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Part 7: Location Services (LCS)
test scenarios and assistance data
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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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The present document is part 1 of a multi-part deliverable covering the Digital cellular telecommunications system (GSM Phase2 and Phase 2+ Releases 1996, 1997, 1998, 1999, 3GPP Release 4, 3GPP Release 5, 3GPP Release 6, 3GPP Release 7, 3GPP Release 8, 3GPP Release 9, 3GPP Release 10, 3GPP Release 11 and 3GPP Release 12); Mobile Station (MS) conformance specification, as identified below:

Part 1: Conformance specification
Reference: 3GPP TS 51.010-1.

Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification.
Reference: 3GPP TS 51.010-2.

Part 3: Layer 3 (L3) Abstract Test Suite (ATS).
Reference: 3GPP TS 51.010-3 v6.3.0 (Note 1).

Part 4: SIM Application Toolkit conformance specification.
Reference: 3GPP TS 51.010-4.

Part 5: Inter-RAT (GERAN to UTRAN) Abstract Test Suite (ATS)
Reference: 3GPP TS 51.010-5.

Part 7: Location Services (LCS) test scenarios and assistance data.
Reference: 3GPP TS 51.010-7.

NOTE 1: GP-25: TTCN is not maintained after v6.3.0, and is henceforward to be considered an example test suite rather than the conformance tests

1 Scope

The present document contains the orbital model information, the assistance data and the assistance data files that shall be used for all LCS Assisted GPS and Assisted GNSS test cases defined in subclause 70 of TS 51.010-1 [4].

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TR 41.001: "GSM Release specifications".

[3] 3GPP TR 21 912 (V3.1.0): "Example 2, using fixed text".

[4] 3GPP TS 51.010-1: "Mobile Station (MS) conformance specification; Part 1: Conformance specification".

[5] 3GPP TS 44.031: "Location Services (LCS); Mobile Station (MS) - Serving Mobile Location Centre (SMLC), Radio Resource LCS Protocol (RRLP)".

[6] STANAG 4294: NATO STANAG 4294. Navstar Global Positioning System (GPS) System Characteristics.

[7] 3GPP TS 23.032: "Universal Geographical Area Description (GAD)".

[8] 3GPP TS 45.005: "Reference needed".

[9] BDS-SIS-ICD-B1I-2.0: "BeiDou Navigation Satellite System Signal In Space Interface Control Document Open Service Signal (Version 2.0)", December 2013.

3 Abbreviations

3.1 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

A-BDS	Assisted - BeiDou Navigation Satellite System
A-GNSS	Assisted - Global Navigation Satellite System
A-GPS	Assisted - Global Positioning System
BDS	BeiDou Navigation Satellite System
FFS	For Further Study
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
LCS	Location Services
SS	Satellite Simulator

SV Space Vehicle
SV ID Space Vehicle Identification

4 Orbital model information, assistance data and assistance data files

4.1 General

The following subclauses define the GPS and GNSS orbital model information, the assistance data and the assistance data files for the test cases defined in TS 51.010-1 [4] subclauses 70.7 to 70.9 for A-GPS Signalling test cases, subclauses 70.13 to 70.15 for A-GNSS Signalling test cases, subclause 70.11 for A-GPS Minimum Performance test cases and subclause 70.16 for A-GNSS Minimum Performance test cases.

The orbital model information is defined and where appropriate is given in Yuma format in .txt files for each scenario in the appropriate data file defined in Annex A or Annex B.

Where the assistance data is fixed or is not required on a per-satellite basis, then it is defined in the following subclauses. Where assistance data is required on a per-satellite basis, or where the values of the data also vary with time then it is specified in comma-separated-variable files in the appropriate data file defined in Annex A or Annex B. These files specify the values to be used for each satellite, indexed by satellite PRN or SV ID, and, where applicable, the values to be used indexed by both time and satellite PRN or SV ID.

All the Assistance Data information elements are given with reference to TS 44.031 [5], where the details are defined.

5 GPS information

5.1 GPS Scenario and Assistance data for Assisted GPS signalling tests

5.1.1 General

This subclause defines the GPS scenario and the associated assistance data that shall be used for all Assisted GPS signalling tests defined in TS 51.010-1 [4] subclauses 70.7 to 70.9.

The satellite simulator (SS) shall generate the six satellite signals defined in subclause 5.1.2 and shall provide assistance data as defined in subclauses 5.1.3 to 5.1.8.

Where assistance data is required on a per-satellite basis, or where the values of the data also varies with time it is specified in comma-separated-variable files in the GPS_data.zip file defined in Annex A. These files specify the values to be used for each satellite, indexed by satellite PRN, and, where applicable, the values to be used indexed by both time and satellite PRN.

Assistance data that is marked as "time varying" and the GPS TOW field are only specified and used in 0.96 second increments. Interpolation between these values shall not be used.

The accuracy of the GPS TOW and assistance data that is marked as "time varying" in the provided assistance data shall be within +/- 2 s relative to the GPS time in the system simulator.

Assistance data Information Elements and fields that are not specified shall not be used.

5.1.2 GPS Scenario

The following GPS scenario shall be used. The assistance data specified in the following subclauses is consistent with this GPS scenario:

- Yuma Almanac data: see file Sig Tokyo_Yuma.txt in the GPS_data.zip file defined in Annex A

- MS location and Reference location: static at latitude: 35 degrees 40 minutes north, longitude: 139 degrees 45 minutes east, (Tokyo) height: = 50m
- Start time: 12th September 2003 21:30:00
- Visible satellites simulated: PRNs: 4, 6, 9, 10, 13, 22.

  Ionospheric model: see values in subclause 5.1.6
- The levels of the simulated satellites shall all be at -125dBm +/- 6dB

5.1.3 Assistance Data Reference Time

Table 5.1.3.1: Reference Time (Fields occurring once per message)

Parameter	Units	Value/remark
GPS Week	weeks	211
GPS TOW	Sec	509400 Start time. Add integer number of 0.96 seconds as required. (Note)
Note: GPS TOW This is the value of GPS TOW in seconds when the GPS scenario is started in the GPS simulator. The value of GPS TOW to be used in the Reference Time IE shall be calculated at the time the IE is required by adding the elapsed time since the time the scenario was started in the GPS simulator to this value, rounded up to the next 0.96 second interval. This "current GPS TOW" is then also used to determine the value of any other parameters marked as "Time varying" in subclause 5.1		

5.1.3a Assistance Data GPS Reference Time Extension

Table 5.1.3a.1: GPS Reference Time Extension (Fields occurring once per message)

Parameter	Units	Value/remark	Release
GPS Week Cycle Number	1024 weeks	1	Rel-10 onwards

5.1.4 Assistance Data Reference Location

Table 5.1.4.1: Reference Location

Parameter	Units	Value/remark
Type of Shape	Bit field	Ellipsoid point with altitude and uncertainty Ellipsoid
Degrees of latitude	degrees	+3.56666666666667 10E1
Degrees of longitude	degrees	+1.39750000000000 10E2
Altitude	m	+50
Uncertainty semi-major	m	3000
Uncertainty semi-minor	m	3000
Orientation of major axis	degrees	0
Uncertainty altitude	m	500
Confidence	%	68

5.1.5 Assistance Data Navigation Model

Table 5.1.5.1: Navigation Model (Fields occurring once per message)

Parameter	Units	Value/remark
Num_Sats_Total		6

Table 5.1.5.2: Navigation Model (Fields occurring once per satellite)

Parameter	Units	Value/remark
SatID		PRNs: 4, 6, 9, 10, 13, 22.
Satellite Status		See file: Sig Navigation_model.csv
C/A or P on L2		See file: Sig Navigation_model.csv
URA Index		See file: Sig Navigation_model.csv
SV Health		See file: Sig Navigation_model.csv
IODC		See file: Sig Navigation_model.csv
L2 P Data Flag		See file: Sig Navigation_model.csv
SF 1 Reserved		See file: Sig Navigation_model.csv
T_{GD}	sec	See file: Sig Navigation_model.csv
t_{oc}	sec	See file: Sig Navigation_model.csv
af_2	sec/sec^2	See file: Sig Navigation_model.csv
af_1	sec/sec	See file: Sig Navigation_model.csv
af_0	sec	See file: Sig Navigation_model.csv
C_{rs}	meters	See file: Sig Navigation_model.csv
Δn	semi-circles/sec	See file: Sig Navigation_model.csv
M_0	semi-circles	See file: Sig Navigation_model.csv
C_{uc}	radians	See file: Sig Navigation_model.csv
e		See file: Sig Navigation_model.csv
C_{us}	radians	See file: Sig Navigation_model.csv
$(A)^{1/2}$	meters$^{1/2}$	See file: Sig Navigation_model.csv
t_{oe}	sec	See file: Sig Navigation_model.csv
Fit Interval Flag		See file: Sig Navigation_model.csv
AODO	sec	See file: Sig Navigation_model.csv
C_{ic}	radians	See file: Sig Navigation_model.csv
$OMEGA_0$	semi-circles	See file: Sig Navigation_model.csv
C_{is}	radians	See file: Sig Navigation_model.csv
i_0	semi-circles	See file: Sig Navigation_model.csv
C_{rc}	meters	See file: Sig Navigation_model.csv
ω	semi-circles	See file: Sig Navigation_model.csv
OMEGAdot	semi-circles/sec	See file: Sig Navigation_model.csv
Idot	semi-circles/sec	See file: Sig Navigation_model.csv

5.1.6 Assistance Data Ionospheric Model

Table 5.1.6.1: Assistance Data Ionospheric Model

Parameter	Units	Value/remark
α_0	seconds	4.6566129 10E-9
α_1	sec/semi-circle	1.4901161 10E-8
α_2	sec/(semi-circle)^2	-5.96046 10E-8
α_3	sec/(semi-circle)^3	-5.96046 10E-8
β_0	seconds	79872
β_1	sec/semi-circle	65536
β_2	sec/(semi-circle)^2	-65536
β_3	sec/(semi-circle)^3	-393216

5.1.7 Assistance Data Almanac

Table 5.1.7.1: Almanac (Fields occurring once per message)

Parameter	Units	Value/remark
Num_Sats_Total		24
WN_a	weeks	212

Table 5.1.7.2: Almanac (Fields occurring once per satellite)

Parameter	Units	Value/remark
SatID		PRNs: 1 to 24
E	dimensionless	See file: Sig Almanac.csv
t_{oa}	sec	See file: Sig Almanac.csv
δi	semi-circles	See file: Sig Almanac.csv
OMEGADOT	semi-circles/sec	See file: Sig Almanac.csv
SV Health		See file: Sig Almanac.csv
$A^{1/2}$	$meters^{1/2}$	See file: Sig Almanac.csv
$OMEGA_0$	semi-circles	See file: Sig Almanac.csv
ω	semi-circles	See file: Sig Almanac.csv
M_0	semi-circles	See file: Sig Almanac.csv
af_0	seconds	See file: Sig Almanac.csv
af_1	sec/sec	See file: Sig Almanac.csv

5.1.7a Assistance Data GPS Almanac Extension

Table 5.1.7a.1: GPS Almanac Extension (Fields occurring once per message)

Parameter	Units	Value/remark	Release
Complete Almanac Provided		1 (TRUE)	Rel-10 onwards

5.1.8 Assistance Data Acquisition Assistance

Table 5.1.8.1: GPS Acquisition Assistance - Parameters appearing once per message

Parameter	Units	Value/remark
Number of Satellites		6
GPS TOW	sec	509400 Start time. Add integer number of 0.96 seconds as required. (Note)
Note: GPS TOW This is the value of GPS TOW in seconds when the GPS scenario is started in the GPS simulator. The value of GPS TOW to be used in the Acquisition Assistance IE shall be calculated at the time the IE is required by adding the elapsed time since the time the scenario was started in the GPS simulator to this value, rounded up to the next 0.96 second interval.		

Table 5.1.8.2: GPS Acquisition Assistance - Parameters appearing [number of satellites] times per message

Parameter	Units	Value/remark
SVID/PRNID		PRNs: 4, 6, 9, 10, 13, 22.
Doppler (0^{th} order term)	Hz	Time varying. See file: Sig Acquisition_assist.csv (Note)
Doppler (1^{st} order term)	Hz/sec	Time varying. See file: Sig Acquisition_assist.csv (Note)
Doppler Uncertainty	Hz	Time varying. See file: Sig Acquisition_assist.csv (Note)
Code Phase	chips	Time varying. See file: Sig Acquisition_assist.csv (Note)
Integer Code Phase		Time varying. See file: Sig Acquisition_assist.csv (Note)
GPS Bit number		Time varying. See file: Sig Acquisition_assist.csv (Note)
Code Phase Search Window	chips	Time varying. See file: Sig Acquisition_assist.csv (Note)
Azimuth	deg	Time varying. See file: Sig Acquisition_assist.csv (Note)
Elevation	deg	Time varying. See file: Sig Acquisition_assist.csv (Note)
Note: Acquisition_assistparameters This field is "Time varying" and its value depends on the "current GPS TOW" as described in subclause 5.1.3. The value of this field to be used shall be determined by taking the "current GPS TOW" value and selecting the field value in the Sig Acquisition_assist.csv file corresponding to the value of "current GPS TOW".		

5.1.8a Assistance Data GPS Acquisition Assistance Extension

Table 5.1.8a.1: GPS Acquisition Assistance Extension - Parameters appearing once per message

Parameter	Units	Value/remark	Release
N_SAT		6	Rel-10 onwards

Table 5.1.8a.2: GPS Acquisition Assistance Extension - Parameters appearing [number of satellites] times per message

Parameter	Units	Value/remark	Release
SatID		PRNs: 4, 6, 9, 10, 13, 22.	Rel-10 onwards
Azimuth LSB	degrees	Time varying. Calculated from Azimuth, see file: Sig Acquisition_assist.csv (Note)	Rel-10 onwards
Elevation LSB	degrees	Time varying. Calculated from Elevation, see file: Sig Acquisition_assist.csv (Note)	Rel-10 onwards
Note: This field is "Time varying" and its value depends on the "current GPS TOW" as described in subclause 5.1.3. The value of this field to be used shall be determined by taking the "current GPS TOW" value and selecting the field value in the Sig Acquisition_assist.csv file corresponding to the value of "current GPS TOW".			

5.2 GPS Scenarios and Assistance Data for Assisted GPS Minimum Performance tests

5.2.1 General

5.2.1.0 Introduction

This subclause defines the GPS scenarios and assistance data IEs which shall be available for use as specified in all A-GPS Minimum Performance test cases defined in TS 51.010-1 [4] subclause 70.11.

The information elements are given with reference to TS 44.031 [5], where the details are defined.

Subclauses 5.2.2 and 5.2.3 list the assistance data IEs required for performance testing of MS-based mode, and subclauses 5.2.4 and 5.2.5 list the assistance data available for performance testing of MS-assisted mode. Subclause 5.2.6 lists the values of the assistance data IE fields for all performance testing.

The A-GPS minimum performance requirements are defined by assuming that all relevant and valid assistance data is received by the MS in order to perform GPS measurements and/or position calculation. This subclause does not include nor consider delays occurring in the various signalling interfaces of the network.

5.2.1.1 Satellite constellations and assistance data for performance testing

The satellite constellations for performance testing shall consist of 24 satellites. Almanac assistance data shall be available for all these 24 satellites. At least 9 of the satellites shall be visible to the MS (that is above 5 degrees elevation with respect to the MS). Other assistance data shall be available for 9 of these visible satellites. In each test, signals are generated for only a subset of these satellites for which other assistance data is available. The number of satellites in this subset is specified in the test. The satellites in this subset shall all be above 15 degrees elevation with respect to the MS. The HDOP for the test shall be calculated using this subset of satellites. The selection of satellites for this subset shall be random and consistent with achieving the required HDOP for the test.

5.2.1.2 GPS Scenarios for performance testing

5.2.1.2.0 General

This subclause defines the GPS scenarios that shall be used for all Assisted GPS performance tests defined in subclause TS 51.010-1 [4] subclause 70.11.

The GPS scenarios achieve the required HDOP for the Test Cases as defined in the Requirements specification TS 45.005 [8]. They also satisfy the requirement that for each test instance the reference location shall change sufficiently such that the MS shall have to use the new assistance data.

The satellites to be simulated in each test case are specified in subclause 5.2.1.2.5.

The viable running time during which the scenario maintains the required HDOP or HDOPs is given. Once this time has been reached the scenario shall be restarted from its nominal start time.

5.2.1.2.1 GPS Scenario #1

The following GPS scenario #1 shall be used during the TTFF tests defined in TS 51.010-1 [4] subclause 70.11. The assistance data specified in the following subclauses for GPS scenario #1 is consistent with this GPS scenario.

Yuma Almanac data: see file Perf GPS_1_Yuma.txt in the GPS_data_perf.zip file defined in Annex A.

MS location: the MS location is calculated as a random offset from the reference location using the method described in subclause 5.2.1.2.4. The reference location is: latitude: 33 degrees 45 minutes 0.019 seconds north, longitude: 84 degrees 23 minutes 0.011 seconds west, (Atlanta USA), height: = 300m.

Nominal start time: 22nd January 2005 (Saturday) 00:08:00.

Viable running time to maintain specified HDOP values: 19 minutes.

Visible satellites available for simulation and for which Assistance Data (other than Almanac) shall be generated: PRNs: 2, 6, 10, 17, 18, 21, 26, 29, 30.

Ionospheric model: see values in subclause 5.2.6.6.

Tropospheric model: STANAG with SRI equal to 324.8, as defined in STANAG 4294 [6].

5.2.1.2.2 GPS Scenario #2

The following GPS scenario #2 shall be used during the TTFF tests defined in TS 51.010-1 [4] subclause 70.11. The assistance data specified in the following subclauses for GPS scenario #2 is consistent with this GPS scenario.

Yuma Almanac data: see file Perf GPS_2_Yuma.txt in the GPS_data_perf.zip file defined in Annex A.

MS location: the MS location is calculated as a random offset from the reference location using the method described in subclause 5.2.1.2.4. The reference location is: latitude: 37 degrees 48 minutes 59.988 seconds south, longitude: 144 degrees 58 minutes 0.013 seconds east, (Melbourne Australia), height: = 100m.

Nominal start time: 22nd January 2004 (Thursday) 00:08:00.

Viable running time to maintain specified HDOP values: 19 minutes.

Visible satellites available for simulation and for which Assistance Data (other than Almanac) shall be generated: PRNs: 3, 11, 14, 15, 18, 22, 23, 25, 31.

Ionospheric model: see values in subclause 5.2.6.6.

Tropospheric model: STANAG with SRI equal to 324.8, as defined in STANAG 4294 [6].

5.2.1.2.3 GPS Scenario #3

The following GPS scenario #3 shall be used during the Moving Scenario and Periodic Location test case defined in TS 51.010-1 [4] subclause 70.11. The assistance data specified in the following subclauses for GPS scenario #3 is consistent with this GPS scenario.

Yuma Almanac data: see file Perf GPS_3_Yuma.txt in the GPS_data_perf.zip file defined in Annex A.

MS location: the MS location is given as a trajectory as shown in Figure 70.11.9.1 of TS 51.010-1 [4] subclause 70.11. The reference location is at the centre of the trajectory and is at: latitude: 37 degrees 48 minutes 59.988 seconds south, longitude: 144 degrees 58 minutes 0.013 seconds east, (Melbourne Australia), height: = 100m.

Start time: 22nd January 2004 (Thursday) 00:08:00.

Start location: at the point between l_{11} and l_{12} in Figure 70.11.9.1 of TS 51.010-1 [4] subclause 70.11, going in a clock-wise direction.

Visible satellites available for simulation and for which Assistance Data (other than Almanac) shall be generated: PRNs: 3, 11, 14, 15, 18, 22, 23, 25, 31.

Viable running time to maintain specified HDOP values: 19 minutes.

Ionospheric model: see values in subclause 5.2.6.6.

