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Pilot Pioneer V10.5
Product Overview

DingLi Corporation Limited

DingLicom

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Overview

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Overview

Drive Test Solution for Mobile Network Test and Measurement

Pilot Pioneer is DingLi's multi-technology mobile network field test solution for directed measurement and troubleshooting. It is an integrated solution that can be used for both indoor and outdoor environment. Various voice and data services tests are supported with the latest test terminals.

Pilot Pioneer test and measurement is applicable throughout the network development lifecycle, therefore allowing network and service provider to fully leverage on their investment. The collected data reflects subscriber's perceptions and experience, enabling network operators to fine tune the network and services to maximize subscriber's satisfaction.

GPS

Advanced Multi-Technology Drive Test Solution

Overview
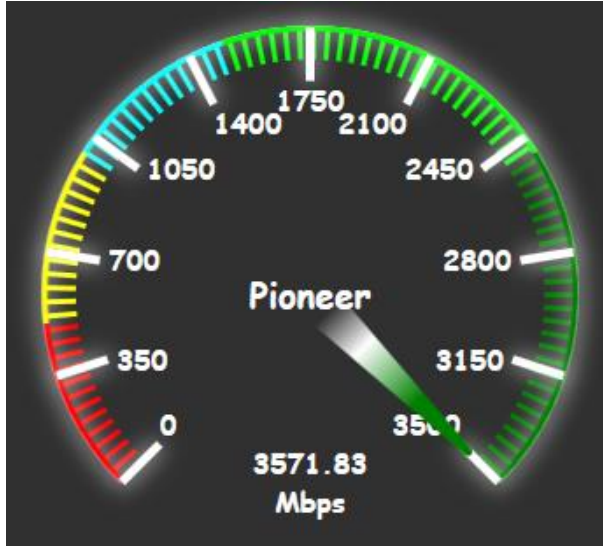
Various Test Scenarios

- Outdoor Drive test
- Indoor test
- Scanner spectrum clearance, coverage, resource block (RB) , CW and spectrum analysis
- Single site verification
- 5G coverage, access, peak performance, perception, and delay test
- Manual GPS position compensation
- Application test from user's perception

Compatible Test Solution with Advanced Network Features

- 5G peak performance (eMBB)
- 5G low-latency performance (uRLLC)
- 5G Carrier Aggregation
- VoNR/EPS FB/VoLTE
- ViLTE from user's perception
- Enhanced Voice Services (EVS)
- NB-IoT/eMTC
- 5G NR frequency scan functions

Pie chart segments: Sophisticate, Professional, Comprehensive, Easy operation, Efficient

Highly-Integrated Service Tests

- 5G NR registration test
- VoNR, VoLTE, EPS FB, CSFB, and voice quality testing
- FTP, Ping, iPerf and other data tests
- Application tests for HTTPs, video and e-mail
- Automatic tests for OTT apps (e.g. Skype, Wechat)

Automatic tests

- Automatic command-based test scripts
- Dedicated SA/NSA/VoNR/EPS FB/5G CA measurement windows
- Automatic device configuration
- Intuitive user interface
- Easy interface operation
- Short learning curve

Multi-technology and Multiple Chipsets support

- 5G NR/NB-IoT/eMTC/LTE-A/LTE-A Pro/LTE/TDS/WCDMA/CDMA/GSM air interface messages collection
- Qualcomm and HiSilicon 5G chipset based terminal measurement
- 5G test terminals, such as handsets, modules, CPE, industrial gateway
- Collect subframe information
- Collect data from service, coverage, interference, resource scheduling and BLER
- TCP/IP data service messages analysis

Test Scenario

Outdoor and Drive Test

- Applicable to various outdoor test environments such as highways, high-speed rail, public hotspots, etc. and data analysis.
- Multiple online/offline map formats supported, e.g. Google Maps/Satellite Maps, Bing Map, Baidu Map, Gaode Map and MapInfo
- Multi-layer information management: GPS-based test routes, Beam information, measurement routes, cell sites, maps, events, and alarms
- Multiple cell site display modes on the Map, comprehensive cell site information management, search, and quick positioning functions
- Multiple map-based analysis under Map window, e.g. cell coverage analysis, TopN cell analysis, and spectrum clearance analysis
- Measurement coverage on background map in grey/simplified map without location name to highlight the network exceptions

Indoor Test Scenarios

- Applicable to various indoor test environments such as any in-building scenarios, elevators, airports, stations, etc. and data analysis.
- Multiple map sources, e.g. iBwave, standard floor plans, and floor images in the *.jpg, *.png, *.bmp, *.tab formats.
- Pre-pinpoint and pinpoint with walk test to ensure the positioning accuracy
- Indoor test management and test data storage based on building floors
- Specialized Report for indoor test
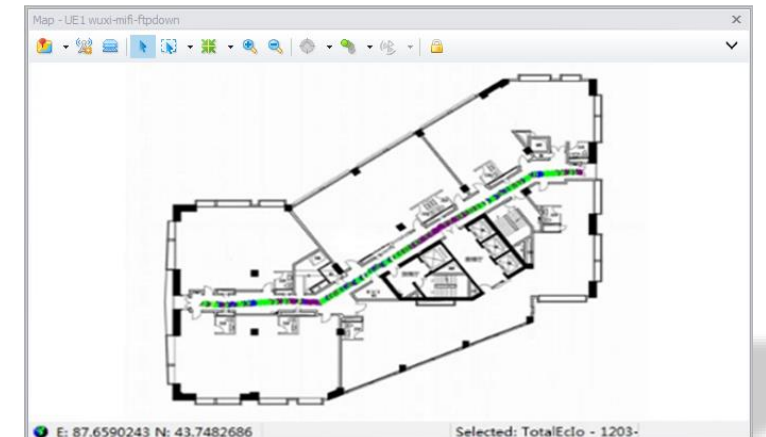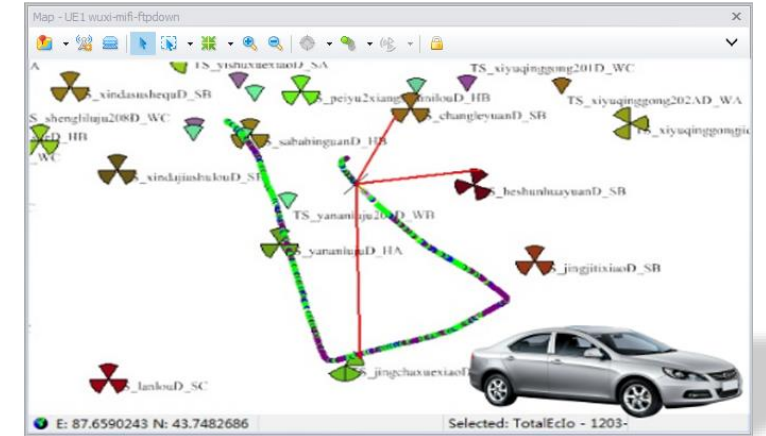
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Standard Product Features

Network Technology

All Radio Access Network Technologies

✓ Supports multiple technologies, including 5G NR/LTE-IoT/LTE-A Pro/LTE-A/LTE/WCDMA/TD-SCDMA/GSM/CDMA

✓ Network measurement information display, e.g. radio parameters, network events, service events, KPIs and Layer 1/2/3 signaling messages

Main Functions(1)

Various Terminals and Scanners Support

- ✓ Commercial smartphone devices
- ✓ Test modules, CPE, industrial gateway.
- ✓ R&S scanners

Forcing Functions with Commercial Terminals

- ✓ Commercial terminals configured with some technologies (e.g. root configuration, ROM re-installation, etc.) for network measurement
- ✓ Reduce test costs by not having to invest on specialized test devices
- ✓ Service test from users' perspective

VoNR/EPS FB/VoLTE/CSFB Smart Analysis and Data Test Exceptions Analysis

- ✓ Smart analysis allows more accurate and quicker data analysis for users
- ✓ Display time, location, possible reasons and processing suggestion for abnormal events in every phase of VoNR/ EPS FB/VoLTE/CSFB test.
- ✓ Custom statistic reports

01. Data Insight and Smart Analysis

- ✓ Integrated Analysis with the features of smart analysis and data mining
- ✓ Automatically locate and analyze possible problems in test data
- ✓ Big data analysis to improve the efficiency to identify and troubleshoot mobile network problems
- ✓ Analysis results may be displayed in various mode. Automatically synchronize the information in map, parameter and event windows.

