



FEATURES

Taoma today is the state of the art of environmental measuring. It is the result of a project that began with two fundamental elements, objective and inalienable: the first is represented by the regulations regarding the exposure of the population and workers to electromagnetic fields. In recent years it has progressively developed and has produced the drawing up of official national and international guidelines for the correct procedure in the execution of measures. The second is implicit in the dizzying evolution of the technologies available that today permit us to work in less time and more efficiently and professionally.

Taoma wants to be a working platform, which by definition is open to various applications, that can be continuously updated and that will remain in the avant-garde growing with the requirements of the professional environmental technician.

Taoma represents a new philosophy of measuring for the environmental technician. The need to operate on the territory in surveying the values of the electromagnetic field in a broad frequency spectrum often means completing the series of data with the temperature and humidity values at the time of the survey and with the values of the GPS georeferentialization of the site in question. Moreover measuring further environmental parameters with additional probes, manage an on-line software that makes it possible to carry out the measuring report on site, being able to transmit via GPRS the complete result of the analysis is translated into a considerable increase in the efficiency of the environmental technician, the reduction of the time required to complete the mission and, consequently, a drastic saving on the relative costs of management.





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1 • The input connector for the measuring probes has been designed to ensure that the precision and solidity of the coupling are not altered by prolonged use. The antenna of the integrated GPS module is visible next to the connector.

2 • In addition to the alphanumeric keyboard useful in inserting texts, there are keys for direct functions and an integrated trackball to navigate on the screen with the mouse function.

3 • Protected by the rubber sleeve at the sides, the system has 1 slot for a Secure Digital card to be used in memorizing the measuring data and a slot for the insertion of a SIM card in case the integrated GPRS module is present.

4 • The simultaneous presence of different connection interfaces makes it possible to use external mouse and keyboard, and optical fibers.

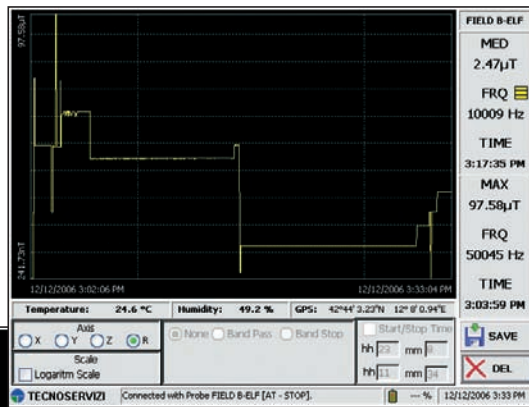


The program starts displaying [this screen](#).
 The user can select one of the modes by clicking on the required icon.

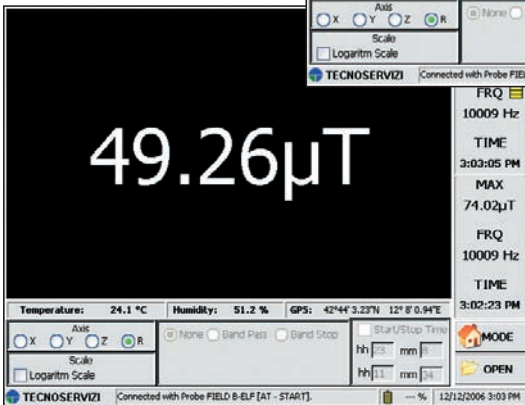


▲ **ACQUIRE** Mode: current ELF measurement graphic displaying instantaneous value (ISO) and maximum value (MAX).

▶ **ACQUIRE** Mode: final measurement graphic displaying median value (MED) and maximum value (MAX).

