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Road vehicles — Multimedia data exchange format for impact tests

Véhicules routiers — Format d'échange de données multimédia pour les essais de choc

Related electronic document A

Descriptors and Hints

Version 2.0 Draft 20101019

Meaning of the colour marks:

black	**no change to the old version 1.5/1.6**
red	**proposed change or addition to version 1.5/1.6**
light blue	**not clarified at the moment**
yellow backgr	**changes in the draft**

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1 Data formats

1.1 Definition of basic and generic data types

Valid basic data types are integer, float and string. Generic data types are date, datetime, coded, reference and filereference.

string: a set of characters according to ISO/IEC 8859-1 without length restrictions.

integer: set of characters representing numbers which don't have any fractional digits.

float: set of characters representing floating-point type with the decimal symbol being a dot (ASCII 46).

date: YYYY-MM-DD — in accordance with ISO 8601.

datetime: YYYY-MM-DD hh:mm:ss — in accordance with ISO 8601.

coded: enumeration of valid values (see 2 Coded values).

reference: value of a channel code part or id used within an other file.

filereference: filename with extension but without pathinformation (according to the filename convention).

1.2 Information files

1.2.1 General rules

The following rules specify the general handling of information files (see main document 5.1).

Mandatory and optional descriptors are built from the lexical space ASCII {48 – 57, 65 – 90, 97 – 122}. Additional descriptors agreed between the transferring parties have to start with a "+" sign (ASCII 43).

The information of <mediatype> like channel, photo, movie and also <testobject> is described in a block structure. Every block starts with a blockbegin-descriptor and ends with a blockend-descriptor. Within a block the position order of the information lines is free.

The hash-symbol "#" (ASCII 35) is restricted to the blockbegin- and blockend-descriptors. These descriptors don't have a value.

All descriptors belonging to the collectivity of media objects of the same type have to be positioned before the first block.

Blocking within a block is not allowed. Valid block-descriptors have to be defined in this document or agreed between the exchanging partners.

1.2.2 Test information

The information about the test has to be stored in the test information file in the main directory. The file extension is "mme". In addition to the standard descriptors special blocks for the NHTSA and for biomechanical testinformations are described.

1.2.2.1 MME standard file

Table 1 — Test information (MME) file

File name:	“filename”.mme, where “filename” is identical to the <testnumber>.			
Location:	main directory			
Contents (for example see 4.1.1.1)				
Descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
Data format edition number	YES		coded	**2.0draft (see 2.1)**
Timestamp	YES		datetime	creation date of this medium.
Time zone	YES		coded	see 2.12
Laboratory name	YES		string	
Laboratory contact name	YES		string	person to contact
Laboratory contact phone	YES		string	
Laboratory contact fax	YES		string	
Laboratory contact email	YES		string	
Laboratory test ref number	YES		string	
Customer name	NO		string	
Customer test ref number	NO		string	
Customer project ref number	NO		string	
Customer order number	NO		string	
Customer cost unit	NO		string	
Customer contact name	NO		string	
Customer contact phone	NO		string	
Customer contact fax	NO		string	
Customer contact email	NO		string	
Title	NO		string	
Comments	NO		string	
Type of the test	YES		string	for example, frontal impact.
Subtype of the test	YES		string	
Regulation	YES		string	
Date of the test	YES		date	
Reference temperature	NO	K	float	measurement point depends on type of the test.
Relative air humidity	NO	%	float	measurement point depends on type of the test.
Number of testobjects	YES		integer	NOVALUE is not allowed
If ‘Number of testobjects’ > 0				
#Begin of testobject	YES			
Type	YES		reference	see ”Test Object” Column 1 in related electronic document *Channel Codes*.
Filename	YES		filereference	name of the testobject information file (see 1.2.3)
#End of testobject	YES			

1.2.2.2 Additional NHTSA test information

Additional information concerning the test set up and/or conditions required making the ISO-MME impact test dataset transportable into the NHTSA EV5 data exchange format has to be added to the test information file within an own optional information block.

Refer to the NHTSA Test Reference Guide, Volume 1, Vehicle Tests, General Test information section, Version 5 (NTRGV1.PDF -- referred to as NHTSA -TRG in the "Remarks" column) for extended field definitions and codes. This document is available on the NHTSA web site at

http://www-nrd.nhtsa.dot.gov/software/test-reference-guides/test-reference-guides.html

File name:	"filename".mme, where "filename" is identical to the <testnumber>.			
Location:	main directory			
Contents (for example see 4.1.1.2)				
Descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
#Begin of NHTSA				
Test configuration	YES		coded	see NHTSA -TRG
Closing speed	YES	m/s	float	see NHTSA -TRG
Impact angle deg	YES	°	integer	0 to 359 degrees, see NHTSA -TRG
Side impact point	YES	m	float	see NHTSA -TRG
Test type	NO		coded	see NHTSA -TRG
Track surface	NO		coded	see NHTSA -TRG
Track condition	NO		coded	see NHTSA -TRG
NHTSA Offset	NO	m	float	see NHTSA -TRG
NHTSA Comments	NO		string	multiple lines, 70 char maximum
#End of NHTSA				

1.2.2.3 Additional biomechanical test information

Additional biomechanical information concerning the test set up has to be added to the test information file within an own optional information block.

File name:	"filename".mme, where "filename" is identical to the <testnumber>.			
Location:	main directory			
Contents (for example see 4.1.1.3)				
Descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
#Begin of biomechanical				
Financial support	YES		string	for instance EC or national programm
Project ref number	YES		string	for instance Contract number of the EC project
Project contact name	YES		string	name of the coordinator of the project
Project contact email	YES		string	
#End of biomechanical				

1.2.3 Object information

All information concerning testobjects, occupants and restraint systems has to be stored in the Object-subdirectory. Allowed filenames are built from the testnumber and the first characters of the channel codes: the testobject, the position and the main location. Every object is described in an own file with the fileextension “mmi”.

For testobjects the filenames consist of the <testnumber> and the <testobject>. For occupants the filenames consist of the <testnumber>, <testobject> and <position>. For restraint systems the filenames consist of the <testnumber>, <testobject>, <position> and <mainlocation> with AIRB and SEBE stored in separate files.

The MME file contains only the information about the number and the type of testobjects and the testobject information filenames.

1.2.3.1 Standard testobject information

File name:	“filename”.mmi, where “filename” is identical to the <testnumber>_<testobject>.			
Location:	Object-subdirectory			
Contents for all testobject types (for example see 4.1.2)				
Descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
Name	YES		string	
Velocity	YES	m/s	float	at time zero
Mass	YES	kg	float	
Impact side	YES		coded	see “Fine Location 1” in related electronic document *Channel Codes*.
Driver position	NO		coded	see “Position” in related electronic document *Channel Codes*.
Class	NO		string	
Code	NO		string	
Ref number	NO		string	
Offset	NO	%	float	overlap in percent
Additional contents for testobject types B and M				
Barrier width	NO	m	float	mandatory for testobject B and M
Barrier height	NO	m	float	mandatory for testobject B and M
Yaw angle	NO	rad	float	mandatory for testobject B and M Angle of barrier with normal to direction of vehicle travel. Units: radians limited to $\pm\pi/2$. 0 rad means that the barrier is perpendicular to the vehicle. Positive sense: Clockwise when viewed from above (SAE J211)
Reference system id	NO		reference	mandatory if a loadcell matrix is used coordinate reference system for the loadcell matrix (see 1.2.4)
Origin X	NO	m	float	mandatory if a loadcell matrix is used top left corner of the loadcell matrix within the reference system – X coordinate
Origin Y	NO	m	float	mandatory if a loadcell matrix is used top left corner of the loadcell matrix within the reference system – Y coordinate

Origin Z	NO	m	float	mandatory if a loadcell matrix is used top left corner of the loadcell matrix within the reference system – Z coordinate
Number of loadcells	NO		integer	mandatory if a loadcell matrix is used

1.2.3.2 Additional NHTSA testobject information

Additional information concerning the testobjects required making the ISO-MME impact test dataset transportable into the NHTSA EV5 data exchange format has to be added to the testobject information files (see 1.2.3.1) within an own optional information block.

