PROTEL

NARDA SAFETY TEST SOLUTIONS · GENERAL DISTRIBUTOR FOR TURKEY

TECHNICAL GUIDE · OCCUPATIONAL HYGIENE LABORATORIES

Electromagnetic Field Measuring Instruments for İSGÜM-Authorised and TÜRKAK-Accredited Laboratories

Selecting NARDA FieldMan, EHP-50F and RF probes for low- and high-frequency EMF measurement under TS EN 50413 and TS EN 50413/A1: frequency coverage, three axes, data logging, averaging and calibration.

TS EN 50413 · A1:2025 | 1 Hz – 400 kHz E + H | 100 kHz – 90 GHz E | Three-axis probes | 6 min / 30 min averaging | DAkkS accredited calibration

1 Hz
lower frequency · EHP-50F

90 GHz
upper frequency · EFD-9091

100 h
FieldMan timer logging

5 sets
from 3 GHz to 90 GHz

PROTEL Elektronik · protelturkey.com

November 2026

01 Summary: six key findings

This guide is for occupational hygiene laboratories in Turkey that perform, or plan to extend, electromagnetic field (EMF) exposure measurements under İSGÜM authorisation and TÜRKAK accreditation. A frequent quotation request is: **an EMF measuring instrument and probes under TS EN 50413, suitable for low-frequency (1 Hz – 400 kHz) and high-frequency (100 kHz – 90 GHz) measurement, three-axis, with data logging or averaging**.

1. **No single instrument or probe meets this request.** The right solution is one base unit (FieldMan), EHP-50F for low frequencies and two complementary electric field probes for high frequencies.
2. **TSE accepted TS EN 50413/A1 on 22.12.2025** (English text). The amendment adds the consideration of modulation and duty cycle and a new informative Annex B. İSGÜM's sample method list names TS EN 50413 (16.12.2019).
3. **90 GHz is not mandatory for everyone.** İSGÜM authorises according to the measuring range of your instruments; the TÜRKAK certificate must cover the same range. The laboratory decides the upper frequency.
4. **EHP-50F + EFD-9091 leaves a 400 kHz – 100 MHz gap.** A second RF probe starting at 100 kHz (EFD-0891, EFD-0691 or EFD-0391) is required.
5. **Accredited calibration above 18 GHz must be specified in the order.** NARDA calibrates with accreditation up to 18 GHz in its own laboratory; if EFD-9091 also needs accredited calibration for 18 – 90 GHz, the probe is calibrated at an external accredited laboratory before delivery.
6. **Logging and averaging depend on the right configuration.** FieldMan offers 1 s – 24 h averaging including 6 and 30 min, and logging for up to 100 hours; RF or LF Basic Sets need the Data Storage option.

Our five sets are ordered **by increasing frequency coverage and increasing cost, from Set A (3 GHz) to Set E (90 GHz)**. All include the FieldMan Basic Set (RF, LF, data storage), EHP-50F and a tripod; they differ in the RF probe. Set E meets the full specification (1 Hz – 90 GHz). The sets are compared in section 6. Details, product images and current links are on our web page: protelturkey.com/en/urun/narda-occupational-safety-emf-measurement-sets.

02 TS EN 50413, the A1 amendment, İSGÜM and TÜRKAK

TS EN 50413 is the basic standard on measurement and calculation procedures for human exposure to electric, magnetic and electromagnetic fields (0 Hz – 300 GHz). It defines measured quantities, instrument requirements, calibration methods and exposure assessment techniques. It is also intended for assessing compliance with Directive 2013/35/EU in the workplace.

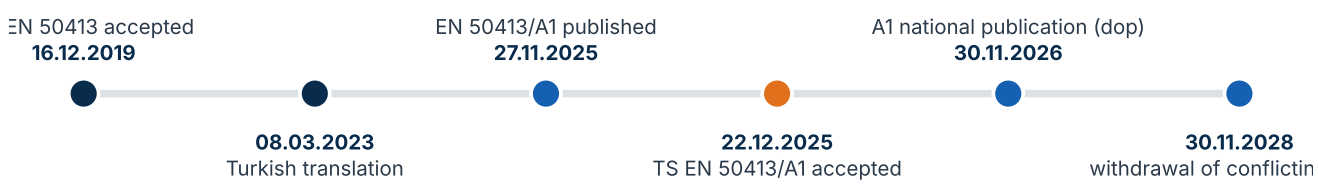


Figure 1. Timeline of TS EN 50413 and the A1 amendment (TSE catalogue and CENELEC information page).

