## TSP Scanner

# Overview

TSP Scanner series is a comprehensive platform based on powerful full-standard scanner and analysis software. It can automatically scan and analyze GSM, WCDMA, FDD/TDD-LTD, NB-IoT, eMTC, 5G NR air interface signals at high speed. The output includes cell coverage parameters, broadcasting channel system messages and spectrum information, which are presented in an intuitive and diverse way. It can be widely used in network survey, planning, construction, optimizing, etc.

# Key Facts

- Broadband device：700MHz-6GHz；
- Support customized 230MHz (220-240MHz) frequency check;
- Support CW, spectrum test；
- Support simultaneous tests of multi-system and multi- frequency
- of GSM, WCDMA, FDD/TDD-LTD, NB-IoT, eMTC, 5G NR signals (can be customized accordingly)；
- The sweep speed can be adjusted by users, which is suitable for different scene applications, such as high-speed rail, highway, general road and indoor test, etc；
- Support blind scanning function, layer 3 decoding, and the decoding success rate is more than 90% when CINR > 0, which is conducive to improving the accuracy of signal attribution judgment；
- Support data import and export, playback analysis and parameter display, automatically generate special test reports, track charts, statistics and other information；
- Scan frequency automatic test, no need to connect test computer, remote monitoring test status, automatic data back to the server, built-in 8GB data storage space；
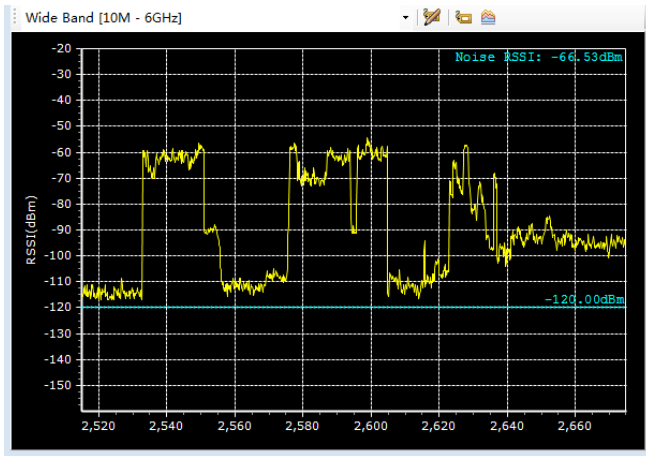
# Features & Applications

## Innovative Features

### Broadband spectrum and multi-mode demodulation

Tsp scanner can meet the cell demodulation test of all the standard networks of domestic operators, and can also carry out broadband spectrum test. A variety of test modes can be combined freely, which greatly improves the test efficiency in multi network test.





### Fast measurement, adapt to a variety of scenes

Tsp scanner's 100 millisecond speed measurement capability can meet the requirements of Li's theorem under the condition of test speed limit in various complex scenes. It is suitable for indoor, general road, high-speed, high-speed rail and other scene tests.
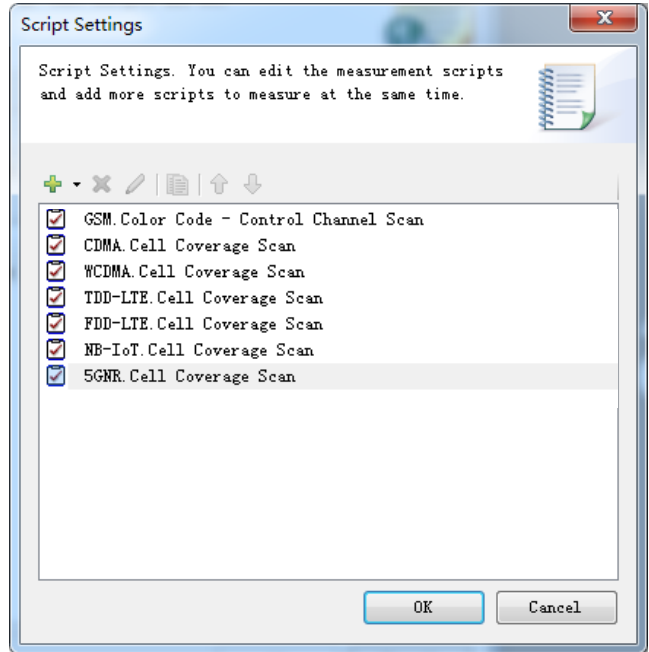
### Powerful co-frequency capability

