ADVANTEST

U3641/3641N
Spectrum Analyzer

For Field Maintenance of CATV and

Digital Mobile Communication Systems

U3641/3641N

Light Weight, Compact, Battery Operated Spectrum Analyzer
Frequency Range: 9 kHz to 3 GHz

The U3641/3641N is a 3-GHz synthesized spectrum analyzer ideal for field use. With a light weight, compact size and three-way power supply including battery operation, the U3641/3641N has been designed specifically for field installation and maintenance applications. In addition, with the inclusion of a synthesized local oscillator, the U3641/U3641N allows high-precision and high-stability measurements with a minimum resolution bandwidth of 100 Hz. A fast zero span sweep speed of 50 µs allows characterization of burst signal rising and falling edges and the measurement of power during on and off periods.

The U3641/3641N can be customized for a variety of applications by selecting from the wide range of available options. The U3641/3641N is a portable spectrum analyzer which can be used for maintenance on various aspects of CATV and digital mobile communication systems.

Option Guide

	Option No.	Function
Controller	OPT15	Activate separate application software.
High-stability reference source	OPT20	High-stability reference oscillator with an aging rate of $\pm 2 \times 10^{-8}$/day
Narrow RBW	OPT26	100Hz and 300Hz resolution bandwidth can be set
CDMA	OPT60	Allows channel power, ACP, OBW, and spurious emission (in-band) measurement.
TV demodulation	OPT72	Frequency tuning function by channel input, image/audio demodulation function
Tracking generator	OPT74	Filter evaluation function/LOSS measurement function for the frequency range from 100 kHz to 2.2 GHz
Channel input setting	OPT78	VHF, UHF, CATV, BS, CS channels of various countries and user channel can be set

The U3641/3641N Accommodates Narrow-Band Wireless Systems

- Ultra-compact and light weight
  Main unit: 6.9 kg or less
  With battery: 9 kg or less
- Frequency range: 9 kHz to 3GHz
- Display dynamic range: 100 dB
- Three-way power supply with battery operation (100/200 VAC, external DC, and battery pack)
- 1.5-hour operation is possible with the specialized battery
- TFT 6-inch color LCD and memory card
- High-stability measurement by means of synthesized operation
- 50-µs high-speed sweep function
- Diverse options and series including
  TV image/audio demodulation, tracking generator, high-stability reference source, narrow RBW, channel input setting, controller, input impedance of 50 ohms (U3641) or 75 ohms (U3641N), CDMA Measurement
- Variety of measurement functions
  20-dB gain preamplifier, 1-Hz resolution counter, occupied frequency bandwidth, adjacent-channel leakage power, and audio monitoring

U3641 Spectrum Analyzer

Basic Performance

Full Range of Features for Portability and

At 6.9 kg (Max.), the Lightest Field Analyzers in Their Class

The U3641/3641N are light and compact (6.8kg or less without the battery pack or 9 kg or less with the pack). The easy-to-attach strap allows the analyzer to be worn on the shoulder and easily carried. The U3641/3641N are rugged enough to satisfy the requirements of vibration, shock and drop tests, allowing them to be used safely under harsh field conditions.

Battery Provides 1.5 Hours of Operation. Three Power Sources to Choose From

The U3641/3641N operate not only on 100/200 V AC power but also on +10 to +16 V DC power or the battery pack. The battery pack can be easily attached or removed. It allows 1.5 hour continuous operation at a full charge, making it easier to perform logistically wide-ranging measurements such as maintenance and installation work. Rapid two- hour battery charging time.

Large Color TFT LC Display

The U3641/3641N employ a 6 inch color TFT LCD display and a tilt mechanism that allows a angle of ±15 degrees, remarkably improving the visibility and efficiency of analysis work.

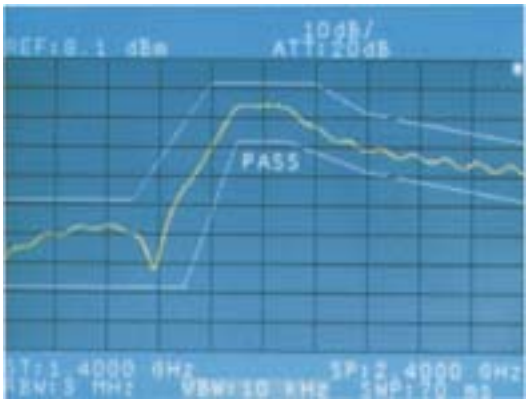
Application Support

2 Memory Card Slots

The U3641/3641N are equipped with two standard memory card slots conforming to JEIDA-Ver.4.1/PCMCIA Rel.2.0. With two memory card slots for saving, recalling the panel settings and storing the measured data, the U3641/3641N's operation becomes a simple task. (SRAM cards are available as optional accessories.) The slots have a dust-proof shutter and a memory card ejection mechanism for reliable operation even in difficult outdoor working conditions.

Wide Array of Analysis Functions

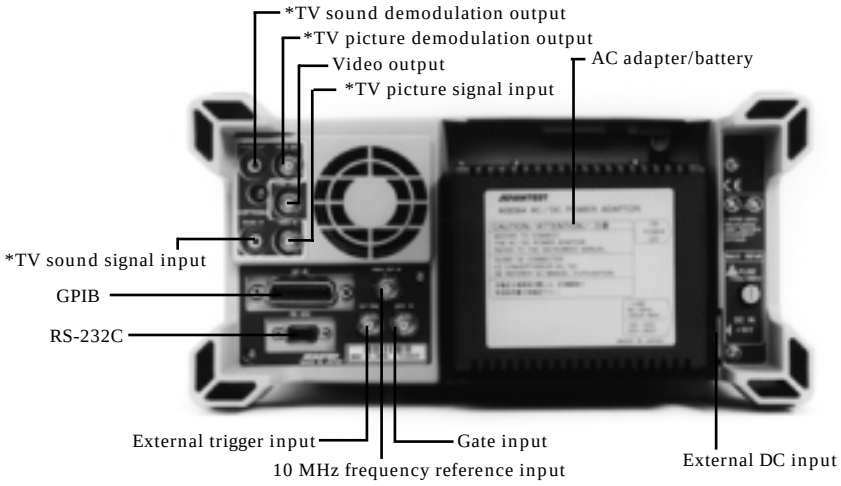
Along with basic functions such as a frequency counter with a 1 Hz resolution and a 20 dB gain preamplifier, the U3641/3641N comes standardly equipped with analysis functions for measuring items such as dB down (required for radio equipment evaluation), third order intermodulation distortion, AM modulation, occupied bandwidth, and adjacent channel leakage power. GO-NO GO evaluations of the displayed waveform can also be easily performed using the limit line and PASS/FAIL functions which allow upper and lower limits to be set on the screen.
Using the user define function, commonly used menus or other items can be freely assigned to function keys, allowing the user to create custom easy-to-use menu.



