THE STANDARDS INSTITUTION OF ISRAEL Telematics Laboratory

Test Report No.8412310521

For Alvarion (formerly Flower & BreezeCom)

Equipment Under Test:
Subscriber unit of Wireless Access system.

Model: BreezeAccess SU-M-900

From The Standards Institution
Of Israel
Industry Division
Telematics Laboratory
EMC Section

ACCREDITED

Certificate No.1487-01

42 Chaim Levanon St. Tel-Aviv 69977 Tel: 972-3-646-7800 Fax: 972-3-646-7779 www.sii.org.il

Order placed by:	Alvarion (formerly Flower & BreezeCom)
Address:	P.O.Box 13139. Tel Aviv 61131, Israel
Sample for test selected by:	The order
The date of test:	09/06/2004, 15/06/2004

Description of Equipment Under Test (EUT):	Subscriber unit of Wireless Access system BreezeAccess SU-M-900
Manufactured by:	Alvarion (formerly Flower & BreezeCom)

Reference Standard:

- CFR 47 FCC: "Rules and Regulations";
  Part 15. "Radio frequency devices";
  Subpart B: "Unintentional radiators" Sec.15.109
  Subpart C: "Intentional radiators" Sec. 15.209

Test Results: The EUT conforms to the requirements of CFR 47 FCC Part 15
Subpart B Sec.15.109 class B
Subpart C Sec. 15.209

This Test Report contains 21 pages and may be used only in full.	This Test Report applies only to the specimen tested and may not be applied to other specimens of the same product.

Table of Contents

1 Scope

This test report contains the results of the conducted and radiated emissions tests, which were caused by the changes, made in the EUT by the manufacturer.

2 EUT Description and operation

*2.1 General description *:*

Description of Equipment Under Test (EUT): BreezeAccess SU-M-900

Manufactured by: Alvarion (formerly Flower & BreezeCom)

The BreezeAccess SU-M-900 unit is a mechanical modification of the BreezeAccess SU-M-2.4 (LKT-SUR-24) unit.
The modification consists of replacing of LKT-SUR-24 unit with SU-I-900 (LKT-ASU-900). The enclosure, power supply, internal connections remain the same..
No electrical changes were done to SU-I-900 unit.
Only a professional installer can install the SU-M-900 unit.

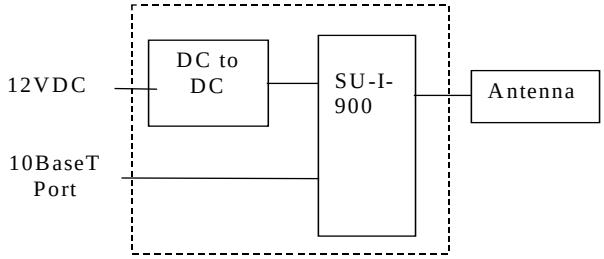

Figure 1: Block diagram of BreezeAccess 900MHz for the SU-M unit

EUT External antenna specification:

Antenna gain: 5 dBi
Mfr: Mobile Mark
Type: Roof mount antenna
Part No.: RM5-2400

* All information is provided by the manufacturer.

3 Test specification, Methods and Procedures

Test Specification:

- CFR 47 FCC: "Rules and Regulations";
  Part 15. "Radio frequency devices";
  Subpart B: "Unintentional radiators" Sec.15.109.
  Subpart C: "Intentional radiators" Sec. 15.209

Methods and Procedures:

- ANSI C63/4/1992: "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".

4 Measurements, examinations and derived results

4.1 Location of the Test Site:

Radiated emission measurements were conducted at EMC Lab of the Standards Institution of Israel in Tel-Aviv and at open area test site located at Kibbutz Native Halamed Hai in Emek HaEla, Israel.

4.2 Test condition:

Temperature: 22 °C
Humidity: 60 %

4.3 Initial visual check and functional test:

Initial visual check of the EUT was performed before testing. No external damages were found.

4.4 Radiated emission measurements in frequency range 30-2000 MHz:

4.4.1 Test procedure:

The test was conducted with dummy load (50 Ohm) connected to the antenna output connector.

The measurements were performed at the Open Area Test Site.

The EUT was arranged on a non-metallic table 0.8 m placed on the turntable.
The photos of the test layout are presented in Appendix 3.

All measurements at the Open Area Test Site were performed at a 10 m measurement distance.

