

MOBILE EARTH STATION TECHNICAL & OPERATIONAL INFORMATION

This Technical Operation Exhibit is attached to an FCC Earth Station License Modification Application, which **seeks to add quantity 250,000 of a new terminal type to the current blanket Mobile Earth Station (MES) license.** The new MES terminal is a transmit-only **SPOT Satellite Messenger and Tracker or Satellite Personal Tracker (“PTracker”)** handheld device for sending user location telemetry data.

SPOT Messenger

SPOT is the world’s first satellite messenger. Whether the user is just checking in, or allowing others to track their progress, SPOT provides a vital line of communications with friends and family when the user wants, and emergency assistance when and where the user needs it, particularly where cell phones don’t work. The device uses the GPS satellite network to acquire its coordinates, and then sends its location and a pre-programmed message over the Globalstar satellite network. The device provides a “Check In” function to let contacts know where the user is and that they are okay, a “Track Progress” function to send and save the user’s location using a mapping application, an “Ask For Help” function requesting non-emergency assistance at the user’s location from the user’s designated contact, and an “Alert 9-1-1” function to dispatch emergency responders to the user’s location. A complete description of the device and additional information can be found at www.findmespot.com.

The Alert 9-1-1 function is used in the event of a life threatening or other critical emergency to notify emergency services of the user’s location and that they need assistance. The GEOS International Emergency Response Center alerts the appropriate agencies worldwide, e.g. contacting 911 responders (Public Safety Answering Points or PSAPs) in North America or 112 responders in Europe. To activate Alert 9-1-1, the user presses and holds the 911 button on the SPOT for at least two seconds. Once activated, the SPOT indicator light will flash green every 3 seconds and turn solid green for 5 seconds as the distress message is transmitted. The SPOT will acquire its coordinates from the GPS network and send that location along with a distress message every five minutes until cancelled. Based on the user’s location and personal information, the Emergency Response Center notifies the appropriate emergency responders, which may include local police, highway patrol, the Coast Guard, an embassy or consulate if outside the United States, or other emergency response or search and rescue teams, as well as notifying the user’s designated emergency contact(s) about the receipt of a distress signal. Even if SPOT cannot acquire its location from the GPS network, it will attempt to send a distress signal, without GPS location, to the Emergency Response Center, which will still notify the user’s contacts and continue to monitor the network for further messages. To cancel the distress signal, the user presses and holds the 911 button on the SPOT for at least 3 seconds. The flashing green light will flash red to indicate that it is preparing to send a cancel message, and then will turn solid red for 5 seconds as the message is transmitted. Accidental activation of the Alert 9-1-1 function is mitigated by the SPOT device design, which incorporates a recessed 911 button, and through the visual display of flashing lights to clearly indicate the status of the unit, with the ability to send a cancel message. Unlimited Alert 9-1-1 usage is included as part of the basic SPOT service plan.

Response to FCC Form 312, Question 43
TECHNICAL OPERATION

The National Association of Search and Rescue estimates that there are over 50,000 search and rescue missions launched each year in the United States. Most of these are initiated without knowledge of the victim’s location. In early trials, SPOT has already resulted in emergency rescues. User testimonials can be found at www.findmespot.com/experiences.testimonials.aspx.

Antenna Facilities

The antenna pertinent to this license modification, the SPOT Satellite Messenger and Tracker or Satellite Personal Tracker, has been designed by Axxon LLC of Covington, LA. In production, it may be fabricated by a third party manufacturer. The new MES radio type corresponding to this application modification is indicated below:

Radio Type	Radio Designator	Services Offered	Frequency Bands (MHz)	Antenna Designation
PTracker	Single mode	Globalstar™	Tx ¹ : 1610-1621.35	GS TX

¹ Tx - transmit band

The new radio is equipped with one Globalstar™ transmit antenna. The antenna has hemispherical coverage with a quasi omni-directional gain pattern, and is integrated in a single housing with the radio unit.

The PTracker SPOT uses an active patch antenna designed by Axxon. The patch antenna is 1.75 inches square and 0.3 inches thick and its peak gain is 5.0 dBic. The patch antenna is mounted with the radio in a waterproof housing 4.38 x 2.75 x 1.5 inches.

