FCC CFR47 CERTIFICATION

PART 22H and 24E

TEST REPORT

FOR

800MHZ (AMPS/CDMA/TDMA) AND

1900MHZ PCS (EDGE/GSM/CDMA/TDMA)

DUAL BAND IN BUILDING REPEATER RAU UNIT

MODEL NUMBER: DAS819A-4

BRAND NAME: LGCell

FCC ID: NOODAS819A-4

REPORT NUMBER: 02U1165-1

ISSUE DATE: MAY 24, 2002

Prepared for
LGC WIRELESS, INC
2540 JUNCTION AVENUE
SAN JOSE CA USA
95134-1902

Prepared by
COMPLIANCE CERTIFICATION SERVICES
561F MONTEREY ROAD, ROUTE 2
MORGAN HILL, CA 95037, USA
TEL: (408) 463-0885
FAX: (408) 463-0888

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1. TEST RESULT CERTIFICATION

COMPANY NAME: LGC WIRELESS INC.
2540 JUNCTION AVENUE
SAN JOSE, CA 95134-1902

CONTACT PERSON: JOHN DORSEY / COMPLIANCE ENGINEER

TELEPHONE NO: (408) 952-2431

EUT DESCRIPTION: 800MHZ CELLULAR (AMPS/TDMA/CDMA) / 1900MHZ PCS (EDGE/GSM/CDMA/TDMA) IN BUILDING REPEATER RAU

MODEL NUMBER: DAS819A-4

DATE TESTED: MARCH 15, 2002 - MAY 15, 2002

TYPE OF EQUIPMENT	INTENTIONAL RADIATOR
EQUIPMENT TYPE	1850-1910 MHz paired with 1930-1990 MHz (24) , and 824 – 849MHz paired with 869 – 894MHz (22) Repeater.
MEASUREMENT PROCEDURE	ANSI 63.4 / 1992, TIA/EIA 603
PROCEDURE	CERTIFICATION
FCC RULE	CFR 47 PART 22 Subpart H and 24 Subpart E

Compliance Certification Services, Inc. tested the above equipment for compliance with the requirement set forth in CFR 47, PART 22 Subpart H-Cellular Radiotelephone Service and 24 Subpart E-Broadband PCS. The equipment in the configuration described in this report, shows the measured emission levels emanating from the equipment do not exceed the specified limit.

Note : This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

Test By:

JERRY HOVEY
ASSOCIATE EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

Released For CCS By:

MIKE HECKROTTE
CHIEF ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

This product is designed for offices, hotel rooms, small parking lots, garages or small buildings, helping to improve CDMA/PCS communications signal and coverage by extending the coverage of a base station.

The outdoor antenna receives signals from a PCS base station, then the repeater transmits the signal to the local antenna. Conversely, signals from handsets are received by the local antenna and transmitted to the PCS base station.

3. FACILITIES, LABORATORY AND ACCREDITATION

3.1. Facilities

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 16.

3.2. Laboratory Accreditation

The laboratory and associated 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. In addition, the test facilities are listed with Federal Communications Commission (reference no: 31040/SIT (1300B3) and 31040/SIT (1300F2)).

No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.

3.3. List of Accreditations

Country	Agency	Scope of Accreditation	Logo
USA	NVLAP*	FCC Part 15, CISPR 22, AS/NZS 3548,IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, CNS 13438	NVLAP 200065-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	FC 1300
Japan	VCCI	CISPR 22 Two OATS and one conducted Site	VCCI R-1014, R-619, C-640
Norway	NEMKO	EN50081-1, EN50081-2, EN50082-1, EN50082-2, IEC61000-6-1, IEC61000-6-2, EN50083-2, EN50091-2, EN50130-4, EN55011, EN55013, EN55014-1, EN55104, EN55015, EN61547, EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN60945, EN61326-1	N ELA 117
Norway	NEMKO	EN60601-1-2 and IEC 60601-1-2, the Collateral Standards for Electro-Medical Products. MDD, 93/42/EEC, AIMD 90/385/EEC	N ELA-171
Taiwan	BSMI	CNS 13438	SL2-IN-E-1012
Canada	Industry Canada	RSS210 Low Power Transmitter and Receiver	Canada IC2324 A,B,C, and F

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4. CALIBRATION, METHODOLOGY AND UNCERTAINTY

4.1. Equipment 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.

4.2. Test Methodology

Conducted and radiated testing were performed according to the procedures documented on chapter 13 of ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057.

Receiving equipment (i.e., receiver, analyzer, quasi-peak adapter, pre-selector) and LISNs conform to CISPR specifications for "Radio Interference Measuring Apparatus and Measurement Methods," Publication 16.

4.3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Radiated Emission	
30MHz – 200 MHz	+/- 3.3dB
200MHz – 1000MHz	+4.5/-2.9dB
1000MHz – 2000MHz	+4.6/-2.2dB
Power Line Conducted Emission	
150kHz – 30MHz	+/-2.9

Any results falling within the above values are deemed to be marginal.

