

4.9 Power Control

Note: The power control is used only in this section. When considering other sections, the power control feature should be deactivated.

A power control feature is implemented within SEAMCAT. When this feature is activated it introduces a variation of the interfering link transmitter power. More details on the implementation of the power control in SEAMCAT is presented in ANNEX 14:.

When using the scenario provided in section 3 (Victim Link and Interfering Link operate at the same frequency 1000 MHz but with a interfering link receiver antenna gain should be equal to 11 dBi), it becomes possible to define the distance between the Victim link receiver and the Interfering link transmitter.

For simplification, we consider that the Victim link receiver and the Interfering link transmitter are defined using the following assumptions (1 km distance between the Victim and the Interfering link transmitter). This is illustrated in Figure 134.

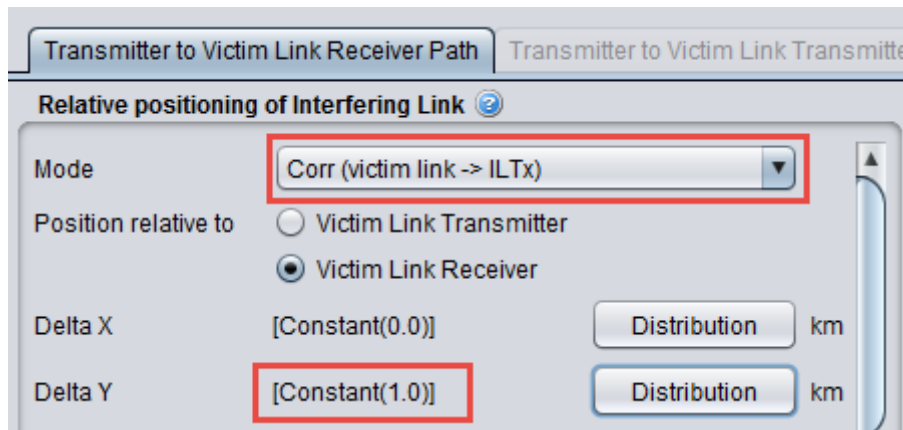


Figure 134: Setting up the distance between the Interfering and the Victim pair of transmitter and receiver

If the power control is not activated then the $iRSS_{unwanted}$ is (see Figure 135):

$$iRSS_{unwanted} = 33(dBm) + 11 + 9 - (32.5 + 10\log(1) + 20\log(1000)) = -39.5dBm$$