Tropospheric model: STANAG with SRI equal to 324.8, as defined in STANAG 4294 [6].

5.2.1.2.4 MS Location for TTFF test cases

5.2.1.2.4.0 General

This subclause defines the method for generating the random MS locations that are required to be used for the TTFF tests defined in TS 51.010-1 [4] subclause 70.11.

For every Test Instance in each TTFF test case, the MS location shall be randomly selected to be within 3 km of the Reference Location. The Altitude of the MS shall be randomly selected between 0 m to 500 m above WGS-84 reference ellipsoid. These values shall have uniform random distributions.

The MS location is calculated as an offset from the Reference Location.

5.2.1.2.4.1 MS Location Offset

The MS location offset shall be calculated by selecting the next pair of random numbers, representing a pair of latitude and longitude offsets in degrees, from a standard uniform random number generator, with the following properties:

The ranges of the latitude and longitude offsets values shall be such that when translated onto the surface of the earth they shall lie within a 3km radius circle, centred on the Reference location specified for the GPS scenario under consideration. For the purposes of this calculation make the following assumptions:

a) Over the 3km radius circle at the Reference location the earth is flat and the meridians and parallels form a rectangular grid

b) The earth is spherical with a radius of 6371141m (equal to the WGS 84 value at 35 degrees latitude)

The resolution used for the latitude and longitude offsets values shall be 90/2E23 for the latitude offset values and 360/2E24 for the longitude offset values, representing the coding resolution in degrees specified in 3GPP TS 23.032 [7].

5.2.1.2.4.2 MS Altitude

The MS altitude value shall be calculated by selecting the next random number from a standard uniform random number generator, in the range 0 to 500, representing meters. The resolution used for the random number shall be 1, representing 1 meter.

5.2.1.2.5 Satellites to be simulated in each test case

The satellites to be simulated in each test case have been selected in order to achieve the required HDOP for that test case.

Table 5.2.1.2.5.1: Satellites to be simulated

Test case	PRNs GPS #1	PRNs GPS #2	PRNs GPS #3
Sensitivity Coarse Time Assistance	2, 6, 10, 17, 18, 21, 26, 29	3, 11, 14, 15, 22, 23, 25, 31	
Sensitivity Fine Time Assistance	2, 6, 10, 17, 18, 21, 26, 29	3, 11, 14, 15, 22, 23, 25, 31	
Nominal Accuracy	2, 6, 10, 17, 18, 21, 26, 29	3, 11, 14, 15, 22, 23, 25, 31	
Dynamic Range	2, 6, 10, 17, 26, 29	3, 14, 15, 22, 25, 31	
Multi-Path scenario	2, 6, 17, 21, 26	3, 14, 15, 22, 25	
Moving Scenario and Periodic location			3, 14, 15, 22, 25

5.2.2 Information elements required for normal MS based testing

The following A-GPS assistance data IEs and fields shall be present for each test. Fields not specified shall not be present. The values of the fields are specified in subclause 5.2.6.

a) Reference Time IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
GPS Week
GPS TOW
GPS TOW Assist
SatID
TLM Message
Anti-Spoof
Alert
TLM Reserved

aa) GPS Reference Time Extension IE. This information element is defined in subclause A.4.2.4c of TS 44.031 [5].

Fields of the IE	Release
GPS Week Cycle Number	Rel-10 onwards

b) Reference Location IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
Ellipsoid point with Altitude and uncertainty ellipsoid

c) Navigation Model IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
All satellite information

d) Ionospheric Model IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
All

5.2.3 Information elements required for MS based Sensitivity Fine Time Assistance test case

The A-GPS assistance data IEs and fields that shall be present for the Sensitivity Fine Time Assistance test case shall be those specified in subclause 5.2.2 with the following exception. Fields not specified shall not be present. The values of the fields are specified in subclause 5.2.6.

Reference Time IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
GPS Week
GPS TOW
BCCH Carrier
BSIC
FNm
TN
BN
GPS TOW Assist
SatID
TLM Message
Anti-Spoof
Alert
TLM Reserved

5.2.4 Information elements available for normal MS assisted testing

The following A-GPS assistance data IEs and fields shall be available for use in each test. Fields not specified shall not be present. The values of the fields are specified in subclause 5.2.6.

a) Reference Time IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
GPS Week
GPS TOW
GPS TOW Assist
SatID
TLM Message
Anti-Spoof

Alert
TLM Reserved

aa) GPS Reference Time Extension IE. This information element is defined in subclause A.4.2.4c of TS 44.031 [5].

Fields of the IE	Release
GPS Week Cycle Number	Rel-10 onwards

b) Reference Location IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
Ellipsoid point with Altitude and uncertainty ellipsoid

c) Almanac IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
Almanac Reference Week
All Satellite information

ca) GPS Almanac Extension IE. This information element is defined in subclause A.4.2.4c of TS 44.031 [5].

Fields of the IE	Release
Complete Almanac Provided	Rel-10 onwards

d) Navigation Model IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
All satellite information

e) Acquisition Assistance IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
GPS TOW
Satellite information
SVID/PRNID
Doppler (0^{th} order term)
Doppler (1^{st} order term)
Doppler Uncertainty
Code Phase
Integer Code Phase
GPS Bit number
Code Phase Search Window
Azimuth
Elevation

f) GPS Acquisition Assistance Extension IE. This information element is defined in subclause A.4.2.4c of TS 44.031 [5].

Fields of the IE	Release
N_SAT	Rel-10 onwards
SatID	Rel-10 onwards
Azimuth LSB	Rel-10 onwards
Elevation LSB	Rel-10 onwards

5.2.5 Information elements available for MS assisted Sensitivity Fine Time Assistance test case

The A-GPS assistance data IEs and fields that shall be available for use for the Sensitivity Fine Time Assistance test case shall be those specified in subclause 5.2.4 with the following exceptions. Fields not specified shall not be present. The values of the fields are specified in subclause 5.2.6.

a) Reference Time IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
GPS Week
GPS TOW
BCCH Carrier
BSIC
FNm
TN
BN
GPS TOW Assist
SatID
TLM Message
Anti-Spoof
Alert
TLM Reserved

b) Acquisition Assistance IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
GPS TOW
BCCH Carrier
BSIC
Frame #
Timeslots #
Bit #
SVID/PRNID
Doppler (0^{th} order term)
Doppler (1^{st} order term)
Doppler Uncertainty
Code Phase
Integer Code Phase
GPS Bit number
Code Phase Search Window
Azimuth
Elevation

5.2.6 Contents of Information elements for Minimum performance testing

5.2.6.1 General

This subclause defines the assistance data values that shall be used for all Assisted GPS performance tests defined in TS 51.010-1 [4] subclause 70.11. It is given for GPS scenarios #1, #2 and #3 where it is different for each scenario; otherwise it is marked "All" where the same value is used for all scenarios.

Where assistance data is required on a per-satellite basis, or where the values of the data also varies with time it is specified in comma-separated-variable files with suffixes XX in the GPS_data_perf.zip file defined in Annex A, where XX is 01, 02 and 03 for GPS scenarios #1, #2 and #3 respectively. These files specify the values to be used for each satellite, indexed by satellite PRN, and, where applicable, the values to be used indexed by both time and satellite PRN.

Assistance data that is marked as "time varying" is specified and used in 80 ms increments. Interpolation between these values shall not be used.

Assistance data Information Elements and fields that are not specified shall not be used.

5.2.6.2 IE Random Offset Values

5.2.6.2.0 Introduction

This subclause defines the methods for generating the random offsets that are required to be applied to one or two assistance data IEs for certain tests defined in TS 51.010-1 [4] subclause 70.11.

5.2.6.2.1 GPS TOW

For every Test Instance in each TTFF test case, the IE GPS TOW shall have a random offset, relative to GPS system time, within the allowed error range of Coarse Time Assistance defined in the test case. This offset value shall have a uniform random distribution.

Note: For the Moving Scenario and Periodic Update Test Case the value of the IE GPS TOW shall be set to the nominal value, i.e. no offset shall be used.

The offset value shall be calculated by selecting the next random number from a standard uniform random number generator, in the range specified for the GPS Coarse Time assistance error range in the Test Requirements, Test parameters table for the test under consideration. The resolution used for the random number shall be 0.01, representing 10ms.

5.2.6.2.2 GPS bit number (BN or Bit #)

In addition, for every Fine Time Assistance Test Instance the IE BN or Bit # shall have a random offset, relative to the true value of the relationship between the two time references, within the allowed error range of Fine Time Assistance defined in the test case. This offset value shall have a uniform random distribution.

The offset value shall be calculated by selecting the next random number from a standard uniform random number generator with the following properties:

The range shall be the number of GSM bits whose duration is less than the range specified for the GPS Fine Time assistance error range in the Test Requirements, Test parameters table for the test under consideration.

The resolution used for the random number shall be 1, representing 1 GSM bit.

5.2.6.3 Assistance Data Reference Time

Contents of Reference Time IE

Table 5.2.6.3.1: Reference Time (Fields occurring once per message)

Parameter	Units	Value/remark GPS #1	Value/remark GPS #2	Value/remark GPS #3
GPS Week	weeks	282	230	230
GPS TOW	ms	518880000 Start time. Add number of 80ms as required. (Note 1)	346080000 Start time. Add number of 80ms as required. (Note 1)	346080000 Start time. Add number of 80ms as required. (Note 1)
BCCH Carrier		ARFCN of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	ARFCN of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	
BSIC		BSIC of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	BSIC of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	
FNm		Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	
TN		Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	
BN		Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	

Note 1: GPS TOW

This is the value in ms of GPS TOW when the GPS scenario is initially started in the GPS simulator. For all TTFF test cases, each time a GPS scenario is used, the GPS start time shall be advanced by 120 seconds from the value last used so that, at the time the fix is made, it is at least 2 minutes later than the previous fix made with that scenario.

The actual value of GPS TOW to be used in the Reference Time IE (before the addition of the random offset, if applicable) shall be calculated at the time the IE is required by adding the elapsed time since the time the scenario was started in the GPS simulator to this value. The accuracy shall be such that the Maximum Test System Uncertainty for Coarse Time Assistance, specified in Table A5.5.1 of TS 51.010-1 [4] , shall be met.

For all TTFF test cases a random offset is then added to the value of GPS TOW as described in subclause 5.2.6.2

Note 2: GSM Frame Number (FNm), Timeslot Number (TN) and Bit Number (BN)

The values of the IEs FNm, TN and BN (before the addition of the random offset) shall be calculated at the time the IE is required. The accuracy of the relationship between the two time references shall be such that the Maximum Test System Uncertainty for Fine Time Assistance, specified in Table A5.5.1 of TS 51.010-1 [4] , shall be met.

A random offset is then added to the value of BN as described in subclause 5.2.6.2

Table 5.2.6.3.2: Satellite Information

Parameter	Units	Value/remark GPS All
Number of satellites		9

Table 5.2.6.3.3: Reference Time - GPS TOW Assist (Fields occurring once per satellite)

Parameter	Units	Value/remark GPS #1	Value/remark GPS #2	Value/remark GPS #3
SatID		PRNs: 2, 6, 10, 17, 18, 21, 26, 29, 30	PRNs: 3, 11, 14, 15, 18, 22, 23, 25, 31	PRNs: 3, 11, 14, 15, 18, 22, 23, 25, 31

Table 5.2.6.3.4: Reference Time - GPS TOW Assist (Fields occurring once per satellite)

Parameter	Units	Value/remark GPS All
TLM Message	Bit string	10922
Anti-Spoof	Bit string	1
Alert		0
TLM Reserved		2

5.2.6.3a Assistance Data GPS Reference Time Extension

Contents of GPS Reference Time Extension IE

Table 5.2.6.3a.1: GPS Reference Time Extension (Fields occurring once per message)

Parameter	Units	Value/remark GPS All	Release
GPS Week Cycle Number	1024 weeks	1	Rel-10 onwards

5.2.6.4 Assistance Data Reference Location

Contents of Reference Location IE

The uncertainty of the semi-major axis is 3 km. The uncertainty of the semi-minor axis is 3 km. The orientation of the major axis is 0 degrees. The uncertainty of the altitude information is 500 m. The confidence factor is 68%.

Table 5.2.6.4.1: Reference Location

Parameter	Units	Value/remark GPS #1	Value/remark GPS #2	Value/remark GPS #3
Type of Shape	Bit field	Ellipsoid point with altitude and uncertainty Ellipsoid	Ellipsoid point with altitude and uncertainty Ellipsoid	Ellipsoid point with altitude and uncertainty Ellipsoid
Degrees of latitude	degrees	33.750005	-37.816663	-37.816663
Degrees of longitude	degrees	-84.383336	144.966670	144.966670
Altitude	m	+300	+100	+100
Uncertainty semi-major	m	3000	3000	3000
Uncertainty semi-minor	m	3000	3000	3000
Orientation of major axis	degrees	0	0	0
Uncertainty altitude	m	500	500	500
Confidence	%	68	68	68

5.2.6.5 Assistance Data Navigation Model

Contents of Navigation Model IE

Table 5.2.6.5.1: Satellite Information

Parameter	Units	Value/remark GPS All
Number of satellites		9

Table 5.2.6.5.2: Navigation Model (Fields occurring once per satellite)

Parameter	Units	Value/remark GPS #1	Value/remark GPS #2	Value/remark GPS #3
SatID		PRNs: 2, 6, 10, 17, 18, 21, 26, 29, 30	PRNs: 3, 11, 14, 15, 18, 22, 23, 25, 31	PRNs: 3, 11, 14, 15, 18, 22, 23, 25, 31
Satellite Status		0 (Note)	0 (Note)	0 (Note)
Note: For consistency Satellite Status is also given in file: Perf Navigation_model_XX.csv				

Table 5.2.6.5.3: Ephemeris and Clock Correction parameters (Fields occurring once per satellite)

Parameter	Units	Value/remark GPS All
C/A or P on L2		See file: Perf Navigation_model_XX.csv
URA Index		See file: Perf Navigation_model_XX.csv
SV Health		See file: Perf Navigation_model_XX.csv
IODC		See file: Perf Navigation_model_XX.csv
L2 P Data Flag		See file: Perf Navigation_model_XX.csv
SF 1 Reserved		See file: Perf Navigation_model_XX.csv
T_{GD}	sec	See file: Perf Navigation_model_XX.csv
t_{oc}	sec	See file: Perf Navigation_model_XX.csv
af_2	sec/sec^2	See file: Perf Navigation_model_XX.csv
af_1	sec/sec	See file: Perf Navigation_model_XX.csv
af_0	sec	See file: Perf Navigation_model_XX.csv
C_{rs}	meters	See file: Perf Navigation_model_XX.csv
Δn	semi-circles/sec	See file: Perf Navigation_model_XX.csv
M_0	semi-circles	See file: Perf Navigation_model_XX.csv
C_{uc}	radians	See file: Perf Navigation_model_XX.csv
e		See file: Perf Navigation_model_XX.csv
C_{us}	radians	See file: Perf Navigation_model_XX.csv
$(A)^{1/2}$	meters$^{1/2}$	See file: Perf Navigation_model_XX.csv
t_{oe}	sec	See file: Perf Navigation_model_XX.csv
Fit Interval Flag		See file: Perf Navigation_model_XX.csv
AODO	sec	See file: Perf Navigation_model_XX.csv
C_{ic}	radians	See file: Perf Navigation_model_XX.csv
$OMEGA_0$	semi-circles	See file: Perf Navigation_model_XX.csv
C_{is}	radians	See file: Perf Navigation_model_XX.csv
i_0	semi-circles	See file: Perf Navigation_model_XX.csv
C_{rc}	meters	See file: Perf Navigation_model_XX.csv
ω	semi-circles	See file: Perf Navigation_model_XX.csv
OMEGAdot	semi-circles/sec	See file: Perf Navigation_model_XX.csv
Idot	semi-circles/sec	See file: Perf Navigation_model_XX.csv

5.2.6.6 Assistance Data Ionospheric Model

Contents of Ionospheric Model IE

Table 5.2.6.6.1: Ionospheric Model

Parameter	Units	Value/remark GPS All
α_0	seconds	4.6566129 10E-9
α_1	sec/semi-circle	1.4901161 10E-8
α_2	sec/(semi-circle)^2	-5.96046 10E-8
α_3	sec/(semi-circle)^3	-5.96046 10E-8
β_0	seconds	79872
β_1	sec/semi-circle	65536
β_2	sec/(semi-circle)^2	-65536
β_3	sec/(semi-circle)^3	-393216

5.2.6.7 Assistance Data Almanac

Contents of Almanac

Table 5.2.6.7.1: Almanac (Field occurring once per message)

Parameter	Units	Value/remark GPS #1	Value/remark GPS #2	Value/remark GPS #3
WN_a	weeks	27	230	230

Table 5.2.6.7.2: Satellite Information

Parameter	Units	Value/remark GPS All
Number of satellites		24

Table 5.2.6.7.3: Almanac (Fields occurring once per satellite)

Parameter	Units	Value/remark GPS #1	Value/remark GPS #2	Value/remark GPS #3
SatID		PRNs: 1, 2, 4, 5, 6, 7, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 29, 30	PRNs: 1, 2, 3, 4, 5, 6, 7, 8, 11, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23, 25, 27, 28, 30, 31	PRNs: 1, 2, 3, 4, 5, 6, 7, 8, 11, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23, 25, 27, 28, 30, 31

Table 5.2.6.7.4: Almanac (Fields occurring once per satellite)

Parameter	Units	Value/remark GPS All
e	dimensionless	See file: Perf Almanac_XX.csv
t_{oa}	sec	See file: Perf Almanac_XX.csv
δi	semi-circles	See file: Perf Almanac_XX.csv
OMEGADOT	semi-circles/sec	See file: Perf Almanac_XX.csv
SV Health		See file: Perf Almanac_XX.csv
$A^{1/2}$	$meters^{1/2}$	See file: Perf Almanac_XX.csv
$OMEGA_0$	semi-circles	See file: Perf Almanac_XX.csv
ω	semi-circles	See file: Perf Almanac_XX.csv
M_0	semi-circles	See file: Perf Almanac_XX.csv
af_0	seconds	See file: Perf Almanac_XX.csv
af_1	sec/sec	See file: Perf Almanac_XX.csv

5.2.6.7a Assistance Data GPS Almanac Extension

Contents of GPS Almanac Extension IE

Table 5.2.6.7a.1: GPS Almanac Extension (Fields occurring once per message)

Parameter	Units	Value/remark GPS All	Release
Complete Almanac Provided		1 (TRUE)	Rel-10 onwards

5.2.6.8 Assistance Data Acquisition Assistance

Contents of Acquisition Assistance IE

Table 5.2.6.8.1: GPS Acquisition Assistance (Fields occurring once per message)

Parameter	Units	Value/remark GPS #1	Value/remark GPS #2	Value/remark GPS #3
GPS TOW	ms	51888000 Start time. Add number of 80ms as required. (Note 1)	346080000 Start time. Add number of 80ms as required. (Note 1)	346080000 Start time. Add number of 80ms as required. (Note 1)
BCCH Carrier		ARFCN of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	ARFCN of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	Absent
BSIC		BSIC of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	BSIC of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	
Frame #		Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	
Timeslots #		Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	
Bit #		Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	

Note 1: GPS TOW

This is the value in ms of GPS TOW when the GPS scenario is initially started in the GPS simulator. For all TTFF test cases, each time a GPS scenario is used, the GPS start time shall be advanced by 120 seconds from the value last used so that, at the time the fix is made, it is at least 2 minutes later than the previous fix made with that scenario.

The actual value of GPS TOW to be used in the Acquisition Assistance IE (before the addition of the random offset, if applicable) shall be calculated at the time the IE is required by adding the elapsed time since the time the scenario was started in the GPS simulator to this value. The accuracy shall be such that the Maximum Test System Uncertainty for Coarse Time Assistance, specified in Table A5.5.1 of TS 51.010-1 [4] , shall be met.

