

# R&S®FS-K15 VOR/ILS Measurement Demodulator for R&S®FSMR/FSU/FSQ Specifications



## Specifications

Specifications apply under the following conditions: 30 minutes warm-up time at ambient temperature, specified environmental conditions met, calibration cycle adhered to, and all internal automatic adjustments performed.

Data without tolerances: typical values only. Accuracy does not include mismatch error and errors due to standard deviation of the measurement readings, which are influenced by the number of averages.

### Frequency

|                        |                           |                                      |
|------------------------|---------------------------|--------------------------------------|
| <b>Frequency range</b> | ILS localizer, VOR        |                                      |
|                        | specified frequency range | 10 MHz to 12 MHz, 107 MHz to 120 MHz |
|                        | usable frequency range    | same as instrument frequency range   |
|                        | ILS glideslope            |                                      |
|                        | specified frequency range | 10 MHz to 12 MHz, 319 MHz to 341 MHz |
|                        | usable frequency range    | same as instrument frequency range   |

### Frequency counter

|                                     |                          |  |
|-------------------------------------|--------------------------|--|
| <b>Frequency counter resolution</b> | RF frequency reading     | 1 Hz   |
|                                     | frequency offset reading | min. 4 digits  |
| <b>Count accuracy</b>               | S/N > 25 dB              | $\pm(\text{frequency} \times \text{ref. accuracy} + 0.1 \text{ Hz})$ |

### Level

|                                      |   |                     |
|--------------------------------------|---|---------------------|
| <b>Level range</b>                   |   | -120 dBm to +30 dBm |
| <b>Level resolution</b>              |   | 0.01 dB             |
| <b>Level measurement uncertainty</b> | 0 dB to -70 dB below reference level, S/N > 20 dB, 95 % confidence level, +20 °C to +30 °C, mixer level < -10 dBm | 0.3 dB              |

### ILS signal analysis

|  |  |                                     |
|--|--|-------------------------------------|
| <b>Level</b>                                       |  |                                     |
| <b>Input level range</b>                           | signal source  |                                     |
|  | RF signal  | -60 dBm to +30 dBm                  |
|  | modulation signal at audio or baseband input   | 100 mV to 3 V ( $V_{\text{RMS}}$ )  |
| <b>Modulation depth measurement</b>                |  |                                     |
| <b>Resolution</b>                                  |  | 0.01 %                              |
| <b>Accuracy 90/150 Hz <math>\pm</math> 1 %</b>     | RF signal  | < 0.4 %                             |
|  | R&S <sup>®</sup> FSMR: modulation signal at audio input                              | < 1 %                               |
|  | R&S <sup>®</sup> FSQ: modulation signal at baseband input (R&S <sup>®</sup> FSQ-B71) | < 3.5 %                             |
| <b>Accuracy 300 Hz to 4 kHz (voice/identifier)</b> | RF signal  | < 1 %                               |
|  | R&S <sup>®</sup> FSMR: modulation signal at audio input                              | < 1 %                               |
|  | R&S <sup>®</sup> FSQ: modulation signal at baseband input (R&S <sup>®</sup> FSQ-B71) | < 3.5 %                             |
| <b>Audio frequency counter</b>                     |  |                                     |
| <b>Resolution of audio frequency counter</b>       |  | 7 digits                            |
| <b>Accuracy</b>                                    |  | < 0.002 %                           |
| <b>DDM measurement, localizer mode</b>             |  |                                     |
| <b>Range</b>                                       |  | 0 to $\pm 0.4$ DDM                  |
| <b>Resolution</b>                                  |  | 0.00001 DDM                         |
| <b>Accuracy</b>                                    | $F_{\text{mod}}$ : 90/150 Hz $\pm$ 1 %   |                                     |
|  | DDM < 0.1, RF signal   | < 0.0002 DDM $\pm$ 0.1 % of reading |
|  | DDM > 0.1, RF signal   | < 0.0002 DDM $\pm$ 0.2 % of reading |
|  | R&S <sup>®</sup> FSMR: modulation signal at audio input                              | < 0.0002 DDM $\pm$ 1 % of reading   |
|  | R&S <sup>®</sup> FSQ: modulation signal at baseband input (R&S <sup>®</sup> FSQ-B71) | < 0.0002 DDM $\pm$ 3.5 % of reading |

