

SimuLTE Mode4 - Simulation Result Parameters Reference

1. Overview

This document catalogues every scalar and vector result parameter recorded during SimuLTE Mode 4 (C-V2X) simulations. For each parameter the table lists:

- The signal name as it appears in the .sca/.vec result files
- The recording type (scalar aggregation or time-series vector)
- The OMNeT++ module that emits the signal
- The source file and approximate line number where the signal is emitted
- A description of what the parameter represents and how the value is computed

Result files analysed:

simulations/Mode4/results/Base-#0.sca (scalars)

simulations/Mode4/results/Base-#0.vec (vectors)

Simulation configuration: Highway network, Falcon-512 PQC signatures, 10 subchannels x 10 RBs each, RRI=100 ms, CBR-based MCS/subchannel adaptation.

2. Protocol Stack Layers

The parameters span four layers of the C-V2X Mode 4 protocol stack:

Application Layer (Mode4App / Mode4RSUApp)

- BSM/SPDU generation, PQC signature & verification, PDR tracking, ICA warnings.

MAC Layer (LteMacVUeMode4)

- Semi-Persistent Scheduling (SPS), grant management, resource (re)selection, MCS selection, subchannel allocation, DCC packet dropping.

RLC Layer (UmRxEntity / UmRxQueue)

- Unacknowledged-mode segmentation/reassembly, SDU/PDU packet loss, delay, and throughput measurement per direction (UL/DL/D2D).

PHY Layer (LtePhyVUeMode4)

- SCI/TB transmission & reception, channel sensing (CBR), propagation/interference/half-duplex failure tracking, awareness ratio, inter-packet delay, position reporting.

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Veins Mobility (TraCIMobility)

- Vehicle position, speed, CO2, lifetime (from SUMO via TraCI).

3. Application Layer Parameters (Mode4App / Mode4RSUApp)

Parameter Name	Recording	Unit	Module	Source File : Line	Description
sentMsg	sum, vector		Mode4App	Mode4App.cc : 564	Incremented by 1 each time a BSM/SPDU packet is broadcast. Total count of V2X messages sent by this
received	sum, vector		Mode4App	Mode4App.cc : 390	Incremented by 1 for every SPDU received from another vehicle. Counts all receptions regardless of verification outcome.
verified	sum, vector	s	Mode4App	Mode4App.cc : 411	Incremented by 1 when the PQC signature on a received SPDU passes verification. Used to compute verification success rate.
delay	mean, vector	s	Mode4App	Mode4App.cc : 389	One-way end-to-end latency: simTime() minus the SPDU timestamp set by the sender. Measures total application-to-application delay.
cbr (app)	vector		Mode4App	Mode4App.cc : 144	Channel Busy Ratio forwarded from the PHY-layer CBR measurement packet. Fraction of subchannels sensed as occupied (0.0-1.0).
lifetime	mean, vector	s	Mode4App	Mode4App.cc : 570	Duration the vehicle existed in the simulation: simTime() - entryTime. Recorded at vehicle departure (finish()).
signatureTimeMs	mean, vector	ms	Mode4App	Mode4App.cc : 507	Wall-clock time to generate one PQC digital signature (Falcon-512/Dilithium-2). Measured with chrono::high_resolution_clock.
warnReceived	sum, vector		Mode4App	Mode4App.cc : 233	Count of ICA (Intersection Collision Avoidance) warning SPDUs received from the RSU.
warnVerified	sum, vector		Mode4App	Mode4App.cc : 315	Count of ICA warnings whose PQC signature was successfully verified.
warnExpected	sum, vector		Mode4App	Mode4App.cc : 327	Expected number of ICA warnings based on sequence-number gap detection. Used to compute ICA PDR.
icaVerifyMs	mean, vector	ms	Mode4App	Mode4App.cc : 314	Wall-clock time to verify one ICA warning signature. Measured with chrono in microseconds, emitted as ms.
icaDelayMs	mean, vector	ms	Mode4App	Mode4App.cc (scalar)	One-way delay for ICA warning messages: simTime() - warn timestamp. Recorded as scalar at finish.
icaReceived	scalar		Mode4App	Mode4App.cc : finish()	Total ICA warnings received during vehicle lifetime. Recorded as scalar in finish().
icaExpected	scalar		Mode4App	Mode4App.cc : finish()	Total ICA warnings expected during vehicle lifetime. Recorded as scalar in finish().
icaPDR	scalar		Mode4App	Mode4App.cc : finish()	ICA Packet Delivery Ratio = icaReceived / icaExpected. Recorded as scalar in finish().
rsuReceivedMsg	sum, vector		Mode4RSUApp	Mode4RSUApp.cc : 318	Incremented by 1 for every SPDU received at the RSU node.
rsuVerifiedMsg	sum, vector		Mode4RSUApp	Mode4RSUApp.cc : 358	Incremented by 1 when the RSU successfully verifies a received SPDU's PQC signature.
numBroadcasted	sum		Mode4RSUApp	Mode4RSUApp.cc : 266	Count of ICA warning SPDUs broadcast by the RSU over the sidelink.
icaSignMs	mean	ms	Mode4RSUApp	Mode4RSUApp.cc : 239	Wall-clock time for the RSU to sign one ICA warning with its PQC private key.
cbr (rsu)	mean		Mode4RSUApp	Mode4RSUApp.cc : 313	Channel Busy Ratio as observed at the RSU node. Forwarded from PHY CBR packet.