Refer to the NHTSA Test Reference Guide, Volume 1, Vehicle Tests, General Test information section, Version 5 (NTRGV1.PDF -- referred to as NHTSA -TRG in the "Remarks" column) for extended field definitions and codes. This document is available on the NHTSA web site at

http://www-nrd.nhtsa.dot.gov/software/test-reference-guides/test-reference-guides.html

File name:	"filename".mmi, where "filename" is identical to the <testnumber>_<testobject>.			
Location:	Object-subdirectory			
Contents for testobject vehicle (for example see 4.1.2.1)				
Field descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
#Begin of NHTSA				
Vehicle make	YES		string	free text
Vehicle model	YES		string	free text
Vehicle year	YES		integer	4 digit year
Body type	YES		coded	see NHTSA -TRG
VIN	YES		string	free text
Vehicle test weight	YES	kg	integer	see NHTSA -TRG
Wheel base	YES	m	float	see NHTSA -TRG
Vehicle length	YES	m	float	see NHTSA -TRG
Vehicle width	YES	m	float	see NHTSA -TRG
Vehicle center of gravity	YES	m	float	see NHTSA -TRG
Vehicle speed	YES	m/s	float	see NHTSA -TRG
Crab angle deg	YES	°	integer	see NHTSA -TRG
Angle of moving cart deg	YES	°	float	see NHTSA -TRG
Veh orientation on cart deg	YES	°	float	see NHTSA -TRG
Engine type	NO		coded	see NHTSA -TRG
Engine size	NO	L	float	
Transmission type	NO		coded	see NHTSA -TRG
Steering column separation	NO		coded	see NHTSA -TRG
Column collapse mechanism	NO		coded	see NHTSA -TRG
Vehicle modifications	NO		string	50 characters maximum
Principal dir of force deg	NO	°	integer	see NHTSA -TRG
Bumper engagement	NO		coded	see NHTSA -TRG
Sill angagement	NO		coded	see NHTSA -TRG

A-Pillar engagement	NO		coded	see NHTSA -TRG
Damage profile distance 1	NO	m	float	see NHTSA -TRG
Damage profile distance 2	NO	m	float	see NHTSA -TRG
Damage profile distance 3	NO	m	float	see NHTSA -TRG
Damage profile distance 4	NO	m	float	see NHTSA -TRG
Damage profile distance 5	NO	m	float	see NHTSA -TRG
Damage profile distance 6	NO	m	float	see NHTSA -TRG
Vehicle damage index	NO		coded	see NHTSA -TRG
Total length indentation	NO	m	float	see NHTSA -TRG
Center damaged area to CG	NO	m	float	see NHTSA -TRG
Maximum crush distance	NO	m	float	see NHTSA -TRG
#End of NHTSA				
Contents for testobject barrier (for example see 4.1.2.2)				
Descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
#Begin of NHTSA				
Barrier shape	NO		coded	see NHTSA -TRG
Rigid or deformable barrier	NO		coded	see NHTSA -TRG
Angle of fixed barrier deg	NO	°	float	see NHTSA -TRG
Diameter of pole barrier	NO	m	float	see NHTSA -TRG
NHTSA Comments	NO		string	Multiple lines, 70 char maximum
#End of NHTSA				

1.2.3.3 Additional biomechanical testobject information

Additional biomechanical information concerning the testobjects has to be added to the testobject information files. Biomechanical tests are mostly performed with a test subject on a test device. The test device has to be described as one of the possible testobjects (see Column 1 in related electronic document *Channel Codes*). The test subject has to be described within an occupant information file (see 1.2.3.4)

File name:	"filename".mmi, where "filename" is identical to the <testnumber>_<testobject>.			
Location:	Object-subdirectory			
Contents				
Descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
Acceleration	NO	m/(s*s)	float	maximum of acceleration

1.2.3.4 Occupant information

The occupant information for all dummies, volunteers or PMHS have to be stored within separate files in the Object-subdirectory.

Refer to the NHTSA Test Reference Guide, Volume 1, Vehicle Tests, General Test information section, Version 5 (NTRGV1.PDF -- referred to as NHTSA -TRG in the "Remarks" column) for extended field definitions and codes. This document is available on the NHTSA web site at

http://www-nrd.nhtsa.dot.gov/software/test-reference-guides/test-reference-guides.html

File name:	“filename”.mmi, where “filename” is identical to the <testnumber>_<testobject><position>.			
Location:	Object-subdirectory			
Contents (for example see 4.1.2.3)				
Descriptor	**Mandatory**	**Unit**	**Data type**	**Remark**
Gender	NO		coded	mandatory for biomechanical tests see 2.11
Age	NO		float	mandatory for biomechanical tests in years
Dummy type	NO		coded	mandatory for NHTSA tests see “Fine Location 3” in related electronic document *Channel Codes*.
Dummy subtype	NO		string	e.g. Build Level D
Dummy id	NO		string	
Dummy manufacturer/Ser No	NO		string	50 characters maximum
Dummy modifications	NO		string	50 characters maximum
Dummy temperature	NO	K	float	
Out of position	NO		coded	YES or NO
Head to windshield header	NO	m	float	see NHTSA -TRG
Head to windshield	NO	m	float	see NHTSA -TRG
Head to side header	NO	m	float	see NHTSA -TRG
Head to side window	NO	m	float	see NHTSA -TRG
Chest to dash	NO	m	float	see NHTSA -TRG
Chest to steering wheel	NO	m	float	see NHTSA -TRG
Arm to door	NO	m	float	see NHTSA -TRG
Hip to door	NO	m	float	see NHTSA -TRG
Knees to dash	NO	m	float	see NHTSA -TRG
Head to seatback	NO	m	float	see NHTSA -TRG
Neck to seatback	NO	m	float	see NHTSA -TRG
Chest to seatback	NO	m	float	see NHTSA -TRG
Knee to seatback	NO	m	float	see NHTSA -TRG
Seat track position	NO		coded	mandatory for NHTSA tests see NHTSA –TRG
1st contact for head	NO		coded	see NHTSA -TRG
2st contact for head	NO		coded	see NHTSA -TRG
1st contact for chest/abdo	NO		coded	see NHTSA -TRG
2st contact for chest/abdo	NO		coded	see NHTSA -TRG
1st contact for legs	NO		coded	see NHTSA -TRG
2st contact for legs	NO		coded	see NHTSA -TRG
Head injury criterion HIC	NO	1	integer	nondimensional
Lo HIC time interval	NO	s	float	
Up HIC time interval	NO	s	float	
Thorax peak accel (CLIP3M)	NO	m/(s*s)	float	

L femur peak load	NO	N	float	
R femur peak load	NO	N	float	
Chest severity index	NO	1	integer	nondimensional
Lap belt peak load	NO	N	integer	
Shoulder belt peak load	NO	N	integer	
Thoracic trauma index	NO	1	float	nondimensional
Pelvis acceleration	NO	m/(s*s)	float	
NHTSA Comments	NO		string	multiple lines, for NHTSA 70 char max.