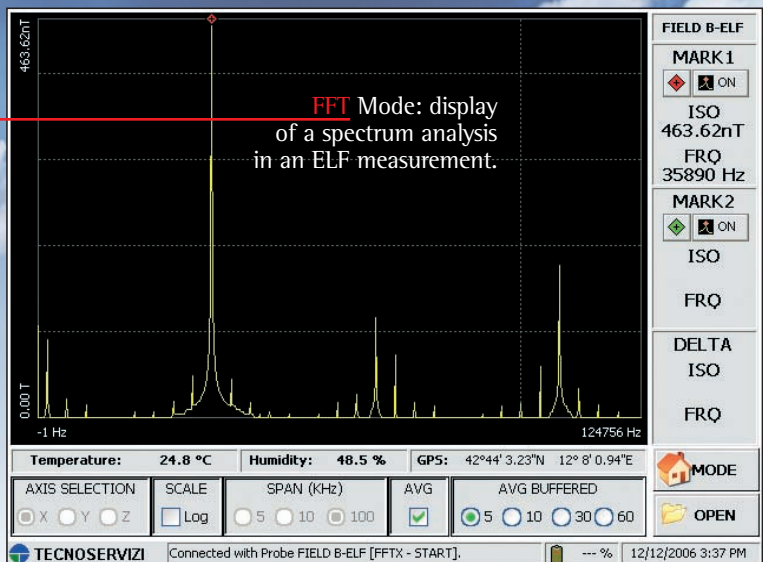


◀ **ACQUIRE** Mode: numerical display of current ELF measurement.



▶ **ACQUIRE** Mode: current RF measurement graphic displaying instantaneous value (ISO), maximum value (MAX) and mobile median value on a six-minute interval (AVG).





I-BOX Mode: configuration menu of the I-BOX (Interface Box) device to programme measuring probes to a long term stand-alone monitoring.

VER. 1.00

I-BOX

ID

Date-Time Start: 12/7/2006 5:47:05 PM Stop: 12/7/2006 5:47:05 PM

Filter Setting None Pass Band Stop Band

Start (Hz) Stop (Hz)

T Sample

Start Del

TECNOSERVIZI 12/12/2006 5:47:07 PM

REPORT Mode: example of a table report that can be viewed on instrument display at the end of the measuring cycle.

FAOMA (FILE VERSION 1.0.0.0)

File created: 12/12/2006 3:33:42 PM

Sensor: FIELD B-ELF

Mode: AT

Sampling Period: 1 second/s

Filter: None

Start Time: 12/12/2006 - 3:02:06 PM

GPS POSITION AT START: 42°44' 3.23"N 12° 8' 0.94"E

MEDIAN:

VALUE (µT): 2.47263

FRQ (Hz): 10009

TIME: 3:17:33 PM

DATE/TIME	ISO (µT)	FRQ (Hz)	Bx (µT)	FRQx (Hz)	By (µT)
12/12/2006 - 3:02:06 PM	0.248002	1	0.138038	1	0.150351
12/12/2006 - 3:02:07 PM	0.241726	1	0.127325	1	0.139636
12/12/2006 - 3:02:08 PM	0.241853	1	0.127174	1	0.140364
12/12/2006 - 3:02:09 PM	0.243468	1	0.125476	1	0.140637
12/12/2006 - 3:02:10 PM	0.243626	1	0.127325	1	0.141474
12/12/2006 - 3:02:11 PM	0.245119	1	0.129420	1	0.143239
12/12/2006 - 3:02:12 PM	0.243589	1	0.129717	1	0.143897
12/12/2006 - 3:02:13 PM	0.243523	1	0.130665	1	0.144480
12/12/2006 - 3:02:14 PM	0.247148	1	0.130013	1	0.146149
12/12/2006 - 3:02:15 PM	0.248002	1	0.130896	1	0.147197
12/12/2006 - 3:02:16 PM	0.248332	1	0.131333	1	0.148107
12/12/2006 - 3:02:17 PM	0.247924	1	0.130160	1	0.147718

SETTINGS Mode: option to configure instrument accessory modes.

