

Test Report No. 8312307936

For Alvarion Ltd.

***Equipment Under Test:
BreezeACCESS VL System: Outdoor Radio
Unit with antenna mfr MAXRAD***

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

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MAXRAD**

Order placed by:	Alvarion Ltd.
Address:	21A Habarzel str, Tel-Aviv, 69710, Israel
Sample for test selected by:	The orderer
The date of test:	28/05/2003

Description of Equipment Under Test (EUT):	BreezeACCESS VL System: Outdoor Radio Unit with antenna mfr MAXRAD
Manufactured by:	Alvarion Ltd.

Reference Documents:

- ❖ CFR 47 FCC: Rules and Regulations; Part 15. "Radio frequency devices"; Subpart B: "Unintentional radiators"; Subpart C: "Intentional radiators" (2002)

Test Results: The EUT meets the following requirements of CFR 47 FCC Part 15 Subpart C:
- Spurious radiated emission Sec.15.209
- Radiated emissions in restricted bands 15.205.

This Test Report contains 15 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.
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1 Scope

This test report contains results of spurious emissions and emission in restricted bands tests, performed on the Outdoor Radio Unit of BreezeACCESS VL System with antenna mfr MAXRAD, according to the relevant requirements of CFR 47 FCC Part 15 Subpart C.

2 EUT description

2.1 *t configuration:*

The tested unit - Outdoor Radio Unit of BreezeACCESS VL System

ODU antenna description: Type: Omni antenna

mfr: MaxRad Inc. Module No: MFB58008

Gain: 8dB.

3 Test specification, Methods and Procedures

- ❖ CFR 47 FCC: Rules and Regulations; Part 15. "Radio frequency devices"; Subpart C: "Intentional radiators" (2002)
- ❖ 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:*

The tests were conducted in the EMC laboratory of the Standards Institution of Israel in Tel-Aviv .

4.2 *Test condition:*

Temperature: 22 °C, Humidity: 50 %

4.3 Radiated emission test - spurious:

4.3.1 Requirements:

EUTs radiated emission shall not exceed value required in section 15.209 Subpart C.

4.3.2 Test procedure:

The measurements were performed in the anechoic chamber.

The EUT was arranged on a non-metallic table 0.8 m placed on the turntable.

Measuring antennas used: Up to 18 GHz - Double Ridge **EMCO** model 3115
above 18 GHz - Alpha TRG model A361

Antenna height = 1 m.

Polarization: Vertical/Horizontal

Measurement distance = 1m.

The frequency range was investigated up to 40 GHz.

The measurements were performed in vertical and horizontal polarization, the maximum reading 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*

4.3.3 Test results and calculation ratio:

The test results are shown in table #1.

The emission level was calculated as:

E Reading (dB μ V) + 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 (an extrapolation reading from 1 m measuring
distance to 3m specified distance)

Table 1. Spurious emissions test results

Frequency (GHz)	Emission Level (dB μ V/m)		Limit @ 3m (dB μ V/m)		Margin (dB)		Results
	Average	Peak	Average	Peak	Average	Peak	
<u>LOW 5.740 GHz</u>							
11.48	45.2	64.9	54	74	8.8	9.1	Complies
17.22	47.9	65.7			6.1	8.3	Complies
22.96	42.0	60.0			12.0	14.0	Complies
28.70	39.6	53.9			14.4	20.1	Complies
34.44	45.9	60.0			8.1	14.0	Complies
<u>MIDDLE 5.785 GHz</u>							
11.57	44.5	63.0	54	74	9.5	11.0	Complies
17.36	49.9	67.6			4.1	6.4	Complies
23.14	43.9	61.9			10.1	12.1	Complies
28.93	39.7	53.5			14.3	20.5	Complies
34.71	46.4	61.0			7.6	13.0	Complies
<u>HIGH 5.835 GHz</u>							
11.67	46.3	64.5	54	74	7.7	9.5	Complies
17.51	51.1	69.5			2.9	4.5	Complies
23.34	44.9	62.4			9.1	11.6	Complies
29.18	39.8	53.6			14.2	20.4	Complies
35.01	47.0	61.0			7.0	13.0	Complies



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4.4 Radiated emission test - restricted bands:

4.4.1 Requirements:

Radiated emission in restricted bands should meet the requirements sec. 15.205 Subpart C.

