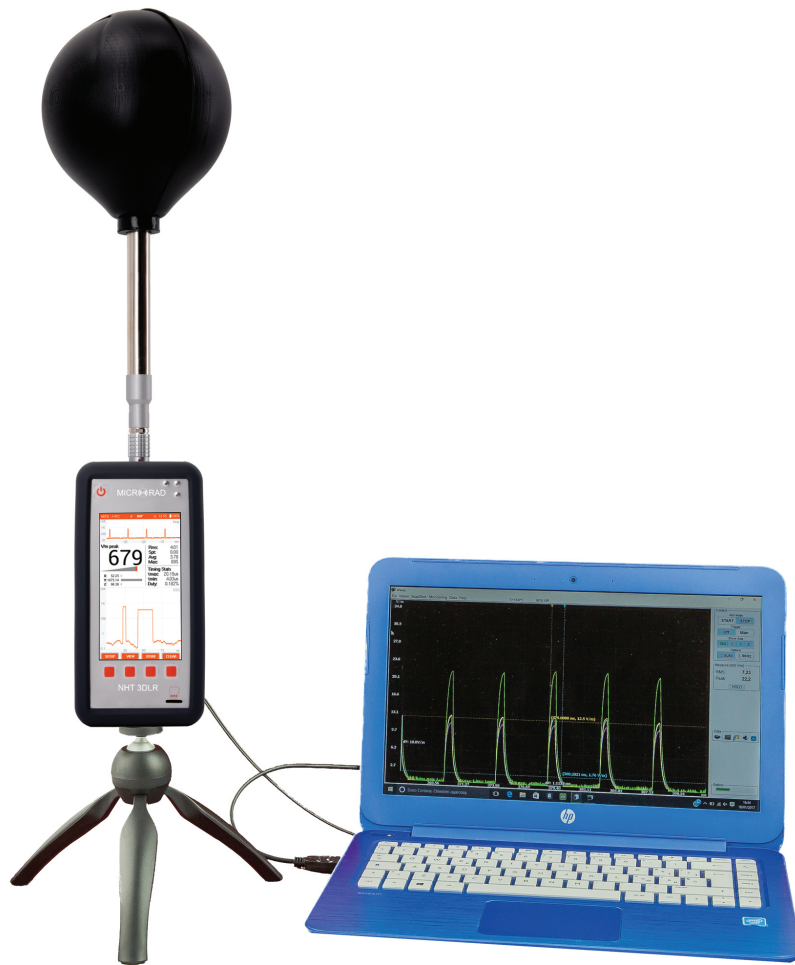


MICRO RAD

Percipere, Aestimare et Inquirere



**Company
Presentation
January 2021**

4TECT

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The Company

Microrad's mission is to offer to electromagnetic safety operators state of the art sensors and analytical instrumentation. All of our handheld products and all sensors are plug-and-play with quick bayonet connection.

Microrad specializes in the design of isotropic sensors, able to operate from static and quasi-static magnetic fields up to millimeter waves in both static and pulsed conditions.



We are constantly engaged in research and development of new products, for the purpose of providing our customers with cutting-edge technical solutions, simple and agile in the measurement phase, ideal for the certification of electromagnetic safety in civil, professional and military sites according to the [standard 2013/35/EU](#).

Microrad develops measurement and monitoring systems for the electromagnetic field also on customer specifications with remote management through specific SW.

The History

Microrad was founded in 2002 by Roberto Ruggeri, former owner of Ates Lab and Normex Telecom, that produced entirely Italian scalar spectrum analyzers and network analyzers.

Roberto Ruggeri in 2002 understood that the exponential **increase of electromagnetic sources** in civil and industrial environments would soon become a source of risk, and he started the production of a professional personal monitor for the measurement of magnetic induction called **HT300**.

