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January 16, 2002

VIA FEDERAL EXPRESS

Federal Communications Commission
Experimental Radio Service
P.O. Box 358320
Pittsburgh, PA 15251-5320

**RE: SPECIAL TEMPORARY AUTHORITY REQUEST
FOR SKYTOWER INC. TO TEST IMT-2000 AND BROADCAST
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 (May 1, 2002- September 30, 2002); however, the actual number of days of airborne testing will likely be limited to approximately three days 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 on IMT-2000 frequencies and digital broadcast signals on UHF 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
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Contact SkyTower's FCC Counsel: Holland & Knight LLP
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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 IMT-2000 communications and digital television transmission. 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/km² 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.

AeroVironment has developed Helios and earlier prototypes as part of NASA's ERAST¹ project, which supports NASA's objectives:

Through ERAST many new propulsion, materials, control, instrumentation, and sensor technologies are being pioneered which could enable the development of a fleet of high-flying

¹ Environmental Research Aircraft and Sensor Technology.

aircraft that could conduct a wide variety of Earth and atmospheric missions [and] serve as relay platforms for telecommunications systems.²

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. See article, Exhibit 1. In August of 1998, Pathfinder, the aircraft that will be used for the upcoming planned telecom demonstrations, flew to over 80,000 feet (Pathfinder, is an earlier, smaller wingspan version of the solar-electric aircraft platform). It is 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.

The operations will be for the purpose of demonstrating and validating the following communications:

- Bi-directional IMT-2000 feeder links between a gateway station and Pathfinder;
- Bi-directional IMT-2000 mobile links between a fixed or mobile remote user and Pathfinder;
- Uni-directional digital television broadcast links (uplink) from a gateway station to Pathfinder;
- Uni-directional digital television broadcast links (downlink) from Pathfinder to remote users.

Communications Research Laboratories ("CRL"), a research agency of the Japanese government, has requested and will be partially funding operational tests on the requested frequencies for its international applications. NASA Dryden Flight Research Center will provide aircraft safety oversight and will participate in the testing. The aircraft will operate within airspace controlled by the U.S. Navy PMRF, and use of this facility will ensure safety and reduce possible interference. Aircraft control and telemetry frequencies are NASA allocations and have been approved for use on the flight-test range at PMRF. See Exhibit 2.

² NASA Facts, Helios Prototype: The Forerunner of Solar-Powered Flight in the 21st Century (NASA Dryden Research Center), available at <http://www.dfrc.nasa.gov/PAO/PAIS/HTML/FS-068-DFRC.html>.

4. Time and Dates of Proposed Operation.

The proposed operations will be from May 1, 2002 – September 30, 2002, on a non-continuous basis, primarily during daylight-hours, and likely limited to approximately three days total airborne testing over this time period. Use of the PMRF has been confirmed for the period. SkyTower would also likely conduct limited and intermittent on-the-ground transmissions to verify the compatibility of the transmitters with existing Pathfinder flight-control and telemetry systems.

Additionally, SkyTower is considering the feasibility of conducting certain on-the-ground testing of the transmitters at AeroVironment's Simi Valley aircraft development facility in California, prior to moving Pathfinder to Hawaii for the in-flight tests. As mentioned below, SkyTower is contracting with Comsearch to perform a frequency coordination study for the testing in Hawaii. SkyTower is also arranging for Comsearch to conduct a preliminary interference analysis for ground testing in Simi Valley, and may submit a supplement or separate STA request for Simi Valley if the results are promising.

5. Class of Station/Call Sign.

SkyTower seeks an experimental station license and requests separate call signs be assigned for the IMT-2000 transmitter and the UHF-DTV transmitter.

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

The transmitters will be tested from the Pathfinder 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) and Mobile IMT-2000 handsets will be tested near the PMRF within a 5-mile radius of the above coordinates.

7. Equipment to Be Used.

The Pathfinder Platform will be used to test two transmitters: a 2 GHz transmitter manufactured by NEC to test IMT-2000 applications and an UHF transmitter manufactured by Toshiba to test UHF digital signal broadcasting. 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.

