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Intelligent Transport Systems (ITS);
LTE-V2X and NR-V2X Access layer specification
for Intelligent Transport Systems operating
in the 5 GHz frequency band;
Release 2

Reference
REN/ITS-00446

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Foreword

This draft European Standard (EN) has been produced by ETSI Technical Committee Intelligent Transport Systems (ITS), and is now submitted for the combined Public Enquiry and Vote phase of the ETSI standards EN Approval Procedure.

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Introduction

The present document outlines the access layer of the Sidelink (PC5 interface) of cellular based Vehicle to Everything communication technology specified in ETSI TS 138 300 [21], which can be operated in the 5,9 GHz frequency band allocated in Europe. NR-V2X and LTE-V2X access layers consist of RRC layer, PDCP layer, RLC layer, MAC layer and Physical layer. A NAS layer is also introduced as part of the access layer in the present document for the provision of control. The present document includes requirements for congestion control and for CEN DSRC protection.

The present document was made after the EU Standardization Mandate M/453 [i.7].

While deployment of LTE-V2X and NR-V2X in the same channel could be possible, it is not intended and is outside the scope of the present document.

The present document does not override regional regulations. The regional regulations apply.

1 Scope

The present document defines the physical layer, the data link layer and radio resource configuration, grouped into the access layer of the ITS station reference architecture ETSI TS 103 898 [i.2]. The access layer technology that is specified in the present document refers to what is known as the sidelink or PC5 interface of cellular V2X for the following frequency bands:

- Operation in frequency band dedicated to ITS for safety related applications in the frequency range 5,875 GHz to 5,925 GHz.
- Operation in frequency bands dedicated to ITS non-safety applications in the frequency range 5,855 GHz to 5,875 GHz.

The present document is a revision of ETSI EN 303 613 [i.1], and extends the LTE-V2X access layer specification to include NR-V2X.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at https://docbox.etsi.org/Reference/.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1] ETSI TS 136 331: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification (3GPP TS 36.331 Release 16)".

[2] ETSI TS 136 300: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2 (3GPP TS 36.300 Release 16)".

[3] ETSI TS 136 321: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Medium Access Control (MAC) protocol specification (3GPP TS 36.321 Release 16)".

[4] ETSI TS 136 322: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Link Control (RLC) protocol specification (3GPP TS 36.322 Release 16)".

[5] ETSI TS 136 323: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Packet Data Convergence Protocol (PDCP) specification (3GPP TS 36.323 Release 16)".

[6] ETSI TS 136 211: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Physical channels and modulation (3GPP TS 36.211 Release 16)".

[7] ETSI TS 136 212: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Multiplexing and channel coding (3GPP TS 36.212 Release 16)".

[8] ETSI TS 136 213: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer procedures (3GPP TS 36.213 Release 16)".

[9] ETSI TS 136 214: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer; Measurements (3GPP TS 36.214 Release 16)".

[10] ETSI TS 123 285: "Universal Mobile Telecommunications System (UMTS); LTE; Architecture enhancements for V2X services (3GPP TS 23.285 Release 16)".

[11] ETSI TS 124 385: "LTE; V2X services Management Object (MO) (3GPP TS 24.385 Release 16)".

[12] ETSI TS 124 386: "LTE; User Equipment (UE) to V2X control function; protocol aspects; Stage 3 (3GPP TS 24.386 Release 16)".

[13] ETSI TS 136 101: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception (3GPP TS 36.101 Release 16)".

[14] ETSI TS 136 133: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for support of radio resource management (3GPP TS 36.133 Release 16)".

[15] ETSI TS 124 301: "Universal Mobile Telecommunications System (UMTS); LTE; 5G; Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3 (3GPP TS 24.301 Release 16)".

[16] ETSI TS 136 413: "LTE; Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP) (3GPP TS 36.413 Release 16)".

[17] ETSI TS 136 414: "LTE; Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 data transport (3GPP TS 36.414 Release 16)".

[18] ETSI TS 102 792: "Intelligent Transport Systems (ITS); Mitigation techniques to avoid interference between European CEN Dedicated Short Range Communication (CEN DSRC) equipment and Intelligent Transport Systems (ITS) operating in the 5 GHz frequency range".

[19] ETSI TS 103 574: "Intelligent Transport Systems (ITS); Congestion Control Mechanisms for C-V2X PC5 interface; Access layer part; Release 2".

[20] ETSI TS 138 331: "5G; NR; Radio Resource Control (RRC); Protocol specification (3GPP TS 38.331 Release 16)".

[21] ETSI TS 138 300: "5G; NR; NR and NG-RAN Overall description; Stage-2 (3GPP TS 38.300 Release 16)".

[22] ETSI TS 138 321: "5G; NR; Medium Access Control (MAC) protocol specification (3GPP TS 38.321 Release 16)".

[23] ETSI TS 138 322: "5G ; NR; Radio Link Control (RLC) protocol specification (3GPP TS 38.322 Release 16)".

[24] ETSI TS 138 323: "5G; NR; Packet Data Convergence Protocol (PDCP) specification (3GPP TS 38.323 Release 16)".

[25] ETSI TS 138 211: "5G ; NR; Physical channels and modulation (3GPP TS 38.211 Release 16)".

[26] ETSI TS 138 212: "5G; NR; Multiplexing and channel coding (3GPP TS 38.212 Release 16)".

[27] ETSI TS 138 213: "5G; NR; Physical layer procedures for control (3GPP TS 38.213 Release 16)".

[28] ETSI TS 138 214: "5G; NR; Physical layer procedures for data (3GPP TS 38.214 Release 16)".

[29] ETSI TS 138 215: "5G; NR; Physical layer measurements (3GPP TS 38.215 Release 16)".

[30] ETSI TS 138 101-1: "5G; NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone (3GPP TS 38.101-1 Release 16)".

[31] ETSI TS 138 133: "5G; NR; Requirements for support of radio resource management (3GPP TS 38.133 Release 16)".

[32] ETSI TS 124 501: "5G; Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3 (3GPP TS 24.501 Release 16)".

[33] ETSI TS 138 413: "5G; NG-RAN; NG Application Protocol (NGAP) (3GPP TS 38.413 Release 16)".

[34] ETSI TS 138 414: "5G; NG-RAN; NG data transport (3GPP TS 38.414 Release 16)".

[35] ETSI TS 103 723: "Intelligent Transport Systems (ITS); Profile for LTE-V2X Direct Communication".

[36] ETSI TS 123 287: "5G; Architecture enhancements for 5G System (5GS) to support Vehicle-to-Everything (V2X) services (3GPP TS 23.287 Release 16)".

[37] ETSI TS 103 836-4-3: "Intelligent Transport Systems (ITS) Vehicular Communications; GeoNetworking; Part 4: Geographical addressing and forwarding for point-to-point and point-to-multipoint communications; Sub-part 3: Media-dependent functionalities for NR-V2X PC5 and LTE-V2X PC5; Release 2".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI EN 303 613: "Intelligent Transport Systems (ITS); LTE-V2X Access layer specification for Intelligent Transport Systems operating in the 5 GHz frequency band".

[i.2] ETSI TS 103 898: "Intelligent Transport Systems (ITS); Communications Architecture; Release 2".

[i.3] ETSI EN 302 571: "Intelligent Transport Systems (ITS); Radiocommunications equipment operating in the 5 855 MHz to 5 925 MHz frequency band; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU".

[i.4] Commission Implementing Decision (EU) 2020/1426 of 7 October 2020 on the harmonised use of radio spectrum in the 5 875-5 935 MHz frequency band for safety-related applications of intelligent transport systems (ITS) and repealing Decision 2008/671/EC.

[i.5] ECC/DEC/(08)01: "The harmonised use of Safety-Related Intelligent Transport Systems (ITS) in the 5875-5935 MHz frequency band". Approved 14 March 2008. Latest updated 18 November 2022.

[i.6] ECC Recommendation (08)01: "Use of the band 5855-5875 MHz for Intelligent Transport Systems (ITS)". Approved 21 February 2008. Amended 3 July 2015.

[i.7] EU Standardization Mandate M/453: "Standardisation mandate addressed to CEN, CENELEC and ETSI in the field of Information and Communication Technologies to support the interoperability of Co-operative systems for Intelligent Transport in the European Community".

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in ETSI TS 103 898 [i.2] and the following apply:

channel busy ratio: portion of sub-channels in the resource pool whose S-RSSI measured by the ITS station exceed a (pre-)configured threshold sensed over last 100 ms

NOTE: This definition is access layer dependant and is specified in ETSI TS 136 214 [9] and is different to the definition in ETSI EN 302 571 [i.3].

channel occupancy ratio: fraction of the total number of sub-channels *used* by the ITS station for its transmissions out of the total number of *configured* (granted) sub-channels over a measurement period of 1 000 ms

NOTE: This definition is access layer dependant and is specified in ETSI TS 136 214 [9].

PC5: interface between the ITS stations used for C-V2X sidelink communication

Resource Block (RB): 7 consecutive symbols in the time domain and 12 consecutive subcarriers in the frequency domain

resource pool: set of resources that can be used for PSCCH and PSSCH

NOTE: Resource pool is defined with the help of start RB, number of sub-channels, size of sub-channel and available subframes.

sidelink: radio link between the ITS stations for C-V2X direct communication

sub-channel: set of contiguous physical resource blocks

3.2 Symbols

For the purposes of the present document, the following symbols apply:

IN	Interface between access layer and networking & transport layer
IN-SAP	Interface between access layer and network & transport layer
MF	Interface between management entity and facilities layer
MI	Interface between management entity and access layer
MN	Interface between management entity and networking & transport layer
MS	Interface between management entity and security entity
NF	Interface between networking & transport layer and facilities layer
SF	Interface between security entity and facilities layer
SI	Interface between security entity and access layer
SN	Interface between security entity and networking & transport layer

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

3GPP	3rd Generation Partnership Project
ACK	Acknowledgement
AM	Acknowledged Mode
API	Application Programming Interface
ARFCN	Absolute Radio-Frequency Channel Number
ASN.1	Abstract Syntax Notation One
BSR	Buffer Status Report
BW	Bandwidth
BWP	Bandwidth Part
CBR	Channel Busy Ratio
CEN	Comité Européen de Normalisation
CID	Context Identifier
CN	Core Network
CR	Channel Occupancy Ratio
CSI	Channel State Information
C-V2X	Cellular Vehicle to Everything
DFN	Direct Frame Number
DL	Downlink
DMRS	Demodulation Reference Signal
DRB	Data Radio Bearer
DSRC	Dedicated Short Range Communications
DTX	Discontinuous Transmission
eNB	enhance Node B
E-UTRA	Evolved Universal Terrestrial Radio Access