Topic	Current status (November 2026)
TS EN 50413 (Turkish text)	Accepted by TSE on 16.12.2019, Turkish translation dated 08.03.2023; in force. Equivalent to EN 50413:2019. The TSE catalogue notes "amended by TS EN 50413/A1:2025".
TS EN 50413/A1	Accepted by TSE on 22.12.2025; English text, 12 pages; in force. Equivalent to EN 50413:2019/A1:2025, amends TS EN 50413:2019. No consolidated Turkish edition; the amendment applies together with the 2019 standard.

Topic	Current status (November 2026)
What A1 adds	5.2.2.5 (assessment methods): signal modulation and duty cycle can affect the measurement or calculation and must be considered when checking limits. New informative Annex B: ITU emission classes; carrier, mean and peak power relationships. CENELEC: dop 30.11.2026, dow 30.11.2028.
İSGÜM sample method list	TS EN 50413 (16.12.2019) for the parameter “Electromagnetic field exposure measurement”.
İSGÜM EMF announcement	Laboratories are authorised according to the ranges of their instruments, and the TÜRKAK accreditation certificate must cover the same range. İSGÜM’s page shows the announcement date as 20.11.2018.
Authorisation file	TÜRKAK accreditation certificate and scope, instrument list, calibration plan based on internationally traceable calibrations, measurement uncertainty calculations, method validation or verification, Turkish test instructions, proficiency testing or interlaboratory comparison at least once every four years per parameter.

What this means for your laboratory

It is sensible for your test instructions to refer to TS EN 50413/A1 as well as TS EN 50413 and to describe how modulated signals (5G TDD, Wi-Fi, pulsed radar) are handled. For such sources a frequency-selective analyzer (SRM-3006 or SignalShark EMF) strengthens the assessment alongside broadband measurement. Scope and method decisions belong to your laboratory and the TÜRKAK and İSGÜM processes; buying an instrument does not by itself grant authorisation or accreditation.

03 Before selecting instruments

The following questions should be answered first:

- Which frequency range will the laboratory declare for İSGÜM and TÜRKAK?
- Electric field, magnetic field or both? Is direct magnetic field measurement needed at RF?
- Broadband total field measurement or frequency-selective analysis?
- Do the sources operate continuously, variably or in pulses?
- Which logging, averaging and reporting functions are needed? Are separate X, Y, Z records required?
- How do the calibration documents cover the targeted frequency and field strength ranges?