The Bilog 30 MHz-2 GHz antenna was used.

The Frequency range from 30 to 2000 MHz was investigated.

The measurements were performed at each frequency at which the signal was 10 dB below the limit or less.

The level were maximized by initially rotating turntable through 360°, varying the antenna height between 1 m and 4 m, rerouting EUT cables and changing antenna polarization from vertical to horizontal. The measuring equipment settings were:

Initial scan:	
Detector type	Peak
Mode	Max hold
Bandwidth	120 kHz
Step size	Continuous sweep
Sweep time	>1 seconds/MHz
Measurements:	
Detector type	Quasi-peak (CISPR 16)
Bandwidth	120 kHz
Measurement time	20 seconds/MHz
Observation	>15 seconds

4.4.2 Test results:

Test results are presented in Table 1. All emissions are found below Class B limit.

Table 1. Radiated emission test results
Specified limit: FCC Part 15 Sec.15.109 Class B

Frequency (MHz)	Turn-table Angle (°)	Antenna Polariz.	Antenna Height (m)	Emission Level (dBμV/m)	Limit @ 3m (dBμV/m)	Margin (dB)	Results
37.7	316	V	1.20	33.6	39	5.4	Complies
47.6	112	V	1.20	27.2	39	11.8	Complies
47.1	34	V	1.20	26.1	39	12.9	Complies
63.6	97	V	1.20	23.7	39	15.3	Complies
444.6	143	V	1.20	27.3	46.5	19.2	Complies
912.5	339	H	1.20	33.5	46.5	13	Complies

Note 1: Emission level = E Reading (dBμV) + Cable loss (dB) + Antenna Factor (dB/m) + Distance factor (9.5 dB).
For Cable Loss and Antenna Factor refer to Appendix 2.

Distance factor was added to extrapolate the measurements performed at 10 m distance to the specified limit at 3 m distance.

4.5 Spurious emissions measurements:

4.5.1 Test procedure:

The measurements were performed in semi-anechoic chamber.
The EUT was arranged on a non-metallic table 0.8 m placed on the turntable.
Measuring antenna used: Double Ridge, height 1 m.
Measurement distance – 1m
The measurements were taken with antenna in vertical and horizontal polarization, the maximum emission was recorded.

Measuring detector function and bandwidths:

Detector type	Peak
Resolution bandwidth	1MHz
Video bandwidth	1 MHz
Detector type	Average
Resolution bandwidth	1MHz
Video bandwidth	3 kHz*

The frequency range was investigated up to 10GHz. Test results:

The test results of spurious emissions are shown in table #2 to #4 .

Radiated Emission level was calculated as
E Reading (dBμV) + measuring cable loss (dB) + measuring antenna factor (dB/m) + Distance correction factor

Where: measuring cable loss and measuring antenna factor are shown in Appendix 2.
Distance correction factor = -9.5 dB (used to extrapolate the reading from 1 m to 3m specified distance)

Table 2. Spurious emissions test results

Tested unit: BreezeAccess SU-M-900
Frequency: Low frequency 904 MHz

Frequency (GHz)	Emission Level (dBμV/m)		Limit @ 3m (dBμV/m)		Margin (dB)		Results
	Average	Peak	Average	Peak	Average	Peak	
1.808	52.3	63.28	54	74	1.7	10.72	Complies
2.712	49.9	61.52			4.1	12.48	Complies
3.616	50.1	62.0			3.9	12	Noise floor
4.520	50.3	62.2			3.7	11.8	Noise floor
5.424	50.5	62.4			3.5	11.6	Noise floor

No emission found above floor noise at the frequency range from 5.4 GHz to 10 GHz.

Note 2 : Emission level = E Reading (dBμV) + measuring cable loss (dB) + measuring antenna factor (dB/m) + Distance correction factor
For measuring cable loss and measuring antenna factor refer to Appendix 2.
Distance correction factor = -9.5 dB (correction to extrapolation reading from 1 m to 3m specified distance)

Table 3. Spurious emissions test results

Tested unit: BreezeAccess SU-M-900
Frequency: Middle frequency 915MHz

Frequency (GHz)	Emission Level (dBμV/m)		Limit @ 3m (dBμV/m)		Margin (dB)		Results
	Average	Peak	Average	Peak	Average	Peak	
1.830	51.65	60.98	54	74	2.35	13.02	Complies
2.745	50.19	62.02			3.81	11.9	Complies
3.660	50.4	62.9			3.6	11.1	Noise floor
4.575	50.6	62.7			3.4	10.9	Noise floor
5.490	50.8	62.9			3.2	10.7	Noise floor

No emission found above floor noise at the frequency range from 5.49 GHz to 10 GHz.

