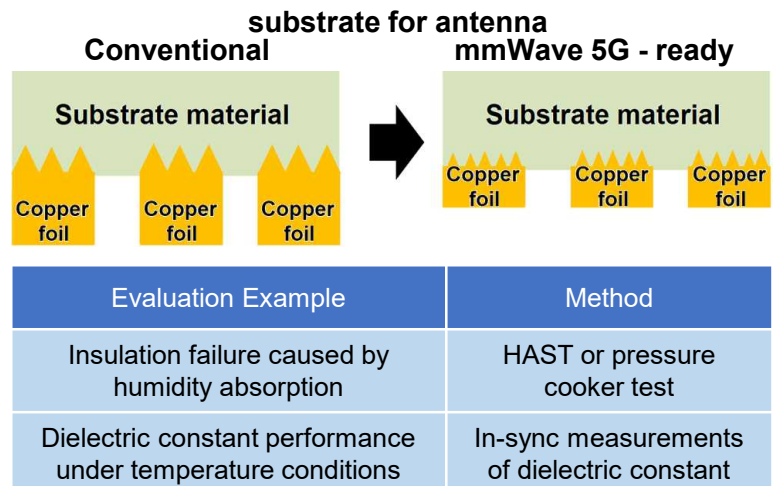
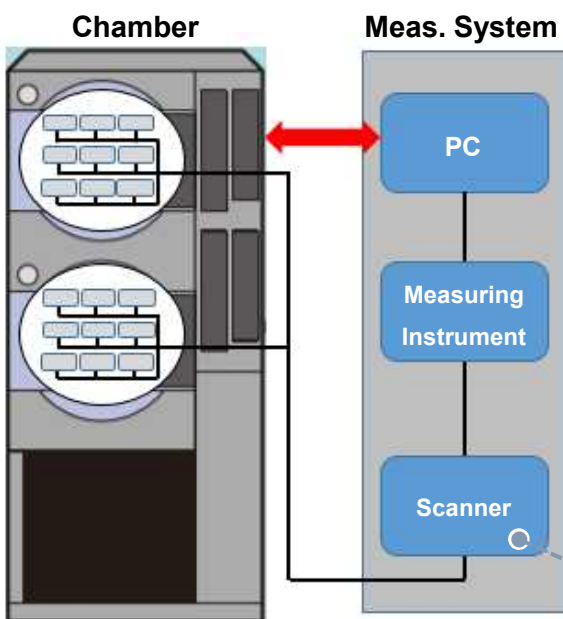


# Products for improving efficiency of evaluation such as insulation and dielectric constant of substrate materials

With the future rise of mmWave 5G, low-loss materials will foresee a rapid growth and play an increasingly important role. ESPEC is here to support our customers to find an ideal material by providing products that improves efficiency in insulation reliability evaluations and dielectric constant measurements.



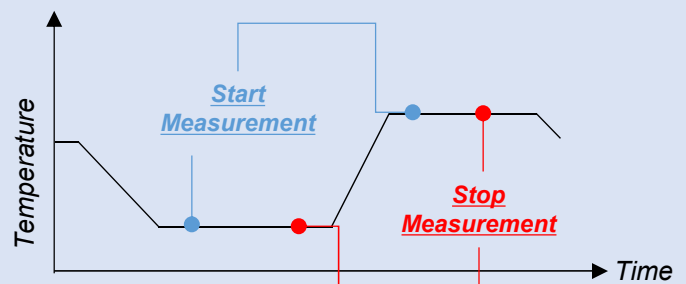
## Features



**Automation**

Measurements at set conditions

Measurement in synchrony with a test chamber



**Automation**

Measuring multiple samples

Unique scanner method allows you to measure multiple samples automatically.

**Efficiency**

Original jig design per samples

**Example: PCB magazine rack to allow you to set samples in open space**



# Measuring system improving efficiency of insulation reliability evaluation

## Insulation Resistance/Leakage Current Evaluation System

Applies voltage under high temperature (and humidity) conditions and detects the leak current caused by insulation breakdown.