Tsp scanner LTE co-frequency demodulation ability is more than 25dB, in the test, the single sample point test is deeper and more accurate for coverage. It is suitable for solving all kinds of network coverage, neighborhood and interference problems. It is a powerful tool for LTE overlapping coverage optimization.
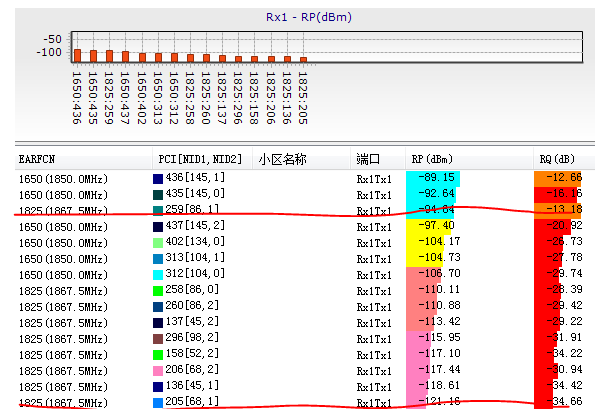
## 5GNR test

Support operators' frequency check test and 5GNR air interface signal demodulation.

## Efficient SIB decoding

When the CINR of TSP scanner is greater than 0 dB, the success rate of SIB decoding is greater than 90%. It can quickly decode network system messages, so that users can more accurately determine the cell configuration and cell ownership. It is suitable for multi operator competition analysis,
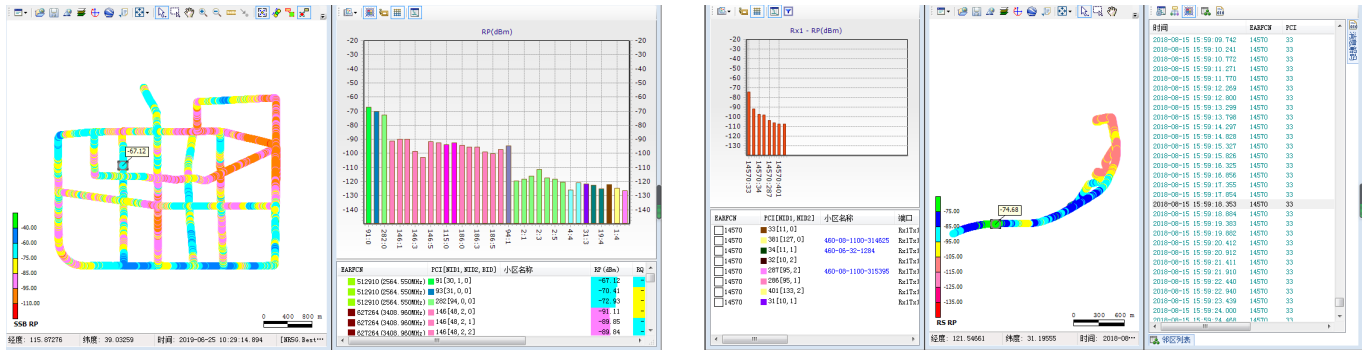




## Uplink timeslot interference test

Tsp scanner uses RB measurement function to check TDD-LTE uplink timeslot interference. When the station is not closed, the accuracy of the test is accurate to RB. RB block in the uplink timeslot time slice is selected to show the spectrum interference.
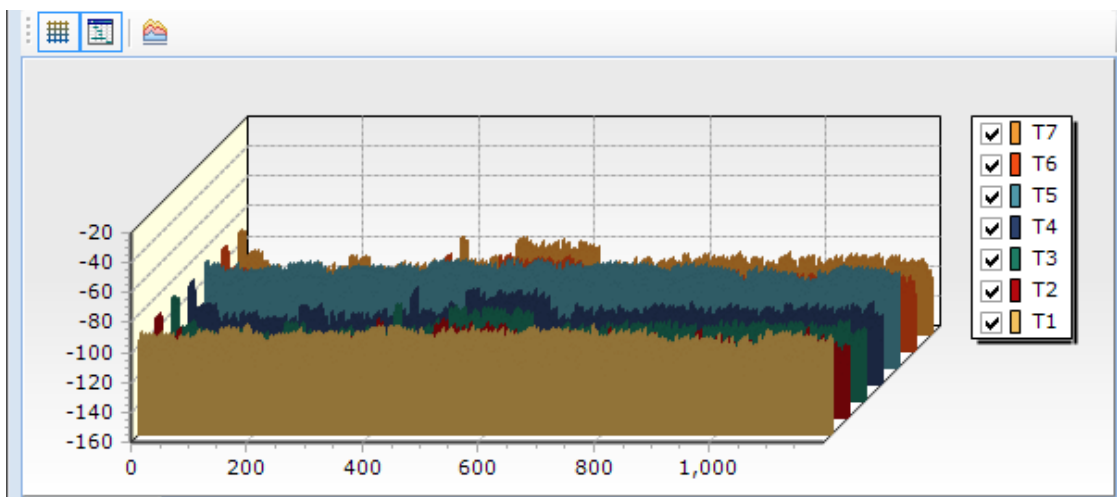
# Typical Applications

