



Liste des normes applicables pour
spécification et développement

*List of standards applicable for
specifications and development*

Activité 2 : Etudes
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1. Glossary

CAM	Cooperative Awareness Message
C2C-CC	Car to Car Communication Consortium
DENM	Decentralized Environmental Notification Message
DSRC	Dedicated Short Range Communications
ISO	International Standardization Organization
ITS	Intelligent Transport Systems
ITS-AID	ITS-Application Identifier
ITSS-C	ITS Station- Central
ITS-G5A	ITS Frequency band 5.875 GHz to 5.905 GHz dedicated to safety related applications
ITS-S	ITS station
ITSS-R	ITS station - Roadside
ITSS-V	ITS station - Vehicle
I2I	Infrastructure-to-Infrastructure Communications
RHW	Road Hazard Warning
TMS	Traffic Management System

2. Introduction

The goal of SCOOP is to test the deployment of cooperative services under real conditions.

After having prioritised the services (see deliverable 2.8 Prioritisation of services in the version of 17 September 2014), it is a matter of developing specifications that can be used to develop the use cases in question.

The work to develop specifications for the SCOOP project depends on either:

- choosing the norms or standards,
- choosing how to use these norms or standards, or
- producing specifications specific to the SCOOP project for the objects not covered by the norms or standards.

The objective of this deliverable is to list the chosen norms and standards that must necessarily be specified in project specifications to be sent to the suppliers that will do the developments.

Consequently, the suppliers must be able to access the chosen norms and standards. These norms and standards are specified in their dated version. Consequently, the body of norms and standards cited in this deliverable is frozen at the publication date of the deliverable's version. The versions cited are not scheduled to be updated during the SCOOP Part 1 project. To the extent that new versions would be published after the publication date of this deliverable, they would not be updated in this deliverable and therefore would not be taken into account for the SCOOP Part 1 development, apart from exceptions to be validated in the Studies Steering Committee.

The norms and standards are chosen after discussions based on the expertise of SCOOP members.

The following elements can be distinguished in particular:

- Supporting documentation is provided for some choices of norms, including the grounds for the choices made in versions prior to the last published version and available at the date this deliverable was established, when applicable.
- The known implications in terms of compatibility or incompatibility with the other European projects are listed.

This document contains the following items:

SCOOP Project



- The scope studied in chapter 3
- The use cases considered in chapter 4
- The versions of the norms and standards chosen for the ITS-G5 stack in chapter 5
- The versions of the norms and standards chosen to treat the security aspects, chapter 6
- The versions of the norms and standards chosen for the I2I communications in chapter 7
- The versions of the norms and standards chosen for the tests in chapter 8
- The aspects concerning the VMS use cases and in-vehicle signage in chapter 9
- The grounds for choosing certain versions of norms in chapter 10
- A comparative table of norms chosen for SCOOP with those chosen by other projects, chapter 11
- A few gaps in terms of norms and standards, especially the D8 cases of unmanaged obstructions and approaching operator vehicles, chapter 12

3. Scope

This chapter provides a concise list of SCOOP elements. For a more detailed understanding of the SCOOP system, refer to L2.4.1 (spécifications Socle commun des spécifications techniques et fonctionnelles pour SCOOP / *Common set of functional and technical specifications for SCOOP partners*)

The SCOOP system includes the following 5 types of elements:

1. ITS stations - roadside

ITSS-R = station ITS roadside also called Roadside Unit (RSU)

2. Two types of stations on-board vehicles:

a) ITSS-V = station ITS vehicle also called On-Board Unit (OBU) or ITSS-VU = ITSS-V User (OBU u = OBU user); the ITSS-Vs include the ITSS-VU Renault and ITSS-VU PSA.

b) ITSS-VG = station ITSS-V operator

also called OBU operator or OBU o. They are used according to 2 modes:

1. "user" mode
2. "operator" mode, which allows road operator specific functions, especially the ITSS-R mobile station or "OBU mobile" station

