CEPT ECC
Electronic Communications Committee **SE24**

SE24 WI63#4

Webmeeting, 2nd February 2021

Date issued: **28 January 2021**

Source: **CRAF**

Subject: **Clutter issue in RAS compatibility study**

Group membership required to read? (Y/N)

N

Summary:

This contribution contains a revision of the RAS compatibility study in the band 6.55-6.6752 GHz provided in the draft report. In this revision, the clutter loss by forest is already included by using SRTM elevation datasets and not consider an additional clutter loss using Recommendation ITU-R P.2108.

Proposal:

invites Group to

- consider not to take into account clutter loss (Recommendation ITU-R P.2108) for the compatibility study with RAS for the single-entry interferer scenario

Background:

WI63, UWB permanent EC mandate.

1 METHODOLOGY AND APPROACH USED IN SHARING AND COMPATIBILITY STUDIES

In section 5.2 (propagation models), MCL is calculated based on two recommendations related to propagation models, ITU-R P.452-16 and ITU-R P.2108.

For the frequency band 2 GHz to 67 GHz, recommendation ITU-R P.2108 assumes a statistical clutter loss for rural and sub-urban environment which leads to an additional loss of approximately 31 dB.

Taking into account that,

- The single entry compatibility studies usually assumes the worst case, so does not include statistical clutter.
- In the 6 GHz band, P.2108 model apply in urban and suburban areas and not in rural environment which apply for RAS stations.
- The forest in the vicinity of the Westerbork Radio Telescope is already included in the SRTM datasets (the Shuttle Radar Topography could not "see" the true ground level but only the surface of the forests (attached pictures 1 and 2)).

The group is invited to not to take into account the statistical clutter loss for the single case scenario in their MCL calculations for RAS compatibility studies.

2 RESULTS FOR A SINGLE-ENTRY COMPATIBILITY STUDY FOR THE CASE OF THE WESTERBORK RADIO TELESCOP

In the following, a compatibility study for single entry interferer scenario and WRT RAS stations performed based on the P.452-16 recommendation.

First, an analysis of the terrain is shown in pictures 1 and 2. Figure 1 shows a google Earth image of the terrain in the vicinity of the WRT. Figure 2 shows an image of the SRMT elevation data of the “ground”, which one could appreciate the higher altitude for the forest areas. So, this means that these trees around the WRT are already taken into account for the propagation losses calculated using P.452-16 model and SRTM dataset.

