Honeywell

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August 23, 2020

Addressed to: Donald K. Stockdale, Jr., Bureau Chief, Wireless Telecommunications Bureau,
Attention Jeff Tobias

Re: WAVIER – EXPEDITED ACTION REQUESTED – EMS Technologies Canada, Ltd. Request for Waiver of Part 87 Rules to Allow Equipment Certification of Aeronautical Mobile Satellite Service Transceivers

Dear Mr. Tobias:

EMS Technologies Canada, Ltd. ("EMS") a wholly owned subsidiary of Honeywell International Inc., pursuant to section 1.925 of the Commission's rules, hereby requests waiver of Sections 87.131, 87.133, 87.137, 87.139(i)(1) and 87.141(j) of the Commission's rules to permit certification of its next generation Aeronautical-Mobile Satellite (Route) Service ("AMS(R)S") transceivers and high power amplifier (HPA). The Aspire 400 support the new Inmarsat Enhanced SwiftBroadband Safety Services (E SB-S)/ SB-Safety 2.0. and SwiftBroadband aircraft communications services.

Similar waivers of Part 87 rules have been granted to EMS, Honeywell International, Inc, and Rockwell Collins Inc.[1] Such equipment is intended for use on aircraft to provide high-speed Internet, voice and video conferencing capabilities in the cockpit, in the cabin and at the gate. The EMS transceiver complies with Inmarsat technical requirements and specifications, and Inmarsat has expressed its support for the instant waiver. A letter in support from Inmarsat can be provided at your request. In addition, the EMS transceivers meet the applicable ARINC Characteristics 429, 739, 600, 741 and 781; RTCA/DO-262E "Minimum Operational Performance Standards FOR Avionics Supporting Next Generation Satellite Systems (NGSS) "; and will be certified pursuant to a Federal Aviation Administration Type Certification, Supplemental Type Certification, and/or Technical Standard Order Certification as applicable to the end customer requirements. Therefore, grant of the instant waiver is in the public interest and should be granted on an expedited basis.

EMS Transceivers Background

EMS's transceivers provide high-speed voice and data links to Inmarsat's world-wide satellite network in the 1525-1559 MHz receive and 1626.5-1660.5 MHz transmit bands. The next generation transceivers: Aspire

[1] *See* EMS equipment authorization for FCC ID K6KHSD-440, FCC ID K6KA781-MK4 Honeywell International Inc, equipment authorization for FCC ID G8BHD-128, and Rockwell Collins Inc equipment authorization for FCC ID AJK8222232 and AJK8222234.

400 support the new Inmarsat Enhanced SwiftBroadband Safety Services (E SB-S)/ SB-Safety 2.0. and SwiftBroadband services.

Requested Waivers – Part 87

The EMS transceivers will meet the technical requirements of Part 87 AMSS rules with respect to output power, spurious emissions, intermodulation and priority and preemption. Specifically, SwiftBroadband transmissions can be suspended if they would interfere with safety-related messages, or if ordered by the captain of the aircraft.[2] The Part 87 rules, however, only contemplate the modulation types and transmission characteristics used for the Inmarsat Aero-H, Aero-L and Aero-I services. Inmarsat's SwiftBroadband services offer higher data rates by utilizing more efficient modulation techniques. The Part 87 rules have not yet been updated to reflect these emissions types and bandwidth.

87.131 Authorized Emissions

Section 87.131 authorizes G1D, G1E and G1W for aircraft earth stations. The SwiftBroadband services, use 16 Point Quadrature Amplitude Modulation ("16-QAM") and QPSK modulation schemes, with emission types G7W and D7W. however HDR, services uses higher modulation schemes of 32QAM and 64QAM Therefore, EMS requests waiver of the authorized emissions in Section 87.131 of the Commission's rules.