1.2.3.5 Restraint system information

Additional information concerning airbags and seatbelts has to be added to the restraint system information files in the Object-subdirectory.

File name:	"filename".mmi, where "filename" is identical to the <testnumber>_<testobject><position><main location>.		
Location:	Object-subdirectory		
Contents (for example see 4.1.2.4)			
Descriptor	**Mandatory**	**Data type**	**Remark**
Restraint type	YES	coded	see NHTSA -TRG
Restraint mount	NO	coded	see NHTSA -TRG
Restraint deployed	NO	coded	see NHTSA -TRG
NHTSA Comments	NO	string	multiple lines, for NHTSA 70 char max.

1.2.4 Reference system information

The descriptive information about all reference systems has to be stored within one reference system information file in the Reference-subdirectory.

File name:	"filename".mmi, where "filename" is identical to the <testnumber>_Reference.		
Location:	Reference-subdirectory		
Contents (for example see 4.1.3)			
Descriptor	**Mandatory**	**Data type**	**Remark**
Number of references	YES	integer	NOVALUE is not allowed
… descriptors, which are valid for all references			
For each reference, if 'Number of references' > 0			
#Begin of reference			
Reference system id	YES	coded	Id used in the reference system data file (see 2.3)
Description	NO	string	general description of the reference coordinate system
X origin	NO	string	description of the origin – X component
Y origin	NO	string	description of the origin – Y component

Z origin	NO	string	description of the origin – Z component
X direction	NO	string	description of the longitudinal axis orientation
Y direction	NO	string	description of the transversal axis orientation
Z direction	NO	string	description of the vertical axis orientation
Comments	NO	string	
#End of reference			

1.2.5 Channel information

The descriptive information about all channels has to be stored in the header section of each channel file. The main use of the channel information file is for sorting.

File name:	"filename".mmi, where "filename" is identical to the <testnumber>_Channel.		
Location:	Channel-subdirectory		
Contents (for example see 4.1.4)			
Descriptor	**Mand.**	**Data type**	**Remark**
Number of channels	YES	integer	NOVALUE is not allowed
… descriptors, which are valid for all channels			
For each channel, if 'Number of channels' > 0			
#Begin of channel			
Channel code	YES	coded	see "Channel code" in related electronic document *Channel Codes*.
All descriptors which are specified within the channel file headers (see 1.3.4.1) are possible but optional. The information of the channel file overrides the information of this file.			
#End of channel			

1.2.6 Moving image information

1.2.6.1 Moving image information file

The descriptive information about all films, videos and image sequences has to be stored within one moving image information file in the Movie-subdirectory. If a single image sequence is referenced, the value for 'Name of the movie file' has to point to a subdirectory of the MOVIE directory.

File name:	"filename".mmi, where "filename" is identical to <testnumber>_Movie.			
Location:	Movie-subdirectory			
Contents (for example see 4.1.5.1)				
Descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
Number of movies	YES		integer	NOVALUE is not allowed
… descriptors, which are valid for all movies				
For each movie, if 'Number of movies' > 0				
#Begin of movie				

Movie id	YES		reference	Id of the movie for referencing
Name of movie file	YES		filereference	
Pixel size	YES	m	float	
Aspect ratio of pixels	YES		float	height of the pixel / width of the pixel
Width of image	YES	pixel	integer	
Height of image	YES	pixel	integer	
Number of images	YES		integer	
Film speed	YES	Hz	float	frames per second
Lens focal length	YES		float	
Shutter time	YES	s	float	
Start time of the movie	YES	s	float	time of the first image
End time of the movie	NO	s	float	time of the last image
Origin	NO		string	e.g. simulation, test
Description	NO		string	
Camera id	NO		string	
Camera type	NO		string	
Lens id	NO		string	
Lens type	NO		string	
Focus	NO		string	
Aperture	NO		string	
Format of movie file	NO		string	e.g. AVI
Colour	NO		string	e.g. B/W, RGB, YUV
Compression code	NO		string	e.g. Indeo
Compression quality	NO		string	e.g. 85%
Keyframes	NO		integer	
Time vector filename	NO		filereference	one component data file in the Channel-subdirectory
Image history filename	NO		filereference	
Correction parameter file	NO		filereference	
Movie images corrected	NO		coded	see 2.8
Comments	NO		string	
#End of movie				

1.2.6.2 Correction parameter file

The correction parameter file is optional. It is referenced as value of “Correction parameter file” in the *moving image information file*.The file content for the correction method “bundle adjustment” has to be:

File name:	“filename”.cor, where “filename” is identical to the <testnumber>_<movie id>.			
Location:	Movie-subdirectory			
Contents (for example see 4.1.5.2)				
Field descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
Distortion correction type	YES		coded	**bundle adjustment**

Pixel distance x	YES	mm	float	
Pixel distance y	YES	mm	float	
Principal point x	YES	pixel	float	deviation from the centre of the image (positive from left to right)
Principal point y	YES	pixel	float	deviation from the centre of the image (positive from left to right)
Calibrated focal length	YES	mm	float	as positive value
Distortion unit	YES		coded	**pixel** or **mm,** for the correction coefficients
Distortion correction A1	YES		float	1. corr. coeff. for radial symmetrical distortion
Distortion correction A2	YES		float	2. corr. coeff. for radial symmetrical distortion
Distortion correction A3	YES		float	3. corr. coeff. for radial symmetrical distortion
Distortion correction B1	YES		float	1. corr. coeff. for radial asymmetrical distortion
Distortion correction B2	YES		float	2. corr. coeff. for radial asymmetrical distortion
Distortion correction C1	YES		float	affinity
Distortion correction C2	YES		float	non-othogonality
Distortion correction R0	YES		float	2. zero crossing of the distortion curve

1.2.6.3 Image history file

The image history file is optional. It is referenced as value of *Image history filename* in the moving image information file. The descriptors are not mandatory. They are unique but their position order shall show the time history of the single processing steps. The numbering of the descriptors is used to differentiate between twice or more usage of the same processing item.

File name:	“filename”.imh, where “filename” is identical to the <testnumber>_< movie id >.		
Location:	Movie-subdirectory		
Contents			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Image processing system	NO	string	with version number
Image interpolation	NO	string	with version number
Sharpening i	NO	string	typically 1 integer value
Colour matrix i	NO	string	
White balance i	NO	string	typically 3 integer values
Brightness i	NO	string	single or matrix of integer
Contrast i	NO	string	single or matrix of integer
Saturation i	NO	string	integer or float
Hue i	NO	string	typically integer
Gamma i	NO	string	typically 1 float value

1.2.7 Photo information

The descriptive information about all fotos has to be stored within one photo information file in the Photo-subdirectory.

