

**REPLY TO REQUEST FOR ADDITIONAL INFORMATION  
CI WIRELESS 1900 MHZ PCS BAND 8 WATT REPEATER  
FCC ID NUW008EKO19**

**Submission Number: EA93341  
Correspondence Number: None**

**April 1999**

This document has been compiled to reply to two of questions posed by the FCC as part of the Equipment Authorization Process for the CI Wireless 1900 MHz PCS Band 8 Watt Repeater (NUW008EKO19). Each of the questions listed by the FCC is listed prior to the reply.

**Question**

- 1) If the unit is intended to handle multiple channels, then you should submit three signal intermodulation tests for each emission kind.*

**Answer**

Based on a conversation between Frank Coperich of the FCC and John O'Brien of Professional Testing, this test is a single test using three emission types of the same kind (i.e. three CDMA signals on three separate CDMA channels). The intent of this test is to determine if intermodulation products generated by multiple carriers will generate products which are over the conducted spurious emission limits. While this test is not documented in the Rules, it is a requirement for multiple channel equipments. Based on the conversation with Mr. Coperich, the test configuration of this test should be:

- (1) Configure 3 signal sources using the same modulation type to provide a multiple channel signal to the device. The recommended channel settings are:
  - (a) One channel at the lowest allowed frequency in the band
  - (b) One channel at the highest allowed frequency in the band
  - (c) One channel at either the 3<sup>rd</sup> lowest or 3<sup>rd</sup> highest channel setting. This will provide a 1 channel guard band from the end channel.

The total power for combined output signal should be maximized to the power rating of the EUT. All input channel settings should be equal.

- (2) Measure (or plot) all intermodulation products inside and outside the allowed channel band. All intermodulation products must meet the  $43 + 10 \log (P)$  requirement for spurious emissions. This figure should come out to a maximum intermod (or spur) level of -13 dBm. Most measurements of the intermod levels are made using a peak method, however, fully accurate measurements of the intermod levels should be made using the following detection methods:

Modulation Type	Detector/Measurement Method
GSM	Peak
TDMA (NADC)	Average
CDMA	Average

Repeat this test for all modulation types which the EUT will be licensed/authorized for.

#### **ALTERNATE METHOD:**

Due to the difficulty in providing three identical fully modulated signals, a method using two intermodulation sources (rather than 3) is allowed. The test should be configured in the following manner:

- (1) Set one carrier to either the highest or lowest allowed channel in the band.
- (2) Set the second carrier two channels away from the first channel (this will either be the 3<sup>rd</sup> highest or lowest in the band, again providing a one channel guard band).
- (3) Configure the output power for the signals such that the total output power is at the maximum rating of the EUT. Also, verify that the input levels for all signals are equal.
- (4) Measure (or plot) all intermodulation products inside and outside the allowed channel band. All intermodulation products must meet the  $43 + 10 \log (P)$  requirement for spurious emissions. This figure should come out to a maximum intermod (or spur) level of -13 dBm. Most measurements of the intermod levels are made using a peak method, however, fully accurate measurements of the intermod levels should be made using the following detection methods:

Modulation Type	Detector/Measurement Method
GSM	Peak
TDMA (NADC)	Average
CDMA	Average

- (5) Repeat this test for all modulation types which the EUT will be licensed/authorized for.

The two channel method was used for this test. Plots of the data for this test are shown in the Appendix.

#### **Question**

- 2) *Please clarify the power output power ratings for multi-channel operation.*

#### **Answer**

The total composite power for this device is 8 watts. The EUT has a power regulation system which will reduce the total individual channel power for the carriers to provide a constant 8 watt composite power regardless of the number of carriers. The worst peak power level is single channel operation, which results in a peak output power of 8 watts (composite power divided by

1). As channels are added to the EUT, the individual channel power is based on the composite power divided by the number of channels. For this reason, the individual channel powers used in the intermod test was 4 watts output per channel ( $8/2 = 4$ ).