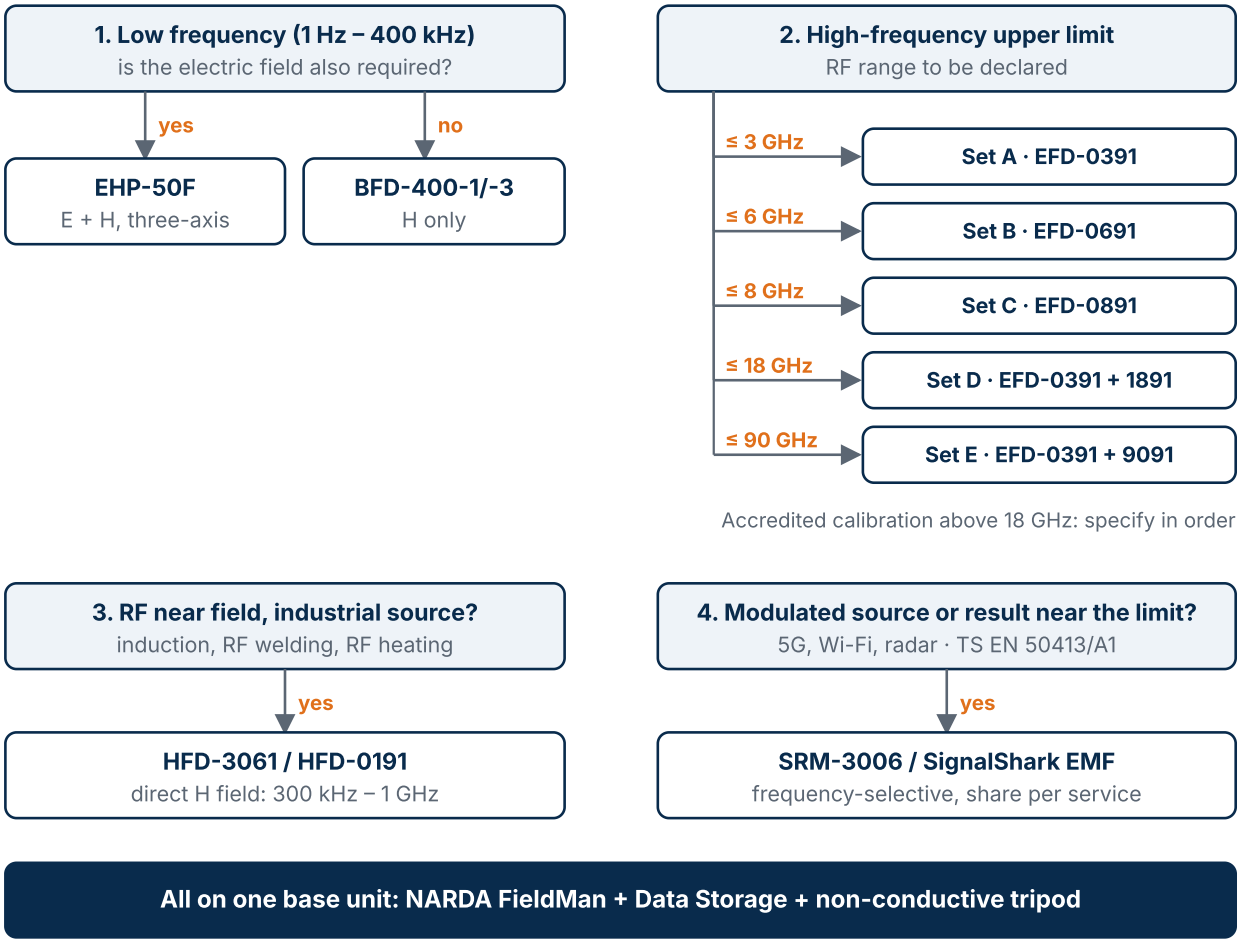


Figure 2. Decision flow: NARDA components by low frequency, RF upper limit, near field and modulation questions.

Is 90 GHz mandatory?

We found no general rule that every occupational hygiene laboratory must go up to 90 GHz. İSGÜM authorises according to the laboratory's instrument range and requires the accreditation certificate to cover that range. The purchasing decision should be based on the workplaces served and the targeted scope. If a technical specification explicitly asks for 90 GHz, that range is covered separately; laboratories with a narrower scope can start with a suitable upper frequency and extend later.

04 Low frequency: NARDA EHP-50F

EHP-50F is a three-axis analyzer that measures electric and magnetic fields simultaneously from 1 Hz to 400 kHz. It performs FFT-based frequency-selective analysis and broadband evaluation. It connects by fiber optic cable to FieldMan or to PC software (EHP50-TS, NBM-TS/TSX), or logs on its own without a display.

Feature	Value (NARDA datasheet)
Frequency range	1 Hz – 400 kHz
Electric field	Low range 5 mV/m – 1 kV/m; high range 500 mV/m – 100 kV/m
Magnetic field	Low range 0.3 nT – 100 µT; high range 30 nT – 10 mT
Axes	Three orthogonal sensors; isotropic result in every mode, separate X, Y, Z results in the PC software
Weighted Peak	IEC 61786-2 time-domain method; ICNIRP 1998 and 2010 (public, occupational), Directive 2013/35/EU (limbs, low and high action levels)

Feature	Value (NARDA datasheet)
Standalone logging	Up to 36 h at 30 s or 60 s intervals; more than 9 h at 1 s – 6 min intervals
Calibration	Calibration certificate with each set; accredited calibration on request; recommended interval 24 months

FFT window

1 Hz – 400 kHz is the instrument range; a single FFT sweep does not show the whole band at once. Spans from 100 Hz to 400 kHz are selectable; the 400 kHz span starts at 4.8 kHz, and the 100 Hz and 200 Hz spans are not available in standalone operation. Where several frequency components are present, the measurement plan should reflect this.

