Specifications

DVB-C characteristics (specific to EFA models 60/63 or options EFA-B20 + EFA-K21)

	Standard test receiver	High-end test receiver with option EFA-B3	High-end demodulator
RF input	selective	selective [1]	non-selective
Connector	50 Ω or 75 Ω, BNC or N female, front or rear panel	50 Ω, N female, rear panel and 75 Ω, BNC female, rear panel	50 Ω, N female, rear panel
Return loss	≥14 dB in channel with 50 Ω connector and input attenuation ≥10 dB ≥12 dB in channel with 75 Ω connector and input attenuation ≥10 dB	≥17 dB (>20 dB typ.) in channel with 50 Ω connector ≥14 dB (>17 dB typ.) in channel with 75 Ω connector	≥30 dB
Frequency range [2]	48 MHz to 862 MHz	4.5 MHz [3] to 1000 MHz	45 MHz to 1000 MHz
Level range [4]	–55 dBm to +20 dBm (low distorsion, preamplifier off) –59 dBm to +20 dBm (low noise, preamplifier off) –64 dBm to +13 dBm (low noise, preamplifier on)	–63 dBm to +20 dBm [5] (normal) –62 dBm to +20 dBm [5] (low distorsion) –65 dBm to +16 dBm [5] (low noise)	–50 dBm to +20 dBm
Noise figure	12 dB typ. (low noise) 7 dB typ. (low noise, preamplifier on)	7 dB typ. (low noise) [6] 9 dB typ. (normal) [6] 11 dB typ. (low distortion) [6]	
Image frequency rejection	≥70 dB (VHF) and ≥50 dB (UHF)	100 dB	
IF rejection		100 dB	
Local oscillator			
Resolution	1 Hz	1 Hz	1 Hz
Frequency error	≤2 x 10^{-6}	≤2 x 10^{-6}	≤2 x 10^{-6}
Phase noise [7]	≥50 dB	≥58 dB	≥62 dB [8]
SSB phase noise (RF = 860 MHz)	–82 dBc/Hz typ. at 1 kHz –90 dBc/Hz typ. at 10 kHz	–91 dBc/Hz typ. at 1 kHz –100 dBc/Hz typ. at 10 kHz	–93 dBc/Hz typ. at 1 kHz –106 dBc/Hz typ. at 10 kHz
System performance			
MER	≥40 dB [9]	≥41 dB [10]	≥42 dB [11]
EVM	≤0.66% [9]	≤0.59% [10]	≤0.52% [11]
SNR	≥42 dB [9]	≥43 dB [10]	≥44 dB [11]

[1] The selective RF inputs of the high-end TV test receiver (with option EFA-B3) are additional to the non-selective RF input of the high-end demodulator. For specifications involving the non-selective RF input, see the high-end demodulator column.
[2] Center frequency.
[3] For frequencies < 10 MHz: group delay tilt increases up to 200 ns, amplitude tilt increases up to 0.7 dB pp typ., minimum input level: –30 dBm, SAW filter ON.
[4] For quasi error-free MPEG2 transport stream, 256 QAM.
[5] At low input frequencies such as 4.57 MHz: additional tilt (typ. 0.7 dB pp), minimum input level: –30 dBm, SAW filter ON.
[6] RF >47.15 MHz.
[7] FM S/N ratio measured at IF output, referred to ±30 kHz frequency deviation and 500 Hz modulation frequency, deemphasis 50 µs, measured to DIN45405, weighted to CCIR468-3.
[8] In frequency range 45 MHz to 900 MHz.
[9] Signal power > –40 dBm.
[10] Signal power > –43 dBm.
[11] Signal power > –30 dBm.

DVB Digital Video Broadcasting

DVB-C characteristics (cont.)

IF input	50 Ω, BNC female, rear panel
Return loss	≥20 dB in channel
Center frequency	36 MHz
Level range	–30 dBm to –5 dBm
IF output	50 Ω, BNC female, rear panel
Return loss	≥20 dB in channel
Center frequency	36 MHz
Level, regulated	–17 dBm
MPEG2 TS parallel output	LVDS (188 bytes/204 bytes)
MPEG2 TS ASI output	serial MPEG2 transport stream (ASI); 75 Ω
Symbol rate	1 Msymbol/s to 6.999 Msymbol/s
Bandwidth (SAW filter)	2 MHz, 7 MHz, 6 MHz, 8 MHz or SAW filter OFF
Channel correction	self-adapting equalizer, equalizer freeze, equalizer off
Measurements	signal power carrier frequency offset symbol rate offset MPEG2 TS bit rate BER (bit error ratio) before and after Reed-Solomon decoder EVM (error vector magnitude) MER (modulation error ratio) SNR (signal/noise ratio) phase jitter I/Q amplitude imbalance I/Q quadrature error carrier suppression crest factor shoulder attenuation according to ETR290
Graphic displays	constellation diagram histogram I/Q frequency spectrum amplitude frequency response phase frequency response group delay frequency response polar plot amplitude distribution (RF) CCDF (RF) eye monitoring history
Alarm messages	signal power, MPEG2 synchronization, EVM, MER, BER before Reed-Solomon decoder, MPEG2 data error
Storage	alarm message with date and time, up to 1000 messages
Memory for instrument setup storage	0 to 4

