Anritsu

MX880131A/880132A

PDC/PHS Measurement Software

(For MT8801C Radio Communication Analyzer)

High-Speed Tester for PDC/PHS Systems

All in 1

1 unit for both PDC and PHS systems
All basic transmission and reception measurements performed by 1 unit
Ten transmission tests in approx. 1 second

Four measurement instruments

The MT8801C can be used to test mobile and base station equipment of PDC or PHS by installing exclusive measurement software.

It incorporates a thermocouple power meter, a transmitter tester, a digital modulation signal generator and a bit error tester, covering the frequency range from 300 kHz to 3 GHz, for efficient and reliable transmission and reception testing.

In transmission tests, Anritsu's unique DSP (digital signal processing) high-speed measurement method has been developed in addition to measurement methods based on ARIB and TELEC standards. As a result, measurement time is greatly reduced for improved efficiency in production and maintenance. GPIB and RS-232C interfaces are standard, so MT8801C can be incorporated easily into automated production lines or on-site automated testing systems.

Unique high-speed measurement method

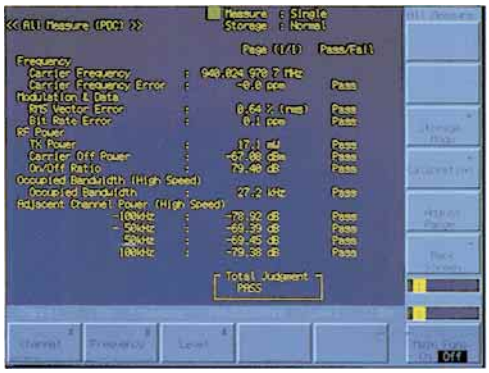
Occupied bandwidth and adjacent channel power can be measured either by methods conforming to ARIB standards and Technical Standard Conformity Certification, or using Anritsu's unique high-speed DSP measurement method.

For ARIB standards, a spectrum analyzer is used to determine the occupied bandwidth and adjacent channel power from the burst signal frequency spectrum. In this method, frequency sweeps must be performed slowly to obtain an accurate burst wave spectrum, so measurement speed falls. For example, more than 10 seconds are required when measuring PDC. With Anritsu's unique measurement method, digital single processing is use to compute the frequency components from a burst signal waveform, and the occupied bandwidth and adjacent channel power are computed from the results. Measurement time of approx. 1 second is possible for PDC transmitters.

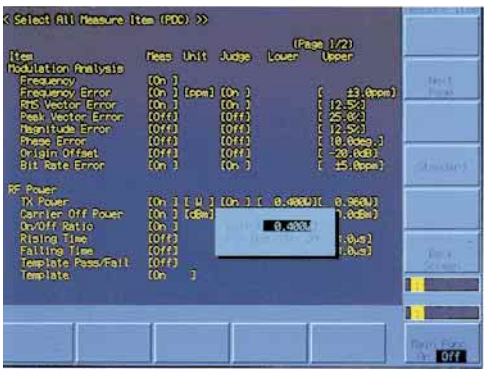
Rapid Measurement, High-Accurate Power Measurement

Batch measurements of transmission test items

Only about 1 second is required to measure all major transmission test items, transmission frequency, modulation accuracy, origin offset, transmission rate, transmission power, leakage power during carrier-off, GO/NO decision of rise/fall edge characteristics with template (limit line), rise/fall time, occupied bandwidth, and adjacent channel power. Pass/fail decisions for limit value of each test item can also be displayed.



In addition to defining limit value for pass/fail decisions, the user can also specify whether pass/fail decisions are to be made and define the measurement items and methods.

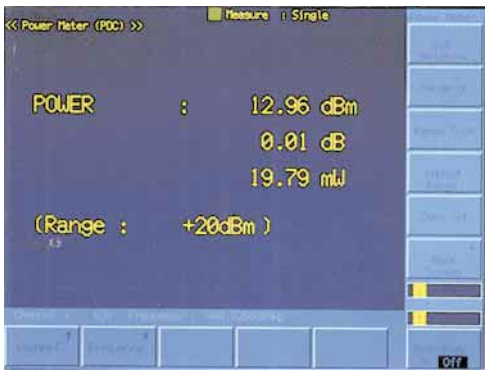


Calibration functions

A built-in thermocouple power sensor is used for calibration, providing accurate measurement of absolute values such as average power during burst-on and leakage power during carrier-off. There is no need for other instruments; Just one press of the CAL key during measurement performs calibration.