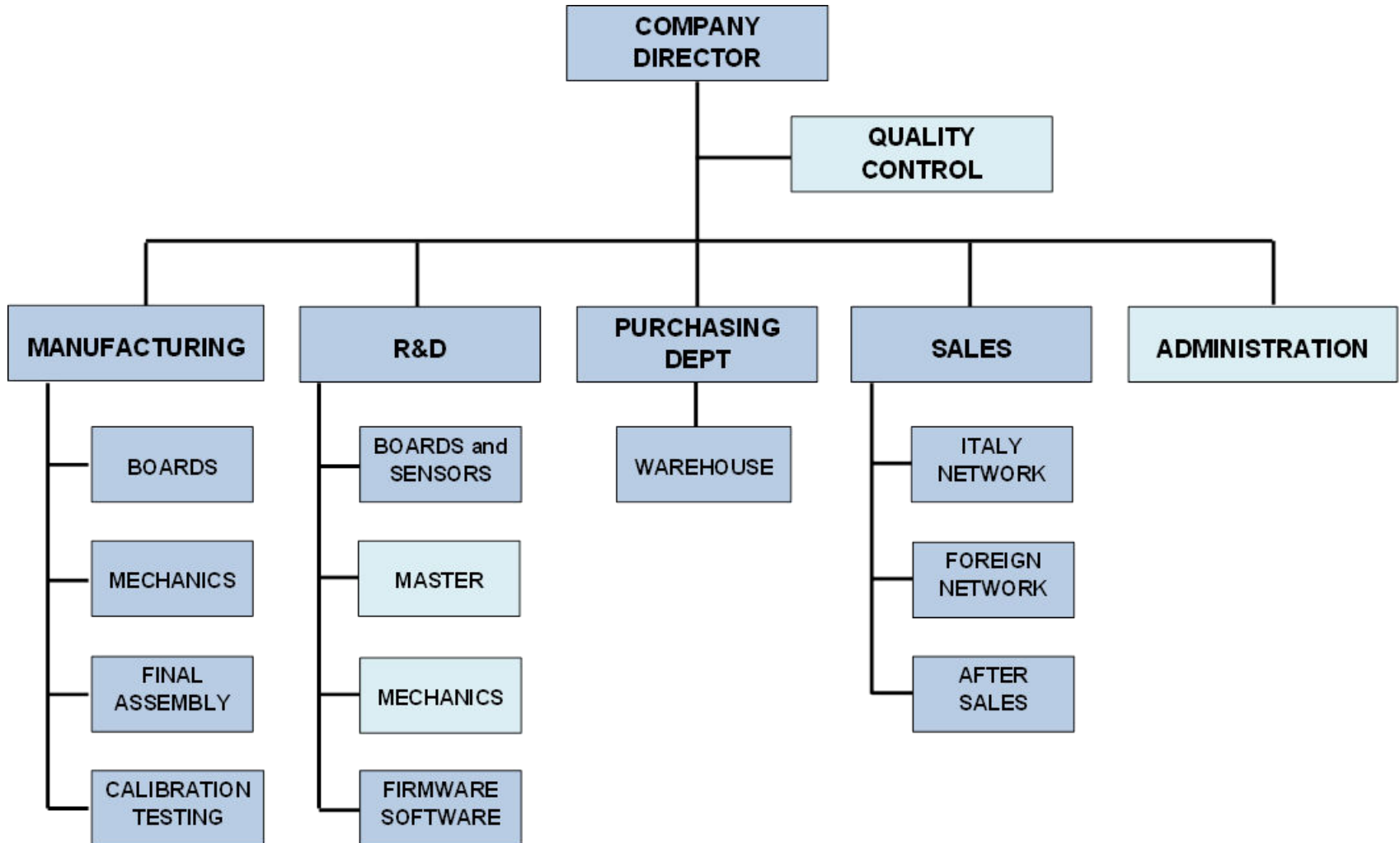
The instrument was immediately met with a favorable response from the market and it is currently used by numerous ARPA (Italian Regional Agency for Environmental Protection) and departments of hospital physics.

The growing demand for specific instrumentation to control exposure to E.M.F. will lead to the realization of the current isotropic line of meters bearing the NHT code.