E-UTRAN	Evolved Universal Terrestrial Radio Access Network
FR1	Frequency 1
FR2	Frequency 2
GBR	Guaranteed Bit Rate
GFBR	Guaranteed Flow Bit Rate
gNB	5G Node B
GNSS	Global Navigation Satellite System
HARQ	Hybrid Automatic Repeat Request
ID	Identity
IE	Information Element
IP	Internet Protocol
ITS	Intelligent Transport Systems
LCP	Link Control Protocol
LTE-V2X	Long Term Evolution based Vehicle-to-Everything
M/R	Mandatory/Recommended
MAC	Medium Access Control
MCS	Modulation and Coding Scheme
MCS-RB	Modulation and Coding Scheme - Resource Blocks
MFBR	Maximum Flow Bit Rate
MIB-SL	Master Information Block - Sidelink
N/A	Not Applicable
NAS	Non-Access Stratum
NR	New Radio
NR-V2X	New Radio (5^{th} generation) Vehicle to Everything
NS	Network Signalling value
PC5	Proximity-based Communication (Interface) 5
PDCP	Packet Data Convergence Protocol
PDU	Protocol Data Unit
PHY	PHYsical layer
PPPP	ProSe Per-Packet Priority
PQI	PC5 QoS Identifier
PRB	Physical Resource Block
ProSe	Proximity-based Service
PSBCH	Physical Sidelink Broadcast Channel
PSCCH	Physical Sidelink Control Channel
PSFCH	Physical Sidelink Feedback Channel
PSSCH	Physical Sidelink Shared Channel
PTRS	Phase Tracking Reference Signal
PUCCH	Physical Uplink Control Channel
PUSCH	Physical Uplink Shared Channel
QAM	Quadrature Amplitude Modulation
QoS	Quality of Service
RAN	Radio Access Network
RB	Resource Block
RLC	Radio Link Control
RLF	Radio Link Failure
RoHC	Robust Header Compression
RRC	Radio Resource Control
RSRP	Reference Signal Received Power
RSSI	Received Signal Strength Indication
RSU	Road Side Unit
SCI	Sidelink Control Information
SCS	Sub Carrier Spacing
SDAP	Service Data Adaptation Protocol
SDU	Service Data Unit
SFN	Sub Frame Number
SLSS	Sidelink Synchronization Signal
SL-SSB	Sidelink Synchronization Signal Block
SN	Sequence Number
SPS	Semi Persistent Scheduling
S-PSS	(Sidelink) Primary Synchronization Signal
S-SSS	(Sidelink) Secondary Synchronization Signal

SSID	Service Set ID
SyncRef UE	Synchronization Reference User Equipment
TB	Transport Block
TDD	Time Division Duplex
TX	Transmit
UCI	Uplink Control Information
UE	User Equipment
UL	Uplink
UM	Unacknowledged Mode
V2X	Vehicle-to-Everything

4 General requirements

4.1 Architecture

The ITS station architecture specified in ETSI TS 103 898 [i.2] is in Figure 4.1.1. LTE-V2X as defined in ETSI TS 136 300 [2] and NR-V2X as defined in ETSI TS 138 300 [21] are two of the access layer technologies of the ITS station architecture.

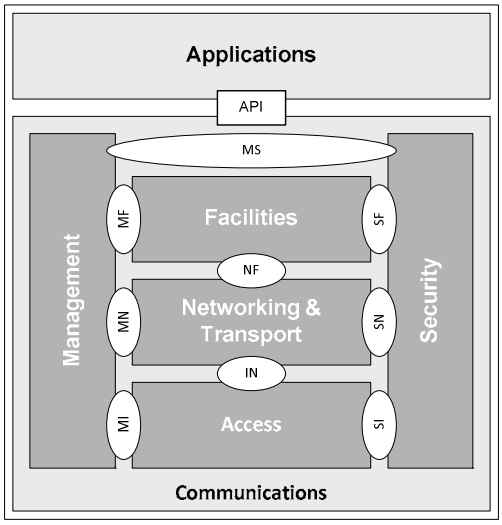

Figure 4.1.1: ITS station architecture

A C-V2X access layer is shown in Figure 4.1.2.

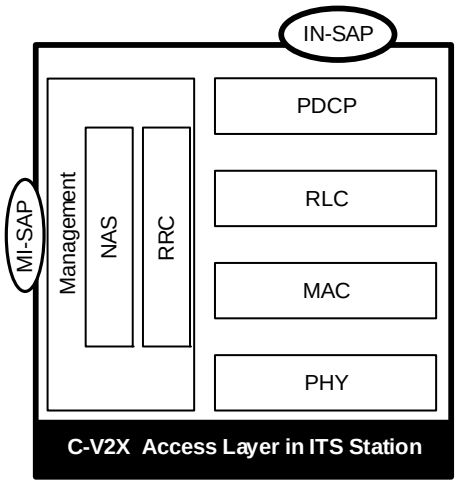

Figure 4.1.2: C-V2X Access Layer protocol stack

An ITS station that includes a cellular V2X technology as the access layer shall support LTE-V2X sidelink communication as defined in ETSI TS 136 300 [2], or NR-V2X sidelink communication as defined in ETSI TS 138 300 [21], or both. LTE-V2X and NR-V2X are different access layers.

NOTE: The present document specifies LTE-V2X and NR-V2X based on 3GPP Release-16 and contains no backwards compatibility requirements other than those explicitly stated in clause 5.7.5.

4.2 Operating Frequencies

ETSI TS 136 101 [13], clause 5.5G defines the operating band of LTE-V2X.

ETSI TS 138 101-1 [30], clause 5.2E defines the operating bands of NR-V2X.

In Europe, ITS frequency band designation for 5 855 MHz to 5 925 MHz is defined by Commission Implementing Decision (EU) 2020/1426 [i.4], ECC/DEC/(08)01 [i.5] and ECC Recommendation (08)01 [i.6].

Band 47 in ETSI TS 136 101 [13] and band n47 in ETSI TS 138 101-1 [30] correspond to the European ITS spectrum in 5 855 MHz to 5 925 MHz as defined by Commission Implementing Decision (EU) 2020/1426 [i.4], ECC/DEC/(08)01 [i.5] and ECC Recommendation (08)01 [i.6].

4.3 Transmit and receive requirement

An ITS station using LTE-V2X shall fulfil the transmit and receive requirement defined for Band 47 in ETSI TS 136 101 [13] and ETSI TS 136 133 [14].

An ITS station using NR-V2X shall fulfil the transmit and receive requirement defined for Band n47 in ETSI TS 138 101-1 [30] and ETSI TS 138 133 [31].

4.4 Congestion control

A C-V2X ITS station shall adapt its CR according to the measured Channel Busy Ratio (CBR) in order to comply with the required CR limit, as defined in ETSI TS 103 574 [19]. The CBR measurement window shall be as specified in ETSI TS 103 574 [19] for LTE-V2X and Table A.2.1 row 36 for NR-V2X.

4.5 CEN DSRC protection

An ITS station using LTE-V2X in Band 47 or NR-V2X in Band n47 shall avoid harmful interference to CEN DSRC:

- The ITS station shall be conformant to ETSI TS 102 792 [18].
- If the ITS station is inside the protected zone, it shall adjust its output power level to maximum 10 dBm e.i.r.p. If the ITS station is inside the protected zone, it shall fulfil the spurious emissions limit of maximum -65 dBm/MHz within 5 795 MHz to 5 815 MHz.

An ITS station using LTE-V2X or NR-V2X in Band n47 shall avoid harmful interference to CEN DSRC.

The ITS station shall be conformant to ETSI TS 102 792 [18].

If the ITS station is inside the protected zone, it shall adjust its output power level to maximum 10 dBm e.i.r.p. If the ITS station is inside the protected zone, it shall fulfil the spurious emissions limit of maximum -65 dBm/MHz within 5 795 MHz to 5 815 MHz.

The upper layers of the ITS station are responsible for detecting that the ITS station is within proximity of CEN DSRC protection zone and then sending an indication to access layers to trigger power level adjustment.

4.6 Channel Configuration

The operation of NR-V2X or LTE-V2X in the overlap of 10 MHz channels with 20 MHz channels is not specified in the present document.

NOTE: Operation in the overlap of 10 MHz channels with 20 MHz channels is not intended and is out of scope of the present document.

5 LTE-V2X access layers

5.1 Physical layer

The physical layer is mainly responsible for encoding/decoding, modulation/demodulation, etc. and shall be as defined in ETSI TS 136 211 [6], ETSI TS 136 212 [7], ETSI TS 136 213 [8] and ETSI TS 136 214 [9].

The minimum set of the essential LTE-V2X information elements defined in ETSI TS 136 331 [1] and their default/initial values shall be as in clause A.1, Tables A.1.1 to A.1.6.

Additionally, for Rel-16 PSSCH transmission, MCS-RB problematic configurations listed in Annex B shall be excluded.

5.2 MAC layer

The MAC layer of the sidelink (PC5 interface) is mainly responsible for resource allocation for LTE-V2X sidelink communications, and shall be as defined in ETSI TS 136 321 [3].

NOTE: There are two normal modes of channel access in LTE-V2X:

- Semi-Persistent Scheduling (SPS).
- Event-Based (known as One-Shot).

5.3 RLC layer

The Radio Link Control (RLC) of sidelink (PC5 interface) is mainly responsible for segmentation and concatenation of SDU, and shall be as defined in ETSI TS 136 322 [4].

5.4 PDCP layer

The PDCP layer of sidelink (PC5 interface) is mainly responsible for differentiating multiple types of SDUs (e.g. IP, Non-IP), and shall be as defined in ETSI TS 136 323 [5].

5.5 RRC layer

The RRC layer of sidelink (PC5 interface) is mainly responsible for access stratum management, and shall be as defined in ETSI TS 136 331 [1].

5.6 NAS layer

The NAS layer of sidelink (PC5 interface) is mainly responsible for requesting the CN providing subscription information to the RAN, as well as indicating the RRC layer for RRC establishment cause for PC5 communication, and shall be as defined in ETSI TS 124 301 [15].

5.7 Additional LTE-V2X access layer functionality for PC5 interface

5.7.1 Transmission/reception of LTE-V2X communication over PC5

Additional LTE-V2X access layer functionality for transmission/reception of LTE-V2X communication over PC5 shall be compliant with ETSI TS 124 385 [11] and ETSI TS 124 386 [12].

5.7.2 QoS management

An ITS station using LTE-V2X shall (de)prioritize a data packet according to its PPPP value in access layer as defined in ETSI TS 136 331 [1] and ETSI TS 136 213 [8].

