

Kalibrierstelle für Antennen und Feldsonden  
*Calibration Body for Antennas and Field Probes*

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Kalibrierschein nach ISO/IEC 17025  
*Calibration Certificate according to ISO/IEC 17025*

Kalibrierzeichen  
*Calibration mark*

|             |
|-------------|
| EH-A1210/26 |
| <b>0612</b> |
| 02.06.2026  |

|  |   |
|--|---|
| Gegenstand<br><i>Object</i>  | Log.-Periodical Antenna   |
| Hersteller & Typ<br><i>Manufacturer &amp; Type</i>                                   | TEKBOX TBMA11   |
| Herstellernummer<br><i>Serial number</i>   | TBMA11260003  |
| Auftraggeber<br><i>Customer</i>  | TekBox Digital Solutions Vietnam Co. Ltd.<br>Saigon Hi-Tech Park, Factory 4, 5F, Lot I-3B-1, N6 Str., Tan Phu Ward, D 9<br>70000 Ho Chi Minh<br>Vietnam |
| Auftragsnummer<br><i>Order Nr.</i>   | L.L7.00059.0.0-A-13675_13<br>Ext. Order No.: P03699   |
| Anzahl der Seiten des Kalibrierscheines<br><i>Number of pages of the certificate</i> | 1 - 4   |
| Datum und Ort der Kalibrierung<br><i>Date and place of calibration</i>               | 02.06.2026<br>Seibersdorf   |

Akkreditierung Austria ist Vollmitglied bei der International Laboratory Accreditation Cooperation ILAC und Unterzeichner der MRAs für die Bereiche „Testing, Calibration and Inspection“.

Die Kalibrierung erfolgt auf der gesetzlichen Grundlage des Akkreditierungsgesetzes in gültiger Fassung entsprechend den Anforderungen der ÖVE/ÖNORM EN ISO/IEC 17025.

Dieser Kalibrierschein dokumentiert die Rückführbarkeit auf nationale Normale zur Darstellung der physikalischen Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI).

Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

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*This calibration certificate documents the traceability to national standards, which realize the physical units or measurements according to the International System of Units (SI).*

*The user is obliged to have the object recalibrated at appropriate intervals.*

Dieser Kalibrierschein gilt ausschließlich für den kalibrierten Gegenstand und darf nur vollständig und unverändert weiterverarbeitet werden. Auszüge oder Änderungen sind unzulässig. Kalibrierscheine ohne Unterschrift haben keine Gültigkeit.

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Datum  
*Date*

Zeichnungsberechtigter  
*Authorized person*

Bearbeiter  
*Person responsible*

02.06.2026

Patrick Preiner

Markus Vaclav

## Calibration Procedure

Calibration of the **antenna factor** is carried out according to the Three -Antenna Method (TAM) as described in internal process guideline LE-EH-VA-A01 (2023-12). The distance between the antennas is measured from the feedpoint (dipole like antenna), reference point (log periodic or hybrid antenna) or aperture plane (horn antenna).

## Test Equipment

| Type                                 | Identification |
|--------------------------------------|----------------|
| Network Analyzer Keysight E5080B     | LE0406         |
| Hybrid Antenna Schwarzbeck VULB 9162 | LE0431         |
| Hybrid Antenna Schwarzbeck VULB 9162 | LE0432         |
| Fully Anechoic Chamber               | LE0455         |
| Double Ridged Horn ETS 3115          | LE0413         |
| Double Ridged Horn ETS 3115          | LE0414         |
| CalStan 11                           | E0921          |

## Environmental Conditions

|                     |             |
|---------------------|-------------|
| Site Temperature    | 20°C - 27°C |
| Site Humidity       | 30% - 80%   |
| Control Temperature | 20°C - 27°C |
| Control Humidity    | 30% - 80%   |

## Results

| Type           | Description                           | Fig./Table |
|----------------|---------------------------------------|------------|
| Antenna Factor | 130MHz-6000MHz, d=3m (referencepoint) | 1          |

## Uncertainty

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k = 2$ , which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EAL Publication EA 4/02.