**Microrad
HT300**

Company Organization



Customer Service

■ Calibration

Microrad has its own laboratory and is responsible for the calibration of all supplied devices. It also provides subsequent calibrations in the company, suggested every 24 months, and accredited ISO/IEC 17025 in agreement with external laboratories.

■ Customer Service

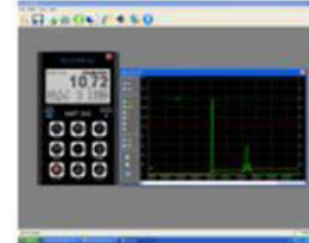
Microrad Customer Service includes the repair, under warranty for the first two years from sale, and the supply of spare parts and accessories. An adequate customer service ensures long life and reliability for each instrument.

■ Training Courses

Microrad provides training courses both in its headquarters and at the site requested by the customer.

■ Software and firmware upgrade

Microrad makes available software and firmware updates for customers on web-site.



Quality Management System

Microrad is a certified ISO 9001:2015 Company



Main market sectors in which Microrad operates

- Energy
- Health & Safety
- Telecommunications
- Transportation (automotive and railway)
- Industrial, scientific and medical (ISM)
- Military



Main Customers

- Telecom Italia
- Rai Way
- Creos Luxemburg
- ARPA Regional
- INPS
- INAIL
- USL Regional
- FCA Fiat Chrysler Automobiles
- MB Tech
- Alstom
- Leonardo Company
- CISAM
- AR Amplifier Research



European regulations and directives

TRANSPORTATION

MILITARY

TELECOMMUNICATION

INDUSTRIAL
SCIENTIFIC
MEDICAL

Directive 2013/35/EU
CEI 211/6 (0 - 10kHz)
CEI 211/7 (10kHz - 300GHz)

CEI EN 50500 (0-20kHz)
CEI EN 62233 (10Hz-400 kHz)
CEI EN 50400 (110MHz – 40GHz)

SAFETY

ENERGY

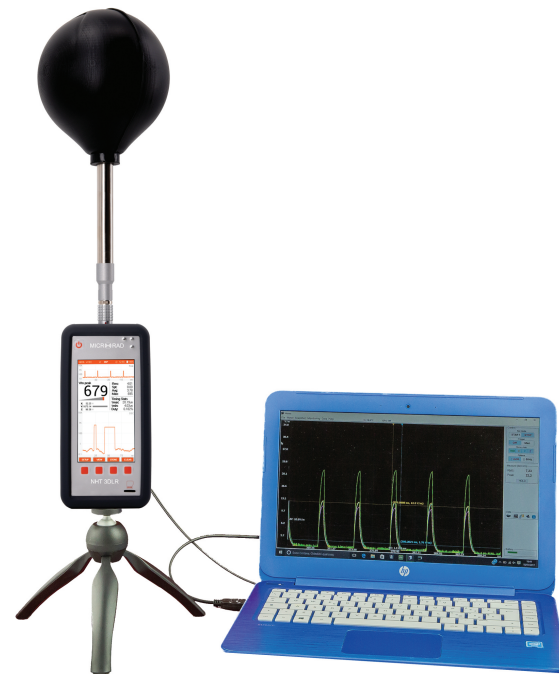
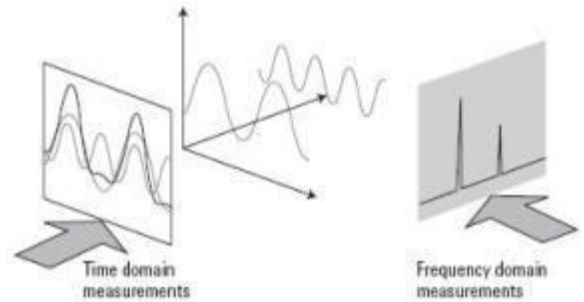
Technology

Over 20 different manufacturing processes incorporating special components and materials are utilized in the construction of Microrad sensors.

The continuous improvement in functionality, efficiency and performance of Microrad products is the result of the Company's research carried out in the **R&D laboratory**.

