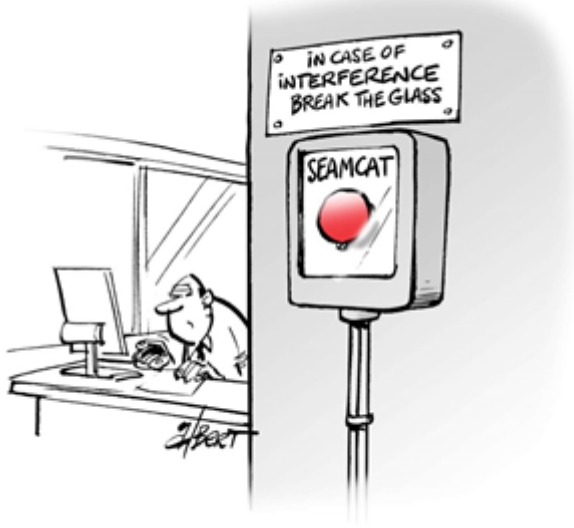


4.7 Uniform distribution of ILT vs VLR

You may define a uniform deployment density of terminals/transmitters per km (see ANNEX 13:). This can either be done by using the “**Uniform Density**” mode combined with the calculation of a simulation radius as described in section 4.7.1 and A13.2 or by using the “**none**” mode combined with the choice of uniform path polar distance as described in section 4.7.2.

- [4.7.1 Uniform density mode - simulation radius calculation](#)
- [4.7.2 "None" mode](#)

4.7.1 Uniform density mode - simulation radius calculation



The number of active transmitters that will be uniformly located within the simulation radius is given by:

$$n_{active} = dens_{transmitter} \cdot prob_{transmission} \cdot \pi (R_{simulation})^2 \quad (\text{Eq. 28})$$

Figure 120 presents the GUI with the input value.

Settings in the System tab	Settings in the Scenario tab
----------------------------	------------------------------

