

FCC CFR47 CERTIFICATION

PARTS 24

TEST REPORT

FOR

PCS RADIO REPEATER

FCC ID:OJFLITENNA0HF0SB0

ISSUE DATE: OCTOBER 23, 2000

Prepared for

**FOXCOM WIRELESS LTD.
Ofek One Center Building B,
Northern Industrial Zone
Lod, Israel 71293**

Tested by

**COMPLIANCE CERTIFICATION SERVICES, INC.
1366 BORDEAUX DRIVE
SUNNYVALE, CA 94089, USA
TEL: (408) 752-8166
FAX: (408) 752-8168**

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1. FCC CERTIFICATION INFORMATION

The following information is in accordance with FCC Rules, 47CFR Part2, Subpart J, Sections 2.1033 – 2.1055.

2.1033(c)(1) Applicant: Foxcom Wireless Ltd.
Ofek One Center Building B,
Northern Industrial Zone
Lod, Israel 71293

Contact person: Shlomo Cohen
Telephone number: 972-8-9183818

2.1033(c)(2) FCC ID: OJFLITENNA0HF0SB0

2.1033(c)(3) Instructions/Installation Manual
Refer to **Attachment:** User's Manual.

2.1033(c)(4) Type of emissions

DXW (TDMA), F9W (CDMA), GXW (GSM),

2.1033(c)(5) Frequency Range

UPLINK	DOWNLINK	SERVICE
1850-1910	1930-1990	TDMA/GSM/CDMA 1900

2.1033(c)(6) Range of Operation Power

18 dBm – 21 dBm maximum output, depending on modulation. Refer to Litenna Data Sheet, separate attachment

2.1033(c)(7) Maximum Power Rating

Modulation	Specification, dBm	CCS Data, dBm
CDMA	18	18
TDMA	21	21.9
GSM	21	20.8

Section 24.232(a,b); Maximum Power. Base stations must not exceed 100 watts, mobile/portable stations must be less than 2 watts EIRP.

2.1033(c)(8) Applied voltage and currents into the final transistor elements

Refer to schematic

2.1033(c)(9) Tune-up/Optimizations Procedure

Refer to installation manual

2.1033(c)(10) Complete Circuit Diagrams and Functional Diagram

Refer to Schematics and Block Diagram . Confidentiality is requested for these items.

2.1033(c)(10a) Means for Frequency Stabilization

Not Applicable. Eut is an amplifier type repeater.

2.1033(c)(10b) Means for Suppressing of Spurious radiation.

SAW filter. See Repeater description.

2.1033(c)(10c) Means for Limiting Modulation.

Not Applicable. Eut is a repeater.

2.1033(c)(10d) Means for Limiting Power.

Software control

2.1033(c)(11) Equipment Identification

Refer to separate Word attachment

2.1033(c)(12) Photographs

Refer to separate Word attachment

2.1033(c)(13) Description of Digital Modulation Techniques

N/A EUT is repeater.

2.1033(c)(14) Standard Test Condition

The repeater was tested under the following conditions.

DC Supply from AC-DC adapter: 24 VDC

The amplifier was aligned and tuned up according to manufacturer's alignment procedure, prior to testing. All data presented represents the worst case parameter being measured.

2.1033 Description of Various Base Station Configurations

Not Applicable.

2.1033 Use of Various Power Supplies

Not Applicable.

TYPE OF EQUIPMENT:	Part 24 REPEATER
MEASUREMENT DISTANCE:	3 METER
TECHNICAL LIMIT:	24.232
FCC RULES:	PART 24
EQUIPMENT AUTHORIZATION PROCEDURE	CERTIFICATION
MODIFICATIONS MADE ON EUT	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO

The above equipment was tested by Compliance Certification Services for compliance with the requirements set forth in the FCC CFR 47, Parts 2, 24, and 90. The results of testing in this report apply to the product/system, which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

T.N. Cokenias
Agent for Foxcom

2. TEST FACILITY

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

3. ACCREDITATION AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code:200065-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (reference no: 31040/SIT (1300B3) and 31040/SIT(1300F2))

4. MEASUREMENT INSTRUMENTATION

Radiated emissions were measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, ridged waveguide liner horn. EMI receivers were used for line conducted readings, spectrum analyzers with pre-selectors and quasi-peak detectors were used to perform radiated measurements. Receiving equipment (i.e., receiver, analyzer, quasi-peak adapter, pre-selector) and LISNs conform to CISPR specification for "Radio Interference Measuring Apparatus and Measurement Methods," Publication 16.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

5. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

6. UNITS OF MEASUREMENT

Measurements of radiated interference are reported in terms of dB(uV/m) at a specified distance. The indicated readings on the spectrum analyzer were converted to dB(uV/m) by use of appropriate conversion factors. Measurements of conducted interference are reported in terms of dB(uV).