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4. MAC Layer Parameters (LteMacVUeMode4)

Parameter Name	Recording	Unit	Module	Source File : Line	Description
macNodeID	vector		LteMacVUeMode4	LteMacVUeMode4.cc : 114	The MAC-layer node identifier assigned to this UE. Emitted once at initialization; allows mapping vector indices to node IDs.
grantRequests	sum, vector		LteMacVUeMode4	LteMacVUeMode4.cc : 1140	Incremented each time the MAC requests a new SPS grant from the resource selection procedure (Section 14.1.1.6 of 3GPP 36.321).
grantStartTime	sum, vector		LteMacVUeMode4	LteMacVUeMode4.cc : 885	The absolute simulation time at which the selected CSR (Candidate Single-subframe Resource) grant begins.
grantBreak	sum, vector		LteMacVUeMode4	LteMacVUeMode4.cc : 749	Emitted when the SPS resource reservation counter reaches zero and the grant expires. Triggers resource reselection.
grantBreakTiming	sum, vector		LteMacVUeMode4	LteMacVUeMode4.cc : 644	Emitted when a grant breaks because the timing constraint could not be met (grant start time already passed).
grantBreakSize	count, sum	bytes	LteMacVUeMode4	LteMacVUeMode4.cc : 1295	Emitted with the PDU payload length (bytes) when the transport block exceeds the capacity of the selected MCS/subchannel combination.
grantBreakMissedTrans	sum		LteMacVUeMode4	LteMacVUeMode4.cc : 1329	Emitted when a scheduled transmission opportunity is missed (e.g., no data ready in the buffer at grant time).
missedTransmission	sum		LteMacVUeMode4	LteMacVUeMode4.cc : 1320	Counter of all missed transmission slots regardless of cause.
resourceReselectionCounter	sum, vector		LteMacVUeMode4	LteMacVUeMode4.cc : 733	Current value of the SPS Resource Reselection Counter (C_resel). Counts down each RRI; at zero, resource reselection is triggered with probability (1 - probResourceKeep).
retainGrant	sum, vector		LteMacVUeMode4	LteMacVUeMode4.cc : 734	Emitted when the UE retains its current grant (counter did not expire, or random draw kept the grant at
selectedMCS	mean, vector		LteMacVUeMode4	LteMacVUeMode4.cc : 1282	The Modulation and Coding Scheme index (0-28) chosen for the current transmission, based on CBR-to-MCS lookup table from sidelink_configuration.xml.
selectedSubchannelIndex	mean, vector		LteMacVUeMode4	LteMacVUeMode4.cc : 892	Starting subchannel index (0 to numSubchannels-1) of the allocated resource within the subframe.
selectedNumSubchannels	mean, vector		LteMacVUeMode4	LteMacVUeMode4.cc : 893	Number of contiguous subchannels allocated to this transmission (1 to numSubchannels).
maximumCapacity	mean	bytes	LteMacVUeMode4	LteMacVUeMode4.cc : 1296	Maximum transport block payload capacity (bytes) for the selected MCS and number of subchannels. If the PDU exceeds this, the grant breaks.
takingReservedGrant	mean, vector		LteMacVUeMode4	LteMacVUeMode4.cc : 894	Boolean flag (0 or 1): whether the selected CSR came from the reserved (previously-used) pool rather than a fresh random selection.
packetDropDCC	sum		LteMacVUeMode4	LteMacVUeMode4.cc : 1179	Incremented when the DCC (Decentralized Congestion Control) mechanism drops a packet to reduce channel load.
droppedTimeout	sum		LteMacVUeMode4	LteMacVUeMode4.cc : ~1300	Packets dropped because they exceeded the MAC buffer lifetime. Currently commented out in code.

