

Specifications

Frequency

Frequency range	
U3741:	9 kHz to 3 GHz, 9 kHz to 2.2 GHz (with the OPT.15 installed)
Pre-Amp:	10 MHz to 3 GHz, 10 MHz to 2.2 GHz (with the OPT.15 installed)
Synchronizable frequency range:	9 kHz to 3 GHz
U3751:	9 kHz to 8 GHz
Frequency band:	9 kHz to 3.1 GHz (band 0), 3 GHz to 8 GHz (band 1)
Pre-Amp:	10 MHz to 8 GHz

Frequency reading accuracy:	\pm (marker read value x frequency reference accuracy + span x span accuracy + residual FM)
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Frequency reference stability	
Aging rate:	$\pm 2 \times 10^{-6}$ /year
Temperature stability:	$\pm 2.5 \times 10^{-6}$ (0 to 50°C)

Frequency counter:	Resolution bandwidth ≤ 100 kHz, span ≤ 100 MHz, signal level: S/N >50 dB
Resolution:	1 Hz to 1 kHz
Accuracy:	\pm (counter read value x frequency reference accuracy + residual FM + 1 LSB)

Frequency stability	
Residual FM (zero/span):	< 60 Hzp-p/100 ms (internal frequency reference)

Frequency span	
Range:	5 kHz to Full, zero span 1 kHz to Full, zero span (with the OPT.70 installed)
Accuracy:	< $\pm 1\%$

Spectrum purity:	-85 dBc/Hz (offset 10 kHz, span < 200 kHz)
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Resolution bandwidth	
Range:	
U3741:	100 Hz to 1 MHz (1 to 3 steps) 30 Hz to 1 MHz (with the OPT.70/71 installed)
U3751:	100 Hz to 3 MHz (1 to 3 steps) 30 Hz to 3 MHz (with the OPT.70/71 installed)
Accuracy:	< $\pm 12\%$

Video bandwidth range:	10 Hz to 3 MHz (1 to 3 steps)
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Sweep

Sweep time	
Setting range:	20 ms to 1000 s (spectrum mode) 50 μ s to 1000 s (zero span)
Accuracy:	< $\pm 2\%$ (zero span)

Sweep mode:	Continuous, single, gated
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Trigger function	
Trigger source:	Free run, video, external, IF

Amplitude range

Measurement range:	Displayed average noise level to +30 dBm Displayed average noise level to 134 dB μ V (with the OPT.15 installed)
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Maximum safe input level:	Attenuator ≥ 10 dB
Pre-Amp OFF:	+30 dBm, 134 dB μ V (with the OPT.15 installed)
Pre-Amp ON:	+13 dBm, 120 dB μ V (with the OPT.15 installed)
U3741:	± 50 VDC max.
U3751:	± 15 VDC max.

Input attenuator range:	0 to 50 dB (10 dB steps)
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Display range:	100/50/20/10/5 dB, linear
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Scale unit:	dBm, dBmV, dB μ V, dB μ Vemf, dBpW, W, V
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Reference level setting range:	-140 to +40 dBm -31.2 to 148.8 dB μ V (with the OPT.15 installed)
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Detection mode:	Normal, Positive peak, Negative peak, Sample, RMS, and Average
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Amplitude accuracy

Calibration signal	
Frequency:	20 MHz
Level:	-20 dBm (75 Ω , with the OPT.15 installed)
Accuracy:	± 0.3 dB, ± 0.4 dB (with the OPT.15 installed)

Scale display accuracy	
Log:	± 0.5 dB/10 dB, ± 0.5 dB/80 dB, ± 0.2 dB/1 dB

Overall amplitude accuracy:	After calibration, with the pre-amp OFF, and at a temperature ranging from 20 to 30°C Input attenuator 10 dB Reference level 0 dBm, input signal level -10 to -50 dBm
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U3741:	± 1.0 dB (9 kHz to 3 GHz) ± 0.8 dB (10 MHz to 3 GHz)
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With the OPT.15 installed:	Reference level 108.8 dB μ V Input signal level 98.8 to 58.8 dB μ V ± 2.1 dB (9 kHz to 2.2 GHz) ± 0.9 dB (10 MHz to 2.2 GHz)
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U3751:	Reference level 0 dBm, input signal level -10 to -50 dBm Image suppression OFF ± 1.5 dB (9 kHz to 10 MHz) ± 0.8 dB (10 MHz to 3.1 GHz) ± 1.0 dB (3.1 GHz to 8 GHz)
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Dynamic range

