



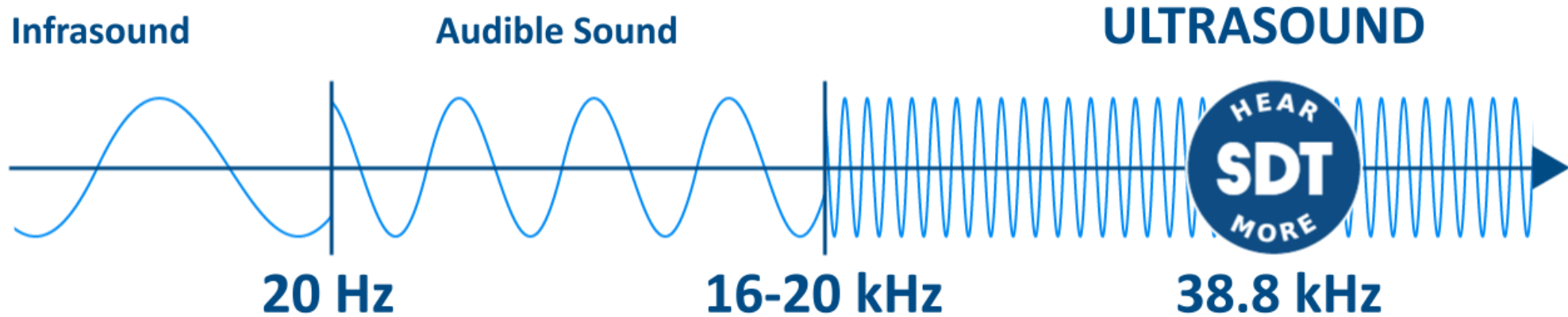
Ultrasound Solutions



SonaVu™ Ultrasonic Imaging Acoustic Camera



What is Ultrasound?



Besides Infrasound and Audible sound, **Ultrasound** refers to any sound pressure wave with a repetition frequency greater than 20 kHz. The characteristics of ultrasound, especially around 40 kHz are particularly interesting for inspectors listening for symptoms of assets failure.



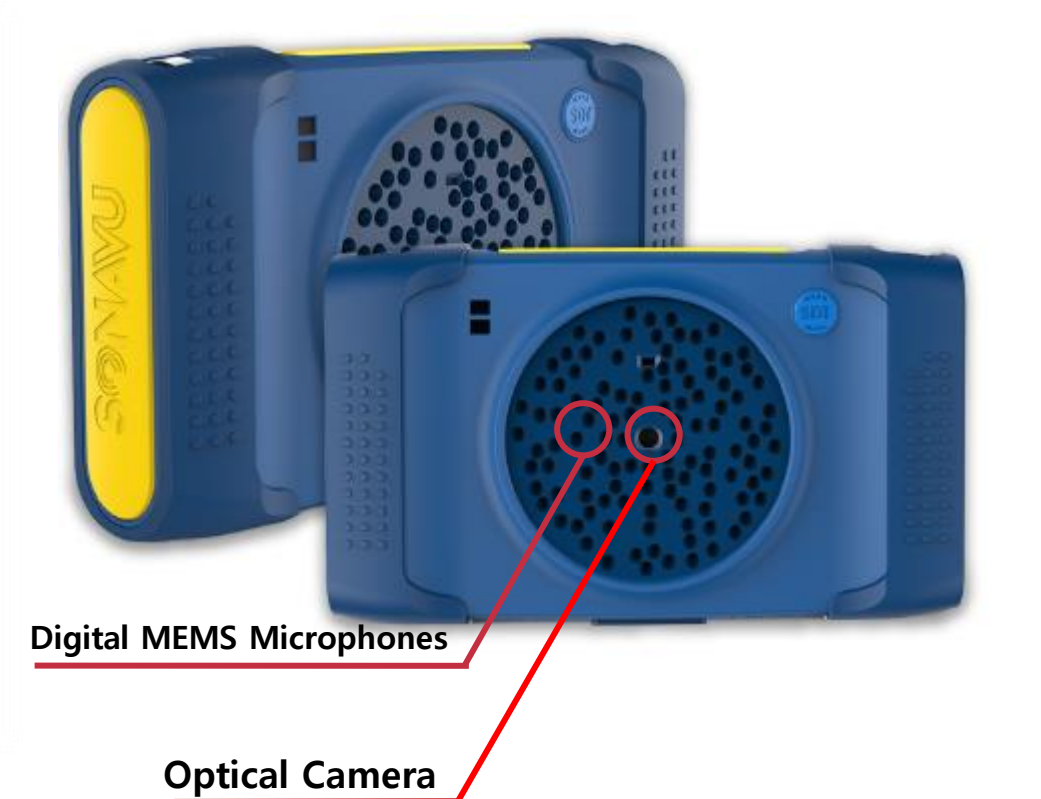
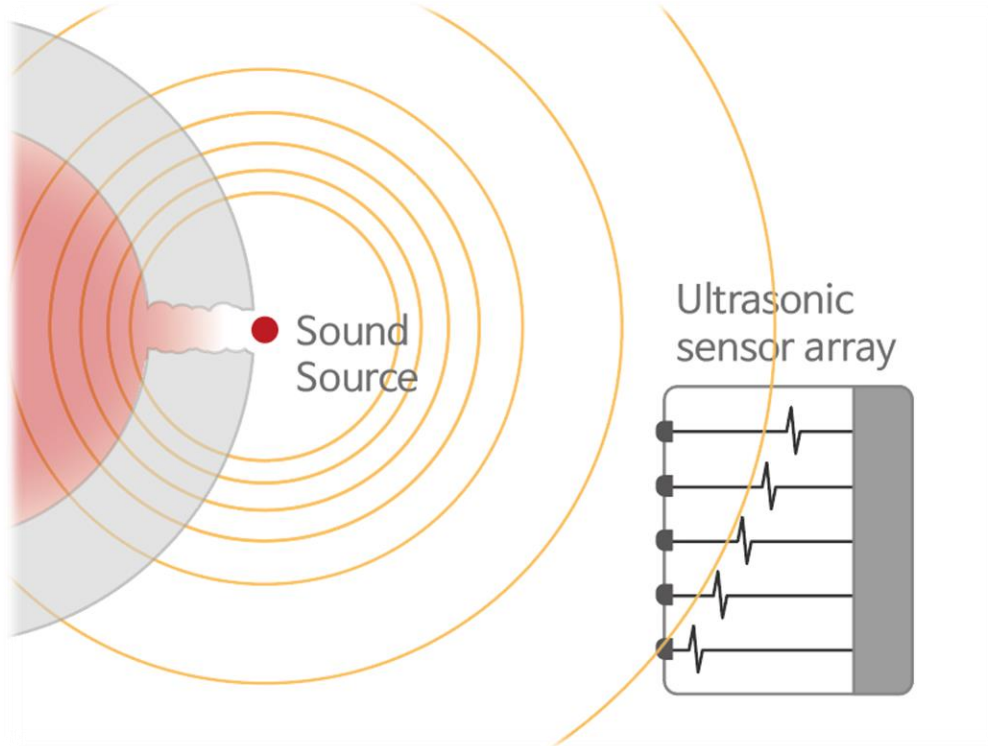
What is Sonavu?



SonaVu™ is a multi-frequency acoustic imaging camera that takes airborne ultrasound inspection to an entirely new level. Equipped with 112 highly sensitive sonic sensors and a precision optical camera, SonaVu™ brings the power of super-human hearing to focus on its vibrant, color touch screen. It unlocks limitless applications for asset reliability, energy conservation, and safety including compressed air leak management, electrical asset reliability, tightness control of large volumes, and much more.

How Ultrasonic Camera can Detect?

Each sensor receives the signal at different times, and the Ultrasonic Camera analyzes the **intensity and sequence of the received signals** to locate the sound source.



The Five Application Pillars

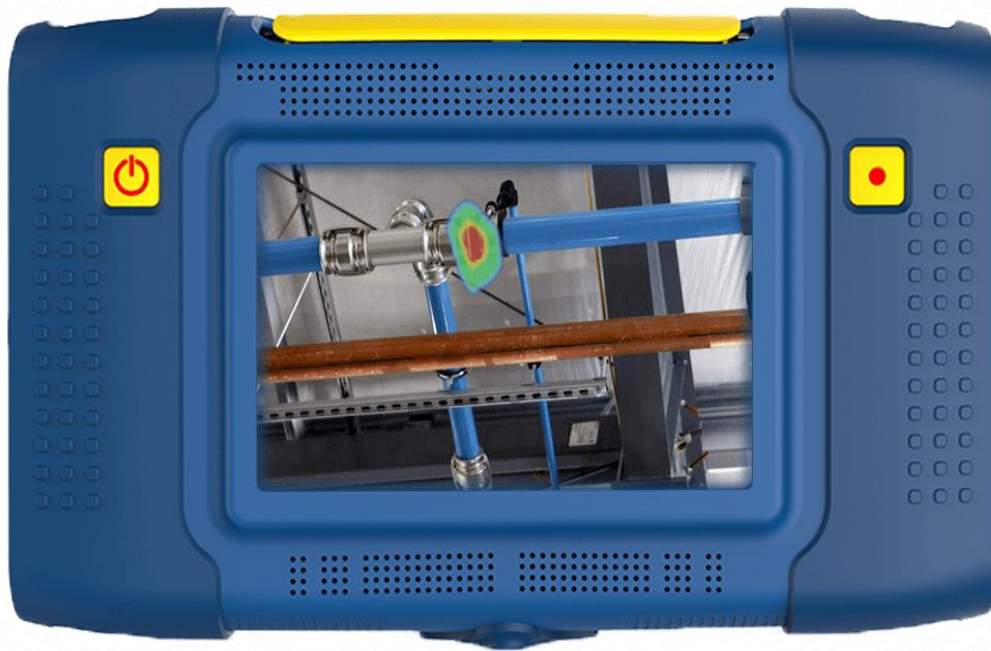
- Compressed Air & GAS Leak Management
- Electrical Asset Reliability
- Fugitive Emission Inspection
- Dry Pipe Sprinkler Systems
- Steam System Testing



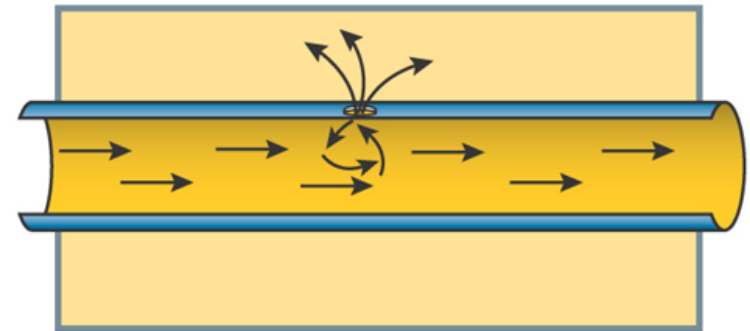
Compressed Air & GAS Leak Management



Compressed Air & GAS Leak Management



- **PRESSURE LEAKS (TURBULENCE)**
- **VACUUM LEAKS**
- **AIR**
- **GAS (NGV/LPG)**
- **OXYGEN**
- **HYDROGEN**
- **SF6**
- **All Gas ETC.**



Compressed Air & GAS Leak Management

All controls are found on the SonaVu™ touch screen.

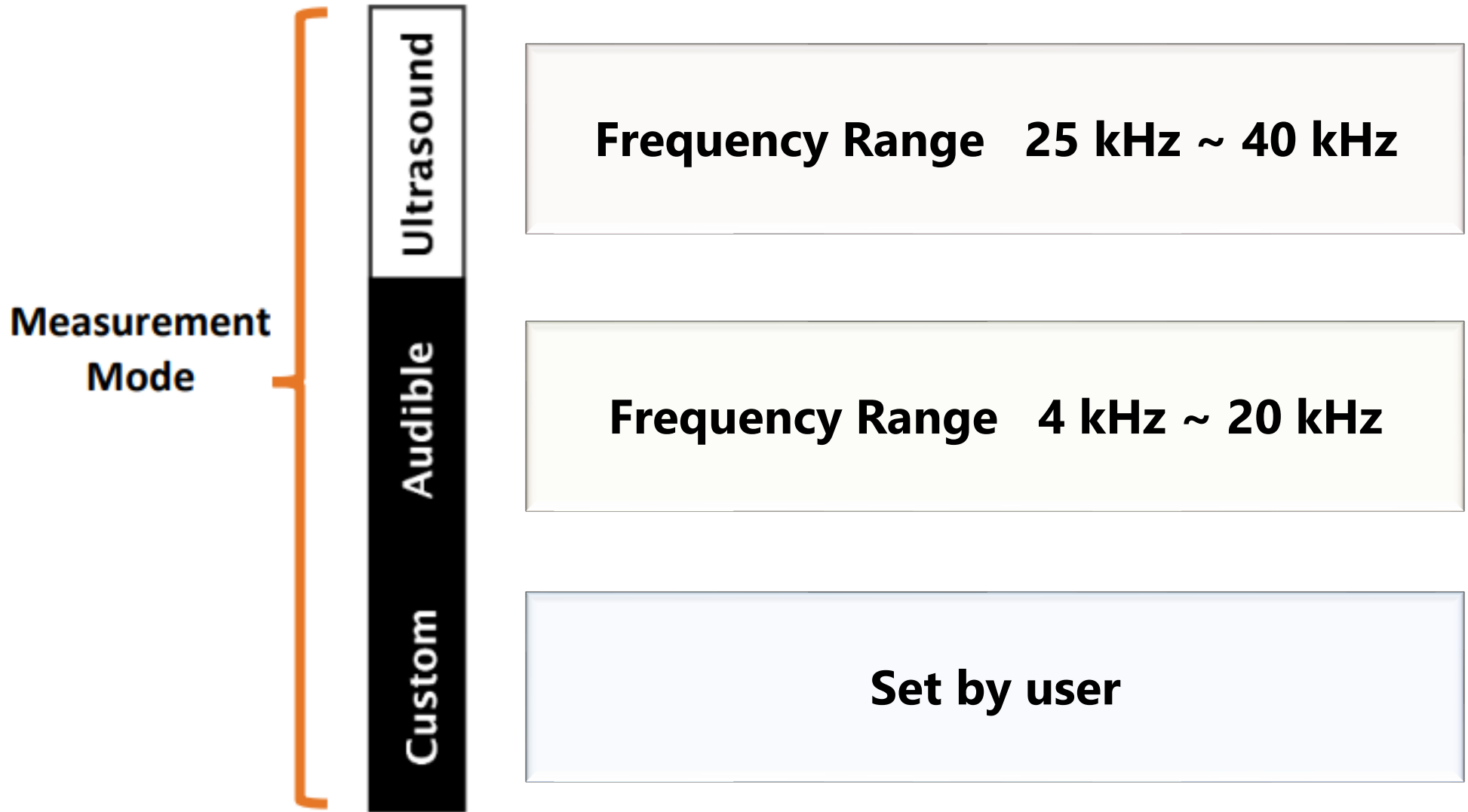
1. Set the distance:
 - Choose near range (<5m) or far range (>5m) or auto range to let SonaVu™ decide.
2. Set the frequency:
 - For compressed air leaks choose 25-40kHz
3. Set the gain:
 - Difference between min/max sound pressure.

Compressed Air & GAS Leak Management

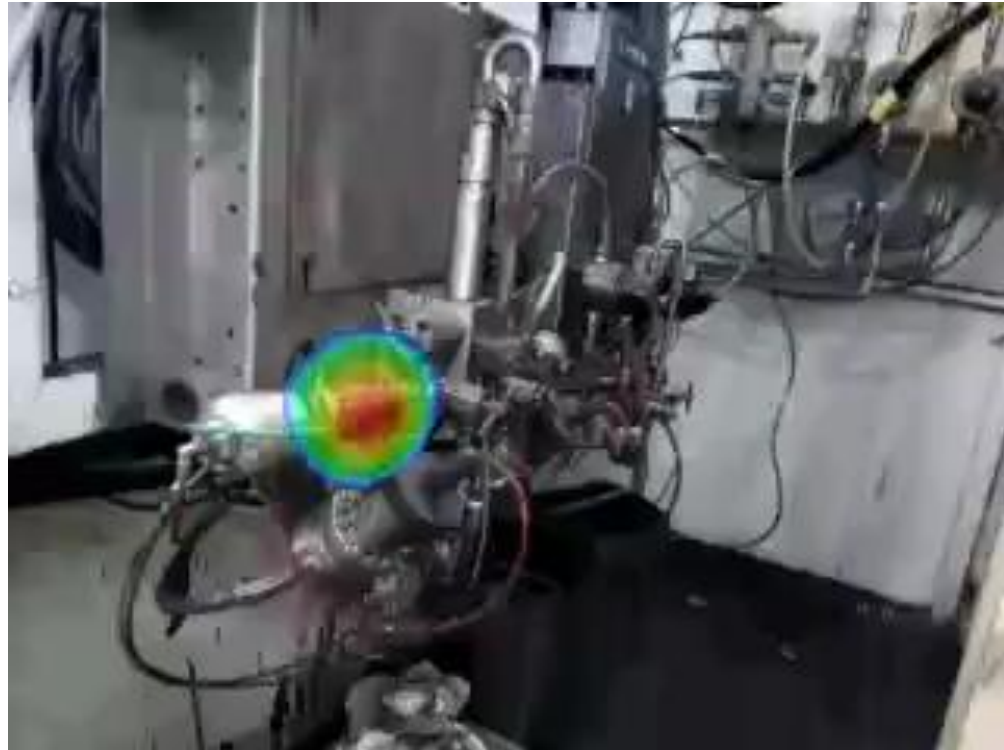
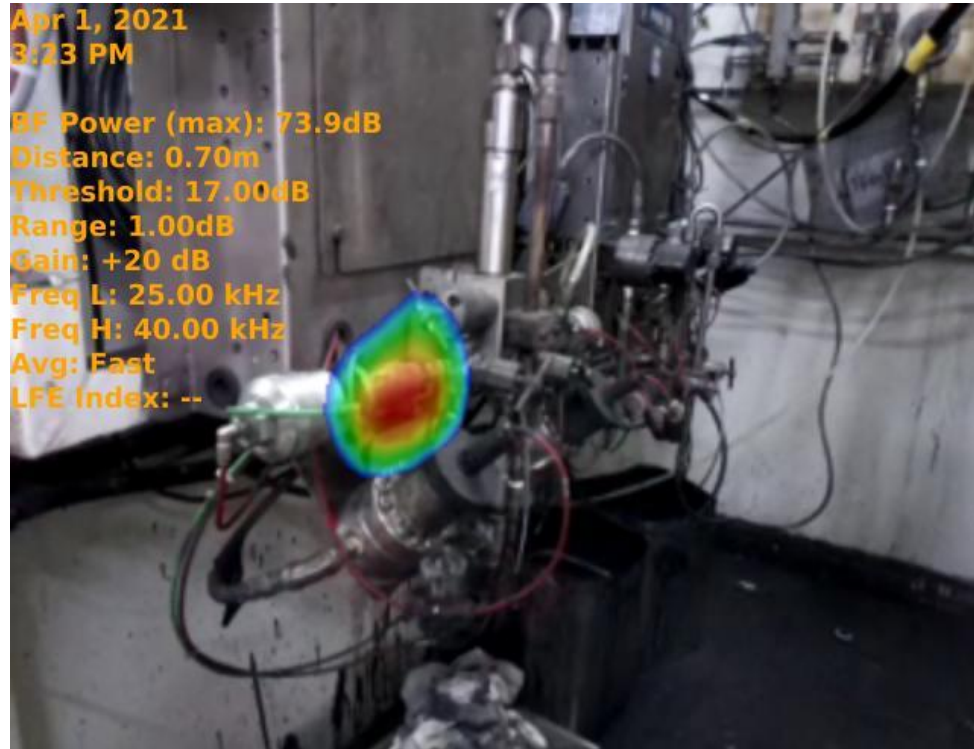
Sensitivity

- 0.05 l/min (0.83 cc/sec) @ 1.6 bar(23PSI) from 1 m
- 0.11 l/min (1.83 cc/sec) @ 1.6 bar(23PSI) from 10 m





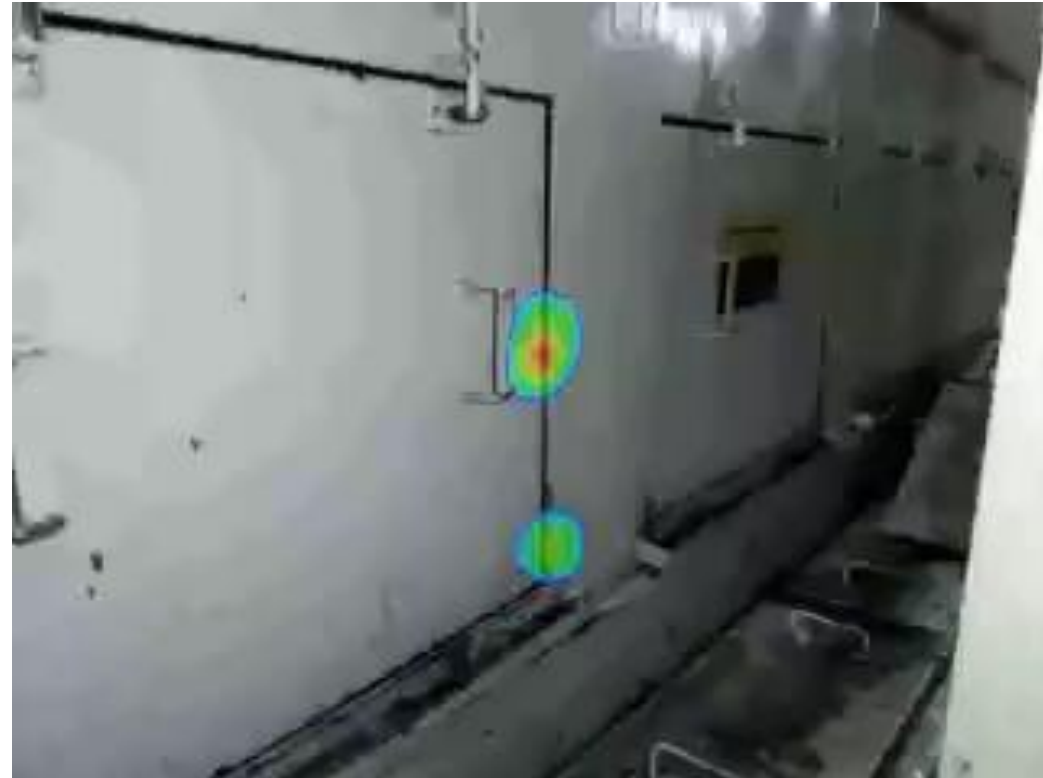
Compressed Air Leak Management



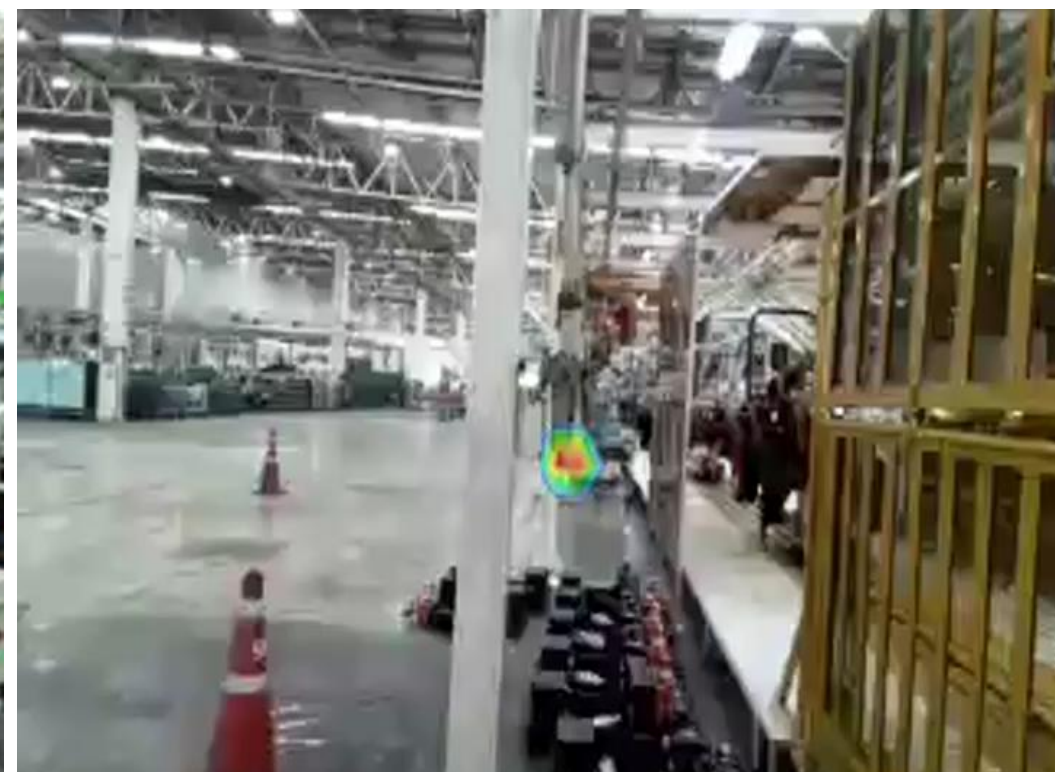
AIR LEAK (2.08M.)



