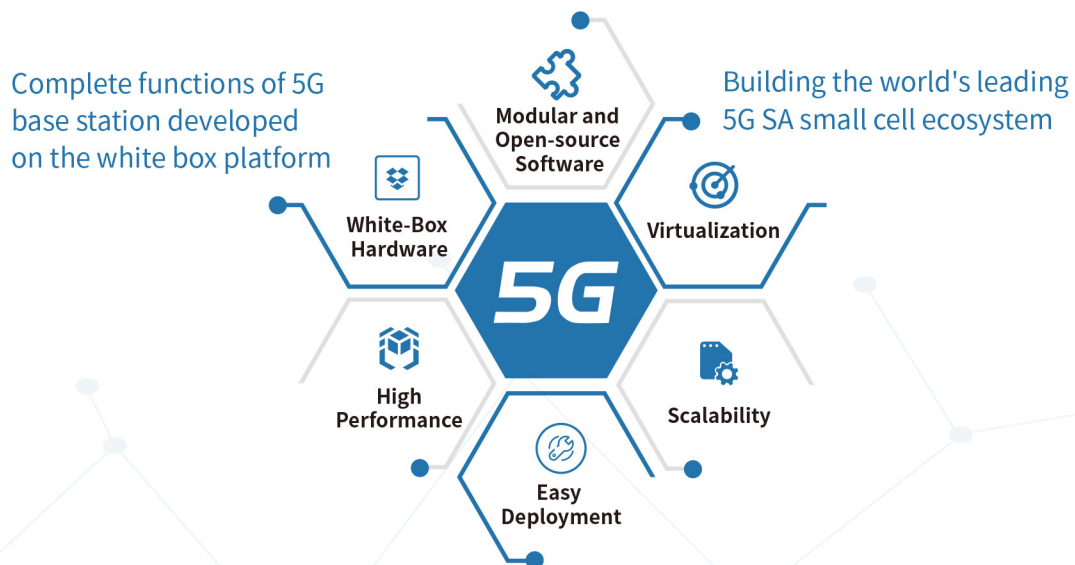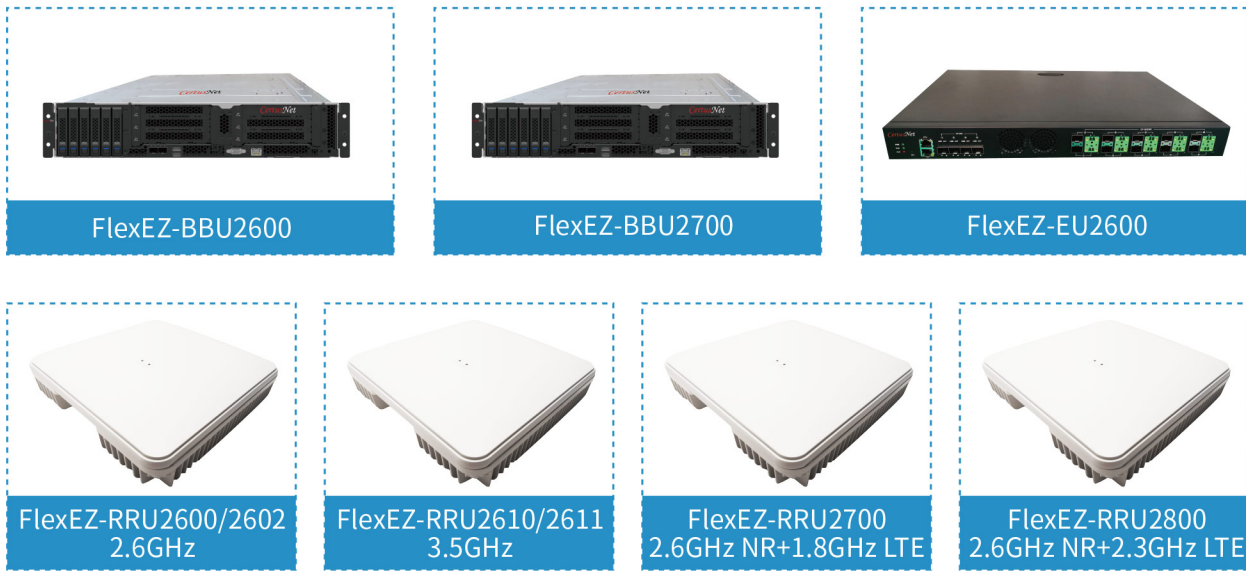# 01 5G White-box Small Cells

