NARRATIVE DESCRIPTION

Panasonic Avionics Corporation ("Panasonic") seeks to renew its current experimental license (WF2XLF) for Ku-Band AMSS operations, which authorizes ground testing in support of Panasonic's Global Communications Suite ("GCS") featuring the "eXConnect" Ku-band aeronautical mobile-satellite service ("AMSS") off-board link and onboard connectivity for transmit portable electronic devices ("T-PEDs"), such as GSM phones and Wi-Fi-enabled laptops and tablets. Concurrent with its renewal request (ELS File No. 0318-EX-RR-2012), Panasonic seeks to modify this experimental license to conduct the ground testing operations in a revised group of frequency bands. All frequency bands proposed herein have been previously authorized in a series of requests for special temporary authority ("STA") and experimental licenses granted to Panasonic. Renewal and modification is sought by or before November 1, 2012, when the current authorization is scheduled to expire.

I. Background

On November 2, 2010, the FCC granted a two-year experimental license (Call Sign WF2XLF), effective until November 1, 2012, to conduct two types of testing: (1) electromagnetic interference ("EMI") ground testing of multiple, simulated T-PEDs; RF transmissions in the aircraft cabin in multiple frequency bands: GSM, cellular, Wi-Fi and others; and (2) picocell system operations in the aircraft cabin for enabling GSM phone communications for passengers and crew. Call Sign WF2XLF authorizes testing onboard parked aircraft at four sites: (1) Southern California Logistics Airport, Victorville, CA; (2) Paine Field/Snohomish County Airport, Everett, WA; (3) Piedmont-Triad International Airport, Greensboro, NC; and (4) TSTC Waco Airport, Waco, TX.[1] The instant application proposes to continue testing at these same sites, while requesting authority to conduct these testing operations in a revised group of frequency bands.

Subsequent to the grant of Call Sign WF2XLF, Panasonic has sought and obtained a series of separate, but related experimental STAs or two-year experimental licenses at additional airfields: (1) Call Sign WE9XMG, granted August 1, 2010, to conduct T-PED EMI testing in certain Wi-Fi bands at the Hartsfield-Jackson International Airport in Atlanta, GA; (2) Call Sign WE9XVM, granted April 18, 2011, to conduct T-PED EMI and picocell testing at the Roswell Industrial Air Center, Roswell, NM; (3) Call Sign WF9XCS, granted September 9, 2011, to conduct T-PED EMI testing in certain Wi-Fi bands at Paine Field/Snohomish County Airport, Everett, WA; (4) Call Sign WF9XGL, granted on December 1, 2011, to conduct T-PED EMI testing in multiple frequencies at the Melbourne, FL International Airport; (5) Call Sign WF9XNT, granted on March 20, 2012, to conduct T-PED EMI testing at the Griffiss International Airfield in Rome, NY (at the same frequencies as authorized under Call Sign WF9XGL); and (6) Call Sign WG2XEE, granted on May 24, 2012, to conduct T-PED EMI testing in multiple frequencies at five sites: San Francisco

[1] Prior to the application for and grant of Call Sign WF2XLF, in November 2009, the FCC granted an experimental STA for the same frequencies at these four sites (Call Sign WE9XDS). The application materials for Call Sign WE9XDS included a more detailed description of the proposed T-PED EMI and picocell testing, which Panasonic respectfully requests be incorporated by reference in the instant application.

International Airport; Denver International Airport; Chicago O'Hare International Airport; as well as the Melbourne, FL International Airport and Griffiss International Airfield in Rome, NY (at the same frequencies as authorized under WF9XGL and WF9XNT).

In addition, currently pending is an application (ELS File No. 0234-EX-PL-2012) for a two-year experimental license to conduct T-PED EMI testing at two sites: Lake City, Florida and Tampa, Florida. Also currently pending are two requests for experimental STAs: an application to conduct picocell and EMI testing in GSM frequencies at the Melbourne, FL International Airport and Griffiss International Airfield, Rome, NY (ELS File No. 0655-EX-ST-2012), as well as an application to conduct testing of the eXConnect system at the George Bush Intercontinental Airport in Houston, TX (ELS File No. 0686-EX-ST-2012). The test frequencies proposed in these pending STA requests are identical to the test frequencies sought in the instant application.