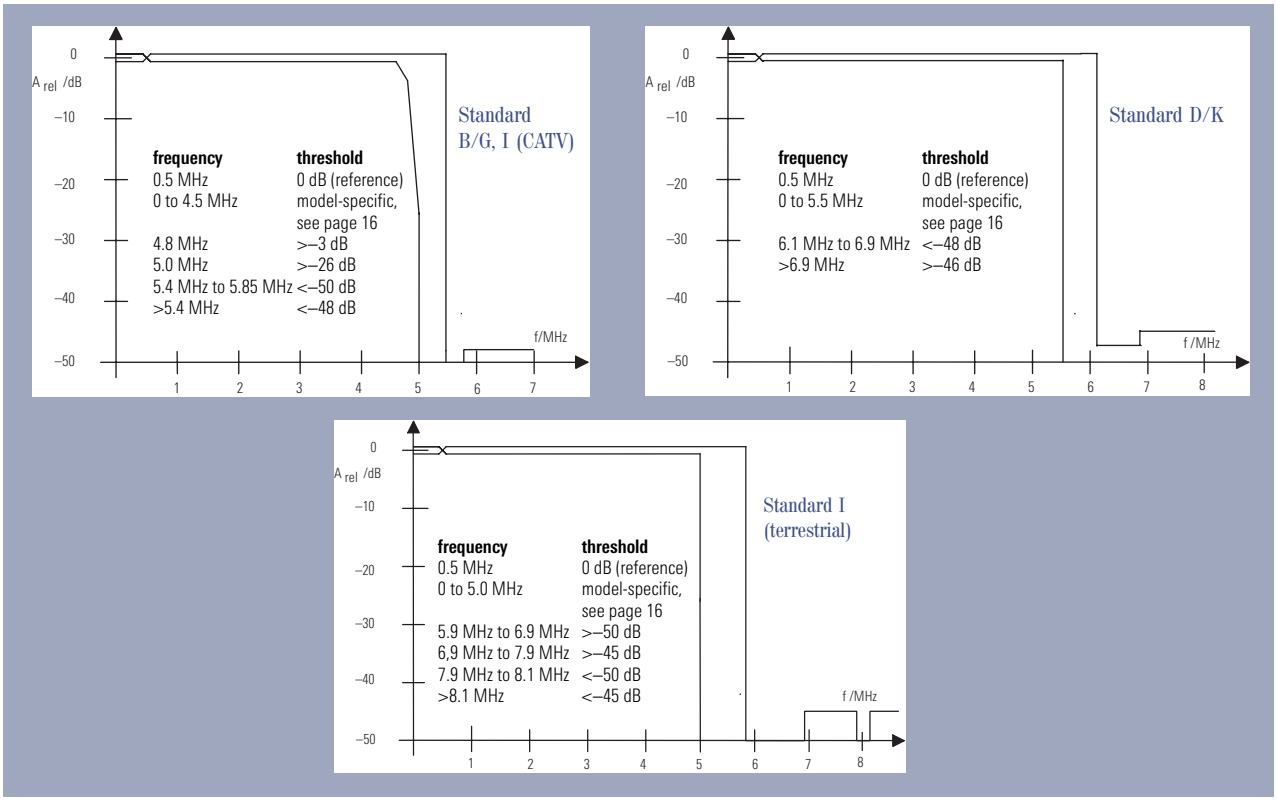
Test parameters	**Range**	**Resolution**	**Error**
Signal power	corresponding to level range	0.1 dB	<3 dB, <1 dB typ.
MER dB (modulation error ratio in dB)	18 dB to 30 dB 30 dB to 35 dB	0.1 dB 0.1 dB	≤0.8 dB ≤1.0 dB
MER % (modulation error ratio in %)	1.9% to 3.2% 3.2% to 12.5%	0.01% 0.01%	≤12% of actual value ≤10% of actual value
EVM (error vector magnitude)	1.17% to 2.07% 2.07% to 8.3%	0.01% 0.01%	≤12% of actual value ≤10% of actual value
SNR (signal/noise ratio)	18 dB to 30 dB 30 dB to 35 dB	0.1 dB 0.1 dB	≤0.5 dB ≤0.8 dB
I/Q amplitude imbalance	0.00% to 5.00%	0.01%	≤0.03 dB
I/Q quadrature error	0.00° to 5.00°	0.01°	≤0.03°
Carrier suppression	25 dB to 45 dB 45 dB to 60 dB	0.1 dB 0.1 dB	≤1 dB ≤3 dB
Carrier frequency offset	±100 kHz	1 Hz	≤280 Hz + 2 ppm x RF
Symbol rate offset	±150 ppm	0.1 ppm	<10 ppm, <3 ppm typ.
MPEG TS bit rate	up to 51.600 Mbit/s	1 kbit/s	<1 kbit/s
BER before Reed-Solomon	1.0×10^{-3} to 0.1×10^{-15}	$0.1 \times 10^{-\text{exponent}}$	–
BER after Reed-Solomon	1.0×10^{-5} to 0.1×10^{-14}	$0.1 \times 10^{-\text{exponent}}$	–