VER. 1.00

setting

Date Time Dialing Internet Option Network and Dial-Up SD Card

Date/Time Properties

Date/Time

December 2006

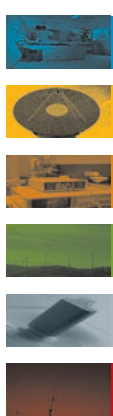
Current Time 5:36:52 PM

Time Zone (GMT-08:00) Pacific Time (US & Canada); Tjtl

Automatically adjust clock for daylight saving

Apply

TECNOSERVIZI 12/12/2006 5:36:52 PM



FUNCTIONS

FULL COMPLIANCE TO THE NORMATIVE STANDARDS

Taoma was designed and built in conformity with the Italian and international normative standards. More in detail the instrument can be used to verify respect of the Italian DM 381 of 10/09/1998, the Italian DPCM of 08/07/2003 and the European Directive 2004/40/EC in course of adoption in the single countries. Moreover **Taoma** complies with the general specs indicated in the international guidelines for the exact procedure in measuring low and high frequency signals.

BROADBAND MEASURING OF ELECTROMAGNETIC FIELDS

The primary function of **Taoma** is the measuring of electromagnetic fields in broadband mode. The system handles various probes in function of the measuring parameter (magnetic induction, magnetic field and electric field) and the relative frequency bands. The standard configuration of **Taoma** allows low and high frequencies broadband measurements and low frequency selective measurements (FFT). The revolutionary feature of this solution is the extensive graphic colour display available to the operator to analyze all the data regarding the measurements. In a single screen it is possible to read the numerical value of the field measured, the frequency value of the most important contribution to the field in the case of ELF measurement, the hour the measurements were begun, dynamic span/time graphic, used selective filter or notch, spatial axes X, Y, Z that may have been enabled in addition to the isotropic value, temperature and humidity values inside the probe, GPS coordinates. The measuring instrument automatically acquires the values collected and visualized from the start command and memorizes all the data in a provisory memory area of its own. This permits subsequent analysis using markers on the graphic available or verifying the numerical and chronological table of the event.

This philosophy eliminates therefore the problem of transferring the data acquired onto an external PC and subsequent elaboration. The presence of a removable SD card makes the management of an important mass of data immediate and flexible. **Taoma** measures, visualizes, acquires and elaborates.

INTELLIGENT AND ACCURATE PROBES

Taoma probes are the result of a totally innovative project aimed at increasing the typical accuracy of the broadband probes used up to now and to make their use more flexible. One sensor for temperature and humidity is incorporated and takes the values at the moment of analysis of the field. In environmental conditions quite different from the typical ones at the moment of calibration, this function ensures a better reliability of the acquired data. Moreover all the probes can be configured by the base instrument to operate separately on an amagnetic supporting tripod and acquire data automatically and continuously for over 24 hours. This is possible by using an optional device, the "Interface Box", which makes installation on the tripod possible. This device has a power supply unit for the probe and an optical interface for connection of **Taoma** via fiber optic cables to execute the programming. This function makes it possible to use several identical probes at the same time, previously configured by a single **Taoma** unit, for the electromagnetic mapping of an extensive area for analysis.



LOW FREQUENCY: BROADBAND AND FFT

Taoma can do magnetic induction and electric field analyses (depending on the probe used), calculating the total field value, or in FFT modality, in the frequency band from 15 Hz to 100 kHz. In the first case a dynamic amplitude/time graphic is provided that permits analysis in real time of the course of the signal. In the second case a amplitude/frequency graphic is provided that visualizes the spectral analysis on the selected axis and it is indispensable in the search for anomalous components, the analysis of harmonics or in following the behaviour of frequencies that are not standard of particular apparatus that are being tested. At the end of every cycle of acquisition **Taoma** furnishes a table of results in .txt format that can be displayed by the WordPad function of the instrument itself.