5G White-box Small Cells FlexEZ-RAN

Based on the software-defined communication as the core technology concept, the development and design of the 5G FlexEZ-RAN series fully demonstrates the technical advantages of CertusNet in SDN/NFV. FlexEZ-RAN provides a distributed solution based on the philosophy of white box, module subdivision, micro-service and decoupling. The model of base station is abstracted into multiply service modules such as support platform, modem, air interface abstraction management, network interoperability and customized plug-ins, which are connected with a unified standardized interface. FlexEZ-RAN, consisting of the baseband unit (BBU,CU+DU), the expansion unit (EU) and the remote radio units(RRU), can be deployed flexibly to offer a variety of solutions to further reduce 5G TCO, ensure network security and stability, as well as meet the requirements of 5G wireless coverage and vertical industry application in different scenarios.

FlexEZ-RAN will greatly transform the existing network architecture and base stations, promote open source and 5G white-box base stations, and support more flexible 5G networks which are able to cope with the "tsunami" of mobile data traffic.

Product Features

Complete functions of 5G base station developed on the white box platform

Building the world's leading 5G SA small cell ecosystem

Modular and Open-source Software

White-Box Hardware

Virtualization

5G

High Performance

Scalability

Easy Deployment

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FlexEZ-BBU2600

FlexEZ-BBU2700

FlexEZ-EU2600

FlexEZ-RRU2600/2602
2.6GHz

FlexEZ-RRU2610/2611
3.5GHz

FlexEZ-RRU2700
2.6GHz NR+1.8GHz LTE


FlexEZ-RRU2800
2.6GHz NR+2.3GHz LTE

FlexEz-RAN Products

Installation and Maintenance

BBU2600 is a 19-inch standard rack unit that can be placed in any standard cabinet or stand-alone; EU2600 can be installed in cabinets, racks and chassis, or wall-mounted; RRU2xxxx can be installed in indoor walls, ceilings, and ceiling buckles.

The Operation and Maintenance Center(OMC) system is provided for operation and maintenance. The GUI is as below:

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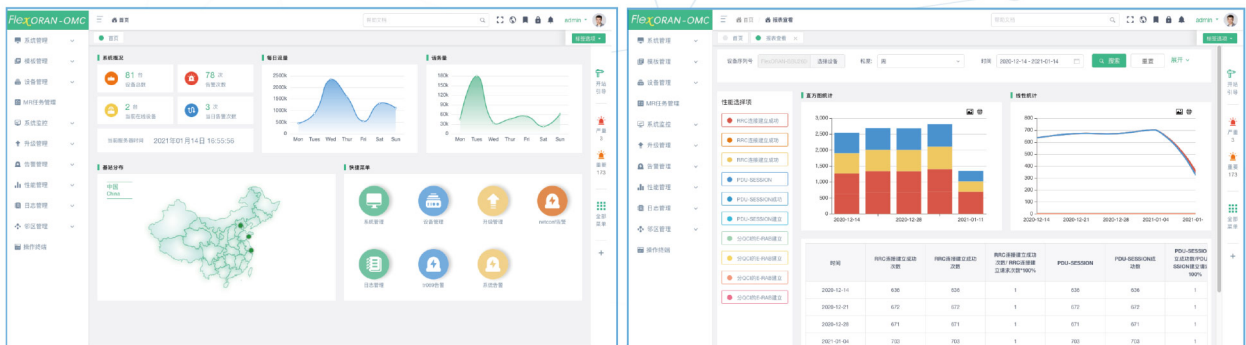
☁ System Functions

The FlexEZ-RAN series consists of a baseband unit, expansion units and remote radio units, which together form a 5G distributed base station system. BBU2600 is the baseband unit which performs all protocols functions for the control plane and data plane in a 5G system. EU2600 is the extension unit that forwards the digital signals from the BBU to multiple remote radio units for the downlink, and combines the signals from multiple remote radio units for the uplink. RRU2xxx remote radio units convert the digital signal from the extension unit into a radio frequency signal to transmit over the 5G NR air interface, and converts the received uplink RF signal into a digital signal and transmits it to the extension unit.

