

DENM Mapping

CAR 2 CAR Communication Consortium



About the C2C-CC

Enhancing road safety and traffic efficiency by means of Cooperative Intelligent Transport Systems and Services (C-ITS) is the dedicated goal of the CAR 2 CAR Communication Consortium (C2C-CC). The industrial driven, non-commercial association was founded in 2002 by vehicle manufacturers affiliated with the idea of cooperative road traffic based on Vehicle-to-Vehicle Communications (V2V) and supported by Vehicle-to-Infrastructure Communications (V2I). The Consortium members represent worldwide major vehicle manufactures, equipment suppliers and research organisations.

Over the years, the C2C-CC has evolved to be one of the key players in preparing the initial deployment of C-ITS in Europe and the subsequent innovation phases. C2C members focus on wireless V2V communication applications based on Direct Communication and concentrate all efforts on creating standards to ensure the interoperability of cooperative systems, spanning all vehicle classes across borders and brands. As a key contributor, the C2C-CC and its members work in close cooperation with the European and international standardisation organisations

Disclaimer

The present document has been developed within C2C-CC and might be further elaborated within C2C-CC. C2C-CC and its members accept no liability for any use of this document and other documents from C2C-CC for implementation. C2C-CC documents should be obtained directly from the C2C-CC.

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IPRs essential or potentially essential to profiles or specifications may have been declared to the C2C-CC. The declarations pertaining to these essential IPRs, if any, are publicly available for the C2C-CC members and non-members, and can be found in "Essential or potentially Essential IPRs notified to the C2C-CC in respect of C2C-CC profiles or specifications" ([C2CCC IPR R]), which is available with the latest update from the webpage (<https://www.car-2-car.org>) of the C2C-CC.

Pursuant to the C2C-CC's IPR Policy [C2CCC IPR P], no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by the C2C-CC. No guarantee can be given as to the existence of other IPRs not referenced in [C2CCC IPR R] (or the updates on the C2C-CC web server) which are, or may be, or may become, essential to the present document.

Codes according to DENM/CDD standard			TPEG2-TEC (ISO 21219-15:2023)			
DENM index	CauseCode	SubCauseCode	code	warn level	referenceWordCC	referenceWordSCC
1_0	trafficCondition	unavailable	1_0	1	traffic congestion	
1_1	trafficCondition	increasedVolumeOfTraffic	1_1	1	traffic congestion	increased volume of traffic
1_2	trafficCondition	trafficJamSlowlyIncreasing	1_0	2	traffic congestion	
1_3	trafficCondition	trafficJamIncreasing	1_0	2	traffic congestion	
1_4	trafficCondition	trafficJamStronglyIncreasing	1_0	2	traffic congestion	
1_5	trafficCondition	trafficStationary	1_0	2	traffic congestion	
1_6	trafficCondition	trafficJamSlightlyDecreasing	1_0	2	traffic congestion	
1_7	trafficCondition	trafficJamDecreasing	1_0	2	traffic congestion	
1_8	trafficCondition	trafficJamStronglyDecreasing	1_0	2	traffic congestion	
1_9	trafficCondition	trafficJamStable	1_1	2	traffic congestion	increased volume of traffic
2_0	accident	unavailable	2_0	3	accident	
2_1	accident	multiVehicleAccident	2_1	3	accident	multi-vehicle accident
2_2	accident	heavyAccident	2_2	3	accident	major accident
2_3	accident	accidentInvolvingLorry	2_3	3	accident	accident involving lorry
2_4	accident	accidentInvolvingBus	2_4	3	accident	accident involving bus
2_5	accident	accidentInvolvingHazardousMaterials	2_5	3	accident	accident involving hazardous materials
2_6	accident	accidentOnOppositeLane	2_6	3	accident	accident in opposite lane
2_7	accident	unsecuredAccident	2_7	3	accident	unsecured accident
2_8	accident	assistanceRequested	2_0	3	accident	
3_0	roadworks	unavailable	3_0	3	roadworks	
3_1	roadworks	majorRoadworks	3_1	3	roadworks	major roadworks
3_2	roadworks	roadMarkingWork	3_2	3	roadworks	road marking work
3_3	roadworks	slowMovingRoadMaintenance	3_3	3	roadworks	slow moving road maintenance
3_4	roadworks	shortTermStationaryRoadworks	3_0	3	roadworks	
3_5	roadworks	streetCleaning	3_0	3	roadworks	
3_6	roadworks	winterService	3_0	3	roadworks	
4_0	reserved for future usage	-				
5_0	impassability	unavailable	5_0	1	impassability	

