

| Parameter                     | Case of utilisation   | Description (unit of measure)   | Value  | Default Value  | Notes  |
|-------------------------------|---|---|--|--|--|
| <i>Simulation settings</i>    |   |   |  |  |  |
| <i>seed</i>                   | Always  | Seed for random numbers generation  | Integer, if set to 0 it is randomly selected                               | 0  |  |
| <i>simulationTime</i>         | Always  | Simulation duration (s)   | Double, > 0  | 10   |  |
| <i>Technology</i>             | Always  | Choice between LTE-V2V, NR-V2X, 802.11p, or coexistence using separate bands (no interference) or the same band)                            | String, [LTE-V2X, 5G-V2X, NR-V2X, 80211p, COEX-NO-INTERF, COEX-STD-INTERF] | LTE-V2X  | Added from v3.1, coexistence options from v5.1, NR-V2X option from v6.1          |
| <i>numVehiclesLTE</i>         | When Technology= COEX-NO-INTERF or Technology= COEX-STD-INTERF  | Number of vehicles that are LTE-V2V between groups of vehicles that are IEEE 802.11p  | Integer, >=0   | 1  | From v5.1  |
| <i>numVehicles11p</i>         | When Technology= COEX-NO-INTERF or Technology= COEX-STD-INTERF  | Number of vehicles that are IEEE 802.11p between groups of vehicles that are LTE-V2V  | Integer, >=0 (cannot be 0 if numVehiclesLTE=0)                             | 1  | From v5.1  |
| <i>fileTrace</i>              | Always  | Set file trace  |  | false  | Removed in v5.1<br>Replaced with <i>TypeOfScenario</i>                           |
| <i>TypeOfScenario</i>         | Always  | Set scenario to simulate; PPP on multiple lanes with various speeds, file traces, or ETSI highway high speed as per TR 36.885 or ETSI-urban | String, [PPP,Traces, ETSI-Highway, ETSI-Urban]                             | PPP  | Added from v5.1  |
| <i>positionTimeResolution</i> | Always  | Positioning update of the vehicles  | Double, >= 0   | 0.1  | Until v5.2.9 only with traffic traces, default was auto (-1); Changed in v5.2.10 |
| <i>roadLength</i>             | When <i>TypeOfScenario</i> =PPP or <i>TypeOfScenario</i> =ETSI-Highway                                      | Length of the road to be simulated (m)  | Double, > 0  | 4000 if <i>TypeOfScenario</i> =PPP, 2000 if <i>TypeOfScenario</i> =ETSI-Highway, 2732 if <i>TypeOfScenario</i> =ETSI-Urban |  |
| <i>roadWidth</i>              | When <i>TypeOfScenario</i> =PPP or <i>TypeOfScenario</i> =ETSI-Highway or <i>TypeOfScenario</i> =ETSI-Urban | Width of each lane (m)  | Double, >= 0 (width 0 means 1-D)   | 3.5 if <i>TypeOfScenario</i> =PPP or ETSI-Urban, 4 if <i>TypeOfScenario</i> =ETSI-Highway                                  |  |
| <i>rho</i>                    | When <i>TypeOfScenario</i> =PPP or <i>TypeOfScenario</i> =ETSI-Highway                                      | Density of vehicles (vehicles/km) - According to the definition, it is $\text{inv}(2.5 \cdot \text{speed})$                                 | Double, > 0  | 100 if <i>TypeOfScenario</i> =PPP, 35 if <i>TypeOfScenario</i> =ETSI-Highway, 24 if <i>TypeOfScenario</i> =ETSI-Urban      |  |
| <i>vMean</i>                  | When <i>TypeOfScenario</i> =PPP or <i>TypeOfScenario</i> =ETSI-Highway                                      | Mean speed of vehicles (km/h)   | Double, >= 0   | 114.23 if <i>TypeOfScenario</i> =PPP, 240 if <i>TypeOfScenario</i> =ETSI-Highway, 60 if <i>TypeOfScenario</i> =ETSI-Urban  |  |
| <i>vStDev</i>                 | When <i>TypeOfScenario</i> =PPP or <i>TypeOfScenario</i> =ETSI-Highway                                      | Standard deviation of speed of vehicles (km/h)  | Double, >= 0   | 12.65 if <i>TypeOfScenario</i> =PPP, 0 if <i>TypeOfScenario</i> =ETSI-Highway, , 0 if <i>TypeOfScenario</i> =ETSI-Urban    |  |
| <i>Nblocks</i>                | When <i>TypeOfScenario</i> =ETSI-Urban  | Number of total blocks  | Integer, > 0   | 1  | From 5.2.11  |
| <i>Nlanesblockh</i>           | When <i>TypeOfScenario</i> =ETSI-Urban  | Number of horizontal lanes per block (both directions)  | Integer, > 0   | 4  | From 5.2.11  |

|  |  |   |   |                         |   |
|--|--|---|---|-------------------------|---|
| <i>Nlanesblockv</i>                        | When<br><i>TypeOfScenario</i> =ETSI-<br>Urban                                    | Number of vertical lanes per<br>block (both directions)                                       | Integer, > 0  | 4                       | From 5.2.11   |
