Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Use of Spectrum Bands Above 24 GHz For Mobile Radio Services	)	GN Docket No. 14-177
	)	
And the resultant	)	
	)	
Report and Order for Further Notice of Proposed Rulemaking	)	FCC 16-89

COMMENTS OF ZODIAC INFLIGHT INNOVATIONS

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Zodiac Inflight Innovations (Zii) offers the following comments in response to the Further Notice of Proposed Rule Making (FNPRM) for the above-referenced Report in which the Commission requested further technical analyses and sharing studies associated with the potential use of 60 GHz transmitters on aircraft.

After preparing our previous response to the NPRM for GN Docket No. 14-177 earlier this year Zii set out to verify our understanding of fuselage and cabin window attenuation (as summarized in Report ITU-R M.2283) as it applies to 60 GHz. From our initial analysis we determined that aircraft fuselage and cabin window attenuation was the primary ambiguity in our assessment of total signal attenuation between cabin emitters and both RAS sites below and EESS sensors above the aircraft.

We procured a 747-400 fuselage section with multiple windows and shipped it to Technische Universität Braunschweig (TU-BS) for use in a measurement program. The TU-BS high frequency measurement team programmed a robot arm to position a receiver in a spherical pattern around the target to measure the attenuation through the fuselage and cabin window.

While we waited for the fuselage section to arrive and be set up for testing we reviewed Recommendation ITU-R RS.1861-0-2010 and determined those EESS sensors which would be most at risk based on frequency and scan type. We included all sensors operating within 57-71 GHz as well sensors operating within frequency ranges that were subharmonics or harmonics of the 57-71 GHz range. Limits for harmonics were derived from spurious limits in CFR 15 Part 255 with further guidance from ETSI EN 302 567 V1.2.1.

A threat analysis was performed on each of the potential victim sensors in accordance with Recommendation ITU-R RS.2017. Free air attenuation values were calculated based on the slant range distance between the aircraft and each sensors using the methods defined in

Recommendation ITU-R P.676-10-2013 taking into account worst case aircraft position in relationship to the scans of various EESS sensor types.

An example wireless IFE system was developed for use in the analyses based on internal requirements and the results of previous studies of cabin coverage and required redundancy for reliable public operation. That example wireless IFE system was then analyzed to determine the correct values for aggregation of emitters in aircraft. Transmitting Passenger Electronic Devices (T-PEDs) were separately evaluated to contribute to the aggregate emitters study. Thereafter, a study was performed to ascertain the worst case aircraft population in both cruise and airport environments which we could use for a worst case threat analysis on each victim sensor.

Initial fuselage attenuation test results received from TU-BS on 19 September and were applied to the previously threat analyses. The test results and analyses were then shared with The Boeing Company and Airbus for comment and peer review.

Unfortunately, the time available between distribution of the studies for review and today's deadline for FNPRM comments was insufficient for the participants to complete their reviews and we are hesitant to submit such detailed studies without peer concurrence.

The Boeing Company has proposed, due to the complexity of the studies performed to-date by Zii and the need for an unequivocal response to NAS/CORF and NASA concerns for non-interference to RAS and EESS, that they would open a project with the Aerospace Vehicle Systems Institute (AVSI) to complete effort initiated by Zii and to jointly present the results to the OET and NTIA. The proposed AVSI project is expected to be completed by Q1 or Q2 of 2017 at the latest.