ADLINK
LEADING EDGE COMPUTING

Solution Brief

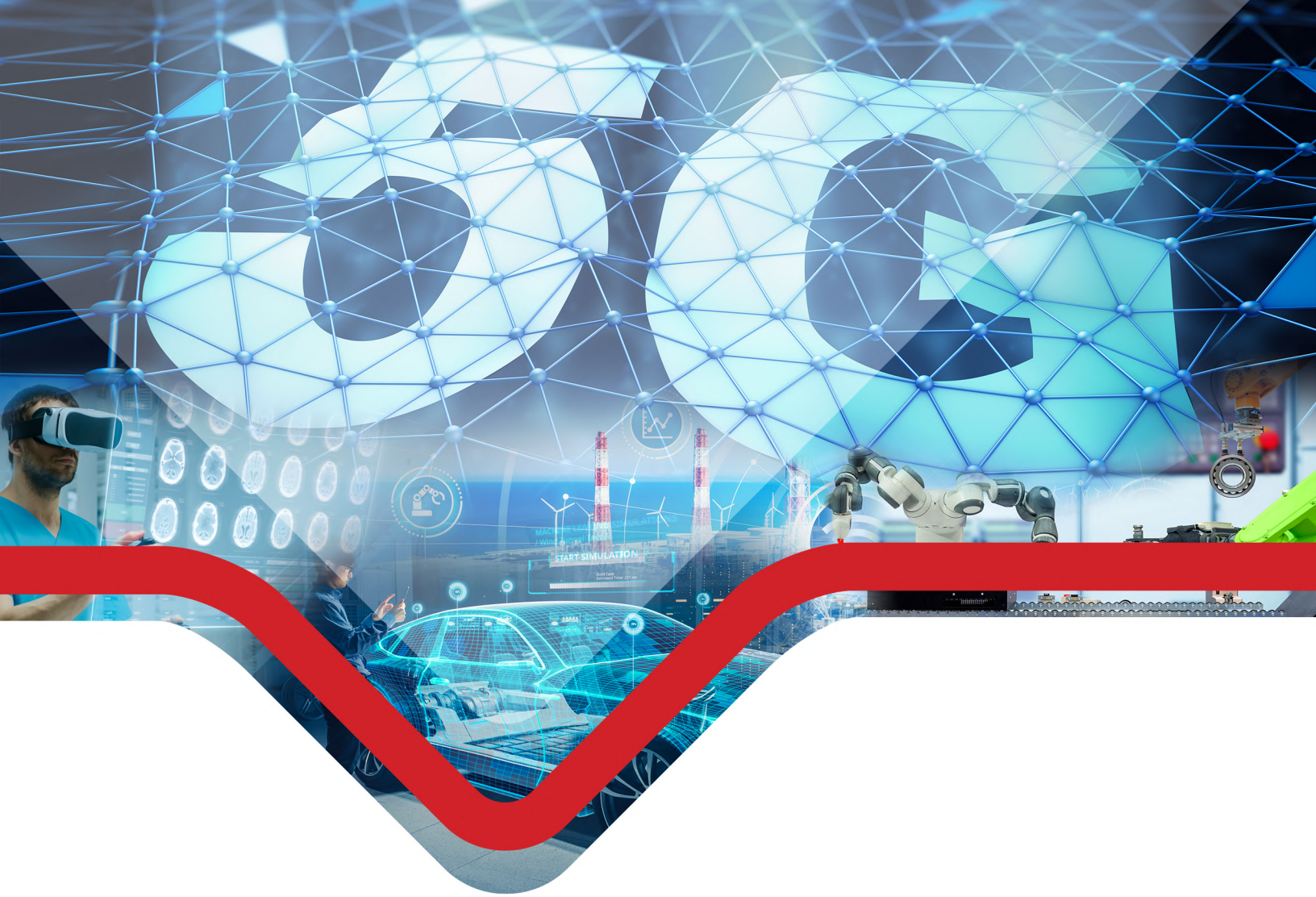
Small Cells Rapidly Evolve to Accelerate 5G Adoption

ADLINK partners with SageRAN to provide fast-to-market 5G small cell solutions accelerating 5G deployment and digital transformation



www.adlinktech.com

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000



5G Small Cell Market Overview

Around the globe, 5G cellular technology now delivers greater performance and higher network capacity than 4G, opening the way to 100x increases in connected device density, real-time AI in edge networks, and massive bandwidth expansion for applications ranging from public safety to immersive virtual worlds. Cellular users know too well how 4G service can fail in certain environments. Small cell 5G access nodes will extend 5G service and fill in coverage gaps, allowing businesses to maximize their cellular investments and support a host of new use models.