| <i>NLanes</i>                              | When<br><i>TypeOfScenario</i> =PPP or<br><i>TypeOfScenario</i> =ETSI-<br>Highway | Number of lanes per<br>direction  | Integer, > 0  | 3                       |   |
| <i>filenameTrace</i>                       | When<br><i>TypeOfScenario</i> =Traces  | File trace name   | String  | null.txt                |   |
| <i>fileObstaclesMap</i>                    | When<br><i>TypeOfScenario</i> =Traces  | Set obstacles map file  | Boolean   | false                   | From v3.1   |
| <i>filenameObstaclesMap</i>                | When<br><i>fileObstaclesMap</i> =true  | File obstacles map name   | String  | null.txt                | From v3.1   |
| <i>XminTrace</i>                           | When<br><i>TypeOfScenario</i> =Traces  | Minimum X coordinate to<br>keep in the traffic trace (m)                                      | Double, >= 0 or -1<br>(auto calculation)  | -1                      | From v3.3   |
| <i>XmaxBlock</i>                           | When<br><i>TypeOfScenario</i> =ETSI-<br>Urban                                    | Width of each block (m)   | Double, >= 0  | 250                     | From v5.3.3   |
| <i>XmaxTrace</i>                           | When<br><i>TypeOfScenario</i> =Traces  | Maximum X coordinate to<br>keep in the traffic trace (m)                                      | Double, >= 0 or -1<br>(auto calculation)  | -1                      | From v3.3   |
| <i>YmaxBlock</i>                           | When<br><i>TypeOfScenario</i> =ETSI-<br>Urban                                    | Height of each block (m)  | Double, >= 0  | 433                     | From v5.3.3   |
| <i>YminTrace</i>                           | When<br><i>TypeOfScenario</i> =Traces  | Minimum Y coordinate to<br>keep in the traffic trace (m)                                      | Double, >= 0 or -1<br>(auto calculation)  | -1                      | From v3.3   |
| <i>YmaxTrace</i>                           | When<br><i>TypeOfScenario</i> =Traces  | Maximum Y coordinate to<br>keep in the traffic trace (m)                                      | Double, >= 0 or -1<br>(auto calculation)  | -1                      | From v3.3   |
| <i>neighborsSelection</i>                  | Always   | If using significant neighbors<br>selection   | Boolean   | False                   | From v3.5; not active<br>from v5.1  |
| <i>Mvicinity</i>                           | If <i>neighborsSelection</i> =true   | Margin for trajectory vicinity<br>(m)   | Integer, > 0  | 10                      | Removed in v5.1   |
| <i>Mborder</i>                             | Always   | Margin for border effect<br>removal (m)   | Integer, >= 0   | 0                       | Removed in v4.1   |
| <b>Application settings</b>                |  |   |   |                         |   |
| <i>Tbeacon</i>                             | Always   | Beacon period (s)   | Double, > 0   | 0.100000                | Replaced in v5.2 by<br><i>averageTbeacon</i>  |
| <i>averageTbeacon</i>                      | Always   | Average beacon period (s)   | Double, > 0   | 0.100000                | Renamed as<br><i>allocationPeriod</i> in v6.1   |
| <i>allocationPeriod</i>                    | Always   | Resource allocation period<br>(s)   | Double, > 0   | 0.100000                | From v6.1   |
| <i>variabilityTbeacon</i>                  | Always   | Interval of variability of<br><i>Tbeacon</i> from vehicle to<br>vehicle (applies only to 11p) | Double, >=0 &<br>< <i>averageTbeacon</i> ; -<br>1 means automatic<br>based on speed   | 0                       | From v5.2; option -1<br>added in v5.2.3.<br>Renamed in v6.1 in<br><i>variabilityGenerationInt<br/>erval</i> |
| <i>generationInterval</i>                  | Always   | Sets the deterministic part of<br>the packet generation<br>interval (s).                      | Double, >0  | <i>allocationPeriod</i> | From v6.1   |
| <i>generationIntervalAverageRandomPart</i> | Always (incompatible with<br><i>variabilityGenerationInterval</i><br>=1)         | Sets the Average random<br>part of the packet generation<br>interval (s).                     | Double, >0  | 0                       | From v6.1   |