Note 2: Emission level = E Reading (dBμV) + measuring cable loss (dB) + measuring antenna factor (dB/m) + Distance correction factor
For measuring cable loss and measuring antenna factor refer to Appendix 2.
Distance correction factor = -9.5 dB (correction to extrapolation reading from 1 m to 3m specified distance)

Table 4. Spurious emissions test results

Tested unit: BreezeAccess SU-M-900
Frequency: High frequency 926 MHz

Frequency (GHz)	Emission Level (dBμV/m)		Limit @ 3m (dBμV/m)		Margin (dB)		Results
	Average	Peak	Average	Peak	Average	Peak	
1.852	47.95	58.43	54	74	6.05	15.57	Complies
2.778	50.23	61.76			3.77	12.24	Complies
3.704	50.5	62.1			3.5	11.9	Noise floor
4.630	50.7	62.3			3.3	11.7	Noise floor
5.556	50.9	62.5			3.1	11.5	Noise floor

No emission found above floor noise at the frequency range from 5.56 GHz to 10 GHz.

Note 2 : Emission level = E Reading (dBμV) + measuring cable loss (dB) + measuring antenna factor (dB/m) + Distance correction factor
For measuring cable loss and measuring antenna factor refer to Appendix 2.
Distance correction factor = -9.5 dB (correction to extrapolation reading from 1 m to 3m specified distance)

5 Compliance with specification

Name of Test	Ref. Standard	Test result
Radiated emission Frequencies range: 30-1000 MHz	FCC Part 15 Subpart B Sec.15.109 class B	Complies
Spurious radiated emission	FCC Part 15 Subpart C Sec.15.209	Complies

Telematics Laboratory
20 March 2006

Name: Eng. Yuri Rozenberg
Position: Head of EMC Branch

Name: Albert Herzenshtein
Position: Testing Engineer

6 Appendix 1: Test equipment used

All measurements equipment is on SII calibration schedule with a recalibration interval not exceeding once a year.

Instrument	Manufac-turer	Model	Serial No.	Last calibration date	Next calibration date
EMI Receiver	HP	8546A+85460A	SII 4068	01/04	01/05
Spectrum analyzer 10 KHz-26.5 GHz	HP	E7405a	SII 4944	01/04	01/05
Antenna Double Ridge 1-18 GHz	EMCO	3115	SII4873	12/03	12/04
Antenna Bilog 30 – 2000 MHz	Schaffner-Chase	CBL6112B	S/N 2714 SII 5119	01/04	01/05
Antenna Mast	R&S	HCM	100002	N/A	N/A
Metallic turntable	R&S	HCT12	100001	N/A	N/A
Positioning controller	R&S	HCC	100002	N/A	N/A

7 Appendix 2: Antenna Factor and Cable Loss

Cable Loss (10m cable + Mast)

Point	Frequency (MHz)	Cable Loss (dB)	Point	Frequency (MHz)	Cable Loss (dB)
1	30	0.53	21	1000	3.68
2	50	0.75	22	1100	3.82
3	100	1.08	23	1200	4.07
4	150	1.39	24	1300	4.24
5	200	1.61	25	1400	4.43
6	250	1.752	26	1500	4.6
7	300	2.00	27	1600	4.7
8	350	2.15	28	1700	4.85
9	400	2.26	29	1800	4.98
10	450	2.383	30	1900	5.19
11	500	2.52	31	2000	5.34
12	550	2.606	32	2100	5.51
13	600	2.75	33	2200	5.69
14	650	2.856	34	2300	5.89
15	700	3.06	35	2400	6.07
16	750	3.201	36	2500	6.22
17	800	3.27	37	2600	6.28
18	850	3.38	38	2700	6.41
19	900	3.46	39	2800	6.53
20	950	3.55	40	2900	6.84

Antenna Factor
Antenna Bilog mfr Schaffner Chase EMC Ltd.
Model CBL6112B S/N 2714

