

## 1.1. EFFECTIVE RADIATED POWER LIMITS @ FCC 2.985 & 22.913

### 1.1.1. Limits @ FCC 22.913

The effective radiated power (EIRP) of transmitters in the Cellular Radiotelephone Service must not exceed the limits in this section:

|                                                                       | Maximum ERP (Watts) |
|-----------------------------------------------------------------------|---------------------|
| Base Transmitters<br>(869-894 MHz)                                    | 500 Watts           |
| Mobile Transmitters &<br>Auxiliary Test Transmitters<br>(824-849 MHz) | 7 Watts             |

### 1.1.2. Method of Measurements

Please refer to Exhibit 8, Sec. 8.1 for test procedures and test setup.

### 1.1.3. Test Equipment List

| Test Instruments                   | Manufacturer       | Model No. | Serial No. | Frequency Range  |
|------------------------------------|--------------------|-----------|------------|------------------|
| Spectrum Analyzer/<br>EMI Receiver | Hewlett<br>Packard | HP 8593EM | 3412A00103 | 9 kHz – 26.5 GHz |
| Attenuator(s)                      | Bird               | ..        | ...        | DC – 22 GHz      |
| Dipole Antenna                     | EMCO               | 3121C     | 8907-434   | 20-1000 MHz      |
| Dipole Antenna                     | EMCO               | 3121C     | 8907-440   | 20-1000 MHz      |

### 1.1.4. Test Data

| TRANSMITTER<br>CHANNEL<br>OUTPUT | FUNDAMENTAL<br>FREQUENCY<br>(MHz) | MEASURED<br>FIELD STRENGTH<br>(dBmV/m) |            | MEASURED EIRP<br>(dBm) |            | Maximum<br>Allowable EIRP<br>(dBm) |
|----------------------------------|-----------------------------------|----------------------------------------|------------|------------------------|------------|------------------------------------|
|                                  |                                   | VERTICAL                               | HORIZONTAL | VERTICAL               | HORIZONTAL |                                    |
| Lowest                           | 824.9750                          | 109.8                                  | 109.8      | 14.6                   | 14.6       | 38.5                               |
| Middle                           | 836.4951                          | 110.2                                  | 110.2      | 15.0                   | 15.0       | 38.5                               |
| Highest                          | 848.9440                          | 110.2                                  | 110.2      | 15.0                   | 15.0       | 38.5                               |

| TRANSMITTER<br>CHANNEL<br>OUTPUT | FUNDAMENTAL<br>FREQUENCY<br>(MHz) | MEASURED<br>AVERAGE<br>POWER (P)<br>(dBm) | EIRP Power<br>(dBm) | Antenna Gain<br>(dBi) |
|----------------------------------|-----------------------------------|-------------------------------------------|---------------------|-----------------------|
| Lowest                           | 824.9750                          | 27.0                                      | 14.6                | -12.4                 |
| Middle                           | 836.4951                          | 26.6                                      | 15.0                | -11.6                 |
| Highest                          | 848.9440                          | 24.8                                      | 15.0                | -9.8                  |

#### ULTRATECH GROUP OF LABS

3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4  
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: [yhk.ultratech@sympatico.ca](mailto:yhk.ultratech@sympatico.ca), Website: <http://www.ultratech-labs.com>

File #: MXA-002F22  
July 21, 2000

- Assessed by ITI (UK) Competent Body, NVLAP (USA) Accreditation Body & ACA/AUSTEL (Australia)
- Recognized/Listed by FCC (USA), Industry Canada (Canada)
- All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

## 1.2. MODULATION REQUIREMENTS @ FCC 2.987(B) & 22.915(A),(B) & (C)

### 1.2.1. Limits @ FCC 22.915

- (a) **Non-voice modulating signals.** Modulating signals other than voice signals such as data signals, may be transmitted, provided the resulting modulated emission exhibits spectral characteristics not exceeding those resulting from voice modulation.
- (b) **Modulation Levels.** The level of the modulating signals must be set to the values specified in this paragraph and must be maintained within  $\pm 10\%$  of those values:
  - (1) The instantaneous frequency deviation resulting from the main modulating signal must be  $\pm 12$  kHz.
  - (2) The instantaneous frequency deviation resulting from the supervisory audio tones must be  $\pm 2$  kHz.
  - (3) The instantaneous frequency deviation resulting from the signaling tone must be  $\pm 8$  kHz.
  - (4) The instantaneous frequency deviation resulting from the wideband data signals must be  $\pm 8$  kHz.
- (c) **Deviation Limitation Circuitry.** Cellular transmitters must be equipped with circuitry that automatically prevents modulation levels for voice transmission from exceeding the limits specified in this section.