Displayed average noise level:	Reference level < -45 dBm (63.8 dB μ V, with the OPT.15 installed) Resolution bandwidth 100 Hz Frequency 10 MHz to 3 GHz
U3741: Pre-Amp OFF:	-123 dBm + 2f (GHz) dB (f < 2.5 GHz) -123 dBm + 2.5f (GHz) dB (f \geq 2.5 GHz) -12 dB μ V + 2f (GHz) dB (f \leq 2.2 GHz, with the OPT.15 installed)
Pre-Amp ON:	-138 dBm + 3f (GHz) dB -27 dB μ V + 3f (GHz) dB (with the OPT.15 installed)
U3751: Pre-Amp OFF:	Frequency 10 MHz to 8 GHz -123 dBm + 2f (GHz) dB (f \leq 3.1 GHz, band 0) -122 dBm + 1f (GHz) dB (f \geq 3 GHz, band 1)
Pre-Amp ON:	-138 dBm + 3f (GHz) dB (f \leq 3.1 GHz, band 0) -139 dBm + 1.3f (GHz) dB (f \geq 3 GHz, band 1)
1 dB gain compression	
U3741: Pre-Amp OFF:	Frequency > 20 MHz > -5 dBm > 102 dB μ V (with the OPT.15 installed)
Pre-Amp ON:	> -25 dBm > 82 dB μ V (with the OPT.15 installed)
U3751: Pre-Amp OFF:	Frequency > 20 MHz > -8 dBm
Pre-Amp ON:	> -25 dBm
Second harmonic distortion	
U3741:	< -70 dBc (Pre-Amp OFF, Frequency > 20 MHz, Mixer input level -30 dBm (77 dB μ V, with the OPT.15 installed))
U3751:	< -70 dBc (Pre-Amp OFF, Frequency > 200 MHz, Mixer input level -40 dBm) < -75 dBc (typ., Pre-Amp OFF, Frequency > 300 MHz, Mixer input level -30 dBm)
Third order intermodulation distortion	
U3741:	< -60dBc (Pre-Amp OFF, Mixer input level -20 dBm (88.8 dB μ V, with the OPT.15 installed), Frequency > 10 MHz, 2 signal separation > 200 kHz)
U3751:	< -50 dBc (Pre-Amp OFF, Mixer input level -20 dBm, Frequency 10 MHz to 8 GHz, 2 signal separation > 200 kHz)
Image/multiple/out of band response	
U3741:	< -60 dBc (Mixer input level -20 dBm (88.8 dB μ V, with the OPT.15 installed))
U3751:	< -60 dBc (Mixer input level -30 dBm, Image suppression ON)
Residual response	
U3741:	< -90 dBm (Frequency > 1 MHz, Pre-Amp OFF) < 21 dB μ V (with the OPT.15 installed)
U3751:	< -80 dBm (Frequency 10 MHz to 8 GHz, Pre-Amp OFF)

Inputs/outputs

RF input	
Connector:	N-type female
Impedance:	50 Ω (nominal) 75 Ω (nominal, with the OPT.15 installed)
VSWR:	
U3741:	Input attenuator \geq 10 dB < 1.5 : 1 < 1.6 : 1 (with the OPT.15 installed)
U3751:	< 1.7 : 1 (10 MHz \leq Frequency \leq 3.0 GHz) < 2.0 : 1 (Frequency > 3.0 GHz)
Calibration signal output	
Connector:	BNC female
Impedance:	50 Ω (nominal) 75 Ω (nominal, with the OPT.15 installed)
Frequency:	20 MHz
Level:	-20 dBm
Frequency reference input	
Connector:	BNC female
Impedance:	50 Ω (nominal)
Frequency (MHz):	1, 1.544, 2.048, 5, 10, 12.8, 13, 13.824, 14.4, 15.36, 15.4, 16.8, 19.2, 19.44, 19.6608, 19.68, 19.8, 20, 26
Level:	0 to +16 dBm
External trigger input	
Connector:	BNC female
Impedance:	10 k Ω (nominal), DC coupling
Level:	0 to +5 V
21.4-MHz IF output	
Connector:	BNC female
Impedance:	50 Ω (nominal)
Level:	Approx. mixer input level + 10 dB (at a frequency of 20 MHz)
Battery mount	
Connector:	AntonBauer QR mount
External DC power input	
Connector:	XLR-4
Voltage range:	+11 to +17 V
GPIO:	
USB:	IEEE-488 bus connector
Video output connector:	USB 1.1
LAN connector:	D-sub15 pin female
Audio output:	RJ45 type, 10/100 base-T Small monophonic jack
General specifications	
Operating environment range:	Ambient temperature: 0 to + 50°C Humidity: RH 85% or less (no condensation)
Storage environment range:	-20 to +60°C, RH 85% or less
AC power input:	Automatic switching to 100 VAC or 200 VAC 100 V: 100 to 120 V, 50/60 Hz 200 V: 220 to 240 V, 50/60 Hz
DC power input:	DC + 11 V to +17 V
Power consumption:	100 VA or less (AC operation) 70 W or less (DC operation)
Mass	
U3741:	5 kg or less (without option)
U3751:	5.6 kg or less (without option)
External dimensions (W x H x D):	
	Approx. 308 x 175 x 209 mm (not including protruding parts) Approx. 337 x 190 x 307 mm (including the handle and feet)