Frequency (MHz)	Antenna Factor (dB/m)	Frequency (MHz)	Antenna Factor (dB/m)	Frequency (MHz)	Antenna Factor (dB/m)	Frequency (MHz)	Antenna Factor (dB/m)	Frequency (MHz)	Antenna Factor (dB/m)
30	18.00	125	11.35	350	14.30	750	20.00	1300	23.10
32	16.90	130	11.00	360	14.50	760	20.00	1320	23.10
34	15.80	135	10.65	370	14.70	770	20.00	1340	23.30
36	14.80	140	10.40	380	14.80	780	20.00	1360	23.40
38	13.70	145	10.15	390	15.15	790	19.90	1380	23.80
40	12.60	150	9.70	400	15.70	800	19.90	1400	24.10
42	11.60	155	9.35	410	16.40	810	19.95	1420	24.40
44	10.60	160	9.10	420	16.70	820	20.20	1440	24.50
46	9.60	165	8.90	430	16.40	830	20.35	1460	24.70
48	8.80	170	8.80	440	16.30	840	20.40	1480	24.70
50	7.90	175	8.75	450	16.35	850	20.40	1500	25.00
52	7.20	180	8.60	460	16.70	860	20.30	1520	25.10
54	6.60	185	8.50	470	17.00	870	20.30	1540	25.10
56	6.00	190	8.40	480	17.20	880	20.30	1560	25.20
58	5.60	185	8.50	490	17.35	890	20.30	1580	25.20
60	5.20	200	8.70	500	17.40	900	20.30	1600	25.20
62	5.00	205	8.95	510	17.45	910	20.35	1620	25.30
64	4.80	210	8.80	520	17.50	920	20.40	1640	25.50
66	4.80	215	8.55	530	17.95	930	20.40	1660	25.70
68	4.90	220	8.90	540	18.80	940	20.60	1680	25.90
70	5.00	225	9.30	550	19.05	950	20.60	1700	25.90
72	5.30	230	9.80	560	18.80	960	20.60	1720	26.00
74	5.60	235	10.40	570	18.70	970	20.60	1740	25.90
76	6.10	240	10.90	580	18.60	980	20.70	1760	25.90
78	6.40	245	11.25	590	18.60	990	20.80	1780	25.70
80	6.90	250	11.70	600	18.80	1000	20.90	1800	25.80
82	7.30	255	12.20	610	19.10	1020	21.30	1820	25.90
84	7.60	260	12.80	620	19.20	1040	21.50	1840	26.10
86	8.00	265	12.80	630	19.20	1060	21.70	1860	26.30
88	8.40	270	12.40	640	19.20	1080	21.90	1880	26.50
90	8.80	275	12.30	650	19.10	1100	21.90	1900	26.80
92	9.20	280	12.30	660	19.10	1120	22.00	1920	27.00
94	9.60	285	12.35	670	19.00	1140	22.20	1940	27.00
96	9.90	290	12.40	680	18.90	1160	22.30	1960	27.10
98	10.40	295	12.60	690	18.95	1180	22.40	1980	27.20
100	10.70	300	12.70	700	19.10	1200	22.50	2000	27.30
105	11.15	310	13.15	710	19.35	1220	22.70		
110	11.40	320	13.50	720	19.60	1240	22.90		
115	11.50	330	13.60	730	19.90	1260	23.00		
120	11.50	340	13.80	740	20.00	1280	12.80		

Cable Loss
Type: Sucoflex 104PE; Ser.No.21324/4PE; 4 m length

Point	Frequency (GHz)	Cable Loss (dB)
0	0.0-1.8	1.67
1	1.8 – 3.6	2.39
2	3.6 – 5.4	3.04
3	5.4-7.2	3.58
4	7.2-9.0	4.06
5	9.0-10.8	4.49
6	10.8-12.6	4.91
7	12.6-14.4	5.31
8	14.4-16.2	5.66
9	16.2-18.00	6.01

Antenna Factor
Double Ridged Guide Antenna mfr EMCO model 3115

Point	Frequency (MHz)	Antenna Factor (dB/m)
1	2000	27.4
2	2500	28.9
3	3000	31.0
4	4000	33.1
5	4500	32.5
6	5000	32.4
7	6000	53.7
8	6500	35.6
9	7000	36.4
10	7500	36.9
11	8000	37.0
12	8500	38.0
13	9000	38.6
14	9500	38.4
15	10000	38.4
16	10500	38.4
17	11000	38.9
18	11500	39.6
19	12000	39.4
20	12500	39.2
21	13000	40.3
22	13500	41.0
23	14000	41.2
24	14500	41.3
25	15000	40.0
26	15500	38.0
27	16000	38.1
28	16500	40.3
29	17000	42.2
30	17500	44.6
31	18000	46.2