For all TTFF test cases a random offset is then added to the value of GPS TOW as described in subclause 5.2.6.2

This "final GPS TOW" value is then also used to determine the value of the Acquisition Assistance parameters marked as "Time varying" in subclause 5.2.6.8

Note 2: GSM Frame Number (Frame #), Timeslot Number (Timeslots #) and Bit Number (Bit #)

The values of the IEs Frame #, Timeslots # and Bit # (before the addition of the random offset) shall be calculated at the time the IE is required. The accuracy of the relationship between the two time references shall be such that the Maximum Test System Uncertainty for Fine Time Assistance, specified in Table A5.5.1 of TS 51.010-1 [4] , shall be met.

A random offset is then added to the value of Bit # as described in subclause 5.2.6.2

Table 5.2.6.8.2: Satellite Information

Parameter	Units	Value/remark GPS All
Number of satellites		9

Table 5.2.6.8.3: GPS Acquisition Assistance (Fields occurring once per satellite)

Parameter	Units	Value/remark GPS #1	Value/remark GPS #2	Value/remark GPS #3
SVID/PRNID		PRNs: 2, 6, 10, 17, 18, 21, 26, 29, 30	PRNs: 3, 11, 14, 15, 18, 22, 23, 25, 31	PRNs: 3, 11, 14, 15, 18, 22, 23, 25, 31

Table 5.2.6.8.4: GPS Acquisition Assistance (Fields occurring once per satellite)

Parameter	Units	Value/remark GPS All
Doppler (0^{th} order term)	Hz	Time varying. See file: Perf Acquisition_assistXX.csv (Note)
Doppler (1^{st} order term)	Hz/sec	Time varying. See file: Perf Acquisition_assistXX.csv (Note)
Doppler Uncertainty	Hz	Time varying. See file: Perf Acquisition_assistXX.csv (Note)
Code Phase	chips	Time varying. See file: Perf Acquisition_assistXX.csv (Note)
Integer Code Phase		Time varying. See file: Perf Acquisition_assistXX.csv (Note)
GPS Bit number		Time varying. See file: Perf Acquisition_assistXX.csv (Note)
Code Phase Search Window	chips	Time varying. See file: Perf Acquisition_assistXX.csv (Note)
Azimuth	deg	Time varying. See file: Perf Acquisition_assistXX.csv (Note)
Elevation	deg	Time varying. See file: Perf Acquisition_assistXX.csv (Note)
Note: Acquisition Assistance parameters This field is "Time varying" and its value depends on the "final GPS TOW" as described in subclause 5.2.6.8. The value of this field to be used shall be determined by taking the "final GPS TOW" value and selecting the nearest field value in the Perf Acquisition_assistXX.csv file corresponding to the value of "final current GPS TOW".		

5.2.6.8a Assistance Data GPS Acquisition Assistance Extension

Contents of GPS Acquisition Assistance Extension IE

Table 5.2.6.8a.1: GPS Acquisition Assistance Extension (Fields occurring once per message)

Parameter	Units	Value/remark GPS All	Release
N_SAT		9	Rel-10 onwards

Table 5.2.6.8a.2: GPS Acquisition Assistance Extension (Fields occurring once per satellite)

Parameter	Units	Value/remark GPS All	Release
SatID		See SVID/PRNID values in Table 5.2.6.8.3	Rel-10 onwards
Azimuth LSB	degrees	Time varying. Calculated from Azimuth, see file: Perf Acquisition_assistXX.csv (Note)	Rel-10 onwards
Elevation LSB	degrees	Time varying. Calculated from Elevation, see file: Perf Acquisition_assistXX.csv (Note)	Rel-10 onwards
Note: This field is "Time varying" and its value depends on the "current GPS TOW" as described in subclause 5.1.3. The value of this field to be used shall be determined by taking the "current GPS TOW" value and selecting the field value in the Perf Acquisition_assistXX.csv file corresponding to the value of "current GPS TOW".			

6 GNSS information

6.1 GNSS Scenarios and Assistance Data for Assisted GNSS signalling tests

6.1.1 General

This subclause defines the GNSS scenario and the associated assistance data that shall be used for all Assisted GNSS signalling tests defined in TS 51.010-1 [4] subclauses 70.12 to 70.15.

The satellite simulator (SS) shall generate all the MS supported GNSS satellite signals defined in subclause 6.1.2 and shall provide assistance data dependent on the MS capabilities defined in subclause 6.1.3.

Where assistance data is required on a per-satellite basis, or where the values of the data also varies with time it is specified in comma-separated-variable files in the GNSS_data.zip file defined in Annex B. These files specify the values to be used for each satellite, indexed by satellite SV ID, and, where applicable, the values to be used indexed by both time and satellite SV ID.

Assistance data that is marked as "time varying" and the GNSS TOW and GANSS TOD fields are only specified and used in 0.96 or 1 second increments. Interpolation between these values shall not be used.

The accuracy of the GNSS TOW and GANSS TOD and assistance data that is marked as "time varying" in the provided assistance data shall be within +/- 2 s relative to the GNSS time in the system simulator.

Assistance data Information Elements and fields that are not specified shall not be used.

The A-GNSS signalling test cases may include several sub-test cases dependent on the GNSS supported by the MS. Each sub-test case is identified by a Sub-Test Case Number as defined in Table 6.1.1-1. The detailed assistance data content defined in subclause 6.1.3 depends on the particular sub-test case.

The term SV ID used in this subclause is defined as the satellite PRN for GPS and Galileo, as the satellite Slot Number for GLONASS and as the Ranging Code Number for BDS.

Most data for Galileo is for further study [FFS].

Table 6.1.1.1: Sub-Test Case Number Definition

Sub-Test Case Number	Supported GNSS
1	MS supporting A-GLONASS only
2	MS supporting A-Galileo only
3	MS supporting A-GPS and Modernized GPS only
4	MS supporting A-GPS and A-GLONASS only
5	Reserved
6	Reserved
7	Reserved
8	Reserved
9	MS supporting A-BDS only
10	MS supporting A-GPS and A-BDS only

6.1.2 GNSS Scenario

The following GNSS scenario shall be used. The assistance data specified in the following subclauses is consistent with this GNSS scenario:

- Yuma Almanac data: the required file(s) in the GNSS_data_sig.zip file specified in Annex B are given below.

Table 6.1.2.1: Yuma Almanac data files for TS 51.010-1 subclause 70.12 to 70.15

Sub-Test Case Number	Yuma file(s)
1	Sig_GNSS_1-1_Yuma.txt
2	Sig_GNSS_1-2_Yuma.txt
3	Sig_GNSS_1-3_Yuma.txt
4	Sig_GNSS_1-1_Yuma.txt and Sig_GNSS_1-3_Yuma.txt
5	[FFS]
6	[FFS]
7	[FFS]
8	[FFS]
9	Sig_GNSS_1-9_Yuma.txt
10	Sig_GNSS_1-3_Yuma.txt and Sig_GNSS_1-9_Yuma.txt

- MS location and Reference location: static at latitude: 35 degrees 44 minutes 39.432 seconds north, longitude: 139 degrees 40 minutes 48.633 seconds east, (Tokyo Japan 2012), height: 300m
- Start time: 1st January 2012 00:31:00 (GPS time)
- Visible satellites simulated are given below

Table 6.1.2.2: Satellites to be simulated for TS 51.010-1 subclause 70.12 to 70.15

Sub-Test Case Number	SV IDs of Satellites to be simulated
1	3, 4, 9, 10, 18, 20
2	[FFS]
3	1, 11, 17, 20, 23, 28 (Note)
4	GPS: 1, 17, 20, 28. GLONASS: 3, 10, 18, 20
5	[FFS]
6	[FFS]
7	[FFS]
8	[FFS]
9	1, 2, 7, 18, 21, 27
10	GPS: 1, 17, 20, 28. BDS: 1, 7, 18, 21
NOTE: For this sub-test the satellite simulator shall generate all the GPS signals supported by the MS for all the simulated satellites.	

- Ionospheric model: see values in subclause 6.1.3
- The levels of the simulated satellites shall all be at -125dBm +/- 6dB

6.1.3 Default Assistance Data Elements to be provided by the SS

The assistance data listed in subclause 6.1.3 are the assistance data elements to be pushed by the SS in some of the tests defined in TS 51.010-1 [4] subclause 70.12 to 70.15. After the reception of an RRLP MEASURE POSITION REQUEST message, the MS may request additional assistance data. In this case the SS shall provide the requested assistance data only if it is available as defined in subclause 6.1.4.

Table 6.1.3.1: GNSS assistance data to be provided to the MS

GNSS Assistance Data IE to be provided to the MS	Mode used in test case	
	MS-based	MS-assisted

GPS Reference Time	Yes for sub-tests 3, 4, 10	Yes for sub-tests 3, 4, 10
GPS Reference Time Extension (Rel-10 onwards)	Yes for sub-tests 3, 4, 10	Yes for sub-tests 3, 4, 10
GPS Reference Location	Yes for sub-tests 3, 4, 10	No
GPS Navigation Model	Yes for sub-tests 3, 4, 10	No
GPS Ionospheric Model	Yes for sub-tests 3, 4, 10	No
GPS UTC Model	Yes for sub-test 4, 10	Yes for sub-test 4, 10
GPS Acquisition Assistance	No	Yes for sub-tests 3, 4, 10
GPS Acquisition Assistance Extension (Rel-10 onwards)	No	Yes for sub-tests 3, 4, 10
GANSS Reference Time	Yes for sub-tests 1, 2, 9	Yes for sub-tests 1, 2, 9
GANSS Reference Location	Yes for sub-tests 1, 2, 9	No
GANSS Ionospheric Model	Yes for sub-test 2	No
GANSS Additional Ionospheric Model	Yes for sub-test 1, 9, 10	No
GANSS Time Model	Yes for sub-test 4, 10	No
GANSS Time Model Extension (Rel-10 onwards)	Yes for sub-test 4, 10	No
GANSS Navigation Model	Yes for sub-tests 1, 2, 4, 9, 10	No
GANSS Reference Measurement Information	No	Yes for sub-tests 1, 2, 4, 9, 10
GANSS Reference Measurement Extension (Rel-10 onwards)	No	Yes for sub-tests 1, 2, 4, 9, 10
GANSS Auxiliary Information	Yes for sub-tests 1, 3, 4. Note.	Yes for sub-tests 1, 3, 4. Note.
Note: Also if MS supports multiple signals per GNSS		

6.1.4 Assistance Data values

Satellite SV IDs to be used

For assistance data IEs which contain the field SatID or SVID/PRNID, and where the values for these fields are not given below, then the following values shall be used.

Table 6.1.4.1: Satellite SV IDs to be used for SatID or SVID/PRNID

Sub-Test Case Number	SV IDs of Satellites to be used
1	3, 4, 9, 10, 18, 20
2	[FFS]
3	1, 11, 17, 20, 23, 28
4	GPS: 1, 17, 20, 28. GLONASS: 3, 10, 18, 20
5	[FFS]
6	[FFS]
7	[FFS]
8	[FFS]
9	1, 2, 7, 18, 21, 27
10	GPS: 1, 17, 20, 28. BDS: 1, 7, 18, 21

Assistance Data GPS Reference Time

Table 6.1.4.2: GPS Reference Time (Fields occurring once per message)

Information Element	Units	Value/remark
GPS Week	weeks	1669
GPS TOW	sec	1860 Start time. Add integer number of 0.96 seconds as required. (Note)
Note: GPS TOW This is the value of GPS TOW in seconds when the GNSS scenario is started in the GNSS simulator. The value of GPS TOW to be used in the Reference Time IE shall be calculated at the time the IE is required by adding the elapsed time since the time the scenario was started in the GNSS simulator to this value, rounded up to the next 0.96 second interval. This "current GPS TOW" is then also used to determine the value of any other Information Elements marked as "Time varying" in subclause 6.1.4.		

Assistance Data GPS Reference Time Extension

Table 6.1.4.2a: GPS Reference Time Extension (Fields occurring once per message)

Information Element	Units	Value/remark	Release
GPS Week Cycle Number	1024 weeks	1	Rel-10 onwards

Assistance Data GPS Reference Location

Table 6.1.4.3: GPS Reference Location

Information Element	Units	Value/remark
Latitude sign		0
Degrees Of Latitude	degrees	35.744287
Degrees Of Longitude	degrees	139.680176
Altitude Direction		0
Altitude	m	300
Uncertainty semi-major	m	3000
Uncertainty semi-minor	m	3000
Orientation of major axis	degrees	0
Uncertainty Altitude	m	500
Confidence	%	68

Assistance Data GPS Navigation Model

Table 6.1.4.4: Satellite Information

Information Element	Units	Value/remark
Num_Sats_Total		6

Table 6.1.4.5: GPS Navigation Model (Fields occurring once per satellite)

Information Element	Units	Value/remark
SatID		See Table 6.1.4-1
Satellite Status		0 (see note)
NOTE: For consistency Satellite Status is also given in file: Sig_GPS_Navigation_model.csv		

Table 6.1.4.6: GPS Ephemeris and Clock correction Information Elements (Fields occurring once per satellite)

Information Element	Units	Value/remark
C/A or P on L2		See file: Sig_GPS_Navigation_model.csv
URA Index		See file: Sig_GPS_Navigation_model.csv
SV Health		See file: Sig_GPS_Navigation_model.csv
IODC		See file: Sig_GPS_Navigation_model.csv
L2 P Data Flag		See file: Sig_GPS_Navigation_model.csv
SF 1 Reserved		See file: Sig_GPS_Navigation_model.csv
SF 2 Reserved		See file: Sig_GPS_Navigation_model.csv
SF 3 Reserved		See file: Sig_GPS_Navigation_model.csv
SF 4 Reserved		See file: Sig_GPS_Navigation_model.csv
T_{GD}	sec	See file: Sig_GPS_Navigation_model.csv
t_{oc}	sec	See file: Sig_GPS_Navigation_model.csv
af_2	sec/sec^2	See file: Sig_GPS_Navigation_model.csv
af_1	sec/sec	See file: Sig_GPS_Navigation_model.csv
af_0	sec	See file: Sig_GPS_Navigation_model.csv
C_{rs}	meters	See file: Sig_GPS_Navigation_model.csv
Δn	semi-circles/sec	See file: Sig_GPS_Navigation_model.csv
M_0	semi-circles	See file: Sig_GPS_Navigation_model.csv
C_{uc}	radians	See file: Sig_GPS_Navigation_model.csv
e		See file: Sig_GPS_Navigation_model.csv
C_{us}	radians	See file: Sig_GPS_Navigation_model.csv
$(A)^{1/2}$	$meters^{1/2}$	See file: Sig_GPS_Navigation_model.csv
t_{oe}	sec	See file: Sig_GPS_Navigation_model.csv
Fit Interval Flag		See file: Sig_GPS_Navigation_model.csv
AODO	sec	See file: Sig_GPS_Navigation_model.csv
C_{ic}	radians	See file: Sig_GPS_Navigation_model.csv
$OMEGA_0$	semi-circles	See file: Sig_GPS_Navigation_model.csv
C_{is}	radians	See file: Sig_GPS_Navigation_model.csv
i_0	semi-circles	See file: Sig_GPS_Navigation_model.csv
C_{rc}	meters	See file: Sig_GPS_Navigation_model.csv
ω	semi-circles	See file: Sig_GPS_Navigation_model.csv
OMEGAdot	semi-circles/sec	See file: Sig_GPS_Navigation_model.csv
Idot	semi-circles/sec	See file: Sig_GPS_Navigation_model.csv

Assistance Data GPS Ionospheric Model

Table 6.1.4.7: GPS Ionospheric Model

Information Element	Units	Value/remark
α_0	seconds	4.6566129 10E-9
α_1	sec/semi-circle	1.4901161 10E-8
α_2	$sec/(semi\text{-}circle)^2$	-5.96046 10E-8
α_3	$sec/(semi\text{-}circle)^3$	-5.96046 10E-8
β_0	seconds	79872
β_1	sec/semi-circle	65536
β_2	$sec/(semi\text{-}circle)^2$	-65536
β_3	$sec/(semi\text{-}circle)^3$	-393216

Assistance Data GPS UTC Model

Table 6.1.4.8: GPS UTC Model

Information Element	Units	Value/remark
A_1	sec/sec	0
A_0	seconds	0
t_{ot}	seconds	249856
WN_t	weeks	133
Δt_{LS}	seconds	15
WN_{LSF}	weeks	158
DN	days	7
Δt_{LSF}	seconds	16

Assistance Data GPS Almanac

Table 6.1.4.9: GPS Almanac (Fields occurring once per message)

Information Element	Units	Value/remark
Num_Sats_Total		31
WN_a	weeks	1669

Table 6.1.4.10: GPS Almanac (Fields occurring once per satellite)

Information Element	Units	Value/remark
SatID		PRNs: 1, 2, 3…21, 22, 23, 25, 26, 27…30, 31, 32
e	dimensionless	See file: Sig_GPS_Almanac.csv
t_{oa}	sec	See file: Sig_GPS_Almanac.csv
δi	semi-circles	See file: Sig_GPS_Almanac.csv
OMEGADOT	semi-circles/sec	See file: Sig_GPS_Almanac.csv
SV Health		See file: Sig_GPS_Almanac.csv
$A^{1/2}$	$meters^{1/2}$	See file: Sig_GPS_Almanac.csv
$OMEGA_0$	semi-circles	See file: Sig_GPS_Almanac.csv
ω	semi-circles	See file: Sig_GPS_Almanac.csv
M_0	semi-circles	See file: Sig_GPS_Almanac.csv
af_0	seconds	See file: Sig_GPS_Almanac.csv
af_1	sec/sec	See file: Sig_GPS_Almanac.csv

Assistance Data GPS Almanac Extension

Table 6.1.4.10a: GPS Almanac Extension (Fields occurring once per message)

Information Element	Units	Value/remark	Release
Complete Almanac Provided		1 (TRUE)	Rel-10 onwards

Assistance Data GPS Acquisition Assistance

Table 6.1.4.11: GPS Acquisition Assistance - Information Elements appearing once per message

Information Element	Units	Value/remark
Number of Satellites		6
GPS TOW		1860 s Start time. Add integer number of 0.96 seconds as required. (Note)
Note: GPS TOW This is the value of GPS TOW in seconds when the GNSS scenario is started in the GNSS simulator. The value of GPS TOW to be used in the Acquisition Assistance IE shall be calculated at the time the IE is required by adding the elapsed time since the time the scenario was started in the GNSS simulator to this value, rounded up to the next 0.96 second interval.		

Table 6.1.4.12: GPS Acquisition Assistance - Information Elements appearing once per satellite

Information Element	Units	Value/remark
SVID/PRNID		See Table 6.1.4-1
Doppler (0^{th} order term)	Hz	Time varying. See file: Sig_GPS_Acquisition_assist.csv (Note)
Doppler (1^{st} order term)	Hz/sec	Time varying. See file: Sig_GPS_Acquisition_assist.csv (Note)
Doppler Uncertainty	Hz	Time varying. See file: Sig_GPS_Acquisition_assist.csv (Note)
Code Phase	chips	Time varying. See file: Sig_GPS_Acquisition_assist.csv (Note)
Integer Code Phase		Time varying. See file: Sig_GPS_Acquisition_assist.csv (Note)
GPS Bit number		Time varying. See file: Sig_GPS_Acquisition_assist.csv (Note)
Code Phase Search Window	chips	Time varying. See file: Sig_GPS_Acquisition_assist.csv (Note)
Azimuth	deg	Time varying. See file: Sig_GPS_Acquisition_assist.csv (Note)
Elevation	deg	Time varying. See file: Sig_GPS_Acquisition_assist.csv (Note)
Note: This field is "Time varying" and its value depends on the "current GPS TOW". The value of this field to be used shall be determined by taking the "current GPS TOW" value and selecting the field value in the Sig_GPS_Acquisition_assist.csv file corresponding to the value of "current GPS TOW ".		