## Propagation model correction

**Background**: In the initial stage of network construction, the propagation model calibration test is the necessary stage of network planning, and the mobile phone drive test cannot play its due role due to the restrictions of conditions, so we need to use the sweep frequency instrument to complete the test task. In the test process, Eagle transmitter transmits CW signal or pilot signal, and Transcom TSP scanner is used as the receiver to scan CW signal or pilot signal fading and propagation distance in the specified frequency band. The collected data accords with Li's theorem and can be directly used for model correction in planning software.

**Solution**: As a receiver, TSP scanner can receive the pilot signal or CW signal from the signal source, collect the signal strength data with geographic information in the way of road test, and then import it into the planning software for the adjustment of model parameters.
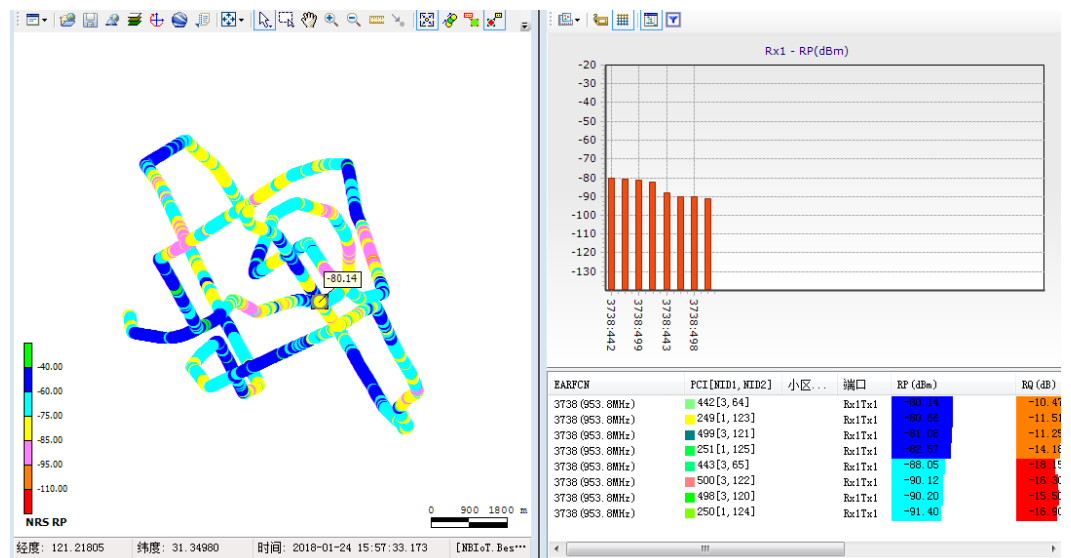


5G Simulation Test System
5G Transmitter
5G Scanner

## NB-IOT/eMTC measurement

**Background**: With the rapid development of Internet of things in China, China Telecom has realized the commercial use of NB-IoT network, followed by China Mobile and China Unicom. China Mobile has also promoted the simultaneous deployment of NB-IoT and EMTC network. With the rapid development of network, the demand for testing instruments and meters has gradually emerged. The existing testing methods have the following problems: NB-IoT version does not support terminal switching temporarily. When using module terminal test, only when the terminal is restarted can it access the currently strongest coverage cell.

The NB-IoT / eMTC network coverage test solution provided by Transcom makes up for the above defects, improves the test efficiency and the integrity of data collection, becomes the first three-party instrument manufacturer to provide NB-IoT / eMTC network test solution, and provides "neutral" test and verification means for operators.

