

To: Craig Scheffler  
E-Mail: craig@swarm-technologies.com  
From: Doug Young  
Date: August 02, 2017

Subject: Request for Info - File # 0305-EX-CN-2017

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Message:

Please address the FCC's International Bureau/Satellite Divisions concerns below:

ODAR comments/issues:

Please provide the full dimensions of the antennae (thickness, length, width).

Do we understand correctly that the DAS collision analysis was completed for a single satellite, and with an area-to-mass figure based on the satellite body, excluding the antenna? If not, please describe in more detail the analysis undertaken, and address whether the satellites' largest dimension has been adequately accounted for in the analysis.

Please provide an analysis or estimate of the average A/M of the satellites if tumbling.

Please provide an estimate of the altitude at which satellite attitude stability is expected to degrade substantially, and/or cease.

Please address whether skin friction effects on the antenna can be expected to reduce orbital lifetime.

Please address whether "skin friction" effects on the antenna can be expected to reduce attitude stability.

As launched, will the satellites have a transmission schedule, or is the initiation of satellite transmissions dependent on an initial schedule uploaded via earth station transmissions? Will initial satellite acquisition be solely dependent on radar or other observation data?

Do the Haystack observations require special funding or cooperative research arrangements, or are the observations within the standard scope of Haystack activities?

Other than a GPS receiver, are there any other measurement devices/sensors on the spacecraft?

U.S. Table of frequency allocation comments:

137.825-138 MHz  
Mobile-satellite (space-to-Earth) US319 US320  
RR FN 5.208

RR FN 5.208: The use of the band 137-138 MHz by the mobile-satellite service is subject to coordination under No. 9.11A.

FN US320: The use of the bands 137-138 MHz, 148-150.05 MHz, 399.9-400.05 MHz, and 400.15-401 MHz by the mobile-satellite service is limited to non-voice, non-geostationary satellite systems and may include satellite links between land earth stations at fixed locations.

Please note that the MSS allocation in the 137-138 MHz band only allows downlink operations; applicant is proposing to operate in the 137-138 MHz band in the uplink direction which is not in accordance with the Radio Regulation. The applicant has not provided an electromagnetic compatibility (EMC) analysis to show that the uplink operations will not cause harmful interference to other downlink earth stations.

Applicant please submit an EMC analysis for the uplink operations to show compatibility other FCC license stations in the 137-138 MHz band. We note that the applicant has obtained consent from ORBCOMM. However, applicant must be aware that the downlink operation will required coordination under No. 9.11A.

Form 442:

For the 137.95 MHz uplink operations, the application has identified earth station as a MOBILE station class with a radius of operation of 5 km. Applicant please clarify if the uplink earth station is moving while transmitting or does it operate in a fixed location but is transportable within a 5-km radius. Why is there a need to move the earth station?

SpaceCap API file:

On the uplink, RX beam:

The box RR 4.4 was NOT checked "Y"; however, this uplink is not in accordance with the ITU RR so this box will need to be checked "Y".

On the max peak power, it has a value of 3.4 dBW and min peak power has a value of 2.3 dBW; however, Form 442 has this power as 1 W = 0 dBW; applicant please review the power levels in both form and update either form to make the technical parameters consistent.

If the power level changes then the power spectral density value will also need to be updated.

On the associated earth station, the co-polar reference pattern is identified as ND-EARTH (which is non-direction earth); however, we note that the beamwidth is 90 degrees which is directional; therefore, we suggest that we remove this ND-EARTH reference and submit the antenna pattern earth station provided in the application.

On the downlink, TX beam:

Box RR No. 4.4 is not marked "Y" which indicates that the applicant will need to coordinate this frequency band.

The minimum elevation angle is given as 0 degrees; however, this value should be 5 degrees.

On the max peak power, it has a value of -8.7 dBW and min peak power has a value of -9.8 dBW; however, Form 442 has this power as 100 mW = -10 dBW; applicant please review the power levels in both form and update either form to make the technical parameters consistent.

On the associated earth station, the co-polar reference pattern is identified as ND-EARTH (which is non-direction earth); however, we note that the beamwidth is 90 degrees which is directional; therefore, we suggest that we remove this ND-EARTH reference and submit the antenna pattern earth station provided in the application.

Exhibit A document:

On the introductory section, second paragraph, start of the second line, it describes the satellite as microsattellites; however, these satellites would fall under nano-satellite or femto-satellites depending of their weight but not microsattellites.

NTIA Space record data document:

Part A, on Earth Station Data (Receiver #1), antenna dimension, it has the beamwidth as 180 degrees yet API has it as 90 degrees.

Part A, on Earth Station Data (Receiver #2), antenna dimension, it has the antenna gain as 1.76 dBi; this antenna is not in the API nor is there an antenna pattern for this antenna.

Part B, on Earth Station Data (Transmitter Data #1), antenna dimension, it has the antenna gain as 1.76 dBi; this antenna is not in the API nor is there an antenna pattern for this antenna.

Part B, on Earth Station Data (Transmitter Data #2), antenna dimension, it has the antenna gain as 1.76 dBi and beamwidth of 35 degrees; this antenna is not in the API nor is there an antenna pattern for this antenna.

Antenna Pattern documents:

Please redo the antenna patterns provided without the satellite names, antenna height, power levels, orbital parameters; only include technical information related to the antenna characteristics.

The items indicated above must be submitted before processing can continue on the above referenced application. Failure to provide the requested information within 30 days of August 02, 2017 may result in application dismissal pursuant to Section 5.67 and forfeiture of the filing fee pursuant to Section 1.1108.

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Responses to this correspondence must contain the Reference number : 38209