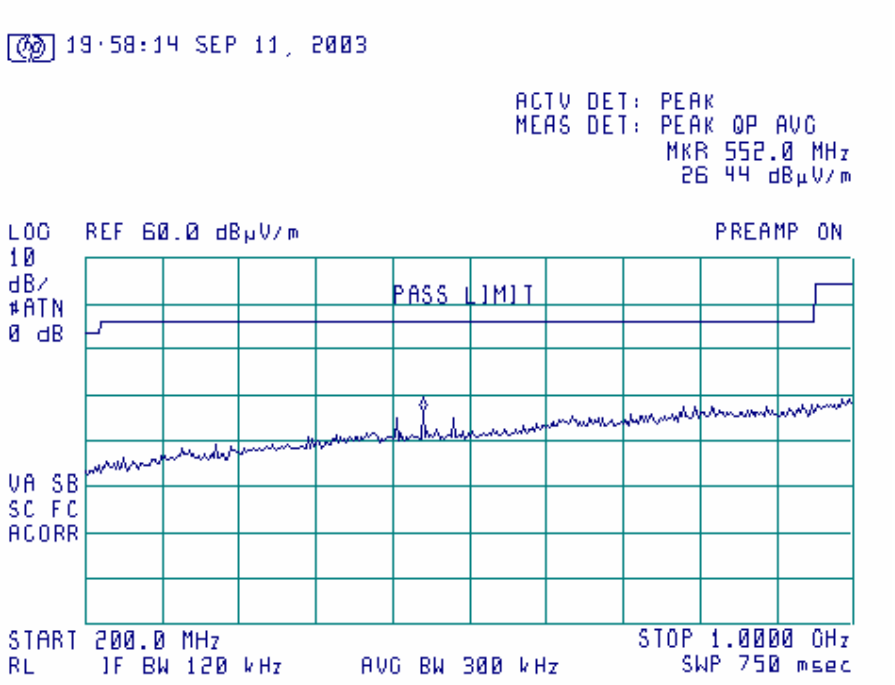
Plot No.8
Spurious emissions measurement test results at OATS in 4.0 GHz - 4.2 GHz range, vertical and horizontal antenna polarization



Plot No.9
Unintentional radiated emissions test results,
vertical and horizontal antenna polarization



Plot No10
Unintentional radiated emissions test results,
vertical and horizontal antenna polarization



Appendix B - Test equipment used for tests

HL Serial No.	Description	Manufacturer information			Due calibration Month/ year
		Name	Model No.	Serial No.	
0026	Spectrum analyzer, 100 Hz-2.2 GHz	Anritsu	MS 2601A	3460	9/04
0032	Biconical antenna, 20 - 200 MHz	Electro-Metrics	BIA-25/30	3577	11/04
0034	Log periodic antenna, 200 - 1000 MHz	Electro-Metrics	LPA 25/30	1988	1/05
0038	Antenna mast, 1-4 m	Hermon Labs	AM-1	028	2/05 check
0091	Position controller for antenna mast + turntable, OFTS	Hermon Labs	CRL-2	091	4/04 check
0287	Turntable, motorized diameter, 2 m	Hermon Labs	TMD-2	042	11/04 check
0337	Probe set, hand held, 5 probes	Electro-Metrics	EHFP-30	238	6/04
0415	Cable coax RF, RG-58	Hermon Labs	CC-3	056	5/04
0446	Active loop antenna, 10 kHz - 30 MHz	Electro-Mechanics	6502	2857	10/04
0569	Antenna, log periodic, 200 – 1000 MHz	Electro-Metrics	LPA 25/30	1953	1/05
0812	Cable, coax, RG-214, 11.5 m, N-type connectors	Hermon Labs	C214-11	148	5/04
1200	Quadruplexer, 1-12 GHz	Elettronica S.p.A.-Roma	UE 84	0240	4/04 check
1424	Spectrum analyzer, 30 Hz - 40 GHz	Agilent Technologies	8564EC	3946A00219	8/04
1425	EMI receiver system, 9 kHz - 2.9 GHz	Agilent Technologies	8542E	3710A00222	9/04
1430	EMI receiver system, 9 kHz - 2.9 GHz	Agilent Technologies	8542E	3807A00262	9/04
1553	Cable RF, 3.5 m	Alpha wire	RG-214	NA	5/04
1566	Cable RF, 2 m	Huber-Suhner	Sucoflex 104PE	13094/4PE	12/04
1826	Antenna mast and turntable position controller	Sh. I. Machines	CRL-4	1	5/04 check
1849	Antenna mast with polarity control	Sh. I. Mashines	AM-F4	NA	1/05 check
1850	Turntable	Sh. I. Mashines	TT-M-3	NA	1/05 check
1942	Cable 18 GHz, 4 m, blue	Rhophase Microwave Ltd.	SPS-1803A-4000-NPS	T4658	10/04
1984	Antenna, double ridged waveguide horn, 1-18 GHz, 300 W, N-type	EMC Test Systems	3115	9911-5964	3/05
2109	Anechoic chamber 6 (L) x 5.5 (W) x 2.95 (H) m	Hermon Labs	AC-2	NA	12/04 check
2254	Cable 40 GHz, 0.8 m, blue	Rhophase Microwave	KPS-1503A-800-KPS	W4907	11/04
2259	Amplifier low noise, 2 - 20 GHz	Sophia Wireless	LNA0220-C	0223	11/04
2273	Power supply 11 V for HL2258, HL2259, HL2260	Hermon Labs	S-11	2273	12/04

