Supplement A
to Operating Manual,Version 01
EMI Test Receiver ESIB7, ESIB26 and ESIB40
(Firmware Version 4.31 and higher)

Dear Customer,

your EMI test receiver is equipped with a new firmware version. The new firmware offers a number of extensions and improvements which are not yet described in the operating manual. They are explained on the following pages. The new functions concern:

- Setting the input attenuation to 0 dB via roll-key no longer possible in Analyzer mode
- Limit lines with additional unit dBpT, editing feature extended
- Extended functionality for option External Mixer Output (FSE-B21)
- Extension of the detector selection by the CISPR Average detector.
- Extension of the adjacent channel power measurement.
- Selection of trace averaging method
- Additional IEEE/IEC-bus commands

Correction of Operating Manual, Section "Windows-NT Software Installation"

The stated path for starting the reinstallation is only valid for software pack 3 (**"C:\SP3\I386\update"**).
To start the reinstallation of software pack 5 path **"C:\SP5\I386\update\update"** has to be entered into the command line.

Input Attenuation 0 dB can no longer be set via Roll-key in Analyzer mode

In order to prevent the input attenuation from being inadvertently switched off, value 0 dB can only be set via manual input. The input attenuation can only be reduced up to 10 dB via roll-key or UP/DOWN keys. In Receiver mode, the availability of the 0 db setting is already controlled with the *0 DB MIN* softkey.

Limit lines with additional unit dBpT, editing feature extended

dBpT can be set as additional unit for limit lines.
In firmware versions used so far, a physical unit once set could not be changed. In the new firmware version this is now possible. The entered reference values remain unchanged

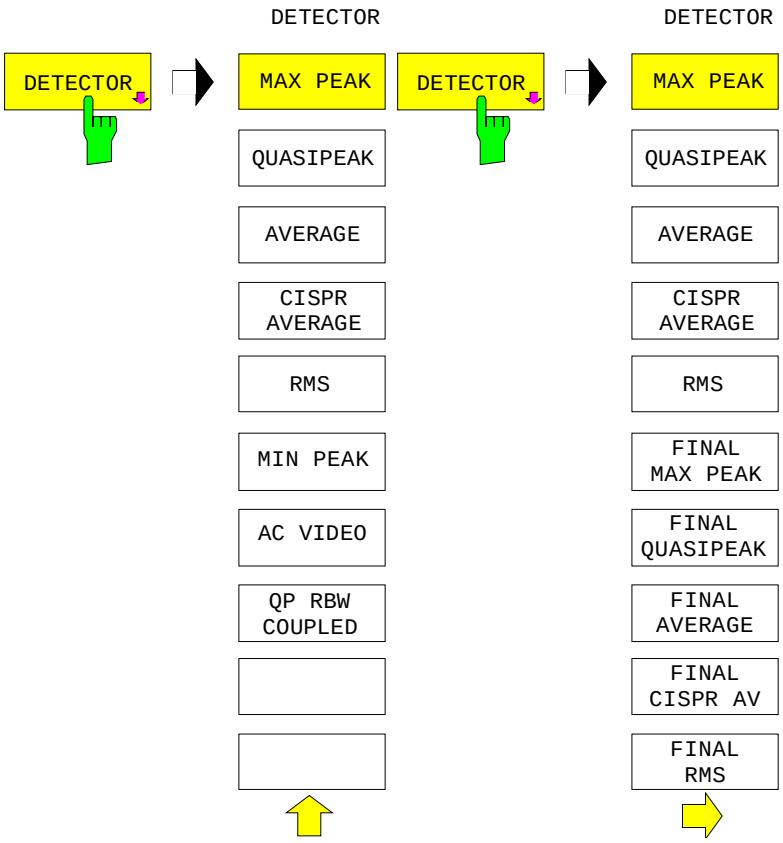
External Mixer option FSE-B21 extended

The permissible setting range of parameter *HARMONIC NUMBER* under *BAND LOCK OFF* was increased from 40 to 62.

CISPR Average Detector (CISPR AV)

The weighting modes that can be selected have been extended by the detector CISPR Average.

CONFIGURATION MODE - EMI RECEIVER menu: *TRACE* menu:



The *DETECTOR* softkey opens a submenu to select the detector.

Multiple detection is activated by switching on up to four single detectors.

The MIN PEAK, RMS and AC VIDEO detector cannot be switched on simultaneously.