The field strength is calculated by adding the Antenna Factor and Cable Factors, then by subtracting the Amplifier Gain from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength
- RA = Receiver Amplitude
- AF = Antenna Factor
- CF = Cable Attenuation Factor
- AG = Amplifier Gain

Assume a receiver reading of 52.5 dBuV is obtained. The Antenna Factor of 7.4dB/m and a Cable Factor of 1.1dB is added. The Amplifier Gain of 29 dB is subtracted, giving a field strength of 32 dBuV/m. The 32 dBuV/m value was mathematically converted to its corresponding level in uV/m.

$$FS = 52.5 + 7.4 + 1.1 - 29 = 32 \text{ dBuV/m}$$

$$\text{Level in uV/m} = \text{Common Antilogarithm} [(32 \text{ dBuV/m})/20] = 39.8 \text{ uV/m}$$

7. FCC 15.207 & 15.209

NOT APPLICABLE – no digital devices, no unintentional radiators in EUT

8. TEST EQUIPMENT LIST

Equipment	Manufacturer	Model No.	Serial No.	Site	Cal Date	Due Date
Receiver	H.P.	8546A	3520A00259	A	03/00	03/01
Bilog Antenna	CHASE	CBL6112	2049	A	05/00	05/01
Spectrum Analyzer	H.P.	8566B	3014A06685	N/A	07/00	07/01
Spectrum Analyzer	H.P.	8593EM	3710A00205	N/A	05/00	05/01
Horn Antenna	EMCO	3115	9001-3245	N/A	12/97	12/00
Pre-Amp	H.P. (1-26.5GHz)	8449B	3008A00369	N/A	04/00	04/01
Power Meter	H.P.	436A	2709A29209	N/A	02/00	02/01
Power Sensor	H.P.	8482A	2349A08568	N/A	02/00	02/01
Horn Antenna	ARA	MWH-1826/B	1013	N/A	7/28/00	7/28/01

B) SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Number	Serial No.
SIGNAL GENERATOR	Rohde & Schwarz	SMIQ03	N/A
SIGNAL GENERATOR	Rohde & Schwarz	SMIQ03	N/A

9. EUT SETUP PHOTOS

- refer to separate attachment

10. EXTERNAL I/O CABLE DESCRIPTION

CABLE NO:1	
I/O Port: : ANTENNA OUT	Number of I/O ports of this type: 4
Number of Conductors: 4	Connector Type: N-TYPE
Capture Type: SCREW IN	Type of Cable used: SHIELDED (to analyzer)
Cable Connector Type: METAL	Cable Length: 1.5 m (to analyzer)
Bundled During Tests: NO	Data Traffic Generated: YES
Remark: 3 terminated 50 ohms, 4th to spectrum analyzer	

CABLE NO: 2	
Optical fiber from base to remote unit	
Remark: N/A	

CABLE NO: 3	
I/O Port: : RF IN from building basestation	Number of I/O ports of this type: 1
Number of Conductors: 2	Connector Type: N-TYPE
Capture Type: SCREW IN	Type of Cable used: SHIELDED
Cable Connector Type: METAL	Cable Length: 1.5 M
Bundled During Tests: NO	Data Traffic Generated: YES
Remark: N/A	

11. CONFIGURATION BLOCK DIAGRAM

(two gen for intermod test)

