CEPT ECC
Electronic Communications Committee

Project Team FM PT 48

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Subject: **Aircraft antenna concept for Direct Air-to-Ground Communication (DA2GC)**

Password protection required? (Y/N)[1] N

Summary

This document contains information about the aircraft antenna concept for the Broadband Direct Air-to-Ground Communication (DA2GC) system proposed in ETSI TR 103 054.

Proposal

FM PT 48 is invited note the information provided in this document.

Background

This contribution intents to respond on the information about the North American developments in Broadband Direct Air-to-Ground Communications given in document FM48(11)034.

[1] ECC policy is that in general all documents should be publicly available unless the author of the document requires that it be restricted to ECC family participants only.

Antenna constellation for the DA2GC system proposed in ETSI TR 103 054

Comparison with ATG-4

Aircell's ATG-4 service is using a 3G radio technology compared to the 4G technology chosen in ETSI TR 103 054. In particular, ATG-4 does not apply MIMO technology and interference handling mechanisms as they are inherently included in the corresponding 3GPP standard(s). The use of directional antennas as intended by Aircell for their 3G system leads to performance increase - especially because of the limited bandwidth available in the US - but would not have the same effect for a LTE based DA2GC system.

Arguments against directional aircraft antennas in a LTE based DA2GC system

On the one hand directional antennas at the aircraft would reduce interference in a LTE based system to some extent, but on the other hand also reduce the capacity improvements achieved by multi-streaming, etc.

In addition, the aircraft-based equipment should be as simple and cost-efficient as possible. Directional antennas would be more complex, resulting typically in higher drag and weight (including RF cabling). Moreover, a dual modem is not necessary in case of a LTE technology, which already exploits diversity with a single modem through its native support of the MIMO multi antenna technique. A dual modem would just unnecessarily increase the CAPEX for the airline.

Performance figures for a LTE-based DA2GC system

The draft performance figures given in document FM48(11)024 on spectrum demand estimation for the LTE based DA2GC system consider already an aircraft antenna constellation that is able to exploit the two orthogonal polarization modes available in a DA2GC system. Using directional antennas as intended by Aircell for their 3G system is not necessarily suitable for a LTE system as it counteracts LTE's capability to exploit diversity through its multi antenna techniques.