



Attachment No.2 to

ELECTROMAGNETIC EMISSIONS TEST REPORT
according to FCC Part 15 subpart C, §15.247 and subpart B

for
BREEZECOM LTD.

EQUIPMENT UNDER TEST:
DS11M system

Approved by
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Electrical



Description of equipment under test

Test items	DS11M family
Manufacturer	BreezeCom Ltd.
Types (Models)	DS11M
Receipt date	April 2, 2000

Applicant information

Applicant's representative	Mr. David Shechter
Applicant's responsible person	Mr. Tsach Shwartz, engineering manager
Company	BreezeCom Ltd.
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Country	Israel
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Test performance

Project Number:	14002
Location	Hermon Laboratories
Test performed	April 12, 16, June 13, 2000
Purpose of test	The EUT certification in accordance with CFR 47, part 2, §2.1033
Test specification(s)	FCC Part 15, Subpart C, §15.247, §§15.205, 15.207, 15.209, 15.107, 15.109



1 Processing gain measurements

1.1 Processing gain according to §15.247 (e)(2)

1.1.1 General

This test was performed to demonstrate that the processing gain of the system is at least 10 dB.

1.1.2 Test procedure

The processing gain was measured using the CW jamming margin method. Test setup is shown in Figure 1.

A signal generator was stepped in 50 kHz increments across the passband of the system, recording at each point the generator level required to produce the BER = 10⁻⁵. This level was the jammer level. The output power of the intentional radiator was measured at the same point. The jammer to signal ratio (J/S) was then calculated, discarding the worst 20% of the J/S data points. The lowest remaining J/S ratio was used to calculate the processing gain as follows:

$$G_p = (S/N)_o + M_j + L_{sys}, \text{ where}$$

G_p = processing gain of the system,

(S/N)_o = signal to noise ratio = 13.3 dB @ BER 10⁻⁵ (Breezcom Declaration, dated June 13, 2000),

M_j = J/S ratio, the worst case, was found 2 dB,

L_{sys} = system losses = 2 dB;