HIGH FREQUENCY: BROADBAND

Above the value of 100kHz **Taoma** can manage various probes for electric and magnetic fields to do broadband measurements up to extremely high frequencies. In this application it is possible to visualize the amplitude/time graphic, the numerical values of the measurements and obviously it is possible to visualize the mobile average value (already configured at a six minute interval but that can also be programmed differently), an indispensable parameter in verifying whether the current regulations have been respected. The probe for measuring the electric field in the 100 kHz to 6 GHz frequency range is absolutely innovative. It is in fact the first probe available on the market that can measure the contributions of the telecommunication and broadcasting sources, including those regarding the WiFi and WiMax services.

GPS AND GPRS MODULES

Taoma is the first handheld solution for environmental measuring that can use a GPS integrated module to supply georeferencing of the measurements taken. Indeed characterizing the outdoor measurements with the relative geographic coordinates to be used in the final job reports is a good technical procedure. This result is very useful above all when the electromagnetic background at the new base radio stations is evaluated, when the environmental impact of a transformation cabin is characterized and each time that the mapping of exposure in an extensive geographic area is done. It is no longer necessary to use an external device. **Taoma** measures and automatically refers the field values with the coordinates of the points in which they were taken. Moreover **Taoma** can use a GPRS module to establish an internet connection to transmit the data acquired at the measuring site to an office, a control centre, a colleague or wherever an immediate check of the activity done in the field by a designated technician is needed.

EASY TO USE IN THE OFFICE AS WELL

The large number of available interfaces makes using **Taoma** in an office easy. Through the USB sockets present it is possible to connect an external mouse and/or keyboard and use the unit to draw up texts and reports to accompany the previously memorized measurements.

A COMPLETE SOLUTION

The Taoma solution can be enhanced by the following optional accessories:

- Amagnetic tripod in wood
- Interface Box for programming and stand-alone use of the measuring probes
- Fiber optic cables in various lengths
- Integrated GPRS module for data transmission
- Laser distance meter for measurements up to 100 meters
- Laser telemeter for measurements up to 400 meters
- Laser telemeter for measurements up to 1000 meters

TECHNICAL SPECS

TAOMA BASIC UNIT

Intel XScale PXA255 400MHz Processor
VGA Colour TFT 6.4" display, 640x420 pixel resolution
Alphanumerical keyboard with access keys for the functions
Integrated trackball
IP-54 protection
Powered by rechargeable Li-Ion battery pack or by AC line
Battery duration: 5 hours (with standard battery pack and TS/004/EHF probe), 12 hours (with high capacity battery pack and TS/004/EHF probe)
Interface for e.m. field probe from 15 Hz to 18 GHz
Other available interfaces: serial RS-232 electric, serial RS-232 optical, 3xUSB (2 client, 1 host), SD card slot
Integrated GPS module
Integrated GPRS module (optional)
Real time measurements with simultaneous visualization of the numerical values (Instantaneous, Average, Max) and of the amplitude/time graph

ORDER CODES

TS/001/UB	Taoma basic unit including transportation case, battery charger, SD reader for PC, user manual
TS/002/BLF	B-field (magnetic induction) probe - Frequency range: 15 Hz - 100 kHz
TS/003/ELF	E-field (electric field) probe - Frequency range: 15 Hz - 100 kHz
TS/004/EHF	E-field (electric field) probe - Frequency range: 100 kHz - 6 GHz
TS/005/EHF	E-field (electric field) probe - Frequency range: 3 MHz - 18 GHz
TS/006/HHF	H-field (magnetic field) probe - Frequency range: 300 kHz - 30 MHz
TS/101/IBOX	Interface Box for programming probes (5 m fiber optic cable included)
TS/301/GPRS	Integrated GPRS module for data transmission
TS/110/FOC	10 m fiber optic cable
TS/120/FOC	20 m fiber optic cable
TS/201/TRP	Amagnetic wooden tripod
TS/202/TLS	Telescopic support
TS/501/DST	Laser distance meter up to 100 m
TS/502/TML	Laser telemeter up to 400 m
TS/503/TML	Laser telemeter up to 1000 m

The description, technical specs and images that compose this brochure are purely indicative. They can be modified by Tecnoservizi sas at any time without notice.

