



CHANGESELF CSNE100

LTE(FDD/TDD)/LTE-A/eMTC/NB-IoT Network

Emulator

Data Sheet

The first instrument designed to emulate an entire LTE(FDD/TDD)/ LTE-A/ eMTC/ NB-IoT network for unlimited number of UEs testing and end-to-end mobile testing simultaneously in one unit.



The first instrument designed to emulate an entire NB-IoT/LTE(FDD/TDD)/ LTE-A/ eMTC/ network for unlimited number of UEs testing and end-to-end mobile testing simultaneously in one unit.

CHANGESELF CSNE100 is first instrument designed to emulate an entire NB-IoT/LTE(FDD/TDD)/ LTE-A/ eMTC/ network for unlimited number of UEs testing and end-to-end mobile testing simultaneously in one unit. Unlimited number of UEs accessing simultaneously makes it

possible to test multiple UEs at a time and can greatly improve the test efficiency.

It enables real testing of unlimited NB-IoT/LTE UEs' mobility, interoperability, functionality, battery life testing, VoLTE/IMS, RCS and data application performance to uncover issues in lab environment.

An intuitive GUI makes it easy to set up network scenarios for adversarial testing, data application, performance testing, battery life testing, mobility testing, VoLTE/IMS/RCS testing, functionality testing, real network simulation in lab environment



setup and much more. Real time message logging and decoding minimize the time required for analysis and debugging. It especially focus on function reliability, service experience, quality experience including VoLTE/IMS IoT testing, addressing the interoperability challenges, performance problems, real power consumption simulation and multi-UE end-to-end applications etc.

Intuitive GUI and API have been tailored for application development teams tasked with testing complex network scenarios and are pre-configured with the specifications

required for major carriers' networks. Customized any signaling and call processing feature support any live network issue simulated in lab. Call flow activity and Layer1,2,3 messages for all devices are displayed and logged in real time for ease in debugging and historical analysis purposes.



Applications

■ Manufacturers and Labs

- NB-IoT, LTE (FDD/TDD)/LTE-A/eMTC/ Product Design
- Real network simulation (Virtual Field Test) in lab
- Multi-UE test environment setup in lab
- Product Development
- Design Verification Testing (DVT)
- Device-to-device interoperability for Voice, Video, OTT, and M2M applications
- VoLTE and RCS functional tests
- Quality Assurance
- Product Evaluation
- Carrier Compliance Labs
- Field and System Performance Analysis
- Application and functionality testing
- Function Reliability and Regression testing

■ Operators

- Pre-launch Evaluation
- Real network issue simulation in lab
- Multi-UE IoT testing and performance reliability testing

■ Benefits

- Reduce time to market – run more tests on a single unit automatically
- Reduce device returns and customer churn through improved device quality – identify system selection and other performance issues under repeatable multi-network conditions
- Address the entire lifecycle of testing needs with a single solution– R&D, DVT, Benchmarking/Evaluation, Certification, Operator
- Customize your test schedule to your needs – flexibility ensures that you meet short-term
- Brings the real world into the lab – realistic messaging, power control and timing creates realistic test scenarios.

A real-time state machine behaves a live network and supports standard interfaces between network components, so testing is comprehensive and conclusive. Resolve field issues by simulating and debugging in the lab.

- Streamlined data service rollouts – CSNE100 LTE network emulator links the mobile under test to an Ethernet

■ Features

- NB-IoT, LTE TDD/FDD simulation simultaneously
- Handles categories M1 and NB1.
- Single-tone and multi-tone category NB1 UE support
- 1.5kHz and 3.75kHz subcarrier spacing
- Handle multi-cells in intra-band or inter-band configurations
- Multiple NB-IoT and LTE cells can be supported in the same eNodeB
- Support of all NPDCCH, NPDSCH, NPUSCH and NPRACH
- Support of multi-DRB mode
- Closed-loop UE power control
- Frequency based MMSE equalizer
- Highly optimized software turbo decoder
- PAPR reduction support
- Multi-cluster PUSCH allocation
- PUCCH3 and PUCCH channel selection support.
- Carrier Aggregation support with cross carrier scheduling
- CoMP testing features
- Round-robin MAC scheduler with dynamic MCS selection
- Fully configurable System Information

connection. Testing against data and application servers are as simple as plugging into the port directly, through a LAN, or via the internet.

