

GENERAL INFORMATION

1. Production Plans---Pursuant 2.983 (c)

Quantity production is planned.

2. Application References---Pursuant 2.1061

None

3. Data Submittal Procedure:

Data is supplied in accordance with Part 2, Sub-part J of the Commission's rules.

Standards used on measurements supplied are EIA IS-137 and OET 53.

4. Similar to "Currently Type Accepted Transmitter Type(s)" IHDT5WT1

5. Report of measurements pertaining to types of emission, frequency range, maximum output power and modulation techniques for Digital Mode Operation (per paragraphs 31 and 32 of the Report and Order in FCC GEN. Docket No. 87-390).

A. Types of emission

This equipment continues to be capable of the existing, approved emissions for previously existing equipment designed and approved for operation in the Domestic Public Cellular Radio Telecommunications Service in the Analog Mode and Digital Mode.

Reference is also made to EIA/TIA Interim Standard IS-137. Actual measurements of Occupied Bandwidth for the Digital Mode are shown in Exhibit 9F-5. Spurious Emissions (Conducted and Radiated) are reported in Exhibits 9G and 9H are the worst (highest level) of Digital and Analog Modes.

B. Frequency range

The frequency range of the equipment is the Domestic Public Cellular Radio Telecommunications Service bands, 824 - 849 MHz and 869 -894MHz, regardless of whether in Analog or Digital mode.

Frequency Stability versus Temperature and Voltage measurements are shown in Exhibits 9J-1 & 2 and 9K-1 & 2. This equipment uses Automatic Frequency Control (AFC) to lock to within ± 200 Hz of the received frequency from the Land Station system. Also refer to Exhibit 6A.

C. Maximum output power

Radio Frequency Output Power is 0.6 Watts. Power output capability of the Mobile Station equipment is still reported to the Land Station system (via the Mobile Station Power Class in the Station Class Mark) and the Mobile Station will respond to commands from the Land Station system to change power levels as defined in the specifications. R. F. Output Power measurement results are shown in Exhibit 9A.

D. Modulation techniques

Modulation in the Digital Mode is p/4 DQPSK (Differential Quaternary Phase Shift Keying). Reference is made to the EIA IS-137 for further details. Exhibits 6C and 6D further discuss details of the modulating circuitry. Exhibit 6F discusses digital modulation techniques. Exhibits 9B, 9C, 9D, 9E-1 & 2 and 9F-1 to 6 show the results of modulation related testing.

6. Determination of Emission Designator for Digital (TDMA) Operation (per Part 2 - Subpart C of the commission's rules)

A. Emission, modulation and transmission characteristics (per section 2.201)

a. First Symbol - Type of modulation of the main carrier.

The main carrier is p/4-shifted Differential Quaternary Phase Shift Keyed (p/4-DQPSK), which has both amplitude and angle modulation characteristics, during the digital mode of operation. This corresponds to the symbol D, defined as "Emissions in which the main carrier is amplitude and angle-modulated either simultaneously or in a pre-established sequence."

b. Second Symbol - nature of signal(s) modulating the main carrier.

One Digital Signal representing sampled quantized voice or other audio information or command data modulates the main carrier in a time division multiplex fashion during the digital mode of operation.

This corresponds to symbol X, defined as "Cases not otherwise covered." The symbol 1 excludes time-division multiplex, and the other choices for digital modulating signals either state "Two or more channels containing quantized or digital information" or "Composite system with one or more channels containing quantized or digital information, together with one or more channels containing analogue information."

c. Third symbol - Type of information to be transmitted.

The information transmitted in the digital mode of operation is a combination of data transmission (command data) and telephony (sampled quantized voice or other audio signals).

This corresponds to symbol W, defined as "combination of above" which would be the combination of symbol D, "Data transmission, telemetry, telecommand," and symbol E, "Telephony (including sound broadcasting)."

B. Bandwidths (per section 2.202)

Bandwidth is primarily determined by the square root of raised cosine filter used to filter the modulating signals. Per EIA IS-137, the filter is defined to have a one sided 3-dB bandwidth of 12.15 kHz with the slope of the roll off defined by $\alpha = 0.35$.

The radio in the digital mode is intended to operate in the TDMA mode. Power ramp up and ramp down times as defined in EIA IS-137 are 124.8 microseconds or less. Computer simulations show that any power transmitted beyond ± 15 kHz of the carrier is 50 dB below the carrier or less for the ramp up and ramp down characteristics used in the radio.

Based on these considerations, the bandwidth used is 30 kHz. Converting this result to the format indicated in paragraph 2.202(b), yields 30K0.

The resulting complete emission designator for the digit operation is then 30K0DXW.

The current Emission Designators for the conventional analog mode, 40K0F1D and 40K0F8W, are included since the equipment also operates in the conventional analog mode.