PASS/FAIL evaluation using upper and lower limit line

I/O Interfaces

GPIB and RS-232C interfaces allow not only printouts, but also simple integration in remote controlled and automated control systems.
Video output enables creation of a screen hard copy, and long term video recording, useful for examinations of intermittent interference, which is only generated occasionally.

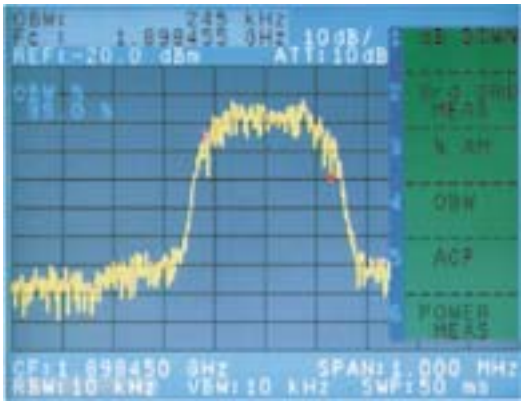


Rear panel
*For option 72 only

Substantial Application Functions Acco

Measurement of occupied frequency bandwidth

The U3641/3641N calculates the bandwidth for the specified power ratio from measured spectrum data and then displays it with the marker. In addition, it displays the occupied frequency bandwidth (OBW) and carrier frequency (FC) at the upper left portion of the screen. The ratio of the obtained power to the total power can be specified in the range from 10.0 to 99.8%.

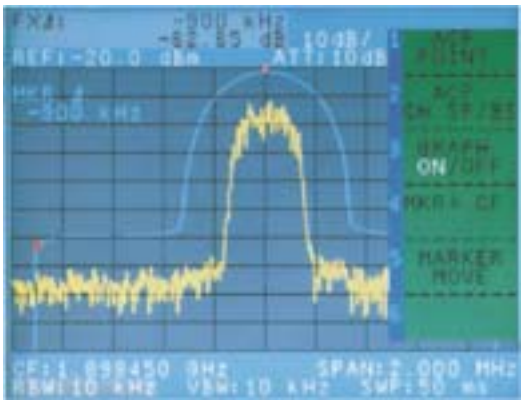


Measurement of adjacent-channel leakage power

The U3641/3641N obtains the total power from the measured data on the screen. Then it integrates the power with respect to the specified bandwidth (BS) to obtain its ratio to total power. Two measurement methods can be selected:

ACP POINT: Obtains the leakage power of the upper and lower channels at the specified channel interval and displays them in numerical forms.

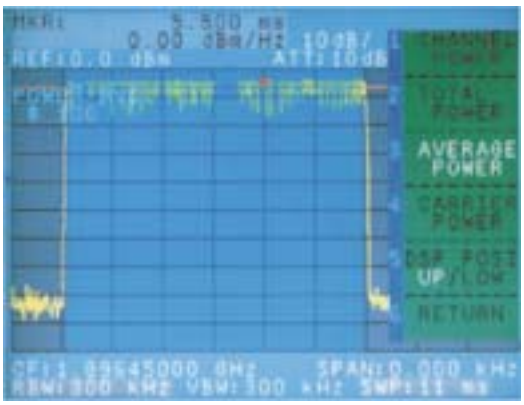
ACP GRAPH: Obtains the leakage power of the specified bandwidth (BS) with respect to all frequency points and overlaps it onto the spectrum data.



Power measurement functions

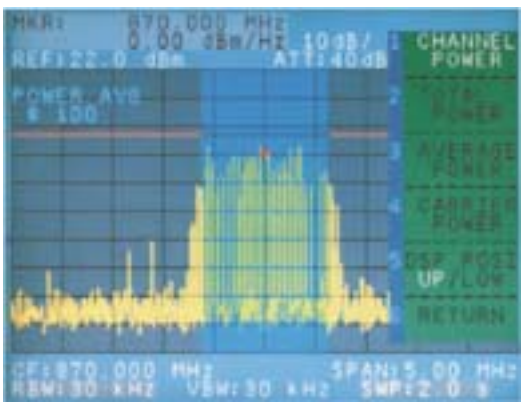
Average power

The modulation modes used for digital mobile communication systems handle signals with large amplitude variation. Therefore, an average power calculation function is incorporated, allowing power measurement for signals with amplitude variation.



Total power

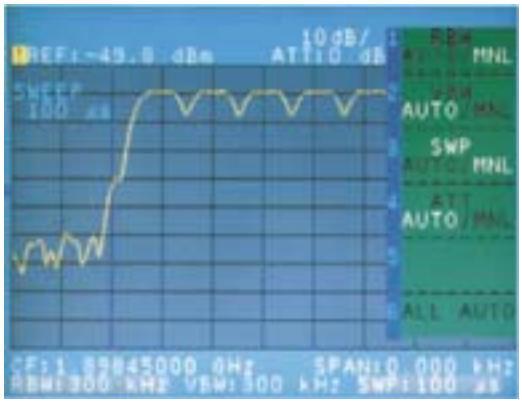
For Spread spectrum signals, used in CDMA or middle-rate wireless LAN, the total power measurement function is crucial. This function includes two modes: one is the channel mode which measures the in-band power specified from the measuring window and the other is the total power mode which measures the total power over the entire measurement span.



modate Digital Mobile Communications

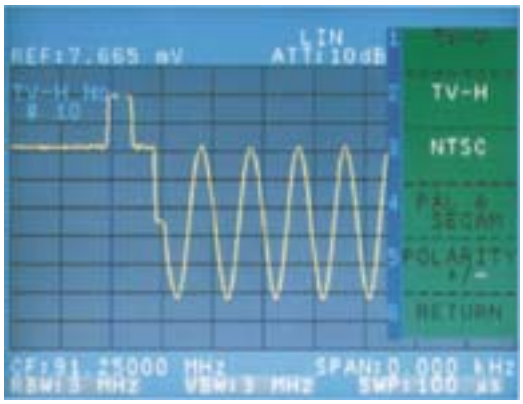
High-speed sweep function

In ZERO SPAN mode (fixed tuning mode without frequency sweep), the sweep time can be set up to 50 µs. This makes it possible to observe TDMA waveforms for digital mobile communication systems and perform detailed analysis through magnified display of burst rising and falling waveforms.