8 Appendix 3: Test configuration illustrations

Photo 1.
BreezeAccess SU-M-900
Internal view

Photo 2.
BreezeAccess SU-M-900
Radiated emission test setup at open site

Photo 3.
BreezeAccess SU-M-900
Radiated emission test setup at open site

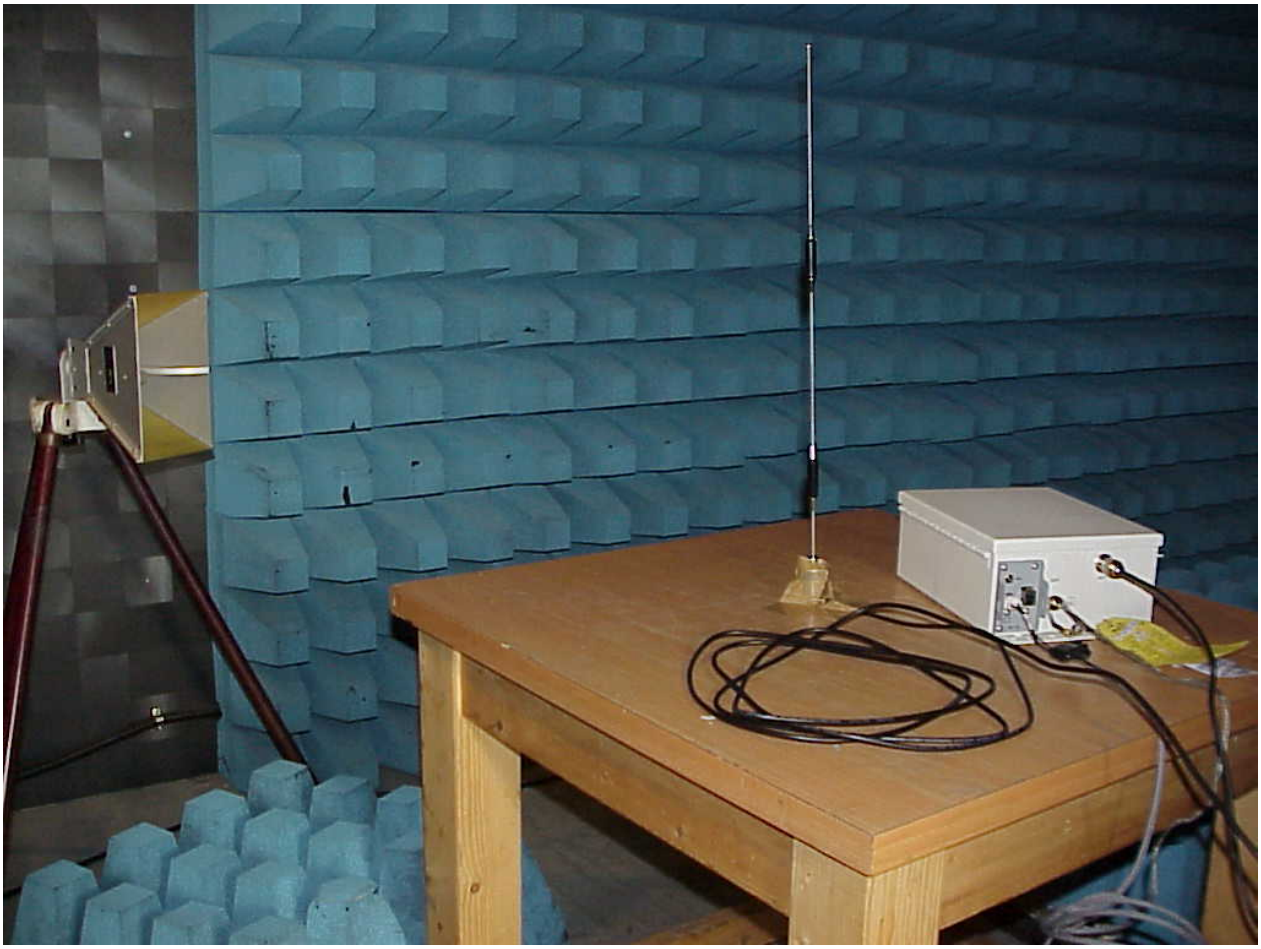

Photo 4.
BreezeAccess SU-M-900
Spurious emission test setup in semi -anechoic chamber