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5. PHY Layer Parameters (LtePhyVUeMode4)

Parameter Name	Recording	Unit	Module	Source File : Line	Description
servingCell	vector		LtePhyUe	LtePhyUe.cc : 153	MAC node ID of the serving eNodeB. In Mode 4 (out-of-coverage) this is a virtual cell ID.
cbr (phy)	mean, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 1872	Channel Busy Ratio: ratio of subchannels whose RSSI exceeded the sensing threshold over the last 100 ms sensing window.
cbrPscch	mean, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 1873	CBR measured only on PSCCH (Physical Sidelink Control Channel) resources. Indicates control-channel congestion.
threshold	mean, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 179	RSRP sensing threshold used to exclude candidate resources during SPS selection (3GPP 36.213 Section 14.1.1.6). Increased iteratively if fewer than 20% of candidates remain.
sciSent	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 629	Count of Sidelink Control Information (SCI) messages transmitted. One SCI is sent per subframe when the UE has an active grant.
sciReceived	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 267	Cumulative count of SCI messages received from all neighboring UEs.
sciDecoded	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 269	Cumulative count of SCI messages successfully decoded (SINR above SCI decoding threshold).
sciUnsensed	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 268	SCI messages not sensed because the received power was below the RSRP threshold (pThresh).
sciFailedDueToProp	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 270	SCI decoding failures caused by propagation loss (signal too weak due to path loss, fading).
sciFailedDueToInterference	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 271	SCI decoding failures caused by co-channel interference from other simultaneous transmissions.
sciFailedHalfDuplex	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 272	SCI messages missed because the UE was transmitting at the same time (half-duplex constraint: cannot TX and RX simultaneously).
txRxDistanceSCI	mean, vector	m	LtePhyVUeMode4	LtePhyVUeMode4.cc : 1504	Euclidean distance (meters) between the SCI transmitter and this receiver at the time of reception.
tbSent	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 526	Count of Transport Blocks (data payload) transmitted by this UE.
tbReceived	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 293	Cumulative count of Transport Blocks received from all neighbors.
tbDecoded	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 294	Transport Blocks successfully decoded (SINR above TB decoding threshold).
tbFailedDueToNoSCI	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 295	TB decoding failures because the corresponding SCI was not received (cannot determine TB resource allocation without SCI).
tbFailedButSCIReceived	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 298	TB failed to decode even though its SCI was successfully received. Indicates data-channel SINR was insufficient.
tbAndSCINotReceived	sum		LtePhyVUeMode4	LtePhyVUeMode4.cc : 151	Both TB and SCI not received (complete miss). Neither control nor data was decoded.
tbFailedHalfDuplex	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 299	TB missed due to half-duplex: UE was transmitting when the TB arrived.
tbFailedDueToProp	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 296	TB decoding failures due to propagation loss (path loss + fading).
tbFailedDueToInterference	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 297	TB decoding failures due to co-channel interference.
tbFailedDueToPropIgnoreSCI	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 302	TB propagation failures counted regardless of SCI status. Used for analysis that decouples control- and data-channel.
tbFailedDueToInterferenceIgnoreSCI	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 303	TB interference failures counted regardless of SCI status.
tbDecodedIgnoreSCI	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 304	TB successfully decoded regardless of SCI status. Measures raw data-channel reliability.
txRxDistanceTB	mean, vector	m	LtePhyVUeMode4	LtePhyVUeMode4.cc : 292	Euclidean distance (meters) between the TB transmitter and this receiver.

