

Spectrum Analyzers

Lightweight, Compact 6.8 kg max./3-Way Power Source

U4341/4342/4941/PHS

- **Compact, Lightweight**
U4341/4342 Series : 6.8kg
U4941 Series : 6.5kg
- **Wide Measurement Frequency Range**
: 9 kHz to 2.2 GHz
- **Display dynamic range : 100 dB**
- **Many Measuring Functions Provided as Standard**
 - Internal Pre-Amp With 20 dB Gain
 - Reduced dB Measurement Function
- **Input Impedance**
50 Ω : U4341/4342/4941
75 Ω : U4341N/4342N/4941N



(Photo is U4342)

U4341/4342/4941/PHS

RF Field Analyzers

With the spread of digital mobile phones, together with PHS and CATV services, we are advancing steadily into the multimedia society. In this technological environment, rapid installation and maintenance are key to improving customer service satisfaction.

The U4341/4342/4941 Series are RF field analyzers developed to enable this rapid installation and maintenance. At just 6.8 kg, the units are the lightest in their class, and give the user three choices of power supply, including battery power. The Series have a frequency range of 9 kHz to 2.2 GHz, with options to match a wide range of applications, for high performance portable use, literally any time, any place and in any situation.

■ At 6.8 kg (Max.), the Lightest Field Analyzers in Their Class

The analyzers are light and compact (6.8 kg 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.

■ Battery Provides 2 Hours of Operation. Three Power Sources to Choose From

The analyzers operate not only on 100/230 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 two-hour continuous operation at a full charge, making it easier to perform logistically wide-ranging measurements such as maintenance and installation work. Rapid 1 hour battery charging time.

* Battery operation time :

U4341/4341N, U4342/4342N, with options ; about 1.5 hours. U4941/ N, no options ; about 2 hours.

■ Large Color TFT LCD Display

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

■ 2 Memory Card Slots

The analyzers 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 U4341/4342/4941 Series's operation becomes a simple task. (In the U4342/4941 Series, 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.

■ Series and Options Cover Wide Array of Configurations

	PHS-ID demodulator function	TV demodulation function	Tracking generator function	Channel input setting
*1:U4341/4341N	—	Standard	—	Standard
*2:U4342/4342N	OPT. 70	OPT. 72	Standard	OPT. 78
*1:U4941/4941N	OPT. 70	—	—	OPT. 78

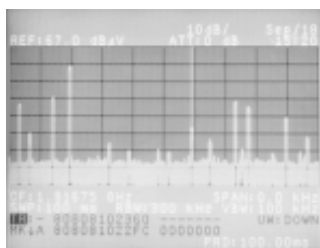
*1 : The U4341/4342/4941 have an input impedance of 50 Ω. The U4341N/4342N/4941N have an input impedance of 75 Ω.

*2 : Either option 70 or option 72 (not both) may be selected.

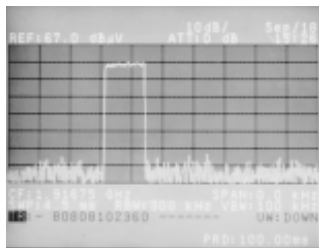
- PHS-ID demodulator function : ID demodulation function for PHS cell stations.
- TV demodulation function : Frequency tuning function by channel input, image/audio demodulation function.
- Tracking generator function : Filter evaluation function/Loss measurement function for the frequency range from 100 kHz to 2.2 GHz.
- Channel input setting : VHF, UHF, CATV, BS, CS channel of various countries and user channel can be set.

TDMA-TDD Waveform Observation (PHS-ID demodulator function)

By selecting the PHS key, the unit enters fixed frequency tuning mode (zero span), and a sweep time of up to 4.5 ms can be set, allowing single slot observation of 625 μ s burst waveforms. Sweep can be initiated using the ID code specified by the ID trigger function, and with the ID marker function, demodulation data such as CI, CS-ID and PS-ID can be displayed simultaneously. The measurement frequency can be set by the PHS channel (carrier number), for more efficient base station transmission timing and measurement of transmission environment.



▲ Multiple station measurement waveform



▲ Single station measurement waveform

Picture/Sound Demodulation (TV demodulation function)

The PICTURE KEY switches from a spectrum display to a TV image display. Sound demodulation is provided simultaneously to compare easily the spectrum waveform and the images.