Appendix C – Antenna factors and cable loss

Antenna factor
Active loop antenna
Model 6502
S/N 2857

Frequency, MHz	Magnetic antenna factor, dB	Electric antenna factor, dB
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	9.8
0.750	-41.9	9.7
1.000	-41.4	10.1
2.000	-41.5	10.0
3.000	-41.4	10.2
4.000	-41.4	10.1
5.000	-41.5	10.1
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

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

Antenna factor
Biconical antenna
Electro-Metrics, model BIA-25/30
Ser.No.3577, HL 0032

Frequency MHz	Antenna Factor dB(1/m)	Frequency MHz	Antenna Factor dB(1/m)
20	15.1	115	16.7
25	14.6	120	14.1
30	13.7	125	13.1
35	11.8	130	13.0
40	11.4	135	12.9
45	11.7	140	12.7
50	11.4	145	12.5
55	10.5	150	14.3
60	10.3	155	14.8
65	8.9	160	14.7
70	7.6	165	15.1
75	7.3	170	15.6
80	7.3	175	16.5
85	7.8	180	16.7
90	9.4	185	17.3
95	10.6	190	17.9
100	11.8	195	17.6
105	12.5	200	17.9
110	13.7		

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

Antenna factor
Log periodic antenna
Electro-Metrics, model LPA-25/30
Ser.No.1988, HL 0034

Frequency MHz	Antenna Factor dB(1/m)	Frequency MHz	Antenna Factor dB(1/m)
200	12.6	625	20.4
225	12.2	650	20.9
250	13.4	675	22.0
275	14.3	700	22.2
300	15.2	725	22.7
325	15.7	750	22.5
350	15.9	775	22.7
375	16.4	800	22.8
400	17.0	825	23.2
425	17.4	850	23.5
450	17.9	875	23.9
475	18.6	900	24.0
500	19.1	925	24.0
525	19.3	950	24.2
550	19.6	975	24.7
575	19.8	1000	25.1
600	20.0		

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

Antenna factor
Log periodic antenna
Electro-Metrics, model LPA-25/30
Ser.No.1953, HL 0569

Frequency MHz	Antenna Factor dB(1/m)	Frequency MHz	Antenna Factor dB(1/m)
200	15.2	625	25.2
225	15.1	650	25.8
250	16.3	675	27.2
275	17.2	700	27.6
300	19.6	725	27.6
325	18.4	750	27.6
350	19.0	775	28.0
375	20.0	800	28.2
400	20.9	825	29.4
425	21.3	850	29.9
450	22.1	875	30.0
475	22.7	900	30.4
500	23.2	925	30.6
525	23.9	950	30.8
550	24.2	975	31.6
575	24.6	1000	32.1
600	24.7		

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

Antenna factor
Double-ridged wave guide horn antenna
Model 3115, S/N 9911-5964, HL1984

Frequency, MHz	Antenna factor, dB(1/m)
1000.0	24.7
1500.0	25.7
2000.0	27.6
2500.0	28.9
3000.0	31.2
3500.0	32.0
4000.0	32.5
4500.0	32.7
5000.0	33.6
5500.0	35.1
6000.0	35.4
6500.0	34.9
7000.0	36.1
7500.0	37.8
8000.0	38.0
8500.0	38.1
9000.0	39.1
9500.0	38.3
10000.0	38.6
10500.0	38.2
11000.0	38.7
11500.0	39.5
12000.0	40.0
12500.0	40.4
13000.0	40.5
13500.0	41.1
14000.0	41.6
14500.0	41.7
15000.0	38.7
15500.0	38.2
16000.0	38.8
16500.0	40.5
17000.0	42.5
17500.0	45.9
18000.0	49.4