Specifications

Analog TV, model-specific characteristics

	Standard test receivers Models 12/78	**High-end test receivers** Models 33/89	**High-end demodulators** Models 33/89
RF input	selective	selective	non-selective
Connector	50 Ω or 75 Ω, BNC or N female, front or rear panel	50 Ω, N female, rear panel and 75 Ω, BNC female, rear panel	50 Ω, N female, rear panel
Return loss	≥14 dB in channel with 50 Ω connector and input attenuation ≥10 dB ≥12 dB in channel with 75 Ω connector and input attenuation ≥10 dB	≥17 dB (>20 dB typ.) in channel with 50 Ω connector ≥14 dB (>17 dB typ.) in channel with 75 Ω connector	≥30 dB
Frequency range (vision carrier)	48 MHz to 860 MHz	5 MHz [1] to 1000 MHz	45 MHz to 1000 MHz
Level range [2]	–67 dBm to +13 dBm (normal) –77 dBm to –47 dBm (with preamplifier)	–67 dBm to +21 dBm [3] (normal) –67 dBm to +21 dBm [3] (low distortion) –77 dBm to +21 dBm [3] (low noise)	–41 dBm to +21 dBm
Image frequency rejection	VHF: ≥70 dB[4] UHF: ≥50 dB[4]	100 dB [5]	
IF rejection		100 dB [5]	
Local oscillator			
Resolution	1 Hz	1 Hz	1 Hz
Frequency error	≤2 x 10^{-6}	≤2 x 10^{-6}	≤2 x 10^{-6}
Phase noise [6]	≥50 dB	≥58 dB	≥62 dB [7]

[1] For frequencies < 10 MHz: group delay tilt increases up to 200 ns, amplitude tilt increases up to 0.7 dB pp typ., minimum input level: –30 dBm, SAW filter ON; upper sideband.
[2] Levels are rms values referred to sync pulse.
[3] In receive frequency range 5MHz to 15 MHz: –41 dBm to 21 dBm.
[4] Image frequency of vision carrier.
[5] Applies to both frequency conversions.
[6] FM S/N ratio measured at IF output, referred to ±30 kHz frequency deviation and 500 Hz modulation frequency, deemphasis 50 µs, measured to DIN45405, weighted to CCIR468-3.
[7] In receive frequency range 45 MHz to 900 MHz.



Tolerance masks of EFA for total amplitude characteristic (RF, IF, VF)

Analog TV, model-specific characteristics (continued)

Video demodulation characteristics	Standard test receivers Models 12/78	High-end test receivers Models 33/89	High-end demodulators Models 33/89
Noise voltage, ref. to b/w transition	$P_{RF} \geq -33$ dBm, 0 dB input attenuation	$P_{RF} = -33$ dBm, 0 dB input attenuation	$P_{RF} \geq -1$ dBm
S/N_{rms} unweighted			≥60 dB typ. 63 dB
S/N_{rms} weighted to CCIR Rec. 567	≥60 dB typ. 64 dB (low noise)	≥64 dB typ. 66 dB (low noise) ≥63 dB typ. 65 dB (normal)	≥67 dB typ. 70 dB
	≥57 dB typ. 59 dB (low distortion)	≥62 dB typ. 64 dB (low distortion)	
$Signal/hum_{peak}$	≥52 dB	≥52 dB	≥52 dB
Linear distortion			
Amplitude frequency response	reference: 0.5 MHz	reference: 0.5 MHz	reference: 0.5 MHz
DC to colour subcarrier	≤0.5 dB	≤0.35 dB	≤0.25 dB
Additional ripple through SAW filter	≤0.1 dB	≤0.1 dB	≤0.1 dB
Group delay response	reference: 0.1 MHz	reference: 0.1 MHz	reference: 0.1 MHz
With constant group delay	≤20 ns	≤15 ns	≤12 ns
With group delay dep. on TV std.	see group-delay table	see group-delay table	see group-delay table
Additional ripple through SAW filter	≤10 ns	≤10 ns	≤10 ns