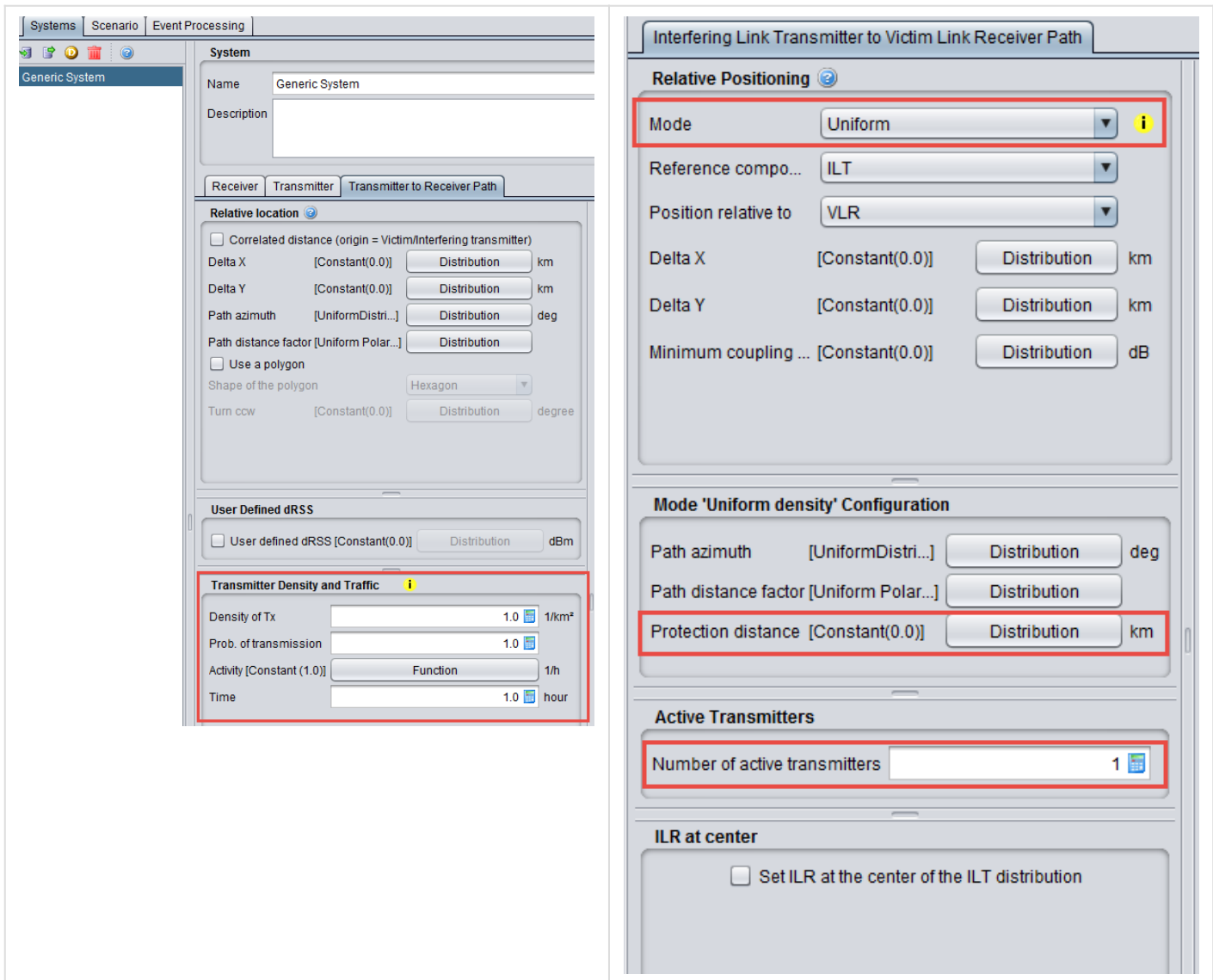


Figure 120: Setting up the simulation radius in SEAMCAT

(Note that the results of the simulation radius is displayed only after running simulation)

The simulation radius is calculated by using the following formula:

$$R_{simu} = \sqrt{\frac{n_{active}}{\pi \cdot dens_{it}^{active} \cdot prob_{transmission}}} \quad (\text{Eq. 29})$$

In the example of Figure 120, this gives:

$$R_{simu} = \sqrt{\frac{1}{\pi \times 10 \times 1}} \text{ \$} = 0.178 \text{ km}$$

