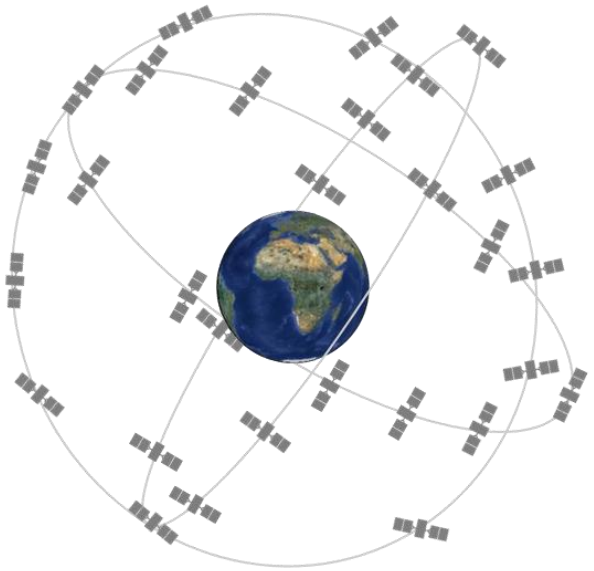
GNSS Signal Generation

Galileo

Facts and figures

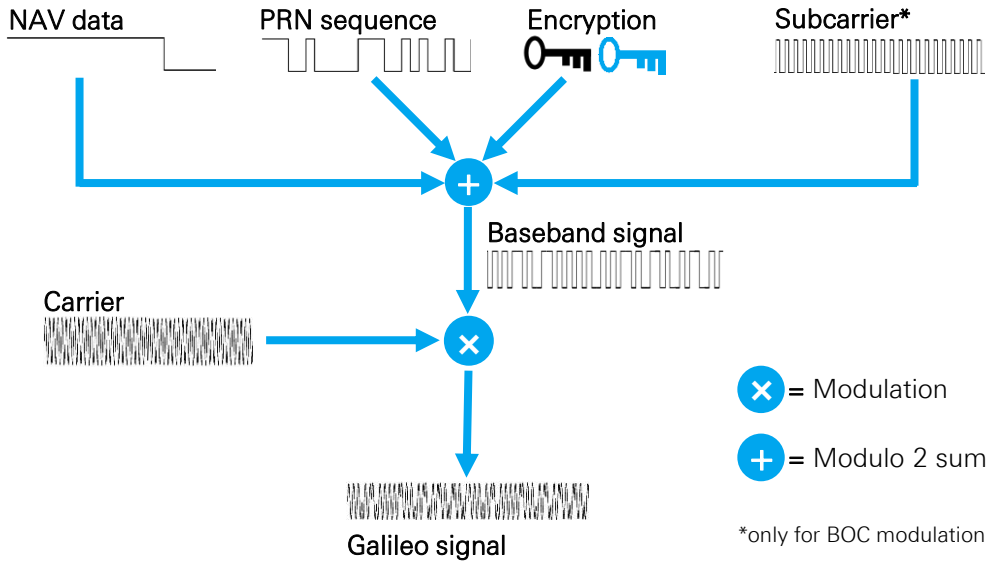


- Joint initiative of the European Commission (EC), the European GNSS Agency (GSA) and the European Space Agency (ESA).
- Provides open service (OS), public regulated service (PRS) restricted to authorized users, commercial service (CS) and search and rescue (SAR) service
- 27 (+3 spare) baseline satellites; currently 22 operational SVs
- 3 orbital planes with an inclination of 56°
- Orbital altitude: ~23.222 km
- Orbital period: ~14h
- Ground track repetition period: 10 sidereal days

Galileo signal plan

Service name	E1 OS	PRS	E5a OS E5b OS	E6 CS
Frequency band	E1	E1 E6	E5	E6
Center frequency [MHz]	1575.42	1575.42 1278.75	1176.45 1207.14	1278.75
Modulation	CBOC(6,1,1/11)	BOC(15,2.5) BOC(10,5)	AltBOC(15,10)	BPSK(5)
Access technique	CDMA	CDMA	CDMA	CDMA
Sub-carrier frequency MHz]	6.138, 1.023	15.345 10.23	15.345	-
Code frequency [MHz]	1.023	2.5575 5.115	10.23	5.115
Primary PRN code length	4092	-	10230	5115
Data rate [bps]	250	-	50 250	1000 -

