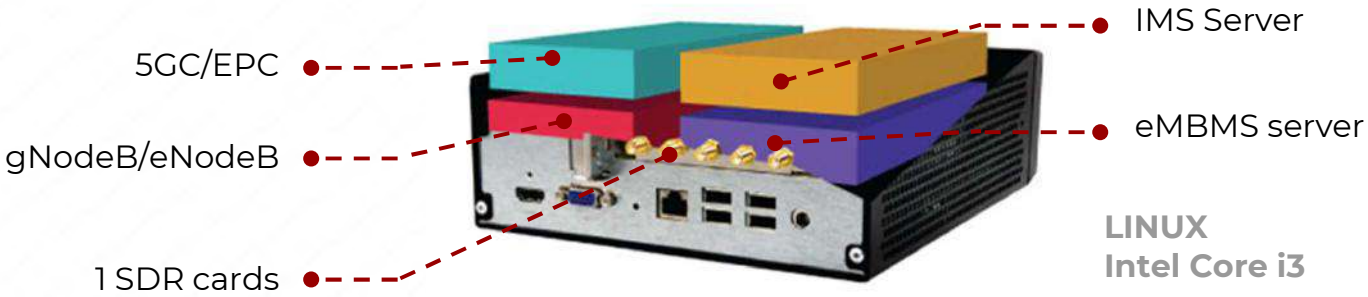
AMARI LTE Callbox mini

Packaged in a plug and play integrated PC, AMARI Callbox Mini is an ideal solution for LTE and NR testing of all types of user equipment with advanced configuration.

It acts as a 3GPP compliant eNodeB, gNodeB, EPC and 5GC allowing functional and performance testing of NR (SA mode), LTE, LTE-A, LTE-M and NB-IoT devices. The offer is completed by an integrated IMS server as well as an eMBMS gateway for VoLTE and eMBMs testing.

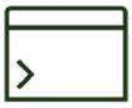
The Callbox is powered by a deployment quality LTE and NR software suite offering the same level of baseband functionality as an indoor/outdoor network.

The Portable LTE Network



Do you have any question? E-mail us at **sales@amarisoft.com** or visit **www.amarisoft.com**

AMARI LTE Callbox mini



Logging and Measurements
Selective logging and display of all layers of 3GPP LTE and NR stacks as well as useful graphs and analytic tools.

Automatic Test Setup and Scripting
Extensive WebSocket API allowing to send remote commands to eNodeB, gNodeB, EPC and 5GC to ease test automation.

Easy Configuration
Easy configuration thanks to JSON files with example configurations already included in each software release for eNodeB, gNodeB, EPC and 5GC.

End to End Data Testing
Running on top of standard Linux in user space mode allowing easy integration with IP services.

Channel Simulation
Simulation of different DL channel types as per 3GPP models specified in 36101 specification

Test Features
Test features allowing to override the nominal protocol behavior in order to simulate error cases.

High Performance

- Highly optimized software supporting hundreds of UEs.
- High data rates supporting downlink and uplink rates of 200 Mbps and 75 Mbps.

Frequency Agnostic
Support of all FDD and TDD frequency bands even non standard ones to test custom frequencies in sub-6GHz.

3GPP Features
Early access to 3GPP features for rapid validation of features under development.

AMARI LTE Callbox mini

PC Specifications

Dimensions H × W × D	**7.8 cm × 20 cm × 25 cm**
Weight	**2 kg**
Number of PCIe SDR Cards	**1**
Power supply voltage	**Input:100 - 240V AC Output: 19.5V/9.23A 180W Adapter**
CPU	**Intel Core i3**
Operating System	**Linux Fedora**

PCIe SDR Specifications

Dimensions H × W × D	**2 cm × 11.5 cm × 12.8 cm**
Weight	**0.1 kg**
Power supply voltage	**12 V DC input**
RF Coverage	**500 MHz to 6.0 GHz**
RF bandwidth	**200 KHz to 56 MHz**
Wireless range	**10 meters**
Operation mode	**FDD and TDD**
MIMO	**DL 2x2**