Wide-band power meter

The power meter with built-in thermocouple power sensor can accurately measure power between 0 and +40 dB.



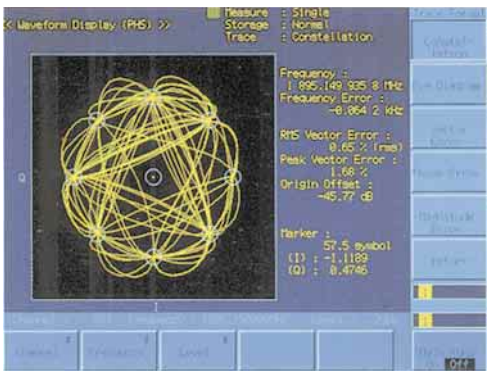
User CAL factor input

By setting the loss of a connected cable or external attenuator as the “USER CAL FACTOR,” measurement results compensated by that value can be displayed.

Graphic Functions for Detailed Analysis

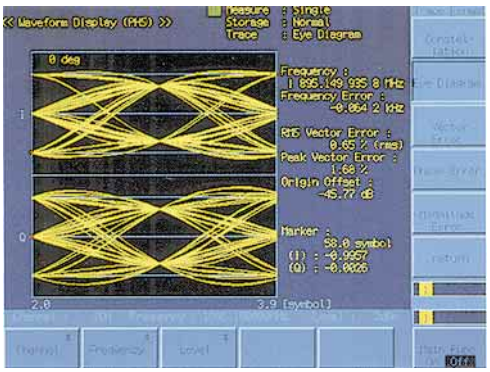
Constellation display function

The I/Q vector components of measured signals are displayed. The frequency error, RMS/PEAK vector errors, and origin offset can be shown on the same screen.



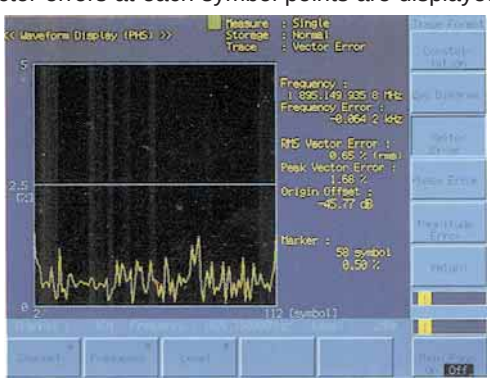
Eye diagrams

Eye margins at symbol points are displayed.



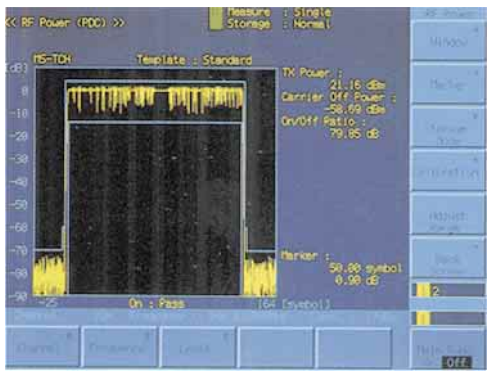
Vector errors at symbols

The vector errors at each symbol points are displayed.