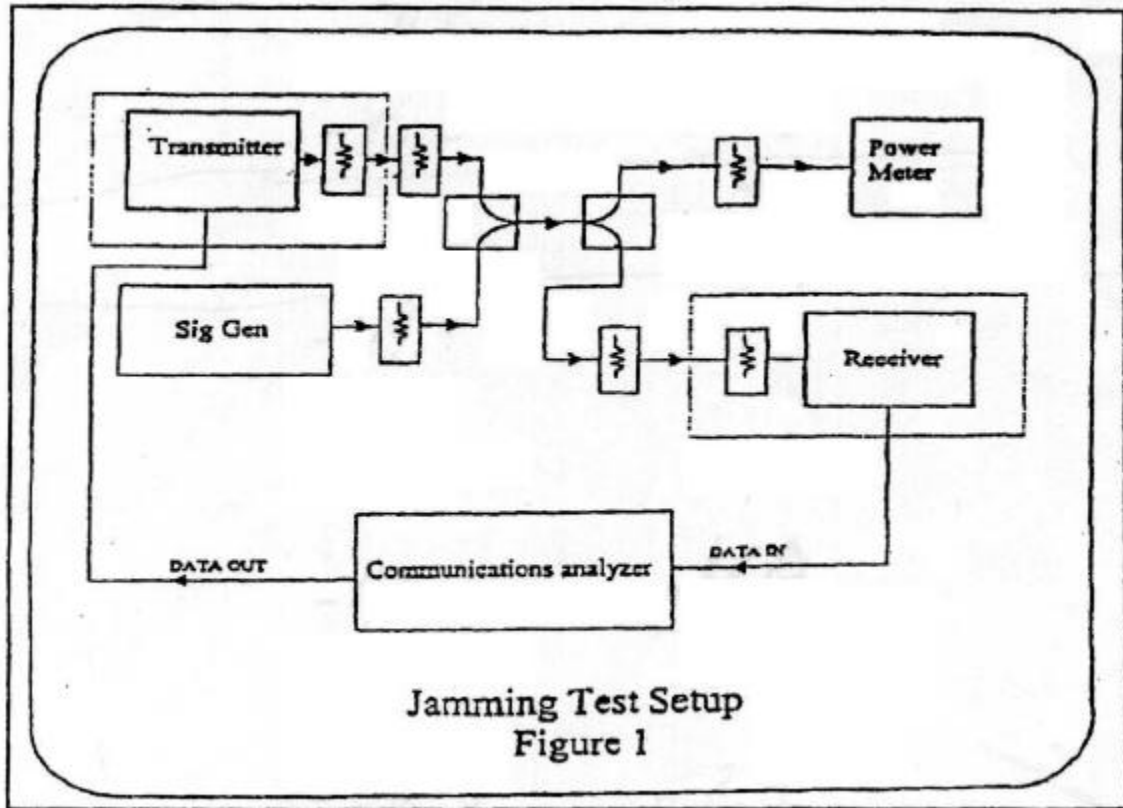
hence

$$G_p = 13.3 + 2 + 2 = 17.3 \text{ dB.}$$

Reference numbers of test equipment used

HL 0053	HL 0317	HL 0661	HL 0460	HL 0740	HL 0846	HL 0940
HL 1176	HL 1422					

Full description is given in Appendix A.



Jamming Test Setup
Figure 1



2 Processing gain measurements results

2Mbps

Channel 6

Freq.	(S/N)	Snoise ref.	Jammer	MJ	Lsys	Gp
MHz	dB	dBm	dBm	dB	dB	dB
2.43	13.3	-44.1	-35.1	9	2	24.3
2.43005	13.3	-44.1	-36.1	8	2	23.3
2.4301	13.3	-44.1	-36.1	8	2	23.3
2.43015	13.3	-44.1	-35.6	8.5	2	23.8
2.4302	13.3	-44.1	-35.6	8.5	2	23.8
2.43025	13.3	-44.1	-36.1	8	2	23.3
2.4303	13.3	-44.1	-36.1	8	2	23.3
2.43035	13.3	-44.1	-36.1	8	2	23.3
2.4304	13.3	-44.1	-36.6	7.5	2	22.8
2.43045	13.3	-44.1	-36.6	7.5	2	22.8
2.4305	13.3	-44.1	-37.1	7	2	22.3
2.43055	13.3	-44.1	-37.1	7	2	22.3
2.4306	13.3	-44.1	-37.1	7	2	22.3
2.43065	13.3	-44.1	-37.6	6.5	2	21.8
2.4307	13.3	-44.1	-37.6	6.5	2	21.8
2.43075	13.3	-44.1	-37.6	6.5	2	21.8
2.4308	13.3	-44.1	-37.6	6.5	2	21.8
2.43085	13.3	-44.1	-37.1	7	2	22.3
2.4309	13.3	-44.1	-37.1	7	2	22.3
2.43095	13.3	-44.1	-37.1	7	2	22.3
2.431	13.3	-44.1	-37.1	7	2	22.3
2.43105	13.3	-44.1	-36.1	8	2	23.3
2.4311	13.3	-44.1	-36.1	8	2	23.3
2.43115	13.3	-44.1	-35.1	9	2	24.3
2.4312	13.3	-44.1	-34.1	10	2	25.3
2.43125	13.3	-44.1	-34.1	10	2	25.3
2.4313	13.3	-44.1	-32.7	11.4	2	26.7
2.43135	13.3	-44.1	-32.1	12	2	27.3
2.4314	13.3	-44.1	-31.6	12.5	2	27.8
2.43145	13.3	-44.1	-31.6	12.5	2	27.8
2.4315	13.3	-44.1	-32.6	11.5	2	26.8
2.43155	13.3	-44.1	-32.6	11.5	2	26.8
2.4316	13.3	-44.1	-33.6	10.5	2	25.8
2.43165	13.3	-44.1	-34.6	9.5	2	24.8
2.4317	13.3	-44.1	-35.6	8.5	2	23.8
2.43175	13.3	-44.1	-36.1	8	2	23.3
2.4318	13.3	-44.1	-37.1	7	2	22.3
2.43185	13.3	-44.1	-37.7	6.4	2	21.7