3. The central station or SCOOP platform

- ITSS-C = station ITS central

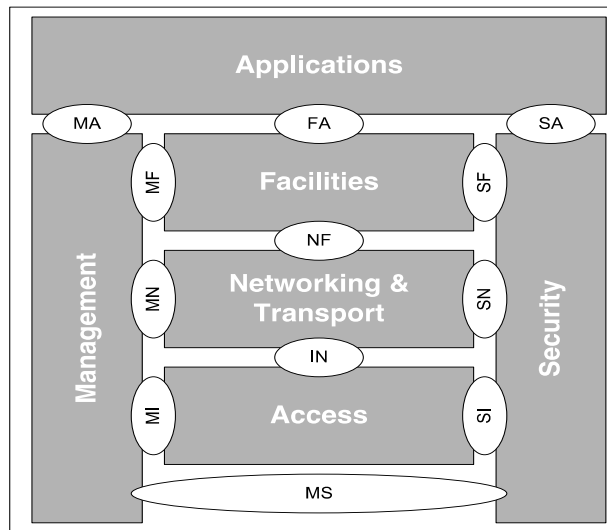
4. Traffic Management System (TMS) or traffic management centre (TMC)

5. The Public Key Infrastructure (PKI)

NOTE:

The ITSS-V and ITSS-R are "ITS stations" whose general architecture is defined by ETSI ([European Telecommunications Standards Institute](#)). They include different layers illustrated in the **Erreur ! Source du renvoi introuvable.** and detailed from the point of view of norms.





General architecture of ITS stations

4. Use cases considered

The use cases use the nomenclature established in the deliverable 2.8 Prioritisation of services (version of 17 September 2014), except for the use case E6, which refers to use case D9 in the 9 July 2014 version of deliverable 2.2, following the decision C-11-14-2 of the Steering Committee of 13 November 2014.

Use case	Surname
A1	Traffic data (position, speed, direction)
A2	Data on detected events (crashes, etc.)
A3	Data on declared events
B1	Warning - scheduled site (land line and cell)
B2	Warning - road operator intervention
B3	Warning - winter maintenance
C2	Real-time speed signage
C3	Embedded VMS
D1	Warning – temporary slippery road
D2	Warning - animal, people on the road
D3	Warning - obstacle on the road
D4	Warning - stationary vehicles, breakdown
D5	Warning - unprotected accident area
D6	Warning – reduced visibility
D7	Warning - wrong way drivers
D8	Warning - unmanaged blockage of a road
E6	Warning - exceptional weather conditions
D10	Warning - emergency brake
D11	Warning - end of queue



5. Versions of the norms and standards chosen for the ITS-G5 stack

This table lists the references and versions of the norms and standards chosen, which have been published and are available.

Table1: List of norms and standards for the ITS stations

No.	Norm	Reference	Version	Use cases	Organisations
ACCESS LAYER					
No. 1	Intelligent Transport Systems (ITS); Radiocommunications equipment operating in the 5,855 MHz to 5,925 MHz frequency band; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive	EN 302 571	1.2.1 (2013-09)	All	ETSI
No. 2	Intelligent Transport Systems (ITS); Access layer specification for Intelligent Transport Systems operating in the 5 GHz frequency band	EN 302 663	1.2.1 (2013-07)	All	ETSI / AFNOR
NO. 3	Intelligent Transport Systems (ITS); Harmonized Channel Specifications for Intelligent Transport Systems operating in the 5 GHz frequency band	TS 102 724	1.1.1 (2012-10)	All	ETSI
No. 4	Intelligent Transport Systems (ITS); Mitigation techniques to avoid interference between European ESC Dedicated Short Range Communication (ESC DSRC) equipment and Intelligent Transport Systems (ITS) operating in the 5 GHz frequency range	TS 102 792	1.1.1 (2012-10)	All	ETSI
TRANSPORT LAYER					
No. 5	Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 4: Geographical addressing and forwarding for point-to-point and point-to-multipoint communications; Sub-part 1: Media-Independent Functionality	EN 302 636-4-1	1.2.1 2014-07	All	ETSI
No. 6	Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 5: Transport Protocols; Sub-part 1: Basic Transport Protocol	EN 302 636-5-1	1.2.1 2014-08	All	ETSI / AFNOR
FACILITIES LAYER					
No. 7	Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 2: Specification of Cooperative Basic Awareness Service	EN 302 637-2	1.3.2 2014-11	All	ETSI
No. 8	Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 3: Specifications of Basic Decentralized	EN 302 637-3	1.2.2 2014-11	A, B, D, E	ETSI