TV signal measurement

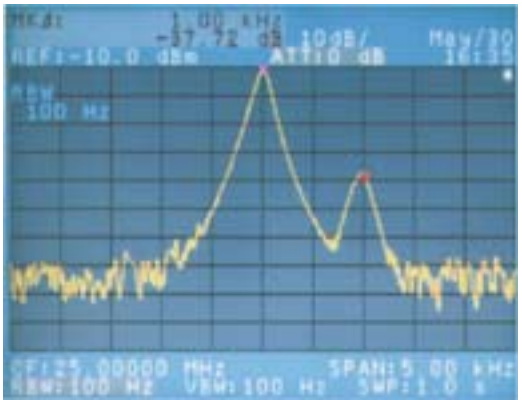
The U3641/3641N sweep can be triggered by means of TV vertical or horizontal sync signals. For horizontal sync triggering, the line number can be specified.



Narrow RBW (Option 26)

The U3641/3641N Allows Analysis of Narrow Band Signal and Measurement of Sideband Noise

In addition to 1 kHz to 3 MHz RBW, 300 Hz and 100 Hz are also available as options. This allows measurement of sideband noise without influence from the carrier for narrow band wireless systems. Also, a 10 kHz offset signal for a TV broadcasting signal can be resolved, allowing accurate measurement of the DU ratio (Desired signal to Undesired signal Ratio).



Channel input setting (Option 78)

The U3641/3641N Allows Channel Setting for Communication Systems of Major Countries

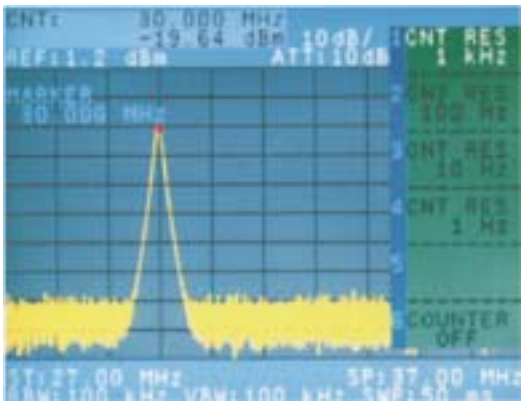
Most communication systems employ the FDMA(Frequency Division Multiple Access) method. When observing the signals using the U3641/3641N, each carrier frequency band to be measured can be registered in the built-in table as a user channel. This allows the center frequency to be called by means of the channel number, resulting in improved work efficiency.

Channel numbers from 1 to 99 can be registered and two tables are provided. For TV broadcasting wave, frequencies are preset according to the VHF, UHF, CATV BS, and CS band designations of major countries.

Wide Array of Analysis Functions

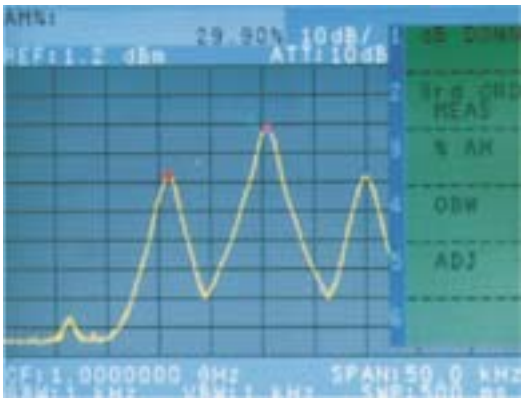
1 Hz Resolution Frequency Counter

Just by adjusting the counter marker to the spectrum, the U3641/3641N can display a frequency counter with a minimum resolution of 1 Hz. This function is extremely useful in multi-carrier frequency measurements, such as mobile radio or CATV systems, which are difficult with conventional frequency counters.



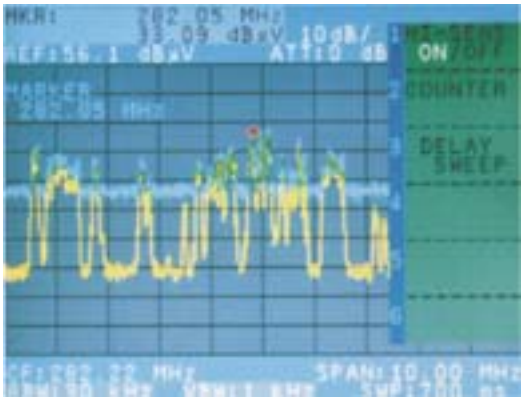
AM Modulation Degree Measurement

The U3641/3641N allows the user to display the AM modulation depth at the touch of a button without performing complicated calculations.



20 dB Gain Preamplifier

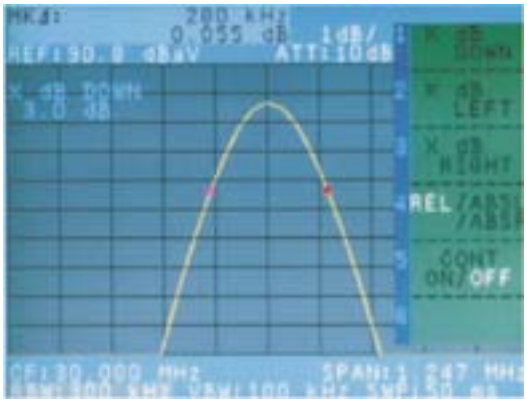
The U3641/3641N have a built-in preamplifier with a 20 dB minimum gain over a 9 kHz to 3.05 GHz range (U3641)/100kHz~2.2GHz range (U3641N). This feature enables analysis of signals at extremely low levels such as -130 dBm or less.



Dynamic range of measurement expanded by preamplifier ON

dB Down Measurement

The U3641/3641N can display the frequency difference and level difference between a reference marker and a marker X dB below.

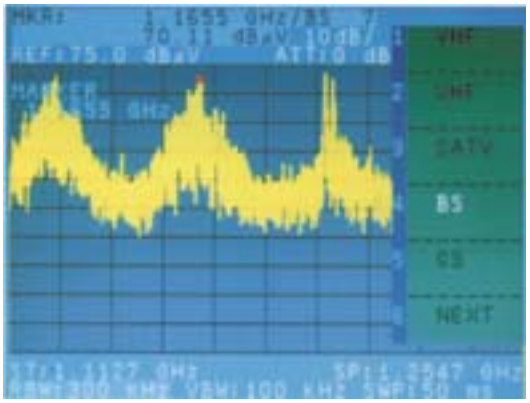


TV Demodulation
Option 72

Ideal For Analysis of TV Transmissions

TV Channel Input

Selecting the TV KEY provides channel input frequency tuning. VHF, UHF, CATV, BS and CS channel tables are prestored in the base memory, and these tables can be custumized by users. The marker function allows channel band display as well as frequency/level indication.