Through the study of complex geometries, Microrad has created a series of highly integrated solutions including the Radar probe for pulsed measurement and the 33 series probes, which started out as a challenge and has now become a reality.

Microrad is the first Company in the market to create a **triple isotropic sensor** capable of measuring static magnetic fields, magnetic induction fields and the variable electric field with a single probe.



Main products

Microrad product range includes complete and optimized solutions for measuring electromagnetic fields, ranging from magnetostatic fields to millimeter waves.

■ Meters

Two new models are now available: **NHT 3DLR** and **NHT 310FR**. These are state-of-the-art instruments, representing an evolution of the previous models NHT3D and NHT310 using latest technologies and introducing innovative features.

■ Probes

The wide range of measurement probes, all of which are developed and manufactured in Microrad and are compatible with all Microrad meters, allows the user to detect and measure electric, magnetic and electromagnetic fields both in static and pulse modes.

■ Personal monitors

Devices for the continuous monitoring of workers' exposure to EMF.

■ Software

The MicroLink application, developed by Microrad for all instruments, allow remote viewing, analysis and control.

NHT3DLR: the new reference meter for the European Directive 2013/35/EU



NHT 3DLR Meter Characteristics



- Selective measurements for magnetic and electric fields with any form factor
- Frequency range: 0Hz – 1MHz in selective mode, 100kHz – 40GHz in broadband mode
- Time domain analysis in oscilloscope mode
- Frequency domain analysis and FFT spectral analysis
- Interchangeable probes
- NHT 3DLR has been designed to measure electromagnetic fields in compliance with all the main international standards and regulations
- This device is able to adapt to future regulatory requirements using its completely reprogrammable system and structure
- NHT 3DLR is ready for the **5G** challenge, for the automotive/railway electric traction industry, the medical diagnostics field

NHT 3DLR Meter – Advantages

- Real time calculation of the **Weighted Peak from 1Hz to 1MHz**.
- Measurement of the **static magnetic field, the electric and magnetic fields** from 1Hz to 1MHz within a single probe (model 33S).
- **Simultaneous visualization** on the display of the numerical and graphic value of the static magnetic field, the electric and magnetic field from 1Hz to 1MHz.
- **Monitoring autonomy of over 24 hours**
- Time and frequency domain analysis
- **FFT** of 1000 points/decade



- Band measurements **from 0Hz to 18GHz** may be made using **only two probes** (33S + 03E)
- On board **Temperature and Humidity sensors** whose values are integrated into the measurements taken

NHT 310FR: the new Microrad meter designed to catch 5G and Radar signals



NHT 310FR Meter

- **Ideal for mobile applications**
- Frequency range: 0Hz - 40GHz
- Touch screen
- Capture and display of pulse signal up to 500ns
- Automatic calculation of the pulse width and duty cycle
- Simultaneous display of the electric and magnetic fields from 0Hz to 1MHz
- Removable memory
- Over 24 hours of autonomy
- Remote Wi-Fi connection with OS Windows and Android App
- **Unbeatable price / performance ratio**



MicroLink Software for all Microrad instruments remote control

The main functions of MicroLink software are:

- **download of all measurement** data stored in the NHT 3DLR or NHT 310FR memory card, creating a local archive for each meter on the PC
- browse and **analyze data contained in the PC archive**, by means of both tabular and graphical presentation of data. Operator can **export** selected data in CSV (comma separated value) text format, XLS Microsoft Excel™ compatible format, and PNG for graphic diagrams; this is useful in order to include these data in a measurement report
- **remotely manage the meter** using the following available connection types: fiber optic cable, USB cable or Wi-Fi.
- check and update of the **meter firmware**



Remote button starts a remote session to the connected meter (USB cable, fiber optic cable or Wi-Fi). A real-time image reflecting the meter screen appears in the window on the bottom left of the MicroLink screen. The operator can select inputs for the meter by placing the mouse cursor over that image as though he were operating on the real instrument.

