FCC ID: NUWØØ4SEKO8

Prepared for:

CI WIRELESS INC.
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Grapevine, Texas 76051

By:

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Submitted to:

Federal Communications Commission
Equipment Approval Services
P.O. Box 358315
Pittsburgh, Pennsylvania 15251-3315

February 1999

FCC Application for Type Acceptance of an Intentional Radiator

CI WIRELESS INC.
EkoCell
800 MHz ESMR Band 4 Watt Repeater
(Transmitter Portion)

Table of Contents

Appendices

Certificate of Compliance

Applicant:	CI Wireless Inc.
Applicant's Address:	1211 Ira E. Woods Avenue Grapevine, Texas 76051
Model:	800 MHz ESMR Band 4 Watt Repeater
Serial Number:	80000/80002
Project Number:	99-216
Test Dates:	December 7 through 9, 1999

I, Jeffrey A. Lenk, for Professional Testing (EMI), Inc., being familiar with the FCC rules and test procedures have reviewed the test setup, measurement data and this report. I believe them to be true and accurate. The **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** was tested and found to be in compliance with FCC Part 90 for Intentional Radiators.

_____

Jeffrey A. Lenk
President

1.0 Equipment Under Test (EUT) Description

The **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** is a 4 watt 800 MHz ESMR Band Repeater System. This system enhances the coverage of a cellular system by adding base station capability to traditional poor cellular coverage areas (i.e. subways, shopping malls, convention centers). The system has a set of automatic setup features, enabling the repeater to be installed & configured by one person. Automatic system monitoring is present to monitor sysetm health & report/record any EUT problems. **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** supports IDEN (GSM) and TDMA communications in the ESMR band.

The EkoCell system is comprised of two components: a Hub unit and a Remote unit. The Hub is installed at a cellular base station while the remote unit is installed at the desired transmit/receive location and attached to an antenna assembly. The two pieces are connected by two fiber optic links (one for transmit, one for receive). Due to the low loss of the fiber link, the Remote is usually not installed at the same location as the Hub unit.

The **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** is intended for professional installation only in the type of environments described above. This device is intended for operation under the requirements of Part 90 (Subpart I). Specific test requirements include the following:

47 CFR 2.989	Occupied Bandwidth
47 CFR 90.205 & 47 CFR 90.219	Output Power & ERP
47 CFR 90.210 (b) & (g)	Out of Band Emissions - Radiated
47 CFR 90.210 (b) & (g)	Out of Band Emissions - Conducted
47 CFR 90.219	Use of Signal Boosters
47 CFR 1.1310	Radiofrequency Radiation Exposure Limits

The **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** was tested in the transmit mode of operation for TDMA and IDEN (GSM) modes of operation. This unit does not possess frequency shifting components and does not re-modulate or re-key the signal. Based on the lack of frequency shifting or re-keying/re-modulation circuitry, the following tests were not performed:

47 CFR 2.995(a) & 47 CFR 90.213 (a)	Frequency Stability vs. Temperature
47 CFR 2.995(a) & 47 CFR 90.213 (a)	Frequency Stability vs. AC Power
47 CFR 90.209	Bandwidth Limitations*
47 CFR 90.211	Modulation Requirements

* Addressed in the areas covering 47 CFR 90.210(c) for conducted and radiated out of band emissions.

The system tested consisted of the following:

Manufacturer & Model	**Serial #**	**FCC ID #**	**Description**
CI Wireless, Inc., Eko-8HEB0-0AC000	80000	NUW004SEK08	800M/1900M MHz Hub Unit

CI Wireless, Inc., Eko-8M0S0-DAC000	80002	NUW004SEK08	800 MHz ESMR Band Remote Unit
Multimode Fiber Optic Cables (10 Ft.) (2 ea.)	N/A	N/A	Hub/Remote Interconnect cables
System Peripherals:			
Bird Model 8073-1	542	N/A	50 ohm Load

Cables and Cords:
Unshielded Power Cord (6 Ft.) (2 ea.)
RG-223 Coaxial Cable (1 M) (2 ea.)

The two models for the system components tested are:

Hub Unit:	Eko-8HEB0-0AC000
Remote Unit:	Eko-8M0C0-DAC000

The test covered under this report address all subseries of these models. The base model designators for the components of this system are Model Eko-8HXB0-XXXXXX for the Hub unit and Model Eko-8MXS0-XXXXXX for the Remote Units. An index of the sub-model designations for the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** is shonw in Appendix A. The two particular models used for this test were loaded with all active circuit options available, providing a worst case configuration for emissions testing. The options sub-model options available for this product have no impact of the strength, bandwidth or spurious output of the intended transmission signal.

The equipment within this report was tested to verify its compliance with FCC Rule Parts 2, and 90, for Intentional Radiators. A separate verification report pursuant to Part 15, Subpart B has been prepared for the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** as a Digital Device and as a receiver.

2.0 Occupied Bandwidth Measurements

Measurements were made on the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** to determine the occupied bandwidth in accordance with Part 2.989.

2.1 Test Procedure

All measurements were performed in a controlled laboratory environment. The occupied bandwidth of the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** was measured using a Hewlett Packard HP 8566 Spectrum Analyzer with a test signal provided to the EUT from a Rhode-Schwartz signal generator. Occupied bandiwdth plots were made for the test generator by itself to use as a comparison for possible spectral regrowth.

Occupied bandwidth was plotted for each of the data types (IDEN (GSM) and TDMA). The shape of the occupied bandwidth was checked for each of the three channels for each modulation type. No change was detected versus channel for each modulation type. The occupied bandwidth was measured based on the emission width 26 dB below the peak emission level.

2.2 Test Criteria

Section 2.989 requires that the occupied bandwidth for Type Accepted units be measured and reported as part of the device filing.

2.3 Test Results

Data for occupied bandwidth testing is located in Appendix B of this report. Data for the occupied bandwidth of the generator by itself is also contained in this appendix. The widest bandwidths for each of the modulation types used by the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** are listed below.

Service Type	Reference Frequency	Occupied Bandwidth
IDEN (GSM)	858.5	18.2 kHz
TDMA	858.5	18.1 kHz

No variation was seen between the emission bandwidth of the EUT and the generator.

3.0 Output Power and ERP

Measurements were made on the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** to verify compliance with the maximum effective radiated power (ERP) requirements of §90.205 and §90.219.

ERP measurements were made at the Professional Testing "Open Field" Site 3, located in Marble Falls, Texas, to determine the radio noise radiated from the EUT. A “Description of Measurement Facilities” has been submitted to the FCC and approved pursuant to Section 2.948 of CFR 47 of the FCC rules.

3.1 Test Procedure

The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The table was centered on a motorized turntable which allows 360 degree rotation. A measurement antenna was positioned at a distance of 3 meters as measured from the closest point of the EUT. The radiated emissions were maximized by configuring the EUT, by rotating the EUT, and by raising and lowering the antenna from 1 to 4 meters.

A Spectrum Analyzer with peak detection was used to find the maximums of the radiated emissions during the variability testing. All final measurements were taken using a Quasi-Peak Adapter with a measurement bandwidth of 120 kHz.

ERP testing of the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** was performed at 3 channel settings for IDEN (GSM) and TDMA transmission modes.

3.2 Test Criteria

Section 90.205 lists various levels for the maximum effective radiated power of Part 90 transmitters. Based on this specification, the lowest allowed ERP is 30 watts. In addition, Section 90.219 states that signal boosters for narrowband systems (the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt**

Repeater will support narrowband and broadband systems) shall be no greater than 5 watts and that the device shall incorporate automatic power limiting to prevent the ERP from exceeding 5 watts. For the purposes of this evaluation, the limit applied to the EUT is 5 watts.

Since theEUT does not include an antenna, a typical antenna (a whip type antenna) was attached to the EUT and used for the ERP measurments. This process was also used for the spurious emission measurements. ERP testing was performed by measuring the maximum electric field from the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** and translating this level to ERP using the following formula:

ERP = {(E*r)^2}/(30)

Where:

E = Electric Field in v/m

r = distance from the measurement antenna to the EUT in meters

This formula was obtained from the Industry Canada document, 'Guidelines for Measurement of Radio Frequency Fields at Frequencies from 10 kHz to 300 GHz, Document Reference NIR-E, dated January 1994'.

3.3 Test Results

Measurements were performed utilizing a spectrum analyzer IF/video bandwidth of 3 kHz/10 kHz. For final measurements, the frequency span was set for 3 MHz and was centered on the peak of the output signal.