BFD-400-1 / BFD-400-3 measure only the magnetic field from 1 Hz to 400 kHz and plug straight into FieldMan, with weighted peak evaluation to Directive 2013/35/EU. They do not replace EHP-50F where the LF electric field is also required.

05 High frequency: NARDA FieldMan and RF probes

FieldMan is a modular measuring platform used at low and high frequencies by changing probes. The probe, not the base unit, defines the measuring range. The probes are digital and carry their calibration data; the manufacturer states that the base unit needs no separate calibration.

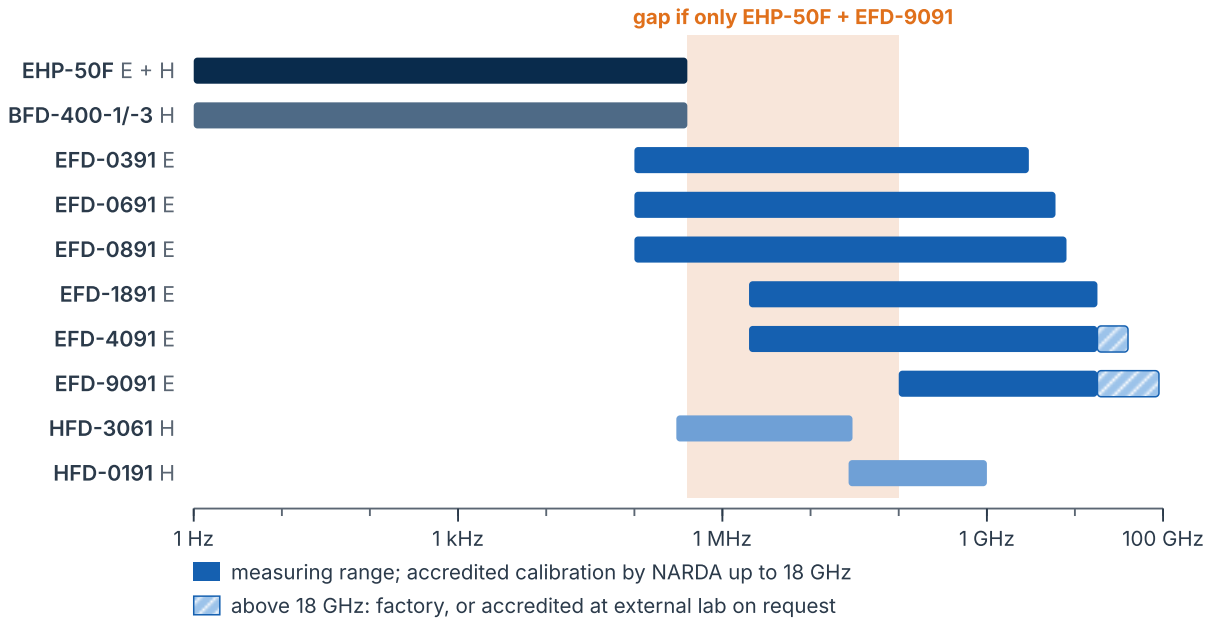


Figure 3. Frequency coverage of NARDA probes (logarithmic axis). Orange band: the 400 kHz – 100 MHz range not measured when only EHP-50F and EFD-9091 are used.

Probe	Field	Frequency	Measuring range (CW)	Accredited calibration*
EFD-0391	E	100 kHz – 3 GHz	—	available on order
EFD-0691	E	100 kHz – 6 GHz	0.2 – 650 V/m	DAkkS, at several frequencies
EFD-0891	E	100 kHz – 8 GHz	0.55 – 900 V/m	DAkkS (ILAC-MRA)
EFD-1891	E	2 MHz – 18 GHz	0.6 – 800 V/m	whole range

Probe	Field	Frequency	Measuring range (CW)	Accredited calibration*
EFD-4091	E	2 MHz – 40 GHz	1.2 – 800 V/m	NARDA to 18 GHz; above on request (external lab)
EFD-6091	E	100 MHz – 60 GHz	0.5 – 400 V/m	NARDA to 18 GHz; above on request (external lab)
EFD-9091	E	100 MHz – 90 GHz	0.5 – 400 V/m	NARDA to 18 GHz; above on request (external lab)
HFD-3061	H	300 kHz – 30 MHz	0.012 – 16 A/m	DAkkS
HFD-0191	H	27 MHz – 1 GHz	—	available on order

* According to NARDA datasheets. All probes can be ordered with accredited calibration as well as factory calibration; it is included in the price for some probes and at extra cost for others. Factory calibration applies outside the accredited scope. All probes are tri-axial isotropic; recommended calibration interval 24 months. True RMS ranges are narrower than CW ranges (e.g. EFD-0891: 0.55 – 17 V/m).

