RTS85HP

REVERBERATION TEST SYSTEM

THE CHAMBER FOR 5G BASE STATIONS

The introduction of Massive MIMO and the 5G New Radio standard transforms the radio part of the base station to an advanced antenna system with integrated transmitter and receiver modules. The antenna connectors are now longer available, forcing most of the RF testing from conducted to Over-the-Air. The RTS85HP is designed to meet the need from this new breed of Remote Radio Units and 3GPP standard TS38.141-2.

MULTIPATH ENVIRONMENT

The RTS85HP consists of a shielded reverberation chamber with reflecting walls. The device under test (DUT) is placed on a turntable. The reflective walls and the turntable in combination with moving reflectors (mode stirrers) create a Rayleigh faded rich isotropic multipath environment (RIMP). This environment is very well suited for antenna and radio performance evaluation of modern multi-antenna (MIMO) equipment. The multipath environment is enabled by default and does not require any additional external expensive equipment. The environment also allows for very rapid and accurate transmitted RF power (TRP) measurements as well as measurements of antenna efficiency. Bluetest's long experience in reverberation chamber technology development has resulted in a well proven, highly accurate and robust OTA test system.

MEASUREMENTS

The RTS85HP is primarily designed for base station transmitter conformance measurements such as output power, adjacent channel leakage (ACLR) and spurious emissions measurements using a signal analyzer. These measurements have typically been performed by connecting a cable to the antenna output on the base station. The move to a higher integration of radio and antenna as well as the introduction of massive MIMO base stations with 64 or even more antenna elements make it virtually impossible to perform these measurements conductively. The alternative is to measure radio and antenna over-the-air (OTA) as described in 3GPP TS38.141-2. The power levels can with Bluetest's RTS85HP accurately be measured regardless of base station antenna gain, number of antenna elements or frequency. Typical measurement time for output power and ACLR is 1 minute. Base station antenna efficiency is due to the isotropic environment very easy to measure providing rapid feedback on internal antenna losses over frequency. Other applications include system and interoperability testing with UEs or UE simulators.

LARGE TEST VOLUME

Another advantage of the reverberation chamber is the ability to handle larger test objects without being limited by a small test zone or requirements for very accurate DUT positioning. The 1.2m turntable is capable of handling loads up to 150kg. An 80 mm pole mount accessory makes the mounting of the RRU easy and is capable of handling RRU's with heights up to 1.5 m, width up to 0.6 m and depth up to 0.5 m. Maximum RRU weight on the pole mount is 100 kg.

RTS85HP Applications

- **3GPP TS38.141-2 base station conformance measurements**
- **Large form factor devices**
- **5G NR sub 6GHz and mmWave measurements**
- **Mobile network interoperability testing**

FREQUENCY RANGE

The standard frequency range of Bluetest's RTS85HP covers from 450 MHz to >12.75 GHz using a proprietary wideband antenna design. A second mmWave measurement antenna can be added, supporting frequencies from 6 GHz all the way up to 43 or 67 GHz, hence covering all of the most popular new 5G bands including the 37.5-42.5 GHz band as well as spurious emission requirements according to 3GPP TS38.141-2.

HIGH POWER CAPABILITY

The RTS85HP is designed to handle the output power levels and antenna gains associated with RRU testing. All internal control electronics are well shielded to avoid being interfered with. Safety measures such as chamber in use warning light