## References

- [1] EA-4/02 M: 2022 Evaluation of the Uncertainty of Measurement in calibration

Figure 1: Antenna Factor; 130MHz-6000MHz, d=3m (referencepoint)

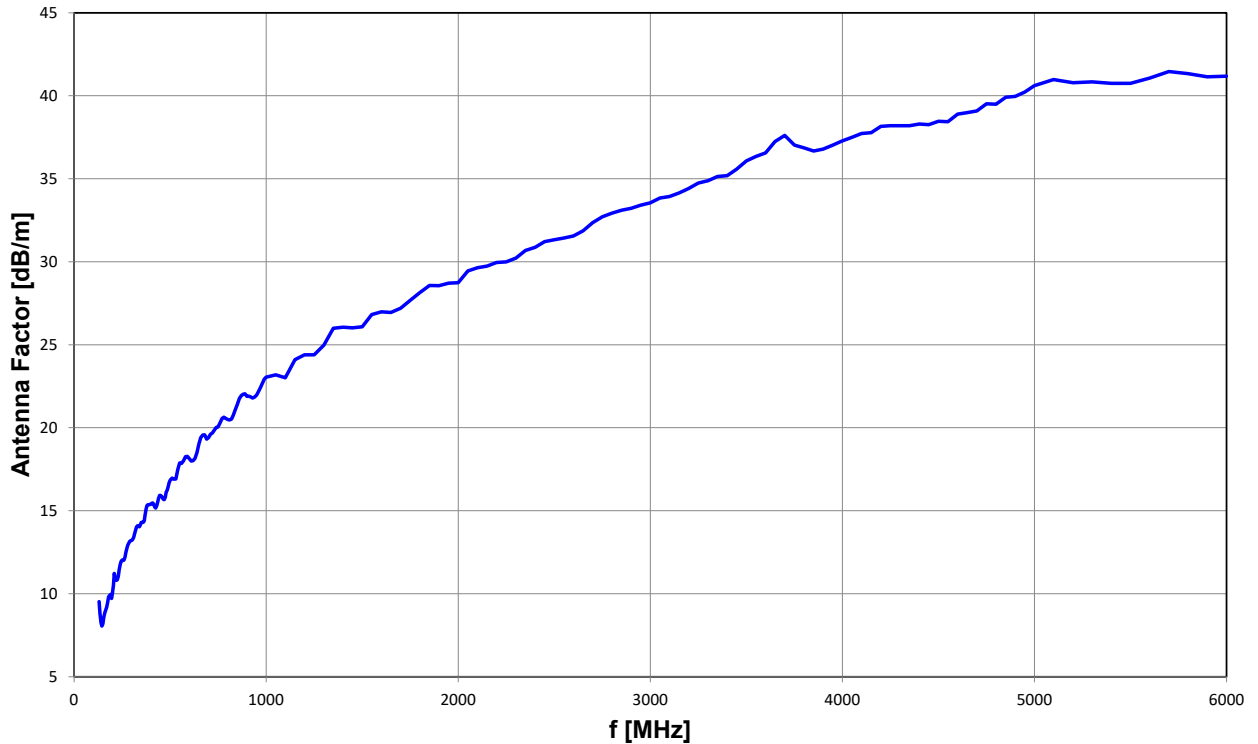


Table 1: Antenna Factor; 130MHz-6000MHz, d=3m (referencepoint)