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2.4319	13.3	-44.1	-38.1	6	2	21.3
2.43195	13.3	-44.1	-38.7	5.4	2	20.7
2.432	13.3	-44.1	-38.7	5.4	2	20.7
2.43205	13.3	-44.1	-38.7	5.4	2	20.7
2.4321	13.3	-44.1	-39.1	5	2	20.3
2.43215	13.3	-44.1	-39.7	4.4	2	19.7
2.4322	13.3	-44.1	-41.1	3	2	18.3

Freq.	S/N	Snoise ref.	Jammer	MJ	Lsys	Gp
MHz	dB	dBm	dBm	dB	dB	dB
2.43225	13.3	-44.1	-41.1	3	2	18.3
2.4323	13.3	-44.1	-41.1	3	2	18.3
2.43235	13.3	-44.1	-40.7	3.4	2	18.7
2.4324	13.3	-44.1	-40.7	3.4	2	18.7
2.43245	13.3	-44.1	-40.7	3.4	2	18.7
2.4325	13.3	-44.1	-40.1	4	2	19.3
2.43255	13.3	-44.1	-40.1	4	2	19.3
2.4326	13.3	-44.1	-40.1	4	2	19.3
2.43265	13.3	-44.1	-39.6	4.5	2	19.8
2.4327	13.3	-44.1	-39.6	4.5	2	19.8
2.43275	13.3	-44.1	-40.1	4	2	19.3
2.4328	13.3	-44.1	-40.1	4	2	19.3
2.43285	13.3	-44.1	-40.7	3.4	2	18.7
2.4329	13.3	-44.1	-40.7	3.4	2	18.7
2.43295	13.3	-44.1	-41.1	3	2	18.3
2.433	13.3	-44.1	-41.1	3	2	18.3
2.43305	13.3	-44.1	-41.7	2.4	2	17.7
2.4331	13.3	-44.1	-41.7	2.4	2	17.7
2.43315	13.3	-44.1	-42.1	2	2	17.3
2.4332	13.3	-44.1	-42.1	2	2	17.3
2.43325	13.3	-44.1	-42.1	2	2	17.3
2.4333	13.3	-44.1	-42.1	2	2	17.3
2.43335	13.3	-44.1	-42.1	2	2	17.3
2.4334	13.3	-44.1	-42.1	2	2	17.3
2.43345	13.3	-44.1	-42.1	2	2	17.3
2.4335	13.3	-44.1	-42.1	2	2	17.3
2.43355	13.3	-44.1	-42.1	2	2	17.3
2.4336	13.3	-44.1	-42.1	2	2	17.3
2.43365	13.3	-44.1	-42.1	2	2	17.3
2.4337	13.3	-44.1	-42.1	2	2	17.3
2.43375	13.3	-44.1	-42.1	2	2	17.3
2.4338	13.3	-44.1	-42.1	2	2	17.3
2.43385	13.3	-44.1	-42.1	2	2	17.3
2.4339	13.3	-44.1	-42.1	2	2	17.3
2.43395	13.3	-44.1	-42.1	2	2	17.3



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2.434	13.3	-44.1	-42.6	1.5	2	16.8
2.43405	13.3	-44.1	-42.6	1.5	2	16.8
2.4341	13.3	-44.1	-42.6	1.5	2	16.8
2.43415	13.3	-44.1	-42.6	1.5	2	16.8
2.4342	13.3	-44.1	-42.6	1.5	2	16.8
2.43425	13.3	-44.1	-42.6	1.5	2	16.8
2.4343	13.3	-44.1	-42.6	1.5	2	16.8
2.43435	13.3	-44.1	-42.6	1.5	2	16.8
2.4344	13.3	-44.1	-42.6	1.5	2	16.8
2.43445	13.3	-44.1	-42.6	1.5	2	16.8