Assistance Data GPS Acquisition Assistance Extension

Table 6.1.4.12a: GPS Acquisition Assistance Extension - Information Elements appearing once per message

Information Element	Units	Value/remark	Release
N_SAT		6	Rel-10 onwards

Table 6.1.4.12b: GPS Acquisition Assistance Extension - Information Elements appearing once per satellite

Information Element	Units	Value/remark	Release
SatID		See Table 6.1.4-1	Rel-10 onwards
Azimuth LSB	degrees	Time varying. Calculated from Azimuth, see file: Sig_GPS_Acquisition_assist.csv (Note)	Rel-10 onwards
Elevation LSB	degrees	Time varying. Calculated from Elevation, see file: Sig_GPS_Acquisition_assist.csv (Note)	Rel-10 onwards
Note: This field is "Time varying" and its value depends on the "current GPS TOW" as described in subclause 5.1.3. The value of this field to be used shall be determined by taking the "current GPS TOW" value and selecting the field value in the Sig_GPS_Acquisition_assist.csv file corresponding to the value of "current GPS TOW".			

Assistance Data GANSS Reference Time

Table 6.1.4.13: Assistance Data GANSS Reference Time: sub-test 1

Information Element	Units	Value/remark
GANSS Day		5844
GANSS TOD	seconds	12645 s Start time. Add integer number of 1 seconds as required. (Note)
GANSS TOD Uncertainty		125 (2.127 seconds)
GANSS Time ID		2 (GLONASS)
Note: GANSS TOD This is the value of GANSS TOD when the GNSS scenario is started in the GNSS simulator. The value of GANSS TOD to be used in the Reference Time IE shall be calculated at the time the IE is required by adding the elapsed time since the time the scenario was started in the GNSS simulator to this value, rounded up to the next 1 second interval. This "current GANSS TOD" is then also used to determine the value of any other Information Elements marked as "Time varying" in subclause 6.1.4		

Table 6.1.4.14: Assistance Data GANSS Reference Time: sub-test 2

Information Element	Units	Value/remark
GANSS Day		FFS
GANSS TOD	seconds	FFS Start time. Add integer number of 1 seconds as required. (Note)
GANSS TOD Uncertainty		125 (2.127 seconds)
GANSS Time ID		Not present (Galileo)
Note: GANSS TOD This is the value of GANSS TOD when the GNSS scenario is started in the GNSS simulator. The value of GANSS TOD to be used in the Reference Time IE shall be calculated at the time the IE is required by adding the elapsed time since the time the scenario was started in the GNSS simulator to this value, rounded up to the next 1 second interval. This "current GANSS TOD" is then also used to determine the value of any other Information Elements marked as "Time varying" in subclause 6.1.4		

Table 6.1.4.14a: Assistance Data GANSS reference time: sub-test 9

Information Element	Units	Value/remark	Release
GANSS Day		2191	
GANSS Day Cycle Number		0	
GANSS TOD	Seconds	1846. Start time. Add integer number of 1 seconds as required. (Note)	
GANSS TOD Uncertainty		125 (2.127 seconds)	
GANSS Time ID		3 (BDS)	
Note: GANSS TOD This is the value of GANSS TOD when the GNSS scenario is started in the GNSS simulator. The value of GANSS TOD to be used in the Reference Time IE shall be calculated at the time the IE is required by adding the elapsed time since the time the scenario was started in the GNSS simulator to this value, rounded up to the next 1 second interval. This "current GANSS TOD" is then also used to determine the value of any other Information Elements marked as "Time varying" in subclause 6.1.4			

Assistance Data GANSS Reference Location

Table 6.1.4.15: Assistance Data GANSS Reference Location

Information Element	Units	Value/remark
Latitude sign		0
Degrees Of Latitude	degrees	35.744287
Degrees Of Longitude	degrees	139.680176
Altitude Direction		0
Altitude	m	300
Uncertainty semi-major	m	3000
Uncertainty semi-minor	m	3000
Orientation of major axis	degrees	0

Information Element	Units	Value/remark
Uncertainty Altitude	m	500
Confidence	%	68

Assistance Data GANSS Ionospheric Model

Table 6.1.4.16: GANSS Ionospheric Model

Information Element	Units	Value/remark
a_{i0}		FFS
a_{i1}		FFS
a_{i2}		FFS
Storm Flag 1		0
Storm Flag 2		0
Storm Flag 3		0
Storm Flag 4		0
Storm Flag 5		0

Assistance Data GANSS Additional Ionospheric Model

Table 6.1.4.16a: GANSS Additional Ionospheric Model (GLONASS)

Information Element	Units	Value/remark
Data Id		00
α_0	Seconds	4.6566129 10E-9
α_1	sec/semi-circle	1.4901161 10E-8
α_2	sec/(semi-circle)^2	-5.96046 10E-8
α_3	sec/(semi-circle)^3	-5.96046 10E-8
β_0	Seconds	79872
β_1	sec/semi-circle	65536
β_2	sec/(semi-circle)^2	-65536
β_3	sec/(semi-circle)^3	-393216

Table 6.1.4.16a0: GANSS additional ionospheric model (BDS)

Information Element	Units	Value/remark
Data Id		01
α_0	Seconds	4.6566129 10E-9
α_1	sec/semi-circle	1.4901161 10E-8
α_2	sec/(semi-circle)^2	-5.96046 10E-8
α_3	sec/(semi-circle)^3	-5.96046 10E-8
β_0	Seconds	79872
β_1	sec/semi-circle	65536
β_2	sec/(semi-circle)^2	-65536

Assistance Data GANSS ID

Table 6.1.4.16b: GANSS ID: sub-test 1, 4

Information Element	Units	Value/remark
GANSS ID		3 (GLONASS)

Table 6.1.4.16c: GANSS ID: sub-test 2

Information Element	Units	Value/remark
GANSS ID		Not present (Galileo)

Table 6.1.4.16d: GANSS ID: sub-test 3

Information Element	Units	Value/remark
GANSS ID		1 (Modernized GPS)

Table 6.1.4.16e: GANSS ID: sub-test 9, 10

Information Element	Units	Value/remark
GANSS ID		4 (BDS)

Assistance Data GANSS Time Model

Table 6.1.4.17: GANSS time Model

Information Element	Units	Value/remark
GANSS Time Model Reference Time		1860 s
T_{A0}	Seconds	0
GNSS_TO_ID		0 (GPS)

Assistance Data GANSS Time Model Extension

Table 6.1.4.17a: GANSS Time Model Extension (GLONASS)

Information Element	Units	Value/remark	Release
GNSS_TOD_ID		0 (GPS)	Rel-10 onwards
Delta T	Seconds	15	Rel-10 onwards

Table 6.1.4.17b: GANSS Time Model Extension (BDS)

Information Element	Units	Value/remark	Release
GNSS_TOD_ID		0 (GPS)	
Delta T	Seconds	13	

Assistance Data GANSS Navigation Model

Table 6.1.4.18: Void

Table 6.1.4.19: GANSS Navigation Model: sub-test 1, 4

Information Element	Units	Value/remark
Num_Sat		6
Non-Broadcast Indication		0

Table 6.1.4.20: Satellite Information (Fields occurring once per satellite): sub-test 1, 4

Information Element	Units	Value/remark
SatID		See Table 6.1.4-1
SV Health		01111 (Note)
IOD		225 (Note)
Note: For consistency SV Health and IOD are also given in file: Sig_GANSS_Navigation_Model_subtest1_4.csv		

Table 6.1.4.21: GANSS Clock Model (Fields occurring once per satellite): sub-test 1, 4

Information Element	Units	Value/remark
GLONASS Satellite Clock Model		
$\tau_n(t_b)$	seconds	See file: Sig_GANSS_Navigation_Model_subtest1_4.csv
$\gamma_n(t_b)$		See file: Sig_GANSS_Navigation_Model_subtest1_4.csv
$\Delta\tau_n$	seconds	See file: Sig_GANSS_Navigation_Model_subtest1_4.csv

Table 6.1.4.22: GANSS Orbit Model (Fields occurring once per satellite): sub-test 1, 4

Information Element	Units	Value/remark
GLONASS Earth-Centered, Earth-fixed Parameters		
E_n	days	See file: Sig_GANSS_Navigation_Model_subtest1_4.csv
P1	minutes	See file: Sig_GANSS_Navigation_Model_subtest1_4.csv
P2		See file: Sig_GANSS_Navigation_Model_subtest1_4.csv
M		See file: Sig_GANSS_Navigation_Model_subtest1_4.csv
$x_n(t_b)$	kilometers	See file: Sig_GANSS_Navigation_Model_subtest1_4.csv
$\dot{x}_n(t_b)$	kilometers/sec	See file: Sig_GANSS_Navigation_Model_subtest1_4.csv
$\ddot{x}_n(t_b)$	kilometers/sec^2	See file: Sig_GANSS_Navigation_Model_subtest1_4.csv
$y_n(t_b)$	kilometers	See file: Sig_GANSS_Navigation_Model_subtest1_4.csv
$\dot{y}_n(t_b)$	kilometers/sec	See file: Sig_GANSS_Navigation_Model_subtest1_4.csv
$\ddot{y}_n(t_b)$	kilometers/sec^2	See file: Sig_GANSS_Navigation_Model_subtest1_4.csv
$z_n(t_b)$	kilometers	See file: Sig_GANSS_Navigation_Model_subtest1_4.csv
$\dot{z}_n(t_b)$	kilometers/sec	See file: Sig_GANSS_Navigation_Model_subtest1_4.csv
$\ddot{z}_n(t_b)$	kilometers/sec^2	See file: Sig_GANSS_Navigation_Model_subtest1_4.csv

Table 6.1.4.23: Void

Table 6.1.4.24: GANSS Navigation Model: sub-test 2

Information Element	Units	Value/remark
Num_Sat		6
Non-Broadcast Indication		0

Table 6.1.4.25: Satellite Information (Fields occurring once per satellite): sub-test 2

Information Element	Units	Value/remark
SatID		See Table 6.1.4-1
SV Health		0 (Note)
IOD		[FFS] (Note)
Note: For consistency SV Health and IOD are also given in file: See file: Sig_GANSS_Navigation_Model_subtest2.csv.		

Table 6.1.4.26: GANSS Clock Model (Fields occurring once per satellite): sub-test 2

Information Element	Units	Value/remark
Standard Satellite clock model		
t_{oc}	seconds	See file: Sig_GANSS_Navigation_Model_subtest2.csv
a_{f2}	sec/sec^2	See file: Sig_GANSS_Navigation_Model_subtest2.csv
a_{f1}	sec/sec	See file: Sig_GANSS_Navigation_Model_subtest2.csv
a_{f0}	sec	See file: Sig_GANSS_Navigation_Model_subtest2.csv
T_{GD}	sec	See file: Sig_GANSS_Navigation_Model_subtest2.csv
Model ID		See file: Sig_GANSS_Navigation_Model_subtest2.csv

Table 6.1.4.27: GANSS Orbit Model (Fields occurring once per satellite): sub-test 2

Information Element	Units	Value/remark
Satellite Navigation Model Using Keplerian Parameters		
t_{oe}	seconds	See file: Sig_GANSS_Navigation_Model_subtest2.csv
ω	semi-circles	See file: Sig_GANSS_Navigation_Model_subtest2.csv
Δn	semi-circles/sec	See file: Sig_GANSS_Navigation_Model_subtest2.csv
M_0	semi-circles	See file: Sig_GANSS_Navigation_Model_subtest2.csv
OMEGAdot	semi-circles/sec	See file: Sig_GANSS_Navigation_Model_subtest2.csv
e		See file: Sig_GANSS_Navigation_Model_subtest2.csv
Idot	semi-circles/sec	See file: Sig_GANSS_Navigation_Model_subtest2.csv
sqrtA	meters$^{1/2}$	See file: Sig_GANSS_Navigation_Model_subtest2.csv
i_0	semi-circles	See file: Sig_GANSS_Navigation_Model_subtest2.csv
$OMEGA_0$	semi-circles	See file: Sig_GANSS_Navigation_Model_subtest2.csv
C_{rs}	meters	See file: Sig_GANSS_Navigation_Model_subtest2.csv
C_{is}	radians	See file: Sig_GANSS_Navigation_Model_subtest2.csv
C_{us}	radians	See file: Sig_GANSS_Navigation_Model_subtest2.csv
C_{rc}	meters	See file: Sig_GANSS_Navigation_Model_subtest2.csv
C_{ic}	radians	See file: Sig_GANSS_Navigation_Model_subtest2.csv
C_{uc}	radians	See file: Sig_GANSS_Navigation_Model_subtest2.csv

Table 6.1.4.27a: GANSS Navigation Model: sub-test 9, 10

Information Element	Units	Value/remark
Num_Sat		6
Non-Broadcast Indication		0

Table 6.1.4.27b: Satellite Information (Fields occurring once per satellite): sub-test 9, 10

Information Element	Units	Value/remark
SatID		See Table 6.1.4-1
SV Health		0 (Note)
IOD		0 (Note)
Note: For consistency SV Health and IOD are also given in file: See file: Sig_GANSS_Navigation_Model_subtest9_10.csv.		

Table 6.1.4.27c: GANSS Clock Model (Fields occurring once per satellite): sub-test 9, 10

Information Element	Units	Value/remark
Standard Satellite clock model		
t_{oc}	seconds	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
a_{f2}	sec/sec^2	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
a_{f1}	sec/sec	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
a_{f0}	sec	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
T_{GD}	sec	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
Model ID		See file: Sig_GANSS_Navigation_Model_subtest9_10.csv

Table 6.1.4.27d: GANSS Orbit Model (Fields occurring once per satellite): sub-test 9, 10

Information Element	Units	Value/remark
Satellite Navigation Model Using Keplerian Parameters		
t_{oe}	seconds	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
ω	semi-circles	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
Δn	semi-circles/sec	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
M_0	semi-circles	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
OMEGAdot	semi-circles/sec	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
e		See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
Idot	semi-circles/sec	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
sqrtA	meters$^{1/2}$	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
i_0	semi-circles	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
$OMEGA_0$	semi-circles	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
C_{rs}	meters	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
C_{is}	radians	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
C_{us}	radians	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
C_{rc}	meters	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
C_{ic}	radians	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv
C_{uc}	radians	See file: Sig_GANSS_Navigation_Model_subtest9_10.csv

Assistance Data GANSS Reference Measurement Information

Table 6.1.4.28: Void

Table 6.1.4.29: GANSS reference measurement information: sub-test 1, 4 (Fields occurring once per message)

Information Element	Units	Value/remark
GANSS Signal ID		0 (G1)

Table 6.1.4.30: GANSS Reference Measurement Information: sub-test 1, 4 (Fields occurring once per satellite)

Information Element	Units	Value/remark
SVID		See Table 6.1.4-1
Doppler (0^{th} order term)	m/s	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest1_4.csv (Note)
Doppler (1^{st} order term)	m/s/s	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest1_4.csv (Note)
Doppler Uncertainty	m/s	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest1_4.csv (Note)
Code Phase	ms	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest1_4.csv (Note)
Integer Code Phase	ms	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest1_4.csv (Note)
Code Phase Search Window		Time varying. See file: Sig_GANSS_reference_measurement_information_subtest1_4.csv (Note)
Azimuth	deg	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest1_4.csv (Note)
Elevation	deg	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest1_4.csv (Note)
Note: For sub-test 1: this field is "Time varying" and its value depends on the "current GANSS TOD". The value of this field to be used shall be determined by taking the "current GANSS TOD" value and selecting the field value in the Sig_GANSS_reference_measurement_information_subtest1_4.csv file corresponding to the value of "current GANSS TOD". For sub-test 4: this field is "Time varying" and its value depends on the "current GPS TOW". The value of this field to be used shall be determined by taking the "current GPS TOW" value and selecting the field value in the Sig_GANSS_reference_measurement_information_subtest1_4.csv file corresponding to the value of "current GPS TOW".		

Table 6.1.4.31: Void

Table 6.1.4.32: GANSS Reference Measurement Information: sub-test 2 (Fields occurring once per message)

Information Element	Units	Value/remark
GANSS Signal ID		0 (E1)

Table 6.1.4.33: GANSS Reference Measurement Information: sub-test 2 (Fields occurring once per satellite)

Information Element	Units	Value/remark
SVID		See Table 6.1.4-1
Doppler (0^{th} order term)	m/s	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest2.csv (Note)
Doppler (1^{st} order term)	m/s/s	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest2.csv (Note)
Doppler Uncertainty	m/s	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest2.csv (Note)
Code Phase	ms	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest2.csv (Note)
Integer Code Phase	ms	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest2.csv (Note)
Code Phase Search Window		Time varying. See file: Sig_GANSS_reference_measurement_information_subtest2.csv (Note)
Azimuth	deg	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest2.csv (Note)
Elevation	deg	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest2.csv (Note)
Note: This field is "Time varying" and its value depends on the "current GANSS TOD". The value of this field to be used shall be determined by taking the "current GANSS TOD" value and selecting the field value in the Sig_GANSS_reference_measurement_information_subtest2.csv file corresponding to the value of "current GANSS TOD".		

Table 6.1.4.33a0: GANSS reference measurement information: sub-test 9, 10 (Fields occurring once per message)

Information Element	Units	Value/remark
GANSS Signal ID		0 (B1I)

Table 6.1.4.33b0: GANSS Reference Measurement Information: sub-test 9, 10 (Fields occurring once per satellite)

Information Element	Units	Value/remark
SVID		See Table 6.1.4-1
Doppler (0^{th} order term)	m/s	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest9_10.csv (Note)
Doppler (1^{st} order term)	m/s/s	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest9_10.csv (Note)
Doppler Uncertainty	m/s	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest9_10.csv (Note)
Code Phase	ms	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest9_10.csv (Note)
Integer Code Phase	ms	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest9_10.csv (Note)
Code Phase Search Window		Time varying. See file: Sig_GANSS_reference_measurement_information_subtest9_10.csv (Note)
Azimuth	deg	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest9_10.csv (Note)
Elevation	deg	Time varying. See file: Sig_GANSS_reference_measurement_information_subtest9_10.csv (Note)
Note: This field is “Time varying” and its value depends on the “current GANSS TOD”. The value of this field to be used shall be determined by taking the “current GANSS TOD” value and selecting the field value in the Sig GANSS reference measurement information subtest9_10.csv file corresponding to the value of “current GANSS TOD”.		

Assistance Data GANSS Reference Measurement Extension

Table 6.1.4.33a: GANSS Reference Measurement Extension: sub-test 1, 4 (Fields occurring once per message)

Information Element	Units	Value/remark	Release
Num_Sat		6	Rel-10 onwards

Table 6.1.4.33b: GANSS Reference Measurement Extension: sub-test 1, 4 (Fields occurring once per satellite)

Information Element	Units	Value/remark	Release
SV_ID		See Table 6.1.4-1	Rel-10 onwards
Azimuth LSB	degrees	Time varying. Calculated from Azimuth, see file: Sig_GANSS_reference_measurement_information_subtest1_4.csv (Note)	Rel-10 onwards
Elevation LSB	degrees	Time varying. Calculated from Elevation, see file: Sig_GANSS_reference_measurement_information_subtest1_4.csv (Note)	Rel-10 onwards
Note: For sub-test 1: this field is "Time varying" and its value depends on the "current GANSS TOD". The value of this field to be used shall be determined by taking the "current GANSS TOD" value and selecting the field value in the Sig_GANSS_reference_measurement_information_subtest1_4.csv file corresponding to the value of "current GANSS TOD". For sub-test 4: this field is "Time varying" and its value depends on the "current GPS TOW". The value of this field to be used shall be determined by taking the "current GPS TOW" value and selecting the field value in the Sig_GANSS_reference_measurement_information_subtest1_4.csv file corresponding to the value of "current GPS TOW".			

