

## EMI Test Receivers R&amp;S ESIB 26 / ESIB 40

## Internal preamplifiers for improved sensitivity above 7 GHz

The new Internal Microwave Preamplifier Option R&S ESIB-B2 improves the sensitivity of the standard-compliant EMI Test Receivers R&S ESIB 26 and ESIB 40\* (FIG 1) in the frequency range above 7 GHz.

### Configuration and integration of preamplifier option

All test receivers of the ESIB [\*] family already come with an internal 20 dB preamplifier for the 9 kHz to 7 GHz range as standard. Models 26 and 40 of the R&S ESIB-B2 option cover the frequency range 7 GHz to 26.5 GHz (receiver model 26) and 7 GHz to 40 GHz (model 40).

The new option with nominal gain of 20 dB clearly reduces the total noise figure of the two test receivers in the microwave range. So even the most exacting sensitivity requirements, e.g. to military standards such as MIL-STD-461, are satisfied more easily.

The option is inserted in the frontend signal path between the diplexer, which suppresses frequency components below 7 GHz, and the tracking YIG filter of the microwave converter. Placed here, it ensures an optimum increase of input sensitivity. FIG 2 outlines the design of the 26.5 GHz and 40 GHz models.

In the receiver, preamplification can be activated in the RECEIVER or ANALYZER modes by softkey. It is activated for the entire frequency range of the receiver and, depending on instrument settings, either the RF attenuation or the reference level are adjusted. The level display of the ESIB automatically considers the preamplification.

Installation of the option increases the displayed average noise level in the bypass mode, i.e. with preamplification deactivated, by approx. 2 dB to 3 dB above 7 GHz compared to a receiver without the option. This is due to the attenuation of the additional relays and the cabling.

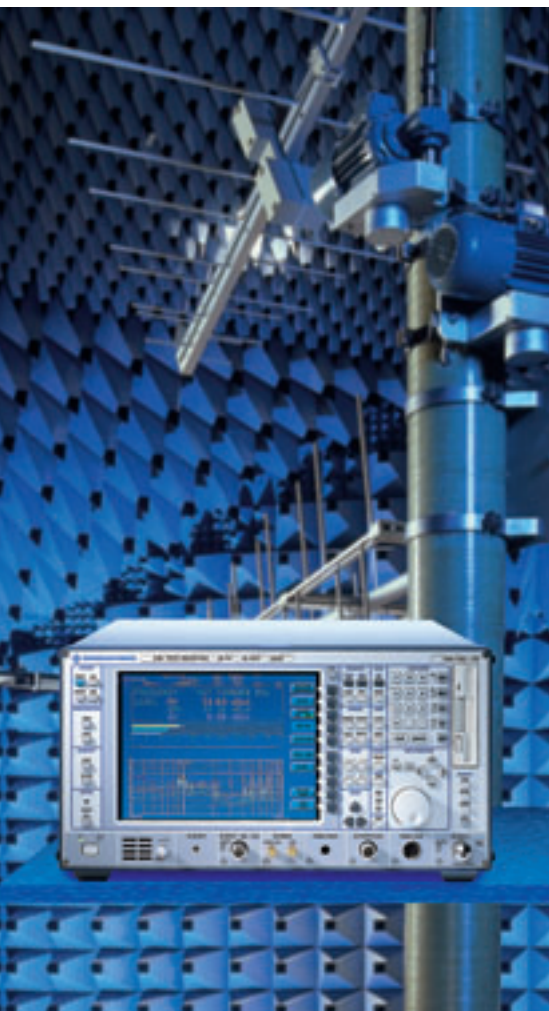
If the receiver comes with the option ready installed, the additional frequency response will have been allowed for in factory calibration. If the option is subsequently integrated, the R&S ESIB must be recalibrated.

### Increased sensitivity simplifies MIL measurements

The new option improves the input sensitivity of receiver models 26 and 40 for measurements above 7 GHz by up to 18 dB. This means that even higher cable attenuation, which occurs with field-strength measurements in large shielded enclosures with cables of up to 20 m in length, can be compensated. This applies at least partially also to the correction factors of the antennas used, which in the case of horn antennas, for example, can exhibit values exceeding 40 dB, depending on frequency range.