02. Custom Analysis-Filter

- ✓ Built-in Filter with conditions for data processing
- ✓ Filter by parameter, time, region, state, condition range, service and Bin.
- ✓ Comprehensive data filtering based on combined conditions, e.g. Parameter + Time + Service.
- ✓ Data displayed in the map window, log files partition, data statistics and analysis based on data filtering.
- ✓ Meet the requirements of custom data capture, statistics reports and specialized analysis.
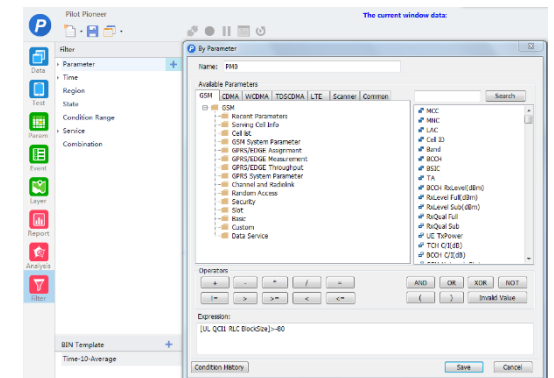
Main Functions(2)

License Query and Online Update

- ✓ License query, including terminals, RAT, services, analysis, reports, etc.
- ✓ Displays soft/hard dongle serial number, expiration date.
- ✓ Online update: Users may update the patches with designated version of license client in an intelligent way or install a new software version

A More Flexible Mode to Detect the Parameters

- ✓ For those parameters which are not listed in the Table, users may drag the parameters from **Message Details** to **Table** to conveniently view any measurement updates
- ✓ Customize the parameters, and save as template
- ✓ Drag and drop message details to display table, or export through **Data Export** function.
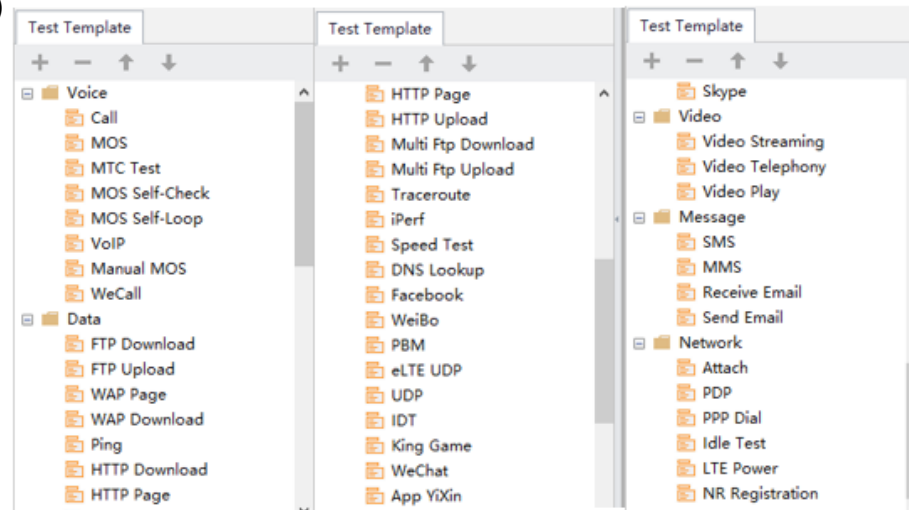
Service Test

01 **Bandwidth Measurement under LTE Network**

- ✓ PBM (Pulse-Sampling Bandwidth Measurement) solution
- ✓ Bandwidth measurement with high accuracy (test result is in accordance with that of FTP test)
- ✓ Low network traffic to reduce test cost (one tenth of FTP test)
- ✓ Minimum network resource utilization with little impact on common users

03 **Various Service Tests**

- ✓ LTE-IoT test: Ping and UDP through AT command, Ping and UDP over PPP
- ✓ Network performance test, e.g. FTP, Multi-FTP, Ping, Attach, Registration
- ✓ Service test from user's perspective, e.g. HTTP, Email
- ✓ Video quality measurement with Youtube, Facebook and other video streaming services used in China mainland (e.g. YouKu, iQIYI, Tencent, iTudou, etc.)
- ✓ Control of test process and voice quality evaluation with MOS (PESQ and POLQA) , applicable to all commercial terminals.
- ✓ TCP/IP data collection for data analysis

04 **Voice Call**

- ✓ Voice test, e.g. 2G/3G/4G/5G, Mobile to Mobile POLQA and PESQ audio quality MOS test

02

Voice Test
- Call
- MOS
- MTC Test
- MOS Self-Check
- MOS Self-Loop
- VoIP
- Manual MOS
- WeCall

Data Service Tests
- FTP Download
- FTP Upload
- WAP Page
- WAP Download
- Ping
- HTTP Download
- HTTP Page
- HTTP Upload
- Multi FTP Download
- Multi FTP Upload
- Traceroute
- iPerf
- Speed Test
- DNS Lookup
- Facebook
- PBM
- eLTE UDP
- UDP
- Skype
- IDT

Network Test
- Attach
- PDP
- PPP Dial
- Idle Test
- LTE Power
- NR Registration

Video Test
- Video Streaming
- Video Telephony
- Video Play

Message Test
- SMS
- MMS
- Receive Email
- Send Email

Test Template screens: Voice (Call, MOS, MTC Test, MOS Self-Check, MOS Self-Loop, VoIP, Manual MOS, WeCall); Data (FTP Download, FTP Upload, WAP Page, WAP Download, Ping, HTTP Download, HTTP Page); HTTP Page, HTTP Upload, Multi Ftp Download, Multi Ftp Upload, Traceroute, iPerf, Speed Test, DNS Lookup, Facebook, WeiBo, PBM, eLTE UDP, UDP, IDT, King Game, WeChat, App YiXin; Skype; Video (Video Streaming, Video Telephony, Video Play); Message (SMS, MMS, Receive Email, Send Email); Network (Attach, PDP, PPP Dial, Idle Test, LTE Power, NR Registration)

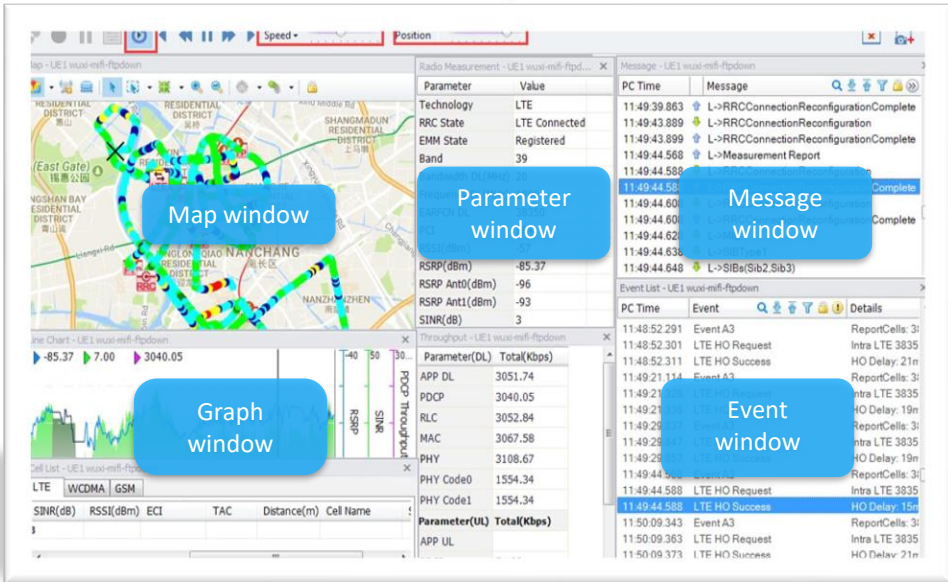# Flexible Analysis and Statistics Reports

Analysis

Powerful Data Analysis Capability

✓ Supports data replay and synchronization to reflect the actual network status.

✓ Supports to Run the replay button, slide (left or right) the speed toolbar and position toolbar to synchronize the information in Map window, Event window and Parameter window.

✓ Multiple display modes, e.g. tables, bar charts, distribution maps and trend chart

✓ Easily exports log file to multiple third-party formats, capable of higher storage performance and flexible scalability

✓ Multiple and professional data analysis
- Coverage Analysis
- Interference Analysis
- Cell Analysis
- Service Analysis
- Delay Analysis

✓ Users may set analysis conditions, including parameters, KPIs, etc., as required, to meet demanding analysis requirements

Reports

Custom Statistics Report

✓ Provides flexible custom reports.

✓ This function meets various statistics requirements.