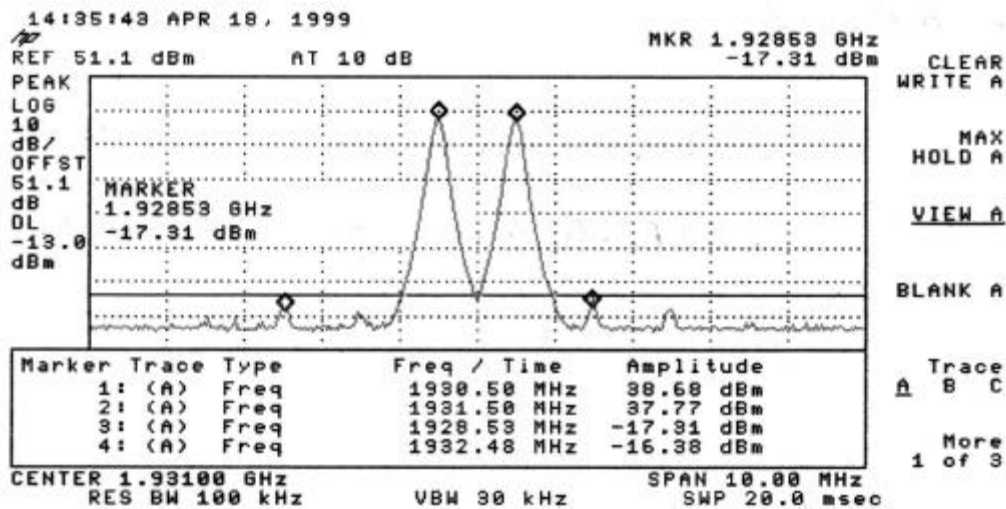


# Intermodulation Product Data Sheet

CI Wireless, 1900 MHz PCS Band 8 Watt Repeater  
(FCC ID: NUW008EKO19)

SERIAL #: Not Available  
DATE: April 18, 1999  
DETECTOR FUNCTION: Average

MODE: TDMA (NADC)  
LINE MEASURED: Antenna  
PROJECT #: 99-219



COMMENT #1: Display Line Set to Limit of -13 dBm

COMMENT #2: Cellular A Band

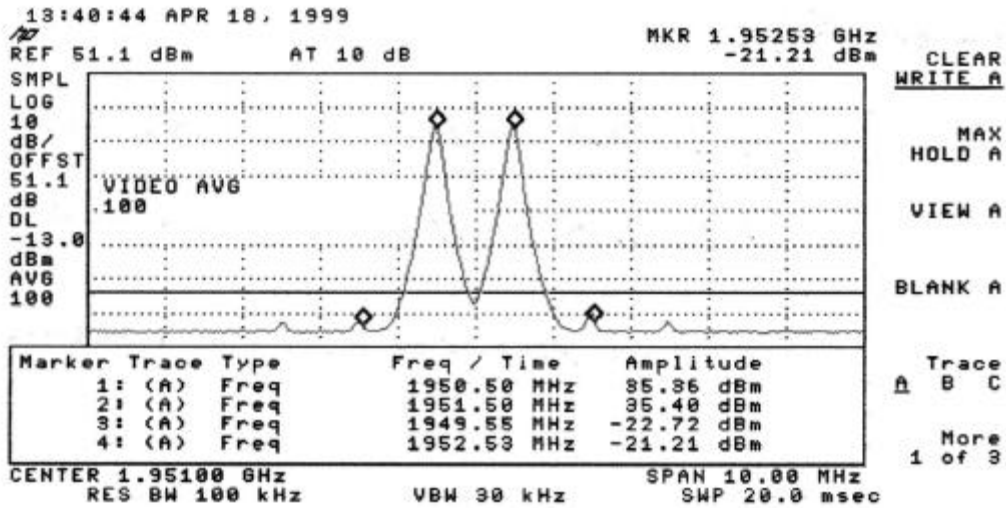
TEST ENGINEER: \_\_\_\_\_ APPROVED BY: \_\_\_\_\_

# Intermodulation Product Data Sheet

CI Wireless, 1900 MHz PCS Band 8 Watt Repeater  
(FCC ID: NUW008EKO19)