4.4.2 Test procedure:

The measurements were performed in the anechoic chamber.

The EUT was arranged on a non-metallic table 0.8 m placed on the turntable.

Measuring antenna: Double Ridge **EMCO** model 3115

Antenna height = 1 m.

Measurement distance = 1m.

Measuring detector function and bandwidths:

Detector type	Peak
Resolution bandwidth	1MHz
Video bandwidth	1 MHz

4.4.3 Test results :

The spurious emissions were found in one restricted band - 10.6-12.7 GHz.

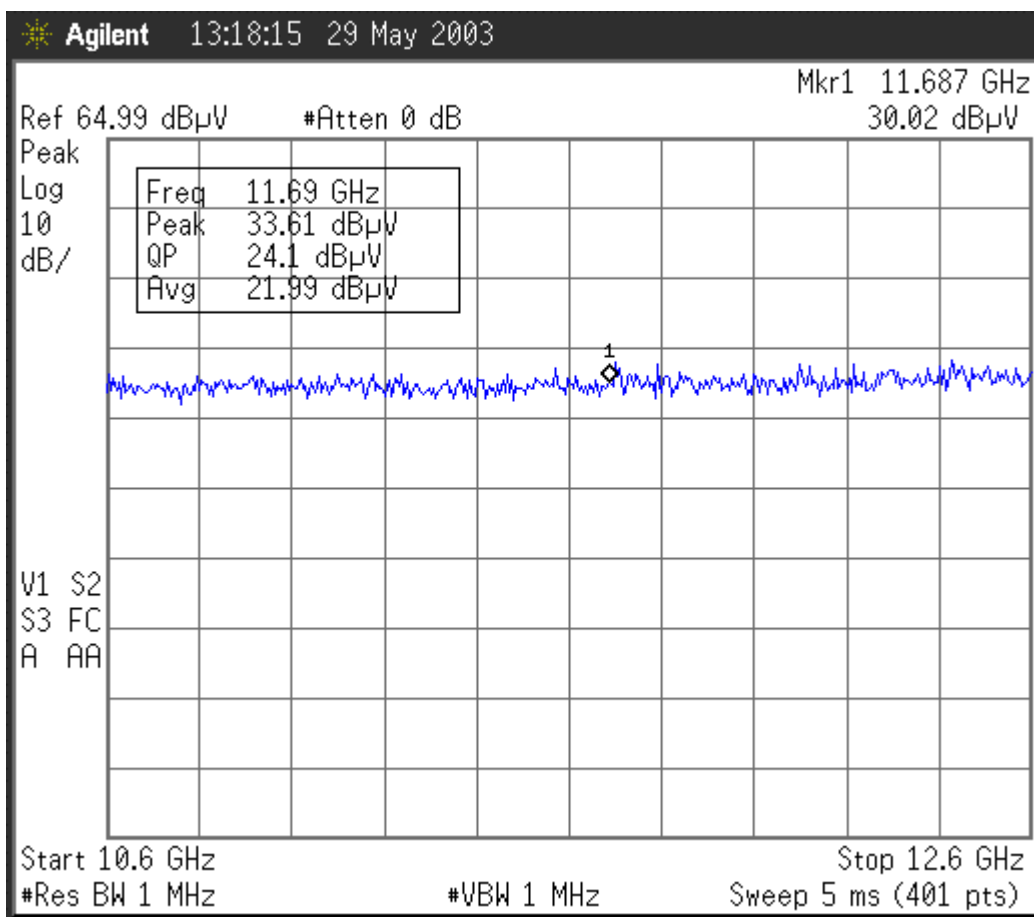
The measurements were performed with both AVG and Peak detector.

