

Implementation Notes

eCall scenario pack



1 Version

Version	Author	Date	Modifications
V1.0	Joshua Stubbs	6-March-2017	first version



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3 References

- a) DGP00956AAA Issue 3-00 Spirent Software Licence.
- b) COMMISSION DELEGATED REGULATION (EU) 2017/79, Annex VI of OfficialJournalEU_20170117.pdf (available at <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2017:012:FULL&from=EN>)



4 Introduction

This document serves as the implantation notes for the eCall scenarios.

The scenario set is provided in SimREPLAY format (*.scn_replay and has been verified on v5.07 of software).

The pack is provided under license as detailed in reference a), for use on one simulation system only. The user can purchase additional software licences for this pack if needed, please contact your local Spirent Sales Representative.

5 The scenario pack

The pack consists of 14 scenarios each of which is named corresponding to the section of reference b) that defines it.

Unless otherwise stated the scenario parameter values use the 5.07 software defaults.



6 Common Test Parameters

Reference b) defines a number of key tables (2, 3 and 4) that define core simulation parameters, these are reproduced below with implementation comments where needed.

Table2 from reference b)

Simulated Parameter	Value	Comments
Test Duration	1 hour	Start time is 10 th November 2017 23:30
Output frequency	1 Hz	The iteration rate of the simulation The minimum value is 10 Hz (better)
eCall location	Any specified land point between latitude range 80N and 80S in coordinate system WGS-84	36° 12'N, 5° 35'W 100m height
Troposphere	Standard Predefined model by the GNSS	STANAG
Ionosphere	Standard Predefined model by the GNSS	Klobuchar (modelled values match broadcast)
PDOP value in the test interval	2.0 < PDOP < 2.5	Per constellation GPS 2.25 → 2.43 Galileo 2.04 → 2.43
Simulated Signals	Galileo (E1 frequency band OS) GPS (L1 frequency band C/A code) Combined Galileo/GPS/SBAS	SBAS is EGNOS
Signal Strength GNSS Galileo GNSS GPS (inc SBAS)	-135 dBm -138.5 dBm	ICD minimums -8dB's (Galileo), ICD minimums -8.5 dB's (GPS)
Number of simulated satellites	at least 6 Galileo at least 6 GPS at least 2 SBAS	6 Galileo 6 GPS 2 SBAS

Table3 from reference b)

Simulated Parameter	Value	Comments
Test Duration	1 hour	Start time is 10 th November 2017 23:30
Output frequency	1 Hz	The iteration rate of the simulation The minimum value is 10 Hz (better)
eCall location	Any specified land point between latitude range 80N and 80S in coordinate system WGS-84	36° 12'N, 5° 35'W 100m height
Model of movement: Speed km/h Turn radius m Turn acceleration m/s ²	140 500 0.2	= 38.89 m/s 500 0.3g's (see note below)
Troposphere Ionosphere	Standard Predefined model by the GNSS Standard Predefined model by the GNSS	STANAG Klobuchar (modelled values equals broadcast)
PDOP value in the test interval	2.0<PDOP<2.5	Per constellation GPS 2.25 → 2.43 Galileo 2.04 → 2.43
Simulated Signals	Galileo (E1 frequency band OS) GPS (L1 frequency band C/A code) Combined Galileo/GPS/SBAS	SBAS is EGNOS
Signal Strength GNSS Galileo GNSS GPS(inc. SBAS)	-135 dBm -138.5 dBm	ICD minimums -8dB's (Galileo), ICD minimums - 8.5 dB's (GPS)
Number of simulated satellites	at least 6 Galileo at least 6 GPS at least 2 SBAS	6 Galileo 6 GPS 2 SBAS

When cornering at 38.39m/s (=140 km/h) with a lateral acceleration of 0.2 m/s² a turn radius of about 7717m is required. If the lateral acceleration is 0.3g's then the turn radius is reduced to 500m. Spirent has complied with the turn radius requirement of 500 meters, which has a consequence of increasing the centripetal acceleration to 0.3g's. A repeating figure of 8 motion is implemented.



Table4 from reference b)

Simulated Parameter	Value	Comments
Test Duration	1 hour	Start time is 10 th November 2017 23:30
Output frequency	1 Hz	The iteration rate of the simulation The minimum value is 10 Hz (better)
eCall location	Any specified land point between latitude range 80N and 80S in coordinate system WGS-84	47° 00'N, 00° 00'E 100m height
Model of movement: Speed km/h Turn radius m Turn acceleration m/s ²	140 500 0.2	= 38.89 m/s 500 0.3g's (see note above)
Satellite Visibility: Signal visibility intervals (s): Signal Absence intervals (s):	300 600	Signal starts in "on" mode, the signal is turned off after 5 minutes and remains off for 10 minutes. Then the signal is turned on, and pattern is repeated
Troposphere Ionosphere	Standard Predefined model by the GNSS Standard Predefined model by the GNSS	STANAG Klobuchar (modelled values equals broadcast)
PDOP value in the test interval	3.5 < PDOP < 4	Per constellation Galileo 3.55 → 3.98 GPS 3.51 → 4.00*
Simulated Signals	Galileo (E1 frequency band OS) GPS (L1 frequency band C/A code) Combined Galileo/GPS/SBAS	SBAS is EGNOS
Signal Strength GNSS Galileo GNSS GPS (inc. SBAS)	-135 dBm -138.5 dBm	ICD minimums -8dB's (Galileo), ICD minimums -8.5 dB's (GPS)
Number of simulated satellites	at least 6 Galileo at least 6 GPS at least 2 SBAS	6 Galileo 6 GPS 2 SBAS

***NOTE**

The GPS PDOP does rise above 4.00 in the last 8 minutes of the scenario. However, this does not impact the testing since the signals are in the "off" mode at this point, and remain in this mode until the end of the scenario.



7 Notes about the tests

10 unique tests have been recognized in reference b). The tests are referenced to their corresponding section number in reference b). Below are some brief notes about the scenarios that have been created for these tests.

Test	Associated Scenario(s)	Comments
2.2.1.3	eCall_2_2_1_3_v1	-
2.2.2.3	eCall_2_2_2_3_v1	-
2.2.2.15	eCall_2_2_2_15_v1	-
2.2.2.16	eCall_2_2_2_16_v1	-
2.2.3.1	eCall_2_2_3_1_(2_2_2_3)_v1 eCall_2_2_3_1_(2_2_2_15)_v1 eCall_2_2_3_1_(2_2_2_16)_v1	Variations of eCall_2_2_3_1_v1 provided as reference b) states to repeat steps 2.2.2.15-2.2.2.16 but with new parameters
2.2.4.1	eCall_2_2_4_1_(2_2_2_3)_v1 eCall_2_2_4_1_(2_2_2_15)_v1 eCall_2_2_4_1_(2_2_2_16)_v1	Variations of eCall_2_2_4_1_v1 provided as reference b) states to repeat steps 2.2.2.15-2.2.2.16 but with new parameters
2.2.5.3	eCall_2_2_5_3_v1	-
2.2.5.8	eCall_2_2_5_8_v1	As reference b) only mentions “with signal level -140 dBm”, a global offset of -10 dB to all constellations have been applied (which puts the GPS signal power to -140 dBm and -137dBm for Galileo).
2.2.6.2	eCall_2_2_6_2_v1	-
2.2.7.6	eCall_2_2_7_6_v1	As reference b) only mentions “with signal level -144 dBm”, a global offset of -14 dB to all constellations have been applied (which puts the GPS signal power to -144 dBm and -141dBm for Galileo)

8 Contacts

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