Table 6.1.4.33c: GANSS Reference Measurement Extension: sub-test 2 (Fields occurring once per message)

Information Element	Units	Value/remark	Release
Num_Sat		6	Rel-10 onwards

Table 6.1.4.33d: GANSS Reference Measurement Extension: sub-test 2 (Fields occurring once per satellite)

Information Element	Units	Value/remark	Release
SV_ID		See Table 6.1.4-1	Rel-10 onwards
Azimuth LSB	degrees	Time varying. Calculated from Azimuth, see file: Sig_GANSS_reference_measurement_information_subtest2.csv (Note)	Rel-10 onwards
Elevation LSB	degrees	Time varying. Calculated from Elevation, see file: Sig_GANSS_reference_measurement_information_subtest2.csv (Note)	Rel-10 onwards
Note: This field is "Time varying" and its value depends on the "current GANSS TOD". The value of this field to be used shall be determined by taking the "current GANSS TOD" value and selecting the field value in the Sig_GANSS_reference_measurement_information_subtest2.csv file corresponding to the value of "current GANSS TOD".			

Table 6.1.4.33e: GANSS Reference Measurement Extension: sub-test 9, 10 (Fields occurring once per message)

Information Element	Units	Value/remark	Release
Num_Sat		6	

Table 6.1.4.33f: GANSS Reference Measurement Extension: sub-test 6, 9 (Fields occurring once per satellite)

Information Element	Units	Value/remark	Release
SV_ID		See Table 6.1.4-1	
Azimuth LSB	degrees	Time varying. Calculated from Azimuth, see file: Sig_GANSS_reference_measurement_information_subtest9_10.csv (Note)	
Elevation LSB	degrees	Time varying. Calculated from Elevation, see file: Sig_GANSS_reference_measurement_information_subtest9_10.csv (Note)	
Note: This field is "Time varying" and its value depends on the "current GANSS TOD". The value of this field to be used shall be determined by taking the "current GANSS TOD" value and selecting the field value in the Sig GANSS reference measurement information subtest9_10.csv file corresponding to the value of "current GANSS TOD".			

Assistance Data GANSS almanac

Table 6.1.4.34: Void

Table 6.1.4.35: GANSS almanac: sub-test 1, 4 (Fields occurring once per message)

Information Element	Units	Value/remark
Num Sats Total		24
Week Number		Any value

Table 6.1.4.35a: Void

Table 6.1.4.35b: GANSS almanac: sub-test 1, 4 (Fields occurring once per satellite)

Information Element	Units	Value/remark
GLONASS Keplerian Parameters		
N^A	days	See file: Sig_GANSS_Almanac_subtest1_4.csv
n^A		Slot Numbers: 1, 2, 3 …. 22, 23, 24
H_n^A		See file: Sig_GANSS_Almanac_subtest1_4.csv
λ_n^A	semi-circles	See file: Sig_GANSS_Almanac_subtest1_4.csv
$t_{\lambda n}^A$	seconds	See file: Sig_GANSS_Almanac_subtest1_4.csv
Δi_n^A	semi-circles	See file: Sig_GANSS_Almanac_subtest1_4.csv
ΔT_n^A	sec/orbit period	See file: Sig_GANSS_Almanac_subtest1_4.csv
$\Delta T\_DOT_n^A$	sec/orbit period^2	See file: Sig_GANSS_Almanac_subtest1_4.csv
ε_n^A		See file: Sig_GANSS_Almanac_subtest1_4.csv
ω_n^A	semi-circles	See file: Sig_GANSS_Almanac_subtest1_4.csv
τ_n^A	seconds	See file: Sig_GANSS_Almanac_subtest1_4.csv
C_n^A		See file: Sig_GANSS_Almanac_subtest1_4.csv
M_n^A		See file: Sig_GANSS_Almanac_subtest1_4.csv

Table 6.1.4.36: Void

Table 6.1.4.37: GANSS almanac: sub-test 2 (Fields occurring once per message)

Information Element	Units	Value/remark
Num Sats Total		24
Week Number		FFS

Table 6.1.4.38: GANSS almanac: sub-test 2 (Fields occurring once per satellite)

Information Element	Units	Value/remark
Keplerian parameters		
SVID		SV IDs: [FFS]
E		See file: Sig_GANSS_Almanac_subtest2.csv
δi	semi-circles	See file: Sig_GANSS_Almanac_subtest2.csv
OMEGADOT	semi-circles/sec	See file: Sig_GANSS_Almanac_subtest2.csv
SV Health KP		See file: Sig_GANSS_Almanac_subtest2.csv
delta $A^{1/2}$	meters$^{1/2}$	See file: Sig_GANSS_Almanac_subtest2.csv
$OMEGA_0$	semi-circles	See file: Sig_GANSS_Almanac_subtest2.csv
M_0	semi-circles	See file: Sig_GANSS_Almanac_subtest2.csv
ω	semi-circles	See file: Sig_GANSS_Almanac_subtest2.csv
af_0	Seconds	See file: Sig_GANSS_Almanac_subtest2.csv
af_1	sec/sec	See file: Sig_GANSS_Almanac_subtest2.csv

Table 6.1.4.38a0: GANSS almanac: sub-test 9, 10 (Fields occurring once per message)

Information Element	Units	Value/remark
Num Sats Total		30
Week Number		313

Table 6.1.4.38b0: GANSS almanac: sub-test 9, 10 (Fields occurring once per satellite)

Information Element	Units	Value/remark
Keplerian parameters		
SVID		SV IDs: 1, 2, 3, …, 30
E		See file: Sig_GANSS_Almanac_subtest9_10.csv
δi	semi-circles	See file: Sig_GANSS_Almanac_subtest9_10.csv
OMEGADOT	semi-circles/sec	See file: Sig_GANSS_Almanac_subtest9_10.csv
SV Health KP		See file: Sig_GANSS_Almanac_subtest9_10.csv
delta $A^{1/2}$	meters$^{1/2}$	See file: Sig_GANSS_Almanac_subtest9_10.csv
$OMEGA_0$	semi-circles	See file: Sig_GANSS_Almanac_subtest9_10.csv
M_0	semi-circles	See file: Sig_GANSS_Almanac_subtest9_10.csv
ω	semi-circles	See file: Sig_GANSS_Almanac_subtest9_10.csv
af_0	Seconds	See file: Sig_GANSS_Almanac_subtest9_10.csv
af_1	sec/sec	See file: Sig_GANSS_Almanac_subtest9_10.csv

Assistance Data GANSS Almanac Model Extension

Table 6.1.4.38a: GANSS Almanac Model Extension: sub-test 1, 4 (Fields occurring once per message)

Information Element	Units	Value/remark	Release
Complete Almanac Provided		1 (TRUE)	Rel-10 onwards

Table 6.1.4.38b: GANSS Almanac Model Extension: sub-test 2 (Fields occurring once per message)

Information Element	Units	Value/remark	Release
Complete Almanac Provided		1 (TRUE)	Rel-10 onwards

Table 6.1.4.38c: GANSS Almanac Model Extension: sub-test 9, 10 (Fields occurring once per message)

Information Element	Units	Value/remark	Release
Complete Almanac Provided		1 (TRUE)	

Assistance Data GANSS Auxiliary Information

Table 6.1.4.39: Void

Table 6.1.4.40: GANSS Auxiliary Information: sub-test 1, 4 (Fields occurring once per satellite)

Information Element	Units	Value/remark
SVID		Slot Number s: See Table 6.1.4-1
Signals Available		G1
Channel Number		5, 6, -2, -7, -3, 2

Table 6.1.4.41: Void

Table 6.1.4.42: GANSS Auxiliary Information: sub-test 3 (Fields occurring once per satellite)

Information Element	Units	Value/remark
SVID		PRNs: See Table 6.1.4-1
Signals Available		L1C and others as supported by the MS

6.2 GNSS Scenarios and Assistance Data for Assisted GNSS Minimum Performance tests

6.2.1 General

6.2.1.0 Introduction

This subclause defines the GNSS scenarios and assistance data IEs which shall be available for use as specified in all A-GNSS Minimum Performance test cases defined in TS 51.010-1 [4] subclause 70.16.

The information elements are given with reference to TS 44.031 [5], where the details are defined.

Subclauses 6.2.2 and 6.2.3 list the assistance data IEs required for performance testing of MS-based mode, and subclauses 6.2.4 and 6.2.5 list the assistance data available for performance testing of MS-assisted mode. Subclause 6.2.6 lists the values of the assistance data IE fields for all performance testing.

The A-GNSS minimum performance requirements are defined by assuming that all relevant and valid assistance data is received by the MS in order to perform GNSS measurements and/or position calculation. This subclause does not include nor consider delays occurring in the various signalling interfaces of the network.

The term SV ID used in this subclause is defined as the satellite PRN for GPS and Galileo, and as the satellite Slot Number for GLONASS.

Most data for Galileo is for further study [FFS].

6.2.1.1 Satellite constellations and assistance data for A-GNSS performance testing

The satellite constellation shall consist of 24 satellites for GLONASS; 27 satellites for GPS, Modernized GPS and Galileo; 3 satellites for QZSS; and 2 satellites for SBAS. Almanac assistance data shall be available for all these satellites. At least 7 of the satellites per GPS, Modernized GPS, Galileo or GLONASS constellation shall be visible to the MS (that is, above 15 degrees elevation with respect to the MS). At least 1 of the satellites for QZSS shall be within 15 degrees of zenith; and at least 1 of the satellites for SBAS shall be visible to the MS. All other satellite specific

assistance data shall be available for all visible satellites. In each test, signals are generated for only 6 satellites (or 7 if SBAS is included). The HDOP for the test shall be calculated using these satellites. The simulated satellites for GPS, Modernized GPS, Galileo and GLONASS shall be selected from the visible satellites for each constellation, consistent with achieving the required HDOP for the test.

6.2.1.2 GNSS Scenarios for A-GNSS performance testing

6.2.1.2.0 Introduction

This subclause defines the GNSS scenarios that shall be used for all Assisted GNSS performance tests defined in TS 51.010-1 [4] subclause 70.16.

The GNSS scenarios achieve the required HDOP for the Test Cases as defined in the Requirements specification TS 45.005 [8]. They also satisfy the requirement that for each test instance the reference location shall change sufficiently such that the MS shall have to use the new assistance data.

The viable running time during which the scenario maintains the required HDOP or HDOPs is given. Once this time has been reached the scenario shall be restarted from its nominal start time.

The test cases include sub-test cases dependent on the GNSS supported by the MS. Each sub-test case is identified by a Sub-Test Case Number as defined in Table 6.2.1.2.1. For each GNSS scenario the parameters that vary with the sub-test are given for each sub-test.

Table 6.2.1.2.0.1: Sub-Test Case Number Definition

Sub-Test Case Number	Supported GNSS
1	MS supporting A-GLONASS only
2	MS supporting A-Galileo only
3	MS supporting A-GPS and Modernized GPS only
4	MS supporting A-GPS and A-GLONASS only

6.2.1.2.1 GNSS Scenario #1

The following GNSS scenario #1 shall be used during the TTFF tests defined in TS 51.010-1 [4] subclause 70.16 with the exception of the Nominal Accuracy test. The assistance data specified in the following subclauses for GNSS scenario #1 is consistent with this GNSS scenario.

Yuma Almanac data: the required file(s) in the GNSS_data_perf.zip file defined in Annex B are given in Table 6.2.1.2.1.1.

Table 6.2.1.2.1.1: Yuma Almanac data files

Sub-Test Case Number	Yuma file(s)
1	Perf_GNSS_1-1_Yuma.txt
2	Perf_GNSS_1-2_Yuma.txt
3	Perf_GNSS_1-3_Yuma.txt
4	Perf_GNSS_1-1_Yuma.txt and Perf_GNSS_1-3_Yuma.txt

MS location: the MS location is calculated as a random offset from the reference location using the method described in subclause 6.2.1.2.5. The reference location is: latitude: 35 degrees 44 minutes 39.432 seconds north, longitude: 139 degrees 40 minutes 48.633 seconds east, (Tokyo Japan 2012), height: = 300m.

Nominal start time: 1st January 2012 00:31:00 (GPS time).

Viable running time to maintain specified HDOP values: 19 minutes.

Visible satellites available for simulation and for which Assistance Data (other than Almanac) shall be generated are given in Table 6.2.1.2.1.2

Table 6.2.1.2.1.2: Visible satellites

Sub-Test Case Number	SV IDs of Visible satellites
1	3, 4, 5, 9, 10, 18, 19, 20
2	[FFS]
3	1, 4, 11, 17, 19, 20, 23, 28, 32
4	GPS: 1, 4, 11, 17, 19, 20, 23, 28, 32. GLONASS: 3, 4, 5, 9, 10, 18, 19, 20

The satellites to be simulated in each test case have been selected in order to achieve the required HDOP. They are defined in Table 6.2.1.2.1.3.

Table 6.2.1.2.1.3: Satellites to be simulated

Sub-Test Case Number	SV IDs of Satellites to be simulated
1	3, 4, 9, 10, 18, 20
2	[FFS]
3	1, 11, 17, 19, 23, 28 (Note)
4	GPS: 20, 28, 32. GLONASS: 5, 10, 20
NOTE: For this sub-test the satellite simulator shall generate all the GPS signals supported by the MS for all the simulated satellites.	

Ionospheric model: see values in subclause 6.2.6.6.

Tropospheric model: STANAG with SRI equal to 324.8, as defined in STANAG 4294 [6].

6.2.1.2.2 GNSS Scenario #2

The following GNSS scenario #2 shall be used during the TTFF tests defined in TS 51.010-1 [4] subclause 70.16 with the exception of the Nominal Accuracy test. The assistance data specified in the following subclauses for GNSS scenario #2 is consistent with this GNSS scenario.

Yuma Almanac data: the required file(s) in the GNSS_data_perf.zip file defined in Annex B are given in Table 6.2.1.2.2.1.

Table 6.2.1.2.2.1: Yuma Almanac data files

Sub-Test Case Number	Yuma file(s)
1	Perf_GNSS_2-1_Yuma.txt
2	Perf_GNSS_2-2_Yuma.txt
3	Perf_GNSS_2-3_Yuma.txt
4	Perf_GNSS_2-1_Yuma.txt and Perf_GNSS_2-3_Yuma.txt

MS location: the MS location is calculated as a random offset from the reference location using the method described in subclause 6.2.1.2.5. The reference location is: latitude: 37 degrees 24 minutes 53.391 seconds north, longitude: 122 degrees 1 minute 3.722 seconds west, (Sunnyvale, USA), height: = 50m.

Nominal start time: 1st June 2012, 00:01:00 (GPS time).

Viable running time to maintain specified HDOP values: 19 minutes.

Visible satellites available for simulation and for which Assistance Data (other than Almanac) shall be generated are given in Table 6.2.1.2.2.2

Table 6.2.1.2.2.2: Visible satellites

Sub-Test Case Number	SV IDs of Visible satellites
1	1, 8, 9, 10, 16, 19, 20, 21
2	[FFS]
3	1, 7, 8, 11, 15, 17, 26, 27, 28
4	GPS: 1, 7, 8, 11, 15, 17, 26, 27, 28. GLONASS: 1, 8, 9, 10, 16, 19, 20, 21

The satellites to be simulated in each test case have been selected in order to achieve the required HDOP. They are defined in Table 6.2.1.2.1.3.

Table 6.2.1.2.1.3: Satellites to be simulated

Sub-Test Case Number	SV IDs of Satellites to be simulated
1	1, 8, 9, 10, 19, 20
2	[FFS]
3	1, 7, 8, 17, 27, 28 (Note)
4	GPS: 1, 8, 26. GLONASS: 8, 10, 20
NOTE: For this sub-test the satellite simulator shall generate all the GPS signals supported by the MS for all the simulated satellites.	

Ionospheric model: see values in subclause 6.2.6.6.

Tropospheric model: STANAG with SRI equal to 324.8, as defined in STANAG 4294 [6].

6.2.1.2.3 GNSS Scenario #3

6.2.1.2.3.0 Introduction

The following GNSS scenario #3 shall be used during the Nominal Accuracy test defined in TS 51.010-1 [4] subclause 70.16. The assistance data specified in the following subclauses for GNSS scenario #3 is consistent with this GNSS scenario.

The scenario used varies dependent on the SBAS supported by the MS and also whether QZSS is supported. The scenario to be used is defined in Table 6.2.1.2.3.1. Where more than one SBAS is supported use the scenario for MSAS if MSAS and QZSS are supported, otherwise use the scenario for the first supported SBAS in the list.

Table 6.2.1.2.3.0.1: Scenarios used for Scenario #3

SBAS supported	Scenarios used	
	MS supports QZSS	MS does not support QZSS
None	GNSS Scenario #1 with QZSS Scenario #1	GNSS Scenario #1
WAAS	[FFS]	GNSS Scenario #2 with WAAS
EGNOS	[FFS]	GNSS Scenario #3A with EGNOS
MSAS	GNSS Scenario #1 with QZSS Scenario #1 and MSAS	GNSS Scenario #1 with MSAS
GAGAN	[FFS]	GNSS Scenario #3B with GAGAN

6.2.1.2.3.1 GNSS Scenario #3A

[FFS]

6.2.1.2.3.2 GNSS Scenario #3B

[FFS]

6.2.1.2.3.3 QZSS Scenario #1

Yuma Almanac data: see file Perf_QZSS_1_Yuma.txt in the GNSS_data_perf.zip file defined in Annex B.

MS location: as for GNSS scenario #1.

Nominal start time: as for GNSS scenario #1.

Viable running time to maintain specified requirements: as for GNSS scenario #1.

Satellite meeting specified requirements to be used for simulation and for which Assistance Data (other than Almanac) shall be generated: PRN 193.

6.2.1.2.3.4 WAAS Scenario

Satellite positions: (PRN 135)133.0 degrees west, height: 35786037.417m, (PRN 138)107.3 degrees west, height: 35786037.417m.

MS location: as for related GNSS scenario.

Satellite used for simulation: PRN 135.

6.2.1.2.3.5 EGNOS Scenario

Satellite positions: (PRN 120)15.5 degrees west, height: 35786037.417m, (PRN 124) 21.5 degrees west, height: 35786037.417m.

MS location: as for related GNSS scenario.

Satellite used for simulation: PRN 120.

6.2.1.2.3.6 MSAS Scenario

Satellite positions: (PRN 129)140.0 degrees east, height: 35786037.417m, (PRN 137)145 degrees east, height: 35786037.417m

MS location: as for related GNSS scenario.

Satellite used for simulation: PRN 129.

6.2.1.2.3.7 GAGAN Scenario

[FFS]

6.2.1.2.4 GNSS Scenario #4

6.2.1.2.4.0 Introduction

The following GNSS scenario #4 shall be used during the Nominal Accuracy test defined in TS 51.010-1 [4] subclause 70.16. The assistance data specified in the following subclauses for GNSS scenario #4 is consistent with this GNSS scenario.

The scenario used varies dependent on the SBAS supported by the MS and also whether QZSS is supported. The scenario to be used is defined in Table 6.2.1.2.4.1. Where more than one SBAS is supported use the scenario for MSAS if MSAS and QZSS are supported, otherwise use the scenario for the first supported SBAS in the list.

Table 6.2.1.2.4.0.1: Scenarios used for Scenario #4

SBAS supported	Scenarios used	
	MS supports QZSS	MS does not support QZSS
None	GNSS Scenario #4D with QZSS Scenario #2	GNSS Scenario #2
WAAS	[FFS]	GNSS Scenario #4C with WAAS
EGNOS	[FFS]	GNSS Scenario #4A with EGNOS
MSAS	GNSS Scenario #4D with QZSS Scenario #2 and MSAS	GNSS Scenario #4D with MSAS
GAGAN	[FFS]	GNSS Scenario #4B with GAGAN

6.2.1.2.4.1 GNSS Scenario #4A

[FFS]

6.2.1.2.4.2 GNSS Scenario #4B

[FFS]

6.2.1.2.4.3 GNSS Scenario #4C

[FFS]

6.2.1.2.4.4 GNSS Scenario #4D

[FFS]

6.2.1.2.4.5 QZSS Scenario #2

Yuma Almanac data: see file Perf_QZSS_2_Yuma.txt in the GNSS_data_perf.zip file defined in Annex B.