87.133 Frequency Stability

Pursuant to Section 87.133(a), the frequency tolerance of an aircraft earth station operating in the 1626.5-1660.5 MHz band is +/- 320 Hz. For SwiftBroadband Aeronautical Class UEs, the frequency signal in the air will be within ± 500 Hz of the nominal assigned frequency including residual satellite Doppler, but excluding any Doppler frequency induced due to UE movement. The frequency compensation resulting from Doppler compensation process (i.e. the residual frequency error) shall not exceed ± 150 Hz at any time.

Therefore, the guaranteed accuracy of any SwiftBroadband transmissions will be +/- 650 Hz and EMS requests a waiver of Section 87.133(a) of the Commission's rules for this reason.

87.137 Types of Emissions

Section 87.137(a) of the Commission's rules authorizes for aircraft earth stations emissions designator 21K0G1D and the authorized bandwidth for aircraft earth station emissions above 50 MHz is 25 kHz. Lower values of necessary and authorized bandwidths are also permitted. SwiftBroadband service will utilize QPSK, 16-QAM,32-QAM and 64-QAM modulation schemes, with emissions class D7W. Due to the increased symbol rates for QPSK, 16-QAM, 32-QAM and 64-QAM a larger authorized bandwidth is necessary. An adequate bandwidth for SwiftBroadband is 225 kHz.

Therefore, EMS seeks waiver of Section 87.137(a) of the Commission's rules to authorize the following emissions designators for the EMS transceivers:

[2] *See* 47 C.F.R. §87.189(e).

Emissions Designator	Authorized Bandwidth(kHz) (Above 50 MHz)
50K0D7W	225
50K0G7W	225
100KD7W	225
100KG7W	225
110KD7W	225
110KG7W	225
200KD7W	225
200KG7W	225
220KD7W	225
220KG7W	225

87.139(i)(1), note 2 Emission Limitations

Section 87.139(i)(1) of the Commission's rules provides the required attenuation for a modulated carrier and note 2 provides an absolute offset of +/- 35 kHz. Under the required designs for the new modulation techniques, in many cases, ninety-nine percent of the occupied bandwidth exceeds the +/- 35 kHz offset. In other words, the new modulation schemes used for SwiftBroadband make meeting the offset impossible.

EMS requests a waiver of Section 87.139(i), note 2 to permit an absolute offset of +/- 560 kHz. The +/-560 kHz is derived from the relationship of the symbol rates. HDR has a maximum symbol rate of 168 ksps compared to 10.5 ksps for the services defined in part 87.

$$\frac{168 \text{ ksps}}{10.5 \text{ ksps}} \times (+/-35 \text{ kHz}) = +/- 560 \text{ kHz}$$

+/- 35 kHz was based on a carrier with a symbol rate of 10.5 ksps. Hence, for the new bearer with a symbol rate of 168 ksps, the exclusion zone works out to be +/- 560 kHz from the carrier centre.

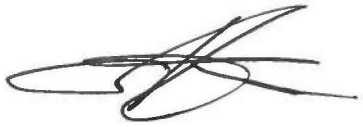
87.141(j) Modulation Requirements

Section 87.141(j) of the Commission's rules requires transmitters used as aircraft earth stations to employ BPSK for transmission rates up to and including 2400 bps, and QPSK for higher rates. Due to the requirements of the SwiftBroadband and HDR service, the EMS transceivers use additional modulation schemes that do not meet this requirement. Specifically, the SwiftBroadband services require the use of 32-QAM and 64-QAM at transmission rates higher than 2400 bps in addition to QPSK and 16-QAM, which were covered under a previously submitted waiver. EMS therefore requests waiver of Section 87.141(j) of the Commission's rules to permit the use of 32-QAM and 64-QAM modulations.

Conclusion

EMS requests that the Commission waive the requirements of Part 87 described above to permit certification of its Inmarsat AMSS transceivers. The Commission has granted similar waivers to EMS, Rockwell Collins, Honeywell and others so that aircraft passengers and crew can receive high speed voice and data communications. Such waiver will not cause harmful interference to other services and is in the public interest. EMS further requests expedited treatment of the instant waiver request.

Sincerely,



Dennis Teske,

SR Director Engineering,