Frequency/MHz	B/G							D/K					I	K1
	General	Sweden	Norway	Denmark	Australia	General/2 (reduced to 50%)	New Zealand	CCIR Report 308	OIRT TK-III-830	OIRT GOST 20532-75	GOST 20532-83	CSFR	SABC TVT 12.2	
	Group delay/ns													
0.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.25	–5 ±Δ	0 ±Δ	0 ±Δ	–5 ±Δ		–2.5 ±Δ		–5 ±Δ		–5 ±Δ			0 ±Δ	0 ±Δ
0.50		0 ±Δ	0 ±Δ							–10 ±Δ	–8 ±Δ		0 ±Δ	0 ±Δ
1.00	–53 ±Δ	0 ±Δ	0 ±Δ	–53 ±Δ	–30 ±Δ	–26.5 ±Δ		–53 ±Δ	–40 ±Δ	–40 ±Δ	–40 ±Δ	–40 ±Δ	0 ±Δ	0 ±Δ
1.50		0 ±Δ	0 ±Δ							–70 ±Δ			0 ±Δ	0 ±Δ
2.00	–90 ±Δ	0 ±Δ	0 ±Δ	–75 ±Δ	–60 ±Δ	–45 ±Δ		–87 ±Δ	–75 ±Δ	–80 ±Δ	–85 ±Δ	–85 ±Δ	0 ±Δ	0 ±Δ
2.25		0 ±Δ	0 ±Δ				–60 ±Δ						0 ±Δ	0 ±Δ
3.00	–75 ±Δ	0 ±Δ	0 ±Δ	–75 ±Δ	–40 ±Δ	–37.5 ±Δ	–60 ±Δ	–85 ±Δ	–90 ±Δ	–80 ±Δ	–92 ±Δ	–90 ±Δ	0 ±Δ	0 ±Δ
3.50		0 ±Δ			0 ±Δ								0 ±Δ	0 ±Δ
3.58		0 ±Δ											0 ±Δ	0 ±Δ
3.60		0 ±Δ	20 ±Δ										0 ±Δ	0 ±Δ
3.75	0 ±Δ					0 ±Δ	0 ±Δ						0 ±Δ	0 ±Δ
3.80				0 ±Δ									0 ±Δ	0 ±Δ
4.00			50 ±20					–50 ±20	–70 ±20	–40 ±20	–60 ±20	–60 ±20	0 ±Δ	0 ±Δ
4.43	170 ±20	175 ±20	170 ±20	170 ±20	170 ±20	85 ±20	170 ±20	0 ±20		0 ±20	–25 ±20	–25 ±20	40 ±20	15 ±20
4.70											0 ±20	0 ±20		
4.80	400 ±40	400 ±40	350 ±40	400 ±40	260 ±40	200 ±40	400 ±40						100 ±40	
5.00								90 ±20	0 ±20	80 ±20		70 ±20		90 ±20
5.50									90 ±20		260 ±40			

High-end demodulator: Δ = 12 ns
High-end test receiver: Δ = 15 ns
Standard test receiver: Δ = 20 ns

Group delay depending on TV standard

Certified Environmental System ISO 14001 REG. NO 1954

Certified Quality System ISO 9001 DQS REG. NO 1954

Specifications

Analog TV, model-specific characteristics (continued)

Video demodulation characteristics (continued)	**Standard test receivers** Models 12/78	**High-end test receivers** Models 33/89	**High-end demodulators** Models 33/89
Transient response			
2T pulse k factor	≤1%	≤1% typ. 0.6%	≤1% typ. 0.6%
2T pulse amplitude error			≤2% typ. 1%
20T pulse amplitude error			≤3% (TV standards B/G, D/K, I)
12.5T pulse amplitude error			≤5% (TV standard M/N)
Chrominance/luminance gain			≤3%
Chrominance/luminance delay	≤20 ns (with constant group delay)	≤15 ns (with constant group delay)	≤12 ns (with constant group delay)
	≤20 ns (with group delay dep. on TV std.)	≤20 ns (with group delay dep. on TV std.)	≤20 ns (with group delay dep. on TV std.)
Tilt, 10/75% modulation	≤1% (15 kHz squarew. signal, T_{rise} 200 ns)	≤1% (15 kHz squarew. signal, T_{rise} 200 ns)	≤1% (0.25 Hz squarew. signal, T_{rise} 2 µs) ≤1% (50 Hz squarew. signal, T_{rise} 2 µs) ≤1% (15 kHz squarew. signal, T_{rise} 200 ns)
Nonlinear distortion			
Luminance nonlinearity	≤2% typ. 0.3%	≤2% typ. 0.3%	≤2% typ. 0.4%
Differential gain	≤2% typ. 0.3%	≤2% typ. 0.3%	≤2% typ. 0.4%
Differential phase	≤1° typ. 0.4°	≤1° typ. 0.4°	≤1° typ. 0.5°
Intermodulation in channel, referred to b/w transition	≥52 dB typ. 56 dB (low noise) ≥62 dB typ. 66 dB (low distortion)	≥57 dB typ. 61 dB (normal) ≥52 dB typ. 56 dB (low noise) ≥62 dB typ. 66 dB (low distortion)	≥55 dB
3rd-order intercept point; 0 dB attenuation	≥0 dBm (low noise) ≥5 dBm (low distortion)	≥10 dBm (normal) ≥14 dBm (low distortion)	

