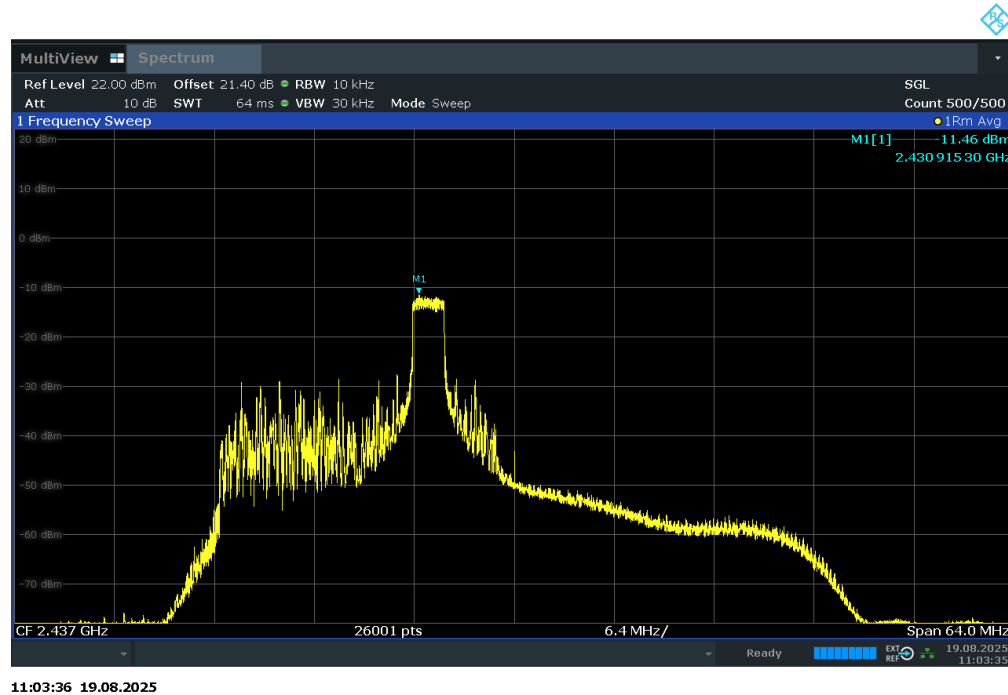


Radio Technology = WLAN ax 40 MHz RU 6, Operating Frequency = mid  
(S01\_AC01)



Path A

#### 5.9.5 TEST EQUIPMENT USED

- R&S TS8997

## 6 TEST EQUIPMENT

### 6.1 TEST EQUIPMENT HARDWARE

- 1 Conducted Emissions FCC  
Conducted Emissions AC Mains for FCC standards

| Ref.No. | Device Name          | Description                        | Manufacturer                        | Serial Number | Last Calibration | Calibration Due |
|---------|----------------------|------------------------------------|-------------------------------------|---------------|------------------|-----------------|
| 1.1     | Opus10 TPR (8253.00) | T/P Logger 13                      | Lufft Mess- und Regeltechnik GmbH   | 13936         | 2023-12          | 2025-12         |
| 1.2     | Fluke 177            | Digital Multimeter 03 (Multimeter) | Fluke Europe B.V.                   | 86670383      | 2023-08          | 2025-08         |
| 1.3     | Chroma 6404          | AC Source                          | Chroma ATE INC.                     | 64040001304   | N/A              | N/A             |
| 1.4     | Shielded Room 02     | Shielded Room 4m x 3m              | Frankonia Germany EMC Solution GmbH | -             | N/A              | N/A             |
| 1.5     | ESH3-Z5              | Two-Line V-Network (EUT)           | Rohde & Schwarz GmbH & Co. KG       | 829996/002    | 2023-09          | 2025-09         |
| 1.6     | ESR 7                | EMI Receiver / Spectrum Analyzer   | Rohde & Schwarz                     | 101424        | 2025-04          | 2027-04         |
| 1.7     | Opus10 THI (8152.00) | T/H Logger 02                      | Lufft Mess- und Regeltechnik GmbH   | 7489          | 2023-12          | 2025-12         |
| 1.8     | CS-RUB6              | Rubidium Frequency Standard        | Rohde & Schwarz GmbH & Co. KG       | 100321        | 2023-10          | 2025-10         |

- 2 R&S TS8997  
2.4 and 5 GHz Bands Conducted Test Lab

| Ref.No. | Device Name           | Description                                             | Manufacturer                      | Serial Number | Last Calibration | Calibration Due |
|---------|-----------------------|---------------------------------------------------------|-----------------------------------|---------------|------------------|-----------------|
| 2.1     | Opus10 TPR (8253.00)  | T/P Logger 13                                           | Lufft Mess- und Regeltechnik GmbH | 13936         | 2023-12          | 2025-12         |
| 2.2     | FSV30                 | Signal Analyzer 10 Hz - 30 GHz                          | Rohde & Schwarz                   | 103005        | 2023-08          | 2025-08         |
| 2.3     | Opus10 THI (8152.00N) | T/H Logger 01                                           | Lufft Mess- und Regeltechnik GmbH | 5809          | 2023-12          | 2025-12         |
| 2.4     | FSW43                 | Signal Analyser                                         | Rohde & Schwarz GmbH & Co. KG     | 102013        | 2023-07          | 2025-07         |
| 2.5     | Opus10 THI (8152.00)  | T/H Logger 14                                           | Lufft Mess- und Regeltechnik GmbH | 13993         | 2023-12          | 2025-12         |
| 2.6     | FSW26                 | Signal- & Spectrum-Analyzer                             | Rohde & Schwarz GmbH & Co. KG     | 104459        | 2023-05          | 2025-05         |
| 2.7     | OSP120                | Contains Power Meter and Switching Unit OSP-B157W8 PLUS | Rohde & Schwarz                   | 101158        | 2024-08          | 2027-08         |
| 2.8     | CS-RUB6               | Rubidium Frequency Standard                             | Rohde & Schwarz GmbH & Co. KG     | 100321        | 2023-10          | 2025-10         |