	Environmental Notification Service				
No. 9	Intelligent Transport Systems (ITS); Vehicular Communications; Geographical Area Definition	EN 302 931	1.1.1 2011-07	All	ETSI / AFNOR
No. 10	Intelligent Transport Systems (ITS); Users and application requirements; Part 1: Facility layer structure, functional requirements and specifications	TS 102 894-1	1.1.1 2013-08	All	ETSI
No. 11	Intelligent Transport Systems (ITS); Users and applications requirements; Part 2: Applications and facilities layer common data dictionary	TS 102 894-2	1.2.1 2014-09	All	ETSI
APPLICATIONS					
No. 12	Intelligent Transport Systems (ITS); Application Object Identifier (ITS-AID); Registration list	TR 102 965	1.1.1 2013-03	All	ETSI
No. 13	Intelligent Transport Systems (ITS); V2X Applications; Part 1: Road Hazard Signalling (RHS) application requirements specification	TS 101 539-1	1.1.1 2013-08	A, B, D, E	ETSI
No. 14	Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Definitions	TS 102 638	1.1.1 2009-06	All	ETSI

6. Versions of the norms and standards chosen for security

SECURITY					
No. 15	Intelligent Transport Systems (ITS); Security; ITS communications security architecture and security management	TS 102 940	1.1.1 (2015-06)	all	ETSI
No. 16	Intelligent Transport Systems (ITS); Security; ITS; Trust and Privacy Management	TS 102 941	1.1.1 (2012-06)	all	ETSI
No. 17	Intelligent Transport Systems (ITS); Security; ITS; Security services and architecture	TS 102 731	1.1.1 (2010-09)	all	ETSI
No. 18	Intelligent Transport Systems (ITS); Security; Threat, Vulnerability and Risk Analysis (TVRA)	TR 102 893	1.1.1 (2010-03)	all	ETSI
No. 19	Intelligent Transport Systems (ITS); Security; Security header and privacy management	TR 103 097	1.2.1 2015-06	all	ETSI
No. 20	Intelligent Transport Systems (ITS); Security, Application Object Identifier	TS 102 965	1.2.1 (2015-06)	all	ETSI
No. 21	Intelligent Transport Systems (ITS); Security; ITS-AID Assigned Numbers”	ISO/TS17419	1.1.1 (2010-03)	all	ISO
No. 22	Intelligent Transport Systems (ITS); Security; Trust and Privacy management	TS 102 941	1.1.1 (2010-03)	all	ETSI



7. Versions of the norms and standards chosen for I2I communications

DATEX					
No. 23	Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 1: Context and Framework	ESC/TS 16 157-1	2011-10	all	ESC
No. 24	Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 2: Location referencing	ESC/TS 16 157-2	2011-10	all	ESC
No. 25	Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 3: Situation publication	ESC/TS 16 157-3	(2011-10)	all	ESC
No. 26	Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 4: Variable Message Sign (VMS) Publications;	ESC/TS 16 157-4	(2014-04)	C	ESC
No. 27	Intelligent transport systems - DATEX II data exchange specifications for traffic management and information – Part: 5 Measured and elaborated data publications	ESC/TS 16 157-5	(2014-04)	A	ESC
No. 28	Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 6: Parking Publications.	ESC/TS 16 157-6	(2015-10) ¹	F	ESC

