

The Outline of Proposed Amendment to Ministerial Ordinance

1. Item

Partial amendment of Regulations for Radio Equipment

2. Amendment to ministerial ordinance

Amendment for Radio Equipment

3. Reasons for amendment

Regarding the existing satellite communication system using L-band based on the satellite constellation by non-geostationary satellites, the existing satellite operator is planning to upgrade the satellites in order to achieve high speed communication, and is also planning to utilize this satellite communication system for distress and safety communications of ships and aircrafts.

Responding these new usage needs for “Non-geostationary satellite system using advanced L-band”, Japan will formulate the technical requirements for implementing this non-geostationary orbit satellite system using Advanced L-band.

4. Outline of the amendment

Table 1 Basic technical requirements of radio equipment

System	Advanced L-band non-geostationary system		
Station Class	Mobile earth station (except for GMDSS)	Aircraft earth station	Ship earth station (for GMDSS)
General condition	Appropriate measures shall be taken to prevent inappropriate use for promoting security, and to satisfy the Radio-radiation protection guidelines in order to countermeasure effects on the human body, etc.		
Frequency band	Service link: 1,618.25-1,626.5MHz In operating, Frequency band shall comply with the results of international coordination by the Radio Regulations.	Service link: 1,621.35-1,626.5MHz In operating, Frequency band shall comply with the results of international coordination by the Radio Regulations.	
Transmitter			
Frequency tolerance	30×10^{-6}		
Antenna power tolerance	Upper limit 50%, Lower limit 50%		
Tolerance of unwanted emission intensity	To meet Radio Regulations Appendix 3 and Recommendation ITU-R M.1343	To meet ETSI EN 301 473	To meet Radio Regulations Appendix 3 and Recommendation ITU-R M.1343
Power level when no carrier is transmitting	To meet Recommendation ITU-R M.1343	To meet ETSI EN 301 473E	To meet Recommendation ITU-R M.1343
Automatic radio emission stop function	To meet Recommendation ITU-R M.1343		
Receiver			
Limit of secondary radiated emissions	Same as Power level when no carrier is transmitting		
Antenna			
Minimum elevation angle of transmitting antenna	To keep at least 3 degrees from the horizontal plane	To meet Table 2	To keep at least 3 degrees from the horizontal plane
Polarization	Right-handed circular polarization		

Table 2 Additional technical requirements for aircraft earth stations

System	Aircraft earth station of Advanced L-band non-geostationary system
Transmitter	
Power handling performance	To have 20W CW handling performance. For AES3, to design according to the maximum number of transmission carriers.
Antenna voltage standing wave ratio	1.8 : 1
Equivalent isotropic radiation power	Upper limit 9dBW, lower limit -4dBW of EIRP of one carrier. The average EIRP within the transmission burst time shall not exceed 15dBW minus antenna gain.
Power control	For AES2 and AES3, to have the ability to control the radiated power level within a back-off range of 8 dB and a step size of 1 dB.
Transmission performance	Operable at flight speeds below 800 knots (1480 km / h)
Receiver	
Receive sensitivity	The allowable noise level shall be as follows. Wideband: -124dBm @ 200kHz (desired signal level: -106dBm @ 35kHz) Narrow band: -121dBm @ CW (same channel), -106dBm @ CW (adjacent channel), -66dBm @ CW (10ch apart)
Packet error rate	1×10^{-6}
Interference elimination	Enable to receive and track the satellite downlink signal even under the interference signal of -10dBm, in the band of 470MHz to 18,000MHz except for the band of 0.95×1616 MHz to 1.05×1626.5 MHz. Enable to reduce the interference signal to a value obtained by linear interpolation from -50 dBm to -72 dBm between 0.95×1616 MHz and 0.99938×1616 MHz, and to a value obtained by linear interpolation from -72 dBm to -10 dBm between 1.00062×1626.5 MHz and 1.05×1626.5 MHz. Enable to receive and track satellite downlink signals in the 1626.5 MHz to 1660.5 MHz band, even under -96 dBm CW interference signals, when there is no other AMS (R) S device in the same aircraft. Enable to receive and track satellite downlink signals in the 1626.5 MHz to 1660.5 MHz band, even under -2 dBm CW interference signals, when there is other AMS (R) S device in the same aircraft.
Reception performance	Operable at flight speeds below 800 knots (1480 km / h)
Antenna	
Minimum elevation angle of transmitting antenna	Satisfying requirements for antenna polarization, antenna gain, and axial ratio in the range of elevation angle of 8° to 90°.
Antenna gain	Minimum gain: -2 Weighted dBic、 Maximum gain: 3 Weighted dBic
Axle ratio	2.5dB or lower
Carrier multipath difference	The decibel difference between the minimum antenna gain at the minimum elevation angle and the maximum antenna gain at the same elevation angle below the horizon shall be larger than the minimum carrier multipath difference. Minimum carrier multipath difference shall be greater than 3dB.

Type of aircraft earth station

AES1: Consists of one Short Burst Data (SBD) transceiver and one Passive Low Gain Antenna (LGA)

AES2: Consists of one or two L-band transceivers and one passive LGA

AES3: Consists of two or more SBD and / or L-band transceivers and one Passive LGA

Table 3 Additional technical requirements for Ship earth stations

System	Ship earth station of Advanced L-band non-geostationary system (for GMDSS)
General Condition	
Other requirements	Required functions, interfaces, identification of ship earth stations, transmission of distress alerts/calls, reception of distress, urgency and safety alerts/calls, audible signal and visual indications, test facilities, Enhanced Group Call (EGC) communications including Maritime Safety Information (MSI), position updating, power and energy supply, and antenna locations shall comply with IMO resolution MSC.434 (98). Safety precautions and maintenance shall comply with IMO Resolution A.694 (17). Labeling and identification shall comply with IMO Resolution MSC.434 (98) and IMO Resolution A.694 (17).

5. Proposed date of entry into force

July, 2020