II. Test Locations

For both T-PED interference and the picocell system, testing and retesting will be conducted at scheduled intervals within the authorized testing period. The proposed testing will be conducted on the ground at the following four (4) airport facilities, all of which are currently authorized for testing under Call Sign WF2XLF:

Facility	Coordinates
Paine Field/Snohomish County Airport Everett, WA	47° 54' 22" N, 122° 16' 53" W
Southern California Logistics Airport Victorville, CA	34° 35' 51" N, 117° 22' 59" W
Piedmont-Triad International Airport Greensboro, NC	36° 5' 52" N, 79° 56' 14" W
TSTC Waco Airport Waco, TX	31° 38' 16" N, 97° 4' 45" W

As Panasonic has explained in its previous applications, its access to aircraft is dependent upon the manufacturer, airline or other owner making the airplane available at a time convenient for them. Panasonic has only a short window – in most cases only a few days – once an airplane is available to conduct the testing before the airplane must be returned to the owner.

Panasonic is in the process of coordinating the appropriate test frequency bands at these sites with the FAA. Panasonic will update the application when it has obtained the required non-governmental tracking numbers.

III. Description of Testing

T-PED EMI Testing. Consistent with its prior STA and experimental license grants, Panasonic will conduct the planned testing in the frequencies identified in Attachment 1 using a signal generator to simulate the operation of multiple T-PEDs transmitting simultaneously. The proposed testing will be conducted onboard aircraft parked at the airport facilities listed above, using various Airbus and Boeing Aircraft, including: Airbus 319 and 320 as well as Boeing 747, 757 and 777.

The aircraft avionics components and systems that are the subject of the proposed tests will operate consistent with normal operations and protocols, including applicable power levels, and be measured for any disruptive effects caused by simulated T-PED transmissions. The maximum transmit power levels of the simulated T-PED transmissions will be limited to the power levels listed below, expressed as both ERP and EIRP.

Consistent with other previous experimental authorizations, the proposed tests will be performed in accordance with FAA and industry developed guidelines for T-PED operation in airplanes: RTCA/DO-294C – Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDs) on Aircraft.[2]

Picocell System Testing. Panasonic's GSM picocell system (called "eXPhone") was designed in conjunction with AeroMobile Limited ("AeroMobile"), the leading manufacturer of GSM picocell systems worldwide, which have been authorized, sold and deployed on commercial aircraft serving Europe, Middle East and Asia. The system has been operating on an interference-free basis since its inception, but the eXPhone system implementation must be independently certified in individual aircraft types.

Consistent with its prior STA and experimental license grants, Panasonic intends to conduct testing of the picocell system in the frequencies identified in Attachment 2 in conjunction with its approved contractors. Panasonic's eXPhone system will be temporarily installed onboard the same commercial passenger airplanes along with various GSM devices transmitting at a range of power levels. The primary purpose of the picocell system ground testing is to continue to gather data for aircraft cabin network design, system testing and avionics interference. For each aircraft type, the total duration of the tests will be approximately 40 hours conducted at intervals over five days. For the EMI testing for aircraft avionics, each aircraft subsystem is tested in turn in a repetitive manner. The GSM picocell system transmitters will be operating during the duration of the tests for each interval. (A more complete description of the operation and equipment of the picocell system is included in the pending experimental STA application, ELS File No. 0655-EX-ST-2012).

IV. Test Frequencies and Other Technical Information

T-PED EMI Testing. Attachment 1 contains a table ("Table 1") listing the proposed T-PED EMI test frequency bands. Also listed on Table 1 are the proposed wireless standards and

[2] A copy of this document is available from RTCA: www.rtca.org.

associated technical information for each test band, including: modulation (pulse or continuous wave), maximum EIRP, maximum ERP, and emission designators. A single 1 MHz test frequency in each uplink band, also identified, will be used for testing. The proposed test bands and associated technical information are the same as the proposed test bands in several previously granted experimental authorizations, including Call Sign WF9XGL (Melbourne, FL International Airport) and Call Sign WF9XNT (Griffiss International Airport, Rome, NY). Panasonic is not seeking any changes in the other technical aspects of proposed tests in these bands as previously authorized. Panasonic acknowledges and accepts that the Special Conditions previously attached to the experimental STAs and licenses for T-PED EMI testing (including Call Signs WF9XGL and WF9XNT) would apply to the requested experimental license.