Data for ERP testing is located in Appendix C of this report **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** met the §90.219 and 90.205 ERP requirements.

4.0 Out of Band Emissions - Radiated

Radiated emissions measurements were made to determine out of band radiated noise produced by the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** in accordance with Section 90.210 (b). Evaluation of the spurious emissions for this device was based primarily on Emission Mask B criteria using representative traffic signals. Particular attention was paid to possible spectral regrowth determine if regrowth was present. If no regrowth is present, the device could be used with other types of traffic (i.e. those which would require Emission Mask G) if a need arose.

Radiated emissions measurements were made at the Professional Testing "Open Field" Site 3, located in Marble Falls, Texas, to determine the radio noise radiated from the EUT. A "Description of Measurement Facilities" has been submitted to the FCC and approved pursuant to Section 2.948 of CFR 47 of the FCC rules.

4.1 Test Procedure

The spurious emissions for the device were measured using test signals for TDMA and IDEN (GSM) injected into the EUT using a Rhode-Schwartz signal generator. These signals were selected for use for this test based on the criteria described in 47 CFR 2.989(h).

The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The table was centered on a motorized turntable which allows 360 degree rotation. A measurement antenna was positioned at a distance of 3 meters as measured from the closest point of the EUT. For measurements above 1 GHz, the antenna distance was decreased to 1 meter. The radiated emissions were maximized by configuring the EUT, by rotating the EUT, and by raising and lowering the antenna from 1 to 4 meters.

The Spectrum Analyzer was used to find the maximums of the conducted emissions during the testing. All final measurements were made using a peak measurement method. The final measurements provided were determined by using the following formula:

Corrected Level = Recorded Level - Pre-Amp Gain + Antenna Factor + Cable Loss

Measurement of the fundimental signal was performed with a sample antenna attached to the EUT. Measurement of spurious radiated emissions was performed with a shielded load attached to the device (no antenna). The **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** does not include an antenna as part of the EUT, so the interest regarding spurious for this device is case radiation.

4.2 Test Criteria

For this EUT, the data obtained for the occupied bandwidth tests indicated that the emissions from the the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** were due to the generator, not the EUT (no spectral regrowth observed). In order to evaluate the EUT versus the out of band emission criteria of §90.210, a representative emission mask suitable for this band (Emission Mask B) was selected. For emissions beyond the immediate area of the intended emission, the attenuation required by §90.210 does not vary (43 + 10 log(P)) versus emission type. Based on this criteria, transmitter related emissions for the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** shall be reduced by the following amount with respect to the level of the fundamental:

Frequency offset versus the fundamental (% of BW)	Attenuation versus the fundamental (dB)
50 to 100	25
100 to 250	35
250 to $10f_c$	43 + 10 log(P)

Based on the figures obtained from the occupied bandwidth tests, the peak power of this unit is 4 watts, which translates the 43 +10 log(P) term to a minimum attenuation of -49 dB. Emission Mask G, which can also be applied over this frequency range, has basically the same upper and lower limits of attenuation, but is more stringent (56 dB worst case for a 4 watt transmitter) over the 100%BW to 250%BW section.

4.3 Test Results

The **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** was tested for radiated spurious emissions at three channel settings for IDEN (GSM) & TDMA transmission modes. The signals were fully modulated for all tests. The test frequencies used for each modulation type are listed below.

Service Type	Test Channel	Test Frequency (MHz)
IDEN (GSM) & TDMA	Lower	851.3
IDEN (GSM) & TDMA	Middle	858.5
IDEN (GSM) & TDMA	Upper	865.7

Radiated emission data sheets are contained in Appendix D of this report. The **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** met the §90.210 (b) radiated emission requirements. No significant spectral regrowth was detected. Documentation of the immediate area surrounding the intended emission is shown as part of the occupied bandwidth plots.

5.0 Out of Band Emissions - Conducted

Conducted emissions measurements were made to determine out of band conducted noise produced by the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** in accordance with Section 90.210 (b). Evaluation of the spurious emissions for this device was based primarily on Emission Mask B criteria using representative traffic signals. Particular attention was paid to possible spectral regrowth determine if regrowth was present. If no regrowth is present, the device could be used with other types of traffic (i.e. those which would require Emission Mask G) if a need arose.

Conducted emissions measurements were made at the Professional Testing's Round Rock, Texas laboratory. All measurements were made in an environmentally controlled setting.

5.1 Test Procedure

The spurious emissions for the device were measured using test signals for TDMA and IDEN (GSM) injected into the EUT using a Rhode-Schwartz signal generator. These signals were selected for use for this test based on the criteria described in 47 CFR 2.989(h).

The conducted spurious emissions of the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** was measured using a Hewlett Packard HP 8566 Spectrum Analyzer with a test signal provided to the EUT from a Rhode-Schwartz signal generator. The Spectrum Analyzer was used to find the maximums of the conducted emissions during the testing. All final measurements were made using a peak measurement method. The final measurements provided were determined by using the following formula:

Corrected Level = Recorded Level - Pre-Amp Gain + Antenna Factor + Cable Loss

5.2 Test Criteria

For this EUT, the data obtained for the occupied bandwidth tests indicated that the emissions from the the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** were due to the generator, not the EUT (no spectral regrowth observed). In order to evaluate the EUT versus the out of band emission criteria of §90.210, a representative emission mask suitable for this band (Emission Mask B) was selected. For emissions beyond the immediate area of the intended emission, the attenuation required by §90.210 does not vary (43 + 10 log(P)) versus emission type. Based on this criteria, transmitter related emissions for the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** shall be reduced by the following amount with respect to the level of the fundamental:

Frequency offset versus the fundamental (% of BW)	Attenuation versus the fundamental (dB)
50 to 100	25
100 to 250	35
250 to $10f_c$	43 + 10 log(P)

Based on the figures obtained from the occupied bandwidth tests, the peak power of this unit is 4 watts, which translates the 43 +10 log(P) term to a minimum attenuation of -49 dB. Emission Mask G, which can also be applied over this frequency range, has basically the same upper and lower limits of attenuation, but is more stringent (56 dB worst case for a 4 watt transmitter) over the 100%BW to 250%BW section.

5.3 Test Results

The **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** was tested for conducted spurious emissions at three channel settings for IDEN (GSM) & TDMA transmission modes The test frequencies used for each modulation type are listed below.

Service Type	Test Channel	Test Frequency (MHz)
IDEN (GSM) & TDMA	Lower	851.3
IDEN (GSM) & TDMA	Middle	858.5
IDEN (GSM) & TDMA	Upper	865.7

Conducted emission data sheets are contained in Appendix E of this report. The **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** met the §90.210 (b) and (g) conducted emission requirements.

6.0 Radiofrequency Radiation Exposure Evaluation

An evaluation was performed to provide data regarding the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** with respect to the Radiofrequency Radiation Exposure requirements of 47 CFR 1.1310.

6.1 Evaluation Procedure

The primary method of controlling radiofrequency radiation exposure from the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** will be the responsibility of the installer of the equipment. The device is to be professionally installed by personnel trained and familiar with installation and configuration of wireless systems. The installer is responsible for antenna selection, site selection and final site configuration. Final compliance with Commission RF exposure regulations for this type of site is the responsibility of the installer and is addressed under separate OET documents.

This device is not marketed outside the wireless communications community. In order to install this system properly, the maximum output power versus the frequency range should be reported in the User's Manual for the device such that this issue can be addressed when the installation site of this device is designed.

6.2 Evaluation Results

The output power level for the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** is reported in the User's Manual as being 4 watts. In addition, the frequency range for this device is reported as being 851.00 to 866.00 MHz. Based on this information, the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** meets the necessary requirements regarding RF exposure.

7.0 Signal Booster Evaluation

An evaluation was performed to provide data regarding the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** with respect to the Signal Booster requirements of 47 CFR 90.219.

7.1 Evaluation Procedure

The majority of the responsibility for meeting the requirements for signal boosters under 47 CFR 90.219 rests with the installer of the device. The key items relating to the use of boosters under 47 CFR 90.219 are:

(1) The booster can only be used to enhance weaknesses in a service area, not expand the service area.
(2) The booster must transmit only on the input signals it receives, not retransmit (shift) to new ones.
(3) The boosters are limited to a maximum of 5 watts ERP under any conditions. Automatic level control is required for Narrowband systems.