| <b>DDM measurement, glideslope mode</b> |  |                                     |
|---|--|-------------------------------------|
| Range                                   |  | 0 to $\pm 0.8$ DDM                  |
| Resolution                              |  | 0.00001 DDM                         |
| Accuracy                                | $F_{\text{mod}}$ : 90/150 Hz $\pm 1$ %   |                                     |
|   | DDM < 0.2, RF signal   | < 0.0004 DDM $\pm 0.1$ % of reading |
|   | DDM > 0.2, RF signal   | < 0.0004 DDM $\pm 0.2$ % of reading |
|   | R&S <sup>®</sup> FSMR: modulation signal at audio input                              | < 0.0004 DDM $\pm 1$ % of reading   |
|   | R&S <sup>®</sup> FSQ: modulation signal at baseband input (R&S <sup>®</sup> FSQ-B71) | < 0.0004 DDM $\pm 3.5$ % of reading |
| <b>Phase measurement 90/150 Hz</b>      |  |                                     |
| Measurement range                       |  | $\pm 60^\circ$                      |
| Resolution                              |  | 0.01°                               |
| Accuracy                                | $F_{\text{mod}}$ : 90/150 Hz $\pm 1$ %, RF signal                                    | < 0.03°                             |

## VOR signal analysis

| <b>Level</b>                                |  |                                    |
|---|--|------------------------------------|
| Input level range                           | signal source  |                                    |
|   | RF signal  | -60 dBm to +30 dBm                 |
|   | modulation signal at audio or baseband input   | 100 mV to 3 V ( $V_{\text{RMS}}$ ) |
| <b>AM modulation depth</b>                  |  |                                    |
| Resolution                                  |  | 0.01 %                             |
| Accuracy of reference and variable signal   | 30 Hz $\pm 1$ %, 9960 Hz $\pm 1$ %   |                                    |
|   | RF signal  | < 0.5 %                            |
|   | R&S <sup>®</sup> FSMR: modulation signal at audio input                              | < 1 %                              |
|   | R&S <sup>®</sup> FSQ: modulation signal at baseband input (R&S <sup>®</sup> FSQ-B71) | < 3.5 %                            |
| Accuracy 300 Hz to 4 kHz (voice/identifier) | RF signal  | < 1 %                              |
|   | R&S <sup>®</sup> FSMR: modulation signal at audio input                              | < 1 %                              |
|   | R&S <sup>®</sup> FSQ: modulation signal at baseband input (R&S <sup>®</sup> FSQ-B71) | < 3.5 %                            |
| <b>FM modulation deviation</b>              |  |                                    |
| Max. deviation                              |  | 700 Hz                             |
| Resolution                                  |  | 0.01 Hz                            |
| Accuracy                                    | 9960 Hz $\pm 1$ %  | < 0.5 % $\pm 0.1$ Hz               |
| <b>Audio frequency counter</b>              |  |                                    |
| Resolution                                  |  | 7 digits                           |
| Accuracy                                    |  | < 0.002 %                          |
| <b>Azimuth phase measurement</b>            |  |                                    |
| Measurement range                           |  | 0° to 360°                         |
| Resolution                                  |  | 0.001°                             |
| Accuracy                                    | $F_{\text{mod}}$ : 30 Hz $\pm 1$ %, 9960 Hz $\pm 1$ %                                | < 0.03°                            |

## Distortion analysis

| <b>Level</b>      |  |                                   |
|-------------------|--|-----------------------------------|
| Measurement range |  | -100 dB to 0 dB, 0.001 % to 100 % |
| Readout unit      |  | dB, %                             |
| Resolution        |  | 0.01 %, 0.01 dB                   |
| Accuracy          |  | 0.5 dB                            |

## Ordering information

| Designation  | Type                    | Order No.    |
|--|-------------------------|--------------|
| VOR/ILS Measurement Demodulator, for R&S <sup>®</sup> FSMR/FSU/FSQ | R&S <sup>®</sup> FS-K15 | 1302.0936.02 |

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Subject to change

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