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Filed On-line

Federal Communications Commission
Office of Engineering and Technology
Experimental Radio Service

RE: **SPECIAL TEMPORARY AUTHORITY REQUEST FOR SKYTOWER INC. TO TEST IMT-2000 AND EHF BROADBAND TRANSMISSIONS FROM HIGH ALTITUDE PLATFORM**

Dear Madam or Sir:

SkyTower, Inc. ("SkyTower") hereby requests a Special Temporary Authority ("STA") to operate radio transmitters from a stratospheric platform, and to operate associated uplink transmitters, in the flight range of the U.S. Navy Pacific Missile Range Facility ("PMRF") on the Island of Kauai in Hawaii. SkyTower requests this STA for a period of five months (July 15, 2003- October 31, 2003); however, the actual number of days of airborne testing will likely be limited to no more than three over this time period. Grant of this STA will serve the public interest by permitting SkyTower to validate performance data for use of stratospheric platforms to provide both wireless communications two-way broadband signals in EHF frequencies. In support of this request, the following information is submitted:

1. Applicant's Name, Address, and Contact Information

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Contact SkyTower Technical Questions
Randall Tyner, Communications Architecture
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Contact for Questions Regarding FCC Filing and Frequency Clearance
Kenneth G. Ryan, Dir. Satellite Engineering
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2. Description of Why an STA is Needed

SkyTower requests an STA in order to test the performance of its stratospheric platform for EHF broadband transmissions. SkyTower's stratospheric platform has significant advantages over terrestrial towers and satellites for certain applications. SkyTower's platform technology has the potential to economically deliver wireless data, voice and video services to residential, business, and government customers in urban, suburban, and even rural areas. Because of its relatively large focused footprint compared to terrestrial towers, a SkyTower platform may be the most cost-effective way to bring a range of telecommunications services to remote locations. Moreover, due to its much closer proximity to earth than satellites (11 miles versus several hundred to 22,000 miles), a SkyTower platform is capable of much higher frequency reuse (over 1,000 times the capacity of a typical GEO satellite on a bps/km^2 basis), and has negligible transmission delay.

SkyTower's parent company, AeroVironment, Inc., with support from NASA and others, has developed multiple unmanned solar-electric airplane prototypes, including Pathfinder, Centurion, and, most recently, Helios. The production version of this platform technology will be capable of continuous flights of up to six-months or more at an altitude of 60,000 feet, above the weather and commercial air traffic. SkyTower is developing various telecommunications applications for the solar-electric aircraft platform and is actively exploring opportunities to either partner with existing holders of frequency spectrum or to acquire underutilized spectrum.

Skytower successfully performed demonstrations of their communications platform for IM-2000 and digital television in the S-bands and UHF bands during testing between June and October of 2002[1]. During the summer of 2001, flight testing of Helios demonstrated the ability of Helios to fly to nearly 100,000 feet, well above the planned operating altitude of 60,000 feet for telecommunications applications. It is

[1] See FCC STA File # 0047-EX-ST-2002, Call sign WB9XQL

critical for the success of stratospheric platforms that transmissions for the target applications be tested under realistic operating conditions. Further, SkyTower will agree to provide to the Commission, subject to protection or redaction of proprietary information, a report on the results of its testing.

3. Type of Operation to Be Conducted and Purpose.

Essentially there will be three systems under test. The DBF, MBH, and radiolocation systems. Each system will have three distinct set of frequencies.

DBF System Operation:

- Bi-directional EHF DBF (28/31 GHz) links between a fixed base station and Helios;
- Bi-directional IMT-2000 feeder links between a gateway station and Helios;
- Bi-directional TT&C links (2.0/2.1 GHz) links between a fixed base station and Helios;

MBH System Operation:

- Bi-directional EHF DBF (47/48 GHz) links between a fixed base station and Helios;
- Bi-directional TT&C links (2.0/2.1 GHz) links between a fixed base station and Helios;

Radiolocation System Operation

- Uni-directional link (1.7 GHz) between Helios and ground;

4. Time and Dates of Proposed Operation.

The proposed operations will be from July 15, 2003 – October 15, 2003, on a non-continuous basis, primarily during daylight-hours, and likely limited to at most three days total airborne testing over this time period. Use of the PMRF has been confirmed for the period. As mentioned below, SkyTower is contracting with Comsearch to perform a frequency coordination study for the testing in Hawaii.

5. Class of Station/Call Sign.

SkyTower seeks a Special Temporary Authority for this experimental service.

6. Location of Transmitter and/or Mobile Area, Including Geographical Coordinates

The transmitters will be tested from the Helios Platform while on the ground at the PMRF and from an airborne loiter station at approximately 60,000 feet within a 50-mile radius of: 22 02 2.51 N and 159 47 21.74 W NAD83 (within the PMRF flight range). The Gateway Uplink transmitter(s) will be tested at the PMRF at the above coordinates.