Characteristics common to all analog models

IF input		50 Ω, BNC female, rear panel
Vision carrier frequency		
TV standards B/G, I, D/K		38.9 MHz
Return loss in channel		≥30 dB
Level range[1]		–13 dBm to 4 dBm
Crosstalk attenuation, RF/IF input		≥75 dB
IF output		50 Ω, BNC female, rear panel
Return loss in channel		≥20 dB
Vision carrier level [1], regulated		–7 dBm
Input for external zero reference		75 Ω, BNC female, rear panel
Control voltage		>1 V
Delay of carrier blanking relative to control pulse		<3 µs
Video selectivity		
In-channel sound carrier suppression		
TV standard	B/G, I,	≥50 dB
	D/K	≥48 dB
Adjacent-channel vision carrier suppression		
TV standard	B/G, I (CATV)	≥50 dB
	I (terrestrial)	≥48 dB
	D/K	≥46 dB

[1] Levels are rms values referred to sync pulse

Characteristics common to all analog models (continued)

Video outputs	75 Ω, BNC female, front panel and 75 Ω, BNC female, real panel
Return loss (0 to 6 MHz)	≥26 dB
Decoupling of outputs Level variation at terminated output with other output short-circuited or open	≤1%
Video level, adjustable	1 V pp ±3 dB
Level inaccuracy	≤2%
Resolution of level control	10 mV
DC offset with carrier clamped to zero level	0 V ±20 mV
Quadrature signal output of sync demodulator	75 Ω, BNC female, on rear panel
Return loss (0 to 6 MHz)	≥20 dB
Gain difference, referred to nominal video output level	≤0.5 dB
Synchronous demodulation	
Phase error of switching carrier	≤1°
Vision carrier phase control	continuous, sampled (switchable)
Time constant of PLL for keyed phase control	normal, slow (switchable)
Time constant of PLL for continuous phase control	fast, normal, slow (switchable)
Sound demodulation	intercarrier method
Audio outputs	Lemo Triax female, in pairs rear panel: balanced, Z <35 Ω front panel: unbalanced, Z <10 Ω
Output signal	M1/L and M2/R
Permissible load	≥300 Ω // ≤5000 pF
Audio level, adjustable	
Reference frequency deviation	±30 kHz or ±50 kHz, selectable
Setting range for ±30 kHz reference frequency deviation	–3 dBm to +10 dBm
Setting range for ±50 kHz reference frequency deviation	+2 dBm to +10 dBm
Resolution of level control	0.1 dB
Level accuracy, f_{mod} 500 Hz	≤0.2 dB
Amplitude frequency response, 40 Hz to 15 kHz, referred to 500 Hz	≤ ±0.3 dB
Deemphasis	50 µs, can be switched off
Distortion at ±50 kHz frequency deviation, deemphasis on	≤0.5%
S/N ratio (intercarrier method)	
referred to ±30 kHz frequency deviation and 500 Hz modulation frequency, measured to DIN45405, weighted to CCIR468-3; the channel not being measured is without signal	
Vision modulation: all-black picture	≥55 dB
Vision modulation: test pattern	≥48 dB
Vision modulation: sinewave, 10% to 75% modulation	≥46 dB
Vision modulation: sinewave, 242 kHz ±15 kHz, 10% to 75% modulation	≥42 dB
Stereo crosstalk, 40 Hz to 15 kHz referred to ±30 kHz frequency deviation and 500 Hz modulation frequency, deemphasis on	≥40 dB
Channel crosstalk, 40 Hz to 15 kHz referred to ±30 kHz frequency deviation, deemphasis on, measured with ±30 kHz spurious FM	≥74 dB
Alarm message Vision carrier level, RF offset, TV synchronization, vision/FM sound carrier level ratios, vision/FM sound carrier frequency spacings, FM pilot deviation, max. FM deviations, min. FM deviations	

Test parameters, analog TV

	Measurement range	Resolution	Error
Vision carrier power or voltage in µV/mV, dBµV, dBmV, dBm, dBµW, dBpW			
Standard test receivers	–77 dBm to 13 dBm	0.1 dB	≤3 dB
High-end test receivers	–77 dBm to 21 dBm	0.1 dB	≤3 dB
High-end demodulators	–41 dBm to 21 dBm	0.1 dB	≤2 dB
Video level	50% to 150%	1%	≤2%

Test parameters, analog TV (continued)

	Measurement range	Resolution	Error
Vision carrier frequency	frequency range depending on EFA model	20 Hz	≤2 x1 0^{-6}
Vision/FM sound carrier 1 level ratio	–23 dB to –7 dB	0.1 dB	≤2 dB
Vision/FM sound carrier 2 level ratio	–30 dB to –14 dB	0.1 dB	≤2 dB
Vision/FM sound carrier 1 frequency spacing	nominal IC frequency ±50 kHz	100 Hz	≤200 Hz [1]
Vision/FM sound carrier 2 frequency spacing	nominal IC frequency ±50 kHz	100 Hz	≤200 Hz s [1]
FM sound carrier deviation	0 kHz to 80 kHz	100 Hz	≤3% ±200 Hz [2]
FM pilot carrier deviation (average)	1 kHz to 5 kHz	10 Hz	≤5%
FM pilot carrier deviation (peak value)	1 kHz to 10 kHz	10 Hz	≤5%
Pilot frequency	pilot frequency ±300 Hz	2 Hz	≤2 Hz
Residual AM	0% to 30%	0.1%	0.5%