Freq.	(S/N)	Snoise ref.	Jammer	MJ	Lsys	Gp
MHz	dB	dBm	dBm	dB	dB	dB
2.4345	13.3	-44.1	-42.1	2	2	17.3
2.43455	13.3	-44.1	-42.1	2	2	17.3
2.4346	13.3	-44.1	-42.1	2	2	17.3
2.43465	13.3	-44.1	-42.1	2	2	17.3
2.4347	13.3	-44.1	-42.1	2	2	17.3
2.43475	13.3	-44.1	-42.7	1.4	2	16.7
2.4348	13.3	-44.1	-42.7	1.4	2	16.7
2.43485	13.3	-44.1	-42.7	1.4	2	16.7
2.4349	13.3	-44.1	-42.7	1.4	2	16.7
2.43495	13.3	-44.1	-42.7	1.4	2	16.7
2.435	13.3	-44.1	-43.1	1	2	16.3
2.43505	13.3	-44.1	-43.1	1	2	16.3
2.4351	13.3	-44.1	-43.1	1	2	16.3
2.43515	13.3	-44.1	-43.1	1	2	16.3
2.4352	13.3	-44.1	-43.1	1	2	16.3
2.43525	13.3	-44.1	-42.7	1.4	2	16.7
2.4353	13.3	-44.1	-42.7	1.4	2	16.7
2.43535	13.3	-44.1	-42.7	1.4	2	16.7
2.4354	13.3	-44.1	-42.7	1.4	2	16.7
2.43545	13.3	-44.1	-42.7	1.4	2	16.7
2.4355	13.3	-44.1	-42.7	1.4	2	16.7
2.43555	13.3	-44.1	-42.7	1.4	2	16.7
2.4356	13.3	-44.1	-42.1	2	2	17.3
2.43565	13.3	-44.1	-42.1	2	2	17.3
2.4357	13.3	-44.1	-42.1	2	2	17.3
2.43575	13.3	-44.1	-42.1	2	2	17.3
2.4358	13.3	-44.1	-42.1	2	2	17.3
2.43585	13.3	-44.1	-42.7	1.4	2	16.7
2.4359	13.3	-44.1	-42.7	1.4	2	16.7
2.43595	13.3	-44.1	-42.7	1.4	2	16.7
2.436	13.3	-44.1	-42.7	1.4	2	16.7
2.43605	13.3	-44.1	-42.7	1.4	2	16.7



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2.4361	13.3	-44.1	-42.7	1.4	2	16.7
2.43615	13.3	-44.1	-42.7	1.4	2	16.7
2.4362	13.3	-44.1	-42.1	2	2	17.3
2.43625	13.3	-44.1	-41.7	2.4	2	17.7
2.4363	13.3	-44.1	-41.1	3	2	18.3
2.43635	13.3	-44.1	-41.1	3	2	18.3
2.4364	13.3	-44.1	-41.1	3	2	18.3
2.43645	13.3	-44.1	-41.1	3	2	18.3
2.4365	13.3	-44.1	-41.1	3	2	18.3
2.43655	13.3	-44.1	-39.6	4.5	2	19.8
2.4366	13.3	-44.1	-39.6	4.5	2	19.8
2.43665	13.3	-44.1	-39.6	4.5	2	19.8
2.4367	13.3	-44.1	-39.6	4.5	2	19.8

