Sky and Space Global (UK) Limited
Experimental License Application
File Number: 0909-EX-CN-2022

Explanation of Experiment

Sky and Space Global (UK) Limited ("Sky & Space") is a satellite company established in the UK, with offices in Poland, Israel, and Australia. The company has three satellites operating in a low earth, non-geostationary orbit that were properly licensed by UK. The three-satellite constellation is known at the Three Diamonds group of satellites. They were designed to provide connectivity across the globe, including to remote areas, for low-bandwidth Internet-of-Things (IoT) operations.

This experimental license application seeks authority to test a new type of small-format, low bandwidth, low-cost ground terminal to assess its performance when it is communicating with the Three Diamonds satellites. This testing is needed to determine what technical refinements might be needed to the ground terminals or other aspects of the communications links to make them viable tools for IoT communications.

Grant of this application will advance the development of the radio technologies that can use satellite communications to serve needs in remote areas or areas that need monitoring for operations or security.

Technical Synopsis:

- Spectrum Requested: 1980-2010 MHz
- Emission Designator: 100KG1D
- Duty Cycle: Configurable
- Output Power is low: 2W, with 4.83 W ERP
- Antenna Gain: 6 dB

Description of Experiment:

Sky & Space is seeking an experimental license for the use of 12 radios that can be used across the US for testing purposes. The radios will have antennas that face skywards, placed on a rooftop or on a pole that does not exceed 6 meters above a building or the ground. The goal is to test the radios using easy installations in a range of areas to determine how they perform and deliver IoT information. As stated above, these radios will communicate with the Three Diamonds satellites operated by Sky & Space.

The radios are under development and need to be tested for data throughput, reliability, bandwidth requirements, weather-resistance, and durability. The test results will be used to improve the design and performance of a next-generation commercial radio for IoT satellite communications that use the Sky & Space constellation.

The radios are known as S-band port terminals, or "Sport." The central frequency is configurable, and it can be set at any frequency from 1980-2010 MHz. the requested occupied bandwidth is only

100 kHz. Sky & Space is requesting access to the whole band so that it can adjust the radios being tested to various frequencies during the testing. A single radio will only use one 100 kHz channel at a time during testing, and that use will be local. The request for the frequency band is intended to allow flexibility in the testing, not for use of the whole band at any time at any location.

Time of Use:

The radios are expected to be in use approximately eight (8) times each day for ten (10) minutes per use. These operations are expected to be primarily during the day, although some testing will be conducted at night if there are installations which need night-time monitoring.

Location of Operations:

Sky & Space has requested continental U.S. (CONUS) operations for this experimentation because it anticipates testing its technology in a range of settings. Those settings include transport and cargo locations such as container shipping ports; rail yards; pipeline monitoring; meter reading; mining operations – for tracking equipment and chemical monitoring; solar and wind generation monitoring; and agricultural settings.

The experiment proposes the use of 12 radios that could be moved from one site to another during the course of the testing. Each setting has specific data requirements, and the radios need to be able to accommodate variability in the speed transmissions and number of satellite passes. The testing will inform Sky & Space about system configuration needed for this technology to be viable for some of the settings described above.

The testing will also examine range of parameters required for effective radio connection between the ground stations being licensed here and the satellites that are already in operation. Sky & Space will be collecting test data on operations at various latitudes and longitudes to determine whether there are areas that require additional coverage.

No Likelihood of Harmful Interference:

Sky & Space would operate on a non-interference, unprotected basis. Any harmful interference to other licensed services operating in the band will be quickly mitigated, including by shutting down the Sky and Space ground transmitter.

The proposed experimental operations request a limited amount of bandwidth that will be used very sporadically. Further, the proposed operations use only a small amount of the spectrum in the band. The power requested is relatively low, and there will be few installations since the application seeks use of only 12 transmitters to be deployed in the continental US..

To achieve maximum effectiveness, the antennas will be aimed at the sky. The transmit antennas will be mounted on top of a building or rail car or container. This should shield the backlobe from most of the RF energy that will come out of the antenna, minimizing any risk of harmful interference.

Sky and Space will coordinate with any other licensed operations in the band that it proposes to use for this testing. The uplink transmissions will only use a small portion of the requested spectrum for any transmission, and the transmissions are expected to take very little time.

These factors combine to minimize the chances of any harmful interference to other operations.

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Conclusion:

Sky & Space is seeking an experimental license to test the operations of radios under development for Internet of Things operations. The application seeks operations across the continental United States, which will allow the applicant flexibility to use each of its 12 radios in varied locations and for varied applications. This will maximize the effectiveness of the testing.

If there are any questions about this application, please contact Anne E. Cortez, Esq. Counsel to Sky and Space, alc@conspecinternational.com or 520-360-0925.