| <i>variabilityGenerationInterval</i>       | Always (incompatible with<br><i>generationIntervalAverageR<br/>andomPart</i> =0) | Interval of variability of<br><i>generationInterval</i> from<br>vehicle to vehicle            | Double, >=0 &<br>< <i>allocationPeriod</i> ; -<br>1 means automatic<br>based on speed | 0                       | From v6.1   |
| <i>beaconSizeBytes</i>                     | Always   | Beacon size (Bytes)   | Integer, > 0 &<br><10000  | 190                     |   |
| <i>resourcesV2V</i>                        | When <i>Technology</i> =80211p   | Resource allocated to V2V<br>(%)  | Integer, > 0 &<br><=100   | 100                     |   |
| <i>variableBeaconSize</i>                  | When <i>Technology</i> =80211p   | Allows packets of 2 sizes   | Boolean   | false                   | Not tested from v5.1  |
| <i>beaconSizeSmallBytes</i>                | When<br><i>variableBeaconSize</i> =true (&<br><i>Technology</i> =80211p)         | Set size of smaller packets   | Integer, >0 & <=<br><i>beaconSizeBytes</i>  | 190                     |   |
| <i>NbeaconsSmall</i>                       | When<br><i>variableBeaconSize</i> =true (&<br><i>Technology</i> =80211p)         | Set number of smaller<br>packets after each large<br>packet                                   | Integer, >0   | 4                       |   |
| <i>cbrActive</i>                           | Always   | If the CBR is calculated  | Boolean   | true                    | From v5.3.0   |
| <i>cbrSensingInterval</i>                  | If <i>cbrActive</i> =true  | Sets the duration of the time<br>interval for CBR calculation<br>(s)                          | Double, >0  | 0.1                     | tested only from<br>version 5.2.9, when the<br>default was changed<br>from 1 to 0.1                         |
| <i>cbrSensingIntervalDesynchN</i>          | If <i>cbrActive</i> =true  | Sets the number of intervals<br>for CBR desynch   | Integer, >0   | 100                     | From v5.3.0   |
| <i>dcc_active</i>                          | Always (gives error if<br><i>cbrActive</i> =false)                               | If the DCC is active  | Boolean   | true                    | From v5.3.0   |

|                                  |   |   |  |             |   |
|----------------------------------|---|---|--|-------------|---|
| <i>camDiscretizationType</i>     | if variabilityTbeacon==1                                | Type of discretization: 'null' = used, 'allSteps'=steps of 0.1s or 'allocationAligned' in {0.1,0.2,0.5,1}         | String ('null', 'allSteps', 'allocationAligned')                     | null        | From v5.3.5   |
| <i>camDiscretizationIncrease</i> | Always  | Percentage of the admissible increase of the generation interval  | Double, >0   | 0           | From v5.3.5   |
| <b>Physical layer settings</b>   |   |   |  |             |   |
| <i>BwMHz</i>                     | Always  | Bandwidth (MHz)   | Double, [1.4, 5, 10, 20] if Technology=C-V2X; only 10 otherwise      | 10          |   |
| <i>Raw</i>                       | Always  | Awareness range (m); can be a vector of increasing numbers, which will create groups of distances for the outputs | Integer, > 0, or String including an increasing list of integers, >0 | 150         | Before v5.2 it was an Integer (String option added from v5.2) |
| <i>Ptx_dBm</i>                   | Always  | Transmitted power (dBm)   | Double   | 23          |   |
| <i>FixedPdensity</i>             | Always  | If true, Ptx_dBm refers to the power adopted over 10 MHz and it is scaled in case the signal uses only a portion  | Boolean  | true        | From v5.2.1; default changed from false to true in v5.2.3     |
| <i>Gt_dB</i>                     | Always  | Transmitter antenna gain (dB)   | Double   | 3           | From v3.1   |
| <i>Gr_dB</i>                     | Always  | Receiver antenna gain (dB)  | Double   | 3           |   |
| <i>F_dB</i>                      | Always  | Noise figure of the receiver (dB)   | Double   | 9           |   |
| <i>folderPERcurves</i>           | Always  | Folder for the PER vs. SINR curves (names of files are fixed)   | String; 'null' means not used  | 'null'      | From v5.2; name of files have been revised in v5.2.1          |
| <i>folderPERcurvesNLOS</i>       | When <i>TypeOfScenario</i> =ETSI-Urban                  | Folder for the PER vs. SINR curves in Crossing NLOS scenario (names of files are fixed)                           | String; 'null' means not used  | 'null'      | From v5.3   |