Codes according to DENM/CDD standard			TPEG2-TEC (ISO 21219-15:2023)			
DENM index	CauseCode	SubCauseCode	code	warn level	referenceWordCC	referenceWordSCC
5_1	impassability	flooding	5_1	1	impassability	flooding
5_2	impassability	dangerOfAvalanches	5_2	1	impassability	danger of avalanches
5_3	impassability	blastingOfAvalanches	5_3	1	impassability	blasting of avalanches
5_4	impassability	landslips	5_4	1	impassability	landslips
5_5	impassability	chemicalSpillage	5_5	1	impassability	chemical spillage
5_6	impassability	winterClosure	5_6	1	impassability	winter closure
5_7	impassability	sinkhole	5_0	1	impassability	
5_8	impassability	earthquakeDamage	5_0	1	impassability	
5_9	impassability	fallenTrees	5_0	1	impassability	
5_10	impassability	rockfalls	5_0	1	impassability	
5_11	impassability	sewerOverflow	5_0	1	impassability	
5_12	impassability	stormDamage	5_0	1	impassability	
5_13	impassability	subsidence	5_0	1	impassability	
5_14	impassability	burstPipe	5_0	1	impassability	
5_15	impassability	burstWaterMain	5_0	1	impassability	
5_16	impassability	fallenPowerCables	5_0	1	impassability	
5_17	impassability	snowDrifts	5_0	1	impassability	
6_0	adverseWeatherCondition-Adhesion	unavailable	6_0	3	slippery road	
6_1	adverseWeatherCondition-Adhesion	heavyFrostOnRoad	6_1	3	slippery road	heavy frost on road
6_2	adverseWeatherCondition-Adhesion	fuelOnRoad	6_2	3	slippery road	fuel on road
6_3	adverseWeatherCondition-Adhesion	mudOnRoad	6_3	3	slippery road	mud on road
6_4	adverseWeatherCondition-Adhesion	snowOnRoad	6_4	3	slippery road	snow on road
6_5	adverseWeatherCondition-Adhesion	iceOnRoad	6_5	3	slippery road	ice on road
6_6	adverseWeatherCondition-Adhesion	blackIceOnRoad	6_6	3	slippery road	black ice on road
6_7	adverseWeatherCondition-Adhesion	oilOnRoad	6_7	3	slippery road	oil on road
6_8	adverseWeatherCondition-Adhesion	looseChippings	6_8	3	slippery road	loose chippings
6_9	adverseWeatherCondition-Adhesion	instantBlackIce	6_9	3	slippery road	instant black ice
6_10	adverseWeatherCondition-Adhesion	roadsSalted	6_10	3	slippery road	roads salted
7_0	aquaplaning	unavailable	7_0	3	aquaplaning	