SERIAL #: Not Available  
DATE: April 18, 1999  
DETECTOR FUNCTION: Average

MODE: TDMA (NADC)  
LINE MEASURED: Antenna  
PROJECT #: 99-219



COMMENT #1: Display Line Set to Limit of -13 dBm

COMMENT #2: Cellular B Band

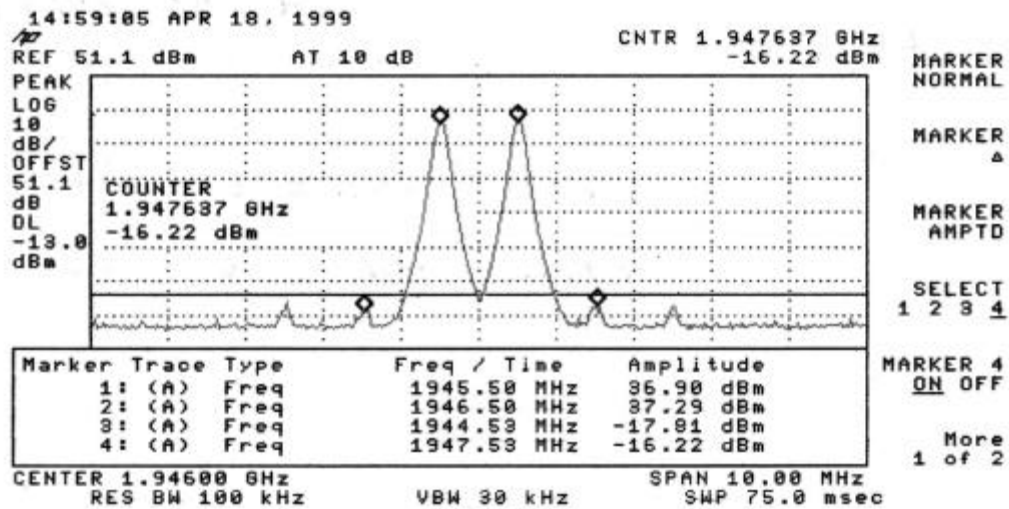
TEST ENGINEER: \_\_\_\_\_ APPROVED BY: \_\_\_\_\_

# Intermodulation Product Data Sheet

CI Wireless, 1900 MHz PCS Band 8 Watt Repeater  
(FCC ID: NUW008EKO19)

SERIAL #: Not Available  
DATE: April 18, 1999  
DETECTOR FUNCTION: Average

MODE: TDMA (NADC)  
LINE MEASURED: Antenna  
PROJECT #: 99-219



COMMENT #1: Display Line Set to Limit of -13 dBm

COMMENT #2: Cellular D Band

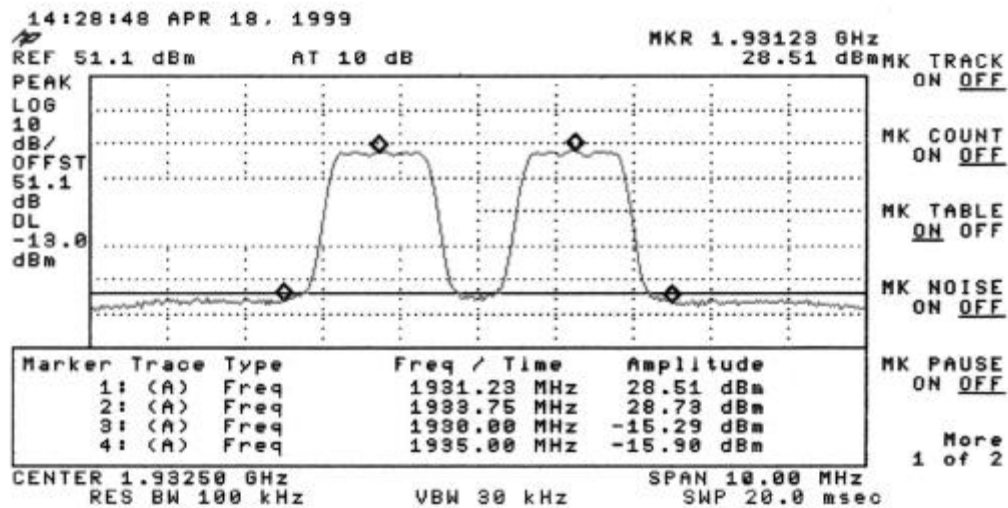
TEST ENGINEER: \_\_\_\_\_ APPROVED BY: \_\_\_\_\_

