Expedited Action Requested

NARRATIVE DESCRIPTION

The Boeing Company ("Boeing") requests an experimental special temporary authorization ("STA") to support testing and demonstration of an airborne picocell system on Boeing's Connexion One aircraft, a specially equipped 737 used to test and demonstrate the Connexion by Boeing[SM] system. This program of experimentation will assist the industry in assessing the potential interference issues associated with the use of picocells and wireless technology onboard commercial passenger aircraft, and in developing technical and operational requirements necessary to mitigate any interference concerns. Specifically, Boeing, in coordination with one or more terrestrial wireless carriers, intends to verify the operation of a dual-technology (CDMA2000 and GSM) picocell network both on the ground and in the air, and to demonstrate the benefits of a picocell system in mitigating the potential interference to terrestrial wireless networks.

In today's airborne environment, a number of mobile phones are being used intentionally or left powered on unintentionally, resulting in higher risk of interference to terrestrial wireless networks as they attempt to communicate directly with the base stations on the ground. Picocell systems offer the potential to permit wireless communications while onboard aircraft, while at the same time avoiding potential interference into terrestrial wireless networks. The results of the proposed experiments will provide important information relating to the Commission's recently initiated proceeding addressing the use of cell phones and other wireless devices onboard on aircraft (WT Docket No. 04-435).

Boeing is also a member of the FAA-commissioned RTCA Special Committee 202, which was established to investigate the compatibility between portable electronic devices ("PEDs") and aircraft systems. Boeing's program of experimentation will also provide the Committee with critical data regarding the compatibility of PEDs and picocell systems with aircraft systems in support of its work.

The experiments proposed by Boeing are similar in scope and duration to experiments previously authorized by the Commission. *See* File No. 0320-EX-ST-2004, Call Sign WB9XWP (eff. June 1, 2004 through Dec. 1, 2004). Boeing acknowledges and accepts the condition placed on that prior experimental STA that the proposed operations are subject to immediate shut down in the event of harmful interference. *See id.* at Special Condition 1. For all of these reasons, grant of the requested experimental STA would serve the public interest.

Boeing seeks an experimental STA commencing on March 21, 2005 for a six-month term. Given the date for commencement of the proposed experiments, Boeing respectfully requests that this application be afforded expedited treatment.

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I. Description of Experiments

Boeing's proposed program of experimentation involves two phases: on-ground testing and airborne testing. Boeing seeks to test a dual-technology (CDMA2000 and GSM) picocell developed by Qualcomm at its System Integration Facility ("SIF") in Kent, Washington; and to install the picocell on the Connexion One aircraft for testing on the ground at Boeing Field in Seattle, Washington and while the aircraft is airborne. Boeing seeks to commence on-ground testing phase of its experiments on March 21, 2005, and the airborne testing phase of its experiments on May 1, 2005. Each of these phases is described more fully below.

A. On-Ground Testing

While the picocell is in a fixed location on the ground, either within the SIF laboratory building or onboard Connexion One at Boeing Field, testing will occur using both CDMA and GSM devices transmitting at a range of powers levels. The primary purpose of on-ground testing at the SIF facility is to examine RF characteristics and integration issues associated with use of the picocell system. The primary purpose of on-ground testing is onboard Connexion One is to gather data for aircraft cabin network design, system testing, and avionics interference. Both mobile phones and picocell base stations will be transmitting during ground testing.

The maximum transmit power for the CDMA and GSM devices is limited to the power requested in this experimental STA request. Up to 50 CDMA and 50 GSM mobiles may transmit simultaneously to communicate with picocell base stations. Up to four picocell base stations from the following list of available technologies will be used at any one time:

- CDMA Cellular
- CDMA PCS
- GSM Cellular
- GSM PCS

B. In-Flight Testing

In-flight testing will be conducted using both CDMA and GSM picocell base stations operating simultaneously within the Connexion One aircraft cabin. While airborne, the use of the cellular and PCS spectrum will be limited to communications with the picocell base station within the aircraft cabin. The picocells operate in such a way that the power levels of the wireless handsets will be controlled to very low levels when compared to operating with a traditional terrestrial base station. All attempts will be made to ensure that the wireless handsets only communicate with the in-cabin picocell base stations while airborne. No air-to-ground communications will be attempted using the PCS or cellular spectrum.

The picocell networks will be activated at altitudes above 10,000 feet and testing will be conducted at altitudes between 10,000 feet and 40,000 feet. During test flights, different combinations of GSM and CDMA PCS/Cellular picocell networks will be tested. The expected duration of a flight is from 1 to 4 hours.

C. Frequency Coordination

1. On-Ground Testing

Prior to transmission, frequency coordination will occur with local cellular and PCS service providers to prevent interference to commercial networks.

2. Airborne Testing

The picocell network RF channels will be coordinated with specific wireless service providers to minimize the potential for interference. In addition, some test flights will be coordinated with select wireless service providers to measure any detectable emissions on the ground originating from the airborne picocell network. Part of this research is to establish whether the power levels associated with an aircraft picocell network can be sufficiently power controlled or attenuated such that there is no harmful interference to the ground networks.

D. Test Frequencies and Equipment Information

Mode	Emission Designator	Freq Band	Unit	Freq (MHz)	# Units	Power (EIRP)	Power (ERP)	Experimental
CDMA	1M25F9W	PCS	Mobile	1850 – 1910	50	26 dBm (0.398 W)	23.83 dBm (0.242 W)	No
CDMA	1M25F9W	PCS	Fixed	1930 - 1990	1	20 dBm (0.100 W)	17.83 dBm (0.061 W)	Yes
CDMA	1M25F9W	Cell	Mobile	824.04 - 848.97	50	26 dBm (0.398 W)	23.83 dBm (0.242 W)	No
CDMA	1M25F9W	Cell	Fixed	869.04 - 893.97	1	20 dBm (0.100 W)	17.83 dBm (0.061 W)	Yes
GSM	270KGXW	PCS	Mobile	1850 – 1910	50	30 dBm (1.000 W)	27.83 dBm (0.607 W)	No
GSM	270KGXW	PCS	Fixed	1930 - 1990	1	20 dBm (0.100 W)	17.83 dBm (0.061 W)	Yes
GSM	270KGXW	Cell	Mobile	824.04 - 848.97	50	33 dBm (1.995 W)	30.83 dBm (1.211 W)	No
GSM	270KGXW	Cell	Fixed	869.04 - 893.97	1	20 dBm (0.100 W)	17.83 dBm (0.061 W)	Yes

E. Test Locations

1. On-Ground Testing

On-ground testing will be conducted at the following locations:

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Boeing Field
7277 Perimeter Rd S
Seattle, WA 98108

System Integration Facility
20403 68th Avenue, S
Building 18-61
Kent, WA 98032

The latitude and longitude coordinates (NAD-83) for these locations are:

Location	Lat	Long
Boeing Field, Seattle WA	47-32-20.3 N	122-18-54.0 W
SIF Facility, Kent WA	47-25-4.8 N	122-15-28.8 W

2. Airborne Testing

Boeing seeks authority to conduct airborne testing throughout the continental United States ("CONUS").

II. Waiver Request

To support Boeing requests in the cellular band, a limited waiver of Section 22.925 of the Commission's Rules is requested to conduct the experimental operations described herein. For the reasons described above, there is good cause for granting the requested waiver. Furthermore, the Commission's previous grant of a similar experimental STA and the absence of harmful interference from those prior experimental operations demonstrate that the Commission's Rules will not be undermined by grant of a limited waiver in this case. Finally, Boeing respectfully requests that the Commission waive any other rule that would be necessary to conduct the experimental operations described herein.