OPT.10 2 Channel input (50 Ω, 3 GHz)

Cross talk between input channels (between RF input 1 and RF input 2):

<-90 dBc (Input level -10 dBm, Input attenuator 0 dB, Preamplifier off)

RF input 2

Connector: N type female
 Impedance: 50 Ω (nominal)
 VSWR: <1.5 : 1 (Input attenuator > 10 dB)
 External trigger input: An external trigger input can be selected as a trigger input of RF input 2 when installing the OPT.10. The input connector is only 1 system.

21.4 MHz IF output: Only IF output which supports RF input 1, when installing the OPT.10.

Except for all items mentioned above, the frequency, sweep, amplitude range, amplitude accuracy, dynamic range, input/output, and performance of specifications follow the standard specifications of the RF input 1 option of the U3741 spectrum analyzer.

OPT.11 2 Channel input (75 Ω, 2.2 GHz)

Cross talk between input channels (between RF input 1 and RF input 2):

<-90 dBc (Input level 98.8 dBμV, Input attenuator 0 dB, Preamplifier off)

RF input 2

Connector: N type female
 Impedance: 75 Ω (nominal)
 VSWR: <1.5 : 1 (Input attenuator > 10 dB)
 External trigger input: An external trigger input can be selected as a trigger input of RF input 2 when installing the OPT.11. The input connector is only 1 system.

21.4 MHz IF output: Only IF output which supports RF input 1, when installing the OPT.11.

Except for all items mentioned above, the frequency, sweep, amplitude range, amplitude accuracy, dynamic range, input/output, and performance of specifications follow the standard specifications of the RF input 1 option of the U3741 + OPT.15 spectrum analyzer.

OPT.20 High-stability frequency reference source

Frequency reference stability

Aging rate: ±2 x 10⁻⁸/day
 ±1 x 10⁻⁷/year
 Warm-up drift: ±5 x 10⁻⁸ (+25°C, 10 minutes after power-on)
 Temperature stability: ±5 x 10⁻⁸ (0 to +40°C, with reference to 25°C)

OPT.28 EMC filter

6 dB bandwidth: 200 Hz, 9 kHz, 120 kHz, 1 MHz
 Bandwidth accuracy: < ±10%

OPT.53/54 Time-domain analysis (1 ch/2 ch)

RF range: Follows the U3741/3751.
 RF amplitude range: Noise level to +30 dBm^{*1}
 Wave recording method: I/Q vector time waveform
 Measuring bandwidth (CBW): 100 Hz to 3 MHz (1 to 3 steps)
 IQ sampling rate: 713 Hz (BW 100 Hz) to 21.4 MHz (BW 3 MHz)
 IQ waveform recording time: 49 msec (BW 3 MHz) to 1000 sec (BW 100 Hz)
 Number of IQ waveform recording samples: 1 M samples (I/Q)

**1) The noise level follows the dynamic range of the U3741/3751.*

OPT.55/56 Wide-band time-domain analysis (1 ch/2 ch)