[1] With unmodulated sound carrier
[2] Without vision modulation

Options

NICAM Demodulator EFA-B2

Standard		NICAM-728
NICAM IF carrier frequency	Standard B/G	33.05 MHz
	Standard I	32.348 MHz
Vision/NICAM carrier level ratio		15 dB to 31 dB
FM sound carrier suppression		≥40 dB
Frequency response deviation from standard curve up to 182 kHz		≤1 dB
Group delay up to 120 kHz		≤150 ns
Group delay up to 182 kHz		≤200 ns
NICAM intercarrier input		50 Ω, BNC female, rear panel
NICAM carrier frequency	Standard B/G	5.85 MHz
	Standard I	6.552 MHz
Return loss		≥20 dB
Level range		–22 dBm to –5 dBm
NICAM-728 data input		75 Ω, TTL, BNC female, rear panel
NICAM-728 clock input		75 Ω, TTL, BNC female, rear panel
QPSK I output		BNC female, rear panel
Output impedance		100 Ω
Permissible load		≥1 kΩ //≤1 nF
Level		0.8 V pp
QPSK Q output		BNC female, rear panel
Output impedance		100 Ω
Permissible load		≥1 kΩ // ≤1 nF
Level		0.8 V pp
Clock/2 output		75 Ω, TTL, BNC female, rear panel
NICAM-728 data output		75 Ω, TTL, BNC female, rear panel
NICAM-728 clock output		75 Ω, TTL, BNC female, rear panel
Audio output, balanced		Lemo Triax female, pair of connectors, rear panel
Output impedance		<35 Ω
Permissible load		≥300 Ω // ≤5 nF
Level at 600 Ω, f_{mod} = 400 Hz		0 dBm ±0.2 dB

Audio output, unbalanced		Lemo Triax female, pair of connectors, front panel
Output impedance		<35 Ω
Permissible load		≥300 Ω // ≤5 nF
Level at 600 Ω, f_{mod} = 400 Hz		0 dBm
NICAM additional information		25-contact SUB-D, TTL, rear panel
Permissible load		≥1 kΩ // ≤100 pF
– Control bits		C0 to C4
– Additional data		A0 to A10
– Frame sync		
– Additional data sync		
– Bit errors		parity bit evaluation
Audio demodulation characteristics		
Frequency response:	30 Hz to 14.7 kHz	≤0.2 dB
	14.7 kHz to 15 kHz	≤0.3 dB
Phase difference between channels (stereo)		≤3°
Distortion		≤0.15%
Crosstalk		≤–80 dB
S/N ratio (empty channel, referred to full-scale level)		
unweighted		≥80 dB
weighted (CCIR 468-3)		≥80 dB
Aliasing products:	30 Hz to 14.7 kHz	≤–55 dB
	14.7 kHz to 15 kHz	≤–35 dB
Other spurious lines (referred to full-scale level)		≤–50 dB
Additional alarm messages		
Vision/NICAM sound carrier power ratio, NICAM intercarrier level, eye height, BER, data jitter; loss of: NICAM data/NICAM clock, frame sync, headroom		

Additional test parameters

	Measurement range	**Resolution**	**Error**
Vision/NICAM carrier level ratio	13 dB to 34 dB	0.1 dB	≤1.5 dB
Level (intercarrier input)	–24 dBm to –3 dBm	0.1 dB	≤1.5 dB
Eye height	10% to 100%	1%	≤2 x (100 / displayed value)% [1]
	Measurement range	**Resolution**	**Error**
BER	0×10^{-9} to $< 1 \times 10^{-5}$	$0.2 \times 10^{-\text{exponent}}$	–
	1×10^{-5} to 1×10^{-2}	$0.1 \times 10^{-\text{exponent}}$	–
Clock or data jitter	0 Hz to 50 Hz	1 Hz	≤20% ±2 Hz [2]

[1] Reference: 100%; vision modulation: all-black picture

[2] Valid for jitter frequency 50 Hz to 60 Hz; 3 dB bandwidth: 10 Hz to 120 Hz

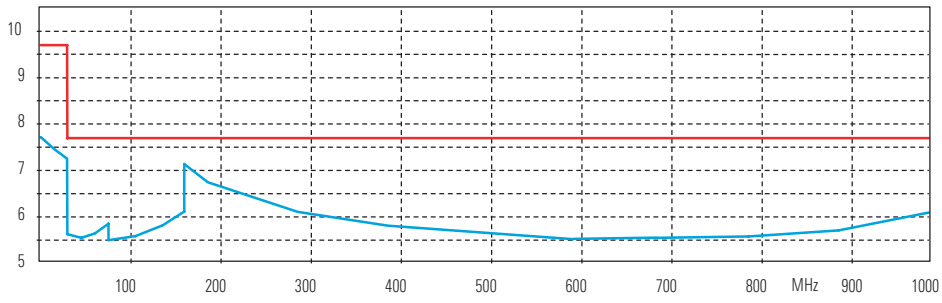
RF Selection EFA-B3

RF selection for High-End Demodulator Models EFA 63/33/89. Two selective RF inputs are available on the rear with 50 Ω and 75 Ω impedance in addition to the non-selective RF input of the high-end demodulator. Demodulation of variable IFs up to 50 MHz via the selective RF inputs.