| <i>pWithLTEPHY</i>               | When <i>Technology</i> ~= CV2X                          | Option to use in 11p SINR and data-rate of the MCS of LTE   | Boolean  | false       | From v4.1   |
| <i>Mode</i>                      | When <i>Technology</i> = 80211p                         | 802.11p TX Mode   | Integer, [1,2,3,4,5,6,7,8]   | 3           | From v3.1, replaced in v5.1 by MCS_11p                        |
| <i>MCS_11p</i>                   | When pWithLTEPHY=false (& <i>Technology</i> ~= CV2X)    | 802.11p TX MCS  | Integer, [0,1,2,3,4,5,6,7]   | 2           | From v5.1   |
| <i>MCS_pWithLTEphy</i>           | When pWithLTEPHY=true (& <i>Technology</i> ~= CV2X)     | LTE MCS to use in 802.11p   | Integer, within 0 and 28   | 3           | From v4.1   |
| <i>riIModel11p</i>               | When <i>Technology</i> ~= CV2X                          | Activates a model to consider the destructive effect of short but strong interference in ITS-G5                   | Boolean  | false       | From v5.3.0   |
| <i>CW</i>                        | When <i>Technology</i> ~= CV2X                          | Contention Window   | Integer in [3, 7, 15, 31, 63] (was Integer, >= 1)                    | 15 (was 16) | From v3.1. Modified in v5.2                                   |
| <i>AifsN</i>                     | When <i>Technology</i> ~= CV2X                          | Arbitration inter-frame space N   | Integer, >= 0  | 6           | From v5.1 (was fixed before)                                  |
| <i>CCAthreshold11p</i>           | When <i>Technology</i> ~= LTEV2V                        | CCA threshold of IEEE 802.11p for undecodable signals (dBm)   | Double   | -65         | From v5.2; replaced in v5.2.9 by CCAthr11p_notsync            |
| <i>CCAthr11p_notsync</i>         | When <i>Technology</i> ~= CV2X                          | CCA threshold of IEEE 802.11p for undecodable signals (dBm)   | Double   | -65         | From v5.2.9; replaces CCAthreshold11p                         |
| <i>CCAthr11p_sync</i>            | When <i>Technology</i> ~= CV2X                          | CCA threshold of IEEE 802.11p for decodable signals (dBm) - also used for CBR calculation                         | Double   | -85         | From v5.2.9   |
| <i>sinrThreshold11p</i>          | When <i>Technology</i> ~= LTEV2V                        | SINR threshold to be used for all IEEE 802.11p transmissions  | Double; -1000 means that curves or embedded thresholds are used      | -1000       | From v5.2; modified in v5.3.0                                 |
| <i>sinrThreshold11p_LOS</i>      | When <i>Technology</i> ~= CV2X                          | SINR threshold to be used for all IEEE 802.11p transmissions  | Double; -1000 means that curves or embedded thresholds are used      | -1000       | From v5.3.0 replaces sinrThreshold11p                         |
| <i>BLERcurveLTE</i>              | When <i>Technology</i> ~= 80211p                        | Option to use error vs. SINR curves   | Boolean  | false       | From v4.1; to be tested in v5.1; removed in v5.2              |
| <i>filenameBLER</i>              | When BLERcurveLTE=true (& <i>Technology</i> ~= 802.11p) | File to be used as error vs. SINR curves  | String   | null.txt    | Removed in v5.2   |
| <i>RBPBeacon</i>                 | When BLERcurveLTE=true (& <i>Technology</i> ~= 802.11p) | Number of RBs pairs per beacon to use with BLER curve   | Integer  | 20          | Removed in v5.3.0   |

|                                 |   |   |  |  |  |
|---------------------------------|---|---|--|--|--|
| <i>MCS</i>                      | When <i>Technology</i> = LTEV2V   | Modulation and coding scheme  | Integer, >= 0 & <= 28  | 4  | Replaced in v5.1 by <i>MCS_LTE</i>   |
| <i>MCS_LTE</i>                  | When <i>Technology</i> = LTEV2V   | Modulation and coding scheme  | Integer, >= 0 & <= 28  | 3  | From v5.1  |
| <i>sinrThresholdLTE</i>         | When <i>Technology</i> ~= 80211p  | SINR threshold to be used for all LTE-V2X transmissions   | Double; -1000 means that curves or embedded thresholds are used  | -1000  | From v5.2. Renamed <i>sinrThresholdCV2X_LOS</i> in v6.1                      |
| <i>sinrThresholdCV2X_LOS</i>    | When <i>Technology</i> ~= 80211p  | SINR threshold to be used for all C-V2X transmissions   | Double; -1000 means that curves or embedded thresholds are used  | -1000  | From v6.1 replaces <i>sinrThresholdLTE</i>                                   |