RF range: Follows the U3741/3751.
 RF amplitude range: Noise level to +30 dBm^{*1}
 Wave recording method: I/Q vector time waveform
 Measuring bandwidth (CBW): 100 Hz to 30 MHz (1 to 3 steps), 40 MHz
 IQ sampling rate: 500 Hz (BW 100 Hz) to 65 MHz (BW 40 MHz)
 IQ waveform recording time: 120 msec (BW 40 MHz) to 1000 sec (BW 100 Hz)
 Number of IQ waveform recording samples: 8 M samples (I/Q)

**1) The noise level follows the dynamic range of the U3741/3751.*

OPT.70/71 High-purity spectrum analysis (1 ch/2 ch)

Frequency span
 Range: 1 kHz to Full, zero span
 Accuracy: < ±1%

Resolution bandwidth
 Range: U3741: 30 Hz to 1 MHz (1 to 3 steps)
 U3751: 30 Hz to 3 MHz (1 to 3 steps)
 Accuracy: < ±12%

Spectrum purity: ≤ -98 dBc/Hz (offset 10 kHz, span ≤ 1 MHz)
 -102 dBc/Hz (Typical)

Displayed average noise level:
 Reference level < -45 dBm, Resolution bandwidth 30 Hz
 U3741:
 Pre-Amp OFF: Frequency 10 MHz to 3 GHz
 -126 dBm + 2f (GHz) dB (f < 2.5 GHz)
 -126 dBm + 2.5f (GHz) dB (f ≥ 2.5 GHz)
 Pre-Amp ON: -141 dBm + 3f (GHz) dB
 U3751:
 Pre-Amp OFF: Frequency 10 MHz to 8 GHz
 -126 dBm + 2f (GHz) dB (f ≤ 3.1 GHz, band 0)
 -125 dBm + 1f (GHz) dB (f ≥ 3 GHz, band 1)
 Pre-Amp ON: -141 dBm + 3f (GHz) dB (f ≤ 3.1 GHz, band 0)
 -142 dBm + 1.3f (GHz) dB (f ≥ 3 GHz, band 1)

OPT.75 Tracking generator (75 Ω, 2.2 GHz)

Frequency range: 100 kHz to 2.2 GHz

Frequency offset
 Range: 0 Hz to 1 GHz
 Accuracy: ±300 Hz
 Resolution: 1 kHz

Output level range: 107 to 47 dBμV (0.5 dB steps)

Output level accuracy: ±0.5 dB (20 MHz, 97 dBμV, +20 to +30°C)

Output level flatness: Using 20 MHz and 97 dBμV as a reference
 ±1.0 dB (1 MHz to 1 GHz)
 ±1.5 dB (100 kHz to 2.2 GHz)

Output level switch error: Using 20 MHz and 97 dBμV as a reference
 ±1.0 dB (1 MHz to 1 GHz, 107 to 47 dBμV)
 ±2.0 dB (1 MHz to 2.2 GHz, 107 to 47 dBμV)
 Frequency offset OFF: ±3.0 dB (100 kHz to 2.2 GHz, 107 to 77 dBμV)
 ±4.0 dB (100 kHz to 2.2 GHz, 76.5 to 47 dBμV)
 Frequency offset ON: ±5.0 dB (100 kHz to 2.2 GHz)

Output spurious: Output level 97 dBμV
 Harmonic: < -15 dBc (100 kHz to 1 MHz)
 < -20 dBc (1 MHz to 2.2 GHz)
 Non-harmonic: < -20 dBc (Frequency offset OFF)

TG leakage: < 31 dBμV (Input attenuator 0 dB)

Output impedance: 75 Ω (nominal)
 VSWR: ≤ 2.0 : 1 (Output level ≤ 97 dBμV)

Maximum allowable level: 117 dBμV, ±10 VDC

OPT.76 Tracking generator (50 Ω, 3 GHz)