Codes according to DENM/CDD standard			TPEG2-TEC (ISO 21219-15:2023)			
DENM index	CauseCode	SubCauseCode	code	warn level	referenceWordCC	referenceWordSCC
8_0	reserved for future usage	-				
9_0	hazardousLocation-SurfaceCondition	unavailable	9_0	3	hazardous driving conditions	
9_1	hazardousLocation-SurfaceCondition	rockfalls	9_1	3	hazardous driving conditions	rock falls
9_2	hazardousLocation-SurfaceCondition	earthquakeDamage	9_2	3	hazardous driving conditions	earthquake damage
9_3	hazardousLocation-SurfaceCondition	sewerCollapse	9_3	3	hazardous driving conditions	sewer collapse
9_4	hazardousLocation-SurfaceCondition	subsidence	9_4	3	hazardous driving conditions	subsidence
9_5	hazardousLocation-SurfaceCondition	snowDrifts	9_5	3	hazardous driving conditions	snow drifts
9_6	hazardousLocation-SurfaceCondition	stormDamage	9_6	3	hazardous driving conditions	storm damage
9_7	hazardousLocation-SurfaceCondition	burstPipe	9_7	3	hazardous driving conditions	burst pipe
9_8	hazardousLocation-SurfaceCondition	volcanoEruption	9_8	3	hazardous driving conditions	volcano eruption
9_9	hazardousLocation-SurfaceCondition	fallingIce	9_9	3	hazardous driving conditions	falling ice
9_10	hazardousLocation-SurfaceCondition	fire	8_1	3	fire	major fire
10_0	hazardousLocation-ObstacleOnTheRoad	unavailable	10_0	3	objects on the road	
10_1	hazardousLocation-ObstacleOnTheRoad	shedLoad	10_1	3	objects on the road	shed load
10_2	hazardousLocation-ObstacleOnTheRoad	partsOfVehicles	10_2	3	objects on the road	parts of vehicles
10_3	hazardousLocation-ObstacleOnTheRoad	partsOfTyres	10_3	3	objects on the road	parts of tyres
10_4	hazardousLocation-ObstacleOnTheRoad	bigObjects	10_4	3	objects on the road	large objects
10_5	hazardousLocation-ObstacleOnTheRoad	fallenTrees	10_5	3	objects on the road	fallen trees
10_6	hazardousLocation-ObstacleOnTheRoad	hubCaps	10_6	3	objects on the road	hub caps
10_7	hazardousLocation-ObstacleOnTheRoad	waitingVehicles	10_7	3	objects on the road	stationary vehicle

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DENM index	CauseCode	SubCauseCode	code	warn level	referenceWordCC	referenceWordSCC
11_0	hazardousLocation-AnimalOnTheRoad	unavailable	11_0	3	animals on roadway	
11_1	hazardousLocation-AnimalOnTheRoad	wildAnimals	11_1	3	animals on roadway	wild animals
11_2	hazardousLocation-AnimalOnTheRoad	herdOfAnimals	11_2	3	animals on roadway	herd of animals
11_3	hazardousLocation-AnimalOnTheRoad	smallAnimals	11_3	3	animals on roadway	small animals
11_4	hazardousLocation-AnimalOnTheRoad	largeAnimals	11_4	3	animals on roadway	large animals
11_5	hazardousLocation-AnimalOnTheRoad	wildAnimalsSmall	11_1	3	animals on roadway	wild animals
11_6	hazardousLocation-AnimalOnTheRoad	wildAnimalsLarge	11_4	3	animals on roadway	large animals
11_7	hazardousLocation-AnimalOnTheRoad	domesticAnimals	11_0	3	animals on roadway	
11_8	hazardousLocation-AnimalOnTheRoad	domesticAnimalsSmall	11_0	3	animals on roadway	
11_9	hazardousLocation-AnimalOnTheRoad	domesticAnimalsLarge	11_4	3	animals on roadway	large animals
12_0	humanPresenceOnTheRoad	unavailable	12_0	3	people on roadway	
12_1	humanPresenceOnTheRoad	childrenOnRoadway	12_1	3	people on roadway	children on roadway
12_2	humanPresenceOnTheRoad	cyclistOnRoadway	12_2	3	people on roadway	cyclists on roadway
12_3	humanPresenceOnTheRoad	motorcyclistOnRoadway	12_3	3	people on roadway	moped rider on roadway
12_4	humanPresenceOnTheRoad	pedestrian	12_0	3	people on roadway	
12_5	humanPresenceOnTheRoad	ordinary-pedestrian	12_0	2	people on roadway	
12_6	humanPresenceOnTheRoad	road-worker	12_0	3	people on roadway	
12_7	humanPresenceOnTheRoad	first-responder	12_0	3	people on roadway	
12_8	humanPresenceOnTheRoad	lightVruVehicle	12_0	1	people on roadway	