Picocell System Testing. Attachment 2 contains a table ("Table 2") listing the proposed picocell system test frequency bands. Also listed on Table 2 are the modulation type ("Chirp"), ERP and emission designators. The proposed frequency bands and associated technical information are the same as in the pending experimental STA application, (ELS File No. 0655-EX-ST-2012).

Finally, included as Attachment 3 is the "Stop Buzzer" contact for the proposed tests.[3]

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Panasonic respectfully requests the renewal of its two-year experimental license, as modified by the revised test frequencies as described above and identified in Attachments 1 and 2.

[3] Panasonic will update the "Stop Buzzer" contact as may be necessary upon grant of the requested two year experimental license and prior to the scheduled start of any tests.

ATTACHMENT 1

Table 1 – T-PED EMI Test Frequency Bands and Technical Information

Table 1 - T-PED EMI Test Frequencies / Transmit Power Requirements

Panasonic Avionics
Proposed Test Frequencies

Wireless Standard	Frequency start of band (MHz)	Frequency end of band (MHz)	Test Frequency (MHz)	Modulation	Test Waveform	Target EIRP (dBm)	Target EIRP (W)	Target ERP (W)	Emission Code
CDMA 2000	410	420	415	CW	2	42.0	15.8	13.7	N0N
GSM 400	450.4	457.6	454	Pulse	1	45.0	31.7	29.5	P0N
CDMA 2000	450	460	455	CW	2	42.0	15.8	13.7	N0N
CDMA 2000	479	484	482	CW	2	42.0	15.8	13.7	N0N
CDMA 2000	776	794	785	CW	2	42.0	15.8	13.7	N0N
CDMA 2000	806	849	828	CW	2	42.0	15.8	13.7	N0N
CDMAone	824	849	828	CW	2	42.0	15.8	13.7	N0N
UMTS FDD	824	849	828	CW	2	42.0	15.8	13.7	N0N
GSM 850	824	849	828	Pulse	1	45.0	31.7	29.5	P0N
IS-136	824	849	828	Pulse	1	45.0	31.7	29.5	P0N
UMTS TDD	824	849	828	Pulse	1	45.0	31.7	29.5	P0N
CDMA 2000	870	925	898	CW	2	42.0	15.8	13.7	N0N
GSM 900	876	915	913	Pulse	1	45.0	31.7	29.5	P0N
Mobile Sat	1613.8	1626.5	1626	Pulse	1	42.0	15.8	13.7	P0N
CDMA 2000	1710	1785	1748	CW	2	42.0	15.8	13.7	N0N
DCS 1800	1710	1785	1748	Pulse	1	42.0	15.8	13.7	P0N
CDMA 2000	1850	1910	1884	CW	2	42.0	15.8	13.7	N0N
UMTS FDD	1850	1910	1884	CW	2	42.0	15.8	13.7	N0N
CDMAone	1850	1910	1884	CW	2	42.0	15.8	13.7	N0N
UMTS TDD	1850	1910	1884	Pulse	1	42.0	15.8	13.7	P0N
PCS 1900	1850	1910	1884	Pulse	1	42.0	15.8	13.7	P0N
IS-136	1850	1910	1884	Pulse	1	42.0	15.8	13.7	P0N
UMTS TDD	1900	1920	1910	Pulse	1	36.0	4.0	1.8	P0N
CDMA 2000	1920	1980	1949	CW	2	42.0	15.8	13.7	N0N
UMTS FDD	1920	1980	1949	CW	2	42.0	15.8	13.7	N0N

Wireless Standard	Frequency start of band (MHz)	Frequency end of band (MHz)	Test Frequency (MHz)	Modulation	Test Waveform	Target EIRP (dBm)	Target EIRP (W)	Target ERP (W)	Emission Code
UMTS TDD	2010	2025	2018	Pulse	1	36.0	4.0	1.8	P0N
UMTS/3G/PCN	2110	2170	2140	CW	2	36.0	4.0	1.8	N0N
802.11b/g 802.11b/g 802.11b/g	2400 2400 2400	2497 2497 2497	2412 2437 2462	Pulse Pulse Pulse	1 1 1	37.0 37.0 37.0	5.0 5.0 5.0	2.9 2.9 2.9	P0N P0N P0N
FDD LTE	2500	2685	2595	Pulse	1	42.0	15.8	13.7	P0N
FDD LTE	2500	2685	2595	CW	2	42.0	15.8	13.7	N0N
Wi-Max	3400	3600	3450	Pulse	1	42.0	15.8	13.7	P0N
Wi-Max	3400	3600	3450	CW	2	42.0	15.8	13.7	N0N
802.11a/n	5150	5250	5170	Pulse	1	37.0	5.0	2.9	P0N
802.11a/n	5250	5350	5300	Pulse	1	37.0	5.0	2.9	P0N
802.11a	5470	5725	5580	Pulse	1	37.0	5.0	2.9	P0N
802/11a/n	5725	5825	5825	Pulse	1	37.0	5.0	2.9	P0N

