



Table 3.8.6 Radiated emission measurements test results for AU-O-2.4 indoor unit frequency range 30 MHz – 1 GHz

DATE: May 4, 1999
RELATIVE HUMIDITY: 49%
AMBIENT TEMPERATURE: 22°C

MEASUREMENTS PERFORMED AT 3 METRES DISTANCE

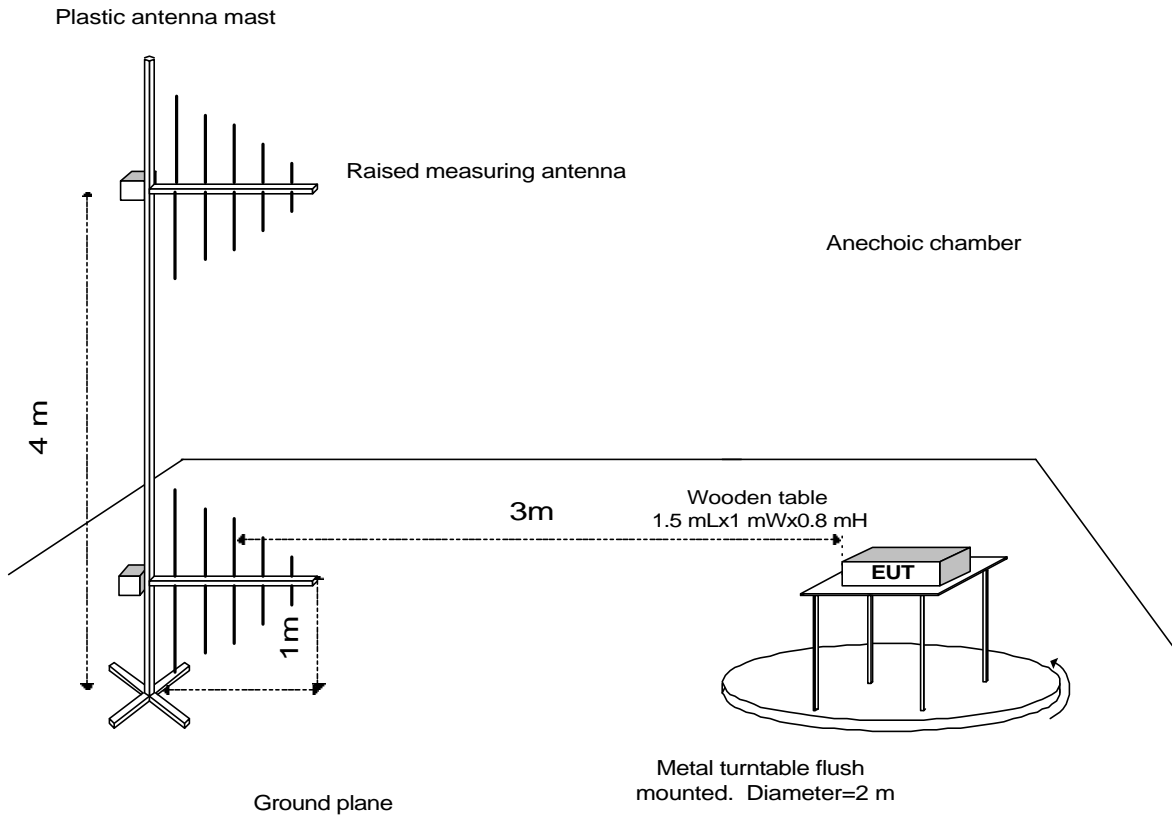
Frequency MHz	Radiated Emissions dB (µV/m)	Specified Limit dB (µV/m)	Margin dB	Pass/ Fail
35.155	31.87	40.0	8.13	Pass
332.383	37.91	40.0	8.09	Pass
930.673	41.47	46.0	4.53	Pass
997.158	45.52	54.0	8.48	Pass

Notes to table calculations:

Measurements were performed with biconilog antenna and quasi-peak detector
Resolution bandwidth = 120 kHz
Margin = dB below (negative if above) specification limit.