✓ Users may predefine analysis conditions, e.g. parameters, KPIs, events

✓ Built-in Filter with conditions for data processing

✓ Multiple display modes, e.g. Excel, Word, etc.

✓ Various statistics templates

Outgoing Call Statistic				FTP Download Statistic						
Outgoing Blocked Call Count	Outgoing Dropped Call Count	Originating CSFB Request Count	Originating CSFB Faliure Count	WCDMA RLC Throughput DL(kbps)	LTE RLC Throughput DL(kbps)	FTP Download Avg. throughput(kbps)	FTP Download Attempt Count	FTP Download Success Count	FTP Download Faliure Count	FTP Download Drop Count
0	25	0	0		1759.96	2940.92	38	36	0	2

Test and Reports Management

Custom Events/Parameters

✓ Provides flexible custom events and parameters
✓ The function of user-defined events, alarms and parameters caters to actual test scenarios.
✓ Statistics on custom events and parameters.
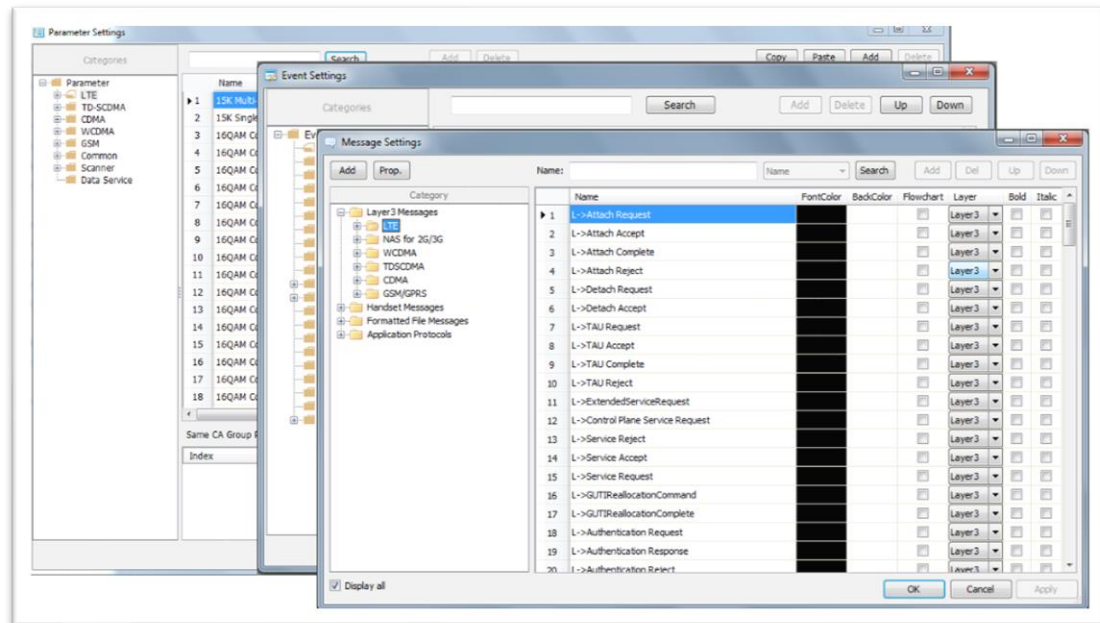
Templates Import/Export

✓ The templates that can be imported/exported include: report templates, analysis templates, filter templates and parameters templates.
✓ It is convenient for sharing templates between multiple Pilot Pioneer Expert users, or between different versions of Pilot Pioneer Expert.
✓ It is easy to import user-defined templates to the updated version or to different computers.

Easy Test Management

✓ Automatically detect and connect test devices
✓ One-click backup and restoring of project configuration
✓ Custom test scenarios, and movable windows in the Workspace for better data view
✓ Multiple shortcut buttons for test management in a more convenient way.
✓ Assistant data display modes, e.g. freeze screen, capture screen, and export data files
✓ Network measurement assistant information display, e.g. test progress, real-time statistics KPIs, device alarm and KPI alarm
✓ Switching among multiple workspaces and multiple terminals' information display

Supported 5G Terminals

Chipsets	
Qualcomm	Hisilicon
Scanners	
R&S	TSME, TSMW, TSMA, TSME6
Please refer to Offered Pilot Pioneer Devices document for more details	

Handsets	
Samsung	S20 G9810
Huawei	Mate 20X, Mate 30, Mate30 Pro, P40, P40 Pro, Mate 40, Mate 40 Pro
Others	MI 10, MI 11, ViVO IQOO3, ViVo IQOO7
Modules	SIM8300G, Lierda MH5000

NB-IoT Test Modules Supported by Pilot Pioneer V10.5

Device Model	Chipset	NB-IoT/eMTC	Band	Services	Forcing Functions
Remo1526/1601	Qualcomm9206	NB-IoT & eMTC	Band1/3/5/8/20/39	VoLTE/Attach/Ping/AT UDP/ iPerf/FTP/Cell Reselection	Basic forcing functions (e.g. power on, power off, attach, detach, APN settings, etc.), scrambling code settings, PSM settings, eDRX settings, network locking, band locking, frequency locking, cell locking, etc.
LongsunA9500	Qualcomm9206	NB-IoT & eMTC	Band1/3/5/8/20/39	VoLTE/Attach/Ping/iPerf/FTP/Cell Reselection	Basic forcing functions (e.g. power on, power off, attach, detach, APN settings, etc.), scrambling code settings, PSM settings, eDRX settings, network locking, band locking, cell locking, etc.
SIM7000	Qualcomm9206	NB-IoT & eMTC	Band1/3/5/8/20/39	VoLTE/Attach/Ping/iPerf/FTP/Cell Reselection	Basic forcing functions (e.g. power on, power off, attach, detach, APN settings, etc.), scrambling code settings, PSM settings, eDRX settings, network locking, band locking, cell locking, etc.
Lierda	HiSilicon	NB-IoT	Band5/8/20	Attach/Ping/AT UDP/ iPerf/FTP/Cell Reselection	Basic forcing functions (e.g. power on, power off, attach, detach, APN settings, etc.), scrambling code settings, PSM settings, eDRX settings, etc.
Quectel test module	HiSilicon	NB-IoT	Band5/8/20	Attach/Ping/AT UDP/ iPerf/FTP/Cell Reselection	Basic forcing functions (e.g. power on, power off, attach, detach, APN settings, etc.), scrambling code settings, PSM settings, eDRX settings, etc.

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New Features

5G

Voice Quality Testing without Phone Audio Port

As many vendors have adapted to design their 5G mobile phones without the audio port, DingLi has developed a new voice quality testing feature that does not require the audio port to cater for such circumstances. The is to ensure DingLi is aligned with new market trends, and test and measurement requirements.

- Simulates user perception of voice quality with supported test phones and Pilot Pioneer V10.5.
- Test phones with USB 3.0 port
- Non-audio port test phones: Huawei Mate series and Huawei P series

5G Carrier Aggregation (CA) Test

NR Throughput - UE1 mmWave 8CC Test

DL Thr(Mbps)	Total	PCell	SCell1	SCell2	SCell3	SCell4	SCell5	SCell6	SCell7
APP									
SDAP									
PDCP	3475.128								
RLC	3484.373								
MAC	3500.707	492.983	493.098	492.496	492.718	493.540	289.519	347.151	399.202
PHY	3619.232	493.778	493.816	493.775	493.901	493.941	322.433	385.550	442.040
UL Thr(Mbps)	Total	PCell	SCell1	SCell2	SCell3	SCell4	SCell5	SCell6	SCell7
APP									
SDAP									
PDCP	115.123								
RLC	115.951								
MAC	116.710	116.669	0.040	0.000	0.000	0.000	0.000	0.000	0.000
PHY	121.567	121.365	0.202	0.000	0.000	0.000	0.000	0.000	0.000

Pilot Pioneer 10.5 supports 5G CA test with the Qualcomm and HiSilicon 5G chipset based test phone terminals

Features:

- Real-time monitoring of CA measurement, network resource allocation, network quality, data rate, etc.
- Real-time monitoring of key events, such as secondary component carrier (CC) configuration, secondary CC activation, and CA handover
- Upto 8CC CA over millimeter waves

Benefits

Verify CA performance improvement:
- higher data throughput
- coverage and capacity expansion

Handsets:

- Huawei Mate 40
- Huawei Mate 40 Pro
- Please see more handset support in *Offered Pilot Pioneer Devices* documentation.

