

CGMS-XXVIII
USA WP-17.1
Agenda Item: I.1

**POSSIBLE INTERFERENCE TO NOAA SATELLITE SYSTEMS
FROM
OPERATIONS OF MTSAT SATELLITES**

Summary and Purpose of Document

This document summarizes the possible interference of MTSAT transmissions into NOAA's GOES and POES satellite systems.

Action Proposed: None

SUMMARY

In response to Action 27.11, NOAA examined the International Telecommunication Union filings of the Japanese MTSAT satellites. Based on the orbital positions of Japan's geostationary meteorological satellites, their proximity to NOAA's GOES and POES spacecraft, and their use of radio frequencies, only two possible scenarios for interference can occur. First, interrogation by the MTSAT located at 135° east longitude (MTSAT-135E) of data collection platforms (DCPs) using 468.875 MHz, 468.883 MHz, and 468.924 MHz, could possibly interfere with DCPs responding to frequencies on 468.825 MHz and 468.8375 MHz sent by the GOES located at 135° west longitude (GOES-135W). Second, the use by MTSAT-135E of 2026 MHz for its earth station commands could pose a potential for interference into NOAA-15 when it is receiving commands from the Fairbanks Command and Data Acquisition Station (FCDAS) on the same frequency.

Analysis indicates that due to an overlap of DCP interrogation frequencies, there is a possibility of interference from MTSAT-135E transmissions into GOES-135W DCPs within the footprint of MTSAT-135E. However, the interference potential is minimal due to the pointing of the DCP antennas to GOES-135W. The beamwidth of the GOES DCP receive antenna is about 40°. Additionally, the MTSAT-135E and GOES-135W satellites are separated by 90° in longitude. Based on these factors, any interference will be into the DCP antenna sidelobes, which are almost 26 dB lower than the peak of the main beam. Due to this large margin, or factor of safety, no harmful interference into GOES-135W DCPs should be encountered.

The second possible occurrence of interference exists when a Japanese earth station transmits ranging signals to MTSAT-135E at 2026 MHz while NOAA-15 is receiving commands from the FCDAS on the same frequency. This is possible because NOAA-15 is visible near the horizon from Japan and Fairbanks simultaneously for short periods of time. From geometrical considerations this mutual visibility occurs about 2 percent of the time. Assuming that commanding is done about half of this time, results in an interference potential occurring about 0.1 percent of the time that a NOAA KLM satellite is visible at the FCDAS. Considering the critical nature of this link, a 0.1 percent probability of interference would be excessive if the command Carrier to Interferer ratio (C/I) were found to be small. However, a link calculation based on reported system parameters shows that the C/I is reasonably large. During mutual visibility, NOAA-15 is always in MTSAT-135E's ranging transmitter sidelobes, which appear to be at least 25 dB below the main beam. Under these conditions, MTSAT-135E's equivalent isotropically radiated power (EIRP) toward NOAA-15 is less than 42 dBW, while the FCDAS EIRP is 77 dBW in its main beam. Thus the C/I is at least 35 dB, which seems to be sufficient to preclude interference.