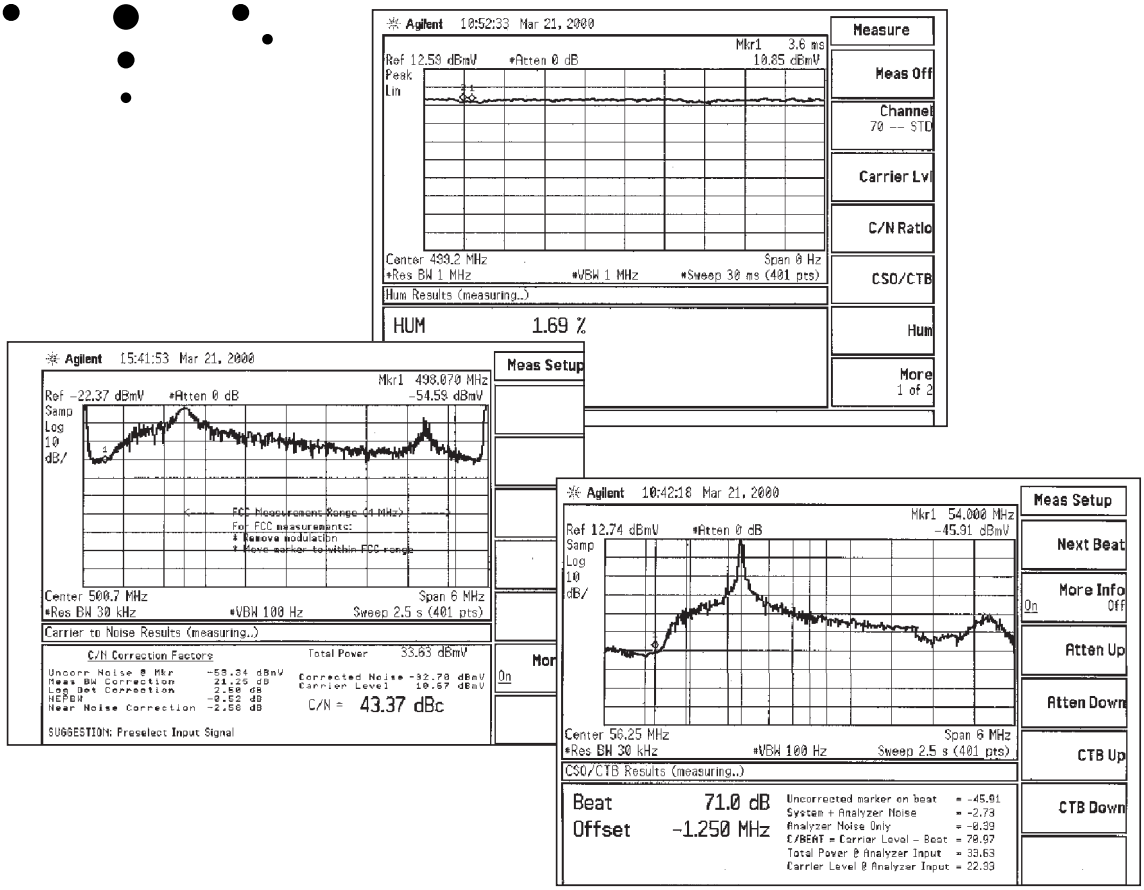
Agilent Cable TV Personality for the ESA-E Series Spectrum Analyzers Option 227

Technical Overview



Rugged, Affordable and Portable
Full Featured Spectrum Analyzer

Familiar, easy to use, one button measurements of:

- **Video carrier level**
- **Carrier-to-noise**
- **Composite second order and composite triple beat**
- **Hum**