IF inputs	selective
Connectors	50 Ω, N female, rear panel and 75 Ω, BNC female, rear panel
Return loss	17 dB (>20 dB typ.) in channel with 50 Ω connector 14 dB (>17 dB typ.) in channel with 75 Ω connector
Frequency range	4.5 MHz [1] to 1000 MHz
Level range	see high-end test receiver column of relevant demodulator mode
System performance	
Noise figure	7 dB typ. (low noise) 9 dB typ. (normal) 11 dB typ. (low distortion)
Image frequency rejection	100 dB
IF rejection	100 dB

[1] For frequencies < 10 MHz: group delay tilt increases up to 200 ns, amplitude tilt increases up to 0.7 dB pp typ., minimum input level: –30 dBm, SAW filter ON.

RF Selection EFA-B3 (continued)



Noise figure (low noise mode)

MPEG2 Decoder EFA-B4

Simultaneous monitoring of all signals in transport stream. Realtime measurement functions according to test specifications for DVB systems (ETR290): priorities 1, 2 and 3.

System performance	
Transport stream	according to ISO/IEC 1-13818
Data rate of transport stream	up to 54 Mbit/s
Length of data packets	188/204 bytes, automatic switchover
External TS ASI input	BNC female, rear panel, 75 Ω
Asynchronous serial MPEG2 transport stream	270 Mbit/s
Level	200 mV pp to 1 V pp
Video signal output (CCVS)	BNC female, rear panel, 75 Ω
Level	1 V pp ±1%
DC offset (black level)	0 V
Video serial digital output (ITU-R601)	BNC female, rear panel, 75 Ω
Audio signal output	Lemo Triax connectors, in pairs; front panel: unbalanced, Z <10 Ω rear panel: balanced, floating, Z <25 Ω
Signals	left/right, sound 1/sound 2, mono
Level of balanced output at rear panel (full scale)	+6 dBm ±0.2 dB into 600 Ω
Frequency response (40 Hz to 15 kHz)	≤0.5 dB, referred to 1 kHz
S/N ratio	>70 dB, unweighted
THD	>70 dB

Video Distributor EFA-B6

The video distributor option provides four decoupled video outputs (CCVS) for analog and digital TV. Option EFA-B4 is required for digital TV.

Video output	2 x BNC female front panel; 2 x BNC female rear panel
Impedance	75 Ω
Return loss (0 MHz to 6 MHz)	≥26 dB
Level accuracy	≤2%
DC offset of video signal (MPEG2 decoder mode, black level)	0 V
DC offset of video signal (analog TV mode, zero vision carrier)	0 V
Decoupling of outputs (level variation at terminated output when switching the other outputs between short circuit and open circuit)	≤1%
Quadrature signal outputs (quadrature signal of sync demodulator in Nyquist demodulator mode)	BNC female, front and rear panel
Impedance	75 Ω
Return loss (0 MHz to 6 MHz)	≥20 dB
Decoupling of outputs (level variation at terminated output when switching the other outputs between short circuit and open circuit)	≤1%

Switchable Video Bandwidth EFA-B7 (for video bandwidth switchover to 6 MHz for TV standard B/G)

	Standard test receivers	High-end test receivers	High-end demodulators
Amplitude frequency response	reference: 0.5 MHz	reference: 0.5 MHz	reference: 0.5 MHz
0 Hz to 5 MHz	≤0.5 dB	≤0.35 dB	≤0.25 dB
5 MHz to 5.5 MHz	≤0.7 dB	≤ 0.5 dB	≤ 0.45 dB
Additional ripple through SAW filter	≤0.1 dB	≤0.1 dB	≤0.1 dB
Group delay response	reference: 0.1 MHz	reference: 0.1 MHz	reference: 0.1 MHz
With constant group delay			
0 Hz to 5.5 MHz	≤20 ns	≤15 ns	≤12 ns
With group delay depending on TV standard	see table on page 17	see table on page 17	see table on page 17
Additional ripple through SAW filter	≤15 ns	≤15 ns	≤15 ns

6 MHz SAW Filter EFA-B11

This filter is recommended for rejection of adjacent channels in systems with 6 MHz channel spacing.

Ripple in band	0.4 dB pp
Rejection of adjacent channels	50 dB (>±3.8 MHz) 85 dB (>±6 MHz) with High Adj. Chan Power ON

7 MHz SAW Filter EFA-B12

This filter is recommended for rejection of adjacent channels in systems with 7 MHz channel spacing.

Ripple in band	0.7 dB pp
Rejection of adjacent channels	>55 dB (>±4.0 MHz) >90 dB (>±5.3 MHz) with High Adj. Chan Power ON

8 MHz SAW Filter EFA-B13

This filter is recommended for shoulder attenuation measurement according to FCC recommendation and for rejection of adjacent channels in systems with 8 MHz channel spacing.