5.7.3 PC5 parameter provisioning

The required provisioning parameters used by a UE to perform LTE-V2X Communication shall be as defined in ETSI TS 123 285 [10], ETSI TS 123 287 [36], ETSI TS 136 413 [16], ETSI TS 136 414 [17] and ETSI TS 103 574 [19].

5.7.4 Synchronization

An ITS station using LTE-V2X shall synchronize with a synchronization reference (e.g. GNSS) in both time and frequency before communicating with other ITS stations using LTE-V2X. The Synchronization related functionality of an ITS station using LTE-V2X shall be compliant with ETSI TS 136 331 [1].

For the scenario where ITS station selects synchronization reference on the sidelink (PC5 interface), whether to (pre-)configure *syncOffsetIndicators* as defined in ETSI TS 136 331 [1] shall be according to different regions/nations' implementation. For the case where *syncOffsetIndicators* is not (pre-)configured, at least RSU ITS station shall be allowed to transmit sidelink synchronization signalling on the subframes that are not configured to transmit LTE-V2X messages, e.g. including the reserved subframes calculated according to ETSI TS 136 213 [8] and the subframes indicated as "0" in *sl-Subframe* of the transmission pool as per ETSI TS 136 331 [1].

NOTE 1: From transmission-side perspective, whether or not to transmit sidelink synchronization signalling is based on the ITS station's capability.

NOTE 2: From reception-side perspective, for the case where *syncOffsetIndicators* is not provided, the parameters used for sidelink synchronization signalling measurement such as *filterCoefficient*, *syncRefMinHyst* and *syncRefDiffHyst* may be preconfigured by implementation.

5.7.5 Compatibility with ETSI EN 303 613

For the PHY and MAC layers, an ITS station using LTE-V2X Release-16 shall be backwards compatible with an ITS station which complies with ETSI EN 303 613 [i.1] as specified in Table A.1.6.

NOTE: ETSI EN 303 613 [i.1] defines an ITS station based on LTE-V2X in 3GPP Release-14.

6 NR-V2X access layers

6.1 Physical layer

The physical layer is mainly responsible for encoding/decoding, modulation/demodulation, etc. and shall be as defined in ETSI TS 138 211 [25], ETSI TS 138 212 [26], ETSI TS 138 213 [27], ETSI TS 138 214 [28] and ETSI TS 138 215 [29].

The minimum set of the essential NR-V2X information elements defined in ETSI TS 138 331 [20] and their default/initial values shall be as in clause A.2, Table A.2.1.

NOTE: Regional regulations may apply to default/initial values.

6.2 MAC layer

The MAC layer of the sidelink (PC5 interface) is mainly responsible for resource allocation for NR-V2X sidelink communications, and shall be as defined in ETSI TS 138 321 [22].

6.3 RLC layer

The Radio Link Control (RLC) of sidelink (PC5 interface) is mainly responsible for segmentation and concatenation of SDU, and shall be as defined in ETSI TS 138 322 [23].

6.4 PDCP layer

The PDCP layer of sidelink (PC5 interface) is mainly responsible for differentiating multiple types of SDUs (e.g. IP, Non-IP) and shall be as defined in ETSI TS 138 323 [24].

6.5 RRC layer

The RRC layer of sidelink (PC5 interface) is mainly responsible for access stratum management, and shall be as defined in ETSI TS 138 331 [20].

6.6 NAS layer

The NAS layer of sidelink (PC5 interface) is mainly responsible for requesting the CN providing subscription information to the RAN, as well as indicating the RRC layer for RRC establishment cause for PC5 communication, and shall be as defined in ETSI TS 124 501 [32].

6.7 Additional NR-V2X access layer functionality for PC5 interface

6.7.1 Transmission/reception of NR-V2X communication over PC5

Additional NR-V2X access layer functionality for transmission/reception of NR-V2X communication over PC5 shall be compliant with ETSI TS 124 385 [11] and ETSI TS 124 386 [12].

6.7.2 QoS management

An ITS station using NR-V2X shall (de)prioritize a data packet according to its Priority value in access layer as defined in ETSI TS 138 331 [20] and ETSI TS 138 213 [27].

6.7.3 PC5 parameter provisioning

The required provisioning parameters used by a UE to perform NR-V2X Communication shall be as defined in ETSI TS 138 413 [33], ETSI TS 138 414 [34] and ETSI TS 103 574 [19].

6.7.4 Synchronization

An ITS station using NR-V2X shall synchronize with a synchronization reference in both time and frequency before communicating with other ITS stations using NR-V2X. The Synchronization related functionality of an ITS station using NR-V2X shall be compliant with ETSI TS 138 331 [20].

An ITS Station may be synchronized to a Cell (gNB/eNB), a GNSS, a SyncRef UE or its own internal clock.

A SyncRef UE transmits a combination of sidelink synchronization signals (S-PSS and S-SSS) called SLSS. There are 672 combinations of these signals, each combination represents a SLSS ID.

A SyncRef UE will indicate in the MIB-SL if it is in coverage of cell/GNSS or not.

An ITS Station may have (pre)configured the synchronization priority for an NR-V2X frequency: sl-SyncPriority (cell or GNSS).

Five groups of SyncRef UEs:

1) MIB-SL.inCoverage=true and SLSS ID=0: SyncRef UE is in coverage of GNSS.

2) MIB-SL.inCoverage=false and SLSS ID=0: SyncRef UE is out of coverage and sync. to SyncRef UE in [20] coverage of GNSS.

3) MIB-SL.inCoverage=true and SLSS ID={1..335}: SyncRef UE is in coverage of a cell.

4) MIB-SL.inCoverage=false and SLSS ID={1..335}: SyncRef UE is out of coverage and sync. to SyncRef UE in coverage of a cell.

5) MIB-SL.inCoverage=false and SLSS ID={336..671}: SyncRef UE is out of coverage and sync. to its internal clock or to a SyncRef UE which is out of coverage.

6.8 Cast Management

For NR-V2X, the cast type, i.e. broadcast, groupcast or unicast, shall be passed to the access layer as described in ETSI TS 103 836-4-3 [37]. For the unicast and groupcast, the destination ID and the destination group ID may be passed to the access layer respectively.

For the groupcast for an application layer connection-less group (i.e. connection-less groupcast), QoS range shall be also passed to the access layer as described in ETSI TS 103 836-4-3 [37]. For the groupcast for an application layer managed group (i.e. connection-oriented groupcast), the member ID and group size shall be also passed to the access layer as described in ETSI TS 103 836-4-3 [37].

Annex A (normative): Information Elements

A.1 LTE-V2X information elements

The minimum set of the LTE-V2X information elements is defined in ETSI TS 136 331 [1]. Their default/initial values shall be as specified in Tables A.1.1 to A.1.6. Mandatory values shall be static. Recommended values may be deviated from, for example by negotiation between devices to improve system performance, or in an ETSI profile, unless specified otherwise in a deployment profile.

NOTE 1: Any specific deployment can deviate from the default values below under the conditions specified in ETSI TS 136 331 [1].

Any deviation from default/initial values are documented in the LTE-V2X profile, ETSI TS 103 723 [35].

For the ASN.1 representation of the below described information elements, see clause 6 in ETSI TS 136 331 [1].

NOTE 2: A value can be mandatory (M) or recommended (R).

NOTE 3: Interoperability of implementations of LTE-V2X specified in the present document, with implementations of ETSI EN 303 613 [i.1], may be achieved by using the default values given in Annex B of ETSI EN 303 613 [i.1].

Table A.1.1: General LTE-V2X information elements

Item	LTE-V2X information element	Value (Note 1)	Comment	Mandatory/ Recommended Value
1	rohc-Profiles	All "False"	Indicates robust header compression profiles can be supported in *SL-V2X-Preconfiguration*.	M
2	carrierFreq	The carrier frequency of one of the channels regulated in Europe for ITS communication.	Indicates one E-UTRAN frequency. See (EU) 2020/1426 [i.4].	M
3	maxTxPower	23	Indicates maximal transmit power in dBm per ITS station in the frequency identified in item 2.	R
4	additionalSpectrumEmission	NS 33	Indicates the additional spectrum emission requirements and power reduction for protected zone. See ETSI TS 136 101 [13].	M
5	sl-bandwidth	n50 for 10 MHz channel. n100 for 20 MHz channel.	Indicates the carrier bandwidth. See ETSI TS 136 331 [1].	M
6	tdd-ConfigSL	None	TDD configuration. The value *none* means that Frame Structure Type 1 specified in ETSI TS 136 211 [6] is used.	M
7	syncAllowed	Gnss	Indicates the allowed synchronization reference(s) which is (are) allowed to use the configured resource pool. In this case, it is a GNSS sync source.	M
8	syncOffsetIndicators	empty	Indicates the transmission windows of the sidelink synchronization signalling. By default, no *syncOffsetIndicators* shall be configured. If indicated otherwise or required by regional regulations, the *syncOffsetIndicator1* = 0 and *syncOffsetIndicator2* = 80, see clause 5.7.4.	M
9	threshS-RSSI-CBR	9	Indicates the S-RSSI threshold for determining the contribution of a sub-channel to the CBR measurement.	M

Table A.1.2: LTE-V2X information elements for transmission pools

Item	LTE-V2X information element	Value (note 1)	Comment	Mandatory/ Recommended Value
1	sl-Subframe	bs100-r14	Indicates the bitmap of the resource pool. By default, all bits are set to "1". Other implementation options may be considered.	M
2	adjacencyPSCCH-PSSCH	True	Indicates whether an ITS station shall always transmit PSCCH and PSSCH in adjacent Resource Blocks (RBs).	M
3	sizeSubchannel	10	Indicates the number of Physical Resource Blocks (PRBs) of each sub-channel in the corresponding resource pool.	M
4	numSubchannel	For 10 MHz the value is 5. For 20 MHz the value is 10.	Indicates the number of sub-channels in the corresponding resource pool.	M
5	startRB-Subchannel	0	Indicates the lowest Resource Block (RB) index of the sub-channel with the lowest index.	M

Table A.1.3: LTE-V2X information elements for SL-PSSCH

Item	LTE-V2X information element	Value (note 1)	Comment	Mandatory/ Recommended Value
1	thresUE-Speed	160 kmph	Indicates an ITS station speed threshold.	R

Table A.1.4: PSSCH Tx Parameters for Below Speed Threshold

Item	LTE-V2X information element	Value (note 1)	Comment	Mandatory/ Recommended Value
1	minMCS-PSSCH	0 or 3	Indicates the minimal allowed MCS. "0" for the transmission using one sub-channel; "3" for the transmission using multiple subchannels.	R
2	maxMCS-PSSCH	11 for non-RSU ITS station. 17 for RSU ITS station.	Indicates maximal allowed MCS.	R
3	allowedRetxNumberPSSCH	Both	Indicates the allowed retransmission number. The value "both" indicates that the number of retransmissions is up to implementation.	R

Table A.1.5: PSSCH Tx Parameters for Equal to or Above Speed Threshold

Item	LTE-V2X information element	Value (note 1)	Comment	Mandatory/ Recommended Value
1	minMCS-PSSCH	0	Indicates the minimal allowed MCS.	R
2	maxMCS-PSSCH	8	Indicates maximal allowed MCS.	R
3	allowedRetxNumberPSSCH	n1	Indicates the allowed retransmission number. Retransmissions are required above the speed threshold.	R

Table A.1.6: LTE-V2X Sidelink Preconfiguration

Item	LTE-V2X information element	Value (note 1)	Comment	Mandatory/ Recommended Value
1	SL-V2X-TxProfile-r15	rel14	Value rel14 indicates that the UE shall use 3GPP Release 14 compatible format (i.e. using MCS table in Table 8.6.1-1 with 64 QAM indices overridden by 16 QAM in ETSI TS 136 213 [8] and not Release 15 feature) to transmit the corresponding LTE-V2X packet.	M

A.2 NR-V2X information elements

The NR-V2X information elements are defined in ETSI TS 138 331 [20] and their default/initial values shall be as specified in Table A.2.1. Mandatory values shall be static. Recommended values may be deviated from (e.g. by negotiation between ITS-Stations to optimize system performance, or as specified in a deployment profile).

