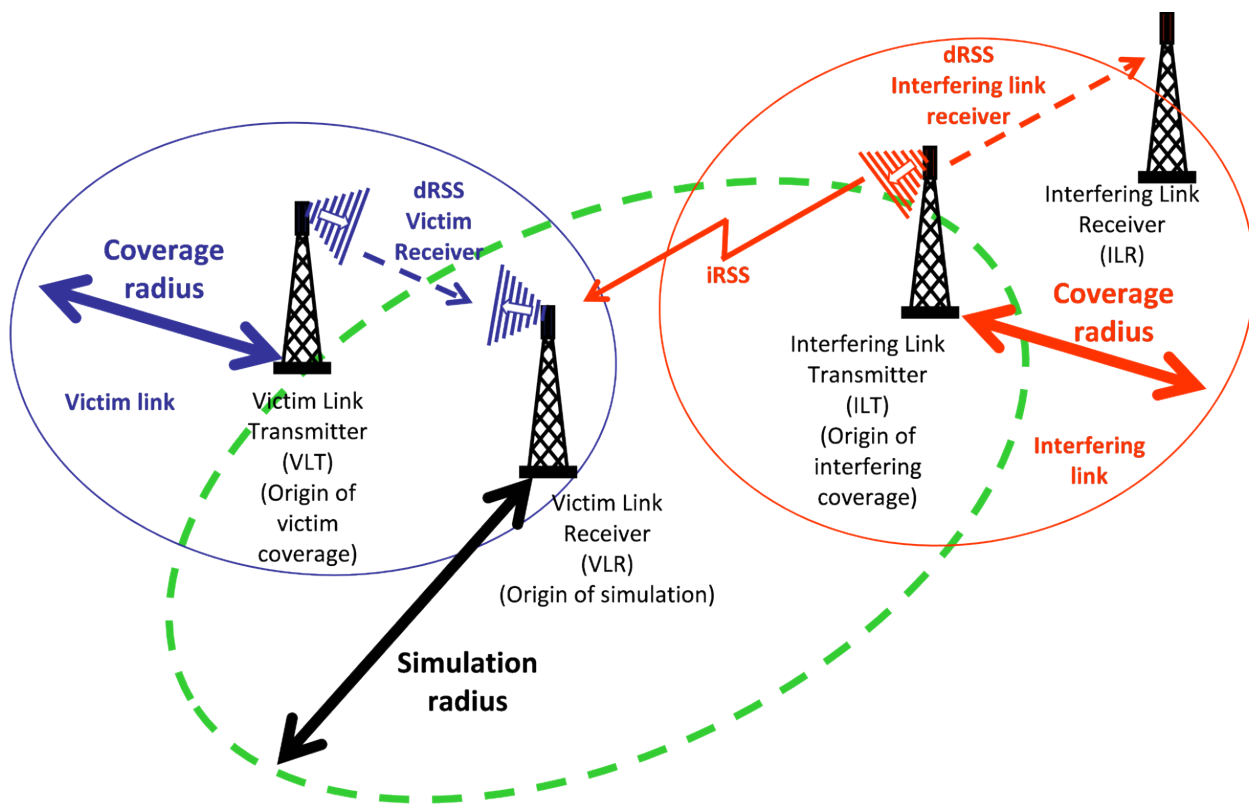


# 4.5 Coverage radius (VLR-VLT)

In this section the Free Space Model is used to derive the attenuation on the different paths and the Victim Link and Interfering Link operate at the same frequency - 1000 MHz - co-channel interference. Figure 115 presents an illustration of the various radii (i.e. coverage radius and simulation radius) that are used in SEAMCAT and with reference to the various pairs of transmitters and receivers used for a simulation.



**Figure 111: Illustration of the Coverage Radius and the Simulation Radius with respect to the pairs of transmitters and receivers of the victim and interfering links**

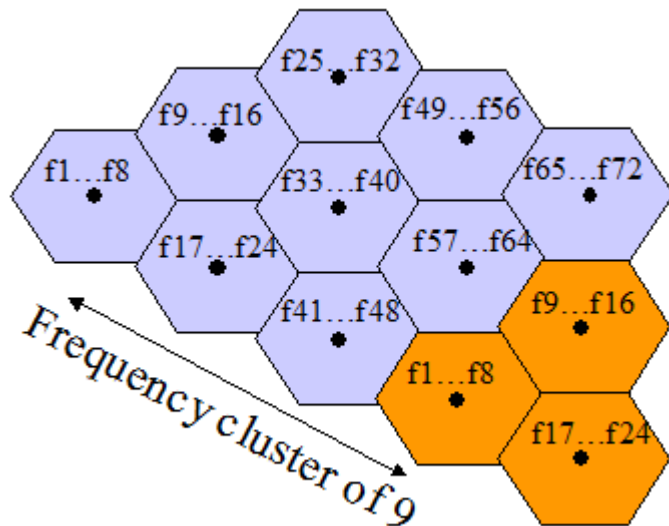
The distance between the VLT and the VLR is referred to as the **coverage radius** ( $R_{max}^{wt}$ ) (see ANNEX 13:). In the case of mobile applications, the number of terminals that may transmit in a given cell of the network is given by:

$$n = dens_{max} \cdot \pi (R_{max}^{wt})^2 = \frac{n_{channels} \cdot n_{userperchannel}}{cluster_{frequency}}$$

(Eq. 25)

The calculation of the coverage radius can be found in ANNEX 13:.