Ripple in band	0.8 dB pp
Rejection of adjacent channels	50 dB (>±4.8 MHz) 90 dB (>±5.3 MHz) with High Adj. Chan Power ON

2 MHz SAW Filter EFA-B14

This filter is recommended for rejection of adjacent channels in systems with 2 MHz channel spacing.

Ripple in band	0.7 dB pp
Rejection of adjacent channels	45 dB (>±1.3 MHz)

Digital Demodulator Platform EFA-B20

Supports ATSC/8VSB demodulation (for specifications see ATSC/8VSB characteristics of EFA models 50/53), ITU-T J.83/B demodulation (for specifications see ITU-T J.83/B characteristics of EFA models 70/73) and DVB-C (ITU-T J.83/A/C) demodulation.

General data

Display	monochrome LCD (320 x 240), backlit
Interfaces	IEC625-2/IEEE488 bus, RS-232-C, printer (Centronics)
Temperature range	to IEC68-2-1/-2
Rated temperature range	+5 °C to +45 °C
Operating temperature range	0 °C to +50 °C
Power supply	100 V to 120 V/220 V to 240 V; +10%/–15% (autoranging), 50 Hz to 60 Hz
Power consumption	EFA 12/60/78: 70 VA EFA 33/63/89: 75 VA EFA 33/63/89 + EFA-B3: 90 VA
Dimensions (W x H x D)	435 mm x 147 mm x 460 mm
Weight	approx. 12 kg, depending on options

Ordering information

DVB-C Test Receiver, selective 4/16/32/64/128/256 QAM, MPEG data stream output, constellation diagram	EFA 60	2067.3004.60
DVB-C Test Demodulator, broadband 4/16/32/64/128/256 QAM, MPEG data stream output, constellation diagram	EFA 63	2067.3004.63

TV Test Receiver, Std. B/G, dual sound IF 38,9 MHz, RF 45 MHz to 860 MHz, IEEE bus	EFA 12	2067.3004.12
TV Demodulator, Std. B/G, dual sound IF 38.9 MHz, RF 45 MHz to 1000 MHz, IEEE bus	EFA 33	2067.3004.33
TV Test Receiver, Std. D/K or I (mono) IF 38.9 MHz, RF 45 MHz to 860 MHz,, IEEE bus	EFA 78	2067.3004.78
TV Demodulator, Std. D/K or I (mono) IF 38.9 MHz, RF 45 MHz to 1000 MHz	EFA 89	2067.3004.89

Options

NICAM Demodulator for TV standard B/G - D/K	EFA-B2	2067.3610.02
NICAM Demodulator for TV standard I	EFA-B2	2067.3610.04
RF Selection for demodulators (models 33/43/53/63/73/89/93)	EFA-B3	2067.3627.02
MPEG2 Decoder	EFA-B4	2067.3633.02
Video Distributor (four video outputs, only models 33/89/93)	EFA-B6	2067.3656.02
Switchable Sound Trap (for models 12/33)	EFA-B7	2067.3710.02
6 MHz SAW Filter (for digital EFA models or EFA-B10, EFA-B20)	EFA-B11	2067.3691.00
7 MHz SAW Filter (for digital EFA models or EFA-B10, EFA-B20)	EFA-B12	2067.3556.02
8 MHz SAW Filter (for EFA 5x,/6x/7x or EFA-B20)	EFA-B13	2067.3579.03
2 MHz SAW Filter (for EFA 5x,/6x/7x or EFA-B20)	EFA-B14	2067.3562.00
Digital Demodulator Platform	EFA-B20	2067.3585.02

Firmware options

DVB-C /J83/A/C (QAM) Firmware (for models 50/53/70/73 or option EFA-B20)	EFA-K21	2067.4000.02
ATSC/8VSB Firmware (for models 60/63/70/73 or option EFA-B20)	EFA-K22	2067.4017.02
J.83/B (QAM) Firmware (for models 50/53/60/63 or option EFA-B20)	EFA-K23	2067.4023.02
FIR Coefficient Readout Firmware (only for EFA 5x or EFA-B20 + EFA-K22)	EFA-K25	2067.4046.02

Recommended extras

EFA Calibration Values	EFA-DCV	2082.0490.09
EFA-B4 Calibration Values	EFA-DCV	2082.0490.15
19" Adapter	ZZA-93	0396.4892.00
Lemo Triax connector (mono) with connecting cable (open)		2067.7451.00
Service manual		2068.0950.24
Carrying Bag for 19" units, 3 HU, depth 460 mm	ZZT-314	1001.0523.00

Printed in Germany 0102 (U bb/kr)

ROHDE&SCHWARZ

ROHDE&SCHWARZ GmbH & Co. KG · Mühldorfstraße 15 · 81671 München · Germany · P.O.B. 80 14 69 · 81614 München · Germany · Telephone +49 89 41 29-0
www.rohde-schwarz.com · Customer Support: Tel. +49 1805 12 42 42, Fax +49 89 41 29-13777, E-mail: CustomerSupport@rohde-schwarz.com