NOTE 1: Any specific deployment can deviate from the default values below under the conditions specified in ETSI TS 138 331 [20].

Any deviation from the values in Table A.2.1 should be documented in an ETSI profile.

For the ASN.1 representation of the below described information elements, see clause 6 in ETSI TS 138 331 [20].

NOTE 2: A value can be mandatory (M) or recommended (R).

NOTE 3: Maximum transmission unit size is variable and depends on configuration, MCS chosen and transfer block size.

Table A.2.1: General NR-V2X information elements and type definitions

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value
1	offsetToCarrier	INTEGER (0..2199)	0	Offset in frequency domain between Point A (lowest subcarrier of common RB 0) and the lowest usable subcarrier on this carrier in number of PRBs (using the ***subcarrierSpacing*** defined for this carrier). The maximum value corresponds to 275 × 8-1. See ETSI TS 138 211 [25], clause 4.4.2.	M
2	SubcarrierSpacing	ENUMERATED {kHz15, kHz30, kHz60, kHz120, kHz240, spare3, spare2, spare1}	30 kHz	Subcarrier spacing of this carrier. It is used to convert the ***offsetToCarrier*** into an actual frequency. Only the values 15 kHz, 30 kHz or 60 kHz (FR1), and 60 kHz or 120 kHz (FR2) are applicable. See ETSI TS 138 211 [25], clause 4.	M
3	carrierBandwidth	INTEGER (1..maxNrofPhysicalResourceBlocks)	24 for 10 MHz channels. 50 for 20 MHz channel.	Width of this carrier in number of PRBs (using the ***subcarrierSpacing*** defined for this carrier) (see ETSI TS 138 211 [25], clause 4.4.2).	M
4	txDirectCurrentLocation	INTEGER (0..4095)	144 for 10 MHz channels. 300 for 20 MHz channel.	Indicates the downlink Tx Direct Current location for the carrier. A value in the range 0..3299 indicates the subcarrier index within the carrier. The values in the value range 3301..4095 are reserved and ignored by the UE. If this field is absent for downlink within ***ServingCellConfigCommon*** and ***ServingCellConfigCommonSIB***, the UE assumes the default value of 3300 (i.e. "Outside the carrier"). (see ETSI TS 138 211 [25], clause 4.4.2). Network does not configure this field via ***ServingCellConfig*** or for uplink carriers.	M
5	sl-AbsoluteFrequencyPointA-r16	ARFCN-ValueNR	Deployment-specific	Absolute frequency of the reference resource block (Common RB 0). Its lowest subcarrier is also known as Point A. See ETSI TS 138 101-1 [30], clause 5.4.2.1.	
6	sl-AbsoluteFrequencySSB-r16	ARFCN-ValueNR	Deployment-specific	Indicates the frequency location of SL-SSB. The transmission bandwidth for sidelink SSB is within the bandwidth of this sidelink BWP. See ETSI TS 138 101-1 [30], clause 5.4.2.1.	
7	ARFCN-ValueNR	INTEGER (0..maxNARFCN)	Not a default value.	The IE ARFCN-ValueNR is used to indicate the ARFCN applicable for a downlink, uplink or bi-directional (TDD) NR global frequency raster, as defined in ETSI TS 138 101-1 [30], clause 5.4.2.1.	
8	frequencyShift7p5khzSL-r16	ENUMERATED {true}	True	Enable the NR SL transmission with a 7,5 kHz shift to the LTE raster. If the field is absent, the frequency shift is disabled. See ETSI TS 138 101-1 [30], clause 5.4E.2.1.	M
9	valueN-r16	INTEGER (-1..1)	0	Indicate the NR SL transmission with a ***valueN*** × 5 kHz shift to the LTE raster	M
10	sl-LengthSymbols-r16	ENUMERATED {sym7, sym8, sym9, sym10, sym11, sym12, sym13, sym14}	sym14	This field indicates the number of symbols used for sidelink in a slot without SL-SSB. A single value can be (pre)configured per sidelink bandwidth part.	M

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value
11	sl-StartSymbol-r16	ENUMERATED {sym0, sym1, sym2, sym3, sym4, sym5, sym6, sym7}	sym0	This field indicates the starting symbol used for sidelink in a slot without SL-SSB. A single value can be (pre)configured per sidelink bandwidth part.	M
12	dl-P0-PSBCH-r16	INTEGER (-16..15)	Not Configured	Indicates P0 value for DL pathloss based power control for PSBCH. If not configured, DL pathloss based power control is disabled for PSBCH.	R
13	dl-Alpha-PSBCH-r16	ENUMERATED {alpha0, alpha04, alpha05, alpha06, alpha07, alpha08, alpha09, alpha1}	Not Configured	Indicates alpha value for DL pathloss based power control for PSBCH. When the field is absent the UE applies the value 1.	R
14	sl-TxDirectCurrentLocation-r16	INTEGER (0..3301)	144 for 10 MHz channels. 300 for 20 MHz channel.	The sidelink Tx/Rx Direct Current location for the carrier. Only values in the value range of this field between 0 and 3299, which indicate the subcarrier index within the carrier corresponding to the numerology of the corresponding sidelink BWP and value 3300, which indicates "Outside the carrier" and value 3301, which indicates "Undetermined position within the carrier" are used in the present document.	M
15	sl-TimeResourcePSCCH-r16	ENUMERATED {n2, n3}	n3	Indicates the number of symbols of PSCCH in a resource pool.	M
16	sl-FreqResourcePSCCH-r16	ENUMERATED {n10,n12, n15, n20, n25}	n12 for 10 MHz channel. N10 for 20 MHz channel.	Indicates the number of PRBs for PSCCH in a resource pool where it is not greater than the number PRBs of the subchannel.	M
17	sl-DMRS-ScrambleID-r16	INTEGER (0..65535)	0	Indicates the initialization value for PSCCH DMRS scrambling.	M
18	sl-NumReservedBits-r16	INTEGER (2..4)	4	Indicates the number of reserved bits in first stage SCI.	M
19	sl-PSSCH-DMRS-TimePatternList-r16	SEQUENCE (SIZE (1..3)) OF INTEGER (2..4)	{2, 3, 4}	Indicates the set of PSSCH DMRS time domain patterns in terms of PSSCH DMRS symbols in a slot that can be used in the resource pool.	M
20	sl-BetaOffsets2ndSCI-r16	SEQUENCE (SIZE (4)) OF **SL-BetaOffsets-r16**	Indices: 0, 5, 11, 14	Indicates candidates of beta-offset values to determine the number of coded modulation symbols for second stage SCI. The value indicates the index in Table 9.3-2 of ETSI TS 138 213 [27].	M
21	sl-Scaling-r16	ENUMERATED {f0p5, f0p65, f0p8, f1}	f1	Indicates a scaling factor to limit the number of resource elements assigned to the second stage SCI on PSSCH. Value *f0p5* corresponds to 0,5, value *f0p65* corresponds to 0,65, and so on.	M
22	sl-PSFCH-Period-r16	ENUMERATED {sl0, sl1, sl2, sl4}	sl4	Indicates the period of PSFCH resource in the unit of slots within this resource pool. If set to *sl0*, no resource for PSFCH, and HARQ feedback for all transmissions in the resource pool is disabled.	M
23	sl-PSFCH-RB-Set-r16	BIT STRING (SIZE (10..275))	Eight 1s followed by sixteen 0s for 10 MHz channels. Twenty 1s followed by thirty 0s for 20 MHz channel.	Indicates the set of PRBs that are actually used for PSFCH transmission and reception. The leftmost bit of the bitmap refers to the lowest RB index in the resource pool, and so on.	M

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value
24	sl-NumMuxCS-Pair-r16	ENUMERATED {n1, n2, n3, n6}	n3	Indicates the number of cyclic shift pairs used for a PSFCH transmission that can be multiplexed in a PRB.	M
25	sl-MinTimeGapPSFCH-r16	ENUMERATED {sl2, sl3}	sl3	The minimum time gap between PSFCH and the associated PSSCH in the unit of slots.	M
26	sl-PSFCH-HopID-r16	INTEGER (0..1023)	0	Scrambling ID for sequence hopping of the PSFCH used in the resource pool. See ETSI TS 138 331 [20], clause 6.3.5.	M
27	sl-PSFCH-CandidateResourceType-r16	ENUMERATED {startSubCH, allocSubCH}	startSubCH	Indicates the number of PSFCH resources available for multiplexing HARQ-ACK information in a PSFCH transmission (see ETSI TS 138 213 [27], clause 16.3).	M
28	gnss-Sync-r16	ENUMERATED {true}	True	SL-ResourcePool-r16/ SL-SyncAllowed-r16**gnss-Sync-r16:** If configured, the (pre-) configured resources can be used if the UE is directly or indirectly synchronized to GNSS (i.e. synchronized to a reference UE which is directly synchronized to GNSS). SL-SyncConfigList-r16/ SL-SyncConfig-r16**gnss-Sync-r16:** if configured, the synchronization configuration is used for SLSS transmission/reception when the UE is synchronized to GNSS. If not configured, the synchronization configuration is used for SLSS transmission/reception when the UE is synchronized to eNB/gNB.	M
29	gnbEnb-Sync-r16	ENUMERATED {true}	Not Configured (disabled)	If configured, the (pre-) configured resources can be used if the UE is directly or indirectly synchronized to eNB or gNB (i.e. synchronized to a reference UE which is directly synchronized to eNB or gNB).	M
30	ue-Sync-r16	ENUMERATED {true}	True	If configured, the (pre-) configured resources can be used if the UE is synchronized to a reference UE which is not synchronized to eNB, gNB and GNSS directly or indirectly.	M
31	sl-SubchannelSize-r16	ENUMERATED {n10, n12, n15, n20, n25, n50, n75, n100}	n12 for 10 MHz channel. N10 for 20 MHz channel.	Indicates the minimum granularity in frequency domain for the sensing for PSSCH resource selection in the unit of PRB.	M
32	sl-StartRB-Subchannel-r16	INTEGER (0..265)	0	Indicates the lowest RB index of the subchannel with the lowest index in the resource pool with respect to the lowest RB index of a SL BWP.	M
33	sl-NumSubchannel-r16	INTEGER (1..27)	2 for 10 MHz channel. 5 for 20 MHz channel.	Indicates the number of subchannels in the corresponding resource pool, which consists of contiguous PRBs only.	M
34	sl-Additional-MCS-Table-r16	ENUMERATED {qam256, qam64LowSE, qam256-qam64LowSE }	qam256	Indicates the MCS table(s) additionally used in the resource pool. 64QAM table is (pre-)configured as default. Zero, one or two can be additionally (pre-)configured using the 256QAM and/or low-SE MCS tables.	M

