



HWA-TECH
中科国技



WrlessPro Test System

OTA Efficient Test Solution

Due to the limited of site size or the office relocated requirement, many enterprises could not build a large chamber to do accurate test. Hwa-Tech WrlessPro could help these enterprises to solve this problem. With a small body, WrlessPro have a similar test accuracy and test angle interval to the standard chamber. On-site construction is not need and transporting. All-in-one equipment could make transportation easily.

www.hwa-tech.com

Hwa-Tech WrlessPro



Introduction of Functions

- Wireless Communication Formats: 2G/3G/4G/5G(FR1)/GNSS/A-GNSS/WiFi/Bluetooth
- IoT Communication Modes: LTE Cat NB1 (NB-IoT)/Cat-M1 (e-MTC)/Lora/Zigbee/UWB
- Test Frequency: 600MHz-7.5/11GHz
- SISO OTA: TRP/TIS/EIRP/EIS
- All-in-one equipment. On-site construction is not need. It could be used after calibration.
- The Theta angular resolution is 15 degrees which could meet the CTIA test specifications.
- Support the latest raster reduction and Clenshaw-Curtis TRP/TIS calculation formulas.
- Support passive antenna test, Desense test, ICS, CA (2CC/3CC/4CC), communication coexistence test.
- The antenna ring is made of EPP hard material. It has military-grade RF components and is normalized regularly. The combination of the three ensures the long-term stable use of the system.

WrlessPro Test System

WrlessPro multi-probe test system launched by Hwa-Tech is specially design for fast research and development. The system conforms to the requirements of the OTA test specifications of 3GPP, CTIA, EU CE, China CCSA and other standard organizations, and provides a report template that meets the requirements of CTIA report. The WrlessPro test system is not need to construct on-site but could have a similar test accuracy and test angle interval to the standard test system. The test speed of WrlessPro could be more than twice that of traditional multi-probe test systems. With WrlessPro, enterprises could accelerate their pace of R&D.

The traditional standard OTA test system usually has a long on-site construction period (more than 2 months) and complicate on-site verification. These will lead to the result that more than 4 months are necessary from equipment purchase to equipment use and due to the limitation of the site size, enterprises must start construction after finding a suitable site. In addition, once the site needs to be relocated, there will cost a lot because of the large size chamber. For fast-growing companies, relocation often happens, so the traditional standard OTA test system is not their best choice.

WrlessPro test system could get a similar test result in 2 meters height to the systems with standard chamber because WrlessPro have an innovative design of asymmetrical distribution of test antennas which use 11+1 probes to let the Theta surface to have 15 degrees angle test interval. Additionally, WrlessPro could be compatible with the latest Clenshaw-Curtis test algorithm which could increase the test speed by more than 2 times.



WrlessPro System Technical Parameters

Technical Parameters	Index
	WrlessPro
Dimension (W * H * D)	1.84m*1.98m*1.09m
Maximum Size of DUT (W * H * D)	25cm*25cm*25cm
Reflected Level of Quiet Zone	< -25dB
Shielding Effectiveness	600MHz~11GHz >80dB
Test Distance (from Antenna End Face to Turntable Center)	0.65m
Maximum Mass of the Tested Part (Turntable)	20kg
Rotation Speed (Turntable)	30°/s
Phi Angular Resolution (Turntable)	0.1°
Theta Angular Resolution (Number of Probes:11+1)	15°
Frequency Range (Test Antenna)	600MHz-7.5GHz/11GHz
TRP/TIS Algorithm	Clenshaw- Curtis/ sin
PSD Size (W * H)	0.8m*0.8m

