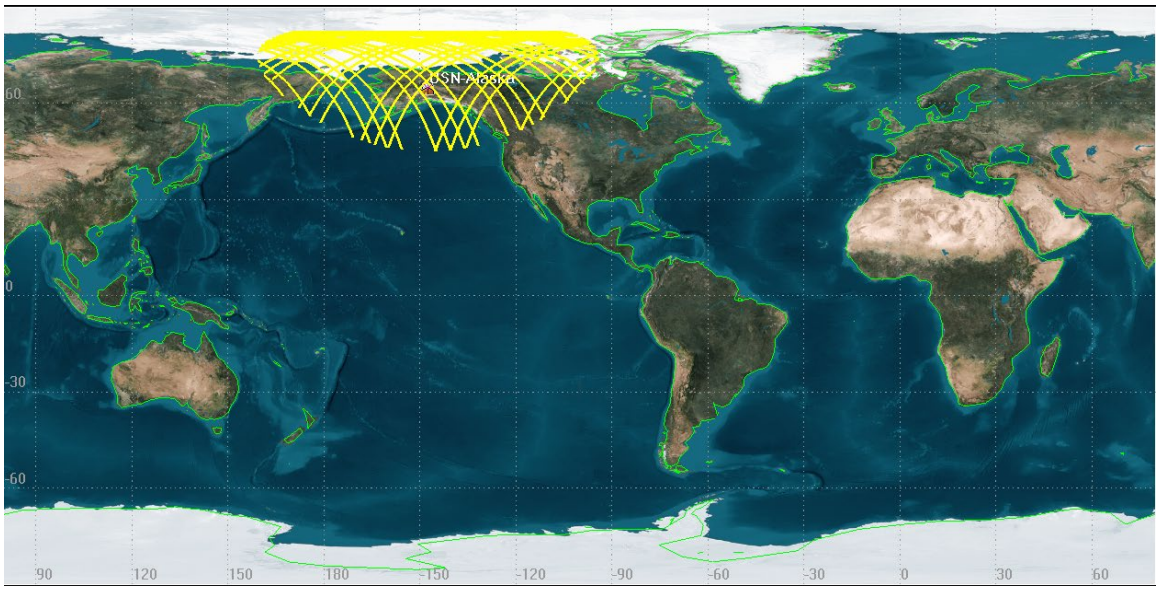
USN PRE-LEOP support for Cosmo-SkyMed2 from Alaska using Cosmo-SkyMed1 on orbit

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 May 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 5 weeks starting Dec 1, 2020. The expected 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 LEOP December 2020

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

Pass	Start Time (UTCG)	Stop Time (UTCG)
1	1 Dec 2020 15:12:34	1 Dec 2020 15:23:15
2	2 Dec 2020 15:30:43	2 Dec 2020 15:41:16
3	8 Dec 2020 15:42:44	8 Dec 2020 15:53:10
4	9 Dec 2020 16:01:01	9 Dec 2020 16:11:09
5	15 Dec 2020 16:13:08	15 Dec 2020 16:23:00
6	16 Dec 2020 16:31:35	16 Dec 2020 16:40:57
7	22 Dec 2020 15:06:00	22 Dec 2020 15:16:43
8	23 Dec 2020 15:24:06	23 Dec 2020 15:34:44
9	29 Dec 2020 15:36:03	29 Dec 2020 15:46:34
10	30 Dec 2020 14:17:46	30 Dec 2020 14:28:18

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-SkyMed2 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