The **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** is to be professionally installed by personnel trained and familiar with installation and configuration of wireless systems. The installer is responsible for antenna selection, site selection and final site configuration. This device is not marketed

outside the wireless communications community. In order to install this system properly, the maximum output power versus the frequency range should be reported in the User's Manual for the device such that this issue can be addressed when the installation site of this device is designed.

7.2 Evaluation Results

The **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** does possess automatic level control to prevent the composite power for the device (irregardless of the number of channels) from exceeding 4 watts. The EUT does not possess frequency shifting components and is intended to only augment weak coverage areas for a particular base station. The Hub portion of the EUT must be connected to a base in order to operate.

The frequency range for this device is reported in the manual as being 851.00 to 866.00 MHz with the power being reported as 4 watts. Based on this information, the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** meets the necessary requirements regarding RF exposure.

8.0 Form 731 Information

The following information is provided for inclusion in the FCC Form 731 for the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater.**

8.1 Emission Designator

Bandwidth:

The **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** does not possess any circuitry which remodulates or changes the bandwidth of the signal that it receives and repeats. The only potential issue that can arise in this type of product regarding bandwidth is spectral regrowth immediately around the primary emission. This is due to the design and power handling capability of the amplifier.

The data contained in the occupied bandwidth test data does not indicate any spectral regrowth. Based on this information, the bandwidth of emissions from the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** would be that of the signal received by the repeater. Since the EUT does not contribute or modify the emission bandwidth, a bandwidth designator will not be included in the overall emission designators for the product. This procedure follows that used during Type Acceptance of the initial CI Wireless Repeater (FCC ID: NUWØØ3EKO19).

Emission Designator::

As with the emission bandwidth, the emission type emitted by the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** are depended on the service that it operates with. Due to the intended installation of the system, the RF output signals of the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** are complaint with the TDMA and IDEN (GSM) protocol requirements. This output emission designators (based on Part 2.201) for these services are:

Service Type	Emission Description	Emission Designator
IDEN (GSM)	(1) Modulation Type: Phase Modulation (2) Nature of Modulating Signal: Case not covered (combination may not match that addressed in the available selections) (3) Type of data being transmitted can be a combination of digital, voice, telegraphy, television, or facsimile	GXW
TDMA	(1) Modulation Type: Main carrier is angle modulated in a simultaneous or preset sequence. (2) Nature of Modulating Signal: Case not covered (combination may not match that addressed in the available selections) (3) Type of data being transmitted can be a combination of digital, voice, telegraphy, television, or facsimile	DXW

Based on the bandwidth and emission type discussions, the emission designators used for the FCC Form 731 are:

IDEN (GSM) Mode

GXW - All data modes and types

TDMA(NADC) Mode

DXW - All data modes and types

8.2 Output Power

In the conducted power tests, the highest power attained for each of the power settings was 35.99 dBm (4 watts). This level was acheived at each of the 3 test frequencies for each of the 3 modulation types. Since the system automatically controls the maximum output power, this level should be constaint for all single carrier operations.

Due to the operating features of the EUT, this is the maximum composite power available from the device. Therfore, the power rating requested for the grant for the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** is:

4 watts

8.3 Frequency Band of Operation

The **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** is rated to be used through the entire 800 MHz cellular (base station) communication band. Based on this requirement, the transmission range of the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** is:

851.00 to 866.00 MHz

8.4 Grant Notes

The only exceptions or notes that would normally be listed for this device are:

(1) The center frequency of the emissions for the IDEN (GSM) should not be less than 1.25 MHz from the band edge (standard guard band).
(2) The power listed in the grant is the composite power for the device for all carriers.

9.0 Modifications

A power line filter (CORCOM Model 3VQ1) was added to the Remote unit of the **CI Wireless Inc., 800 MHz ESMR Band 4 Watt Repeater** to meet the unintended conducted emission requirement.

10.0 List of Test Equipment

A list of the test equipment utilized to perform the conducted and radiated emission measurements is given below. The date of calibration is given for each.

Device	**Description**	**Date Last Calibrated**	**Calibration Due**
HP 8566B	Spectrum Analyzer	10/30/98	10/30/99
HP 85650A	Quasi Peak Adapter	10/30/98	10/30/99
MITEQ AFS4-00101800-40-10P-N	Preamplifier	05/22/98	05/22/99
EMCO 3108	Biconical Antenna	07/22/98	07/22/99
EMCO 3146	Log Periodic Antenna	07/22/98	07/22/99
EMCO 3115	Double Ridged Horn Antenna	05/22/98	05/22/99

Appendix A Sub-Model Index Data

800 Hub **Example:** Eko-8HEB0-0AC000

Eko-8H X X X - X X X X X X

Option Designators (Include only equipped options)
Combiner **0 2 4**
Wave Division Multiplex Option
Heater Option (N/A for Hub)
Crossband Coupler Option(1.9 and 800)
AC Power Option (DC Standard)
Duplexer Option

Standard Nomenclature
Reserved
B-Both
C- Cellular
S - Trunking/Cellular
Expansion Configured Hub Unit
H - Hub Unit Only 1.9 GHz, Non-Expandable

Microcell (Remote) **Examples:** Eko-8M0C0-DAC000
Eko-8M0S0-DAC000

Eko-8M X X X - X X X X X X

Option Designators (Include only equipped options)
Combiner **0 2 4** (N/A)
Wave Division Multiplex
Heater Option
Crossband Coupler Option
AC Power - Standard
Duplexer - Standard

Standard Nomenclature

Reserved

C - Cellular
S - Trunking/ESMR
Expansion or Slave Unit*
M - Standard Power Microcell Unit
R - Microcell Unit, 1900 MHz, 8 watt
* Slave Unit is equipped to interconnect with Eko-1.9M which includes the Eko-M-X option

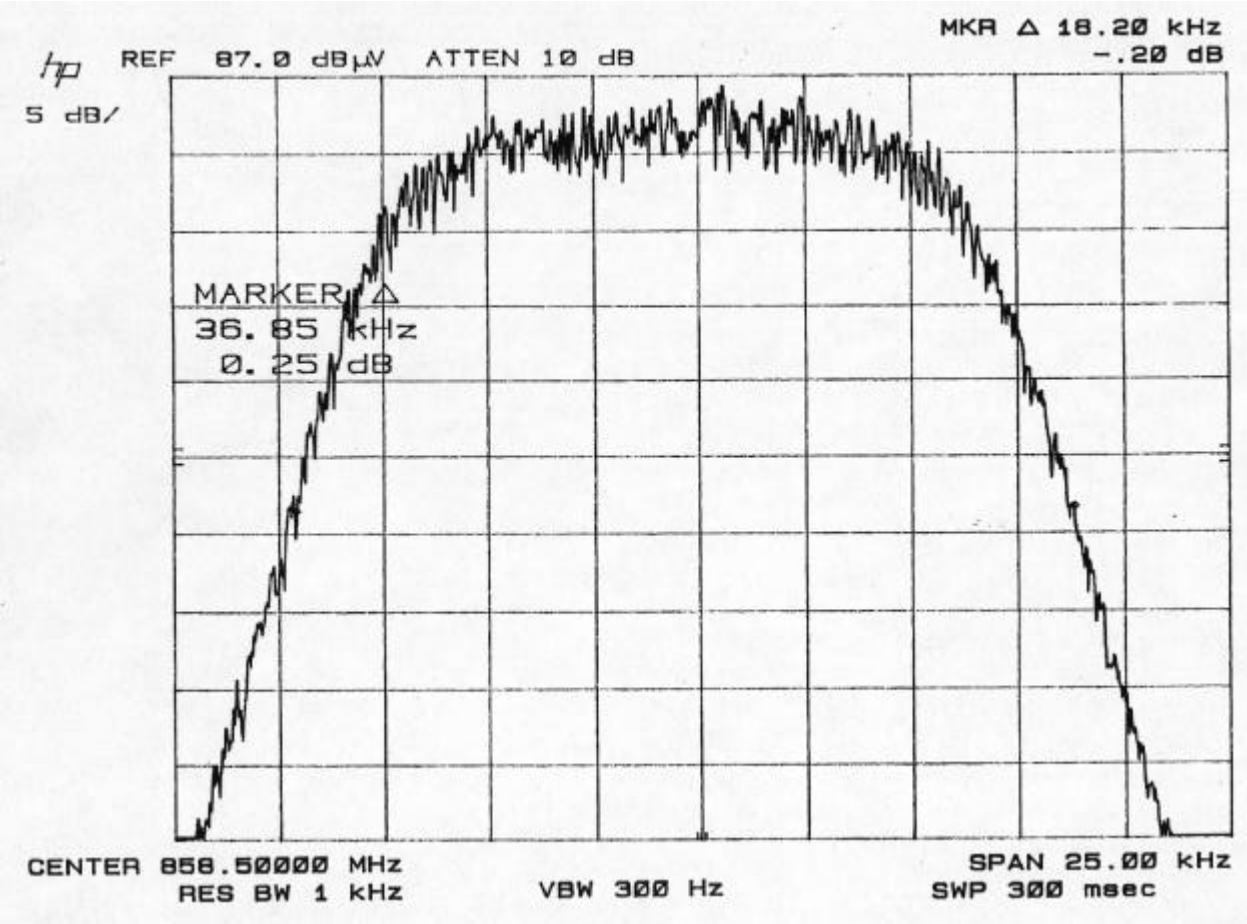
For the 1900 MHz unit, the 8 shown in these descriptions is replaced by 1.9