Signal modulation



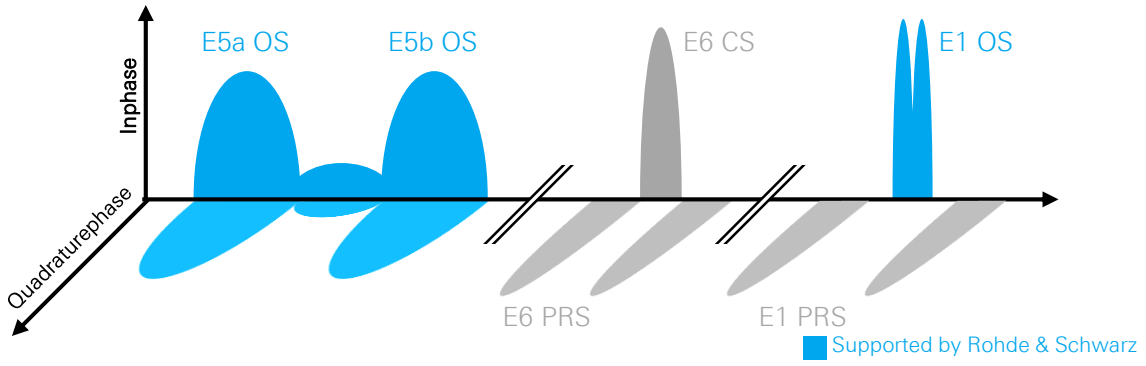
Your challenge

- Galileo is an emerging technology which will be part of a wide variety of applications, reaching from location-based services (LBS) over agriculture to time-reference functions
- The performance of newly developed Galileo receivers has to be tested before they are brought to market
- Controlled and realistic conditions are a prerequisite to get conclusive test results
- Galileo receivers cannot be tested in a real-world environment since this is time-consuming, costly and almost impossible to reproduce
- The structure of Galileo signals is complex and therefore difficult to create manually

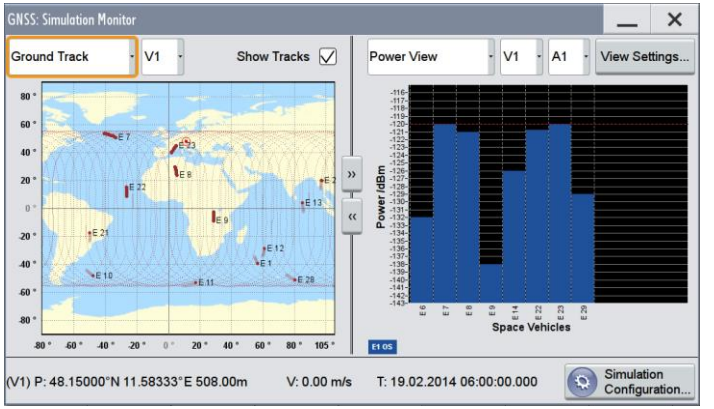
Our solution

- Use the R&S®SMBV100A or the R&S®SMW200A to simulate complex satellite constellations in real-time and with unlimited simulation time
- Perform tests in the lab under controlled and repeatable conditions using a R&S®GNSS simulator
- Perform production tests with the R&S®SMBV-P101 or precomputed waveforms from R&S®WinIQSIM2
- Generate signals for all available GNSS systems:
  - Galileo (E1 OS)
  - GPS (C/A, P, L2C), Glonass (C/A), Beidou (B1I,B2I)

Galileo spectrum



Galileo simulation in the R&S®SMW200A



E1 OS simulation performed by the R&S®SMW200A.

Rohde & Schwarz Solutions for GNSS Signal Generation

- GNSS simulator, R&S®SMBV100A
- GNSS simulator, R&S®SMW200A
- GNSS production tester, R&S®SMBV-P101
- GNSS waveforms with R&S®WinIQSIM2

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