According to a January 2021 study by ReportLinker, "demand for 5G deployments, rising mobile data traffic, the growing focus on last-mile connectivity by telecom operators, and increased spectral efficiency" will push the global small cell market into a 25.1% CAGR through 2028. This is in line with the 24% CAGR predicted for urban areas through 2026 by the Small Cell Forum (SCF). The trade group expects 5G to be the dominant small cell technology in 2024 and to have nearly total share over 3G/4G by 2026. "For most operators," the SCF report notes, "it is important to deploy flexible, virtualized core and RAN platforms, with high levels of automation, so that 5G can be easily introduced alongside existing networks."

5G small cells can be deployed in public, private, and hybrid networks for a variety of reasons and use cases. Most will be needed in areas with minimal or no coverage by wired or Wi-Fi (generation 6 or later) networking. Virtually every field will benefit from 5G, but SCF data indicates that manufacturing, retail, government, transport, healthcare, and entertainment will lead the market in private adoption. Common small cell applications might include enabling cellular access to crowds of tens of thousands in sports stadiums, deploying hundreds to thousands of sensors on manufacturing floor equipment, or setting up an ad hoc, high-bandwidth cellular network for remote military operations.

However, to reach the full potential for 5G deployment, adopters need their business priorities satisfied. These include lowering operating expenditure (OpEx), easy plug-and-play deployment, support for open radio access network (RAN) architectures, and having deep integration with Wi-Fi while simultaneously being functionally distinct from it. The new 5G small cell solution from ADLINK and SageRAN meets these needs and much more.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

A 5G Small Cell Solution Built on Big Synergies

When ADLINK and SageRAN Network Technology formally announced the establishing of a joint lab for developing open architecture 5G edge solutions in October 2020, it formalized an already long-standing partnership between the two companies. SageRAN possessed deep expertise in the 5G protocol stack as well as successful 5G baseband unit (BBU) and remote radio unit (RRU) reference designs. ADLINK brought decades of experience in the design and manufacturing of rugged, high-performance systems for embedded computing markets. Together, they had the ability to create a 5G small cell design that could deploy virtually anywhere with exceptional reliability, functionality, and value.

The collaboration yielded SageRAN's 5G small cell solution, which, when sealed, looks like a ruggedized carry-on travel case with wheels. Inside the case, a 19-inch rackmount frame supports an ADLINK MECS-6110 edge server 5G core, an ADLINK MECS-7210 5G BBU, and an ADLINK MECS-6110 application server. (SageRAN offers a list of compatible, approved third-party RRUs.) ADLINK's MECS line brought off-the-shelf cost benefits along with Open Telecom IT Infrastructure (OTII) compliance, NVIDIA GPU Cloud (NGC) compatibility, and outstanding scalability. The 5G small cell solution conveniently transports anywhere and installs with a streamlined speed that comes from superior engineering and broad open standards support.

As an example of the small cell solution's flexibility, it can provide a higher level of cellular performance with the optional installation of ADLINK's PCIe-A100 adapter in one of the MECS edge servers' PCI Express expansion slots. The PCIe-A100 is a 5G forward error correction (FEC) accelerator based on the Intel® vRAN Dedicated Accelerator ACC100. The ACC100 performs signal analysis on noisy communications to accurately isolate and resolve data transmission errors. This increases channel throughput in edge applications while lowering data latency and overall platform power consumption.

The 5G small cell solution has been approved as an Intel® IoT RFP Ready Kit (RRK), which are an industry-leading collection of IoT solutions meant to help integrators in key vertical markets accelerate IoT adoption and demonstrate the technology's potential. To earn RRK approval, ADLINK and SageRAN had to meet Intel's demanding criteria and prove how the solution could help customers solve a multitude of industry challenges with a pre-integrated, scalable, and fast time-to-market offering.



Verticals

Application Software — Speed test | Iperf | Video | More….

