NETWORK OPTIMIZATION SOLUTION (XCAL, XCAP)
enables measurement, analytics, Improvement of telecommunication service quality

It is a solution that collects and analyzes the radio wave environment and data transmission and reception between the base station and the terminal in real-time to improve the communication service quality.

Drive Test

Walk Test

Remote Test

Post-processing

Drive test solution that collects wireless network data from field environment in real-time

- Optimization for shaded area
- Interworking test between Mobile and Base Station
- Voice quality test

XCAL

Portable test solution that collects wireless network data through Handheld device

- In-building test
- Subway test
- Mountain, Coastline

24/7 real-time wireless network quality monitoring and data collection

- Real-time monitoring
- Network trend evaluation
- User Friendly UI

Analysis solution to process the collected data in various form

- Root Cause Analysis
- Support major KPIs
- Autonomous report creation

XCAP

Drive Test	Walk Test
XCAL	XCAL-Mobile
XCAL-EZMO	XCAL-Solo III
XCAL-HubC6	XCAL-Duo
XCAL-Hybrid	
	XCAL-Mate
XCAL-PU12	**Post-processing**
XCAL-MO III	XCAP

Remote Test

XCAL-Manager	XCAP-Cloud
XCAL-Ranger	XCAL-Air

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XCAL

PC based Advanced 5G Network Optimization Solution

Used extensively on many of world's largest networks, the intuitive and flexible XCAL series of drive test tools are designed to troubleshoot, monitor, maintain and optimize wireless voice and data network performance – all in real-time. XCAL assesses QoS/QoE and ensures seamless service integration with existing technologies ranging from 2G to 5G. By automatically recording and deciphering messages from the air interface, XCAL detects any network bottlenecks and impediments that may affect the delivery of high-quality voice and data services, providing invaluable insights for your network enterprise. Being the first to market on 5G and closely collaborating with early technology adopters, the product is equipped to meet all 5G drive test requirements.

XCAL-EZMO

Innovative MOS Testing Solution up to 6 UEs

XCAL-EZMO is an innovative MOS testing solution that minimizes the load on the Host PC by performing MOS calculations within the device. It features 6 ports, each with its own individual sound control, allowing independent standard-based voice quality (MOS) testing for both mobile-to-mobile and mobile-to-landline test scenarios. The unique feature of this tool is that any phone supporting Bluetooth can be used for voice quality analysis, demonstrating that high-quality, scalable, and robust network benchmarking tools don't have to be expensive.

Features

* Support Benchmarking Test interworking with device of various manufacturer
* Optimized for Field Test (Indoor & Outdoor)
* E2E Network Performance measurement with AEGIS (Big Data Analytics Solution)

Functions
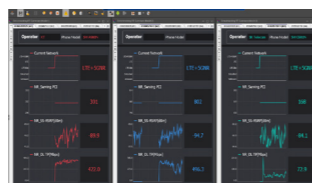
* QoS, QoE, MOS Test
* Key indicator monitoring : Signaling message, 5G NR Throughput, 5G NR Base Station information, etc.
* Operator Benchmark Test
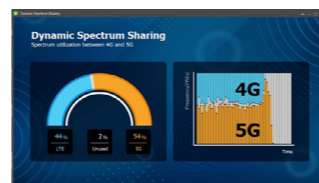* Display voice/data quality test result and RF information in real-time

GPS

* MOS Test available with MC-CM132 cable set

ENDC (5GNR+LTE) Summary

Benchmarking RF Summary

Dynamic Spectrum Sharing

Detail Functions	
Data Collections	Layer 1,2,3 Message, TCP/IP packet information
	L1 : SSB Measurement/PDSCH/PUSCH, etc
	L2 : PDCP/RLC/MAC, etc
	L3 : RRC/NAS, etc
Chipsets	4G : Qualcomm, Samsung, LGE, GCT, Intel, MediaTek, Altair, Sequans, Hisilicon
	5G NR : Qualcomm, Samsung, MediaTek, Hisilicon
Technologies	WiFi, IS-95A/B, 1xRTT, EVDO Rev0/A/B, GSM/GPRS, EDGE, WCDMA, HSDPA, HSUPA, HSPA+, DC-HSDPA, DC-HSUPA, MC-HSDPA, LTE, LTE-A (CA ~ 7CA) LTE-U (LAA), PS-LTE (MCPTT), eMTC (Cat.M1), NB-IoT, 5GNR(NSA,SA,NRDC)
Application Automation Test	Voice/VoLTE/VoNR/VoWiFI(MOS: PESQ/POLQA), ViLTE(PEVQ), MCPTT(POLQA), SMS/MMS
	FTP, HTTP, Ping, i-Perf, E-mail, VOD, YouTube(PEVQ-S), MCPTT, Android APP automation Test, Messenger talk & Texting. TWAMP
Scanners	R&S, PCTEL, Anritsu

Features

* Compact Size
* Support independent MOS test per UE
* Support benchmarking test to measure and compare KPIs up to 6 UEs

