

Pilot Pioneer V10.2



Pilot Pioneer is DingLi's multi-technology laptop-based mobile network test and measurement tool. It is an integrated solution that can be used for both indoor and outdoor test environment. Various services tests can be conducted with a wide range of the latest supported commercial test terminals. Pilot Pioneer 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 subscribers' satisfaction.

Various Test Scenarios

- Outdoor Drive test
- Indoor test
- NB-IoT scanner test, resource block (RB) , CW and spectrum analysis
- Single site verification
- Qualcomm chipset (commercial terminals) based forcing functions
- Data Insight in LTE network
- Custom analysis
- Custom statistics report
- Statistics Report for NB-IoT/ eMTC performance

Highly-Integrated Service Tests

- NB-IoT test: Ping, UDP
- VoLTE, CSFB, and MOS tests
- FTP, Ping, WAP, PBM and other data tests
- Application tests for HTTP, video and e-mail
- Automatic tests for OTT (e.g. Wechat and Wechat contacts)

Automatic tests

- Dedicated NB-IoT measurement windows
- Automatic device configuration
- Intuitive user interface
- Easy interface operation
- Short learning curve

Compatible with Advanced Network Features

- NB-IoT/eMTC test solutions
- Downlink 256QAM/uplink 64 QAM test solutions
- 4 x 4 MIMO test solution
- VoLTE test
- ViLTE test
- 3CC (FDD/TDD) CA test
- GSM Refarming
- WCDMA AMR-WB

Multi-technology and Multiple Chipsets support

- NB-IoT/eMTC/ LTE-A/LTE/TDS/WCDMA
- /CDMA/GSM air interface messages collection
- Qualcomm and Hisilicon chipsets and terminals
- TCP/IP data service messages analysis



Test Solutions

LTE-A Pro Test

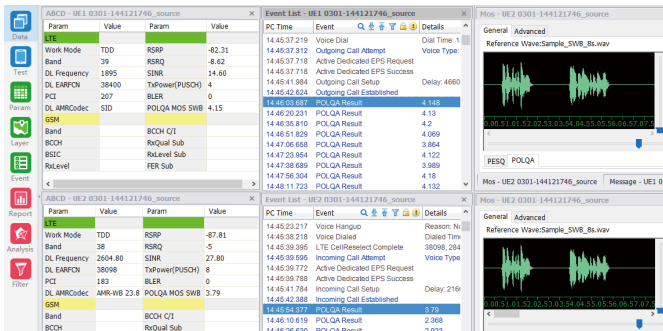
- LTE-A Pro test with SAMSUNG Galaxy S8 G9500.
- Capable of 3CC Carrier Aggregation (CA) and TDD+FDD CA
- Capable of 4x4 MIMO and downlink 256QAM/uplink 64 QAM
- Display radio parameters and support Release 12/13 protocol.
- High data download throughput, with maximum throughput approaching to the theoretical value (1Gbps)
- Handover between 2x2 MIMO and 4x4 MIMO
- Supports forcing functions, e.g. network locking, band locking and LTE cell locking.
- Supports real-time CA measurement, network resource allocation, network quality, throughput, etc.
- Display key events, such as secondary component carrier (CC) modification, CA handover, and secondary CC activation, etc.



SAMSUNG
Galaxy S8 G9500

VoLTE and ViLTE Tests

- FDD-LTE and TDD-LTE VoLTE test
- Qualcomm and HiSilicon chipset-based VoLTE/ViLTE test
- Automatic mobile to mobile VoLTE/ViLTE test
- Single and multi-channel POLQA MOS test solutions
- Real-time SIP signaling and details, and auto VoLTE events display
- Customized VoLTE statistics report



R&S (Rohde & Schwarz) TSME Scanner Measurement and Network Optimization

- R&S TSME scanner is supported to compliment Pilot Pioneer test and measurement capability.
- Supports Top N and Userlist synchronous signal scanning under NB-IoT, to cater to NB-IoT establishment and development.
- Supports CW and spectrum analysis, and channel demodulation for NRS, NPSS, NSSS.
- Display such parameters as RSRP, RSRQ, RSSI and CINR of each resource block (RB) decoded by the TSME scanner.
- Automatically detect the channel in which the dedicated frequency is under usage, and display the detected channel list and signal strength.
- Support power measurement of timeslot from index 0 to 19, and GP (guard period) and power measurement of subframe from index 0 to level 9.



NB-IoT & eMTC Test

- Support HiSilicon and Qualcomm chipset-based NB-IoT test.
- Single test module supporting both NB-IoT and eMTC network technology.
- Support one-click display of all dedicated NB-IoT and eMTC test key parameters.
- Support 3GPP Release13 protocol.
- NB-IoT test: Ping, and UDP
- Initiate services under idle mode.
- Display cell reselection event and details of each event, including frequency/ scrambling code, delay, cell reselection type and exception causes.
- Support multiple forcing functions with terminal, e.g. network locking, band locking and NB-IoT and eMTC cell locking, for various test scenarios.
- Multiple AT commands sent sequentially in a cycle manner.



