

**Benetel™**

# Benetel 5G NR NSA Evaluation System

O-RAN | SPLIT 7.2x



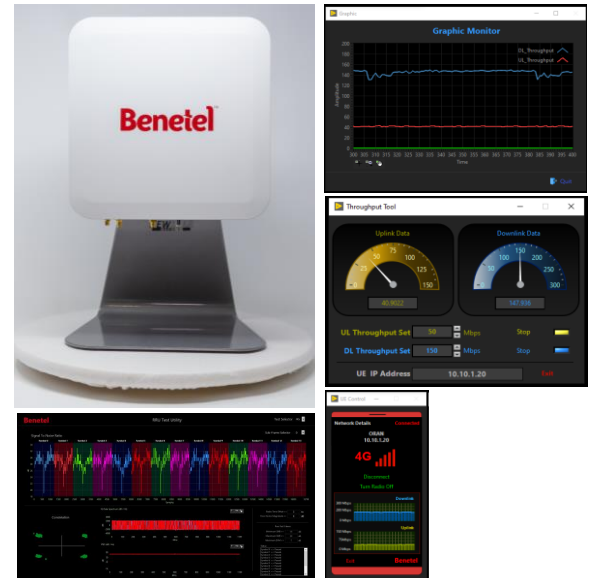
# 5G NR NSA Evaluation System

## O-RAN | SPLIT 7.2x

Benetel 5G NR Non-Standalone (NSA) Evaluation System is an indoor evaluation system targeted for laboratory, research, and test integration purposes. It is a virtual RAN (vRAN) implementation, compliant with ORAN fronthaul specification, implementing split 7.2x, where the layer 1 (L1) is split between the Radio Unit (RU) and Baseband processing.

The complete system is delivered with 2 servers in a mobile 15U Server rack, together with 1 x LTE RU (Band 7) and 1 x 5G NR RU (Band N78). The package contains the OpenAirInterface™ (OAI) Stack and NSA Core, as well as all connectors, Test SIMs and cabling required to set up the system. A list of approved UEs is provided.

In addition, Benetel is providing a suite of Software Test Applications with the Evaluation Platform to facilitate functional and performance testing.



A representation of the Eval System set up with Benetel's Server Control GUI. The GUI allows user to bring up the Server and check performance. Above are some GUI windows- Graphic Monitor, UE Control, Throughput Tool and RRU Test Utility.

## OpenAirInterface™ Software Alliance

The OpenAirInterface™ Software Alliance is a non-profit consortium fostering a community of industrial as well as research contributors for open source software and hardware development for the core network (EPC), access network and user equipment of 3GPP cellular networks. The Alliance sponsors the initial work of EURECOM to create OpenAirInterface™ towards development of 5G Cellular Stack on Commercial Off-The-Shelf (COTS) hardware.

The OpenAirInterface™ UE, eNB/gNB and Core is a fully open implementation, intended for research purposes and is not fully functional as would be expected in commercial Software Stack. It should be noted that while the package is designed to be stable in terms of extended run-time, not recommended for commercial deployment.

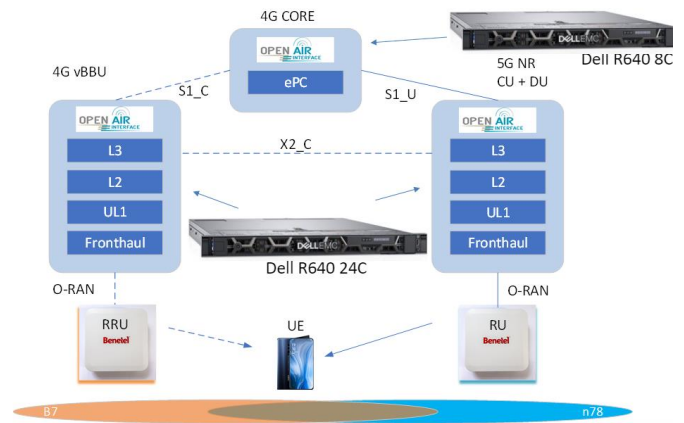
It is a community developed package and unlike some other open source initiatives, it does not have a strong open-source gatekeeper.

More information on OSA is available on [www.openairintergace.org](http://www.openairintergace.org)

Benetel has engaged directly with EURECOM to ensure that necessary hooks are included in the latest releases of the stack to ensure functionality with the Benetel ORAN based RU. The OpenAirInterface™ stack does not currently support C, M and S-Planes for full ORAN compliance.

## EQUIPMENT | SYSTEM DIAGRAM

- 1 x LTE Band 7 RRU
- 1 x 5G NR RU
- 2 x Server to implement the 4G BBU, 5G DU, 5G CU and EPC
- Ethernet Switch
- Cables
- Downloadable Benetel Test Suite
- 5 x pre-provisioned Test SIM cards
- UE (Optional)
- 15U Open Frame Server Rack
- Antennas (LTE/5G & GPS)



## Radio Unit Specifications

Benetel's vRAN Radio Unit (RU) product family is specifically targeted to address the infrastructure needs of the emerging disaggregated RAN for 4G & 5G networks. Benetel's RU platforms support multiple baseband systems, including OpenAirInterface™.