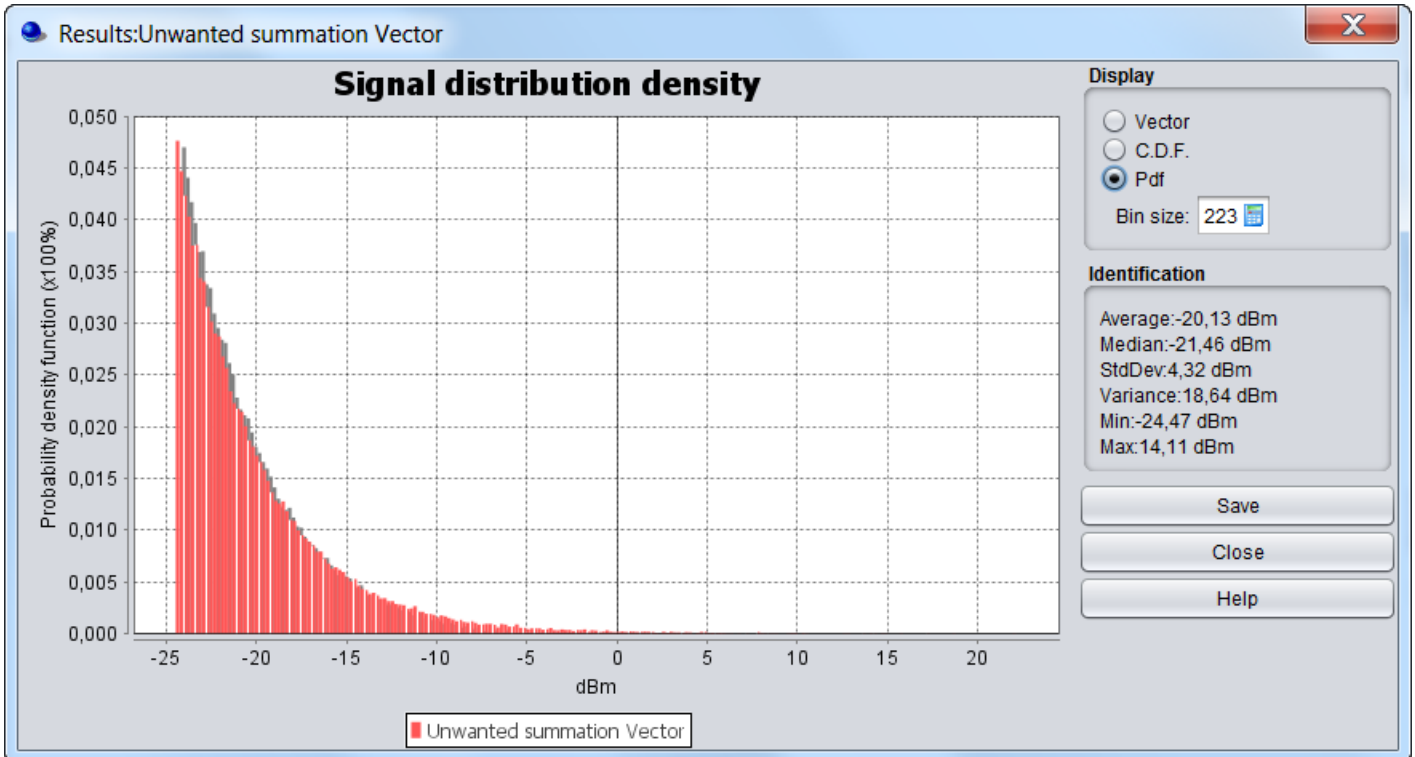


Figure 121: iRSS using the simulation radius for 1 active transmitter (R=0.178)

Calculated Radius			
Victim Link Transmitt...	1.4272992929222168	km	Double
Interfering Link Tran	0.0	km	Double
Interfering Link Tran...	0.1784124116152771	km	Double

Figure 122: Calculated simulation radius with 1 active transmitter

Then for a **single** interfering link transmitter located at the edge of the simulation radius ($R = 0.178 \text{ km}$), the $iRSS_{\text{unwanted}}$ may be calculated:

$$iRSS_{\text{unwanted}} = 33(\text{dBm}) + 11 + 9 - (32.5 + 10\log(0.178^2) + 20\log(1000)) = -24.5\text{dBm}$$

When increasing the number of active transmitters to 10 (see Figure 123), the simulation radius becomes:

$$R_{\text{simu}} = \sqrt{\frac{10}{\pi \times 10 \times 1}} = 0.564\text{km}$$

Then, for a **single** interfering link transmitter located at the edge of that simulation radius ($R = 0.564 \text{ km}$), the $iRSS_{\text{unwanted}}$ resulting from this terminal may be calculated as:

$$iRSS_{\text{unwanted}} = 33(\text{dBm}) + 11 + 9 - (32.5 + 10\log(0.564^2) + 20\log(1000)) = -34.5\text{dBm}$$

If 10 active terminals are located at the edge of the simulation radius, the $iRSS_{\text{unwanted}}$ may be calculated in the following way:

$$iRSS_{\text{unwanted}} = -34.6(\text{dBm}) + 10\log(10) = -24.5\text{dBm}$$

Then the $iRSS_{\text{unwanted}}$ should be above -24.5 dBm as shown on Figure 124.