3 Radiated Emissions FAR 2.4 GHz FCC  
Radiated emission tests for 2.4 GHz ISM devices in a fully anechoic room

| Ref.No. | Device Name               | Description                                              | Manufacturer                        | Serial Number          | Last Calibration | Calibration Due |
|---------|---------------------------|----------------------------------------------------------|-------------------------------------|------------------------|------------------|-----------------|
| 3.1     | Opus10 TPR (8253.00)      | T/P Logger 13                                            | Lufft Mess- und Regeltechnik GmbH   | 13936                  | 2023-12          | 2025-12         |
| 3.2     | Innco Systems CO3000      | Controller for bore sight mast FAC                       | innco systems GmbH                  | CO3000/1460/54740522/P | N/A              | N/A             |
| 3.3     | AMF-7D00101800-30-10P-R   | Broadband Amplifier 100 MHz - 18 GHz                     | Miteq                               |                        | N/A              | N/A             |
| 3.4     | Anechoic Chamber 03       | FAR, 8.80m x 4.60m x 4.05m (l x w x h)                   | Albatross Projects                  | P26971-647-001-PRB     | N/A              | N/A             |
| 3.5     | Fluke 177                 | Digital Multimeter 03 (Multimeter)                       | Fluke Europe B.V.                   | 86670383               | 2023-08          | 2025-08         |
| 3.6     | HF 906                    | Double-ridged horn                                       | Rohde & Schwarz                     | 357357/002             | 2022-07          | 2025-07         |
| 3.7     | JS4-18002600-32-5P        | Broadband Amplifier 18 GHz - 26 GHz                      | Miteq                               | 849785                 | N/A              | N/A             |
| 3.8     | FSW43                     | Spectrum Analyzer                                        | Rohde & Schwarz GmbH & Co. KG       | 103779                 | 2024-12          | 2026-12         |
| 3.9     | EP 1200/B, NA/B1          | AC Source, Amplifier with integrated variable Oscillator | Spitzenberger & Spies GmbH & Co. KG | B6278                  | N/A              | N/A             |
| 3.10    | 3160-09                   | Standard Gain / Pyramidal Horn Antenna 26.5 GHz          | EMCO Elektronik GmbH                | 00083069               | N/A              | N/A             |
| 3.11    | WHKX 7.0/18G-8SS          | High Pass Filter                                         | Wainwright Instruments GmbH         | 09                     | N/A              | N/A             |
| 3.12    | MA3000/0800-XP-ET-compact | Bore Sight Antenna Mast                                  | innco systems GmbH                  | 9210522                | N/A              | N/A             |
| 3.13    | TT 1.5 WI                 | Turn Table                                               | Maturo GmbH                         | -                      | N/A              | N/A             |
| 3.14    | 5HC3500/18000-1.2-KK      | High Pass Filter                                         | Trilithic                           | 200035008              | N/A              | N/A             |
| 3.15    | Opus 20 THI (8120.00)     | ThermoHygro Datalogger                                   | Lufft Mess- und Regeltechnik GmbH   | 115.0318.0802.033      | 2023-08          | 2025-08         |
| 3.16    | TD1.5-10kg                | EUT Tilt Device (Rohacell)                               | Maturo GmbH                         | TD1.5-10kg/024/3790709 | N/A              | N/A             |
| 3.17    | AFS42-00101800-25-S-42    | Broadband Amplifier 25 MHz - 18 GHz                      | Miteq                               | 2035324                | N/A              | N/A             |
| 3.18    | HF 907                    | Double-ridged horn                                       | Rohde & Schwarz                     | 102444                 | 2024-10          | 2027-10         |

4 Radiated Emissions SAC H-Field  
Radiated emission tests in the H-Field in a semi anechoic room

| Ref.No. | Device Name          | Description                                              | Manufacturer                        | Serial Number | Last Calibration | Calibration Due |
|---------|----------------------|----------------------------------------------------------|-------------------------------------|---------------|------------------|-----------------|
| 4.1     | N5000/NP             | Filter for EUT, 2 Lines, 250 V, 16 A                     | ETS-LINDGREN                        | 241515        | N/A              | N/A             |
| 4.2     | Opus10 TPR (8253.00) | T/P Logger 13                                            | Lufft Mess- und Regeltechnik GmbH   | 13936         | 2023-12          | 2025-12         |
| 4.3     | ESW44                | EMI Receiver / Spectrum Analyzer                         | Rohde & Schwarz GmbH & Co. KG       | 101603        | 2024-03          | 2026-03         |
| 4.4     | Anechoic Chamber 01  | SAC/FAR, 10.58 m x 6.38 m x 6.00 m                       | Frankonia Germany EMC Solution GmbH | none          | N/A              | N/A             |
| 4.5     | Fluke 177            | Digital Multimeter 03 (Multimeter)                       | Fluke Europe B.V.                   | 86670383      | 2023-08          | 2025-08         |
| 4.6     | Opus10 THI (8152.00) | T/H Logger 10                                            | Lufft Mess- und Regeltechnik GmbH   | 12488         | 2023-12          | 2025-12         |
| 4.7     | EP 1200/B, NA/B1     | AC Source, Amplifier with integrated variable Oscillator | Spitzenberger & Spies GmbH & Co. KG | B6278         | N/A              | N/A             |
| 4.8     | DS 420S              | Turn Table 2 m diameter                                  | HD GmbH                             | 420/573/99    | N/A              | N/A             |
| 4.9     | HFH2-Z2              | Loop Antenna + 3 Axis Tripod                             | Rohde & Schwarz GmbH & Co. KG       | 829324/006    | 2024-04          | 2027-04         |
| 4.10    | CS-RUB6              | Rubidium Frequency Standard                              | Rohde & Schwarz GmbH & Co. KG       | 100321        | 2023-10          | 2025-10         |