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value
35	sl-ThreshS-RSSI-CBR-r16	INTEGER (0..45)	12	Indicates the S-RSSI threshold for determining the contribution of a sub-channel to the CBR measurement. Value 0 corresponds to -112 dBm, value 1 to -110 dBm, value n to (-112 + n × 2) dBm, and so on.	M
36	sl-TimeWindowSizeCBR-r16	ENUMERATED {ms100, slot100}	ms100	Indicates the time window size for CBR measurement.	R
37	sl-TimeWindowSizeCR-r16	ENUMERATED {ms1000, slot1000}	ms1000	Indicates the time window size for CR evaluation.	R
38	sl-PTRS-FreqDensity-r16	SEQUENCE (SIZE (2)) OF INTEGER (1..276)	Not Configured	Presence and frequency density of SL PTRS as a function of scheduled BW. If the field is not configured, the UE uses K_PTRS = 2.	M
39	sl-PTRS-TimeDensity-r16	SEQUENCE (SIZE (3)) OF INTEGER (0..29)	Not Configured	Presence and time density of SL PTRS as a function of MCS. If the field is not configured, the UE uses L_PTRS = 1.	M
40	sl-PTRS-RE-Offset-r16	ENUMERATED {offset01, offset10, offset11}	Not Configured	Indicates the subcarrier offset for SL PTRS . If the field is not configured, the UE applies the value offset00.	M
41	sl-PriorityThreshold-r16	sL-ResourcePool-R16: sl-PriorityThreshold-r16 INTEGER (1..9)	9 (always prioritize SL)	sL-ResourcePool-R16: Indicates the threshold used to determine whether NR sidelink transmission is prioritized over uplink transmission of priority index 0 as specified in ETSI TS 138 213 [27], clause 16.2.4.3, or whether PUCCH transmission carrying SL HARQ is prioritized over PUCCH transmission carrying UCI of priority index 0 if they overlap in time as specified in ETSI TS 138 213 [27], clause 9.2.5.0.	R
42	void				
43	SL-Thres-RSRP-r16	INTEGER (0..66)	18	Value 0 corresponds to minus infinity dBm, value 1 corresponds to -128 dBm, value 2 corresponds to -126 dBm, value n corresponds to (-128 + (n-1) × 2) dBm and so on, value 66 corresponds to infinity dBm.	M
44	sl-MultiReserveResource-r16	ENUMERATED {enabled}	Enabled	Indicates if it is allowed to reserve a sidelink resource for an initial transmission of a TB by an SCI associated with a different TB, based on sensing and resource selection procedure.	M
45	sl-MaxNumPerReserve-r16	ENUMERATED {n2, n3}	n2	Indicates the maximum number of reserved PSCCH/PSSCH resources that can be indicated by an SCI.	M
46	sl-SensingWindow-r16	ENUMERATED {ms100, ms1100}	ms1100	Parameter that indicates the start of the sensing window.	M

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value
47	sl-SelectionWindow-r16	ENUMERATED {n1, n5, n10, n20}	n20	Parameter that determines the end of the selection window in the resource selection for a TB with respect to priority indicated in SCI. Value n1 corresponds to 1 × 2^{μ}, value n5 corresponds to 5 × 2^{μ}, and so on, where μ = 0, 1, 2, 3 refers to SCS 15, 30, 60, 120 kHz respectively. SL-SelectionWindowList-r16 ::= SEQUENCE (SIZE (8)) OF SL-SelectionWindowConfig-r16 SL-SelectionWindowConfig-r16 ::= SEQUENCE { sl-Priority-r16 INTEGER (1..8), sl-SelectionWindow-r16 ENUMERATED {n1, n5, n10, n20}	M
48	sl-Priority-r16	INTEGER (1..8)	Application-driven	Sidelink logical channel priority, as specified in ETSI TS 138 321 [22].	R

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value
49	sl-ResourceReservePeriodList-r16	SEQUENCE (SIZE (1..16)) OF **SL-ResourceReservePeriod-r16**	Values from sl-ResourceReservePeriod1-r16 and sl-ResourceReservePeriod2-r16	Set of possible resource reservation periods allowed in the resource pool in the unit of ms. Up to 16 values can be configured per resource pool. **SL-TxConfigIndex-r16**: **sl-CBR-ConfigIndex-r161-r16**) **SL-ResourceReservePeriod-r16** ::= CHOICE { **sl-ResourceReservePeriod1-r16** ENUMERATED {ms0, ms100, ms200, ms300, ms400, ms500, ms600, ms700, ms800, ms900, ms1000}, **sl-ResourceReservePeriod2-r16** INTEGER (1..99)	M

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value

50	sl-ResourceReservePeriod1-r16	ENUMERATED {ms0, ms100, ms200, ms300, ms400, ms500, ms600, ms700, ms800, ms900, ms1000}	ms0, ms100, ms200, ms300, ms400, ms500, ms600, ms700, ms800, ms900, ms1000	Part of **SL-ResourceReservePeriod-r16**:
				Set of possible resource reservation period allowed in the resource pool in the unit of ms. Up to 16 values can be configured per resource pool.
				SL-ResourceReservePeriod-r16 ::= CHOICE {
				sl-ResourceReservePeriod1-r16 ENUMERATED {ms0, ms100, ms200, ms300, ms400, ms500, ms600, ms700, ms800, ms900, ms1000},
				sl-ResourceReservePeriod2-r16 INTEGER (1..99)
				}
				Set of possible resource reservation period allowed in the resource pool in the unit of ms. Up to 16 values can be configured per resource pool.
					M

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value

51	sl-ResourceReservePeriod2-r16	INTEGER (1..99)	50	Part of **SL-ResourceReservePeriod-r16**:
				Set of possible resource reservation period allowed in the resource pool in the unit of ms. Up to 16 values can be configured per resource pool.
				
				SL-ResourceReservePeriod-r16 ::= CHOICE {
				sl-ResourceReservePeriod1-r16 ENUMERATED {ms0, ms100, ms200, ms300, ms400, ms500, ms600, ms700, ms800, ms900, ms1000},
				sl-ResourceReservePeriod2-r16 INTEGER (1..99)
				}
					M

52	sl-RS-ForSensing-r16	ENUMERATED {pscch, pssch}	pscch	Indicates whether DMRS of PSCCH or PSSCH is used for L1 RSRP measurement in the sensing operation.	M
53	sl-TDD-Configuration-r16	**TDD-UL-DL-ConfigCommon** OPTIONAL	Not Configured	Indicates the TDD configuration associated with the reception pool of the cell indicated by *sl-SyncConfigIndex*.	M
54	dl-UL-TransmissionPeriodicity	ENUMERATED {ms0p5, ms0p625, ms1, ms1p25, ms2, ms2p5, ms5, ms10}	Not Configured	Periodicity of the DL-UL pattern, see ETSI TS 138 213 [27], clause 11.1. If the ***dl-UL-TransmissionPeriodicity-v1530*** is signalled, UE shall ignore the ***dl-UL-TransmissionPeriodicity*** (without suffix).	M
55	dl-UL-TransmissionPeriodicity-v1530	ENUMERATED {ms3, ms4}	Not Configured	Periodicity of the DL-UL pattern, see ETSI TS 138 213 [27], clause 11.1. If the ***d-UL-TransmissionPeriodicity-v1530*** is signalled, UE shall ignore the ***dl-UL-TransmissionPeriodicity*** (without suffix).	M
56	nrofDownlinkSlots	INTEGER (0..**maxNrofSlots**)	Not Configured	Number of consecutive full DL slots at the beginning of each DL-UL pattern, see ETSI TS 138 213 [27], clause 11.1. In this release, the maximum value for this field is 80.	M
57	nrofUplinkSlots	INTEGER (0..**maxNrofSlots**)	Not Configured	Number of consecutive full UL slots at the end of each DL-UL pattern, see ETSI TS 138 213 [27], clause 11.1. In this release, the maximum value for this field is 80.	M

