

Hiber Inc.
Responses to Experimental License Questions
File No. 0443-EX-CN-2021, Correspondence Reference No. 63529

By this submission, Hiber Inc. ("Hiber") responds to the email of the Office of Engineering and Technology ("OET") dated July 26, 2021, requesting additional information regarding the above-referenced application. For OET's convenience, provided below in bold text are the OET's requests/questions.

Please provide Technical Parameters for 200 units of Faber Electronics BV EDGE1 L-band, mobile earth terminals ("METs"). Please provide the size (meter), antenna gain (dBi), input power at antenna flange (watts), and EIRP (dBW) of the proposed METs operating in the 1626.5-1660 MHz band.

Size: 0.078 meters

Antenna Gain: 5.5 dBi at 1.6435 GHz

Input power at flange: 1.5 W

EIRP: 7.0 dBW

Please provide Specification data sheet from Faber Electronics BV manufacture for the EDGE1 L-band METs.

Data sheet attached as Exhibit 1. The terminal is owned and designed by Hiber. Faber Electronics BV is a contract manufacturer. Therefore, the data sheet is provided by Hiber.

Please clarify and confirm that applicant is the "owner" of 200 units of Faber Electronics BV EDGE1 L-band METs; which will be used to conduct tests for the provision of low-cost, low power Internet-of-Things ("IoT") services and solutions via the Inmarsat 4F3 satellite located at 98 degrees West latitude (S2932, United Kingdom-licensed).

Applicant is the owner of the 200 units of the EDGE1 METs, which will be used to conduct tests for the provision of low-cost, low power Internet-of-Things ("IoT") services and solutions via the Inmarsat 4F3 satellite located at 98 degrees West latitude (S2932, United Kingdom-licensed). Any market trials conducted will be in conformance with the limitations set forth in 47 CFR § 5.602, including rendering inoperable or retrieving the devices from trial participants at the conclusion of the trial.

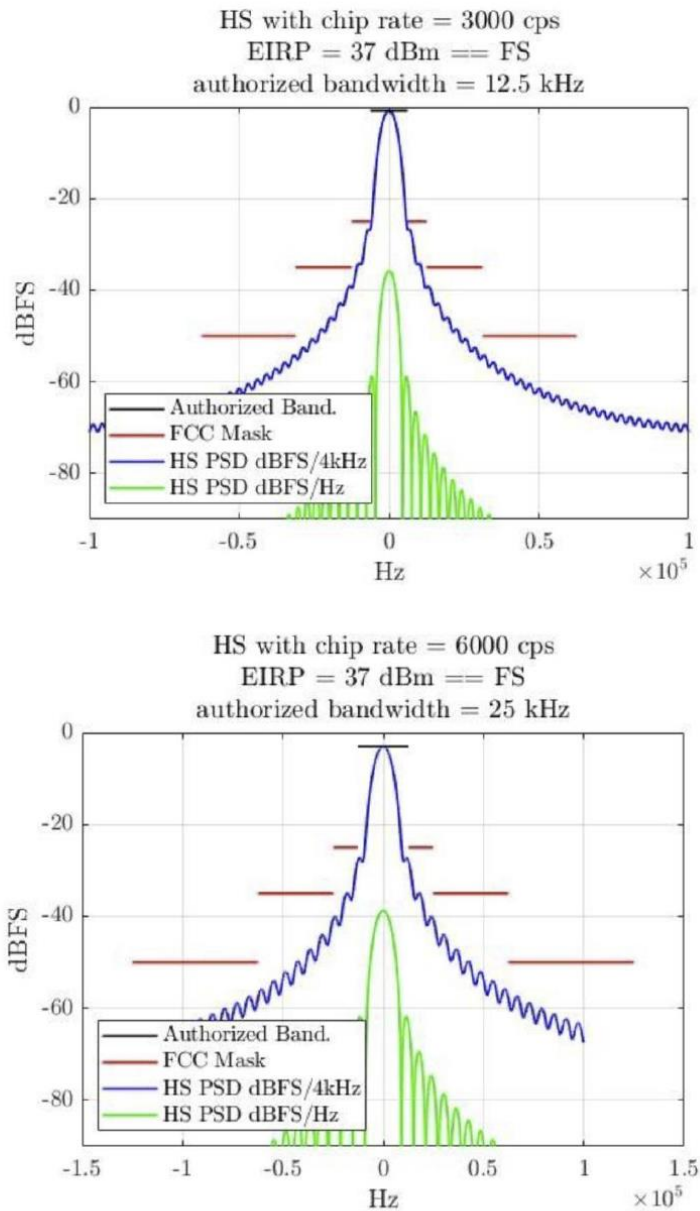
The METs will be used in test facilities operated by partners of Hiber, in controlled test environments and not in uncontrolled field operations. The anticipated use cases are for testing of the METs in two separate environments: at heavy equipment facilities in Iowa and Illinois, and at a railroad test yard in Missouri. The METs will be under the immediate custody and control of Hiber's partners at all times. All test units will be returned to Hiber immediately upon the conclusion of the testing program.