5 Radiated Emissions SAC up to 1 GHz  
Radiated emission tests up to 1 GHz in a semi anechoic room

| Ref.No. | Device Name          | Description                                                        | Manufacturer                        | Serial Number | Last Calibration | Calibration Due |
|---------|----------------------|--------------------------------------------------------------------|-------------------------------------|---------------|------------------|-----------------|
| 5.1     | N5000/NP             | Filter for EUT, 2 Lines, 250 V, 16 A                               | ETS-LINDGREN                        | 241515        | N/A              | N/A             |
| 5.2     | Opus10 TPR (8253.00) | T/P Logger 13                                                      | Lufft Mess- und Regeltechnik GmbH   | 13936         | 2023-12          | 2025-12         |
| 5.3     | ESW44                | EMI Receiver / Spectrum Analyzer                                   | Rohde & Schwarz GmbH & Co. KG       | 101603        | 2024-03          | 2026-03         |
| 5.4     | Anechoic Chamber 01  | SAC/FAR, 10.58 m x 6.38 m x 6.00 m                                 | Frankonia Germany EMC Solution GmbH | none          | N/A              | N/A             |
| 5.5     | HL 562 ULTRALOG      | Biconical-log-per antenna (30 MHz - 3 GHz) with HL 562E biconicals | Rohde & Schwarz GmbH & Co. KG       | 830547/003    | 2025-04          | 2028-04         |

| Ref.No. | Device Name                          | Description                                              | Manufacturer                        | Serial Number                   | Last Calibration | Calibration Due |
|---------|--------------------------------------|----------------------------------------------------------|-------------------------------------|---------------------------------|------------------|-----------------|
| 5.6     | Fluke 177                            | Digital Multimeter 03 (Multimeter)                       | Fluke Europe B.V.                   | 86670383                        | 2023-08          | 2025-08         |
| 5.7     | Opus10 THI (8152.00)                 | T/H Logger 10                                            | Lufft Mess- und Regeltechnik GmbH   | 12488                           | 2023-12          | 2025-12         |
| 5.8     | EP 1200/B, NA/B1                     | AC Source, Amplifier with integrated variable Oscillator | Spitzenberger & Spies GmbH & Co. KG | B6278                           | N/A              | N/A             |
| 5.9     | DS 420S                              | Turn Table 2 m diameter                                  | HD GmbH                             | 420/573/99                      | N/A              | N/A             |
| 5.10    | HL562E ULTRALOG                      | Biconical-log-per Antenna (30 MHz - 6 GHz)               | Rohde & Schwarz GmbH & Co. KG       | 102299                          | 2024-07          | 2027-07         |
| 5.11    | Chase CBL6111C + INMET 64671 18N-6dB | Hybrid Antenna with 6dB Attenuator                       |                                     | 2624   Kartei-Nr E-003226/K1026 | 2023-03          | 2026-03         |
| 5.12    | CS-RUB6                              | Rubidium Frequency Standard                              | Rohde & Schwarz GmbH & Co. KG       | 100321                          | 2023-10          | 2025-10         |
| 5.13    | AM 4.0                               | Antenna Mast 4 m                                         | Maturo GmbH                         | AM4.0/180/1192 0513             | N/A              | N/A             |

The calibration interval is the time interval between "Last Calibration" and "Calibration Due"

## 6.2 TEST EQUIPMENT SOFTWARE

| <b>Semi-Anechoic Chamber:</b>  |                                                  |
|--------------------------------|--------------------------------------------------|
| Software                       | Version                                          |
| EMC32 Measurement Software     | 10.60.10                                         |
| INNCO Mast Controller          | 1.02.62                                          |
| INNCO Mast Height              | 34.10                                            |
| INNCO Mast Elevation           | 36.11                                            |
| MATURO Controller              | 1.24                                             |
| MATURO Mast                    | 12.19                                            |
| MATURO Turn-Table              | 30.10                                            |
| <b>Fully-Anechoic Chamber:</b> |                                                  |
| Software                       | Version                                          |
| EMC32 Measurement Software     | 10.60.10                                         |
| MATURO Controller              | 1.30                                             |
| MATURO Turn-Unit               | 11.10                                            |
| MATURO Mast                    | 12.10                                            |
| MATURO Turntable               | 12.11                                            |
| INNCO Controller               | 1.03.02                                          |
| INNCO Mast Height              | 34.10                                            |
| INNCO Mast Elevation           | 36.11                                            |
| <b>TS 8997</b>                 |                                                  |
| WMS32 Measurement Software     | 11.60.00 (till 2024-03-19), 11.70.00 + Hotfix 01 |
| <b>Conducted AC Emissions:</b> |                                                  |
| Software                       | Version                                          |
| EMC32 Measurement Software     | 10.60.20                                         |

## 7 ANTENNA FACTORS, CABLE LOSS AND SAMPLE CALCULATIONS

This chapter contains the antenna factors with their corresponding path loss of the used measurement path for all antennas as well as the insertion loss of the LISN.

### 7.1 LISN R&S ESH3-Z5 (150 KHZ – 30 MHZ)

| Frequency |  | Corr. | LISN<br>insertion<br>loss<br>ESH3-Z5 | cable<br>loss<br>(incl. 10<br>dB<br>atten-<br>uator) |
|-----------|--|-------|--------------------------------------|------------------------------------------------------|
| MHz       |  | dB    | dB                                   | dB                                                   |
| 0.15      |  | 10.1  | 0.1                                  | 10.0                                                 |
| 5         |  | 10.3  | 0.1                                  | 10.2                                                 |
| 7         |  | 10.5  | 0.2                                  | 10.3                                                 |
| 10        |  | 10.5  | 0.2                                  | 10.3                                                 |
| 12        |  | 10.7  | 0.3                                  | 10.4                                                 |
| 14        |  | 10.7  | 0.3                                  | 10.4                                                 |
| 16        |  | 10.8  | 0.4                                  | 10.4                                                 |
| 18        |  | 10.9  | 0.4                                  | 10.5                                                 |
| 20        |  | 10.9  | 0.4                                  | 10.5                                                 |
| 22        |  | 11.1  | 0.5                                  | 10.6                                                 |
| 24        |  | 11.1  | 0.5                                  | 10.6                                                 |
| 26        |  | 11.2  | 0.5                                  | 10.7                                                 |
| 28        |  | 11.2  | 0.5                                  | 10.7                                                 |
| 30        |  | 11.3  | 0.5                                  | 10.8                                                 |

#### Sample calculation

$$U_{\text{LISN}} (\text{dB } \mu\text{V}) = U (\text{dB } \mu\text{V}) + \text{Corr. (dB)}$$

U = Receiver reading

LISN Insertion loss = Voltage Division Factor of LISN

Corr. = sum of single correction factors of used LISN, cables, switch units (if used)

Linear interpolation will be used for frequencies in between the values in the table.