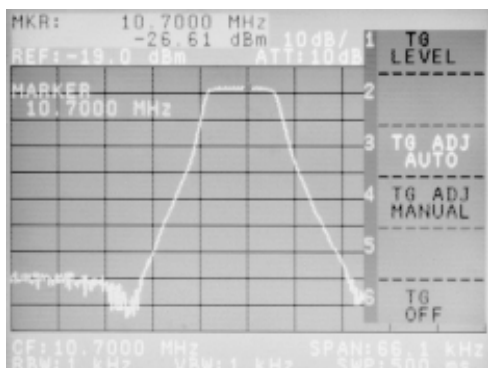
The equipment can be used as a demodulator for arbitrary frequencies as in a TV Broadcasting Center's IF bands or CATV uplink image checking.



▲ TV picture demodulation

Frequency Characteristics Evaluations of Filters and Amplifiers (Tracking generator function)

The U4342 and U4342N 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. It is also possible to perform impedance matching evaluation, return loss method, by using a directional coupler.



▲ Characteristic analysis of band pass filter

Specifications

Frequency (All Series Models)	
Frequency Range	9 kHz to 2.2 GHz
Frequency Readout Accuracy	(Start, Stop, CF, Marker) $\pm(\text{span} \times \text{span accuracy} + 0.15 \times \text{RBW} + 50 \text{ kHz})$
Count Frequency Marker	
Resolution	1 Hz to 1 kHz
Count Accuracy	$\pm(\text{marker freq} \times \text{freq reference accuracy} + 1 \text{ LSD} \pm 5 \text{ Hz})$
Accuracy	$(S/N \geq 25 \text{ dB}, \text{RBW} \geq 100 \text{ kHz}, 50 \text{ kHz} \leq \text{SPAN} \leq 10 \text{ MHz})$
Frequency Reference Accuracy	$\pm 2 \times 10^{-6}/\text{year}$ $\pm 1 \times 10^{-5}$ (at 0 to 50°C)
Frequency Span	
Range	50 kHz to 2.4 GHz, ZERO span
Accuracy	$\leq \pm 5\%$ (SPAN $\geq 100\text{kHz}$)
Frequency Stability	
Residual FM	$\leq 3 \text{ kHz}_{p-p}/100 \text{ ms}$
Frequency Drift	$\leq 10 \text{ kHz}$ After warm up 30 min. Sweep time 50 ms to 5 s At stable temperature
Noise Sidebands	$\leq -100 \text{ dBc/Hz}$ at 20 kHz offset
Resolution Bandwidth (3 dB)	
Range	1 kHz to 3 MHz 1-3 sequence
Bandwidth Accuracy	$\leq \pm 20\%$ 1 kHz to 1 MHz $\leq \pm 25\%$ 3 MHz
Selectivity	$\leq 15:1$ (60 dB : 3 dB)
Bandwidth (6dB)	U4341 Series : — U4342/4941 Series : 9 kHz, 120 kHz
Video Bandwidth	10 Hz to 3 MHz

Amplitude Range	U4341/4342/4941	U4341N/4342N/4941N
Amplitude Range	+20 dBm to displayed Average Noise Level	+130 dB μ V to displayed Average Noise Level
Maximum Input Level	$\pm 50 \text{ V DC max.}$	
Preamplifier OFF (Input atten $\geq 10 \text{ dB}$)	+27 dBm	+134 dB μ V
Preamplifier ON (Input atten $\geq 0 \text{ dB}$)	+13 dBm	+120 dB μ V
Display Range		
Log	10 \times 10 div 10, 5, 2, 1 dB/div	
Linear	10% of reference level/div	
QP Log	U4341 Series : — U4342/4941 Series : 40 dB (5 dB/div)	
Reference Level Range		
Preamplifier OFF		
Log	-64 to +40 dBm (0.1 dB step)	+46 to +150 dB μ V (0.1 dB step)
Linear	141.1 μ V to 22.36 V	199.5 μ V to 31.62 V
Preamplifier ON		
Log	-84 to +10 dBm (0.1 dB step)	+26 to +120 dB μ V (0.1 dB step)
Linear	14.11 μ V to 707.1 mV	19.95 μ V to 1 V
Input Attenuator Range	0 to 50 dB (10 dB step)	

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U4341/4342/4941/PHS (Continued From Previous Page)

Sweep (All Series Models)	
Sweep Time Accuracy	50 ms to 1000s and manual sweep 4.5 ms to 1000s and ZERO span
Accuracy	≤ ± 5%
Trigger mode	FREE RUN, SINGLE, VIDEO, EXT, TV

Demodulation (All Series Models)	
Spectrum Demod	
Modulation Type	AM and FM
Audio Output	Speaker and phone jack with volume control

