Certification Requirements

The information in this exhibit is in accordance with requirements for certification as outlined in the FCC Rules and Regulations, 47 CFR Part 2; Sections 2.1033(c), 2.1046 - 2.1057, and Part 24, Sections 24.52, 24.235 and 24.238.

Section 2.1033(c): Application for Certification

(1) Name of Applicant: Motorola Inc., Motorola is also the manufacturer of the equipment described herein. Mailing address indicated on Form 731.

(2) Identification of Equipment: IHDT6ZA1

(3) Instruction Manual: Refer to EXHIBIT 14.

Because the mobile station transceiver is based on the design of a European GSM model and since the user functionality and features are nearly identical to this GSM model, the user instruction manual that is included in this submission is a copy of the GSM manual and should be viewed as a preliminary version user manual in a state very near that of the final version intended to ship with the equipment. If necessary, when available, the final version can be provided upon request.

(4) Types of Emissions: Designator **250KGXW** (and determination of Emission Designator, per 2.201)

The transceiver transmits a Gaussian Minimal Shift Keying (GMSK) modulated carrier having a BT product of 0.3. The bandwidth of a GMSK modulated carrier having a BT of 0.3 is 250 kHz (see EXHIBIT 2). This results in **250K** for the first four characters of the emissions designator.

GMSK is the same as Minimal Shift Keying (MSK) except that the NRZ data has been filtered prior to modulation. As a result, GMSK, like MSK can generally be thought of as frequency shift keying (FSK), or Offset Quadrature Phase Shift Keying (OQPSK), and can be modulated and demodulated using either of these techniques. Motorola's transceiver is based off of the OQPSK technique, which is a type of phase modulation. This corresponds to **G**, for Types of Modulation.

The transceiver uses a digital signal representing sampled, quantized voice or other audio information or command data to modulate the main carrier in a Time Division Multiple Access (TDMA) fashion. This corresponds to **X** for nature of modulating signals. 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.

The information transmitted is a combination of command data and telephony (sampled quantized voice or other audio signals). This corresponds to **W** for Types of Information Transmitted, defined as “Combination of above” which would be the combination of symbol D, “Data transmission, telemetry, telecommand”, and symbol E, “Telephony (including sound broadcasting)”.

(5) Frequency Range

This equipment is designed to transmit from 1850 - 1910 MHz. This frequency range corresponds to Blocks A, D, B, E, F and C of the US Wideband PCS frequency band.

(6) Range of Operating Powers

The transmitter output power range is 0 dBm to +30 dBm. This range of output power is controlled to sixteen discrete levels in increments of 2 dBm. This is a dynamic adjustment carried out under the command and supervision of the cellular base station and is used to control the uplink power from the transceiver during operation as the position of the transceiver changes within a cell. Transmit power tuning adjustments are made at all sixteen levels and are based on conducted power measurements: Refer to EXHIBIT 6.

(7) Maximum Power Rating (Sec. 24.232)

In no case may the peak “in the burst” output power of a mobile station transmitter exceed 33 dBm (2 Watts) EIRP. The Equivalent Isotropic Radiated Power (EIRP) for the unit tested was 32.97 dBm (1.98 Watts). (Refer also to EXHIBIT 6.)

(8) The dc voltages applied to and dc currents into the Final Amplifying Device: Refer to EXHIBIT 5.

(9) Tune-Up Procedure

There are no user accessible adjustments or tuning in this portable Wideband PCS transceiver. All necessary adjustments and tuning are performed during manufacture of the product. Any adjustments or tuning after service or repair are done as part of that process as special equipment is required to perform such adjustments.

(10) A Schematic Diagram: Refer to EXHIBIT 4

and a description of all circuitry and devices provided for:

(i) Determining and Stabilizing Frequency:
Refer to EXHIBIT 3.

(ii) Suppressing Spurious Radiation

Spurious and harmonic suppression is achieved through multiple means.

1. Radio Architecture:

   a. Selection of local oscillator frequencies and intermediate frequencies (IF) to minimize spurious products.

   b. Minimization of broadband noise both in-band and out-of-band through the combination of gain/noise figure architecture in the transmitter exciter stages and proper control of the transmitter's gain.