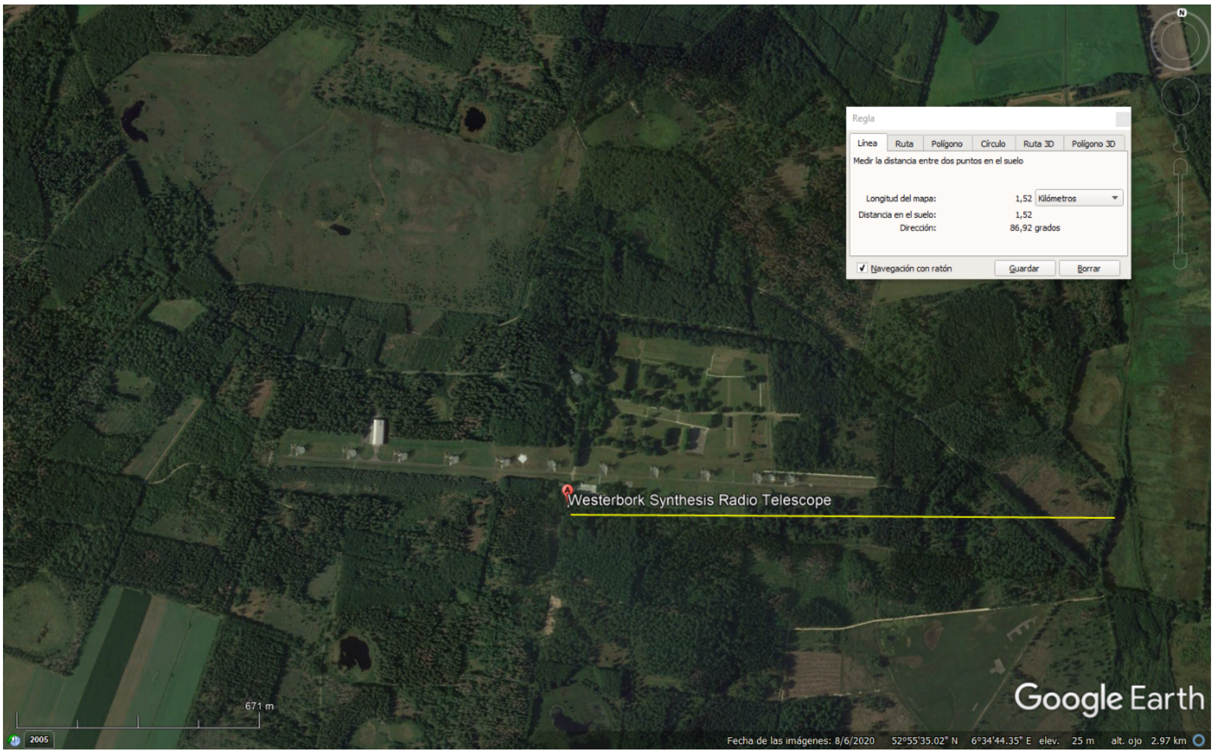

Figure 1. Google Earth picture of the Westerbork Radio Telescope site.

