

EXHIBIT 9:**MEASURED DATA ON CONDUCTED AND RADIATED EMISSIONS**
----- 47CFR 2.1033(6).***1. POWER LINE CONDUCTED EMISSIONS ----- Pursuant 47 CFR 15.107.***

Measured data on conducted emissions per 47CFR 15.107 on AC power lines is the subject of attached Technical Report No.9ELS029F.

2. RADIATED EMISSIONS ----- Pursuant 47 CFR 15.109.

Measured data on radiated emissions per 47CFR 15.109 is the subject of attached Technical Report No.9ELS029F.

ELECTROMAGNETIC COMPATIBILITY TEST REPORT

Company Name: Elisra Electronic Systems Ltd.

Equipment Under Test: Series MW-CBDA-ESMR-1W60 BDA

Report I.D.Number: 9ELS029F.DOC

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EMI TEST Ltd. EMC Test Laboratory
Moshav Hanniel P.O.B.65, D.N.Lev Hasharon, Israel, 42865
Phone:(972) 9-8987382 Fax:(972) 9-8987383

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1. General Information.

Applicant: Elisra Electronic Systems Ltd.

Applicant Address: 48 Mivtza Kadesh St., Bene Beraq 51203, Israel

Telephone: 972-3-6175639

FAX: 972-3-6175299

The testing was observed by the following applicant's personnel: Mr. Shmuel Auster

Date of reception for testing: February 12, 1999

Dates of testing: February 12, 1999
February 17, 1999

Test Laboratory Location: EMI TEST Ltd, Moshav Hanniel, P.O.Box 65, D.N.Lev Hasharon, Israel 42865

Equipment Under Test: Series MW-CBDA-ESMR-1W60
Bi-Directional Amplifier

Serial Numbers: 99021001

Mode of Operation: Up-Link and Down-Link Receiving and Transmitting modes

Year of Manufacture: 1999

Applicable EMC Specification: Federal Communication Commission (FCC), Code of Federal Regulations 47, Ch. 1 (10-1-97 Edition)
Part 15: Radio Frequency Devices, Sections 15.107 & 15.109, Class B

2. Tests Summary.

EMI Test Laboratory has completed testing of Series MW-CBDA-ESMR-1W60 Bi-Directional Amplifier in accordance with the requirements of the FCC Part 15 Regulations for Class B equipment.

The EUT has been found to comply with the conducted and radiated emission requirements of the FCC Part 15 Regulations for Class B equipment:

Section 15.107:	Limits of Mains Terminal Interference Voltage (Conducted Emission) in the 0.45MHz to 30MHz frequency range.
Section 15.109:	Limits of Radiated Interference Field Strength in the 30MHz to 9000MHz frequency range.

3. Applicable Documents.

- 3.1 Federal Communication Commission (FCC), Code of Federal Regulations 47, Ch.1 (10-1-97 Edition), Part 15: Radio Frequency Devices, Sections 15.107 & 15.109.
- 3.2 FCC/OET, Laboratory Measurement Procedures MP-4, July 1987, "FCC Procedures for Measuring RF Emissions from Computing Devices".
- 3.3 FCC/Office of Science and Technology OST-55, August 1982, "Characteristics of Open Field Test Sites".
- 3.4 FCC/OET, "FCC Procedure for Measuring Electromagnetic Emissions from Digital Devices", TP-5, March 1989.
- 3.5 FCC/OET, "Understanding the FCC Regulations Concerning Computing Devices", OST-62, May 1984
- 3.6 International Special Committee On Radio Interference (CISPR) Publication 16, First Edition 1993, Part 1. "Radio disturbance and immunity measuring apparatus".
- 3.7 International Special Committee On Radio Interference (CISPR) Publication 16, First Edition 1993, Part 2. "Methods of measurement of disturbance and immunity".
- 3.8 American National Standard, "Specifications for Electromagnetic Noise and Field Strength Instrumentation, 10KHz to 1GHz", ANSI C63.2, 1987.
- 3.9 American National Standard, "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9KHz to 40GHz", ANSI C63.4, 1992.

4. Detailed Applicable EMC Requirements and Limits.

4.1 Limits of Mains Terminal Interference Voltage (Conducted Emission).

FCC Part 15 Class B Limits for mains terminal interference voltages in the frequency band 450KHz to 30MHz are:

Frequency, in MHz	Quasi-Peak (dBuV)
0.45 - 30	48

Note:

In accordance with CISPR16 Publication measurements were made across a 50 Ohm/50uH Line Impedance Stabilization Network (LISN).