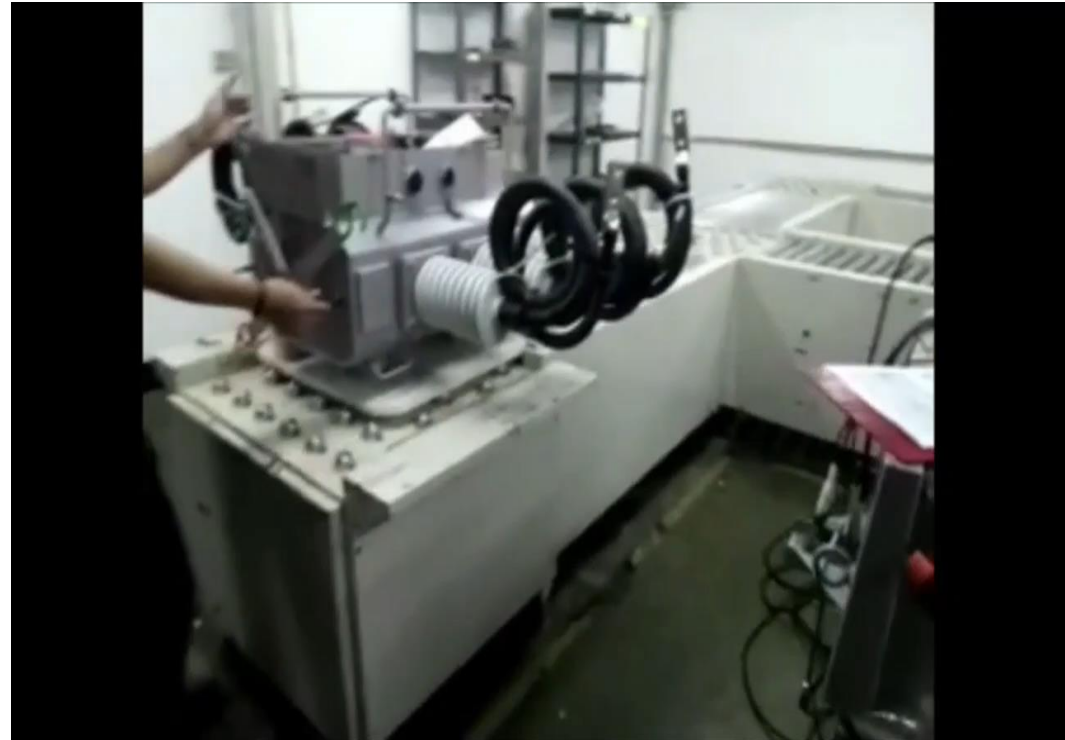
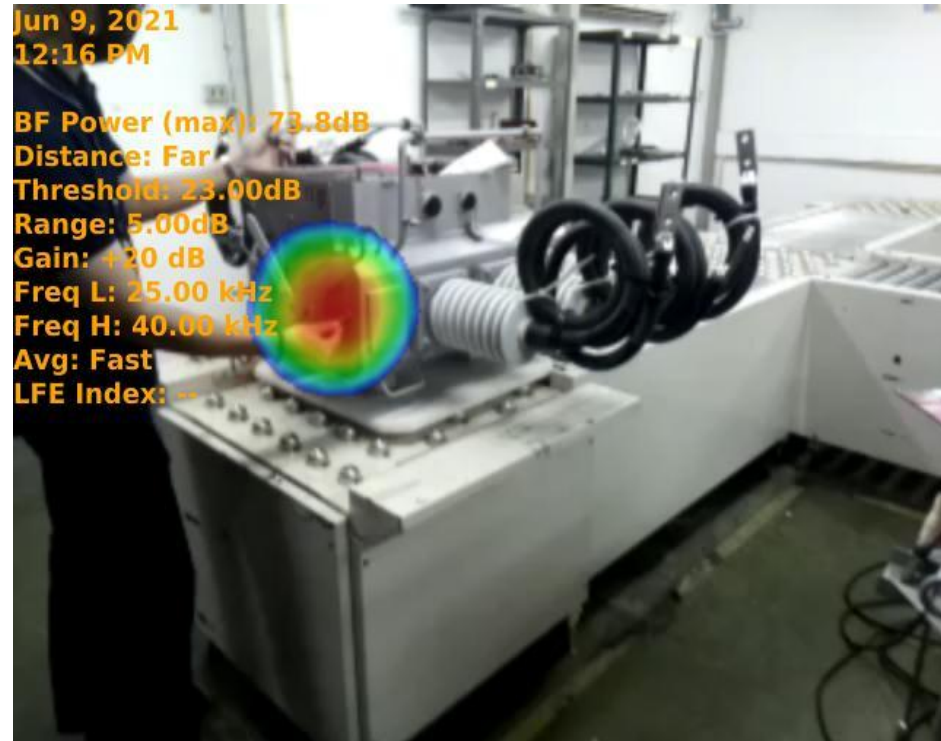
VACUUM LEAKS

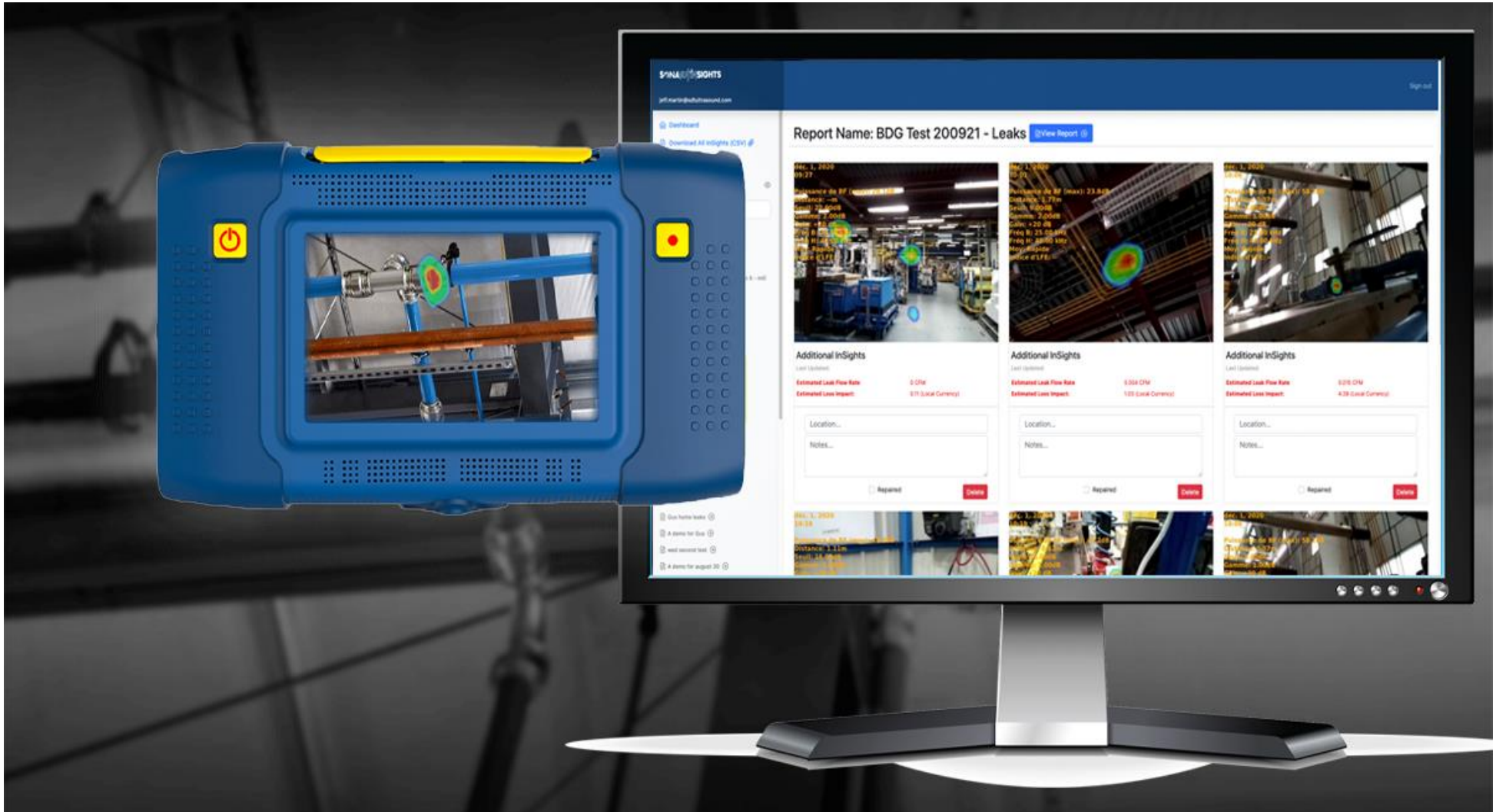


GAS CO LEAK









SONAVU INSIGHTS

jeff.martin@sdtultrasound.com

Dashboard

Download All InSights (CSV)

Disclaimer

SONAVU INSIGHTS

Filter InSights...

- audible test v2
- audible test
- test999
- BDG Test 200921
- Patrices report
- A demo electrical report
- A demo for sdt international - line 6 - mill 5
- A demo electrical report
- A demo for kcc 3
- A demo report for kcc
- A demo leak report for KCC
- Test 1m 0309
- Test 1m 0309
- Test 1m
- Test 1m
- Test 1m
- Test 1m
- trouble 2
- SBGE
- Cushion line 01
- Gus home leaks
- A demo for Gus

Sign out


May 21, 2021 11:21 AM

BF Power (max): 65.4dB
Distance: 0.63m
Threshold: 62.00dB
Range: 4.00dB
Gain: +10 dB
Freq L: 25.00 kHz
Freq H: 40.00 kHz
Avg: Fast
LFE Index: 2



Additional InSights

Last Updated: 2021-09-08 15:13:35pm

Estimated Leak Flow Rate Distance Not Set 

Estimated Annual Loss: NA

Column A3

some notes here - the line is in maintenance on a date

Repaired


May 21, 2021 11:26 AM

BF Power (max): 74.5dB
Distance: 0.63m
Threshold: 73.00dB
Range: 4.00dB
Gain: +10 dB
Freq L: 25.00 kHz
Freq H: 40.00 kHz
Avg: Fast
LFE Index: 3



Additional InSights

Last Updated: 2021-09-23 19:21:27pm

Estimated Leak Flow Rate 0.104 CFM 

Estimated Savings Impact: 103.85 (Local Currency)

repaired by by LG

Repaired


May 21, 2021 11:28 AM

BF Power (max): 50.9dB
Distance: 0.52m
Threshold: 50.00dB
Range: 4.00dB
Gain: +10 dB
Freq L: 25.00 kHz
Freq H: 40.00 kHz
Avg: Fast
LFE Index: 2



Additional InSights

Last Updated: 2021-09-08 15:13:58pm

Estimated Leak Flow Rate 0.014 CFM 

Estimated Savings Impact: 13.74 (Local Currency)

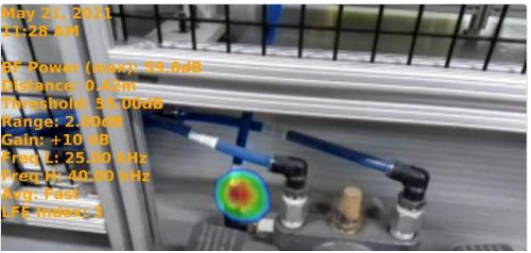
Location...

Notes...

Repaired

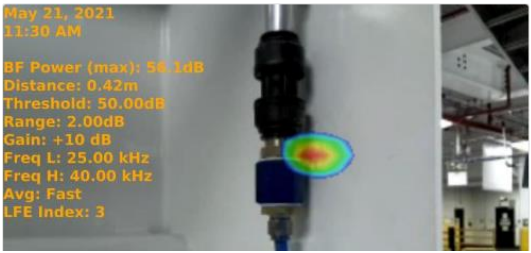
May 21, 2021 11:28 AM

BF Power (max): 53.5dB
Distance: 0.42m
Threshold: 53.00dB
Range: 2.00dB
Gain: +10 dB
Freq L: 25.00 kHz
Freq H: 40.00 kHz
Avg: Fast
LFE Index: 3



May 21, 2021 11:30 AM

BF Power (max): 54.1dB
Distance: 0.42m
Threshold: 50.00dB
Range: 2.00dB
Gain: +10 dB
Freq L: 25.00 kHz
Freq H: 40.00 kHz
Avg: Fast
LFE Index: 3



May 21, 2021 11:31 AM

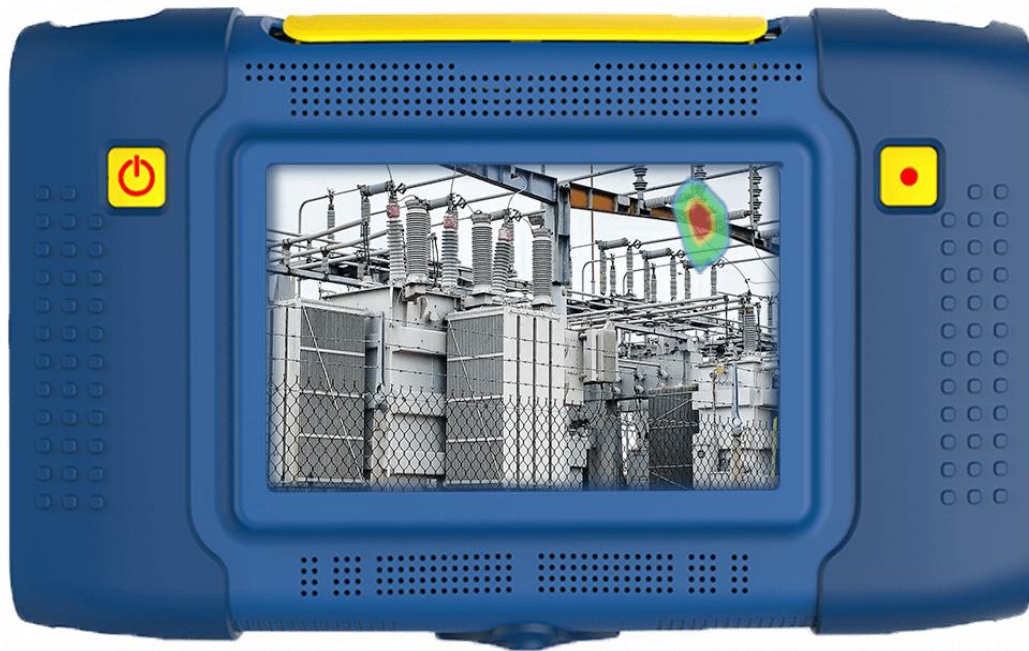
BF Power (max): 83.1dB
Distance: 0.44m
Threshold: 79.00dB
Range: 2.00dB
Gain: +10 dB
Freq L: 25.00 kHz
Freq H: 40.00 kHz
Avg: Fast
LFE Index: 5



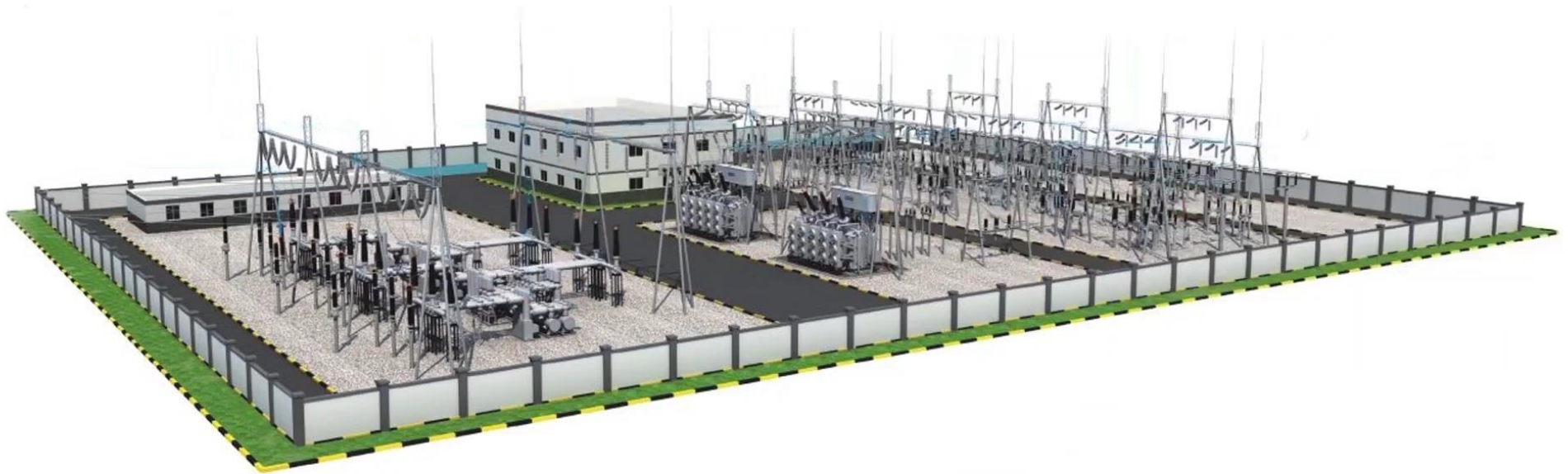
Electrical Asset Reliability



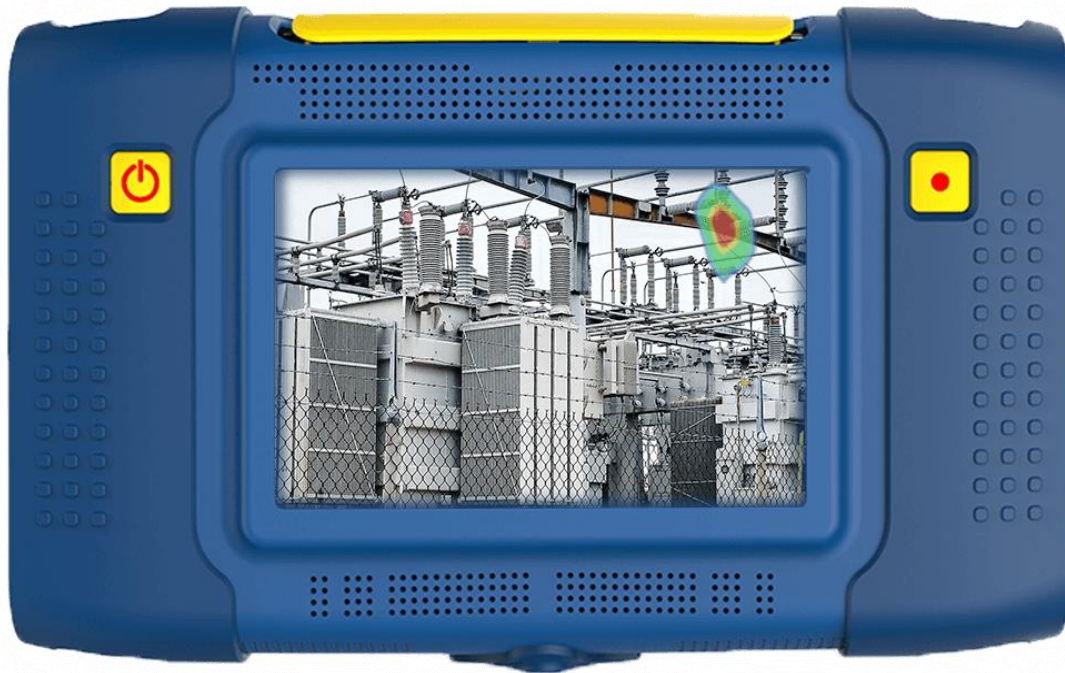
Electrical Asset Reliability



Partial Discharge คือ ประจุไฟฟ้าทำลาย
ความเป็นฉนวน เกิดขึ้นทั้งในเนื้อฉนวนและนอก
เนื้อฉนวน โดย Partial Discharge ที่เกิดขึ้นในเนื้อ
ฉนวน เป็นผลมาจากการที่ประจุไหลผ่านช่องว่าง
เล็ก ๆ ในเนื้อฉนวนและสร้างความเสียหาย โดยที่
ช่องว่างเหล่านี้จะทนแรงดันไฟฟ้าได้น้อยกว่า
ฉนวนที่อยู่รอบตัวมัน ความเสียหายจะยืดตัว
ออกไปจนในที่สุดเมื่อมันยาวพอก็จะเกิดการ
Breakdown จาก High Voltage ลงสู่ ground



Electrical Asset Reliability



1. Corona



2. Tracking

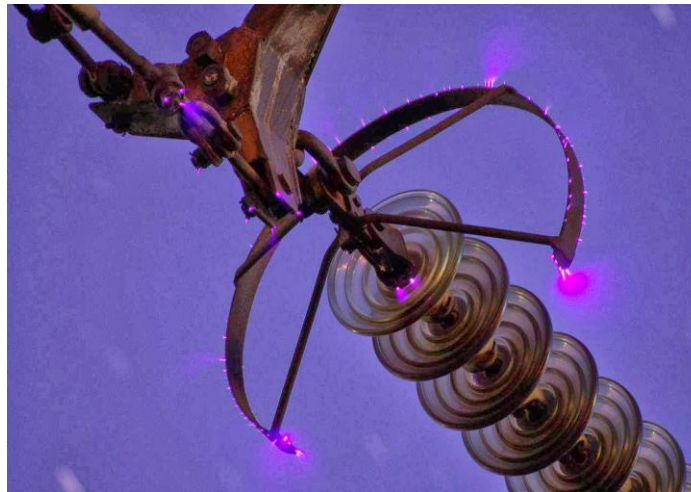


3. Arcing

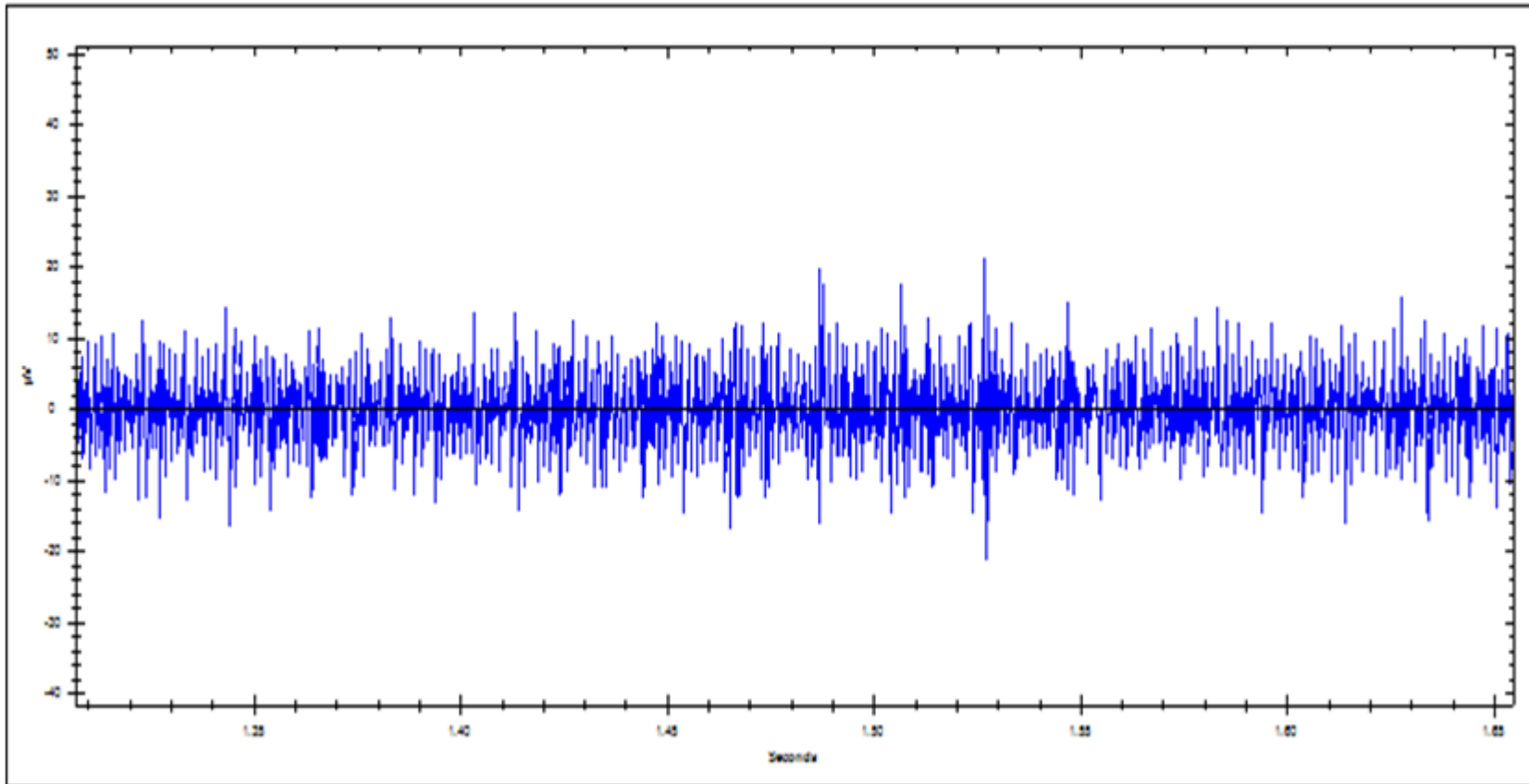


CORONA

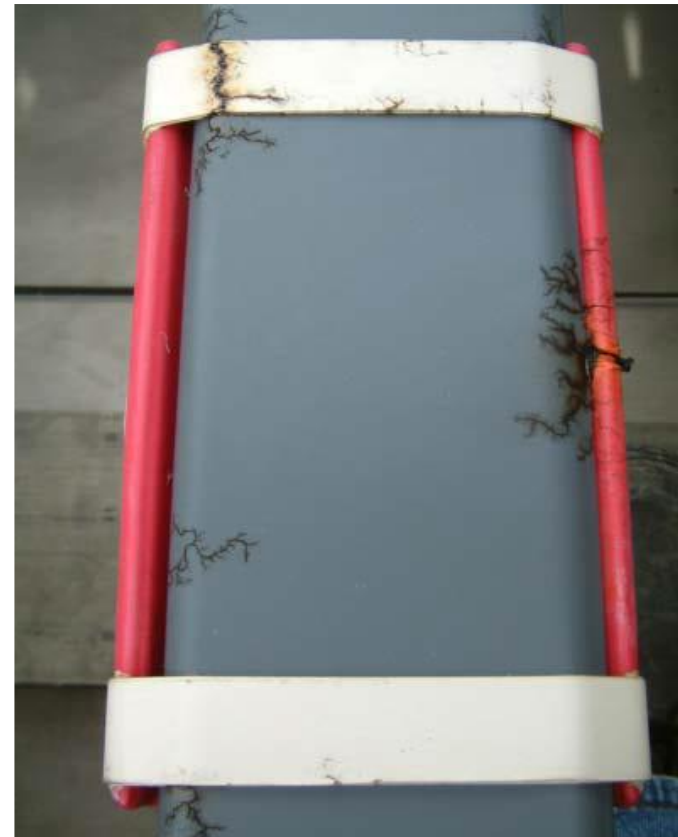
ปรากฏการณ์โคโรน่า (Corona) เป็น Partial Discharge ประเภทหนึ่ง ที่เกิดขึ้นบริเวณแนวสายส่งไฟฟ้าแรงสูงช่วงนี้ เกิดจากสภาพอากาศที่ร้อน แห้งแล้ง และฝนทิ้งช่วงเป็นระยะเวลานาน ทำให้บริเวณผิวลูกถ้วยสกปรก สภาพความเป็นฉนวนลดลง เกิดความเครียดของไฟฟ้าสูง เป็นผลให้อากาศบริเวณโดยรอบเกิดการแตกตัวออกมาในรูปของเสียงและแสง ปรากฏการณ์โคโรน่าที่เกิดขึ้นเป็นปรากฏการณ์ปกติที่เกิดขึ้นในการส่งจ่ายระบบไฟฟ้าแรงสูง ไม่เป็นอันตรายต่อผู้อาศัยใกล้แนวสายส่งไฟฟ้าแต่อย่างใด เพียงก่อให้เกิดความรำคาญจากเสียงและแสงที่เกิดขึ้นบ้างเท่านั้น