Flow Touch

Flow Manager

Flow Analyzer

User Clients

Signal Analyzer
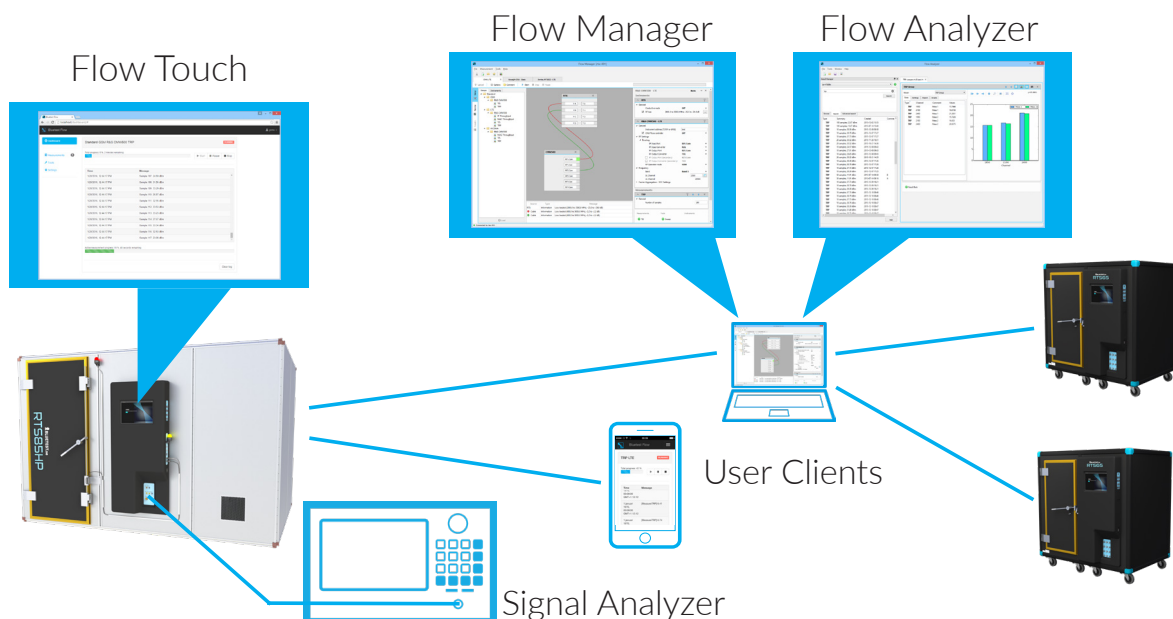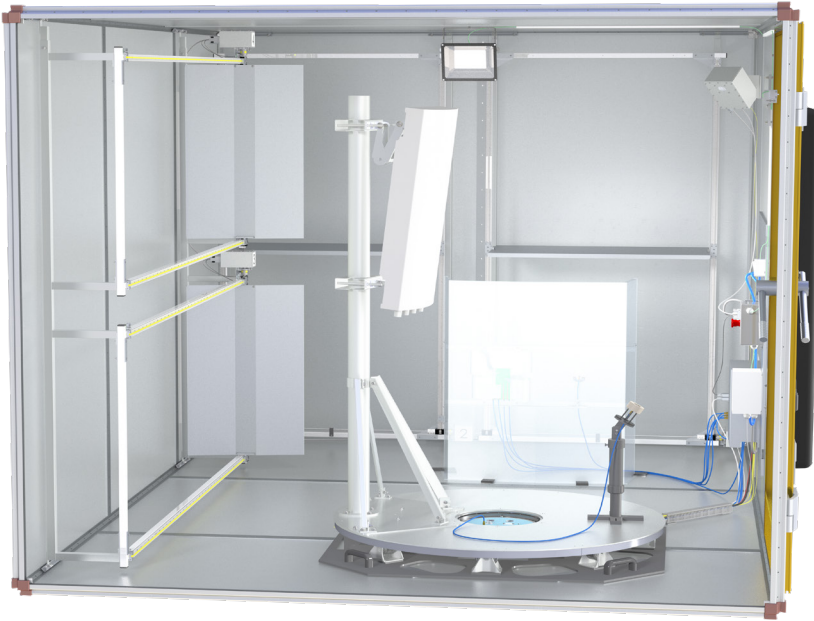
and electronically controlled and locked door can be added as requested.

BLUETEST FLOW SOFTWARE PLATFORM

The RTS85HP comes with a measurement and analysis software platform: Bluetest Flow. This integrated test environment offers functionality for testing complex wireless solutions. It builds upon years of research and development expertise. The Flow platform consists of Flow Manager, Flow Analyzer and Flow Touch.

FLEXIBLE SYSTEM MANAGEMENT

All measurements are executed by the built-in Flow measurement server. There is no need to be concerned about incompatible computers or conflicting programs that cause time consuming troubleshooting. Measurement configuration is done remotely with Bluetest Flow Manager installed on any regular office PC. It provides in-depth measurement configuration and setup while retaining direct chamber control. Flow Touch is available on the built-in 19" high resolution touch screen or any mobile device with a web browser and allows you to start, stop and monitor measurements from anywhere.