Functions

* Mouth to Ear delay measurement
* MCPTT and MOS measurement
* Support CS, PS, VoIP, VoLTE call test
* Diagnosis of network issues : Call Drop, Setup Fail, Throughput degradation
* Support various QoS Algorithm (PESQ, POLQA(V2, V3))
* UE control via Bluetooth

M2E Delay measurement and POLQA calculation in EZMO H/W

Item	Specification
Power Input	19.5 VDC
CPU	Intel Core I-Series-7Gen. i7 2.8GHz
Memory	16GB
HDD	512GB
OS	Windows 10 Pro 64bit
External Interface	USB Type-C 3.1 Gen2 x1 Port External USB Type-A 3.1 Gen1 x2 Ports
Phone Interface	USB Type-A 3.1 Gen2 : Type-A Receptacle Audio In/Out : 3.5-Phi Stereo Jack
Size	228.0 x 134.6 x 49.0 (W x D x H, mm)
Weight	1.16 kg

XCAL-HubC6

**Sophisticated USB C-Type multi-hub supports up to 6 UEs**

XCAL-HubC6 is a dedicated USB C-Type Multi hub that can be used in conjunction with XCAL solutions. It provides auto port recognition, fast charging and high-speed USB data communication. It is optimized for high-performance data transmission and reception tests and long-term tests of 5G UEs with high power consumption as it supports fast charging up to 6 times faster during high-speed DM data communication. In addition, by supporting AC power and portable PD battery, it can be used in various measurement environments such as building, subway, laboratory and drive tests.

Features

* Support up to 6 Smartphones enables more service call test in parallel

* Enhance stability by preventing user errors with automatic device detection & configuration

* Power Supply to Smartphones more than enough for seamless test

* Support Walk Test for Indoor measurement as well with PD Battery

Functions

* Charging speed up to 6x faster than general Hub

* Support USB 3.2 Gen2 (10Gbps)

* Automatic mobile detection to port configuration

* Control USB Port On/OFF one by one

* Support USB-C Locking standard interface (Panel Mount locking screw)

* Portable PD battery with Power Module

XCAL / XCAL-Hybrid

XCAL-HubC6
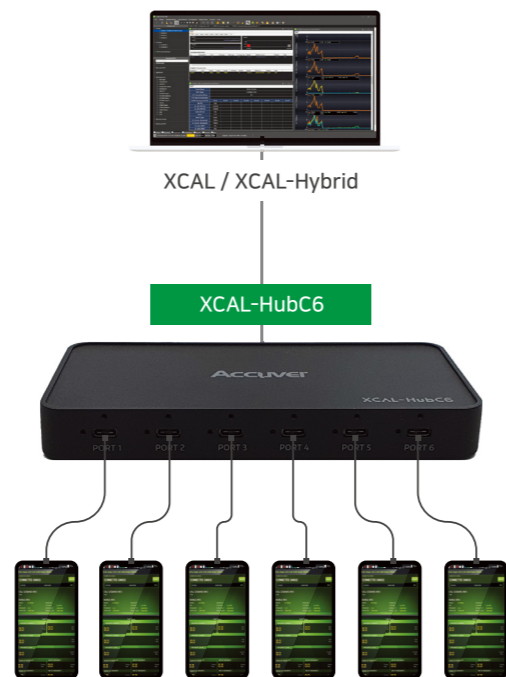
Item	Specification	
Input power voltage	12V DC	Adaptor : 12V/7.5A
External Interface	USB Type-C 3.2 Gen2 x1 Port	Host Port
Phone Interface	USB Type-C USB3.2 Gen2 x 6 Port	Mobile Port
Power Consumption	70W	
Output Power (per Port)	5V / 1.5A ~ Max 3A	
Size	162 x 86 x 24 (W x D x H, mm)	With Rubber Foot
Weight	280g	

USB 3.2 Gen 2
- Product capability : Product signals at 10Gbps
- Marketing name : SuperSpeed USB 10Gbps

XCAL-Hybrid

5G Benchmarking Test Solution up to 12 UEs

XCAL-Hybrid is an innovative benchmarking solution that combines the strengths of XCAL-Mobile and XCAL-M. This new concept harnesses the enhanced performance of smartphone application processors (APs) to enable data processing within XCAL-Mobile, allowing multiple devices to be supported on a single PC. With the dedicated USB hub XCAL-HubC6, you can test multiple smartphones up to 12 UEs. XCAL-Hybrid offers a simplified configuration compared to existing equipment like Pu12 and MO III.

Features

* Simultaneous measurement of 12 mobiles with optimized performance

* Full optimization data collecting in conjunction with XCAL-Mobile

* Support various communications technology KPIs (2G to 5G NR)

* Easy in-building measurement and real-time analysis with lightweight configuration

* Benchmarking and Rollout test features in conjunction with XCAL-manager server

Functions

* Intelligently manage massive volumes of drive test data, maps and performance counters

* Full optimization data collecting in conjunction with XCAL-Mobile

* Carry out Multiple data sessions on each test UEs

* QoS/QoE Test (Voice, E-MOS, SMS, video, VQML, etc.)