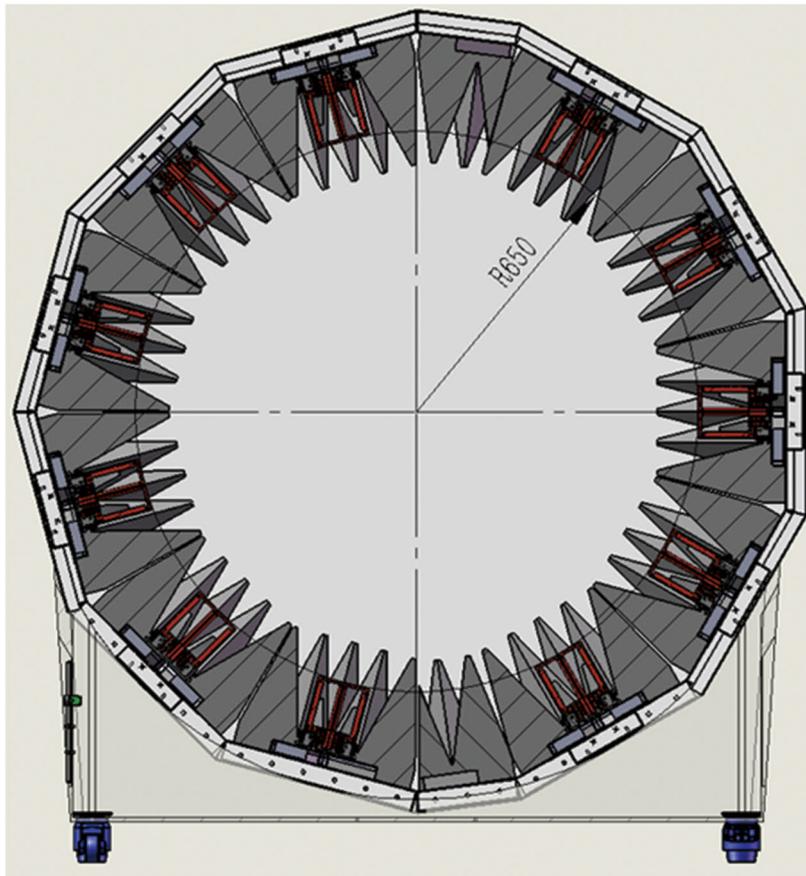


Main Features of WrlessPro System ①

■ Meet CTIA Requirements for Test Angular Resolution

The traditional 24-antenna (23 test antenna + 1 communication antenna) system use 15 degrees equal angle interval distribution to form a symmetrical prototype. This distribution allowed the 3D pattern test could be completed by rotating DUT half a turn on rotation. Compare with the traditional system, WrlessPro use asymmetrical 13-sided design to reduce the number of probes to 11 and could complete 3D pattern test by rotating DUT one turn on rotation. The number of sampling points does not change.

By this kind of antenna array configuration, WrlessPro could use less antennas to reach 15° test step in Theta axis without test speed slow down (comparing to 24 antenna system) and decrease antenna coupling which may cause test errors. Test system provide sleeve dipole antennas to do calibration as options, comparing to Horn antenna, Sleeve dipole is smaller and have good gain flatness. Thus, we could get more precise calibration result in short test distance (from test antenna's top to the center of turntable). Users could also use Sleeve antenna to do efficiency verify regular, there could make sure test result correct long time.



Main Features of WrlessPro System ②

■ Comparable to the Test Accuracy of Standard Test Systems

Due to the small size of chamber, it is necessary to carefully design each component to improve the stability of system from all aspects.

01

EPP Absorbing Material

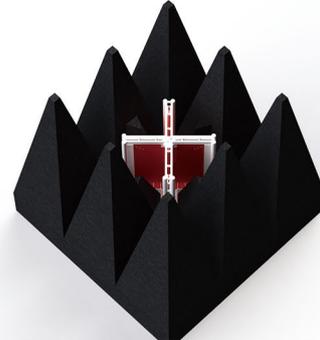
The EPP is a hard material, which is not easy to change with time. The service life of this material is up to 15 years. The probe ring of WrlesPro adopts the integrated design of the EPP absorbing material and the probes that ensure a long-term stability of probe ring and avoid the change of test accuracy after many years of use.