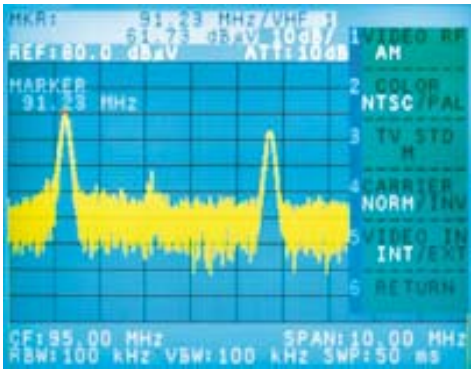
Picture/Sound Demodulation

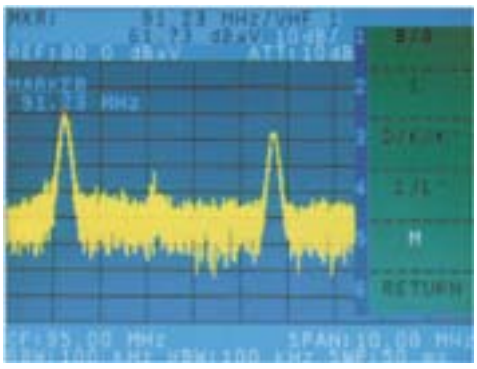
The PICTURE KEY switches from a spectrum display to a TV image display. Sound demodulation is provided simulataneously to compare easily the spectrum waveform and the images.
The equipment can be used as a demodulator for arbitrary frequencies as in a TV relay station's IF bands or CATV uplink image checking.

TV picture demodulation

Conforms with World TV Standars

TV demodulation option(Option 72) covers worldwide TV standards: NTSC, PAL and SECAM colors and M, B/G, D/K/K', I and L/L' systems are selectable.





CDMA Measurement
Option 60

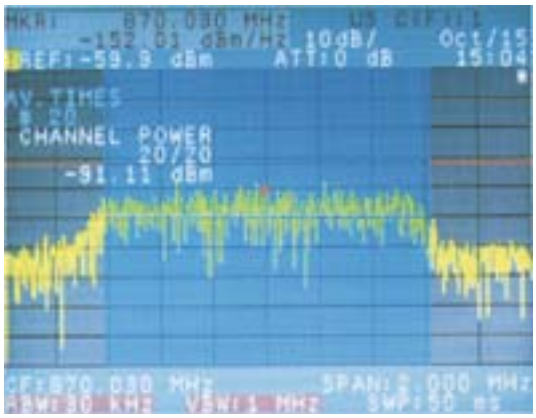
For CDMA (IS-95/J-STD-008) Tx Measurement

Addition of the CDMA option (OPT60)to the U3641 Spectrum Analyzer enables easy one button measurement of CDMA transmission characteristics specified by IS-95/J-STD-008. Option 60 allows CDMA spectrum measurements for both base stations and mobile stations, at cellular or PCS frequencies. The standard internal pre-amp of the U3641 is indispensable for high sensitivity field measurement. This sensitivity, combined with the U3641's compact, lightweight, battery-driven design makes the unit ideal for field use.

- Automatic internal setting of CDMA parameters
- High stability CDMA channel power measurement function
- High sensitivity power measurement possible with the built-in pre-amp
- Multiple CDMA system channels supported

Measurement Items

- Channel Power measurement
- Occupied Bandwidth measurement
- Adjacent Channel Power (Spectrum Mask) measurement.
- Spurious Emission (In-Band) measurement



High Stability and High Sensitivity CDMA Channel Power Measurement

- High Stability Power Measurement
  Absolute accuracy : ≤±2.0dB (15 to 30 °C)
  ≤±2.5dB (0 to 30 °C)
  Relative accuracy : ≤±0.5dB (15 to 30 °C)
  ≤±0.8dB (0 to 50 °C)

(after CAL execution, automatic setting, Pre-amp off, -50dBm/1.23MHz to +20dBm/1.23MHz, within 80dB display range.)

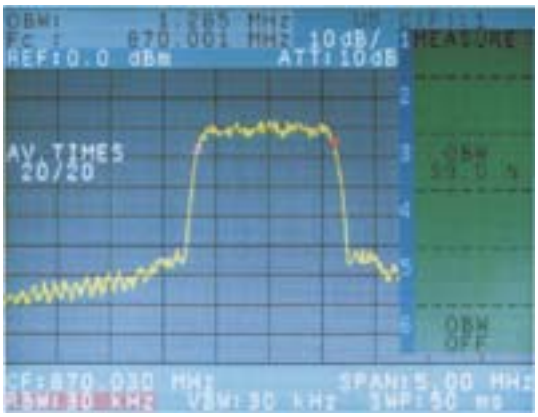
- Hight Sensitivity Power Measurement
  Pre-amp on:-25 to -90dBm/1.23MHz(Typ.)

Channel Tables for CDMA Systems

- Center frequency set by channel number (US-Cellular, KOREA-Cellular, CHINA-Cellular, JAPAN-Cellular, US-PCS, and KOREA-PCS channels supported)
- FORWARD/REVERSE channels supported
- Channel number offset allowed
- User table for up to 99 channels

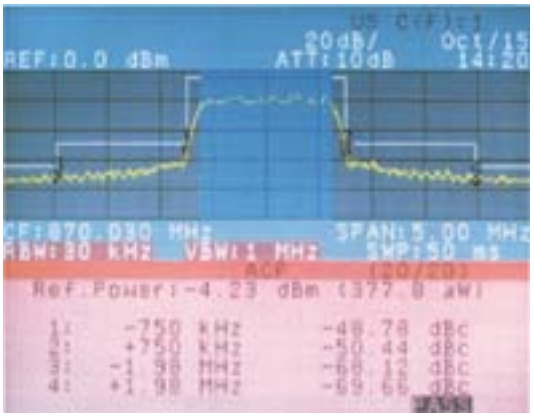
For CDMA (IS-95/J-STD-008) Tx Measurement

CDMA Measurement
Option 60



OBW Measurement

- Single-operation measurement of frequency bandwidth (OBW) occupying 99% of the power
- Occupancy variable from 10% to 99.8%
- 2 to 999 times averaging
- REVERSE mode measurement corresponding to each rate (9600/14400,4800/7200,2400/3600,1200/1800)

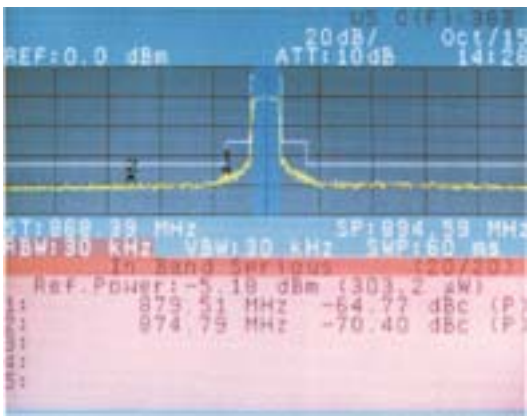


ACP (SpectrumMask) Measurement

- ACP (dBc) measurement at each offset frequency according to standard, referenced to Tx power