The test results are shown in Plots #1 to # 3. As shown in all plots the AVG results are below AVG limit and the measurements taken with peak detector are below Peak limit.

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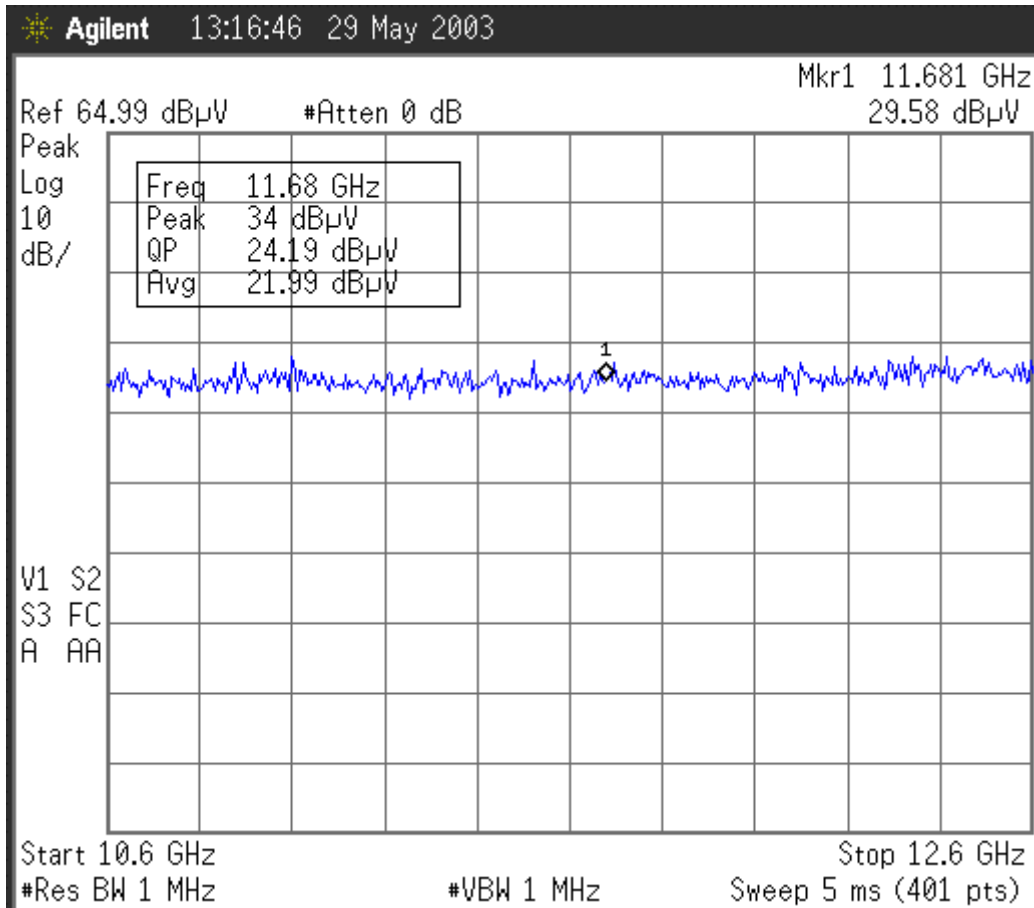
Plot #1
Radiated emission in restricted band 10.6-12.7 GHz LOW frequency