File name:	“filename”.mmi, where “filename” is identical to <testnumber>_Photo.			
Location:	Photo-subdirectory			
Contents (for example see 4.1.6)				
Field descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
Number of photos	YES		integer	NOVALUE is not allowed
… descriptors, which are valid for all photos				
For each photo, if ‘Number of photos’ > 0				
#Begin of photo				
Photo id	YES		string	Id of the photo for referencing
Testobject	YES		reference	type of testobject in test information file
Classification	YES		coded	see 2.7
Width of image	YES	pixel	integer	
Height of image	YES	pixel	integer	
Aspect ratio of pixels	YES		float	Height of the pixel / width of the pixel
Name of photo file	YES		filereference	
Photographer	NO		string	
Description	NO		string	
Camera type	NO		string	
Direction	NO		string	e.g. left hand side
Aperture	NO		string	
Exposure time	NO	µs	float	
Format of photo file	NO		string	e.g. TIFF or JPEG file format
Colour	NO		string	e.g. B/W, RGB, YUV
Compression	NO		string	
Comments	NO		string	
#End of photo				

1.2.8 Additional information files

The descriptive information about media objects like documents or reports has to be stored within one information file in the corresponding subdirectory. These information files are optional.

File name:	“filename”.mmi, where “filename” is identical to the <testnumber>_<mediatype>.		
Location:	corresponding subdirectory e.g. Report		
Contents (for example see 4.1.7)			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Number of <media objects>	YES	integer	NOVALUE is not allowed
… descriptors, which are valid for all <mediatypes>			
For each <mediatype>, if ‘Number of < mediatypes >’ > 0			
#Begin of <mediatype>			
Filename	YES	filereference	

Description	NO	string	
Format of file	NO	string	e.g. PDF
Originator	NO	string	
#End of <mediatype>			

1.3 Data files

1.3.1 General rules

The following rules specify the general handling of data files (see main document 5.2).

The data block of each data file starts with the separator line '#Start of data' and may be consisting of one ore more columns. The columns are separated by one ore multiple tabulation stops.

Some common used data structures are predefined in the following chapters. The column description of the predefined data structures may be omitted. **MultiChannel** has to be used for all data structures which are not predefined or agreed between the exchanging partners. In this case all columns have to be described in the header section. All descriptors which are identical for all columns shall be positioned before the column block structure.

1.3.2 Multi column data files

File name:	"filename".mmd		
Location:	specific subdirectory		
Contents (for example see 4.2.1)			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Data structure	YES	coded	**MultiChannel** (see 2.2)
Description	NO	string	
… all descriptors defined in 1.2 and 1.3, if they are valid for all columns			
#Start of data			
... Data section ...			
Contents if 'Data structure' is MultiChannel			
Number of columns	YES	integer	NOVALUE is not allowed
#Begin of column			
Name	YES	string	title of the column
Unit	YES	string	see 2.17
Format	YES	coded	see 1.1
… all descriptors defined in the chapters 1.2 and1.3, if they are valid for the specific column			
Comments	NO	string	
#End of column			

1.3.3 Reference system data file

The relations between all reference systems described in the reference system information file have to be stored within one reference system data file in the Reference-subdirectory. It is a multicolumn data file.

File name:	"filename".mmd,

	where “filename” is identical to the <testnumber>_Reference.		
Location:	Reference-subdirectory		
Contents (for example see 4.2.2)			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Data structure	YES	coded	**Reference** (see 2.2)
#Start of data			
... Data section ...			
Column specification if ‘Data structure’ is References			
Field descriptor	**Value**	**Remark**	
Number of columns	10		
Description of column 1			
Name	Source		
Unit	1		
Format	reference	Reference system id (see 1.2.4 and 2.3)	
Description of column 2			
Name	Destination		
Unit	1		
Format	reference	Reference system id (see 1.2.4 and 2.3)	
Description of column 3			
Name	Time		
Unit	s		
Format	float		
Description of column 4			
Name	X		
Unit	m		
Format	float		
Description of column 5			
Name	Y		
Unit	m		
Format	float		
Description of column 6			
Name	Z		
Unit	m		
Format	float		
Description of column 7			
Name	QuaternionW		
Unit	1		
Format	float		
Description of column 8			
Name	QuaternionX		
Unit	1		
Format	float		

Description of column 9		
Name	QuaternionY	
Unit	1	
Format	float	
Description of column 10		
Name	QuaternionZ	
Unit	1	
Format	float	

1.3.4 Channel data files

Allowed filenames are built by the <testnumber>, the <channelcode> defined in the related electronic document *Channel Codes* and the <codeextension>. For transducer channel files with a local reference system according to SAEJ211 the <codeextension> (see 2.16) has to be omitted.

1.3.4.1 One component data files

One component data files consist of a single data column in the data section and are stored in the Channel-subdirectory.

File name:	"filename".mmd, where "filename" is identical to <testnumber>_<channelcode>_<codeextension>.mmd			
Location:	Channel-subdirectory			
Contents (for example see 4.2.3)				
Field descriptor	**Mand.**	**Unit**	**Data type**	**Remark**
Data structure	YES		coded	**Channel** (see 2.2)
Instrumentation standard	YES		string	
Name of the channel	YES		string	
Data source	YES		coded	see 2.4
Data status	YES		coded	see 2.5
Unit	YES		coded	see "Dimension" in related electronic document *Channel Codes*.
Cut off frequency	YES	[Hz]	float	-3dB frequency of Pre-filter
Channel amplitude class	YES		float	see ISO 6487
Sampling interval	YES	[s]	float	time step
Bit resolution	YES		integer	
Time of first sample	YES	[s]	float	'minus' before impact
Number of samples	YES		integer	
Reference channel	YES		coded	see 2.6
Reference channel name	NO		reference	<channelcode> of the time reference channel if 'Reference channel' is explicit
Laboratory channel code	NO		string	
Customer channel code	NO		string	
Channel code	NO		coded	see "Channel code" in related electronic document *Channel Codes*.

Channel frequency class	NO		coded	see “Filter class” in related electronic document *Channel Codes*.
Transducer type	NO		string	
Transducer id	NO		string	
Uuid	NO		string	universally unique identifier
Prefilter type	NO		string	anti-aliasing filter
First global maximum value	NO		float	same unit as used in the data section
Time of maximum value	NO	[s]	float	
First global minimum value	NO		float	same unit as used in the data section
Time of minimum value	NO	[s]	float	
Start offset interval	NO	[s]	float	‘minus’ before impact
End offset interval	NO	[s]	float	‘minus’ before impact
Offset post test	NO		float	same unit as used in the data section
Inverse sensitivity	NO		float	[unit / sensor output]
Inverse polynom coeff A	NO		float	[unit / (sensor output)^3]
Inverse polynom coeff B	NO		float	[unit / (sensor output)^2]
Inverse polynom coeff C	NO		float	[unit / (sensor output)^1]
Inverse polynom coeff M	NO		float	same unit as used in the data section
Offset pre test	NO		float	[sensor output]
Loadcell width	NO	m	float	mandatory for loadcell channels width of loadcell
Loadcell height	NO	m	float	mandatory for loadcell channels height of loadcell
Loadcell top left Y	NO	m	float	mandatory for loadcell channels defines top, left of loadcell with reference to the loadcell matrix origin
Loadcell top left Z	NO	m	float	mandatory for loadcell channels defines top, left of loadcell with reference to the loadcell matrix origin
Transducer natural frequency	NO	[Hz]	float	
Transducer damping ratio	NO	[1]	float	
Calibration date	NO		date	
Calibration due date	NO		date	
Comments	NO		string	
#Start of data				
... Data section ...				