NEV/MEC SDK

L2/L3 Software — 世炬网络 SAGERAN — 5G Protocol Stack

L1 Software — intel — Intel FlexRAN

Virtualization — Containers | DPDK | Hypervisor | More….

COTS Hardware — ADLINK LEADING EDGE COMPUTING

intel RFP READY

5G Base Station System: 5G Antenna, 5G RRU, 5G BBU (MECS-7210), 5G Core Network (MECS-6110), Application Server (MECS-6110)

SageRAN's 5G Small Cell Solution Based on ADLINK's 5G Edge Servers

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

ADLINK's Open Standards-based, COTS 5G Edge Servers

For 5G to deliver on its transformative potential, the edge systems supplying 5G connectivity need high-performance CPUs and GPUs combined with right-sized storage and memory resources for sustaining peak I/O rates. These systems should be scalable through GPU and FPGA enhancements, especially given 5G's roadmap for future enhancements. Particularly in mobile deployments, systems should be rugged enough to provide reliable service anywhere and both compact and power-efficient to comfortably operate in the target environment.

The ADLINK MECS-6110/7210 edge servers address these 5G needs with cost-effective commercial-off-the-shelf (COTS) architecture and components such as Intel® Xeon® Scalable and Xeon® D Processors, 4x10G SFP+ networking, and dual PCI Express x16 slots for processing expansion. All MECS edge servers are designed for demanding physical environments but only occupy 1U or 2U for space efficiency. The MECS line's mix of performance and flexibility make it an excellent choice for bringing 5G to applications such as automated inspection systems on a manufacturing floor, where numerous high-definition cameras may require consistent wireless bandwidth without the restrictions of wired networking. Similarly, a MECS deployment could help bring 5G connectivity to augmented/virtual reality (AR/VR) wearable displays in industrial, academic, or healthcare settings. Thousands of 5G applications exist already, but countless more are waiting to be invented as strong computing foundations like MECS solutions lay the foundations for 5G adoption and implementation.

aws qualified device

intel SELECT SOLUTIONS

opendatacenter.cn

ADLINK devotes considerable resources to being a major industry partner in order to be among the first to implement, and even help design, breakthrough technologies. One way to demonstrate this commitment in its product lines is through key vendor program and industry consortia memberships. For instance, the ADLINK MECS-7210 found in some 5G base station solutions, when configured with NVIDIA T4 Tensor GPUs, carries NVIDIA's NGC-Ready Computing Platform validation. MECS edge servers have also been validated with Amazon's AWS Device Qualification Program for Amazon edge platforms. ADLINK's alternative 5G edge server, the MECS-6110, is a verified Intel® Select Solution for universal customer premises equipment (uCPE) for CentOS. And all of this is in addition to ADLINK's work in IoT-centric organizations, including the Open Robotics ROS 2 Steering Committee, Intel® IoT Solutions Alliance, and the Open Data Center Committee (ODCC), which oversees the Open Telecom IT Infrastructure (OTII) Project.



ADLINK MECS 5G Edge Servers

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

SageRAN's 5G Small Cell Solution for Smart Manufacturing

As noted, 5G small cells provide a host of opportunities for public and private networks and usher in a new wave of possibilities throughout any vertical market. Within manufacturing, for example, 5G's high reliability and next-generation speed can put more intelligent, time-critical functionality at the operational edge. This opens new possibilities, such as linking legacy industrial and process controls with modern IT systems, instituting the production benefits of robotics, and greatly expanding an organization's security readiness.

A manufacturer located in a smart industrial park approached SageRAN with a need to improve its operational efficiency. As a forward-thinking cellular solutions provider, SageRAN was a solid choice that blended expertise, reliability, and total value. SageRAN started work on its 5G protocol development in 2017, building on prior 4G stack work. Two years of development yielded a very stable, high-performance offering that fit perfectly with the company's ambitions to innovate continuously and become a global force in open standards-based 5G adoption. Integrating its software with ADLINK's COTS server hardware allowed SageRAN to provide clients, such as its manufacturing prospect, with a cost-effective, rugged platform that would deliver many years of scalable service for its 5G stack.