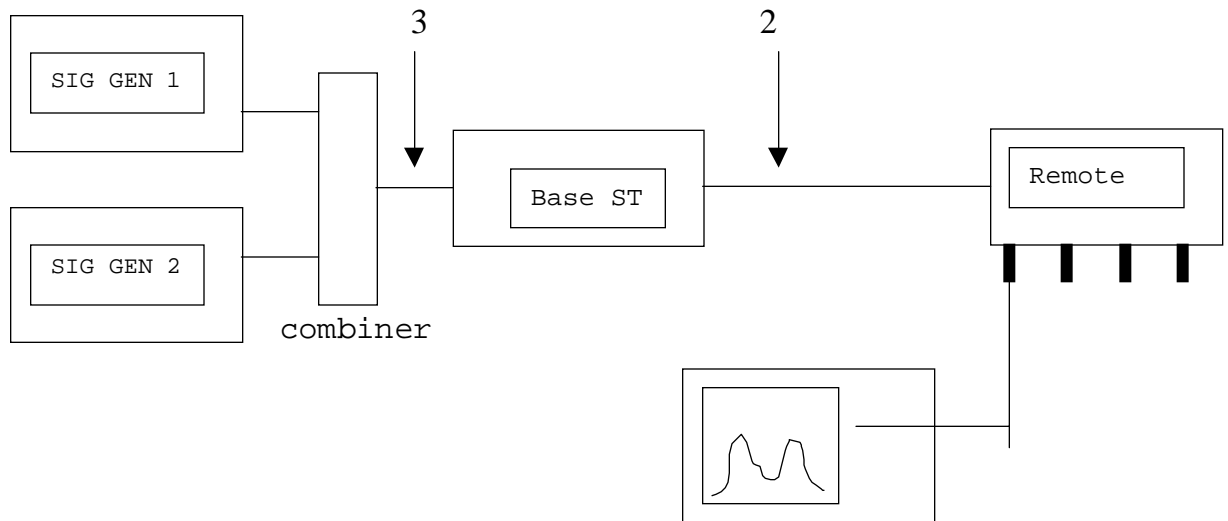


FIGURE 1.

12. PART 2: CERTIFICATION TEST REQUIREMENT:

SECTION 2.1046: RF POWER OUTPUT

Test Setup: Refer to figure #1

Minimum requirement:

Section 24.232 Maximum Power. Base stations less than 300 watts, mobile/portable 2 watts EIRP.

Test procedure:

Figure 1. shows the setup for conducted RF power output measurement. RF power output was measured with a power meter. Set the power amplifier to the maximum output gain.

Modulation	Specification, dBm	CCS Data, dBm
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CDMA	18	18
TDMA	21	21.9
GSM	21	20.8

SECTION 2.1047: MODULATION CHARACTERISTICS

Not applicable. EUT is a repeater.

SECTION 2.1049: OCCUPIED BANDWIDTH

Test Setup: Refer to figure #1

Minimum Requirement:

Section 2.1049(i); transmitters designed for other types of modulation-when modulated by an appropriate signal of sufficient amplitude to be representative of the type of service in which used. A description of the input signal should be supplied.

Test Procedure:

The Eut's occupied bandwidth is compared to the input source plot (signal generator) and output plot (power amplifier) and check that the input signal bandwidth is not greater at the output of amplifier.

Test results:

Plots were made for the output of the amplifier and another for the input from signal generator. was used for this test. Refer to chart designating plots.

SECTION 2.1051: SPURIOUS EMISSION AT ANTENNA TERMINALS

Test Setup: Refer to figure #1

Minimum Requirement:

Section 22.917(e):

For transmitters the magnitude of each spurious, harmonic, and intermodulation emissions that can be detected when the equipment is operated under conditions specified in the instruction manual and/or alignment procedure, shall not be more than $43 + 10 \log (P)$ dBc below the mean power output, which is equivalent to -13 dBm.

Test Procedure:

Scan Eut from 1MHz to the 10th harmonic of carrier and check for spurious, harmonic, and intermodulation emissions. Set the **RES Bw**: 30kHz, offset analyzer for external attenuation and using the **DISPLAY LINE** place it at -13dBm. Use enough attenuation to prevent overload on the spectrum analyzer input, which can cause overload..

Test results:

Plots were made for the output of the amplifier and another for the input from signal generator. was used for this test. Refer to chart designating plots.