1.3.5 Static measurement data file

Static measurement data may consist of points, lines and areas.

File name:	“filename”.mmd, where “filename” is identical to <testnumber>_ StaticData.
Location:	Static-subdirectory
Contents (for example see 4.2.4)	

Field descriptor	Mandatory	Data type	Remark
Data structure	YES	coded	**StaticData** (see 2.2)
#Start of data			
... Data section ...			
Column specification if 'Data structure' is StaticData			
Field descriptor	**Value**	**Remark**	
Number of columns	7		
Description of column 1			
Name	Name		
Unit	1		
Format	string	shall be the <channelcode>	
Description of column 2			
Name	Refsys		
Unit	1		
Format	reference	Reference system id (see 1.2.4 and 2.3)	
Description of column 3			
Name	Group		
Unit	1		
Format	string	name of line or area, **NOVALUE** for points	
Description of column 4			
Name	Classification	Classification, see 2.7	
Unit	1		
Format	coded	see 2.7	
Description of column 5			
Name	X		
Unit	m		
Format	float		
Description of column 6			
Name	Y		
Unit	m		
Format	float		
Description of column 7			
Name	Z		
Unit	m		
Format	float		

1.3.6 3D point data file

The coordinates of a three dimensional point can be combined and stored in a multicolumn data file of data structure **Point** in the Channel-subdirectory. The filename includes the Channel code with the direction "M". The columns contain the values for the Time, X, Y and Z component. The data structure **PointStdDev** is an enlargement with 3 additional columns for the standard deviations of the spatial components.

File name:	"filename".mmd,

	where “filename” is identical to <testnumber>_<channelcode>_<codeextension>.mmd with the direction “M” in the Channel code		
Location:	Channel-subdirectory		
Contents (for example see 4.2.5)			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Data structure	YES	coded	**Point, PointStdDev** (see 2.2)
#Start of data			
... Data section ...			
Column specification if ‘Data structure’ is Point			
Field descriptor	**Value**	**Remark**	
Number of columns	4		
Description of column 1			
Name	Time		
Format	float		
Unit	s		
Description of column 2			
Name	X		
Format	float		
Unit	m		
Description of column 3			
Name	Y		
Unit	m		
Format	float		
Description of column 4			
Name	Z		
Unit	m		
Format	float		
Column specification if ‘Data structure’ is PointStdDev			
Number of columns	7		
Field descriptor	**Value**	**Remark**	
… the 4 column descriptions of **Points** and in addition			
Description of column 5			
Name	SX		
Format	float		
Unit	m		
Description of column 6			
Name	SY		
Unit	m		
Format	float		
Description of column 7			
Name	SZ		

Unit	m	
Format	float	

1.3.7 Camera position file and 6dObject file

The position and orientation of all cameras can be stored within one camera position file in the Movie-subdirectory. It is a multicolumn data file. This data type is also usable for other media objects which are described by a position and an orientation.

File name:	"filename".mmd, where "filename" is identical to <testnumber>_ CameraPosition or <testnumber>_ 6dObject		
Location:	Movie-subdirectory for camera positions Object-subdirectory for all other rigid bodies with 6 degrees of freedom		
Contents (for example see 4.2.6)			
Field descriptor	**Mandatory**	**Data type**	**Remark**
Data structure	YES	coded	**PositionAndOrientation** (see 2.2)
#Start of data			
... Data section ...			
Column specification if 'Data structure' is PositionAndOrientation			
Field descriptor	**Value**	**Remark**	
Number of columns	10		
Description of column 1			
Name	Name		
Unit	1		
Format	reference	Movie id from moving image information file or id of the 6dObject	
Description of column 2			
Name	Refsys		
Unit	1		
Format	reference	Reference system id (see 1.2.4 and 2.3)	
Description of column 3			
Name	Time		
Unit	1		
Format	string	float value for moving, **fixed** for nonmoving cameras	
Description of column 4			
Name	X		
Unit	s		
Format	float		
Description of column 5			
Name	Y		
Unit	m		
Format	float		
Description of column 6			

Name	Z	
Unit	m	
Format	float	
Description of column 7		
Name	QuaternionW	
Unit	m	
Format	float	
Description of column 8		
Name	QuaternionX	
Unit	1	
Format	float	
Description of column 9		
Name	QuaternionY	
Unit	1	
Format	float	
Description of column 10		
Name	QuaternionZ	
Unit	1	
Format	float	

1.4 Comment files

All comment files contain unformatted text. To reference a data channel use the channel code with an appended colon (for example see 4.3.2).

2 Coded values

2.1 Valid values for the descriptor ‘Data format edition number‘

Value	Remark
2.0	current version
2.0draft	for testing only; current draft version

2.2 Valid values for the descriptor ‘Data structure‘

Value	Remark
MultiChannel	user specific number of columns; see 1.3.2
Reference	10 columns; see 1.3.3
Channel	1 column; see 1.3.4.1
StaticData	7 columns; see 1.3.5
Point	4 columns; see 1.3.6
PointStdDev	7 columns; see 1.3.6
PositionAndOrientation	10 columns; see 1.3.7

2.3 Valid values for the descriptor ‘Reference system id‘

Value	Remark
LOC	local coordinate system for transducers according to SAE J211
nST	testobject *n* static (see related electronic document *Channel Codes*)
nT0	testobject *n* at T0 (see related electronic document *Channel Codes*)
nDY	testobject *n* dynamic (see related electronic document *Channel Codes*)
i	3 digit number *i* with leading zeros (000 = undefined)

2.4 Valid values for the descriptor ‘Data source‘

Value	Remark
transducer	channel data has been generated by transducer
camera	channel data has been generated by camera
simulation	channel data has been generated by simulation
calculation	channel data has been calculated from other channels
parameter	channel data can be constant or limit curve
NOVALUE	undefined / other

2.5 Valid values for the descriptor ‘Data status‘

Value	Remark
ok	
channel failed	
meaningless data	
no data	
questionable data	
scaling factor applied	
system failed	
linearised data	
NOVALUE	

2.6 Valid values for the descriptor ‘Reference channel‘

Value	Remark
implicit	Time reference is given with the descriptor values ‘Time of first sample’ and ‘Sampling interval’.
explicit	Explicit time channel exists in test data. Channel name is given with the descriptor ‘Reference channel name’.
NOVALUE	No time reference is available. For example in case of constant channels (filter class ‘X’).

2.7 Valid values for the descriptor ‘Classification‘

Value	Remark
PRE	before the test
DURING	during the test
POST	after the test
SENSOR	image of the transducer
NOVALUE	no classification is available

2.8 Valid values for the descriptor ‘.Movie images corrected‘

Value	Remark
YES	The images of the movie are corrected.
NO	The images of the movie are not corrected.

2.9 Valid values for the descriptor ‘Distortion correction type‘

The descriptor ‘Distortion correction type’ is used within correction parameter files to distinguish the type of correction.