MicroLink Software main screen

The screenshot displays the MicroLink software interface with the following components:

- COMMAND TOOLBAR:** Includes icons for refresh, up, info, left-right, and help.
- LOCAL ARCHIVE:** A file tree on the left showing folders for 'NHT3DLR0001', 'NHT3DLR0002', '2019', 'malgo', and 'I4'. Below it, a list of measurement events with timestamps.
- MEASUREMENT INFORMATION:** A panel on the top right showing recording details:
 - SINGLE RECORDING: Spt[1]: 73.67 V/m, Peak: 106.0 V/m, Probe: 33S E LR
 - Start: 10:50:55, 14/05/19; Tavg: 00:06:00; Avg: n/a; Gps: n/a
 - T: +18.6 °C; RH: 65.3 %; Span: 100 Hz - 100 kHz; Fms: 73.67 V/m; Max Rms: 73.67 V/m
 - Data: Time Domain; Ref.Level: 13/35 EU Inf; Wp: 9.8%; Wp: 35.7%
- TABULAR DATA:** A table in the center-right showing measurement results:

Nr	Time (us)	Inst.Field (V/m)
1	2.4414	102.7
2	4.8828	103.0
3	7.3242	103.3
4	9.7656	103.6
5	12.207	103.8
6	14.6484	104.1
7	17.0898	104.3
8	19.5313	104.5
9	21.9727	104.7
10	24.4141	104.9
11	26.8555	105.1
12	29.2969	105.2
- METER SCREENSHOT:** A panel on the bottom left showing a large digital readout of 73.7 V/m rms. It also includes a small waveform and various parameters:
 - Peak: 106.0, Spt: 0.000, Avg: 12.22, Max: 73.67
 - Wp 13/35 EU Inf, 9.8%, Max: 35.7%
 - X: 0.033, Y: 0.030, Z: 73.67
- GRAPHIC DIAGRAM:** A 'Time Domain Chart' on the bottom right showing a red sinusoidal waveform. The y-axis is 'Inst.Field (V/m)' from 0 to 110, and the x-axis is 'Time (us)' from 0 to 2400.
- STATUS BAR:** At the bottom, it shows environmental data: h65% +19°C, ψ 33S, 10:50:55, 5%.