Electric field does not always replace magnetic field

In the far field E and H are linked and the equivalent power density can be calculated from E. In near-field conditions such as induction heating, RF welding or close to antennas, E and H must be assessed separately; an equivalent power density shown by an E probe is not an independent H-field measurement. In these cases HFD-3061 (300 kHz – 30 MHz) and HFD-0191 (27 MHz – 1 GHz) are used.

06 Recommended systems

The sets below are PROTEL's technical recommendations, not NARDA package names or packages pre-approved by any authority. Order codes, current versions and package contents are confirmed with NARDA at the quotation stage.

Set A · up to 3 GHz

LF 1 Hz – 400 kHz (E, H) · RF 100 kHz – 3 GHz (E)

- FieldMan Basic Set (RF, LF, data storage)
- EHP-50F
- **EFD-0391, 100 kHz – 3 GHz**
- Non-conductive tripod

The most economical start: power frequency, induction, RF heating and welding, broadcast, and mobile and Wi-Fi (2.4 GHz) up to 3 GHz.

Set B · up to 6 GHz

LF 1 Hz – 400 kHz (E, H) · RF 100 kHz – 6 GHz (E)

- FieldMan Basic Set (RF, LF, data storage)
- EHP-50F
- **EFD-0691, 100 kHz – 6 GHz**
- Non-conductive tripod

All sources up to 6 GHz with one probe, including 5G FR1 (3.5 GHz) and 5 GHz Wi-Fi.

Set C · up to 8 GHz

LF 1 Hz – 400 kHz (E, H) · RF 100 kHz – 8 GHz (E)

- FieldMan Basic Set (RF, LF, data storage)
- EHP-50F
- **EFD-0891, 100 kHz – 8 GHz**
- Non-conductive tripod

All everyday sources up to 8 GHz with one probe, including Wi-Fi 6E/7 (6 GHz band).

Set D · up to 18 GHz

LF 1 Hz – 400 kHz (E, H) · RF 100 kHz – 18 GHz (E)

- FieldMan Basic Set (RF, LF, data storage)
- EHP-50F
- **EFD-0391, 100 kHz – 3 GHz**
- **EFD-1891, 2 MHz – 18 GHz**
- Non-conductive tripod

Adds radar, satellite and microwave links up to 18 GHz. EFD-1891's accredited calibration covers its whole range (datasheet).

Set E · up to 90 GHz

LF 1 Hz – 400 kHz (E, H) · RF 100 kHz – 90 GHz (E)

- FieldMan Basic Set (RF, LF, data storage)
- EHP-50F
- **EFD-0391, 100 kHz – 3 GHz**
- **EFD-9091, 100 MHz – 90 GHz**
- Non-conductive tripod

The full specification. EFD-0391 covers 100 kHz – 100 MHz below EFD-9091. If accredited calibration above 18 GHz is required, it is done at an external accredited laboratory.

Add-ons

Magnetic field · frequency-selective

- BFD-400-1/-3: LF H field, 2013/35/EU weighted peak
- HFD-3061 / HFD-0191: RF H field, near field
- SRM-3006 or SignalShark EMF: share per service
- EHP-200A: selective E and H, 9 kHz – 30 MHz