02

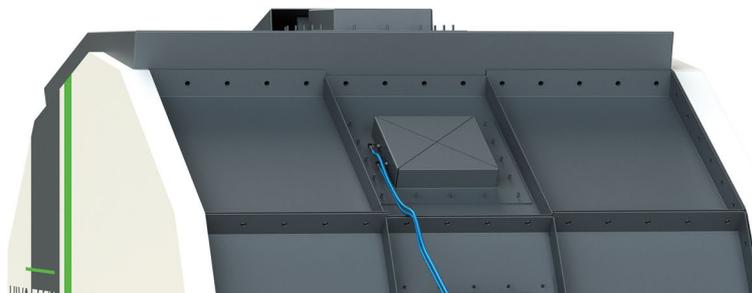
Integrated Design of Test Antenna and Absorbing Material

In this system, in order to complete the integrated design of test antenna and absorbing material, the absorbing material should open the mold specially. The integrated design avoids reduced accuracy caused by RCS between antennas. In addition, EPP material is not easy to deformed, which could ensure the long-term performance stability of test antenna, and then extend the normalization time interval of system.



03

In WrlessPro, in order to reduce the interfere of connecting RF cables as radiators in chamber, all RF cables are placed outside chamber and grounded through chamber cover. This ensures that chamber has no cable influence except for a magnetic ring cable in rotation.



By carefully designing the individual components, the system can match the test result of standard system when testing small DUT.

Band	TRP					TIS				
	Channel	Freq	WrlessLab	WrlessPro	Difference	Channel	Freq	WrlessLab	WrlessPro	Difference
WLAN (11b)	6	2437	13.81	13.56	-0.25	6	2437	-85.0	-84.79	0.17
WLAN (11g)	6	2437	11.99	11.54	-0.45	6	2437	-71.6	-70.99	0.56
WLAN (11a)	44	5220	10.01	10.52	0.51	44	5220	-68.1	-68.5	-0.36
WLAN (11n)	157	5785	10.69	10.69	0.02	157	5785	-67.5	-68.06	-0.57
LTE B3	19575	1747.5	17.8	17.71	-0.09	1575	1842.5	-95.5	-95.53	-0.03
LTE B5	20525	836.5	13.7	13.45	-0.25	2525	881.5	-91.9	-92.2	-0.30
LTE B38	38000	2595	17.8	17.35	-0.45	38000	2595	-90.8	-91	-0.20
LTE B41	40620	2593	17.9	17.7	-0.20	40620	2593	-90.9	-91.06	-0.16

Main Features of WrlessPro System ③

■ No On-Site Construction Required, Easy to Use

01

In current extremely intensified competition environment, more and more innovative enterprises require fast equipment arrival cycle and simple commissioning. 3-4 months construction cycle is unbearable. WrlessPro chamber do not need on-site construction. The normalization, calibration and other works have been completed in the factory. This thereby greatly improving the delivery speed.

02

WrlessPro chamber size is designed as 1.84m * 1.98m * 1.09m (width * height * depth) based on the normal size of office building elevator. This design allows WrlessPro to be send into elevator or pass through office door wholly. Overall disassembly and then assembly will be not necessary. Even if the elevator door is narrow, WrlessPro also support disassembly partly without affecting the overall probe layout. Then the probe normalized data will not be affected by disassembly and assembly.