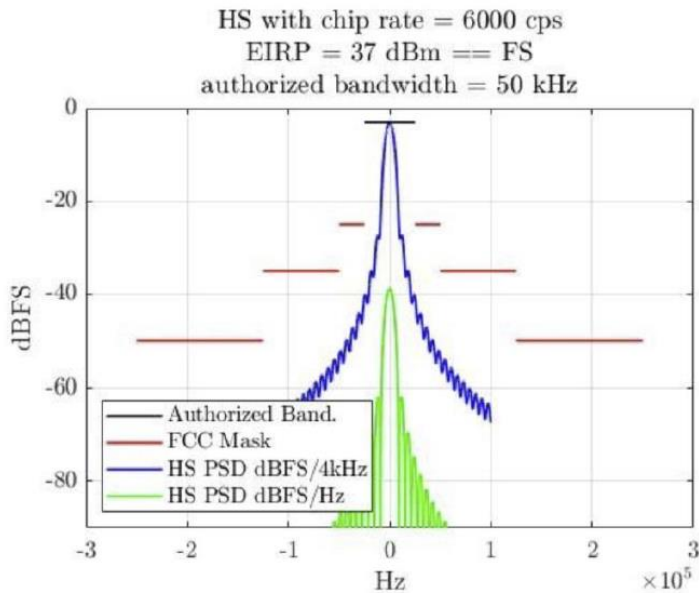
Please certify the proposed METs will conform to the FCC limits for out-of-band and spurious emissions as set forth in Section 25.202(f) and 25.216 of the FCC's Rules.

Hiber certifies that the METs will conform to the FCC limits for out-of-band and spurious emissions, as set forth in Section 202(f) and 25.216 of the FCC's rules. Additional support for this statement is provided below.

Figure 1 below shows the specific spectrum mask for the Hiber service uplink in the 1626.5 to 1660.5 MHz band at 12.5, 25, and 50 kHz. The spectrum mask demonstrates that Hiber's user terminals will comply with the out-of-band emission limitations specified in 47 C.F.R. § 25.202(f).

Fig.1





With respect to Section 25.216, the MET utilizes a B39172B5143U410 (from RFFE Qualcomm) bandpass filter at the RF front end and the power amplifier utilizes a LFCN-1700+ (Mini-Circuits) low pass filter to comply with the limits imposed in the rule.

Please describe how the proposed will meet the requirements pertaining to operation of mobile stations as set forth in the §25.287(a) (1) to (8).

Per the attached letter from Inmarsat (included as Exhibit 2), Inmarsat through its Network Operations Center in London and its network of land earth stations will maintain the same extent of positive control of Hiber's operations as it does for its other L-band users and will thereby be able to address any unlikely interference issues as required by Section 25.287 of the Commission's Rules. Specific to each provision of the rule, Hiber states as follows:

- (1) Inmarsat assigns a priority to the MET, which preserves the priority and preemptive access given to maritime distress and safety communications sharing the band
- (2) This requirement is not applicable, as MET does not handle maritime distress and safety communications.
- (3) Each MET is assigned a unique identification number, which is encoded in the transmitted message.

(4) (5), (6), and (7)

The METs to be used in the testing under the experimental license are test units that do not have an operational forward communications link. Without such capability, Inmarsat cannot control the METs or send a shut-off command to the METs, and the METs cannot receive a separate signaling channel. The forward link for the test units will be fully implemented around November 2021, after which the METs will comply fully with subsections (5), (6,) and (7). At that time, all test units in the field will be withdrawn and replaced with the updated units with the forward link capability. Until the forward link is implemented in November, the METs can be shut off manually at the test sites. As mentioned above, the METs will be operated in closely-controlled test environments operated by Hiber's partners, at fixed locations in Iowa, Illinois, and Missouri. The METs can be shut down locally at the facility on immediate notice in the unlikely event of any interference.

Hiber has pending a blanket application for 500,000 METs, which will have the forward link capability. See SES-LIC-20210607-00918 (filed June 7, 2021).

(8) This requirement is not applicable. The METs do not handle maritime distress and safety communications.

Are the proposed Mets type approval by Inmarsat? and certified pursuant to the Commission's equipment certification procedure?

Inmarsat does not utilize a formal type approval process for equipment to be used with leased spectrum. However, the MET has been designed in close coordination with the Inmarsat leasing team to ensure that the specifications and characteristics of the METs match the assigned leased band and that there will be no interference between the Hiber METs and other Inmarsat users, and the design has been approved by the relevant department within Inmarsat for use with the assigned leased spectrum. The MET has not yet been certified pursuant to the Commission's equipment certification process. This will be done following the testing for which experimental authorization is sought in the present application.