Appendix B Occupied Bandwidth Test Data

Occupied Bandwidth Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 12, 1998 MODE: TDMA
CONFIGURATION: EUT



COMMENT #1: Channel Setting = Middle

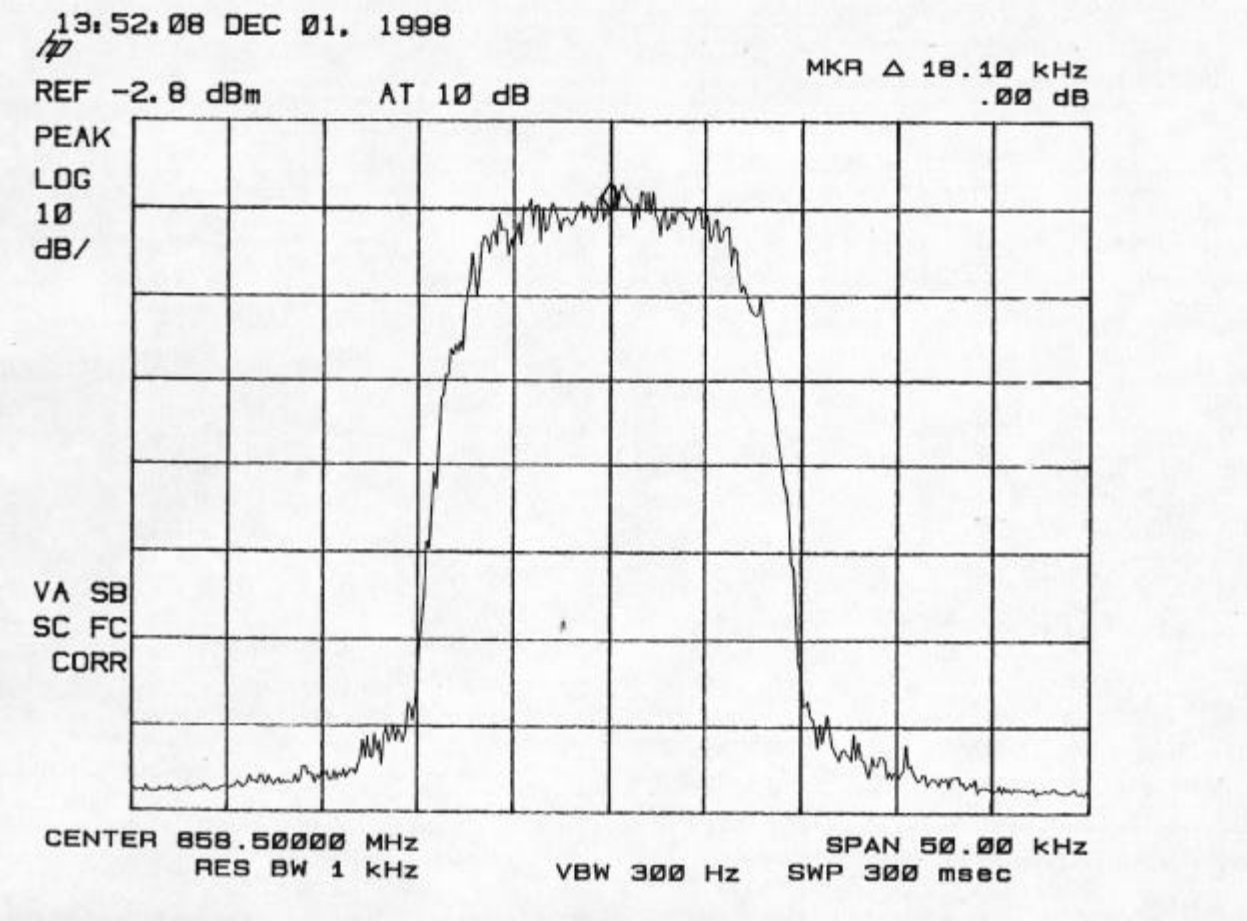
COMMENT #2: 26 dB Bandwidth = 18.2 kHz

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Occupied Bandwidth Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 12, 1998 MODE: TDMA
CONFIGURATION: Generator Only



COMMENT #1: Channel Setting = Middle

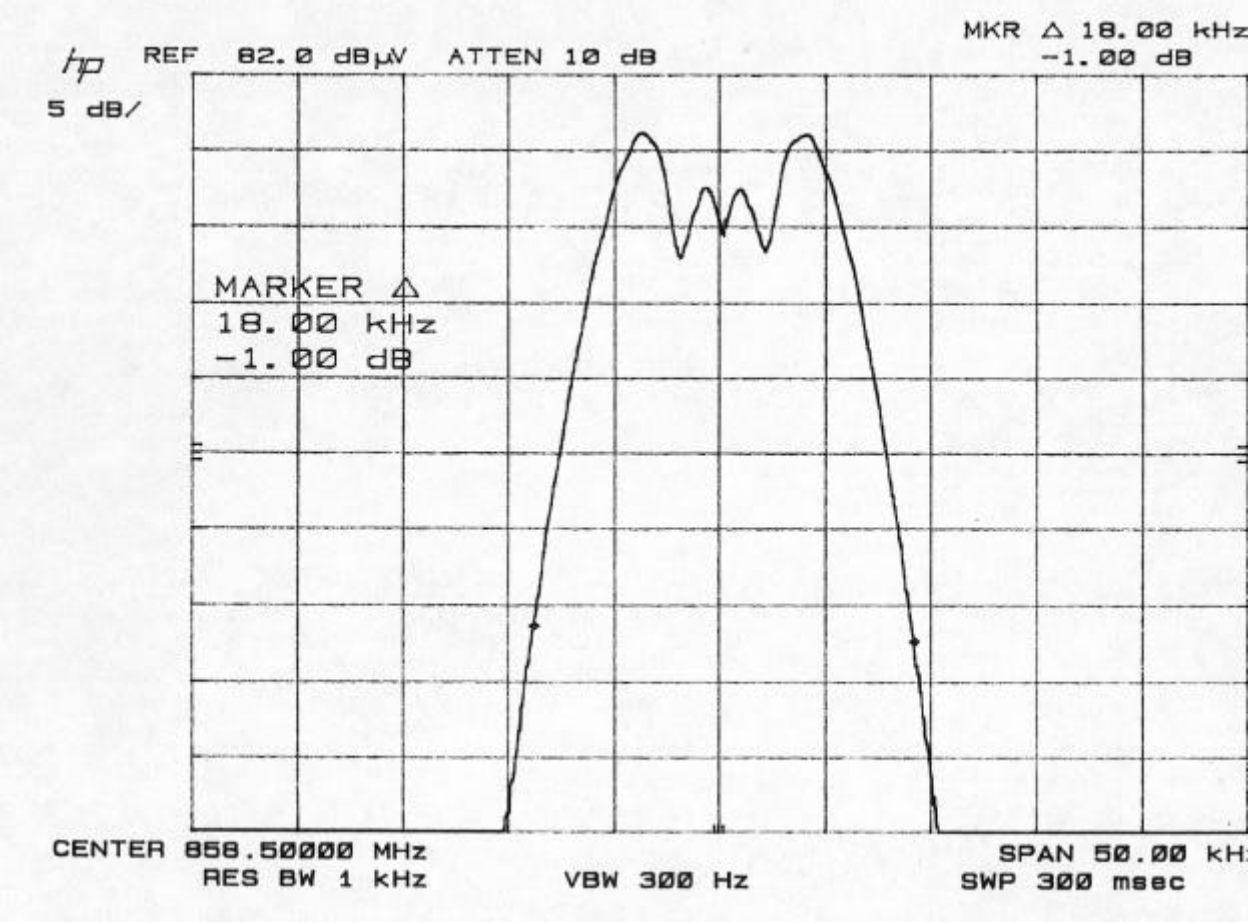
COMMENT #2: 26 dB Bandwidth = 18.1 kHz

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Occupied Bandwidth Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 12, 1998 MODE: IDEN (GSM)
CONFIGURATION: EUT