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value
58	nrofDownlinkSymbols	INTEGER (0..**maxNrofSymbols**-1)	Not Configured	Number of consecutive DL symbols in the beginning of the slot following the last full DL slot (as derived from nrofDownlinkSlots). The value 0 indicates that there is no partialdownlink slot (see ETSI TS 138 213 [27], clause 11.1).	M
59	nrofUplinkSymbols	INTEGER (0..**maxNrofSymbols**-1)	Not Configured	Number of consecutive UL symbols in the end of the slot preceding the first full UL slot (as derived from nrofUplinkSlots). The value 0 indicates that there is no partial-uplink slot. (see ETSI TS 138 213 [27], clause 11.1).	M
60	sl-SyncConfigIndex-r16	INTEGER (0..15)	Not Configured	Indicates the synchronization configuration that is associated with a reception pool, by means of an index to the corresponding entry SL-SyncConfigList of in SIB12 for NR sidelink communication.	M
61	sl-ZoneConfigMCR-Index-r16	INTEGER (0..15)	See Table A.2.2 sl-TransRange-r16, sl-ZoneLength-r16	Indicates the codepoint of the communication range requirement field in SCI.	M
62	sl-TransRange-r16	ENUMERATED {m20, m50, m80, m100, m120, m150, m180, m200, m220, m250, m270, m300, m350, m370, m400, m420, m450, m480, m500, m550, m600, m700, m1000, spare9, spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1}	m500, m450, m400, m350, m300, m250, m200, m150, m120, m100, m80. See Table A.2.2 sl-TransRange-r16, sl-ZoneLength-r16	Indicates the communication range requirement for the corresponding ***sl-ZoneConfigMCR-Index***. See clause 5.8.11 Zone identity calculation in ETSI TS 138 331 [20].	M
63	sl-ZoneLength-r16	ENUMERATED { m5, m10, m20, m30, m40, m50, spare2, spare1}	m40, m50 See Table A.2.2 sl-TransRange-r16, sl-ZoneLength-r16	Indicates the length of each geographic zone.	M
64	FilterCoefficient	FilterCoefficient ::= ENUMERATED { fc0, fc1, fc2, fc3, fc4, fc5, fc6, fc7, fc8, fc9, fc11, fc13, fc15, fc17, fc19, spare1, ...}	fc0	The IE FilterCoefficient specifies the measurement filtering coefficient. Value ***fc0*** corresponds to k = 0, ***fc1*** corresponds to k = 1, and so on.	R
65	sl-RB-Number-r16	INTEGER (10..275) OPTIONAL, -- Need M	24 for 10 MHz channel. 50 for 20 MHz channel.	Indicates the number of PRBs in the corresponding resource pool, which consists of contiguous PRBs only. The remaining RB cannot be used (See ETSI TS 138 214 [28], clause 8).	M
66	sl-PreemptionEnable-r16	ENUMERATED {enabled, pl1, pl2, pl3, pl4, pl5, pl6, pl7, pl8}	pl1	Indicates whether pre-emption is disabled or enabled in a resource pool. If enabled, a priority level p_preemption can be optionally configured. If the pre-emption is enabled but p_preemption is not configured, pre-emption is applicable to all levels.	R

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value
67	sl-PriorityThreshold-UL-URLLC-r16	INTEGER (1..9)	9	Indicates the threshold used to determine whether NR sidelink transmission is prioritized over uplink transmission of priority index 1 as specified in ETSI TS 138 213 [27], clause 16.2.4.3, or whether PUCCH transmission carrying SL HARQ is prioritized over PUCCH transmission carrying UCI of priority index 1 if they overlap in time as specified in ETSI TS 138 213 [27], clause 9.2.5.0.	R
68	sl-X-Overhead-r16	ENUMERATED {n0,n3, n6, n9}	n0	Accounts for overhead from CSI-RS, PTRS. If the field is absent, the UE applies value *n0* (see ETSI TS 138 214 [28], clause 5.1.3.2).	M
69	sl-MaxTransPower-r16	INTEGER (-30..33)	23 dBm	Indicates the maximum value of the UE's sidelink transmission power on this resource pool. The unit is dBm.	R
70	sl-Alpha-PSSCH-PSCCH-r16	ENUMERATED {alpha0, alpha04, alpha05, alpha06, alpha07, alpha08, alpha09, alpha1}	Not Configured	Indicates alpha value for sidelink pathloss based power control for PSCCH/PSSCH when sl-P0-PSSCH is configured. When the field is absent the UE applies the value 1.	R
71	dl-Alpha-PSSCH-PSCCH-r16	ENUMERATED {alpha0, alpha04, alpha05, alpha06, alpha07, alpha08, alpha09, alpha1}	Not Configured	Indicates alpha value for downlink pathloss based power control for PSCCH/PSSCH when dl-P0-PSSCH is configured. When the field is absent the UE applies the value 1.	R
72	sl-P0-PSSCH-PSCCH-r16	INTEGER (-16..15)	Not Configured	Indicates P0 value for sidelink pathloss based power control for PSCCH/PSSCH. If not configured, sidelink pathloss based power control is disabled for PSCCH/PSSCH.	R
73	dl-P0-PSSCH-PSCCH-r16	INTEGER (-16..15)	Not Configured	Indicates P0 value for downlink pathloss based power control for PSCCH/PSSCH. If not configured, downlink pathloss based power control is disabled for PSCCH/PSSCH.	R
74	dl-Alpha-PSFCH-r16	ENUMERATED {alpha0, alpha04, alpha05, alpha06, alpha07, alpha08, alpha09, alpha1}	Not Configured	Indicates alpha value for downlink pathloss based power control for PSFCH when dl-P0-PSFCH is configured. When the field is absent the UE applies the value 1.	R
75	dl-P0-PSFCH-r16	INTEGER (-16..15)	Not Configured	Indicates P0 value for downlink pathloss based power control for PSFCH. If not configured, downlink pathloss based power control is disabled for PSFCH.	R
76	sl-TxPercentage-r16	ENUMERATED {p20, p35, p50}	p20	Indicates the portion of candidate single-slot PSSCH resources over the total resources. Value p20 corresponds to 20 %, and so on.	R
77	sl-MCS-Table-r16	ENUMERATED {qam64, qam256, qam64LowSE}	Not Configured (mode 1 specific)		R
78	sl-MinMCS-PSSCH-r16	INTEGER (0..27)	Not Configured (mode 1 specific)	Indicates the minimum MCS value for Mode 1 configured and dynamic grants when using the associated MCS table. If no MCS is configured, UE autonomously selects MCS from the full range of values.	R

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value
79	sl-MaxMCS-PSSCH-r16	INTEGER (0..31)	Not Configured (mode 1 specific)	Indicates the maximum MCS value used for Mode 1 configured and dynamic grants when using the associated MCS table. If no MCS is configured, UE autonomously selects MCS from the full range of values.	R
80	sl-TimeResource-r16	BIT STRING (SIZE (10..160))	1111111111	Indicates the bitmap of the resource pool, which is defined by repeating the bitmap with a periodicity during a SFN or DFN cycle.	M
81	sl-SyncPriority-r16	ENUMERATED {gnss, gnbEnb}	Gnss	This field indicates synchronization priority order, as specified in clause 5.8.6 of ETSI TS 138 331 [20].	R
82	sl-NbAsSync-r16	BOOLEAN	Not Configured (false)	This field indicates whether the network can be selected as synchronization reference directly/indirectly only, if ***sl-SyncPriority*** is set to gnss. If this field is set to TRUE, the network is enabled to be selected as synchronization reference directly/indirectly. The field is only present in ***SidelinkPreconfigNR***. Otherwise it is absent.	R
83	sl-SyncRefMinHyst-r16	ENUMERATED {dB0, dB3, dB6, dB9, dB12}	dB0	Hysteresis when evaluating a SyncRef UE using absolute comparison.	R
84	sl-SyncRefDiffHyst-r16	ENUMERATED {dB0, dB3, dB6, dB9, dB12, dBinf}	dB6	Hysteresis when evaluating a SyncRef UE using relative comparison.	R

85	sl-NumSSB-WithinPeriod-r16	ENUMERATED {n1, n2, n4, n8, n16, n32, n64}	`sl-SSB-TimeAllocation1-r16:`
			• `n1`
			
			`sl-SSB-TimeAllocation2-r16:`
			• `n1`
			
			`sl-SSB-TimeAllocation3-r16:`
			• `Not Configured`
				Indicates the number of SL-SSB transmissions within one SL-SSB period. The applicable values are related to the subcarrier spacing and frequency as follows:
				FR1, SCS = 15 kHz: 1
				FR1, SCS = 30 kHz: 1, 2
				FR1, SCS = 60 kHz: 1, 2, 4
				FR2, SCS = 60 kHz: 1, 2, 4, 8, 16, 32
				FR2, SCS = 120 kHz: 1, 2, 4, 8, 16, 32, 64
					M

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value
86	sl-TimeOffsetSSB-r16	(0..1279)	sl-SSB-TimeAllocation1-r16: • 0 sl-SSB-TimeAllocation2-r16: • 40 sl-SSB-TimeAllocation3-r16: • Not Configured	Indicates the slot offset from the start of SL-SSB period to the first SL-SSB.	M
87	sl-TimeInterval-r16	INTEGER (0..639)	Not Configured	Indicates the slot interval between neighbouring SL-SSBs. This value is applicable when there are more than one SL-SSBs within one SL-SSB period.	M
88	sl-SSID-r16	INTEGER (0..671)	Not Configured	Indicates the ID of sidelink synchronization signal associated with different synchronization priorities.	R
89	syncTxThreshIC-r16 (SL-RSRP-Range-r16)	INTEGER (0..13)	Not Configured	Value 0 corresponds to -infinity, value 1 to -115 dBm, value 2 to -110 dBm, and so on (i.e. in steps of 5 dBm) until value 12, which corresponds to -60 dBm, while value 13 corresponds to +infinity.	R
90	syncTxThreshOoC-r16 (SL-RSRP-Range-r16)	INTEGER (0..13)	5	Value 0 corresponds to -infinity, value 1 to -115 dBm, value 2 to -110 dBm, and so on (i.e. in steps of 5 dBm) until value 12, which corresponds to -60 dBm, while value 13 corresponds to +infinity.	R
91	syncInfoReserved-r16	BIT STRING (SIZE (2))	Not Configured	Reserved for future use.	R
92	sl-SDAP-Header-r16	ENUMERATED {present, absent}	{present} Unicast only	Indicates whether or not a SDAP header is present on this sidelink DRB. The field cannot be changed after a sidelink DRB is established. This field is set to present if the field sl-DefaultRB is set to true.	M
93	sl-DefaultRB-r16	BOOLEAN	Unicast only Set lowest DRB ID to TRUE, all others to FALSE	Indicates whether or not this is the default sidelink DRB for this NR sidelink communication transmission destination. Among all configured instances of SL-SDAP-Config for this destination, this field shall be set to true in at most one instance of SL-SDAP-Config and to false in all other instances.	R
94	sl-CastType-r16	ENUMERATED {broadcast, groupcast, unicast, spare1}	Application-driven	Indicates the cast type for the corresponding destination for which to request the resource.	R
95	sl-GFBR-r16	INTEGER (0..4000000000)	Application-driven	Indicate the guaranteed bit rate for a GBR QoS flow. Kbit/s	R
96	sl-MFBR-r16	INTEGER (0..4000000000)	Application-driven	Indicate the maximum bit rate for a GBR QoS flow. Kbit/s	R
97	sl-Range-r16	INTEGER (1..1000)	Application-driven	This field indicates the range parameter of the QoS flow, as defined in clause 5.4.1.1.1 of ETSI TS 123 287 [36]. It is present only for groupcast. The unit is meter.	R