* Indoor/outdoor network performance analysis

* Support various QoS Algorithm
  : PESQ, POLQA(V2, V3)

XCAL-HubC6

Max. 12 UE for in-building test

Full Feature List	
Data Collection	Collecting Layer 1,2,3 Message, TCP/IP packet information by interworking with device and scanner
	L1 : PCFICH/PDSCH/PUSCH, etc
	L2 : PDCP/RLC/MAC, etc
	L3 : RRC/NAS, etc.
Chipsets	Qualcomm, Samsung
Support devices	Android Smartphone (Up to 12 mobiles)
Technologies	WiFi
	GSM/GPRS, EDGE
	WCDMA, HSDPA, HSUPA, HSPA+, DC-HSDPA, DC-HSUPA, MC-HSDPA
	LTE, LTE-A (CA ~ 6CA) LTE-U (LAA), 5G-NR
MOS	Embedded MOS
Application automation test	Voice(VoLTE)/SMS/FTP/Ping/HTTP/Iperf/Email *Additional Autocall will be reviewed and added sequentially
Scanners	R&S, PCTEL

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XCAL-Pu12

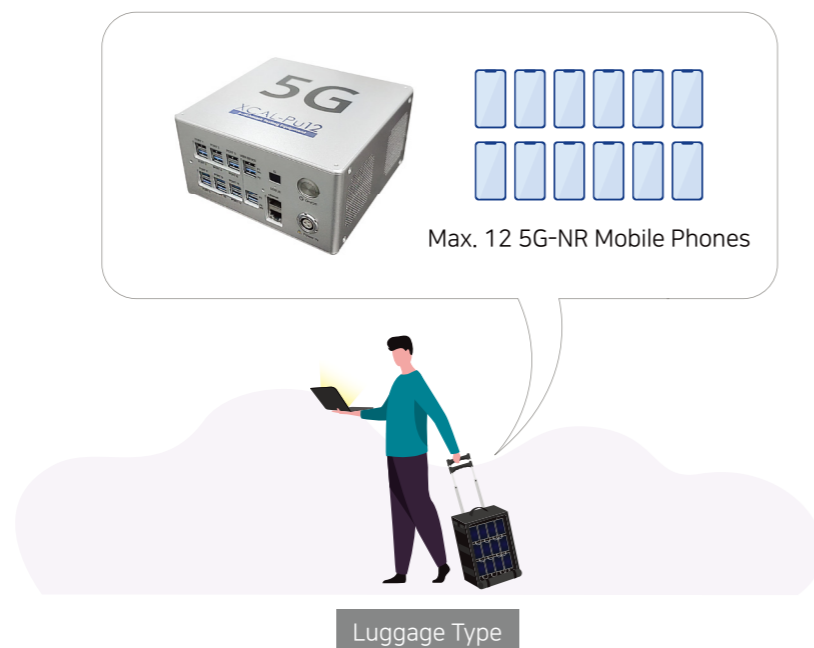**Portable 5G wireless network benchmarking solution**

XCAL-Pu12 is a compact and portable multi-benchmarking solution that supports up to 12 User Equipments (UEs), offering optimized performance for 5G measurements. This solution allows for a comprehensive comparison of network operators' device performance from the perspective of customer Quality of Experience (QoE). The compact size and lightweight design of the Pu12 hardware enable testing in various locations, including in-building tests, drive tests, and walk tests with a portable setup.

Features

* 12 UE Benchmarking Test at the same time
* Field Test with Luggage type
* E2E Network Performance measurement with AEGIS (Big Data Analytics Solution)

Functions

* Interface with various devices
  : Smartphone (up to 12)
  : USB Modem (2)
  : GPS (1), Scanner (2)
* MOS Test
* Key indicator monitoring
  : Signaling message, 5G NR Throughput, 5G NR Base Station
* Same GUI with XCAL
* Display Voice/Data quality test result and RF information in real-time
* External battery pack

Max. 12 5G-NR Mobile Phones

Luggage Type

Item	Specification
Power Input	19 - 24VDC
Power Consumption	Stand-by : < 10 W Maximum : 50 W (with mobile phone 4)
CPU	Intel Core i7-7Gen 2.8GHz x2
SSD/Memory	512GB x2 / 16GB x2
External interface	**Front** : Ethernet x 2 port (Gigabit) : Phone Interface x 12 (USB 3.2 Gen2 지원) : User USB Device x 4 (User 2Port / GPS 2Port) **Rear** : Debug Port x 1 (USB2.0 Mini B-Type) : HDMI x 2
Phone Interface	USB 3.1 Gen2
Size	170 x 87 x 170 (mm, W x H x D)
Weight	2.12 kg

XCAL-MO III

Real UE based Field Testing Solution up to 30 UEs

XCAL-MO III is an efficient benchmarking solution that allows for simultaneous interfacing with up to 30 mobile phones through parallel connections. It also supports various scanner brands, enabling users to test the true end-user network experience in real field conditions. Additionally, it can be scaled by connecting multiple XCAL-MO III together, providing excellent flexibility and portability while reducing overall costs.

