

DIN CEN ISO/TS 19091:2017-06 (E)

Intelligent transport systems - Cooperative ITS - Using V2I and I2V communications for applications related to signalized intersections (ISO/TS 19091:2017); English version CEN ISO/TS 19091:2017

Contents		Page
Foreword		vi
Introduction		vii
1	Scope	1
2	Normative references	1
3	Terms and definitions	2
4	Abbreviated terms	9
5	General description (informative)	11
5.1	Overview	11
5.2	Functional model	11
5.2.1	Description	11
5.2.2	Architecture	13
5.2.3	Message interactions	15
5.2.4	Common operational assumptions	15
5.3	Safety use cases	16
5.3.1	Intent	16
5.3.2	Additional assumptions	17
5.3.3	Architecture implications	17
5.4	Mobility/sustainability use cases	17
5.4.1	Intent	17
5.4.2	Additional assumptions	18
5.4.3	Architecture implications	18
5.5	Priority/pre-emption use cases	18
5.5.1	Intent	18
5.5.2	Additional assumptions	20
5.5.3	Architecture implications	20
5.5.4	Public transport signal priority application	21
5.5.5	Freight vehicle signal priority application	22
5.5.6	Emergency (public safety) vehicle pre-emption application	23
6	Function description (informative)	24
6.1	Public safety vehicle	24
6.1.1	Broadcast public safety vehicle information	24
6.1.2	Broadcast emergency response indication	24
6.2	Signal pre-emption	24
6.2.1	Signal pre-empt request (normal power)	25
6.2.2	Signal pre-empt request (high power)	25
6.2.3	Request signal pre-empt — Message identifier	25
6.2.4	Request signal pre-empt — Intersection identifier	25
6.2.5	Request signal pre-empt — Approach lane	25
6.2.6	Request signal pre-empt — Egress lane	26
6.2.7	Request signal pre-empt — Vehicle class	26
6.2.8	Request signal pre-empt — Time of service	26
6.2.9	Request signal pre-empt — Vehicle identity	26
6.2.10	Request signal pre-empt — Vehicle location and speed	26
6.2.11	Request signal pre-empt — Cancellation	26
6.2.12	Request signal pre-empt — Transaction identifier	27
6.2.13	Request signal pre-empt — Duration	27

6.3	Public transport and commercial vehicle	27
6.3.1	Broadcast priority requesting vehicle information	27
6.4	Signal priority requirements	27
6.4.1	Signal priority request	27
6.4.2	Request signal priority — Message identifier	27
6.4.3	Request signal priority — Intersection identifier	28
6.4.4	Request signal priority — Approach lane	28
6.4.5	Request signal priority — Egress lane	28
6.4.6	Request signal priority — Vehicle class	28
6.4.7	Request signal priority — Time of service	28
6.4.8	Request signal priority — Vehicle identity	28
6.4.9	Request signal priority — Vehicle location and speed	29
6.4.10	Request signal priority — Service information	29
6.4.11	Request signal priority cancellation	29
6.4.12	Request signal priority — Priority request level	29
6.4.13	Request signal priority — Transaction identifier	29
6.4.14	Request signal priority — Duration	29
6.4.15	Request signal priority — Transit schedule	29
6.5	Broadcast area's geometrics	30
6.5.1	Broadcast roadway geometrics	30
6.5.2	Broadcast roadway geometrics — Message identifier	30
6.5.3	Broadcast intersection — Identifier	30
6.5.4	Broadcast intersection — Reference point	30
6.5.5	Broadcast intersection — Lane/approach default width	30
6.5.6	Broadcast intersection — Egress lanes/approach	30
6.5.7	Broadcast intersection — Ingress lanes/approach	31
6.5.8	Broadcast intersection — Lane/approach number	31
6.5.9	Broadcast intersection — Lane/approach centerline coordinates	31
6.5.10	Broadcast intersection — Vehicle lane/approach manoeuvres	31
6.5.11	Broadcast intersection — Pedestrian crossing lane/approach manoeuvres	32
6.5.12	Broadcast intersection — Special lane/approach manoeuvres	32
6.5.13	Broadcast intersection — Version identifier	32
6.5.14	Broadcast intersection — Crossings	32
6.5.15	Broadcast intersection — Lane/approach width	33
6.5.16	Broadcast intersection — Node lane/approach width	33
6.5.17	Broadcast intersection — Egress connection	33
6.5.18	Broadcast intersection — Traffic control	33
6.5.19	Broadcast intersection — Traffic control by lane/approach	33
6.5.20	Broadcast road conditions	33
6.5.21	Broadcast intersection — Signal group	34
6.6	Broadcast GNSS augmentation details	34
6.6.1	Broadcast GNSS augmentations	34
6.6.2	Broadcast GNSS augmentation detail — NMEA	34
6.6.3	Broadcast GNSS augmentation detail — RTCM	34
6.7	Signalized intersection requirements	34
6.7.1	Broadcast signal phase and timing information	34
6.7.2	Broadcast signal phase and timing — Message identifier	35
6.7.3	Broadcast signal phase and timing — Intersection identifier	35
6.7.4	Broadcast signal phase and timing — Intersection status	35
6.7.5	Broadcast signal phase and timing — Timestamp	35
6.7.6	Broadcast manoeuvre — Signal group	35
6.7.7	Broadcast manoeuvre — Manoeuvre state	35
6.7.8	Broadcast manoeuvre — Vehicular state	35
6.7.9	Broadcast manoeuvre — Pedestrian state	35
6.7.10	Broadcast manoeuvre — Special state	36
6.7.11	Broadcast manoeuvre — Time of change — Minimum	36
6.7.12	Broadcast manoeuvre — Time of change — Maximum	36
6.7.13	Broadcast manoeuvre — Succeeding signal indications	36
6.7.14	Broadcast manoeuvre — Succeeding signal indication time of change	37
6.7.15	Broadcast manoeuvre pending manoeuvre start time	37
6.7.16	Broadcast manoeuvre — Pedestrian detect	37
6.7.17	Broadcast manoeuvre — Pedestrian call	37
6.7.18	Broadcast manoeuvre — Optimal speed information	38
6.7.19	Broadcast manoeuvre — Signal progression information	38