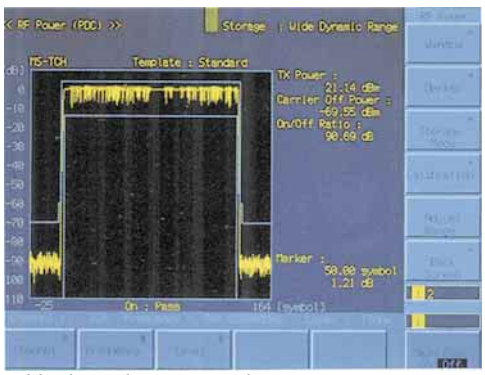


Measurement of antenna power and leakage power during carrier-off

At measurement of burst signal antenna power, the burst-on section are auto-detected based on the modulated wave, so an external synchronization trigger is not needed. In addition, the average power during burst-on section is automatically matched to a template value, simplifying measurement automation. Any template can be set, and three types can be stored. The leakage power during carrier-off can be measured as either an absolute value or as an on/off ratio. When the carrier-off power is low, measurements can be performed in wide-dynamic-range mode (during single-mode measurements with synchronizing word).



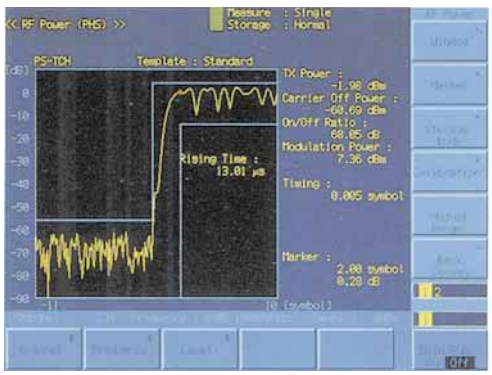
Normal mode



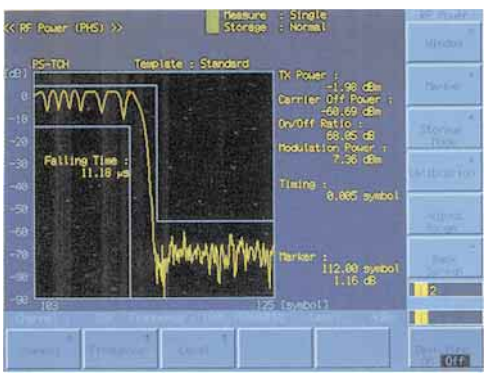
Wide-dynamic-range mode

Measurement of antenna power rise/fall edge characteristics

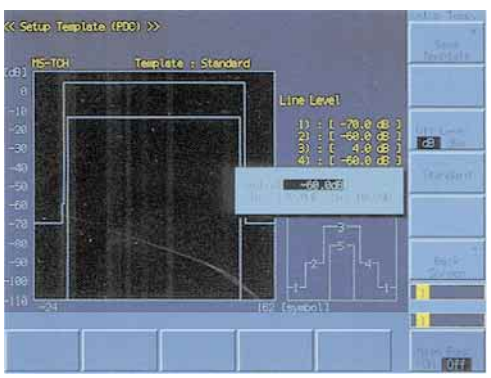
Antenna power rise/fall edge characteristics can be measured simultaneously with antenna power measurements. In addition, the marker points can be moved and the power can be read with 1/10 symbol resolution.



Rise edge characteristics



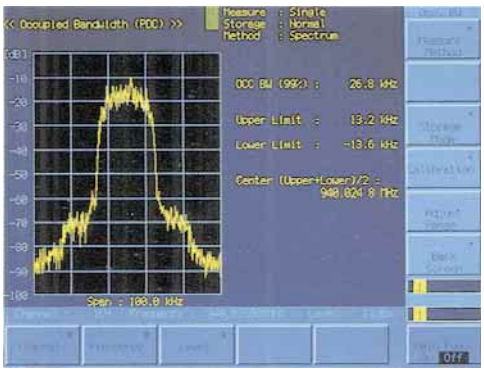
Fall edge characteristics



Template setting

Measurement of occupied bandwidth

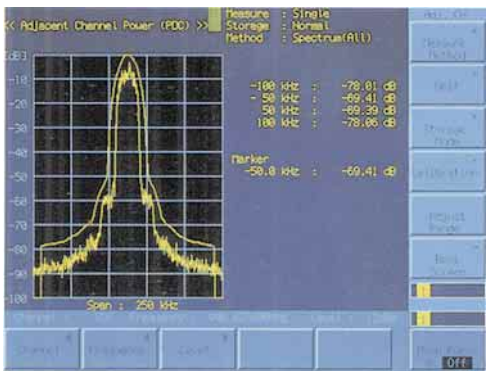
The standard measurement mode using the spectrum analyzer method, or the high-speed measurement mode, which reduces measurement time, can be used.