4.2 FCC Part 15 Limits of Radiated Interference Field

The MW-CBDA-ESMR-1W60 BDA operates with radio frequencies in 851-866MHz (Down-Link) and 806-821MHz (Up Link) bands. In accordance with 47 CFR Para.15.33 (a) (1), the highest frequency of measurement range should be to the tenth harmonic of the highest fundamental frequency, or 8660MHz.

Strength (Radiated Emissions) for Class B equipment in the frequency range 30MHz to 8660MHz at test distance of 3m should be less than those given in the following table:

Frequency (MHz)	Field Strength at 3 m in dBuV/m in uV/m	
30 - 88	40.0	100
88 - 216	43.5	150
216 - 960	46.0	200
Above 960	54.0	500

Notes:

1. The tighter limit shall apply at the edge between two frequency bands;
2. Distance refers to the distance in meters from measuring instrument antenna to the closest point of any part of the EUT.

5. Procedures for Measuring RF Emissions from EUT.

5.1 AC Power line Conducted Emissions Measurements.

Conducted emissions on the input power leads of MW-CBDA-ESMR-1W60 BDA were measured in the frequency range of 450KHz to 30MHz. The measurements were performed using a spectrum analyzer, which has CISPR characteristic bandwidths and quasi-peak detector, and a Line Impedance Stabilization Network (LISN), with $50\Omega/50\mu\text{H}$ (CISPR16) characteristics.

Measurements were made to determine the line-to-ground radio noise voltage which was conducted from the power-input cables that are directly connected to the public utility AC power lines. EUT units were connected to the public utility power lines through a standardized $50\mu\text{H}/50\Omega$ LISN. The LISN was attached to the ground plane and bonded to it by means of low-inductance bonding strap.

MW-CBDA-ESMR-1W60 BDA was designed for wall-mounted operation, and was tested as a table-top equipment. It was installed upon the 0.8m-high wooden table located in the center of a horizontal conductive ground plane with 4 x 4 meters dimensions.

Additional vertical reference ground plane with dimensions 2x2 meters was located 40cm from the EUT. This vertical ground plane was bonded to horizontal ground plane by means of low-impedance bonds with spacing of 1 meter between adjacent bonds.

The EUT was tested with unshielded power cords. The length of the power cord between the EUT and the Line Impedance Stabilization Network (LISN) was shortened to 1 meter. The excess length of the power cord was folded back and forth in a non-inductive pattern at its approximate center in a bundle 30cm to 40cm in length. The EUT and cables were positioned in a way maximizing conductive emission. No isolation transformers or other external RFI suppression devices were used during the tests.

In some cases, a pre-scan using a spectrum analyzer in Peak Detector mode was initially performed on the EUT to locate the highest emissions. If the minimum passing margin appeared to be less than 20, when measured in a peak detector mode, the emissions were re-measured using spectrum analyzer in quasi-peak mode. The test results of this test were recorded in the data sheets.

In case of each emission the test results were recorded and emission level was compared with the standard level.

All conducted emission tests were performed for 230VAC and 11VAC supply voltages.

5.2 Radiated Emissions Measurements.

Measurements of radiated emission were made using a spectrum analyzer with 120KHz/6dB bandwidth and peak or quasi-peak detector, and appropriate broadband linearly polarized antennas. Tests were performed in the frequency range of 30MHz to 8660MHz.

The EUT was set and operated in a manner representative of actual use. During radiated emission tests the EUT was placed on wooden table located in the center of a non-conductive rotating platform, 80cm above the horizontal metallic ground plane.

The test antenna was located 3 meters from the EUT, and precise compliance measurements were performed.

The test antenna was installed on the antenna mast in vertical polarization. When necessary, small frequency ranges (5MHz or 10MHz, typically) were spanned in order to increase resolution and make easier identification of emissions emanating from the EUT in presence of ambient noise. To locate maximum emissions from the test sample, the antenna was varied in height from 1 to 4 meters, and the EUT was rotated through 360 degrees.

For each emission the test results were recorded and emission levels were compared with the standard level. All significant emissions were recorded in tabular form.

Identical measurement procedure was repeated with antenna oriented horizontally.

During the compliance tests spectrum analyzer was set in quasi-peak detector mode.