## 7.2 ANTENNA R&S HFH2-Z2 (9 KHZ – 30 MHZ)

| Frequency | AF<br>HFH-<br>Z2) | Corr. | cable loss<br>1 (inside<br>chamber) | cable loss<br>2<br>(outside<br>chamber) | cable<br>loss 3<br>(switch<br>unit) | cable<br>loss 4<br>(to<br>receiver) | distance<br>corr.<br>(-40 dB/<br>decade) | d <sub>Limit</sub><br>(meas.<br>distance<br>(limit) | d <sub>used</sub><br>(meas.<br>distance<br>(used) |
|-----------|-------------------|-------|-------------------------------------|-----------------------------------------|-------------------------------------|-------------------------------------|------------------------------------------|-----------------------------------------------------|---------------------------------------------------|
| MHz       | dB (1/m)          | dB    | dB                                  | dB                                      | dB                                  | dB                                  | dB                                       | m                                                   | m                                                 |
| 0.009     | 20.50             | -79.6 | 0.1                                 | 0.1                                     | 0.1                                 | 0.1                                 | -80                                      | 300                                                 | 3                                                 |
| 0.01      | 20.45             | -79.6 | 0.1                                 | 0.1                                     | 0.1                                 | 0.1                                 | -80                                      | 300                                                 | 3                                                 |
| 0.015     | 20.37             | -79.6 | 0.1                                 | 0.1                                     | 0.1                                 | 0.1                                 | -80                                      | 300                                                 | 3                                                 |
| 0.02      | 20.36             | -79.6 | 0.1                                 | 0.1                                     | 0.1                                 | 0.1                                 | -80                                      | 300                                                 | 3                                                 |
| 0.025     | 20.38             | -79.6 | 0.1                                 | 0.1                                     | 0.1                                 | 0.1                                 | -80                                      | 300                                                 | 3                                                 |
| 0.03      | 20.32             | -79.6 | 0.1                                 | 0.1                                     | 0.1                                 | 0.1                                 | -80                                      | 300                                                 | 3                                                 |
| 0.05      | 20.35             | -79.6 | 0.1                                 | 0.1                                     | 0.1                                 | 0.1                                 | -80                                      | 300                                                 | 3                                                 |
| 0.08      | 20.30             | -79.6 | 0.1                                 | 0.1                                     | 0.1                                 | 0.1                                 | -80                                      | 300                                                 | 3                                                 |
| 0.1       | 20.20             | -79.6 | 0.1                                 | 0.1                                     | 0.1                                 | 0.1                                 | -80                                      | 300                                                 | 3                                                 |
| 0.2       | 20.17             | -79.6 | 0.1                                 | 0.1                                     | 0.1                                 | 0.1                                 | -80                                      | 300                                                 | 3                                                 |
| 0.3       | 20.14             | -79.6 | 0.1                                 | 0.1                                     | 0.1                                 | 0.1                                 | -80                                      | 300                                                 | 3                                                 |
| 0.49      | 20.12             | -79.6 | 0.1                                 | 0.1                                     | 0.1                                 | 0.1                                 | -80                                      | 300                                                 | 3                                                 |
| 0.490001  | 20.12             | -39.6 | 0.1                                 | 0.1                                     | 0.1                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 0.5       | 20.11             | -39.6 | 0.1                                 | 0.1                                     | 0.1                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 0.8       | 20.10             | -39.6 | 0.1                                 | 0.1                                     | 0.1                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 1         | 20.09             | -39.6 | 0.1                                 | 0.1                                     | 0.1                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 2         | 20.08             | -39.6 | 0.1                                 | 0.1                                     | 0.1                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 3         | 20.06             | -39.6 | 0.1                                 | 0.1                                     | 0.1                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 4         | 20.05             | -39.5 | 0.2                                 | 0.1                                     | 0.1                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 5         | 20.05             | -39.5 | 0.2                                 | 0.1                                     | 0.1                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 6         | 20.02             | -39.5 | 0.2                                 | 0.1                                     | 0.1                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 8         | 19.95             | -39.5 | 0.2                                 | 0.1                                     | 0.1                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 10        | 19.83             | -39.4 | 0.2                                 | 0.1                                     | 0.2                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 12        | 19.71             | -39.4 | 0.2                                 | 0.1                                     | 0.2                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 14        | 19.54             | -39.4 | 0.2                                 | 0.1                                     | 0.2                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 16        | 19.53             | -39.3 | 0.3                                 | 0.1                                     | 0.2                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 18        | 19.50             | -39.3 | 0.3                                 | 0.1                                     | 0.2                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 20        | 19.57             | -39.3 | 0.3                                 | 0.1                                     | 0.2                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 22        | 19.61             | -39.3 | 0.3                                 | 0.1                                     | 0.2                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 24        | 19.61             | -39.3 | 0.3                                 | 0.1                                     | 0.2                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 26        | 19.54             | -39.3 | 0.3                                 | 0.1                                     | 0.2                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 28        | 19.46             | -39.2 | 0.3                                 | 0.1                                     | 0.3                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |
| 30        | 19.73             | -39.1 | 0.4                                 | 0.1                                     | 0.3                                 | 0.1                                 | -40                                      | 30                                                  | 3                                                 |

### Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$

U = Receiver reading

AF = Antenna factor

Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)

distance correction =  $-40 * \text{LOG} (d_{\text{Limit}} / d_{\text{used}})$

Linear interpolation will be used for frequencies in between the values in the table.

