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March 14, 2002

William F. Caton
Acting Secretary
Federal Communications Commission
Washington, D.C. 20554

RE: Comments on Review of Part 87 of the Commission's Rules Concerning the
Aviation Radio Service, WT Docket No. 01-289, FCC 01-303

Dear sir:

Enclosed please find the Comments of Honeywell International Inc. in response to the Federal Communication Commission's Notice of Proposed Rulemaking regarding regulations governing the Aviation Radio Service.

If you have any questions regarding this filing, please contact the undersigned.

Sincerely,

/s/ William K. Coulter

William K. Coulter

cc: Chuck LaBerge, Honeywell International Inc.

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)
)
Review of Part 87 of the Commission's) WT Docket No. 01-289
Rules Concerning the Aviation)
Radio Service)

**COMMENTS OF
HONEYWELL INTERNATIONAL INC.**

Honeywell International Inc. ("Honeywell") is a leading producer of avionics and aeronautical navigation and communications hardware. Therefore, Honeywell takes a great deal of interest in the initiation by the Federal Communications Commission ("FCC" or the "Commission") of this Notice of Proposed Rulemaking ("*NPRM*") regarding the Aviation Radio Service.¹

Honeywell will focus its comments at this time on that part of the Commission's proposed modifications dealing with technical standards for AMS(R)S equipment. In general, Honeywell supports the objectives stated in Section II.A.1 of the *NPRM*.² However, we have the following comments and observations regarding certain of the proposals made in the *NPRM*.

1. We disagree with the proposed change to 47 C.F.R. § 87.131 that would raise the maximum output power from 60 to 80 watts.³ The proposed change to 80 watts seeks to make the reference point for the power measurement the output port of the High Power Amplifier ("HPA"). While we agree that a value of 80 watts at this point is the correct specification, we believe that the reference point should remain at the input to the antenna subsystem. Measurements at this point include the effects of the diplexer filter that establishes the broadband transmitter spectrum characteristics. This is particularly important because these spectrum characteristics are the subject of the proposed change to 47 C.F.R. § 87.139. The current state of transmitter technology makes it impossible to achieve the spectrum characteristics proposed for 47 C.F.R. § 87.139 at the output of the HPA. A filter between the HPA output port and the antenna input port is required to meet these characteristics. Because most of the table proposed in response to 47 C.F.R. § 87.139 is given in terms of decibels with respect

¹ *In Re* Review of Part 87 of the Commission's Rules Concerning the Aviation Radio Service, *Notice of Proposed Rulemaking* in WT Dkt. No. 01-289, FCC 01-303 (rel. Oct. 16, 2001).

² *Id.* at ¶¶ 5-9.

³ *Id.* at ¶ 8.

to the carrier power (dBc),⁴ we believe that the spectral characteristics and the maximum output power should be specified at the same point, namely at the output of the diplexer filter. Under these conditions, the value of 60 watts contained in the current 47 C.F.R. § 87.131 is correct and should be retained.

2. We recommend that the terms “per carrier” be deleted in two places in the proposed footnote 8 to 47 C.F.R. § 87.131 and that the term “power” be clarified as the maximum of the average output power.⁵ RTCA and ICAO documents support a specification of the maximum total average power in all carriers of the level indicated. In particular, both ICAO (Annex 10, Part III, Volume I, Chapter 4) and RTCA (RTCA DO-210D Change 1) documents specify that the critical intermodulation performance is specified with two carriers whose *total* average power is equivalent to 60 watts at the output of the diplexer filter. Our recommended change to the term “maximum of the average output power” is intended to avoid any confusion with the peak envelope power that is the “power” equivalent to the peak instantaneous envelope voltage of the transmitted waveform generated by multiple carriers.
3. We believe that footnote 8 to 47 C.F.R. § 87.131 may be further misleading by indicating that an operating aircraft earth station would intentionally generate a maximum EIRP of 2000 watts. Such is not the case. The value of 2000 watts (+33 dBW) comes about by combining the maximum antenna gain with the maximum transmitter power. In fact, all aircraft earth stations are required by the satellite system operator to employ closed-loop power control which constrains the maximum EIRP to a value in the range of 350 to 400 watts, or less.
4. The best alternative may be to revise footnote 8 to 47 C.F.R. § 87.131 along the following lines:

The maximum of the average output power may not exceed 60 watts as measured at the input port of the antenna subsystem. The maximum average EIRP generated by the maximum power into the antenna port and the maximum designed antenna gain may not exceed 2000 watts. The maximum average output power under closed-loop gain control may not exceed 630 watts.
5. Honeywell also supports modification of the Emission Limitations suggested for 47 C.F.R. § 87.139(i)(1) to reflect the latest technical standards. We note that the proposed changes to 87.139(i)(1) appear to be derived from document RTCA DO-210D Change 1. However, we point out that the entry for the range 1610.6 MHz to 1613.8 MHz should be corrected to be (minus) -80 dBW/MHz. Similarly, the entry

⁴ See *id.* at Appendix A, pp. A-6 to A-7.