All radiated emission tests were performed in two operational modes:

- a) Up-Link transmission at 806, 816 and 821MHz frequencies;
- b) Down-Link transmission at 851, 860 and 866MHz frequencies.

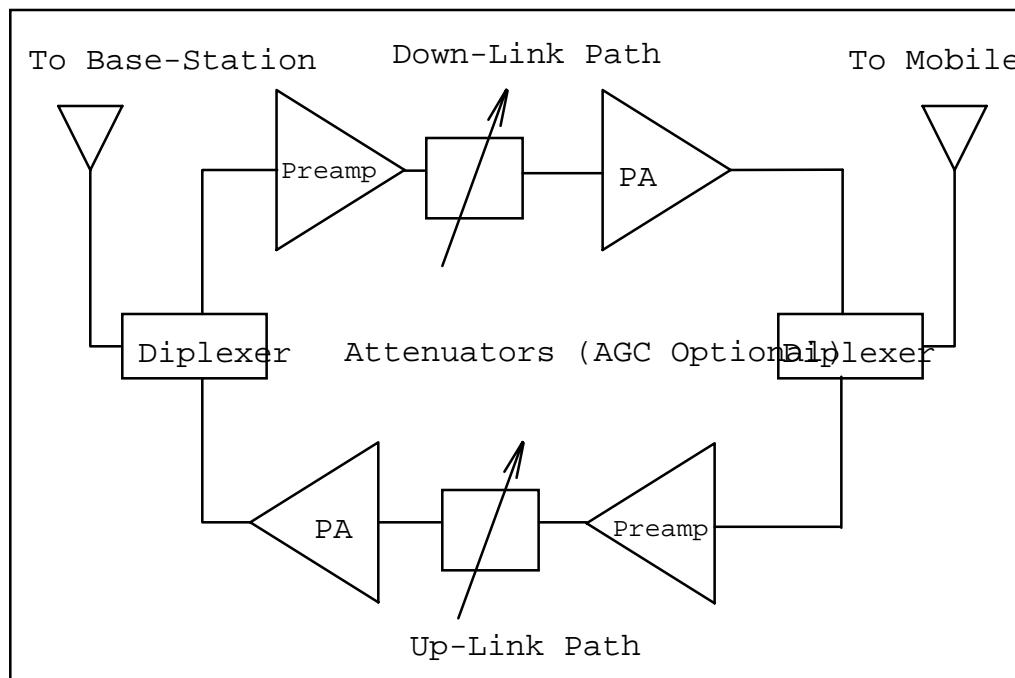
During radiated emission tests the MW-CBDA-ESMR-1W60 BDA was fed from 115VAC power source.

6. System Test Configuration.

6.1 Product Description.

MW-CBDA-ESMR-1W60 BDA is cellular repeater/booster, and may be used in order to enlarge coverage of cellular base stations. The MW-CBDA-ESMR-1W60 BDA incorporates high-linear power amplifiers and diplexers with sharp out-of band rejection, which assists in avoiding interfering signals and intermodulations. Automatic Gain Control (AGC) is an optional feature and can be implemented according to customer request. The tested MW-CBDA-ESMR-1W60 BDA operated without AGC provisions.

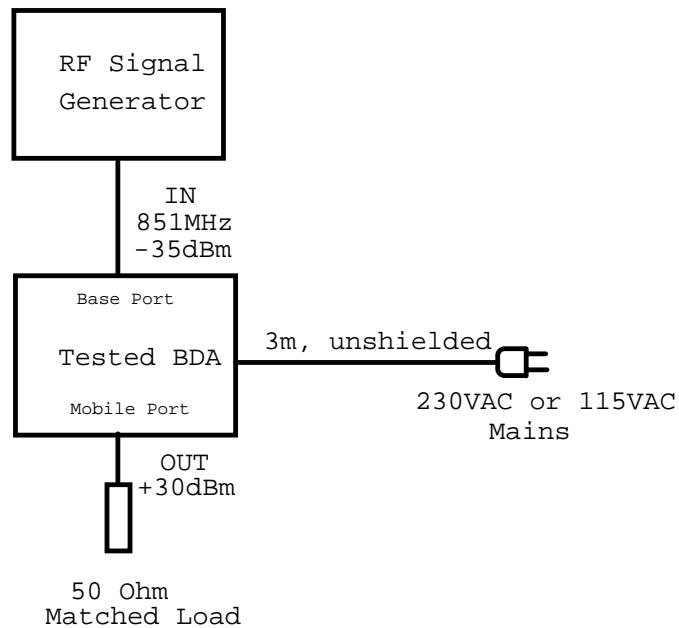
The block-diagram of the MW-CBDA-ESMR-1W60 BDA is given in the following figure:



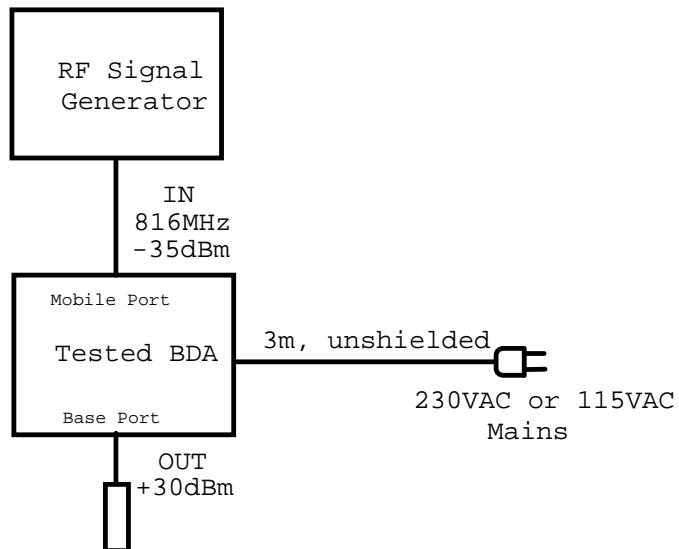
6.2 The Tested Configuration.

The MW-CBDA-ESMR-1W60 BDA was tested in the configuration shown in the following figure:

a) Down-Link Configuration.



b) Up-Link Configuration.



6.3 Clock frequencies.

The MW-CBDA-ESMR-1W60 BDA does not employ any digital clock oscillator.

6.4 Cables Used During the Tests:

No.	Description	Length (m)	Shielding
1	50Ohm coaxial cable from Signal Generator to the EUT.	1.0	85-95% braided + foil overall shield
2	50Ohm coaxial cable from the EUT to 50Ohm matched load.	0.5	85-95% braided + foil overall shield
3	Power cable	3.0	Unshielded

6.5 Modifications Required for Compliance.

The MW-CBDA-ESMR-1W60 BDA in its original design complied with the conducted and radiated emission requirements of FCC Part 15 for Class B equipment. Therefore no corrective actions were required.

7. Description of the Test Site.

Location:	Moshav Hanniel, P.O.Box 65, D.N.Lev Hasharon, 42865, Israel
Phone:	(972)-9-8987382
FAX:	(972)-9-8987383
Open Site Ranges:	3 and 10 meters
Turntable:	2.1 x 1.6 meter with maximum loading 1500kg, distant actuation. The turntable and the tested equipment are environmentally protected.
Antenna Mast:	1 to 4 meter
Supply Voltages:	230VAC/50Hz, 3 Phases, 16A from each phase; 115VAC/50Hz, 3 Phases, 32A from each phase; up to 50VDC, 30A max

8. List of Test Equipment Used.

No.	Description	Manufacturer and Model Number	Series No.
1.	Spectrum Analyzer 9KHz to 2.2GHz	Anritsu MS2601B/K	MT81431
2	Spectrum Analyzer	HP8563E	3821A09026
3	RF Signal Generator	HP8656A	N/A
4	Antenna, Biconical, 20MHz to 200MHz	EMCO Model 3110B	1813
5	Antenna, Log-Periodic, 200MHz to 1GHz	EMCO Model 3146	3807
6	Antenna Double Ridged Horn	EMCO Model 3115	4272
7	Amplifier 10MHz to 500MHz	MITEQ Model AU-1114	323214
8	Amplifier, 500MHz to 2GHz	MITEQ Model AM-3A-0520	329110
9	Amplifier 30dB	Microwave Technology Ltd. Model SAO-4868	14026
10	Plotter	HP Model 7440A-002	2929A17765
11	LISN, 9KHz to 100MHz	EMCO Model 3825/2	2205

EMI Test Laboratory test equipment is calibrated on regular basis according to equipment manufacturer requirements.