The cluster characterises the frequency re-use of a mobile network (see Figure 112).

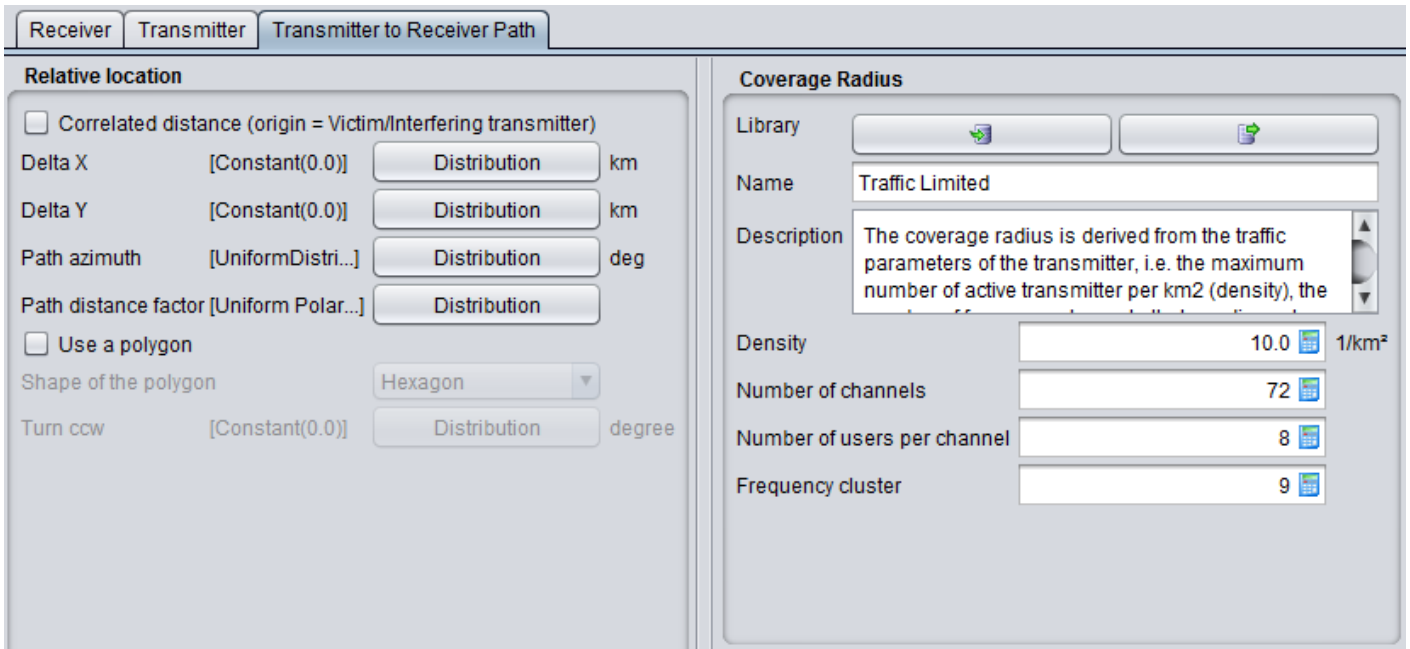


**Figure 112: Frequency cluster**

The victim link coverage radius (i.e. centred on the victim link transmitter) may then be calculated by using the formula below. Figure 113 presents how to set-up SEAMCAT.

$$n = dens_{max} \cdot \pi (R_{max}^{wt})^2 = \frac{n_{channels} \cdot n_{userperchannel}}{cluster_{frequency}}$$

(Eq. 26)