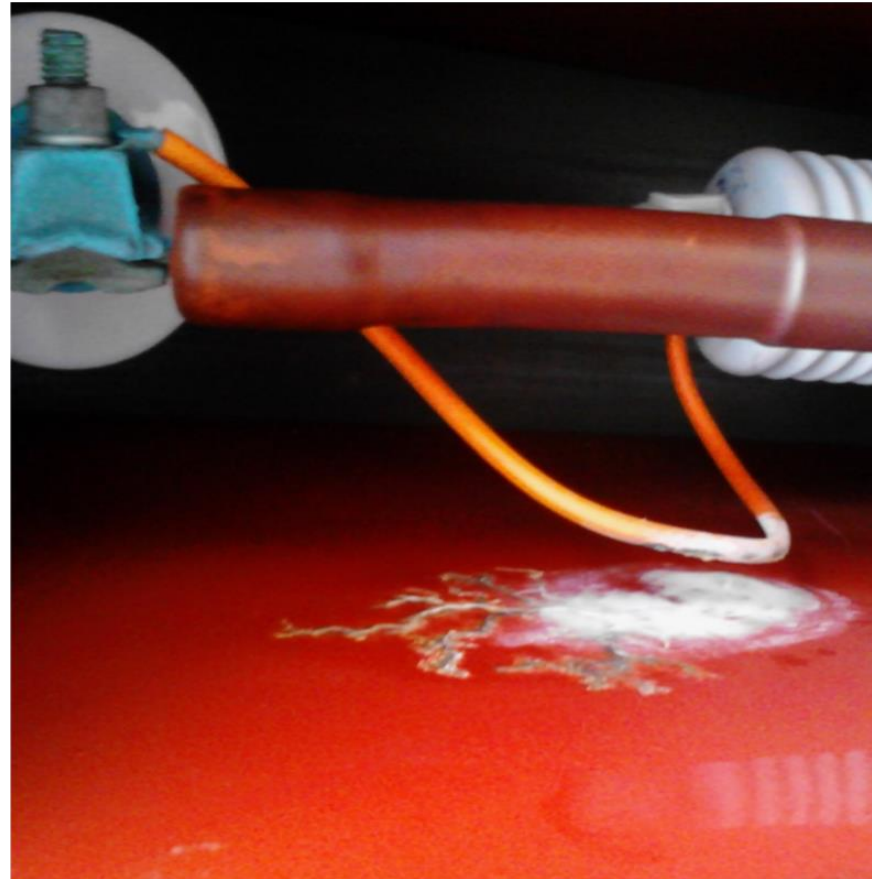
CORONA



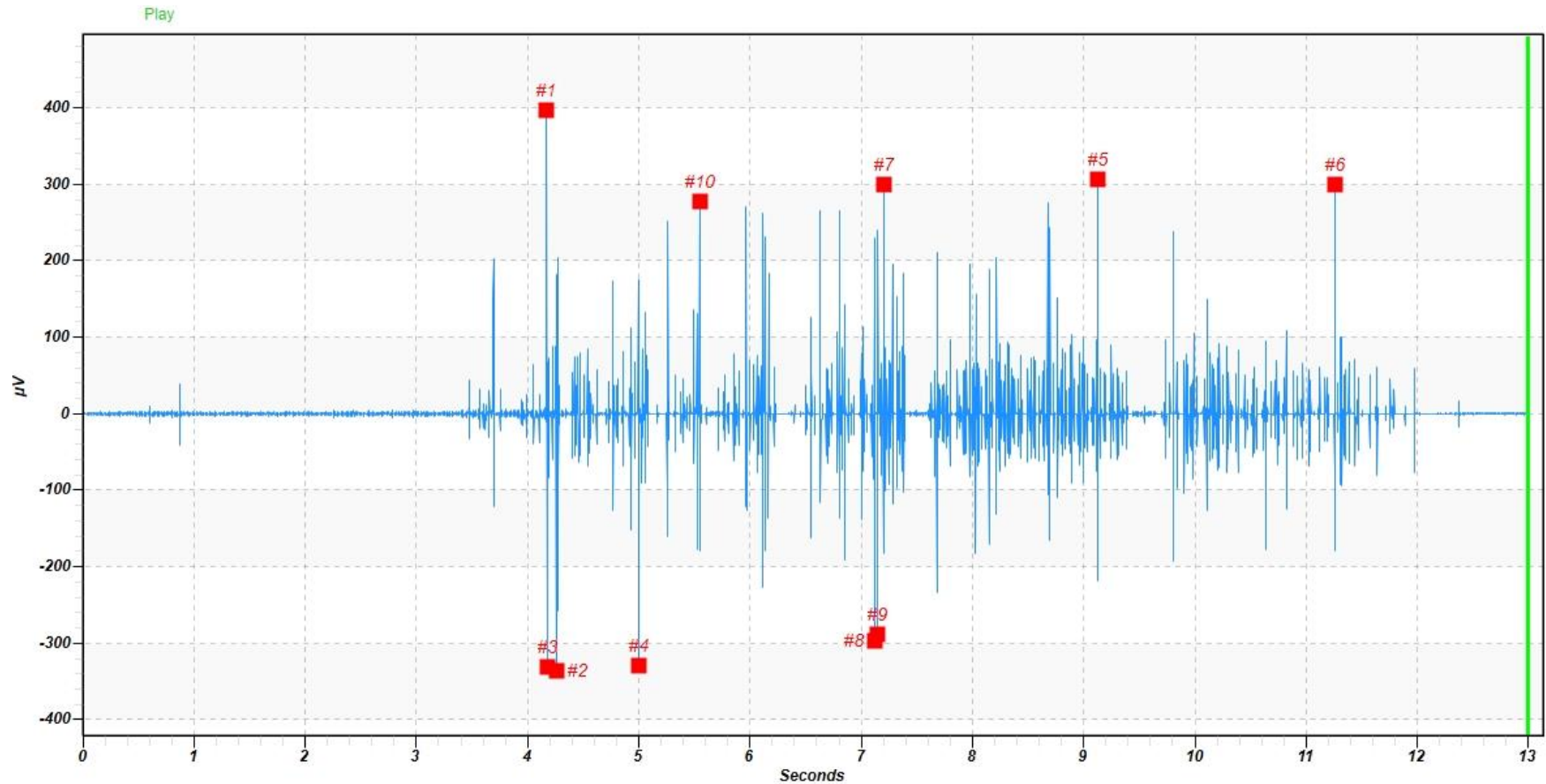
TRACKING



TRACKING

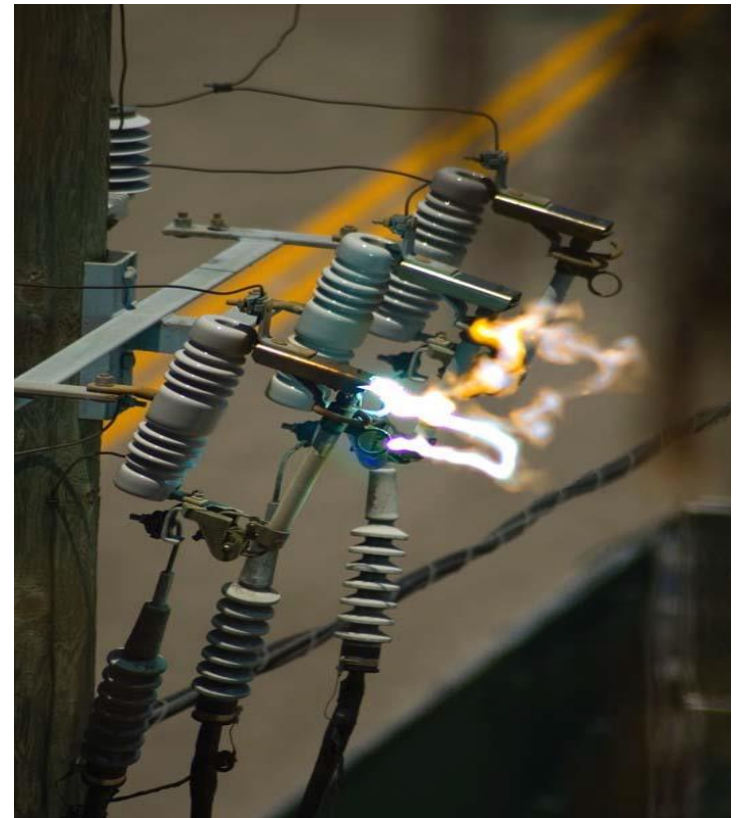


TRACKING



ARCING

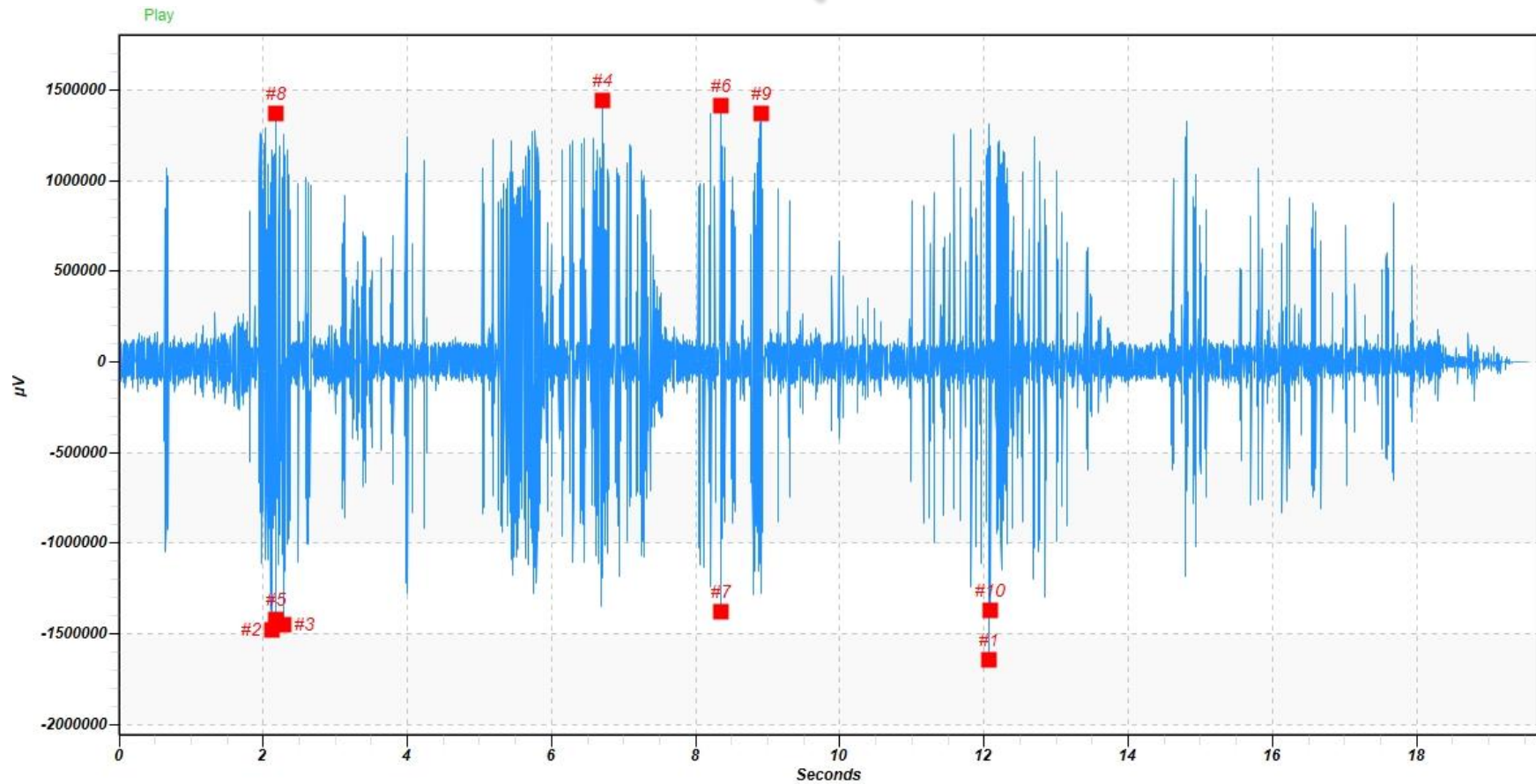
- Arcing Discharge
- The easiest to distinguish
- Electrical breakdown of a gas producing an ongoing plasma discharge, resulting from electrical current flowing through nonconductive media such as air
- Occurs in both low voltage and high voltage systems



ARCING



ARCING



Partial Discharge

- ⚡ Partial → เป็นบางส่วน
- ⚡ Discharge → ปลดปล่อย



PARTIAL DISCHARGE

การปลดปล่อยบางส่วน !!!



Partial Discharge

- ⚡ “การคายประจุไฟฟ้า (*Discharge*) หรือเกิดประกายไฟ (*Spark*) เป็นสะพานเชื่อมต่อกันในบางส่วนของฉนวนที่อยู่ ระหว่างตัวนำ 2 ขั้ว แต่ไม่เชื่อมถึงกันทั้งหมด เกิดขึ้นได้ในโพรงอากาศ ของฉนวนแข็ง, ในฟองอากาศของฉนวนเหลว, ในสารแขวนลอยที่ฝัง ตัวอยู่ในเนื้อฉนวน อันเนื่องมาจากขบวนการผลิต หรือ ในอากาศรอบ ขั้วไฟฟ้า ”
- ⚡ “ประจุไฟฟ้าทำลายความเป็นฉนวน เกิดขึ้นทั้งในเนื้อฉนวนและนอกเนื้อฉนวน โดย *Partial Discharge* ที่เกิดขึ้นในเนื้อฉนวน เป็นผลมาจากการที่ประจุไหลผ่านช่องว่างเล็ก ๆ ในเนื้อฉนวนและสร้างความเสียหาย โดยที่ช่องว่างเหล่านี้จะทนแรงดันไฟฟ้าได้น้อยกว่าฉนวนที่อยู่รอบตัวมัน ความเสียหายจะยึดตัวออกไปจนในที่สุดเมื่อมันยาวพอก็จะเกิดการ *Breakdown* จาก **high Voltage** ลงสู่ **ground**”


Partial Discharge เกิดขึ้นได้อย่างไร ?

-  **จากการผลิต** - ฉนวนไฟฟ้าชนิดวัสดุแข็ง ถูกออกแบบให้กระจายความเค้นทางไฟฟ้าอย่างสม่ำเสมอระหว่างตัวนำ แต่การผลิตจำนวนมากอาจมีบางชิ้นเกิดความบกพร่องที่ทำให้เกิดโพรงหรือช่องว่างเล็ก ๆ ในเนื้อของวัสดุ
-  **การติดตั้ง** - เมื่อมีการประกอบหรือติดตั้งอุปกรณ์ไฟฟ้าในพื้นที่ทำงาน อาจผิดพลาดทำความเสียหายแก่ฉนวน ทำให้ความเป็นฉนวนลดลง หรือมีความเค้นทางไฟฟ้าที่ฉนวนเพิ่มขึ้น

Partial Discharge เกิดขึ้นได้อย่างไร ?

-  **อายุการใช้งานและการเสื่อมสภาพ** - โดยทั่วไปวัสดุฉนวนไฟฟ้าจะเสื่อมสภาพตามกาลเวลา พันธะทางเคมีภายในถูกทำลาย ขบวนการนี้จะทำให้ฉนวนอ่อนแอลง มีความทนทานต่อความเค้นทางไฟฟ้าลดลง แม้ในสภาพเงื่อนไขการทำงานปกติ
-  **ได้รับความเค้นสูงเกินไป** - การลัดวงจร หรือ โคนฟ้าผ่า เป็นการเพิ่มความเค้นให้ฉนวนจากกระแสหรือแรงดันเกิน ถึงแม้จะเกิดในช่วงเวลาสั้น ๆ แต่ความเค้นทางไฟฟ้าหรือความร้อนจากกระแสเกินที่เกิดขึ้น ก็สามารถทำความเสียหายถาวรแก่ฉนวนได้

Partial Discharge เกิดขึ้นได้อย่างไร ?

 **เสียหายขณะทำงาน - อุปกรณ์ไฟฟ้า**
ทั้งหลายอาจเกิดความเสียหายทาง
กายภาพในขณะที่ใช้งานได้จากปัจจัย
ภายนอก



Electrical Asset Reliability

- ⚡ Corona Partial Discharge
- ⚡ Surface Partial Discharge
- ⚡ Floating Partial Discharge
 1. Internal (Void) Discharge
 2. Discharge by Electrical (material wears)
 3. Tracking (Baby Arcing)
 4. Arcing

1 → 2 → 3 → 4

⚡ Corona Partial Discharge

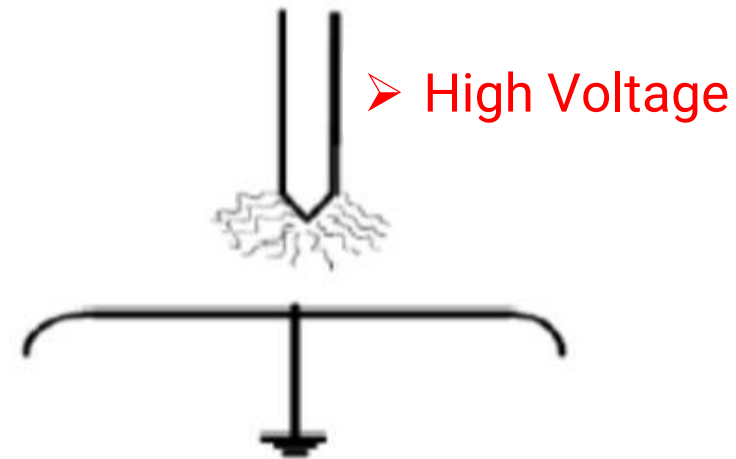
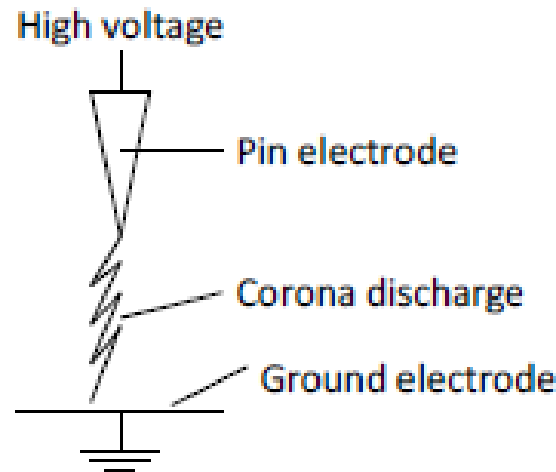


Figure 3. Test object for corona discharge experiment

Corona Partial Discharge

Figure 3 shows the test object that has been used in the measurement of corona discharges. The setup consists of a sharp end electrode, which was applied with a 50 Hz sinusoidal voltage and a grounded plane.

⚡ Surface Partial Discharge

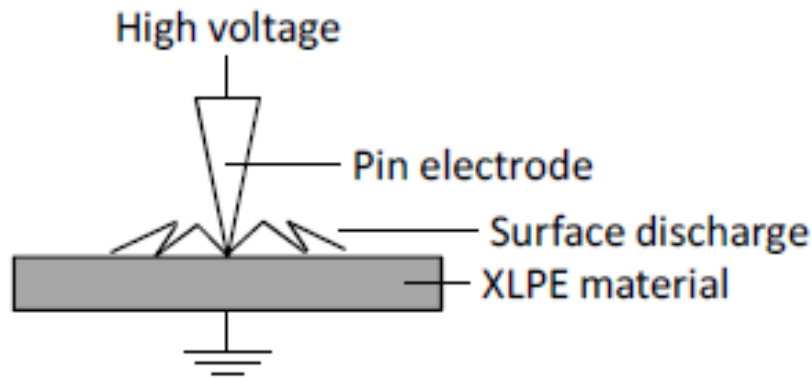
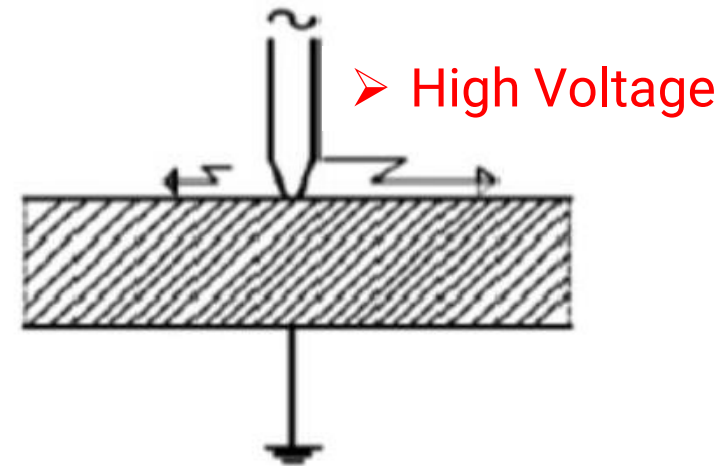


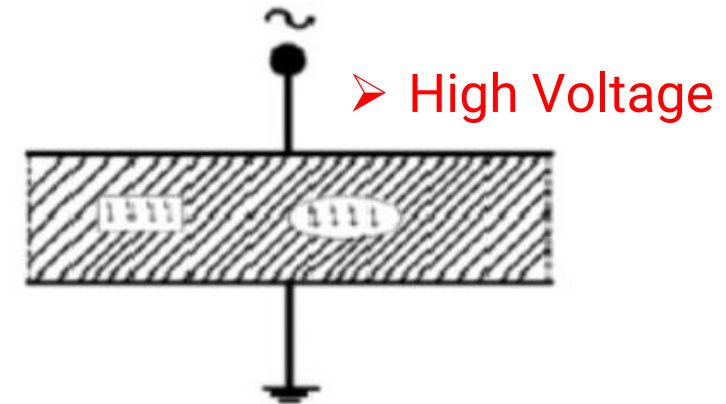
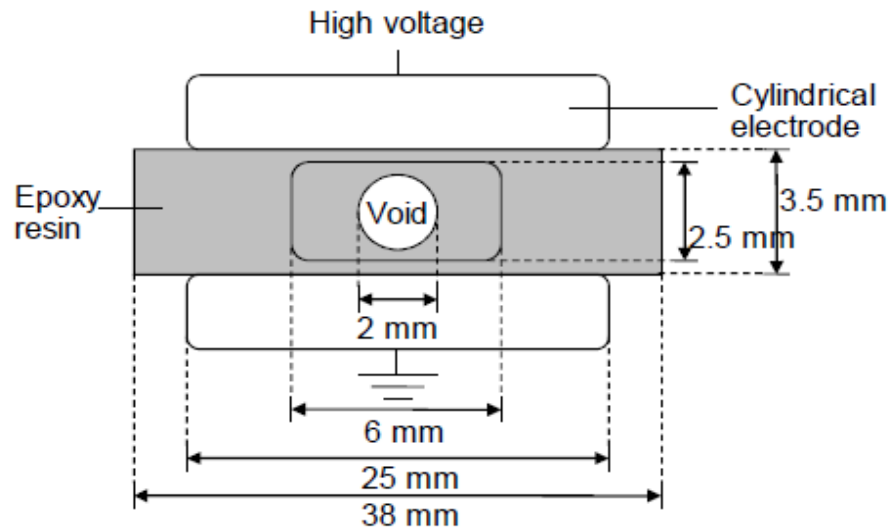
Figure 2. Test object for surface discharge experiment



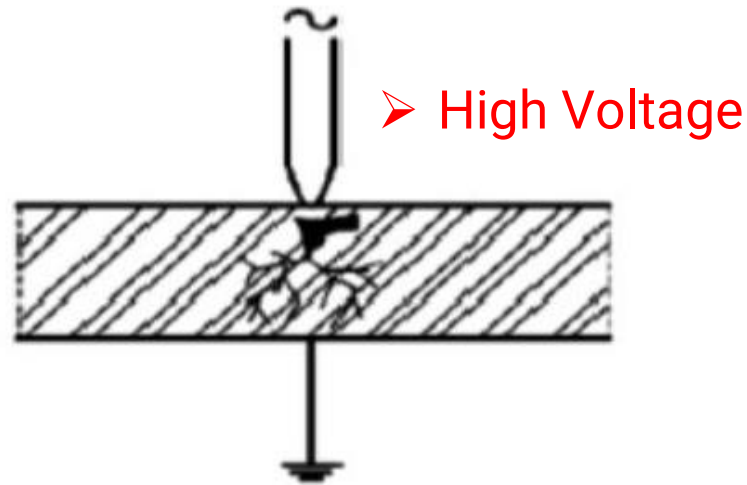
Surface Partial Discharge

The test object that has been in the measurement of surface discharges is shown in Figure 2. A sharp pin electrode was placed on the surface of XLPE material and was applied with a 50 Hz sinusoidal applied voltage. The bottom surface of the material was always grounded.

⚡ Floating Partial Discharge Internal / Void Discharge



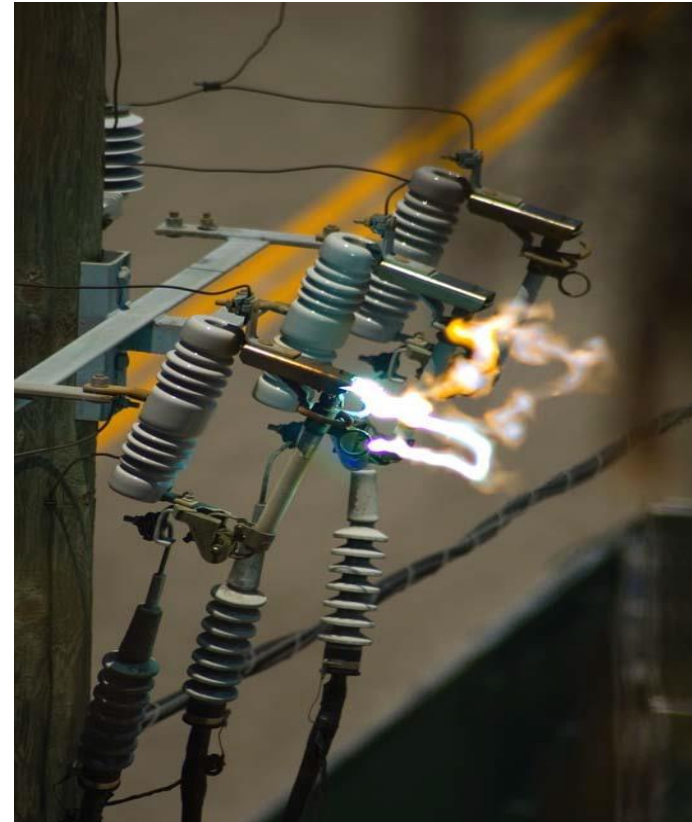
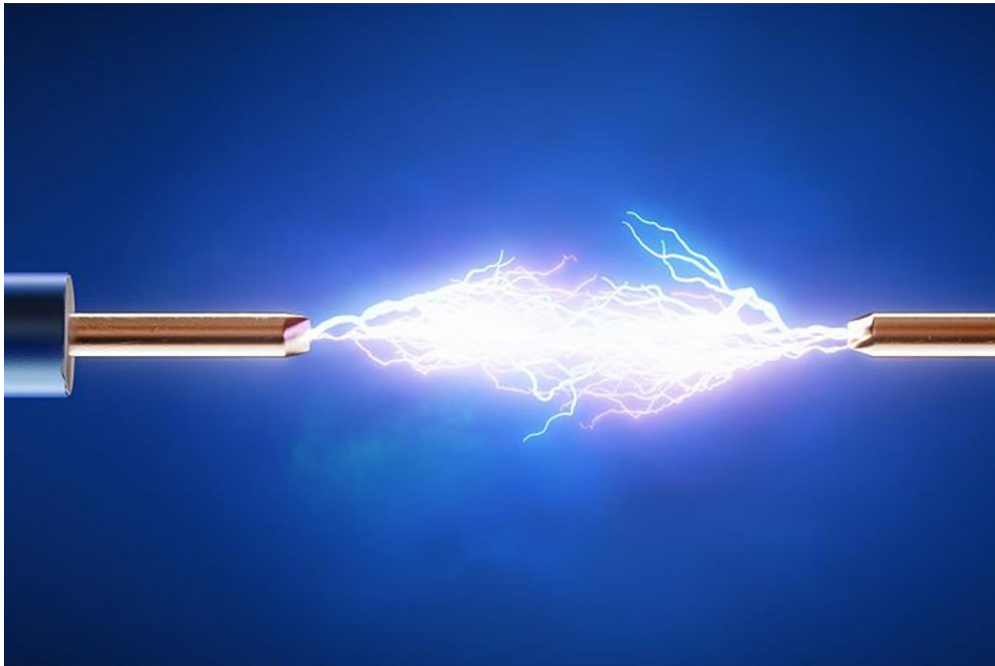
⚡ Floating Partial Discharge Discharge by Electrical (material wears)



Floating Partial Discharge

The test object that has been in the measurement of floating discharges is shown. This type of internal discharge occurs within cavities of electrical insulation and increases as the material wears

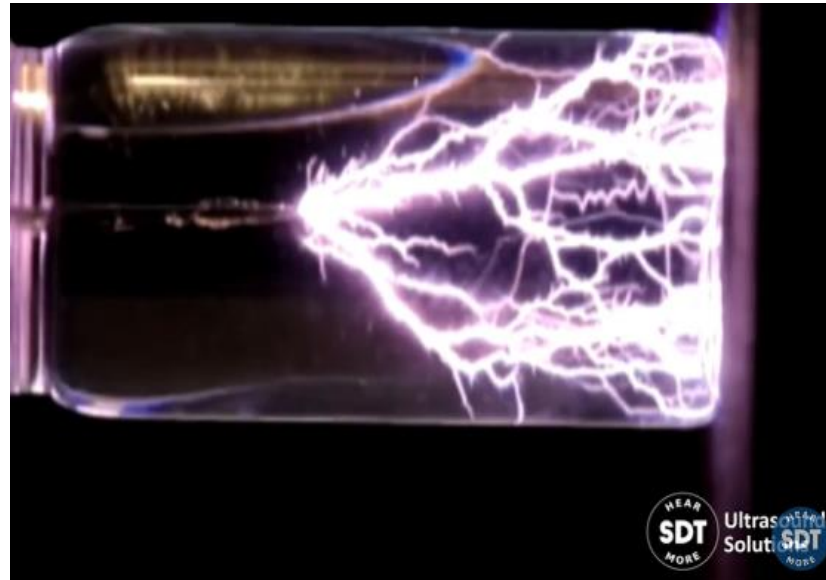
⚡ Occurs in both Low Voltage and High Voltage systems



⚡ Occurs in both Low Voltage and High Voltage systems

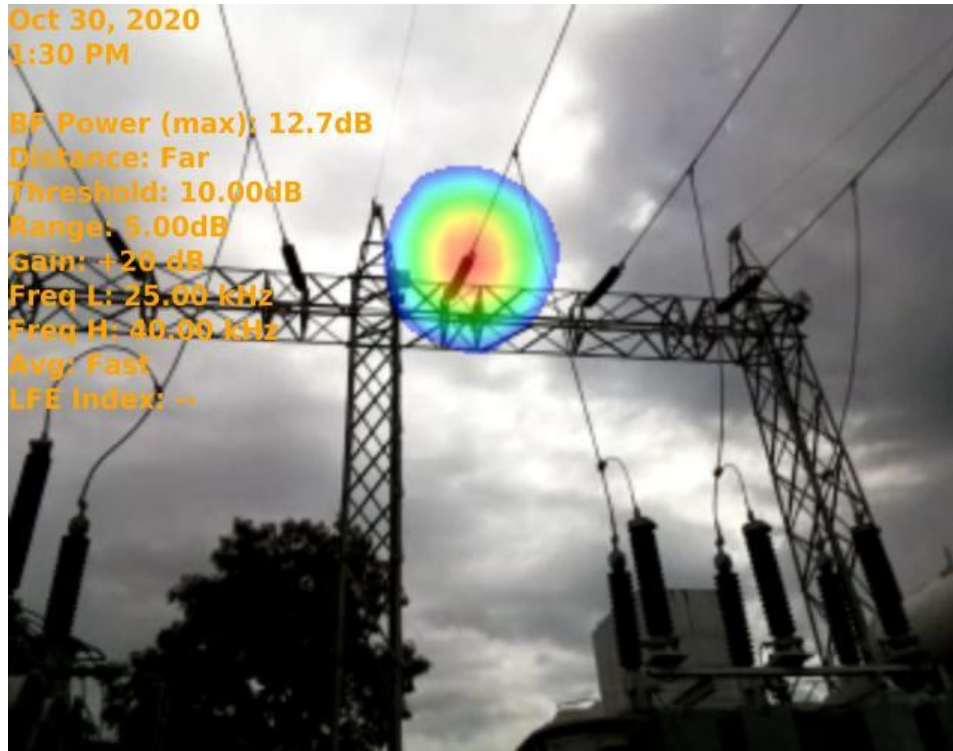


- ⚡ **Arc Flash** - ลักษณะทางกายภาพที่เรามองเห็นการ *Flow* ของ *electron* จากการ *discharge* เข้าหากันระหว่างขั้ว 2 ขั้ว ลำแสงสีฟ้าจากการ *Arc* นี้ มันคือการที่ *electron* วิ่งผ่านอากาศ แล้วไปชนกับโมเลกุลก๊าซในอากาศ ทำให้โมเลกุลเกิดการแตกตัว เป็น *plasma* นั่นก็คือลำแสงสีฟ้า