9. Conducted Emission Data.

The final level of the conducted emission in dB μ V, is calculated by taking the reading from the spectrum analyzer and taking into account the LISN Correction Factor and the Cable Loss.

To convert the data from dB μ V to μ V, the following conversion is applied:

$$\begin{aligned} \text{dB}\mu\text{V} &= 20\log(\mu\text{V}) \\ \mu\text{V} &= \text{Inverse log}(\text{dB}\mu\text{V}/20) \end{aligned}$$

10. Radiated Emission Data.

The Final Level, expressed in dB μ V/m, is calculated by taking the reading from the spectrum analyzer (V_{rec}, dB μ V), subtracting the preamplifier gain (Gain, dB) and adding the Antenna Correction Factor (AF, dB/m) and Cable Loss Factor (CF, dB). This result then was subtracted from the FCC Part 15 Standard limit for Class B equipment to yield the Safety Margin (in dB) given in tabular form in data sheets.

Example:

Suppose that:

The test frequency is F = 180MHz;
Spacing between the test antenna and the EUT is 3 meters;
The level detected by the spectrum analyzer V_{rec} = 30.97dB μ V;
Preamplifier gain Gain(dB) = 32.8dB;
The antenna factor AF(dB/m) = 13.9dB/m at 180MHz;
Cable loss CL(dB) = 2.02dB.

Then:

The field strength can be calculated using the following formula:

$$\begin{aligned} E(\text{dB}\mu\text{V}/\text{m}) &= V_{\text{rec}}(\text{dB}\mu\text{V}) - \text{Gamp}(\text{dB}) + \text{AF}(\text{dB}/\text{m}) + \text{CL}(\text{dB}) = \\ &= 30.97 - 32.8 + 13.9 + 2.02 = 14.09(\text{dB}\mu\text{V}/\text{m}). \end{aligned}$$

This level is 25.91dB lower than the FCC Part 15 standard limit (40dB μ V/m) for Class B devices at frequency 180MHz.

11. Results of Conducted Emissions Tests.

Levels of conducted emissions were measured on "Phase" and "Neutral" power leads of the MW-CBDA-ESMR-1W60 BDA in the 450KHz to 30MHz frequency range in two cases:

- a) the MW-CBDA-ESMR-1W60 BDA was fed from 230VAC/50Hz power source;
- b) the MW-CBDA-ESMR-1W60 BDA was fed from 115VAC/50Hz power source.

The measured conducted emission of the MW-CBDA-ESMR-1W60 BDA did not exceed FCC Part 15 standard levels for Class B equipment, given in Para. 4.1.

No conducted emissions exceeding the noise floor of the spectrum analyzer were detected on Phase and Neutral input power leads. The noise floor was at least 25dB below the FCC Part 15 conducted emission level for Class B equipment.

Summary of Conducted Emission Tests.

The conducted emissions were tested on "Phase" and "Neutral" 230VAC/50Hz and 115VAC/50Hz power leads of the MW-CBDA-ESMR-1W60 BDA in the 450KHz to 30MHz frequency range.

In summary, the MW-CBDA-ESMR-1W60 BDA complied with the conducted emission requirements of FCC Part 15 Standard for Class B equipment.

12. Results of Radiated Emission Tests.

Radiated emission tests were conducted in the 30MHz to 1000MHz frequency range.

The measured radiated emission of the MW-CBDA-ESMR-1W60 BDA in its original design were below the noise floor of the spectrum analyzer and did not exceed FCC Part 15 Class B standard level, as given in Para. 4.2.

Summary of Radiated Emission Tests.

The MW-CBDA-ESMR-1W60 BDA meets radiated electric field requirements of FCC Part 15 Regulations for Class B equipment.

13. Signatures.

**Test measurements were
performed by:**

Dr. Alexander Axelrod
(EMI Test Ltd.)

11 March 1999

(Date, Signature)

Test report was prepared by:

Mr. Tal Axelrod
(EMI Test Ltd.)

11 March 1999

(Date, Signature)

Approved by:

Dr. Alexander Axelrod
(EMI Test Ltd.)

11 March 1999

(Date, Signature)

The testing was observed by:

Mr. Shmuel Auster
(Elisra Electronic Systems Ltd.)

11 March 1999

(Date, Signature)

14. Setup Photographs.

Photograph 1. Test Setup for Conducted Emission Tests.

See File test1.jpg

Photograph 2. Test Setup for Radiated Emission Tests.

See File test2.jpg