Value	Remark

bundle adjustment	see 1.2.6.2

2.10 Valid values for the descriptor ‘Distortion unit‘

Value	Remark
mm	see 1.2.6.2
pixel	see 1.2.6.2

2.11 Valid values for the descriptor ‘.Gender‘

Value	Remark
male	see 1.2.3.4
female	see 1.2.3.4

2.12 Valid values for the descriptor ‘Time zone‘

Value	Remark
GMT	Greenwich Mean Time
GMT+i	Greenwich Mean Time + i hours (0<i<13)
GMT-i	Greenwich Mean Time - i hours (0<i<12)

2.13 Valid values for block descriptors

Blockbegin- and blockend-descriptors are used within information and data files to structure the information lines. Blocks are surrounded by a ‘#Begin of <value>‘ and a ‘#End of <value>’ descriptor. Predefined values are listed in the following table.

Value	Remark
column	used for the description section of multicolumn data files
testobject	used for testobject information in the mme file
NHTSA	used for additional NHTSA specific information
biomechanical	used for the additional information of biomechanical test environments
reference	used within reference system information and data files
movie	used for movie information files
photo	used for photo information files
channel	used for channel information files

2.14 Valid values for the format specification

Value	Remark
integer	see 1.1
float	see 1.1

string	see 1.1
date	see 1.1
datetime	see 1.1
coded	see 1.1
reference	see 1.1
filereference	see 1.1

2.15 Valid values for the data origin

Value	Remark
T	origin of the channel data is a transducer
F	origin of the channel data is filmanalysis
S	origin of the channel data is simulation
C	the channel data is a combination of different origin
0	undefined / other

2.16 Valid values for the codeextension

The <codeextension> is a concatenation of the 'Reference system id' in table 2.3 and the 'Data origin' in table 2.15 ~~separated by a '_'~~. Predefined values for the <codeextension> are all possible combinations of the values listed in tables 2.3 and 2.15. Examples are shown in the following table.

Value	Remark
1T0S	simulation data in the coordinate system of testobject 1 at stage T0
1T0F	filmanalysis data in the coordinate system of testobject 1 at stage T0
1DYF	filmanalysis data in the coordinate system of the moving testobject 1
DSTC	calculated data of a dummy part (e.g. headimpactor) in a static coordinate system (e.g. photogrammetric measurement)
TSTF	filmanalysis data in the static testrig coordinate system
001F	filmanalysis data in the coordinate system 001 specified in the reference system information file
002S	simulation data in the coordinate system 002 specified in the reference system information file
~~LOCT~~	transducer data in the local coordinate system does not have a <codeextension> see (1.3.4)!

2.17 Allowed units

The SI units are currently divided into base units and derived units, which together form what is called "the coherent system of SI units." The units allowed to use for the data exchange are decribed in their notation in the following table. Additional units may be used if agreed between the exchanging partners.

Value	Quantity	Remark
m	Length	base unit
mm	Length	decimal submultiple of the base unit
µm	Length	decimal submultiple of the base unit

s	Time	base unit
ms	Time	decimal submultiple of the base unit
µs	Time	decimal submultiple of the base unit
kg	Mass	base unit
A	Electric Current	base unit
K	Temperature	base unit
cd	Luminous Intensity	base unit
rad	Angle	coherent derived unit
sr	Solid Angle	coherent derived unit
Hz	Frequency	coherent derived unit
N	Force	coherent derived unit
Pa	Pressure	coherent derived unit
J	Energy	coherent derived unit
W	Power	coherent derived unit
C	Electric Charge	coherent derived unit
V	Voltage	coherent derived unit
lm	Luminous Flux	coherent derived unit
lx	Illuminance	coherent derived unit
m/s	Velocity	derived unit
m/(s*s)	Acceleration	derived unit
rad/s	Angle Velocity	derived unit
rad/(s*s)	Angle Acceleration	derived unit
Nm	Moment	derived unit
kg*m/s	Impulse	derived unit
V/A	Resistance	derived unit
m*m	Area	derived unit
m*m*m	Volume	derived unit
1	Unit One	without unit or ratio of two mutually comparable quantities
%	Percent	symbol for the number 0.01
pixel	Image Unit	accepted Non-SI unit if agreed between the exchanging partners
L	liter	accepted Non-SI unit if agreed between the exchanging partners
°	Angle	accepted Non-SI unit if agreed between the exchanging partners
°/s	Angle Velocity	accepted Non-SI unit if agreed between the exchanging partners
°/(s*s)	Angle Acceleration	accepted Non-SI unit if agreed between the exchanging partners
dB	Decibel	accepted Non-SI unit if agreed between the exchanging partners

3 Hints

For future use.

4 Examples

4.1 Examples of information files

4.1.1 Examples of test information files

4.1.1.1 Example of MME file

Filename: 2009ISO2.mme see 1.2.2.1

Data format edition number	:2.0
Timestamp	:2009-07-07 09:25:15
Timeszone	GMT+1
Laboratory name	:ALPHA Car Test Laboratory
Laboratory contact name	:Frank N. Stein
Laboratory contact phone	:+49-222/123-4567
Laboratory contact fax	:+49-222/123-8901
Laboratory contact email	:frank.stein@alpha.cartest.com
Laboratory test ref number	:2001WG3
Customer name	:ISO/TC22/SC12/WG3 Safety Laboratory
Customer test ref number	:2001ISO1
Customer project ref number	:ISOTC22
Customer order number	:SC12WG3
Customer cost unit	:2001/0
Customer contact name	:Mary Land
Customer contact phone	:+44-123/555-123
Customer contact fax	:+44-123/555-456
Customer contact email	:mary.land@iso.tc22.sc12.wg3.uk
Title	:Simulation Test
Type of the test	:Vehicle into Vehicle
Subtype of the test	:40% Offset both
Regulation	:AMS
Date of the test	:2009-03-03
Reference temperature	:285.5
Relative air humidity	:75
Number of test objects	:2
#Begin of testobject	
Type	1
Filename	2009ISO2_1.INF
#End of testobject	
#Begin of testobject	
Type	B
Filename	2009ISO2_B.INF
#End of testobject	

4.1.1.2 Example of additional NHTSA test information

Filename: 2009NHTSA2.mme see 1.2.2.2

Data format edition number	:2.0
...	
#Begin of NHTSA	
Test type	NCA
Test configuration	VTB
Track surface	CON
Track condition	DRY
. . .	
#End of NHTSA	

4.1.1.3 Example of additional biomechanical test information

Filename: 2009BIOMECH2.mme see 1.2.2.3

Data format edition number :2.0
...
#Begin of biomechanical
Financial support EC
Project ref number EC09-12345
Project contact name Beerlustconi
Project contact email beerlustconi@projects.eu
#End of biomechanical

4.1.2 Examples of object information files

4.1.2.1 Example of vehicle information file

Filename: 2009ISO2_1.mmi see 1.2.3.1 and 1.2.3.2

Name Vehicle A
Velocity 15.72
Mass 1430.00
Impact side 2
Driver position 1
Class A0
Code LittleCar
Ref number 007-008
Offset 40
#Begin of NHTSA
Vehicle make CarManu
Vehicle model Eagle
Vehicle year 2009
. . .
#End of NHTSA

