Antenna Statement

Mica Tech 0.26 Meter Antenna

FCC Rule §25.209

The antenna pattern contained with this application, exceeds the CFR §25.209 sidelobe specification for the sidelobe envelope in the ±1.4° to 4.95° region by a maximum of 4.5 dB, at 14.25 GHz. At azimuths greater than ±4.92°, the antenna meets the requirements of §25.209.

The maximum RF power density normally licensed by the Federal Communications Commission for smaller diameter antennas, utilizing Ku-band digital traffic, is -14.0 dBW/4 kHz. This license application is being filed by Tri-State to operate the 0.26 meter remote antennas with a RF transmit power density of –35.0 dBW/4 kHz.

A review of the antenna pattern envelope for the Mica Tech 0.26 meter antenna (included as Exhibit I) indicated that the antenna exceeds the CFR §25.209 sidelobe specifications by 4.5 dB at 14.25 GHz. A comparison of the FCC's maximum authorized RF transmit power density (-14.0 dBW/4 kHz) and the actual transmit power density of the proposed remote earth stations (-35.0 dBW/4 kHz), indicates that the applied for transmit power density is 21.0 dB lower than the specified power restrictions. When the Mica Tech 0.26 meter antenna pattern envelope is considered, the applied for transmit power density is still 16.5 dB, lower than the maximum RF power density normally licensed by the FCC. This reduced RF transmit power will result in acceptable performance for the antenna, with respect to adjacent satellite interference.

The applicant agrees to accept any adjacent satellite interference in the 12 GHz receive band as a result of the performance of the antenna. The applicant understands that adjacent satellite interference protection applies only to the extent of the criteria set forth in §25.209.

FCC Rule §25.134(g)

Concerning FCC Rule §25.134(g), Tri-State Generation and Transmission Association, Inc. has filed for the use of 50 remote 0.26 meter earth stations. However, only 45 of these antennas will be transmitting at one time. If 45 antennas are transmitting 0.08 watts, at any given moment, the total aggregate transmit power will be 3.6 watts. The formula below was used to calculate the RF transmit power density.

RF Transmit Power density = 10Log (power in watts) or
= 10Log (0.08)
= -11.0 dBW/1 MHz -24.0
= -35.0 dBW/4 kHz

Then utilizing the formula in Part 25.134(g) the Maximum Power Spectral Density for 45 remote antennas transmitting at once can determined as follows:

Max Power Spectral Density = -14.0 -10Log(N)
= -14.0 -10Log(45)
= -14.0 -16.5
= -30.5 dBW/4 kHz

Further, as reported on the preceding page, the antenna pattern for the 0.26 meter remote antennas indicates that they fail to meet the performance standards as outlined in Rule §25.209, by 4.5 dB. When the 4.5 dB, non-compliance number is inserted into the below formula, the revised Maximum Power Spectral Density is as follows:

Max. Power Spectral Density = -14.0 – 4.5 - 10 Log (N)
= -14.0 – 4.5 - 10 Log (45)
= -14.0 – 4.5 - 16.5
= -35.0 dBW/4 kHz

Since the RF transmit power density at 0.08 watts is -35.0 dBW/4 kHz and the Maximum Power Spectral Density is also -35.0 dBW/4 kHz, the 0.26 meter antennas should not cause problems if the number of transmitting antennas is limited to 45 at any given time.