Figure 3.8.1
Radiated emission test setup



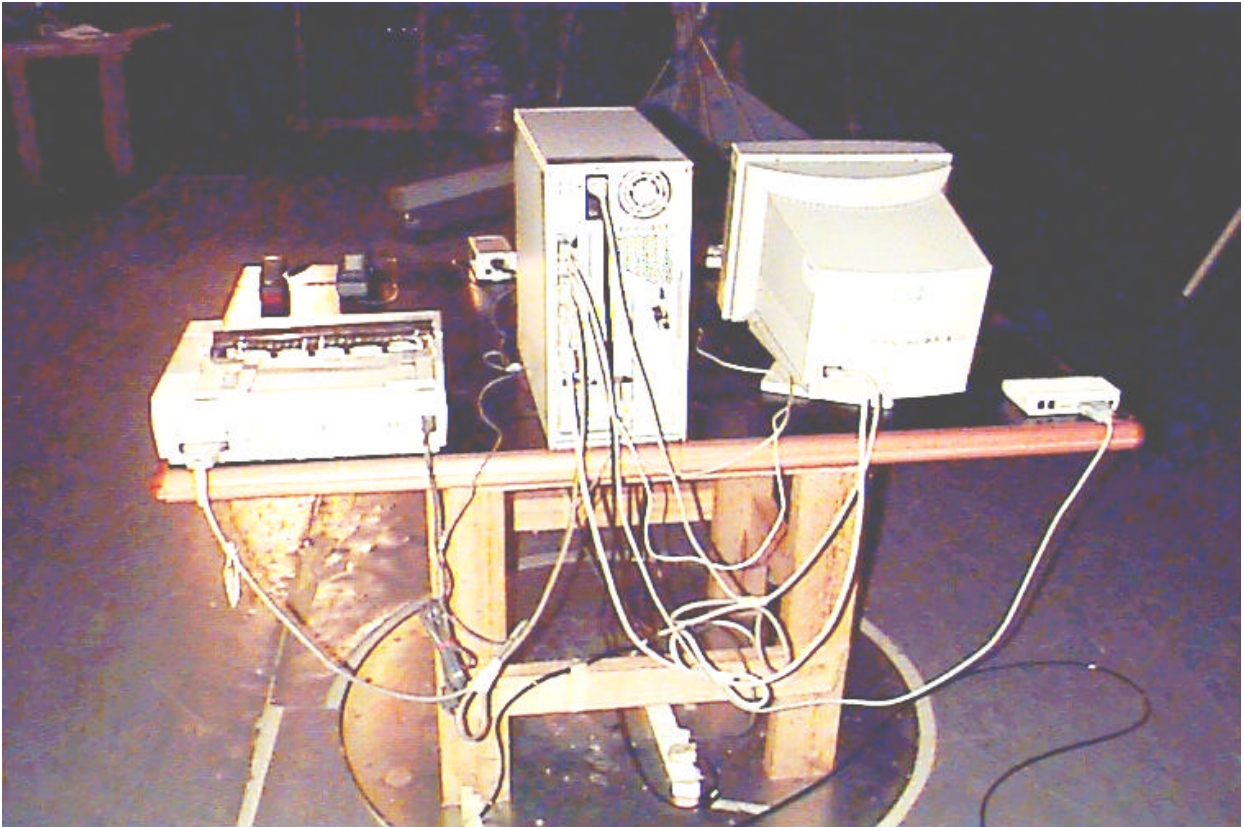


Photograph No. 3.8.1
Radiated emission measurement test setup for indoor unit





Photograph No. 3.8.2
Radiated emission measurement test setup for indoor unit





Photograph No. 3.8.3
Radiated emission measurement test setup for indoor unit





3.9 Conducted emission measurements according to §15.107, §15.207

3.9.1 General

This test was performed to measure conducted emissions induced in mains by the EUT.

3.9.2 Test set-up

The test was performed in the shielded room. The EUT was setup as shown in Photographs 3.9.1 to 3.9.3.

The frequency range from 450 kHz to 30 MHz was investigated.

The measurements were performed on the EUT 120 V AC power lines (both neutral and phase) by means of the LISN, connected to the spectrum analyzer. The unused 50 Ω connector of the LISN was resistively terminated in 50 Ω when not connected to the measuring instrument. The position of the EUT cables was varied to determine maximum emission level. The peak detector (resolution bandwidth = 9 kHz) was used. The test results are shown in Tables 3.9.1 to 3.9.3 and Plots 3.9.1 to 3.9.6.

Reference numbers of test equipment used

HL 0163	HL 0466	HL 0521	HL 0580	HL 0590	HL 0787	HL 0817
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Full description is given in Appendix A.



Table 3.9.1 Conducted emission measurements on SU-A/O-xD1V-2.4 power lines
Frequency range : 450 kHz - 30 MHz

DATE: May 4, 1999
 RELATIVE HUMIDITY: 50%
 AMBIENT TEMPERATURE: 23°C

Frequency MHz	Line ID	Conducted Emissions dB (mV)	Limit dB (mV)	Limit Margin dB	Pass/ Fail
0.451	Ph	36.71	48	11.29	Pass
0.525	N	39.61	48	8.39	Pass
6.483	N	38.69	48	9.31	Pass
7.741	Ph	31.87	48	16.13	Pass
10.383	N	39.20	48	8.80	Pass
15.090	N	39.90	48	8.10	Pass
17.947	Ph	38.55	48	9.45	Pass
19.207	Ph	38.68	48	9.32	Pass

Test parameters:

Detector type = QP (quasi peak).
 Resolution bandwidth = 9 kHz.

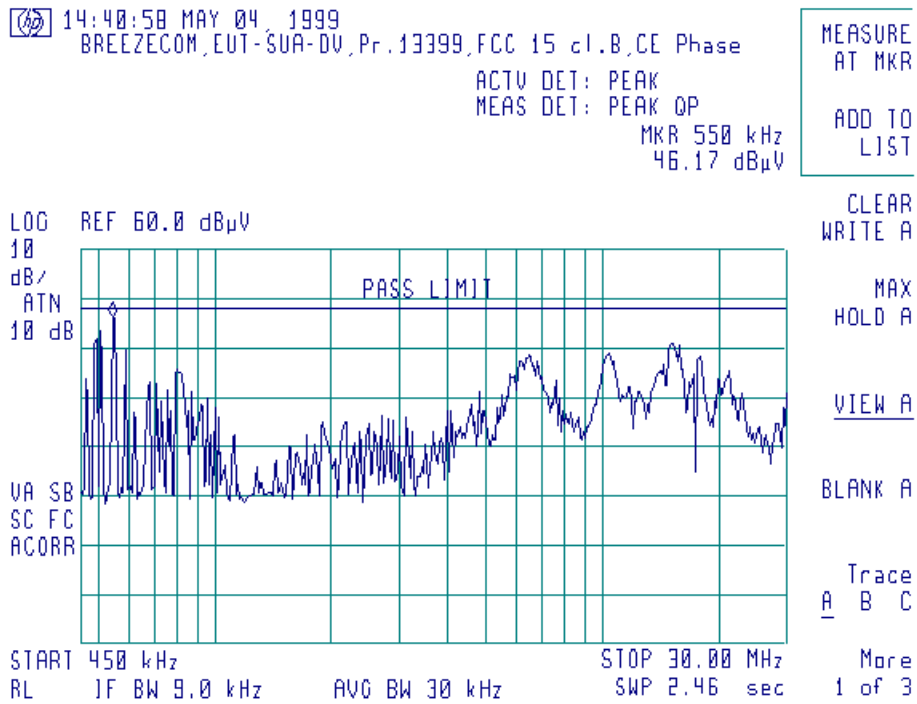
Table calculations and abbreviations:

Conducted emission = EMI meter reading (dBμV) + cable loss (dB) + LISN correction factor (dB). (For LISN correction factor refer to Appendix B).
 Margin = dB below (negative if above) specification limit.
 Line ID = Line identification (Ph - phase, N - neutral).