Dynamic Range	U4341/4342/4941	U4341N/4342N/4941N
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	-132 dBm + 3.3f (GHz) dB	-23 dBμV + 3.3f (GHz) dB
Gain Compression	(1 dB)	
Preamplifier OFF (mixer input level, f ≥ 10 MHz)	>-10 dBm	>+100 dBμV
Preamplifier ON (RF input level, f ≥ 10 MHz)	>-40 dBm	>+70 dBμV
Spurious Response		
Preamplifier OFF		
Second Harmonic Distortion	≤ -70 dB (-30 dBm input, input atten 0 dB, f ≥ 10 MHz)	
Third Order Intermodulation Distortion	≤ -70 dB (-30 dBm input, input atten 0 dB, f ≥ 10 MHz)	
Residual Response	(Input atten 0 dB, f ≥ 1 MHz)	
Preamplifier OFF	≤ -100 dBm, 50Ω	≤ +10 dBμV, 75Ω
Preamplifier ON	≤ -115 dBm, 50Ω	≤ -5 dBμV, 75Ω

Amplitude Accuracy	U4341/4342/4941	U4341N/4342N/4941N
Frequency Response		
Preamplifier OFF	≤ ± 1.0 dB (100 kHz to 2 GHz) ≤ ± 2.0 dB (9 kHz to 2.2 GHz) At Input atten 10 dB, 20 to 30°C after calibration, 30 MHz reference	
Preamplifier ON	≤ ± 1.0 dB (100 kHz to 2 GHz) ≤ ± 2.0 dB (9 kHz to 2.2 GHz) At Input atten 0 dB, 20 to 30°C after calibration, 30 MHz reference	
Calibration Signal Accuracy	-20 dBm ± 0.3 dB	+90.5 dBμV ± 0.3 dB
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	
Input Attenuator	(20 to 50 dB settings referenced to 10 dB)	
Switching Accuracy	≤ ± 1.0 dB (100 kHz to 2 GHz) ≤ ± 1.5 dB (9 kHz to 2.2 GHz)	
Resolution Bandwidth	(after automatic calibration)	
Switching Uncertainty	≤ ± 1.0 dB at RBW 3 MHz as reference	

Inputs & Outputs (All Series Models)	
RF Input	
Connector	N type jack
Impedance	U4341/4342/4941 : 50Ω (nominal) U4341N/4342N/4941N : 75Ω (nominal)
Preamplifier OFF (Input atten 10 dB)	VSWR ≤ 1.5 (100 kHz to 2 GHz)
Preamplifier ON (Input atten 0 dB)	VSWR ≤ 2.0 (9 kHz to 2.2 GHz) VSWR ≤ 2.1 (10 MHz to 2 GHz)
10 MHz Reference Input	
Connector	BNC jack, rear panel
Impedance	50Ω (nominal)
Input Range	+8 to +16 dBm
Video Output	
Connector	BNC jack, rear panel
Impedance	75Ω (nominal) AC coupled
Amplitude	approx. 1 V _{P-P} 75Ω (Composite video signal)
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, 8Ω (nominal)
GPIB interface	IEEE-488, bus Connector
Plotter	HP-GL commands (682-XA)
Printer	HP/PCL commands
RS232	D-SUB 9 pin, rear panel

TV Signal Analysis Function (U4341/4341N/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
Impedance	75Ω (nominal) DC coupled
Amplitude	approx. 1 V _{P-P} , 75Ω
TV Sound Demodulation Output	
Connector	pin jack, rear panel
Impedance	1 kΩ (nominal) AC coupled
TV Image Signal Input	
Connector	BNC jack, rear panel
Impedance	75Ω (nominal) AC coupled
Input level	about 1 V _{P-P}
TV Sound Signal Input	
Connector	pin jack, rear panel
Impedance	1 kΩ (nominal) AC coupled

U4341/4342/4941/PHS

PHS-ID Demodulator Function (Option 70 only)	
Signal Reception	
Radio access format	TDMA-TDD
Modulation format	$\pi/4$ shift QPSK
Transmission speed	384K bits/second
Signal channel	Logic control channel code configuration conforms to RCR STD-28
Level Measurement Range	
Reception performance	level measurement SWP = 400 ms max. Preamplifier OFF : (input atten = 10 dB) 52 dB μ V to 107 dB μ V Preamplifier ON : (input atten = 0 dB) 16 to 67 dB μ V
Sweep trigger modes	FREE RUN, VIDEO, ID
Measurement Functions	
ID list displays	CI, CS-ID, PS-ID, level, time
ID-MKR	Display of specified signal ID in waveform display mode
Period measurement	Measurement of specified CS-ID
Burst Error Rate	The number of error slots/The measured (Set) number
Level measurement operations	Center value processing Average value processing Max./min. value processing