Agilent Technologies

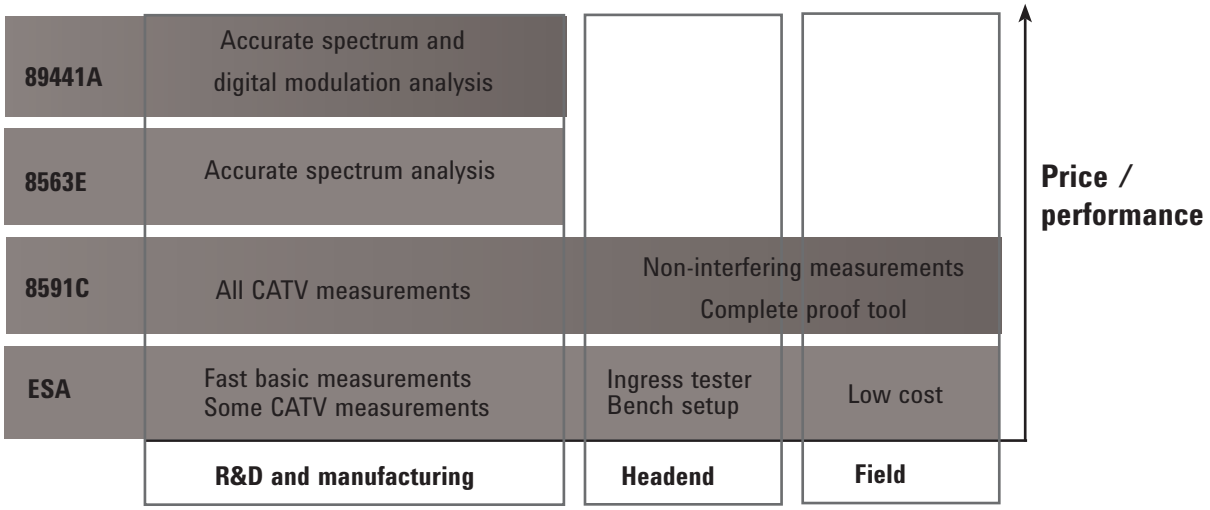
Users familiar with the industry standard 8591C will recognize the measurement screens and menus. They will especially be pleased with the 10 dB increase in dynamic range. In many cases this allows C/N and CSO/CTB measurements to be made without the complexity of a bandpass filter.

The analyzer is ready to make calibrated measurements five minutes after turn on. Since the analyzer has a continuous background calibration, there's no need to recalibrate due to temperature swings.

E4402B

8591C

Only Agilent offers a full range of spectrum analyzers to meet your measurement needs.



Comparison of features of the ESA-E series with Option 227 and 8591C

Features	ESA-E series Option 227	8591C	ESA-E Option 227 benefit
Purpose	Field tool	Headend proof tool	Lower cost
Gated and color measurements	Not available	Yes	Optimized for field use
Ingress monitoring	5 ms swp time, 23 meas/sec	20 ms swp time, 9 meas/sec	Higher probability of intercept
Warm-up time	5 minutes	30 min at temperature	Fast warm-up
User calibration	Continuous background autoalign	Every 5 °C change in temperature	Always calibrated
Internal preamp	calibrated	Not calibrated in normal mode	Option IDS
Attenuator step size	5 dB	10 dB	Easier to optimize mixer level
C/N atten sw point	47 dBmV	37 dBmV	More dynamic range, w/o bandpass filter
CSO/CTB atten sw point	37 dBmV for 80 dB dynamic range	27 dBmV for 70 dB dynamic range	More dynamic range, w/o bandpass filter
Channel plans	Can customize	Fixed per version	User configurable
Help text	Extensive help text	Only 'see more info'	Manual not required
RAM storage	PC compatible floppy disk	RAM card	Easier to get displays into the PC
Video format	NTSC and PAL	NTSC, PAL, and Secam versions	Field selectable
Channel tuning plans	Standard + user prog channel plans	Fixed per version	Makes any channel plan possible
Display	Color LCD, VGA output	Monochrome CRT, composite output	PC compatible

Comparison of measurements of the 8591C versus the ESA-E series

Measurements	8591C	E44xxB ESA-E series
Carrier level and freq	Standard	Opt 1D5 precision frequency reference for FCC accuracy
Digital channel power	Standard	Standard
Carrier to noise	Internal preamp std, add opt 107 for gated C/N	Opt 1DS Internal Preamp
CSO/CTB	Standard, add Opt 107 for gated CSO	Standard
Hum	Standard	Standard
DOM	Full field and TV line	Full field and TV line with Opts AYX and B7B
TV picture on screen	Opt 107 or 180	Opt B7B
FM demod	Standard	Opt BAA and AYX or STD
Crossmod	Standard	Not available
In chnl freq response	Std, add Opt 107 for gated measurement	Not available
Diff gain/diff phase	Opt 107	Not available
Chroma-luma delay	Opt 107	Not available