Features

* Support various wireless communication test including 5G NR
* Support up to 30 UE simultaneously
* Optimized for Field Test and Benchmarking Test
* Scalable in Cascade form(2X) (up to 60 UEs)

Functions

* Interface with various devices
  : Smartphone (up to 30)
    USB Modem (2)
    GPS (1), Scanner (2)
* Support independent OS per Slot(5 port each)
* Measure various application including Layer 1, 2, 3
* QoE (Quality of Experience) Measurement
* Support Autocall and MOS Test
* Display Voice/Data quality test result and RF information in real-time
* Device control and sound source transmission by Bluetooth cable

XCAL S/W

GPS

Item	Specification
Power Input	48 VDC (Require external power supply)
Power Consumption	290W (Max. 450W)
CPU	Intel Core i7-7600U (Kabylake)
SSD/Memory	512GB / 16GB
OS	Windows 10
OS Recovery	Supported
Phone Interface	USB 6-ports USB3.1 (Gen2) 3A, 5V (Max.)
Size	249 x 193 x 327(W x H x D, mm)
Weight	< 7Kg

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XCAL-Mobile
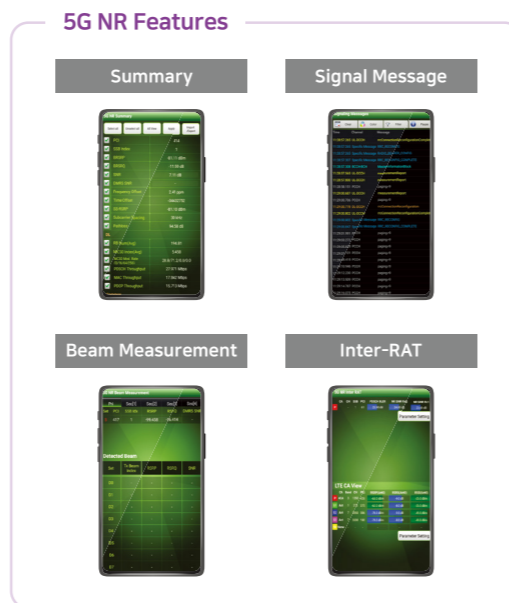### Smartphone based portable In-building Testing Solution

Capturing RAN (Radio Access Network) performance has never been easier. XCAL-Mobile is a leading handheld air interface monitoring tool that facilitates QoS (Quality of Service) and QoE (Quality of Experience) testing across various technologies, including GSM, CDMA, EVDO, WiFi, LTE, LTE-A, NB-IoT, and 5G NR. It provides extensive application testing capabilities and delivers real-time network measurement and visualization on smart devices. With XCAL-Mobile, all features can be easily controlled using the regular handset keys, making it user-friendly for anyone. It supports all major smartphones and can also be extended to include Android devices.

XCAL-Solo III
Unlimited Handheld Network Testing Solution

XCAL-Solo is a handheld air interface measurement solution for conducting QoS and QoE tests without any limitations. It allows you to attach portable hardware to your smartphone, enabling a wide range of application testing, including real-time audio MOS measurement, network measurement, and data monitoring. XCAL-Solo also supports the creation and editing of measurement scenarios, as well as various automated call tests such as voice, VoLTE, FTP, web, email, iPerf, ping, YouTube, multi-call, multi-RAB, multi-session, and UDP (*IoT). The user-friendly touch interface, accessible through the Android OS GUI, enhances the overall usability of XCAL-Solo.

Features

* Create and Edit Auto call scenario
* Monitor measured data through smartphone display in real-time
* Auto screen capture function for reporting the issue
* Support MOS test
* Remote control by XCAL-Manager (Log file management and remote control test)

5G NR Features

| Summary | Signal Message |
| Beam Measurement | Inter-RAT |

Functions

* Collect RF information in real-time
* Autocall setting
* Log mask setting
* Call test result history
* Log upload
* In-building measurement
* Google map

Features

* Ultralight(100g) handy solution
* Monitor measured data through smartphone display in real-time
* Auto screen capture function for reporting the issue
* Remote control by XCAL-Manager (Log file management and remote control test)
* Rooting and Custom Kernel are not required

XCAL SOLO III

XCAL-Solo III SW on Smartphone

Bluetooth Transceiver

XCAL-Solo III HW

MOS Kit

XCAL-Solo III bag

Functions

* Collect RF information in real-time
* Auto call setting
* Log mask setting
* Call test result history
* Log upload
* In-building measurement
* Google map