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Parameter Name	Recording	Unit	Module	Source File : Line	Description
periodic	vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 300	Flag from SCI indicating traffic type: 1 = periodic (SPS), 0 = aperiodic (event-triggered).
senderID	vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 1513	MAC node ID of the transmitting UE, extracted from the SCI metadata.
subchannelReceived	mean, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 273	Starting subchannel index of the received packet's resource allocation.
subchannelsUsed	mean, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 274	Number of subchannels occupied by the received packet.
subchannelSent	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 630	Starting subchannel index used when transmitting.
subchannelsUsedToSend	sum, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 631	Number of subchannels allocated for the transmitted packet.
interPacketDelay	mean, vector	s	LtePhyVUeMode4	LtePhyVUeMode4.cc : 1669	Time elapsed between consecutive packet receptions from the same sender. Used to detect packet loss gaps.
awareness1sStat	mean, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 1917	Neighbor awareness ratio over a 1-second window: fraction of nearby vehicles from which at least one packet was received within the last 1 s.
awareness500msStat	mean, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 1918	Neighbor awareness ratio over a 500 ms window.
awareness200msStat	mean, vector		LtePhyVUeMode4	LtePhyVUeMode4.cc : 1919	Neighbor awareness ratio over a 200 ms window.
posX	mean, vector	m	LtePhyVUeMode4	LtePhyVUeMode4.cc : 1953	X-coordinate (meters) of this node's position in the OMNeT++ playground at reception time.
posY	mean, vector	m	LtePhyVUeMode4	LtePhyVUeMode4.cc : 1954	Y-coordinate (meters) of this node's position in the OMNeT++ playground at reception time.
averageCqiD2D	mean		LtePhyUeD2D	LtePhyUeD2D.cc : 266	Average Channel Quality Indicator for the D2D sidelink. CQI ranges 0-15; higher = better channel conditions.
averageCqiDI	mean		LtePhyUe	LtePhyUe.cc : 413	Average CQI for the downlink direction. Typically -nan in Mode 4 (no eNodeB).
averageCqiUI	mean		LtePhyUe	LtePhyUe.cc : 511	Average CQI for the uplink direction. Typically -nan in Mode 4.

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6. RLC Layer Parameters (UmRxEntity / UmRxQueue)

RLC (Radio Link Control) parameters are recorded per direction: D2D (sidelink), DL (downlink), UL (uplink). In Mode 4 out-of-coverage operation, only D2D values are meaningful; DL and UL will report NaN.

Two granularity levels exist: PDU-level (per RLC protocol data unit) and SDU-level (per service data unit / IP packet). Cell-level variants aggregate across all UEs.