SECTION 2.1053: FIELD STRENGTH OF SPURIOUS RADIATION

Measurement Equipment Used:

HP 8593EM Spectrum Analyzer

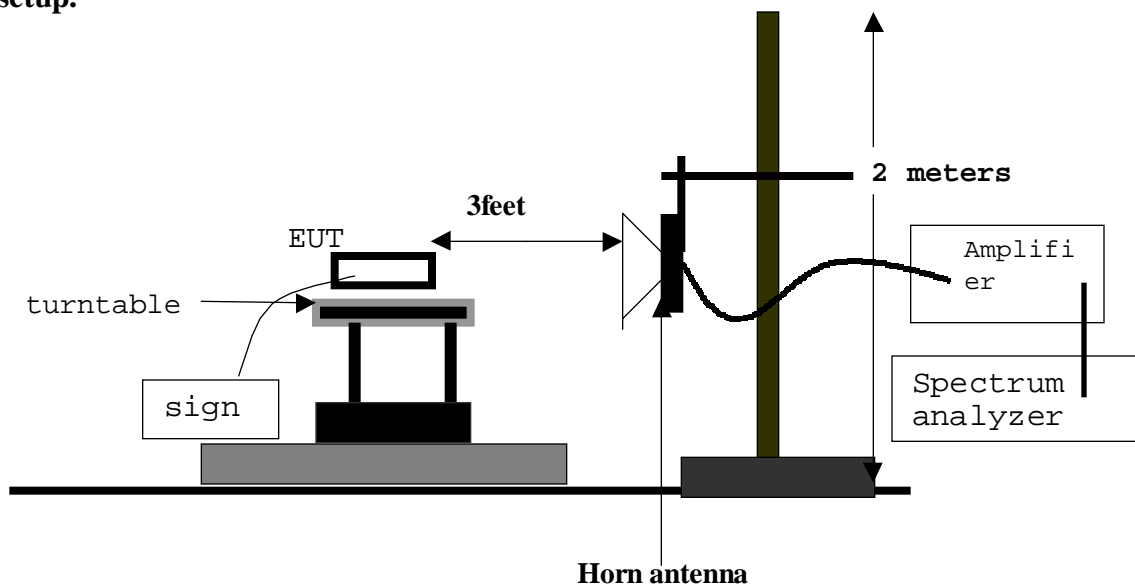
HP 8449 B Preamplifier, 1-26 GHz

ARA DRG-118/A Double Ridged Horn antenna, 1 - 18 GHz

QIM "The Workhorse" low loss cable, 9 ft (loss: 0.85 dB/ft@ 26 GHz)

ARA MWH-1826/B Horn antenna 18/26GHz

Test setup:



Radiated Emissions Configuration

Minimum Requirement:

Section 22.917(e):

The magnitude of each spurious and harmonic emissions detected as being radiated from the EUT must be at a level no more than $43 + 10 \log$ (mean output power, watts) dB below the mean power output (-13dBm).

Resultant radiated field at 3 meters from -13dBm source feeding isotropic antenna: 82 dBuV/m.

Test procedure:

1 foot test

EUT antenna output was terminated with a 50-ohm load. The EUT was placed on a wooden table. The search antenna placed 1 ft from the EUT. With the transmitter operating at full power the turntable was slowly rotated to locate the direction of maximum emission. Once maximum direction is determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

Test Result:

No emissions detected within 45 dB of limit up to 10fo.

SECTION 2.1055: FREQUENCY STABILITY

NOT APPLICABLE – EUT is an amplifier-type repeater. No RF oscillators, no frequency determining circuits in EUT.

CHART OF PLOTS:

CDMA Low	1
CDMA Low out of band	2,3
CDMA 1.931 GHz output	4
CDMA 1.931 GHz input	5
CDMA Hi 1985 MHz, 1988.75 MHz	6
CDMA Hi 1985 MHz, 1988.75 MHz out of band	7,8
TDMA Lo 1930.03/1930.12 MHz	9
TDMA Lo 1930.03/1930.12 MHz out of band	10,11
TDMA High 1989.88/1989.97 MHz	12
TDMA High 1989.88/1989.97 MHz out of band	13,14
TDMA High 1989.88 output	15
TDMA High 1989.88 input	16
GSM Lo 1930..8 output	17
GSM Lo 1930.2/1930.8 MHz	18
GSM Lo 1930.2/1930.8 MHz out of band	19,20
GSM Hi 1989.2/1989.8 MHz	21
GSM Hi 1989.2/1989.8 MHz	22,23
GSM Lo 1930..8 input	24