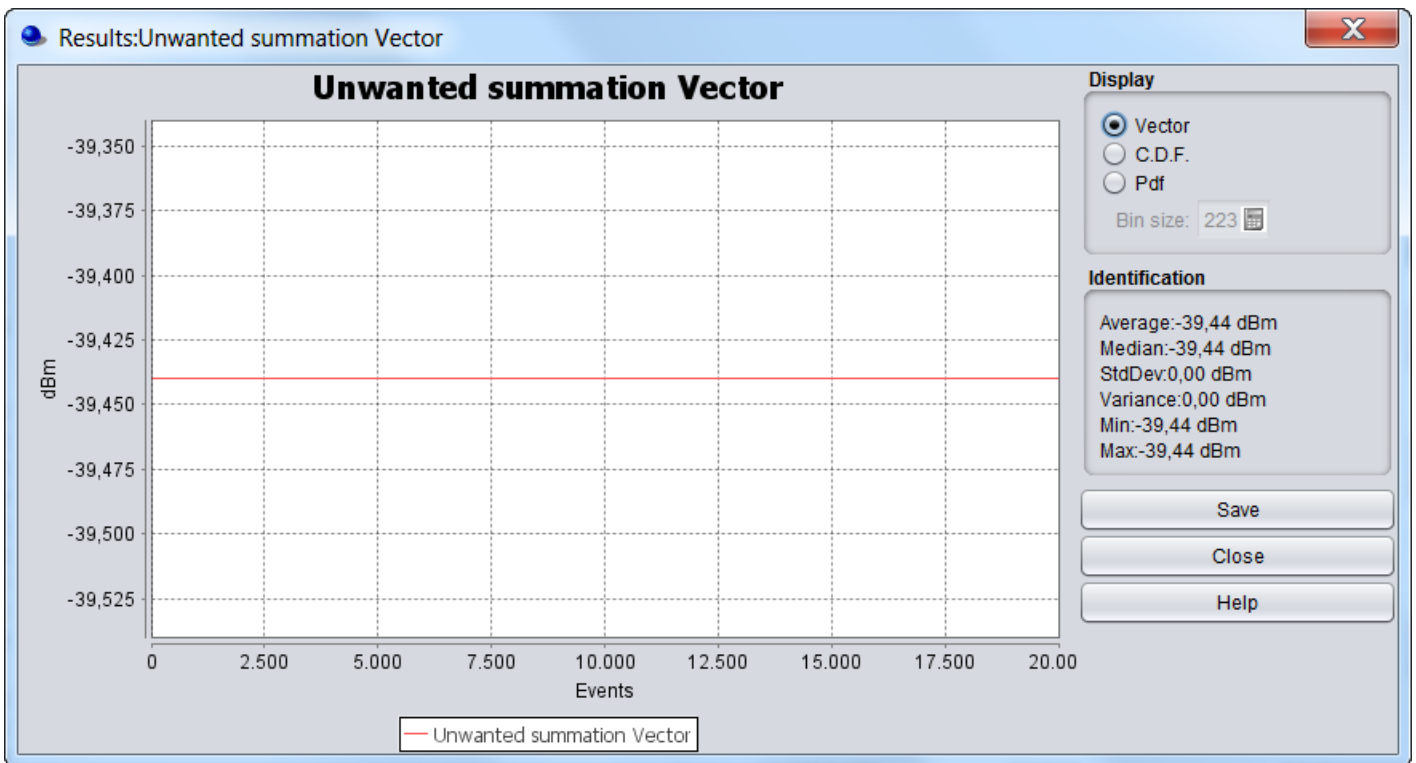


Figure 135: $iRSS_{\text{unwanted}}$ without power control

The same assumption is used for the distance between ILT and the ILR (i.e. $x = 0$ km and $y = 1$ km) where the ILT is the (0,0) origin as shown in Figure 136.

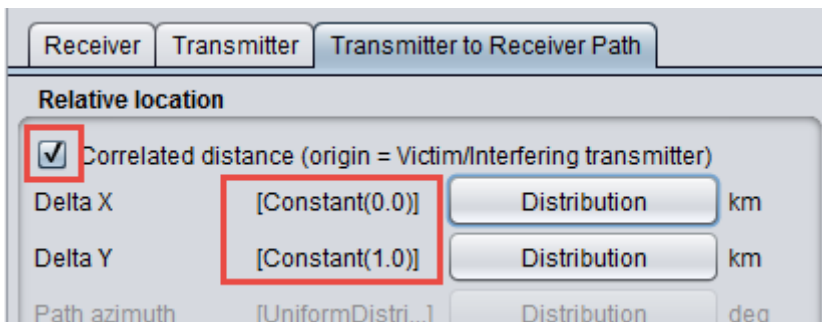


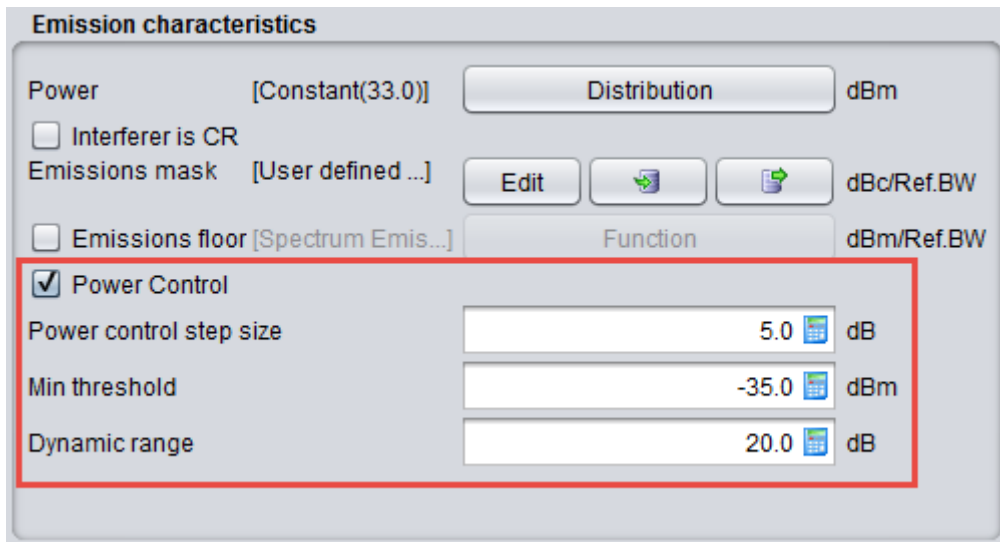
Figure 136: Setting up the distance between the Interfering link transmitter and the Interfering link receiver to evaluate the $dRSS_{\text{Interfering link receiver}}$

The power received by the Interfering link receiver ($dRSS_{\text{Interfering link receiver}}$) is then:

$$dRSS_{\text{Interfering link receiver}} = 33(\text{dBm}) + 11 + 11 - (32.5 + 10\log(1) + 20\log(1000)) = -37.5\text{dBm}$$

Note: **You should not confuse the $dRSS_{\text{Interfering link receiver}}$ and the $dRSS_{\text{Victim link receiver}}$**
Figure 111 illustrates their differences.

The power control can be input as shown in Figure 137.