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DENM index	CauseCode	SubCauseCode	code	warn level	referenceWordCC	referenceWordSCC
12_9	humanPresenceOnTheRoad	bicyclist	12_2	1	people on roadway	cyclists on roadway
12_10	humanPresenceOnTheRoad	wheelchair-user	12_0	3	people on roadway	
12_11	humanPresenceOnTheRoad	horse-and-rider	11_4	3	animals on roadway	large animals
12_12	humanPresenceOnTheRoad	rollerskater	12_0	3	people on roadway	
12_13	humanPresenceOnTheRoad	e-scooter	12_2	3	people on roadway	cyclists on roadway
12_14	humanPresenceOnTheRoad	personal-transporter	12_0	3	people on roadway	
12_15	humanPresenceOnTheRoad	pedelec	12_2	1	people on roadway	cyclists on roadway
12_16	humanPresenceOnTheRoad	speed-pedelec	12_2	2	people on roadway	cyclists on roadway
12_17	humanPresenceOnTheRoad	ptw	12_3	1	people on roadway	moped rider on roadway
12_18	humanPresenceOnTheRoad	moped	12_3	1	people on roadway	moped rider on roadway
12_19	humanPresenceOnTheRoad	motorcycle	12_3	1	people on roadway	moped rider on roadway
12_20	humanPresenceOnTheRoad	motorcycle-and-sidecar-right	12_3	2	people on roadway	moped rider on roadway
12_21	humanPresenceOnTheRoad	motorcycle-and-sidecar-left	12_3	2	people on roadway	moped rider on roadway
13_0	reserved for future usage	-				
14_0	wrongWayDriving	unavailable	14_0	4	vehicle on wrong carriageway	
14_1	wrongWayDriving	wrongLane	14_0	4	vehicle on wrong carriageway	
14_2	wrongWayDriving	wrongDirection	14_0	4	vehicle on wrong carriageway	
15_0	rescueAndRecoveryWorkInProgress	unavailable	15_0	3	rescue and recovery work in progress	
15_1	rescueAndRecoveryWorkInProgress	emergencyVehicles	15_1	3	rescue and recovery work in progress	emergency vehicles
15_2	rescueAndRecoveryWorkInProgress	rescueHelicopterLanding	15_2	3	rescue and recovery work in progress	rescue helicopter landing
15_3	rescueAndRecoveryWorkInProgress	policeActivityOngoing	15_3	3	rescue and recovery work in progress	police activity ongoing
15_4	rescueAndRecoveryWorkInProgress	medicalEmergencyOngoing	15_4	3	rescue and recovery work in progress	medical emergency ongoing
15_5	rescueAndRecoveryWorkInProgress	childAbductionInProgress	15_5	3	rescue and recovery work in progress	child abduction in progress

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15_6	rescueAndRecoveryWorkInProgress	prioritizedVehicle	15_1	3	rescue and recovery work in progress	emergency vehicles
15_7	rescueAndRecoveryWorkInProgress	rescueAndRecoveryVehicle	15_1	3	rescue and recovery work in progress	emergency vehicles
16_0	reserved for future usage	-				
17_0	adverseWeatherCondition-ExtremeWeatherCondition	unavailable	17_0	3	extreme weather conditions	
17_1	adverseWeatherCondition-ExtremeWeatherCondition	strongWinds	17_1	3	extreme weather conditions	strong winds
17_2	adverseWeatherCondition-ExtremeWeatherCondition	damagingHail	17_2	3	extreme weather conditions	damaging hail
17_3	adverseWeatherCondition-ExtremeWeatherCondition	hurricane	17_3	3	extreme weather conditions	hurricane
17_4	adverseWeatherCondition-ExtremeWeatherCondition	thunderstorm	17_4	3	extreme weather conditions	thunderstorm
17_5	adverseWeatherCondition-ExtremeWeatherCondition	tornado	17_5	3	extreme weather conditions	tornado
17_6	adverseWeatherCondition-ExtremeWeatherCondition	blizzard	17_6	3	extreme weather conditions	blizzard
18_0	adverseWeatherCondition-Visibility	unavailable	18_0	2	visibility reduced	
18_1	adverseWeatherCondition-Visibility	fog	18_1	2	visibility reduced	visibility reduced due to fog
18_2	adverseWeatherCondition-Visibility	smoke	18_2	2	visibility reduced	visibility reduced due to smoke
18_3	adverseWeatherCondition-Visibility	heavySnowfall	18_3	2	visibility reduced	visibility reduced due to heavy snowfall
18_4	adverseWeatherCondition-Visibility	heavyRain	18_4	2	visibility reduced	visibility reduced due to heavy rain
18_5	adverseWeatherCondition-Visibility	heavyHail	18_5	2	visibility reduced	visibility reduced due to heavy hail
18_6	adverseWeatherCondition-Visibility	lowSunGlare	18_6	2	visibility reduced	visibility reduced due to low sun glare