Cable TV measurement specifications and characteristics

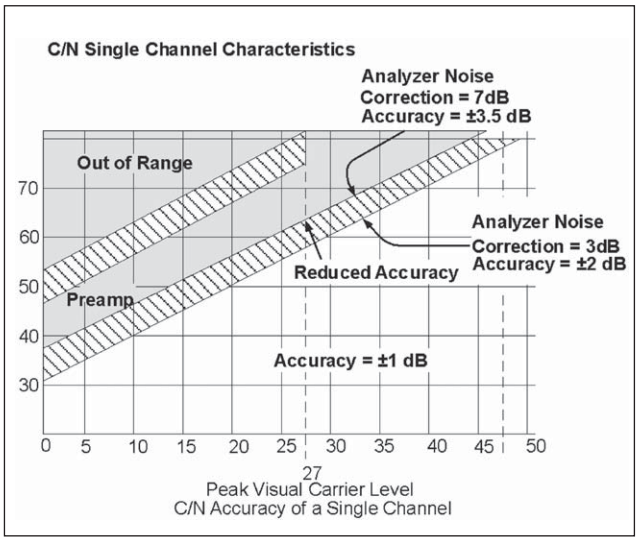
Channel selection	Analyzer tunes to specified channels based upon selected tune configuration. User-specific channel plans can also be added.
Tune configuration	Standard, off-the-air, HRC, IRC, T (NTSC-M) CBL, off-the-air (NTSC-J) Standard, off-the-air, HRC, IRC, T (PAL-M) HRC, VHF, UHF, S, S-CABLE, CENELEC (PAL-B/G) DS, Z (PAL-D/K) HRC, VHF, UHF (PAL-I)
Frequency reference (standard)	
Resolution	100 Hz
Accuracy	± (7 x 10 -6 x carrier frequency + 100 Hz) High stability frequency reference Option 1DS improves frequency reference.
Visual-carrier level	The peak amplitude of the visual carrier is measured to an absolute standard traceable to the National Institute of Standards and Technology.
Absolute accuracy	± 1.0 dB for S/N > 30 dB
Relative accuracy	± 0.5 dB relative to adjacent channels in frequency ± 0.7 dB relative to all other channels
Visual-to-aural carrier level difference	The difference between peak amplitudes of the visual and aural carrier is measured.
Accuracy	± 0.5 dB for S/N > 30 dB
Depth of modulation (characteristic)	Percent AM is measured from horizontal sync tip to maximum video level; measurement requires a white-reference VITS and may not be valid for scrambled channels.
Accuracy	± 2.0 percent for C/N > 40 dB
Hum/low-frequency disturbance	Power-line frequency and low-frequency disturbance measured on modulated or unmodulated carriers. May not be valid for scrambled channels.
Accuracy	± 0.4 percent for hum ≤ 3 percent
Visual carrier-to-noise ratio (C/N)[1]	The C/N is calculated from the visual-carrier peak level and the minim noise level, normalized to 4 MHz[2] noise bandwidth.
Optimum input range	See graphs[3]
Maximum C/N range	Input level dependent - see graphs[3]
C/N accuracy	Input level and measured C/N dependent ± 1.0 to ± 3.5 dB over optimum input range.
CSO and CTB distortion[1]	Manual composite second order (CSO) and composite triple beat (CTB) distortions are measured relative to the visual carrier peak and require momentary disabling of the carrier. Automatic measurements are made in the channel above the channel selected and assumes that it is unused.
Optimum input range	See graphs[3]
Maximum CSO/CTB range	Input level dependent - see graphs 70 to 75 dB over optimum input range
CSO/CTB accuracy	Input level and measured CSO/CTB dependent - see graphs ± 1.5 dB to ± 4.0 dB over optimum input range