**Solution**: As a receiver, TSP scanner can be used for coverage test of existing NB-IoT / eMTC network through frequency point setting and PCI blind search. Operators can conduct comparative test, and the indoor distribution system simulation test of NB-IoT / eMTC can be carried out with the signal output equipment developed by Transcom.

## Simulation test of new indoor coverage system

**Background：** With the construction of 4G network and the popularization of intelligent terminals, the rapid development of data services, the user behavior of indoor scenes is more intensive, and the majority of indoor traffic is concentrated in office buildings, residential buildings, stations and other places, which are centralized to cover blind spots (such as basements, garages), In the area with disorderly signals (such as high-rise buildings) and concentrated business volume (such as catering, entertainment and leisure places), operators can compete for indoor traffic volume by building indoor distribution, improve operating revenue, expand new business and maintain user loyalty. In order to improve the quality and management ability of the room subsystem and simplify the construction of the room subsystem, the new room subsystem will It will be greatly promoted, and the number of micro base stations will be greatly increased. The simulation test of the new room subsystem can effectively solve the deployment problem of micro base stations.

**Solution：** T3919A/T3919AS pilot transmitter is used as the analog source, and the TSP scanner is used as the receiver. The signal strength data of the cell (such as frequency point, PCI, RSRP, RSRQ, SINR and other parameters) are collected by walking test, the coverage of the actual base station is simulated, the coverage of the base station signal is evaluated, and the location and quantity of the base station are further confirmed to provide accurate data for the layout of the room subsystem.

## Frequency check test

**Solution:** The frequency check test should be performed within the planned frequency range before network planning and building, to know whether the frequency range is occupied or interfered. When TSE Scanner is used in the spectrum mode, the specific interference and occupation within the planned frequency range of urban roads can be analyzed based on spectrum, to evaluate whether the frequency range meet the operating requirements.
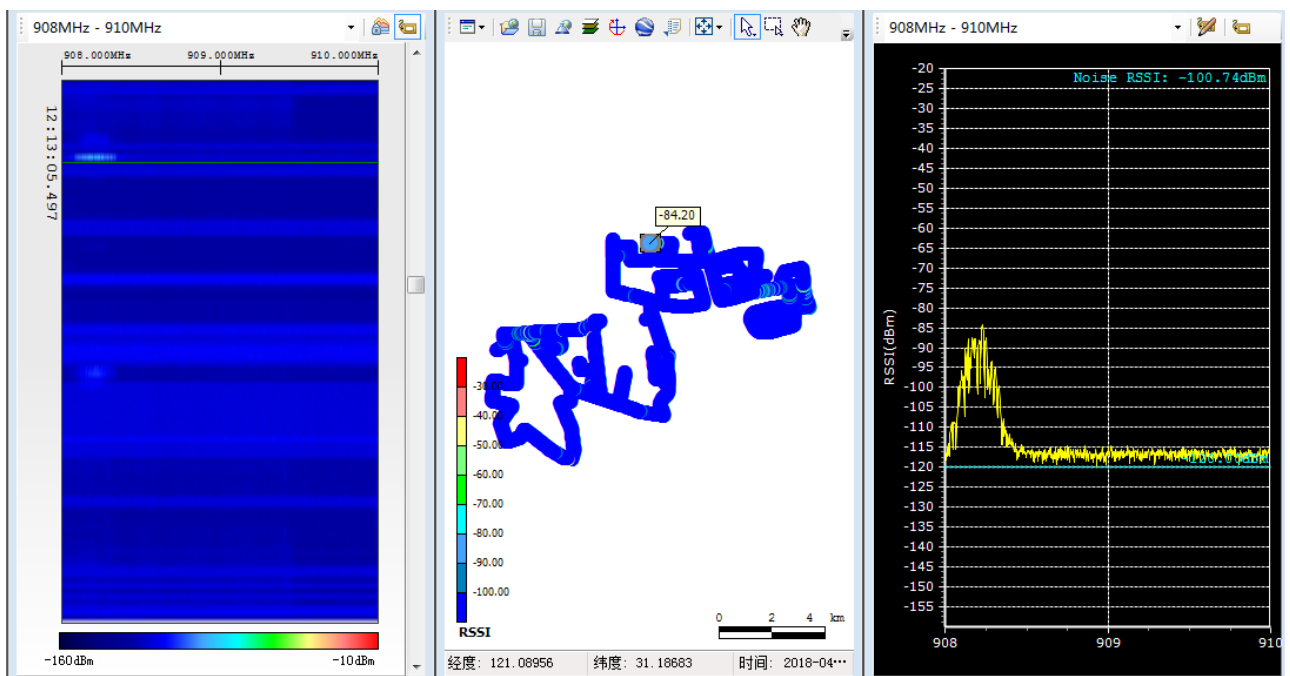
## Operators network coverage comparison analysis