Measurement probes

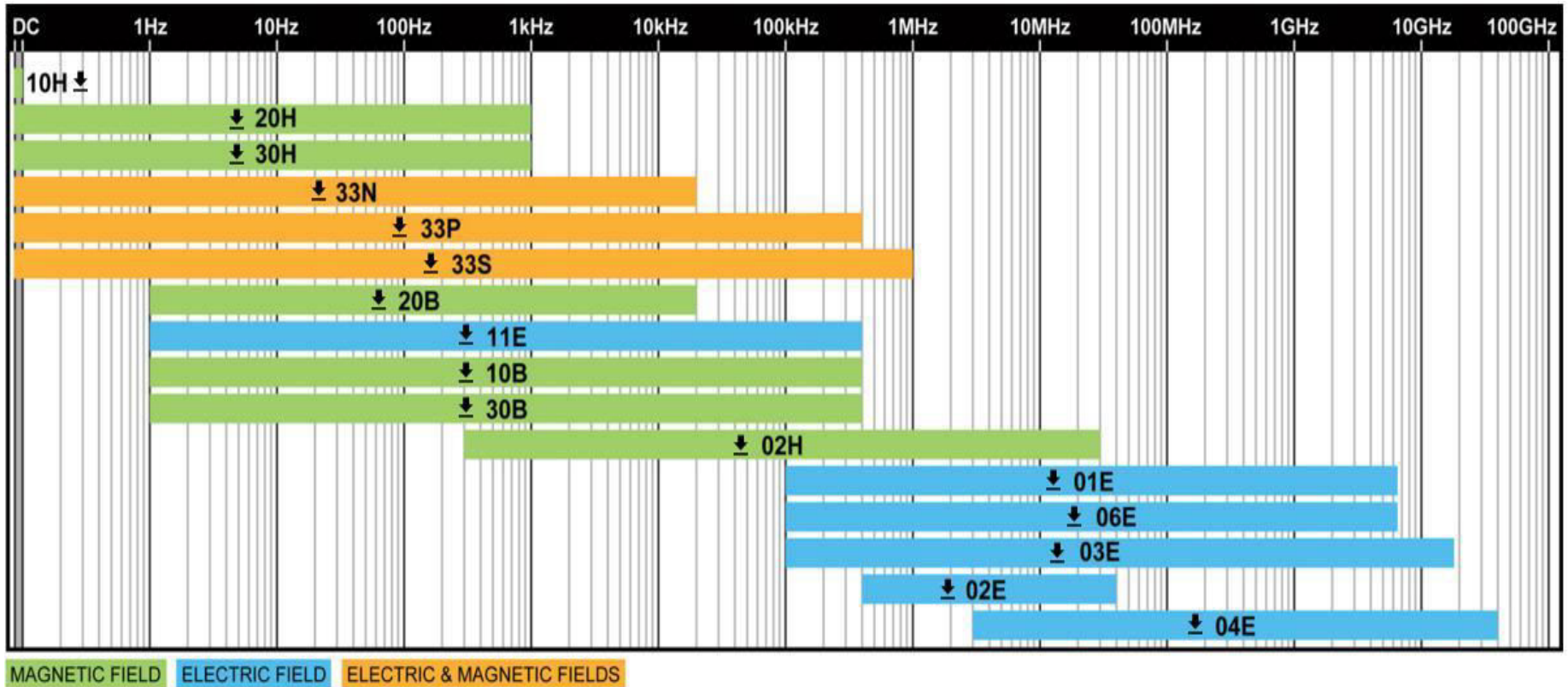


- The wide range of Microrad probes allows to measure magnetic electric fields from static up to 40GHz.
- All probes can be plugged into all Microrad meters which are **automatic recognition** enabled.
- All the probes are of **isotropic** type, constituted internally by three sensitive elements