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value
98	sl-ResourceType-r16	ENUMERATED {gbr, non-GBR, delayCriticalGBR, spare1}	Application-driven		R
99	sl-StandardizedPQI-r16	INTEGER (0..255)	Application-driven	Indicate the PQI for standardized PQI.	R
100	sl-PriorityLevel-r16	INTEGER (1..8)	Application-driven	Indicates the Priority Level for a QoS flow. Values ordered in decreasing order of priority, i.e. with 1 as the highest priority and 8 as the lowest priority.	R
101	sl-PacketDelayBudget-r16	INTEGER (0..1023)	Application-driven	Indicates the Packet Delay Budget for a QoS flow. Upper bound value for the delay that a packet may experience expressed in unit of 0,5 ms.	R
102	sl-PacketErrorRate-r16	INTEGER (0..9)	Application-driven	Indicates the Packet Error Rate for a QoS flow. The packet error rate is expressed as Scalar x 10-k where k is the Exponent.	R
103	sl-AveragingWindow-r16	INTEGER (0..4095)	2000ms	Indicates the Averaging Window for a QoS flow, and applies to GBR QoS flows only. Unit: ms. The default value of the IE is 2 000 ms.	M
104	sl-MaxDataBurstVolume-r16	INTEGER (0..4095)	Not Configured	Indicates the Maximum Data Burst Volume for a QoS flow, and applies to delay critical GBR QoS flows only. Unit: byte.	
105	sl-DiscardTimer-r16	ENUMERATED {ms3, ms10, ms20, ms25, ms30, ms40, ms50, ms60, ms75, ms100, ms150, ms200, ms250, ms300, ms500, ms750, ms1500, infinity}	ms250	Value in ms of discardTimer specified in ETSI TS 138 323 [24]. Value ***ms50*** corresponds to 50 ms, value ***ms100*** corresponds to 100 ms and so on.	R
106	sl-PDCP-SN-Size-r16	ENUMERATED {len12bits, len18bits}	Unicast: len12bits Groupcast/Broadcast: len18bits	PDCP sequence number size for unicast NR sidelink communication, 12 or 18 bits, as specified in ETSI TS 138 323 [24]. For groupcast and broadcast NR sidelink communication, only 12 bits is applicable, as specified in clause 9.1.1.5 of ETSI TS 138 331 [20].	M
107	sl-OutOfOrderDelivery-r16	ENUMERATED { true }	Unicast only { true }	Indicates whether or not outOfOrderDelivery specified in ETSI TS 138 323 [24] is configured. This field should be either always present or always absent, after the radio bearer is established.	M

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value

108	SN-FieldLengthUM	ENUMERATED {size6, size12}	Size6	This field indicates the RLC SN field size for NR sidelink communication, see ETSI TS 138 322 [23]. For groupcast and broadcast, only value size6 (6 bits) is configured for the field s-*SN-FieldLengthUM*.
				
				`sl-UM-RLC-r16 SEQUENCE {`
				`sl-SN-FieldLengthUM-r16 SN-FieldLengthUM OPTIONAL, -- Cond SLRBSetup`
					M

109	sl-MaxRetxThreshold-r16	ENUMERATED { t1, t2, t3, t4, t6, t8, t16, t32 }	t32	Parameter for RLC AM for NR sidelink communications, see ETSI TS 138 322 [23]. Value ***t1*** corresponds to 1 retransmission, value ***t2*** corresponds to 2 retransmissions and so on.	M
110	SN-FieldLengthAM	ENUMERATED {size12, size18}	{ size12 }	This field indicates the RLC SN field size for NR sidelink communication, see ETSI TS 138 322 [23]. For groupcast and broadcast, only value size6 (6 bits) is configured for the field sl-SN-FieldLengthUM. `SL-RLC-Config-r16 ::= CHOICE { sl-AM-RLC-r16 SEQUENCE { sl-SN-FieldLengthAM-r16 SN-FieldLengthAM OPTIONAL, -- Cond SLRBSetup`	M

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value
111	T-PollRetransmit	ENUMERATED { ms5, ms10, ms15, ms20, ms25, ms30, ms35, ms40, ms45, ms50, ms55, ms60, ms65, ms70, ms75, ms80, ms85, ms90, ms95, ms100, ms105, ms110, ms115, ms120, ms125, ms130, ms135, ms140, ms145, ms150, ms155, ms160, ms165, ms170, ms175, ms180, ms185, ms190, ms195, ms200, ms205, ms210, ms215, ms220, ms225, ms230, ms235, ms240, ms245, ms250, ms300, ms350, ms400, ms450, ms500, ms800, ms1000, ms2000, ms4000, ms1-v1610, ms2-v1610, ms3-v1610,ms4-v1610, spare1}	Unicast only ms250	Timer for RLC AM for NR sidelink communications, see ETSI TS 138 322 [23], in milliseconds. Value ms5 means 5 ms, value ms10 means 10 ms and so on.	M
112	PollPDU	ENUMERATED { p4, p8, p16, p32, p64, p128, p256, p512, p1024, p2048, p4096, p6144, p8192, p12288, p16384,p20480, p24576, p28672, p32768, p40960, p49152, p57344, p65536, infinity, spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1}	Unicast only P4	Parameter for RLC AM in ETSI TS 138 322 [23]. Value p4 corresponds to 4 PDUs, value p8 corresponds to 8 PDUs and so on. infinity corresponds to an infinite number of PDUs.	M

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value
113	PollByte	ENUMERATED { kB1, kB2, kB5, kB8, kB10, kB15, kB25, kB50, kB75, kB100, kB125, kB250, kB375, kB500, kB750, kB1000, kB1250, kB1500, kB2000, kB3000, kB4000, kB4500, kB5000, kB5500, kB6000, kB6500, kB7000, kB7500, mB8, mB9, mB10, mB11, mB12, mB13, mB14, mB15, mB16, mB17, mB18, mB20, mB25, mB30, mB40, infinity, spare20, spare19, spare18, spare17, spare16, spare15, spare14, spare13, spare12, spare11, spare10, spare9, spare8, spare7, spare6, spare5,spare4, spare3, spare2, spare1}	kB25	Parameter for RLC AM in ETSI TS 138 322 [23]. Value kB25 corresponds to 25 kB, value kB50 corresponds to 50 kB and so on. infinity corresponds to an infinite amount of kiloBytes.	M
114	sl-PrioritisedBitRate-r16	ENUMERATED {kBps0, kBps8, kBps16, kBps32, kBps64, kBps128, kBps256, kBps512, kBps1024, kBps2048, kBps4096, kBps8192, kBps16384, kBps32768, kBps65536, infinity}	Application-driven	Value in kiloBytes/s. Value ***kBps0*** corresponds to 0 kB/s, value ***kBps8*** corresponds to 8 kB/s, value ***kBps16*** corresponds to 16 kB/s, and so on.	R
115	sl-BucketSizeDuration-r16	ENUMERATED {ms5, ms10, ms20, ms50, ms100, ms150, ms300, ms500, ms1000, spare7, spare6, spare5, spare4, spare3,spare2, spare1}	ms50	Value in ms. ***ms5*** corresponds to 5 ms, value ***ms10*** corresponds to 10 ms, and so on.	M
116	sl-ConfiguredGrantType1Allowed-r16	ENUMERATED {true}	Not Configured	If present, SL MAC SDUs from this sidelink logical channel can be transmitted on a sidelink configured grant type 1. Corresponds to "sl-configuredGrantType1Allowed" in ETSI TS 138 321 [22].	

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value
117	sl-HARQ-FeedbackEnabled-r16	ENUMERATED {enabled, disabled }	{ enabled }	If present, indicate the HARQ feedback enabled/disabled restriction in LCP for this sidelink logical channel. If set to enabled, the sidelink logical channel will be multiplexed only with a logical channel which enabling the HARQ feedback. If set to disabled, the sidelink logical channel cannot be multiplexed with a logical channel which enabling the HARQ feedback. Corresponds to "sl-HARQ-FeedbackEnabled" in ETSI TS 138 321 [22]. If this field of at least one sidelink logical channel for the UE is set to enabled, sl-PSFCH-Config should be mandatory present in at least one of the SL-ResourcePool.	R
118	sl-MaxPUSCH-Duration-r16	ENUMERATED {ms0p02, ms0p04, ms0p0625, ms0p125, ms0p25, ms0p5, spare2, spare1}	Not Configured	If present, indicate the maximum PUSCH duration of UL-SCH resources that this sidelink logical channel is mapped to, when checking the SR trigger condition. Corresponds to "sl-MaxPUSCH-Duration" in ETSI TS 138 321 [22].	
119	SchedulingRequestId	INTEGER (0..7)	Not Configured	The ID of the SchedulingRequestConfig that uses this scheduling request resource.	
120	sl-LogicalChannelSR-DelayTimerApplied-r16	BOOLEAN	False	Indicates whether to apply the delay timer for SR transmission for this sidelink logical channel. Set to false if logicalChannelSR-DelayTimer is not included in sl-BSR-Config.	M

121	SL-MeasObject-r16	SEQUENCE {
		frequencyInfoSL-r16 ARFCN-ValueNR
		...
		}
			Unicast-only
			Band 47
				It specifies information applicable for sidelink DMRS measurement.	M

122	sl-ReportAmount-r16	ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity}	Unicast-only {infinity}	Number of sidelink measurement reports applicable for ***sl-Periodical*** report type.	M
123	ReportInterval (sl-ReportInterval-r16)	ENUMERATED {ms120, ms240, ms480, ms640, ms1024, ms2048, ms5120, ms10240, ms20480, ms40960, min1,min6, min12, min30 }	Not Configured	The IE ReportInterval indicates the interval between periodical reports. The ***ReportInterval*** is applicable if the UE performs periodical reporting (i.e. when reportAmount exceeds 1), for ***triggerTypeevent*** as well as for ***triggerTypeperiodical***. Value ***ms120*** corresponds to 120 ms, value ***ms240*** corresponds to 240 ms and so on, while value ***min1*** corresponds to 1 min, ***min6*** corresponds to 6 min and so on.	
124	sl-RS-Type-r16	ENUMERATED {dmrs, spare3, spare2, spare1}	Not Configured		R
125	sl-ReportOnLeave-r16	BOOLEAN	Not Configured	indicates whether or not the UE shall initiate the sidelink measurement reporting procedure when the leaving condition is met for a frequency in ***sl-FrequencyTriggeredList***, as specified in clause 5.8.10.4.1 of ETSI TS 138 331 [20].	R