Offset Frequency	FOWARD	REVERSE
IS-95	±750kHz, ±1.98MHz	±900kHz, ±1.98MHz
J-STD-008	±885KHz, ±2.5MHz	±1.25MHz,±2.5MHz

- Spectrum Mask pass/fail judgment to IS-95 and J-STD-008 standard templates
- Posi/Sample detection selection



Spurious Emission (In-Band) Measurement

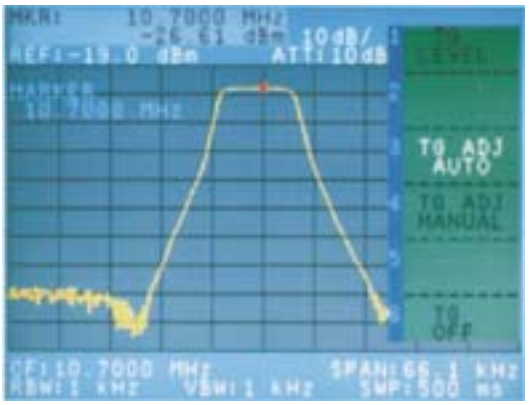
- Relative (dBc) measurement simultaneous with Tx power measurement
- Pass/Fail judgment with peak list display to IS-95 and J-STD-008 standard templates
- Posi/Sample detection switching
- Automatic setting of in-Band frequency for each CDMA system

Tracking Generator
Option 74

Tracking Generator for Filter Evaluation, Loss Measurement

Frequency Characteristics Evaluations of Filters and Amplifiers

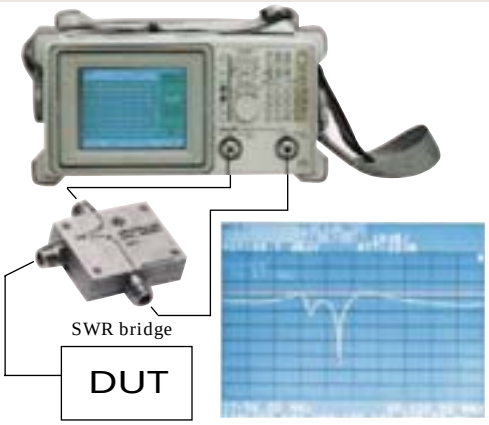
Tracking generator option(Option 74) can generate a sine wave signal in synch to the frequency sweep of a spectrum analyzer in a range of 100 kHz to 2.2 GHz, enabling direct measurement of frequency characteristics.



Characteristic analysis of band bass filter

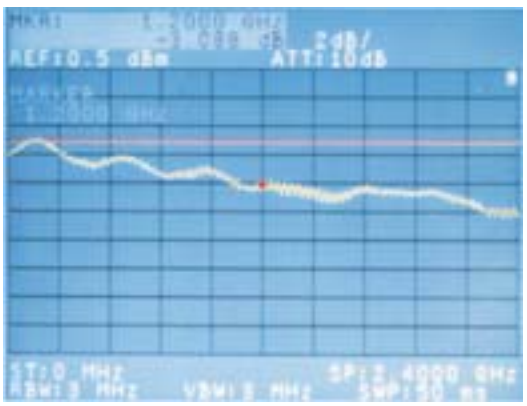
Impedance Matching Measurement

With an SWR bridge (optional accessory), Tracking generator option (Option 74) can measure return loss, enabling simple evaluation of DUT impedance matching.
Recommended SWR Bridge: ZRB2VAR-52/53/73 (ROHDE & SCHWARZ)



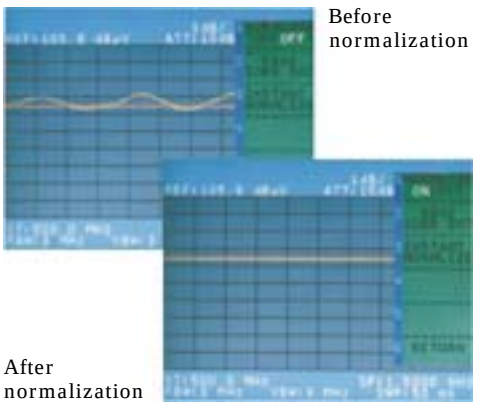
Circuit Network Loss Measurement

Tracking generator option (Option 74) can easily measure the insertion loss of high frequency devices and equipment, or their connected cables, in a wide frequency range of 100 kHz to 2.2 GHz.



Normalization Function Enables High Precision Measurement

When used with a tracking generator, Tracking generator option (Option 74) have a normalization function which cancels out all frequency characteristics of the measuring devices. This function allows characteristics evaluation to be made of only the DUT.



Before normalization

After normalization

Specifications

Frequency	
Frequency Range	9 kHz to 3.0 GHz
Frequency Readout	Start, Stop, CF, Marker
Accuracy	± (freq readout × freq ref error + 5% × span + 15% × RBW + 10 Hz)
Count Frequency Marker	
Resolution	1 Hz to 1 kHz
Count Accuracy	± (marker freq × freq reference accuracy + 1 LSD ±5 Hz)
Accuracy	(S/N ≥ 25 dB, RBW ≥ 3 kHz, 1 kHz ≤ SPAN ≤ 200 MHz)
Frequency Reference Accuracy	$\pm 2 \times 10^{-6}$/year $\pm 1 \times 10^{-5}$ (at 0°C to 50°C)
Frequency Span	
Range	1 kHz to 3.2 GHz, ZERO span
Accuracy	≤±5%
Frequency Stability	
Residual FM	≤60 Hz_{p-p}/100 ms (ZERO span, RBW = 100 Hz)
Frequency Drift	<150 Hz/min (SPAN ≤ 10kHz) After warm up 30min, At stable temperature
Noise Sidebands	≤ –105 dBc, at 20 kHz offset ≤ –100dBc, at 10kHz offset
Resolution Bandwidth	(3 dB)
Range	1 kHz to 3 MHz 1–3 sequence 100 Hz, 300 Hz (OPT.26)
Bandwidth Accuracy	≤ ±20% (1 kHz to 1 MHz) ≤ ±25% (3 MHz)
Selectivity	< 15:1 (60 dB : 3 dB, 1kHz to 3MHz)
Video Bandwidth	10 Hz to 3 MHz (1–3 step)