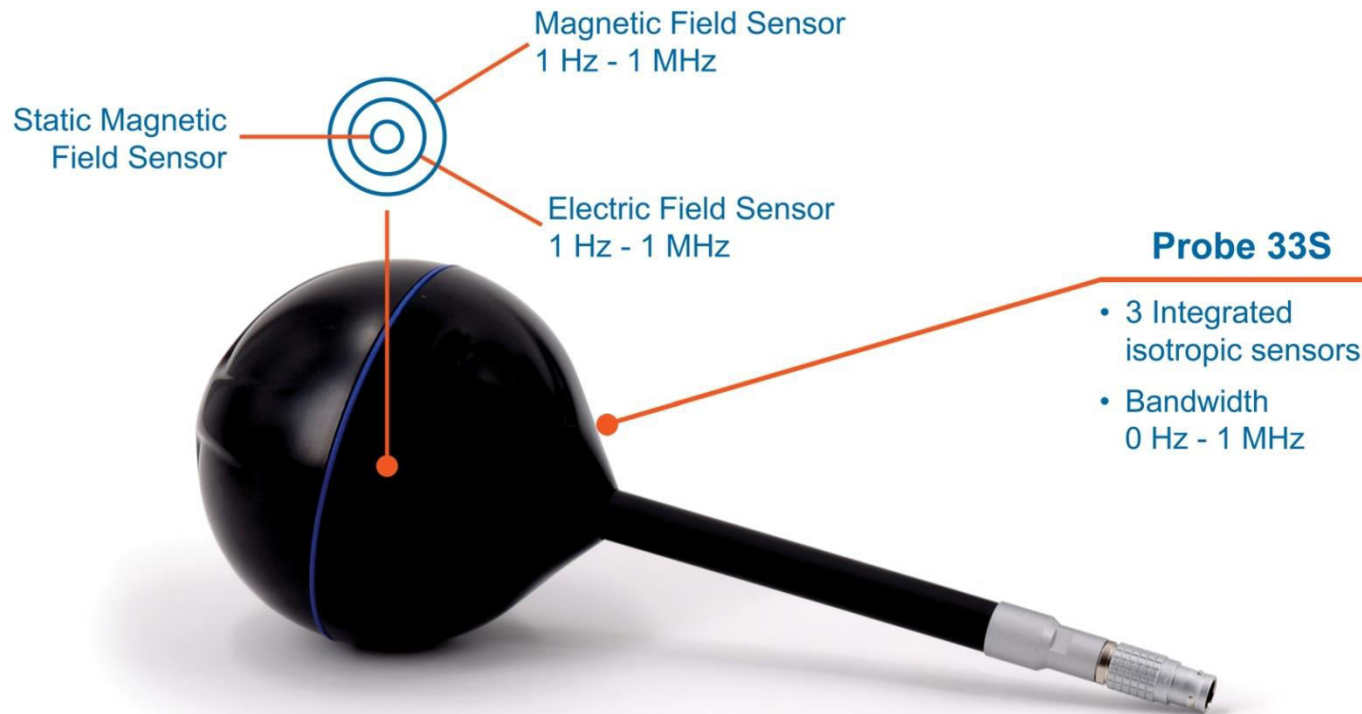
Technologies

- **Diode dipoles** are used in the probes for radiofrequency electric field measurement
- **Capacitors** in the probes for low-frequency electric field measurement
- **Coils** are used in the probes for magnetic field measurement
- **Hall sensors** in the probes of static magnetic field measurement

Microrad range of Measurement Probes



New 33S triple probe Electric, Magnetic and Magnetostatic Fields



New 33S triple probe

Electric, Magnetic and Magnetostatic Fields

- Consists of three different sensors combined in one probe
- Each **isotropic** sensor within the probe is based on a set of three mutually orthogonal sensitive elements
- Electric field E sensor:
 - type Capacitor
 - frequency 1Hz ÷ 1MHz
 - dynamic > 100dB
- Magnetic induction B sensor:
 - type Coil
 - frequency 1Hz ÷ 1MHz
 - dynamic > 100dB
- Magnetostatic field B_{DC} sensor:
 - type Hall Sensor
 - frequency DC
 - dynamic > 80dB



AM40A Personal Monitor

AM40A is the RF Personal monitor for the **continuous monitoring** of workers' exposure to EMF. It has been designed and developed to be worn by operators in potentially hazardous environments protecting him from situations of overexposure to electromagnetic fields. AM40A can be affixed to an arm band, clipped onto a belt or onto a helmet: this solution guarantees the operator can feel the vibration of the alarm in any operating condition.



- Visual, acoustic and vibration alarm
- **Pulse Mode** of operation for an effective response to pulse signal
- Frequency band 1 MHz – 40 GHz
- **Wi-Fi** option for wireless transmission of the alarms and of the measurement of the field
- Isotropic E field sensor
- Internal data logger
- 400 hours of autonomy
- **MicroLink Software** for remote configuration and data visualization

EMF18-G Sensor for EMC applications

EMF18-G is an isotropic electric field sensor based on new generation diode dipoles.

EMF18-G has been designed to be used in the characterization of the electric field in TEM, GTEM cells, in an anechoic chamber and for monitoring of critical areas for electromagnetic safety, measurement applications with drones.



- Consists of three different sensors combined in one probe
- Frequency band 10 KHz – 18 GHz
- Dynamic Range 0,5 – 500 V/m
- Sample Rate (Max) 20 mS
- Temperature Compensation 0 – 40 °C
- ± 0.8 dB max with Normalization
- Operational Autonomy > 45 hours
- Possibility to simultaneously use up to eight Probes using the same SW release

Customized products for the military sector



NHT 3DLR meter for Radar applications according to the CEI 211-7/B NORM



ER Probe

Biaxial probe for measurements of electric field (E) in the frequency band L, S, C, X and Ku

NHT 3DLR Meter

The Microrad meter is able to measure both

- The average value **Em**
- The peak value **Ep**.

The instrument automatically recognizes the probe connected to it.

MICR RAD

Microrad is a certified ISO 9001:2015 Company



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