



Line Field	Channel 02	Channel 03	Channel 04	Channel 05	Channel 06	Channel 07
Center Frequency (MHz)	304.000000	402.000000	410.000000	415.000000	428.000000	434.000000
Channel Plane (Symbol/s)	3.300000	3.300000	3.300000	3.300000	3.300000	3.300000
Offset	None	None	None	None	None	None
Line Start	24.08.2003 15:40:27	24.08.2003 15:42:52	24.08.2003 15:45:18	24.08.2003 15:47:34	24.08.2003 15:50:00	24.08.2003 15:52:26
RF Level(dBm)	86.8	87.3	87.4	87.1	87.6	87.7
Occupancy (20Hz/120)	425.6	826.5	475.8	---	425.9	277.8
Symbol Rate (kbaud)	3	3	3	---	3.2	3.2
ISI (delta T)	0.00E+00 (200/1000)	1.40E-08 (300/1000)	0.00E+00 (200/1000)	---	0.00E+00 (200/1000)	0.00E+00 (200/1000)
ISI (delta T)	0.00E+00 (400/1000)	0.00E+00 (300/1000)	0.00E+00 (400/1000)	---	0.00E+00 (300/1000)	0.00E+00 (300/1000)
ISI (delta T)	0.00E+00 (400/1000)	0.00E+00 (400/1000)	0.00E+00 (400/1000)	---	0.00E+00 (400/1000)	0.00E+00 (400/1000)
ISI (delta T)	0	0	0	---	0	0
ISI (delta T)	38.193	38.193	38.193	---	38.193	38.193
Units (Hz)	OK	OK	OK	OK	OK	OK
Units (dB)	OK	OK	OK	UNDEF	OK	OK
Units (T)	OK	OK	OK	UNDEF	OK	OK
Units (Response)	1.00	1.0	1.41	---	0.89	1.26
Units (Phase)	0.0	0.4	0.3	---	0.9	0.1
Units (T)	0.0000	0.0000	0.0000	---	0.0000	0.0000
Units (L)	---	---	---	---	---	---
Units (L)	---	---	---	---	---	---
Units (M)	12.8	12.8	12.8	12.2	12.8	12.8
Units (S)	11.2	11.2	11.2	11	11.3	11.3
Units (C)	11.2	11.2	11.2	11	11.3	11.3
Units (A)	36.7	---	---	---	---	---
Units (B)	0.00	---	---	---	---	---
Units (C)	---	---	---	---	---	---
Units (D)	---	---	---	---	---	---
Units (E)	---	---	---	---	---	---
Units (F)	---	---	---	---	---	---
Units (G)	---	---	---	---	---	---
Units (H)	---	---	---	---	---	---
Units (I)	---	---	---	---	---	---
Units (J)	---	---	---	---	---	---
Units (K)	---	---	---	---	---	---
Units (L)	---	---	---	---	---	---
Units (M)	---	---	---	---	---	---
Units (N)	---	---	---	---	---	---
Units (O)	---	---	---	---	---	---
Units (P)	---	---	---	---	---	---
Units (Q)	---	---	---	---	---	---
Units (R)	---	---	---	---	---	---
Units (S)	---	---	---	---	---	---
Units (T)	---	---	---	---	---	---
Units (U)	---	---	---	---	---	---
Units (V)	---	---	---	---	---	---
Units (W)	---	---	---	---	---	---
Units (X)	---	---	---	---	---	---
Units (Y)	---	---	---	---	---	---
Units (Z)	---	---	---	---	---	---

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## Measurement Software EFA-SCAN R&S® EFA-K1

Fast recording and documentation of measurement values for the digital Test Receivers R&S EFA

- ◆ Repeated measurements in any number of loops
- ◆ Run mode (frequency scan)
- ◆ Snapshot mode
- ◆ Saving of measurement values to a file
- ◆ Use for R&S EFA 2x/4x/5x/6x/7x
- ◆ PC connection via RS-232-C, IEC/IEEE bus or TCP/IP
- ◆ For Windows 98/NT/2000 and XP


**ROHDE & SCHWARZ**

Recording and documenting measurement values is part of the everyday work of an engineer. Recording entire measurement sequences (e.g. at a cable headend) can be very time-consuming, which means that users immediately start looking for a solution that will save them time and effort. Such a solution has now been developed specifically for the digital models 2x, 4x, 5x, 6x and 7x of the R&S EFA test receiver family – it is called R&S EFA-K1.

