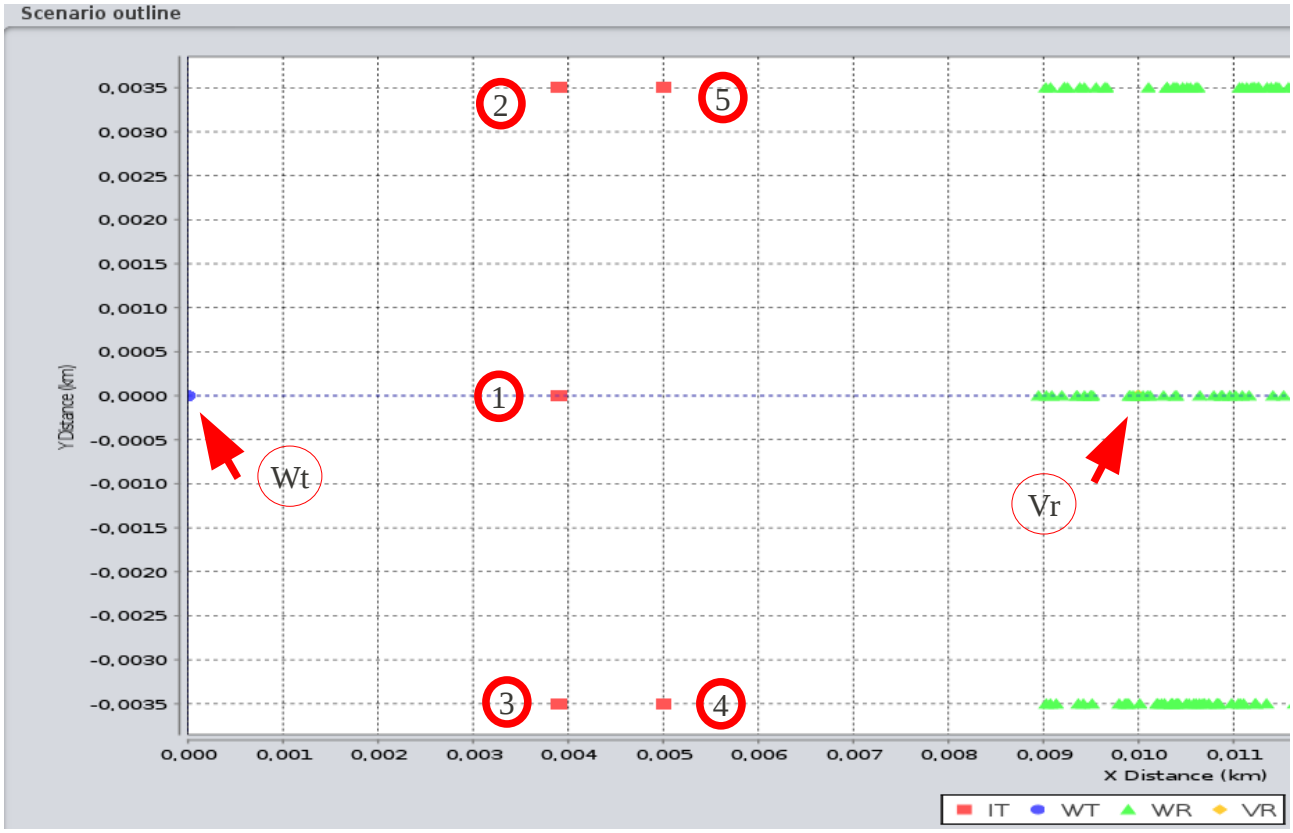
Test of Seamcat Beta 3.2.5

During the tests of Seamcat Beta 3.2.5 there was some evidence for not proper work. To verify these doubts, a test scenario was used. This scenario and the results achieved will be explained in this document.

Scenario:	workspace DSRC_vs_ITS free flow_sent2.sws
Victim Link	center frequency 5805 MHz band width 20 MHz antenna gain 4.8 dB, no antenna pattern blocking 3 dB const. user defined dRSS of -47 dBm
Interfering link(s)	center frequency 5880 MHz emission mask in the range of the victim's band: -55 dB power: 10 dBm (active); -100 dBm (inactive) (see description below) no antenna pattern
Paths	propagation models are used without variations
placement	Vr and Wt distance: 10 meter It_1 distance 6.1 m from Vr It_2 and It_3 relative to It_1 ± 3.5 m (y) It_4 in a distance of 6.1 m and 35° from Vr It_5 relative to It_4, +7 m (y)

The scenario refers to three traffic lanes, 3.5 m wide. Distances of It_4 and It_5 are choosen to have the projection of the Its in the middle between Wt and Vr, i.e. 5 m from Vr. The distance of It_1 is set to the same value. The picture below illustrates the scenario.