Title	Description
Device Requirements	Android 8.0 (Android 8.0-11.0) or above
Wireless Telecommunication Technology	CDMA/EVDO, 2G (GSM/GPRS/EDGE), 3G (UMTS/HSPA), LTE (4G-FDD & TDD), LTE-A, 5GNR, NB-IoT, WIFI
Call Type	VoLTE, Voice, FTP, Web Browser, SMS, Email, Ping, YouTube, Netflix, Social media (facebook, Twitter, Instagram), Skype/WhatsApp, Dropbox, Google Play, etc.
5G NR KPI Monitoring	PCI, SSB Index, BRSRP, BRSRQ, SNR, DMRS SNR, Frequency Offset, Time Offset, SS-RSRP, Subcarrier Spacing, Pathloss, RB Num(Avg), MCS0 Index(Avg), MCS0 Mod. Rate(Q/16/64/256), PDSCH Throughput, MAC Throughput, PDCP Throughput, NR-ARFCN, DL Frequency, PDSCH BLER, UL RB Num(Avg), UL Allocated Slots, PUSCH BLER

Item	Specification
Operating power	Qualcomm QC8250 (Kryo™ 585 CPU 4x Kryo Gold (2.85GHz) + 4x Kryo Silver (1.8 GHz) Octa-core)
Bluetooth	8GB, LPDDR5(POP)
Phone Interface	128GB UFS3.0 Onboard Storage
Battery	Android OS Version 10
Memory	DC +9V / MAX 18W
Operating Condition	Temperature : 0℃ ~ 50℃, Vibration : 3G (x-y-z axis)
Size	80 x 80 x 20 (mm, W x H x D)
Weight	100g

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# XCAL-Duo   Handheld Network Testing Solution up to 2 UEs

XCAL-Duo is a cutting-edge wireless network measurement solution capable of conducting QoS and QoE tests on two commercial smartphones simultaneously. It supports two non-rooted smartphones at the same time, providing a wider range of testing options. XCAL-Duo ensures reliable measurement of Mobile to Ear delay and Mobile to Mobile Data Latency. The lightweight and portable design makes it suitable for various measurement environments, including field tests, in-building tests, and lab tests.

XCAL-Mate   YOUR ULTIMATE COMPANION FOR WALK TESTING

The XCAL-Mate backpack is your essential companion for flawless mobile network optimization. Specially designed to accommodate XCAL network testing equipment such as the XCAL-PU12 and XCAL-Solo III, as well as up to 12 smartphones, it ensures stable testing conditions. With its extensive key features, it is the ideal choice for telecom professionals tackling network optimization tasks.

Features

* Test Two off-the-shelf smartphone simultaneously
* Monitor measured data through smartphone display in real-time
* MOS measurement by POLQA algorithm
* Remote control by XCAL-Manager (Log file management and remote control test)
* Rooting and Custom Kernel are not required

Functions

* M2E Delay, Mobile to Mobile Data Latency Measurement
* Collect RF information in real-time
* Autocall setting
* Logmask setting
* Autocall test result history
* Log File upload
* In-building measurement
* Google map

Bluetooth
Control S/W
XCAL-Duo
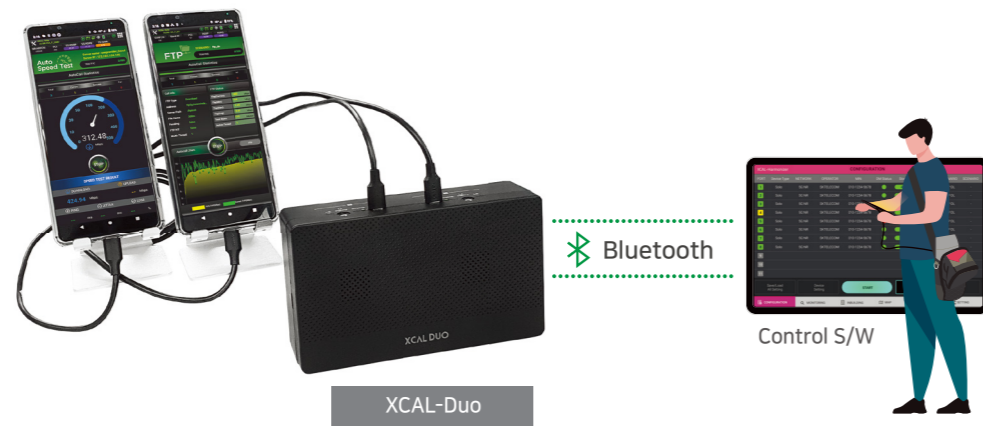
Item	Specification
CPU	Qualcomm QC8250 (Kryo™ 585 CPU 4x Kryo Gold (2.85GHz) + 4x Kryo Silver (1.8 GHz) Octa-core)
Memory	8GB, LPDDR5(POP)
Storage	1TB NVMe M.2
Battery	RRC2020 : 10.80V, 9.22Ah, 99.60Wh
OS	Android OS
Input Voltage	DC +20V / 60W
Size	159.4 x 94.0 x 44.0 (mm, W x H x D)
Weight	750g

Features

* 5.2kg Light-weight carbon frame
* Support up to 12 smartphones
* Embedded cooling fan to prevent over heating
* Equipped with XCAL network testing tools
* Embedded battery enables seamless test for walk and driving test

Functions

* Walk test
* In-building measurement
* Collect RF information in real-time
* Auto call test
* Benchmarking test