COMMENT #1: Channel Setting = Middle

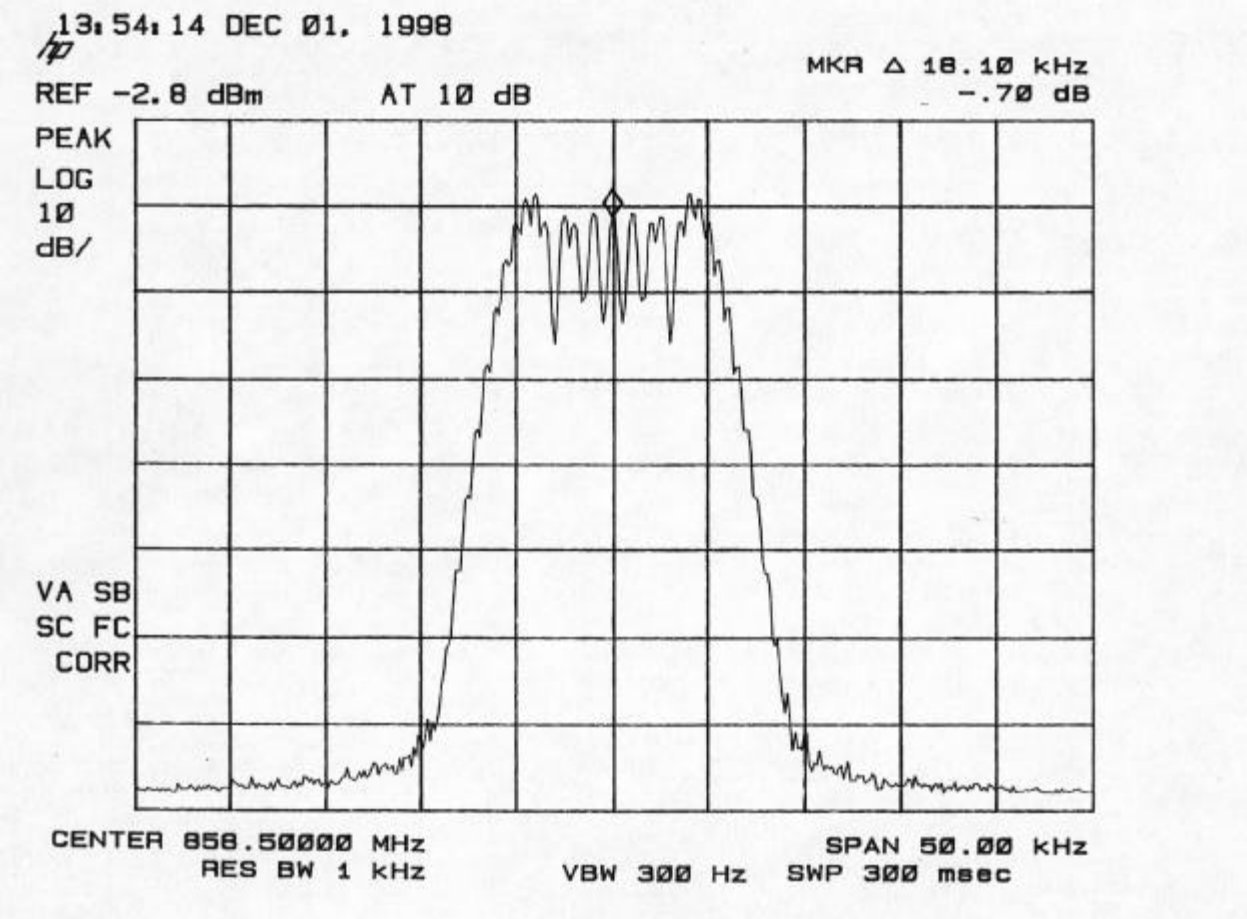
COMMENT #2: 26 dB Bandwidth = 18.0 kHz

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Occupied Bandwidth Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 12, 1998 MODE: IDEN (GSM)
CONFIGURATION: Generator Only



COMMENT #1: Channel Setting = Middle

COMMENT #2: 26 dB Bandwidth = 18.1 kHz

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Appendix C

Effective Radiated Power Test Data

Effective Radiated Power Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 7, 1998

IDEN (GSM) Mode

Freq. (MHz)	Recorded Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Level ERP (watts)	Limit (watts)	Margin (watts)
851.30	105.60	22.50	2.80	130.90	3.691	5.00	-1.31
858.50	105.70	22.50	2.80	131.00	3.777	5.00	-1.22
865.70	105.80	22.50	2.80	131.10	3.865	5.00	-1.14

TDMA Mode

Freq. (MHz)	Recorded Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Level ERP (watts)	Limit (watts)	Margin (watts)
851.30	105.70	22.50	2.80	131.00	3.777	5.00	-1.22
858.50	105.60	22.50	2.80	130.90	3.691	5.00	-1.31
865.70	105.80	22.50	2.80	131.10	3.865	5.00	-1.14

COMMENT #1: Worst Case Height (All modulations): 1.5 meters

COMMENT #2: Worst case emission direction for all measurements was 180 degrees.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien Jeff Lenk

Appendix D

Out of Band Emissions (Radiated) Test Data

Out of Band Emission - Radiated Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 7, 1998 POLARIZATION: Vertical
MODE: IDEN (GSM)

Freq. (MHz)	EUT Direction (Deg)	Recorded Level (dBuV)	Cable Loss (dB)	Antenna Factor (dBuV/m)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
851.300	190.0	105.60	2.8	22.5	130.9	Ref	Ref
851.309	190.0	39.90	2.8	22.5	65.2	105.9	-40.7
851.318	190.0	56.00	2.8	22.5	81.3	95.9	-14.6
851.345	190.0	19.60	2.8	22.5	44.9	91.0	-46.1
1702.600	190.0	11.50	2.6	24.6	38.7	91.0	-52.3
2553.90	190.0	12.30	3.4	26.8	42.5	91.0	-48.5
3405.20	190.0	11.60	3.8	31.2	46.6	91.0	-44.4
4256.50	190.0	11.40	5.0	32.4	48.8	91.0	-42.2
5107.80	190.0	10.50	7.2	33.5	51.2	91.0	-39.8
5959.10	190.0	16.50	7.2	34.8	58.5	91.0	-32.5
6810.40	190.0	17.80	6.8	34.9	59.5	91.0	-31.5
7661.70	190.0	16.60	7.4	36.8	60.8	91.0	-30.2
8513.00	190.0	16.90	8.4	37.3	62.6	91.0	-28.4

COMMENT #1: Channel = Low Setting, 851.30 MHz

COMMENT #2: Measurements < 1 GHz made at 3 meters. Measurements made > 1 GHz made at 1 meter. No EUT emissions detected from > 1 MHz from the fundimental.

COMMENT #3: Worst case emissions were for EUT antenna in vertical position. Data is presented for this configuration.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Out of Band Emission - Radiated Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 7, 1998 POLARIZATION: Horizontal
MODE: IDEN (GSM)

Freq. (MHz)	EUT Direction (Deg)	Recorded Level (dBuV)	Cable Loss (dB)	Antenna Factor (dBuV/m)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
851.300	190.0	91.20	2.8	22.5	116.5	Ref	Ref
851.309	190.0	25.20	2.8	22.5	50.5	105.9	-55.4
851.318	190.0	25.00	2.8	22.5	50.3	95.9	-45.6
851.345	190.0	17.40	2.8	22.5	42.7	91.0	-48.3
1702.600	190.0	14.10	2.6	24.6	41.3	91.0	-49.7
2553.90	190.0	13.10	3.4	26.8	43.3	91.0	-47.7
3405.20	190.0	11.50	3.8	31.2	46.5	91.0	-44.5
4256.50	190.0	12.00	5.0	32.4	49.4	91.0	-41.6
5107.80	190.0	11.70	7.2	33.5	52.4	91.0	-38.6
5959.10	190.0	18.20	7.2	34.8	60.2	91.0	-30.8
6810.40	190.0	17.60	6.8	34.9	59.3	91.0	-31.7
7661.70	190.0	15.80	7.4	36.8	60.0	91.0	-31.0
8513.00	190.0	15.10	8.4	37.3	60.8	91.0	-30.2

COMMENT #1: Channel = Low Setting, 851.30 MHz

COMMENT #2: Measurements < 1 GHz made at 3 meters. Measurements made > 1 GHz made at 1 meter. No EUT emissions detected from > 1 MHz from the fundimental.