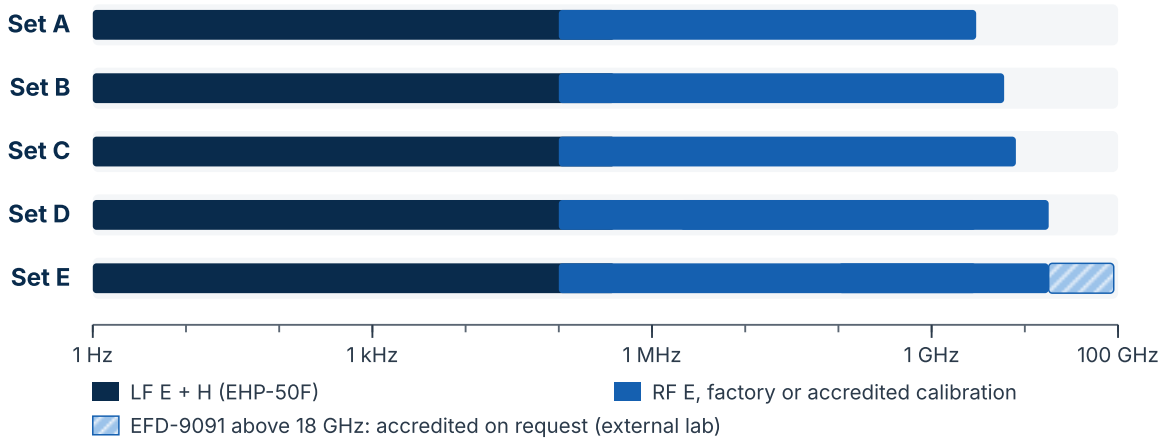


Figure 4. Frequency coverage of the sets and accredited calibration coverage according to datasheets.

Alternative configurations and add-ons

Target need	Combination	Coverage
LF electric and magnetic field only	FieldMan + EHP-50F	E and H: 1 Hz – 400 kHz
LF magnetic field on the FieldMan display	+ BFD-400-1 or BFD-400-3	H: 1 Hz – 400 kHz, 2013/35/EU weighted peak
RF magnetic field (near field)	+ HFD-3061, HFD-0191 if needed	H: 300 kHz – 30 MHz; 27 MHz – 1 GHz
Frequency-selective analysis	SRM-3006 (9 kHz – 6 GHz) or SignalShark EMF (8 kHz – 8 GHz)	Share per service; modulation assessment
Selective LF/MF E and H	EHP-200A (9 kHz – 30 MHz)	Three-axis, with spectrum analysis
Existing NBM probes	A/D Probe Converter	Use of NBM probes on FieldMan

07 Three axes, data logging and averaging

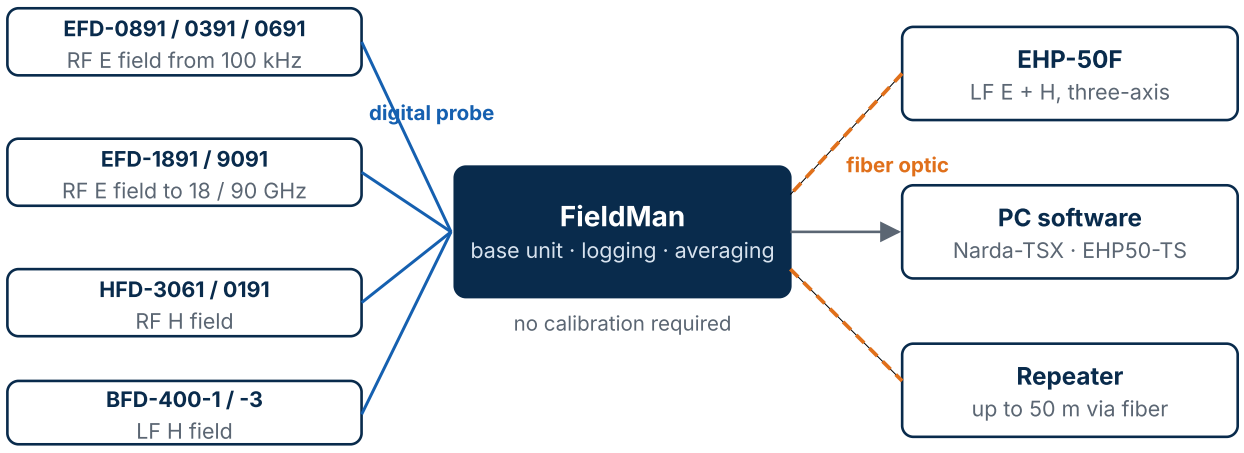


Figure 5. System structure: FieldMan base unit, digital probes, EHP-50F fiber link, PC software and Repeater.