Plot 3.9.1

Test Specification: § 15.107, § 15.207
Conducted emission measurements on power line
Frequency range: 450 kHz-30 MHz
Line: neutral
Detector: quasi-peak





Plot 3.9.2

Test Specification: § 15.107, § 15.207
Conducted emission measurements on power line
Frequency range: 450 kHz-30 MHz
Line: phase
Detector: quasi-peak

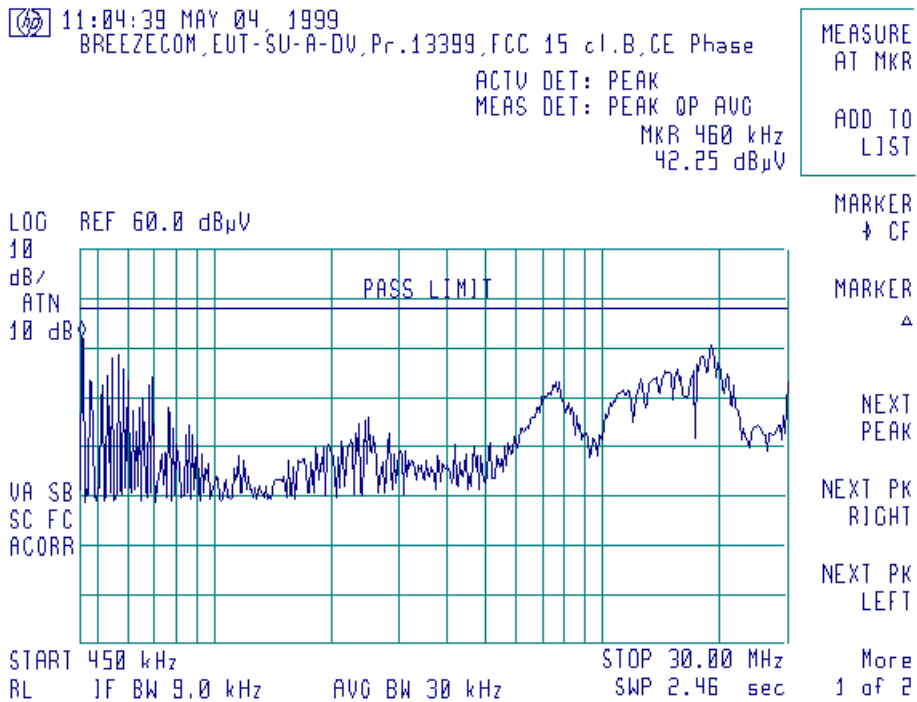




Table 3.9.2 Conducted emission measurements on SU-A-xD-2.4 power lines
Frequency range : 450 kHz - 30 MHz

DATE: May 4, 1999
 RELATIVE HUMIDITY: 50%
 AMBIENT TEMPERATURE: 23°C

Frequency MHz	Line ID	Conducted Emissions dB (mV)	Limit dB (mV)	Limit Margin dB	Pass/ Fail
0.464	Ph	38.28	48	9.72	Pass
6.903	Ph	39.34	48	8.66	Pass
7.383	N	39.23	48	8.77	Pass
10.564	Ph	39.83	48	8.17	Pass
10.743	N	38.77	48	9.23	Pass
16.686	N	42.58	48	5.42	Pass
17.164	Ph	39.16	48	8.84	Pass
23.168	Ph	39.62	48	8.38	Pass

Test parameters:

Detector type = QP (quasi peak).
 Resolution bandwidth = 9 kHz.

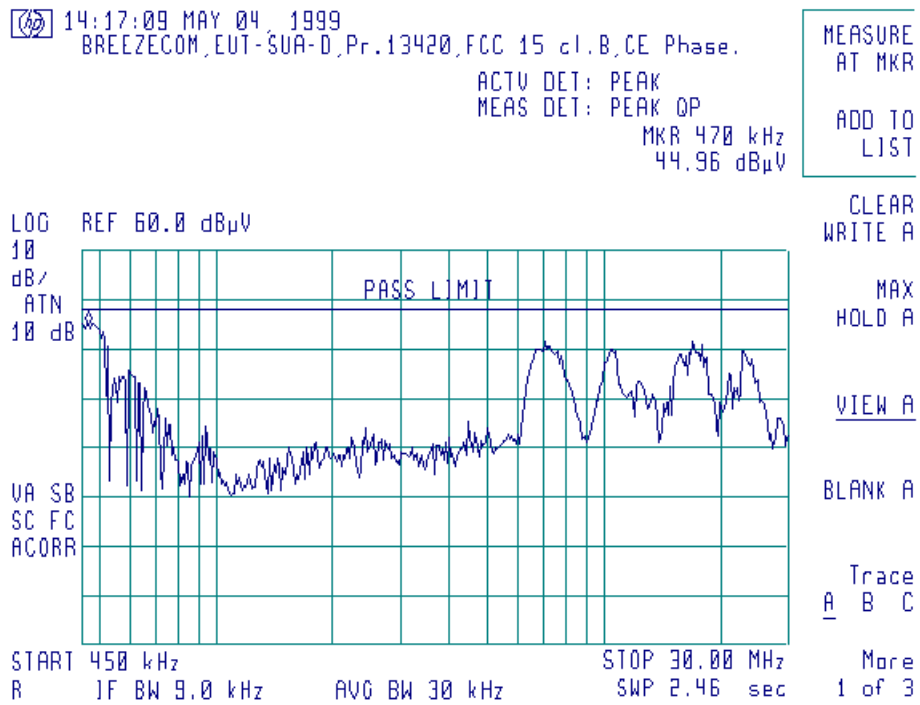
Table calculations and abbreviations:

Conducted emission = EMI meter reading (dB μ V) + cable loss (dB) + LISN correction factor (dB). (For LISN correction factor refer to Appendix B).
 Margin = dB below (negative if above) specification limit.
 Line ID = Line identification (Ph - phase, N - neutral).



Plot 3.9.3

Test Specification: § 15.107, § 15.207
Conducted emission measurements on power line
Frequency range: 450 kHz-30 MHz
Line: phase
Detector: quasi-peak





Plot 3.9.4

Test Specification: § 15.107, § 15.207
Conducted emission measurements on power line
Frequency range: 450 kHz-30 MHz
Line: neutral
Detector: quasi-peak

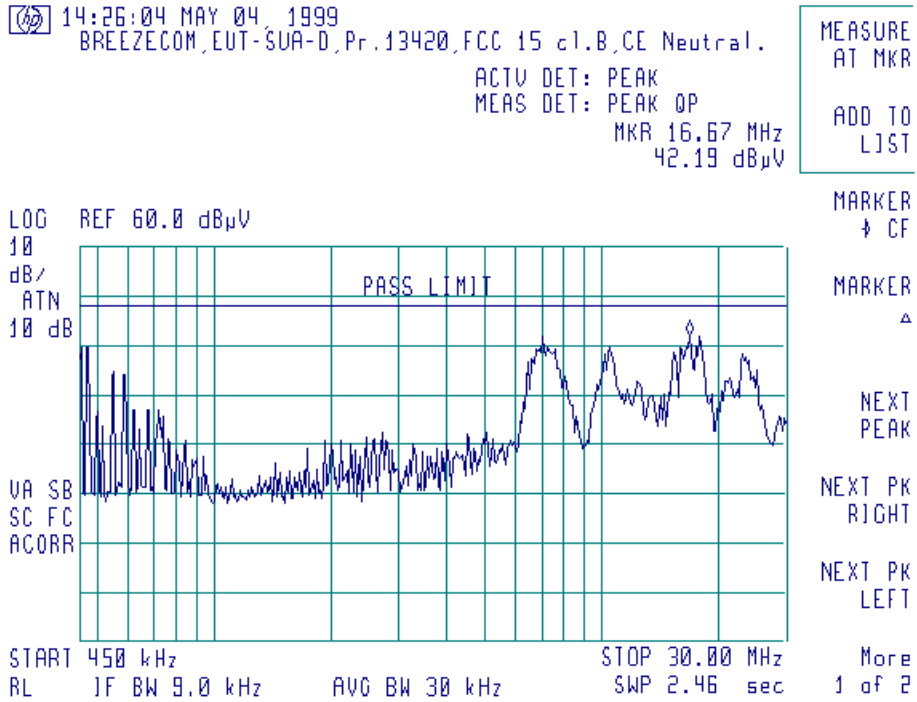




Table 3.9.3 Conducted emission measurements on AU-O -2.4 power lines
Frequency range : 450 kHz - 30 MHz

DATE: May 4, 1999
 RELATIVE HUMIDITY: 50%
 AMBIENT TEMPERATURE: 23°C

Frequency MHz	Line ID	Conducted Emissions dB (mV)	Limit dB (mV)	Limit Margin dB	Pass/ Fail
0.453	Ph	39.66	48	8.34	Pass
0.457	Ph	39.60	48	8.40	Pass
7.083	Ph	41.98	48	6.02	Pass
10.743	Ph	39.32	48	8.68	Pass
17.286	Ph	39.21	48	8.79	Pass
23.169	Ph	39.52	48	8.48	Pass
23.229	N	38.95	48	9.05	Pass

Test parameters:

Detector type = QP (quasi peak).

Resolution bandwidth = 9 kHz.

Table calculations and abbreviations:

Conducted emission = EMI meter reading (dBμV) + cable loss (dB) + LISN correction factor (dB). (For LISN correction factor refer to Appendix B).

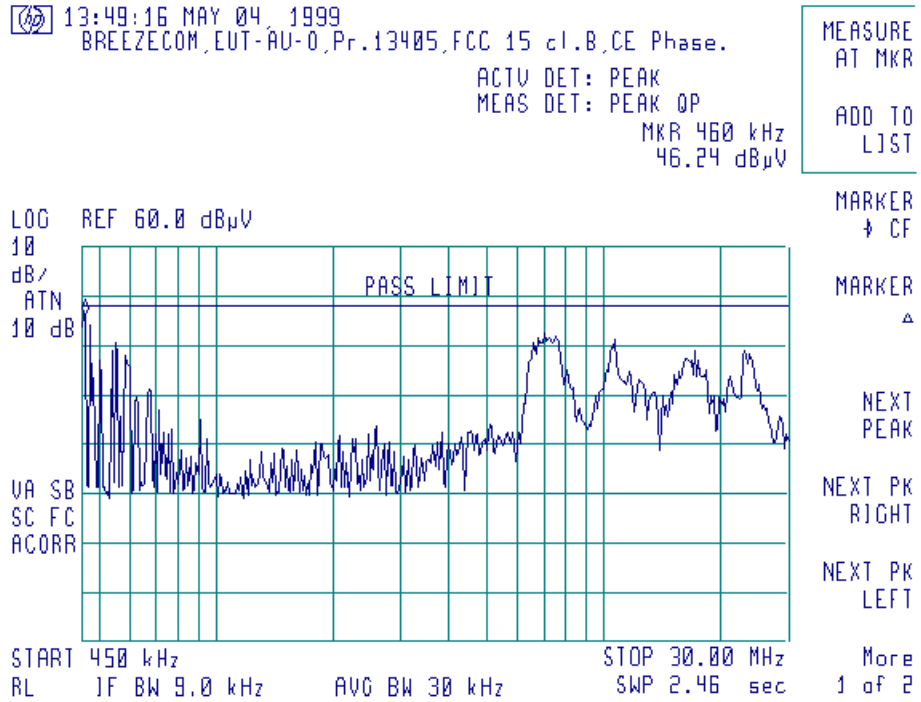
Margin = dB below (negative if above) specification limit.