Isotropic or single axis measuring function
Identification of the frequency value of the signal with highest contribution to the total field (ELF)
Band-pass, selective and notch filters that can be configured by the user (ELF)
FFT (ELF) analysis
Markers for graphic analyses
Long term monitoring function
Tables and graphics of the results for post measuring analyses
Memorization of the measurements: on 2 GB SD card (included)
Dimensions: 280 x 185 x 50 mm
Weight: 990 g (with standard battery pack)
Operating temperature: from -10°C to +50°C

B-FIELD PROBE TS/002/BLF

Isotropic measuring
Frequency range: 15 Hz - 100 kHz
Measuring range: 100 nT - 10 mT
Overload limit: 20 mT
Flatness of frequency response (50 Hz - 10 kHz): ± 0.5 dB
Isotropic response @ 50 Hz: ± 0.5 dB
Linearity between 1 μ T and 500 μ T: ± 0.5 dB ± 150 nT

E-FIELD PROBE TS/003/ELF

Isotropic measuring
Frequency range: 15 Hz - 100 kHz
Measuring range: 10 V/m - 100 kV/m
Overload limit: 200 kV/m
Flatness of frequency response (50 Hz - 10 kHz): ± 0.5 dB
Isotropic response @ 50 Hz: ± 1 dB
Linearity between 100 V/m and 10 kV/m: ± 0.5 dB

E-FIELD PROBE TS/004/EHF

Isotropic measuring
Frequency range: 100 kHz - 6 GHz
Measuring range: 0.2 V/m - 340 V/m
Overload limit: 600 V/m
Flatness of frequency response (1 MHz - 1 GHz): ± 1 dB
Flatness of frequency response (1.1 GHz - 2.5 GHz): ± 1.5 dB
Flatness of frequency response (2.6 GHz - 6 GHz): ± 2.5 dB
Isotropic response: ± 0.5 dB
Linearity between 2 V/m and 200 V/m (@ 27.12 MHz): ± 0.5 dB ± 0.5 V/m

B-FIELD PROBE TS/005/EHF

Isotropic measuring
Frequency range: 3 MHz - 18 GHz
Measuring range: 0.6 V/m - 1000 V/m
Overload limit: 1300 V/m
Flatness of frequency response (10 MHz - 1 GHz): ± 1 dB
Flatness of frequency response (1.1 GHz - 6 GHz): ± 2.2 dB
Flatness of frequency response (6.1 GHz - 18 GHz): ± 2.5 dB
Isotropic response: ± 0.5 dB
Linearity between 2 V/m and 200 V/m (@ 27.12 MHz): ± 0.5 dB ± 0.5 V/m

B-FIELD PROBE TS/006/HHF

Isotropic measuring
Frequency range: 300 kHz - 30 MHz
Measuring range: 0.015 A/m - 10 A/m
Overload limit: 30 A/m
Flatness of frequency response (500 kHz - 30 MHz): ± 1.5 dB
Isotropic response: ± 0.8 dB
Linearity between 0.03 A/m and 10 A/m (@ 27.12 MHz): ± 0.8 dB ± 15 mA/m

INTERFACE BOX TS/101/IBOX

Rechargeable integrated battery with a battery life > 24 hours
LED indication of the battery charge
Optical interface with status LED
Internal processor for managing the activity
Fiber optic cable 5 m long
Battery charger
Threading for installation on tripod



CALIBRATION AND TRACEABILITY

In agreement with the guidelines and current regulations, the Taoma system is furnished with a calibration certificate for every measuring probe. The standard certificate documents a calibration according to a UNI ISO IEC EN 17025 quality method with SIT referability. It is carried out with SIT traceable sampling instruments applying controlled ISO quality methods as defined above. Upon request a SIT accredited calibration with regards to the intensity of the electric field, the magnetic field and the density of the electromagnetic power for the high frequency range is available, also documented by a relative certificate.



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