- ⚡ **Short Circuit** - การลัดวงจรอันนี้ก็เข้าใจได้ง่าย คือการที่ขั้ว 2 ขั้วมาแตะกันโดยตรง
- ⚡ **Spark** - การเกิดประกายไฟ กระเด็นออกมาจากการ *short circuit* หรือหากการ *Arc* นั้นมีความร้อนสูงมากก็จะเกิดการ *spark* จากการละลายของโลหะได้เช่นกัน
- ⚡ **Breakdown** - ภาวะสิ้นสุดของการต้านทานของฉนวน การที่ไฟฟ้าสามารถ *discharge* ข้ามฉนวนมายังอีกขั้วหนึ่ง หรือ ลงพื้นดิน หรือ กระจายไปสู่อากาศก็ได้
- ⚡ **Discharge** - ลักษณะของการ *Flow* ของ *Electron* จากการถึงจุด *breakdown* ของไฟฟ้าระหว่างขั้ว 2 ขั้ว และ *electron* ก็จะเริ่ม *discharge* ผ่านอากาศระหว่างขั้วทั้งสองได้

Electrical Asset Reliability



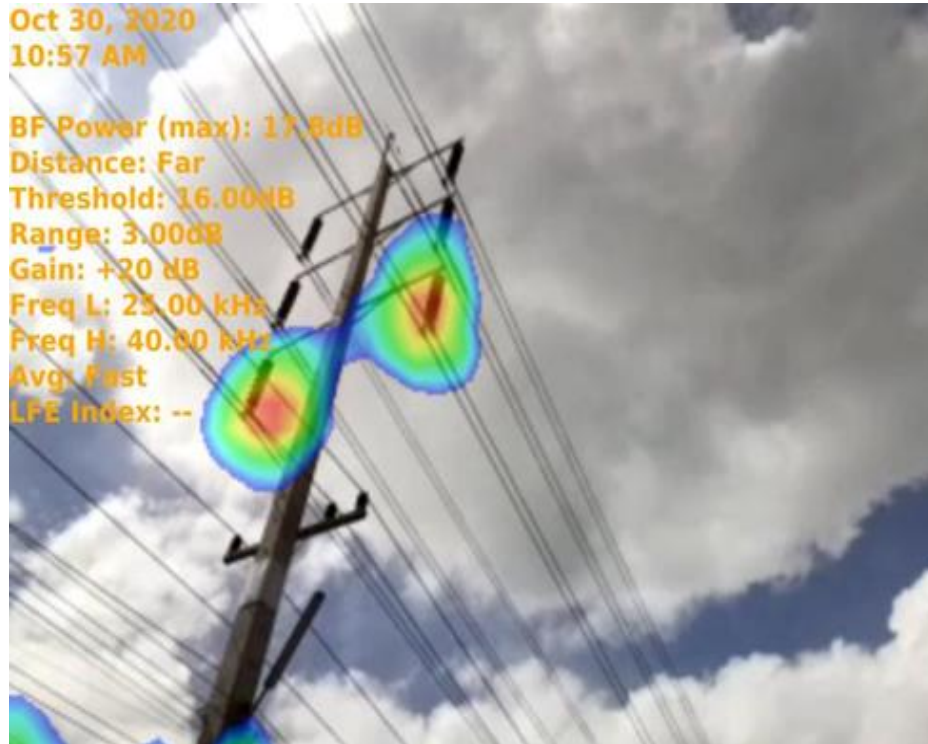
Electrical Asset Reliability

Nov 9, 2020
12:01 PM

BF Power (max): 39.7dB
Distance: Far
Threshold: 28.00dB
Range: 2.00dB
Gain: +0 dB
Freq L: 34.48 kHz
Freq H: 47.50 kHz
Avg: Slow
LFE Index: --



Electrical Asset Reliability



Electrical Asset Reliability

Oct 30, 2020
1:23 PM

BF Power (max): 21.0dB
Distance: Far
Threshold: 10.00dB
Range: 1.00dB
Gain: +20 dB
Freq L: 25.00 kHz
Freq H: 40.00 kHz
Avg: Fast
LFE Index: --



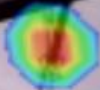
Electrical Asset Reliability



Electrical Asset Reliability

Feb 15, 2022
3:56 PM

BF Power (max): 15.2dB
Distance: Far
Threshold: 0.00dB
Range: 1.00dB
Gain: +20 dB
Freq L: 25.00 kHz
Freq H: 40.00 kHz
Avg: Fast
LFE Index: --



Electrical Asset Reliability



Electrical Asset Reliability



Electrical Asset Reliability



Electrical Asset Reliability



Electrical Asset Reliability



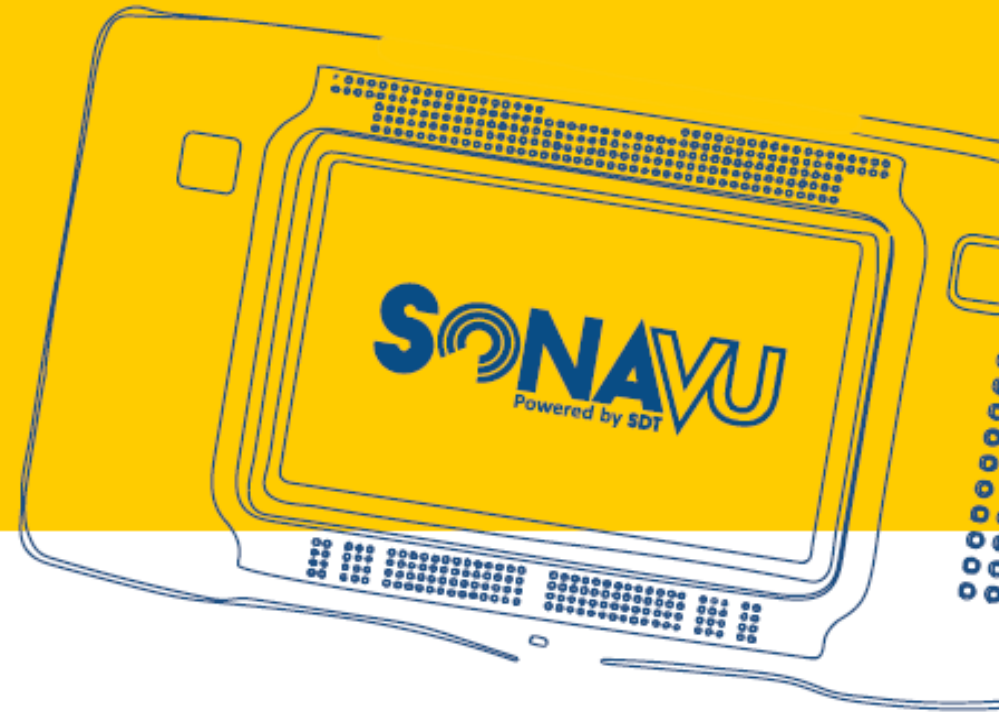
PRPD Phase Resolved Partial Discharge

What is PRPD?

PRPD Is an algorithm for partial discharge analysis. It is widely used method in the field of electrical analysis

How Do We Identify PRPD?

Airborne ultrasonic signals (frequency range 25 - 40 khz) present a pattern of PD reflecting 360 degrees of an AC cycle



Analyzing PRPD



Types of PRPD & Patterns



Corona Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

Present at high 90°



Surface Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

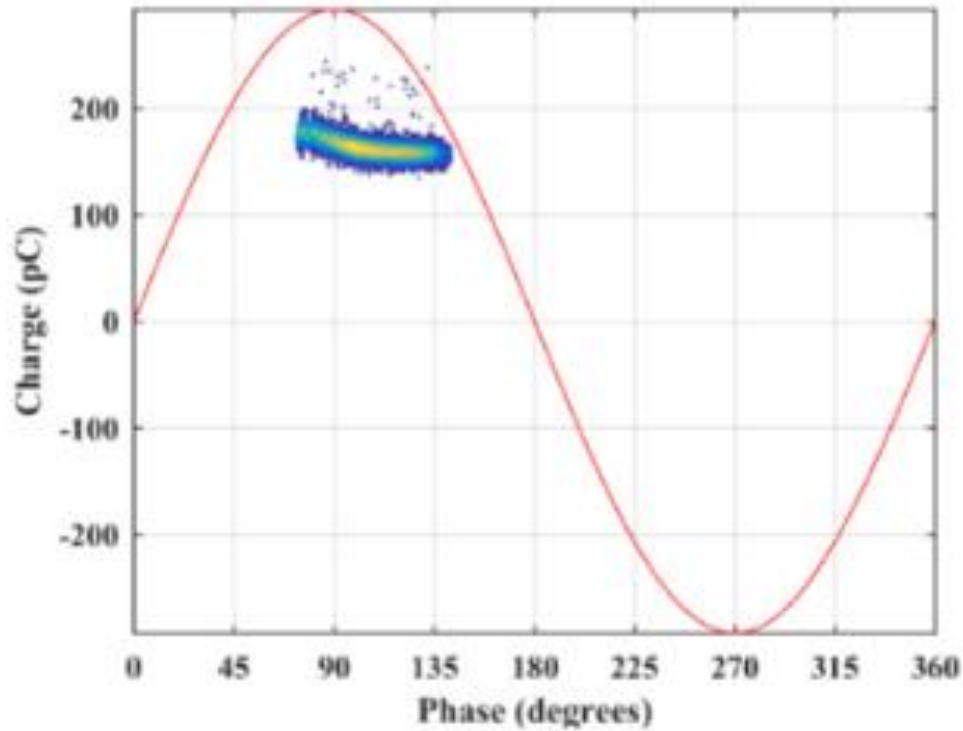
Present at high 90° and 270°



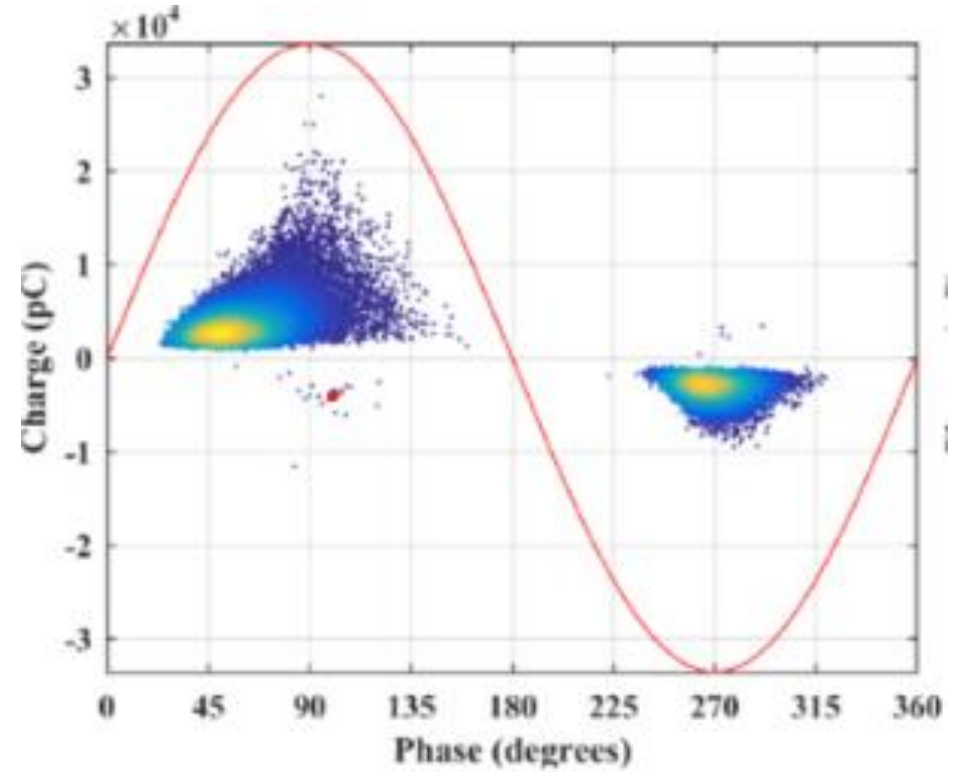
Floating Partial Discharge

A.K.A. "floating electrode" - This type of internal discharge occurs within cavities of electrical insulation and increases as the material wears

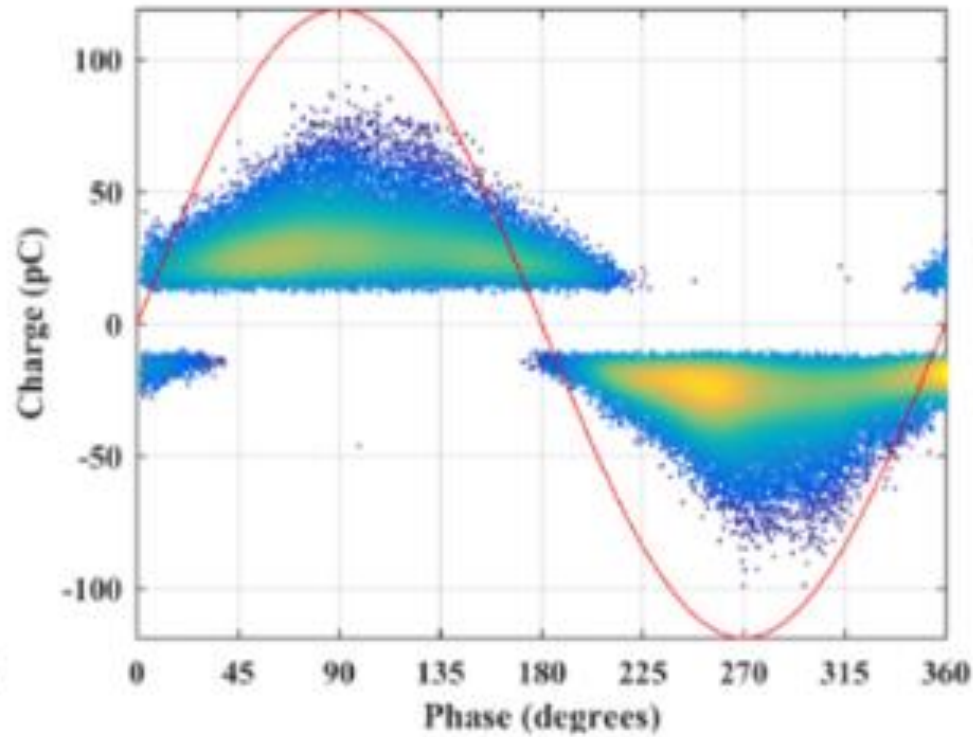
Present at high 90° (floating) and lower 270°



Corona discharge PRPD pattern



Surface discharge PRPD pattern

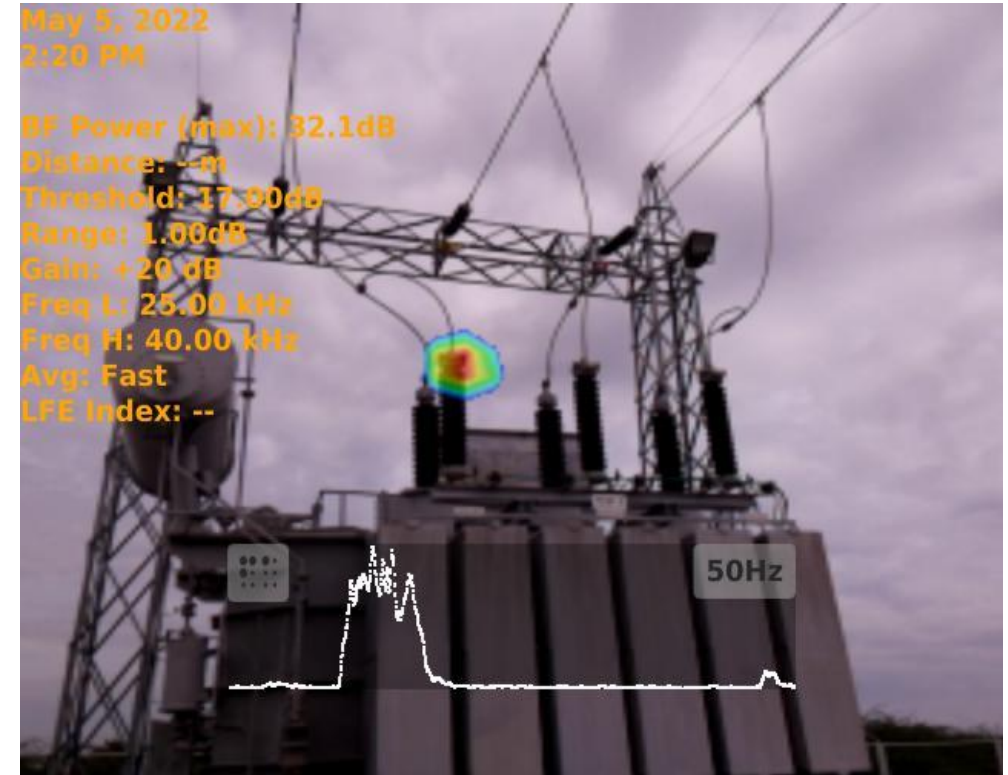


Floating discharge PRPD pattern

PRPD Phase Resolved Partial Discharge



PRPD Phase Resolved Partial Discharge



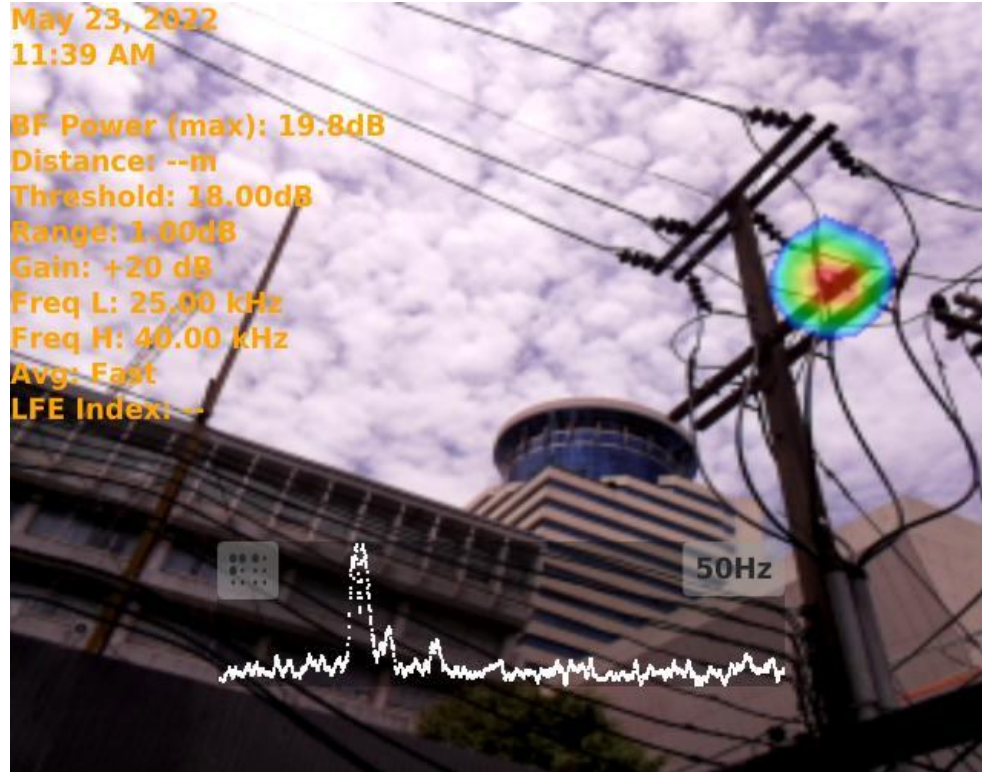
PRPD Phase Resolved Partial Discharge



PRPD Phase Resolved Partial Discharge

May 23, 2022
11:39 AM

BF Power (max): 19.8dB
Distance: --m
Threshold: 18.00dB
Range: 1.00dB
Gain: +20 dB
Freq L: 25.00 kHz
Freq H: 40.00 kHz
Avg: Fast
LFE Index: --

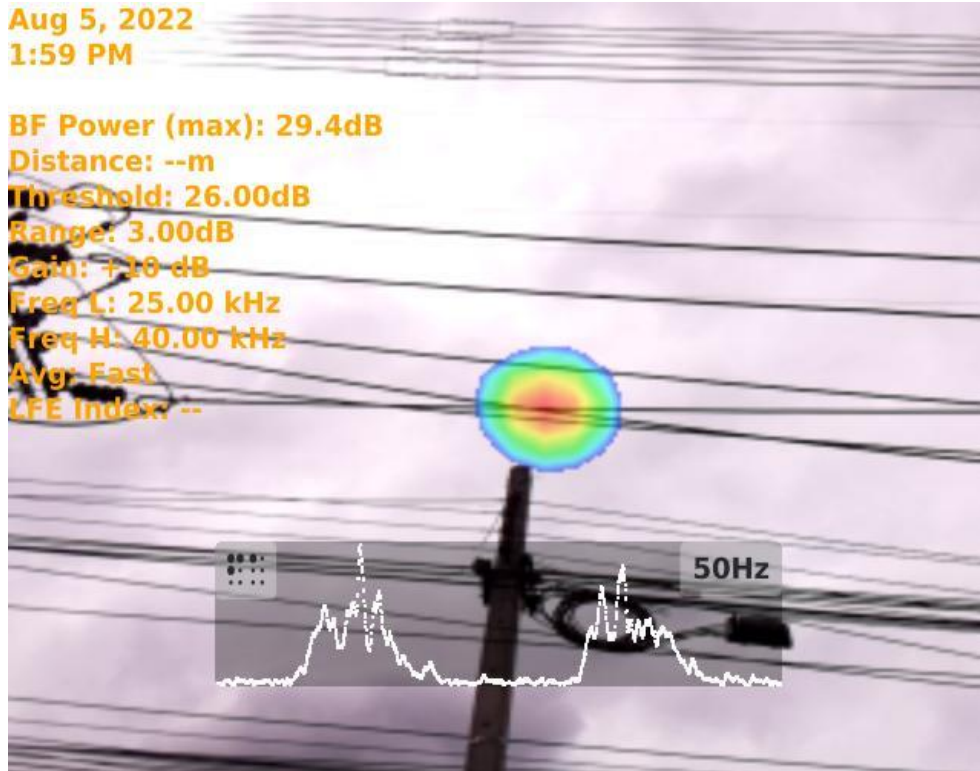


PRPD Phase Resolved Partial Discharge



Aug 5, 2022
1:59 PM

BF Power (max): 29.4dB
Distance: --m
Threshold: 26.00dB
Range: 3.00dB
Gain: +18 dB
Freq L: 25.00 kHz
Freq H: 40.00 kHz
Avg: Fast
LFE Index: --





Audible sound



Ultrasound



Audible sound



Ultrasound

Types of PRPD & Patterns



Corona Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

Present at high 90°



Surface Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

Present at high 90° and 270°



Floating Partial Discharge

A.K.A. "floating electrode" - This type of internal discharge occurs within cavities of electrical insulation and increases as the material wears

Present at high 90° (floating) and lower 270°



Types of PRPD & Patterns



Corona Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

Present at high 90°



Surface Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

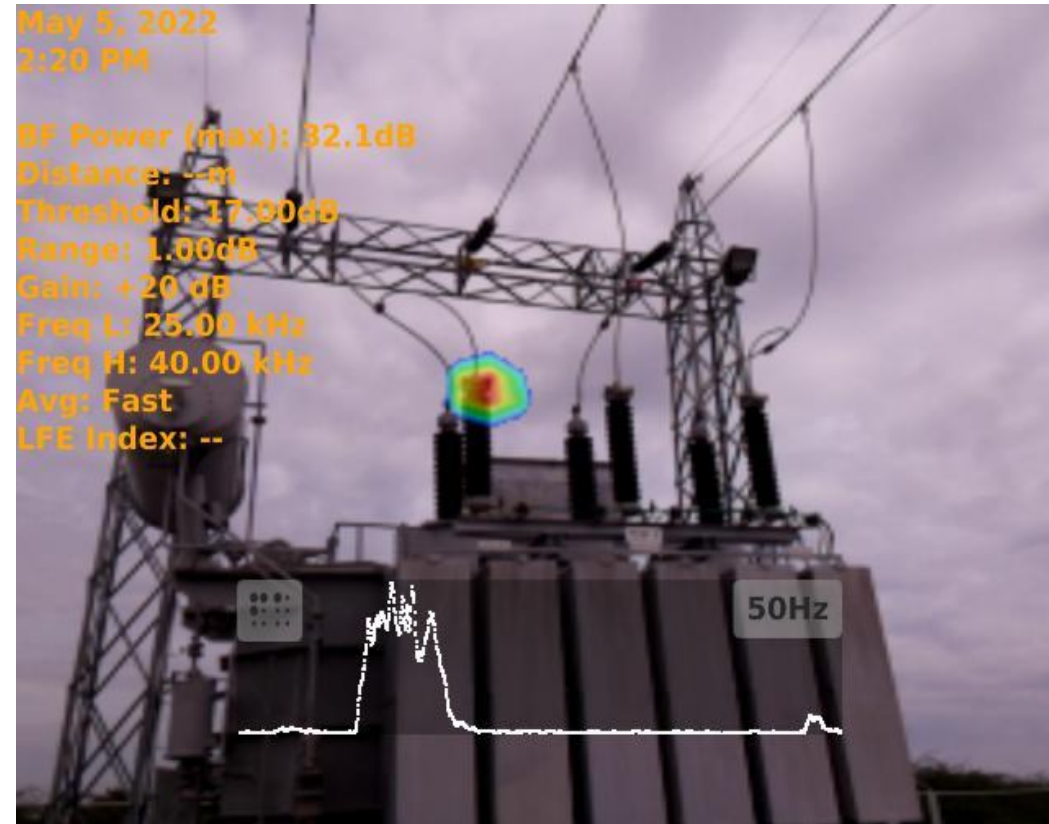
Present at high 90° and 270°



Floating Partial Discharge

A.K.A. "floating electrode" - This type of internal discharge occurs within cavities of electrical insulation and increases as the material wears

Present at high 90° (floating) and lower 270°



Types of PRPD & Patterns



Corona Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

Present at high 90°



Surface Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

Present at high 90° and 270°



Floating Partial Discharge

A.K.A. "floating electrode" - This type of internal discharge occurs within cavities of electrical insulation and increases as the material wears

Present at high 90° (floating) and lower 270°



Types of PRPD & Patterns



Corona Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

Present at high 90°



Surface Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

Present at high 90° and 270°



Floating Partial Discharge

A.K.A. "floating electrode" - This type of internal discharge occurs within cavities of electrical insulation and increases as the material wears