8. Versions of the norms and standards chosen for the tests

TESTS					
No. 29	Intelligent Transport System (ITS); Testing; Framework for conformance and interoperability testing.	ETSI EG 202 798	V1.1.1		
No. 30	Intelligent Transport System (ITS) ; Testing ; Conformance test specification for TS 102 867 and TS 102 941 ; Part 1 : Test requirements and proforma Protocol Implementation Conformance Statement (PICS).	ETSI TS 103 096-1	V1.1.1		
No. 31	Intelligent Transport System (ITS) ; Testing ; Conformance test specification for TS 102 867 and TS 102 941 ; Part 2 : Test Suite Structure and Test Purpose (TSS&TP).	ETSI TS 103 096-2	V1.1.1		

¹ Adopted by vote at end of June 2015 - In process of being published



No. 32	Intelligent Transport System (ITS) ; Testing ; Conformance test specification for TS 102 867 and TS 102 941 ; Part 3 : Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT).	ETSI TS 103 096 -3	V1.1.1		
No. 33	Intelligent Transport System (ITS) ; Testing ; Conformance test specification for TS 102 867 and TS 102 941 ; part 4 : Validation report.	ETSI TS 103 096 -4	V1.1.1		
No. 34	Intelligent Transport System (ITS) ; Testing ; Conformance test specification for Geonetworking Basic Transport Protocol (BTP) ; Part 1 : Test requirements and proforma Protocol Implementation Conformance Statement (PICS).	ETSI TS 102 870-1	V1.1.1		
No. 35	Intelligent Transport System (ITS) ; Testing ; Conformance test specifications for Geonetworking Basic Transport Protocol (BTP) ; Part 2 : Test Suite Structure and Test Purpose (TSS&TP).	ETSI TS 102 870-2	V1.1.1		
No. 36	Intelligent Transport System (ITS) ; Testing ; Conformance test specifications for Geonetworking Basic Transport Protocol (BTP) ; Part 3 : Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT).	ETSI TS 192 870-3	V1.1.1		
No. 37	Intelligent Transport System (ITS) ; Testing ; Conformance test specifications for Geonetworking ITS G5 ; Part 1 : test requirements and proforma Protocol Implementation Conformance Statement (PICS).	ETSI TS 102 871-1-	V1.1.1		
No. 38	Intelligent Transport System (ITS) ; Testing ; Conformance test specifications for Geonetworking ITS G5 ; Part 2 : Test Suite Structure and Test Purpose (TSS&TP).	ETSI TS 102 871-2	V1.1.1		
No. 39	Intelligent Transport System (ITS) ; Testing ; Conformance test specifications for Geonetworking ITS G5 ; Part 3 : Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT).	ETSI TS 192 871-3	V1.1.1		
No. 40	Intelligent Transport System (ITS) ; Testing ; Conformance test specification for Cooperative Awareness Messages (CAM) ; Part 1 : Test requirements and proforma Protocol Implementation Conformance Statement (PICS).	ETSI TS 102 868-1	V1.1.1		
No. 41	Intelligent Transport System (ITS) ; Testing ; Conformance test specification for Cooperative Awareness Messages (CAM) ; Part 2 : Test Suite Structure and Test Purpose (TSS&TP).	ETSI TS 102 868-2	V1.1.1		
No. 42	Intelligent Transport System (ITS) ; Testing ; Conformance test specification for Cooperative Awareness Messages (CAM) ; Part 3 : Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT).	ETSI TS 102 868-3	V1.1.1		



No. 43	Intelligent Transport System (ITS) ; Testing ; Conformance test specification for Decentralized Environmental Notification Messages (DENM) ; Part 1 : Test requirements and proforma Protocol Implementation Conformance Statement (PICS).	ETSI TS 102 869-1	V1.1.1		
No. 44	Intelligent Transport System (ITS) ; Testing ; Conformance test specification for Decentralized Environmental Notification Messages (DENM) ; Part 2 : Test Suite Structure and Test Purpose (TSS&TP).	ETSI TS 102 869-2	V1.1.1		
No. 45	Intelligent Transport System (ITS) ; Testing ; Conformance test specification for Decentralized Environmental Notification Messages (DENM) ; Part 3 : Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT).	ETSI TS 102 869-3	V1.1.1		
No. 46	Conformance test specifications for Transmission of IP packets over GeoNetworking (GN6)	TS 102 859			