| <i>duplex</i>                   | When <i>Technology</i> = LTEV2V   | Duplexing type  | String, [HD,FD]  | HD   | Replaced in v5.1 by <i>duplexLTE</i>   |
| <i>duplexLTE</i>                | When <i>Technology</i> ~= 80211p  | Duplexing type  | String, [HD,FD]  | HD   | From v5.1. Replaced in v6.1 by <i>duplexCV2X</i>                             |
| <i>duplexCV2X</i>               | When <i>Technology</i> ~= 80211p  | Duplexing type  | String, [HD,FD]  | HD   | From v6.1 replaces <i>duplexLTE</i>  |
| <i>Ksi_dB</i>                   | When <i>Technology</i> ~= 80211p  | Self-interference cancellation coefficient (dB)   | Double   | -110 if <i>duplexCV2X</i> =F D, Inf if <i>duplexCV2X</i> =H D          |  |
| <i>NumBeaconsFrequency</i>      | When <i>Technology</i> ~= 80211p  | Maximum number of BRs in the frequency domain   | Integer, > 0 or -1 (meaning all BRs)   | -1   | From v3.1  |
| <i>ifAdjacent</i>               | When <i>Technology</i> = LTEV2V   | If using adjacent PSCCH and PSSCH in LTEV2V   | Boolean  | true   | From v3.5  |
| <i>BRoverlapAllowed</i>         | When <i>Technology</i> ~= 80211p  | If true it allows beacon resources to partially overlap   | Boolean  | false  | From v5.2.1; it cannot be set if the algorithm is not Mode 4 or random       |
| <i>cv2xCbrFactor</i>            | When <i>Technology</i> ~= 80211p  | Factor for CV2X DCC thresholds  | Double, >0   | 1  | From v6.1 replaces <i>lteCbrFactor</i>                                       |
| <i>sizeSubchannel</i>           | When <i>Technology</i> ~= 80211p  | Subchannel size in C-V2V  | Integer (input values must be supported by 3GPP standard), -1 means that it automatically selects the best value (only in LTE) | -1   | From v3.5  |
| <i>SCS_NR</i>                   | When <i>Technology</i> =NR-V2X  | Sets the SCS for 5G (kHz)   | Integer  | 15   | From v6.1  |
| <i>nDMRS_NR</i>                 | When <i>Technology</i> =NR-V2X  | Sets the number of DMRS resource element used in each slot in each RB                                 | Integer [12,15,18,21,24]   | 24   | From v6.1  |
| <i>MCS_NR</i>                   | When <i>Technology</i> =NR-V2X  | Modulation and coding scheme  | Integer, >= 0 & <= 28  | 7  | From v6.1  |
| <i>SCIsymbols</i>               | When <i>Technology</i> =NR-V2X  | Sets the number of symbols dedicated to the SCI-1 in NR-V2X   | Integer, [2,3]   | 3  | From v6.1  |
| <i>nRB_SCI</i>                  | When <i>Technology</i> =NR-V2X. It gives error if it is bigger than <i>sizeSubchannel</i> | Sets the number of RBs dedicated to the SCI-1   | Integer, [10,12,15,20,25]  | 10   | From v6.1  |
| <i>cv2xtNumberOfReplicasMax</i> | When <i>Technology</i> ~= 80211p  | Number of transmissions (HARQ)  | Integer, [1,2]   | 1  | From v6.1 replaces <i>lteNumberOfReplicasMax</i>                             |
| <i>winnerModel</i>              | Always  | Set Winner+ channel model   | Boolean  | True   | From v3.1; removed in v5.3.0   |
| <i>channelModel</i>             | Always  | Set the channel model (0=Winner+, N=N slopes, with N=1,2,3). Channel model 4 is 5G 3GPP channel model | Integer, 0 to 4  | 0  | From v5.3.0. From v6.1 introduced 5G channel model ( <i>channelModel</i> =4) |
| <i>stdDevShadowLOS_dB</i>       | Always  | Standard deviation of shadowing in LOS (dB)   | Integer  | 3  | From v3.1  |
| <i>stdDevShadowNLOS_dB</i>      | Always  | Standard deviation of shadowing in NLOS (dB)  | Integer  | 4  | From v3.1  |
| <i>L0_dB</i>                    | When <i>channelModel</i> >0   | Path loss at 1m (dB)  | Double, >0   | 47.86 if <i>channelModel</i> = [1,2,3] 32.4 if <i>channelModel</i> = 4 | From v6.1 5G channel model is introduced                                     |
| <i>beta</i>                     | When <i>channelModel</i> >0   | Path loss exponent  | Double, >0   | 2.20 if <i>channelModel</i> = [1,2,3] 2 if <i>channelModel</i> = 4     | From v6.1 introduced value for 5G channel model                              |
| <i>d_threshold1</i>             | When <i>channelModel</i> >1 & <i>channelModel</i> <4                                      | Distance threshold in 2/3 slopes model  | Double, >=1  | 10   | From v5.3.0  |

|   |  |  |  |                |  |
|---|--|--|--|----------------|--|