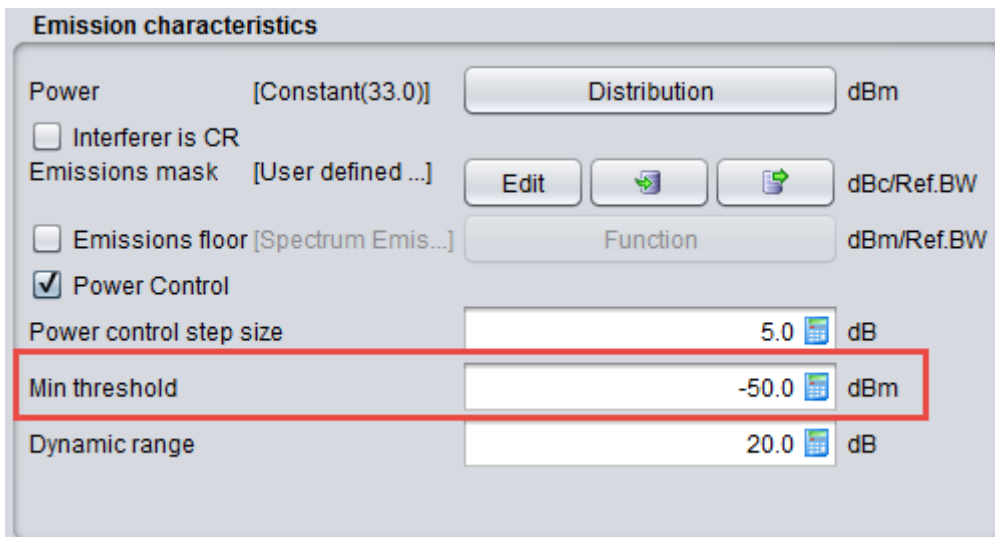
The screenshot shows the 'Emission characteristics' dialog box. The 'Power Control' checkbox is checked. The 'Power control step size' is set to 5.0 dB, the 'Min threshold' is set to -35.0 dBm, and the 'Dynamic range' is set to 20.0 dB. These three fields are enclosed in a red rectangular box.

Parameter	Value	Unit
Power	[Constant(33.0)]	dBm
Interferer is CR	<input type="checkbox"/>	
Emissions mask	[User defined ...]	dBc/Ref.BW
Emissions floor	[Spectrum Emis...]	dBm/Ref.BW
Power Control	<input checked="" type="checkbox"/>	
Power control step size	5.0	dB
Min threshold	-35.0	dBm
Dynamic range	20.0	dB

Figure 137: Setting up the power control for the interfering link

Using these assumptions, the results of the simulation are the same as previously since the threshold (-35 dBm) is above the $dRSS_{\text{Interfering link receiver}}$ (-37.5 dB). This corresponds to the Case 1 described in ANNEX 14:.

Now, if the threshold is decreased from -35 dBm to -50 dBm (see Figure 138)



The screenshot shows the 'Emission characteristics' dialog box. The 'Power Control' checkbox is checked. The 'Min threshold' field is highlighted with a red rectangular box and is set to -50.0 dBm.

Parameter	Value	Unit
Power	[Constant(33.0)]	dBm
Interferer is CR	<input type="checkbox"/>	
Emissions mask	[User defined ...]	dBc/Ref.BW
Emissions floor	[Spectrum Emis...]	dBm/Ref.BW
Power Control	<input checked="" type="checkbox"/>	
Power control step size	5.0	dB
Min threshold	-50.0	dBm
Dynamic range	20.0	dB

Figure 138: Reduction of the minimum threshold in the PC

Since, the power control feature is activated the gain of the power control is determined according to the guidance given in ANNEX 14: on page 344. Since the $dRSS_{\text{Interfering link receiver}}$ is -37.5 dBm and:

$$-50\text{dBm}(PC\text{threshold}) + 2 * PC\text{step}(5\text{dB}) < -37.5\text{dBm} < -50\text{dBm}(PC\text{threshold}) + 3 * PC\text{step}(5\text{dB})$$

The gain of the power control (g_{itPC}) is 10 dB (Case (i+1) in ANNEX 14:). This means that the $iRSS_{\text{unwanted}}$ will be decreased by 10 dB, i.e. :

$$iRSS_{\text{unwanted}} = -39.5\text{dBm} - g_{itPC} = -49.5\text{dBm}$$

Finally, if the threshold is decreased from -50 dBm to -70 dBm , the power control feature is activated. Since the $dRSS_{\text{Interfering link receiver}}$ is -37.5 dBm , this results in:

$$-70\text{dB}(PC\text{threshold}) + 20(PC\text{dyn}) < -37.5\text{dBm}$$

The gain of the power control is 20 dB (Case ($n_{\text{step}} + 2$) in ANNEX 14:). This means that the $iRSS_{\text{unwanted}}$ will be decreased by 20 dB, i.e. :

$$iRSS_{\text{unwanted}} = -39.5\text{dBm} - g_{itPC} = -59.5\text{dBm}$$

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