COMMENT #3: Worst case emissions were for EUT antenna in vertical position. Data is presented for this configuration.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Out of Band Emission - Radiated Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 7, 1998 POLARIZATION: Vertical
MODE: IDEN (GSM)

Freq. (MHz)	EUT Direction (Deg)	Recorded Level (dBuV)	Cable Loss (dB)	Antenna Factor (dBuV/m)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
858.500	190.0	105.70	2.8	22.5	131.0	Ref	Ref
858.509	190.0	59.50	2.8	22.5	84.8	106.0	-21.2
858.518	190.0	56.20	2.8	22.5	81.5	96.0	-14.5
858.545	190.0	41.00	2.8	22.5	66.3	91.5	-25.2
1717.000	190.0	13.90	2.6	24.6	41.1	91.5	-50.4
2575.50	190.0	10.50	3.4	26.8	40.7	91.5	-50.8
3434.00	190.0	13.10	3.8	31.2	48.1	91.5	-43.4
4292.50	190.0	11.20	5.0	32.4	48.6	91.5	-42.9
5151.00	190.0	12.70	7.2	33.5	53.4	91.5	-38.1
6009.50	190.0	18.60	7.2	34.8	60.6	91.5	-30.9
6868.00	190.0	19.20	6.8	34.9	60.9	91.5	-30.6
7726.50	190.0	18.50	7.4	36.8	62.7	91.5	-28.8
8585.00	190.0	16.20	8.4	37.3	61.9	91.5	-29.6

COMMENT #1: Channel = Middle Setting, 858.50 MHz

COMMENT #2: Measurements < 1 GHz made at 3 meters. Measurements made > 1 GHz made at 1 meter. No EUT emissions detected from > 1 MHz from the fundimental.

COMMENT #3: Worst case emissions were for EUT antenna in vertical position. Data is presented for this configuration.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Out of Band Emission - Radiated Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 7, 1998 POLARIZATION: Horizontal
MODE: IDEN (GSM)

Freq. (MHz)	EUT Direction (Deg)	Recorded Level (dBuV)	Cable Loss (dB)	Antenna Factor (dBuV/m)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
858.500	190.0	91.20	2.8	22.5	116.5	Ref	Ref
858.509	190.0	23.30	2.8	22.5	48.6	106.0	-57.4
858.518	190.0	18.50	2.8	22.5	43.8	96.0	-52.2
858.545	190.0	16.80	2.8	22.5	42.1	91.5	-49.4
1717.000	190.0	15.10	2.6	24.6	42.3	91.5	-49.2
2575.50	190.0	13.20	3.4	26.8	43.4	91.5	-48.1
3434.00	190.0	12.70	3.8	31.2	47.7	91.5	-43.8
4292.50	190.0	12.40	5.0	32.4	49.8	91.5	-41.7
5151.00	190.0	11.50	7.2	33.5	52.2	91.5	-39.3
6009.50	190.0	17.50	7.2	34.8	59.5	91.5	-32.0
6868.00	190.0	19.10	6.8	34.9	60.8	91.5	-30.7
7726.50	190.0	18.20	7.4	36.8	62.4	91.5	-29.1
8585.00	190.0	17.10	8.4	37.3	62.8	91.5	-28.7

COMMENT #1: Channel = Middle Setting, 858.50 MHz

COMMENT #2: Measurements < 1 GHz made at 3 meters. Measurements made > 1 GHz made at 1 meter. No EUT emissions detected from > 1 MHz from the fundimental.

COMMENT #3: Worst case emissions were for EUT antenna in vertical position. Data is presented for this configuration.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Out of Band Emission - Radiated Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 7, 1998 POLARIZATION: Vertical
MODE: IDEN (GSM)

Freq. (MHz)	EUT Direction (Deg)	Recorded Level (dBuV)	Cable Loss (dB)	Antenna Factor (dBuV/m)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
865.700	190.0	105.80	2.8	22.5	131.1	Ref	Ref
865.709	190.0	39.80	2.8	22.5	65.1	106.1	-41.0
865.718	190.0	58.50	2.8	22.5	83.8	96.1	-12.3
865.745	190.0	14.50	2.8	22.5	39.8	91.6	-51.8
1731.400	190.0	16.20	2.6	24.6	43.4	91.6	-48.2
2597.10	190.0	12.30	3.4	26.8	42.5	91.6	-49.1
3462.80	190.0	12.60	3.8	31.2	47.6	91.6	-44.0
4328.50	190.0	11.10	5.0	32.4	48.5	91.6	-43.1
5194.20	190.0	11.20	7.2	33.5	51.9	91.6	-39.7
6059.90	190.0	18.50	7.2	34.8	60.5	91.6	-31.1
6925.60	190.0	18.30	6.8	34.9	60.0	91.6	-31.6
7791.30	190.0	19.10	7.4	36.8	63.3	91.6	-28.3
8657.00	190.0	15.60	8.4	37.3	61.3	91.6	-30.3

COMMENT #1: Channel = High Setting, 865.70 MHz

COMMENT #2: Measurements < 1 GHz made at 3 meters. Measurements made > 1 GHz made at 1 meter. No EUT emissions detected from > 1 MHz from the fundimental.

COMMENT #3: Worst case emissions were for EUT antenna in vertical position. Data is presented for this configuration.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Out of Band Emission - Radiated Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 7, 1998 POLARIZATION: Horizontal
MODE: IDEN (GSM)

Freq. (MHz)	EUT Direction (Deg)	Recorded Level (dBuV)	Cable Loss (dB)	Antenna Factor (dBuV/m)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
865.700	190.0	92.30	2.8	22.5	117.6	Ref	Ref
865.709	190.0	25.30	2.8	22.5	50.6	106.0	-55.4
865.718	190.0	21.10	2.8	22.5	46.4	96.0	-49.6
865.745	190.0	18.90	2.8	22.5	44.2	91.5	-47.3
1731.400	190.0	15.80	2.6	24.6	43.0	91.5	-48.5
2597.10	190.0	12.50	3.4	26.8	42.7	91.5	-48.8
3462.80	190.0	13.40	3.8	31.2	48.4	91.5	-43.1
4328.50	190.0	15.00	5.0	32.4	52.4	91.5	-39.1
5194.20	190.0	13.90	7.2	33.5	54.6	91.5	-36.9
6059.90	190.0	11.60	7.2	34.8	53.6	91.5	-37.9
6925.60	190.0	16.70	6.8	34.9	58.4	91.5	-33.1
7791.30	190.0	17.40	7.4	36.8	61.6	91.5	-29.9
8657.00	190.0	15.40	8.4	37.3	61.1	91.5	-30.4

COMMENT #1: Channel = High Setting, 865.70 MHz

COMMENT #2: Measurements < 1 GHz made at 3 meters. Measurements made > 1 GHz made at 1 meter. No EUT emissions detected from > 1 MHz from the fundimental.

COMMENT #3: Worst case emissions were for EUT antenna in vertical position. Data is presented for this configuration.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Out of Band Emission - Radiated Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 7, 1998 POLARIZATION: Vertical
MODE: TDMA

Freq. (MHz)	EUT Direction (Deg)	Recorded Level (dBuV)	Cable Loss (dB)	Antenna Factor (dBuV/m)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
851.300	188.0	105.70	2.8	22.5	131.0	Ref	Ref
851.309	188.0	38.60	2.8	22.5	63.9	106.0	-42.1
851.318	188.0	33.40	2.8	22.5	58.7	96.0	-37.3
851.345	188.0	30.10	2.8	22.5	55.4	91.5	-36.1
1702.600	188.0	12.10	2.6	24.6	39.3	91.5	-52.2
2553.90	188.0	13.20	3.4	26.8	43.4	91.5	-48.1
3405.20	188.0	11.80	3.8	31.2	46.8	91.5	-44.7
4256.50	188.0	12.40	5.0	32.4	49.8	91.5	-41.7
5107.80	188.0	14.40	7.2	33.5	55.1	91.5	-36.4
5959.10	188.0	16.80	7.2	34.8	58.8	91.5	-32.7
6810.40	188.0	17.10	6.8	34.9	58.8	91.5	-32.7
7661.70	188.0	15.80	7.4	36.8	60.0	91.5	-31.5
8513.00	188.0	16.60	8.4	37.3	62.3	91.5	-29.2

COMMENT #1: Channel = Low Setting, 851.30 MHz

COMMENT #2: Measurements < 1 GHz made at 3 meters. Measurements made > 1 GHz made at 1 meter. No EUT emissions detected from > 1 MHz from the fundimental.

