



U.S. Department
of Transportation
**Federal Aviation
Administration**

Memorandum

Subject: INFORMATION: Revised Guidance Regarding the
Installation of In-Seat Power Supply Systems (ISPSS) for
Portable Electronic Devices (PED)

Date: June 24, 1997

From: Manager, Transport Standards Staff, ANM-110

Reply to
Attn. of: 97-111-34

To: SEE DISTRIBUTION LIST

Subsequent to the release of the initial policy memo regarding in-seat power supply systems, a number of comments from the field have prompted a revisit of this policy. A formal review of the policy was accomplished by members of the High Intensity Radiated Fields (HIRF) team and they have recommended changes to the initial memo. These changes are in bold type and are located in paragraph (c) below.

The FAA Transport Airplane Directorate advises all ACO's that, for the approval of in-seat power supply systems which connect aircraft electrical power to passenger provided carry-on devices, the following conditions must be met:

- a. The in-seat power supply system must be designed to provide circuit protection against system overloads, smoke and fire hazards resulting from intentional or unintentional system shorts, faults, etc. (e.g., including spilling liquids in the sockets and children inserting thin metal objects into the sockets).
- b. Each system must be designed to prevent any radiated or conducted electromagnetic interference (EMI) to critical or essential aircraft systems. (Filtering may be used to accomplish this.) Also, the manufacturer must ensure isolation of the aircraft electrical system bus from any unacceptable electrical noise created by connected portable electronic devices or by the ISPSS.
- c. The ISPSS shall be designed such that it **may** be deactivated **at any time** below 10,000 feet above ground level (AGL). A clearly labeled and conspicuous means (on/off switch) of deactivating the PED ISPSS must be provided for **either the flight crew**, the cabin crew **or both**. This disabling feature shall be available at all times and must allow for the immediate disconnection of all seat outlets. (Because circuit breakers are not to be used as switches, their use for this purpose is not acceptable.)

It is recommended that an ISPSS light be installed in the cockpit for flight crew awareness. Also, if a system disabling feature is installed in the flight deck, a description

of the flight crew control, and its operation, must be contained in the Airplane Flight Manual.

d. Occupants shall be protected against the hazards of electrical shock. Applicants must submit substantiation of non-hazard to passengers for all proposed voltages. Substantiation must include system requirements which eliminate the risk of shock.

e. To provide for a power connection from the aircraft ISPSS to the portable electronic device, a special adapter shall be required for all connected PED's to operate. The special adapter will have the following characteristic -- it must have a mating connector that will plug into a unique connector on the aircraft side which cannot be mistaken for, and is not compatible with, a conventional duplex alternating current (AC) outlet.

f. System Power Limitations -- Applicants must submit substantiation of non-hazard to passengers for proposed maximum power. Regardless of substantiation, maximum power available at each seat outlet shall be limited to 100 watts.

g. Conducted/Radiated electromagnetic compatibility (EMC) evaluation of the in-seat power supply system shall be accomplished with maximum load at each passenger outlet.

h. System testing shall be accomplished in accordance with appropriate chapters of RTCA DO-160C. Testing for conducted emissions shall include 150 kHz to at least 30 MHz as depicted in Section 21 of RTCA document DO-160C. Additionally, the conducted emissions portion of the testing shall be continued up to 100 MHz (amplitude and voltage as specified in Section 21 of RTCA DO-160C) to ensure no RF coupling paths exist which may channel 30-100 MHz signals upstream of the ISPSS.

Although the radiated portion of the EMC evaluation normally includes testing to at least 1.6 Ghz, the radiated portion of this testing will also include frequencies from 1.6 Ghz to 6 Ghz. This additional testing should ensure protection for future advancements in aircraft electrical and avionics systems.

i. Finally, the use of external audio speakers shall not be permitted with any portable electronic device. All audio must be delivered through headphones/ headsets.

Note 1: It is not expected that the PED's perform to the category 'Z' level of radiated emissions. However, it is required that the power supply system will filter undesirable emissions generated by the PED's or by the ISPSS itself and prevent the propagation of any unwanted RF into other aircraft systems. (See condition 2 above.)

Note 2: The burden of establishing the suitability of use of a portable electronic device on a particular airplane model will remain with the airplane operator as provided for by 14 CFR Part 91, Section 91.21 of the Federal Aviation Regulations.

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