Main Features

High-speed Rail Test and GPS Trajectory Compensation*

- Does not require to use a separate hardware. Upgrade the software to the corresponding version that support high-speed rail test and GPS trajectory compensation.
- Intelligent trajectory compensation: intelligent GPS positioning compensation on the routes with GPS loss, using Dingli's independently-developed algorithm.
- Built-in routes: 65 Chinese high-speed rail and urban rail routes; customized route maps for all Chinese high-speed rail and highway routes
- Flexible test: multi-network and multi-services test with multiple terminals

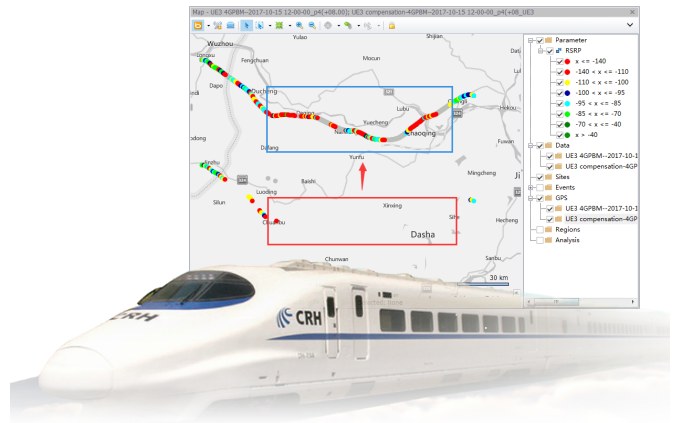
*Note: Unique to China market only, customers who want to have the access to this function may contact Dingli.

Real-time KPIs Display

- Real-time statistics of test duration, test distance, various network coverage rate and other KPIs.
- General Statistics: test execution count, test status, success rate, delay, etc.
- Radio Parameters: the maximum, minimum, mean and median value of key parameters, total samples count, parameters threshold, CDF and PDF statistics, etc.
- Exceptions: service exceptions, low MOS score, low throughput, etc., instant exception details display with a single click.

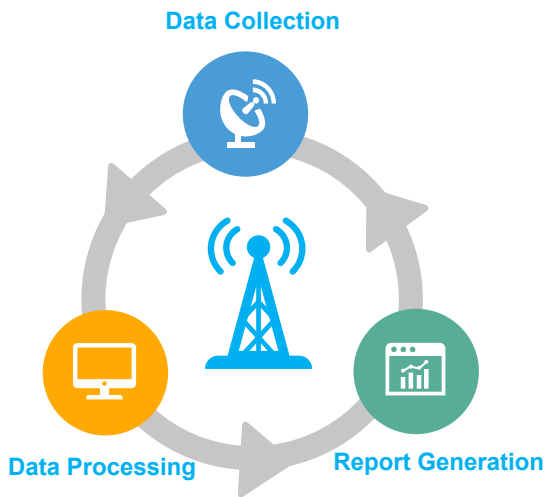
| Total Test Duration | | Total Test Distance | | Coverage Ratio | | | | |
|---------------------|----------------|---------------------|------------------|--------------------|--------|---------------|--|--|
| 0 | 3 Minute | 0.00 | Meter | NB-IoT | 100.0% | | | |
| General Statistics | | | Radio Parameters | | | Exceptions | | |
| Service Type | Attempts Count | Success Count | Failure Count | Test Dropped Count | Delay | Success Ratio | | |
| Voice MO | 0 | 0 | 0 | 0 | 0 | 0% | | |
| Voice MT | 0 | 0 | 0 | 0 | 0 | 0% | | |
| FTP Download | 0 | 0 | 0 | 0 | 0 | 0% | | |
| FTP Upload | 0 | 0 | 0 | 0 | 0 | 0% | | |
| Ping | 0 | 0 | 0 | 0 | 0 | 0% | | |
| PBM | 0 | 0 | 0 | 0 | 0 | 0% | | |
| AT UDP | 2 | 2 | 0 | 0 | 90 | 100.00% | | |
| Index | Start Time | End Time | Service Duration | Results | | | | |
| 1 | 13:54:05 | 13:55:35 | 90 | Success | | | | |
| 2 | 13:56:08 | 13:57:38 | 90 | Success | | | | |

| Total Test Duration | | Total Test Distance | | Coverage Ratio | | | | |
|-------------------------|-----------------|---------------------------|------------------|----------------|---------------------------------|------------|--|--|
| 0 | 3 Minute | 0.00 | Meter | NB-IoT | 100.0% | | | |
| General Statistics | | | Radio Parameters | | | Exceptions | | |
| Parameters Name | Maximum | Minimum | Mean | Median | Total Measurement Samples Count | | | |
| RSRP(dBm) | -50 | -58 | -53.31 | -54 | 497 | | | |
| Index | Threshold Range | Measurement Samples Count | PDF | CDF | | | | |
| 1 | (-INF,-140] | 0 | 0% | 0% | | | | |
| 2 | (-140,-110] | 0 | 0% | 0% | | | | |
| 3 | (-110,-100] | 0 | 0% | 0% | | | | |
| 4 | (-100,-95] | 0 | 0% | 0% | | | | |
| 5 | (-95,-85] | 0 | 0% | 0% | | | | |
| 6 | (-85,-70] | 0 | 0% | 0% | | | | |
| 7 | (-70,-40] | 497 | 100.00% | 100.00% | | | | |
| 8 | (-40,+INF) | 0 | 0% | 0% | | | | |
| SINR(dB) | 19.37 | 6.35 | 13.31 | 12.86 | 497 | | | |
| FTP Download Rate(Kbps) | 0 | 0 | 0 | 0 | 0 | | | |



Single Site Verification

- The procedure for single site verification includes test, statistics and analysis, and reporting.
- 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, VoLTE/CSFB KPIs, etc.
- Single site verification reports generation to preview verification results in a convenient way
- Data processing in *.csv format for various analysis scenarios.