Codes according to DENM/CDD standard			TPEG2-TEC (ISO 21219-15:2023)			
DENM index	CauseCode	SubCauseCode	code	warn level	referenceWordCC	referenceWordSCC
18_7	adverseWeatherCondition-Visibility	sandstorms	18_7	2	visibility reduced	visibility reduced due to sandstorms
18_8	adverseWeatherCondition-Visibility	swarmsOfInsects	18_8	2	visibility reduced	visibility reduced due to swarms of insects
19_0	adverseWeatherCondition-Precipitation	unavailable	19_0	2	precipitation	
19_1	adverseWeatherCondition-Precipitation	heavyRain	19_1	2	precipitation	heavy rain
19_2	adverseWeatherCondition-Precipitation	heavySnowfall	19_2	2	precipitation	heavy snowfall
19_3	adverseWeatherCondition-Precipitation	softHail	19_3	2	precipitation	soft hail
20_0	violence	unavailable	20_0	4	reckless persons	
20_1	violence	reserved for future usage				
20_2	violence	reserved for future usage				
20_3	violence	stoneThrowingPersons	20_3	4	reckless persons	persons throwing objects
21_0	reserved for future usage	-				
22_0	reserved for future usage	-				
23_0	reserved for future usage	-				
24_0	reserved for future usage	-				
25_0	reserved for future usage	-				
26_0	slowVehicle	unavailable	26_0	3	slow-moving vehicles	
26_1	slowVehicle	maintenanceVehicle	26_1	3	slow-moving vehicles	slow-moving maintenance vehicle
26_2	slowVehicle	vehiclesSlowingToLookAtAccident	26_2	3	slow-moving vehicles	vehicles slowing to look at accident
26_3	slowVehicle	abnormalLoad	26_3	3	slow-moving vehicles	abnormal load
26_4	slowVehicle	abnormalWideLoad	26_4	3	slow-moving vehicles	abnormal wide load
26_5	slowVehicle	convoy	26_5	3	slow-moving vehicles	convoy
26_6	slowVehicle	snowplough	26_6	3	slow-moving vehicles	snowplough
26_7	slowVehicle	deicing	26_7	3	slow-moving vehicles	de-icing