VoNR Voice Quality Testing

VoNR with POLQA/PESQ voice quality testing standard (EVS 24.4kbit/s) is supported with the following features and benefits:

01

Features:
- Real-time RTP (Real-time Transport Protocol) packet data
- Real-time display of POLQA/PESQ voice quality testing score
- Real-time display of uplink and downlink AMR voice codec information

02

Handset Support:
- Huawei Mate 30
- Huawei P40
- Huawei P40 Pro
- Please see more handset support in *Offered Pilot Pioneer Devices* documentation.

NR Registration

The new test service NR Registration allows the UE (based on test plan configuration) to:
- automatically send registration request
- complete NR registration
- access to 5G NR network

Pilot Pioneer will monitor the NR registration process and display the network performance in real time, such as the delay, success rate.

Drive Test with the Test Phone GPS
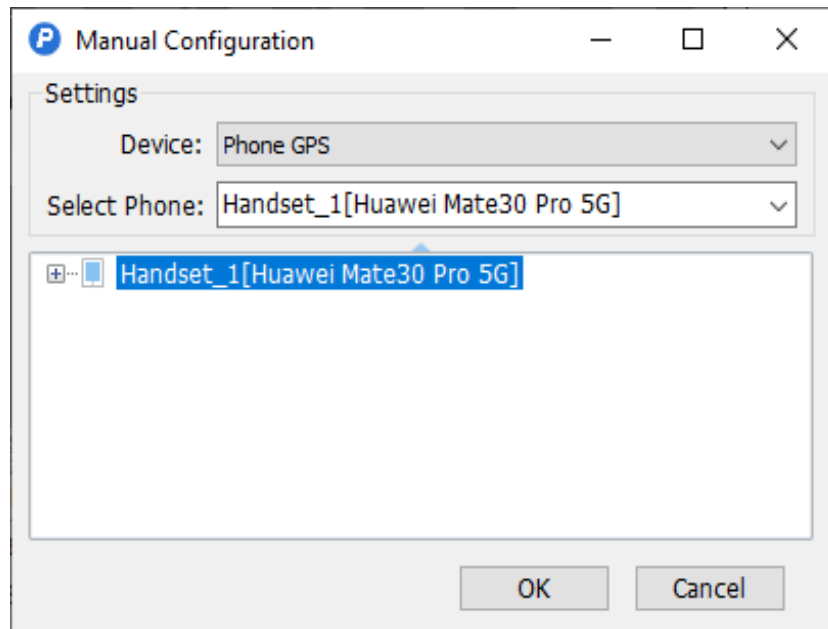
Users may perform drive test with Pilot Pioneer V10.5 onwards using the test phone GPS function.

- The test phone needs to be installed with Pioneer Tools.
- Select **Phone GPS** for **Device** and select a handset model for **Export Device**.

Manual GPS Positioning Compensation
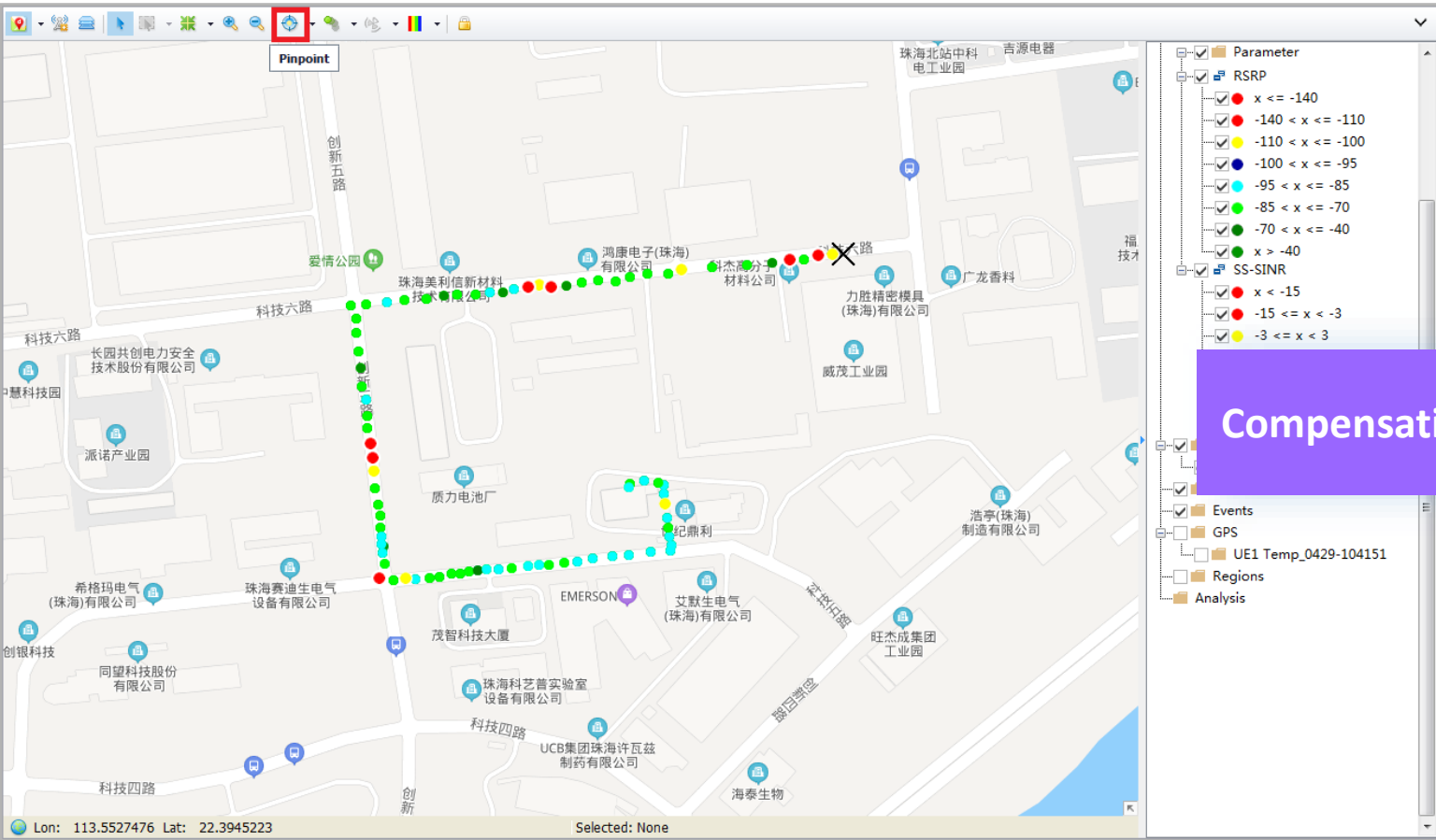
Environment:

- No GPS signal due to multipath

- No GPS signal due to signal blocking

- No GPS signal with high speed travel

Benefits

More positioning accuracy of the measurement plot

Note

The function is available only when there is no GPS signal received

Multiple Online Map Format
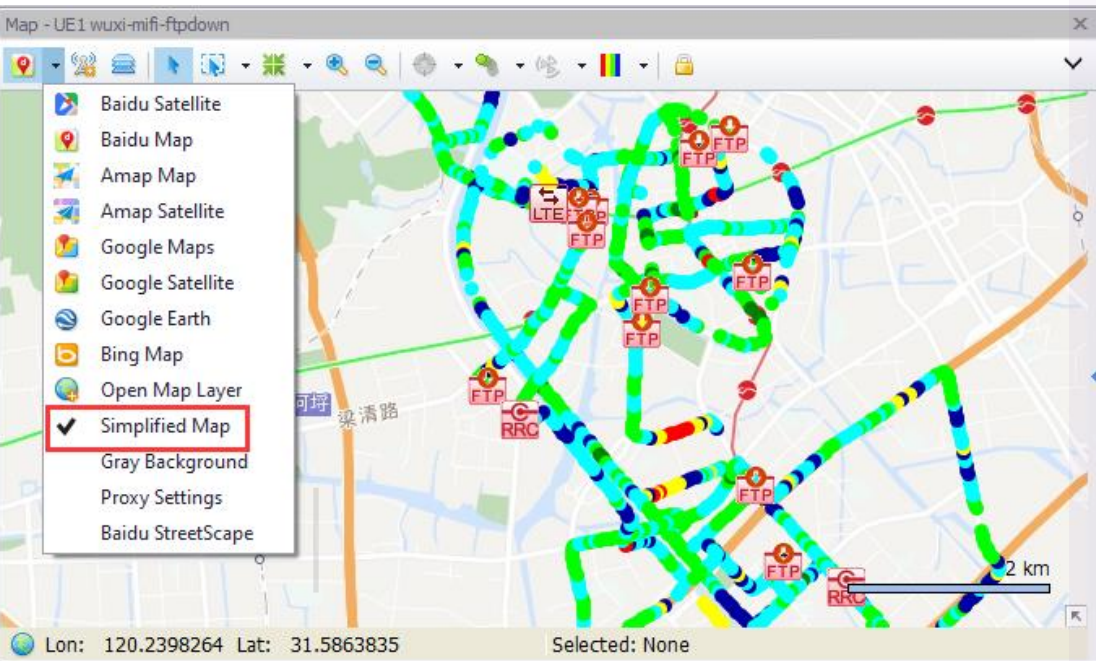
New map types:

- Baidu satellite

- Google map

- Google satellite

- Simplified map.