The AVERAGE and CISPR AVERAGE detector cannot be switched on simultaneously.

Softkey *AC VIDEO* is available only if the instrument is equipped with the linear video output (option ESIB-B1).

CISPR AV detector

For the measurement of the average according to CISPR 16-1, the maximum value of the linear average value is displayed during the measurement time. It is used for the measurement of pulsed sinusoidal signals with low pulse frequency, for example. The maximum value is calibrated with the rms value of an unmodulated sinusoidal signal.

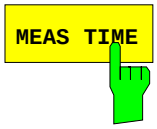
On the ESIB, averaging is done with lowpass filters of the 2nd order (simulation of a mechanical instrument). The lowpass time constants and the IF bandwidths are fixed depending on the frequency. The main parameters are listed in the following table:

	CISPR Band A	**CISPR Band B**	**CISPR Band C/D**
Frequency range	9 kHz to 150 kHz	150 kHz to 30 MHz	30 MHz to 1000 MHz
IF bandwidth	200 Hz	9 kHz	120 kHz
Lowpass time constant	160 ms	160 ms	100 ms

Setting the Measurement Time

The measurement time is the time during which ESIB measures the input signal and forms a measurement result weighted by the selected detector. The measurement time does not include settling times. ESIB automatically waits until transients are over.

CONFIGURATION MODE - EMI RECEIVER menu



The *MEAS TIME* softkey activates the entry field for the measurement time.

The measurement time can be set with 2 digits resolution in the range 100 µs to 100 s, e.g. 980 ms, 990 ms, 1 s, 1.1 s.

When the quasi-peak detector is used, the minimum measurement time is 1 ms.

When the CISPR average detector is used, the minimum measurement time is 100 ms.

With the average, RMS, AC video or min/max peak detector the smallest settable measurement time depends on the bandwidth.

Bandwidth	Shortest measurement time AV, RMS	Shortest measurement time PK+, PK-, AC video
≤ 10 Hz	1 s	10 ms
100 Hz	100 ms	1 ms
200 Hz	50 ms	1 ms
1 kHz	10 ms	0.1 ms
9 kHz	1 ms	0.1 ms
≥ 100 kHz	0.1 ms	0.1 ms

IEC/IEEE-bus command `:[SENSe:]SWEep:TIME <numeric_value>`

Effect of measurement time with CISPR Average measurement

With CISPR Average measurements, the maximum value of the weighted signal during the measurement time is displayed. The relatively long time constants used with CISPR Average detectors entail long measurement times to obtain correct results. With unknown signals the measurement time should be at least 1 s. This ensures correct weighting of pulses down to a pulse frequency of 5 Hz.
After a frequency change or a modification of the attenuation, the receiver waits until the lowpass has settled before the measurement time starts. The measurement time is selected depending on the IF bandwidth and the characteristics of the signal to be measured. Unmodulated sinusoidal signals as well as signals with high modulation frequency can be measured within a short time. Slowly fluctuating signals or pulse signals require longer measurement times.

Weighting of pulsed sinusoidal signals

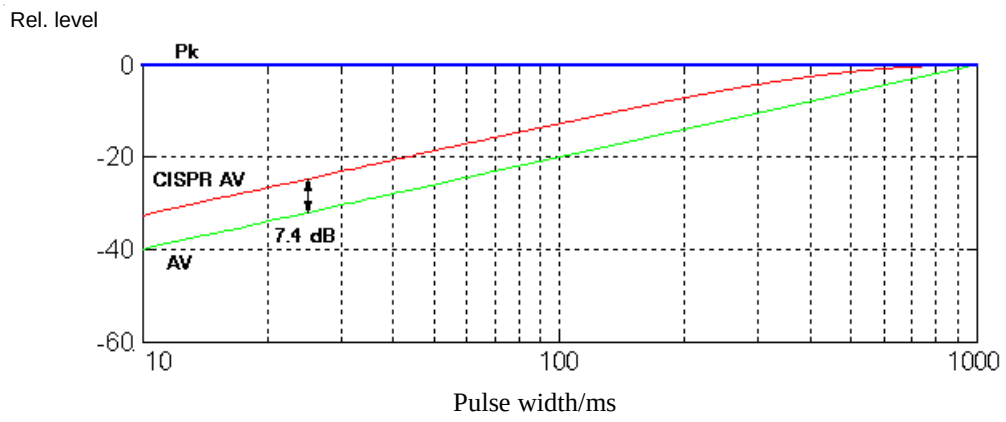


Fig. 1 Differences of the weighting of pulsed sinusoidal signals resulting from display modes AV, CISPR AV and Pk depending on the pulse width (measurement time = 2 s, pulse frequency = 1 Hz, IF bandwidth = 9 kHz, averaging time constant = 160 ms).