Three-axis isotropic measurement senses the field in three spatial directions and reduces dependence on probe orientation. **Three-axis sensing is not the same as displaying or logging X, Y and Z separately.** FieldMan RF probes give the isotropic total (RSS); EHP-50F shows X, Y, Z separately in the PC software. If a specification requires per-axis records, this is checked before ordering.

FieldMan function	Value (NARDA datasheet)
Result types	Actual, maximum, minimum, average (Avg), maximum average (Max Avg)
Time averaging	1 s, 3 s, 10 s, 30 s, 1 min, 3 min, 6 min, 10 min, 30 min, 1 h, 6 h, 24 h
Spatial averaging	Bar graph and average line for up to 100 measurement positions
Timer logging	Automatic wake-up/shutdown, up to 100 h, 1 s – 6 min intervals, up to 32,000 intervals
Memory	750 MB internal, up to 128 GB with a memory card (16 GB microSD included)
Options	Data Storage 2460/95.15 (for RF and LF Basic Sets), GPS/range finder 2460/95.11, Narda-TSX live measurement 2460/95.01

The averaging time and evaluation are chosen according to the method and limit set used; a single averaging time should not be applied automatically to every measurement. LF/RF functions and data logging should be specified explicitly in the quotation.

08 Calibration and metrological traceability

The probe's measuring band, the points in the calibration certificate and the accredited scope of the calibration laboratory must be checked separately. According to TÜRKAK's R10.12 Metrological Traceability Guide, priority goes to calibration laboratories accredited under the ILAC arrangement; it must be verified that the service is within the accredited scope and that the calibration covers the required quantities and ranges with suitable uncertainty. If no accredited service exists, alternatives may be used only with a recorded justification submitted to TÜRKAK.

All NARDA probes can be ordered with factory calibration or accredited calibration; accredited calibration is included as standard for some probes and added at extra cost for others. NARDA performs accredited calibration under DAkkS accreditation (DIN EN ISO/IEC 17025, ILAC-MRA); DAkkS is a signatory of the ILAC mutual recognition arrangement. However, an accredited organisation does not provide accredited calibration at every frequency it offers.

Special care with the 90 GHz option

NARDA performs accredited calibration up to 18 GHz in its own DAkkS laboratory. For EFD-9091, EFD-6091 and EFD-4091, if accredited calibration above 18 GHz is also required, NARDA sends the probe to an external accredited laboratory before delivery, has it calibrated there and delivers it with the certificate; otherwise a factory calibration applies above 18 GHz. If the accreditation scope is to be declared up to 90 GHz, this option must be specified in the order.

Before ordering, we obtain the calibration points, uncertainties and accredited scope for the selected probes from NARDA in writing and pass them on, so the measurement uncertainty budget can be based on these documents. The laboratory should still manage probe and base unit identities, software versions, intermediate checks and calibration records within its own quality system.

09 Sources and solutions by frequency band

Frequency band	Typical workplace sources	NARDA solution
1 Hz – 400 kHz	Transformers, switchgear and busbars, welding machines, induction furnaces and hardening, motors and drives	E and H: EHP-50F · H only: BFD-400-1/-3
100 kHz – 30 MHz	Induction heating, RF plastic welding and sealing (13.56 / 27.12 MHz), MF/HF transmitters	E: EFD-0891 or EFD-0391 · H: HFD-3061 · selective: EHP-200A
30 MHz – 1 GHz	FM and TV transmitters, PMR/TETRA radios, RF drying and heating	E: EFD-0891 · H: HFD-0191 · selective: SRM-3006, SignalShark EMF
1 – 8 GHz	Mobile base stations (4G, 5G FR1), Wi-Fi 6/6E/7, industrial microwave (2.45 GHz), radar and links	E: EFD-0891 · selective: SRM-3006 (to 6 GHz), SignalShark EMF (to 8 GHz)
8 – 90 GHz	Radar, satellite ground stations, microwave links, 5G FR2	E: EFD-9091 (to 90 GHz), EFD-1891 (18 GHz), EFD-4091 (40 GHz)

10 Information to prepare before requesting a quote

- ☐ Current or targeted İSGÜM authorisation and TÜRKAK accreditation scope
- ☐ Lower and upper frequency limits for electric and magnetic fields separately
- ☐ Workplaces served and electromagnetic field sources to be measured
- ☐ Expected field strengths, pulsed sources and low-level measurement needs
- ☐ Make, model and calibration details of existing instruments and probes
- ☐ Expectations for logging, averaging, per-axis data and PC software
- ☐ Whether accredited calibration is required over the whole declared range

With this information we offer the suitable set, an alternative and the calibration documents in one quotation, so measurement gaps and additional hardware needs are visible before purchase.