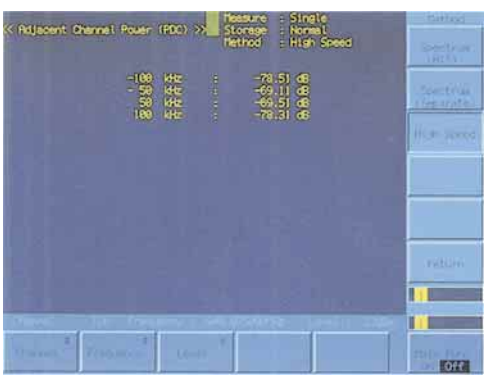
Standard measurement mode

Measurement of adjacent channel power

The standard measurement mode using the spectrum analyzer method, or the high-speed measurement mode, which reduces measurement time, can be used.



Standard measurement mode



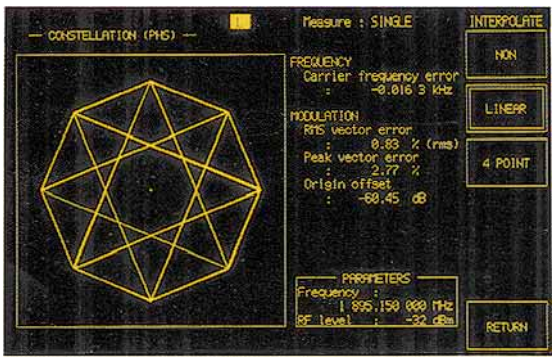
High-speed measurement mode

Receiver Sensitivity Measurement

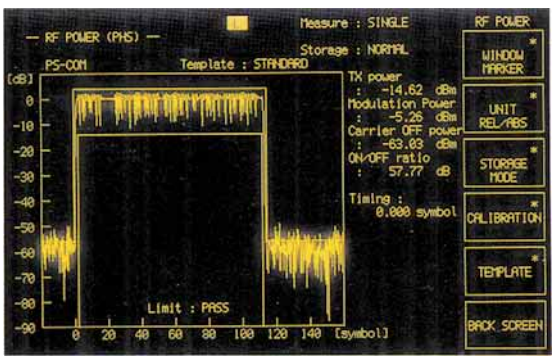
Digital modulation signal generator

The MT8801C has a digital modulation signal generator covering 300 kHz to 3 GHz for reception sensitivity measurement.

Burst signals suited to communication systems
The MT8801C has a TDMA system frame structure and modulation patterns for each time slot covering the communication system standards. Modulation pattern for down communication channel is provided, and is output at the system required timing by using the trigger input/output signal. Hence the MT8801C can generate the burst signals needed to measure the receiver sensitivity.

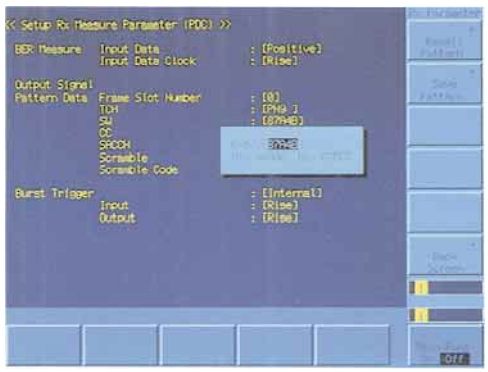


Constellation display



Burst waveform

Greater freedom in choosing modulation patterns within time slots
Any one time slot can be selected freely. There is considerable freedom in choosing the modulation pattern within slots; either a PN9 or PN15 TCH segment can be chosen, and part of the data outside the TCH segment can be edited. The pattern memory function can be used to store and recall patterns. A data scrambling function is provided as standard, and any initial code can permit more sophisticated evaluations and diagnostics using the MT8801C as a supposed base station.