FIG 3 shows the displayed average noise level of the R&S ESIB 40 with the preamplifier switched on, recorded with a peak detector (MAX PK), 1 MHz IF band-

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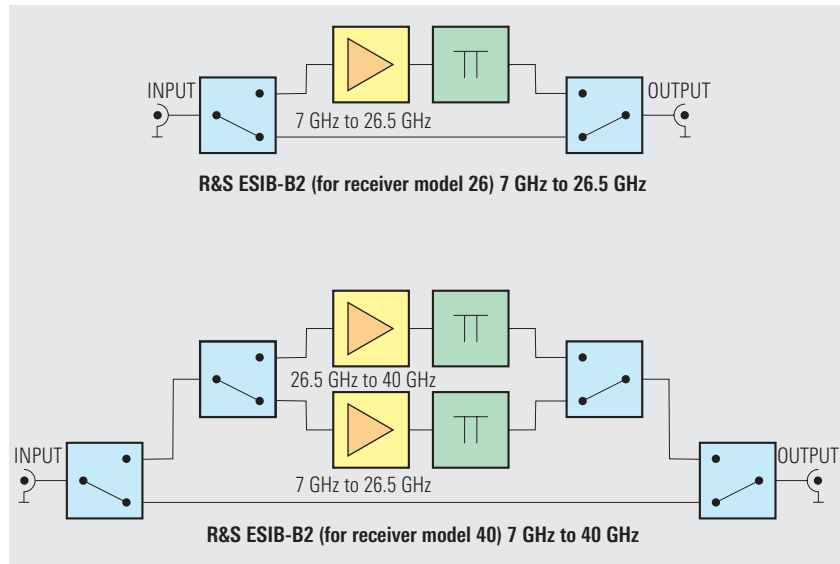
**FIG 1**  
The EMI Test Receivers R&S ESIB provide standard-compliant EMI measurements up to 40 GHz.

\* The previous name of the ESI test receiver family was changed to R&S ESIB (models 7, 26 and 40) for legal reasons.

width (RBW) and taking into account cable attenuation and transducer factors of three horn antennas up to 18 GHz, 26.5 GHz and 40 GHz. The inserted limit line (red) corresponds to MIL-STD-461E RE102-1. The parallel line (green) at a distance of  $-10$  dB marks the noise display specified in the standard.

In extreme cases (e.g. above 26.5 GHz) another external preamplifier might be required directly at the antenna terminal to satisfy even the most stringent requirements of the MIL standard.

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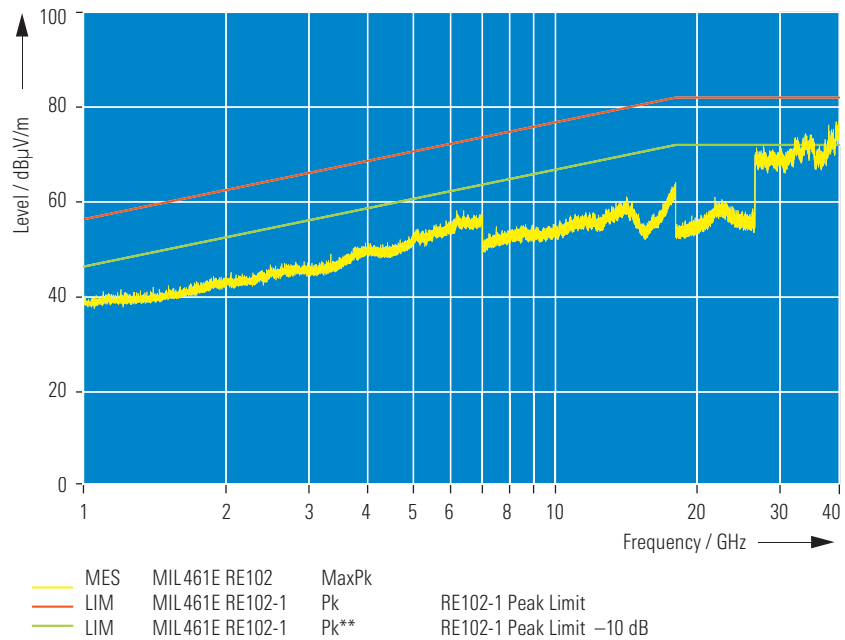


**FIG 2** Block diagram of the Internal Microwave Preamplifier Option R&S ESIB-B2, model 26.5 GHz (top) and model 40 GHz (bottom). The latter comprises two preamplifier modules optimized for the particular frequency range.

More information and data sheet at  
[www.rohde-schwarz.com](http://www.rohde-schwarz.com)  
 (search term: ESIB)

Data sheet R&S ESIB

REFERENCES  
 [\*] EMI Test Receiver ESI – EMI professionals through to 40 GHz. News from Rohde & Schwarz (1999) No. 162, pp 7–9



**FIG 3** Noise display of the R&S ESIB40 from 1 GHz to 40 GHz weighted by peak detector; RF attenuation 0 dB, preamplification 20 dB, RBW 1 MHz and active transducer set: antenna transducer: R&S HF906, EMCO 3160-09, EMCO 3160-10; cable transducer: R&S HFU-Z5, RTK081, RTK050, RTK040.