Frequency range:	100 kHz to 3 GHz
Frequency offset	
Range:	0 Hz to 1 GHz
Accuracy:	±300 Hz
Resolution:	1 kHz
Output level range:	0 to -60 dBm (0.5 dB steps)
Output level accuracy:	±0.5 dB (20 MHz, -10 dBm, +20 to +30°C)
Output level flatness:	Using 20 MHz and -10 dBm as a reference ±1.0 dB (1 MHz to 1 GHz) ±1.5 dB (100 kHz to 3 GHz)
Output level switch error:	Using 20 MHz and -10 dBm as a reference ±1.0 dB (1 MHz to 1 GHz, 0 to -60 dBm) ±2.0 dB (1 MHz to 2.6 GHz, 0 to -60 dBm) ±3.0 dB (100 kHz to 3 GHz, 0 to -30 dBm) ±4.0 dB (100 kHz to 3 GHz, -30.5 to -60 dBm) ±5.0 dB (100 kHz to 3 GHz)
Frequency offset OFF:	
Frequency offset ON:	
Output spurious:	Output level -10 dBm
Harmonic:	< -15 dBc (100 kHz to 1 MHz) < -20 dBc (1 MHz to 3 GHz)
Non-harmonic:	< -20 dBc (Frequency offset OFF)
TG leakage:	< -80 dBm (Input attenuator 0 dB)
Output impedance:	50 Ω (nominal)
VSWR:	≤ 2.0 : 1 (Output level ≤ -10 dBm)
Maximum allowable level:	+10 dBm, ±10 VDC

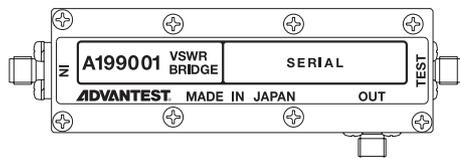
OPT.77 Tracking generator (50 Ω, 6 GHz) ^{*2)}

Frequency range:	100 kHz to 6 GHz
Output level range:	0 to -30 dBm (0.5 dB step)
Output level accuracy:	±0.5 dB (20 MHz, -10 dBm, +20 to +30°C)
Output level flatness:	20 MHz on -10 dBm criterion, at +20 to +30°C ±1 dB (1 MHz to 1 GHz) ±1.5 dB (100 kHz to 3.1 GHz) ±2.0 dB (100 kHz to 6 GHz)
TG leakage:	≤ -80 dBm (input attenuator: 0 dB)
Output impedance:	50 Ω (nominal)
VSWR:	≤ 2.0 : 1 (Output level ≤ -10 dBm)
Maximum allowable level:	+10 dBm, ±10 VDC

*2) The OPT.77 is not allowed to be installed on the U3741.

A199001 6 GHz VSWR bridge

Frequency range:	100 MHz to 6 GHz
Directivity:	≥34 dB (100 MHz to 1 GHz) ≥29 dB (1 to 3.8GHz) ≥25 dB (3.8 to 6GHz)
Maximum input power:	+15 dBm (Input Port)
DC voltage:	±30 VDC (Test Port)
Connector:	SMA (female)
External dimensions	
(W x H x D):	Approx. 103 x 35 x 20 mm
Mass:	100 g or less



Ordering information

Main unit	
Spectrum analyzer:	U3741 U3751
Accessories	
Operating manual (CD):	BU37005
Power cable:	A01412
Input cable:	A01037-0300
With the OPT.15 installed:	A01045
N-BNC adapter:	JUG-201A/U
With the OPT.15 installed:	BA-A165
NC-F adapter (with the OPT.15 installed):	NCP-NFJ
Ferrite core:	ESD-SR-120, E045R150718

Options	
2 Channel input (50 Ω, 3 GHz):	OPT.10
2 Channel input (75 Ω, 2.2 GHz):	OPT.11
1 Channel input (75 Ω):	OPT.15
High-stability frequency reference source:	OPT.20
EMC filter:	OPT.28
Time-domain analysis (1 ch):	OPT.53
Time-domain analysis (2 ch):	OPT.54
Wide-band time-domain analysis (1 ch):	OPT.55
Wide-band time-domain analysis (2 ch):	OPT.56
High-purity spectrum analysis (1 ch):	OPT.70
High-purity spectrum analysis (2 ch):	OPT.71
Tracking generator (75 Ω, 2.2 GHz):	OPT.75
Tracking generator (50 Ω, 3 GHz):	OPT.76
Tracking generator (50 Ω, 6 GHz):	OPT.77

Accessories	
Japanese operating manual (printed manual):	JU37005
English operating manual (printed manual):	EU37005
Battery pack:	A870008
Charger:	A870009
75 Ω input impedance converter:	ZT-130NC
DC power cable:	A114020
Carrying bag:	A129001
Transit case:	A129002
Rack mount kit (JIS):	A122003
Rack mount kit (EIA):	A124004
6 GHz VSWR bridge:	A199001

Note on accessories:

The operating manual on the CD is supplied as standard.

The printed version of the operating manual is offered as an accessory.