7. Equipment to Be Used.

The Helios Platform will be used to test two transmitters: a 2 GHz transmitter manufactured by NEC to test IMT-2000 applications and an EHF transmitters test broadband digital signal transmissions. Both of these transmitters are custom designed prototypes. Gateway uplink will be provided using NEC equipment. The IMT-2000 handsets will be prototypes provided by NEC that have been modified slightly to communicate with stratospheric platforms.

8. Frequency Desired. The frequencies required for these tests are summarized in the Table below:

#	Mission	Function	Frequency	Bandwidth	EIRP(dBW)	EIRP(W)	Antenna Gain	Antenna	Remark
1	DBF System	DBF Link	31.112GHz	1MHz	27dBW	501.19W	30.0dBi	Horn Antenna	DBF Uplink (MS -> POD)
			28.168GHz	1MHz	6.0dBW	3.98W	11.7dBi	DBF Antenna Array	DBF Downlink (POD -> MS)
2		TTC Link	2195.7MHz	60KHz	7.4 dBW	5.5W	13dBi	9 Elements Patch Antenna	TTC Downlink 1 (POD -> BS)
			2195.5MHz	60KHz	7.4dBW	5.5W	13dBi	9 Elements Patch Antenna	TTC Downlink 2 (POD -> BS)
			2005.7MHz	60KHz	4.4 dBW	2.75W	13dBi	9 Elements Patch Antenna	TTC Uplink 1 (BS -> POD)
			2005.5MHz	60KHz	4.4dBW	2.75W	13dBi	9 Elements Patch Antenna	TTC Uplink 2 (BS -> POD)
3		Feeder Link	2002.5MHz	1MHz	15.3 dBW	33.88W	13dBi	9 Elements Patch Antenna	Feeder Uplink (BS -> POD)
			2192.5MHz	1MHz	18.3 dBW	67.61W	13dBi	9 Elements Patch Antenna	Feeder Downlink (POD -> BS)
4	MBH System	MBH Link	48.15GHz	60MHz	18.0dBW	63.10W	26.0dBi	Corrugated Horn Antenna	MBH Uplink (MS -> POD)
			48.05GHz	60MHz	18.0dBW	63.10W	25.0dBi	Corrugated Horn Antenna	MBH Downlink (BS -> POD)
			47.995GHz	6.765MHz	18.0dBW	63.10W	25.0dBi	Corrugated Horn Antenna	Camera Control Uplink (BS -> POD)
			47.45GHz	60MHz	10.5dBW	11.22W	22.5dBi	Corrugated Horn Antenna	MBH Downlink (POD -> BS)
			47.35GHz	60MHz	10.5dBW	11.22W	22.5dBi	Corrugated Horn Antenna	MBH Downlink (POD -> MS)
			47.245GHz	6.76MHz	8.5dBW	7.08W	22.5dBi	Corrugated Horn Antenna	Camera Data Transfer Downlink (POD -> BS)
5		TTC	1987.5MHz	6.76MHz	6.0dBW	3.98W	10dBi	Flat/Patch Antenna	TTC Uplink (BS -> POD)
			2177.5MHz	6.76MHz	6.5dBW	4.47W	10dBi	Flat/Patch Antenna	TTC Downlink (POD -> BS)
6	Radio Location	Downlink	Helios1.7GHz						Helios to ground (antenna array)

9. Output Power and ERP of Transmitter.

The effective radiated power ("ERP") of the DBF link transmitters will range from 27 dBW for the earth to air ground station uplink and 6 dBW for the air to ground downlink. The DBF TT&C links will operate at 4.4 dBW (uplink) and 7.4 dBW (downlink). The DBF feederlinks will operate at 15.3 dBW (uplink) and 18.3 dBW (downlink). The MBH system will operate at 18 dBW for both the uplink and downlink of the MBH links. The MBH TT&C links will operate at 6.0 dBW (uplink) and 6.5 dBW (downlink).

10. Proposed Type of Emission

The DBF system link emissions are as follows: DBF links 1 MHz for both uplink and downlink, DBF TT&C link 60 kHz for both uplink and downlink, and DBF feederlinks 1 MHz bandwidth for both uplink and downlink.

The MBH system link emissions are as follows: MBH links 60 MHz for both uplink and downlink, MBH TT&C 6.76 MHz for both uplink and downlink. There is also an MBH Camera Control, which will operate at 6.76 MHz for both uplink and downlink.

11. Antenna Height Above Ground.

The Uplink transmitter will be less than two meters above ground. The airborne transmitters will operate from an altitude of approximately 60,000 feet.

12. Anti-Drug Abuse Act Certification.

The applicant certifies that no party to this application is subject to a denial of federal benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. § 862a.

Please direct any technical or other questions to Comsearch or to the contacts noted above.

Sincerely,

Kenneth G. Ryan
Dir. Satellite Engineering
COMSEARCH
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Exhibits Filed Online

1. Frequency Plan
2. Antenna Characteristics
3. Frequency Clearance Matrix
4. Interference Analysis Study for CC 2.1 GHz Band
5. Interference Analysis Study for POFS 2.1 GHz Band
6. Interference Analysis Study for BAS 2.0 GHz Band