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: ± (marker read value x frequency reference accuracy + span x span accuracy + residual FM)

Frequency reference stability
Aging rate: ±2 x 10^-4/year
Temperature stability: ±2.5 x 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: ± (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
(span with the OPT.70 installed)
Accuracy: < ±1%

Spectrum purity: -85 dBc/Hz (offset 10 kHz, span < 200 kHz)

Resolution bandwidth
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: < ±12%

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

Sweep

Sweep time
Setting range: 20 ms to 1000 s (spectrum mode)
50 µs to 1000 s (zero span)
Accuracy: < ±2% (zero span)

Sweep mode: Continuous, single, gated

Trigger function
Trigger source: Free run, video, external, IF

Amplitude range

Measurement range: Displayed average noise level to +30 dBm
Display average noise level to 134 dBµV
(with the OPT.15 installed)

Maximum safe input level:
Pre-Amp OFF: +30 dBm, 134 dBµV (with the OPT.15 installed)
Pre-Amp ON: +13 dBm, 120 dBµV (with the OPT.15 installed)
U3741: ±50 VDC max.
U3751: ±15 VDC max.

Input attenuator range: 0 to 50 dB (10 dB steps)
Display range: 100/50/20/10/5 dB, linear
Scale unit: dBm, dBmV, dBµV, dBµVemf, dBµW, W, V

Reference level setting range: -140 to +40 dBm
-312 to 148.8 dBµV (with the OPT.15 installed)
Detection mode: Normal, Positive peak, Negative peak, Sample, RMS, and Average

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
U3741: Reference level 0 dBm,
input signal level -10 to -50 dBm
±1.0 dB (9 kHz to 3 GHz)
±0.8 dB (10 MHz to 3 GHz)
With the OPT.15 installed: Reference level 108.8 dBµV
Input signal level 98.8 to 58.8 dBµV
±2.1 dB (9 kHz to 2.2 GHz)
±0.9 dB (10 MHz to 2.2 GHz)
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)
**Dynamic range**

Displayed average noise level:
- Reference level < -45 dBm (63.8 dBµV, with the OPT.15 installed)
- Resolution bandwidth 100 Hz

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency Range</th>
<th>Pre-Amp OFF</th>
<th>Pre-Amp ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>U3741:</td>
<td>10 MHz to 3 GHz</td>
<td>-123 dBm + 2f (GHz) dB (f &lt; 2.5 GHz)</td>
<td>-138 dBm + 3f (GHz) dB (with the OPT.15 installed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-123 dBm + 2.5f (GHz) dB (f ≥ 2.5 GHz)</td>
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<tr>
<td></td>
<td></td>
<td>-12 dBµV + 2f (GHz) dB (f ≥ 2.2 GHz, with the OPT.15 installed)</td>
<td></td>
</tr>
<tr>
<td>U3751:</td>
<td>10 MHz to 8 GHz</td>
<td>-123 dBm + 2f (GHz) dB (f ≤ 3.1 GHz, band 0)</td>
<td>-138 dBm + 3f (GHz) dB (f ≥ 3 GHz, band 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-122 dBm + 1f (GHz) dB (f ≥ 3 GHz, band 0)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-12 dBµV + 2f (GHz) dB (f ≤ 2.2 GHz, with the OPT.15 installed)</td>
<td></td>
</tr>
</tbody>
</table>

- 1 dB gain compression
  - U3741: Frequency > 20 MHz
    - Pre-Amp OFF: > -5 dBm
    - Pre-Amp ON: > 8 dBm
  - U3751: Frequency > 20 MHz
    - Pre-Amp OFF: > -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 dBµV, 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: < -60 dBc (Pre-Amp OFF, Mixer input level -20 dBm (88.8 dBµV, 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 dBµV, 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)
- U3751: < -21 dBµV (with the OPT.15 installed)
- U3741: < -80 dBm (Frequency 10 MHz to 8 GHz, Pre-Amp OFF)

**Inputs/outputs**

**RF input**
- Connector: N-type female
- Impedance: 50 Ω (nominal)
- VSWR: 75 Ω (nominal, with the OPT.15 installed)
- Input attenuator: 10 dB

**U3741:**
- Frequency 10 MHz to 3 GHz
  - Pre-Amp OFF: -123 dBm + 2f (GHz) dB (f < 2.5 GHz)
  - Pre-Amp ON: -138 dBm + 3f (GHz) dB (with the OPT.15 installed)

**U3751:**
- Frequency 10 MHz to 8 GHz
  - Pre-Amp OFF: -123 dBm + 2f (GHz) dB (f ≤ 3.1 GHz, band 0)
  - Pre-Amp ON: -138 dBm + 3f (GHz) dB (f ≥ 3 GHz, band 1)

**Calibration signal output**
- Connector: BNC female
- Impedance: 50 Ω (nominal)

**Frequency reference input**
- Connector: BNC female
- Impedance: 50 Ω (nominal)

**External trigger input**
- Connector: BNC female
- Impedance: 10 kΩ (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

**GPIB**
- IEEE-488 bus connector

**USB**
- USB 1.1

**Video output connector**
- D-sub15 pin female

**LAN connector**
- RJ45 type, 10/100 base-T

**Audio output**
- 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 spectrum analyzer.

OPT.20 High-stability frequency reference source

Frequency reference stability
- Aging rate: ±x 10^-7/day
- Warm-up drift: ±5 x 10^-7 (+25°C, 10 minutes after power-on)
- Temperature stability: ±5 x 10^-7 (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
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)

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
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: 120 msec (BW 40 MHz) to 1000 sec (BW 100 Hz)
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)

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

Frequency range:
- U3741: 30 Hz to 1 MHz (1 to 3 steps)
- U3751: 30 Hz to 3 MHz (1 to 3 steps)

Resolution bandwidth:
- U3741: Frequency 10 MHz to 3 GHz
- U3751: Frequency 10 MHz to 8 GHz

Accuracy:
- < ±12%

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

Displayed average noise level:
- U3741: Refer to < -45 dBm, Resolution bandwidth 30 Hz
- U3751: Refer to < -126 dBm + 2f (GHz) dB (f < 2.5 GHz)

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)
- ±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)
- ±5.0 dB (100 kHz to 2.2 GHz)

Output level spurious:
- Output level 97 dBµV
- Harmonic: < -15 dBc (100 kHz to 1 MHz)
- Non-harmonic: < -20 dB (1 MHz to 2.2 GHz)
- Frequency offset OFF:
- TG leakage: < 31 dBµV (Input attenuator 0 dB)

Output impedance:
- 75 Ω (nominal)

Maximum allowable level: 117 dBµV, ±10 VDC

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

Frequency offset OFF: ±3.0 dB (100 kHz to 3 GHz)
±4.0 dB (100 kHz to 3 GHz, -30.5 to -60 dBm)

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)**

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
±1.0 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

**Note:** 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,
E04SR150718

**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.