Freq.	(S/N)	Snoise ref.	Jammer	MJ	Lsys	Gp
MHz	dB	dBm	dBm	dB	dB	dB
2.43675	13.3	-44.1	-39.1	5	2	20.3
2.4368	13.3	-44.1	-38.6	5.5	2	20.8
2.43685	13.3	-44.1	-38.1	6	2	21.3
2.4369	13.3	-44.1	-38.1	6	2	21.3
2.43695	13.3	-44.1	-37.7	6.4	2	21.7
2.437	13.3	-44.1	-37.7	6.4	2	21.7
2.43705	13.3	-44.1	-37.1	7	2	22.3
2.4371	13.3	-44.1	-37.1	7	2	22.3
2.43715	13.3	-44.1	-37.1	7	2	22.3
2.4372	13.3	-44.1	-37.1	7	2	22.3
2.43725	13.3	-44.1	-37.6	6.5	2	21.8
2.4373	13.3	-44.1	-38.6	5.5	2	20.8
2.43735	13.3	-44.1	-39.1	5	2	20.3
2.4374	13.3	-44.1	-39.6	4.5	2	19.8
2.43745	13.3	-44.1	-41.1	3	2	18.3
2.4375	13.3	-44.1	-41.7	2.4	2	17.7
2.43755	13.3	-44.1	-41.7	2.4	2	17.7
2.4376	13.3	-44.1	-42.1	2	2	17.3
2.43765	13.3	-44.1	-42.1	2	2	17.3
2.4377	13.3	-44.1	-42.6	1.5	2	16.8
2.43775	13.3	-44.1	-42.6	1.5	2	16.8
2.4378	13.3	-44.1	-42.6	1.5	2	16.8
2.43785	13.3	-44.1	-42.6	1.5	2	16.8
2.4379	13.3	-44.1	-42.6	1.5	2	16.8
2.43795	13.3	-44.1	-41.1	3	2	18.3
2.438	13.3	-44.1	-41.1	3	2	18.3
2.43805	13.3	-44.1	-41.1	3	2	18.3
2.4381	13.3	-44.1	-41.1	3	2	18.3
2.43815	13.3	-44.1	-41.1	3	2	18.3



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2.4382	13.3	-44.1	-41.1	3	2	18.3
2.43825	13.3	-44.1	-41.1	3	2	18.3
2.4383	13.3	-44.1	-41.1	3	2	18.3
2.43835	13.3	-44.1	-41.1	3	2	18.3
2.4384	13.3	-44.1	-41.6	2.5	2	17.8
2.43845	13.3	-44.1	-41.6	2.5	2	17.8
2.4385	13.3	-44.1	-41.6	2.5	2	17.8
2.43855	13.3	-44.1	-41.6	2.5	2	17.8
2.4386	13.3	-44.1	-41.6	2.5	2	17.8
2.43865	13.3	-44.1	-41.6	2.5	2	17.8
2.4387	13.3	-44.1	-42.1	2	2	17.3
2.43875	13.3	-44.1	-42.1	2	2	17.3
2.4388	13.3	-44.1	-42.1	2	2	17.3
2.43885	13.3	-44.1	-42.1	2	2	17.3
2.4389	13.3	-44.1	-42.1	2	2	17.3
2.43895	13.3	-44.1	-42.1	2	2	17.3

Freq.	(S/N)	Snoise ref.	Jammer	MJ	Lsys	Gp
MHz	dB	dBm	dBm	dB	dB	dB
2.439	13.3	-44.1	-42.1	2	2	17.3
2.43905	13.3	-44.1	-42.1	2	2	17.3
2.4391	13.3	-44.1	-42.1	2	2	17.3
2.43915	13.3	-44.1	-42.1	2	2	17.3
2.4392	13.3	-44.1	-42.1	2	2	17.3
2.43925	13.3	-44.1	-41.6	2.5	2	17.8
2.4393	13.3	-44.1	-41.6	2.5	2	17.8
2.43935	13.3	-44.1	-41.6	2.5	2	17.8
2.4394	13.3	-44.1	-41.6	2.5	2	17.8
2.43945	13.3	-44.1	-41.6	2.5	2	17.8
2.4395	13.3	-44.1	-41.6	2.5	2	17.8
2.43955	13.3	-44.1	-41.6	2.5	2	17.8
2.4396	13.3	-44.1	-41.6	2.5	2	17.8
2.43965	13.3	-44.1	-41.6	2.5	2	17.8
2.4397	13.3	-44.1	-41.6	2.5	2	17.8
2.43975	13.3	-44.1	-41.6	2.5	2	17.8
2.4398	13.3	-44.1	-41.6	2.5	2	17.8
2.43985	13.3	-44.1	-41.6	2.5	2	17.8
2.4399	13.3	-44.1	-41.6	2.5	2	17.8
2.43995	13.3	-44.1	-41.6	2.5	2	17.8
2.44	13.3	-44.1	-41.6	2.5	2	17.8
2.44005	13.3	-44.1	-41.6	2.5	2	17.8
2.4401	13.3	-44.1	-41.6	2.5	2	17.8
2.44015	13.3	-44.1	-41.6	2.5	2	17.8
2.4402	13.3	-44.1	-41.6	2.5	2	17.8
2.44025	13.3	-44.1	-41.1	3	2	18.3