Simplifed map is the one that all the location and building names except the road names are removed from the map.

Benefits: It presents a legible and intuitive view for test information or test route.

RCI- Remote Control Interface

Remote Work Station

Testing Conductor

Platform integration
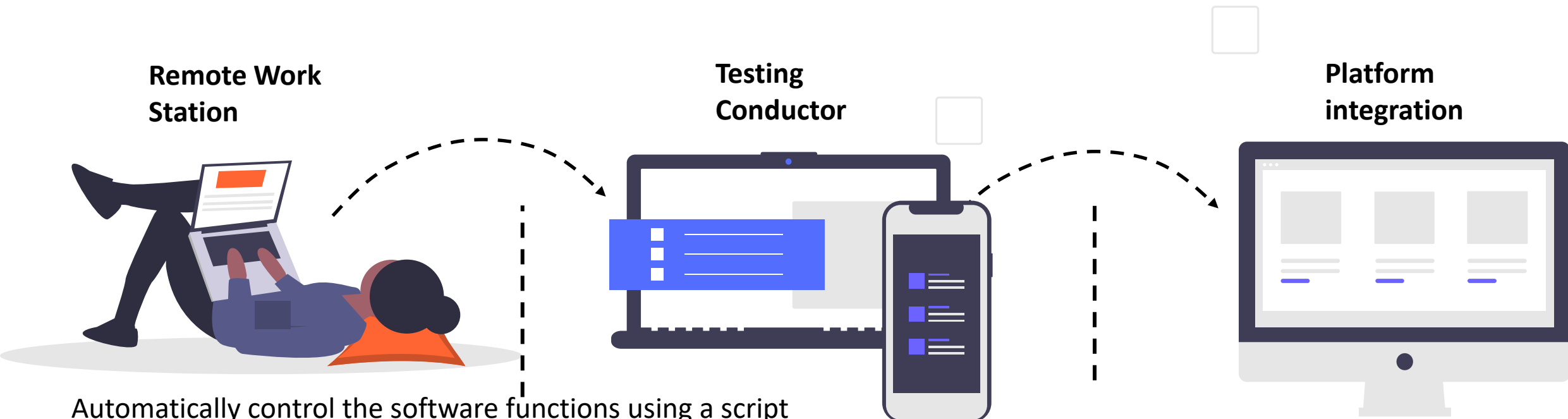
Automatically control the software functions using a script through socket connection. This script is command-based scripting. The API is provided by DingLi, which is called as "Test Automation API" or "RCI (Remote Control Interface)"
This includes:

- *Device connect/disconnect*
- *Start/ Stop testing*
- *Query UE status*
- *Excute/ release forcing code*

Push the customized measurement information to other platforms in real time:

- *RSRP*
- *SINR*
- *Throughput*

/04

Main Features

5G

ViLTE and VoLTE Tests

Pioneer Interface

IMS-SIP Decode

POLQA/PESQ

VoLTE UE

Walktour Pack

Audio

Headphone

Supported services

VoNR/EPS FB/VoLTE/ViLTE test

Automatic test

Voice and video test:: the voice or video app control test automatically

Supported terminals

- Qualcomm chipset: all common 4/5G commercial handsets
- HiSilicon chipset: Huawei Mate and P series
- Samsung chipset.

Voice quality testing evaluation

- Real-time audio quality measurement with PESQ/POLQA voice quality testing
- Sampling rate switching among 8K, 16K and 48K; sound recording and playback tests for outgoing and incoming calls
- Mobile to mobile (connected to different computers) voice quality test to simulate real usage scenario.
- Supports multi-channel/signal-channel voice quality test.
- POLQA voice quality testing V1.1 and V2.4 algorithm
- AMR/EVS

Test plan/KPI

Quick and easy test plan and test reports generation with a single click.

VoNR with POLQA Voice Quality Testing Standard - Real-Time Measurement

Voice Quality Testing KPIs

KPIs	Description	KPIs	Description
Library Version	POLQA algorithm library version	Level Reference (dBov)	Audio amplitude level of full reference signal (full audio with sound and pause)
P863 Version	ITU protocol version	Level Degraded (dBov)	Audio amplitude level of full degraded signal (full audio with sound and pause)
Processing Mode	Two algorithm modes for POLQA: Narrowband and Super Wideband. Different algorithm modes have different score range	ASL Reference (dBov)	Avg. audio amplitude level of reference signal during audio activation (P.56)
Sample Rate (Hz)	Reference audio signal sampling frequency, 8KHz for NB, and 48KHz for SWB	ASL Degraded (dBov)	Avg. audio amplitude level of degraded signal during audio activation (P.56)
POLQA Score	The scoring results by P.863 standard, NB(1-4.5), SWB (1-4.75)	Pause Level Reference (dBov)	Avg. audio amplitude level of reference signal during audio pause (P.56)
Mean Delay(ms)	Average delay of degraded signal compared with reference signal	Pause Level Degraded (dBov)	Avg. audio amplitude level of degraded signal during audio pause (P.56)
Min Delay(ms)	Min. delay of degraded signal compared with reference signal	SNR Reference (dB)	Signal-to-noise ratio of reference signal
Max Delay(ms)	Max. delay of degraded signal compared with reference signal	SNR Degraded (dB)	Signal-to-noise ratio of degraded signal
Delay Jitter	Jitter of delay of degraded signal compared with reference signal	ASR Reference	Active speech ratio of reference signal, i.e. ratio of audio activated duration to total audio duration
Attenuation (dB)	Attenuation between degraded signal and reference signal	ASR Degraded	Active speech ratio of degraded signal, i.e. ratio of audio activated duration to total audio duration
R Value (E-Model)	Score value when mapping to G.107 scoring standard	Pitch Reference (Hz)	Avg. pitch of reference signal
Estimated Sample Rate	Sampling rate of degraded signal by POLQA algorithm	Pitch Degraded (Hz)	Avg. pitch of degraded signal
Resampling Applied	If the samling rate difference between reference signal and degraded signal is more than 0.5%, POLQA will slow down the signal with high sampling rate, and Resample Applied will be set to 1 (Yes)	Record File	Audio file with degraded signal, the storage path and name
Direction	Uplink or downlink. If downlink, the current terminal is used for audio transmission	Reference File	Audio file with reference signal, the storage path and name