Setup RX parameter display

High-accurate output power
A unique ALC (automatic level control) function ensures a high-accurate output power and flat frequency response at $\pi/4$ DQPSK modulation, even for burst signals.

Continuously-variable output level
The continuously-variable level mode enables variation of the output level in 0.1 dB steps over a 20 dB range (0 to –20 dB) from a given level, without momentary signal interruption.

Measurement of reception sensitivity

PN9 and PN15 error rates can be measured. The number of measurement bits can be chosen from among 10^2, 2558, 10^3, 10^4, 10^5, 10^6, and ∞. The number of errors and error rate are displayed. When used with external signal generator for interference signal source, adjacent channel selectivity, intermodulation and other parameter can be measured.

BER measurement

Measurement Software and Items

• MX880131A: PDC (Personal Digital Cellular) Measurement Software

Measurement item	ARIB STD-27D	Technical Standard Conformity Certification (TELEC)	Anritsu's high-speed measurement
Frequency deviation	✔	✔	
Occupied bandwidth	✔	✔	✔
Antenna power deviation	✔	✔	
Leakage power during carrier-off	✔	✔	
Rise/fall edge characteristics	✔	—	
Rise/fall time			✔
Modulation accuracy	✔	—	
Origin offset	✔		
Adjacent channel power		✔	✔
Transmission rate			✔
Receiver sensitivity	✔	—	

• MX880132A: PHS (Personal Handy Phone System) Measurement Software

Measurement item	ARIB STD-27D	Technical Standard Conformity Certification (TELEC)	Anritsu's high-speed measurement
Frequency deviation	✔	✔	
Occupied bandwidth	✔	✔	✔
Antenna power deviation	✔	✔	
Leakage power during carrier-off			✔
Rise/fall edge characteristics	✔	—	
Rise/fall time			✔
Modulation accuracy	✔	—	
Origin offset	✔		
Adjacent channel power	✔	✔	✔
Transmission rate			✔
Receiver sensitivity	✔		

✔: Measurement with MT8801C
—: Measurement not stated in Technical Standard Conformity Certification (TELEC)

Specifications

• MX880131A (PDC Measurement Software)

Transmission measurement	Frequency/modulation measurement	Frequency: 10 MHz to 2.2 GHz Input level range: –5 to +40 dBm (average power of burst signal, MAIN connector) –30 to +15 dBm (average power of burst signal, AUX connector) Carrier frequency measurement accuracy: ±(reference oscillator accuracy + 1 Hz) Modulation accuracy: ±(2% of indicated value + 0.5%) Origin offset accuracy: ±0.5 dB (relative to signal of –30 dBc) Transmission rate Measurement range: 42 kHz ±100 ppm Accuracy: ±1 ppm Waveform display: Constellation display
	Amplitude measurement	Frequency range: 10 MHz to 2.2 GHz Input level range: +10 to +40 dBm (average power of burst signal, MAIN connector) Transmission power accuracy: ±10% (MAIN connector, after calibration) Carrier-off power measurement range: ≥65 dB (normal mode, compared to average power of burst signal) ≥95 dB (wide-dynamic-range mode, compared to average power of burst signal: 3 W) *Measured limit determined by average noise level (≤–60 dBm, 100 MHz to 2.1 GHz) Rise/fall edge characteristics: Displays waveform while synchronizing modulation data to measured signal, displays limit line, measures rise/fall edge time (measured at 100 kHz bandwidth)
	Occupied bandwidth measurement	Frequency range: 10 MHz to 2.2 GHz Input level range: +10 to +40 dBm (average power of burst signal, MAIN connector) Standard mode: Displays calculation result after signal measured with sweep-type spectrum analyzer High-speed mode: Displays calculation result after FFT of signal measured
	Adjacent channel power measurement	Frequency range: 100 MHz to 2.2 GHz Input level range: +10 to +40 dBm (average power of burst signal, MAIN connector) Standard mode: Displays calculation result after signal measured with sweep-type spectrum analyzer High-speed mode: Displays calculation result after analyzing signal (one burst) with spectrum analyzer emulation Measurement range: ≥60 dB (50 kHz offset), ≥65 dB (100 kHz offset)
	Batch measurement functions	Measurement item: Transmission frequency, frequency error, modulation accuracy, origin offset, transmission rate, antenna power, leakage power during carrier-off, GO/NO decision of rise/fall edge characteristics with template (limit line), rise/fall time, occupied bandwidth, adjacent channel power Measurement time: ≤1.5 s (amplitude measurement: normal mode; occupied bandwidth and leakage power of adjacent channel measurements: high-speed mode), ≤2 s (amplitude measurement: wide-dynamic-range mode; occupied bandwidth and leakage power of adjacent channel measurements: high-speed mode)
Reception measurement	Signal generator	Frequency range: 10 MHz to 3 GHz Level setting range: –143 to –28 dBm (MAIN connector), –143 to –3 dBm (AUX connector) Modulation system: $\pi/4$ DQPSK, α=0.5 (root-Nyquist filter) Modulation accuracy: ≤3%rms Burst repetition rate: 20 ms (normal), 40 ms (half rate) *Single burst output in one frame modulation data slots Modulation data At continuous signal output: PN9/PN15 pseudorandom pattern, any 4-bits repetition pattern At burst signal output: Up/down communication channel selectable, edits data within slots
	Error rate measurement	Function: Sync with signal generator modulation data and measures error rate Measurement pattern: PN9, PN15 Input level: TTL (NRZ) Number of measurement bits: 10^2, 2556, 10^3, 10^4, 10^5, 10^6, ∞ Input connector: BNC (rear panel) or DUT interface (front panel, D-sub 25-pin connector)