Amplitude Range	U3641	U3641N
Amplitude Range	+20 dBm to displayed Average Noise Level	+130 dBµV to displayed Average Noise Level
Maximum Input Level	±50 V DC max.	
Preamplifier OFF (Input atten ≥ 10 dB)	+27 dBm	+134 dBµV
Preamplifier ON (Input atten ≥ 10 dB)	+13 dBm	+120 dBµV
Display Range		
Log	10 × 10 div 10, 5, 2, 1 dB/div	
Linear	10% of reference level/div, RBW ≥ 3kHz	
Reference Level Range		
Preamplifier OFF	(Input Atten 0 dB to 50 dB)	
Log	–64 dBm to +40 dBm (0.1 dB step)	+46 dBµV to +150 dBµV
Linear	+141.1 µV to +22.36 V	+198.4µV to 31.44V
Preamplifier ON	(Input Atten 0 dB to 10 dB)	
Log	–89 dBm to –25 dBm (0.1 dB step)	+21 dBµV to +85 dBµV
Linear	+7.934 µV to +12.57 mV	+11.16 µV to +17.68mV
Input Attenuator Range	0 dB to 50 dB (10 dB step)	

Sweep	
Sweep Time	50ms to 1000s 50 µs to 1000s(ZERO span)
Accuracy	≤ ±5%
Trigger mode	FREE RUN, SINGLE, VIDEO, EXT, TV

Demodulation	
Spectrum Demodulation	
Modulation Type	AM and FM (FM is at RBW ≥ 3kHz)
Audio Output	Speaker and phone jack with volume control

Dynamic Range	U3641	U3641N
Displayed Average Noise Level	(RBW 1 kHz, VBW 10 Hz, Input atten 0 dB, f ≥ 1 MHz)	
Preamplifier OFF	–117 dBm+ 2.7f (GHz) dB	–8 dBµV + 2.7f (GHz) dB
Preamplifier ON	–135 dBm + 4.3f (GHz) dB	–22 dBµV + 3.0f (GHz) dB
Gain Compression	(Input atten 0dB, f ≥ 10MHz)	
Preamplifier OFF (mixer input level)	> –10 dBm	> +100 dBµV
Preamplifier ON (RF input level)	> –40 dBm	> +80 dBµV
Spurious Response	(Input atten 0 dB, f ≥ 10MHz)	
Preamplifier OFF		
Second Harmonic Distortion	≤–70 dB(–30 dBm input)	≤–70 dB(+78 dBµV input)
Third Order Intermodulation Distortion	≤–70 dB(–30 dBm input) 2-tone frequency separation > 10kHz	≤–70 dB(+78 dBµV input)
Residual Responses	(Input atten 0 dB, f ≥ 1MHz)	
Preamplifier OFF	≤ –100 dBm, 50 Ω	≤ +10 dBµV, 75 Ω
Preamplifier ON	≤ –105 dBm, 50 Ω	≤ +5 dBµV, 75 Ω

Amplitude Accuracy	U3641	U3641N
Frequency Response	20°C to 30°C, referenced to 30MHz and after calibration	
Preamplifier OFF (Input atten 10dB)	≤±1.0 dB (100 kHz to 2.7 GHz) ≤±2.0 dB (9 kHz to 3.0 GHz)	≤±1.0 dB (100 kHz to 2.2 GHz)
Preamplifier ON (Input atten 0dB)	≤±1.0 dB (100 kHz to 2.7 GHz) ≤±2.0 dB (9 kHz to 3.0 GHz)	≤±1.0 dB (100 kHz to 2.2 GHz)
Calibration Signal Accuracy	–20 dBm ±0.3 dB	+90.5dBµV ±0.3dB
IF Gain Uncertainty	<±0.5 dB (after automatic calibration)	
Scale Fidelity	(after automatic calibration)	
Log	≤ ±1.5 dB/90 dB ≤ ±1.0 dB/10 dB ≤ ±0.2 dB/1 dB	
Linear	≤ ± 5% of reference level, RBW ≥ 3kHz	
Input Attenuator Switching Accuracy	(10dB reference, 20dB to 50dB setting) ≤ ±1.0 dB (100 kHz to 2.7 GHz) ≤ ±1.5 dB (9kHz to 3.0 GHz)	≤ ±1.0 dB (100 kHz to 2.2 GHz)
Resolution Bandwidth Switching Uncertainty	(after automatic calibration) ≤ ±1.0 dB at RBW 3 MHz as reference	

Inputs & Outputs	
RF Input	
Connector	N type jack
Impedance	U3641 : 50 Ω (nominal) U3641N : 75 Ω (nominal)
Preamplifier OFF	VSWR ≤ 1.5 (100 kHz to 2 GHz) VSWR ≤ 2.0 (9 kHz to 3.0 GHz (U3641) /2.2 GHz(U3641N))
Preamplifier ON	(Input atten ≥ 10dB to 50dB) VSWR ≤ 2.5 (10 MHz to 3.0 GHz (U3641) / 2.2 GHz(U3641N), Input atten ≥ 0dB)
10 MHz Reference Input	
Connector	BNC jack, rear panel
Impedance	500 Ω (nominal)
Input Range	0 dBm to +16 dBm
Video Output	
Connector	BNC jack, rear panel
Impedance	75 Ω (nominal) AC coupled
Amplitude	approx. 1 V_{P-P}, 75 Ω (Composite video signal)

Specifications

Inputs & Outputs	
External Trigger Input	
Connector	BNC jack, rear panel
Impedance	10 kΩ (nominal) DC coupled
Trigger Level	TTL level
Gate Input	
Connector	BNC jack, rear panel
Impedance	10 kΩ (nominal)
Sweep Stop	during TTL low level
Sweep Continue	during TTL high level
Phone Output	
Connector	Subminiature Monophonic jack, front panel
Power Output	0.2 W, 8 Ω (nominal)
GPIB interface	IEEE-488, bus Connector
Plotter	HP-GL commands (682-XA)
Printer	PCL commands
RS232C	D-SUB 9 pin, rear panel
Printer	ESC/P commands
Power Input	
Battery mounter	AC/ DC adapter(A08364) or battery (option)

Controller (OPT15 only)	
BASIC program loading	Loads a program from a memory card (JEIDA-Ver.4.1/PCMCIA Rel. 2.0 or later).
BASIC program execution	Executes a BASIC program from a memory card or the flash memory in the unit.
BASIC program creation and editing	With an external terminal connected, programs can be created and edited.
I/O	GPIB : Allows control of external instruments and control from external hosts. RS232C : Allows programs to be created and edited with an external terminal connected.
Recording/storage	Allows data and programs to be recorded/stored in and loaded from a memory card (JEIDA-Ver.4.1/PCMCIA Rel. 2.0 or later).