**Solution：** TSP Scanner is able to obtain network coverage of various operators by means of one test, distinguish the attributes of various operators based on the frequency or MNC, rank the coverage, network structure and interference indexes, evaluate the 4G network coverage and interference indicators of each operator, and demonstrate the problem areas an duty cycles in the form of statistical chart and trajectory chart. Understand the trends of competitors and highlight network optimization.
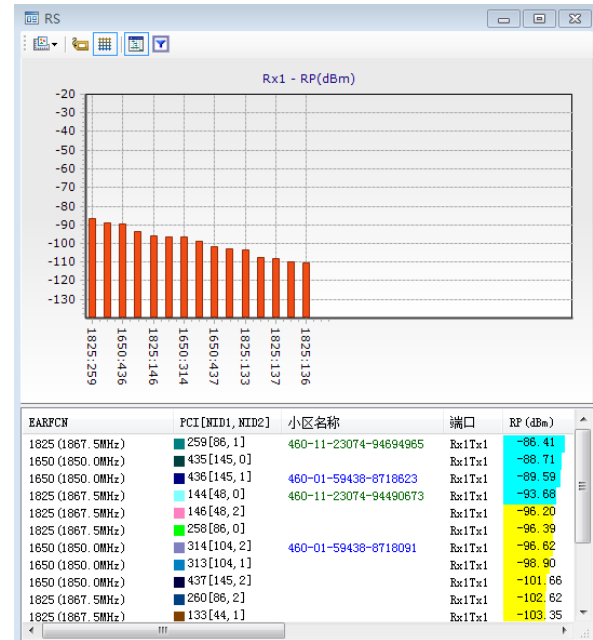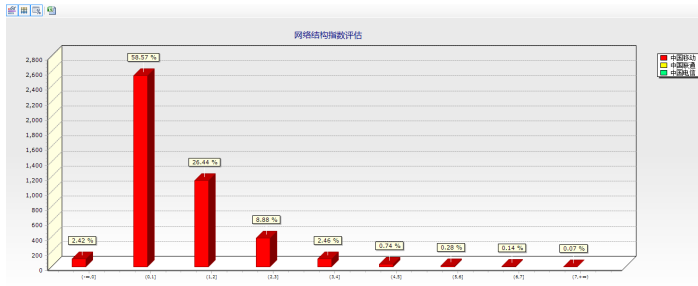