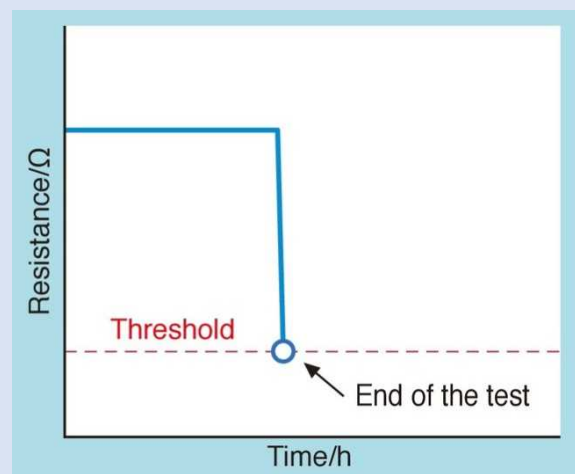
|                             |  |
|-----------------------------|--|
| <b>Model</b>                | AMI-U  |
| <b>No. of Channels</b>      | 150Ch per rack<br>(100V / 300V / 500V / 1000V / 2500V)<br>300Ch per rack<br>(100V / 300V / 500V)                             |
| <b>Measuring Range</b>      | $2 \times 10^5 \sim 1 \times 10^{13} (\Omega)$ (100V applied)<br>$2 \times 10^3 \sim 1 \times 10^{11} (\Omega)$ (1V applied) |
| <b>Applied Voltage</b>      | 100V / 300V / 500V / 1000V / 2500V   |
| <b>System Compatibility</b> | HAST<br>Platinous J<br>AR Series<br>Bench-Top Chamber  |



**Automation** *Two pass / fail judgement mode after detection*

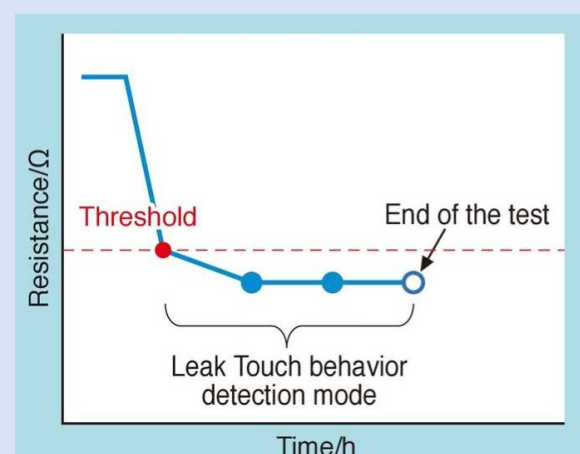
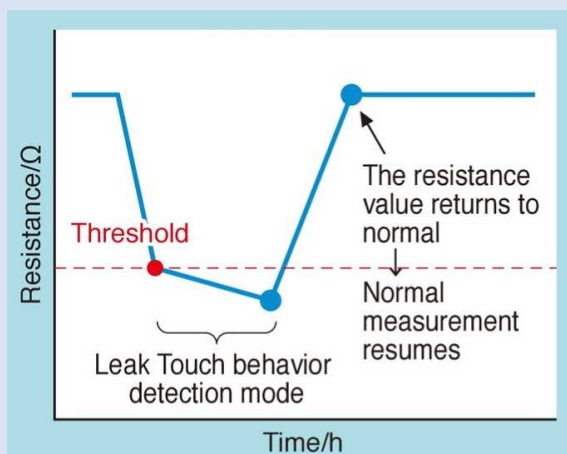
### One time failure – “Leak Touch”

The moment the circuit detects current over the threshold, the channel's specimen is judged as failure and the channel's test ends immediately.







### One time failure – “Leak Touch behavior”



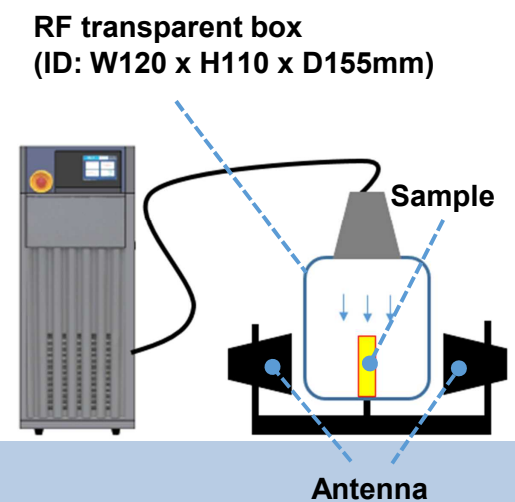
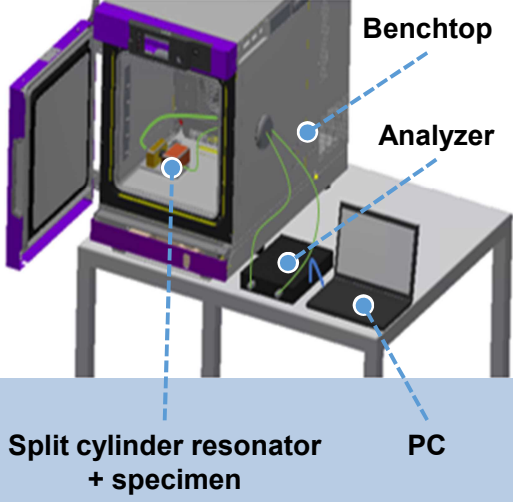
When the circuit detects leak current exceeding the threshold, it will continue to monitor the channel for repeating leaks “. When the number of leaks reaches the set value, it will stop the test.