What is the shut-off time of the proposed METs?

Less than 1 second

Will the METs be capable of remote operation from Inmarsat? if so, where is the remote-control location?

Once the METs are fully operational in approximately November, the METs will be capable of being remotely operated by Hiber. The remote control location is Amsterdam, The Netherlands.

Where is the network control and monitoring center for the proposed METs?

The network control and monitoring center is located at Moermanskade 600, 1013 BC Amsterdam, The Netherlands.

Please provide a point of contact available 24 hours per day, seven days per week, with the authority and ability to terminate operations authorized herein, for discussing interference concerns with other licensees.

Maarten Engelen, CTO
+31-6-82828889, maarten@hiber.global

Please do not hesitate to contact me if you have any questions.

Sincerely,



Maarten Engelen
CTO, Hiber

Edge station with Battery.

HiberEasypulse edge station datasheet.



MAIN COMPONENTS

- GNSS module (GPS, Glonass, Galileo, BeiDou/QZSS)
 - Accuracy: 1 meter
- (2x) 3-axis accelerometer



AVAILABLE SENSOR DATA

- Location
- Movement detection
- Vibration
 - Start/stop vibration event
- Shock
 - Extreme event detection
- Vehicle run time and idle time (vibration ON & moving/static asset)

DASHBOARD

- Map
- Show last location
- Historical data
- Sensor data visualisation
- Notifications when vibration is detected
- Notifications when shock is detected

API FOR 3RD PARTY PLATFORMS

- Hiber gRPC API based on:
 - Protobuf - Google's protocol buffer
 - Protobuf libraries in most used languages, such as Java, JavaScript, Golang, C#, C, and C++
 - gRPC - Remote Procedure Call (RPC) services definition in the protobuf format, based on HTTP/2

POWER SUPPLY

- Battery powered*
- Up to 5 years lifetime at 25°C temperature
 - Up to 1 year at 1 message every 15 minutes
 - Up to 3 years at 1 message every 1 hour
- Capacity: up to 35Ah

*Batteries cannot be replaced by the customer. A new device is shipped before the batteries are depleted.

PROGRAMMING

- Edge computing
 - Data aggregation (for example: min, max and average)
 - Notification of threshold values
- Over-the-air firmware updates and configurable settings

MEMORY

- Data storage and backup
(for example when there is non-line-of sight to the satellite)
- On-board storage of 100+ messages

SECURITY

- AES-256 data encryption (optional)
- Hardware encryption and data security (ARM® Cortex®-M33)

SATELLITE CONNECTIVITY

- Global coverage
- 2-way communication
- EIRP: <7dBW
- Frequency:
 - Tx: 1626.5 - 1660.6 MHz
 - Rx: 1525 - 1559 MHz
- 32 Bytes of application payload
- Up to 100 times per day data message transmission to hiber.cloud
- Transmitted message typical latency: 10 seconds
- Message reception interval: down to 5 minutes
- Preconfigured fixed transmission rate
 - Message transmission interval: 15min-24h
- Polling by user request

ENVIRONMENTAL

- Dust and water ingress: IP67
- Operating temperature: -20°C/+65°C

INSTALLATION

- Slap-n-Track
 - Mounting plate
 - Magnets
 - Adhesive (optional)
- Direct mounting
 - Mounting plate
 - Bolting (optional)
 - Glueing (optional)

DIMENSIONS

- 160mm x 160mm x 90mm (excluding mounting)
- 250mm x 250mm x 100mm (including mounting with magnets)

WEIGHT

- 2.6 kg (including mounting plate and magnets)



16 August 2021

Mr. Bruce Henoch
General Counsel
Hiber Inc.
8400 Baltimore Avenue, Suite 320
College Park, MD 20740

Dear Mr. Henoch:

This letter memorializes Hiber's recent discussions with Inmarsat regarding Hiber's applications for FCC licenses for mobile earth terminals designed to communicate with Inmarsat geostationary satellites using transmit and receive frequencies assigned to Inmarsat in the L-band.

Inmarsat supports Hiber's license applications to this end, and Hiber may disclose our support to the FCC in the relevant applications.

Hiber's communications with Inmarsat satellites will utilize frequencies determined by Inmarsat within frequency ranges that, as a result of international allocation and coordination agreements, are exclusively used by Inmarsat to the exclusion of other operators. Through its Network Operations Center in London and its network of land earth stations, Inmarsat will maintain the same extent of positive control of Hiber's operations as it does for its other L-band users, and will thereby be able to address any unlikely interference issues as required by Section 25.287 of the Commission's Rules.

Thank you for seeking our input to Hiber's filings.

Sincerely,

/s/ Brennan T. Price
Brennan T. Price
Director, Regulatory Affairs
Inmarsat, Inc.
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Email brennan.price@inmarsat.com