Present at high 90° (floating) and lower 270°



Types of PRPD & Patterns



Corona Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

Present at high 90°



Surface Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

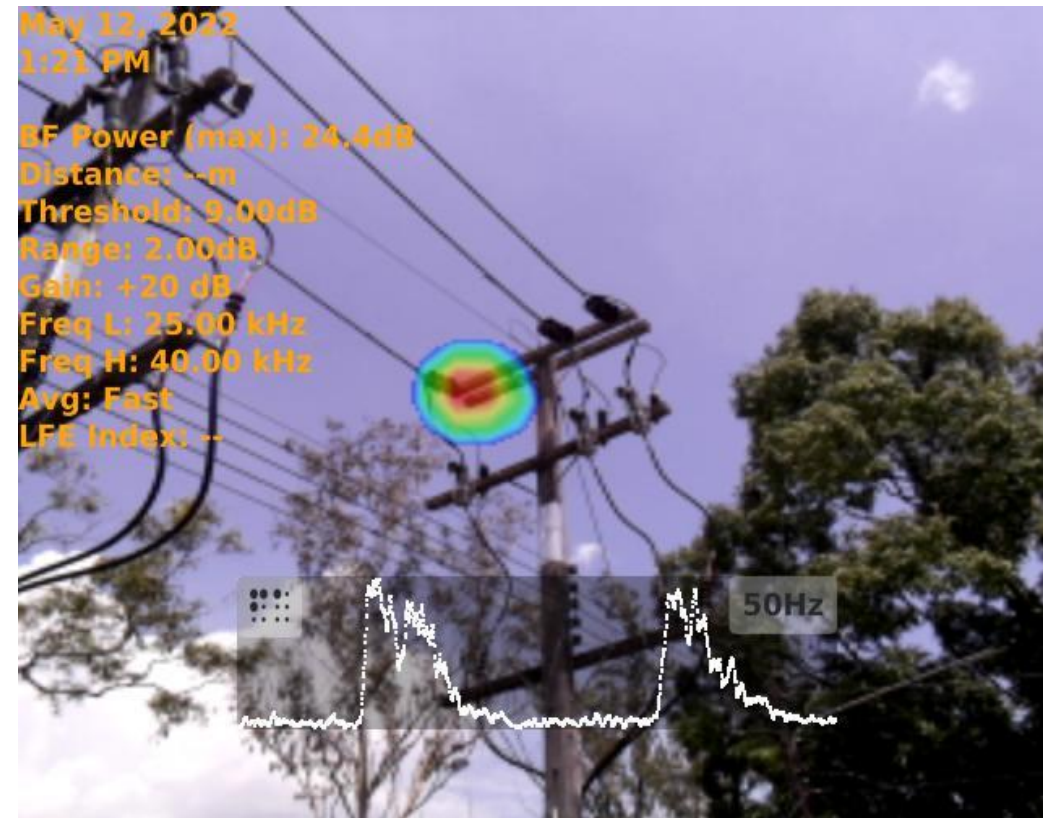
Present at high 90° and 270°



Floating Partial Discharge

A.K.A. "floating electrode" - This type of internal discharge occurs within cavities of electrical insulation and increases as the material wears

Present at high 90° (floating) and lower 270°



Types of PRPD & Patterns



Corona Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

Present at high 90°



Surface Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

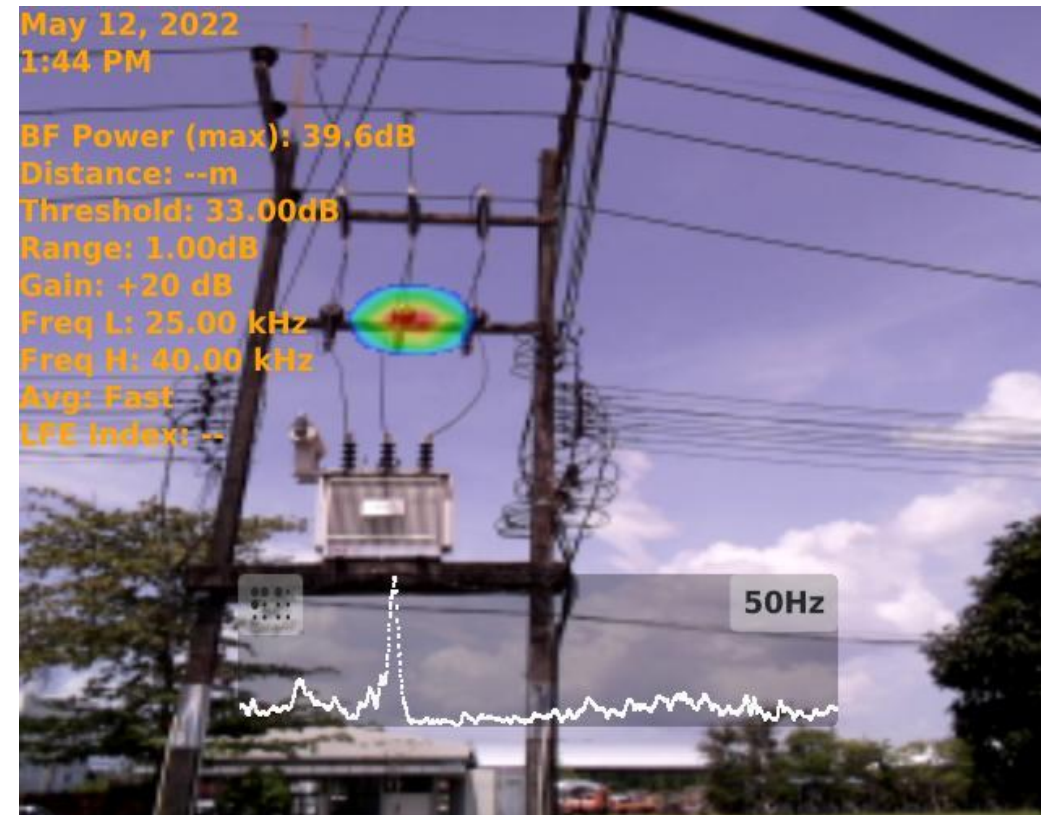
Present at high 90° and 270°



Floating Partial Discharge

A.K.A. "floating electrode" - This type of internal discharge occurs within cavities of electrical insulation and increases as the material wears

Present at high 90° (floating) and lower 270°



Types of PRPD & Patterns



Corona Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

Present at high 90°



Surface Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

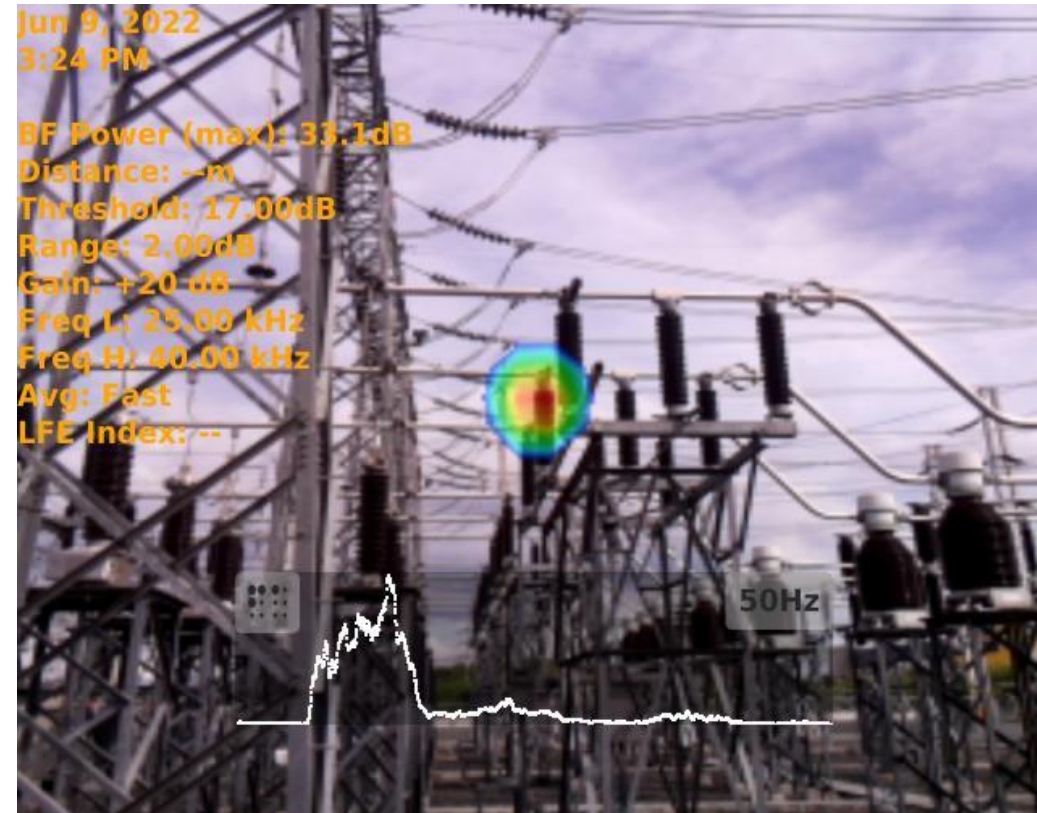
Present at high 90° and 270°



Floating Partial Discharge

A.K.A. "floating electrode" - This type of internal discharge occurs within cavities of electrical insulation and increases as the material wears

Present at high 90° (floating) and lower 270°



Types of PRPD & Patterns



Corona Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

Present at high 90°



Surface Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

Present at high 90° and 270°



Floating Partial Discharge

A.K.A. "floating electrode" - This type of internal discharge occurs within cavities of electrical insulation and increases as the material wears

Present at high 90° (floating) and lower 270°



Types of PRPD & Patterns



Corona Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

Present at high 90°



Surface Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

Present at high 90° and 270°



Floating Partial Discharge

A.K.A. "floating electrode" - This type of internal discharge occurs within cavities of electrical insulation and increases as the material wears

Present at high 90° (floating) and lower 270°

Aug 5, 2022
1:59 PM

BF Power (max): 29.8dB

Distance: --m

Threshold: 26.00dB

Range: 3.00dB

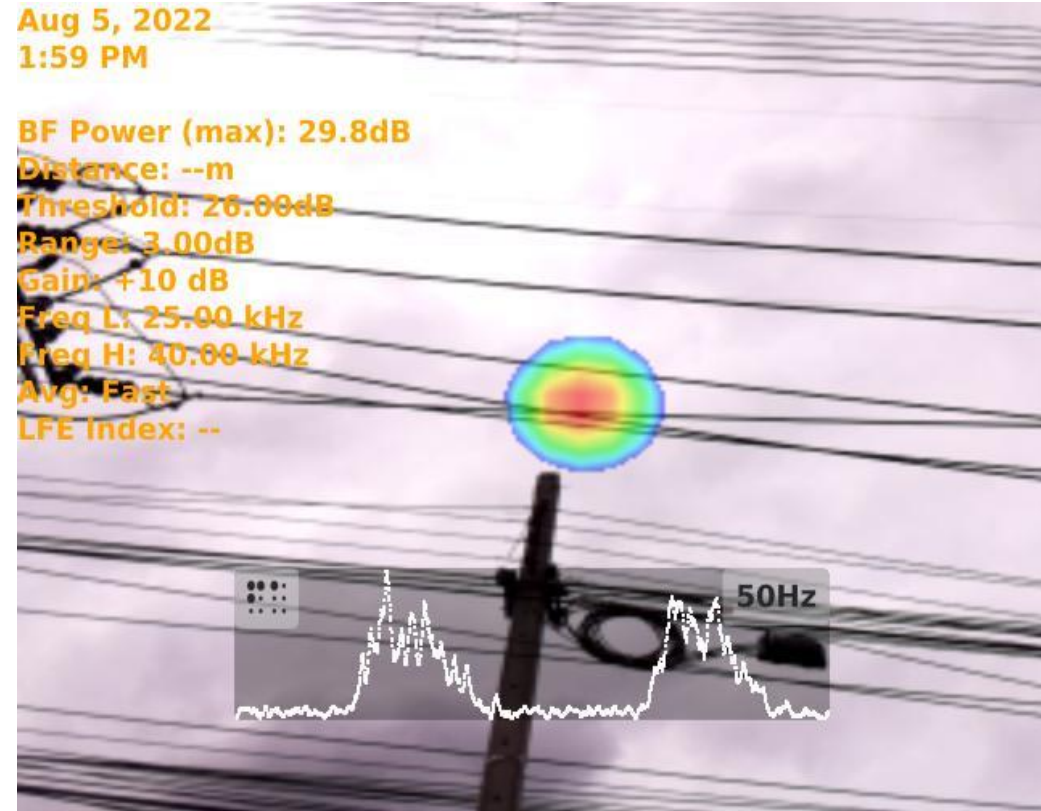
Gain: +10 dB

Freq L: 25.00 kHz

Freq H: 40.00 kHz

Avg: Fast

LFE Index: --



Types of PRPD & Patterns



Corona Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

Present at high 90°



Surface Partial Discharge

Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage

Present at high 90° and 270°

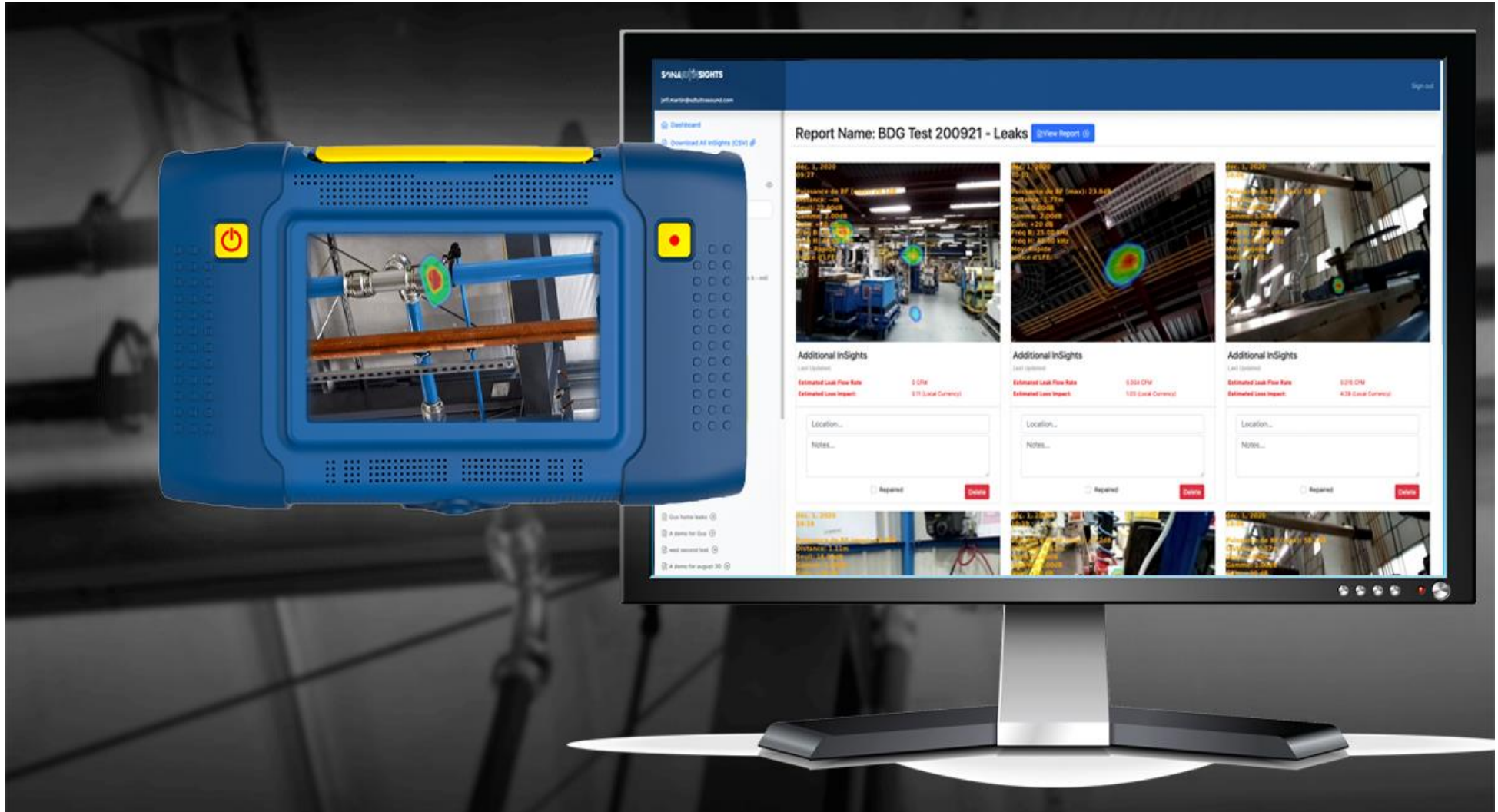


Floating Partial Discharge

A.K.A. "floating electrode" - This type of internal discharge occurs within cavities of electrical insulation and increases as the material wears

Present at high 90° (floating) and lower 270°





Dashboard Management

SonaVu InSights™ is a browser-based app for monitoring the condition of compressed air systems and electrical assets, documenting findings, and prioritizing maintenance and repairs.

SonaVu™ is a multi-frequency acoustic imaging camera that blends visual and auditory senses to bring compressed air waste and failing or faulty electrical equipment into focus. Images and videos of compressed air leaks and electrical faults can be recorded using the SonaVu™ Acoustic Imaging Camera then uploaded to a SonaVu InSights™ Report Library very quickly.

Managing your Electrical Assets using SonaVu InSights™

Simply scanning your electrical assets with a SonaVu™ Acoustic Imaging Camera will reveal any defects and deterioration on the insulation that is present. To complete a survey, record findings, then upload them to the Report Library on SonaVu InSights™. Here they can be securely stored.

Electrical defects detected with the SonaVu™ can be organized based on notes, location, reporting technician, part number/equipment, date and time, and production process powered. From here they can be further prioritized and scheduled for repair based on the maintenance planners' parameters.

Features for Managing Electrical Assets with SonaVu InSights™

- Upload and store unlimited survey data, images, and videos with lightning-fast speeds.
- Organize findings based on different parameters chosen by the technicians, managers, or planners.
- Determine types of Partial Discharge using Phase Resolved Partial Discharge (PRPD).
- Continuously integrate team discussion into a single living report.

- Dashboard
- Download All InSights (CSV)
- Disclaimer

SONAVU INSIGHTS

Filter InSights...

- audible test v2
- audible test
- test999
- BDG Test 200921
- Patrices report
- A demo electrical report
- A demo for sdt international - line 6 - mill 5
- A demo electrical report
- A demo for kcc 3
- A demo report for kcc
- A demo leak report for KCC
- Test 1m 0309
- Test 1m 0309
- Test 1m
- Test 1m
- Test 1m
- trouble 2
- SBGE
- Cushion line 01



DEMO Electrical Test

InSights Created: 2021-08-27
Last Updated:

Inspected By: Jeffrey Martin
Loss Impact: **NA (Local Currency)**
Savings Impact: **NA (Local Currency)**

- View Report
- View/Edit Individual Faults



An Electrical Demo

InSights Created: 2021-08-26
Last Updated:

Inspected By: Jeffrey Martin
Loss Impact: **NA (Local Currency)**
Savings Impact: **NA (Local Currency)**

- View Report
- View/Edit Individual Faults



Plant 21 - Line 6 - South East Corner - Column 30-42 - Valve 21

InSights Created: 2021-08-26
Last Updated:

Inspected By: Jeffrey Martin
Loss Impact: **1843.82 (Local Currency)**
Savings Impact: **87.15 (Local Currency)**

- View Report
- View/Edit Individual Leaks

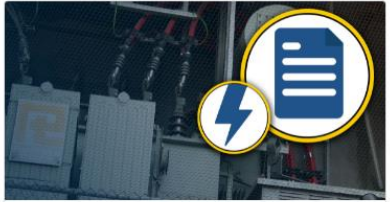


TEST

InSights Created: 2021-08-26
Last Updated:

Inspected By:
Loss Impact: **58046.54 (Local Currency)**
Savings Impact: **0.00 (Local Currency)**

- View Report
- View/Edit Individual Leaks



TEST

InSights Created: 2021-08-26
Last Updated:

Inspected By: Gilles Lanthier



Patterson Example

InSights Created: 2021-08-24
Last Updated:

Inspected By: Robert Dent



Ipex

InSights Created: 2021-08-24
Last Updated:

Inspected By:

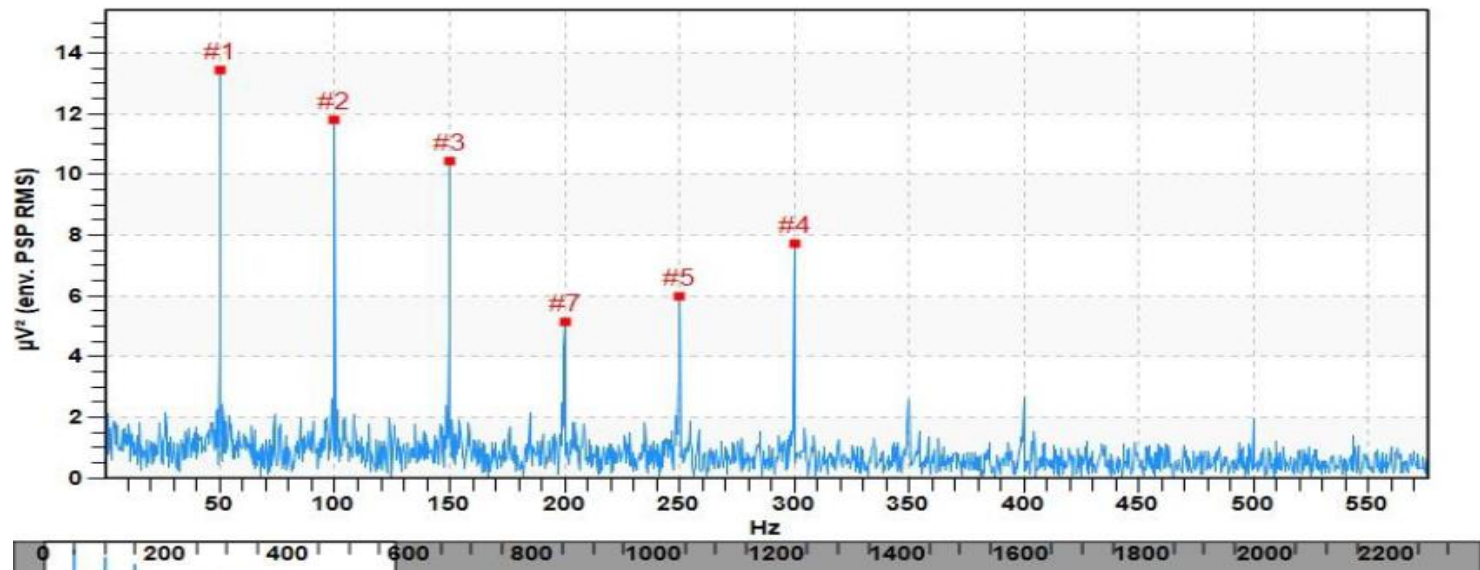
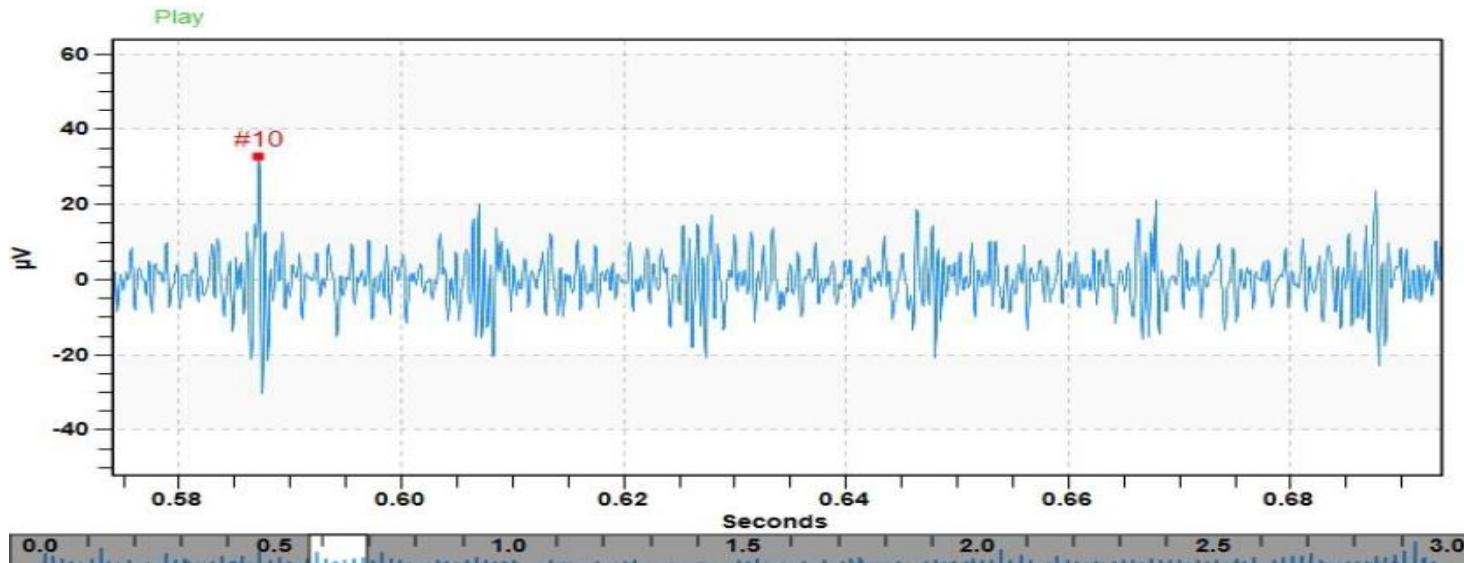


test rob

InSights Created: 2021-08-24
Last Updated:

Inspected By:

TWF and Spectral FFT Analysis



NEW Hardware



**Ultrasonic Sensor Array
112 Digital MEMS Sensors**

- 112 Digital MEMS Microphone
- 5-inch Touch Screen **HD Full Color**
- Distance Range 0.3 to 150 m **(New)**
- Frame Rate Speed 25 FPS **(800 x 480)**
- Microphone Sensitivity **-41 dBFS**
- Sample Rate 96,000 Sample per Second
- Including Distance Range Sensor
- Adjustable Lighting
- 53 GB Build-in Memory card

NEW Hardware



**Ultrasonic Sensor Array
112 Digital MEMS Sensors**

- Rechargeable Battery
- 4 Hours operation time
- Headphone Bluetooth
- External Battery Pack 4 Hours with Charger & USB-C Cable

Firmware



- Real-Time Visualization of Sound
- Desired Frequency Range Filtering
- Threshold (0 to 120 dB)
- Image Range
- Gain
- Image Average Function (Fast & Slow)
- Video , US sound and Image Storage
- Improved Accuracy according to the Distance



- Image Storage (Up to 1,000,000 data)
- Video Storage with US Sound (7 days for continuous video)
- LEAKReporter Cost Web Software (iOS & Android)
- PRPD Partial Discharge detection and analysis
- SonaVu InSights™ Dashboard Management and Reporting generation
- SonaVu to UAS3 Conversion Spectral FFT & Waveform Data **(NEW 2023)**

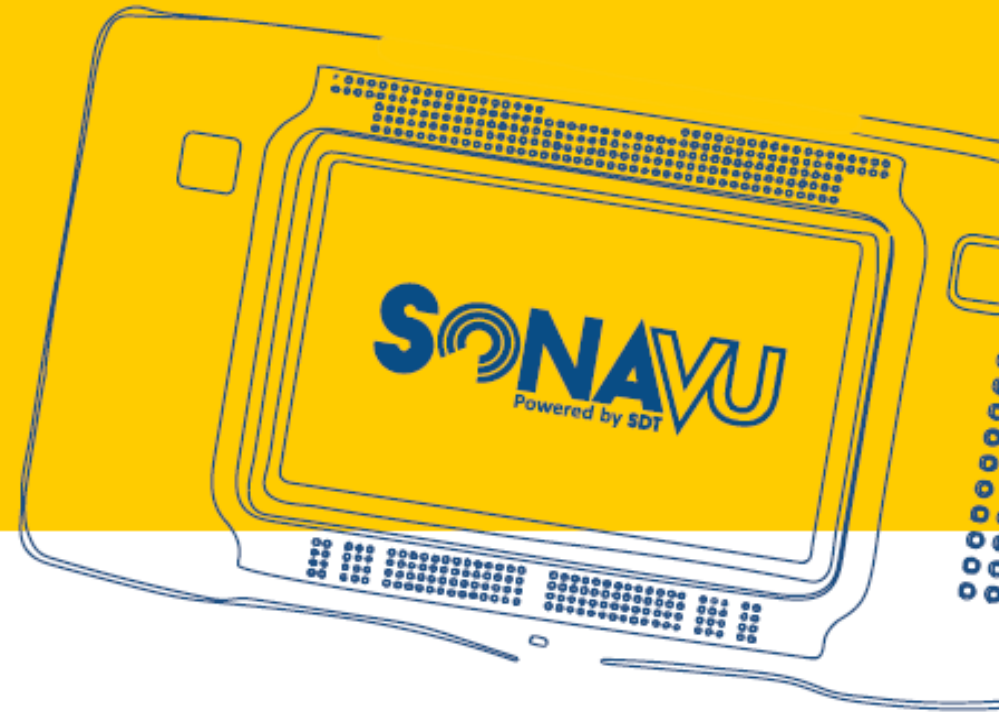
PRPD Phase Resolved Partial Discharge

What is PRPD?