# Intermodulation Product Data Sheet

CI Wireless, 1900 MHz PCS Band 8 Watt Repeater  
(FCC ID: NUW008EKO19)

SERIAL #: Not Available  
DATE: April 18, 1999  
DETECTOR FUNCTION: Average

MODE: CDMA  
LINE MEASURED: Antenna  
PROJECT #: 99-219



COMMENT #1: Display Line Set to Limit of -13 dBm

COMMENT #2: Cellular A Band

TEST ENGINEER: \_\_\_\_\_ APPROVED BY: \_\_\_\_\_

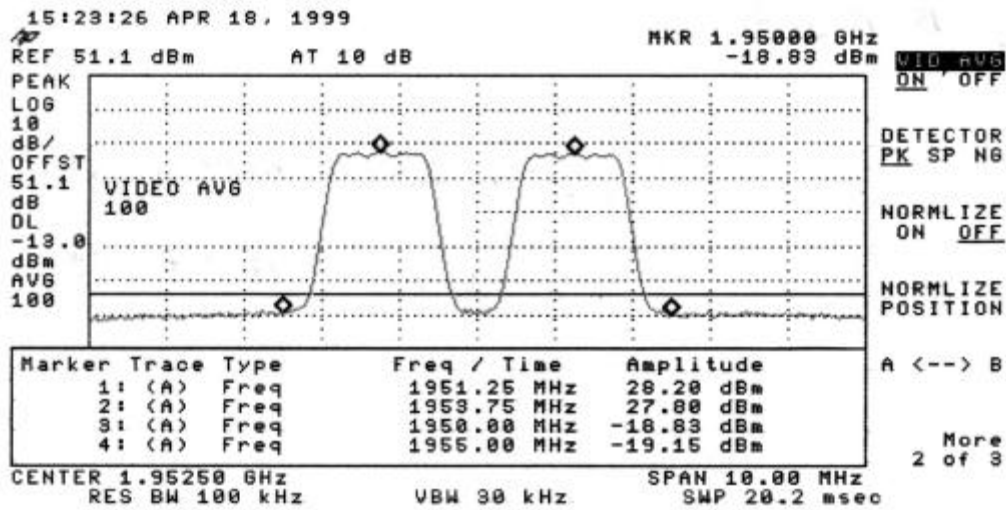


# Intermodulation Product Data Sheet

CI Wireless, 1900 MHz PCS Band 8 Watt Repeater  
(FCC ID: NUW008EKO19)

SERIAL #: Not Available  
DATE: April 18, 1999  
DETECTOR FUNCTION: Average

MODE: CDMA  
LINE MEASURED: Antenna  
PROJECT #: 99-219



COMMENT #1: Display Line Set to Limit of -13 dBm

COMMENT #2: Cellular B Band

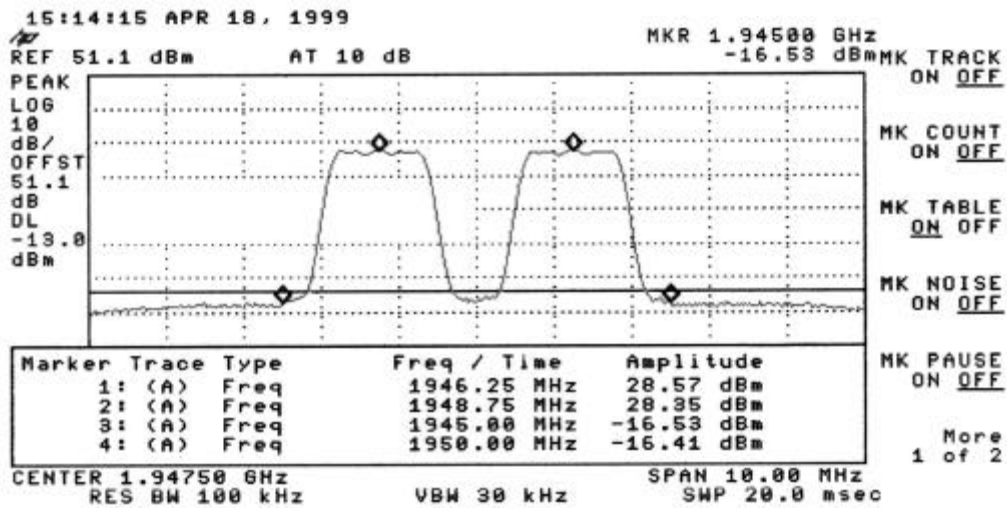
TEST ENGINEER: \_\_\_\_\_ APPROVED BY: \_\_\_\_\_