Table shows an extract of values

### 7.3 ANTENNA R&S HL562 (30 MHz – 1 GHz)

( $d_{\text{Limit}} = 3 \text{ m}$ )

| Frequency | AF<br>R&S<br>HL562 | Corr. |
|-----------|--------------------|-------|
| MHz       | dB (1/m)           | dB    |
| 30        | 18.6               | 0.6   |
| 50        | 6.0                | 0.9   |
| 100       | 9.7                | 1.2   |
| 150       | 7.9                | 1.6   |
| 200       | 7.6                | 1.9   |
| 250       | 9.5                | 2.1   |
| 300       | 11.0               | 2.3   |
| 350       | 12.4               | 2.6   |
| 400       | 13.6               | 2.9   |
| 450       | 14.7               | 3.1   |
| 500       | 15.6               | 3.2   |
| 550       | 16.3               | 3.5   |
| 600       | 17.2               | 3.5   |
| 650       | 18.1               | 3.6   |
| 700       | 18.5               | 3.6   |
| 750       | 19.1               | 4.1   |
| 800       | 19.6               | 4.1   |
| 850       | 20.1               | 4.4   |
| 900       | 20.8               | 4.7   |
| 950       | 21.1               | 4.8   |
| 1000      | 21.6               | 4.9   |

| cable loss<br>1 (inside<br>chamber) | cable loss<br>2<br>(outside<br>chamber) | cable<br>loss 3<br>(switch<br>unit) | cable<br>loss 4<br>(to<br>receiver) | distance<br>corr.<br>(-20 dB/<br>decade) | $d_{\text{Limit}}$<br>(meas.<br>distance<br>(limit)) | $d_{\text{used}}$<br>(meas.<br>distance<br>(used)) |
|-------------------------------------|-----------------------------------------|-------------------------------------|-------------------------------------|------------------------------------------|------------------------------------------------------|----------------------------------------------------|
| dB                                  | dB                                      | dB                                  | dB                                  | dB                                       | m                                                    | m                                                  |
| 0.29                                | 0.04                                    | 0.23                                | 0.02                                | 0.0                                      | 3                                                    | 3                                                  |
| 0.39                                | 0.09                                    | 0.32                                | 0.08                                | 0.0                                      | 3                                                    | 3                                                  |
| 0.56                                | 0.14                                    | 0.47                                | 0.08                                | 0.0                                      | 3                                                    | 3                                                  |
| 0.73                                | 0.20                                    | 0.59                                | 0.12                                | 0.0                                      | 3                                                    | 3                                                  |
| 0.84                                | 0.21                                    | 0.70                                | 0.11                                | 0.0                                      | 3                                                    | 3                                                  |
| 0.98                                | 0.24                                    | 0.80                                | 0.13                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.04                                | 0.26                                    | 0.89                                | 0.15                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.18                                | 0.31                                    | 0.96                                | 0.13                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.28                                | 0.35                                    | 1.03                                | 0.19                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.39                                | 0.38                                    | 1.11                                | 0.22                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.44                                | 0.39                                    | 1.20                                | 0.19                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.55                                | 0.46                                    | 1.24                                | 0.23                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.59                                | 0.43                                    | 1.29                                | 0.23                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.67                                | 0.34                                    | 1.35                                | 0.22                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.67                                | 0.42                                    | 1.41                                | 0.15                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.87                                | 0.54                                    | 1.46                                | 0.25                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.90                                | 0.46                                    | 1.51                                | 0.25                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.99                                | 0.60                                    | 1.56                                | 0.27                                | 0.0                                      | 3                                                    | 3                                                  |
| 2.14                                | 0.60                                    | 1.63                                | 0.29                                | 0.0                                      | 3                                                    | 3                                                  |
| 2.22                                | 0.60                                    | 1.66                                | 0.33                                | 0.0                                      | 3                                                    | 3                                                  |
| 2.23                                | 0.61                                    | 1.71                                | 0.30                                | 0.0                                      | 3                                                    | 3                                                  |

( $d_{\text{Limit}} = 10 \text{ m}$ )

|      |      |      |
|------|------|------|
| 30   | 18.6 | -9.9 |
| 50   | 6.0  | -9.6 |
| 100  | 9.7  | -9.2 |
| 150  | 7.9  | -8.8 |
| 200  | 7.6  | -8.6 |
| 250  | 9.5  | -8.3 |
| 300  | 11.0 | -8.1 |
| 350  | 12.4 | -7.9 |
| 400  | 13.6 | -7.6 |
| 450  | 14.7 | -7.4 |
| 500  | 15.6 | -7.2 |
| 550  | 16.3 | -7.0 |
| 600  | 17.2 | -6.9 |
| 650  | 18.1 | -6.9 |
| 700  | 18.5 | -6.8 |
| 750  | 19.1 | -6.3 |
| 800  | 19.6 | -6.3 |
| 850  | 20.1 | -6.0 |
| 900  | 20.8 | -5.8 |
| 950  | 21.1 | -5.6 |
| 1000 | 21.6 | -5.6 |

|      |      |      |      |       |    |   |
|------|------|------|------|-------|----|---|
| 0.29 | 0.04 | 0.23 | 0.02 | -10.5 | 10 | 3 |
| 0.39 | 0.09 | 0.32 | 0.08 | -10.5 | 10 | 3 |
| 0.56 | 0.14 | 0.47 | 0.08 | -10.5 | 10 | 3 |
| 0.73 | 0.20 | 0.59 | 0.12 | -10.5 | 10 | 3 |
| 0.84 | 0.21 | 0.70 | 0.11 | -10.5 | 10 | 3 |
| 0.98 | 0.24 | 0.80 | 0.13 | -10.5 | 10 | 3 |
| 1.04 | 0.26 | 0.89 | 0.15 | -10.5 | 10 | 3 |
| 1.18 | 0.31 | 0.96 | 0.13 | -10.5 | 10 | 3 |
| 1.28 | 0.35 | 1.03 | 0.19 | -10.5 | 10 | 3 |
| 1.39 | 0.38 | 1.11 | 0.22 | -10.5 | 10 | 3 |
| 1.44 | 0.39 | 1.20 | 0.19 | -10.5 | 10 | 3 |
| 1.55 | 0.46 | 1.24 | 0.23 | -10.5 | 10 | 3 |
| 1.59 | 0.43 | 1.29 | 0.23 | -10.5 | 10 | 3 |
| 1.67 | 0.34 | 1.35 | 0.22 | -10.5 | 10 | 3 |
| 1.67 | 0.42 | 1.41 | 0.15 | -10.5 | 10 | 3 |
| 1.87 | 0.54 | 1.46 | 0.25 | -10.5 | 10 | 3 |
| 1.90 | 0.46 | 1.51 | 0.25 | -10.5 | 10 | 3 |
| 1.99 | 0.60 | 1.56 | 0.27 | -10.5 | 10 | 3 |
| 2.14 | 0.60 | 1.63 | 0.29 | -10.5 | 10 | 3 |
| 2.22 | 0.60 | 1.66 | 0.33 | -10.5 | 10 | 3 |
| 2.23 | 0.61 | 1.71 | 0.30 | -10.5 | 10 | 3 |

#### Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + \text{AF (dB 1/m)} + \text{Corr. (dB)}$   
 U = Receiver reading  
 AF = Antenna factor  
 Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)  
 distance correction =  $-20 * \text{LOG} (d_{\text{Limit}} / d_{\text{used}})$   
 Linear interpolation will be used for frequencies in between the values in the table.  
 Tables show an extract of values.

## 7.4 ANTENNA R&S HF907 (1 GHZ – 18 GHZ)

| Frequency | AF<br>R&S<br>HF907 | Corr. |
|-----------|--------------------|-------|
| MHz       | dB<br>(1/m)        | dB    |
| 1000      | 24.4               | -19.4 |
| 2000      | 28.5               | -17.4 |
| 3000      | 31.0               | -16.1 |
| 4000      | 33.1               | -14.7 |
| 5000      | 34.4               | -13.7 |
| 6000      | 34.7               | -12.7 |
| 7000      | 35.6               | -11.0 |

| cable loss<br>1 (relay<br>+ cable<br>inside<br>chamber) | cable loss<br>2<br>(outside<br>chamber) | cable loss<br>3 (switch<br>unit,<br>atten-<br>uator &<br>pre-amp) | cable loss<br>4 (to<br>receiver) |  |  |
|---------------------------------------------------------|-----------------------------------------|-------------------------------------------------------------------|----------------------------------|--|--|
| dB                                                      | dB                                      | dB                                                                | dB                               |  |  |
| 0.99                                                    | 0.31                                    | -21.51                                                            | 0.79                             |  |  |
| 1.44                                                    | 0.44                                    | -20.63                                                            | 1.38                             |  |  |
| 1.87                                                    | 0.53                                    | -19.85                                                            | 1.33                             |  |  |
| 2.41                                                    | 0.67                                    | -19.13                                                            | 1.31                             |  |  |
| 2.78                                                    | 0.86                                    | -18.71                                                            | 1.40                             |  |  |
| 2.74                                                    | 0.90                                    | -17.83                                                            | 1.47                             |  |  |
| 2.82                                                    | 0.86                                    | -16.19                                                            | 1.46                             |  |  |

| Frequency | AF<br>R&S<br>HF907 | Corr. |
|-----------|--------------------|-------|
| MHz       | dB<br>(1/m)        | dB    |
| 3000      | 31.0               | -23.4 |
| 4000      | 33.1               | -23.3 |
| 5000      | 34.4               | -21.7 |
| 6000      | 34.7               | -21.2 |
| 7000      | 35.6               | -19.8 |

| cable loss<br>1 (relay<br>inside<br>chamber) | cable loss<br>2 (inside<br>chamber) | cable loss<br>3<br>(outside<br>chamber) | cable loss<br>4 (switch<br>unit,<br>atten-<br>uator &<br>pre-amp) | cable loss<br>5 (to<br>receiver) | used<br>for<br>FCC<br>15.247 |
|----------------------------------------------|-------------------------------------|-----------------------------------------|-------------------------------------------------------------------|----------------------------------|------------------------------|
| dB                                           | dB                                  | dB                                      | dB                                                                | dB                               |                              |
| 0.47                                         | 1.87                                | 0.53                                    | -27.58                                                            | 1.33                             |                              |
| 0.56                                         | 2.41                                | 0.67                                    | -28.23                                                            | 1.31                             |                              |
| 0.61                                         | 2.78                                | 0.86                                    | -27.35                                                            | 1.40                             |                              |
| 0.58                                         | 2.74                                | 0.90                                    | -26.89                                                            | 1.47                             |                              |
| 0.66                                         | 2.82                                | 0.86                                    | -25.58                                                            | 1.46                             |                              |

| Frequency | AF<br>R&S<br>HF907 | Corr. |
|-----------|--------------------|-------|
| MHz       | dB<br>(1/m)        | dB    |
| 7000      | 35.6               | -57.3 |
| 8000      | 36.3               | -56.3 |
| 9000      | 37.1               | -55.3 |
| 10000     | 37.5               | -56.2 |
| 11000     | 37.5               | -55.3 |
| 12000     | 37.6               | -53.7 |
| 13000     | 38.2               | -53.5 |
| 14000     | 39.9               | -56.3 |
| 15000     | 40.9               | -54.1 |
| 16000     | 41.3               | -54.1 |
| 17000     | 42.8               | -54.4 |
| 18000     | 44.2               | -54.7 |