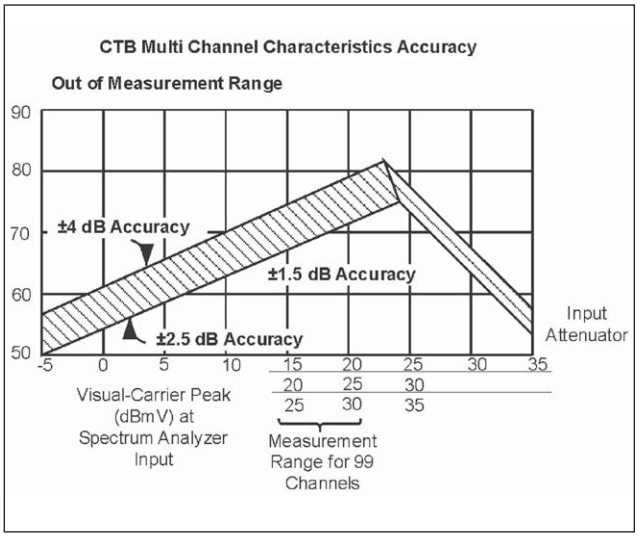
Note: These measurement specifications and characteristics are based on the following Agilent Technologies ESA spectrum analyzers: E4402B, E4404B, E4405B and E4407B.

1. A preamplifier and preselector filter may be required to achieve specifications.
2. For PAL-B/G, PAL-D/K and PAL-I, the C/N is normalized to 5 MHz noise bandwidth.
3. Optimum input range is determined at the time of measurement since a total input power measurement is first done to automatically set the attenuator.

C/N, CSO, and CTB measurement characteristics

The following graphs summarize the ESA Option 227 characteristics for C/N, CSO, and CTB testing on cable TV systems with up to 99 channels and no amplitude tilt. C/N, CSO, and CTB measurement accuracies and ranges can be read from the relevant graphs. They depend upon the visual carrier peak level, the measurement reading, and the total power input to the analyzer.





Accuracy and characteristics

Additional ESA options that are useful for cable TV measurement personality users

Other useful options for CATV	Function
1DP – 75 Ohm input Z	For 1.5 GHz 75 Ohm analyzer
1D7 – 75/50 external matching pad	Adapt 50 Ohm analyzers
E1779A – Ni-Cad snap on battery	True portability
E1779B Ni-MH snap on battery for European Union	True portability
A5D – 12 Vdc power cord	Car battery plug-in
AYU – Yellow soft carry case	Shoulder carry
AYT – Gray soft carry case	Shoulder carry
UK9 – Front panel cover	Hard cover protection
AXT– Hard transit case	Protection during shipping
1D5 – High stability freq ref	Measure frequencies FCC accurate
1DR – Narrow resolution bws	Measure 60 Hz sidebands
1DS – 1.5/3 GHz internal preamp	Extends sensitivity and C/N measure range
BAA – FM demod	Measure FM deviation
AYX – Fast 0-span sweeps; IF and video output	Measure bursted TDMA carriers
B7B – TV trigger and picture	Depth of Modification on a TV line and on screen picture
042/044 – Backpack	Portable transportation
A4H – GPIB and parallel ports	Connect to external printer or computer

Option ordering information

To add options to a product, use the following ordering scheme:

Model: E44xxB (xx = 02, 04, 05 or 07)

Model options: E44xxB-Option 1
E44xxB-Option 2

Agilent product literature

Cable TV Service and Installation Analyzer,
Product Overview, 5980-0845E

ESA Series Spectrum Analyzer,
Brochure, literature number 5968-3278E

ESA Series Spectrum Analyzers,
Technical Specifications, literature number 5968-3386E

Select the Right Agilent Portable Spectrum Analyzer for Your Needs,
Selection Guide, literature number 5968-3413E

ESA/EMC Spectrum Analyzer,
Configuration Guide, literature number 5968-3412E

E1779A/B Rechargeable Battery Pack,
Product Overview, literature number 5966-1851E

E4444A BenchLink Spectrum Analyzer,
Product Overview, literature number 5966-0676E

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	*0.125 €/minute
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