MS location: as for GNSS scenario #4D.

Nominal start time: as for GNSS scenario #4D.

Viable running time to maintain specified requirements: as for GNSS scenario #4D.

Satellite meeting specified requirements to be used for simulation and for which Assistance Data (other than Almanac) shall be generated: PRN [FFS].

6.2.1.2.3.6 WAAS Scenario

Satellite positions: (PRN 135)133.0 degrees west, height: 35786037.417m, (PRN 138)107.3 degrees west, height: 35786037.417m.

MS location: as for related GNSS scenario.

Satellite used for simulation: PRN 138.

6.2.1.2.3.7 EGNOS Scenario

Satellite positions: (PRN 120)15.5 degrees west, height: 35786037.417m, (PRN 124) 21.5 degrees west, height: 35786037.417m.

MS location: as for related GNSS scenario.

Satellite used for simulation: PRN 124.

6.2.1.2.3.8 MSAS Scenario

Satellite positions: (PRN 129)140.0 degrees east, height: 35786037.417m, (PRN 137)145 degrees east, height: 35786037.417m.

MS location: as for related GNSS scenario.

Satellite used for simulation: PRN 137.

6.2.1.2.3.9 GAGAN Scenario

[FFS]

6.2.1.2.5 MS Location for TTFF test cases

6.2.1.2.5.0 Introduction

This subclause defines the method for generating the random MS locations that are required to be used for the TTFF tests defined in TS 51.010-1 [4] subclause 70.16.

For every Test Instance in each TTFF test case, the MS location shall be randomly selected to be within 3 km of the Reference Location. The Altitude of the MS shall be randomly selected between 0 m to 500 m above WGS-84 reference ellipsoid. These values shall have uniform random distributions.

The MS location is calculated as an offset from the Reference Location.

6.2.1.2.5.1 MS Location Offset

The MS location offset shall be calculated by selecting the next pair of random numbers, representing a pair of latitude and longitude offsets in degrees, from a standard uniform random number generator, with the following properties:

The ranges of the latitude and longitude offsets values shall be such that when translated onto the surface of the earth they shall lie within a 3km radius circle, centred on the Reference location specified for the GNSS scenario under consideration. For the purposes of this calculation make the following assumptions:

a) Over the 3km radius circle at the Reference location the earth is flat and the meridians and parallels form a rectangular grid

b) The earth is spherical with a radius of 6371141m (equal to the WGS 84 value at 35 degrees latitude)

The resolution used for the latitude and longitude offsets values shall be 90/2E23 for the latitude offset values and 360/2E24 for the longitude offset values, representing the coding resolution in degrees specified in 3GPP TS 23.032 [7].

6.2.1.2.5.2 MS Altitude

The MS altitude value shall be calculated by selecting the next random number from a standard uniform random number generator, in the range 0 to 500, representing meters. The resolution used for the random number shall be 1, representing 1 meter.

6.2.2 Information elements required for normal MS based testing

The following A-GPS and A-GANSS assistance data IEs and fields shall be present for each test as appropriate for the GNSS(s) used during the test. Fields not specified shall not be present. The values of the fields are specified in subclause 6.2.6.

a) GPS Reference Time IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
GPS Week
GPS TOW
GPS TOW Assist
SatID
TLM Message
Anti-Spoof
Alert
TLM Reserved

aa) GPS Reference Time Extension IE. This information element is defined in subclause A.4.2.4c of TS 44.031 [5].

Fields of the IE	Release
GPS Week Cycle Number	Rel-10 onwards

b) GANSS Reference Time IE. This information element is defined in subclause A.4.2.6.1 of TS 44.031 [5].

Fields of the IE
GANSS Day
GANSS TOD
GANSS TOD Uncertainty
GANSS Time ID

c) GANSS Time Model IE. This information element is only required for multi system tests, and is defined in subclause A.4.2.6.2 of TS 44.031 [5].

Fields of the IE
GNSS_TOD_ID For each GNSS included in the test.

ca) GANSS Time Model Extension IE. This information element is only required for multi system tests, and is defined in subclause A.4.2.6.2 of TS 44.031 [5].

Fields of the IE	Release
GNSS_TOD_ID For each GNSS included in the test.	Rel-10 onwards
Delta T	Rel-10 onwards

d) GPS Reference Location IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
Ellipsoid point with Altitude and uncertainty ellipsoid

e) GANSS Reference Location IE. This information element is defined in subclause A.4.2.6.1 of TS 44.031 [5].

Fields of the IE
Ellipsoid point with Altitude and uncertainty ellipsoid

f) GPS Navigation Model IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
All satellite information

g) GANSS Navigation Model IE. This information element is defined in subclause A.4.2.6.2 of TS 44.031 [5].

Fields of the IE
All satellite information

GANSS	Clock and Orbit Model Choice
Galileo	Model-1
Modernized GPS	Model-3
GLONASS	Model-4
QZSS QZS-L1	Model-2
QZSS QZS-L1C/L2C/L5	Model-3
SBAS	Model-5

h) GPS Ionospheric Model IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
All

i) GANSS Ionospheric Model IE. This information element is defined in subclause A.4.2.6.1 of TS 44.031 [5].

Fields of the IE
All

j) GANSS Additional Ionospheric Model IE. This information element is defined in subclause A.4.2.6.1 of TS 44.031 [5].

Fields of the IE
All

k) GPS UTC Model IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
All

l) Void

m) GANSS Auxiliary Information IE. This information element is defined in subclause A.4.2.6.2 of TS 44.031 [5].

Fields of the IE
GANSS Auxiliary Information

6.2.3 Information elements required for MS based Sensitivity Fine Time Assistance test case

The A-GPS and A-GANSS assistance data IEs and fields that shall be present for the Sensitivity Fine Time Assistance test case shall be those specified in subclause 6.2.2 with the following exception. Fields not specified shall not be present. The values of the fields are specified in subclause 6.2.6.

a) GPS Reference Time IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
GPS Week
GPS TOW
BCCH Carrier
BSIC
FNm
TN
BN
GPS TOW Assist
SatID
TLM Message
Anti-Spoof
Alert
TLM Reserved

b) GANSS Reference Time IE. This information element is defined in subclause A.4.2.6.1 of TS 44.031 [5].

Fields of the IE
GANSS Day
GANSS TOD
GANSS TOD Uncertainty
GANSS Time ID
BCCH Carrier
BSIC
FNm
TN
BN

6.2.4 Information elements available for normal MS assisted testing

The following A-GPS and A-GANSS assistance data IEs and fields shall be available for use in each test as appropriate for the GNSS(s) used during the test. Fields not specified shall not be present. The values of the fields are specified in subclause 6.2.6.

a) GPS Reference Time IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
GPS Week
GPS TOW
GPS TOW Assist
SatID
TLM Message
Anti-Spoof
Alert
TLM Reserved

aa) GPS Reference Time Extension IE. This information element is defined in subclause A.4.2.4c of TS 44.031 [5].

Fields of the IE	Release
GPS Week Cycle Number	Rel-10 onwards

b) GANSS Reference Time IE. This information element is defined in subclause A.4.2.6.1 of TS 44.031 [5].

Fields of the IE
GANSS Day
GANSS TOD
GANSS TOD Uncertainty
GANSS Time ID

c) GANSS Time Model IE. This information element is only required for multi system tests, and is defined in subclause A.4.2.6.2 of TS 44.031 [5].

Fields of the IE
GNSS_TOD_ID For each GNSS included in the test.

ca) GANSS Time Model Extension IE. This information element is only required for multi system tests, and is defined in subclause A.4.2.6.2 of TS 44.031 [5].

Fields of the IE	Release
GNSS_TOD_ID For each GNSS included in the test.	Rel-10 onwards
Delta T	Rel-10 onwards

d) GPS Reference Location IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
Ellipsoid point with Altitude and uncertainty ellipsoid

e) GANSS Reference Location IE. This information element is defined in subclause A.4.2.6.1 of TS 44.031 [5].

Fields of the IE
Ellipsoid point with Altitude and uncertainty ellipsoid

f) GPS Almanac IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
Almanac Reference Week
All Satellite information

fa) GPS Almanac Extension IE. This information element is defined in subclause A.4.2.4c of TS 44.031 [5].

Fields of the IE	Release
Complete Almanac Provided	Rel-10 onwards

g) GANSS Almanac Model IE. This information element is defined in subclause A.4.2.6.2 of TS 44.031 [5].

Fields of the IE
GANSS Almanac Model

GANSS	Almanac Model Choice
Galileo	Model-1
Modernized GPS	Model-3,4
GLONASS	Model-5
QZSS QZS-L1	Model-2
QZSS QZS-L1C/L2C/L5	Model-3,4
SBAS	Model-6

ga) GANSS Almanac Model Extension IE. This information element is defined in subclause A.4.2.6.2 of TS 44.031 [5].

Fields of the IE	Release
Complete Almanac Provided	Rel-10 onwards

h) GPS Navigation Model IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
All satellite information

i) GANSS Navigation Model IE. This information element is defined in subclause A.4.2.6.2 of TS 44.031 [5].

Fields of the IE
All satellite information

GANSS	Clock and Orbit Model Choice
Galileo	Model-1
Modernized GPS	Model-3
GLONASS	Model-4
QZSS QZS-L1	Model-2
QZSS QZS-L1C/L2C/L5	Model-3
SBAS	Model-5

j) GPS Acquisition Assistance IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
GPS TOW
Satellite information
SVID/PRNID
Doppler (0^{th} order term)
Doppler (1^{st} order term)
Doppler Uncertainty
Code Phase
Integer Code Phase
GPS Bit number
Code Phase Search Window
Azimuth
Elevation

ja) GPS Acquisition Assistance Extension IE. This information element is defined in subclause A.4.2.4c of TS 44.031 [5].

Fields of the IE	Release
N_SAT	Rel-10 onwards
SatID	Rel-10 onwards
Azimuth LSB	Rel-10 onwards
Elevation LSB	Rel-10 onwards

k) GANSS Reference Measurement Information IE. This information element is defined in subclause A.4.2.6.2 of TS 44.031 [5].

Fields of the IE
SV_ID
Doppler (0^{th} order term)
Doppler (1^{st} order term)
Doppler Uncertainty
Code Phase
Integer Code Phase
Code Phase Search Window
Azimuth
Elevation

ka) GANSS Reference Measurement Extension IE. This information element is defined in subclause A.4.2.6.2 of TS 44.031 [5].

Fields of the IE	Release
Num_Sat	Rel-10 onwards
SV_ID	Rel-10 onwards
Azimuth LSB	Rel-10 onwards
Elevation LSB	Rel-10 onwards

l) GANSS Auxiliary Information IE. This information element is defined in subclause A.4.2.6.2 of TS 44.031 [5].

Fields of the IE
GANSS Auxiliary Information

m) GPS UTC Model IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
All

6.2.5 Information elements available for MS assisted Sensitivity Fine Time Assistance test case

The A-GNSS assistance data IEs and fields that shall be available for use for the Sensitivity Fine Time Assistance test case shall be those specified in subclause 6.2.4 with the following exceptions. Fields not specified shall not be present. The values of the fields are specified in subclause 6.2.6.

a) GPS Reference Time IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
GPS Week
GPS TOW
BCCH Carrier
BSIC
FNm
TN
BN
GPS TOW Assist
SatID
TLM Message
Anti-Spoof
Alert
TLM Reserved

b) GANSS Reference Time IE. This information element is defined in subclause A.4.2.6.1 of TS 44.031 [5].

Fields of the IE
GANSS Day
GANSS TOD
GANSS TOD Uncertainty
GANSS Time ID
BCCH Carrier
BSIC
FNm
TN
BN

c) GPS Acquisition Assistance IE. This information element is defined in subclause A.4.2.4 of TS 44.031 [5].

Fields of the IE
GPS TOW
BCCH Carrier
BSIC
Frame #
Timeslots #
Bit #
SVID/PRNID
Doppler (0^{th} order term)
Doppler (1^{st} order term)
Doppler Uncertainty
Code Phase
Integer Code Phase

GPS Bit number
Code Phase Search Window
Azimuth
Elevation

6.2.6 Contents of Information elements for Minimum performance testing

6.2.6.1 General

This subclause defines the assistance data values that shall be used for all Assisted GNSS performance tests defined in TS 51.010-1 [4] subclause 70.16. It is given for GNSS scenarios #1, #2, #3 and #4 and QZSS Scenarios #1 and #2, where it is different for each scenario; otherwise it is marked "All" where the same value is used for all scenarios.

Where assistance data is required on a per-satellite basis, or where the values of the data also varies with time it is specified in comma-separated-variable files in the GNSS_data_perf.zip file defined in Annex B. These files specify the values to be used for each satellite, indexed by satellite SV ID, and, where applicable, the values to be used indexed by both time and satellite SV ID.

Assistance data that is marked as "time varying" is specified and used in 80 ms increments. Interpolation between these values shall not be used.

Assistance data Information Elements and fields that are not specified shall not be used.

6.2.6.2 IE Random Offset Values

6.2.6.2.0 Introduction

This subclause defines the methods for generating the random offsets that are required to be applied to one or two assistance data IEs for certain tests defined in TS 51.010-1 [4] subclause 70.16.

6.2.6.2.1 GNSS TOW

For every Test Instance in each TTFF test case, the IE GPS TOW or GANSS TOD shall have a random offset, relative to GNSS system time, within the allowed error range of Coarse Time Assistance defined in the test case. This offset value shall have a uniform random distribution.

The offset value shall be calculated by selecting the next random number from a standard uniform random number generator, in the range specified for the GNSS Coarse Time assistance error range in the Test Requirements, Test parameters table for the test under consideration. The resolution used for the random number shall be 0.01, representing 10ms.

6.2.6.2.2 GNSS bit number (BN or Bit #)

In addition, for every Fine Time Assistance Test Instance the IE BN or Bit # shall have a random offset, relative to the true value of the relationship between the two time references, within the allowed error range of Fine Time Assistance defined in the test case. This offset value shall have a uniform random distribution.

The offset value shall be calculated by selecting the next random number from a standard uniform random number generator with the following properties:

The range shall be the number of GSM bits whose duration is less than the range specified for the GNSS Fine Time assistance error range in the Test Requirements, Test parameters table for the test under consideration.

The resolution used for the random number shall be 1, representing 1 GSM bit.

6.2.6.3 Satellite SV IDs to be used

For assistance data IEs which contain the field SatID or SVID/PRNID, and where the values for these fields are not given below, then the following values shall be used.

Table 6.2.6.3.1: Satellite SV IDs to be used for SatID or SVID/PRNID

Sub-Test Case Number	GNSS #1	GNSS #2	GNSS #4C
1	3, 4, 5, 9, 10, 18, 19, 20	1, 8, 9, 10, 16, 19, 20, 21	[FFS]
2	[FFS]	[FFS]	[FFS]
3	1, 4, 11, 17, 19, 20, 23, 28, 32	1, 7, 8, 11, 15, 17, 26, 27, 28	[FFS]
4	GPS: 1, 4, 11, 17, 19, 20, 23, 28, 32. GLONASS: 3, 4, 5, 9, 10, 18, 19, 20	GPS: 1, 7, 8, 11, 15, 17, 26, 27, 28. GLONASS: 1, 8, 9, 10, 16, 19, 20, 21	[FFS]

6.2.6.4 Assistance Data Contents

Assistance Data GPS Reference Time: sub-test 3, 4

Table 6.2.6.4.1: GPS Reference Time (Fields occurring once per message)

Information Element	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
GPS Week	Weeks	1669	1690	[FFS]
GPS TOW		1860 s Start time. Add number of 80ms as required. (Note 1)	432060 s Start time. Add number of 80ms as required. (Note 1)	[FFS]
BCCH Carrier		ARFCN of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	ARFCN of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	-
BSIC		BSIC of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	BSIC of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	-
FNm		Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	-
TN		Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	-
BN		Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	-

Note 1: GPS TOW

This is the value in ms of GPS TOW when the GNSS scenario is initially started in the GNSS simulator. For all TTFF test cases, each time a GNSS scenario is used, the GPS start time shall be advanced by 120 seconds from the value last used so that, at the time the fix is made, it is at least 2 minutes later than the previous fix made with that scenario.

The actual value of GPS TOW to be used in the Reference Time IE (before the addition of the random offset, if applicable) shall be calculated at the time the IE is required by adding the elapsed time since the time the scenario was started in the GNSS simulator to this value. The accuracy shall be such that the Maximum Test System Uncertainty for Coarse Time Assistance, specified in Table A5.5.1 of TS 51.010-1 [4] , shall be met.

For all TTFF test cases a random offset is then added to the value of GPS TOW as described in subclause 6.2.6.2.

Note 2: GSM Frame Number (FNm), Timeslot Number (TN) and Bit Number (BN)

The values of the IEs FNm, TN and BN (before the addition of the random offset) shall be calculated at the time the IE is required. The accuracy of the relationship between the two time references shall be such that the Maximum Test System Uncertainty for Fine Time Assistance, specified in Table A5.5.1 of TS 51.010-1 [4] , shall be met.

A random offset is then added to the value of BN as described in subclause 6.2.6.2.

Table 6.2.6.4.2: Satellite Information

Parameter	Units	Value/remark GPS All
Number of satellites		9

Table 6.2.6.4.3: Reference Time - GPS TOW Assist (Fields occurring once per satellite)

Parameter	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
SatID		See Table 6.2.6.3-1	See Table 6.2.6.3-1	See Table 6.2.6.3-1

Table 6.2.6.4.4: Reference Time - GPS TOW Assist (Fields occurring once per satellite)

Parameter	Units	Value/remark GNSS All
TLM Message	Bit string	10922
Anti-Spoof	Bit string	1
Alert		0
TLM Reserved		2

Assistance Data GPS Reference Time Extension: sub-test 3, 4

Table 6.2.6.4.4a: GPS Reference Time Extension (Fields occurring once per message)

Parameter	Units	Value/remark GNSS All	Release
GPS Week Cycle Number	1024 weeks	1	Rel-10 onwards

Assistance Data GPS Reference Location: sub-test 3, 4

Table 6.2.6.4.5: GPS Reference Location

Parameter	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
Latitude sign		0	0	[FFS]
Degrees of latitude	degrees	35.744287	37.414831	[FFS]
Degrees of longitude	degrees	139.680176	-122.017701	[FFS]
Altitude Direction		0	0	[FFS]
Altitude	m	300	50	[FFS]
Uncertainty semi-major	m	3000	3000	[FFS]
Uncertainty semi-minor	m	3000	3000	[FFS]
Orientation of major axis	degrees	0	0	[FFS]
Uncertainty altitude	m	500	500	[FFS]
Confidence	%	68	68	[FFS]

Assistance Data GPS Navigation Model: sub-test 3, 4

Table 6.2.6.4.6: Satellite Information

Parameter	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
Number of satellites		9	9	[FFS]

Table 6.2.6.4.7: Navigation Model (Fields occurring once per satellite)

Parameter	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
SatID		See Table 6.2.6.3-1	See Table 6.2.6.3-1	See Table 6.2.6.3-1
Satellite Status		0 (Note)	0 (Note)	[FFS]
Note: For consistency Satellite Status is also given in file: Perf_GPS_Navigation_model_XX.csv.				