11 Frequently asked questions

Can FieldMan measure 1 Hz – 90 GHz with one probe?

No. This coverage comes from several probes used together: EHP-50F for low frequencies and suitable RF probes for high frequencies. Measurements are made by changing probe and mode; the whole band is not measured at once.

Are EHP-50F and EFD-9091 together sufficient?

Not if continuous 100 kHz – 90 GHz RF electric field coverage is required. EHP-50F ends at 400 kHz and EFD-9091 starts at 100 MHz. The gap needs EFD-0891, EFD-0691 or EFD-0391, which start at 100 kHz.

Can BFD-400 replace EHP-50F?

Only if magnetic field measurement alone is the goal. If the LF electric field is also required, BFD-400 does not meet the need.

Can EFD-9091 be supplied with accredited calibration up to 90 GHz?

Yes, on request. NARDA calibrates with accreditation up to 18 GHz in its own laboratory; for 18 – 90 GHz the probe is calibrated at an external accredited laboratory before delivery and supplied with the certificate. This must be specified in the order.

Does TS EN 50413/A1 change instrument selection?

It does not change the measured quantities; it requires modulation and duty cycle to be considered. Where modulated sources are common, adding a frequency-selective analyzer (SRM-3006 or SignalShark EMF) strengthens the assessment.

Can we keep using our NBM-550 probes?

Existing NBM probes can be used on FieldMan with NARDA's A/D Probe Converter; their calibration status and accredited scope must be checked separately.

Is buying the instrument enough for accreditation?

No. Method application, staff competence, traceability, measurement uncertainty and quality processes are also assessed. İSGÜM authorisation and TÜRKAK accreditation follow those institutions' processes; an instrument quotation is not a guarantee of acceptance.

Request a quote for a NARDA set that fits your laboratory's scope

Send us your target frequency range, your electric and magnetic field measurement needs and your existing probe list.

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PROTEL is the general distributor of NARDA Safety Test Solutions for Turkey. Our sales authority for NARDA products is limited to Turkey.

12 Sources

1. TSE — Standards search: TS EN 50413 and TS EN 50413/A1 — intweb.tse.org.tr/standard/standard/StandardAra.aspx
2. CENELEC — EN 50413:2019/A1:2025 information page (dop, dow, amended clauses) — standards.iteh.ai
3. İSGÜM — Sample method list for occupational hygiene measurement, test and analysis authorisation — csgb.gov.tr
4. İSGÜM — Laboratory authorisation page and electromagnetic field announcement — csgb.gov.tr
5. TÜRKAK — R10.12 Metrological Traceability Guide, Revision 05 (28.04.2021) — turkak.org.tr
6. NARDA — FieldMan datasheet, NSTS 0925-E0370EE — narda-sts.com
7. NARDA — FieldMan probes and accessories — narda-sts.com
8. NARDA — EHP-50F datasheet, NSTS 1225-E0310F — narda-sts.com
9. NARDA — EFD-0891 (NSTS 0226-E0428A), EFD-0691 (NSTS 0624-E0387B), EFD-1891 (NSTS 0723-E0398A) datasheets — narda-sts.com
10. NARDA — EFD-9091 (NSTS 0523-E0405A), EFD-6091 (NSTS 0623-E0391A), EFD-4091 (NSTS 0523-E0399A) datasheets — narda-sts.com
11. NARDA — HFD-3061 (NSTS 1024-E0407A) and BFD-400-1 (NSTS 0225-E0406A) datasheets — narda-sts.com
12. NARDA — SRM-3006 datasheet, NSTS 1223-E0272O; SignalShark 3310 for EMF, NSTS 0226-E0423B — narda-sts.com

Technical content checked on 1 November 2026. The manufacturer's current documents apply for instrument and probe specifications, and the current requirements of the relevant institutions apply for authorisation and accreditation. NARDA product names and technical information © Narda Safety Test Solutions GmbH. This guide is intended to help with instrument selection; it is not legal or accreditation advice.