- Scalability – A single-channel system can evolve into the heart of an automated system or anything in between and just the capabilities you need, when you need them. Upgrade to eMTC, NB-IoT smoothly.

Blocks.

- Support of RRC measurement with measurement gap
- Standard S1AP and GTP-U interfaces to the Core Network. Several PLMNs and S1 interfaces can be used simultaneously.
- Transparent access to the IP network (no external Serving Gateway nor PDN gateway are necessary). Configurable access point name, IP range, DNS and E-RAB QoS.
- Configurable logging system for all channels with built-in text decoders.
- Simplified connections enable multiple device-to-device testing with one instrument
- Multi-PDN support with no limitation
- Same QoS algorithm with live network
- Network emulation is easily configured for major carriers' networks
- Realtime message and event analyzer displays and logs Layer 3 messages
- Powerful GUI for easy test scenario creation without script generation or software programming
- Wide range of test cases available for technology providers, network operators and device manufacturers
- Powerful device automation and

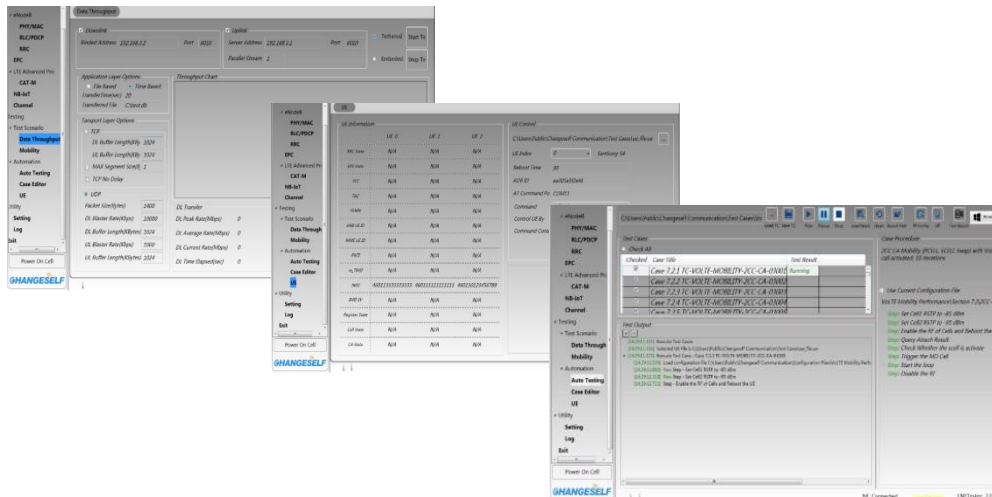
- monitoring during testing
- Configurable parameters enable rapid generation of custom test cases
- Multi-cell, multi-eNB, multi-EPC(PLMN) network emulation simultaneously
- API supported for re-development and test script automation
- Customize call processing and signaling definition

Technical Specifications

The following specifications describe warranted performance over the temperature range 0-40 °C.