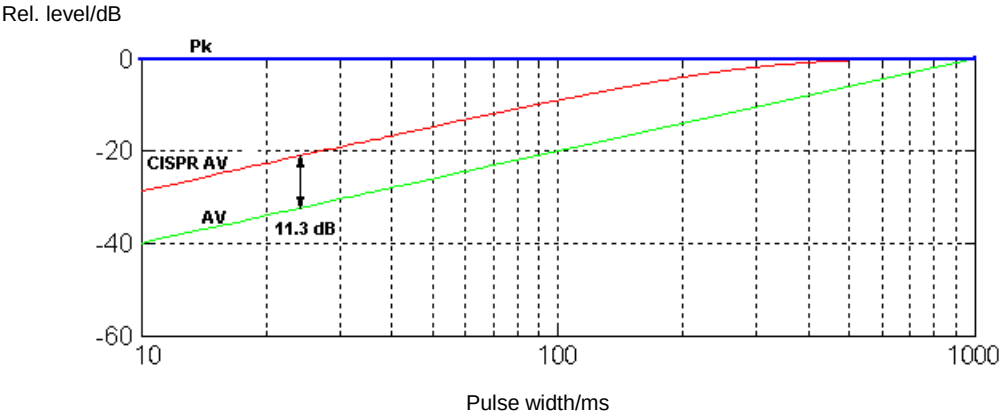


Fig. 2 Differences of the weighting of pulsed sinusoidal signals resulting from display modes AV, CISPR AV and Pk depending on the pulse width (measurement time = 2 s, pulse frequency = 1 Hz, IF bandwidth = 120 kHz, averaging time constant = 100 ms).

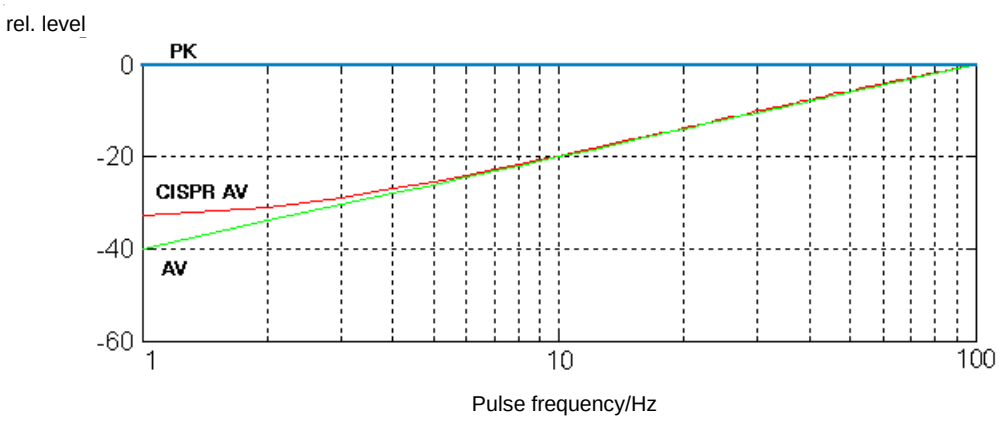


Fig. 3 Differences of the weighting of pulsed sinusoidal signals resulting from display modes AV, CISPR AV and Pk depending on the pulse width (measurement time = 2 s, pulse width = 10 ms, IF bandwidth = 9 kHz, averaging time constant = 160 ms).