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Plot #2

Radiated emission in restricted band 10.6-12.7 GHz

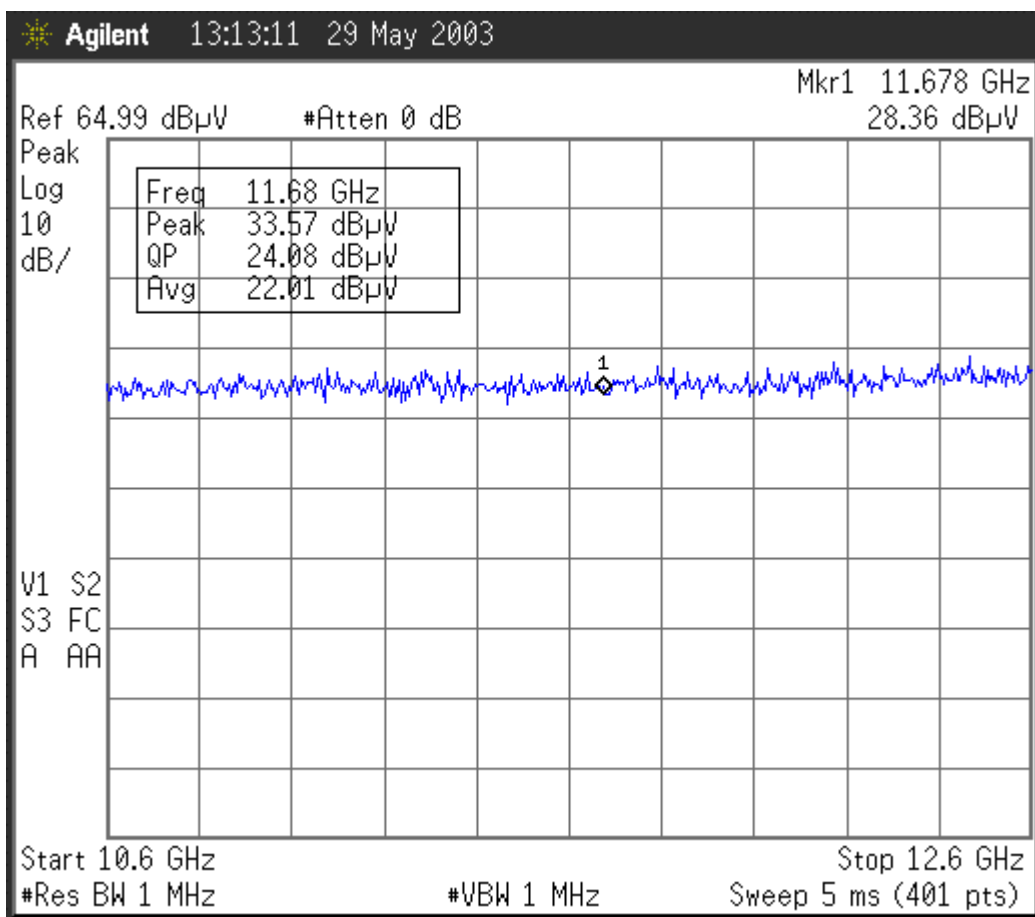
MID frequency



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Plot #3

Radiated emission in restricted band 10.6-12.7 GHz HIGH frequency

5 Compliance with specification

Test	FCC Part 15	Test result
Spurious radiated emission	Sec.15.209	Complies
Radiated emissions in restricted bands	Sec.15.205	Complies



Telematics Laboratory
4 June, 2003



Approved by: Yuri Rozenberg
Position: Head of EMC Branch

Tested by: Albert Herzenshtein
Position: Testing Engineer



Written by: Galit Grodetsky
Position: Standard 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	MFR	Model	Serial No.	Last calibration date	Next calibration date
Spectrum analyzer 10 KHz-26.5 GHz	HP	E7405a	SII 4944	04/03	04/04
Spectrum analyzer 9 KHz-50 GHz	HP	8565E	3517A00347	07/02	07/03
Antenna Double Ridge 1-18 GHz	EMCO	3115	5802	10/02	10/03
Antenna Standard Gain Horn 18-40 GHz	WILTRON	Alpha TRG A361	861A/590	01/03	01/04

7 Appendix 2: Antenna Factor and Cable Loss

Antenna Factor

Standard Gain Horn 2600 – 4000 MHz Alpha TRG Model A361

Point	Frequency (MHz)	Antenna Factor (dB/m)
1	26000	35.22
2	27000	35.40
3	28000	35.52
4	29000	35.64
5	30000	35.76
6	31000	35.90
7	32000	36.07
8	33000	36.16
9	34000	36.31
10	35000	36.46
11	36000	36.60
12	37000	36.74
13	38000	36.93
14	39000	37.21
15	40000	37.28