Table 6.2.6.4.8: Ephemeris and Clock Correction parameters (Fields occurring once per satellite)

Parameter	Units	Value/remark GNSS All
C/A or P on L2		See file: Perf_GPS_Navigation_model_XX.csv
URA Index		See file: Perf_GPS_Navigation_model_XX.csv
SV Health		See file: Perf_GPS_Navigation_model_XX.csv
IODC		See file: Perf_GPS_Navigation_model_XX.csv
L2 P Data Flag		See file: Perf_GPS_Navigation_model_XX.csv
SF 1 Reserved		See file: Perf_GPS_Navigation_model_XX.csv
SF 2 Reserved		See file: Perf_GPS_Navigation_model_XX.csv
SF 3 Reserved		See file: Perf_GPS_Navigation_model_XX.csv
SF 4 Reserved		See file: Perf_GPS_Navigation_model_XX.csv
T_{GD}	sec	See file: Perf_GPS_Navigation_model_XX.csv
t_{oc}	sec	See file: Perf_GPS_Navigation_model_XX.csv
af_2	sec/sec^2	See file: Perf_GPS_Navigation_model_XX.csv
af_1	sec/sec	See file: Perf_GPS_Navigation_model_XX.csv
af_0	sec	See file: Perf_GPS_Navigation_model_XX.csv
C_{rs}	meters	See file: Perf_GPS_Navigation_model_XX.csv
Δn	semi-circles/sec	See file: Perf_GPS_Navigation_model_XX.csv
M_0	semi-circles	See file: Perf_GPS_Navigation_model_XX.csv
C_{uc}	radians	See file: Perf_GPS_Navigation_model_XX.csv
e		See file: Perf_GPS_Navigation_model_XX.csv
C_{us}	radians	See file: Perf_GPS_Navigation_model_XX.csv
$(A)^{1/2}$	$meters^{1/2}$	See file: Perf_GPS_Navigation_model_XX.csv
t_{oe}	sec	See file: Perf_GPS_Navigation_model_XX.csv
Fit Interval Flag		See file: Perf_GPS_Navigation_model_XX.csv
AODO	sec	See file: Perf_GPS_Navigation_model_XX.csv
C_{ic}	radians	See file: Perf_GPS_Navigation_model_XX.csv
$OMEGA_0$	semi-circles	See file: Perf_GPS_Navigation_model_XX.csv
C_{is}	radians	See file: Perf_GPS_Navigation_model_XX.csv
i_0	semi-circles	See file: Perf_GPS_Navigation_model_XX.csv
C_{rc}	meters	See file: Perf_GPS_Navigation_model_XX.csv
ω	semi-circles	See file: Perf_GPS_Navigation_model_XX.csv
OMEGAdot	semi-circles/sec	See file: Perf_GPS_Navigation_model_XX.csv
Idot	semi-circles/sec	See file: Perf_GPS_Navigation_model_XX.csv

Assistance Data GPS Ionospheric Model: sub-test 3, 4

Table 6.2.6.4.9: GPS Ionospheric Model

Information Element	Units	Value/remark GNSS All
α_0	seconds	4.6566129 10E-9
α_1	sec/semi-circle	1.4901161 10E-8
α_2	$sec/(semi\text{-}circle)^2$	-5.96046 10E-8
α_3	$sec/(semi\text{-}circle)^3$	-5.96046 10E-8
β_0	seconds	79872
β_1	sec/semi-circle	65536
β_2	$sec/(semi\text{-}circle)^2$	-65536
β_3	$sec/(semi\text{-}circle)^3$	-393216

Assistance Data GPS UTC Model: sub-test 4

Table 6.2.6.4.10: GPS UTC Model

Information Element	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
A_1	sec/sec	0	0	FFS
A_0	seconds	0	0	FFS
t_{ot}	seconds	249856	77824	FFS
WN_t	weeks	133	155	FFS
Δt_{LS}	seconds	15	15	FFS
WN_{LSF}	weeks	158	158	FFS
DN	days	7	7	FFS
Δt_{LSF}	seconds	16	16	FFS

Assistance Data GPS Almanac: sub-test 3, 4

Table 6.2.6.4.11: GPS Almanac (Fields occurring once per message)

Information Element	Units	Value/remark GNSS All
Num_Sats_Total		27

Table 6.2.6.4.11a: GPS Almanac (Field occurring once per message)

Parameter	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
WN_a	weeks	1669	1691	[FFS]

Table 6.2.6.4.12: GPS Almanac (Fields occurring once per satellite)

Parameter	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
SatID		PRNs: 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 32	PRNs: 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 30	[FFS]

Table 6.2.6.4.13: GPS Almanac (Fields occurring once per satellite)

Information Element	Units	Value/remark
e	dimensionless	See file: Perf_GPS_Almanac_XX.csv
t_{oa}	sec	See file: Perf_GPS_Almanac_XX.csv
δi	semi-circles	See file: Perf_GPS_Almanac_XX.csv
OMEGADOT	semi-circles/sec	See file: Perf_GPS_Almanac_XX.csv
SV Health		See file: Perf_GPS_Almanac_XX.csv
$A^{1/2}$	$meters^{1/2}$	See file: Perf_GPS_Almanac_XX.csv
$OMEGA_0$	semi-circles	See file: Perf_GPS_Almanac_XX.csv
ω	semi-circles	See file: Perf_GPS_Almanac_XX.csv
M_0	semi-circles	See file: Perf_GPS_Almanac_XX.csv
af_0	seconds	See file: Perf_GPS_Almanac_XX.csv
af_1	sec/sec	See file: Perf_GPS_Almanac_XX.csv

Assistance Data GPS Almanac Extension: sub-test 3, 4

Table 6.2.6.4.13a: GPS Almanac Extension (Fields occurring once per message)

Parameter	Units	Value/remark GNSS All	Release
Complete Almanac Provided		1 (TRUE)	Rel-10 onwards

Assistance Data GPS Acquisition Assistance: sub-test 3, 4

Table 6.2.6.4.14: GPS Acquisition Assistance (Fields occurring once per message)

Parameter	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
GPS TOW		1860 s Start time. Add number of 80ms as required. (Note 1)	432060s Start time. Add number of 80ms as required. (Note 1)	[FFS]
BCCH Carrier		ARFCN of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	ARFCN of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	Absent
BSIC		BSIC of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	BSIC of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	
Frame #		Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	
Timeslots #		Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	
Bit #		Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	

Note 1: GPS TOW

This is the value in ms of GPS TOW when the GNSS scenario is initially started in the GPS simulator. For all TTFF test cases, each time a GNSS scenario is used, the GPS start time shall be advanced by 120 seconds from the value last used so that, at the time the fix is made, it is at least 2 minutes later than the previous fix made with that scenario.

The actual value of GPS TOW to be used in the Acquisition Assistance IE (before the addition of the random offset, if applicable) shall be calculated at the time the IE is required by adding the elapsed time since the time the scenario was started in the GNSS simulator to this value. The accuracy shall be such that the Maximum Test System Uncertainty for Coarse Time Assistance, specified in Table A5.5.1 of TS 51.010-1 [4] , shall be met.

For all TTFF test cases a random offset is then added to the value of GPS TOW as described in subclause 6.2.6.2

This "final GPS TOW" value is then also used to determine the value of the Acquisition Assistance parameters marked as "Time varying" in subclause 6.2.6.4

Note 2: GSM Frame Number (Frame #), Timeslot Number (Timeslots #) and Bit Number (Bit #)

The values of the IEs Frame #, Timeslots # and Bit # (before the addition of the random offset) shall be calculated at the time the IE is required. The accuracy of the relationship between the two time references shall be such that the Maximum Test System Uncertainty for Fine Time Assistance, specified in Table A5.5.1 of TS 51.010-1 [4] , shall be met.

A random offset is then added to the value of Bit # as described in subclause 6.2.6.2

Table 6.2.6.4.15: Satellite Information

Parameter	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
Number of satellites		9	9	[FFS]

Table 6.2.6.4.16: GPS Acquisition Assistance (Fields occurring once per satellite)

Parameter	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
SVID/PRNID		See Table 6.2.6.3-1	See Table 6.2.6.3-1	See Table 6.2.6.3-1

Table 6.2.6.4.17: GPS Acquisition Assistance (Fields occurring once per satellite)

Parameter	Units	Value/remark GNSS All
Doppler (0^{th} order term)	Hz	Time varying. See file: Perf_GPS_Acquisition_assist_XX.csv (Note)
Doppler (1^{st} order term)	Hz/sec	Time varying. See file: Perf_GPS_Acquisition_assist_XX.csv (Note)
Doppler Uncertainty	Hz	Time varying. See file: Perf_GPS_Acquisition_assist_XX.csv (Note)
Code Phase	chips	Time varying. See file: Perf_GPS_Acquisition_assist_XX.csv (Note)
Integer Code Phase		Time varying. See file: Perf_GPS_Acquisition_assist_XX.csv (Note)
GPS Bit number		Time varying. See file: Perf_GPS_Acquisition_assist_XX.csv (Note)
Code Phase Search Window	chips	Time varying. See file: Perf_GPS_Acquisition_assist_XX.csv (Note)
Azimuth	deg	Time varying. See file: Perf_GPS_Acquisition_assist_XX.csv (Note)
Elevation	deg	Time varying. See file: Perf_GPS_Acquisition_assist_XX.csv (Note)
Note: Acquisition Assistance parameters This field is "Time varying" and its value depends on the "final GPS TOW" as described in subclause 6.2.6.8. The value of this field to be used shall be determined by taking the "final GPS TOW" value and selecting the nearest field value in the Perf_GPS_Acquisition_assist_XX.csv file corresponding to the value of "final current GPS TOW".		

Assistance Data GPS Acquisition Assistance Extension: sub-test 3, 4

Table 6.2.6.4.17a: GPS Acquisition Assistance Extension (Fields occurring once per message)

Parameter	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C	Release
N_SAT		9	9	[FFS]	Rel-10 onwards

Table 6.2.6.4.17b: GPS Acquisition Assistance Extension (Fields occurring once per satellite)

Parameter	Units	Value/remark GNSS All	Release
SatID		See Table 6.2.6.3-1	Rel-10 onwards
Azimuth LSB	degrees	Time varying. Calculated from Azimuth, see file: Perf_GPS_Acquisition_assist_XX.csv (Note)	Rel-10 onwards
Elevation LSB	degrees	Time varying. Calculated from Elevation, see file: Perf_GPS_Acquisition_assist_XX.csv (Note)	Rel-10 onwards
Note: This field is "Time varying" and its value depends on the "current GPS TOW" as described in subclause 5.1.3. The value of this field to be used shall be determined by taking the "current GPS TOW" value and selecting the field value in the Perf_GPS_Acquisition_assist_XX.csv file corresponding to the value of "current GPS TOW".			

Assistance Data GANSS Reference Time: sub-test 1, 2

Table 6.2.6.4.18: Assistance Data GANSS Reference Time: sub-test 1 (Fields occurring once per message)

Information Element	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
GANSS Day		5844	5996	[FFS]
GANSS TOD	seconds	12645 s Start time. Add number of 1 seconds as required. (Note 1)	10845 Start time. Add number of 1 seconds as required. (Note 1)	[FFS]
GANSS TOD Uncertainty		125 (2.127 seconds)	125 (2.127 seconds)	125 (2.127 seconds)
GANSS Time ID		2 (GLONASS)	2 (GLONASS)	2 (GLONASS)
BCCH Carrier		ARFCN of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	ARFCN of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	
BSIC		BSIC of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	BSIC of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	
FNm		Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	
TN		Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	
BN		Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	

Note 1: GANSS TOD

This is the value in seconds of GANSS TOD when the GNSS scenario is initially started in the GNSS simulator. For all TTFF test cases, each time a GNSS scenario is used, the GANSS start time shall be advanced by 120 seconds from the value last used so that, at the time the fix is made, it is at least 2 minutes later than the previous fix made with that scenario.

The actual value of GANSS TOD to be used in the Reference Time IE (before the addition of the random offset, if applicable) shall be calculated at the time the IE is required by adding the elapsed time since the time the scenario was started in the GNSS simulator to this value. The accuracy shall be such that the Maximum Test System Uncertainty for Coarse Time Assistance, specified in Table A5.5.1 of TS 51.010-1 [4] , shall be met.

For all TTFF test cases a random offset is then added to the value of GANSS TOD as described in subclause 6.2.6.2

Note 2: GSM Frame Number (FNm), Timeslot Number (TN) and Bit Number (BN)

The values of the IEs FNm, TN and BN (before the addition of the random offset) shall be calculated at the time the IE is required. The accuracy of the relationship between the two time references shall be such that the Maximum Test System Uncertainty for Fine Time Assistance, specified in Table A5.5.1 of TS 51.010-1 [4] , shall be met.

A random offset is then added to the value of BN as described in subclause 6.2.6.2

Table 6.2.6.4.19: Assistance Data GANSS Reference Time: sub-test 2 (Fields occurring once per message)

Information Element	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
GANSS Day		FFS	FFS	FFS
GANSS TOD	seconds	FFS Start time. Add number of 1 seconds as required. (Note 1)	FFS Start time. Add number of 1 seconds as required. (Note 1)	FFS Start time. Add number of 1 seconds as required. (Note 1)
GANSS TOD Uncertainty		125 (2.127 seconds)	125 (2.127 seconds)	125 (2.127 seconds)
GANSS Time ID		Not present (Galileo	Not present (Galileo	Not present (Galileo
BCCH Carrier		ARFCN of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	ARFCN of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	
BSIC		BSIC of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	BSIC of serving BCCH Present for Sensitivity Fine Time Assistance test case. Absent otherwise.	
FNm		Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	
TN		Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	
BN		Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	Present for Sensitivity Fine Time Assistance test case. Absent otherwise. Note 2	

Note 1: GANSS TOD

This is the value in seconds of GANSS TOD when the GNSS scenario is initially started in the GNSS simulator. For all TTFF test cases, each time a GNSS scenario is used, the GANSS start time shall be advanced by 120 seconds from the value last used so that, at the time the fix is made, it is at least 2 minutes later than the previous fix made with that scenario.

The actual value of GANSS TOD to be used in the Reference Time IE (before the addition of the random offset, if applicable) shall be calculated at the time the IE is required by adding the elapsed time since the time the scenario was started in the GNSS simulator to this value. The accuracy shall be such that the Maximum Test System Uncertainty for Coarse Time Assistance, specified in Table A5.5.1 of TS 51.010-1 [4] , shall be met.

For all TTFF test cases a random offset is then added to the value of GANSS TOD as described in subclause 6.2.6.2

Note 2: GSM Frame Number (FNm), Timeslot Number (TN) and Bit Number (BN)

The values of the IEs FNm, TN and BN (before the addition of the random offset) shall be calculated at the time the IE is required. The accuracy of the relationship between the two time references shall be such that the Maximum Test System Uncertainty for Fine Time Assistance, specified in Table A5.5.1 of TS 51.010-1 [4] , shall be met.

A random offset is then added to the value of BN as described in subclause 6.2.6.2

Assistance Data GANSS Reference Location: sub-test 1, 2

Table 6.2.6.4.20: Assistance Data GANSS Reference Location

Parameter	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
Latitude sign		0	0	[FFS]
Degrees of latitude	degrees	35.744287	37.414831	[FFS]
Degrees of longitude	degrees	139.680176	-122.017701	[FFS]
Altitude Direction		0	0	[FFS]
Altitude	m	300	50	[FFS]
Uncertainty semi-major	m	3000	3000	[FFS]
Uncertainty semi-minor	m	3000	3000	[FFS]
Orientation of major axis	degrees	0	0	[FFS]
Uncertainty altitude	m	500	500	[FFS]
Confidence	%	68	68	[FFS]

Assistance Data GANSS Ionospheric Model: sub-test 2

Table 6.2.6.4.21: GANSS Ionospheric Model

Information Element	Units	Value/remark GNSS All
a_{i0}		FFS
a_{i1}		FFS
a_{i2}		FFS
Storm Flag 1		0
Storm Flag 2		0
Storm Flag 3		0
Storm Flag 4		0
Storm Flag 5		0

Assistance Data GANSS Additional Ionospheric Model: sub-test 1

Table 6.2.6.4.21a: GANSS Additional Ionospheric Model

Information Element	Units	Value/remark GNSS All
Data Id		00
α_0	Seconds	4.6566129 10E-9
α_1	sec/semi-circle	1.4901161 10E-8
α_2	sec/(semi-circle)^2	-5.96046 10E-8
α_3	sec/(semi-circle)^3	-5.96046 10E-8
β_0	Seconds	79872
β_1	sec/semi-circle	65536
β_2	sec/(semi-circle)^2	-65536
β_3	sec/(semi-circle)^3	-393216

Assistance Data GANSS ID: sub-test 1, 2, 3, 4

Table 6.2.6.4.21b: GANSS ID: sub-test 1, 4

Information Element	Units	Value/remark GNSS All
GANSS ID		3 (GLONASS)

Table 6.2.6.4.21c: GANSS ID: sub-test 2

Information Element	Units	Value/remark GNSS All
GANSS ID		Not present (Galileo)

Table 6.2.6.4.21d: GANSS ID: sub-test 3

Information Element	Units	Value/remark GNSS All
GANSS ID		1 (Modernized GPS)

Assistance Data GANSS Time Model: sub-test 4

Table 6.2.6.4.22: Void

Table 6.2.6.4.23: GANSS time Model

Information Element	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
GANSS Time Model Reference Time		1860 (s)	432060 (s)	[FFS]
T_{A0}	Seconds	0	0	[FFS]
GNSS_TO_ID		0 (GPS)	0 (GPS)	0 (GPS)

Assistance Data GANSS Time Model Extension: sub-test 4

Table 6.2.6.4.23a: GANSS Time Model Extension

Information Element	Units	Value/remark GNSS All	Release
GNSS_TOD_ID		0 (GPS)	Rel-10 onwards
Delta T	Seconds	15	Rel-10 onwards

Assistance Data GANSS Navigation Model: sub-test 1, 2, 4

Table 6.2.6.4.24: Void

Table 6.2.6.4.25: GANSS Navigation Model: sub-test 1, 4

Information Element	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
Num_Sat		8	8	[FFS]
Non-Broadcast Indication		0	0	[FFS]

Table 6.2.6.4.26: Satellite Information (Fields occurring once per satellite): sub-test 1, 4

Parameter	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
SatID		See Table 6.2.6.3-1	See Table 6.2.6.3-1	See Table 6.2.6.3-1
SV Health		01111 (Note)	01111 (Note)	01111 (Note)
IOD		225 (Note)	195 (Note)	[FFS]
Note: For consistency SV Health and IOD are also given in file: Perf_GANSS_Navigation_Model_subtest1_4_XX.csv.				

Table 6.2.6.4.27: GANSS Clock Model (Fields occurring once per satellite): sub-test 1, 4

Information Element	Units	Value/remark GNSS All
GLONASS Satellite Clock Model		
$\tau_n(t_b)$	seconds	See file: Perf_GANSS_Navigation_Model_subtest1_4_XX.csv
$\gamma_n(t_b)$		See file: Perf_GANSS_Navigation_Model_subtest1_4_XX.csv
$\Delta\tau_n$	seconds	See file: Perf_GANSS_Navigation_Model_subtest1_4_XX.csv

Table 6.2.6.4.28: GANSS Orbit Model (Fields occurring once per satellite): sub-test 1, 4

Information Element	Units	Value/remark GNSS All
GLONASS Earth-Centered, Earth-fixed Parameters		
E_n	days	See file: Perf_GANSS_Navigation_Model_subtest1_4_XX.csv
P1	minutes	See file: Perf_GANSS_Navigation_Model_subtest1_4_XX.csv
P2		See file: Perf_GANSS_Navigation_Model_subtest1_4_XX.csv
M		See file: Perf_GANSS_Navigation_Model_subtest1_4_XX.csv
$x_n(t_b)$	kilometers	See file: Perf_GANSS_Navigation_Model_subtest1_4_XX.csv
$\dot{x}_n(t_b)$	kilometers/sec	See file: Perf_GANSS_Navigation_Model_subtest1_4_XX.csv
$\ddot{x}_n(t_b)$	kilometers/sec^2	See file: Perf_GANSS_Navigation_Model_subtest1_4_XX.csv
$y_n(t_b)$	kilometers	See file: Perf_GANSS_Navigation_Model_subtest1_4_XX.csv
$\dot{y}_n(t_b)$	kilometers/sec	See file: Perf_GANSS_Navigation_Model_subtest1_4_XX.csv
$\ddot{y}_n(t_b)$	kilometers/sec^2	See file: Perf_GANSS_Navigation_Model_subtest1_4_XX.csv
$z_n(t_b)$	kilometers	See file: Perf_GANSS_Navigation_Model_subtest1_4_XX.csv
$\dot{z}_n(t_b)$	kilometers/sec	See file: Perf_GANSS_Navigation_Model_subtest1_4_XX.csv
$\ddot{z}_n(t_b)$	kilometers/sec^2	See file: Perf_GANSS_Navigation_Model_subtest1_4_XX.csv

Table 6.2.6.4.29: Void

Table 6.2.6.4.30: GANSS Navigation Model: sub-test 2

Information Element	Units	Value/remark GNSS All
Num_Sat		6
Non-Broadcast Indication		0

Table 6.2.6.4.31: Satellite Information (Fields occurring once per satellite): sub-test 2

Parameter	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
SatID		See Table 6.2.6.3-1	See Table 6.2.6.3-1	See Table 6.2.6.3-1
SV Health		0 (Note)	0 (Note)	0 (Note)
IOD		[FFS] (Note)	[FFS] (Note)	[FFS] (Note)
Note: For consistency SV Health and IOD are also given in file: See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv.				