Codes according to DENM/CDD standard			TPEG2-TEC (ISO 21219-15:2023)			
DENM index	CauseCode	SubCauseCode	code	warn level	referenceWordCC	referenceWordSCC
26_8	slowVehicle	saltingVehicles	26_8	3	slow-moving vehicles	salting vehicles
27_0	dangerousEndOfQueue	unavailable	27_0	3	dangerous end of queue	
27_1	dangerousEndOfQueue	suddenEndOfQueue	27_1	3	dangerous end of queue	sudden end of queue
27_2	dangerousEndOfQueue	queueOverHill	27_2	3	dangerous end of queue	queue over hill
27_3	dangerousEndOfQueue	queueAroundBend	27_3	3	dangerous end of queue	queue around bend
27_4	dangerousEndOfQueue	queueInTunnel	27_4	3	dangerous end of queue	queue in tunnel
28_0	reserved for future usage	-				
90_0	reserved for future usage	-				
91_0	vehicleBreakdown	unavailable	13_0	3	broken down vehicles	
91_1	vehicleBreakdown	lackOfFuel	13_0	3	broken down vehicles	
91_2	vehicleBreakdown	lackOfBatteryPower	13_0	3	broken down vehicles	
91_3	vehicleBreakdown	engineProblem	13_0	3	broken down vehicles	
91_4	vehicleBreakdown	transmissionProblem	13_0	3	broken down vehicles	
91_5	vehicleBreakdown	engineCoolingProblem	13_0	3	broken down vehicles	
91_6	vehicleBreakdown	brakingSystemProblem	13_0	3	broken down vehicles	
91_7	vehicleBreakdown	steeringProblem	13_0	3	broken down vehicles	
91_8	vehicleBreakdown	tyrePuncture	13_0	3	broken down vehicles	
91_9	vehicleBreakdown	tyrePressureProblem	13_0	3	broken down vehicles	
91_10	vehicleBreakdown	vehicleOnFire	13_1	3	broken down vehicles	broken-down vehicle on fire
92_0	postCrash	unavailable				
92_1	postCrash	accidentWithoutECallTriggered				
92_2	postCrash	accidentWithECallManuallyTriggered				
92_3	postCrash	accidentWithECallAutomaticallyTriggered				
92_4	postCrash	accidentWithECallTriggeredWithoutAccessToCellularNetwork				
93_0	humanProblem	unavailable				
93_1	humanProblem	glycemiaProblem				
93_2	humanProblem	heartProblem				

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DENM index	CauseCode	SubCauseCode	code	warn level	referenceWordCC	referenceWordSCC
94_0	stationaryVehicle	unavailable	10_7	3	objects on the road	stationary vehicle
94_1	stationaryVehicle	humanProblem	10_7	3	objects on the road	stationary vehicle
94_2	stationaryVehicle	vehicleBreakdown	13_0	3	broken down vehicles	
94_3	stationaryVehicle	postCrash	10_7	3	objects on the road	stationary vehicle
94_4	stationaryVehicle	publicTransportStop	10_7	3	objects on the road	stationary vehicle
94_5	stationaryVehicle	carryingDangerousGoods	10_7	3	objects on the road	stationary vehicle
94_6	stationaryVehicle	vehicleOnFire	13_1	3	broken down vehicles	broken-down vehicle on fire
95_0	emergencyVehicleApproaching	unavailable	15_1	3	rescue and recovery work in progress	emergency vehicles
95_1	emergencyVehicleApproaching	emergencyVehicleApproaching	15_1	3	rescue and recovery work in progress	emergency vehicles
95_2	emergencyVehicleApproaching	prioritizedVehicleApproaching	15_1	3	rescue and recovery work in progress	emergency vehicles
96_0	hazardousLocation-DangerousCurve	unavailable				
96_1	hazardousLocation-DangerousCurve	dangerousLeftTurnCurve				
96_2	hazardousLocation-DangerousCurve	dangerousRightTurnCurve				
96_3	hazardousLocation-DangerousCurve	multipleCurvesStartingWithUnknownTurningDirection				
96_4	hazardousLocation-DangerousCurve	multipleCurvesStartingWithLeftTurn				
96_5	hazardousLocation-DangerousCurve	multipleCurvesStartingWithRightTurn				
97_0	collisionRisk	unavailable				
97_1	collisionRisk	longitudinalCollisionRisk				
97_2	collisionRisk	crossingCollisionRisk				
97_3	collisionRisk	lateralCollisionRisk				
97_4	collisionRisk	vulnerableRoadUser				
98_0	signalViolation	unavailable				
98_1	signalViolation	stopSignViolation				
98_2	signalViolation	trafficLightViolation				
98_3	signalViolation	turningRegulationViolation				

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DENM index	CauseCode	SubCauseCode	code	warn level	referenceWordCC	referenceWordSCC
99_0	dangerousSituation	unavailable				
99_1	dangerousSituation	emergencyElectronicBrakeEngaged				
99_2	dangerousSituation	preCrashSystemEngaged				
99_3	dangerousSituation	espEngaged				
99_4	dangerousSituation	absEngaged				
99_5	dangerousSituation	aebEngaged				
99_6	dangerousSituation	brakeWarningEngaged				
99_7	dangerousSituation	collisionRiskWarningEngaged				