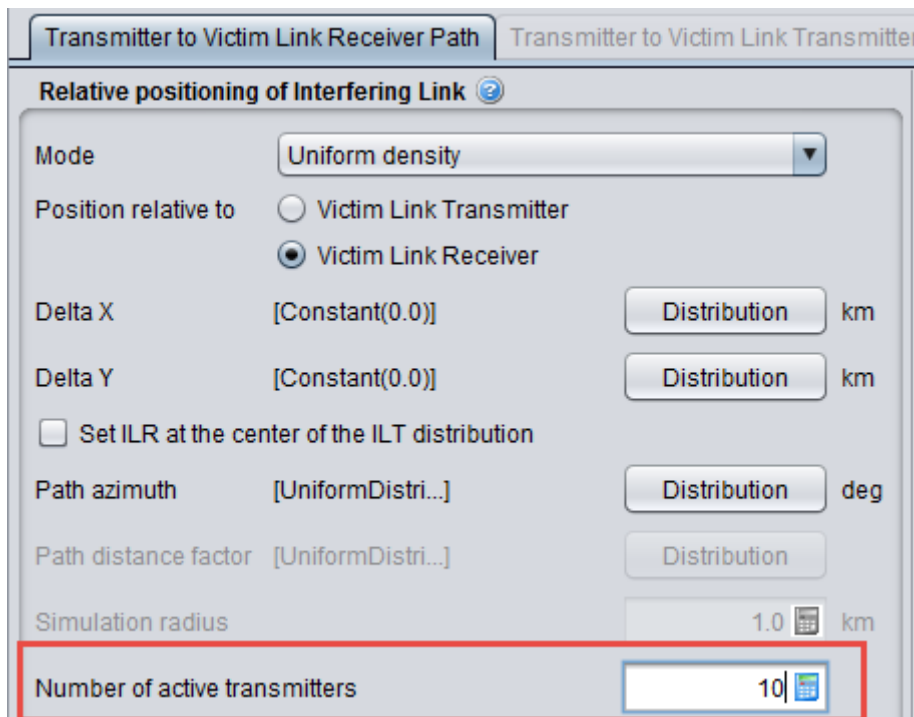


Figure 123: Setting up the simulation radius in SEAMCAT with a different number of active transmitters