Table 6.2.6.4.32: GANSS Clock Model (Fields occurring once per satellite): sub-test 2

Information Element	Units	Value/remark GNSS All
Standard Satellite clock model		
t_{oc}	seconds	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
a_{f2}	sec/sec^2	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
a_{f1}	sec/sec	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
a_{f0}	sec	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
T_{GD}	sec	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
Model ID		See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv

Table 6.2.6.4.33: GANSS Orbit Model (Fields occurring once per satellite): sub-test 2

Information Element	Units	Value/remark GNSS All
Satellite Navigation Model Using Keplerian Parameters		
t_{oe}	seconds	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
ω	semi-circles	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
Δn	semi-circles/sec	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
M_0	semi-circles	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
OMEGAdot	semi-circles/sec	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
e		See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
Idot	semi-circles/sec	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
sqrtA	meters$^{1/2}$	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
i_0	semi-circles	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
$OMEGA_0$	semi-circles	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
C_{rs}	meters	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
C_{is}	radians	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
C_{us}	radians	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
C_{rc}	meters	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
C_{ic}	radians	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv
C_{uc}	radians	See file: Perf_GANSS_Navigation_Model_subtest2_XX.csv

Assistance Data GANSS Reference Measurement Information: sub-test 1, 2, 4

Table 6.2.6.4.34: Void

Table 6.2.6.4.35: GANSS Reference Measurement Information: sub-test 1, 4 (Fields occurring once per message)

Information Element	Units	Value/remark GNSS All
GANSS Signal ID		0 (G1)

Table 6.2.6.4.36: GANSS Reference Measurement Information: sub-test 1, 4 (Fields occurring once per satellite)

Information Element	Units	Value/remark GNSS All
SVID		See Table 6.2.6.3-1
Doppler (0^{th} order term)	m/s	Time varying. See file: Perf_GANSS_reference_measurement_information_subtest1_4_XX.csv (Note)
Doppler (1^{st} order term)	m/s/s	Time varying. See file: Perf_GANSS_reference_measurement_information_subtest1_4_XX.csv (Note)
Doppler Uncertainty	m/s	Time varying. See file: Perf_GANSS_reference_measurement_information_subtest1_4_XX.csv (Note)
Code Phase	ms	Time varying. See file: Perf_GANSS_reference_measurement_information_subtest1_4_XX.csv (Note)
Integer Code Phase	ms	Time varying. See file: Perf_GANSS_reference_measurement_information_subtest1_4_XX.csv (Note)
Code Phase Search Window		Time varying. See file: Perf_GANSS_reference_measurement_information_subtest1_4_XX.csv (Note)
Azimuth	deg	Time varying. See file: Perf_GANSS_reference_measurement_information_subtest1_4_XX.csv (Note)
Elevation	deg	Time varying. See file: Perf_GANSS_reference_measurement_information_subtest1_4_XX.csv (Note)
Note: For sub-test 1: this field is "Time varying" and its value depends on the "current GANSS TOD". The value of this field to be used shall be determined by taking the "current GANSS TOD" value and selecting the field value in the Perf_GANSS_reference_measurement_information_subtest1_4_XX.csv file corresponding to the value of "current GANSS TOD". For sub-test 4: this field is "Time varying" and its value depends on the "current GPS TOW". The value of this field to be used shall be determined by taking the "current GPS TOW" value and selecting the field value in the Perf_GANSS_reference_measurement_information_subtest1_4_XX.csv file corresponding to the value of "current GPS TOW".		

Table 6.2.6.4.37: Void

Table 6.2.6.4.38: GANSS Reference Measurement Information: sub-test 2 (Fields occurring once per message)

Information Element	Units	Value/remark GNSS All
GANSS Signal ID		0 (E1)

Table 6.2.6.4.39: GANSS Reference Measurement Information: sub-test 2 (Fields occurring once per satellite)

Information Element	Units	Value/remark GNSS All
SVID		See Table 6.2.6.3-1
Doppler (0^{th} order term)	m/s	Time varying. See file: Perf_GANSS_reference_measurement_information_subtest2_XX.csv (Note)
Doppler (1^{st} order term)	m/s/s	Time varying. See file: Perf_GANSS_reference_measurement_information_subtest2_XX.csv (Note)
Doppler Uncertainty	m/s	Time varying. See file: Perf_GANSS_reference_measurement_information_subtest2_XX.csv (Note)
Code Phase	ms	Time varying. See file: Perf_GANSS_reference_measurement_information_subtest2_XX.csv (Note)

Information Element	Units	Value/remark GNSS All
Integer Code Phase	ms	Time varying. See file: Perf_GANSS_reference_measurement_information_subtest2_XX.csv (Note)
Code Phase Search Window		Time varying. See file: Perf_GANSS_reference_measurement_information_subtest2_XX.csv (Note)
Azimuth	deg	Time varying. See file: Perf_GANSS_reference_measurement_information_subtest2_XX.csv (Note)
Elevation	deg	Time varying. See file: Perf_GANSS_reference_measurement_information_subtest2_XX.csv (Note)
Note: This field is "Time varying" and its value depends on the "current GANSS TOD". The value of this field to be used shall be determined by taking the "current GANSS TOD" value and selecting the field value in the Perf_GANSS_reference_measurement_information_subtest2_XX.csv file corresponding to the value of "current GANSS TOD".		

Assistance Data GANSS Reference Measurement Extension: sub-test 1, 2, 4

Table 6.2.6.4.39a: GANSS Reference Measurement Extension: sub-test 1, 4 (Fields occurring once per message)

Information Element	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C	Release
Num_Sat		8	8	[FFS]	Rel-10 onwards

Table 6.2.6.4.39b: GANSS Reference Measurement Extension: sub-test 1, 4 (Fields occurring once per satellite)

Information Element	Units	Value/remark GNSS All	Release
SV_ID		See Table 6.2.6.3-1	Rel-10 onwards
Azimuth LSB	degrees	Time varying. Calculated from Azimuth, see file: Perf_GANSS_reference_measurement_information_subtest1_4_XX.csv (Note)	Rel-10 onwards
Elevation LSB	degrees	Time varying. Calculated from Elevation, see file: Perf_GANSS_reference_measurement_information_subtest1_4_XX.csv (Note)	Rel-10 onwards
Note: For sub-test 1: this field is "Time varying" and its value depends on the "current GANSS TOD". The value of this field to be used shall be determined by taking the "current GANSS TOD" value and selecting the field value in the Perf_GANSS_reference_measurement_information_subtest1_4_XX.csv file corresponding to the value of "current GANSS TOD". For sub-test 4: this field is "Time varying" and its value depends on the "current GPS TOW". The value of this field to be used shall be determined by taking the "current GPS TOW" value and selecting the field value in the Perf_GANSS_reference_measurement_information_subtest1_4_XX.csv file corresponding to the value of "current GPS TOW".			

Table 6.2.6.4.39c: GANSS Reference Measurement Extension: sub-test 2 (Fields occurring once per message)

Information Element	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C	Release
Num_Sat		[FFS]	[FFS]	[FFS]	Rel-10 onwards

Table 6.2.6.4.39d: GANSS Reference Measurement Extension: sub-test 2 (Fields occurring once per satellite)

Information Element	Units	Value/remark GNSS All	Release
SV_ID		See Table 6.2.6.3-1	Rel-10 onwards
Azimuth LSB	degrees	Time varying. Calculated from Azimuth, see file: Perf_GANSS_reference_ measurement_information _subtest2_XX.csv (Note)	Rel-10 onwards
Elevation LSB	degrees	Time varying. Calculated from Elevation, see file: Perf_GANSS_reference_ measurement_information _subtest2_XX.csv (Note)	Rel-10 onwards
Note: This field is "Time varying" and its value depends on the "current GANSS TOD". The value of this field to be used shall be determined by taking the "current GANSS TOD" value and selecting the field value in the Perf_GANSS_reference_measurement_information_subtest2_XX.csv file corresponding to the value of "current GANSS TOD".			

Assistance Data GANSS Almanac Model: sub-test 1, 2, 4

Table 6.2.6.4.40: Void

Table 6.2.6.4.41: GANSS Almanac Model: sub-test 1, 4 (Fields occurring once per message)

Parameter	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
Num Sats Total		24	24	24
Week Number		Any value	Any value	Any value

Table 6.2.6.4.42: Void

Table 6.2.6.4.42a: GANSS Almanac Model: sub-test 1, 4 (Fields occurring once per satellite)

Information Element	Units	Value/remark GNSS All
GLONASS Keplerian Parameters		
N^A	days	See file: Perf_GANSS_Almanac_subtest1_4_XX.csv
n^A		Slot Numbers: 1, 2 , 3 …….22, 23, 24
$H_n{}^A$		See file: Perf_GANSS_Almanac_subtest1_4_XX.csv
$\lambda_n{}^A$	semi-circles	See file: Perf_GANSS_Almanac_subtest1_4_XX.csv
$t_{\lambda n}{}^A$	seconds	See file: Perf_GANSS_Almanac_subtest1_4_XX.csv
$\Delta i_n{}^A$	semi-circles	See file: Perf_GANSS_Almanac_subtest1_4_XX.csv
$\Delta T_n{}^A$	sec/orbit period	See file: Perf_GANSS_Almanac_subtest1_4_XX.csv
$\Delta T\_DOT_n{}^A$	sec/orbit period^2	See file: Perf_GANSS_Almanac_subtest1_4_XX.csv
$\varepsilon_n{}^A$		See file: Perf_GANSS_Almanac_subtest1_4_XX.csv
$\omega_n{}^A$	semi-circles	See file: Perf_GANSS_Almanac_subtest1_4_XX.csv
$\tau_n{}^A$	seconds	See file: Perf_GANSS_Almanac_subtest1_4_XX.csv
$C_n{}^A$		See file: Perf_GANSS_Almanac_subtest1_4_XX.csv
$M_n{}^A$		See file: Perf_GANSS_Almanac_subtest1_4_XX.csv

Table 6.2.6.4.43: Void

Table 6.2.6.4.44: GANSS Almanac Model: sub-test 2 (Fields occurring once per message)

Parameter	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
Num Sats Total		24	24	24
Week Number		FFS	FFS	FFS

Table 6.2.6.4.45: GANSS Almanac Model: sub-test 2 (Fields occurring once per satellite)

Parameter	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
Keplerian parameters				
SVID		SV IDs: [FFS]	SV IDs: [FFS]	SV IDs: [FFS]

Table 6.2.6.4.46: GANSS Almanac Model: sub-test 2 (Fields occurring once per satellite)

Information Element	Units	Value/remark GNSS All
e		See file: Perf_GANSS_Almanac_subtest2_XX.csv
δi	semi-circles	See file: Perf_GANSS_Almanac_subtest2_XX.csv
OMEGADOT	semi-circles/sec	See file: Perf_GANSS_Almanac_subtest2_XX.csv
SV Health KP		See file: Perf_GANSS_Almanac_subtest2_XX.csv
delta $A^{1/2}$	$meters^{1/2}$	See file: Perf_GANSS_Almanac_subtest2_XX.csv
$OMEGA_0$	semi-circles	See file: Perf_GANSS_Almanac_subtest2_XX.csv
M_0	semi-circles	See file: Perf_GANSS_Almanac_subtest2_XX.csv
ω	semi-circles	See file: Perf_GANSS_Almanac_subtest2_XX.csv
af_0	Seconds	See file: Perf_GANSS_Almanac_subtest2_XX.csv
af_1	sec/sec	See file: Perf_GANSS_Almanac_subtest2_XX.csv

Assistance Data GANSS Almanac Model Extension: sub-test 1, 2, 4

Table 6.2.6.4.46a: GANSS Almanac Model Extension: sub-test 1, 4 (Fields occurring once per message)

Information Element	Units	Value/remark GNSS All	Release
Complete Almanac Provided		1 (TRUE)	Rel-10 onwards

Table 6.2.6.4.46b: GANSS Almanac Model Extension: sub-test 2 (Fields occurring once per message)

Information Element	Units	Value/remark GNSS All	Release
Complete Almanac Provided		1 (TRUE)	Rel-10 onwards

Assistance Data GANSS Auxiliary Information: sub-test 1, 3, 4

Table 6.2.6.4.47: Void

Table 6.2.6.4.48: GANSS Auxiliary Information: sub-test 1, 4 (Fields occurring once per satellite)

Parameter	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
SVID		Slot Number s: see Table 6.2.6.3-1	Slot Number s: see Table 6.2.6.3-1	Slot Number s: see Table 6.2.6.3-1
Signals Available		G1	G1	G1
Channel Number		5, 6, 1, -2, -7, -3, 3, 2	1, 6, -2, -7, -1, 3, 2, 4	[FFS]

Table 6.2.6.4.49: Void

Table 6.2.6.4.50: GANSS Auxiliary Information: sub-test 3 (Fields occurring once per satellite)

Parameter	Units	Value/remark GNSS #1	Value/remark GNSS #2	Value/remark GNSS #4C
SVID		PRNs: see Table 6.2.6.3-1	PRNs: see Table 6.2.6.3-1	SV IDs: see Table 6.2.6.3-1
Signals Available		L1C and others as supported by the MS	L1C and others as supported by the MS	L1C and others as supported by the MS

Annex A (normative): GPS data files

A.1 GPS data files for signalling tests

The GPS data files for use in GPS signalling tests are contained in archive GPS_Data_Sig_V5.zip which accompanies this document.

A.2 GPS data files for Minimum Performance tests

The GPS data files for use in GPS Minimum Performance tests are contained in archive GPS_Data_Perf_V4.zip which accompanies this document. The different scenarios are designated with suffixes XX in the zip file, where XX is 01, 02, 03 for scenarios #1, #2, #3.

Annex B (normative): GNSS data files

B.1 GNSS data files for signalling tests

The GNSS data files for use in GNSS signalling tests are contained in archive GNSS_Data_Sig_V6.zip which accompanies the present document.

B.2 GNSS data files for Minimum Performance tests

The GNSS data files for use in GNSS Minimum Performance tests are contained in archive GNSS_Data_Perf_V5.zip which accompanies the present document. The different scenarios are designated with suffixes XX in the zip file, where XX is 01, 02, 03 etc. for scenarios #1, #2, #3 etc.

Annex C (informative): Change history

Date	TSG #	TSG Doc	CR	Rev	Subject/Comment	Version Old	Version New
2010-02	-	-	-	-	First draft	-	0.0.1
2010-03	-	-	-	-	Scenario and Assistance Data text added from TS 51.010-1	0.0.1	0.0.2
2010-03	-	-	-	-	Version 1.0.0 for information	0.0.2	1.0.0
2010-08	-	-	-	-	Additions of Assistance Data text and editorial corrections	1.0.0	1.1.0
2010-08	-	-	-	-	Editorial corrections	1.1.0	1.2.0
2010-08	-	-	-	-	Editorial corrections	1.2.0	1.3.0
2010-08	GP-47	GP-101608	-	-	Version 2.0.0 for approval	1.3.0	2.0.0
2010-08	-	-	-	-	Minor editorial corrections	2.0.0	2.0.1
2010-09	-	-	-	-	Editorial corrections	2.0.1	9.0.0
2010-12	GP-48	GP-101720	0001	-	CR 51.010-7-0001 GPS Assistance Data corrections	9.0.0	9.1.0
2011-03	GP-49	GP-110019	0002	-	CR 51.010-7-0002 Corrections to term “PRN”	9.1.0	9.2.0
2011-06	GP-50	GP-110558	0004	-	CR 51.010-7-0004 Removal of incorrect data file	9.2.0	9.3.0
2011-06	GP-50	GP-110837	0003	1	CR 51.010-7-0003 Addition of Assistance Data values for A-GNSS	9.2.0	9.3.0
2012-06	GP-54	GP-120477	0006	-	CR 51.010-7-0006 Corrections to GPS Almanac data file for signalling test cases	9.3.0	9.4.0
2012-09	GP-55	GP-121040	0007	1	CR 51.010-7-0007 Addition of missing Assistance Data	9.4.0	9.5.0
2012-12	GP-56	-	-	-	Correction of version of GP-121040 in the history table	9.5.0	9.5.1
2013-03	GP-57	GP-130075	0008	1	CR 51.010-7-0008 Corrections to GNSS assistance data	9.5.1	9.6.0
2013-03	GP-57	GP-130076	0009	1	CR 51.010-7-0009 Changes to assistance data file names	9.5.1	9.6.0
2013-03	GP-57	GP-130077	0010	1	CR 51.010-7-0010 Temporary removal of GLONASS aquisition assistance data files	9.5.1	9.6.0
2013-03	GP-57	GP-130079	0012	1	CR 51.010-7-0012 Corrections to GPS Almanac assistance data files	9.5.1	9.6.0
2013-03	GP-57	GP-130078	0011	1	CR 51.010-7-0011 Addition of Rel-10 IE fields	9.6.0	10.0.0
2013-09	GP-59	GP-130756	0014	1	CR 51.010-7-0014 Additions and corrections to Assistance Data	10.0.0	10.1.0
2014-03	GP-61	GP-140037	0015	-	CR 51.010-7-0015 Correction to GPS Navigation Model value	10.1.0	10.2.0
2014-03	GP-61	GP-140038	0016	-	CR 51.010-7-0016 Correction to OmegaA0 values for scenario #1	10.1.0	10.2.0
2014-03	GP-61	GP-140041	0019	-	CR 51.010-7-0019 Adjustment of SV IDs of Satellites to be simulated	10.1.0	10.2.0
2014-03	GP-61	GP-140074	0020	-	CR 51.010-7-0020 Deletion of FN1	10.1.0	10.2.0
2014-03	GP-61	GP-140087	0017	1	CR 51.010-7-0017 Correction to GPS Almanac value	10.1.0	10.2.0
2014-03	GP-61	-	-	-	Upgraded to Rel-11 with no change	10.2.0	11.0.0
2014-03	GP-61	GP-140088	0018	1	CR 51.010-7-0018 Corrections to GLONASS GANSS Day values	11.0.0	12.0.0
2014-06	GP-62	GP-140266	0022	-	CR 51.010-7-0022 Clarification of Assistance Data usage with sub-tests	12.0.0	12.1.0
2014-06	GP-62	GP-140267	0023	-	CR 51.010-7-0023 Correction to T_lamda_n_A values for scenario #1 and signalling tests	12.0.0	12.1.0
2014-12	GP-64	GP-140764	0024	-	CR 51.010-7-0024 Introduction of BDS into A-GNSS Signalling tests	12.1.0	12.2.0
2014-12	GP-64	GP-140766	0026	-	CR 51.010-7-0026 Introduction of BDS into A-GNSS Signalling files	12.1.0	12.2.0
2014-12	GP-64	GP-140792	0028	-	CR 51.010-7-0028 Update of Foreword	12.1.0	12.2.0

History

Document history		
V12.1.0	October 2014	Publication
V12.2.0	January 2015	Publication