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**Gain and Antenna Factors for Double Ridged Guide Antenna****Manufactured by EMC Test Systems****Model Number: 3115 Serial Number: 5802****1.0 Meter Calibration****Polarization: Horizontal**

Frequency (MHz)	Antenna Factor (dB/m)	Gain Numeric	Gain dBi
1000	24.3	3.86	5.9
1500	25.6	6.48	8.1
2000	27.9	6.83	8.3
2500	28.9	8.43	9.3
3000	30.7	7.97	9.0
3500	32.0	8.06	9.1
4000	33.0	8.38	9.2
4500	32.9	10.91	10.4
5000	34.1	10.16	10.1
5500	34.8	10.51	10.2
6000	35.2	11.38	10.6
6500	35.4	12.79	11.1
7000	36.4	11.83	10.7
7500	37.3	10.90	10.4
8000	37.5	12.05	10.8
8500	37.9	12.36	10.9
9000	38.2	12.86	11.1
9500	38.3	14.04	11.5
10000	38.7	14.25	11.5
10500	38.5	16.28	12.1
11000	38.8	16.87	12.3
11500	39.5	15.41	11.9
12000	39.3	17.96	12.5
12500	39.1	20.03	13.0
13000	40.2	16.83	12.3
13500	41.2	14.53	11.6
14000	41.9	13.20	11.2
14500	41.3	16.27	12.1
15000	39.6	26.07	14.2
15500	38.1	39.49	16.0
16000	38.4	39.12	15.9
16500	39.8	29.81	14.7
17000	41.6	20.97	13.2
17500	44.8	10.55	10.2
18000	46.5	7.57	8.8

Specification compliance testing factor (1.0 meter spacing) to be added to receiver meter reading in dBV to convert to field intensity in dBV/meter. Calibrated 07 Oct 02 (DDMMYYYY). Calibration per ARP 958.



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MAXRADGain and Antenna Factors for Double Ridged Guide Antenna
Manufactured by EMC Test Systems

Model Number: 3115 Serial Number: 5802

1.0 Meter Calibration Polarization: Vertical

Frequency (MHz)	Antenna Factor (dB/m)	Gain Numeric	Gain dBi
1000	24.1	4.11	6.1
1500	25.6	6.48	8.1
2000	27.9	6.83	8.3
2500	28.9	8.47	9.3
3000	30.6	8.18	9.1
3500	31.9	8.24	9.2
4000	33.0	8.45	9.3
4500	32.8	11.14	10.5
5000	34.0	10.34	10.1
5500	34.8	10.40	10.2
6000	35.1	11.67	10.7
6500	35.4	12.86	11.1
7000	36.3	11.92	10.8
7500	37.3	10.95	10.4
8000	37.4	12.15	10.8
8500	37.8	12.58	11.0
9000	38.2	13.01	11.1
9500	38.2	14.21	11.5
10000	38.5	14.79	11.7
10500	38.6	16.05	12.1
11000	38.8	16.93	12.3
11500	39.3	16.19	12.1
12000	39.1	18.46	12.7
12500	39.1	20.28	13.1
13000	40.1	17.19	12.4
13500	41.1	14.85	11.7
14000	41.8	13.55	11.3
14500	41.3	16.25	12.1
15000	39.6	25.78	14.1
15500	38.0	39.54	16.0
16000	38.3	39.73	16.0
16500	39.6	31.52	15.0
17000	41.3	22.72	13.6
17500	44.5	11.49	10.6
18000	46.5	7.69	8.9

Specification compliance testing factor (1.0 meter spacing) to be added to receiver meter reading in dBV to convert to field intensity in dBV/meter. Calibrated 07 Oct 02 (DD/MM/YYYY). Calibration per ARP 958.