As with so many manufacturers, labor costs were a core pain point for this client, which wanted to use automation to increase production and product quality while lowering expenses. SageRAN wheeled in its 5G small cell solution, described above, combining ADLINK MECS edge servers with SageRAN's BBU protocol stack and an expansion unit to help extend the kit's connection distance. SageRAN's core implementation included full compliance with 5G security standards, including 128-bit encryption of inter-device communications and network-wide security governance. At all points, the customer wanted a 5G solution that was easy to integrate, compatible with the company's current and future network, and agnostic in its approach to public or private cellular support.

SageRAN's small cell kit more than met the manufacturer's requirements. High environmental tolerances; redundant, hot-swappable storage; and redundant power supplies delivered maximum uptime assurance. Outfitted with a ADLINK's COTS server hardware range of task-optimized Intel® Xeon® processors, ADLINK's range of MECS edge servers had all the compute performance needed for the end client's communications workloads while providing PCI Express expansion for future scaling. The manufacturer successfully implemented new robotics and inspection systems, all connected by 5G, and quickly achieved secure, high-speed wireless communications throughout its facility. The 5G implementation and new automation moves the manufacturer much closer to its goal of running a modern, cost-effective "dark factory" able to operate literally in the dark (if necessary) in a fully automated fashion. This also achieves the client's goals of lowering operating costs and significantly increasing product quality and reliability, all while opening future opportunities for on-site analytics and further automation enhancements.



LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

ADLINK 5G Edge Server Selection Guide

MECS Series Edge Server Specifications





Model Name		MECS-7210	MECS-6110 / 6111
Form Factor (WxHxD)		2U 19" rackmount 438mm x 88mm x 420mm	1U 19" rackmount 438mm x 44mm x 420mm
Processor		2x 1st or 2nd Gen Intel® Xeon® Scalable Processors	1x Intel® Xeon® D-2100 family processor
Chipset		Intel® C624/C627 Chipset	Integrated on Intel® Xeon® D SoC
Memory		16x DDR4-2666 DIMM, ECC, REG up to 512GB	4x DDR4-2666 1DPC RDIMM, ECC, REG up to 256GB
Storage	On-board	1x M.2 2242 M key SATA 6 Gb/s 2x extensive M.2 2242/2280 NVMe slots	1x M.2 NVME socket, 2242 M Key 1x M.2 NVME socket, 2280 M Key
	Drive bay	2x 2.5" hot-swappable SATA 6 Gb/s, front access	2x 2.5" hot-swappable SATA 6Gb/s, front access (MECS-6110)
PCIe Expansion		2x PCIe x16 Gen3 single/dual-slot FHFL interfaces	• 2x PCIe x16 Gen3 single-slot FHFL interfaces or • 1x PCIe x16 Gen3 dual-slot FHFL interface or • 1x PCIe x16 Gen3 single-slot FHFL interfaces 1x PCIe x8 Gen3 single-slot FHFL interfaces 1x PCIe x8 Gen3 OCP NIC v2
IO	Ethernet	2x RJ-45 10/100/1000BASE-T Ethernet ports 4x 10G SFP+ Ethernet ports	2x RJ-45 10/100/1000BASE-T Ethernet ports 4x 10G SFP+ Ethernet ports
	Console Port	1x RJ45, front access	1x RJ45, front access
	USB3.0	2x USB3.0, front access	2x USB3.0, front access 1x USB2.0, internal
Operating temperature		-5°C to +55°C	-5°C to +55°C

FEC Accelerator Specificaitons

Model Name	PCIe-A100
ASICs	Intel® vRAN Accelerator ACC100 Adapter (Mount Bryce)
Form Factor	HHHL (half height, half length)
RAM	8GB DDR4 with ECC
PCIe standard	PCIe 3.0 x16
Power Consumption	Max. 50W
Operation Temperate	-5°C~+55°C

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

WORLDWIDE OFFICES

ADLINK Technology, Inc.

9F, No.166 Jian Yi Road, Zhonghe District
New Taipei City 235, Taiwan
新北市中和區建一路166號9樓
Tel: +886-2-8226-5877
Fax: +886-2-8226-5717
Email: service@adlinktech.com

Ampro ADLINK Technology, Inc.

6450 VIA DEL ORO, SAN JOSE, CA 95119-1208, USA
Tel: +1-408-360-0200
Toll Free: +1-800-966-5200
Fax: +1-408-600-1189
Email: info@adlinktech.com

ADLINK Technology Singapore Pte. Ltd.