## Interference inspect

**Solution：** TSE Scanner is able to receive RSSI to indicate the interference. When connected with a beam antenna, interference can be located and inspected. For TD-LTE, the uplink time slot interference testing function of TSE Scanner captures the RB power of the uplink, compare it with the reverse spectrum and approach the interference source by testing multiple points with beam antenna.
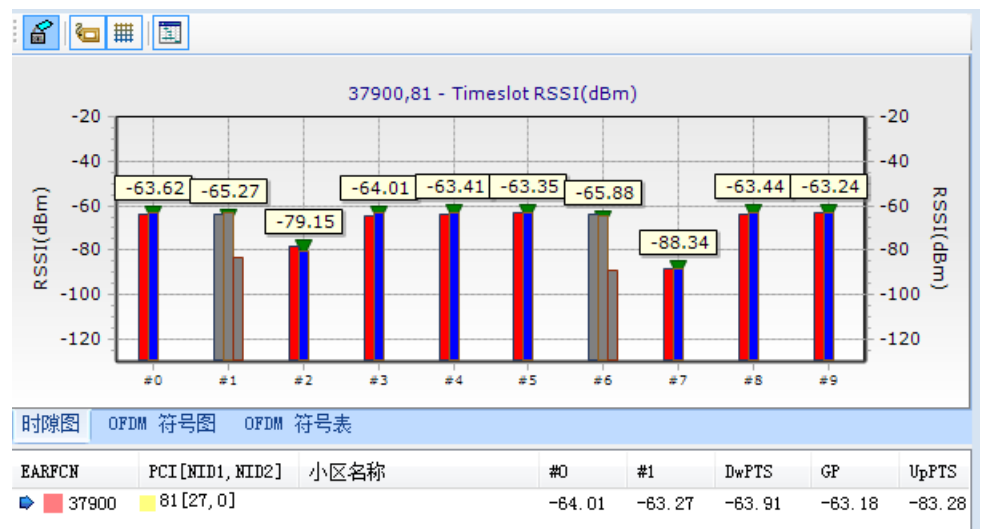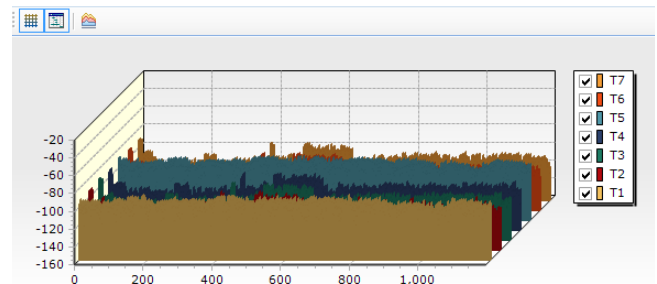
## 5GNR test

**Solution：** TSP 5GNR scanner frequency sweep test equipment collects data, and outputs wireless parameters of the top N cells such as PSS, SSS, SSB, PbCH, DMRs, frequency point, PCI, beam, RP, RQ, CINR, Time Offset, RSSI, etc. through the test analysis software, which are used by analysts for network coverage analysis and evaluation, as shown in the figure:

# Control Elements



- RF Antenna Port
- Status LED
- Power Button
- Ethernet Port
- Power Port
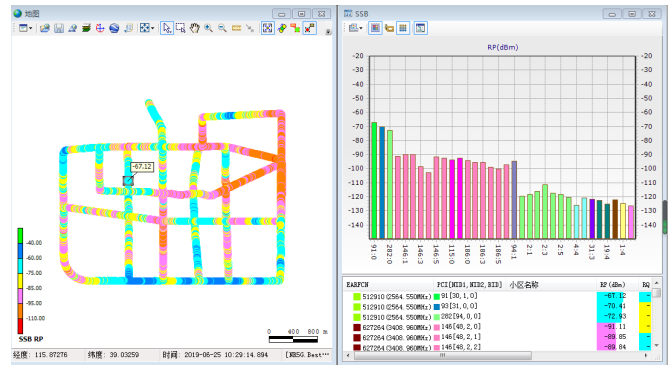
# Specifications