Parameter Name	Recording	Unit	Module	Source File : Line	Description
rlcPduPacketLossD2D	mean		UmRxEntity	UmRxEntity.cc : 725	Per-PDU packet loss on D2D: emits 0.0 (received) or 1.0 (lost) for each expected RLC PDU. Mean gives loss
rlcPduPacketLossDI	mean		UmRxEntity	UmRxEntity.cc : 714	Per-PDU packet loss on downlink. NaN in Mode 4.
rlcPduPacketLossUI	mean		UmRxEntity	UmRxEntity.cc : 703	Per-PDU packet loss on uplink. NaN in Mode 4.
rlcPduDelayD2D	mean		UmRxEntity	UmRxEntity.cc : 726	RLC PDU delay on D2D: (NOW - creationTime) in seconds for each successfully received PDU.
rlcPduDelayDI	mean		UmRxEntity	UmRxEntity.cc : 715	RLC PDU delay on downlink. NaN in Mode 4.
rlcPduDelayUI	mean		UmRxEntity	UmRxEntity.cc : 704	RLC PDU delay on uplink. NaN in Mode 4.
rlcPduThroughputD2D	mean	B/s	UmRxEntity	UmRxEntity.cc : 727	RLC PDU throughput on D2D: PDU size / elapsed time since last PDU.
rlcPduThroughputDI	mean	B/s	UmRxEntity	UmRxEntity.cc : 716	RLC PDU throughput on downlink. NaN in Mode 4.
rlcPduThroughputUI	mean	B/s	UmRxEntity	UmRxEntity.cc : 705	RLC PDU throughput on uplink. NaN in Mode 4.
rlcPacketLossD2D	mean		UmRxEntity	UmRxEntity.cc	Per-SDU (higher-layer packet) loss rate on D2D.
rlcPacketLossDI	mean		UmRxEntity	UmRxEntity.cc	Per-SDU loss rate on downlink.
rlcPacketLossUI	mean		UmRxEntity	UmRxEntity.cc	Per-SDU loss rate on uplink.
rlcPacketLossTotal	mean		UmRxEntity	UmRxEntity.cc	Overall SDU loss rate across all directions.
rlcDelayD2D	mean	s	UmRxEntity	UmRxEntity.cc : 771	SDU-level delay on D2D: (NOW - original timestamp) in seconds.
rlcDelayDI	mean	s	UmRxEntity	UmRxEntity.cc : 757	SDU-level delay on downlink.
rlcDelayUI	mean	s	UmRxEntity	UmRxEntity.cc : 766	SDU-level delay on uplink.
rlcThroughputD2D	mean	B/s	UmRxEntity	UmRxEntity.cc	SDU-level throughput on D2D.
rlcThroughputDI	mean	B/s	UmRxEntity	UmRxEntity.cc	SDU-level throughput on downlink.
rlcThroughputUI	mean	B/s	UmRxEntity	UmRxEntity.cc	SDU-level throughput on uplink.
rlcCellPacketLossD2D	mean		UmRxEntity	UmRxEntity.cc	Cell-wide aggregate SDU loss on D2D.
rlcCellPacketLossDI	mean		UmRxEntity	UmRxEntity.cc	Cell-wide aggregate SDU loss on downlink.
rlcCellPacketLossUI	mean		UmRxEntity	UmRxEntity.cc	Cell-wide aggregate SDU loss on uplink.
rlcCellThroughputD2D	mean	B/s	UmRxEntity	UmRxEntity.cc	Cell-wide aggregate throughput on D2D.
rlcCellThroughputDI	mean	B/s	UmRxEntity	UmRxEntity.cc	Cell-wide aggregate throughput on downlink.
rlcCellThroughputUI	mean	B/s	UmRxEntity	UmRxEntity.cc	Cell-wide aggregate throughput on uplink.

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7. HARQ Parameters (LteMacBase)

HARQ (Hybrid Automatic Repeat Request) error-rate statistics. Recorded per retransmission attempt (1st through 4th) and per direction. In the current Mode 4 config maxHarqRtx=0, so only 1st-attempt and 2nd-attempt (harqErrorRate_2nd_DI) appear with non-NaN values. Most are disabled in omnetpp.ini.

Parameter Name	Recording	Unit	Module	Source File : Line	Description
harqErrorRate_2nd_DI	mean		LteMacBase	LteMacBase.cc	HARQ block error rate on the 2nd transmission attempt (downlink). Fraction of HARQ processes that still fail after first retransmission.

8. Veins Mobility Parameters (TraCIMobility)

These scalars are produced by the Veins TraCIMobility module which interfaces with SUMO. They are recorded per-vehicle as scalars (no vector variant).