High-Stability Reference Source(OPT20 only)	
Frequency	10MHz
Frequency Accuracy	$\pm 2 \times 10^{-8}$ / day $\pm 1 \times 10^{-7}$ / year

Narrow RBW (OPT26 only)	
Resolution Bandwidth (3 dB)	
Range	300Hz, 100Hz
Bandwidth accuracy	≤ ±20 %
Selectivity	≤15:1 (60 dB : 3 dB)

TV Demodulation Function (OPT 72 only)	
TV demodulation	
Demodulation type	NTSC, PAL, SECAM
TV standard	M, B/G, D/K/K', I, L/L'
Demodulation output	Video, Sound
TV Image Demodulation Output	
Connector	BNC jack, rear panel
Inpedance	75 Ω (nominal) DC coupled
Amplitude	approx. 1 V_{P-P}, 75 Ω
TV Sound Demodulation Output	
Connector	pin jack, rear panel
Inpedance	1 k Ω (nominal) AC coupled
TV Image Signal Input	
Connector	BNC jack, rear panel
Inpedance	75 Ω (nominal) AC coupled
Input level	about 1 V_{P-P}
TV Sound Signal Input	
Connector	pin jack, rear panel
Inpedance	1k Ω (nominal) AC coupled

Cannot be mounted at the same time as the OPT 60.

Tracking Generator Function (OPT 74 only)	
Frequency range	100 kHz to 2.2 GHz
Output level range	U3641 ; 0 dBm to -31 dBm, 1 dB steps U3641N ; 105dBμV to 74 dBμV, 1dB step
Output level accuracy	≤ ±0.5 dB (at 30 MHz, –10dBm(U3641)/95dBV(U3641N), 20°C to 30°C)
Output level flatness	≤ ±0.7 dB (100 kHz to 1 GHz) ≤ ±1.5 dB (100 kHz to 2.2 GHz) (U3641 ; at –10 dBm, 30 MHz reference) (U3641N ; at 95dBμV, 30MHz reference)
Output level switching accuracy	≤ ±1.0 dB (100 kHz to 1 GHz) ≤ ±2.0 dB (100 kHz to 2.2 GHz) (U3641; at –10 dBm reference) (U3641N ; at 95dBμV reference)
Output spurious	Harmonic < –20 dBc Non-harmonic < –30 dBc
TG leakage	U3641 ; ≤ –95 dBm U3641N ; ≤ 16dBμV
TG output	
Connector	N type jack
Impedance	U3641 ; 50 Ω (nominal)
(≤ 10 dBm output)	U3641N ; 75Ω(normal) VSWR ≤ 1.5 (100 kHz to 2 GHz) VSWR ≤ 2.0 (100 kHz to 2.2GHz) (U3641 ; ≤ 10dBm output) (U3641N ; ≤ 95dBμ output)

Channel Input Setting (OPT 78 only)	
Channel setting	Channel setting for VHF, UHF, CATV, BS and CS. Two user channels are available and 99 channels can be registered for each channel

OPT 78 is included in OPT 72.
Cannot be mounted at the same time as fhe OPT 60.

CDMA Measurement (OPT 60 only)	
Measurement standard	Conforms to CDMA standard IS95 and J-STD-008
Channel input function	
US cellular	1 to 799, 990 to 1023
KOREA cellular	1 to 799, 990 to 1023
CHINA cellular	0 to 1000, 1329 to 2047
JAPAN cellular	1 to 799, 801 to 1039, 1041 to 1199
US PCS	0 to 1199
KOREA PCS	0 to 1300
USER TABLE	99 channels can be created.
Channel power measurement	(After automatic calibration, automatic setting, preamplifier OFF, -50 dBm/ 1.23MHz to +20 dBm/1.23 MHz, within 80 dB range) BNC jack, rear panel
Absolute accuracy	≤ ±2.0 dB (15 °C to 35 °C) ≤ ±2.5 dB (0 °C to 50 °C)
Relative accuracy	≤ ±0.5 dB (15 °C to 35 °C) ≤ ±0.8 dB (0 °C to 50 °C)
Occupied frequency bandwidth (OBW) measurement	Occupation ratio can be set to 10.0% to 99.8%
Adjacent channel leakage power (ACP) measurement	Template display (After making measurement the specified number of times, calculates the reference power and draws a template.) Standard template, user template selectable PASS/FAIL function
Spurious emission (in-band) measurement (relative value)	Template display (After making measurement the specified number of times, calculates the reference power and draws a template.) Standard template, user template selectable PASS/FAIL function

The OPT 72 and OPT 78 cannot be mounted at the same time.

Specifications/Options/Accessories

General Specifications	
Environment Temperature Operating Temperature Non-operating Temperature	 0°C to 50°C, humidity 85% or less –20°C to +60°C
Power Supply External DC Input AC Input Power consumption	 Connector XLR 4 pin Voltage +10V to +16V Automatically selections between 100 VAC and 200 VAC Operation at 100 VAC : Voltage 100 V to 120 V Frequency 50 Hz / 60 Hz Operation at 220 VAC: Voltage 220 V to 240 V Frequency 50 Hz / 60 Hz Operation at DC : 60 W or less AC adaptor use : 100VA or less
Mass	(Without options, accessories, carrying belts, batteries AC adaptor) 6.9 kg or less
Dimensions	approx. 148 (H) × 291 (W) × 330 (D) mm (without feet or connector)
IC Memory Card connector	2 slots JEIDA–Ver.4.1 PCMCIA Rel.2.0 Type 1

Standard accessories
- Power cable : A01412
- N-BNC connector adaptor : JUG-201A/U (U3641; One)
- NC-BNC connector adaptor : BA-A165 (U3641N; One)
- N-C15 connector adaptor : NCP-NFJK (U3641N; One)
- AC-DC adaptor : A08364
- Carrying belt
- Operation manual

Options

Options (sold separately)

OPT 3641 +15 controller option
OPT 3641N +15 controller option
OPT 3641 +20 High-stability reference option
OPT 3641N + 20 High -stability reference option
OPT 3641 +26 Narrow RBW option
OPT 3641N + 26 Narrow RBW option
OPT 3641 + 60 CDMA option
OPT 3641 + 72 TV demodulation option
OPT 3641N + 72 TV demodulation option
OPT 3641 + 74 Tracking generator option
OPT 3641N + 74 Tracking generator option
OPT 3641 + 78 Channel input setting option
OPT 3641N + 78 Channel input setting option

Accessories

cessories (sold separately)

R16072 Transit case
R16216A Carrying case
R16601 Display hood
A02806 Front cover
PROPAC14BATT Batteries
DUAL2402CHARGER Chargers
A09507 64K byte SRAM memory card
A09508 256K byte SRAM memory card
A09509 2M byte SRAM memory card
A01434 DC cable

Application software (sold separately)

GSM/DCS1800-MS software	PU36410300-IC
GSM/DCS1800-BS software	PU36410310-IC
DCS1900-MS software	PU36410500-IC
DCS1900-BS software	PU36410510-IC

Spectrum Analyzers U3641, U3661

U3641: 9 kHz to 3 GHz

U3661: 9 kHz to 26.5 GHz

Lightweight, portable analyzers with synthesizer accuracy for mobile use

Photo 42744

Brief description

Spectrum Analyzers U3641 and U3661 (Advantest) feature exceptional characteristics such as:

- Size and weight: only 148 mm x 291 mm x 330 mm and 6.5 kg / 8.3 kg (without battery or power supply unit)
- Three types of power supply possible: AC supply, battery (up to 1.5 h / 1 h) or direct DC supply
- 15.2 cm (6 inch) colour LCD
- Integrated preamplifier with a gain of >25 dB
- Full dynamic range, eg for GSM pulse measurements
- Two memory card drives to PCMCIA standard for saving measurement results and instrument settings

The main technical features at a glance

- Optional OCXO reference oscillator with aging of 2 x 10^{-8} / day
- Operation independent of AC supply

Measurements on mobile radio base stations

- Dynamic range >70 dB for measuring the power ramp of GSM base stations
- SWR measurements on antennas in conjunction with tracking generator and SWR Bridge ZRB2 (see page 194)
- With BasePak hardware and software package (see page 175): SWR measurements and detection of cable faults using FDR (frequency domain reflectometry)
- Precision measurement of pulse power with the aid of various power measurement functions
- Different power measurement functions (only U3661)
- Gated sweep for display of spectrum due to modulation or switching
- GSM application software for optional controller (only U3641)

Radiomonitoring

- High sensitivity through built-in preamplifier up to 3 GHz for measurements down to –135 dBm with 1 kHz resolution bandwidth
- Input of antenna correction factors and limit curves
- Output of all results also in dBµV
- Ideal combination with Rohde & Schwarz antennas

Modularity through retrofittable options

Options and their functions	Option
Internal controller	15 (only U3641)
Improved reference frequency	20 (not usable with option 73)
100 Hz, 300 Hz RBW additionally	26
CDMA measurements at a key stroke	60 (only U3641, not usable with option 72)
TV demodulator including screen display	72
FM deviation measurements	73 (not usable with option 20)
Tracking generator 100 kHz to 2.2 GHz	74
Channel input	78

Spectrum Analyzer U3641, U3661

Specifications in brief

Internal reference oscillator	standard
Frequency drift in temperature range 0 to +50°C	≥± 1 x 10^{-5}
Aging	≥± 2 x 10^{-6}
OCXO reference oscillator	option 20
Frequency drift in temperature range 0 to +50°C	≥± 1 x 10^{-7}
Aging	≥± 2 x 10^{-8}
Frequency	
Frequency range	
U3641	9 kHz to 3 GHz
U3661	9 kHz to 26.5 GHz
Resolution bandwidths	1 kHz to 3 MHz, wide (5 MHz)/auto
option 26	100 Hz, 300 Hz
Shape factor	15 : 1
Frequency span	1 kHz to 3.2 GHz/zero span
Residual FM	≤60 Hz pp/100 ms
Max. input level	
Preamplifier off	≥±27 dBm
Preamplifier on	≥±13 dBm
Sweep time	50 ms to 1000 s 50 µs to 100 s Zero Span
Tracking generator	option 74
Frequency range	100 kHz to 2.2 GHz
Output level	0 to –31 dBm in 1 dB steps
Level accuracy	≤±0.5 dB at 30 MHz
Frequency response	≤±0.7 dB up to 1 GHz ≤±1.5 dB from 100 kHz to 2.2 GHz
General data	
Operating temperature range	0 to 50°C
Storage temperature range	–20 to +60°C
EMC	complies with the requirements of the European EMC Directives EN 50081-1 and EN 50082-1
Permissible humidity	<85% non-condensing
Power supply	200 to 240 V AC ±10 %, 48 to 66 Hz 100 to 120 V AC ±10 %, 48 to 66 Hz 10 to 16 V DC at XLR connector
Power consumption	approx. 60 W
Dimensions (W x H x D)	148 mm x 291 mm x 330 mm
Weight	approx. 6.9 kg without battery, without power supply

Ordering information

Spectrum Analyzer		
50 Ω	U3641	
75 Ω	U3641N	
50 Ω	U3661	
Options		
Internal controller	15 (only for U3641)	
Improved reference frequency	20	
100/300 Hz resolution bandwidths	26	
CDMA measurements	60 (only for U3641)	
TV demodulator including option 78	72	
Broadband FM demodulator	73	
Tracking generator	74	
Channel input	78	
Extras		
Battery 60 Wh	U4000-B5	
Charger for 2 batteries B5	U4000-C4	
Charger for 4 batteries B5	U4000-C5	
Charger for 4 batteries B5 and diagnostic module	U4000-C6	
Memory card 256 k	A09508	
GSM MS application		
Program for Internal Controller	PU36410300-IC	
GSM BS application		
Program for Internal Controller	PU36410310-IC	
Display Hood	R16601	
DC Connecting Cable	A01434	
SWR Bridge	ZRB2	0373.9017.5x
Transit Case	R16072	
Carrying Case	R16216	
Front Cover	A02806	

Distortion signals, frequency response	**U3641**	**U3661 band 0 (N = 1)**	**U3661 band 1 (N = 1)**	**U3661 band 2 (N = 2)**	**U3661 band 4 (N = 4)**
Frequency range	9 kHz to 3 GHz	9 kHz to 3.2 GHz	3.0 GHz to 7.1 GHz	6.7 GHz to 14.5 GHz	13.7 GHz to 26.5 GHz
Noise floor RBW 1 kHz, ATT 0 dB, VBW 10 Hz	Preamplifier off: ≤–117 dBm + 2.7 f[GHz]dB Preamplifier on: ≤–135 dBm + 4.3 f[GHz]dB	–118 dBm + 2f [GHz] >1 MHz	–115 dBm	–110 dBm	–105 dBm
Intermodulation	Preamplifier off: ≤–70 dBc Preamplifier on: ≤–70 dBc	–70 dBc <1.7 GHz –80 dBc >1.7 GHz	–100 dBc	–100 dBc	–100 dBc
Internal distortion signals	Preamplifier off: ≤–100 dB Preamplifier on: ≤–105 dB	–100 dBm >1 MHz	–90 dBm	–90 dBm	–90 dBm
Phase noise	≤–100 dBc/Hz (10 kHz carrier offset)	≤–100 dBc/Hz + 20 logN	≤–100 dBc/Hz + 20 logN	≤–100 dBc/Hz + 20 logN	≤–100 dBc/Hz + 20 logN
Frequency response	Preamplifier off: ≤±1.0 dB (100 kHz to 2.7 GHz) ≤±2.0 dB (9 kHz to 3 GHz) Preamplifier on: ≤±1.0 dB (100 kHz to 2.7 GHz) ≤±2.0 dB (9 kHz to 3 GHz)	±2 dB	±1.5 dB	±3.5 dB	±4 dB