Functionality	
3GPP LTE release support	3GPP Release 13 LTE/eMTC/NB-IoT, LTE release 12 compliant; LTE release 11 TDD special sub frame configurations 7 and 9 support
Network Technology	LTE (FDD,TDD)/LTE-A/eMTC/NB-IoT
Band Support	LTE-FDD band (1/2/3/4/5/6/7/8/9/10/11/12/13/14/17/18/19/20/21/22/23/24/25/26/27/28/29/30/31) LTE-TDD band (33/34/35/36/37/38/39/40/41/42/43/44)
Band width	1.4, 3, 5, 10, 15 and 20 MHz
MIMO	2x2,4x2 MIMO(CA) ,4x4 MIMO
Transmission modes	TM1 (single antenna, SISO) , TM2 to10 (MIMO 2x2, 4x2, 4x4)
CA	FDD, TDD and FDD/TDD Combined Carrier Aggregation (2CC)
Number UE access simultaneously	Unlimited
Number of active users supported	Only limited by the available bandwidth
Type of UE compatible	Compatible with all commercial UEs; Full and half duplex UEs supported; Category 0 UE support
IP Protocol	IPv4, IPv6 supported
Signal and Measurement	DRX, ROHC, SPS, Wideband CQI/PMI, PRS (Positioning Reference Signals) Signal, HARQ, Timing Measurement through PRACH, CSI-RS, 256QAM DL support for PDSCH and eMBMS etc.
MBMS/eMBMS	User configurable list of service and multicast components. Generate one stream per service over the M1 interface (GTP + SYNC protocols). Built-in test RTP packet generator.
QoS	support with user selectable DRB configuration for each QCI
CMAS/ETWS	Public Warning System (CMAS/ETWS) support
Core Network	Implements one MME with built-in SGW, PGW and HSS; Handling of UE procedures: attach, authentication, security configuration, detach, tracking area update, service access, radio bearer establishment, paging; Multi-PDN support and built-in dynamic ERAB setup for easy VoLTE/IMS testing; Configurable access point name, IP range, DNS and E-RAB QoS
IMS Server	- Implements P-CSCF with built-in I-CSCF, S-CSCF and HSS. Support of SIP protocol, MD5, AKAv1 and AKAv2 authentication, IPSec (ESP, hmac-md5-96 and no encryption), voice calls between UEs, voice echo test, Support of SMS (GSM 3.40) using SIP MESSAGE and SMS over SG.
Number of Cells	Up to 2 cells
Number of eNodeB	Up to 2 eNodeB
Number Core Network	Up to 2 independent Core Network

Internal Signal Generator	Produce AWGN, CW, Multi-Tone, PSK, QAM signals
Logging	Core network, RRC, and MAC logging synchronized across layers and cells
NAS Integrity check and encryption	AES and Snow3G algorithms
USIM cards Authentication	XOR or Milenage authentication algorithm
Interface	Standard S1 interface (S1AP and GTP-U protocols), standard X2AP interface between eNodeBs, M1 interface for MBMS.
Subscriber database	Configurable user database. No external HSS is needed.
User Interface	Standalone test the mobility scenarios: Cell Reselection/Cell Redirection/Cell Handover, intra eNodeB, S1 or X2 handovers Data Performance testing including DL/UL/Bi-Directional UDP and TCP Embedded Data Performance testing
RF Connectors	
TX1	Output port, SMA(F), 2 ports
TX2	Output port, SMA(F), 2 ports
TX1/RX1	Combined Output/Input port, SMA(F), 2 ports
TX2/RX2	Combined Output/Input port, SMA(F), 2 ports
RF Port VSWR	20 typical
RF Tx level Range	0~--142 dBm RSTP
RF Tx level accuracy	+/- 1.5dB typical
TX/RX port damage input level	30dBm
USB	2xUSB 3.0 Type A connector on front panel 2xUSB 3.0 Type A connector on rear panel
VGA	1x VGA Sub-D15 Connector
HDMI	1x Type A receptacle
LAN	2x Ethernet RJ-45 10/100/1000 Mbps
GPS	1 SMA(F) port on rear panel
Environment	
Operation ranges	Temperature: 0°C to 40 °C Humidity: 5% to 90% (non condensing)
Storage ranges	Temperature: 0°C to 60 °C Humidity: 5% to 90% (non condensing)
Noise Level	Less than 40dBa @ one meter radius (under typical office environment conditions and sound pressure level)
Power Supply	100-240V AC / 50-60Hz
Dimensions	42.88cm(W) x 13.4cm (H) x 54cm(D), all units in mm
Weight	<12kg



For more information on Changeself Technologies' products, applications or services, please contact us.

www.changeself.cn

Changeself Technology(Shenzhen) Co., Limited

Tel: 0086-755-86159665

Fax: 0086-755-26534894

E-mail: sales@changeself.cn

Address: 15C, Suite A, Si Da Building, Nan You Bld, Nan Shan District, Shenzhen, China.

Product specifications and descriptions in this document subject to change without notice.

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