COMMENT #3: Worst case emissions were for EUT antenna in vertical position. Data is presented for this configuration.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Out of Band Emission - Radiated Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 7, 1998 POLARIZATION: Horizontal
MODE: TDMA

Freq. (MHz)	EUT Direction (Deg)	Recorded Level (dBuV)	Cable Loss (dB)	Antenna Factor (dBuV/m)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
851.300	188.0	94.50	2.8	22.5	119.8	Ref	Ref
851.309	188.0	31.10	2.8	22.5	56.4	206.0	-149.6
851.318	188.0	21.70	2.8	22.5	47.0	96.0	-49.0
851.345	188.0	23.70	2.8	22.5	49.0	91.5	-42.5
1702.600	188.0	11.80	2.6	24.6	39.0	91.5	-52.5
2553.90	188.0	12.60	3.4	26.8	42.8	91.5	-48.7
3405.20	188.0	13.40	3.8	31.2	48.4	91.5	-43.1
4256.50	188.0	11.70	5.0	32.4	49.1	91.5	-42.4
5107.80	188.0	16.80	7.2	33.5	57.5	91.5	-34.0
5959.10	188.0	17.20	7.2	34.8	59.2	91.5	-32.3
6810.40	188.0	15.60	6.8	34.9	57.3	91.5	-34.2
7661.70	188.0	16.40	7.4	36.8	60.6	91.5	-30.9
8513.00	188.0	16.20	8.4	37.3	61.9	91.5	-29.6

COMMENT #1: Channel = Low Setting, 851.30 MHz

COMMENT #2: Measurements < 1 GHz made at 3 meters. Measurements made > 1 GHz made at 1 meter. No EUT emissions detected from > 1 MHz from the fundimental.

COMMENT #3: Worst case emissions were for EUT antenna in vertical position. Data is presented for this configuration.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Out of Band Emission - Radiated Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 7, 1998 POLARIZATION: Vertical
MODE: TDMA

Freq. (MHz)	EUT Direction (Deg)	Recorded Level (dBuV)	Cable Loss (dB)	Antenna Factor (dBuV/m)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
858.500	188.0	105.60	2.8	22.5	130.9	Ref	Ref
858.509	188.0	36.70	2.8	22.5	62.0	105.9	-43.9
858.518	188.0	34.00	2.8	22.5	59.3	95.9	-36.6
858.545	188.0	34.80	2.8	22.5	60.1	91.4	-31.3
1717.000	188.0	14.70	2.6	24.6	41.9	91.4	-49.5
2575.50	188.0	13.20	3.4	26.8	43.4	91.4	-48.0
3434.00	188.0	12.80	3.8	31.2	47.8	91.4	-43.6
4292.50	188.0	13.80	5.0	32.4	51.2	91.4	-40.2
5151.00	188.0	14.40	7.2	33.5	55.1	91.4	-36.3
6009.50	188.0	16.70	7.2	34.8	58.7	91.4	-32.7
6868.00	188.0	17.20	6.8	34.9	58.9	91.4	-32.5
7726.50	188.0	16.20	7.4	36.8	60.4	91.4	-31.0
8585.00	188.0	16.40	8.4	37.3	62.1	91.4	-29.3

COMMENT #1: Channel = Middle Setting, 858.50 MHz

COMMENT #2: Measurements < 1 GHz made at 3 meters. Measurements made > 1 GHz made at 1 meter. No EUT emissions detected from > 1 MHz from the fundimental.

COMMENT #3: Worst case emissions were for EUT antenna in vertical position. Data is presented for this configuration.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Out of Band Emission - Radiated Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 7, 1998 POLARIZATION: Horizontal
MODE: TDMA

Freq. (MHz)	EUT Direction (Deg)	Recorded Level (dBuV)	Cable Loss (dB)	Antenna Factor (dBuV/m)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
858.500	188.0	93.80	2.8	22.5	119.1	Ref	Ref
858.509	188.0	29.20	2.8	22.5	54.5	106.0	-51.5
858.518	188.0	23.50	2.8	22.5	48.8	96.0	-47.2
858.545	188.0	21.40	2.8	22.5	46.7	82.0	-35.3
1717.000	188.0	11.80	2.6	24.6	39.0	82.0	-43.0
2575.50	188.0	12.20	3.4	26.8	42.4	82.0	-39.6
3434.00	188.0	13.40	3.8	31.2	48.4	82.0	-33.6
4292.50	188.0	12.60	5.0	32.4	50.0	82.0	-32.0
5151.00	188.0	13.80	7.2	33.5	54.5	82.0	-27.5
6009.50	188.0	15.80	7.2	34.8	57.8	82.0	-24.2
6868.00	188.0	16.20	6.8	34.9	57.9	82.0	-24.1
7726.50	188.0	16.20	7.4	36.8	60.4	82.0	-21.6
8585.00	188.0	16.10	8.4	37.3	61.8	82.0	-20.2

COMMENT #1: Channel = Middle Setting, 858.50 MHz

COMMENT #2: Measurements < 1 GHz made at 3 meters. Measurements made > 1 GHz made at 1 meter. No EUT emissions detected from > 1 MHz from the fundimental.

COMMENT #3: Worst case emissions were for EUT antenna in vertical position. Data is presented for this configuration.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Out of Band Emission - Radiated Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 7, 1998 POLARIZATION: Vertical
MODE: TDMA

Freq. (MHz)	EUT Direction (Deg)	Recorded Level (dBuV)	Cable Loss (dB)	Antenna Factor (dBuV/m)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
865.700	190.0	105.80	2.8	22.5	131.1	Ref	Ref
865.709	190.0	38.00	2.8	22.5	63.3	106.1	-42.8
865.718	190.0	35.60	2.8	22.5	60.9	96.1	-35.2
865.745	190.0	34.30	2.8	22.5	59.6	91.6	-32.0
1731.400	190.0	12.30	2.6	24.6	39.5	91.6	-52.1
2597.10	190.0	13.40	3.4	26.8	43.6	91.6	-48.0
3462.80	190.0	11.80	3.8	31.2	46.8	91.6	-44.8
4328.50	190.0	12.60	5.0	32.4	50.0	91.6	-41.6
5194.20	190.0	13.60	7.2	33.5	54.3	91.6	-37.3
6059.90	190.0	16.20	7.2	34.8	58.2	91.6	-33.4
6925.60	190.0	17.10	6.8	34.9	58.8	91.6	-32.8
7791.30	190.0	16.60	7.4	36.8	60.8	91.6	-30.8
8657.00	190.0	16.40	8.4	37.3	62.1	91.6	-29.5

COMMENT #1: Channel = High Setting, 865.70 MHz

COMMENT #2: Measurements < 1 GHz made at 3 meters. Measurements made > 1 GHz made at 1 meter. No EUT emissions detected from > 1 MHz from the fundimental.

COMMENT #3: Worst case emissions were for EUT antenna in vertical position. Data is presented for this configuration.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Out of Band Emission - Radiated Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 7, 1998 POLARIZATION: Horizontal
MODE: TDMA

Freq. (MHz)	EUT Direction (Deg)	Recorded Level (dBuV)	Cable Loss (dB)	Antenna Factor (dBuV/m)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
865.700	188.0	94.60	2.8	22.5	119.9	Ref	Ref
865.709	188.0	28.90	2.8	22.5	54.2	106.1	-51.9
865.718	188.0	24.50	2.8	22.5	49.8	96.1	-46.3
865.745	188.0	22.20	2.8	22.5	47.5	91.6	-44.1
1731.400	188.0	13.40	2.6	24.6	40.6	91.6	-51.0
2597.10	188.0	12.20	3.4	26.8	42.4	91.6	-49.2
3462.80	188.0	11.80	3.8	31.2	46.8	91.6	-44.8
4328.50	188.0	12.60	5.0	32.4	50.0	91.6	-41.6
5194.20	188.0	12.80	7.2	33.5	53.5	91.6	-38.1
6059.90	188.0	16.40	7.2	34.8	58.4	91.6	-33.2
6925.60	188.0	15.40	6.8	34.9	57.1	91.6	-34.5
7791.30	188.0	15.20	7.4	36.8	59.4	91.6	-32.2
8657.00	188.0	16.80	8.4	37.3	62.5	91.6	-29.1

COMMENT #1: Channel = High Setting, 865.70 MHz

COMMENT #2: Measurements < 1 GHz made at 3 meters. Measurements made > 1 GHz made at 1 meter. No EUT emissions detected from > 1 MHz from the fundimental.