Other test-related norms

Name	Title	Subtitle
TR 103 099	Architecture of conformance validation framework	
TR 103 101	Test suite validation;	Access technology support ISO 21218
TS 102 859-1	Testing; Conformance test specifications for Transmission of IP packets over GeoNetworking;	Part 1: Test requirements and proforma Protocol Implementation Conformance Statement (PICS).
TS 102 859-2	Testing; Conformance test specifications for Transmission of IP packets over GeoNetworking;	Part 2: Test Suite Structure and Test Purpose (TSS&TP).
TS 102 859-3	Testing; Conformance test specifications for Transmission of IP packets over GeoNetworking;	Part 3: Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT).
TS 102 916-1	Test specifications for the methods to ensure Cooperative ITS G5 coexists with RTTT DSRC;	Part 1: Protocol Implementation Conformance Statement (PICS)
TS 102 916-2	Test specifications for the methods to ensure Cooperative ITS G5 coexists with RTTT DSRC;	Part 2: Test Suite Structure and Test Purpose (TSS&TP).
TS 102 916-3	Test specifications for the methods to ensure Cooperative ITS G5 coexists with RTTT DSRC;	Part 3: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT)



TS 102 917-1	Test specifications for the channel congestion control algorithms operating in the 5.9 GHz range;	Part 1: Protocol Implementation Conformance Statement (PICS)
TS 102 917-2	Test specifications for the channel congestion control algorithms operating in the 5.9 GHz range;	Part 2: Test Suite Structure and Test Purposes (TSS & TP).
TS 102 917-3	Test specifications for the channel congestion control algorithms operating in the 5.9 GHz range;	Part 3: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT)

9. VMS use case and in-vehicle signage

No.	Norm	Reference	Version	Use case	Organisation
No. 47	Intelligent transport systems — Cooperative ITS - Data exchange specification for in-vehicle presentation of external road and traffic related data	ESC ISO/DTS 17425	Vote scheduled for August 2015	C Case	ESC & ISO
No. 48	Intelligent transport systems — Cooperative ITS - Dictionary of in- vehicle information (IVI) data structures	ESC ISO/PRF TS 19321	Voted, in publication	C Case	ESC & ISO
No. 49	Intelligent transport systems — Cooperative ITS - Road Work Application	study*	study	B Case	
No. 50	Intelligent transport systems — Cooperative ITS - Contextual speed	ESC ISO/DTS 17426*	Vote scheduled for August 2015	C Case	ESC & ISO

* see comments below in chapter 11.

10. A few grounds of justification

The following fact was considered for interoperability: "two projects that use the CAM and DENM norms are not interoperable as soon as their versions of CAM and DENM are not respectively compatible."

No.	Element of justification (interoperability / main choices / choice of prior versions)
No. 1	French motorways operated under a concession use electronic tollbooths that satisfy the ESC-DSRC norms in a frequency band (5.8 GHz) close to that of the ITS-G5 systems (5.9 GHz). The standard (EN 302 571) defining the emission masks for ITS-G5 systems takes into account the proximity of this ESC-DSRC band and defines the levels of emission mitigations (TS 102 792 and TR 102 960).



No. 4	Version 1.1.1 , which predates version 1.2.0, the last version published, was chosen because the CAM and DENM versions chosen cite as reference the version 1.1.1.
No. 7-8	It was decided to take the latest EN versions published by ETSI (mandate m453) for the CAM and DENM messages, which are respectively 1.3.2 and 1.2.2 . The notable difference between the old CAM and DENM versions 1.3.0 and 1.2.0 and the new versions 1.3.2 and 1.2.2 is the recent insertion of a container dedicated to announcing electronic tollbooths (ESC DSRC) in these messages. This container will make it possible for the (motorway) infrastructure to announce these tollbooths (position, etc.) so receiving vehicles can start the appropriate mitigation techniques (e.g., reduce power and increase the frequency of messages).
No. 49	No work item is recorded in ESC or ISO even if the need is urgent. This is the result of informal discussions during the meetings without any decision. The work to perform could be an initiative to initiate in CN16.
No. 50	This is somewhat the pendant for the ESC ISO/TS 17425 on speeds (message 47). Interesting for the C2 case.