Preparation:

Path loss for 6.1 m ≈ 63 dB

Calculation: A single It in a distance of 6.1 m from Vr would lead to
relUnwanted: -55 + 10(lg(2*10^7) – lg 10^6) = -42 dB
iRSSunwanted: 10 – 42 -63 + 4.8 = -90.2 dB
iRSSblocking: 10 – 63 + 4.8 – 3 = -51.2 dB

These values are verified by single tests, which result in:
iRSSunwanted: -90.72 dB
iRSSblocking: -51.73 dB

For two Its at the same location, the values will increase by 3 dB (doubling the power), i.e.
iRSSunwanted: -87.71 dB
iRSSblocking: -48.72 dB
(The slight deviations might be caused by mathematical rounding and are not of importance.)

The Compatibility Mode will show an interference probability of 0 % for 1 It and 100 % for 2 Its. The Translation Mode (100 steps between 0 and 50 dBm) will show a step to 100 % interference probability at transmission power of 11 dBm (1 It) and 8 dBm (2 Its).

Tests:

For the tests, the Its were „switched off“ by setting a transmission power of -100 dBm. Only the three equally distant Its It_1, It_4 and It_5 were activated by setting the transmission power to 10 dBm, either as single It or two of them.

The values for iRSSunwanted and iRSSblocking were in all tests exactly as expected, i.e. as given above for 1 resp. 2 Its. Using the Translation, it is expected to see symmetric values due to the symmetric structure of the scenario, i.e. choosing parameter „transmission power It_2“ should result in the same picture as parameter „transmission power It_3“, the same for It_4 and It_5.

In the table below, the values (in dBm) given for the Translation Mode (100 points between 0 and 50 dBm) refer to a step to 100 % interference probability, indicating the transmission power for the first point of 100 %.

Test #	I	II	III	IV	V	VI
Active It(s)	It_1	It_4	It_5	It_4 and It_5	It_1 and It_4	It_1 and It_5
Comp. Mode	0 %	0 %	0 %	100 %	100 %	100 %
Transl. Mode link 1	11	3	11	3	3	11
Transl. Mode link 2	4	12	4	4	4	const. 100 %
Transl. Mode link 3	4	4	12	4	const. 100 %	4
Transl. Mode link 4	3	11	3	3	3	const. 100 %
Transl. Mode link 5	3	11	11	11	3	3

Tests #I, #II and #III were repeated, setting the transmission power of the „active“ links to 100 dBm instead of 10 dBm. In Translation Mode, all values below 10 dBm from the table above were now constantly 100 % interference, the values above 10 dBm were the same as shown in the table.

Interpretation:

As already indicated in emails, there is obviously a mixing in the numbering of the links. In the Translation Parameters window there is another order than in the Workspace/Interfering Links window. Using the names one can assign to the interference links and which are used in the Workspace/Interfering Links window also for the Translation Parameters window would avoid confusion here.

More important are the results itself. In the scenario, no antenna patterns are used. So from interference point of view, It_1, It_4 and It_5 are exactly identical, because all of them are in the same distance from the Vr. Therefore, in tests #I, #II and #III the results of It_1, It_4 and It_5 should be interchangeable (depending on the active one of them), the results for It_2 and It_3 should be identical in all three tests.

Even more confusion seems to be in tests #IV, #V and #VI. Also here, the results for It_1, It_4 and It_5 should be interchangeable (depending on the active two of them), the results for It_2 and It_3 should be identical in any case.

Remark: Interchangeable means here, in theory the numbers should be exactly the same, due to identical distances. But mathematical roundings might cause slightly different numbers, because the processing order is different and necessary cuts might occur at a different stage of the calculation. So there might be a difference of e.g. 1 dB in the results.

The symmetry expected is not visible in the results. Therefore, some unsolved problems are assumed to exist in the calculation engine.

Some of the tests were re-done using separately placed Its to avoid the co-location functionality. This did not change the results, so probably this is not the reason for the unclear behaviour.