| <i>beta2</i>                              | When <i>channelModel</i> >1 & <i>channelModel</i> <4             | Path loss exponent, second slope   | Double, >0   | 2.20           | From v5.3.0  |
| <i>d_threshold2</i>                       | When <i>channelModel</i> >2 & <i>channelModel</i> <4             | Second distance threshold in 3 slopes model  | Double, >=1  | 10             | From v5.3.0  |
| <i>beta3</i>                              | When <i>channelModel</i> >2 & <i>channelModel</i> <4             | Path loss exponent, third slope  | Double, >0   | 2.20           | From v5.3.0  |
| <i>Abuild_dB</i>                          | When <i>winnerModel</i> = false & <i>fileObstaclesMap</i> = true | Attenuation every meter inside buildings (dB)  | Double   | 0.4            | From v3.1  |
| <i>Awall_dB</i>                           | When <i>winnerModel</i> = false & <i>fileObstaclesMap</i> = true | Attenuation for each wall crossed (dB)   | Double   | 6              | From v3.1  |
| Settings of resource allocation algorithm |  |  |  |                |  |
| <i>BRAAlgorithm</i>                       | Always   | Allocation algorithm   | Integer, [2,7,9,10,18,101,102]   | 18             |  |
|   |  |  | 1 - Controlled   |                | Not supported from v4.1                            |
|   |  |  | 2 - Controlled with scheduled BR reassignment  |                | Not tested from v5.0                               |
|   |  |  | 3 - Autonomous with sensing range  |                | Not supported from v4.1                            |
|   |  |  | 4 - Autonomous with BR map   |                | Not supported from v4.1                            |
|   |  |  | 5 - Autonomous with sensing  |                | Not supported from v4.1                            |
|   |  |  | 6 - Autonomous with sensing (Intel)  |                | Not supported from v4.1                            |
|   |  |  | 7 - Controlled with Maximum Reuse Distance (MRD)   |                | From v3.5; not tested from v5.0                    |
|   |  |  | 8 - Autonomous with sensing with allocations synch to beacon interval (3GPP standard mode 4)               |                | From v3.1; not supported from v5.1                 |
|   |  |  | 9 - Controlled with power control and target blocking rate   |                | From v3.5; not tested from v5.0; removed from v5.4 |
|   |  |  | 10 - Controlled with Maximum Reuse Power (MRD)   |                | From v4.1; not tested from v5.0                    |
|   |  |  | 18 - Autonomous with sensing (3GPP LTE mode 4 if Technology=LTEV2 X or 3GPP 5G mode 2 if Technology=5GV2X) |                | From v4.1. Introduced 5G mode2 from v6.1           |
|   |  |  | 101 - Random allocation  |                | From v4.1  |
|   |  |  | 102 - Ordered allocation following X coordinate  |                | From v4.1; not tested from v5.0                    |
| <i>posError95</i>                         | When <i>BRAAlgorithm</i> = 2                                     | LTE positioning error - 95th percentile (m)  | Double   | 0              |  |
| <i>Tupdate</i>                            | When <i>BRAAlgorithm</i> = 2                                     | Time interval between position updates at the eNodesB (s)  | Double, > 0  | <i>Tbeacon</i> |  |
| <i>Mreuse</i>                             | When <i>BRAAlgorithm</i> = 2                                     | Reuse margin (m)   | Integer  | 0              |  |
| <i>Treassign</i>                          | When <i>BRAAlgorithm</i> = 2,7,9,10                              | Interval of scheduled reassignment (s)   | Double, > 0  | <i>Tbeacon</i> |  |
| <i>randomOrder</i>                        | All algorithms except <i>BRAAlgorithm</i> = 101,102              | Set whether resources are selected randomly (at first assignment for all <i>BRAAlgorithm</i> except 101,102,7 and for <i>BRAAlgorithm</i> 1,2) | Boolean  | True           | Removed from v4.1                                  |
| <i>blockTarget</i>                        | When <i>BRAAlgorithm</i> = 9                                     | Target blocking rate   | Double   | 0.01           | From v3.5; removed in v5.4                         |
| <i>knownShadowing</i>                     | When <i>BRAAlgorithm</i> = 10                                    | Sets if the shadowing is estimated by the eNodeB   | Boolean  | false          | From v4.1  |