Carrier Aggregation (CA) Test

Carrier Aggregation (CA) test solution where users can quickly configure PCell and SCell CA parameters supports key CA technologies and Release 9/10/11/12/13. During CA test, events, messages and various KPIs of PCell and SCell can be displayed in real time.
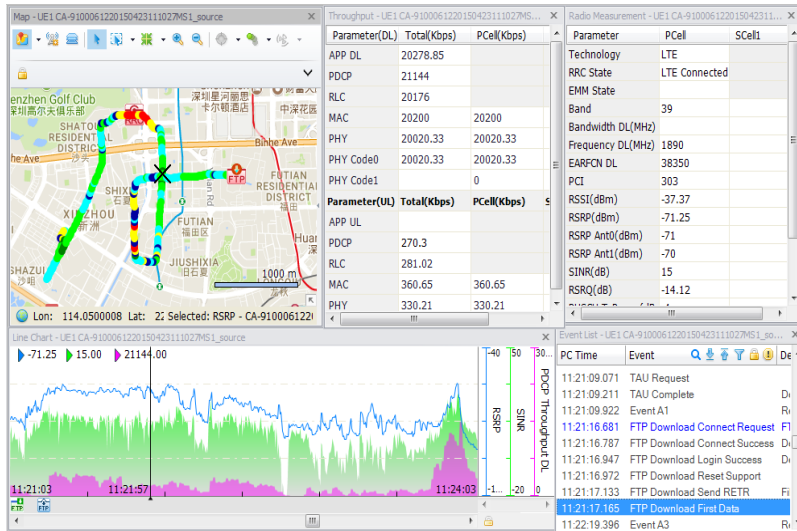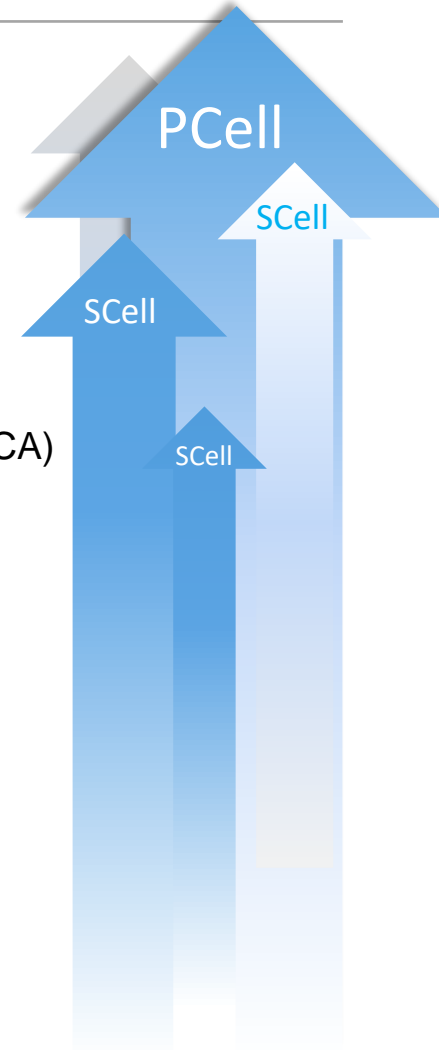
- Multiple FDD-LTE and TDD-LTE CA modes supported (2CC/3CC/4CC CA)
- FDD+FDD and FDD+TDD 4CC Carrier Aggregation
- 5G CA test with upto 8CC CA over millimeter waves
- Qualcomm and Hisilicon chipset-based CA test
- High speed download for data services
- Real-time multi-terminals monitoring of CA measurement, network resource allocation, network quality, date rate, etc.
- Real-time monitoring of key events, such as secondary component carrier (CC) modification, CA handover, and secondary CC activation
- Customized CA statistics report

Carrier Aggregation (CA) Test---Real Time Interface

@DingLi (3/26/2020)　　　　　　　DL1105PV　　　　　Powering Network Experience　　　　30

Single Site Verification

Single site verification is a three stage process that includes test, statistics and analysis, and reporting. The single site verification design promotes data processing efficiency and fast single site verification reports generation.

The following functions and KPIs are supported:

- Various pre-defined test scenarios and user-defined test scenarios
- Multi-dimensional KPIs for single site verification, such as radio parameters, coverage map, peak rate of data service, VoNR/EPS FB/VoLTE/CSFB KPIs, etc.
- Single site verification reports generation to preview verification results in a convenient way
- Supports data export to *.csv format for further processing, which satisfies more analysis scenarios.

Obtain site information

Collect data by scenario

Test images screenshot as prompted

Process data in a smart way

Fill in survey data

Generate single site verification reports

Export data to *csv format (optional)

Data Collection

Data Processing

Reports Generation
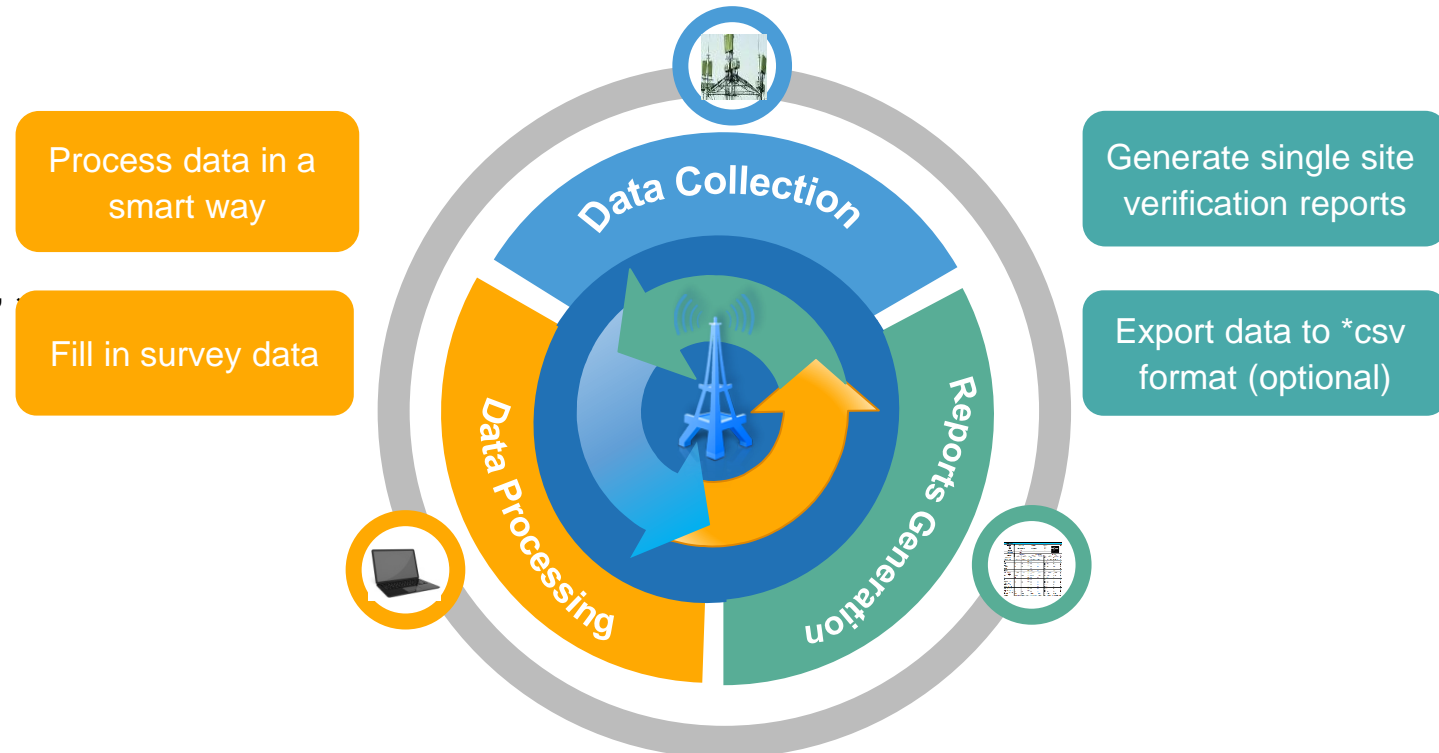
High-speed Rail Test with GPS Trajectory Compensation*

01

Optimized GPS module: external high-accuracy and high- sensitivity GPS module for rapid and stable positioning

02

Real-time Compensation with Gyroscope: External gyroscope, GPS and Google KML map are used to accurately display the test route geo-position (during test)

03

Flexible test: multi-network and multi-service test with multiple terminals

04

Intelligent trajectory compensation: intelligent GPS positioning compensation on the travelled routes with DingLi's proprietary algorithm, for the precise and actual network measurement positioning (after test)

05

Built-in routes: 65 Chinese high-speed rail and urban rail routes; customized route maps for all Chinese high-speed rail and highway routes

◆Note: Unique to China market only, customers who want to have the access to this function may contact DingLi.