Test Items

Antenna Test Items

Antenna Gain
Circular Polarization Gain
Directional Pattern
Beam Width
Cross Polarization Level
Antenna Efficiency
Front-to-Rear Ratio
Axial Ratio
2D/3D Directional Pattern
Antenna Correlation Coefficient (ECC)
Out-of-Roundness
Gain Synthesis

IoT Application Test Items

Desense Test (Desense)
Coexisting Interference Test
User-defined Limit Index Conversion and Communication Distance Simulation
Performance Test in Specified Direction Range
UWB AOA Test
UWB TOF Test
Zigbee/Lera/UWB Signaling Performance Test

SISO Active Test Items

Total Isotropic Radiation Power (TRP)
Total Isotropic Receiving Sensitivity (TIS)
Effective Isotropic Radiation Power (EIRP)
Effective Isotropic Receiving Sensitivity (EIRS)
Near Horizontal Plane Radiated Power (NHPRP)
Near Horizontal Plane Receiving Sensitivity (NHPIS)
Directional Pattern
Channel Sensitivity Scanning in ICS

Hwa-Tech Test Accessories

■ RF Switch Box



Frequency Range: 400MHz ~ 12GHz

The adaptive power amplifier RF switch box developed by Hwa-Tech can adjust the power amplification level according to the received power, support real-time switching of 7-level amplification link, and provide a dynamic range of 90dB maximally, ensuring that the test signal strength is within the effective dynamic range of the system.

■ High-speed Switch Box



Frequency Range: 400MHz~12GHz

The high-speed switch box developed by Hwa-Tech is used for antenna switching at different angles and switching between different polarization of dual-polarized antennas, and supports hard trigger test. All RF switches in the high-speed switch box are designed with high-performance semiconductor components, and the isolation of a single switch can reach more than 70dB.

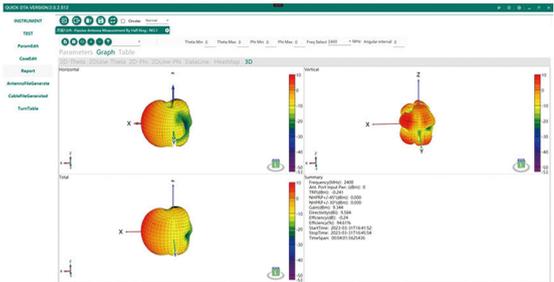
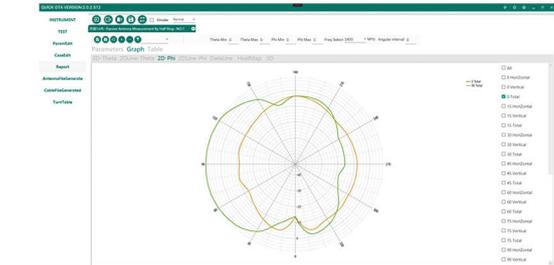
■ Dipole Antenna



The standard dipole antenna developed by Hwa-Tech has higher gain accuracy, and its roundness can reach 0.1dB. It is applicable for the calibration of active test or high-precision test.

Software Features

QUICK OTA test software is fully compliant with CTIA's test specifications. It has a wide range of applications, excellent data processing functions, flexible function configuration, smooth test process and stable and reliable operation. It could meet the test requirement of all stages of R&D, pre-certification, and certification.



Easy to Use	Support free angle step setting and flexible parameter configuration.
	Support one-click import of test templates, make work simpler.
	Test results can be directly imported into test cases, and test result templates are automatically generated to facilitate problem traceability, retesting, and verification.
Efficient Automated Test Capabilities	Support the test result summary function to view the test result summary at any time.
	It has settings of dropped line handling, special points, and exception prompt.
	Support multi-standard multi-channel continuous test function and on-hook test function.
Data Processing and Visualization	Supports single-point test, 2D test, and 3D test capabilities.
	With data batch function, single or multiple data report export, pattern comparison between different frequencies of the same antenna, and pattern comparison of different antennas of the same frequency.
	Supports data interpolation in the Theta and Phi directions with a minimum of 1 degree step.
Data Storage and Logging	Smoother test data viewing function, support 2D diagrams, 3D diagrams and raw data viewing
	Improved log management to facilitate problem tracking.
	Customized test information remarking function.
	Persistent storage of data

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