• MX880132A (PHS Measurement Software)

Transmission measurement	Frequency/modulation measurement	Frequency: 10 MHz to 2.2 GHz Input level range: –5 to +40 dBm (average power of burst signal, MAIN connector) –30 to +15 dBm (average power of burst signal, AUX connector) Carrier frequency measurement accuracy: ±(reference oscillator accuracy +10 Hz) Modulation accuracy: ±(2% of indicated value +0.7%) Origin offset accuracy: ±0.5 dB (relative to signal of –30 dBc) Transmission rate Measurement range: 384 kHz ±100 ppm Accuracy: ±1 ppm Waveform display: Constellation display
	Amplitude measurement	Frequency range: 10 MHz to 2.2 GHz Input level range: +10 to +40 dBm (average power of burst signal, MAIN connector) Transmission power accuracy: ±10% (MAIN connector, after calibration) Carrier-off power measurement range: ≥55 dB (Normal mode, compared to average power of burst signal) ≥69 dB (Wide-dynamic-range mode, compared to average power of burst signal: 80 mW) *Measured limit determined by average noise level (≤–50 dBm, 100 MHz to 2.2 GHz) Rise/fall edge characteristics: Displays waveform while synchronizing modulation data to measured signal, displays limit line, measures rise/fall edge time (measured at 1 MHz bandwidth) Transmission timing PS: Measures duration of CS, PS unique word send interval (capable of working with CS or signal generator equivalent to CS) CS: Measures slot send interval time
	Occupied bandwidth measurement	Frequency range: 10 MHz to 2.2 GHz Input level range: +10 to +40 dBm (average power of burst signal, MAIN connector) Standard mode: Displays calculation result after signal measured with sweep-type spectrum analyzer High-speed mode: Displays calculation result after FFT of measured signal
	Adjacent channel power measurement	Frequency range: 100 MHz to 2.2 GHz Input level range: +10 to +40 dBm (average power of burst signal, MAIN connector) Standard mode: Displays calculation result after signal measured with sweep-type spectrum analyzer High-speed mode: Displays calculation result after analyzing signal (one burst) with spectrum analyzer emulation Measurement range: ≥60 dB (600 kHz offset), ≥65 dB (900 kHz offset)
	Batch measurement functions	Measurement item: Transmission frequency, frequency error, modulation accuracy, origin offset, transmission rate, antenna power, leakage power during carrier-off, GO/NO decision of rise/fall edge characteristics with template (limit line), rise/fall time, occupied bandwidth, adjacent channel power Measurement time: ≤1.5 s (amplitude measurement: normal mode; occupied bandwidth and adjacent channel power measurements: high-speed mode), ≤2 s (amplitude measurement: wide-dynamic-range mode; occupied bandwidth and leakage power of adjacent channel measurements: high-speed mode)
Reception measurement	Signal generator	Frequency range: 10 MHz to 3 GHz Level setting range: –143 to –28 dBm (MAIN connector), –143 to –3 dBm (AUX connector) Modulation system: $\pi/4$ DQPSK, α=0.5 (root-Nyquist filter) Modulation accuracy: ≤3%rms Burst repetition rate: 5 ms (frame period, single burst output in one frame) Modulation data At continuous signal output: PN9/PN15 pseudorandom pattern, any 4-bits repetition pattern At burst signal output: Up/down communication channel selectable, edits data within slots *Scramble function on/off and scramble code setting
	Error rate measurement	Function: Sync with signal generator modulation data and measures error rate Measurement pattern: PN9, PN15 Input level: TTL (NRZ) Number of measurement bits: 10^2, 2556, 10^3, 10^4, 10^5, 10^6, ∞ Input connector: BNC (rear panel) or DUT interface (front panel, D-sub 25-pin connector)