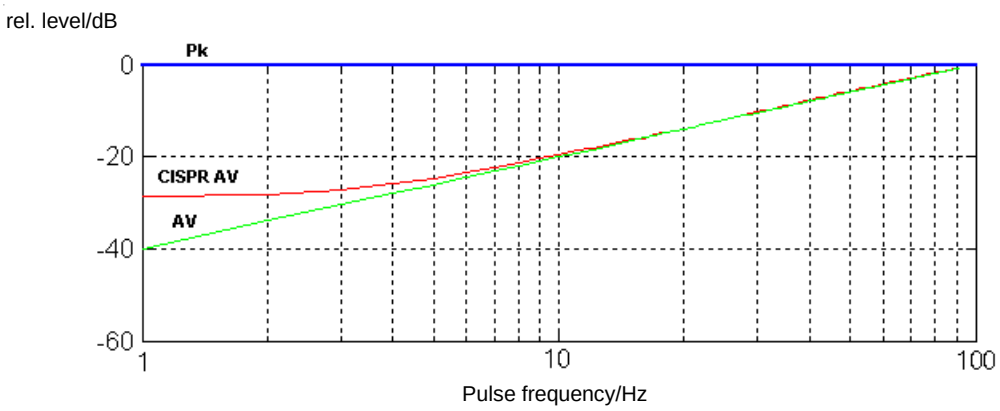
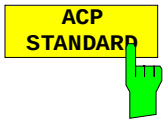


Fig. 4 Differences of the weighting of pulsed sinusoidal signals resulting from display modes AV, CISPR AV and Pk depending on the pulse frequency (measurement time = 2 s, pulse width = 10 ms, IF bandwidth = 120 kHz, averaging time constant = 100 ms).

Adjacent Channel Power Measurements

The chapter "Channel Configuration" of the operating manual was extended to include adjacent channel power measurements.



The *ACP STANDARD* softkey activates the selection of a digital mobile-radio standard. The parameters for the adjacent channel power measurement are set according to the regulations of the selected standard.

ACP STANDARD
NONE
NADC
TETRA
PDC
PHS
CDPD
CDMA800 FWD
CDMA800 REV
CDMA1900 FWD
CDMA1900 REV
W-CDMA FWD
W-CDMA REV
W-CDMA 3GPP FWD
W-CDMA 3GPP REV
CDMA2000 MC
CDMA2000 DS
CDMA ONE 800 FWD
CDMA ONE 800 REV
CDMA ONE 1900 FWD
CDMA ONE 1900 REV
TD-SCDMA

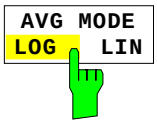
The following standards can be selected:

NADC (IS-54 B)
TETRA
PDC (RCR STD-27)
PHS (RCR STD-28)
CDPD
CDMA 800 FWD
CDMA 800 REV
CDMA 1900 REV
CDMA 1900 FWD
W-CDMA FWD
W-CDMA REV
W-CDMA 3GPP FWD
W-CDMA 3GPP REV
CDMA2000 Multi Carrier
CDMA2000 Direct Sequence
CDMA ONE 800 FWD
CDMA ONE 800 REV
CDMA ONE 1900 REV
CDMA ONE 1900 FWD
TD-SCDMA

Selection of Trace Averaging Method

Section "Trace Selection and Setup" of the operating manual was extended to include the selection of the trace averaging method.

TRACE 1 right side menu:



The *AVERAGE LIN/LOG* softkey switches between linear and logarithmic averaging in case of logarithmic level display.
In case of logarithmic averaging, the dB values of the display voltage are averaged, in case of linear averaging the level values in dB are converted into linear voltages or powers prior to averaging. These voltages or powers are averaged and then again converted into level values.

For stationary sinewave signals the two averaging methods yield the same result.

Logarithmic averaging is recommended if sinewave signals are to clearly stand out against the noise since, with this averaging, noise suppression is greater while the sinewave signals remain unchanged.

IEC/IEEE command `:[SENSe<1|2>:]AVERage:TYPE VIDeo|LINear`

New and Extended IEEE-Bus Commands

The new firmware was extended by the following IEEE-bus commands:

- Additional command for active limit lines.
- Additional power measurement standard.
- Selection of Trace Averaging Method.
- Additional detector.
- Additional command for firmware update via IEC/IEEE bus interface.
- Additional parameter PHOLd for TRACe:DATA command.

:CALCulate<1|2>:LIMit<1...8>:ACTive?

This command queries the name of all activated limit lines. The names are output in alphabetical order. If no limit line is activated, an empty string will be output. The numeric suffixes in CALCulate<1|2> and LIMit<1 to 8> are not significant.

Example: ":CALC:LIM:ACT?"