PRPD Is an algorithm for partial discharge analysis. It is widely used method in the field of electrical analysis

How Do We Identify PRPD?



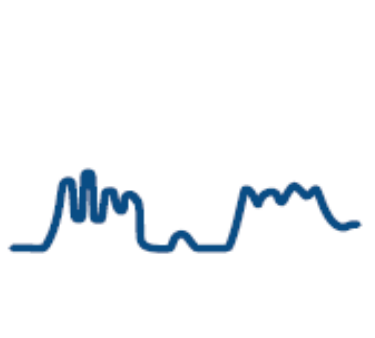
Airborne ultrasonic signals (frequency range 25 - 40 khz) present a pattern of PD reflecting 360 degrees of an AC cycle

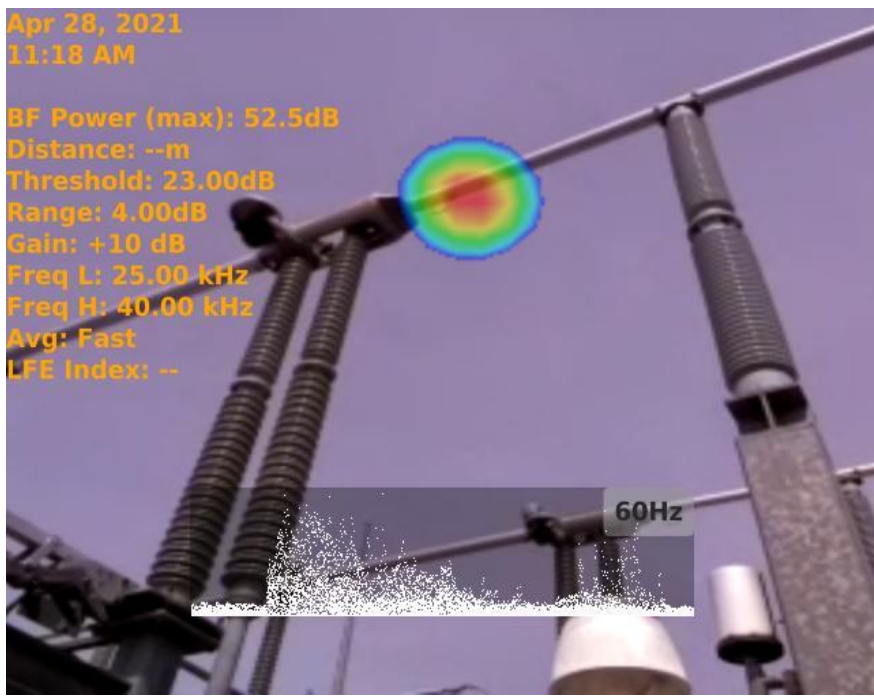


Analyzing PRPD



Types of PRPD & Patterns

	<p>Corona Partial Discharge Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage Present at high 90°</p>
	<p>Surface Partial Discharge Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage Present at high 90° and 270°</p>
	<p>Floating Partial Discharge A.K.A. "floating electrode" - This type of internal discharge occurs within cavities of electrical insulation and increases as the material wears Present at high 90° (floating) and lower 270°</p>



Analyzing PRPD



Types of PRPD & Patterns



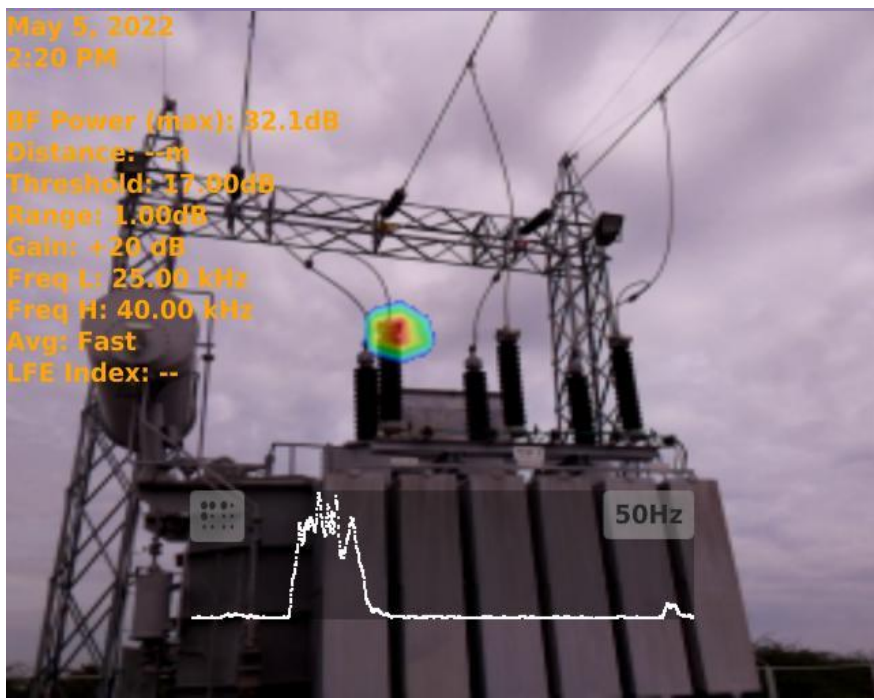
Corona Partial Discharge
Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage
Present at high 90°



Surface Partial Discharge
Electrical discharge caused by the ionization of fluid such as air surrounding a conductor carrying a high voltage
Present at high 90° and 270°



Floating Partial Discharge
A.K.A. "floating electrode" - This type of internal discharge occurs within cavities of electrical insulation and increases as the material wears
Present at high 90° (floating) and lower 270°



- Dashboard
- Download All InSights (CSV)
- Disclaimer

SONAVU INSIGHTS

Filter InSights...

- audible test v2
- audible test
- test999
- BDG Test 200921
- Patrices report
- A demo electrical report
- A demo for sdt international - line 6 - mill 5
- A demo electrical report
- A demo for kcc 3
- A demo report for kcc
- A demo leak report for KCC
- Test 1m 0309
- Test 1m 0309
- Test 1m
- Test 1m
- Test 1m
- trouble 2
- SBGE
- Cushion line 01



DEMO Electrical Test

InSights Created: 2021-08-27
Last Updated:

Inspected By: Jeffrey Martin
Loss Impact: **NA (Local Currency)**
Savings Impact: **NA (Local Currency)**

- View Report
- View/Edit Individual Faults



An Electrical Demo

InSights Created: 2021-08-26
Last Updated:

Inspected By: Jeffrey Martin
Loss Impact: **NA (Local Currency)**
Savings Impact: **NA (Local Currency)**

- View Report
- View/Edit Individual Faults



Plant 21 - Line 6 - South East Corner - Column 30-42 - Valve 21

InSights Created: 2021-08-26
Last Updated:

Inspected By: Jeffrey Martin
Loss Impact: **1843.82 (Local Currency)**
Savings Impact: **87.15 (Local Currency)**

- View Report
- View/Edit Individual Leaks

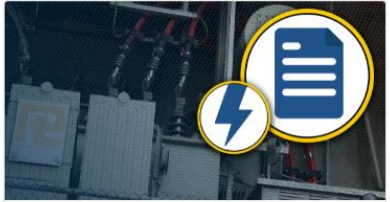


TEST

InSights Created: 2021-08-26
Last Updated:

Inspected By:
Loss Impact: **58046.54 (Local Currency)**
Savings Impact: **0.00 (Local Currency)**

- View Report
- View/Edit Individual Leaks



TEST

InSights Created: 2021-08-26
Last Updated:

Inspected By: Gilles Lanthier



Patterson Example

InSights Created: 2021-08-24
Last Updated:

Inspected By: Robert Dent



Ipex

InSights Created: 2021-08-24
Last Updated:

Inspected By:

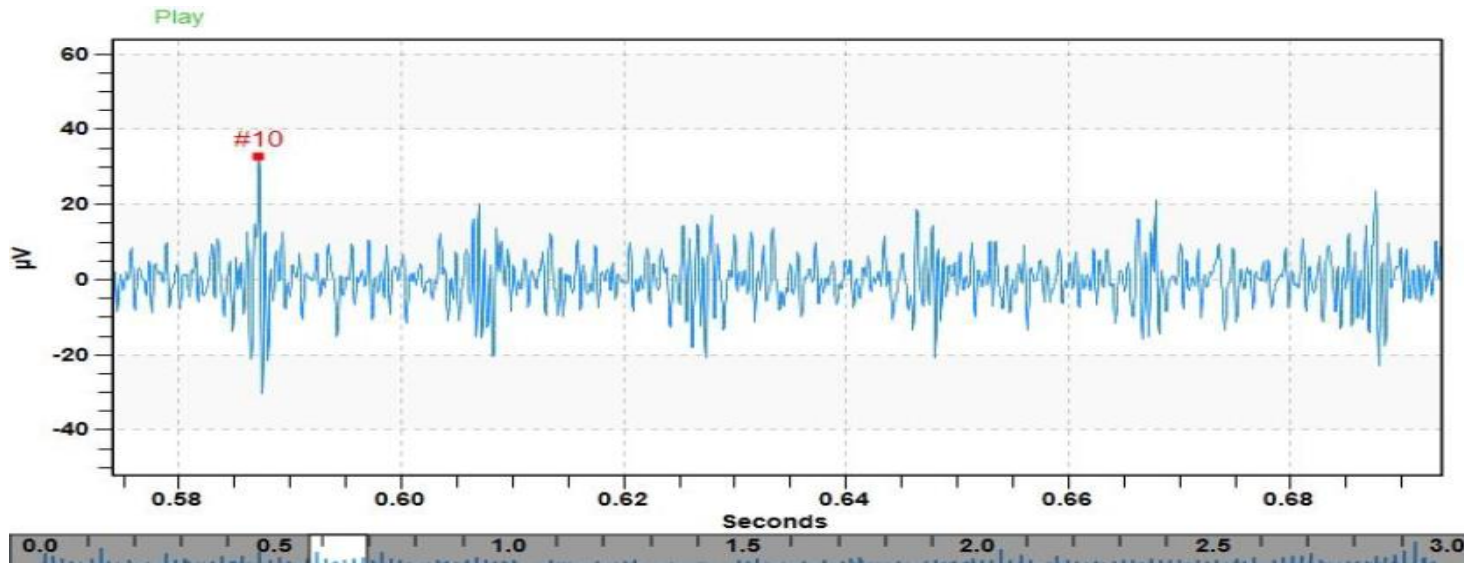


test rob

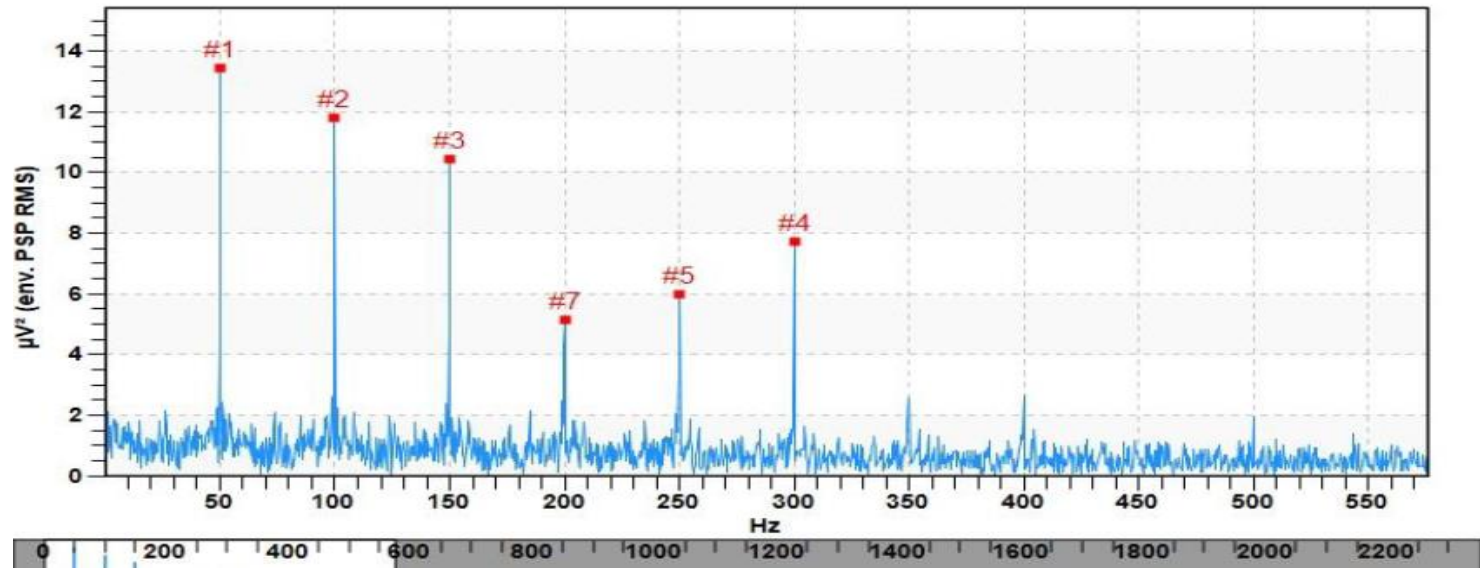
InSights Created: 2021-08-24
Last Updated:

Inspected By:

TWF and Spectral FFT Analysis



UAS3
Ultranalysis Suite

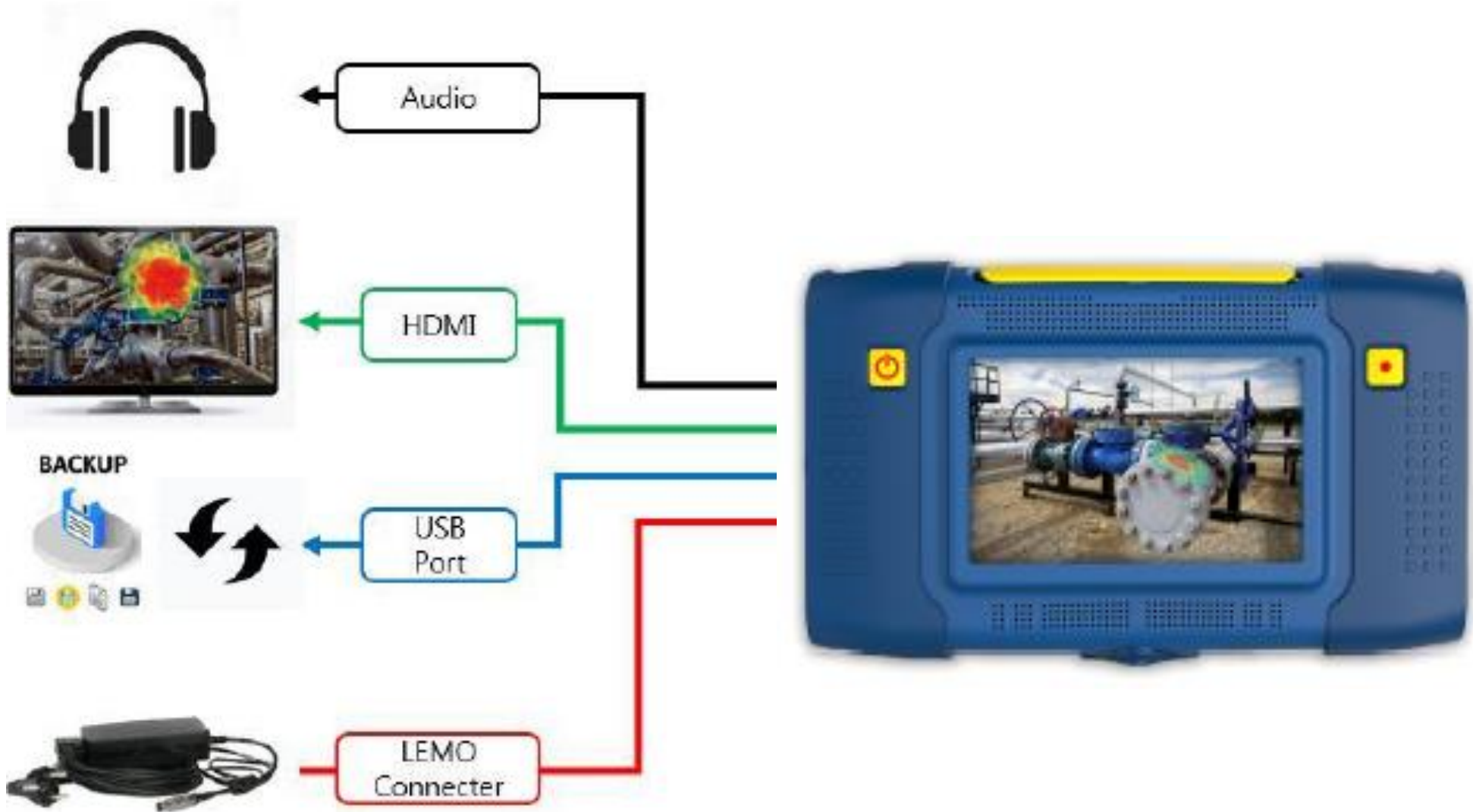


SDT SonaVu™ Set



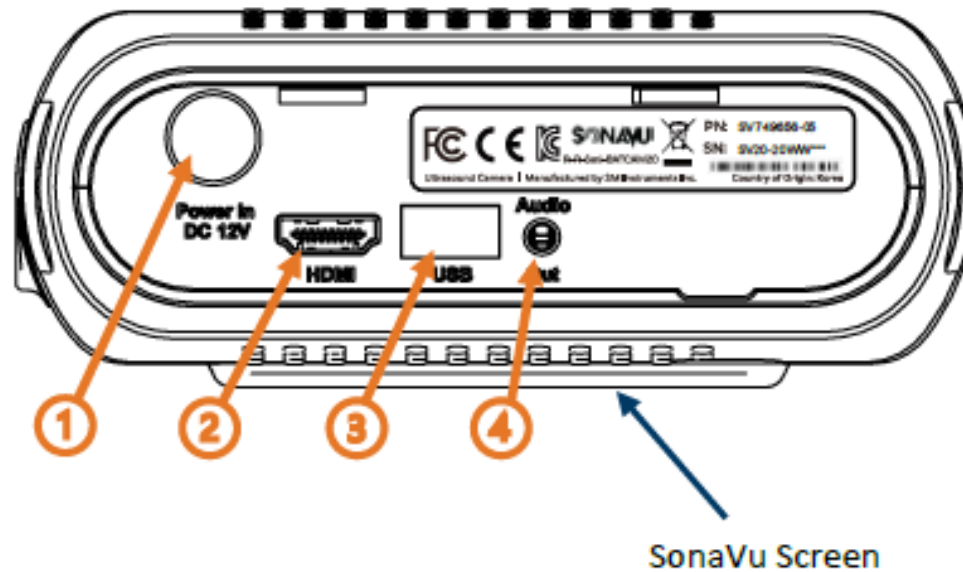
Qty	Article Code	Description
	FS.SVU.STN.001	SDT SonaVu™ Base Kit
1	FU.SVU.001-01	SonaVu™ Acoustic Imaging Camera w/ Hand Strap and Rubber Grip
1	FU.SVU.PWR.001	SonaVu™ Power Supply w/ Adapters
1	FU.SVU.CLN.001	SonaVu™ Cleaning Kit
1	FU.SVU.EXPC.001	SonaVu™ External Battery Cable
1	FU.SVU.EXBP.001	SonaVu™ External Battery Pack w/ Charger & USB-C Cable
1	FU.SVU.ADT.001	SonaVu™ Universal Power Adapter (Only Outside North America)
1	FU.CA930.CBOX.002-01	SDT930 Custom Carrying Case
1	FUHDPH-8	Headphones, Overhead, Bluetooth

External Interface Connection



External Interface Connection

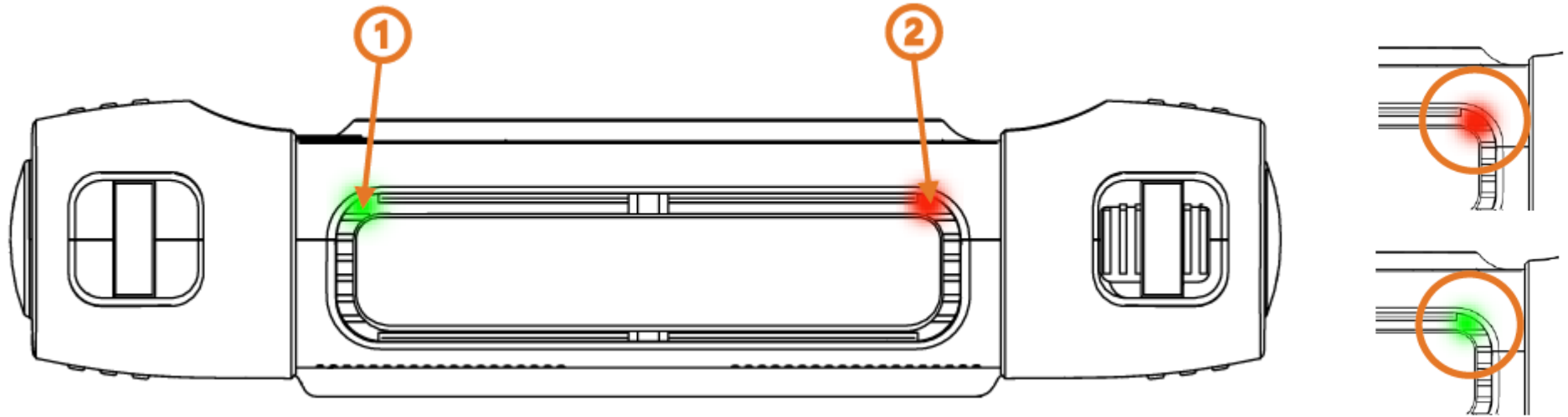
1	Power Port	LEMO Power Connector for DC power supply
2	Video Port	HDMI port for video output to external display
3	USB Port	USB 2.0 for transferring data and updating device firmware
4	Audio Jack	Standard 1/8" audio jack for headphones or external speaker



Connecting the Charger/Power Adaptor

Connect the LEMO cable by aligning the red dot on the LEMO connector with the red dot on the power port on the side of the device.





Power Status Indicator (1)

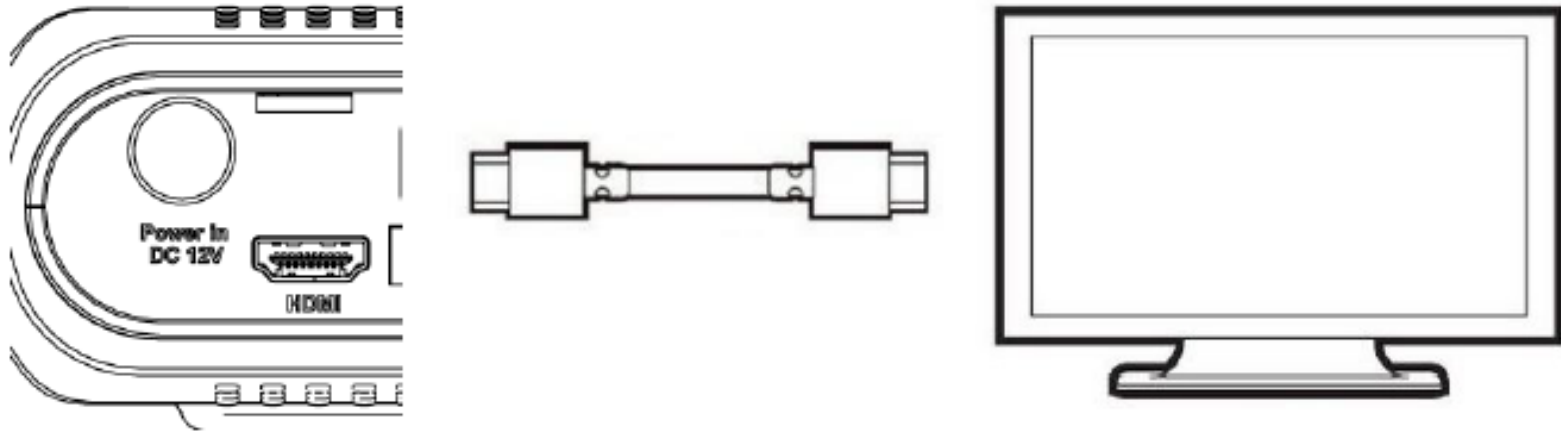
After powering ON the SonaVu™, a Green LED indicator will light on the top left corner of the casing.

Charging Status Indicator (2)

When the power adapter is connected the SonaVu™ will automatically start charging the internal battery and a Red LED indicator will light on the top right corner.

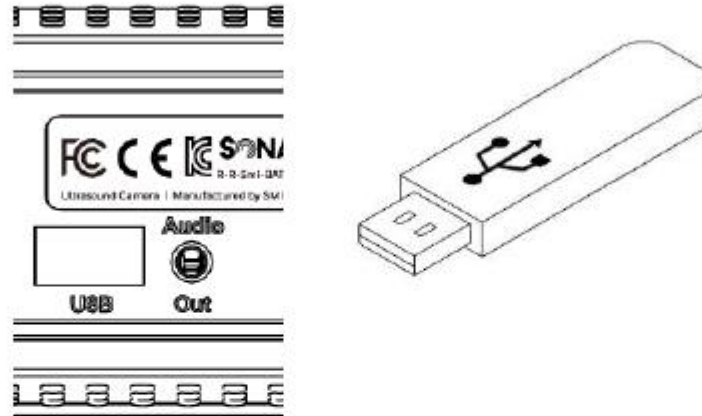
① HDMI Port

The SonaVu™ can be connected to an external monitor with an HDMI cable.

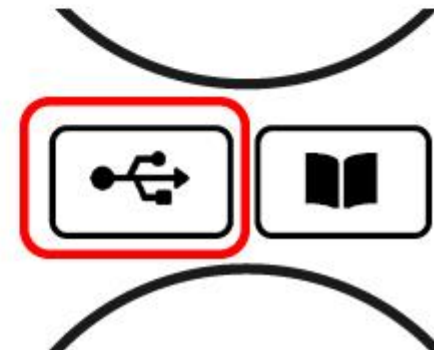


② USB Port

Image and video files stored in SonaVu™ can be transferred to a USB drive (FAT 32 form USB port).