Preferred:

<u>Frequency (MHz)</u>	<u>Guard Band (MHz)</u>	<u>direction</u>
<i>IMT-2000</i>		
1985 - 1990	1982.5 - 1992.5	ground to air (feeder uplink)
2175 - 2180	2172.5 - 2182.5	air to ground (feeder downlink)
1945 - 1950	1942.5 - 1952.5	ground to air (mobile/user uplink)
2135 - 2140	2132.5 - 2142.5	air to ground (mobile/user downlink)
1989.5 - 1995.5	1987.0 - 1998.0	ground to air (TV feeder uplink)
<i>Digital Broadcast</i>		
530-536		air to ground (DTV broadcast downlink -Ch. 24)

Alternates:

<u>Frequency (MHz)</u>	<u>direction</u>
<i>IMT-2000</i>	
Any 5 MHz bandwidth within the IMT-2000 frequencies.	
<i>Digital Broadcast</i>	
Any UHF DTV Channel	air to ground (DTV broadcast downlink)

SkyTower is requesting the 2 GHz bands specified above for several reasons: (i) these bands are IMT-2000 bands for which there are compatible user equipment and transmitters that can be modified for the tests; (ii) these tests will help validate service in the 2 GHz range in specific bands requested by foreign customers for international applications; and (iii) frequencies in the 2 GHz band are likely to be used for third-generation wireless applications that may include stratospheric platforms as integral components. For example, the Commission currently is undertaking a rulemaking to determine whether it should allow for flexibility in delivery of communications in the 2 GHz band.³ As part of this rulemaking the Commission is considering proposals by ICO and MOTIENT to allow use of

³ See Notice of Proposed Rulemaking, *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Band; Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile Satellite Service*, FCC 01-225 (Released Aug. 17, 2001) (IB docket No. 01-185, ET Docket NO. 95-18).

terrestrial augmentation of their satellite systems. ICO proposes to use high altitude platforms as well as towers. SkyTower is participating in this rulemaking. As part of its third-generation wireless proceedings, the Commission recently ordered that the 2500-2690 MHz band could be used for advance mobile and fixed terrestrial wireless services⁴ and is exploring allocation of additional spectrum in the 2 GHz band for third-generation wireless applications.⁵

The 530 to 536 MHz request is for UHF TV channel 24. However, any free UHF Digital TV channel will suffice for this experiment. SkyTower has only located one station in the Hawaiian Islands operating on Channel 24. This station, a low-power UHF translator station, KUKO-LP (Fac. Id. 41612), is located in Haleakala on the island of Maui approximately 243 miles from the PMRF. We are in the process of contacting KUKO-LP.

Additional technical descriptions of the proposed frequency plan, antenna characteristics are attached as Exhibits 3 & 4. In addition, SkyTower is contracting with Comsearch to perform a frequency coordination study focused on incumbent commercial users of this spectrum, and will provide this study upon its completion (the PMRF is responsible for coordination with all potential government users of the spectrum in the Hawaii area).

9. Output Power and ERP of Transmitter.

The effective radiated power ("ERP") of the 2 GHz transmitter will be less than 5 dBW. The ERP of the UHF system will be less than 10 dBW.

10. Proposed Type of Emission

All of the 2 GHz mobile system transmitters (uplink and downlink) will transmit CDMA spread QPSK signals, circularly polarized. (The mobile handsets used will also be CDMA spread QPSK, but linearly polarized dipole). The UHF transmitter will downlink an OFDM signal, circularly polarized from Pathfinder with a uplink feeder transmitting an OFDM signal.

⁴ See *First Report & Order, Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems*, FCC 01-256 (Released Sep. 24, 2001) (E.T. Docket No. 00-258 hereinafter "3G Rulemaking").

⁵ See *Memorandum Opinion & Order and Further Notice of Proposed Rulemaking, 3G Rulemaking*, FCC 01-224, Released (Aug. 30, 2001)

11. Antenna Height Above Ground.

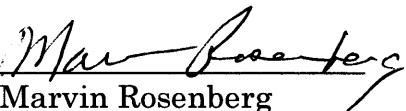
The Uplink transmitter will be less than two meters above ground. The airborne transmitters will operate from an altitude of approximately 60,000 feet.

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.

Enclosed with this letter are the requisite FCC Form 159 and a check in the amount of \$50.00 to cover the filing fee. An extra copy of this filing is enclosed. Please date-stamp the extra copy and return it to me in the enclosed self-addressed, stamped envelope. Please direct any technical or other questions to the contact persons identified above.

Very truly yours,

By: 
Marvin Rosenberg
Holland & Knight LLP
on behalf of SkyTower, Inc.

cc: Bruce Franca, OET
Carl Huie, OET

Exhibits

1. LA Times Article regarding Recent Flights
2. NASA Aircraft Control & Telemetry Frequencies
3. Frequency Plan
4. Antenna Characteristics