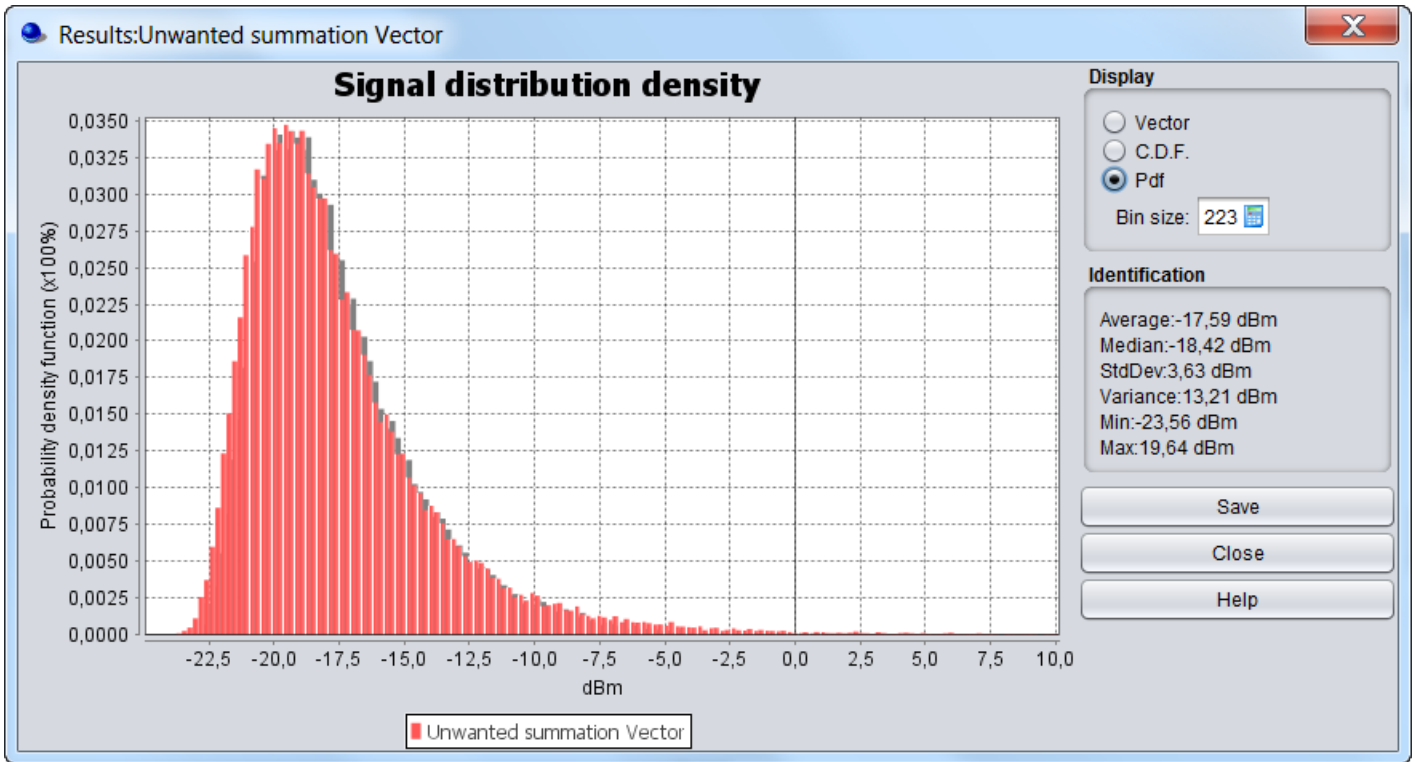


Figure 124: iRSS using the simulation radius calculated for 10 active interferers (R=0.564 km)

Calculated Radius			
Victim Link Transmitt...	1.4272992929222168	km	Double
Interfering Link Tran	0.0	km	Double
Interfering Link Tran...	0.5641895835477563	km	Double

Figure 125:

Calculated simulation radius with 10 active transmitters

4.7.2 "None" mode

When you select the **"None" mode** (see ANNEX 13:), he can also define a Uniform density of terminal/transmitter by using the Uniform polar distance defined within the path distance factor and a uniform distributed path azimuth (0 to 360 deg). **Uniform polar distance** leads to uniformly distributed terminals in the **circular area** (area) and the **Uniform distance** leads to uniformly distributed terminals along the **radius** (line).

Then using a user-defined radius of 0.178 km and 1 interfering link transmitter (see Figure 126), it is possible to reproduce the results of section 4.7.1. Therefore, the same results as those given in Figure 121 are found as shown in Figure 127.