2. Physical Construction and Circuit Design Techniques:

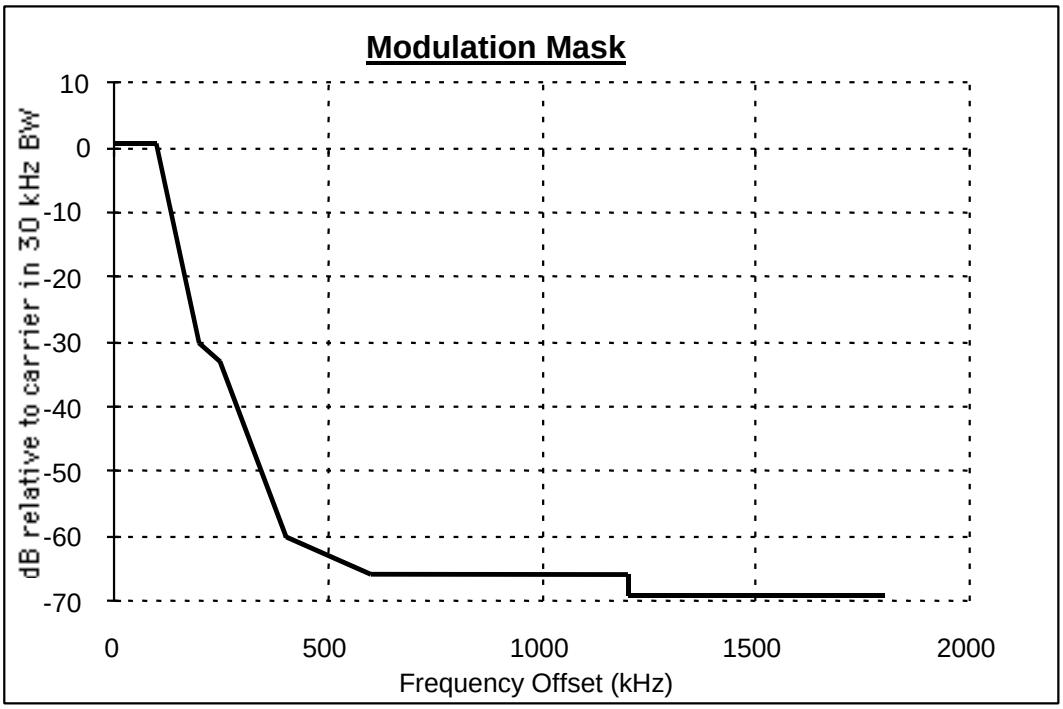
   a. Sources of spurious radiation such as frequency source circuitry and high gain circuitry within the equipment are assembled under grounded conductive shields forming a localized shielded enclosure within the unit.

b. Physical separation of frequency sources from high gain circuitry.

c. Multilayer PC boards allow use of stripline for routing signals.

(iii) Limiting Modulation

The carrier is modulated with Gaussian Minimal Shift Keying (GMSK) having a BT product of 0.3. By definition, the peak frequency deviation of GMSK is one-fourth of the bit rate, or 270.833/4 = 67.7083 kHz. There is a theoretical phase trajectory that any given bit stream should ideally follow over the period of one time slot. However, imperfections in the modulation process can introduce errors, which produce variations from the ideal trajectory. By design, the transmitter will follow the ideal trajectory to within 5 degrees RMS and 20 degrees peak phase error. The modulation imperfections can lead to a spreading of the occupied spectrum. However, the mask shown below is met under all specified conditions of temperature, humidity, voltage, and frequency. The mask shown applies to a transceiver with a conducted output power of +30 dBm.

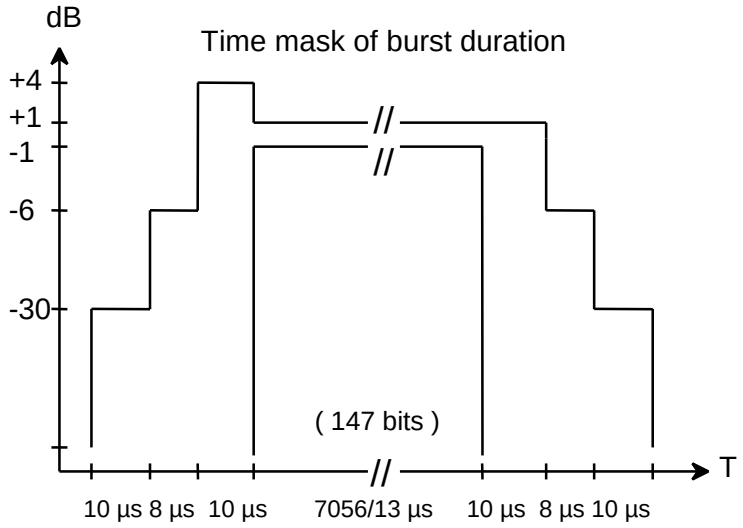


To ensure a high degree of modulation accuracy and compliance with the modulation spectral mask the modulation is imparted on the carrier through the use of direct digital synthesis techniques (Refer to EXHIBIT 2).

(iv) Limiting Power

The transmitter is capable of independently setting the output power burst for its designated timeslot out of the 8 timeslots within a TDMA frame. This is accomplished by adjusting the transmitter gain through a discrete time power control loop and ramping the transmitter's output power on and off at the beginning and end of each timeslot, respectively. A microprocessor in this power control loop monitors the transmitter's output power and adjusts it accordingly to keep it within the specified tolerance of the power level that the transceiver has been ordered to operate at by the base site.

Following is the time mask specifying the ramp up, ramp down and duration of the power output of the transmitter during the burst.



(11) FCC Labeling Requirements/Equipment Identification Label:
Refer to EXHIBIT 11.

(12) Equipment Photographs:
Refer to EXHIBITS 12 (External) and 13 (Internal)

(13) Detailed Description of Modulation System
Refer to EXHIBIT 2.

(14) Data Required by 2.1046 - 2.1057 Inclusive

Section 2.1046: Measurements Required: RF Power Output - Refer to EXHIBITS 5 and 6.

Section 2.1047: Measurements Required: Modulation Characteristics

Part 24 of the FCC Rules and Regulations contains no specific requirements pertaining to modulation characteristics. For a detailed description of GMSK modulation refer to EXHIBIT 2.

Section 2.1049: Measurements Required: Occupied Bandwidth - Refer to EXHIBIT 8.

Section 2.1051: Measurements Required: Conducted Spurious Emissions - Refer to EXHIBIT 9.

Section 2.1053: Measurements Required: Radiated Spurious Emissions - Refer to EXHIBIT 7.

Section 2.1055: Measurements Required: Frequency Stability - Refer to EXHIBIT 10.