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

Cable loss
RF cable 3.5 m, Alpha Wire, model RG-214, S/N 149, HL 1553

No.	Frequency, MHz	Cable loss, dB	Measurement uncertainty, dB
1	1	0.01	±0.05
2	10	0.07	
3	30	0.12	
4	50	0.22	
5	100	0.26	
6	200	0.40	
7	300	0.52	
8	400	0.60	
9	500	0.70	
10	600	0.77	
11	700	0.84	
12	800	1.00	
13	900	1.00	
14	1000	1.05	
15	2000	1.70	

Cable loss
Cable Coaxial, RG-58/RG-214, s/n 056, HL 0415
+ Cable Coaxial, RG-214, 11.5m, s/n 148, HL 0812

No.	Frequency, MHz	Cable loss, dB	Measured uncertainty, dB
1	20	0.73	±0.12
2	30	0.91	
3	50	1.2	
4	80	1.56	
5	100	1.76	
6	200	2.59	
7	300	3.26	
8	400	3.93	
9	500	4.42	
10	600	4.92	
11	700	5.36	
12	800	5.88	
13	900	6.41	
14	1000	6.71	
15	1500	8.63	
16	2000	10.39	

Cable loss
Cable RF, 2m, model: Sucoflex 104PE, S/N 13094/4PE, HL 1566

No.	Frequency, MHz	Cable loss, dB	Tolerance, dB	Measurement uncertainty, dB
1	30	0.10	≤ 5.0	±0.12
2	50	0.13		
3	100	0.20		
4	300	0.33		
5	500	0.45		
6	800	0.60		
7	1000	0.65		
8	1500	0.91		
9	2000	1.08		
10	2500	1.19		
11	3000	1.28		
12	3500	1.49		
13	4000	1.63		
14	4500	1.63	≤ 5.0	±0.17
15	5000	1.66		
16	5500	1.88		
17	6000	1.96		
18	6500	1.93		
19	7000	2.07		
20	7500	2.37		
21	8000	2.34		
22	8500	2.64		
23	9000	2.68		
24	9500	2.64		
25	10000	2.70		
26	10500	2.84		
27	11000	2.88		
28	11500	3.19		
29	12000	3.15		
30	12500	3.20	≤ 5.0	±0.26
31	13000	3.22		
32	13500	3.47		
33	14000	3.41		
34	14500	3.59		
35	15000	3.79		
36	15500	4.24		
37	16000	4.12		
38	16500	4.46		
39	17000	4.50		
40	17500	4.49		
41	18000	4.45		

Cable loss
Cable 18 GHz, 4 m, blue, model: SPS-1803A-4000-NPS, S/N T4658, HL 1942

Frequency, GHz	Cable loss, dB
0.03	0.21
0.05	0.26
0.10	0.36
0.20	0.50
0.30	0.61
0.40	0.70
0.50	0.78
0.60	0.85
0.70	0.93
0.80	0.99
0.90	1.04
1.00	1.10
1.10	1.16
1.20	1.22
1.30	1.26
1.40	1.31
1.50	1.35
1.60	1.41
1.70	1.45
1.80	1.49
1.90	1.53
2.00	1.57
2.10	1.61
2.20	1.65
2.30	1.69
2.40	1.72
2.50	1.76
2.60	1.79
2.70	1.83
2.80	1.87
2.90	1.90
3.10	1.97
3.30	2.04
3.50	2.11
3.70	2.18
3.90	2.24
4.10	2.31
4.30	2.38
4.50	2.43
4.70	2.53
4.90	2.53
5.10	2.63
5.30	2.65
5.50	2.72
5.70	2.76
5.90	2.79