Line ID = Line identification (Ph - phase, N - neutral).



Plot 3.9.5

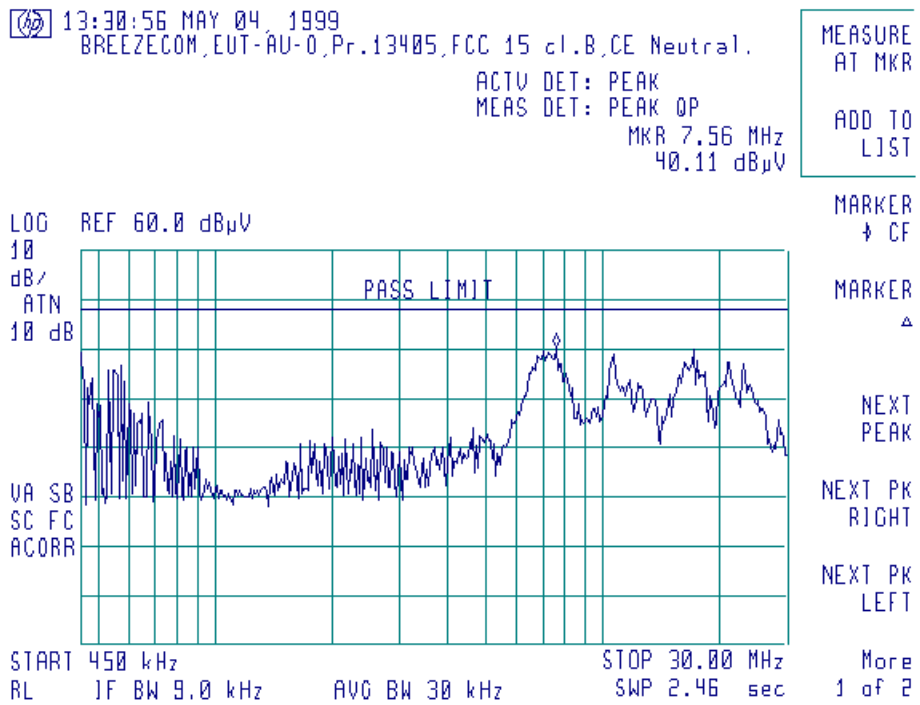
Test Specification: § 15.107, § 15.207
Conducted emission measurements on power line
Frequency range: 450 kHz-30 MHz
Line: phase
Detector: quasi-peak