4.4. Test and Measurement Equipment

The following test and measurement equipment was utilized for the tests documented in this report:

TEST AND MEASUREMENT EQUIPMENT LIST				
Description of Equipment	Manufacturer	Model	Serial Number	Calibration Due Date
Spectrum Analyzer	HP	8566B	3014A06685	6/28/02
Spectrum Display	HP	85662A	3026A19146	6/28/02
Quasi-Peak Detector	HP	85650A	3145A01654	6/28/02
Spectrum Analyzer	HP	8593EM	3710A00205	6/20/02
Preamplifier	HP	8447D	2944A06589	8/10/02
Bilog Antenna	Chase	CBL6112B	2586	8/2/02
Preamplifier	MITEQ	NSP2600-44	646456	4/12/02
Horn Antenna	EMCO	3115	6739	1/31/03
Horn Antenna	Antenna Research Associates	MWH 1826/B	1013	7/26/02
Signal Generator	R&S	SMIQ 03	DE22422	5/25/02
I/Q Modulation Generator	R&S	AMIQ	DE30562	7/28/03
Tune Dipole	Compliance Design	Roberts	116	5/5/03
Horn Antenna	EMCO	3115	6717	1/31/03
HPF	MICROLAB	FH-1800H	N/A	N.C.R.
HPF	MICROLAB	FH-2400H	N/A	N.C.R.
50 ohm terminator	SHX	TF-5	N/A	N.C.R.
Environmental Chamber	Thermotron	SE 600-10-10	29800	4/26/03
RMS Voltmeter	Keithley	179A	30747	4/4/03

5. APPLICABLE RULES

5.1. RF POWER OUTPUT §2.1046

§22.913 & 24.232- POWER LIMIT

§22.913(a) Maximum ERP. The effective radiated power (ERP) of base station transmitters and cellular repeater must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

§24.232(a) Maximum Peak output power for base station transmitters should not exceed 100 Watts EIRP (equivalent isotropically radiated power).

§24.232(b) Mobile stations are limited to 2 Watts EIRP.

Specification Limit:

Band MHz	Link	Limit Watts	Limit dBm
800	Downlink	500	57
800	Uplink	7	38.5
1900	Downlink	100	50
1900	Uplink	2	33

5.2. MODULATION CHARACTERISTICS §2.1047

Not applicable. The EUT does not have a modulator. The EUT is a repeater.

5.3. OCCUPIED BANDWIDTH §2.1049

§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.

5.4. SPURIOUS EMISSIONS AT ANTENNA TERMINALS §2.1051

§22.917 & 24.238- EMISSION LIMITS

§22.917(e) Out of band emissions. The mean power of emissions must be attenuated below the mean power of the unmodulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least 43+10log P dB (-13dBm)

§22.917(f) Mobile emissions in base frequency range. The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitter operated must be attenuated to a level not to exceed –80dBm at the transmit antenna connector.

§24.238(a) The magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under conditions specified in the instruction manual and/or alignment procedure, shall not be less than 43+10 log (mean output power in watts) dBc below the mean power output outside a licensee's frequency block (-13dBm).

5.5. FIELD STRENGTH OF SPURIOUS RADIATION §2.1053

§22.917 & 24.238- EMISSION LIMITS

§22.917(e) Out of band emissions. The mean power of emissions must be attenuated below the mean power of the unmodulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least 43+10log P dB (-13dBm)

§22.917(f) Mobile emissions in base frequency range. The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitter operated must be attenuated to a level not to exceed –80dBm at the transmit antenna connector.

§24.238(a) The magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under conditions specified in the instruction manual and/or alignment procedure, shall not be less than 43+10 log (mean output power in watts) dBc below the mean power output outside a licensee's frequency block (-13dBm).

5.6. FREQUENCY STABILITY §2.1055

§24.235 The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.7. FREQUENCY RANGE TO BE INVESTIGATED §2.1057

§2.1057(a) In all of the measurements set forth in §2.1051 and §2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:

(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

(2) If the equipment operates at or above 10 GHz and below 30 GHz:
to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

(3) If the equipment operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower.

§2.1057(b) Particular attention should be paid to harmonics and sub-harmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.

§2.1057(c) The amplitude of spurious emissions, which are attenuated more than 20 dB below the permissible value, need not be reported.

§2.1057(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

Spec limit: Frequency investigation range from 30 MHz to 20 GHz.

6. TEST SETUP, PROCEDURE AND RESULT

6.1. RF POWER OUTPUT

INSTRUMENTS LIST

EQUIPMENT	MANUFACTURE	MODEL NO.	CAL. DUE DATE
Signal Generator	Rohde & Schwarz	SMIQ 03	05/25/02
Spectrum Analyzer	HP	8566B	05/04/02

TEST SETUP

TEST PROCEDURE

The EUT was set to maximum output power (maximum gain). RF output power was measured with Spectrum Analyzer.

RESULT

No non-compliance noted:

Band MHz	Modulation	Link	Measured Power dBm
800	AMPS	Downlink	20.3
800	CDMA	Downlink	10.6
800	TDMA	Downlink	17.33
800	AMPS	Uplink	-9.8
800	CDMA	Uplink	-10.1
800	TDMA	Uplink	-10.0
1900	CDMA	Downlink	10.78
1900	EDGE	Downlink	17.21
1900	GSM	Downlink	20.96
1900	TDMA	Downlink	17.67
1900	CDMA	Uplink	0.86
1900	EDGE	Uplink	0.59
1900	GSM	Uplink	0.4
1900	TDMA	Uplink	0.81