Key characteristics are summarized in the table below:

**Globalstar™ Satellite Personal Tracker Antenna
(GS TX)**

Parameter	Transmit Antenna	Receive Antenna
Frequency	1610 to 1621.35 MHz	N/A
Polarization	Left Hand Circular	
Peak Gain	<5.0 dBic	
Elevation Plane Coverage	10 to 90 degrees	
Azimuth Plane Coverage	360 degrees	
Gain below 10 degrees elevation	<0 dBic	
Size	1.75” square, 0.3” thick	

Response to FCC Form 312, Question 43

TECHNICAL OPERATION

Antenna Heights

The extremely small size of the mobile terminal makes FAA notification unnecessary. See Section 17.14(b) of the Rules.

The PTracker is intended to be used as a handheld portable radio at roughly waist level of approximately three to four feet above ground level (“AGL”), but will still operate if held higher or set down on a surface.

Operational Parameters

- a) Frequency of operation: Transmit band of 1610 to 1621.35 MHz.
- b) Antenna Polarization: Left hand circular
- c) Emission Designator: 2M50G2D
- d) Maximum EIRP: The maximum EIRP of -3.0 dBW is dictated by the maximum available transmitter power of the radio and its peak antenna gain. The EIRP density is the EIRP divided by the channel bandwidth of 2.50 MHz and further corrected for the required 4 kHz bandwidth.
- e) Maximum EIRP Density

New Radio Type and Antenna Type	Max Tx Power Available (dBW)	Peak Antenna Gain (dBic or dBi)	Max EIRP (dBW)	(e) Max EIRP Density/Carrier (dBW/4 kHz) ²
PTracker	-8.0	5.0	-3.0	-31.0

² Meets the -15 dBW/4 kHz MES limit specified in the FCC General Rules and Regulations governing Frequency Allocations and Radio Treaty Matters (47 C.F.R. Part 2), Section 2.106, footnote S5.364.

- f) Description of Modulation: The Globalstar™ PTracker MES transmitter utilizes direct sequence CDMA at a chip rate of 2.50 MHz on BPSK modulation. Baseband filtering is implemented to meet the out-of-band emissions requirements. Each transmission is done at a constant power level, i.e. this MES terminal does not use power control.

Additional Technical and Operational Information

• **Radioastronomy Protection**

The Globalstar™ PTracker MES operates in the 1610 - 1621.35 MHz (earth-to-space) band. In this band, Mobile Satellite Services is co-primary with Radiodetermination Satellite Services.

Globalstar, Inc., intends to abide by the radioastronomy coordination guidelines set forth in the FCC Rules governing the Satellite Communications (47 C.F.R. Part 25), Section 25.213(a). A coordination procedure is outlined in the “Technical Operational Coordination Agreement for the Joint Usage of the Band 1610.6 – 1613.8 MHz between the National Science Foundation and Globalstar for Airborne Mobile Earth Stations Operating in its Mobile Satellite Service (MSS) Network,” dated November 29, 2001. Under the agreed operational procedure, radioastronomy sites in the US will inform the operator of the Globalstar™ gateway serving its area, through Globalstar USA, as to the planned schedule for radioastronomy measurements. During active measurement periods, the appropriate gateway will not assign particular channels between 1610.6 - 1613.8 MHz (Globalstar™ channels 1 - 3) to MESs in the radioastronomy exclusion zones.

For the PTracker units, operations will be barred in the joint band in designated radioastronomy exclusion zones.

• **GPS and GLONASS Protection**

The new Globalstar™ PTracker MES has been designed to protect radionavigation satellite services in the band 1559 - 1610 MHz, including GPS and GLONASS receivers, according to the FCC Rules governing the Satellite Communications (47 C.F.R. Part 25), Sections 25.202 (f) and 25.216. Since the unit contains an integrated GPS receiver, internal specifications require particularly stringent transmit filtering to protect its own GPS receiver performance. Specifically, the Globalstar™ PTracker terminal will not exceed an out-of-band emissions EIRP density level (averaged over any 2 ms active transmission period) of at least:

-70 dBW/MHz between 1559 - 1605 MHz; and,
-70 to -10 dBW/MHz, linearly interpolated between 1605 - 1610 MHz.

The EIRP of any discrete spurious emission (i.e. bandwidth less than 700 Hz) will not exceed:

-80 dBW between 1559 - 1605 MHz; and,
-80 to -20 dBW/MHz, linearly interpolated between 1605 - 1610 MHz.

The peak EIRP density of carrier-off state emissions (averaged over any 2 ms active transmission period) will not exceed:

-80 dBW/MHz between 1559 - 1610 MHz.