Ordering Information

Please specify the model/order number, name and quantity when ordering.

Model/order No.	Name
	— Main frame —
MT8801C	Radio Communication Analyzer
	— Standard accessories —
J0576B	Coaxial cord (N-P • 5D-2W • N-P), 1 m: 1 pc
J0768	Coaxial adapter (N-J • TNC-P): 2 pcs
	Power cord: 1 pc
F0014	Fuse, 6.3 A: 2 pcs
	— Options*1 —
MT8801C-01	Analog measurement
MT8801C-04	AF low impedance output (requires Option 01)
MT8801C-07	Spectrum analyzer
MT8801C-11	GSM audio test (requires MX880115A and Option 01)
MT8801C-12	CDMA measurement (requires Option 01)
MX880113A	IS-136A Measurement Software (requires Option 01)
MX880114A	AMPS/PCS1900 Measurement Software (requires Option 01)
MX880115A	GSM Measurement Software
MX880116A	PDC Measurement Software with Call Processing
MX880117A	PHS Measurement Software with Call Processing
MX880118A	DECT Measurement Software (requires Option 07)
MX880131A	PDC Measurement Software
MX880132A	PHS Measurement Software

Model/order No.	Name
MX880201A-01	Soft handoff (requires Option 12)
W1331AE	MX880131A operation manual (standard accessory for MX880131A, 1 copy)
W1332AE	MX880132A operation manual (standard accessory for MX880132A, 1 copy)
	— Optional accessories —
J0127C	Coaxial cord (BNC-P • RG-58A/U • BNC-P), 0.5 m
J0769	Coaxial adapter (BNC-J • TNC-P)
J0040	Coaxial adapter (N-P • BNC-J)
MA1612A	Four-Point Junction Pad (5 to 3000 MHz)
J0395	Fixed attenuator for high power (30 dB, 30 W, dc to 9 GHz)
J0007	GPIB cable, 1 m (408JE-101)
J0008	GPIB cable, 2 m (408JE-102)
B0329D	Front cover (1MW 5U)
B0331D	Front handle kit (2 pcs/set)
B0332	Joint plate (4 pcs/set)
B0333D	Rack mount kit
B0334D	Carrying case (hard type, with protective cover and casters)
J0742A	RS-232C cable, 1 m (for PC-98 PC, D-sub 25-pin)
J0743A	RS-232C cable, 1 m (for DOS/V PC, D-sub 9-pin)

*1: Options 01, 04, 07, 11 and 12 are installed in Anritsu.
It can be retrofitted to an already purchased MT8801C. For details, contact your Anritsu sales representative.

Anritsu

Specifications are subject to change without notice.

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