| cable loss<br>1 (relay<br>inside<br>chamber) | cable loss<br>2 (High<br>Pass) | cable loss<br>3 (pre-<br>amp) | cable loss<br>4 (inside<br>chamber) | cable loss<br>5<br>(outside<br>chamber) | cable<br>loss 6<br>(to<br>receiver) |
|----------------------------------------------|--------------------------------|-------------------------------|-------------------------------------|-----------------------------------------|-------------------------------------|
| dB                                           | dB                             | dB                            | dB                                  | dB                                      | dB                                  |
| 0.56                                         | 1.28                           | -62.72                        | 2.66                                | 0.94                                    | 1.46                                |
| 0.69                                         | 0.71                           | -61.49                        | 2.84                                | 1.00                                    | 1.53                                |
| 0.68                                         | 0.65                           | -60.80                        | 3.06                                | 1.09                                    | 1.60                                |
| 0.70                                         | 0.54                           | -61.91                        | 3.28                                | 1.20                                    | 1.67                                |
| 0.80                                         | 0.61                           | -61.40                        | 3.43                                | 1.27                                    | 1.70                                |
| 0.84                                         | 0.42                           | -59.70                        | 3.53                                | 1.26                                    | 1.73                                |
| 0.83                                         | 0.44                           | -59.81                        | 3.75                                | 1.32                                    | 1.83                                |
| 0.91                                         | 0.53                           | -63.03                        | 3.91                                | 1.40                                    | 1.77                                |
| 0.98                                         | 0.54                           | -61.05                        | 4.02                                | 1.44                                    | 1.83                                |
| 1.23                                         | 0.49                           | -61.51                        | 4.17                                | 1.51                                    | 1.85                                |
| 1.36                                         | 0.76                           | -62.36                        | 4.34                                | 1.53                                    | 2.00                                |
| 1.70                                         | 0.53                           | -62.88                        | 4.41                                | 1.55                                    | 1.91                                |

### Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$

U = Receiver reading

AF = Antenna factor

Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)

Linear interpolation will be used for frequencies in between the values in the table.

Tables show an extract of values.

## 7.5 ANTENNA EMCO 3160-09 (18 GHZ – 26.5 GHZ)

| Frequency | AF<br>EMCO<br>3160-09 | Corr. | cable loss<br>1 (inside<br>chamber) | cable<br>loss 2<br>(pre-<br>amp) | cable loss<br>3 (inside<br>chamber) | cable<br>loss 4<br>(switch<br>unit) | cable<br>loss 5<br>(to<br>receiver) |
|-----------|-----------------------|-------|-------------------------------------|----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| MHz       | dB (1/m)              | dB    | dB                                  | dB                               | dB                                  | dB                                  | dB                                  |
| 18000     | 40.2                  | -23.5 | 0.72                                | -35.85                           | 6.20                                | 2.81                                | 2.65                                |
| 18500     | 40.2                  | -23.2 | 0.69                                | -35.71                           | 6.46                                | 2.76                                | 2.59                                |
| 19000     | 40.2                  | -22.0 | 0.76                                | -35.44                           | 6.69                                | 3.15                                | 2.79                                |
| 19500     | 40.3                  | -21.3 | 0.74                                | -35.07                           | 7.04                                | 3.11                                | 2.91                                |
| 20000     | 40.3                  | -20.3 | 0.72                                | -34.49                           | 7.30                                | 3.07                                | 3.05                                |
| 20500     | 40.3                  | -19.9 | 0.78                                | -34.46                           | 7.48                                | 3.12                                | 3.15                                |
| 21000     | 40.3                  | -19.1 | 0.87                                | -34.07                           | 7.61                                | 3.20                                | 3.33                                |
| 21500     | 40.3                  | -19.1 | 0.90                                | -33.96                           | 7.47                                | 3.28                                | 3.19                                |
| 22000     | 40.3                  | -18.7 | 0.89                                | -33.57                           | 7.34                                | 3.35                                | 3.28                                |
| 22500     | 40.4                  | -19.0 | 0.87                                | -33.66                           | 7.06                                | 3.75                                | 2.94                                |
| 23000     | 40.4                  | -19.5 | 0.88                                | -33.75                           | 6.92                                | 3.77                                | 2.70                                |
| 23500     | 40.4                  | -19.3 | 0.90                                | -33.35                           | 6.99                                | 3.52                                | 2.66                                |
| 24000     | 40.4                  | -19.8 | 0.88                                | -33.99                           | 6.88                                | 3.88                                | 2.58                                |
| 24500     | 40.4                  | -19.5 | 0.91                                | -33.89                           | 7.01                                | 3.93                                | 2.51                                |
| 25000     | 40.4                  | -19.3 | 0.88                                | -33.00                           | 6.72                                | 3.96                                | 2.14                                |
| 25500     | 40.5                  | -20.4 | 0.89                                | -34.07                           | 6.90                                | 3.66                                | 2.22                                |
| 26000     | 40.5                  | -21.3 | 0.86                                | -35.11                           | 7.02                                | 3.69                                | 2.28                                |
| 26500     | 40.5                  | -21.1 | 0.90                                | -35.20                           | 7.15                                | 3.91                                | 2.36                                |

### Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$

U = Receiver reading

AF = Antenna factor

Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)

Linear interpolation will be used for frequencies in between the values in the table.

Table shows an extract of values.