|                                 |   |   |  |                                   |  |
|---------------------------------|---|---|--|-----------------------------------|--|
| <i>Rsense</i>                   | When <i>BRAAlgorithm</i> = 3  | Sensing Range (m)   | Integer, $\geq$ Raw & $<$ Rnoise (distance at which rx power is equal to noise power)                          | <i>Raw</i>                        | Algorithm not supported from v4.1                              |
| <i>pReselect</i>                | When <i>BRAAlgorithm</i> = 5  | Probability of resources reselection  | Double   | 0.1                               | Algorithm not supported from v4.1                              |
| <i>kBest</i>                    | When <i>BRAAlgorithm</i> = 5  | Number of best candidates for resource reselection  | Integer  | 20                                | Algorithm not supported from v4.1                              |
| <i>hysteresysM</i>              | When <i>BRAAlgorithm</i> = 5  | Hysteresys Margin (dB) for resource reselection   | Double   | 6                                 | Algorithm not supported from v4.1                              |
| <i>Tsps</i>                     | When <i>BRAAlgorithm</i> = 6  | Resource Reselection Period for Semi-persistent Scheduling (s)  | Double   | 0.5                               | Algorithm not supported from v4.1                              |
| <i>MBest</i>                    | When <i>BRAAlgorithm</i> = 6  | Number of best candidates for resource reselection  | Integer  | 20                                | Algorithm not supported from v4.1                              |
| <i>probResKeep</i>              | When <i>BRAAlgorithm</i> = 18   | Probability to keep the previously selected BR  | Double, $\geq 0$ & $\leq 0.8$  | 0                                 | From v3.1  |
| <i>ratioSelectedMode4</i>       | When <i>BRAAlgorithm</i> = 18   | Percentage of resources to be considered for random selection   | Double, $> 0$ & $\leq 1$   | 0.2                               | From v3.5  |
| <i>testMBest_5G</i>             | When <i>BRAAlgorithm</i> = 18 & Technology=5G-V2X   | Parameter used to reintroduce L2 in 5G mode2  | Double, $> 0$ & $\leq 1$   | 1                                 | From v6.1  |
| <i>NsensingPeriod</i>           | When <i>BRAAlgorithm</i> = 18   | Number of beacon periods during which performing sensing  | Integer, $> 0$   | 10                                | From v3.1; Replaced by <i>TsensingPeriod</i> in v5.1           |
| <i>TsensingPeriod</i>           | When <i>BRAAlgorithm</i> = 18   | Duration of the sensing period  | Double, $> 0$  | 1                                 | From v5.1  |
| <i>minRandValueMode4</i>        | When <i>BRAAlgorithm</i> = 18   | Minimum duration keeping the same allocation  | Integer, $> 0$ ; -1 for standard values  | -1                                | From v3.5  |
| <i>maxRandValueMode4</i>        | When <i>BRAAlgorithm</i> = 18   | Maximum duration keeping the same allocation  | Integer, $>$ minRandV alueMode4; -1 for standard values  | -1                                | From v3.5  |
| <i>subframeT1Mode4</i>          | When <i>BRAAlgorithm</i> = 18   | Minimum subframe for the next allocation  | Integer, $\geq 1$ & $\leq 4$   | 1                                 | From v3.5. Replaced by <i>T1autonomousMode</i> in v6.1         |
| <i>T1autonomousMode</i>         | When <i>BRAAlgorithm</i> = 18   | Minimum time for the next allocation (ms)   | Integer, $\geq 1$ & $\leq 4$ for SCS=15, $\geq 0.5$ & $\leq 3$ for SCS=30, $\geq 0.5$ & $\leq 2.75$ for SCS=60 | 1 for SCS=15, 0.5 for SCS=[30,60] | From v6.1  |
| <i>subframeT2Mode4</i>          | When <i>BRAAlgorithm</i> = 18   | Maximum subframe for the next allocation  | Integer, $\geq 20$ & $\leq 100$  | 100                               | From v3.5. Replaced by <i>T2autonomousMode</i> in v6.1         |
| <i>T2autonomousMode</i>         | When <i>BRAAlgorithm</i> = 18   | Maximum time for the next allocation (ms)   | Integer, $\geq 20$ & $\leq 100$  | 100                               | From v3.5  |
| <i>powerThresholdMode4</i>      | When <i>BRAAlgorithm</i> = 18   | Minimum power threshold to consider a BR as occupied (dBm)  | Integer, $\geq -128$ & $\leq -2$ (multiple of 2)   | -110                              | From v3.5. Replaced by <i>powerThresholdAutonomous</i> in v6.1 |