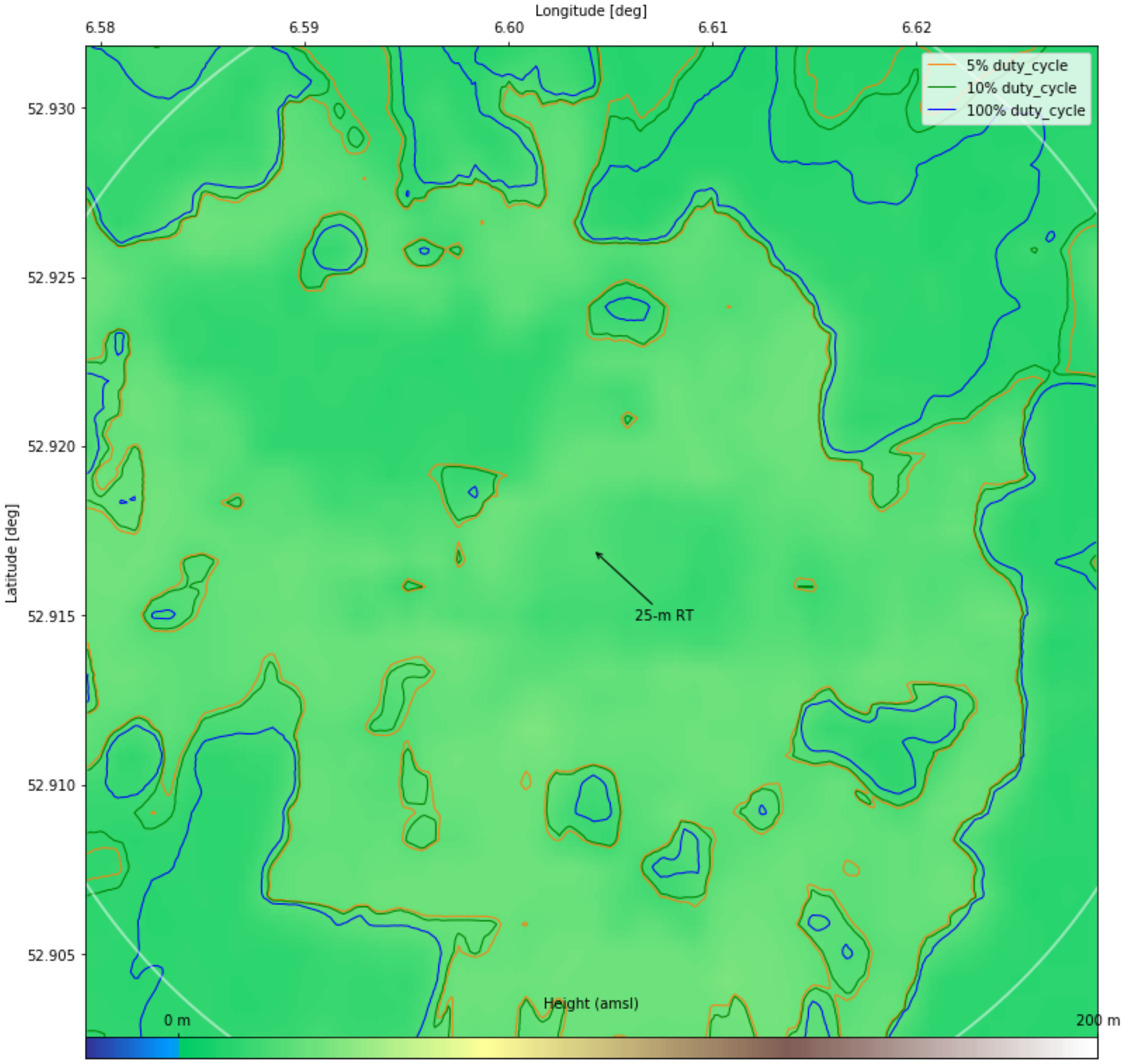

Figure 2. SRMT elevation data of the terrain in the vicinity of the Westerbork Radio Telescope.

Minimum coupling losses (A_min) are calculated based on the equation 1.

$$A_{Min} = S_{H\_UWB} - S_{H\_RA} + 10\log\left(\frac{T_{on}}{T_{integral}}\right) \quad (1)$$

Spectral power flux density S_H_UWB is calculated from the equation 2.

$$S_{H\_UWB} = P_{UWB} - 30 - 60 + 10\log\left(\frac{4\pi\upsilon_0^2}{c^2}\right) \qquad (2)$$

Calculated minimum separation distances for the worst case single entry interferer scenario are depicted in figure 3, assuming three different cases depending on the duty cycle (5%, 10% and 100%). This leads into separation distances between 5 and 18 km approximately.

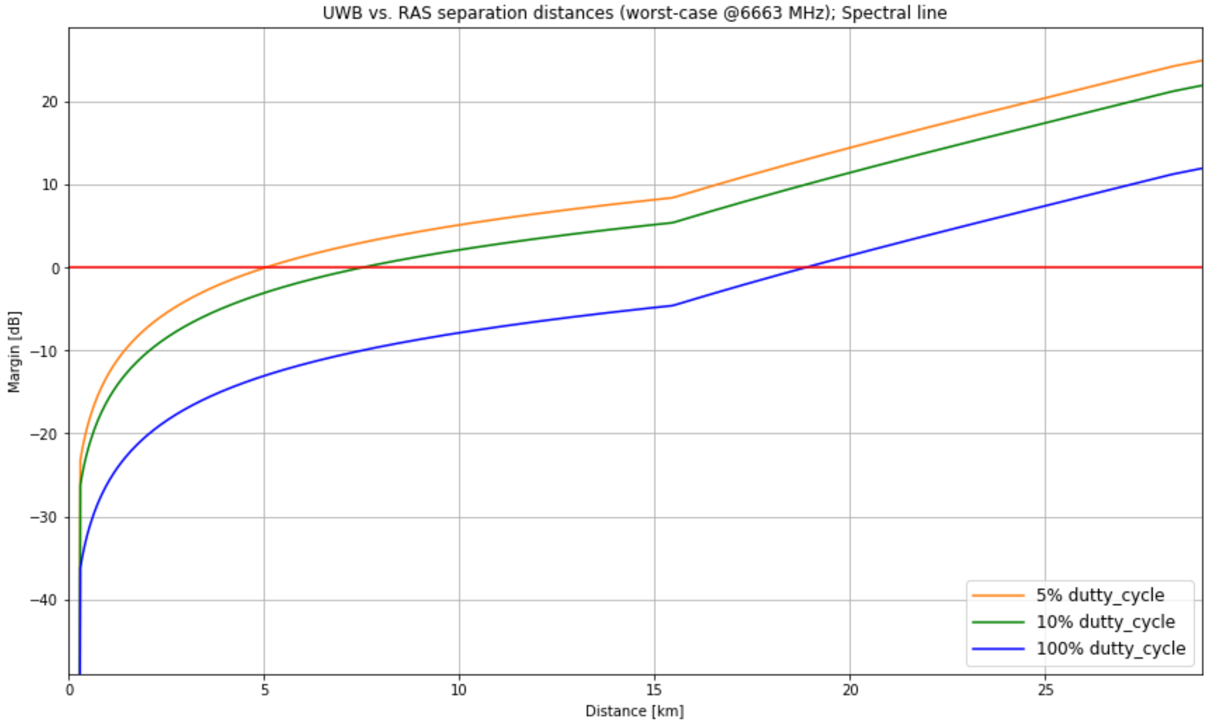

Figure 3. Minimum separation distances for the worst case single entry interferer scenario.