| Parameters | | |
|---|---|---|
| 5GNR | Data mode | PCI, PSS_RP [dBm] ,SSS_RP [dBm], PSS_RQ [dB] ,SSS_RQ [dB], SS_CINR[dB], RSPBCH_RP [dBm], RSPBCH_RQ [dB]. RSPBCH_CINR [dB], SSB_RP[dBm], SSB_RQ [dB], SSB_CINR [dB], SSB_idx |
| | Measurement mode | (P-SS/S-SS) & PBCH |
| | Detection Capability of the Same Frequency Cell | >7dB |
| | Measuring speed | >28 points/sec (Single freq. point) |
| | Carrier spacing | 15/30kHz |
| | Dynamic range (CINR) | PSS/SSS CINR: -10 to + 40 dB |
| | Level Measurement Accuracy | PBCH DMRS CINR: -8 to + 40 dB |
| | Detection sensitivity: RSRP | ±1dB |
| NB-IOT/e-MTC | Data mode | -130 dBm (SCS@ 15kHz) |
| | Measurement mode | Support NB-IoT/eMTC test simultaneously |
| | Deployment type | Support independent deployment, internal deployment and protection belt deployment |
| | Measuring speed | ≤ 1S (Single freq. point) |
| | Detection Capability of the Same Frequency Cell | >25 dB |
| | Dynamic range (CINR) @ 20 MHz: P-SCH/S-SCH | -20 to +40 dB |
| | Dynamic range (CINR) @ 20 MHz: RS | -23 to +40 dB |
| | Detection sensitivity: RSRP | -135 dBm (RSRP@ 20 MHz) |
| FDD/TD-LTE | Measurement mode | P-SCH/S-SCH, RS, and RB |
| | Data mode | RSSI, RS, RQ, CINR, Timing, Cell ID, Cyclic Prefix, CFO, Delay Spread |
| | Channel bandwidth | 1.4 / 3 / 5 / 10 / 15 / 20 MHz |
| | Antenna | SISO, MISO, MIMO (4x2) |
| | Measurement speed @（20MHz） | >40channel/sec |
| | SIB decoding rate | 90% @ CINR > 0 dB |
| | Detection Capability of the Same Frequency Cell | >25 dB |
| | Dynamic range (CINR) @ 20 MHz: P-SCH/S-SCH | -20 to +40 dB |
| | Dynamic range (CINR) @ 20 MHz: RS | -23 to +40 dB |
| | Detection sensitivity: RS RP | -135 dBm (RSRP@ 20 MHz) |
| UMTS [ WCDMA/HSPA(+)] | Test mode | Top N Pilot |
| | Data mode | lo, Ec/Io, Aggregate Ec/Io, SIR, Rake Finger Count, Time Off- set, Delay Spread |
| | Channel bandwidth | 200 kHz / 3.84 MHz |
| | Measurement speed | 20 channel/sec |
| | SIB decoding rate | 200ms/Single Cell |
| | CPICH detection dynamic range (Ec/Io) | -21dB |
| | Sensitivity | -110 dBm |
| GSM | Measurement mode | Color Code |
| | Data mode | BSIC, C/I,RSSI |
| | Channel bandwidth | 30 kHz / 200 kHz |
| | Measurement speed | ≥ 80Channel Decodes/sec |
| | SIB decoding rate | 20s/ 95 Carriers; 30s/ 125Carriers |
| | Dynamic range | +2 dB C/I @ 90% BSIC Detection |
| | Sensitivity | -114 dBm |

| Power Measurement | CW test | >800 Channel/sec |
| --- | --- | --- |
| | Measurement speed | |
| | Spectrum measurement | |
| | Measurement range | >90dB |
| | Measurement speed | >3G/sec |
| RF Characteristic | Internal spurious response | -114 dBm |
| | Operation electrical level | -15 dBm Max. |
| | Safety input electrical level | ≤ 10 dBm |
| | Frequency accuracy | ± 0.05 ppm (GPS Locked ); ± 0.1 ppm (GPS Unlocked) |
| Physical Characteristic | Power (+8 to +16 VDC) | 24W |
| | Size | (120*100*220)mm； |
| | Weight | 2.5kg |
| | Temperature tange | Operating: 0° C to + 50° C; Storage: - 40° C to + 85° C |
| | Communication interface | LAN |
| | RF input | RF: SMA Female(50Ω);GPS: Male(50Ω) |

# Ordering List

| Option | |
|---|---|
| TSP-S001 | GSM |
| TSP-S004 | WCDMA |
| TSP-S006 | TD-LTE |
| TSP-S007 | FDD-LTE |
| TSP-S008 | NB-IoT |
| TSP-S009 | e-MTC |
| TSP-H011 | MIMO |
| TSP-H012 | Signal Back |
| TSP-H013 | 5G Frequency Check |
| TSP-H014 | 5G NR |
| **Standard accessary** | |
| TSP-AS01 | Indoor and outdoor general antenna for scanner |
| TSP-AS02 | GPS antenna |
| TSP-AS03 | Data cable（2m ethernet cable） |
| TSP-AS04 | Battery kit: include battery, charger and cable |
| TSP-AS05 | Dongles and disk |
| TSP-AS06 | Carrying Case |
| TSP-AS07 | Scanner adapter |

# *Contribute Asian Wisdom of RF T&M to 5G World*

**TRANSCOM INSTRUMENTS CO., LTD.**

Add: 6F, Buliding29, No.69 Guiqing Road,
Xuhui District, Shanghai, PRC.200233

Tel : +86 21 6432 6888

Fax: +86 21 6432 6777

Mail: sales@transcomwireless.com

**TRANSCOM INSTRUMENTS INDIA PVT.LTD.**

Add:FF-26, Augusta Point, Sector 53, Golf Course
Road, Gurgaon, Haryana, India

Tel : +91-9560656319

Mail : support@transcomwireless.com

www.transcomwireless.com

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