## Chamber line-up to accommodate various sample size and quantity

|                             |   |  |
|-----------------------------|---|--|
| <b>Appearance</b>           |    |   |
| <b>Model</b>                | <b>EHS-212/222/412(M/MD)</b>  | <b>EHS-432/432L</b>  |
| <b>Temperature Range</b>    | 212/222: +105 to 142.9C<br>412: +105 to 162.2C  | +105 to 162.2C   |
| <b>Humidity Range</b>       | 75 to 100%rh  | 75 to 100%rh   |
| <b>Inner Dimension (mm)</b> | 212/412:<br>Φ294 x D318* (296)<br><br>222:<br>Φ394 x D426*(404)<br>*( )without fan-guard  | 432:<br>Φ548 x D560<br><br>432-L:<br>Φ560 x D760   |
| <b>Features</b>             | <div data-bbox="338 1111 531 1173" style="border: 1px solid red; padding: 2px; display: inline-block; margin-bottom: 10px;"><b>Efficiency</b></div>  <ul style="list-style-type: none"> <li>• Stackable design for improved space efficiency</li> <li>• Simultaneous tests Under different conditions.</li> </ul> <p style="text-align: right;">EHS-212MD<br/>EHS-222MD<br/>EHS-412MD</p> <div data-bbox="338 1626 531 1688" style="border: 1px solid red; padding: 2px; display: inline-block; margin-top: 10px;"><b>Efficiency</b></div> <ul style="list-style-type: none"> <li>• Slide tray allows wiring to be done in open space.<br/>(with optional Slide shelf terminal block)</li> </ul>  | <div data-bbox="927 1111 1129 1173" style="border: 1px solid red; padding: 2px; display: inline-block; margin-bottom: 10px;"><b>Large Capacity</b></div> <ul style="list-style-type: none"> <li>• An ideal for mass process of small specimen</li> <li>• Capacity<br/>EHS-432: 130L<br/>EHS-432-L: 180L</li> </ul> |

# Temperature chambers for dielectric constant measurement

|   |  |  |
|---|--|--|
| <p><b>Product Appearance</b></p>                  | <p><b>Thermal Air Test System<br/>(under development)</b></p>  <p>*Requires compressed air</p> <ul style="list-style-type: none"> <li>• Dew Point Temp.: &lt;-60C</li> <li>• Air Flow Rate: 140 to 200NL/min</li> <li>• Air Pressure: 0.55 to 1.0 MPa</li> </ul>  | <p><b>Bench-Top Chambers</b></p>    |
| <p><b>Temperature/<br/>Humidity<br/>Range</b></p> | <p>-60 to +200C<br/>(set range, not test area)</p>   | <p>-60 to +150C<br/>30 to 95%rh (SH)</p>   |
| <p><b>Temperature<br/>Change Rate</b></p>         | <p>Heating: 10C/min<br/>Cooling: 10C/min<br/>(between -29C and +169C)</p>  | <p>Heating: 2.9C/min<br/>Cooling 1.7C/min<br/>(between -39 and +129C)</p>  |
| <p><b>Features</b></p>                            | <ul style="list-style-type: none"> <li>• Allows pin spot cooling and heating, leaving measuring instrument out in ambient condition</li> <li>• By directly blowing the conditioned air onto the sample, the specimen will go through rapid temperature change.</li> </ul>  | <ul style="list-style-type: none"> <li>• You can set the entire split cylinder resonator with the sample to be placed inside the chamber.</li> <li>• Complete test system in a small package.</li> <li>• Climatic chamber (SH) also in the lineup to test the influence of humidity to the dielectric constant performance.</li> </ul> |
|   | <p><b>Free Space Method (S-Parameter Method)</b><br/>Temperature range: -50 to +150C (example)</p> <p><b>RF transparent box<br/>(ID: W120 x H110 x D155mm)</b></p>  <p>The diagram shows a Thermal Air Test System connected to an RF transparent box. Inside the box, a sample is positioned between two antennas. Arrows indicate air flow from the system onto the sample.</p> | <p><b>Split Cylinder Resonator Method</b></p>  <p>The diagram shows a Benchtop chamber containing a split cylinder resonator with a specimen inside. The chamber is connected to an Analyzer, which is in turn connected to a PC on a desk.</p>    |