Commercial Terminals for Service Test from User's Perspective

- Multiple commercial phones for comprehensive network measurement
 - Genuine/jailbreak iPhone6/6s Plus series
 - Samsung S8/S7/S6/Note5 series
 - Huawei series
 - HTC, Sony, Coolpad, ZTE, LG
- Forcing functions with commercial terminals: reduce test costs by not having to invest on specialized test devices
- Downlink and uplink Scanner test (R&S and PCTEL) for network problem diagnosis and optimization

Main Functions

Indoor Test

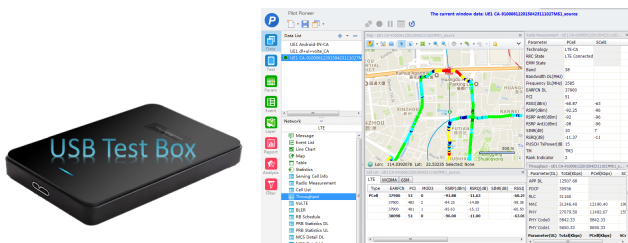
- Applicable to various indoor test environments such as within hotels, office buildings, shopping malls, airports, multi-level high rise buildings, etc.
- Multiple map sources, e.g. iBwave, standard floor plans, and floor images in the *.jpg, *.png, *.bmp, *.tab formats.
- Pre-pinpoint and pinpoint with walk test to ensure the positioning accuracy
- Indoor test management and test data storage based on building floors
- Built-in specialized reports for indoor test

Outdoor Test

- Applicable to various outdoor test environments such as highways, high-speed rail, recreational hotspots, etc.
- Multiple maps supported, e.g. Google Maps/Satellite Maps, Bing Map, Baidu Map, and Mapinfo
- Multi-layer management mode: GPS-based test routes parameter coverage routes, site, maps, events, and alarms
- Multiple cell site display modes on the Map, comprehensive cell site information management, search, and quick positioning functions
- Street Maps to indicate areas requiring optimization
- Parameter coverage on background map in grey to highlight the network exceptions

USB Test Box Integrated with Test Module

- Dingli's USB test box is integrated with test module for mobile network test and measurement.
- "set test band as required by users " and "configure CA 2CC as required by users"
- VoLTE service test and MOS speech quality evaluation
- Network locking, band locking and cell locking



Custom Filter

- Flexible user-defined filter function
- Data filter based on parameter, time, region, state, condition range, service and bin
- Comprehensive data filtering based on combined conditions, e.g. Parameter + Time + Service.
- Map display, logfile partition, statistics and analysis based on filter
- Meet the requirements of user-defined data capture, statistics report and specialized analysis.

Various Service test

- Voice test, e.g. 2G/3G/4G Voice test, Mobile to Mobile MOS test
- Network performance test, e.g. FTP, Multi-FTP, Ping, Attach
- Service test from user's perspective, e.g. HTTP, Email
- Video quality test, e.g. YouTube, Facebook
- TCP/IP data collection from data services test

Multi-dimension Data Display

- Switching among multiple workspaces and multiple data files display
- Multiple display modes, e.g. tables, bar charts, distribution maps and trend charts
- Network measurement information display, e.g. radio parameters, network events, service events, and Layer 3 signaling messages
- Network measurement assistant information display, e.g. test progress, real-time statistics KPIs, device alarms and KPI alarms
- Assistant data display modes, e.g. freeze screen, capture screen, and export data files
- Drag parameters from Message Details to a Table window for viewing of measurement updates.

Easy Operation

- Online software update for customers
- Hard dongle license query and online upgrade
- Checks and connects with the test device automatically.
- One-click backup and restore of project configuration
- Customized scenes for easy test execution
- Movable KPIs display windows
- Various shortcut keys for easy operation

Product Values

For Network Operators, System Vendors and Service Providers

- Provide flexible authentication modes, support multiple commercial test terminals, reduce operational cost, and provide maximum benefit on investment
- Support multi-technology indoor and outdoor service tests, applicable throughout network development lifecycle
- Improve test efficiency with highly integrated and automated services test
- Integrated data collection and analysis in one tool to maximize investment

For Engineers

- Simple and easy operation, user-friendly interface for shorter learning curve
- Highly skilled product support for quick problem resolution and customization services
- Automatic device configuration and data collection to reduce workload
- Integrated common services test and network troubleshooting ability to improve network optimization efficiency