eNodeB Technical Specifications

3GPP release	**LTE release 14**
Frequency bands	**All FDD and TDD bands with support of custom frequencies**
Bandwidth	**1.4, 3, 5, 10, 15 and 20 MHz in LTE 200 KHz for NB-IoT supporting all operation modes (in-band, guard band and standalone).**
Supported number of cells	**1**
Supported number of UEs	**Up to 500 UEs**
LTE UE category	**0/1/2/3/4**
Transmission modes	**1 (single antenna) and 2 to 10 (MIMO 4x4)**
Modulation schemes	**Up to 256QAM in DL and 64QAM in UL**
AS encryption and integrity protection	**AES, SNOW3G, ZUC**
Handover	**Intra eNodeB, S1 and X2 handover support**
IoT	**LTE category 0 and 1 LTE-M cat M1 NB-IoT cat NB1 and NB2**
NB-IoT subcarrier spacing	**15 kHz and 3.75 kHz**
Network interfaces	**S1AP and GTP-U to EPC X2AP between eNodeBs M1 and M2 for eMBMS**

amarisoft

AMARI Callbox mini

gNodeB Technical Specifications

3GPP release	**Release 15**
Frequency bands	**FDD/TDD FR1 (< 6 GHz)**
Bandwidth	**Up to 20 MHz**
MIMO	**Up to MIMO 2x2 in DL**
Subcarrier spacing	**All SSB/data subcarrier spacing combinations**
Modulation schemes	**Up to 256QAM in DL and 64QAM in UL**
Supported modes	**SA**
Use case	**eMBB**
Network interfaces	**NG interface (NGAP and GTP-U) to 5GC**

Supported number of cells

Max number of LTE cells	**1**
Max number 5G cells	**1**
Max total number of cells	**1**
Σ(Bi*Li)	**40**

Bi is the bandwidth in MHz of cell i Li is the number of dl MIMO layer for cell i

Configuration examples

4G LTE	**20MHz 2x2**
5G NR	**SA: 1 5G cell 20MHz 2x2**
NB-IoT	**1 NB-IoT cell in standalone, in-band or guard-band mode**
LTE-M	**1 LTE cell with CAT M1 support**

EPC Technical Specifications

Network elements	**Mobility Management Entity (MME), Serving Gateway (SGW), Packet Data Network Gateway (PGW), and Home Subscriber Server (HSS) all integrated within the same software component**
3GPP release	**Release 14**
NAS encryption and integrity protection	**AES, SNOW3G, ZUC**
USIM authentication	**XOR, Milenage, TUAK**
IP version	**IPv4 and IPv6**
QoS	**Support of all LTE QCIs as well TFT and dedicated bearers**
Handover	**S1 based support**
Network interfaces	**S1AP and GTP-U to eNodeB RX for external IMS server S6a for optional external HSS**
RAT	**LTE, NB-IoT**
CIoT features	**control plane CIoT optimization, Non IP data delivery, Attach without PDN connectivity**
Power saving features	**PSM and extended DRX**

IMS Server Technical Specifications

Network Elements	**Proxy-CSCF (P-CSCF), Interrogating-CSCF (I-CSCF), Serving-CSCF (S-CSCF), and Home Subscriber Server (HSS) all integrated within the same software component**
ISIM authentication	**XOR, Milenage, TUAK**
Security features	**MD5, AKAv1 and AKAv2 for authentication and IPSec at transport level**
Network interfaces	**Rx interface for support of precondition and dedicated bearer Cx interface for external authentication**
IP versions	**IPv4 and IPv6**
Services	**Voice call, Video call, Voice echo test, Call hold, SMS over SIP and SMS over SG**

eMBMS Gateway Technical Specifications

Network Elements	**LTE eMBMS Gateway (eMBMS-GW) and Multi-cell Coordination Entity (MCU)**
Network interfaces	**M1 interface to eNodeB for user plane M2AP interface to eNodeB for control plane**

5G Core Technical Specifications

Network elements	**Access and Mobility Management Function (AMF), Authentication Server Function (AUSF), Session Management Function (SMF) and User plane Function(UPF) all integrated within the same software component**
3GPP release	**Release 15**
NAS encryption and integrity protection	**AES, SNOW3G, ZUC**
USIM authentication	**XOR, Milenage, TUAK 5G-AKA**
IP version	**IPv4, IPv4v6, IPv6 and unstructured PDUs support**
QoS	**Configurable QoS flows**
PDU	**Multi PDU sessions support**
Network interfaces	**NG interface (NGAP and GTP-U protocols) to several gNodeBs RX for external IMS server**

Web GUI interface for logging and analysis