| f [MHz] | AF1 Ver [dB/m] | U [dB] | f [MHz] | AF1 Ver [dB/m] | U [dB] | f [MHz] | AF1 Ver [dB/m] | U [dB] |
|---------|----------------|--------|---------|----------------|--------|---------|----------------|--------|
| 130     | 9.52           | ±1.00  | 275     | 12.75          | ±1.00  | 420     | 15.23          | ±1.00  |
| 135     | 8.81           | ±1.00  | 280     | 12.92          | ±1.00  | 425     | 15.16          | ±1.00  |
| 140     | 8.25           | ±1.00  | 285     | 13.06          | ±1.00  | 430     | 15.29          | ±1.00  |
| 145     | 8.04           | ±1.00  | 290     | 13.15          | ±1.00  | 435     | 15.48          | ±1.00  |
| 150     | 8.19           | ±1.00  | 295     | 13.19          | ±1.00  | 440     | 15.74          | ±1.00  |
| 155     | 8.57           | ±1.00  | 300     | 13.21          | ±1.00  | 445     | 15.92          | ±1.00  |
| 160     | 8.85           | ±1.00  | 305     | 13.27          | ±1.00  | 450     | 15.92          | ±1.00  |
| 165     | 9.01           | ±1.00  | 310     | 13.39          | ±1.00  | 455     | 15.87          | ±1.00  |
| 170     | 9.19           | ±1.00  | 315     | 13.60          | ±1.00  | 460     | 15.78          | ±1.00  |
| 175     | 9.51           | ±1.00  | 320     | 13.83          | ±1.00  | 465     | 15.68          | ±1.00  |
| 180     | 9.81           | ±1.00  | 325     | 14.01          | ±1.00  | 470     | 15.67          | ±1.00  |
| 185     | 9.89           | ±1.00  | 330     | 14.09          | ±1.00  | 475     | 15.82          | ±1.00  |
| 190     | 9.95           | ±1.00  | 335     | 14.07          | ±1.00  | 480     | 16.12          | ±1.00  |
| 195     | 9.71           | ±1.00  | 340     | 14.03          | ±1.00  | 485     | 16.23          | ±1.00  |
| 200     | 10.02          | ±1.00  | 345     | 14.13          | ±1.00  | 490     | 16.47          | ±1.00  |
| 205     | 10.51          | ±1.00  | 350     | 14.29          | ±1.00  | 495     | 16.68          | ±1.00  |
| 210     | 11.23          | ±1.00  | 355     | 14.30          | ±1.00  | 500     | 16.83          | ±1.00  |
| 215     | 10.89          | ±1.00  | 360     | 14.30          | ±1.00  | 510     | 16.96          | ±1.00  |
| 220     | 10.81          | ±1.00  | 365     | 14.38          | ±1.00  | 520     | 16.90          | ±1.00  |
| 225     | 10.83          | ±1.00  | 370     | 14.75          | ±1.00  | 530     | 16.92          | ±1.00  |
| 230     | 11.05          | ±1.00  | 375     | 15.11          | ±1.00  | 540     | 17.47          | ±1.00  |
| 235     | 11.42          | ±1.00  | 380     | 15.31          | ±1.00  | 550     | 17.88          | ±1.00  |
| 240     | 11.76          | ±1.00  | 385     | 15.37          | ±1.00  | 560     | 17.85          | ±1.00  |
| 245     | 11.94          | ±1.00  | 390     | 15.37          | ±1.00  | 570     | 18.01          | ±1.00  |
| 250     | 12.02          | ±1.00  | 395     | 15.37          | ±1.00  | 580     | 18.26          | ±1.00  |
| 255     | 11.99          | ±1.00  | 400     | 15.39          | ±1.00  | 590     | 18.27          | ±1.00  |
| 260     | 12.02          | ±1.00  | 405     | 15.46          | ±1.00  | 600     | 18.13          | ±1.00  |
| 265     | 12.21          | ±1.00  | 410     | 15.46          | ±1.00  | 610     | 17.99          | ±1.00  |
| 270     | 12.50          | ±1.00  | 415     | 15.37          | ±1.00  | 620     | 18.02          | ±1.00  |