	XM-PU12 Backpack	XM-HubC6 Backpack	XM-SOLO Backpack	XM-SOLO Pouch
Solution Inside	XCAL-PU12	XCAL-HubC6	XCAL-Solo III 6ea	XCAL-Solo III
Number of UEs	12	6 or 12	6	1
Power	Battery Pack (RRC Battery 4ea)	Power Bank 3ea	Power Bank 6ea	Power Bank 1ea
Dimensions (W x D x H, mm)	400 x 220 x 530	450 x 160 x620	460 x 140 x 640	200 x 100 x 250
Weight (excl. devices and batteries)	8.73 kg	3.50 kg	3.59 kg	0.49 kg
Power rating	19V / 10.5A / 199.5W	-	-	-
Cooling fan	O	O	-	-

Accuver

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XCAL-Manager

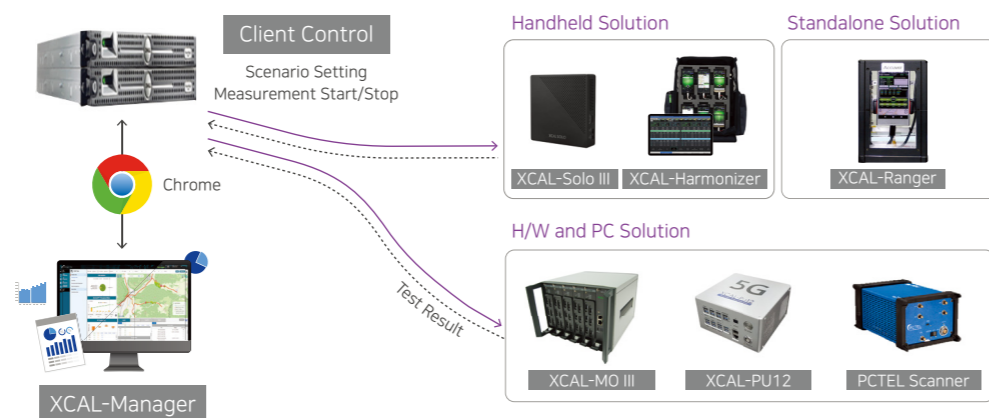## Server based automated 5G network measurement solution

XCAL-Manager is a server-based automated measurement and analysis solution that offers fully systematic and continuous remote control, real-time monitoring, and analysis of measurement results. It provides an optimization solution that allows measurements to be conducted without limitations of time and location, with a fully automated system facilitated through a centralized server, eliminating the need for on-site engineers. XCAL-Manager maximizes measurement efficiency while minimizing costs. Moreover, it supports various measurement and analysis tasks such as base station capacity measurement, beamforming performance measurement, and handover performance analysis, essential for 5G network performance evaluation.

XCAL-Ranger

## Unattended automated test solution for remote site

XCAL-Ranger is the perfect solution for unattended automatic measurement. It installs a smartphone into a robust XCAL-Ranger hardware, enabling flexible deployment for large-scale measurements at remote sites. Additionally, it seamlessly integrates with the XCAL-Manager platform, offering remote control and log file data storage on the server. XCAL-Ranger ensures accurate and efficient measurements without the need for constant human intervention.

Features

* Control XCAL Field solution remotely and monitor real-time status and RF information
* Check and Stabilize the base station performance through various types of Load tests
* Save time & cost for log analysis by classifying massive volume of log files according to test purpose

Functions

* Centralized management
  : Share test scenario and settings
  : Alarm function when error occurs
* Monitoring
  : Check the location and RF information of test UE on the map
  : Check field environment in real-time
* Autonomous measurement
  : Perform automated measurement via measurement schedule setup
  : Manage measurement condition via automatic measurement termination option
  : Easy Field test with Drive route function
* Statistics analysis
  : Check measurement result in real-time
  : Provide automatic statistics via customer setup

Client Control
Scenario Setting
Measurement Start/Stop

Handheld Solution
XCAL-Solo III   XCAL-Harmonizer

Standalone Solution
XCAL-Ranger

Chrome

H/W and PC Solution
XCAL-MO III   XCAL-PU12   PCTEL Scanner

Test Result

XCAL-Manager

Main

Various Report Types

Analysis

In-building Test

Features

* 24/7 measurement
* Reduce manual test costs
* Continuous data collection
* Enhanced and wider coverage network testing

and test monitoring

XCAL-Ranger (Client)