| <i>powerThresholdAutonomous</i> | When <i>BRAAlgorithm</i> = 18   | Minimum power threshold to consider a BR as occupied (dBm)  | Integer, $\geq -128$ & $\leq -2$ (multiple of 2)   | -110                              | From v6.1  |
| <i>minSCIsinr</i>               | When <i>BRAAlgorithm</i> = 18   | Minimum SINR for a SCI to be correctly decoded (dB)   | Double   | 0                                 | From v3.5  |
| <b>Output settings</b>          |   |   |  |                                   |  |
| <i>outputFolder</i>             | Always  | Folder for the output files   | String   | Output                            | From v3.1  |
| <i>printNeighbors</i>           | Always  | Activate the print to file of the number of neighbors   | Boolean  | False                             |  |
| <i>printSpeed</i>               | Always  | Activate the print to file of the speed distribution  | Boolean  | False                             | From v5.3.0  |
| <i>printUpdateDelay</i>         | Always  | Activate the print to file of the update delay (a.k.a. inter-packet gap) between successive successfully received beacons | Boolean  | False                             | Previously named <i>printBeaconDelay</i>                       |
| <i>printPacketDelay</i>         | Always  | Activate the print to file of the packet delay between successive successfully received beacons                           | Boolean  | False                             | From v3.1  |
| <i>printdataAge</i>             | Always  | Activate the print to file of the data age of successfully received beacons   | Boolean  | False                             | From 5.2   |
| <i>delayResolution</i>          | When <i>printUpdateDelay</i> = true or <i>printUpdateDelay</i> = true or <i>printdataAge</i> = true | Delay resolution (s)  | Double, $> 0$  | 0.001                             | From v3.1  |

|                                  |   |  |  |       |  |
|----------------------------------|---|--|--|-------|--|
| <i>printDistanceDetails</i>      | Always                                      | Activate the print to file of the details on reception rate for distances from 0 up to the max awareness range | Boolean                                      | False | From v3.1; replaces in v5.2 by <i>printPacketReceptionRatio</i>  |
| <i>printPacketReceptionRatio</i> | Always                                      | Activate the print to file the packet reception ratio for distances from 0 up to the max awareness range       | Boolean                                      | False | From 5.2   |
| <i>prnResolution</i>             | When <i>printPacketReceptionRatio</i> =true | Granularity in PRR vs. distance calculation (m)  | Integer, >0                                  | 10    | From 5.2   |
| <i>printPRRmap</i>               | When <i>TypeOfScenario</i> =Traces          | Activate the creation and print of a PRR map   | Boolean                                      | False | From v3.1; To be updated from v5.1   |
| <i>printCBR</i>                  | Always                                      | Activate the print to file of a cdf of the CBR   | Boolean                                      | False | From v4.2  |
| <i>printPowerControl</i>         | if <i>CBRactive</i> =true                   | Activate the print to file of the power control allocation   | Boolean                                      | False | From v3.5; To be updated from v5.1   |
| <i>powerResolution</i>           | When <i>printPowerControl</i> = true        | Power resolution (dBm)   | Double,>0                                    | 1     | From v3.5  |
| <i>message</i>                   | Always                                      | Message printed in the Command Window  | String                                       | none' | From v6.1  |
| Additional settings              |   |  |  |       |  |
| RSUcfig                          | Always                                      | Name of the optional configuration file setting the RSUs   | String ('null' means that there are no RSUs) | null  | From v5.2.2<br>Must contain:<br>[NumberOfRSUs] (Integer, >=0), [Technology] ('11p' or 'LTE'), [PacketType] ('CAM' if LTE; 'CAM' or 'DENM' or 'hp'DENM' if 11p), [xLocation] (array of integers), [yLocation] (array of integers) |