## 7.6 ANTENNA EMCO 3160-10 (26.5 GHZ – 40 GHZ)

| Frequency<br>GHz | AF<br>EMCO<br>3160-10<br>dB (1/m) | Corr.<br>dB | cable loss<br>1 (inside<br>chamber)<br>dB | cable loss<br>2<br>(outside<br>chamber)<br>dB | cable<br>loss 3<br>(switch<br>unit)<br>dB | cable<br>loss 4<br>(to<br>receiver)<br>dB | distance<br>corr.<br>(-20 dB/<br>decade)<br>dB | d <sub>Limit</sub><br>(meas.<br>distance<br>(limit)<br>m | d <sub>used</sub><br>(meas.<br>distance<br>(used)<br>m |
|------------------|-----------------------------------|-------------|-------------------------------------------|-----------------------------------------------|-------------------------------------------|-------------------------------------------|------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------|
| 26.5             | 43.4                              | -11.2       | 4.4                                       |                                               |                                           |                                           | -9.5                                           | 3                                                        | 1.0                                                    |
| 27.0             | 43.4                              | -11.2       | 4.4                                       |                                               |                                           |                                           | -9.5                                           | 3                                                        | 1.0                                                    |
| 28.0             | 43.4                              | -11.1       | 4.5                                       |                                               |                                           |                                           | -9.5                                           | 3                                                        | 1.0                                                    |
| 29.0             | 43.5                              | -11.0       | 4.6                                       |                                               |                                           |                                           | -9.5                                           | 3                                                        | 1.0                                                    |
| 30.0             | 43.5                              | -10.9       | 4.7                                       |                                               |                                           |                                           | -9.5                                           | 3                                                        | 1.0                                                    |
| 31.0             | 43.5                              | -10.8       | 4.7                                       |                                               |                                           |                                           | -9.5                                           | 3                                                        | 1.0                                                    |
| 32.0             | 43.5                              | -10.7       | 4.8                                       |                                               |                                           |                                           | -9.5                                           | 3                                                        | 1.0                                                    |
| 33.0             | 43.6                              | -10.7       | 4.9                                       |                                               |                                           |                                           | -9.5                                           | 3                                                        | 1.0                                                    |
| 34.0             | 43.6                              | -10.6       | 5.0                                       |                                               |                                           |                                           | -9.5                                           | 3                                                        | 1.0                                                    |
| 35.0             | 43.6                              | -10.5       | 5.1                                       |                                               |                                           |                                           | -9.5                                           | 3                                                        | 1.0                                                    |
| 36.0             | 43.6                              | -10.4       | 5.1                                       |                                               |                                           |                                           | -9.5                                           | 3                                                        | 1.0                                                    |
| 37.0             | 43.7                              | -10.3       | 5.2                                       |                                               |                                           |                                           | -9.5                                           | 3                                                        | 1.0                                                    |
| 38.0             | 43.7                              | -10.2       | 5.3                                       |                                               |                                           |                                           | -9.5                                           | 3                                                        | 1.0                                                    |
| 39.0             | 43.7                              | -10.2       | 5.4                                       |                                               |                                           |                                           | -9.5                                           | 3                                                        | 1.0                                                    |
| 40.0             | 43.8                              | -10.1       | 5.5                                       |                                               |                                           |                                           | -9.5                                           | 3                                                        | 1.0                                                    |

### Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$

U = Receiver reading

AF = Antenna factor

Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)

Linear interpolation will be used for frequencies in between the values in the table.

distance correction =  $-20 * \text{LOG} (d_{\text{Limit}} / d_{\text{used}})$

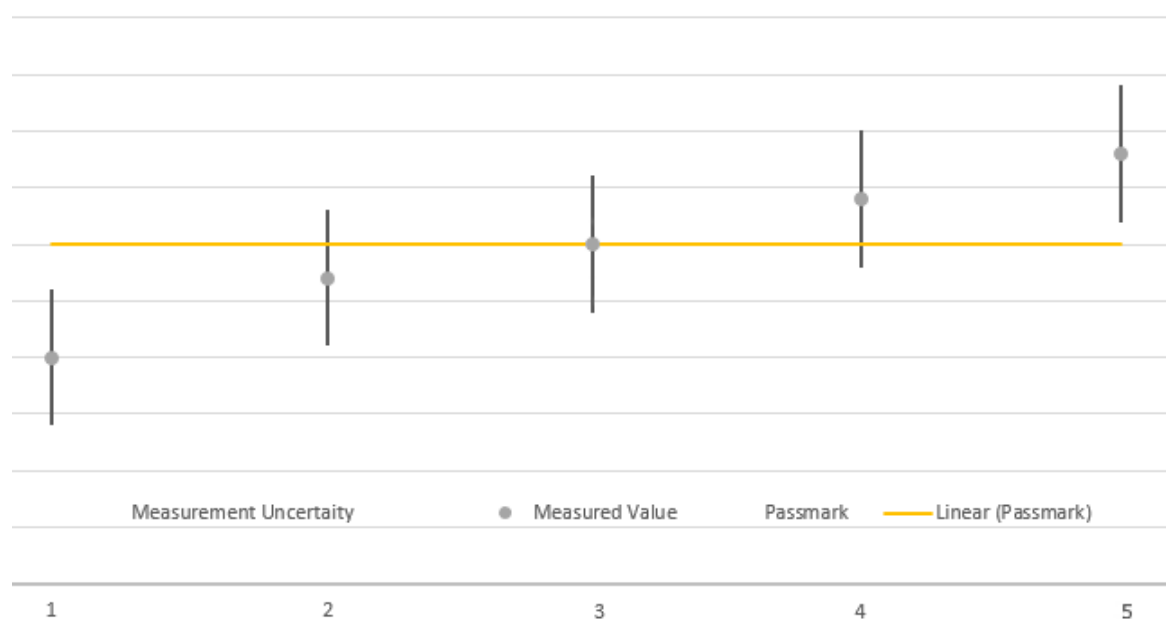
Linear interpolation will be used for frequencies in between the values in the table.

Table shows an extract of values.

## 8 MEASUREMENT UNCERTAINTIES

| Test Case                            | Parameter          | Uncertainty                    |
|--------------------------------------|--------------------|--------------------------------|
| AC Power Line                        | Power              | $\pm 3.4$ dB                   |
| Field Strength of spurious radiation | Power              | $\pm 5.5$ dB                   |
| 6 dB / 26 dB / 99% Bandwidth         | Power<br>Frequency | $\pm 2.9$ dB<br>$\pm 11.2$ kHz |
| Conducted Output Power               | Power              | $\pm 2.2$ dB                   |
| Band Edge Compliance                 | Power<br>Frequency | $\pm 2.2$ dB<br>$\pm 11.2$ kHz |
| Frequency Stability                  | Frequency          | $\pm 25$ Hz                    |
| Power Spectral Density               | Power              | $\pm 2.2$ dB                   |

The measurement uncertainties for all parameters are calculated with an expansion factor (coverage factor)  $k = 1.96$ . This means, that the true value is in the corresponding interval with a probability of 95 %.



The verdicts in this test report are given according the above diagram:

| Case | Measured Value  | Uncertainty Range | Verdict |
|------|-----------------|-------------------|---------|
| 1    | below pass mark | below pass mark   | Passed  |
| 2    | below pass mark | within pass mark  | Passed  |
| 3    | on pass mark    | within pass mark  | Passed  |
| 4    | above pass mark | within pass mark  | Failed  |
| 5    | above pass mark | above pass mark   | Failed  |

That means, the laboratory applies, as decision rule (see ISO/IEC 17025:2017), the so-called shared risk principle.

## 9 PHOTO REPORT

Please see separate photo report.

\*\*\*\*\*END OF TEST REPORT\*\*\*\*\*