



Air-Ground Mobile Broadband Service in 14.0-14.5 GHz Band

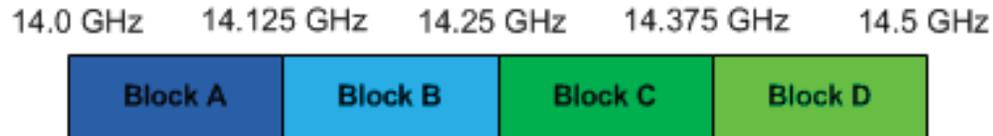
RM-11640, GN 13-114

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Multiple Licenses

- Four 125 MHz license blocks in 14.0 – 14.5 GHz band



- Aggregation of up to two license blocks in auction
- Flexible auction will generate higher auction revenue
 - Enable auction participation by entities with a wider range of financial backing
 - Competitive airborne connectivity market would support four licenses
 - Smaller 125 MHz license block will promote competition and enable participation by smaller providers



Robust Service in 125 MHz block

- 125 MHz spectrum blocks have adequate network capacity
 - 100 Gbps aggregate forward link capacity and 25 Gbps reverse link capacity
 - Over 16 times current Gogo network's peak capacity
 - Over 110 times conventional Ku-band satellite capacity for ESAA over CONUS
- 125 MHz blocks are sufficient to support current state-of-the-art 4G carrier aggregation technology
- Federal coordination restrictions would have no significant service impact
 - Low probability of interference to NASA TDRSS in 14.0-14.05 GHz band
 - Lack of comments and information in 14.4 -14.5 GHz band for Federal fixed and mobile services indicates that the operators of these services perceive no risk of harm from Air Ground Mobile Broadband Service (AGMBS)
 - Inhibiting aircraft transmission in 14.47-14.5 GHz band and coordination of ground stations will avoid interference to Radio Astronomy with little impact on the utility of the upper 30 MHz



Technology Neutral Rules

- Protect primary satellite services by specifying maximum aggregate spectral density towards GSO and NGSO satellites
 - Allows flexibility for licensees to allocate interference budget over the aggregate of ground stations and aircrafts
 - Rule 22.1120(a) references an illustrative AGMBS system with a particular number of ground stations and beams per site; this is specific to one implementation and does not allow tradeoffs in ground station site placement and antenna design
 - Rule 22.1120(b) references maximum aircraft EIRP density assuming a certain aircraft antenna pattern. For aircraft antennas with better pattern discrimination above horizon, the EIRP density can be higher
- Maximum aggregate spectral density towards GSO should be based on a $\Delta T/T$ of 1% and maximum G/T of 6 dB/K



Considerations for Future Ku-Band Satellites

- Commission should consider interference impacts of future Ku-band satellites when adopting AGMBS rules
 - NGSO satellite systems with low elevation footprints
 - Future GSO satellites with high average G/T
- Uncertainty in potential interference scenarios would limit investments in AGMBS



Five-Year Substantial Service Requirement

- Constructing an AGMBS system covering U.S. airspace will require only ~200 base stations and could be accomplished readily in five years
- Qualcomm, the only other commenter to address this issue, also supported a five-year timeframe
- Alternatively, the Commission should establish a seven-year build-out period with an interim milestone at the four-year mark