In the Figure 4, the separation distance is calculated considering the terrain for the specific location of the WRT and assuming a height of 15 meters for the radiotelescope antennas. The circle radius in white are respectively 2, 7, 12 and 17 km length.

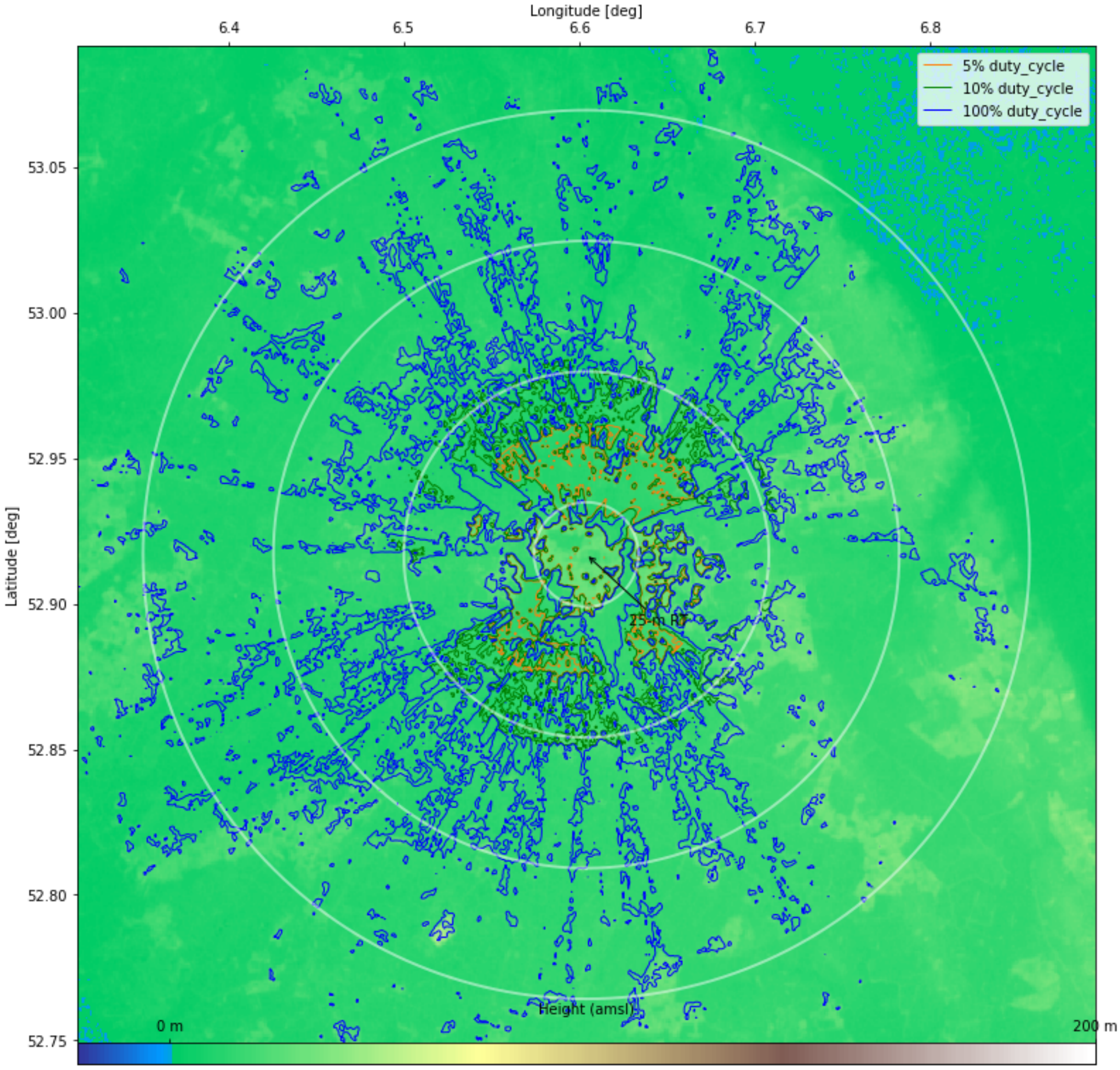

Figure 4. WRT coordination zones.