COMMENT #3: Worst case emissions were for EUT antenna in vertical position. Data is presented for this configuration.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Appendix E

Out of Band Emissions (Conducted) Test Data

Out of Band Emission - Conducted Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 9, 1998 MODE: IDEN (GSM)

Freq. (MHz)	Recorded Level (dBm)	Cable Loss (dB)	Corrected Level (dBm)	Limit (dBm)	Margin (dB)
851.300	34.90	1.0	35.9	Ref	Ref
851.309	-20.00	1.0	-19.0	10.9	-29.9
851.318	-33.70	1.0	-32.7	0.9	-33.6
851.345	-56.30	1.0	-55.3	-13.1	-42.2
1702.600	-27.80	1.3	-26.5	-13.1	-13.4
2553.90	-31.60	1.7	-29.9	-13.1	-16.8
3405.20	-44.30	1.9	-42.4	-13.1	-29.3
4256.50	-44.70	2.4	-42.3	-13.1	-29.2
5107.80	-45.30	2.8	-42.5	-13.1	-29.4
5959.10	-44.10	2.8	-41.3	-13.1	-28.2
6810.40	-35.40	3.4	-32.0	-13.1	-18.9
7661.70	-35.30	3.9	-31.4	-13.1	-18.3
8513.00	-42.00	4.2	-37.8	-13.1	-24.7

COMMENT #1: Channel = Lowest Setting, 851.30 MHz

COMMENT #2: Recorded Level adjusted to compensate for 31 dB attenuator installed in signal path prior to taking reading.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Out of Band Emission - Conducted Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 9, 1998 MODE: IDEN (GSM)

Freq. (MHz)	Recorded Level (dBm)	Cable Loss (dB)	Corrected Level (dBm)	Limit (dBm)	Margin (dB)
858.500	34.70	1.0	35.7	Ref	Ref
858.509	-29.80	1.0	-28.8	10.9	-39.7
858.518	-37.00	1.0	-36.0	0.9	-36.9
858.545	-39.90	1.0	-38.9	-13.1	-25.8
1717.000	-28.30	1.3	-27.0	-13.1	-13.9
2575.50	-31.30	1.7	-29.6	-13.1	-16.5
3434.00	-43.80	1.9	-41.9	-13.1	-28.8
4292.50	-44.50	2.4	-42.1	-13.1	-29.0
5151.00	-43.20	2.8	-40.4	-13.1	-27.3
6009.50	-43.60	2.8	-40.8	-13.1	-27.7
6868.00	-36.70	3.4	-33.3	-13.1	-20.2
7726.50	-36.80	3.9	-32.9	-13.1	-19.8
8585.00	-36.50	4.2	-32.3	-13.1	-19.2

COMMENT #1: Channel = Middle Setting, 858.50 MHz

COMMENT #2: Recorded Level adjusted to compensate for 31 dB attenuator installed in signal path prior to taking reading.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Out of Band Emission - Conducted Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 9, 1998 MODE: IDEN (GSM)

Freq. (MHz)	Recorded Level (dBm)	Cable Loss (dB)	Corrected Level (dBm)	Limit (dBm)	Margin (dB)
865.700	34.80	1.0	35.8	Ref	Ref
865.709	-21.30	1.0	-20.3	10.9	-31.2
865.718	-33.30	1.0	-32.3	0.9	-33.2
865.745	-52.40	1.0	-51.4	-13.1	-38.3
1731.400	-28.20	1.3	-26.9	-13.1	-13.8
2597.10	-29.50	1.7	-27.8	-13.1	-14.7
3462.80	-44.40	1.9	-42.5	-13.1	-29.4
4328.50	-44.40	2.4	-42.0	-13.1	-28.9
5194.20	-44.30	2.8	-41.5	-13.1	-28.4
6059.90	-44.50	2.8	-41.7	-13.1	-28.6
6925.60	-36.50	3.4	-33.1	-13.1	-20.0
7791.30	-35.50	3.9	-31.6	-13.1	-18.5
8657.00	-35.80	4.2	-31.6	-13.1	-18.5

COMMENT #1: Channel = High Setting, 865.70 MHz

COMMENT #2: Recorded Level adjusted to compensate for 31 dB attenuator installed in signal path prior to taking reading.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Out of Band Emission - Conducted Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 9, 1998 MODE: TDMA

Freq. (MHz)	Recorded Level (dBm)	Cable Loss (dB)	Corrected Level (dBm)	Limit (dBm)	Margin (dB)
851.300	34.70	1.0	35.7	Ref	Ref
851.309	-22.00	1.0	-21.0	10.9	-31.9
851.318	-28.40	1.0	-27.4	0.9	-28.3
851.345	-52.30	1.0	-51.3	-13.1	-38.2
1702.600	-31.40	1.3	-30.1	-13.1	-17.0
2553.90	-34.20	1.7	-32.5	-13.1	-19.4
3405.20	-43.20	1.9	-41.3	-13.1	-28.2
4256.50	-42.50	2.4	-40.1	-13.1	-27.0
5107.80	-41.50	2.8	-38.7	-13.1	-25.6
5959.10	-43.40	2.8	-40.6	-13.1	-27.5
6810.40	-38.90	3.4	-35.5	-13.1	-22.4
7661.70	-36.80	3.9	-32.9	-13.1	-19.8
8513.00	-38.20	4.2	-34.0	-13.1	-20.9

COMMENT #1: Channel = Lowest Setting, 851.30 MHz

COMMENT #2: Recorded Level adjusted to compensate for 31 dB attenuator installed in signal path prior to taking reading.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Out of Band Emission - Conducted Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 9, 1998 MODE: TDMA

Freq. (MHz)	Recorded Level (dBm)	Cable Loss (dB)	Corrected Level (dBm)	Limit (dBm)	Margin (dB)
858.500	34.80	1.0	35.8	Ref	Ref
858.509	-20.50	1.0	-19.5	10.9	-30.4
858.518	-33.40	1.0	-32.4	0.9	-33.3
858.545	-54.20	1.0	-53.2	-13.1	-40.1
1717.000	-28.40	1.3	-27.1	-13.1	-14.0
2575.50	-34.50	1.7	-32.8	-13.1	-19.7
3434.00	-40.40	1.9	-38.5	-13.1	-25.4
4292.50	-42.30	2.4	-39.9	-13.1	-26.8
5151.00	-42.80	2.8	-40.0	-13.1	-26.9
6009.50	-38.60	2.8	-35.8	-13.1	-22.7
6868.00	-37.20	3.4	-33.8	-13.1	-20.7
7726.50	-36.40	3.9	-32.5	-13.1	-19.4
8585.00	-41.50	4.2	-37.3	-13.1	-24.2

COMMENT #1: Channel = Middle Setting, 858.50 MHz

COMMENT #2: Recorded Level adjusted to compensate for 31 dB attenuator installed in signal path prior to taking reading.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Out of Band Emission - Conducted Data Sheet

CI Wireless Inc.
800 MHz ESMR Band 4 Watt Repeater

SERIAL #: 80000/80002 PROJECT #: 99-216
DATE: December 9, 1998 MODE: TDMA

Freq. (MHz)	Recorded Level (dBm)	Cable Loss (dB)	Corrected Level (dBm)	Limit (dBm)	Margin (dB)
865.700	34.90	1.0	35.9	Ref	Ref
865.709	-23.00	1.0	-22.0	10.9	-32.9
865.718	-35.20	1.0	-34.2	0.9	-35.1
865.745	-54.90	1.0	-53.9	-13.1	-40.8
1731.400	-32.10	1.3	-30.8	-13.1	-17.7
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6059.90	-42.60	2.8	-39.8	-13.1	-26.7
6925.60	-36.50	3.4	-33.1	-13.1	-20.0
7791.30	-37.40	3.9	-33.5	-13.1	-20.4
8657.00	-39.40	4.2	-35.2	-13.1	-22.1

COMMENT #1: Channel = Highest Setting, 865.70 MHz

COMMENT #2: Recorded Level adjusted to compensate for 31 dB attenuator installed in signal path prior to taking reading.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**