5G White-box Small Cells series support the main functions:

Network Element	Item	Specifications
FlexEZ-RAN	Frequency Band	Sub6G(NR:2515MHz-2675MHz; 3300MHz-3600MHz FDD-LTE: 1710MHz-1735MHz/ 1805MHz-1830MHz); TDD-LTE:2320MHz-2370MHz
	Bandwidth	NR:100/60/80MHz; LTE:20/15/10/5MHz
	Number of Cells	4 cells
	Number of Connected Users	1200
	Number of Active Users	400
	Number of Schedule Users on Single TTI	14
	MIMO	2*2 MIMO/4*4 MIMO
	Peak data rate	2T2R: downlink 850Mbps, uplink 230Mbps; 4T4R: downlink 1700Mbps, uplink 230Mbps
	Latency	Control plane: 20ms, user plane: 4ms, (DL) user plane: 6ms(UL)
	Synchronization	GPS/BDS, 1588v2
	WAN Management Protocol	TR069
BBU2600/2700	Classes	5G NR, 5G NR+LTE
	Subcarrier Spacing	30KHz,15KHz
	Frame Structure Configuration	SIB Static frame structure
	Periodicity	DL-UL pattern :5ms periodicity
	BWP	1-4 BWP
	Physical channels	Downlink:PBCH/PDCCH/PDSCH; Uplink :PRACH/PUCCH/PUSCH/SRS
	Random Access	Competitive and non-competitive random access
	Power Control	Uplink and downlink power control
	Scheduling	Service-based QoS scheduling, PF scheduling
	Link Adoption	Uplink and downlink adoption
	HARQ	Uplink and downlink HARQ, IR algorithm
	Radio Network Interfaces	NG interface, Xn interface, and F1 interface
	Radio Resource Management	Measurement and mobility management, QoS guarantee, network slicing, VoNR, SON etc.
	Encryption and Integrity Protection	Encryption/Decryption, Integrity Protection
	RLC transmission mode	AM/UM/TM transmission mode
EU2600	Data Compression/Decompression	Frequency domain and time domain
	Cell Splitting and Merging	Under the same EU
	Cascade	Secondary cascade
	Linked RRU	Maximum 8 RRUs, photoelectric hybrid cable for power supply
	Interfaces	CPRI
RRU2XXX	Operating Frequency Band	Sub6G(NR:2515MHz-2675MHz; 3300MHz-3600MHz FDD-LTE: 1710MHz-1735MHz/ 1805MHz-1830MHz);TDD-LTE:2320MHz-2370MHz
	Operating Bandwidth	NR:100/60/80MHz;LTE:20/15/10/5MHz
	MIMO	2*2 MIMO;4*4 MIMO
	Maximum Transmission Power	250mw/500mw per antenna
	Receiver Sensitivity	-94dBm
	Modulation Mode	QPSK, 16QAM, 64QAM, 256QAM;

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Use Cases

As an important radio base station type in the 5G era, the 5G distributed small cell product plays an important role in the indoor coverage deployment scenarios. It has lower cost than the distributed base station from the traditional vendors, and has higher capacity, more flexible deployment and intelligent unified management than the traditional passive DAS system. Therefore, the FlexORAN 2000 series will be one of the ideal choices for 5G indoor network coverage.

In addition to traditional coverage scenarios, the FlexEZ-RAN will also help in the innovation and upgrading of various vertical industry applications - energy and infrastructure, public safety, and intelligent manufacturing, etc.

Energy and Infrastructure

5G enabled the vertical industry by connecting and monitoring remote sites (such as wind power), energy transmission and energy management, enhanced infrastructure and intelligent measurement (smart gas meters, water meters, etc.), integrated sensors to collect information and distributed power generation, etc.

Public Safety

The advantages of 5G technology include fast transmission of video surveillance images with higher resolution, intelligent video surveillance analysis and alarm with multi-view and high resolution, AR video surveillance based on wearable equipment (police helmet and face armor) and suspicious personnel identification, etc.

Intelligent Manufacturing

5G empowers this industry with real-time transmission of sensor networks and information in the plant or workshop, which is mainly used for predictive maintenance of plant equipment and industrial robots, remote centralized control of cloud robots (in various complex working conditions), identification and tracking of product position in the whole process of production and sales of value chain (production and distribution process tracking), and utilization of high resolution/3D video or on-site sensor feedback, therefore to achieve remote control of production quality and improve product quality.

The FlexEZ-RAN, combined with edge computing, big data, and AI products of CertusNet, will help various applications in the three major scenarios of 5G to create an intelligent, open and integrated 5G network.

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