84 Genting Lane #07-02A, Axxel Innovation Centre,
Singapore 349584
Tel: +65-6844-2261
Fax: +65-6844-2263
Email: singapore@adlinktech.com

ADLINK Technology Singapore Pte Ltd. (Indian Liaison Office)

#50-56, First Floor, Spearhead Towers
Margosa Main Road (between 16th/17th Cross)
Malleswaram, Bangalore - 560 055, India
Tel: +91-80-42246107, +91-80-23464606
Fax: +91-80-23464606
Email: india@adlinktech.com

ADLINK Technology Japan Corporation

〒101-0045 東京都千代田区神田鍛冶町3-7-4
ユニゾ神田鍛冶町三丁目ビル4F
Unizo Kanda Kaji-cho 3 Chome Bldg. 4F,
3-7-4 Kanda Kajicho, Chiyoda-ku, Tokyo 101-0045, Japan
Tel: +81-3-4455-3722
Fax: +81-3-5209-6013
Email: japan@adlinktech.com

ADLINK Technology Korea Ltd.

경기도 용인시 수지구 신수로 767 A동 1503호
(동천동, 분당수지유타워) (우) 16827
A-1503, U-TOWER, 767 Sinsu-ro, Suji-gu,
Yongin-si, Gyeonggi-do, Republic of Korea, 16827
Toll Free:+82-80-800-0585
Tel: +82-31-786-0585
Fax: +82-31-786-0583
Email: korea@adlinktech.com

ADLINK Technology, Inc. (Israel Liaison Office)

SPACES OXYGEN, 62 Medinat, Ha-yehudim st
4673300, Herzliya, Israel, P.O.Box – 12960
Tel: +972-54-632-5251
Fax: +972-77-208-0230
Email: israel@adlinktech.com

ADLINK Technology (China) Co., Ltd.

上海市浦东新区张江高科技园区芳春路300号 (201203)
300 Fang Chun Rd., Zhangjiang Hi-Tech Park
Pudong New Area, Shanghai, 201203 China
Tel: +86-21-5132-8988
Fax: +86-21-5192-3588
Email: market@adlinktech.com

ADLINK Technology Beijing

北京市海淀区上地东路1号盈创动力大厦E座801室(100085)
Rm. 801, Power Creative E, No. 1 Shang Di East Rd.
Beijing, 100085 China
Tel: +86-10-5885-8666
Fax: +86-10-5885-8626
Email: market@adlinktech.com

ADLINK Technology Shenzhen

深圳市南山区科技园南区高新南七道数字技术园
A1栋2楼C区 (518057)
2F, C Block, Bldg. A1, Cyber-Tech Zone, Gao Xin Ave. Sec. 7
High-Tech Industrial Park S., Shenzhen, 518054 China
Tel: +86-755-2643-4858
Fax: +86-755-2664-6353
Email: market@adlinktech.com

ADLINK Technology GmbH

Hans-Thoma-Straße 11
D-68163 Mannheim, Germany
Tel: +49 621 43214-0
Fax: +49 621 43214-30
Email: germany@adlinktech.com

Ulrichsbergerstraße 17
D-94469 Deggendorf, Germany
Tel: +49 991 290 94–10
Fax: +49 991 290 94–29
Email: germany@adlinktech.com

ADLINK Technology, Inc. (French Liaison Office)

Bâtiment Thalès - Parc des Algorithmes,
Route de l'Orme des Merisiers,
91190 SAINT AUBIN, France
Tel: +33 (0) 1 60 12 35 66
Fax: +33 (0) 1 60 12 35 66
Email: france@adlinktech.com

ADLINK Technology, Inc. (UK Liaison Office)

First Floor West Exeter House,
Chichester fields Business Park Tangmere,
West Sussex, PO20 2FU, United Kingdom
Tel:+44-1243-859677
Email: uk@adlinktech.com

ADLINK® LEADING EDGE COMPUTING

intel partner Titanium

NVIDIA ELITE PARTNER

All products and company names listed are trademarks or trade names of their respective companies.
All specifications are subject to change without further notice.
All Updated by May 6, 2021 ©2021 ADLINK Technology, Inc. All Rights Reserved.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000