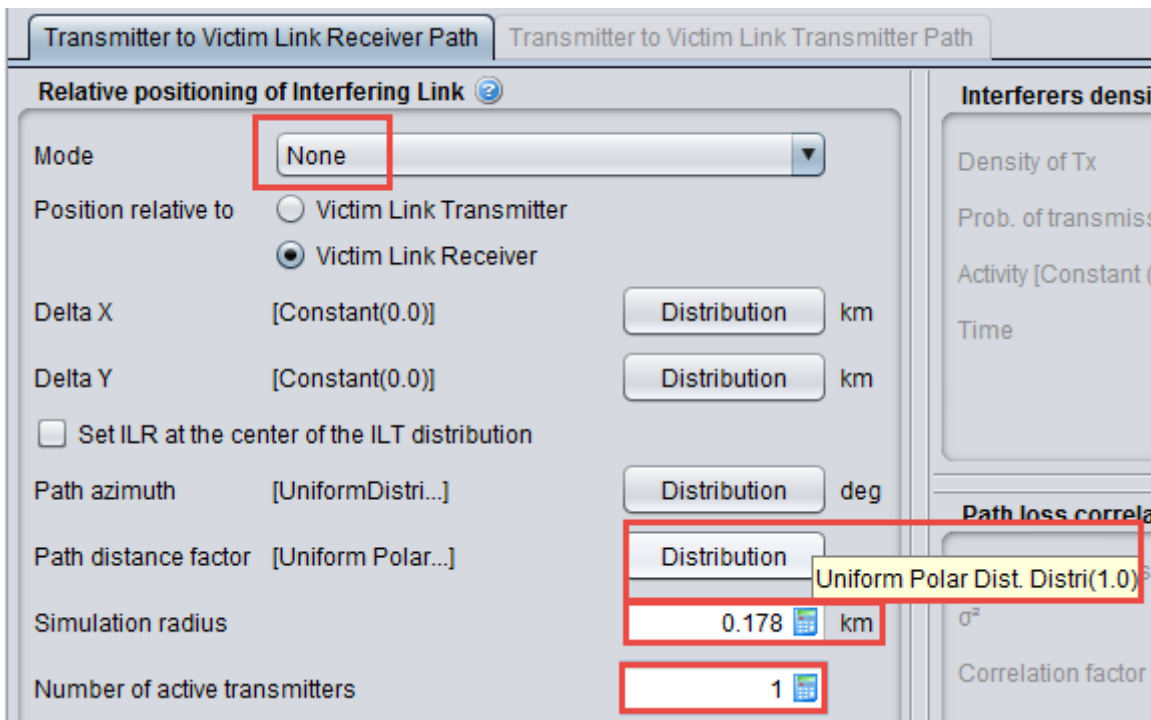


Figure 126: Uniform density using "None" mode

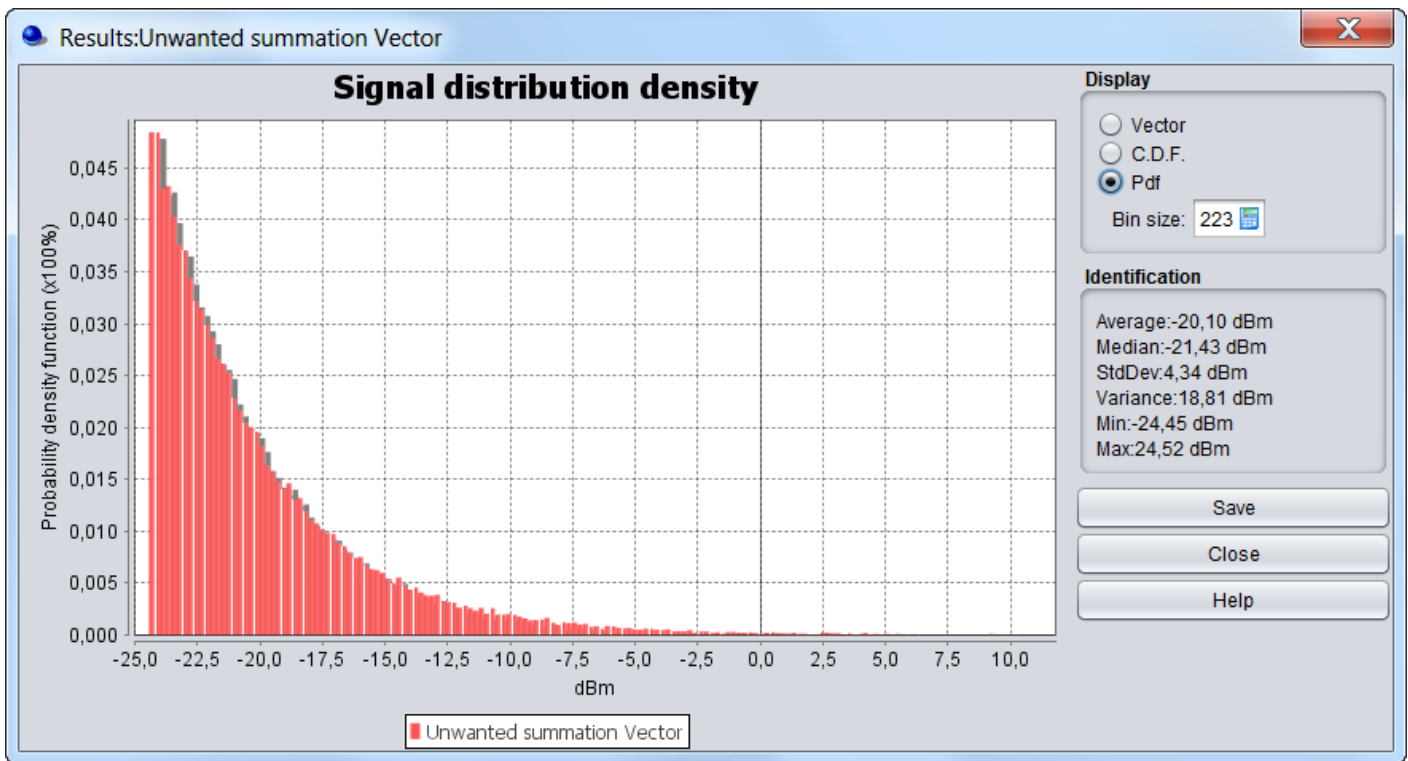


Figure 127: $iRSS_{\text{unwanted}}$ / Uniform polar feature / 1 interfering link transmitter and simulation radius of 0.178 km (same results as in Figure 121)