Features: *RST value: -
SCPI: device-specific

:CALCulate<1|2>:MARKer<1...4>: FUNCtion:POWer:PRESet NADC | TETRA | PDC | PHS | CDPD | FWCDma | RWCDma | FW3Gppcdma | RW3Gppcdma| F8CDma | R8CDma | F19Cdma | R19Cdma | M2CDma | D2CDma | FO8Cdma | RO8Cdma | FO19CDMA | RO19CDMA | **TCDMa |** NONE

This command selects the settings for power measurement of one of the standards.

Example: "CALC:MARK:FUNC:POW:PRES NADC"

Features: *RST value: -
SCPI: device-specific

Mode: A-F

TCDMa **TD-SCDMa**

The selection of a standard influences the parameters weighting filter, channel bandwidth and spacing, resolution and video bandwidth, as well as detector and sweep time.

:[SENSe<1|2>:]AVERage:TYPE MAXimum | MINimum | SCALar | **VIDeo | LINear**

This command selects the trace averaging method.

VIDeo Averaging of logarithmic level values.

LINear Averaging of linear power values prior to their conversion into level values.

Example: `":AVER:TYPE LIN"`

Features: ***RST value: VIDeo
SCPI: device-specific

Mode: A, VA ("VIDeo" and "LINear" are not available in VA mode)

Note: *It is also possible to select the evaluation mode (MAXimum, MINimum, SCAlar) for the trace with this command. However, it is recommended to use command DISPlay[:WINDow<1|2>]:TRACe<1...4>:MODE for this purpose. The command AVERage:TYPE should be used only to select the trace averaging method. Also, the query reads out the trace averaging mode only.*

The following functions are defined but should not be used:

MAXimum (MAX HOLD): $AVG(n) = MAX(X_1...X_n)$

MINimum (MIN HOLD): $AVG(n) = MIN(X_1...X_n)$

SCALar (AVERAGE): $$AVG(n) = \frac{1}{n} \times \sum_{i=1}^{n} xi$$

:[SENSe<1|2>:]DETector<1 to 4>[:FUNCtion] APEak | NEGative | POSitive| SAMPle | RMS | AVERage | **CAVerage** | QPEak | ACVideo

This command switches the detector for recording of the measured value.

Example: `":DET POS"`

Features: *RST value: Trace1: POSitive
Trace 2: AVERage
SCPI: conforming

Modes: R, A

In scan mode of the receiver, the detectors POSitive, RMS, AVERage, **CAVerage,** QPEak and ACVideo are available (ACVideo only with option ESIB-B1).

In the analyzer mode, the detectors APEak, POSitive, NEGative, RMS, SAMPLe and AVERage are available. The value "APEak" (AutoPeak) displays both the positive peak value and the negative peak value when noise is present. The positive peak value is displayed when one signal is present. The trace is selected by means of the numeric suffix after DETector.

:[SENSe<1|2>:]DETector:RECeiver[:FUNCtion] POSitive | NEGative | RMS | AVERage | **CAVerage** | QPEak| ACVideo

This command switches on the detectors for single measurements.

Example: ":DET:REC POS,AVER,QPE"

Features: *RST value: POS
SCPI: device-specific

Mode: R

The trace is not selectable; up to four detectors may be switched on simultaneously.

The RMS, NEgative and ACVideo detector cannot be switched on simultaneously.

The AVERage and **CAVerage** detector cannot be switched on simultaneously.

Selection ACVideo is available only if the instrument is equipped with the linear video output (option ESIB-B1).

:[SENSe<1|2>:]DETector<1 to 4>:FMEasurement NEGative | POSitive | RMS | AVERage | **CAVerage** | QPEak | ACVideo

This command selects the detector for the final measurement (the detector used for the subsequent final measurement).

Example: "DET:FME POS"

Features: *RST value: Trace 1, 3 POS
Trace 2, 4 AVERage
SCPI: device specific

Mode: R

:SYSTem:FIRMware:UPDate <string>

This command starts a firmware update using the files in the set directory.

Example : ":SYST:FIRM:UPD 'C:\V4.32'"

Features : *RST value: –
SCPI : conforming

Mode: A, VA, BTS, MS

This command is an event and has therefore no query and no *RST value assigned.

:TRACe[:DATA] TRACE1| TRACE2| TRACE3| TRACE4| SINGle | **PHOLd** | SCAN | STATus | FINAL1 | FINAL2 | FINAL3 | FINAL4, <block> | <numeric_value>

This command transfers trace data from the controller to the instrument, the query reads trace data out of the instrument.

Receiver

PHOLd yields the level value of the maxhold marker of the bargraph.