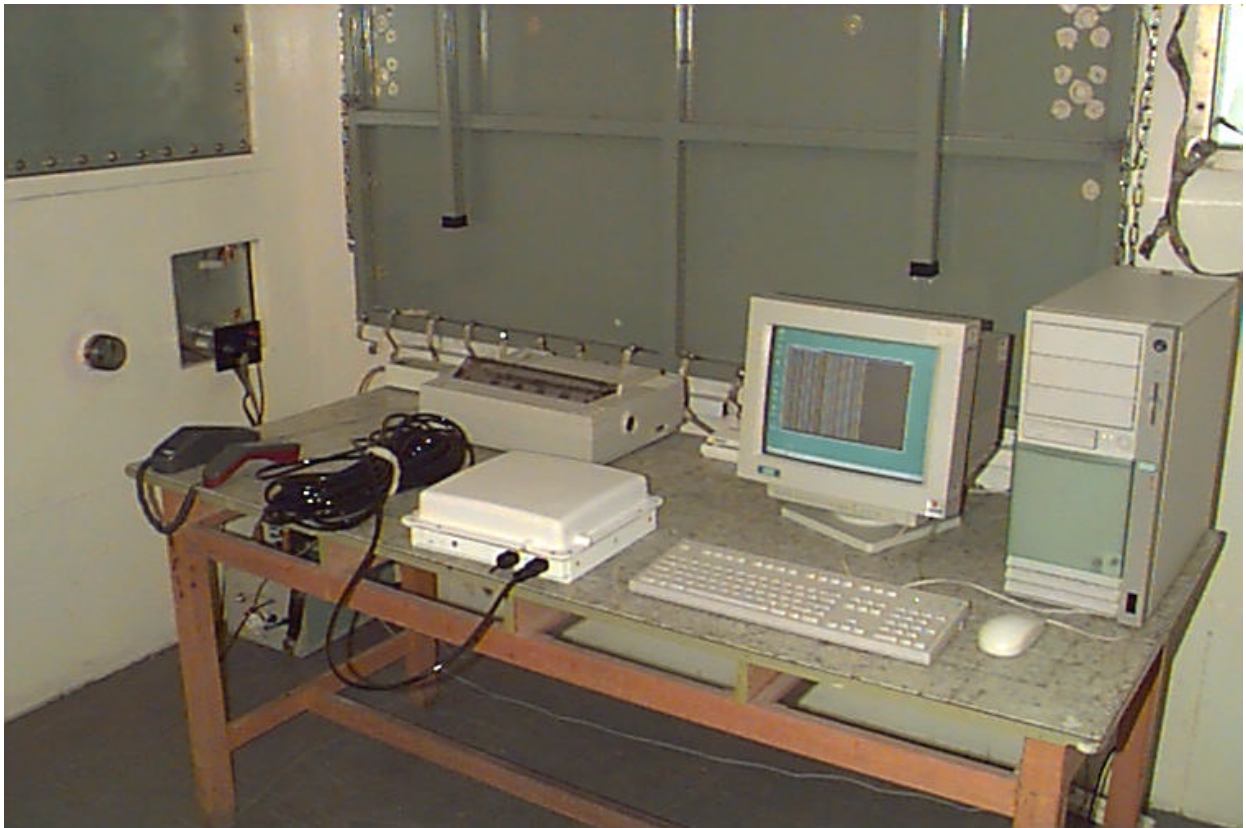
Plot 3.9.6

Test Specification: § 15.107, § 15.207
Conducted emission measurements on power line
Frequency range: 450 kHz-30 MHz
Line: neutral
Detector: quasi-peak



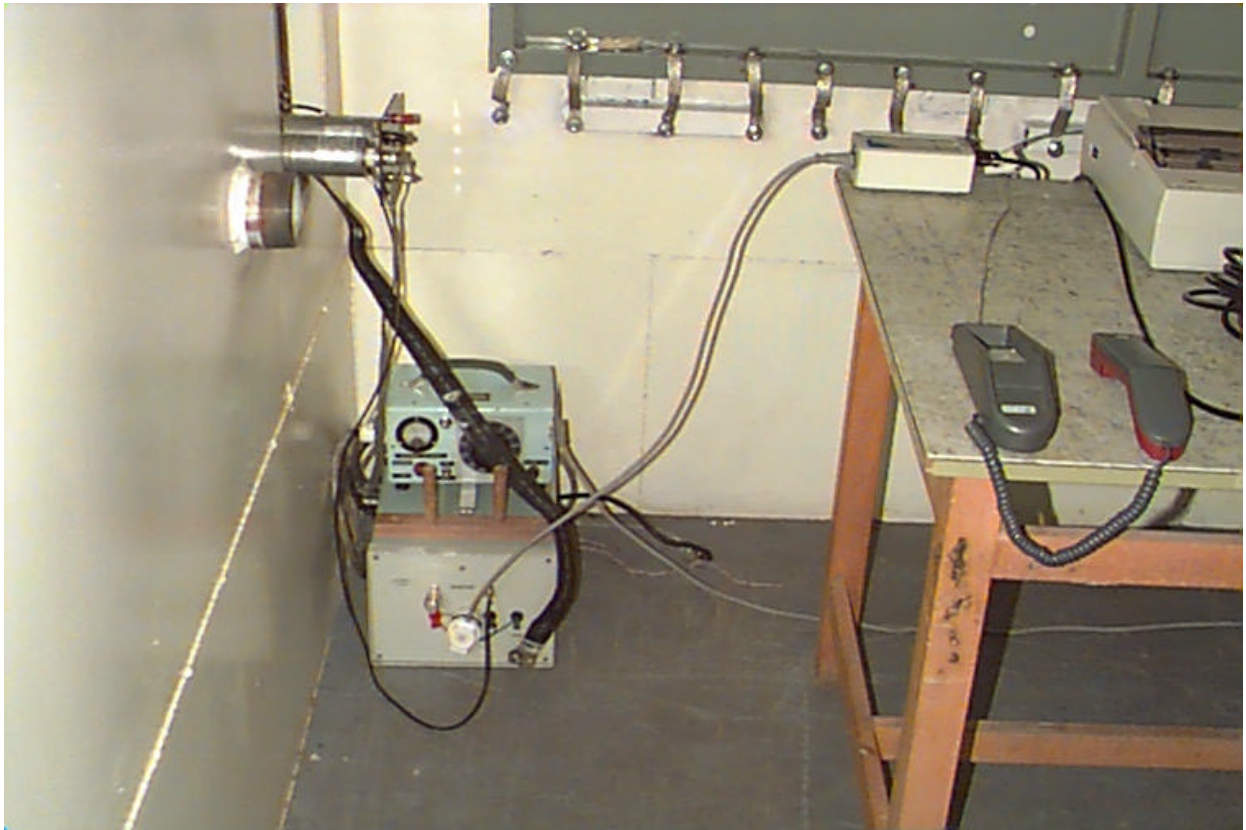


Photograph 3.9.1
Conducted emission measurement test setup for SU-A/O-xD1V-2.4 products





Photograph 3.9.2
Conducted emission measurement test setup for SU-A/O-xD1V-2.4 products





Photograph 3.9.3
Conducted emission measurement test setup for SU-A/O-xD1V-2.4 products