EASY OR ADVANCED – IT IS UP TO YOU

Flow Manager combined with Flow Touch provides all the functionality you need for your OTA measurements whether it is advanced or basic. Get started fast with predefined measurement settings or configure your own measurements with Flow Manager. In Flow Manager, you visually setup the measurements by connecting the cables and instruments, just like you do it in reality. The user interface supports a simplified view for the new user and an advanced view with access to more parameter settings for the advanced and experienced user.

REMOTE CONTROL

Flow is equipped with an API using JSON-RPC over http. This enables interaction with other systems on both measurement level as well as basic chamber control level allowing for tight integration with RRU control software and automated measurements.

ANALYSIS AND COMPARISON

The integrated result database collects all results in one place and enables easy and powerful search functions using Bluetest Flow Analyzer. Organize your results by adding metadata to them in form of tags or additional DUT information. You can combine results and make customized comparison plots. Export your data and create HTML reports from any kind of results. Multiple results can be combined from different devices, wireless standards, measurements types and then exported into one single report. The high resolution chamber camera adds the possibility to document your measurement and attach the picture or video with the result.

CALIBRATION

Calibration of the system is easily done by yourself using a network analyzer and is normally only performed when changing chamber load or chamber configuration.
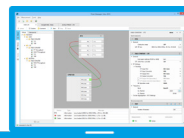
FLOW PLATFORM OVERVIEW

FLOW TOUCH

Flow Touch is a touch interface that can be used on any device with a web browser. Flow Touch allows you to control and monitor your measurements remotely. Start, stop and pause the measurements are just a few examples of the possibilities. Flow touch comes with the touch screen included in your RTS.
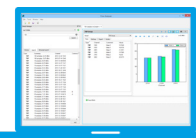
FLOW MANAGER

Flow Manager is the desktop client in which you configure your measurements. You set up your measurements, create batches and add multi-parameter sweeps. Define your measurements as you want whether you are a beginner or advanced user. You are guided in Flow Manager by the built in manual.

FLOW ANALYZER

Flow Analyzer is the result and data processing tool that gives you endless opportunities to plot your data as you want. Search in the built-in database and compare your measurements. Create your own design for plots and graphs, put them in a report format and export your results.

DUT INTERFACING

The RTS85HP is equipped with power and communication interfaces tailored to meet the needs of Remote Radio Heads. Power supply is typically 48V DC and communication is handled through high capacity optical fiber such as single or multimode MPO-12 or 24. Additional communication interfaces such as GbE can also be fitted.

OTHER OPTIONS

The RTS85HP can be tailored to your needs and local requirements with options such as chamber temperature logger, chamber camera, sprinkler feed-through pipes, earthquake brackets etc. Contact your local Bluetest representative for a discussion on your specifi requests.

We have a wide range of accessories such as reference antennas, cables and DUT holders to improve the work with your measurements. Check out our website for more details.

SERVICE & MAINTENANCE

We will not leave you after the installation of your RTS85HP. System operation training is tailored to your level of experience as well as previous knowledge of our products.

After-installation service offers include for example measurement customizations, upgrades, or software and hardware maintenance plans. Our support and service solutions provide an upgrade path for both hardware and software platforms to ensure that the capabilities of your RTS85HP stay ahead of tomorrow's wireless technologies.

SUPPORTING ACCESSORIES

TECHNICAL SPECIFICATIONS

Model	RTS85HP
Frequency range	
Antenna 1	450 MHz - >12.75 GHz
Antenna 2	6 GHz - 43/67 GHz
Unloaded chamber loss at 28GHz	Typ. 52 dB
Shielding	
500 MHz - 6 GHz	Typ.>100 dB
6GHz - 43 GHz	Typ.>80 dB
43GHz - 67 GHz	Typ.>60dB
Power consumption	Typical 160-220 W (depending on installed options)
Weight	1500 kg (3333 lb) (depending on installed options)
External dimensions	Width: 3.5 m (137.8")
	Height: 2.3 m (90.6")
	Depth: 2.7 m (105.9")
Door opening	0.9 m x 2.1 m (35.4" x 82.7")
Accuracy (Power & ACLR)	0.3 dB (STD)
Repeatability	0.1 dB (STD)
Maximum RRU size	0.6m x 0.5m x 1.2m

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