## Interfaces

The new EFA-SCAN R&S EFA-K1 measurement software runs on any PC under Windows98/NT/2000 or XP. The connection between the PC and the Test Receiver R&S EFA can be set up via the RS-232-C interface or the IEC/IEEE bus. Another option is the use of a terminal server to establish the connection via LAN/WAN (FIG 1). The measurement software can be configured for all three types of connection.

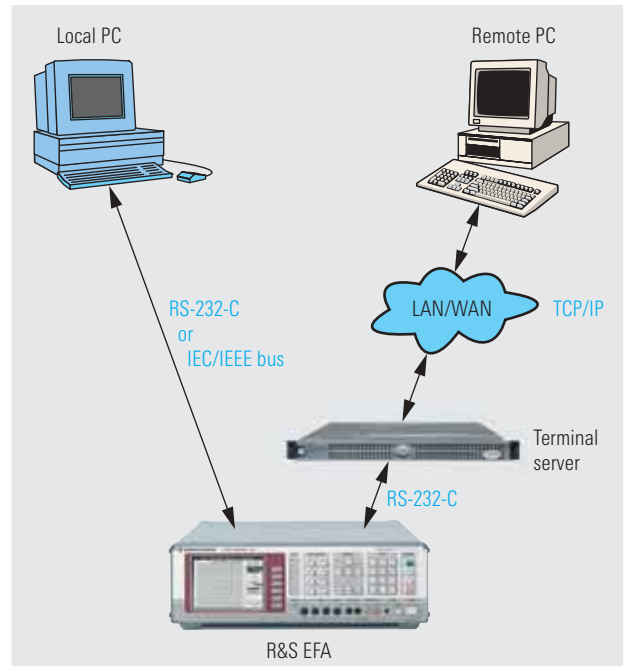


FIG 1: Connecting options between PC and R&S EFA.

## Intuitive operation

Measurement Software EFA-SCAN R&S EFA-K1 is easy and intuitive to operate. Even the sequence of registers in the entry dialog specifies the steps that need to be carried out one after the other. After the interface and model have been

selected, a dialog window appears for defining the measurement task at hand. First, the default setting of the receiver is determined, e.g. bandwidth, SAW filter or signal input (FIG 2).

FIG 2: R&S EFA6x default setting.

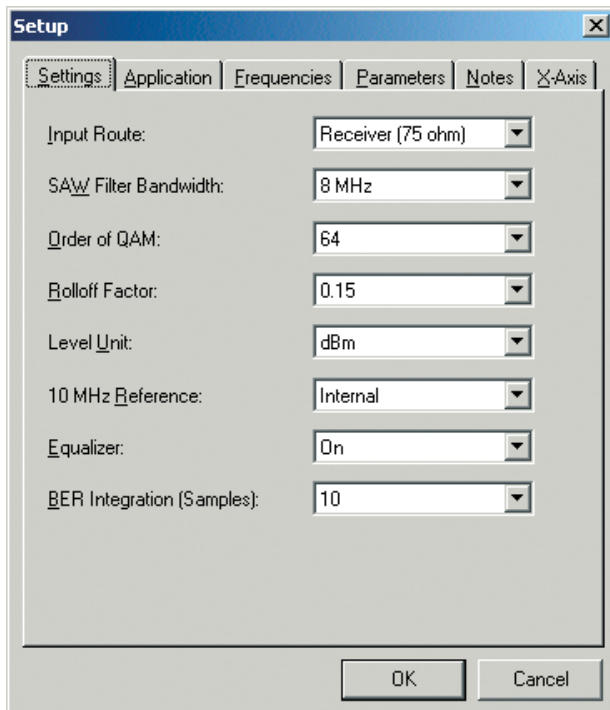
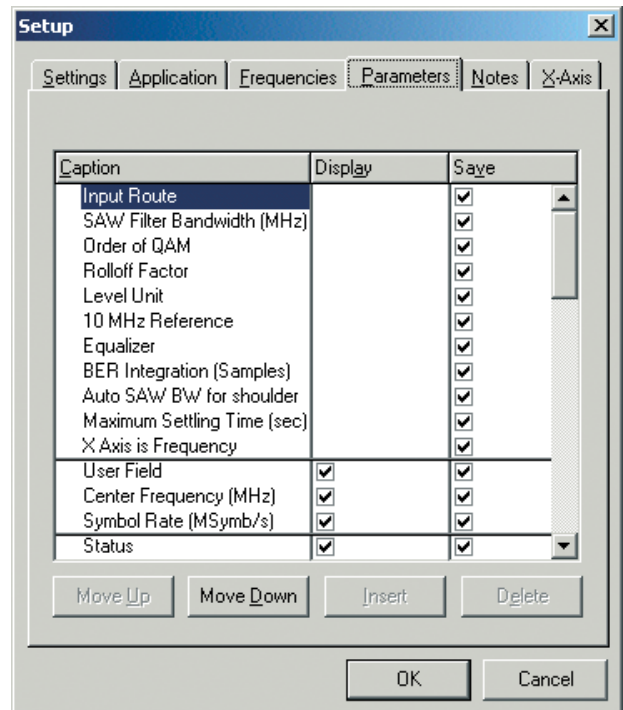


FIG 3: Parameter list for R&S EFA6x.