### LTE RU

Features	Specification
Fronthaul Interface / Split	O-RAN / 7.2x
O-RAN RU Category	Category A
Fronthaul Connection	10GbaseR
Sync	1588V2 & GPS
Frequency Band / Carrier Bandwidth	B7 / 20MHz
MIMO	2x2
Base Station Class	Local Area BS
TX power per Ant port	21dBm
3GPP Specification	TS 36.104 V15

### 5G RU

Features	Specification
Fronthaul Interface / Split	ORAN / 7.2x
ORAN RU Category	Category A
Fronthaul Connection	10GbaseR/25Gbps
Sync	1588V2 & GPS
Band / Carrier Bandwidth	N78 (3.3-3.8 GHz) / 40MHz
MIMO	2x2
Base Station Class	Local Area BS
SCS	30KHz
TX power per Ant port	20 dBm
Time Alignment Error	+/- 0.75 us
3GPP Specification	TS 38.104 V15

## User Equipment (UEs)

The following UE has been tested and is recommended with Benetel 5G NR NSA Evaluation System.

- OPPO Reno 5G, CPH1921 (Validated)
- Samsung Galaxy A90 5G, SM-A908BZKABTU (Ongoing)

Benetel can provide above UEs and additional Test SIMs upon request.

Please enquire [sales@benetel.com](mailto:sales@benetel.com) for any additional device compatibility.

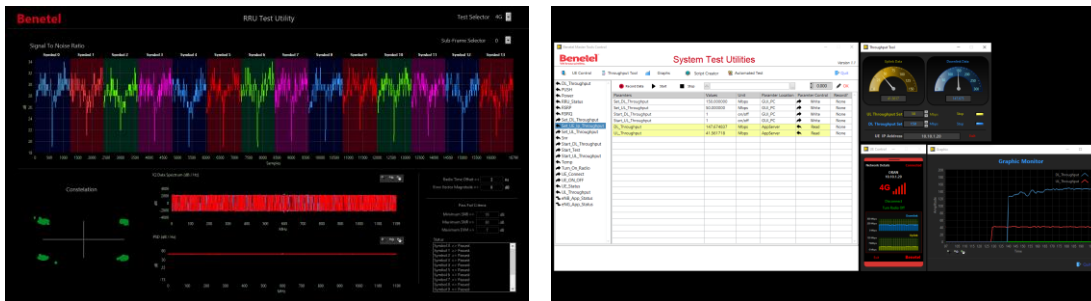
# Benetel Test Suite

Benetel includes a downloadable binary of its Test Suite which must be installed on a Windows 10 PC/Laptop and connected to the ethernet switch provided in the package. The 5G NR NSA System and its user-friendly graphical interface supports easy configuration of the 5G NSA system from the GUI.

The GUI includes several applications to facilitate configuration, testing and demonstrations. The System Test Utility has automated test scripts and several KPI measurements for the system including system throughput and connectivity measurements.

The RU Test Suite allows the tester to run standalone tests verifying radio performance, ORAN protocol and KPIs according to 3GPP. Available KPIs that can e.g. be reported are:

- Downlink, Uplink Throughput
- PUSCH SINR, PUSCH SDU SINR
- PUCCH SINR, PUCCH SDU SINR
- PRACH statistics e.g. Max/Min time advance, number of PRACH detected
- DL/UL Modulation and coding scheme (MCS)
- DL/UL HARQ transmission count
- PUSCH CRC Errors
- UL time advance



Above are some GUI windows of the Graphic Monitor, UE Control, Throughput Tool and RRU Test Utility options.

## 5G NR NSA Use Case

The 5G NR NSA System and its user-friendly Test Suite supports the following use cases:

- 5G NSA System connectivity
- Downlink & Uplink Throughput Performance
- Customer 5G NSA demonstrations

**The BNTL- XP0001 evaluation system can be purchased directly from Benetel.**

**Support:** The package includes 20 hours of Remote Support. **Upgrades:** Benetel may provide selected RU updates for 6 months from delivery. There will be an upgrading fee for updates beyond the mentioned timeframe. **Annual maintenance:** Annual maintenance fee is required for software updates and additional support. **DISCLAIMER: Third Party Software:** Benetel has chosen to introduce this 5G Evaluation System utilizing the OpenAirInterface™ stack for ease of configuration, with a vision to enable effortless access to an open stack for evaluation purposes. The performance and supported features of the stack is defined by OpenAirInterface™ Software Alliance and is being constantly evolved by its contributors. For “carrier-grade” stacks, Benetel works in the broad ecosystem, supporting a variety of stack vendors, many of them based on Intel’s Flexran approach. **Radio frequency emissions:** The radio units will not be CE or FCC certified and they should only be used with the provided attenuators and subject to local laws and regulations.