@DingLi (3/26/2020)   DL1105PV   Powering Network

Huawei mLAB vMOS Test

Video - UE1 Pioneer6_0422-133809_UE1-Huawei mLAB VMOS

Video Play | Video Streaming | VoIP | Video Telephony
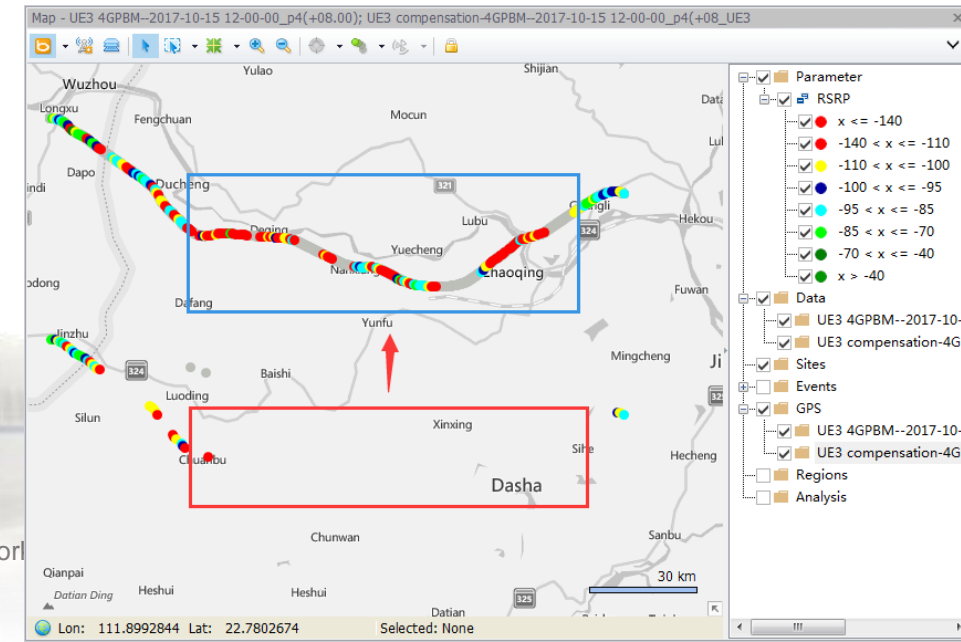
Parameters	Value	Parameters	Value
Total Receive Bytes	30653351	Media Quality	Super Definition
Download Progress（%）	100	Total Bit Rate（bps）	1202656
Current Rcv Speed（bps）	45916811	Video Duration Time(ms)	201000
ReBuffer Counts	0	Video FPS	25
Rebuffer Time(ms)	0	Video Width（px）	1105
Play Duration（ms）	28967	Video Height（px）	622
Stalling Ratio（%）	0	Video Codec	H264
Init Buffer Latency（ms）	1493	Audio Codec	AAC
VMOS	3.05	WebSite Type	
Quality Score	3.72	Video Title	【舅子】奥特…
Loading Score	3.21	Video Server IP	27.221.98.52
Stalling Score	5.00	Video Server Location	中国山东济南…

13:38:18.859	Video Play First Data	Access Delay:0.286(s)	
13:38:19.972	Video Play Reproduction Request	Access Delay:1.00(s)	
13:38:27.438	Video Play Last Data	Receive Size: 30.663(MB)	ReBuffer Count: 0
13:38:48.940	Video Play VMos Report	VMOS:3.05	
13:38:49.187	Video Play Finish	Download Progress: 100 %	
13:38:49.229	Network Disconnect		

ITU-T Recommendation P.800

| MOS	Quality	Impairment
5	Excellent	Imperceptible
4	Good	Perceptible but not annoying
3	Fair	Slightly annoying
2	Poor	Annoying
1	Bad	Very annoying

mLAB

Background:

Video has become a technology consuming most network traffic, and video service experience has become a key index to measure network service quality. With the improvement of video resolution (from 720P/1080P to 4K/8K), video service are becoming increasingly demanding for the network. Therefore, the way to evaluate the video service experience under the current network has become increasingly important to users and operators.

DingLi:

DingLi cooperates with Huawei MBB to develop the Huawei vMOS technology. Pilot Pioneer has the privilege to introduce and support Huawei Mobile vMOS, which evaluates video quality with vMOS score. The vMOS video experience evaluation (e.g. vMOS scores) is designed to take into consideration the video source quality, start loading time, stalling ratio, and video play duration

LTE-IoT (NB-IoT and eMTC) Test
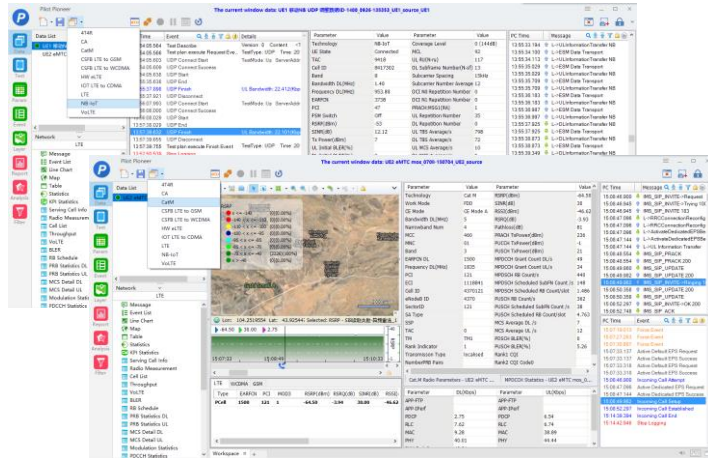
Customized NB-IoT and eMTC test scenarios

General

- Pilot Pioneer V10.5 supports LTE-IoT test with multiple NB-IoT and eMTC test modules. Each test module supports both NB-IoT and eMTC.

- Pilot Pioneer V10.5 may connect LiteProbe as one of the LTE-IoT test device.

- LTE-IoT test services: Ping and UDP through AT command, Ping and UDP over PPP

LTE-IoT test features

- Customized LTE-IoT test scenarios, one-click display of all NB-IoT and eMTC test KPIs

- Support 3GPP Release 14 protocol.

- Support multiple test services and forcing functions.

- Support HiSilicon and Qualcomm chipset.

Note: Mutilple LiteProbes and LTE-IoT test modules can be connected to Pilot Pioneer 10.5 for concurrent testing.

Benefits and values

- Available LTE-IoT solutions

- Support various LTE-IoT application scenarios

- Meet customers' requirements for LTE-IoT test

Test modules with HiSilicon and Qualcomm chipset

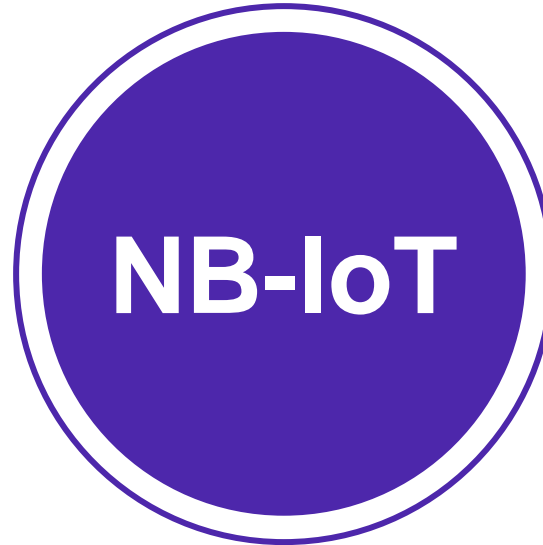# NB-IoT Scanner Test

Top N Synchronous Signal Scanning

- Top N scanning: blind scan for various frequencies, and scan for dedicated cells.
- Complete scan data：EARFCN, PCI, NPSS-RP/RQ/RSSI, NSSS-RP/RQ/RSSI

User list Synchronous Signal Scanning

- **UserList Scanning**: exports complete test data, which include the data for EARFCN, PCI, NPSS RP/RQ/RSSI, NSSS RP/RQ/RSSI
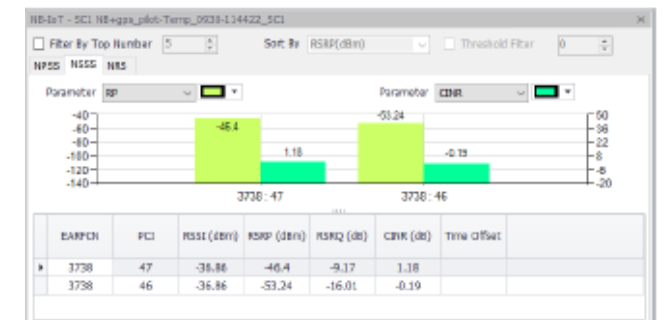
NB-IoT

About the System

- Able to identify PCI
- Display intra-frequency and inter-frequency neighbor cell list
- Scan the blind cell (with dedicated frequencies) broadcast , and the lock cell (with dedicated frequencies) broadcast.
- MIB/SIB1 demodulation function: System bandwidth (MIB), antenna count, TraceArea and Cell ID (SIB1)

Channel Demodulation

- Channel demodulation for NRS, NPSS, NSSS, etc., calculating various channel power.

Benefits and values:
- ✓ Provide better network optimization solutions for device manufacturers, service suppliers
  - Support frequency planning
  - Support network benchmarking test
- ✓ Available interference analysis for network operators
  - To identify whether the transmission problem is caused by cell overlapping coverage or external interference

Real-Time KPIs Display

KPIs (e.g. test duration, test distance, coverage rate and various network technologies, etc.) can be displayed in real time. This release comes several KPIs categories:

🖼️ **FEATURES**

- General Statistics: test execution count, test status, success rate, delay, etc.
- Radio Parameters: max, min, mean and median key parameters value, total samples count, parameters threshold, and CDF and PDF statistics, etc.
- Exceptions: service exceptions, low MOS score, low throughput, etc.