Frequency, GHz	Cable loss, dB
6.10	2.88
6.30	2.90
6.50	2.97
6.70	3.02
6.90	3.04
7.10	3.07
7.30	3.12
7.50	3.13
7.70	3.19
7.90	3.24
8.10	3.30
8.30	3.36
8.50	3.45
8.70	3.41
8.90	3.45
9.10	3.42
9.30	3.55
9.50	3.48
9.70	3.58
9.90	3.61
10.10	3.66
10.30	3.68
10.50	3.70
10.70	3.70
10.90	3.75
11.10	3.78
11.30	3.86
11.50	3.98
11.70	4.10
11.90	4.12
12.10	4.09
12.40	4.13
13.00	4.23
13.50	4.35
14.00	4.40
14.50	4.44
15.00	4.57
15.50	4.66
16.00	4.64
16.50	4.66
17.00	4.75
17.50	4.85
18.00	4.93

Cable loss
Cable 40 GHz, 0.8 m, blue, model: KPS-1503A-800-KPS, S/N W4907, HL 2254

Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB
0.03	0.04	5.10	0.80	15.00	1.49
0.05	0.07	5.30	0.83	15.50	1.49
0.10	0.09	5.50	0.83	16.00	1.46
0.20	0.15	5.70	0.84	16.50	1.47
0.30	0.19	5.90	0.87	17.00	1.50
0.40	0.25	6.10	0.86	17.50	1.57
0.50	0.29	6.30	0.89	18.00	1.63
0.60	0.33	6.50	0.90	18.50	1.57
0.70	0.37	6.70	0.89	19.00	1.63
0.80	0.41	6.90	0.93	19.50	1.65
0.90	0.44	7.10	0.92	20.00	1.64
1.00	0.45	7.30	0.95	20.50	1.75
1.10	0.48	7.50	0.96	21.00	1.72
1.20	0.51	7.70	0.97	21.50	1.78
1.30	0.53	7.90	1.01	22.00	1.76
1.40	0.54	8.10	1.00	22.50	1.72
1.50	0.57	8.30	1.05	23.00	1.83
1.60	0.59	8.50	1.04	23.50	1.80
1.70	0.04	8.70	1.07	24.00	1.90
1.80	0.07	8.90	1.11	24.50	1.81
1.90	0.09	9.10	1.09	25.00	1.98
2.00	0.15	9.30	1.14	25.50	1.91
2.10	0.19	9.50	1.12	26.00	2.02
2.20	0.25	9.70	1.15	26.50	1.92
2.30	0.29	9.90	1.16	27.00	1.97
2.40	0.33	10.10	1.16	28.00	2.02
2.50	0.37	10.30	1.19	29.00	1.95
2.60	0.41	10.50	1.14	30.00	1.94
2.70	0.44	10.70	1.19	31.00	2.11
2.80	0.45	10.90	1.17	32.00	2.17
2.90	0.48	11.10	1.13	33.00	2.27
3.10	0.61	11.30	1.20	34.00	2.27
3.30	0.64	11.50	1.13	35.00	2.29
3.50	0.65	11.70	1.20	36.00	2.35
3.70	0.68	11.90	1.18	37.00	2.37
3.90	0.69	12.10	1.14	38.00	2.40
4.10	0.71	12.40	1.19	39.00	2.57
4.30	0.73	13.00	1.34	40.00	2.36
4.50	0.75	13.50	1.33		
4.70	0.77	14.00	1.48		
4.90	0.79	14.50	1.45		

Appendix C - General information

Test facility 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) and by Industry Canada for electromagnetic emissions (file numbers IC 2186-1 for OATS and IC 2186-2 for anechoic chamber), certified by VCCI, Japan (the registration numbers are R-808 for OATS, R-1082 for anechoic chamber, C-845 for conducted emissions site), assessed by TNO Certification EP&S (Netherlands) for a number of EMC, telecommunications, environmental, safety standards, and by AMTAC (UK) for safety of medical devices. 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) and approved by Israel Ministry of environmental protection, radiation hazards department (Permit number 1158).

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Abbreviations and acronyms

The following abbreviations and acronyms are applicable to this test report:

dB	decibel
dBm	decibel referred to one milliwatt
dB(μV)	decibel referred to one microvolt
dB(μV/m)	decibel referred to one microvolt per meter
EMC	electromagnetic compatibility
EUT	equipment under test
GHz	gigahertz
H	height
Hz	hertz
kHz	kilohertz
kV	kilovolt
L	length
LNA	low noise amplifier
m	meter
MHz	megahertz
NA	not applicable
QP	quasi-peak
RF	radio frequency
RE	radiated emission
rms	root mean square
s	second
V	volt
W	width

Specification references

47CFR part 15: 2003	Radio Frequency Devices
ANSI C63.2:1996	American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications.
ANSI C63.4:2001	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.