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2.4403	13.3	-44.1	-41.1	3	2	18.3
2.44035	13.3	-44.1	-41.1	3	2	18.3
2.4404	13.3	-44.1	-41.1	3	2	18.3
2.44045	13.3	-44.1	-41.1	3	2	18.3
2.4405	13.3	-44.1	-41.1	3	2	18.3
2.44055	13.3	-44.1	-41.1	3	2	18.3
2.4406	13.3	-44.1	-41.1	3	2	18.3
2.44065	13.3	-44.1	-41.1	3	2	18.3
2.4407	13.3	-44.1	-41.1	3	2	18.3
2.44075	13.3	-44.1	-40.6	3.5	2	18.8
2.4408	13.3	-44.1	-40.6	3.5	2	18.8
2.44085	13.3	-44.1	-40.6	3.5	2	18.8
2.4409	13.3	-44.1	-40.1	4	2	19.3
2.44095	13.3	-44.1	-40.1	4	2	19.3
2.441	13.3	-44.1	-39.6	4.5	2	19.8
2.44105	13.3	-44.1	-39.6	4.5	2	19.8
2.4411	13.3	-44.1	-39.6	4.5	2	19.8
2.44115	13.3	-44.1	-39.6	4.5	2	19.8
2.4412	13.3	-44.1	-39.6	4.5	2	19.8

Freq. MHz	(S/N) dB	Snoise ref. dBm	Jammer dBm	MJ dB	Lsys dB	Gp dB
2.44125	13.3	-44.1	-39.1	5	2	20.3
2.4413	13.3	-44.1	-39.1	5	2	20.3
2.44135	13.3	-44.1	-39.1	5	2	20.3
2.4414	13.3	-44.1	-39.1	5	2	20.3
2.44145	13.3	-44.1	-39.1	5	2	20.3
2.4415	13.3	-44.1	-39.1	5	2	20.3
2.44155	13.3	-44.1	-39.1	5	2	20.3
2.4416	13.3	-44.1	-39.1	5	2	20.3
2.44165	13.3	-44.1	-39.1	5	2	20.3
2.4417	13.3	-44.1	-39.1	5	2	20.3
2.44175	13.3	-44.1	-39.1	5	2	20.3
2.4418	13.3	-44.1	-39.1	5	2	20.3
2.44185	13.3	-44.1	-39.1	5	2	20.3
2.4419	13.3	-44.1	-38.6	5.5	2	20.8
2.44195	13.3	-44.1	-38.1	6	2	21.3
2.442	13.3	-44.1	-37.6	6.5	2	21.8
2.44205	13.3	-44.1	-37.1	7	2	22.3
2.4421	13.3	-44.1	-36.6	7.5	2	22.8
2.44215	13.3	-44.1	-36.1	8	2	23.3
2.4422	13.3	-44.1	-35.6	8.5	2	23.8
2.44225	13.3	-44.1	-35.1	9	2	24.3
2.4423	13.3	-44.1	-34.6	9.5	2	24.8
2.44235	13.3	-44.1	-34.1	10	2	25.3