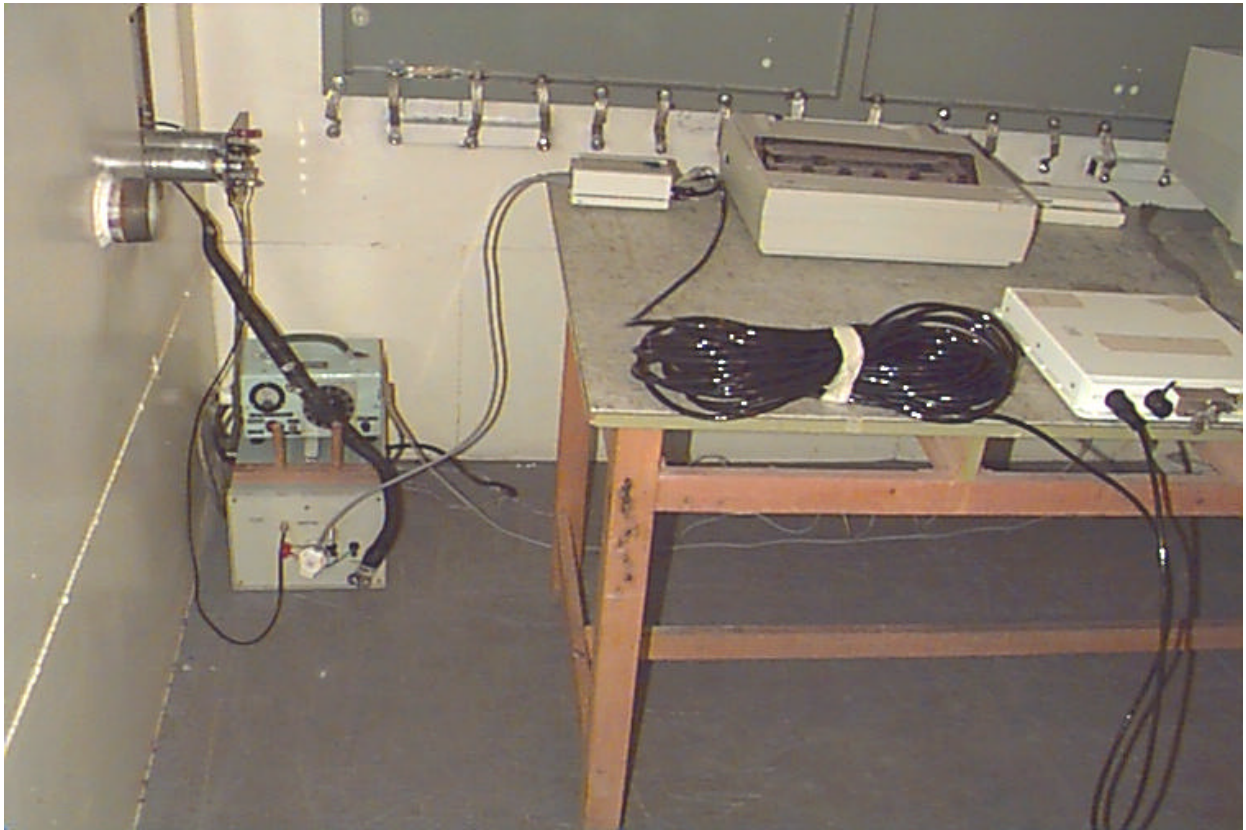


Photograph 3.9.4
Conducted emission measurement test setup for AU-O- 2.4 and SU-A-xD-2.4 products



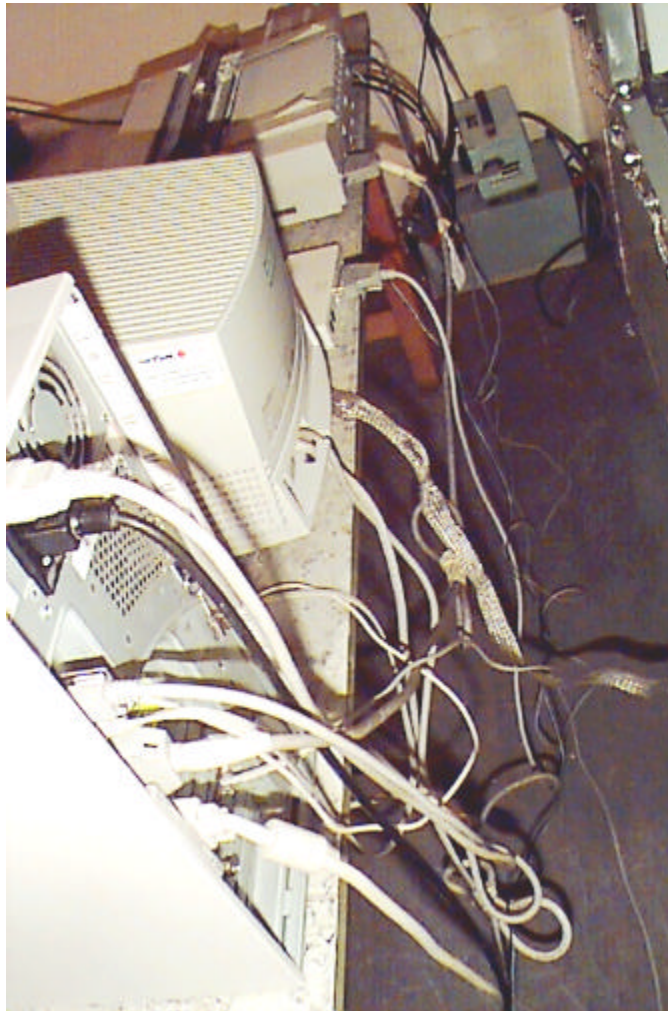


Photograph 3.9.5
Conducted emission measurement test setup for AU-O- 2.4 and SU-A-xD-2.4 products





Photograph 3.9.6
Conducted emission measurement test setup for AU-O- 2.4 and SU-A-xD-2.4 products





4 Summary and signatures

The EUT was found to be in compliance with the limits of FCC part 15 subpart C §15.205, §15.207, §15.209 (a), §15.247 and Subpart B, §15.107, §15.109.

Test performed by:

Mr. Michael Nikishin, test engineer



Approved by:

Dr. Edward Usoskin, C.E.O.



Responsible person from Breezcom Ltd.