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value
126	Hysteresis	INTEGER (0..30)	Not Configured	The IE Hysteresis is a parameter used within the entry and leave condition of an event triggered reporting condition. The actual value is field value × 0,5 dB.	R
127	TimeToTrigger	ENUMERATED { ms0, ms40, ms64, ms80, ms100, ms128, ms160, ms256, ms320, ms480, ms512, ms640, ms1024, ms1280, ms2560, ms5120}	Not Configured	The IE ***TimeToTrigger*** specifies the value range used for time to trigger parameter, which concerns the time during which specific criteria for the event needs to be met in order to trigger a measurement report. Value ***ms0*** corresponds to 0 ms and behaviour as specified in clause 7.1.2 of ETSI TS 138 331 [20] applies, value ***ms40*** corresponds to 40 ms, and so on.	R
128	sl-MeasId-r16	INTEGER (1..maxNrofSL-MeasId-r16)	Not Configured	Identifies the sidelink measurement identity for which the reporting is being performed.	R
129	sl-OffsetDFN-r16	INTEGER (1..1000)	Not Configured	Indicates the timing offset for the UE to determine DFN timing when GNSS is used for timing reference. Value 1 corresponds to 0,001 ms, value 2 corresponds to 0,002 ms, and so on. If the field is absent, no offset is applied.	
130	t400-r16	ENUMERATED{ms100, ms200, ms300, ms400, ms600, ms1000, ms1500, ms2000}	ms200	Indicates the value for timer ***T400*** as described in clause 7.1 of ETSI TS 138 331 [20]. Value ***ms100*** corresponds to 100 ms, value ***ms200*** corresponds to 200 ms and so on.	M
131	sl-MaxNumConsecutiveDTX-r16	ENUMERATED {n1, n2, n3, n4, n6, n8, n16, n32}	Unicast-only:n32	This field indicates the maximum number of consecutive HARQ DTX before triggering sidelink RLF. Value ***n1*** corresponds to 1, value ***n2*** corresponds to 2, and so on.	R
132	sl-SSB-PriorityNR-r16	INTEGER (1..8)	1	This field indicates the priority of NR SL-SSB transmission and reception.	R
133	SL-TypeTxSync-r16	ENUMERATED {**gnss**, **gnbEnb**, **ue**}	gnss	The IE ***SL-TypeTxSync*** indicates the synchronization reference type.	M
134	sl-ThresUE-Speed-r16	ENUMERATED {kmph60, kmph80, kmph100, kmph120, kmph140, kmph160, kmph180, kmph200}	See Table A.2.3 SL-PSSCH-TxConfigList information element	This field indicates a UE absolute speed threshold.	R
135	sl-MinMCS-PSSCH-r16	INTEGER (0..27)	See Table A.2.3 SL-PSSCH-TxConfigList information element	SidelinkPreconfigNR-r16: This field indicates the minimum and maximum MCS values used for transmissions on PSSCH.	R
136	sl-MaxMCS-PSSCH-r16	INTEGER (0..31)	See Table A.2.3 SL-PSSCH-TxConfigList information element	SidelinkPreconfigNR-r16: This field indicates the minimum and maximum MCS values used for transmissions on PSSCH.	R
137	sl-MinSubChannelNumPSSCH-r16	INTEGER (0..27)	See Table A.2.3 SL-PSSCH-TxConfigList information element	This field indicates the minimum and maximum number of sub-channels which may be used for transmissions on PSSCH.	R

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value
138	sl-MaxSubchannelNumPSSCH-r16	INTEGER (0..27)	See Table A.2.3 SL-PSSCH-TxConfigList information element	This field indicates the minimum and maximum number of sub-channels which may be used for transmissions on PSSCH.	R
139	sl-MaxTxTransNumPSSCH-r16	INTEGER (0..32)	See Table A.2.3 SL-PSSCH-TxConfigList information element	Indicates the maximum transmission number (including new transmission and retransmission) for PSSCH.	R
140	SL-txPower-r16	INTEGER (-30..33)	See Table A.2.3 SL-PSSCH-TxConfigList information element	dBm	R
141	sl-ProbResourceKeep-r16	ENUMERATED {v0, v0dot2, v0dot4, v0dot6, v0dot8}	v0dot8	Indicates the probability with which the UE keeps the current resource when the resource reselection counter reaches zero for sensing based UE autonomous resource selection (see ETSI TS 138 321 [22]).	R
142	sl-ReselectAfter-r16	ENUMERATED { n1, n2, n3, n4, n5, n6, n7, n8, n9}	n3	Indicates the number of consecutive skipped transmissions before triggering resource reselection for sidelink communication (see ETSI TS 138 321 [22]).	R
143	ul-PrioritizationThres-r16	INTEGER (1..16)	16	Indicates the UL priority threshold, which is used to determine whether SL TX is prioritized over UL TX, as specified in ETSI TS 138 321 [22]. Network does not configure the sl-PrioritizationThres and the ul-PrioritizationThres to the UE separately.	R
144	sl-PrioritizationThres-r16	INTEGER (1..8)	8	Indicates the SL priority threshold, which is used to determine whether SL TX is prioritized over UL TX, as specified in ETSI TS 138 321 [22]. Network does not configure the sl-PrioritizationThres and the ul-PrioritizationThres to the UE separately.	R
145	sl-CSI-Acquisition-r16	ENUMERATED {enabled}	{enabled}	Indicates whether CSI reporting is enabled in sidelink unicast. If the field is absent, sidelink CSI reporting is disabled.	R

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value

146	sl-RoHC-Profiles-r16	SL_ROHC-PROFILES-r16 ::= SEQUENCE {
		profile0x0001-r16 BOOLEAN,
		profile0x0002-r16 BOOLEAN,
		profile0x0003-r16 BOOLEAN,
		profile0x0004-r16 BOOLEAN,
		profile0x0006-r16 BOOLEAN,
		profile0x0101-r16 BOOLEAN,
		profile0x0102-r16 BOOLEAN,
		profile0x0103-r16 BOOLEAN,
		profile0x0104-r16 BOOLEAN
		}
				This field indicates the supported RoHC profiles for NR sidelink communications.	M

147	profile0x0001-r16	BOOLEAN	True		M
148	profile0x0002-r16	BOOLEAN	True		M
149	profile0x0003-r16	BOOLEAN	False		M
150	profile0x0004-r16	BOOLEAN	False		M
151	profile0x0006-r16	BOOLEAN	True		M
152	profile0x0101-r16	BOOLEAN	False		M
153	profile0x0102-r16	BOOLEAN	False		M
154	profile0x0103-r16	BOOLEAN	False		M
155	profile0x0104-r16	BOOLEAN	False		M
156	sl-MaxCID-r16	INTEGER (1..16383)	15	Indicates the value of the MAX_CID parameter as specified in ETSI TS 138 323 [24]. The total value of MAX_CIDs across all bearers for the UE should be less than or equal to the value of maxNumberROHC-ContextSessions parameter as indicated by the UE.	M

Item	Preconfiguration Parameter (3GPP Information Element)	Range	Value (note 1)	Explanation of Information Element	Mandatory/ Recommended Value
157	sl-CR-Limit-r16	INTEGER(0..10000)	120, 120, 60 for 10 MHz channel. 300, 120, 60 for 20 MHz channel	Indicates the maximum limit on the occupancy ratio. Value 0 corresponds to 0, value 1 to 0,0001, value 2 to 0,0002, and so on (i.e. in steps of 0,0001) until value 10 000, which corresponds to 1.	M

NOTE 4: All Information Elements and Type Definitions in Table A.2.1 are defined in ETSI TS 138 331 [20] unless stated otherwise in the explanation column.

Table A.2.2: sl-TransRange-r16, sl-ZoneLength-r16

sl-ZoneConfigMCR-Index-r16	sl-TransRange-r16	sl-ZoneLength-r16
0	m80	m40
1	m100	m40
2	m120	m40
3	m150	m40
4	m180	m40
5	m200	m40
6	m250	m40
7	m300	m40
8	m350	m50
9	m400	m50
10	m450	m50
11	m500	m50
12	reserved	reserved
13	reserved	reserved
14	reserved	reserved
15	reserved	reserved

Table A.2.3: SL-PSSCH-TxConfigList information element

	sl-ParametersAboveThres-r16	sl-ParametersBelowThres-r16
sl-TypeTxSync-r16	gnss	
sl-ThresUE-Speed-r16	kmph140	
sl-MinMCS-PSSCH-r16	0	0
sl-MaxMCS-PSSCH-r16	31	31
sl-MinSubChannelNumPSSCH-r16	1	1
sl-MaxSubChannelNumPSSCH-r16	27	27
sl-MaxTxTransNumPSSCH-r16	32	32

Annex B (normative): List of MCS-RB prohibited cases (LTE-V2X)

NOTE: Table B.1 remains in the present document due to the requirement in clause 5.7.5 for a Release-15 onwards LTE-V2X implementation to be able to operate in Release-14 mode.

The MCS-RB configurations for Rel-14 PSSCH transmission as shown in Tables B.1 and B.2 shall be prohibited.

Table B.1: Single transmission

I_{MCS}	I_{TBS}	N_{PRB}
0	0	N/A
1	1	N/A
2	2	N/A
3	3	N/A
4	4	N/A
5	5	N/A
6	6	N/A
7	7	N/A
8	8	81
9	9	4, 6, 8, 16, 30, 36, 60, 72, 96
10	10	20, 27, 32, 40, 54, 64
11	10	32, 64
12	11	75
13	12	25, 50
14	13	5, 10, 45, 60, 90
15	14	20, 40, 54, 80, 81, 90
16	15	50, 75
17	16	N/A
18	17	12, 16, 24, 27, 32, 40, 45, 48, 50, 54, 64, 72, 75, 80, 90, 96
19	18	3, 4, 5, 6, 8, 9, 10, 12, 15, 16, 18, 20, 24, 25, 27, 30, 32, 36, 40, 45, 48, 50, 54, 60, 64, 72, 75, 80, 81, 90, 96
20	19	3, 4, 5, 6, 8, 9, 10, 12, 15, 16, 18, 20, 24, 25, 27, 30, 32, 36, 40, 45, 48, 50, 54, 60, 64, 72, 75, 80, 81, 90, 96

Table B.2: Two transmissions

I_{MCS}	I_{TBS}	N_{PRB}
0	0	N/A
1	1	N/A
2	2	N/A
3	3	N/A
4	4	N/A
5	5	N/A
6	6	N/A
7	7	N/A
8	8	N/A
9	9	N/A
10	10	N/A
11	10	N/A
12	11	N/A
13	12	N/A
14	13	N/A
15	14	N/A
16	15	N/A
17	16	N/A
18	17	16, 32, 64
19	18	N/A
20	19	27, 36, 54, 60
21	19	27, 36, 54,60
22	20	25, 50, 54
23	21	30, 45, 50
24	22	48
25	23	10, 20, 27, 40, 45
26	24	25
27	25	4, 9, 18, 24, 36, 40, 90
28	26	3, 4, 5, 6, 8, 9, 10, 12, 15, 16, 18, 20, 24, 25, 27, 30, 32, 36, 40, 45, 48, 50, 54, 60, 64, 72, 75, 80, 81, 90, 96

History

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