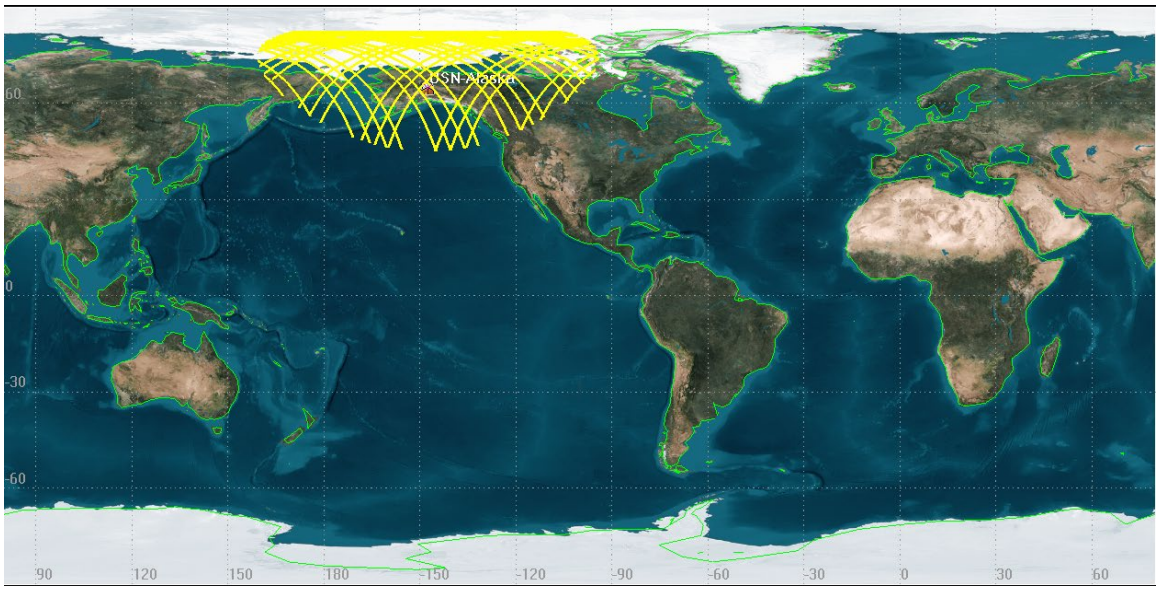
USN PRE-LEOP support for Cosmo-SkyMed2 from Alaska using Cosmo-SkyMed1 on orbit

Cosmo-SkyMed2 (CSG-2) is the second generation earth observation science satellites launched by ESA to serve the European Union. Cosmo-SkyMed2 will be launched from the Kourou space center in August 2021. To support this launch it has been requested that a test campaign be conducted using the on orbit Cosmo-Skymed1 (CSG-1) in the Receive only mode at downlink frequency = 2230.000 MHz.

The Pre-LEOP testing is scheduled to be conducted with 2 NGSO passes of CSG-1 per week for 4 weeks starting March 24, 2021. The daily nominal opportunities for passes are shown below, but are subject to change.

CSG-1
1 44873U 19092A 20296.11917612 .00000154 00000-0 25953-4 0 9992
2 44873 97.8871 117.4471 0001378 89.5579 270.5795 14.82155616 45738



USN Alaska coverage of CSG-1 PRE-LEOP testing March 2021

USN Alaska possible passes for CSG-1 1 December – 30 December 2020 UTC

Pass	Start Time (UTCG)	Stop Time (UTCG)
1	24 Mar 2021 12:20:42	24 Mar 2021 12:28:51
2	24 Mar 2021 13:54:58	24 Mar 2021 14:05:12
3	24 Mar 2021 15:30:58	24 Mar 2021 15:41:31
4	24 Mar 2021 17:09:33	24 Mar 2021 17:17:18
5	25 Mar 2021 03:06:13	25 Mar 2021 03:14:30
6	25 Mar 2021 04:42:06	25 Mar 2021 04:52:44
7	25 Mar 2021 06:18:27	25 Mar 2021 06:28:32
8	25 Mar 2021 07:54:46	25 Mar 2021 08:02:39
9	25 Mar 2021 09:30:31	25 Mar 2021 09:36:11
10	25 Mar 2021 11:04:45	25 Mar 2021 11:10:53

Flux Density impinging on the ground in Alaska from Cosmo-SkyMed1
The Flux density is calculated as:

$$\boldsymbol{Flux\ density = EIRP \div (4\pi\, Rse^2)}$$

Where $\boldsymbol{Rse}$ is the distance from spacecraft to the ground.
Where $\boldsymbol{EIRP}$ is the Effective Isotropic Radiated Power of the Spacecraft.

Data from the spacecraft vendor indicates that the maximum EIRP of Cosmo-SkyMed1 is -8.83 dBW. The altitude (and thus the closest distance to earth during an overhead pass) is = 645 Km.

Converting -8.83 dBW to scalar watts = 0.130 watts transmitted at 2230.000 MHz

Therefor:

$$\boldsymbol{Flux\ density = 0.13 \div (4\pi * 645{,}000\ meters^2)}$$

Flux density = 2.486 x 10^{-14} Watts/meter^2
Or
Flux density = 2.486 x 10^{-15} mW/cm^2