# Intermodulation Product Data Sheet

CI Wireless, 1900 MHz PCS Band 8 Watt Repeater  
(FCC ID: NUW008EKO19)

SERIAL #: Not Available  
DATE: April 18, 1999  
DETECTOR FUNCTION: Average

MODE: CDMA  
LINE MEASURED: Antenna  
PROJECT #: 99-219



COMMENT #1: Display Line Set to Limit of -13 dBm

COMMENT #2: Cellular D Band

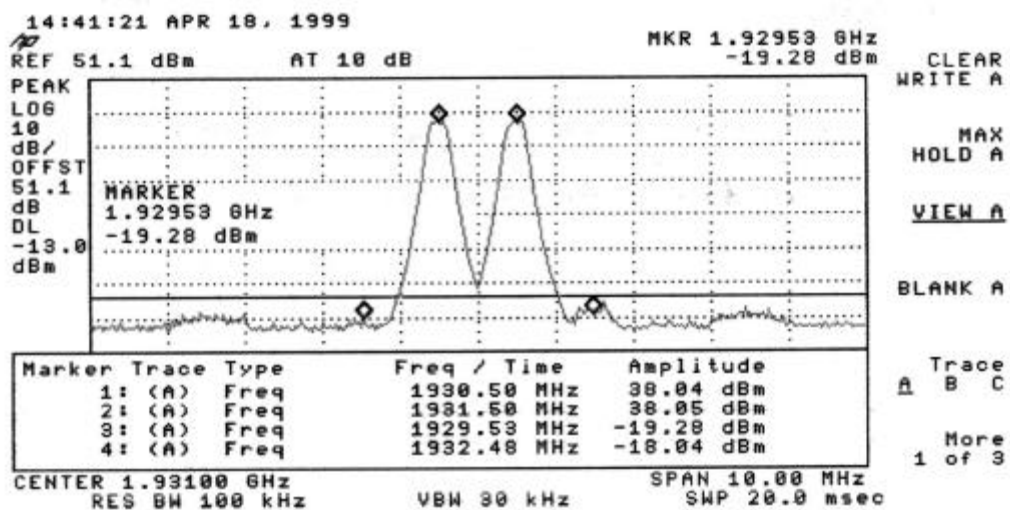
TEST ENGINEER: \_\_\_\_\_ APPROVED BY: \_\_\_\_\_

# Intermodulation Product Data Sheet

CI Wireless, 1900 MHz PCS Band 8 Watt Repeater  
(FCC ID: NUW008EKO19)