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2.4424	13.3	-44.1	-33.6	10.5	2	25.8
2.44245	13.3	-44.1	-33.1	11	2	26.3
2.4425	13.3	-44.1	-32.6	11.5	2	26.8
2.44255	13.3	-44.1	-32.1	12	2	27.3
2.4426	13.3	-44.1	-31.6	12.5	2	27.8
2.44265	13.3	-44.1	-31.6	12.5	2	27.8
2.4427	13.3	-44.1	-31.6	12.5	2	27.8
2.44275	13.3	-44.1	-32.1	12	2	27.3
2.4428	13.3	-44.1	-32.1	12	2	27.3
2.44285	13.3	-44.1	-32.6	11.5	2	26.8
2.4429	13.3	-44.1	-33.1	11	2	26.3
2.44295	13.3	-44.1	-33.1	11	2	26.3
2.443	13.3	-44.1	-33.6	10.5	2	25.8
2.44305	13.3	-44.1	-34.1	10	2	25.3
2.4431	13.3	-44.1	-34.6	9.5	2	24.8
2.44315	13.3	-44.1	-35.6	8.5	2	23.8
2.4432	13.3	-44.1	-36.1	8	2	23.3
2.44325	13.3	-44.1	-36.1	8	2	23.3
2.4433	13.3	-44.1	-36.1	8	2	23.3
2.44335	13.3	-44.1	-36.1	8	2	23.3
2.4434	13.3	-44.1	-36.1	8	2	23.3
2.44345	13.3	-44.1	-36.1	8	2	23.3

Freq.	(S/N)	Snoise ref.	Jammer	MJ	Lsys	Gp
MHz	dB	dBm	dBm	dB	dB	dB
2.4435	13.3	-44.1	-34.8	9.3	2	24.6
2.44355	13.3	-44.1	-34.8	9.3	2	24.6
2.4436	13.3	-44.1	-34.8	9.3	2	24.6
2.44365	13.3	-44.1	-34.6	9.5	2	24.8
2.4437	13.3	-44.1	-34.6	9.5	2	24.8
2.44375	13.3	-44.1	-34.6	9.5	2	24.8
2.4438	13.3	-44.1	-34.6	9.5	2	24.8
2.44385	13.3	-44.1	-34.6	9.5	2	24.8
2.4439	13.3	-44.1	-34.6	9.5	2	24.8
2.44395	13.3	-44.1	-34.6	9.5	2	24.8
2.444	13.3	-44.1	-34.6	9.5	2	24.8
2.44405	13.3	-44.1	-34.6	9.5	2	24.8
2.4441	13.3	-44.1	-34.4	9.7	2	25
2.44415	13.3	-44.1	-34.4	9.7	2	25
2.4442	13.3	-44.1	-34.4	9.7	2	25
2.44425	13.3	-44.1	-34.4	9.7	2	25
2.4443	13.3	-44.1	-34.4	9.7	2	25
2.44435	13.3	-44.1	-34.4	9.7	2	25
2.4444	13.3	-44.1	-34.1	10	2	25.3
2.44445	13.3	-44.1	-34.1	10	2	25.3



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2.4445	13.3	-44.1	-34.1	10	2	25.3
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**APPENDIX A – Test equipment and ancillaries used for tests**

HL serial No.	Serial No.	Description	Manufacturer	Model No.	Due calibr.
0053	2320	Attenuator, 50 Ohm, 2 W, 0-18 GHz, 20 dB	Hewlett Packard	8492A	4/01
0317	26163	Power sensor, 30 MHz – 40 GHz, -70 to 20 dBm	Boonton	51072	4/01
0661	0266	Generator Swept Signal, 10MHz to 40GHz+ 10dBm	Hewlett Packard	83640B	2/01
0740	08167	Coupler coaxial directional 1.7-4.2 GHz	Narda	3043B-30	4/01
0846	232919 BE	Power meter, RF, 100 kHz-100 GHz, -70 to +37 dBm	Boonton	4200	2/01
0940	8468	Attenuator, 50 Ohm, 2 W, 0-12.4 GHz, 10 dB	Hewlett Packard	8491A	4/01
1176	1176	Microwave cable, 1 m	Suhner	SMA/SMA	2/01
1422	1422	Cable coax, 50 ohm, 40 GHz	Insulated Wire	NA	5/01