Tracking Generator Function (U4342/4342N/4342PHS only)	
Frequency range	100 kHz to 2.2 GHz
Output level range	U4342 ; 0 to -31 dBm, 1 dB steps U4342N ; 105 to 74 dB μ V, 1 dB step
Output level accuracy	$\leq \pm 0.5$ dB (at 30 MHz, -10 dBm(U4342)/95dB μ V(U4342N), 20 to 30°C)
Output level flatness	$\leq \pm 0.7$ dB (100 kHz to 1 GHz) $\leq \pm 1.5$ dB (100 kHz to 2.2 GHz) (U4342 ; at -10 dBm, 30 MHz reference) (U4342N ; at 95 dB μ V, 30 MHz reference)
Output level switching accuracy	$\leq \pm 1.0$ dB (100 kHz to 1 GHz) $\leq \pm 2.0$ dB (100 kHz to 2.2 GHz) (U4342 ; at -10 dBm reference) (U4342N ; at 95 dB μ V reference)
Output spurious	Harmonic < -20 dBc Non-harmonic < -30 dBc
TG leakage	U4342 ; ≤ -95 dBm U4342N ; ≤ 16 dB μ V
TG output	
Connector	N type jack
Impedance	U4342/4342PHS ; 50 Ω (nominal) U4342N ; 75 Ω (normal)
(≤ 10 dBm output)	VSWR ≤ 1.5 (100 kHz to 2 GHz) VSWR ≤ 2.0 (100 kHz to 2.2 GHz) (U4342 ; ≤ -10 dBm output) (U4342N ; ≤ 95 dB μ V output)

Channel Input setting (U4341/4342/OPT 78 only)	
Channel setting	Channel setting for VHF, UHF, CATV, BS and CS. Two user channel are available and 99 channels can be registered for each channel

OPT. 78 is included in OPT. 72.

General Specifications (All Series Models)

Environment Temperature:

Operating Temperature; 0 to 50°C, humidity 85 % or less
Non-operating Temperature; -20 to + 60°C

Power Supply:

External DC Input; Connector XLR 4 pin Voltage + 10V to + 16V
AC Input; Automatically selections between 100 and 200VAC
Operation at 100 VAC: Voltage 100 to 120 V, Frequency 50/60Hz
Operation at 220 VAC: Voltage 220 to 240 V, Frequency 50/60Hz

Power consumption ;

<U4341 Series>

Operation at DC : Max. 55 W

AC adaptor use : 120 VA or less

Maximum peak power consumption of AC adaptor is ≥ 330 VA

<U4342/4941 Series>

Operation at DC : Max. 50 W

AC adaptor use : 110 VA or less

Maximum peak power consumption of AC adaptor is ≥ 300 VA

Mass : (Without options, accessories, carrying belts, batteries)

U4341/4341N : 6.8 kg or less

U4341/4342N : 6.8 kg or less

U4341/4941N : 6.5 kg or less

U4342PHS : 6.8 kg or less

U4941PHS : 6.8 kg or less

Dimensions : approx. 148 (H) \times 291 (W) \times 330 (D) mm
(Without feet or connector)

IC Memory Card : 2 slots

connector ; JEIDA-Ver.4.1 PCMCIA Rel.2.0

Standard accessories :

A01412 Power cable

JUG-201A/U N-BNC connector adaptor : (U4341N/4941 ; One, U4342 ; Two)

BA-A165 NC-BNC connector adaptor : (U4341N/4941 ; One, U4342N ; Two)

NCP-NFJK N-C15 connector adaptor : (U4341N/4342N/4941N only)

A08364 AC-DC adaptor

A09507 SRAM card (64K byte)

: (U4341/4341N/option 72 only)

Carrying belt

Operation manual

Options (sold separately)

U4941/4941N Options

Option 4941+78 Channel input option

Option 4941N+78 Channel input option

U4342/4342N Options

Option 4342+72 TV demodulation option

Option 4342N+72 TV demodulation option

Option 4342+78 Channel input option

Option 4342N+78 Channel input option

Accessories (sold separately)

R16072 Transit case

R16216A Carrying case

R16601 Display hood

A02806 Front cover

PROPAC 14 BATT Batteries

DUAL-2401-CHARGER Chargers

A09507 64K byte SRAM memory card

A09508 256K byte SRAM memory card

A09509 2M byte SRAM memory card

A01434 External DC power input cable

A04210 1.9 GHz BPF

HRM-554S N-SMA converter adapter

TCF-358HAA1500 1.5 m SAM cable

TCF-358HAA2000 2.0 m SAM cable

4XAM1001 Antenna connector

3XAM1618 PHS antenna

MAGNET-KIDAI Magnetic antenna mount for use on vehicles