SECTION 25.138(A) AND 25.223(B) ANALYSIS

In this application, DIRECTV Enterprises, LLC ("DIRECTV") seeks authority for transmission for 17/24 GHz reverse band BSS feeder links and Ka-band FSS.

Section 25.138(a) provides that an application for a blanket Ka-band earth station license will be routinely processed if it meets the following requirements:

> GSO FSS earth station antenna off-axis EIRP spectral density for co-polarized signals shall not exceed the following values, within 3° of the GSO arc, under clear sky conditions:
>
> 18.5-25log(theta)-10log(N) dBW/40kHz..... for 2.0° <= theta <= 7°
> -2.63-10log(N)..... dBW/40kHz..... for 7° <= theta <= 9.23°
> 21.5-25log(theta)-10log(N) dBW/40kHz..... for 9.23° <= theta <= 48°
> -10.5-10log(N)..... dBW/40kHz..... for 48° <= theta <= 180°
>
> Where:
> theta is the angle in degrees from the axis of the main lobe; for systems where more than one earth station is expected to transmit simultaneously in the same bandwidth, *e.g.*, CDMA systems, N is the likely maximum number of simultaneously transmitting co-frequency earth stations in the receive beam of the satellite; N=1 for TDMA and FDMA systems.

For TDMA and FDMA systems, it can readily be shown that for an antenna that just meets the performance requirements of Section 25.209, an input power density of less than -10.4 dBW/40 kHz into the antenna will result in compliance with Section 25.138(a). The maximum EIRP density for the single emission designator in this application is 80 dBW/36 MHz. Subtracting the maximum antenna gain and scaling the 36 MHz to 40 kHz results in maximum input power densities of -17.9 dBW/40 kHz and -18.8 dBW/40 kHz for the 28.35-28.6 GHz and 29.25-30 GHz band, respectively, thereby demonstrating compliance with this rule.

In like manner, Section 25.223(b) provides that an application for a 17/24 GHz reverse band BSS feeder link earth station license will be routinely processed if it meets the following requirements:

> Feeder link earth station antenna off-axis EIRP spectral density for co-polarized signals shall not exceed the following values, within 3° of the GSO arc, under clear sky conditions:
>
> 32.5-25log(theta) dBW/MHz … for 2.0° <= theta <= 7°
> 11.4 dBW/MHz … for 7° <= theta <= 9.23°
> 35.5-25log(theta) dBW/MHz … for 9.23° <= theta <= 48°
> 3.5 dBW/40kHz … for 48° <= theta <= 180°

Where theta is the angle in degrees from the axis of the main lobe.

It can readily be shown that for an antenna that just meets the performance requirements of Section 25.209, an input power density of less than 3.6 dBW/MHz into the antenna will result in compliance with Section 25.223(b). The maximum EIRP density for the single emission designator in this application is 80 dBW/36 MHz. Subtracting the maximum antenna gain and scaling the 36 MHz to 40 kHz results in maximum input power densities of -2.7 dBW/MHz for the 24.75-25.15 GHz band, thereby demonstrating compliance with this rule.