XCAL-Manager (Server)
Send the status and results to the server

Manager PC

Functions

* Auto recovery feature
  : Automatically performs recovery for errors during measurement
* Status report
  : Reports current device status for remote monitoring
* Automated call
  : Supports various types of measurement including Voice, VoLTE, FTP, HTTP, Youtube, etc.
* Schedule for measurement
  : Provides various schedule feature to perform automated measurement according to the configured schedule
* Automated Log file management
  : Log files are uploaded to the server and deleted from the device automatically
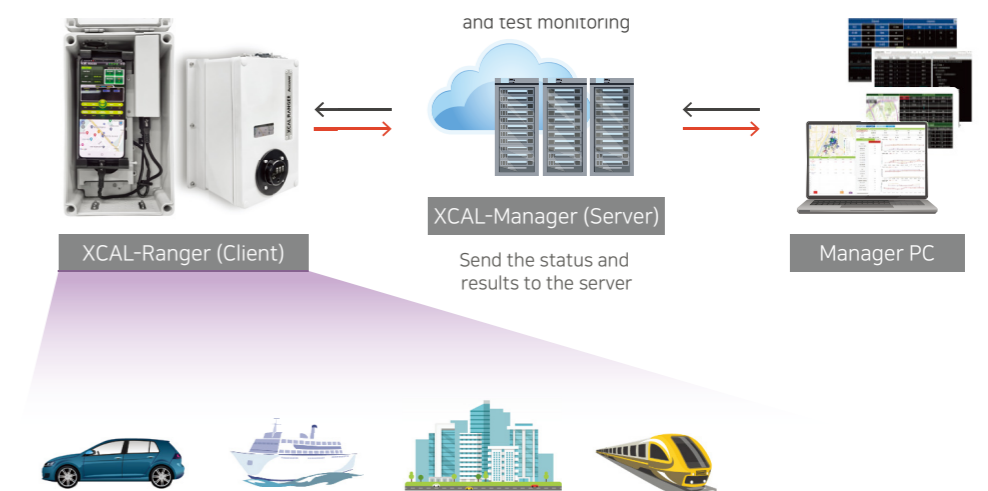
Title	Specification
Power Input	5 VDC (Normal), 9V, 15V
Power Consumption	Max: 1.5W + a (Max 45W)
Power Input Connector	USB C-Type
Phone Interface	USB C-Type Cable
Enclosure Material	Aluminum / PC (Polycarbonate)
Size	240 x 56 x 150 (mm, W x H x D)
Weight	1.75kg (without wall bracket)

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XCAP
PC based powerful analysis solution

XCAP is a robust and highly configurable analysis solution designed to extract, analyze, and generate reports from data collected in XCAL. It is available as a standalone platform or an enterprise-grade client-server solution, supporting all wireless standards and major third-party data formats. By automating the entire network post-processing and troubleshooting workflow, XCAP minimizes OPEX. Developed by engineers for engineers, it offers a comprehensive range of standard-specific KPIs, ensuring ease of use, configuration, and maintenance. Continuously evolving based on user feedback and incorporating major feature upgrades, XCAP, in conjunction with XCAL, provides an unparalleled combination of sophistication and simplicity to enhance your network performance.

Features

* Efficient analytics by providing DM logs in various types of result data
  : Comparison analysis by mobile/network/technology
  : Visualize service and network-level performance geospatially
  : Display GPS information
  : Trend analysis and complex statistical analysis

Functions

* **Analyze collected information**
  : Analyze and Diagnose data collected in real time such as RF environment
* **Call performance analytics**
  : Displays wireless environment values in graphs, maps, tables, and statistics
* **Synchronizing**
  : Easy to analyze the radio wave section by comparing data such as graphs, maps, tables, and app status based on time
* **In-building analytics**
  : Display and analyze wireless environment measurement values by time/section in buildings
* **Check Logging/packet message**
  : All messages from the chipset can be checked.
  : L1, L2, L3(RCC/NAS), TCP/IP, etc.
* **Main tree function**
  : Provide Graph, Map, Table, CDF/PDF

Beamforming Info

PRB Scheduling Map

5G-NR L3

· Coverage Analysis Report   · KPI Statistics Report Type B
· RF Comparison Report   · Single Cell Report
· KPI Statistics Report Type A   · Sector Swap Report

5G-NR Report

Incomplete Call

RCA Algorithm

Analysis Result

5G-NR RCA

# XCAP-Cloud
Cloud based collaborative analysis solution

XCAP-Cloud is a collaborative analysis solution designed for mobile network optimization. Users can harness the power of XCAP on the cloud to perform statistical analysis on vast amounts of data. The analysis results can be shared in detail with colleagues. XCAP-Cloud offers a diverse range of dashboard formats, including tables, graphs, and geo-mapping, enabling comprehensive data visualization. It facilitates the collection, storage, and management of big data, allowing for systematic improvement of mobile network KPIs. Technical engineers can easily analyze data using the web-based packet viewer and SQL editor. With seamless integration with other server based solutions like XCAL-Manager and XCAL-RO, XCAP-Cloud maximizes usability without the need for high-end on-premises PCs or servers for analysis processing.

