Applicant: Qualcomm Inc. FCC ID: J9CGSK2HFK

Exhibit 4 Product Overview (Part 2.1033)

4.1 Technical Description

The GIK-1700 "K2 Globalstar Hands Free Carkit" (HFK) operates in Globalstar mode only, communicating directly with overhead Globalstar satellites and via those satellites to the nearest Globalstar Gateway and through the Gateway to the rest of the network. The service supports voice and data communications. The Globalstar HFK uses Code Division Multiple Access (CDMA) technology to provide secure, dependable service to the user.

4.2 Address of Manufacturer and Applicant 2.1033 (c) (1)

Manufacturer:

Qualcomm Incorporated
5775 Morehouse Drive
San Diego, CA 92121
Telephone: (858) 587-1121

Applicant:

Qualcomm Incorporated
5775 Morehouse Dr.
San Diego, CA 92121
Telephone: (858) 587-1121

4.3 FCC Identifier 2.1033 (c) (2)

The FCC identifier is: J9CGSK2HFK

4.4 User Manual 2.1033 (c) (3)

See Exhibit 8 Globalstar K2 HFK User Manual

4.5 Types of Emissions 2.1033 (c) (4)

1M25G1W

4.6 Frequency Range 2.1033 (c) (5)

Each Globalstar HFK is capable of transmitting on any one of the frequency channels defined between 1610 and 1626.5 MHz. In the US and other countries where one or more TDMA mobile satellite service (MSS) low earth orbit (LEO) systems are authorized to operate, Globalstar HFKs transmit (and are authorized to transmit) in only the lower 9 of the 13 channels, operating in the frequency range from 1610 to 1621.35 MHz. Depending on local Globalstar traffic conditions, a given HFK may be assigned to operate on any of the authorized channels for a given call. Multiple access and efficient frequency re-use is provided by means of code division multiple access (CDMA) technology.

4.7 Operating Power Levels 2.1033 (c) (6)

Active power control is employed in the Globalstar system to minimize collateral interference between proximate Globalstar subscribers, since as is true of any multiple access spread spectrum system, other users signals represent noise to a given users signal. Thus all signals are automatically reduced to minimum power levels by the system, transparently to the user. As defined in the Globalstar Air Interface (GAI) Specification (80-25118-1), the effective isotropic radiated power (EIRP) of a mobile HFK operating at maximum power output is 2.51 Watt.

4.8 DC Supply and Current Range 2.1033 (c) (8)

The HFK is powered by an external DC power supply, which provides a nominal 12.0 V_{DC} nominal (10.8 to 16.0 V_{DC} range) at 300 mA to 2.0 Amperes current draw; 24 Watts maximum load. Power to the transmitter power amplifier (PA) passes through multiple switching and analog power regulator stages, and the PA never “sees” any changes in the supply voltage. It is thus virtually immune to any effects of voltage fluctuation within the defined DC power voltage input range of the HFK. Outside that range the HFK simply shuts down.

4.9 List of Semiconductor Active Devices 2.1033 (c) (10)

See Exhibit 12 Parts List

4.10 Circuit Diagram 2.1033 (c) (10)

See Exhibit 11 Schematics

4.11 Transmitter Tune-Up Procedure 2.1033 (c) (9)

All frequency adjustments are set at the factory and there are no frequency field adjustments for this product. The transmit frequency is locked to the base station and controlled by VCTCXO adjustments to offset any possible errors.

4.12 Frequency Stability Device 2.1033 (c) (10)

All RF oscillators are phase-lock loop locked to the output signal of a voltage controlled temperature compensated crystal oscillator (TCXO), the master oscillator of the system. It is specified to provide frequency accuracy to better than 5 parts per million over the HFK's five year design life. Exhibit 14 details the temperature variation frequency stability test results which have been obtained. Due to the relatively large Doppler error inherent to an LEO communications system, transmit frequencies are locked to the TCXO signal and are not adjusted based on frequency differences with respect to Gateway transmitted signals.

4.13 Spurious Radiation Suppression Devices 2.1033 (c) (10)

See Exhibit 6 and Exhibit 11

4.14 Drawing of Equipment Identification Plate or Label 2.1033 (c) (11)

See Exhibit 5 Identifier Label

4.15 Photographs 2.1033 (c) (12)

See Exhibit 9 and Exhibit 10

4.16 Modulation Technique 2.1033 (c) (13)

The Globalstar Air Interface uses a modified form of IS-95 to support Code Division Multiple Access. CDMA was selected for Globalstar because it represents a proven technology that can provide efficient modulation scheme for satellite communications. It is relatively interference tolerant, both from a standpoint of generation of interference to other services and tolerating outside interference. As a bonus, there is a level of security inherent in the modulation scheme. It is difficult to listen into conversations or to pirate services from the system. CDMA is able to provide good voice quality while operating at relatively low RF power levels. The Globalstar CDMA is based on the existing QUALCOMM CDMA product line used for terrestrial cellular communications.

4.17 Test Data 2.1033 (3) (14)

See Exhibit 14, Exhibit 15, and Exhibit 16

4.18 RF Block Diagram

See Exhibit 6 Block Diagram