| f<br>[MHz] | AF1 Ver<br>[dB/m] | U<br>[dB] | f<br>[MHz] | AF1 Ver<br>[dB/m] | U<br>[dB] | f<br>[MHz] | AF1 Ver<br>[dB/m] | U<br>[dB] |
|------------|-------------------|-----------|------------|-------------------|-----------|------------|-------------------|-----------|
| 630        | 18.15             | ±1.00     | 1 300      | 24.98             | ±1.00     | 3 450      | 35.59             | ±1.20     |
| 640        | 18.50             | ±1.00     | 1 350      | 25.99             | ±1.00     | 3 500      | 36.07             | ±1.20     |
| 650        | 19.01             | ±1.00     | 1 400      | 26.06             | ±1.00     | 3 550      | 36.34             | ±1.20     |
| 660        | 19.41             | ±1.00     | 1 450      | 26.01             | ±1.00     | 3 600      | 36.55             | ±1.20     |
| 670        | 19.57             | ±1.00     | 1 500      | 26.08             | ±1.00     | 3 650      | 37.24             | ±1.20     |
| 680        | 19.56             | ±1.00     | 1 550      | 26.81             | ±1.00     | 3 700      | 37.61             | ±1.20     |
| 690        | 19.31             | ±1.00     | 1 600      | 26.98             | ±1.00     | 3 750      | 37.03             | ±1.20     |
| 700        | 19.40             | ±1.00     | 1 650      | 26.94             | ±1.00     | 3 800      | 36.87             | ±1.20     |
| 710        | 19.60             | ±1.00     | 1 700      | 27.19             | ±1.00     | 3 850      | 36.67             | ±1.20     |
| 720        | 19.68             | ±1.00     | 1 750      | 27.67             | ±1.00     | 3 900      | 36.79             | ±1.20     |
| 730        | 19.85             | ±1.00     | 1 800      | 28.14             | ±1.00     | 3 950      | 37.02             | ±1.20     |
| 740        | 20.01             | ±1.00     | 1 850      | 28.56             | ±1.00     | 4 000      | 37.28             | ±1.20     |
| 750        | 20.05             | ±1.00     | 1 900      | 28.56             | ±1.00     | 4 050      | 37.50             | ±1.20     |
| 760        | 20.30             | ±1.00     | 1 950      | 28.71             | ±1.00     | 4 100      | 37.73             | ±1.20     |
| 770        | 20.56             | ±1.00     | 2 000      | 28.74             | ±1.00     | 4 150      | 37.78             | ±1.20     |
| 780        | 20.63             | ±1.00     | 2 050      | 29.45             | ±1.00     | 4 200      | 38.16             | ±1.20     |
| 790        | 20.56             | ±1.00     | 2 100      | 29.63             | ±1.00     | 4 250      | 38.19             | ±1.20     |
| 800        | 20.49             | ±1.00     | 2 150      | 29.74             | ±1.00     | 4 300      | 38.19             | ±1.20     |
| 810        | 20.47             | ±1.00     | 2 200      | 29.96             | ±1.00     | 4 350      | 38.20             | ±1.20     |
| 820        | 20.52             | ±1.00     | 2 250      | 29.99             | ±1.00     | 4 400      | 38.30             | ±1.20     |
| 830        | 20.77             | ±1.00     | 2 300      | 30.22             | ±1.00     | 4 450      | 38.26             | ±1.20     |
| 840        | 21.09             | ±1.00     | 2 350      | 30.68             | ±1.00     | 4 500      | 38.46             | ±1.20     |
| 850        | 21.42             | ±1.00     | 2 400      | 30.87             | ±1.00     | 4 550      | 38.44             | ±1.20     |
| 860        | 21.76             | ±1.00     | 2 450      | 31.21             | ±1.00     | 4 600      | 38.89             | ±1.20     |
| 870        | 21.93             | ±1.00     | 2 500      | 31.32             | ±1.00     | 4 650      | 38.99             | ±1.20     |
| 880        | 22.02             | ±1.00     | 2 550      | 31.43             | ±1.00     | 4 700      | 39.09             | ±1.20     |
| 890        | 22.04             | ±1.00     | 2 600      | 31.56             | ±1.00     | 4 750      | 39.51             | ±1.20     |
| 900        | 21.89             | ±1.00     | 2 650      | 31.85             | ±1.00     | 4 800      | 39.49             | ±1.20     |
| 910        | 21.91             | ±1.00     | 2 700      | 32.35             | ±1.00     | 4 850      | 39.92             | ±1.20     |
| 920        | 21.85             | ±1.00     | 2 750      | 32.71             | ±1.00     | 4 900      | 39.96             | ±1.20     |
| 930        | 21.78             | ±1.00     | 2 800      | 32.93             | ±1.00     | 4 950      | 40.23             | ±1.20     |
| 940        | 21.85             | ±1.00     | 2 850      | 33.10             | ±1.00     | 5 000      | 40.61             | ±1.20     |
| 950        | 21.96             | ±1.00     | 2 900      | 33.22             | ±1.00     | 5 100      | 40.97             | ±1.20     |
| 960        | 22.18             | ±1.00     | 2 950      | 33.41             | ±1.00     | 5 200      | 40.78             | ±1.20     |
| 970        | 22.41             | ±1.00     | 3 000      | 33.55             | ±1.00     | 5 300      | 40.84             | ±1.20     |
| 980        | 22.67             | ±1.00     | 3 050      | 33.84             | ±1.20     | 5 400      | 40.74             | ±1.20     |
| 990        | 22.92             | ±1.00     | 3 100      | 33.93             | ±1.20     | 5 500      | 40.75             | ±1.20     |
| 1 000      | 23.04             | ±1.00     | 3 150      | 34.14             | ±1.20     | 5 600      | 41.07             | ±1.20     |
| 1 050      | 23.18             | ±1.00     | 3 200      | 34.41             | ±1.20     | 5 700      | 41.45             | ±1.20     |
| 1 100      | 23.00             | ±1.00     | 3 250      | 34.75             | ±1.20     | 5 800      | 41.33             | ±1.20     |
| 1 150      | 24.10             | ±1.00     | 3 300      | 34.88             | ±1.20     | 5 900      | 41.14             | ±1.20     |
| 1 200      | 24.39             | ±1.00     | 3 350      | 35.14             | ±1.20     | 6 000      | 41.18             | ±1.20     |
| 1 250      | 24.39             | ±1.00     | 3 400      | 35.19             | ±1.20     |            |                   |           |