Users may click the exception to view its details as the exception information is synchronized in various window

🔘 **BENEFITS&VALUES**

- ✓ Users may rapidly view the test results.
- ✓ Users may adjust the test plan according to the KPIs.
- ✓ Promote the work efficiency.

Real-Time KPIs Display

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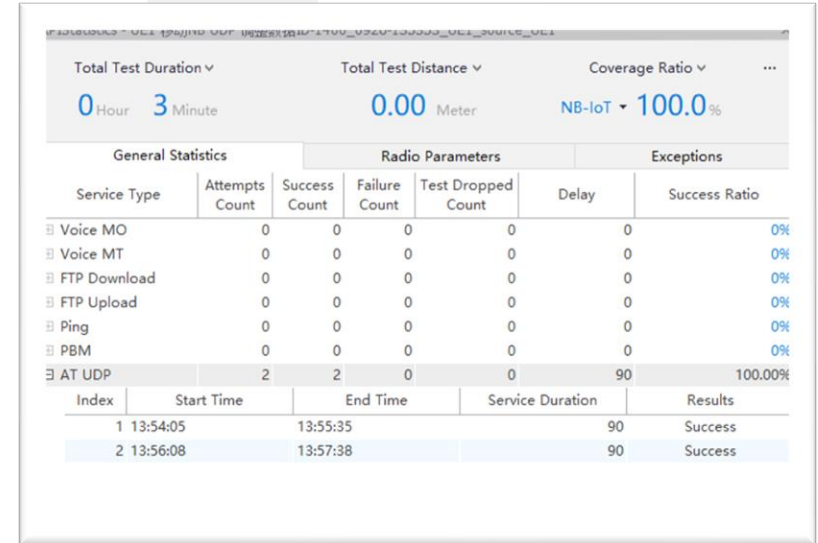
Benefits and values:
- Users may rapidly view the test results.
- Users may adjust the test plan according to the KPIs.
- Promote the work efficiency.

Radio Parameters: max, min, mean and median key parameters value, total samples count, parameters threshold, and CDF and PDF statistics, etc.
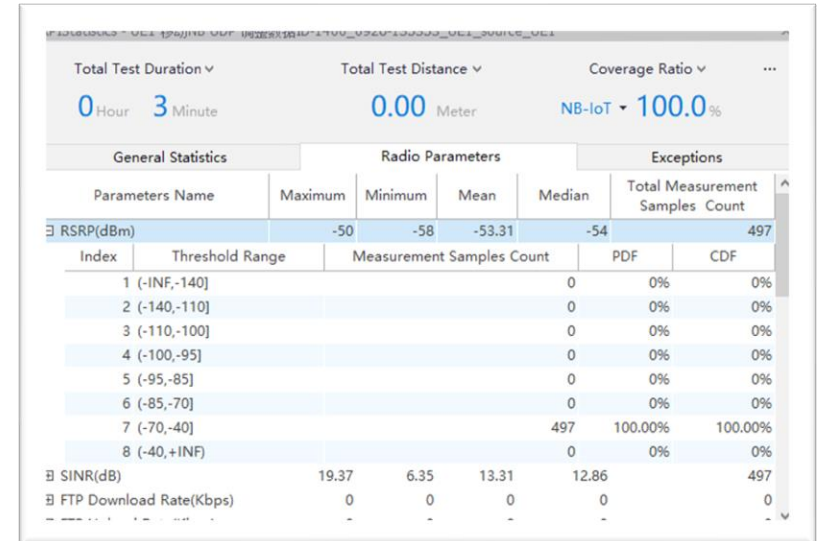
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/05

Conclusion

Conclusion

Pilot Pioneer will be your ideal network optimization and evaluation solution.

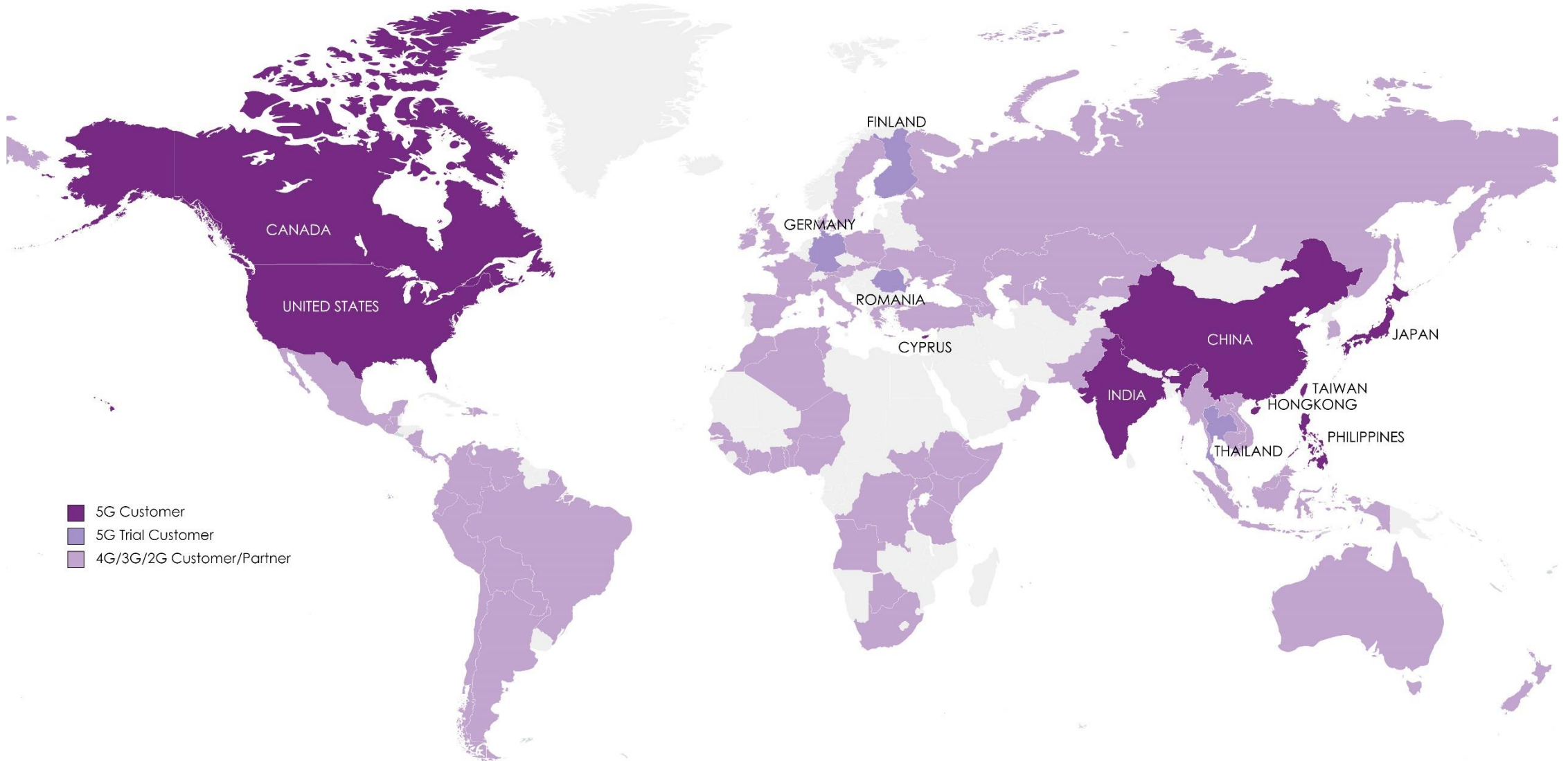## For Network Operators, System Vendors and Service Providers

- Provides flexible authentication modes (such as hard dongle and soft dongle), support multiple commercial test terminals, which provides maximum benefits on the tool investment

- Multi-technology indoor and outdoor service tests, applicable throughout the network development process

- Improves test efficiency with highly integrated and automated services test

- Provides a user-friendly interface for easy operation

For Engineers

- Simple and easy operation, user-friendly interface for shorter learning curve

- Specialized technical support and customized services

- Automatic device configuration and data collection to reduce workload

- Integrated common services test and network troubleshooting ability to improve network optimization efficiency

Customer Base

5G Customer
5G Trial Customer
4G/3G/2G Customer/Partner

FINLAND
GERMANY
ROMANIA
CYPRUS
CANADA
UNITED STATES
CHINA
JAPAN
INDIA
TAIWAN
HONGKONG
THAILAND
PHILIPPINES

Thanks

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