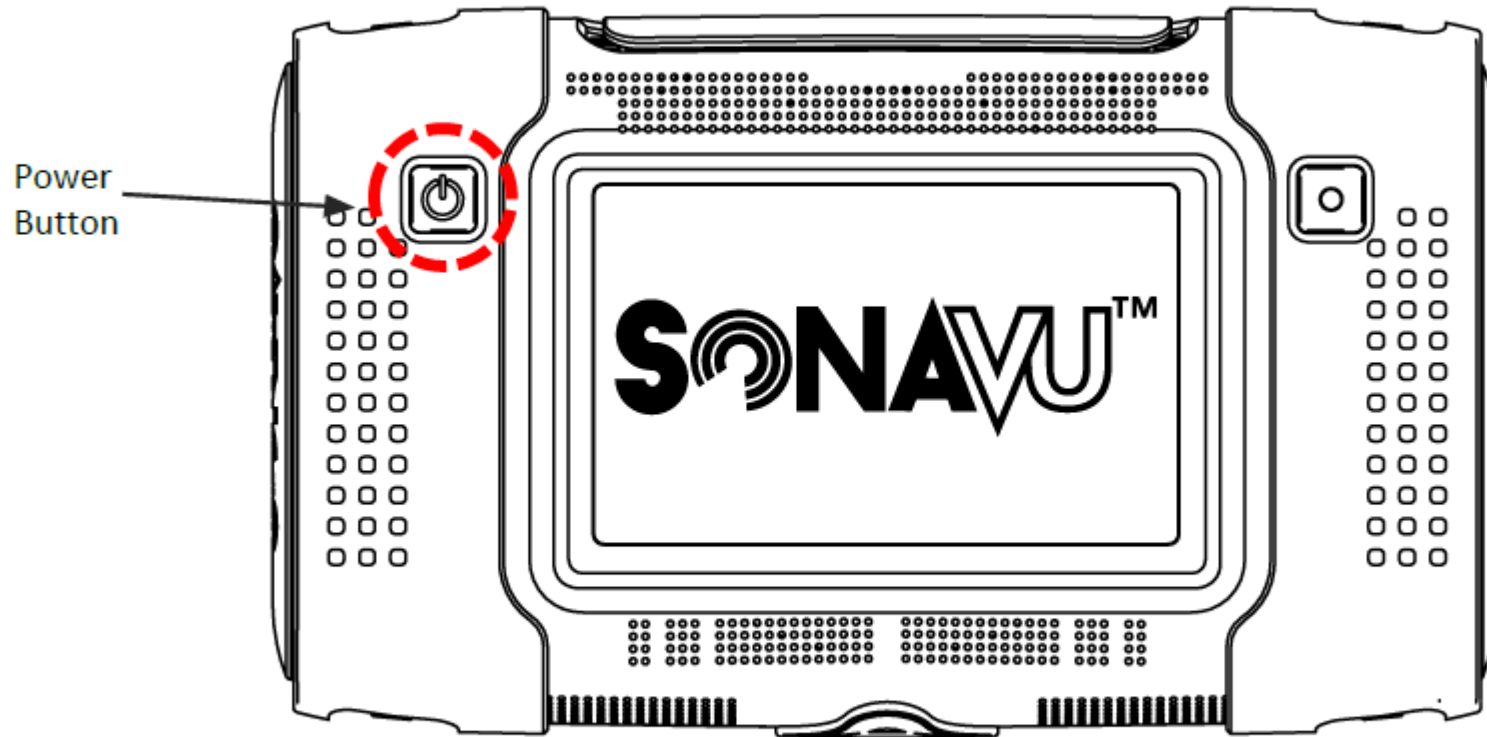


To copy data*:



Using the Power Button

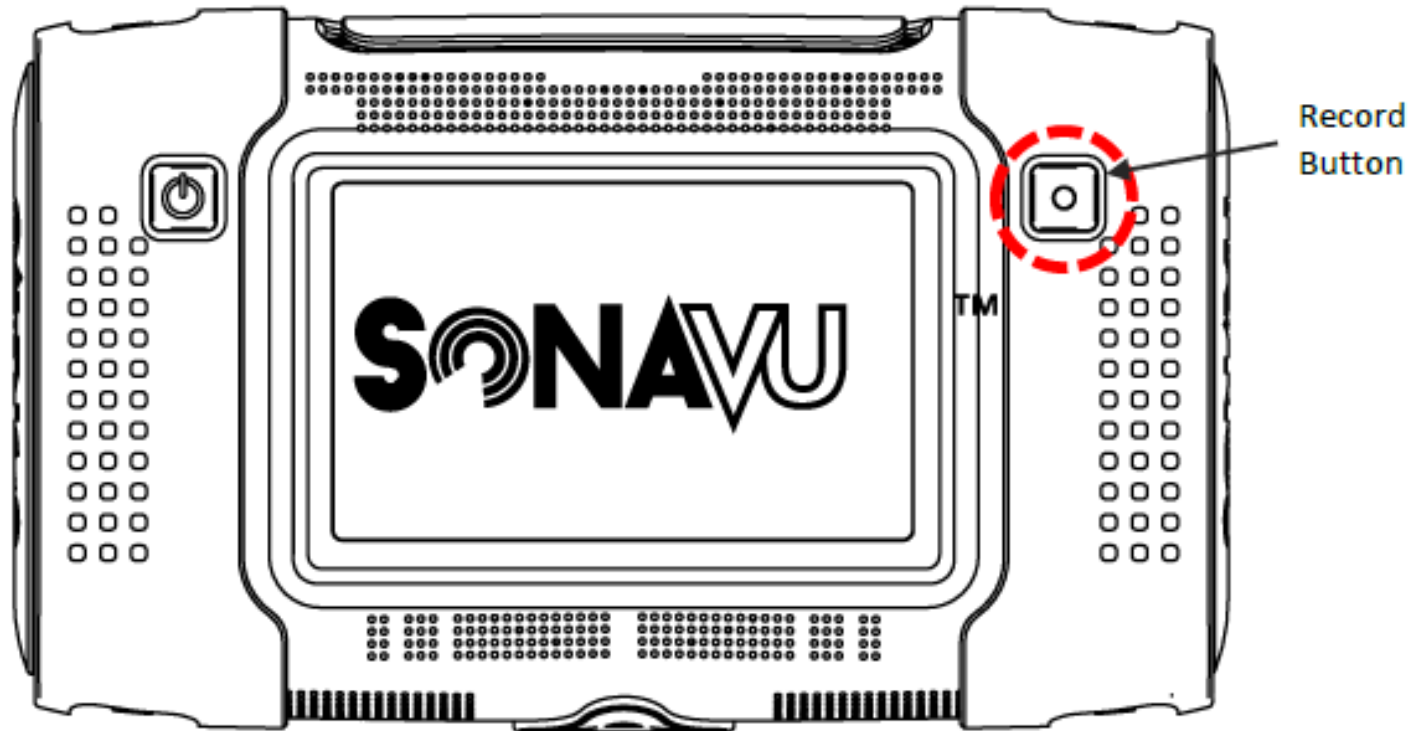
Press the power button on the left side and hold for 2 seconds to power the SonaVu™ on. The green LED power status indicator on the top left side of the device will light.



To turn off the power, press the power button again and hold for 2 seconds. The green LED power status indicator lamp will turn off.

Using the Record Button

The Record button allows you to save the screen you are measuring as an image (JPG) or a video (AVI).



Using the Record Button

① Save Image

press of the Record button saves the you are measuring as an image (JPG). The saved images can be viewed by the library icon on the right side of the screen.



A short screen format). clicking main

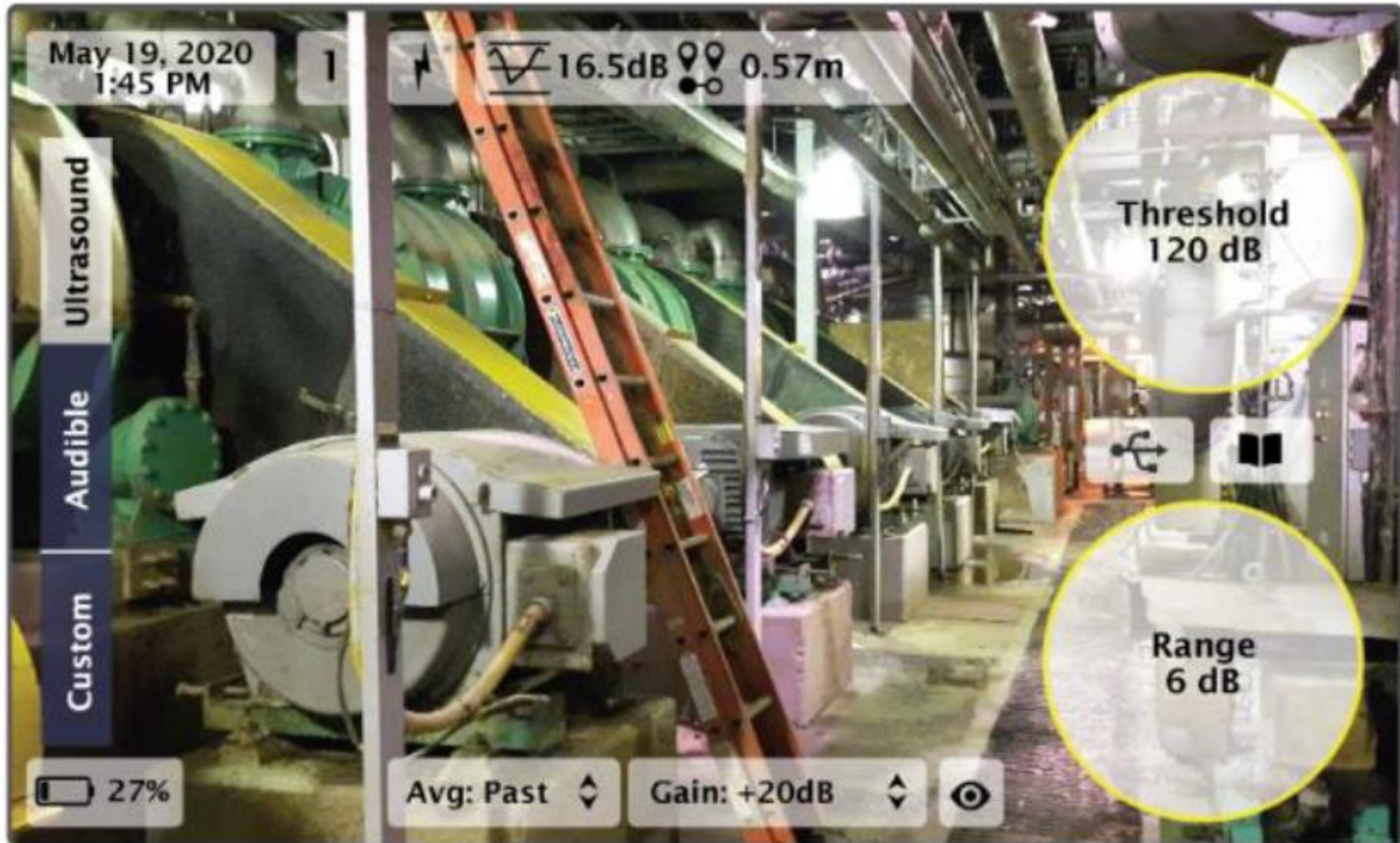
② Save Video

hold the Record button for 2 seconds to recording video (AVI format). A flashing will appear at the top right of the screen indicate that you are recording. Press and record button for 2 seconds to stop (video is automatically saved). saved videos can be viewed by clicking library icon on the right side of the main

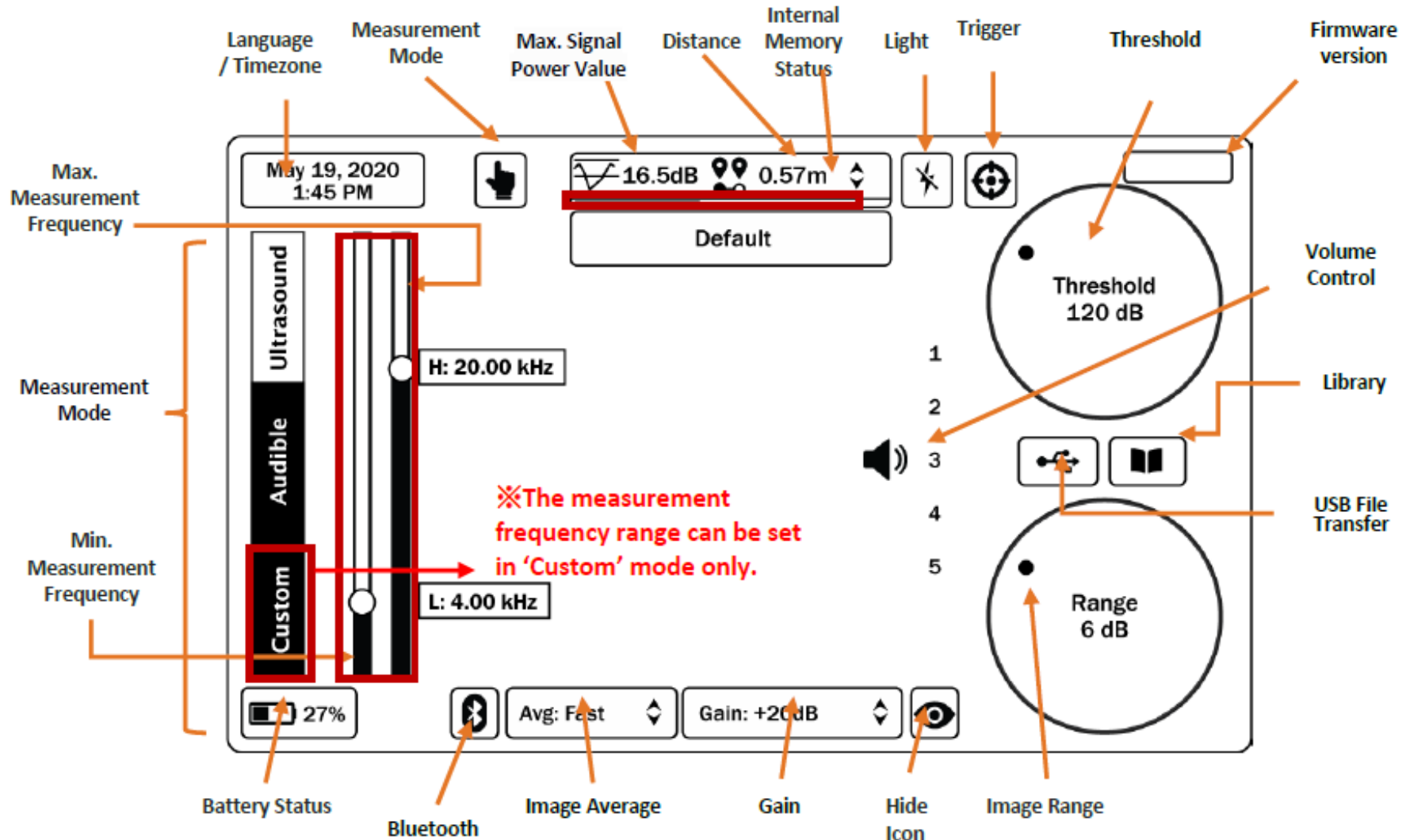


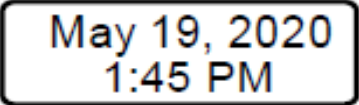
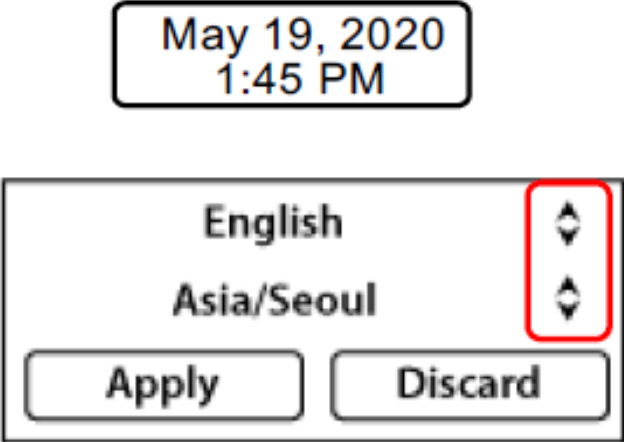
Press and start red icon to hold the recording. The screen.

Main Screen (User Interface)



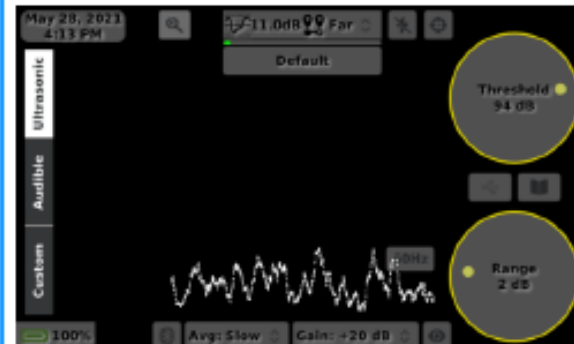
Main Screen (User Interface)




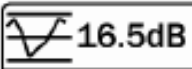
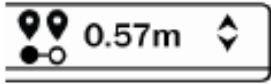
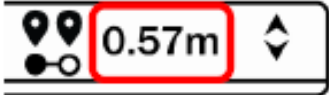


Icon	Function	Description
	<p>Language/Time zone Check and Setting</p>	<p>Displays the current date/time. To change the language or the Time Zone press and hold the icon:</p>  <p>Touch the arrows in the red box to select the language/time zone you want</p> <p>*Languages: Korean, English, Chinese and French *Time zone: Support for all countries</p> <p>Press 'Apply' to save the changes. Press 'Discard' to cancel the changes.</p>

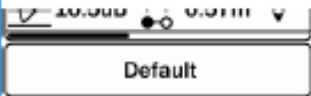



Icon	Function	Description
	Detailed Measurement Mode	User can click this icon to change to the default mode, the leakage estimation mode, and the partial discharge estimation mode. Each mode is as follows.
	Leak Strength Index	Indicates the estimated strength of the Leak established in laboratory conditions: <ol style="list-style-type: none"> 1. Less than 200cc/m 2. Excess 200 Less than 400cc/m 3. Excess 400 ~ Less than 600cc/m 4. Excess 600 ~ Less than 800cc/m 5. More than 800cc/m
	Partial Discharge (PD) Estimation	This icon (object) shows a partial discharge graph, dividing the measured ultrasonic signal by a constant period (50, 60Hz).
		Tap the 50/60Hz button to toggle the period between 50 and 60 Hz.

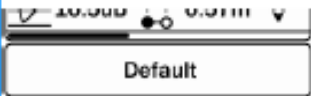



Icon	Function	Description
	Detailed Measurement Mode	User can click this icon to change to the default mode, the leakage estimation mode, and the partial discharge estimation mode. Each mode is as follows.
	Leak Strength Index	Indicates the estimated strength of the Leak established in laboratory conditions: <ol style="list-style-type: none"> 1. Less than 200cc/m 2. Excess 200 Less than 400cc/m 3. Excess 400 ~ Less than 600cc/m 4. Excess 600 ~ Less than 800cc/m 5. More than 800cc/m
	Partial Discharge (PD) Estimation	This icon (object) shows a partial discharge graph, dividing the measured ultrasonic signal by a constant period (50, 60Hz).
		Tap the 50/60Hz button to toggle the period between 50 and 60 Hz.

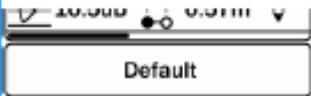






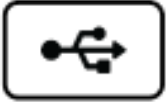
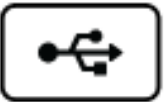


Icon	Function	Description
	Light ON/OFF	<p>Press the icon to toggle the light on or off on the front of the device.</p> <p> Light ON  Light OFF</p>
	Signal Indicator	<p>Displays the current signal level being measured. Signal Power is the rainbow color scheme on the measurement screen, which indicates the amount of pressure being measured in the selected bandpass/mode</p>
	Distance Setting	<p>Set the distance between the measurement target and the ultrasonic camera.</p> <p>Options:</p> <p><i>Near Distance:</i> Target is less than 5m</p> <p><i>Far Distance:</i> Target is more than 5m</p> <p><i>Automatic Distance Setting:</i> For more precise measurements. Target MUST be less than 3m</p> <p>With the Auto option, the distance between the sound source and the ultrasonic camera displays in real time (up to 3 m).</p> <p></p>



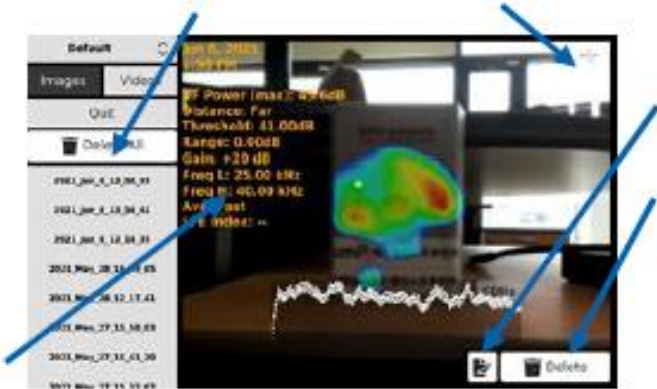
Icon	Function	Description
	Internal Memory Status Indicator	<p>Displays the amount memory available on the SonaVu™</p> <p>The internal memory capacity of SonaVu™ is 53GB.</p> <p>The status bar has three sections:</p> <ul style="list-style-type: none"> Green: less than 98% used Orange: more than 98% used Red*: more than 99% used <p>*Saving video is not available in the Red zone</p>
	Trigger Settings	<p>Touch this icon (object) to start recording the video itself if the maximum beam power value measured is greater than threshold value which user set.</p> <p>(Recording time: 10 minutes)</p>

Icon	Function	Description
	<p>Folder Settings</p>	<p>This icon (object) shows the current folder location. You can also click and hold the icon (object) to create and delete new folder, to select a folder.</p>   <p> Tap this icon and scroll through it. You can create folder names in any language.</p>

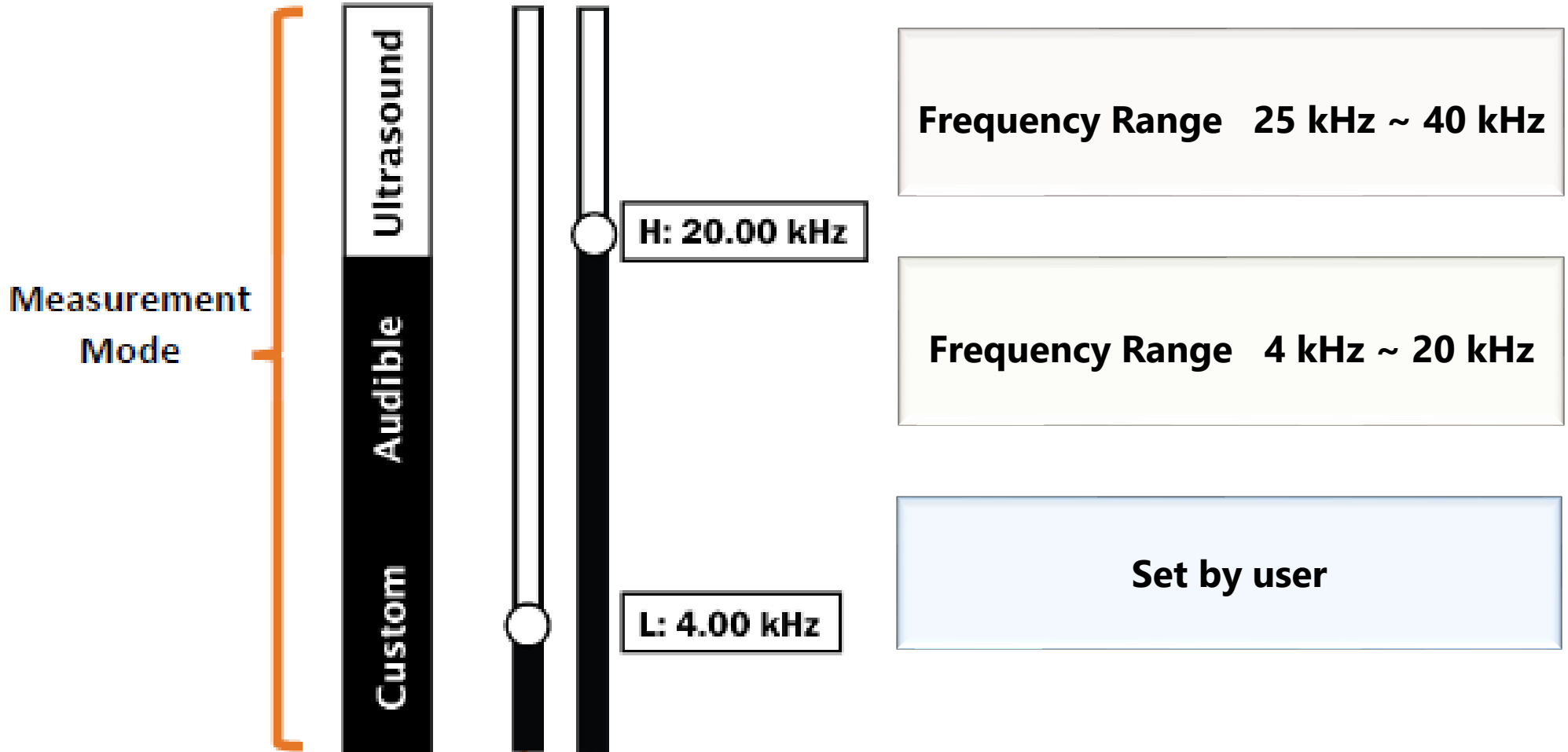
Icon	Function	Description
	<p>Folder Settings</p>	<p>This icon (object) shows the current folder location. You can also click and hold the icon (object) to create and delete new folder, to select a folder.</p>   <p> Tap this icon and scroll through it. You can create folder names in any language.</p>

Icon	Function	Description
	<p>Folder Settings</p>	<p>This icon (object) shows the current folder location. You can also click and hold the icon (object) to create and delete new folder, to select a folder.</p>   <p> Tap this icon and scroll through it. You can create folder names in any language.</p>

Icon	Function	Description
	Transfer to USB - Measurement Files (Image/Video)	Copies all annotated images and videos to an attached USB drive: <ol style="list-style-type: none">1. Insert a USB drive in the USB port located on the left side of SonaVu™2. Press the icon to start the copy process3. All measurement images and videos will transfer to the USB drive.
		
Icon states:		
		USB Memory Device is not connected
		Transfer in progress
		Transfer complete

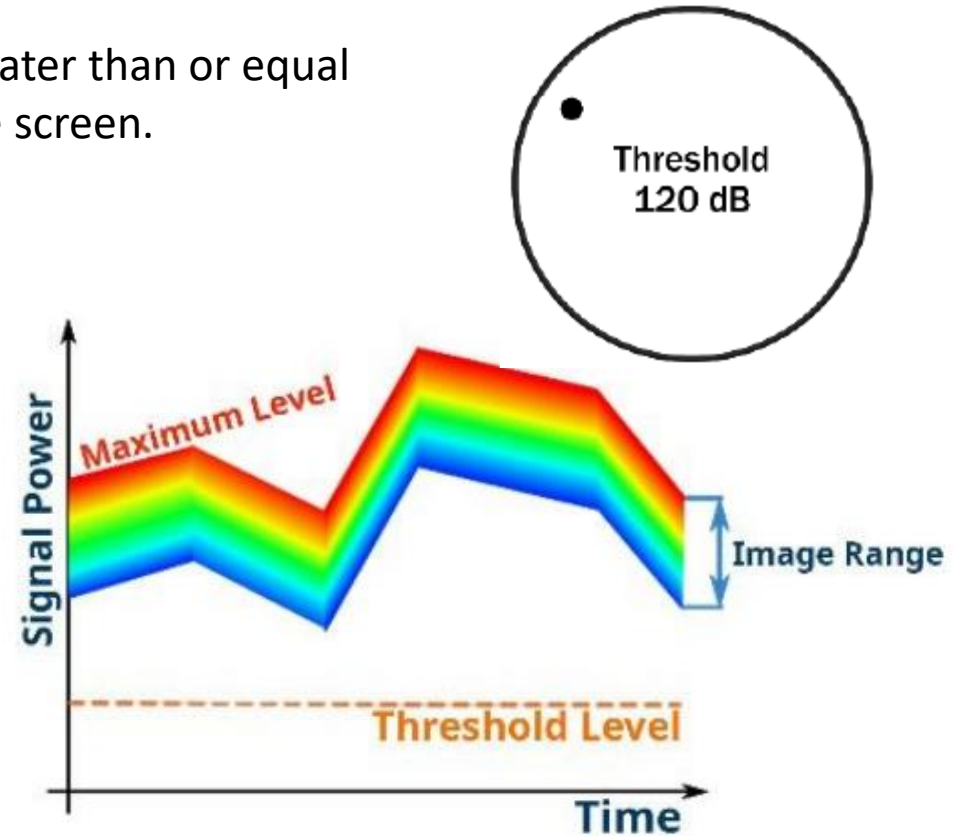
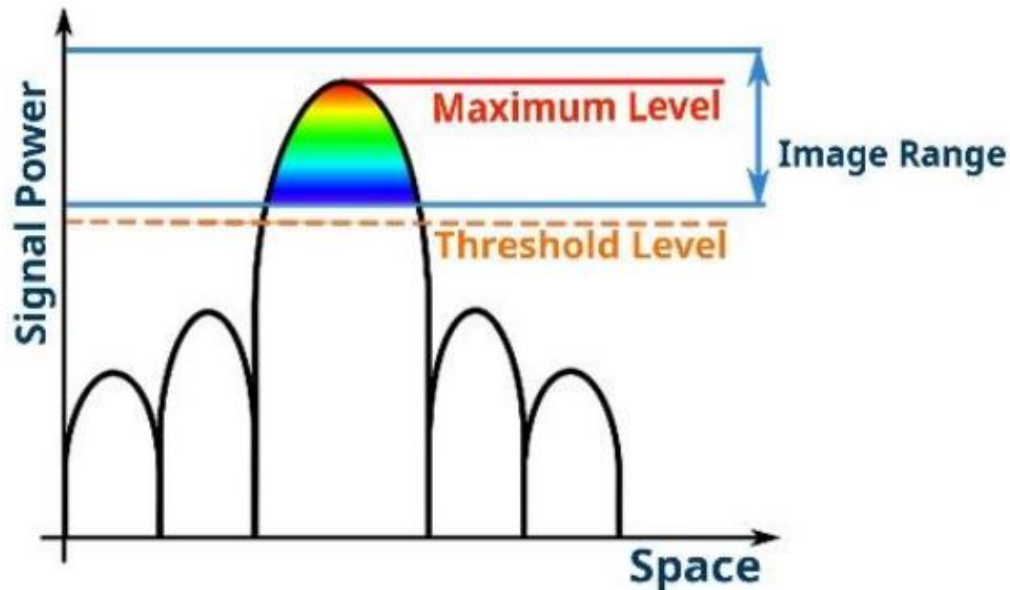
Icon	Function	Description
	<p>Library (Check/Delete measurement file)</p>	<p>Press this icon to check or delete a measurement file (image/video) from the SonaVu™ internal memory.</p>  <p>Press 'Images' or 'Videos' to view the measurement files.</p> 

Sound Measurement



Threshold

The sound you are trying to measure must be greater than or equal to the Threshold before the signal appears on the screen.