In the next step, the user must enter the frequencies at which the measurements are to be performed, and this can also be a single frequency. The measurement parameters are then defined in a list that depends on the model and standard. The user can decide for each measurement parameter whether the measurand is only to be displayed and/or also stored to a file (FIG 3).

The parameters thus set for device setup, frequencies and other parameters can be stored to a configuration file for reuse.

## Two measurement modes

The measurements are started at a key-stroke. Two modes are offered: In the Snapshot mode, the previously defined frequency list is processed just once; in the Run mode, it is cyclically performed until the measurements are explicitly stopped. The dwell time between the cycles can be individually set and the measurement values thus obtained are displayed in tables for each frequency (FIG 4) and/or stored to a file.

## Further processing

The measurement values to be stored are saved in CSV format (comma-separated values) which is a commonly used file format enabling data to be ported to Excel or a database, for example. This ensures easy further processing

## Instantly ready for use

Measurement Software EFA-SCAN R&S EFA-K1 is supplied on a CD-ROM together with a null-modem cable so that operation can start immediately once the software has been installed and the PC has been connected to the Test Receiver R&S EFA via the serial RS-232-C interface.

FIG 4: Table for displaying the measurement values (in this case, R&S EFA6x).

User Field	Channel 32	Channel 33	Channel 34	Channel 35	Channel 36	Channel 37
Center Frequency (MHz)	394,0000000	402,0000000	410,0000000	418,0000000	426,0000000	434,0000000
Symbol Rate (MSymb/s)	6,9000000	6,9000000	6,9000000	6,9000000	6,9000000	6,9000000
Status	Done	Done	Done	Done	Done	Done
Time Stamp	24.06.2003 15:40:27	24.06.2003 15:42:52	24.06.2003 15:45:18	24.06.2003 15:47:34	24.06.2003 15:50:00	24.06.2003 15:52:24
RF Level (dBm)	-56,6	-57,3	-57,4	-51,1	-57,6	-57,7
Frequency Offset (Hz)	-421,6	926,5	-475,8	---	-935,9	277,8
Symbol Rate Offset (Hz)	5	0,8	3	---	12,1	3,2
BER before RS	0,00E+00 (391/1000)	1,40E-09 (390/1000)	0,00E+00 (392/1000)	---	0,00E+00 (388/1000)	0,00E+00 (386/1000)
BER after RS	0,00E+00 (401/1000)	0,00E+00 (399/1000)	0,00E+00 (402/1000)	---	0,00E+00 (397/1000)	0,00E+00 (395/1000)
Packet Err Ratio	0,00E+00 (401/1000)	0,00E+00 (403/1000)	0,00E+00 (402/1000)	---	0,00E+00 (401/1000)	0,00E+00 (395/1000)
Packet Err / s	0	0	0	---	0	0
TS Bitrate (Mbit/s)	38,153	38,153	38,153	---	38,153	38,153
10 MHz Ref Sync	OK	OK	OK	OK	OK	OK
Carrier Loop Sync	OK	OK	OK	UNSYNC	OK	OK
MPEG TS Sync	OK	OK	OK	UNSYNC	OK	OK
Ampl. Response (dB)	1,03	1,5	1,41	---	0,83	1,05
Phase Response (°)	9,5	9,4	8,9	---	8,9	8,5
Group Delay (µs)	0,0765	0,0709	0,0708	---	0,0573	0,0668
Shoulder Lower (dB)	---	---	---	---	---	---
Shoulder Upper (dB)	---	---	---	---	---	---
Crest Factor - Margin (dB)	12,8	12,8	12,8	12,2	12,8	12,8
Crest Factor - Max (dB)	11,2	11,2	11,2	11	11,3	11,3
Crest Factor - Current (dB)	11,2	11,2	11,2	11	11,3	11,3
Echo Pattern Attn. 1 (dB)	-36,7	---	---	---	---	---
Echo Pattern Delay 1 (µs)	0,59	---	---	---	---	---
Echo Pattern Attn. 2 (dB)	---	---	---	---	---	---
Echo Pattern Delay 2 (µs)	---	---	---	---	---	---
I/Q Ampl. Imbal. (%)	0,01	0,01	0	---	0	0
I/Q Quad. Error (°)	0	0	0	---	0	0
Carrier Suppression (dB)	>60	>60	>60	---	>60	>60
Phase Jitter (° RMS)	0,17	0,16	0,12	---	0,22	0,15
S/N (dB)	33,9	33,4	33,8	---	30,5	33,5
MER (dB RMS)	33,6	33,1	33,4	---	30,2	33,2
Sync Errors (%)	0,0	0,0	0,0	100,0	0,0	0,0