Mr. Itzik Raiskin RF group manager



**APPENDIX A - Test equipment and ancillaries used for tests**

HL Serial No.	Serial No.	Description	Manufacturer	Model No.	Due Calibr.
0025	5837	Spectrum Analyzer, 10 kHz-23 GHz	Anritsu	MS-710C	8/00
0038	028	Antenna Mast, 1-4 m	Hermon Labs	AM-1	2/00 Check
0041	2811	Ridged Guide Horn Antenna, 1-18 GHz	Electro-Metrics,	RGA 50/60	8/00
0053	7538	Attenuator, 50 Ohm, 2 W, 0 - 18 GHz, 10 dB	Hewlett Packard	8492A	2/00
0056	2627	Attenuator, 50 Ohm, 2 W, 0 - 18 GHz, 30 dB	Hewlett Packard	8492A	2/00
0121	121	Filter Low Pass, 0 -1200 MHz	Hewlett Packard	360B	7/00
0163	1314	LISN, 9kHz-100MHz	Electro-Metrics	ANS-25/2	11/99
0275	040	Table non-metallic, adjustable height, 1.5 x 1.0 x 0.8 m	Hermon Labs	TNM	3/00 Check
0287	042	Turntable, Motorized Diameter, 2m	Hermon Labs	TMD-2	4/00 Check
0316	202BK	Power Meter, IEEE-488, RF, 100 kHz – 100 GHz, -70 to +37 dBm	Boonton	4220-01	2/00
0411	933876 8	Cable, Coax, Microwave, DC-18 GHz, N-N, 2 m	Given Imaging	36Q01Q0107 8.8	9/00
0460	27705	Power Sensor, 50 Ohm. 500 kHz to 18 GHz	Boonton	51075	2/00
0465	023	Anechoic Chamber 9 (L) x 6.5 (W) x 5.5 (H) m	Hermon Labs	AC-1	10/99
0466	024	Shielded Room 3 (L) x 3 (W) x 2.4 (H) m	Hermon Labs	SR-1	5/02 Check
0521	0319	Spectrum Analyzer with RF filter section (EMI Receiver 9 kHz – 6.5 GHz)	Hewlett Packard	8546A	7/00
0547	400	Amplifier, GaAs FET, 6-18 GHz, 2 W, 30 dB, 12 V/ 1.2 A, N.F.4.5 dB	Avantek	AMT-12407 M	12/99
0580	580	DC block adaptor 10 kHz-2.2 GHz	Anritsu	MA8601 A	6/00
0589	176	Cable coaxial, 2.3 m	Hermon Labs	GORE-3	11/99
0590	10	Attenuator 10 dB, 50 Ohm, N-type, 2W	Elisra Electronic Systems	MW2100-N-Type	6/00
0593	101	Antenna Mast, 1-4 m/ 1-6 m Pneumatic	Hermon Labs	AM-F1	4/00 check
0594	102	Turntable for Anechoic Chamber, flush mounted,	Hermon Labs	WDC1	11/99



HL Serial No.	Serial No.	Description	Manufacturer	Model No.	Due Calibr.
		d=1.2 m, pneumatic			
0604	9611-1011	Antenna Biconilog Log-Periodic/T Bow-Tie, 26 – 2000 MHz	EMCO	3141	7/00
0661	0266	Generator Swept Signal, 10MHz to 40GHz+ 10dBm	Hewlett Packard	83640B	5/00
0787	1877	Transient limiter	Hewlett Packard	11947A-8ZE	11/99
0812	148	Cable, coax, RG-214, 11.5 m, N-type connectors	Hermon Labs	C214-11	8/00
0813	149	Cable, coax, RG-214, 12 m, N-type connectors	Hermon Labs	C214-12	8/00
0815	151	Cable, coax, RG-214, 7.3 m, N-type connectors, inside anechoic chamber	Hermon Labs	C214-7	8/00
0816	152	Cable, coax, RG-214, 8 m, N-type connectors, outside anechoic chamber	Hermon Labs	C214-8	8/00
0817	153	Cable, coax, RG-58, 8 m, N-type connectors	Hermon Labs	C58-8	8/00
0872	8767	Cable, Coax, Microwave, DC-18 GHz, N-N, 1 m	Gore	PFP01P0103 9.4	9/00
1017	9603	Attenuator, 50 Ohm, 20 W, 0-4 GHz, 30 dB	Narda	766-30	1/00
1175	84	Microwave 5 m cable	Gore	84C01C0224 5.2	2/00
1200	D/0024 0	Quadruplexer, 1-12 GHz	Elettronica S.p.A.-Roma	UE84	4/00



APPENDIX B-Test equipment correction factors

Antenna factor
Double ridged guide antenna
Electro-Metrics, model RGA-50/60
Ser.No.2811

Frequency, MHz	Antenna factor, dB(1/m)
1000	24.3
1500	25.4
2000	28.4
2500	29.2
3000	30.5
3500	31.6
4000	33.7
4500	32.2
5000	34.5
5500	34.5
6000	34.6
6500	35.3
7000	35.5
7500	35.9
8000	36.6
8500	37.3
9000	37.7
9500	37.7
10,000	38.2
10,500	38.5
11,000	39.0
11,500	40.1
12,000	40.2
12,500	39.3
13,000	39.9
13,500	40.6
14,000	41.1
14,500	40.5
15,000	39.9
15,500	37.8
16,000	39.1
16,500	41.1
17,000	41.7
17,500	45.1
18,000	44.3

Antenna factor 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/meter).



**Antenna factor at 3m calibration
Biconilog antenna EMCO model 3141
Ser.No.1011**

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

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



**Correction factor
Line impedance stabilization network
model ANS-25/2
Electro-Metrics**

Frequency, kHz	Correction factor
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 dB is to be added to the meter readings (dB/ μ v) of the interference analyzer or spectrum analyzer.