Using a user-defined radius of 0.564 km and 10 interfering link transmitters, the same results as those given in Figure 124 are reached as shown in Figure 128.

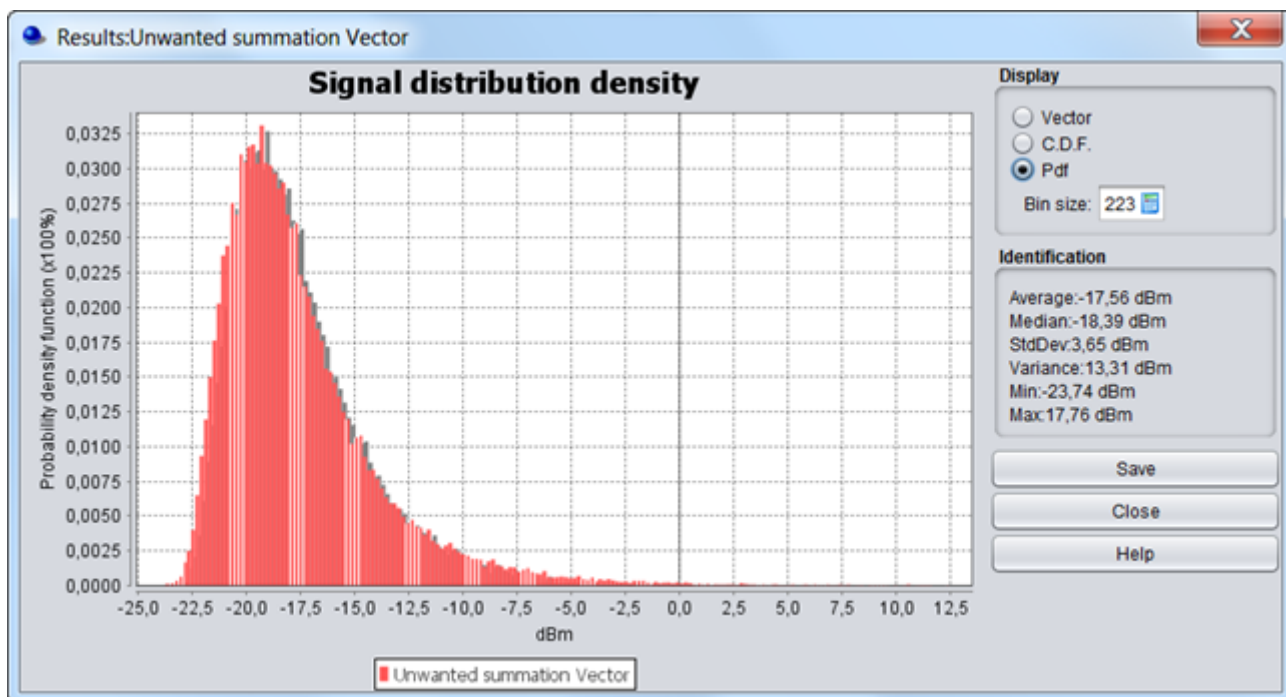


Figure 128: $iRSS_{\text{unwanted}}$ / Uniform polar feature / 10 interfering link transmitter (same results as in Figure 121)