### 1.2.2. Method of Measurements

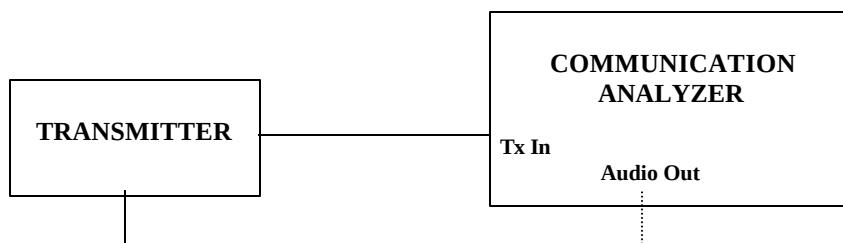
**For Audio Transmitter:-** The carrier frequency deviation was measured with the tone input signal level varied from 0 Vp to audio input rating level plus 16 dB at frequencies 0.1, 0.5, 1.0, 3.0 and 5.0 kHz. The maximum deviation was recorded at each test condition.

**For Data Transmitter with Maximum Frequency Deviation set by Factory:-** The EUT was set at maximum frequency deviation, and its peak frequency deviation was then measured using EUT's internal random data source.

### 1.2.3. Test Equipment List

| Test Instruments       | Manufacturer    | Model No. | Serial No. | Frequency Range                                                                                     |
|------------------------|-----------------|-----------|------------|-----------------------------------------------------------------------------------------------------|
| Communication Analyzer | Rohde & Schawrz | SMF02     | 879988/057 | 400 kHz - 1000 MHz including AF & RF Signal Generators, SINAD, DISTORTION, DEVIATION meters and etc |

### 1.2.4. Test Arrangement



#### ULTRATECH GROUP OF LABS

3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4  
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: [yhk.ultratech@sympatico.ca](mailto:yhk.ultratech@sympatico.ca), Website: <http://www.ultratech-labs.com>

File #: MXA-002F22  
July 21, 2000

- Assessed by ITI (UK) Competent Body, NVLAP (USA) Accreditation Body & ACA/AUSTEL (Australia)
- Recognized/Listed by FCC (USA), Industry Canada (Canada)
- All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

## 1.2.5. Test Data

*Main Modulating Signal: Modulation Limiting set at  $\pm 12$  kHz*

| 1kHz MODULATING<br>SIGNAL LEVEL (mV) | PEAK FREQUENCY<br>DEVIATION (KHz) | MAXIMUM LIMIT<br>(KHz)           |
|--------------------------------------|-----------------------------------|----------------------------------|
| 250<br>(Min. audio input rating)     | 11.5                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 260                                  | 12.2                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 270                                  | 11.3                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 280                                  | 11.3                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 290                                  | 12.0                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 300                                  | 12.4                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 320                                  | 12.3                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 340                                  | 12.4                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 360                                  | 12.1                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 380                                  | 12.3                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 400                                  | 12.5                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 600                                  | 12.3                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 800                                  | 11.9                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 1000                                 | 12.1                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 1500                                 | 12.5                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 2000                                 | 11.9                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 3000                                 | 11.8                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |

### ULTRATECH GROUP OF LABS

3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4  
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: [yhk.ultratech@sympatico.ca](mailto:yhk.ultratech@sympatico.ca), Website: <http://www.ultratech-labs.com>

File #: MXA-002F22  
July 21, 2000

- Assessed by ITI (UK) Competent Body, NVLAP (USA) Accreditation Body & ACA/AUSTEL (Australia)
- Recognized/Listed by FCC (USA), Industry Canada (Canada)
- All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

Voice Signal Input Level = 300 mili-Volts

| MODULATING<br>FREQUENCY (KHz) | PEAK FREQUENCY<br>DEVIATION (KHz) | MAXIMUM LIMIT<br>(KHz)           |
|-------------------------------|-----------------------------------|----------------------------------|
| 0.3                           | 5.1 (Note 1)                      | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 0.4                           | 7.5 (Note 1)                      | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 0.6                           | 9.6 (Note 1)                      | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 0.8                           | 11.5                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 1.0                           | 11.9                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 1.2                           | 11.0                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 1.4                           | 11.0                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 1.6                           | 10.9                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 1.8                           | 10.9                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 2.0                           | 10.9                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 2.5                           | 11.1                              | $\pm 10.8$ kHz to $\pm 13.2$ kHz |
| 3.0                           | 8.7 (Note 1)                      | $\pm 10.8$ kHz to $\pm 13.2$ kHz |

Note (1): The frequency deviation outside the audio frequency band dropped below 10.8 kHz because of the audio bandpass filter.

**ULTRATECH GROUP OF LABS**

3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4

Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: [yhk.ultratech@sympatico.ca](mailto:yhk.ultratech@sympatico.ca), Website: <http://www.ultratech-labs.com>

File #: MXA-002F22  
July 21, 2000

- Assessed by ITI (UK) Competent Body, NVLAP (USA) Accreditation Body & ACA/AUSTEL (Australia)
- Recognized/Listed by FCC (USA), Industry Canada (Canada)
- All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)