6.7.20	Broadcast manoeuvre — Egress lane queue	38
6.7.21	Broadcast manoeuvre — Egress lane storage availability	38
6.7.22	Broadcast manoeuvre — Wait indication	38
6.8	Broadcast cross traffic sensor information	38
6.9	Broadcast vulnerable road user sensor information	38
6.10	Broadcast dilemma zone violation warning	38
6.11	Broadcast signal preferential treatment status	38
6.11.1	Broadcast preferential treatment — Signal status message	39
6.11.2	Broadcast preferential treatment — Message identifier	39
6.11.3	Broadcast preferential treatment — Intersection identifier	39
6.11.4	Broadcast preferential treatment — Intersection status	39
6.11.5	Broadcast preferential treatment — Prioritization request status	39
6.11.6	Broadcast preferential treatment — Vehicle source	39
6.11.7	Broadcast preferential treatment — Transaction identifier	40
6.12	Message identifier	40
6.13	System performance requirements	40
6.13.1	Broadcast intersection — Computed lane/approach	40
6.14	Transmission rates — Signal preferential treatment	40
6.14.1	Maximum transmission rate — Request signal preferential treatment	40
6.14.2	Maximum response time — Request signal preferential treatment	40
6.14.3	Minimum transmission rate — Signal status message	40
6.14.4	Minimum transmission period — Signal status message	41
6.15	Transmission rate requirements — Broadcast roadway geometrics information	41
6.15.1	Minimum transmission rate — Broadcast roadway geometrics information	41
6.15.2	Maximum transmission rate — Broadcast roadway geometrics information	41
6.15.3	Default transmission rate — Broadcast roadway geometrics information	41
6.16	Transmission rate requirements — GNSS augmentations detail broadcasts	41
6.16.1	Minimum transmission rate — GNSS augmentation details broadcasts	41
6.16.2	Default transmission rate — GNSS augmentation details broadcasts	41
6.17	Transmission rate requirements — Broadcast signal phase and timing information	41
6.17.1	Minimum transmission rate — Broadcast signal phase and timing information	42
6.17.2	Maximum transmission rate — Broadcast signal phase and timing information	42
6.17.3	Default transmission rate — Broadcast signal phase and timing information	42
6.18	Transmission rate requirements — Broadcast cross traffic sensor information	42
6.18.1	Minimum transmission rate — Broadcast cross traffic sensor information	42
6.18.2	Maximum transmission rate — Broadcast cross traffic sensor information	42
6.18.3	Default transmission rate — Broadcast cross traffic sensor information	42
6.19	Transmission rate requirements — Broadcast vulnerable road user sensor information	42
6.19.1	Transmission rate — Broadcast vulnerable road user sensor information	42
6.19.2	Maximum transmission rate — Broadcast vulnerable road user sensor information	43
6.19.3	Default transmission rate — Broadcast vulnerable road user sensor information	43
7	Messages	43
8	Conformance	43
	Annex A (informative) Use cases	44
	Annex B (informative) Use case to requirements traceability	102
	Annex C (informative) Requirements traceability matrix	119
	Annex D (normative) Extension procedures	133
	Annex E (normative) Profile A for J2735™	134
	Annex F (normative) Profile B for J2735™	138
	Annex G (normative) Profile C for J2735™	162
	Bibliography	211