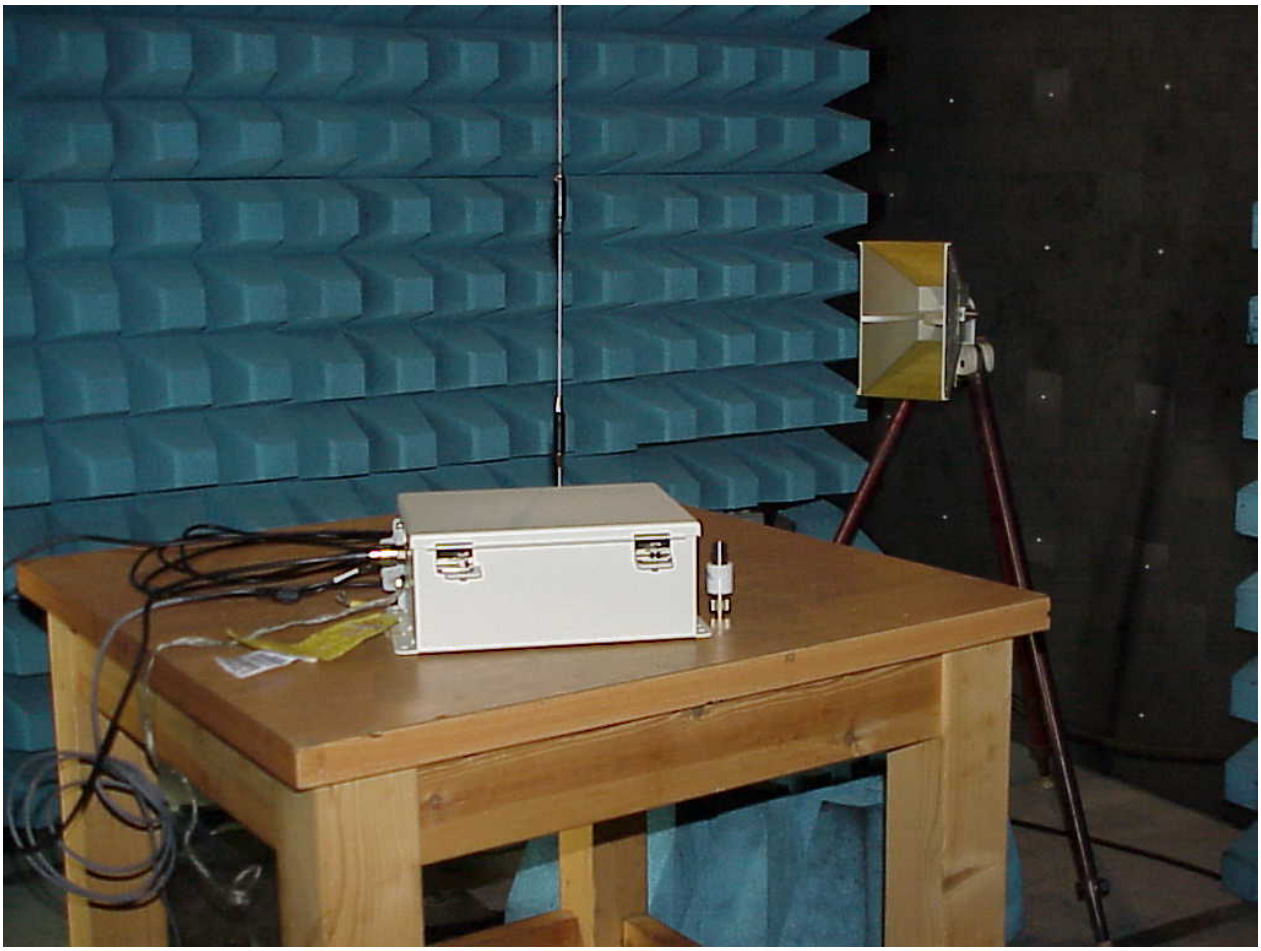

Photo 5.
BreezeAccess SU-M-900
Spurious emission test setup in semi -anechoic chamber