⁵ See *id.* at Appendix A, pp. A-5 to A-6.

for 1660-1670 MHz should indicate an absolute power level of (minus) -49.5 dBW/20 kHz.⁶

6. A new note should also be included in the table in the proposed revision to 47 C.F.R. § 87.139(i)(1) to reflect Note 5 of RTCA DO-210D Change 1 which states: “This level is not applicable for Intermodulation products”. This note should be applicable to the 1626.5 to 1660 MHz, and 1660 to 1670 MHz table entries of the proposed 47 C.F.R. § 87.139(i)(1).
7. Another new note should be included in the table in 47 C.F.R. § 87.139(i)(1) to reflect Note 6 of RTCA DO-210D Change 1, which states: “The upper limit for the excess power for any narrow band spurious emission (excluding Intermodulation products within a 30 kHz measurement bandwidth) shall be 10 dB above the power limit in this table.” This note should be applicable to the 1626.5 to 1660 MHz and 1660 to 1670 MHz table entries of the proposed 47 C.F.R. § 87.139(i)(1). The intent of this note in RTCA DO-210D was to establish a limit of -60dBc for narrowband discrete spurious emissions in the transmit band while establishing a tighter limit of -70 dBc for emissions due to wideband noise. During the investigations leading up to adoption of RTCA DO-210D Change 1, these limits were found to be the best achievable with current equipment.
8. As an alternate to our points 6 and 7, the Commission may wish to adopt the wording of RTCA DO-262, Section 2.2.3.1.2.1.6.1, which states two conditions for measuring emissions in the 1610.6-1613.8 MHz and 1660-1670 MHz bands, both of which are used for observations by the Radio Astronomy Service. RTCA DO-262 has incorporated a test methodology consistent with the measurement requirements of the Radio Astronomy Service, as detailed in ITU-RA-769.1. A version of the RTCA DO-262 conditions adapted with appropriate Part 87 references is as follows:

“An AES that transmits on any assignable frequency [in the 1626.5-1660.5 MHz band] shall meet the emissions requirements of [47 C.F.R. § 87.139] in the 1610.6 –1613.8 MHz and 1660-1670 MHz bands under the following conditions:

1. When operating with the maximum combination of channels permitted by the equipment design;
2. When averaged over 2000 seconds of normal operation, including any frequency switching and power control due to normal satellite motion during that interval, and typical call duration and voice or data activity statistics; and

When operating under the same conditions, the average power spectral density due to the composite of HSN and intermodulation emissions in the band

⁶ See *id.* at Appendix A, p. A-7.

1610.6-1613.8 MHz and 1660-1670 MHz shall meet the requirements of [47 C.F.R. § 87.139].”

9. We note that the subject of emission limits on aircraft earth station equipment is still under study and consideration by committees or working groups in ETSI, ITU, and AEEC, and that RTCA has recognized the possibility that additional changes to RTCA DO-210D and RTCA DO-262 may be required. Nevertheless, we support inclusion of the changes to 47 C.F.R. § 87.139 to bring Part 87 up to date with the latest available consensus on these requirements.
10. We suggest that the Commission review the requirements of RTCA DO-210D Change 1, item 19 and determine how to appropriately reflect those requirements in Part 87. Change item 19 refers to paragraph 2.2.4.2.10.1 of RTCA DO-210D and establishes a lowest assignable operating channel for AMS(R)S or AMSS as 1631.5075 MHz, and the highest assignable channel for AMS(R)S or AMSS as 1660.4925 MHz. Accounting for channel bandwidth and modulation sidelobes, therefore, RTCA DO-210D Change 1 limits the AMS(R)S and AMSS operating band to 1631.5-1660.5 MHz. The result of this change is to establish a guard band of 5 MHz between the AMS(R)S and AMSS aircraft-to-satellite transmissions governed by RTCA DO-210D and the upper edge of the so-called “Big LEO” band of 1610-1626.5 MHz.
11. Finally, we concur with the proposed minor change to renumbered section 47 C.F.R. § 87.139(i)(3).

We support the Commission’s efforts to update its Part 87 Rules in order to bring them into alignment with current industry practice and thinking. We encourage the Commission to finalize the rulemaking at the earliest possible time in order to bring greater certainty to the industry.

Respectfully submitted,

HONEYWELL INTERNATIONAL INC.

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