## Overview of measurement parameters

	R&S EFA2x	R&S EFA4x	R&S EFA5x	R&S EFA6x	R&S EFA7x
Parameter	DVB-C	DVB-T	ATSC/8VSB	DVB-C	J.83/B
User field	✓	✓	✓	✓	✓
Center frequency (MHz)	✓	✓		✓	✓
Pilot frequency (MHz)			✓		
Priority		✓			
Symbol rate (Msymbol/s)	✓		✓	✓	✓
Status	✓	✓	✓	✓	✓
Time stamp	✓	✓	✓	✓	✓
RF level (dBm)	✓	✓	✓	✓	✓
Frequency offset (Hz)	✓	✓		✓	✓
Pilot frequency offset (Hz)			✓		
Bit rate offset (ppm)		✓			
Symbol rate offset (Hz)			✓	✓	✓
BER before Viterbi		✓			
BER before RS	✓	✓	✓	✓	✓
BER after RS		✓	✓	✓	✓
Seg err ratio			✓		✓
Seg err/s			✓		✓
Packet err ratio				✓	
Packet err/s				✓	
TPS FFT mode		✓			
TPS guard interval		✓			
TPS order of QAM		✓			
TPS alpha		✓			
TPS code rate		✓			
TS bit rate (Mbit/s)		✓	✓	✓	✓
10 MHz ref sync		✓	✓	✓	✓
OFDM sync		✓			
Carrier loop sync	✓ (symbol rate/carrier sync)		✓	✓	✓
MPEG TS sync	✓ (frame sync)	✓	✓	✓	✓
Amplifier response (dB)		✓	✓	✓	✓
Phase response (°)		✓	✓	✓	✓
Group delay (µs)		✓	✓	✓	✓
Shoulder lower (dB)		✓	✓	✓	✓
Shoulder upper (dB)		✓	✓	✓	✓
Crest factor – margin (dB)		✓	✓	✓	✓
Crest factor – max (dB)		✓	✓	✓	✓
Crest factor – current (dB)		✓	✓	✓	✓
Impulse response attn. 1-5 (dB)		✓			
Impulse response delay 1-5 (µs)		✓			
Ghost pattern attn. 1-5 (dB)			✓		
Ghost pattern delay 1-5 (µs)			✓		
Echo pattern attn. 1-5 (dB)				✓	✓
Echo pattern delay 1-5 (µs)				✓	✓
I/Q imbalance (%)	✓	✓		✓	✓
I/Q quad. error (°)	✓ (I/Q phase)	✓ (I/Q phase)		✓	✓
Carrier suppression (dB)	✓	✓		✓	✓
Carrier suppr. phase (°)		✓			
Phase jitter (° RMS)	✓	✓	✓	✓	✓
C/I (dB)	✓				
S/N (dB)	✓	✓	✓	✓	✓
MER (dB RMS)	✓	✓	✓	✓	✓
MER (% RMS)	✓	✓	✓	✓	✓
EVM (% RMS)			✓	✓	✓
Pilot value			✓		
PV ampl. error (dB)			✓		
Sig./pilot ratio (dB)			✓		
Sync errors (%)	✓	✓	✓	✓	✓
Data errors (%)	✓	✓	✓	✓	✓

## Ordering information

Order designation	Type	Order No.
Measurement Software EFA-SCAN	R&S EFA-K1	2067.9202.02

More information at  
[www.rohde-schwarz.com](http://www.rohde-schwarz.com)  
(search term: EFA, EFA-SCAN, EFA-K1);  
see also data sheets R&S EFA40/43  
(PD 0757.5514), R&S EFA50/53/70/73/90/  
93 (PD 0757.7017) and R&S EFA12/33/60/  
63/78/89 (PD 0757.2421).





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