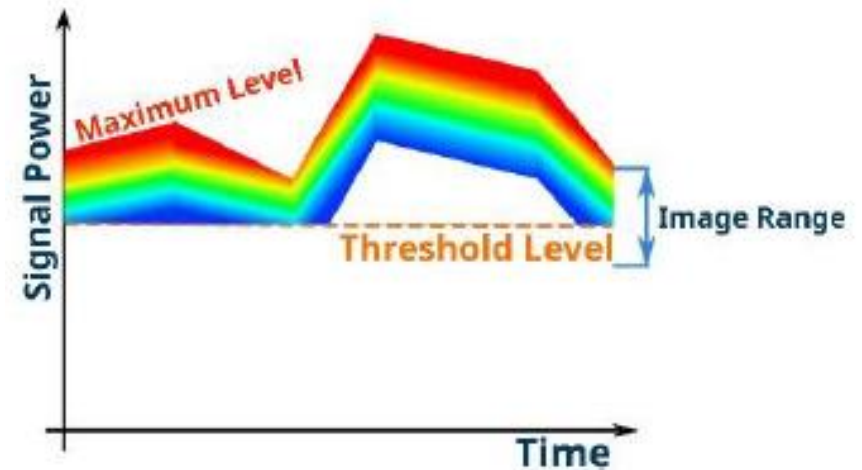
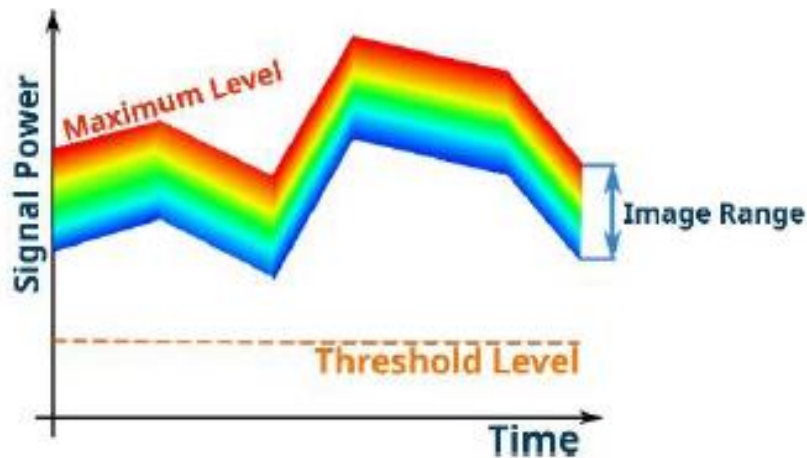
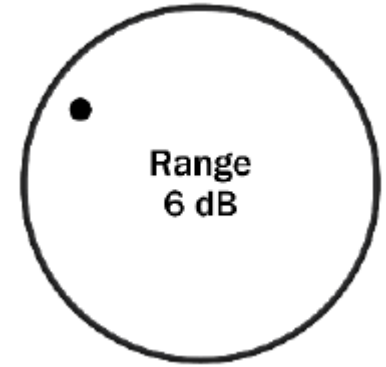


Threshold value can be set 0 to 120 dB depends on measurement environment.
We recognize threshold value is an environment dB +5 or 10 dB.

Remember to set the threshold until image combined in one point.

Image Range

The Image Range sets the width of the Signal Power displayed. The minimum (Blue) and maximum (Red) values can range between a minimum of 0 to a maximum of 10 dB.

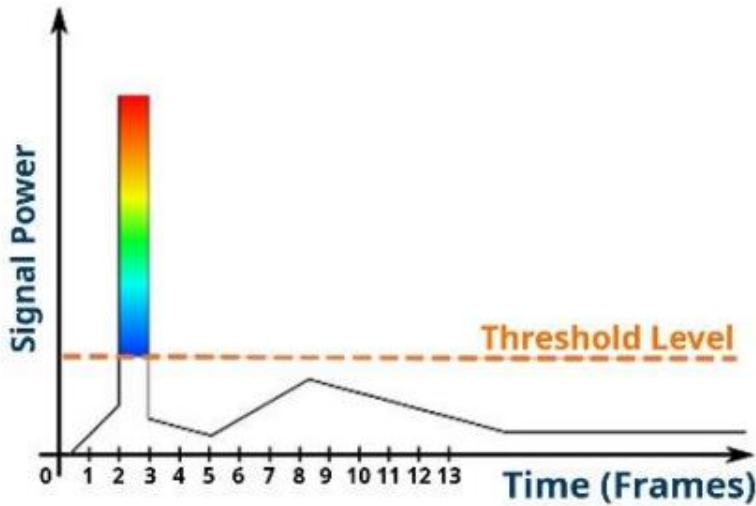
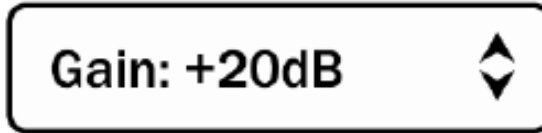
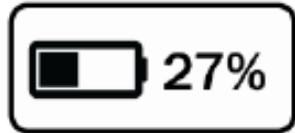


The Image Range varies with the peak (maximum value). As the sound pressure changes, the minimum value changes too.

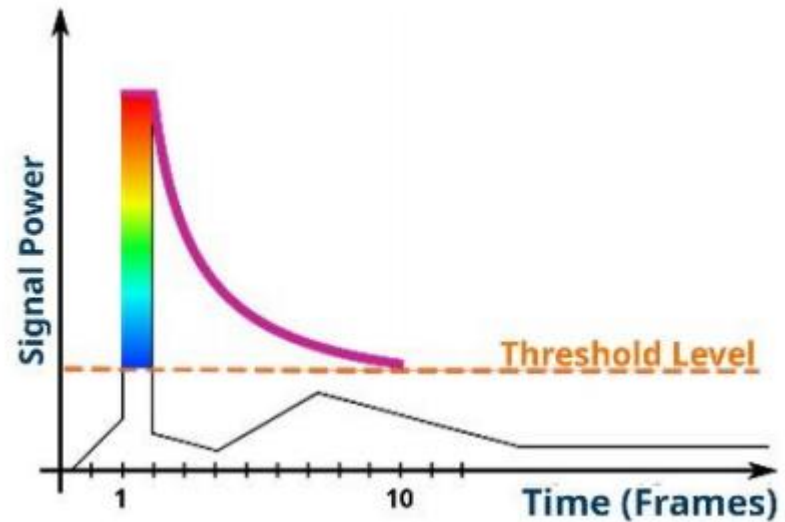
Raising the Threshold affects the Signal Power displayed on the screen regardless of the set values of the Image Range.

Image Average

Image Average setting adjusts the response time of the image range.



FAST - The Image Range is calculated every 3 frames captured (default setting)

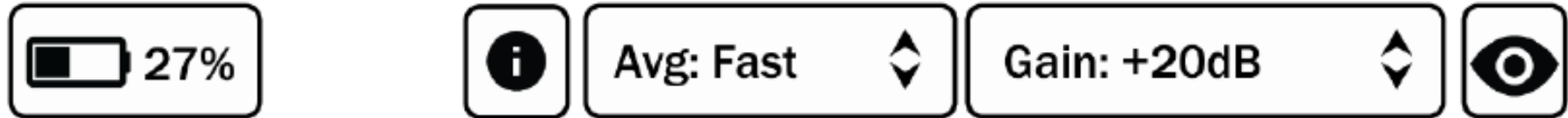


SLOW - The Image Range is calculated every 10 frames captured.

The SLOW setting makes visualizing short bursts easier to see. The image takes longer to dissipate on the screen.

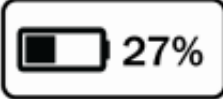







Selectable values: 0, +10, +20, or +30 dB

A reasonable gain value for normal-sized noise measurements: +20 dB

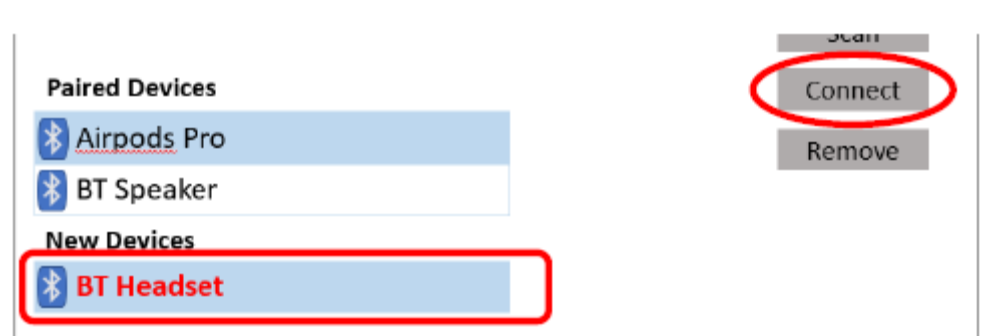
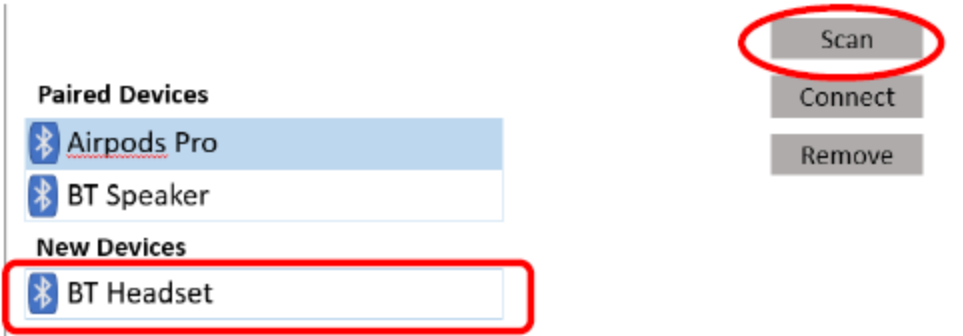
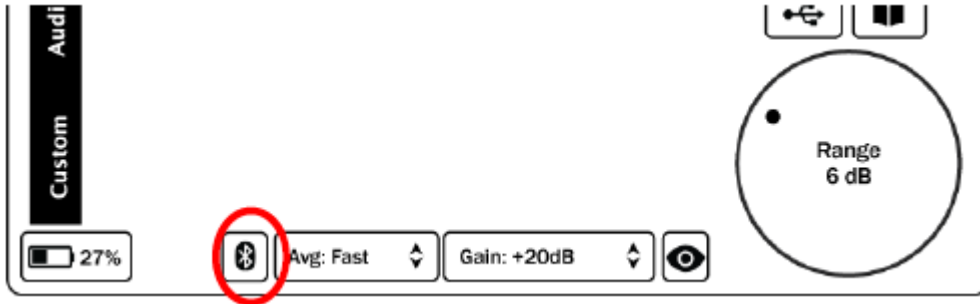


The smaller the sound, the better it is to increase the gain value. For example, if you measure in a noisy factory environment, you need to lower the gain setting to make more accurate measurements, whereas if you measure in a very quiet environment, you need to increase the gain setting to make the correct measurement.

Battery Status Check

Icon	Function	Description
	Battery Status Check	<p>Displays the current battery charge level. Fully charged, the SonaVu™ operates for approximately four hours.</p> <p> <i>Battery Capacity 2 ~ 9 %</i></p> <p> <i>Battery Capacity 10 ~ 29 %</i></p> <p> <i>Battery Capacity 30 ~ 72 %</i></p> <p> <i>Battery Capacity 73 ~ 97 %</i></p> <p> <i>Battery Capacity 98 ~ 100 % (Full Charged)</i></p> <p> If the battery is below 1%, this warning message will appear.</p> <p> When the battery level reaches more than 15% the icon will change and the SonaVu™ can be used again.</p>

Bluetooth Setup

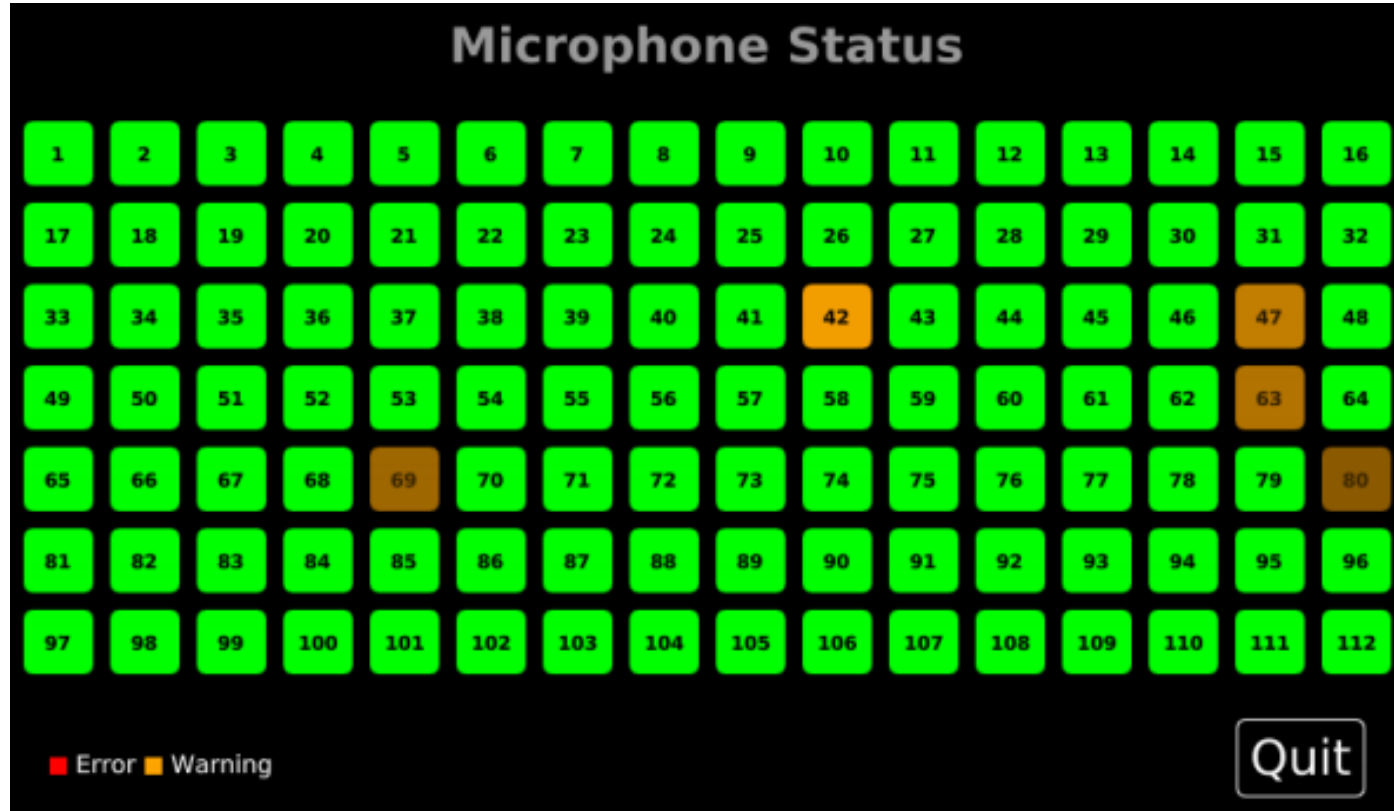


MEM Status check

The Operating States are as follows:

-  Green Normal
-  Orange Dangerous
-  Red Abnormal

Cleansing Sensor Array

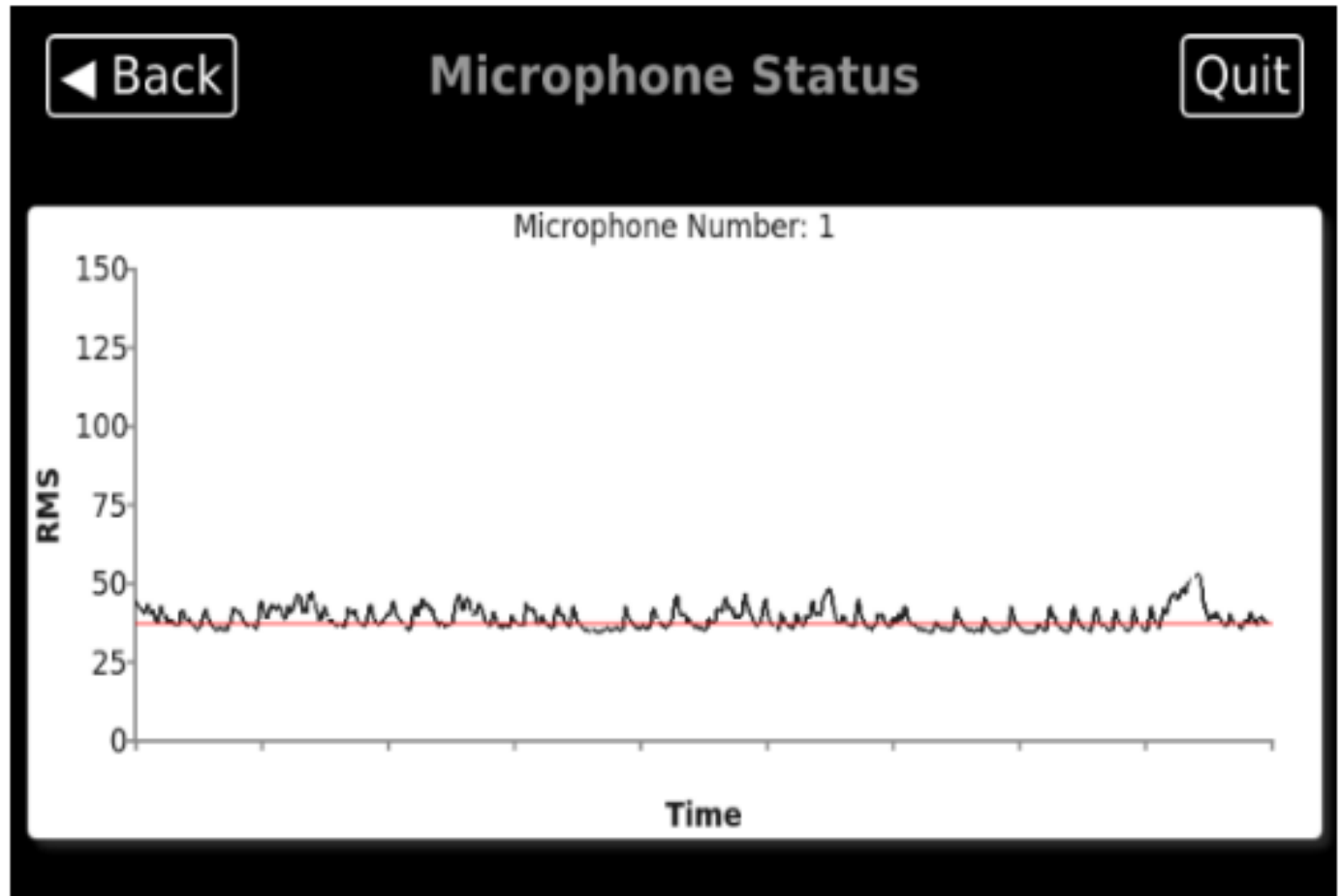


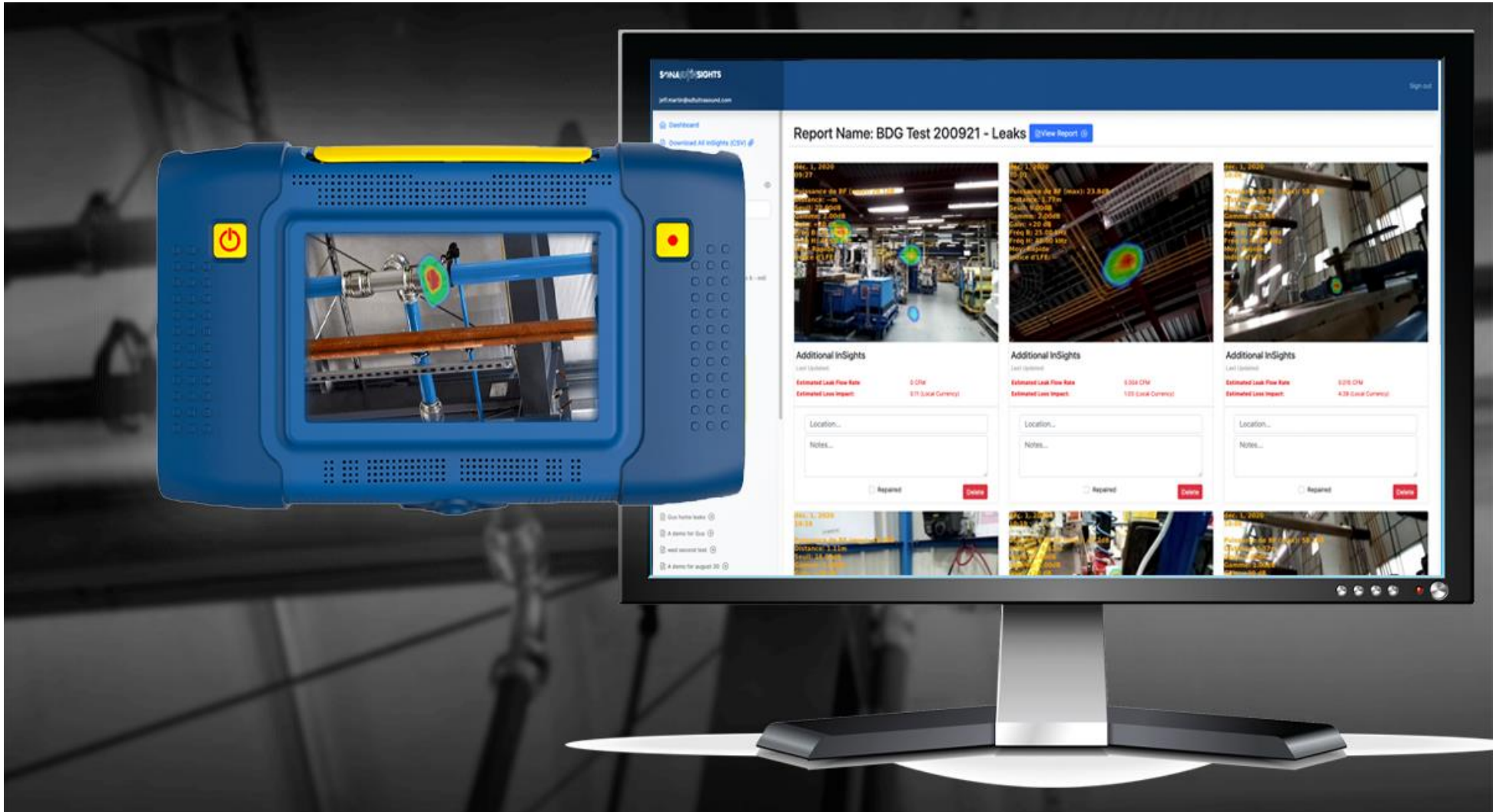
MEM Status check

The Operating States are as follows:

	Green	Normal
	Orange	Dangerous
	Red	Abnormal

Cleansing Sensor Array





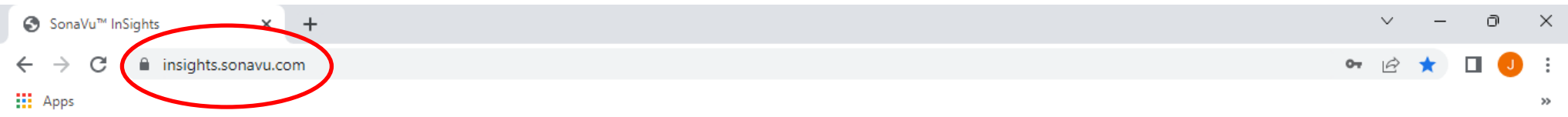
Dashboard Management

SonaVu InSights™ is a browser-based app for monitoring the condition of compressed air systems and electrical assets, documenting findings, and prioritizing maintenance and repairs.

SonaVu™ is a multi-frequency acoustic imaging camera that blends visual and auditory senses to bring compressed air waste and failing or faulty electrical equipment into focus. Images and videos of compressed air leaks and electrical faults can be recorded using the SonaVu™ Acoustic Imaging Camera then uploaded to a SonaVu InSights™ Report Library very quickly.

ขั้นตอนการ Register SonaVu InSights™

1. ขอข้อมูล SDT End User Form จากลูกค้า
2. ผู้ขายส่งไฟล์ SDT End User Form ให้ SDT พร้อมแจ้งขอ register assign admin account เพื่อ Login ใช้งาน SonaVu InSights™
3. ทาง SDT ส่งเมลหาลูกค้า แจ้งยืนยันลงทะเบียนเรียบร้อย พร้อมใช้งาน “confirmation email with registration information and activation instructions”
4. ลูกค้ากด Link SonaVu Insights: <https://insights.sonavuu.com/> พร้อม Create Password ของลูกค้าเอง
5. Login การใช้งาน ใส่ E-mail และ Password กด Sign In
6. “ Welcome to SonaVu InSights™ ”



Please sign in

Sign in

© 2022 - SDT Ultrasound Solutions - 1.3.0

[Forgot Password](#)

Users & Administration


- Dashboard - Home
- Download All InSights (CSV)
- Disclaimer
- SONAVU INSIGHTS
- Filter InSights...
- PEA N3
- PEA N3
- On Nut High Voltage Substation
- test
- Environment 3
- Environment 2
- Environment 1
- Energy 1
- Energy
- Chemical plant
- Pulp 4

Advance Siam - Dashboard




Generate New Leak Report

Start



Generate New Electrical Report

Start



Generate New LDAR Report

Start



Add/Edit Compressor System Information

Add New Edit

Advance Siam Saved Insights

Total Loss Impact: **THB 94,612,231 - THB 115,637,171**

Total Savings Impact: **THB 57,025 - THB 69,697**

Filter By Inspector
All SonaVu Insights



Add New User by Admin

Users & Administration

Dashboard - Home

Download All InSights (CSV)

Disclaimer

SONAVU INSIGHTS

Filter InSights...

PEA N3

PEA N3

On Nut High Voltage Substation

test

Environment 3

Environment 2

Environment 1

Energy 1

Energy

Chemical plant

Pulp 4

Advance Siam - Dashboard

Add a New User to Your Team

First Name	Last Name
<input type="text"/>	<input type="text"/>
Email	Title or Role
<input type="text"/>	<input type="text"/>

Register User

Your Current Team

วนาพล ชูเฉลิม Not Active Engineer warapon@advancesiam.com Delete User	Jinhnipha Thawang Active Sale Engineer jinhnipha@advancesiam.com Delete User	พิทักษ์ หาญวิวัฒน์ Active Inspector pithakh@scg.com Delete User
สหศักดิ์ เมตตาประสพกิจ Active	Booneak Sukthavee Active	Pruttipong Chunnisal Active



2
YEAR
LIMITED
WARRANTY

Product Warranty

Included in the purchase of your SonaVuTM is a two-year, standard warranty from the date the customer receives the product.

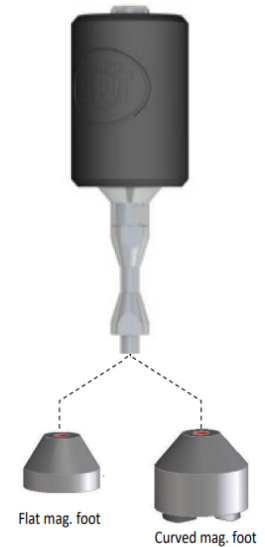
METAL CLAD SWITCHGEAR

Medium & High Voltage



METAL CLAD SWITCHGEAR

Medium & High Voltage



METAL CLAD SWITCHGEAR

Medium & High Voltage



OIL FILLED TRANSFORMERS



TRANSFORMERS (115kV ↔ 22kV/33kV)





Ultrasound Solutions

Thank you