SERIAL #: Not Available  
DATE: April 18, 1999  
DETECTOR FUNCTION: Peak

MODE: GSM  
LINE MEASURED: Antenna  
PROJECT #: 99-219



COMMENT #1: Display Line Set to Limit of -13 dBm

COMMENT #2: Cellular A Band

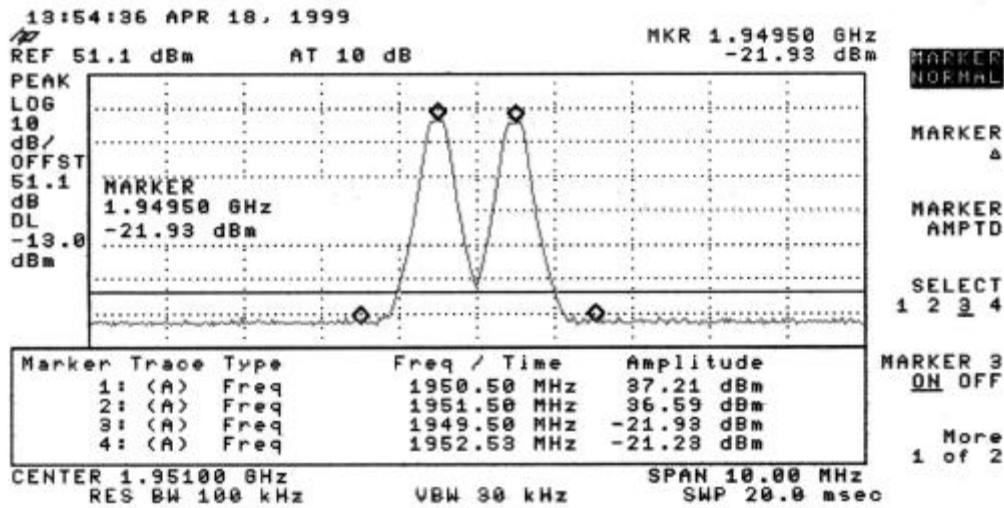
TEST ENGINEER: \_\_\_\_\_ APPROVED BY: \_\_\_\_\_

# Intermodulation Product Data Sheet

CI Wireless, 1900 MHz PCS Band 8 Watt Repeater  
(FCC ID: NUW008EKO19)

SERIAL #: Not Available  
DATE: April 18, 1999  
DETECTOR FUNCTION: Peak

MODE: GSM  
LINE MEASURED: Antenna  
PROJECT #: 99-219



COMMENT #1: Display Line Set to Limit of -13 dBm

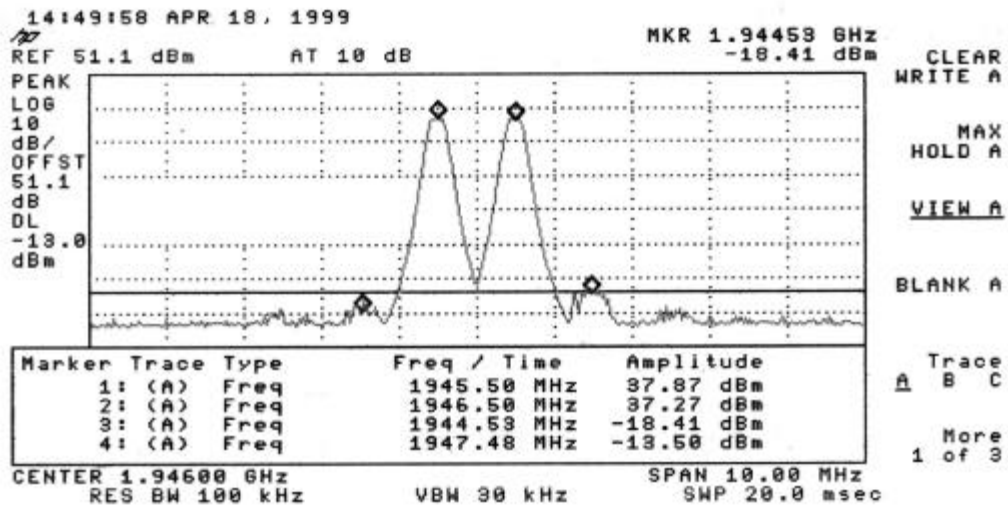
COMMENT #2: Cellular B Band

TEST ENGINEER: \_\_\_\_\_ APPROVED BY: \_\_\_\_\_  
Intermodulation Product Data Sheet

CI Wireless, 1900 MHz PCS Band 8 Watt Repeater  
(FCC ID: NUW008EKO19)

SERIAL #: Not Available  
DATE: April 18, 1999  
DETECTOR FUNCTION: Peak

MODE: GSM  
LINE MEASURED: Antenna  
PROJECT #: 99-219



COMMENT #1: Display Line Set to Limit of -13 dBm

COMMENT #2: Cellular D Band

TEST ENGINEER: \_\_\_\_\_ APPROVED BY: \_\_\_\_\_