Parameter Name	Recording	Unit	Module	Source File : Line	Description
startTime	scalar	s	TraCIMobility	TraCIMobility.cc	Simulation time when the vehicle entered the network (SUMO departure time).
stopTime	scalar	s	TraCIMobility	TraCIMobility.cc	Simulation time when the vehicle left the network.
totalTime	scalar	s	TraCIMobility	TraCIMobility.cc	Total time the vehicle was active: stopTime - startTime.
minSpeed	scalar	m/s	TraCIMobility	TraCIMobility.cc	Minimum instantaneous speed observed during the vehicle's trip.
maxSpeed	scalar	m/s	TraCIMobility	TraCIMobility.cc	Maximum instantaneous speed observed during the vehicle's trip.
totalDistance	scalar	m	TraCIMobility	TraCIMobility.cc	Total distance traveled by the vehicle (odometer).
totalCO2Emission	scalar	g	TraCIMobility	TraCIMobility.cc	Cumulative CO2 emissions reported by SUMO's emission model.
posx	vector	m	TraCIMobility	TraCIMobility.cc	X-coordinate of vehicle position over time (from SUMO via TraCI).
posy	vector	m	TraCIMobility	TraCIMobility.cc	Y-coordinate of vehicle position over time.
speed	vector	m/s	TraCIMobility	TraCIMobility.cc	Instantaneous vehicle speed over time.
acceleration	vector	m/s ²	TraCIMobility	TraCIMobility.cc	Instantaneous vehicle acceleration over time.
co2emission	vector	g/s	TraCIMobility	TraCIMobility.cc	Instantaneous CO2 emission rate over time.
roiArea	scalar		TraCIMobility	TraCIMobility.cc	Flag indicating whether the vehicle was within the Region of Interest.

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9. Notes on Disabled Statistics

The following statistics are defined in .ned files but explicitly disabled in omnetpp.ini (statistic-recording = false) to reduce result file size and simulation overhead:

MAC layer (all directions): macDelay, macThroughput, macCellThroughput, macCellPacketLoss, macPacketLoss, macBufferOverflow, harqErrorRate (1st/2nd/3rd/4th attempts UL/DL/D2D), receivedPacketFromUpperLayer, receivedPacketFromLowerLayer, sentPacketToUpperLayer, sentPacketToLowerLayer, measuredIltbs, pdcpdrop0-3.

These can be re-enabled by setting the corresponding statistic-recording to true in omnetpp.ini.

10. Key Formulas

Packet Delivery Ratio (PDR):

$$\text{PDR} = \text{tbDecoded} / \text{tbSent} \quad (\text{PHY-layer, per link})$$

$$\text{PDR} = \text{received} / (\text{sum of all sentMsg by neighbors}) \quad (\text{application-layer})$$

$$\text{ICA PDR} = \text{icaReceived} / \text{icaExpected} \quad (\text{ICA-specific})$$

Channel Busy Ratio (CBR):

$$\text{CBR} = (\text{number of subchannels with RSSI} > \text{threshold}) / (\text{total subchannels in 100ms window})$$

Verification Success Rate:

$$\text{VSR} = \text{verified} / \text{received}$$

SCI Decode Rate:

$$\text{SDR} = \text{sciDecoded} / \text{sciReceived}$$

TB Decode Rate:

$$\text{TDR} = \text{tbDecoded} / \text{tbReceived}$$

RLC Packet Loss Rate:

$$\text{PLR} = \text{mean}(\text{rlcPduPacketLossD2D}) \quad (\text{each sample is 0.0 or 1.0})$$

11. Simulation Configuration Summary

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Network: Highway (Veins + SUMO intersection scenario)

Crypto: PQC digital signatures (default Falcon-512)

Subchannels: 10 subchannels x 10 RBs each

RRI: 100 ms (pStep=100)

Tx Power: 23 dBm

RSSI Threshold: 9

Max HARQ Retx: 0

Prob Resource Keep: 0.8

CBR-based adaptation: enabled

CR Limit: enabled

Packet dropping: enabled

Packet size: 2300 bytes

Send interval: 100 ms

Carrier frequency: 5.915 GHz