ATTACHMENT 2

Table 2 – Picocell System Test Frequency Bands and Technical Information

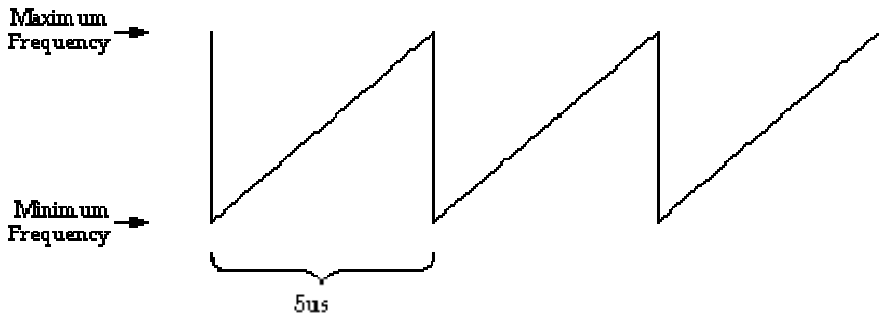
TABLE 2 – Picocell System Test Frequencies and Technical Information

Band Lower Limit (MHz)	Band Upper Limit (MHz)	Modulation Type	Target ERP (mW) (without aircraft attenuation)	Emission Designator
450	470	Chirp*	0.12303	20M0DXN
869	894	Chirp	0.35481	25M0DXN
921	960	Chirp	0.35481	39M0DXN
1805	1880	Chirp	0.39811	75M0DXN
2110	2170	Chirp	0.72444	60M0DXN

*A description of the "Chirp" modulation follows.

Description of "Chirp" Modulation

The signal in each band takes the form of a chirp, *i.e.*, a swept frequency waveform. The effective sweep waveform is a "sawtooth" triangular wave as indicated in the figure below:



Frequency Sweep Waveform

The sweep repeats at a rate of 200 kHz. This repeat rate is the same as the channel frequency width for each mobile phone. The maximum and minimum frequencies are programmable, with a maximum swept bandwidth of 75 MHz.

There will be two Cellular Radio Frequency Management Units ("CRFMU") operating on the aircraft at the same time. A slight dither, called the "M sequence" is applied to avoid the units beating and creating standing waves. This is achieved by applying a pseudo random sequence to the synthesizer reference oscillator of the Radio Frequency Printed Circuit Boards ("RF PCBs") (basically FM modulating the waveform).

A "windowing" technique is used to minimize the out-of-band emissions and improve in-band flatness. This requires the amplitude of the chirp signal to be slightly smaller (and tapered) for the extreme frequencies.

The simple sinusoidal chirp signal of constant amplitude will generate signals in every channel of the swept bandwidth. By modulating the amplitude and phase of that signal, a 'notch' in the spectrum can be produced. Within the notch frequencies the noise will have lower power. Ideally the notch should cover one section of the bandwidth, without affecting the power in the other sections. The notch section is the same frequency as the base transceiver station ("BTS"), and programmable.

The CRFMU can be programmed for various start and stop frequencies in each cellular band and for the BTS operation a notch can be generated to give additional S/N ratio.

ATTACHMENT 3

"Stop Buzzer" Contact

STOP BUZZER" CONTACT

The follow Panasonic personnel will be present and have "stop buzzer" authority to order the immediate cessation of all test activities should report(s) of interference be reported at the test sites:

Name	**Email**	**Mobile Number**
Bassam Chamas – Lead*	Bassam.Chamas@panasonic.aero	(949) 505-3084

*Additional "stop buzzer" contacts will be identified when specific tests are scheduled for each of the planned sites.