Features

* Ultimately compelling cloud analysis solution
* Convenient and Agile analysis
* Robust data management solution
  : Managing and mining massive data quickly and easily
* Reduce OPEX
* Compatible with various chipset logs

Data collection by XCAL Solution

XCAP-E — High-Performance Data Analysis Engine

XCAP-A — Statistics Big Data Processing

XCAP-S — Cloud-based XCAP Solution

XCAP-Cloud

Web UI

Data Analysis for Project A

Engineer A   Engineer B   Engineer X

Functions

* **Custom Statistical analytics**
  : Support for custom query UI and SQL editing function
* **Detailed analytics per model unit**
  : Automatic analytics of data and report generation
  : Cloud system-based data analytics
  : Map, Table, Graph, Chart analytics same as PC version
* **Custom Report**
  : Pie, Bar, Line, Map chart and Excel table report function
  : Create a report according to the template set by the user
* **Web based Packet viewer**
  : Packet decoding and analytics function
  : Flow graph
  : DRX/DRM file parsing
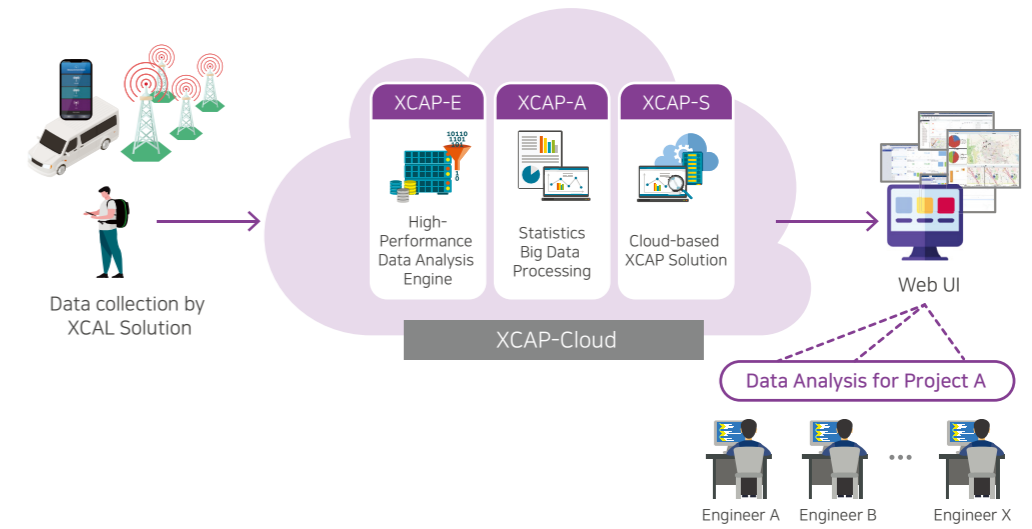
XCAP-A

Dash Board
- Pie chart Drill-down
- DL/UL Throughput, Success rate
- RSRP, SINR, etc.

Statistics
- Cluster condition setting
- Group/File/User setting

Aggregation Analytics
- Aggregation by group/raw data
- Analysis results and templates sharing

XCAP-S

File Manager
- Parsing sampling option
- Merge model creation

Graph
- Time-based line graph
- Various Parameter Overlay function

Range to Sync
- Data synchronization of Table, Map, Chart, CDF, PDF format

XCAL-Air

Drone-based Airspace Network Test Solution

XCAL-Air is a drone-based solution designed to assess the quality of airspace networks. This aims to ensure communication for Unmanned Aircraft Systems (UAS) and Urban Air Mobility (UAM) operational flight at altitudes of up to 600m. XCAL-Air is equipped with Accuver Network measurement devices including XCAL-Solo III and XCAT-IXA 2x C, along with a scanner. It can also be employed for assessing signals and detecting signal leaks within Private 5G zones. Furthermore, we offer a server-based drone control and measurement solution called XCAL-Manager Air. By mapping real-time measurement data onto a 3D map, you can analyze signal performance visually and intuitively.

XCAL-Air
Drone-based network measurement solution

* 3D location-based 5G Network KPIs collection
* Durable mounting and waterproofing for 1500 ft testing
* Real-time network measurement for high-speed UAM
  : signal strength, signal quality, throughput, latency, etc.
* Support for various types of network measurement devices
  : XCAL-Solo III, XCAT-IXA 2x C, Scanners

XCAL-Manager Air
Server-based measurement & control automation solution

* Central control system for managing and scheduling remote tests conducted by XCAL-Air
* Identify 5G coverage gaps and facilitate data-driven decisions for airspace 5G Network
* Assign drone missions and pre-configure routes based on test scenarios
* Comprehensive analysis of RF, messages, and protocols
* Real-time network performance monitoring on 3D Map

XCAL-Air

| LTE/5G QoE test & Benchmarking | Spectrum Analyzer | Scanner |

XCAL-Manager Air

XCAL-Air	Type 1	Type 2	Type 3
Incl.	XCAL-Solo III Smartphone Scanner	XCAL-Solo III 3ea Smartphone 3ea	XCAT-IXA 2x C Smartphone
Usage	Aerial network optimization Interference Monitoring Spectrum/Cell scanning	Aerial network optimization Network Benchmarking	Interference Monitoring Base station inspection
Technology	3G/LTE/5G	3G/LTE/5G	3G/LTE/5G
Weight	13 lbs	13 lbs	16.5 lbs
Max. measurement time (independent of drone operation)	Depend on Battery (e.g. FTP test: 4h / 10,000mAh Battery)	Depend on Battery (e.g. FTP test: 4h / 20,000mAh Battery)	3h 50m