**Figure 113: Calculation of the victim link coverage radius**

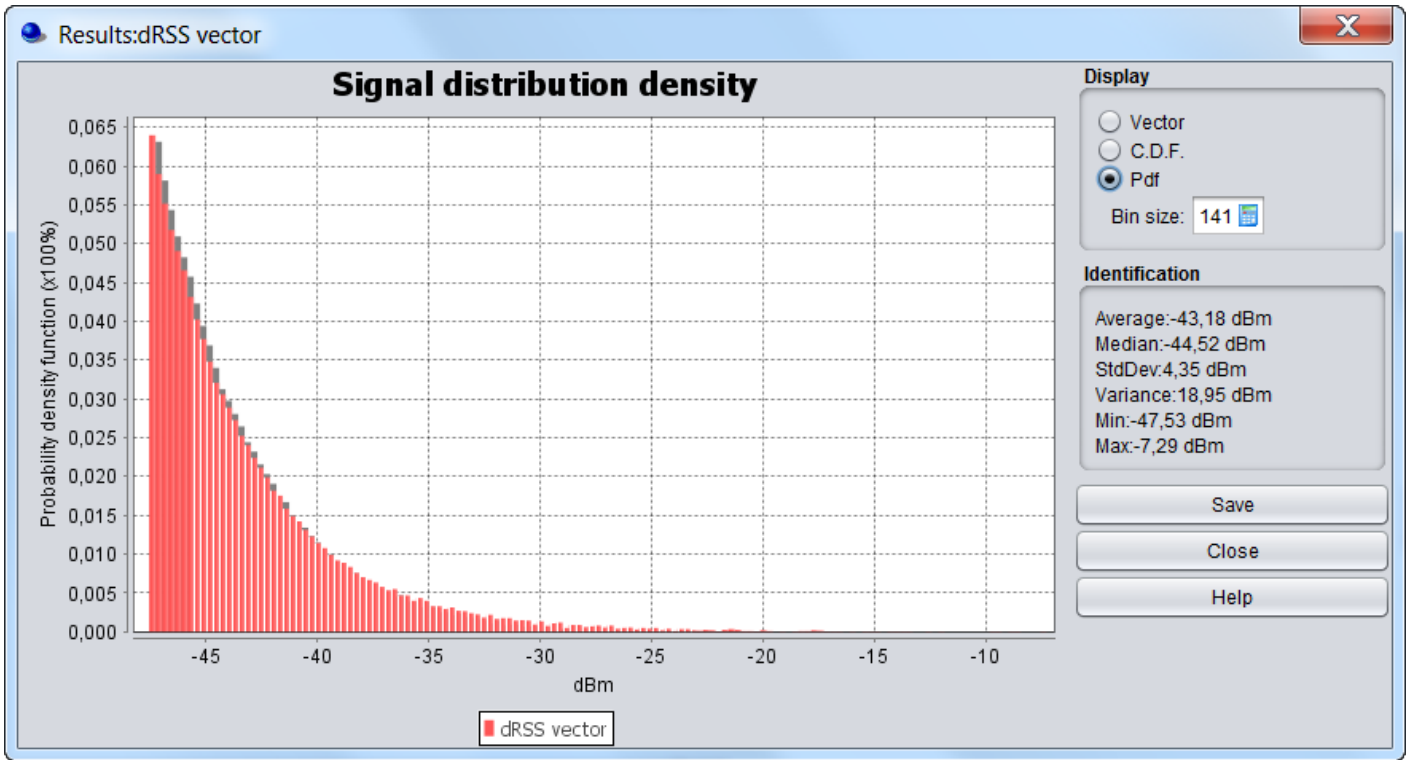
(Eq. 27)

$$R_{max}^{wt} = \sqrt{\frac{72 \times 8}{\pi \times 10 \times 9}} = 1.42 \text{ km}$$

Figure 115 presents the results of the dRSS vector and the results in the coverage radius of the victim link.

The dRSS for a receiver located at the edge of the coverage area may be calculated:

$$dRSS = 30 \text{ (dBm)} + 9 + 9 - (32.5 + 10 \log(1.43^2) + 20 \log(1000)) = -47.5 \text{ dBm}$$

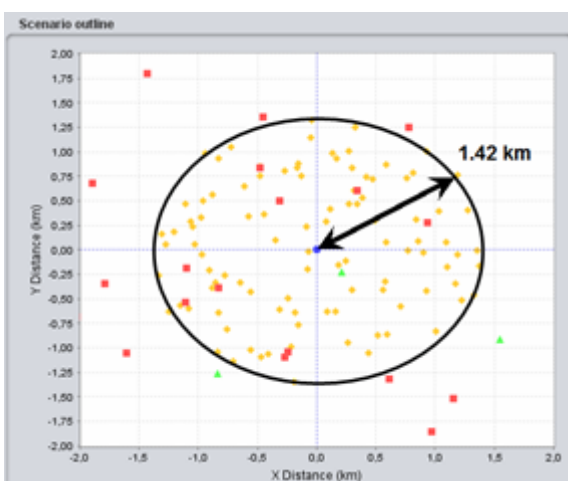


**Figure 114: Resulting dRSS distribution**

**Calculated Radius**

Victim Link Transmi...	1.42729929292221...	km	Double
Interfering Link Tran...		km	Double
Interfering Link Tran...		km	Double

**Figure 115: Calculation results of the victim link coverage radius**



**Figure 116: Illustration of the VLR and VLT positioning based on the traffic limited network coverage radius (ILT-red, ILR-green, VLR-yellow, VLT-blue)**

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