11. Comparative table of versions chosen in other projects

This table lists the references and versions of the norms and standards chosen in the other known projects or in the roadmap of the C2C consortium.

Table established by the SCOOP partners (dated the deliverable's publication date)

No.	Reference	SCOOP version	Corridor version (Germany)	Eco-AT Version (Austria)	C2C recommendation	Comp ass 4D version (France)	SISCO GA version (Spain)
No. 1	EN 302 571	1.2.1 (2013-09)	1.2.0	Not listed	1.2.1		
No. 2	EN 302 663	1.2.1 (2013-07)	1.1.1	Not listed	1.2.0	1.2.1	
No. 3	TS 102 724	1.1.1 (2012-10)		Not listed	1.1.1		
No. 4	TS 102 792	1.1.1 (2012-10)		Not listed			
No. 5	EN 302 636-4-1	1.2.1 (2014-07)	1.2.0	1.2.1 (2014-07)	1.2.0	1.2.1	
No. 6	EN 302 636-5-1	1.2.1 (2014-08)	1.1.1	Not listed	1.2.0	1.2.1	
No. 7	EN 302 637-2	1.3.2 (2014-11)	1.3.0 (not compatible with 1.3.2)	Final Draft 1.3.1 (2014-09) (compatible* with 1.3.2)	1.3.0 (not compatible with 1.3.2)	1.3.2	1.3.1 (compatible with 1.3.2)



No. 8	EN 302 637-3	1.2.2 (2014-11)	1.2.0 (not compatible with 1.2.2)	Final Draft 1.2.1 (2014-09) (compatible* with 1.3.2)	1.2.0 (not compatible with 1.2.2)	1.2.4	1.2.0 (compatible* with 1.2.1)
No. 9	EN 302 931	1.1.1 (2011-07)	1.1.0	Not listed	1.1.1		
No. 10	TS 102 894-1	1.1.1 (2013-08)	See TS 102 894-2	Not listed	Not listed		
No. 11	TS 102 894-2	1.2.1 (2014-09)	1.1.1	Not listed	1.1.1	1.1.6	
No. 12	TR 102 965	1.1.1 (2013-03)		Not listed			
No. 13	TS 101 539-1	1.1.1 (2013-08)	Not listed	Not listed	Not listed		
No. 14	TS 102 638	1.1.1 (2009-06)		Not listed			
No. 15	TS 102 940	1.1.1 (2012-06)		Reference without version	1.1.1		
No. 16	TS 102 941	1.1.1 (2012-06)		Reference without version	1.1.1		
No. 17	TS 102 731	1.1.1 (2010-09)		Reference without version			
No. 18	TR 102 893	1.1.1 (2010-03)		1.1.1			

*Compatibility with the SCOOP version

Only the boxes for which there is known information have been filled in. An empty box does not necessarily mean that the project in question has not listed this reference.

12. Shortcomings identified in the norms

12.1. D8 use case "unmanaged blockage"

This use case doesn't correspond to any cause code / subcause code pair. We had to use a pair (9/0) signifying "bad surface condition of the roadway." In the absence of a dedicated message in the norm, we use an "obstacle" type cause code. This can pose interoperability problems during cross-tests and should be corrected for mass deployment. The development of the norm DEN (EN 302 637-3) is apportioned in the norm TPEG-TEC (TS 18234-9) but centred on the car as transmitter. This can make sense when the vehicle transmits, but becomes incomprehensible when the infrastructure transmits.

12.2. B2 use case, sub-case "emergency vehicle approaching"

In the same way as the previous case, the since the norm is not explicit, the use by the project of the "95/0" cause/subcause can be a source of ambiguity. There can be confusion between priority vehicles as defined by



the highway code (ambulance, police) and operators' service vehicles. This point should be resolved for mass development.

