Test Case: IntAirNet Project Radio Model (Excluding Interference)

Aim of the test: The IntAirNet project radio model calculates the signal-to-noise ratio (SNR) of a received signal and based on a trace file contains the SNR to PER/BER mapping, it decides whether the reception succeeds or fails. This test aims to validate the operation of the radio model when no interference is affecting the reception at the receiver.
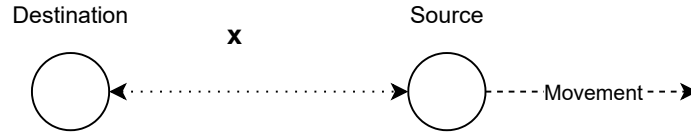

Figure 1: Simulation scenario where a source moves away from the destination.

Test configuration:

- Parameterize the scenario as specified in Table 1.

- The position of the destination is fixed at $(0, 0, 18)\,km$.

- The source is located at $(x, 0, 18)\,km$ where $x = \{45, 55, 70, 85, 110, 140, 175, 220, 275, 360\}\,km$.

Parameter	Value
Tx power (P_{tx})	$42\,\mathsf{dBm}$
Tx and Rx antenna gain (G_{tx}, G_{rx})	$3\,\mathsf{dBi}$
Tx and Rx losses (L_{tx}, L_{rx})	$4\,\mathsf{dB}$
Frequency (f)	$960\,\mathsf{MHz}$
Noise figure (F_n)	$6\,\mathsf{dB}$
Thermal noise density (N_0)	$-174\,\mathsf{dBm/Hz}$
Receiver bandwidth (BW)	$500\,\mathsf{kHz}$
Application type	`UdpBasicApp`
Send interval	$4\,\mathsf{ms}$
Start time	$\mathsf{unifrom}[9, 10]\,\mathsf{s}$
Stop time	$4010\,\mathsf{s}$
Payload size	$100\,\mathsf{B}$
Data rate	$10\,\mathsf{Mbps}$
Simulation time	$4011\,\mathsf{s}$

Table 1: Parameterization of the test scenario.

Test execution:

- The source node sends at least 1×10^6 packets at each of its specified locations i.e., $(45, 0, 18)$, $(55, 0, 18)$, $(70, 0, 18)$, etc.

- An SNR margin of 10 dB is used.

- The average packet error rate for each source location is recorded at the destination.

- The scenario is repeated 10 times to obtain confidence intervals.

Expected results:
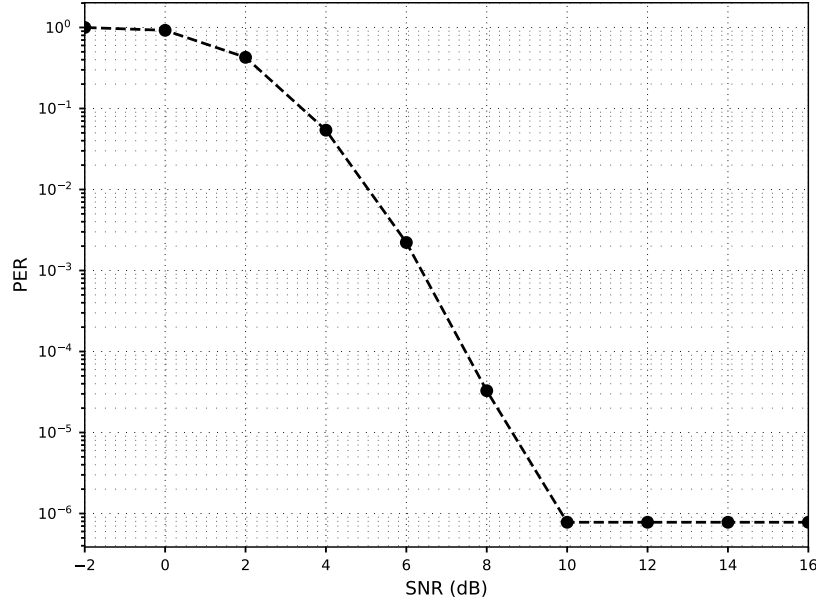
- A plot of the SNR vs PER is obtained similar to what is shown in Figure 2.

Figure 2: Expected SNR vs PER.