4.1.2.2 Example of barrier information file

Filename: 2009ISO2_B.mmi see 1.2.3.1 and 1.2.3.2

Name Fixed barrier
Velocity 0.00
Mass 1500.00
Impact side NOVALUE
Class NOVALUE
Code xyz
Ref number 1111-012
Barrier width 3.2
Barrier height 1.64
Reference system id BST
Comments according to the SAE J211 reference coordinate system
Origin X 0.12
Origin Y -1.4
Origin Z -1.8
Number of loadcells 64
#Begin of NHTSA
Barrier shape LCB
Rigid or deformable barrier R
Angle of fixed barrier deg 0

Diameter of pole barrier	NOVALUE
NHTSA Comments	NO DATA COLLECTED ON A1, B1, C1, D1, D2, D3,
NHTSA Comments	D4,D5,D6,D7,D8,D9
#End of NHTSA	

4.1.2.3 Example of occupant information

Filename: 2009ISO2_11.mmi see 1.2.3.4

Gender	male
Age	NOVALUE
Comments	V3239.OCC
Comments	
Comments	- DRIVER OCCUPANT INFORMATION
Dummy Type	H3
Dummy subtype	Build Level D
Dummy Manufacturer/Ser No	VECTOR, S/N:034
Dummy Modifications	UNMODIFIED
Dummy temperature	NOVALUE
Out of position	NO
Head to Windshield Header	.350
Head to Windshield	.635
Head to Side Header	.245
Head to Side Window	.325
Chest to Dash	.515
Chest to Steering Wheel	.320
Arm to Door	.126
Hip to Door	.154
Knees to Dash	.220
Head to Seatback	NOVALUE
Neck to Seatback	NOVALUE
Chest to Seatback	NOVALUE
Knee to Seatback	NOVALUE
Seat Track Position	RW
1st Contact for Head	AB
2nd Contact for Head	NO
1st Contact for Chest/Abdo	AB
2nd Contact for Chest/Abdo	NO
1st Contact for Legs	DP
2nd Contact for Legs	SC
Head Injury Criterion HIC	377
Lo HIC Time Interval	.0528
Up HIC Time Interval	.0887
Thorax Peak Accel (CLIP3M)	426.59
L Femur Peak Load	3534
R Femur Peak Load	4642
Chest Severity Index	NOVALUE
Lap Belt Peak Load	6474
Shoulder Belt Peak Load	5109
Thoracic Trauma Index	NOVALUE
Pelvic Acceleration	NOVALUE

4.1.2.4 Example of restraint system information

Filename: 2009ISO2_11SEBE.mmi see 1.2.3.5

Restraint type	3PT
Restraint mount	BC
Restraint Deployed	NA.

4.1.3 Example of reference system information file

Filename: 2009ISO2_Reference.mmi see 1.2.4

Number of references	5
#Begin of reference	
Reference system id	LOC
Description	local transducer systems according to SAE J211
X origin	center of gravity of the transducer
Y origin	center of gravity of the transducer
Z origin	center of gravity of the transducer
X direction	x-direction of the transducer
Y direction	y-direction of the transducer
Z direction	z-direction of the transducer
#End of reference	
#Begin of reference	
Reference system id	1T0
Description	vehicle system at Time 0
X origin	center of the front axle
Y origin	center of the front axle
Z origin	center of the front axle
X direction	from the front of the car to the rear
Y direction	from the left to the right of the car
Z direction	opposite to the force of gravity
#End of reference	
#Begin of reference	
Reference system id	1DY
Description	vehicle system dynamic
X origin	center of the front axle
Y origin	center of the front axle
Z origin	center of the front axle
X direction	from the front of the car to the rear
Y direction	from the left to the right of the car
Z direction	opposite to the force of gravity
#End of reference	
#Begin of reference	
Reference system id	001
Description	vehicle system at T0 / direction of the axes according to SAE J211
X origin	center of the front axle
Y origin	center of the front axle
Z origin	center of the front axle
X direction	from the rear of the car to the front
Y direction	from the left to the right of the car
Z direction	in the direction of the force of gravity
#End of reference	
#Begin of reference	
Reference system id	TST
Description	testrig static
X origin	Marker on the floor in front of the barrier
Y origin	Marker on the floor in front of the barrier
Z origin	Marker on the floor in front of the barrier
X direction	from the barrier to the vehicle, opposite to the driving direction
Y direction	from the left to the right of the car
Z direction	opposite to the force of gravity
#End of reference	

4.1.4 Example of channel information file

Filename: 2009ISO2_Channel.mmi see 1.2.5

Number of channels	75

#Begin of channel
Channel code 11HEAD0000H3ACXA
#End of channel
#Begin of channel
Channel code 11HEAD0000H3ACYA
#End of channel
#Begin of channel
…

4.1.5 Examples of moving image information

4.1.5.1 Example of moving image information file see 1.2.6.1

Filename: 2009ISO2_Movie.mmi

Number of movies 7
Comments
Comments information valid for all movies
Comments
Pixel size 12
Aspect ratio of pixels :1.00
Origin :Crashtest
Camera type :KAPPA ROC
Format of movie file :AVI
Colour :RGB
Movie images corrected :NO
Comments
Comments specific information of movie 1
#Begin of movie
Movie id L1
Name of movie file :LEFTATOT.AVI
Camera id :KAPPA12
Width of image :512
Height of image :384
Number of images :351
Film speed :1000
Start time of the movie -0.05
End time of the movie 0.3
Description :total view of vehicle A from the left side
Lens id :14579435
Lens type :Schneider
Lens focal length :0.01
Focus :infinite
Aperture :5.6 - 8
Shutter time 0.00025
Compression code :Indeo 5.11
Compression quality :85%
Keyframes :7
Time vector filename :2009ISO2_10VEHC000000TI00_1DYF.mmd
Image history filename :2009ISO2_L1.imh
Correction parameter file :2009ISO2_L1.cor
#End of movie
Comments
Comments specific information of movie 2
#Begin of movie
Movie id :R1
Description :total view of vehicle A from the right side
Camera id :KAPPA67
. . .

4.1.5.2 Example of COR file

Filename: 2009ISO2_R1.cor see 1.2.6.2

```
Distortion correction type      :bundle adjustment
Pixel distance x                :0.016
Pixel distance y                :0.016
Principal point x               :-9.38
Principal point y               :-8.25
Calibrated focal length         :10.128
Distortion unit                 :mm
Distortion correction A1        :-1.1685e-003
Distortion correction A2        :5.3873e-006
Distortion correction A3        :2.8685e-007
Distortion correction B1        :-1.4558e-005
Distortion correction B2        :-3.2337e-005
Distortion correction C1        :6.6139e-007
Distortion correction C2        :3.6798e-005
Distortion correction R0        :3.413
```

4.1.6 Example of photo information file

Filename: 2009ISO2_Photo.mmi see 1.2.7

```
Number of photos                :6
Comments                        :
Comments                        : information valid for all photos
Comments                        :
Width of image                  :1170
Height of image                 :1000
Aspect ratio of pixels          :1.00
Photographer                     Hamilton
Camera type                     :ETA 007
Aperture                         4 – 5.6
Exposure time                   :0.008
Format of photo file            :TIFF
Colour                          :RGB
Compression                     :LZW
Comments                        :##############################
Comments                        : specific information of photo 1
#Begin of photo
Photo id                         1
Testobject                       1
Classification                   POST
Name of photo file              :BRIGPOST.TIF
Description                     :partial view of the frontcar of vehicle B
Direction                       :right
#End of photo
Comments                        :##############################
Comments                        : specific information of photo 2
#Begin of photo
Photo id                         2
Testobject                       1
. . .
```

4.1.7 Example of report information file

Filename: 2009ISO2_Report.mmi see 1.2.8

```
Number of reports                3
#Begin of report
Filename                         2009ISO2_Report.pdf
```

Description contains tables and diagrams
#End of report
. . .