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8 Appendix 3: Test configuration illustration



**Photo #1
Spurious emissions test**

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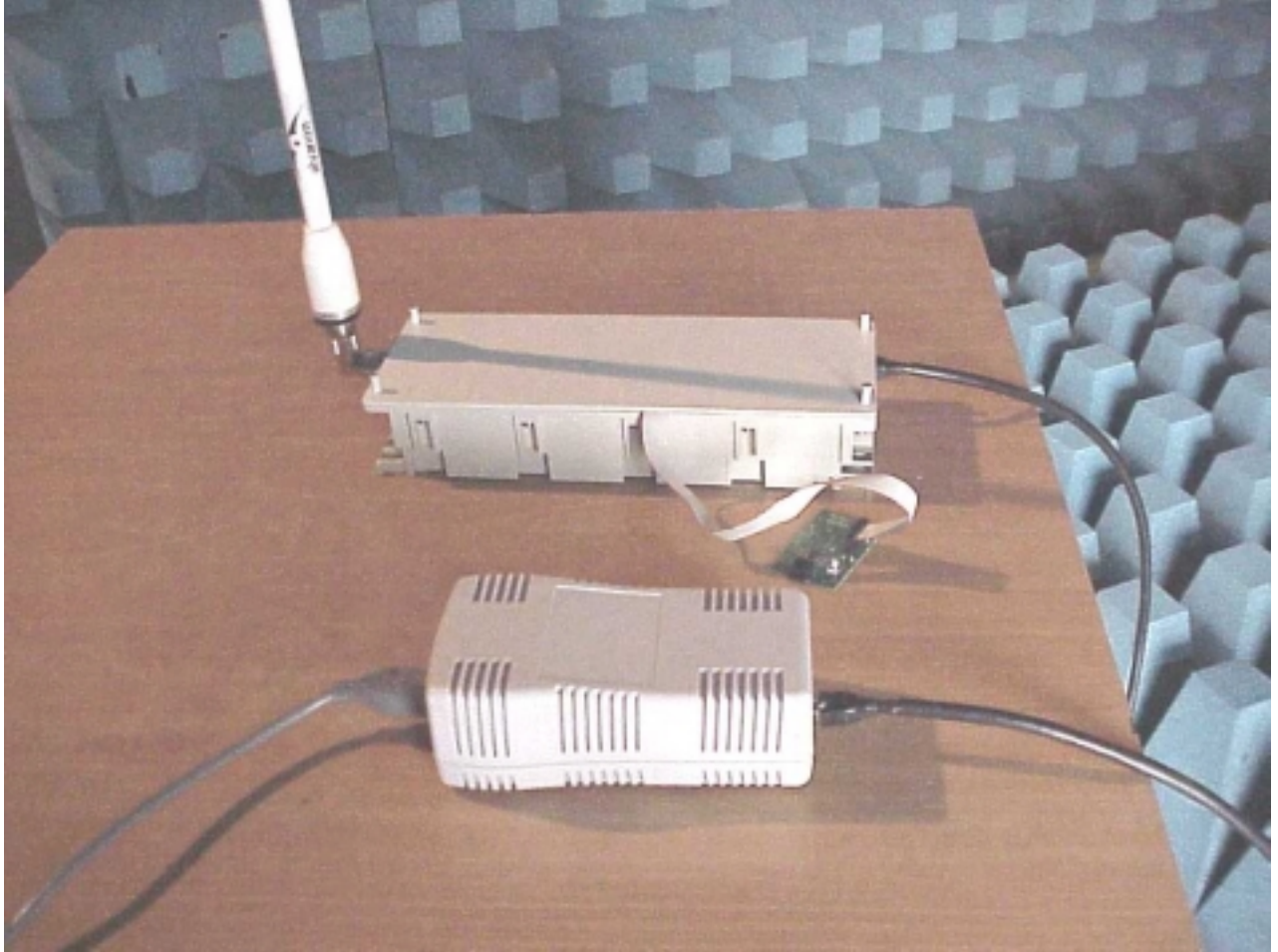


Photo #3
Outdoor Radio unit with antenna MaxRad