4.2 Examples of data files

4.2.1 Example of multi column data file

Filename: 2009ISO2_Steeringwheel_Movement.mmd see 1.3.2

Data structure MultiChannel
Number of columns 4
Comments Relative movement of the steering wheel hub
Comments
Description Time[s] X[m] Z[m] R[m]
#Begin of Column
Comments Timebase
Name Time
Unit s
Format float
#End of Column
#Begin of Column
Comments Movement in X-Direction relative to Time Zero
Name X
Unit m
Format float
#End of Column
#Begin of Column
Comments Movement in Z-Direction relative to Time Zero
Name Z
Unit m
Format float
#End of Column
#Begin of Column
Comments Resultant relative movement in XZ-plane
Name R
Unit m
Format float
#End of Column
#Start of data

-0.001	-6.60e-003	5.16e-003	8.38e-003
0.000	0.00e+000	0.00e+000	0.00e+000
0.001	1.20e-002	-1.95e-003	1.22e-002
0.002	4.02e-003	-8.98e-003	9.84e-003
0.003	5.04e-004	-1.56e-002	1.56e-002
0.004	-1.36e-004	-1.98e-002	1.98e-002
0.005	-3.13e-003	-1.37e-002	1.40e-002
0.006	-2.85e-003	-1.25e-004	2.86e-003
0.007	-3.75e-003	5.92e-003	7.01e-003

. . .

4.2.2 Example of reference system data file

Filename: 2009ISO2_Reference.mmd see 1.3.3

Data structure Reference
Comments Name Refsys Time X Y Z Qw Qx Qy Qz
#Start of data

1T0	TST	0.000	2.9522	-7.3176	1.6790	1.00000	0.00000	0.00000	0.00000

001	1T0	0.000	0.0000	0.0000	0.0000	0.00000	0.00000	1.00000	0.00000
1DY	1T0	0.002	0.0340	0.0000	0.0000	1.00000	0.00000	0.00000	0.00000
1DY	1T0	0.001	0.0170	0.0000	0.0000	1.00000	0.00000	0.00000	0.00000
1DY	1T0	0.000	0.0000	0.0000	0.0000	1.00000	0.00000	0.00000	0.00000
1DY	1T0	0.001	-0.0160	0.0000	0.0000	1.00000	0.00000	0.00000	0.00000

. . .

4.2.3 Example of channel data file

Filename: 2009ISO2_ 11HEAD0000H3ACXA.mmd see 1.3.4

Data structure	Channel
Instrumentation standard	ISO 6487 (1987) / SAE J211 (MAR95)
Name of the channel	:Head Acceleration X
Data source	:transducer
Data status	:ok
Unit	:m/(s*s)
Cut off frequency	:2000.0
Channel amplitude class	:2000.0
Sampling interval	:0.0001
Bit resolution	:12
Time of first sample	:0.0000
Number of samples	:2500
Reference channel	:implicit
Reference channel name	:NOVALUE
Laboratory channel code	:HEAD01AX
Customer channel code	:1HEAD_X_ACC
Channel frequency class	:1000
Transducer type	:TAU 7270 A
Transducer id	071234
Transducer natural frequency	NOVALUE
Transducer damping ratio	NOVALUE
Uuid	NOVALUE
Calibration date	NOVALUE
Calibration due date	NOVALUE
Prefilter type	:Butterworth, 6 pole
First global maximum value	:+1.237802E+02
Time of maximum value	:+0.18450
First global minimum value	:-5.489905E+02
Time of minimum value	:+0.06860
Start offset interval	:-0.0500
End offset interval	:+0.0000
Offset post test	NOVALUE
Inverse sensitivity	NOVALUE
Inverse polynom coeff A	NOVALUE
Inverse polynom coeff B	NOVALUE
Inverse polynom coeff C	NOVALUE
Inverse polynom coeff M	NOVALUE
Offset pre test	NOVALUE
Loadcell width	NOVALUE
Loadcell height	NOVALUE
Loadcell top left Y	NOVALUE
Loadcell top left Z	NOVALUE
#Start of data	

-4.788391E-01

. . .

4.2.4 Example of static measurement data file

Filename: 2009ISO2_ StaticData.mmd **see 1.3.5**

```
Data structure                          StaticData
Comments                                Name  Refsys  Group  Classification  X  Y  Z
#Start of data
11APILMI0000DSM0    1ST     NOVALUE    PRE    0.361    -0.7885  07172
11APILMI0000DSM0    1ST     NOVALUE    POST   0.406    -0.7832  07255
. . .
P0001               1ST     Dashboard  PRE    0.300    -0.450   0.655
P0002               1ST     Dashboard  PRE    0.301    -0.450   0.654
P0003               1ST     Dashboard  PRE    0.302    -0.450   0.653
P0004               1ST     Dashboard  PRE    0.303    -0.450   0.652
. . .
```

4.2.5 Example of 3D point data file

Filename: 2009ISO2_11HEADLEMI00DSMV_1T0F.mmd **see 1.3.6**

```
Data structure                          Point
Comments                                Time  X  Y  Z
#Start of data
   -0.0090   4.679542e-001   -4.399675e-001   7.325757e-001
   -0.0080   4.679646e-001   -4.399681e-001   7.326144e-001
   -0.0070   4.679401e-001   -4.399651e-001   7.326324e-001
   -0.0060   4.679460e-001   -4.399436e-001   7.326981e-001
. . .
```

4.2.6 Example of camera position file

Filename: 2009ISO2_CameraPosition.mmd **see 1.3.7**

```
Data structure                                  PositionAndOrientation
Comments                                        MovieId  Refsys  Time[s]  X[m]  Y[m]  Z[m]  Qw  Qx  Qy  Qz
#Start of data
L1      TST     0.000   2.9521   -7.3178   1.6081   0.76506   0.64370   0.01340   0.01277
L1      TST     0.001   2.9522   -7.3177   1.6080   0.76506   0.64370   0.01341   0.01277
...
L1      TST     0.150   2.9525   -7.3177   1.6081   0.76506   0.64370   0.01347   0.01272
IN1     1T0     fixed   0.8000   -0.4000   0.0200   0.96593   0.00000   -0.25882  0.00000
IN2     1T0     fixed   0.8000   -0.4000   0.0280   0.96126   0.00000   -0.27564  0.00000
. . .
```

4.3 Example of comment files

4.3.1 Example of test comment file **see 1.4**

Filename: 2009ISO2.txt

The car to car test was performed on 3rd of March 2009 at ALPHA Car Test Laboratory. The airbags of vehicle A had to be exchanged before the test.

4.3.2 Example of channel comment file **see 1.4**

Filename: 2009ISO2_Channel.txt

Following problems occurred:
11HEAD0000H3ACXA: large deviations at post test calibration...