Anritsu

MX880117A

PHS Measurement Software with Call Processing

(For MT8801C Radio Communication Analyzer)

High-Speed Tester for PHS Mobile Phones

All in 1

1 unit for PHS, PDC, GSM, DCS1800, PCS1900, IS-136A and CDMA system.
All basic transmitter and receiver measurements performed by 1 unit.
Performs many transmitter tests simultaneously in less than 2 second.

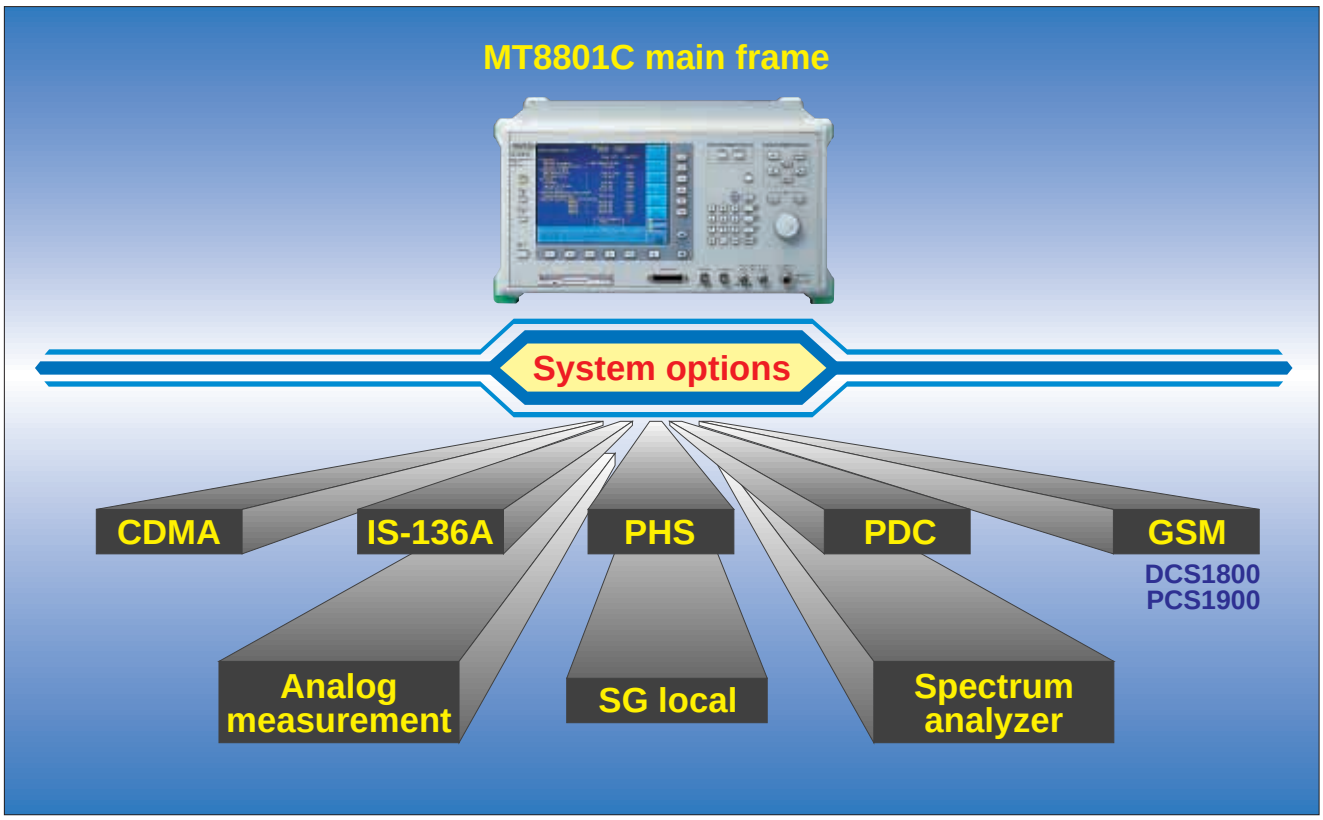
Digital mobile communications systems today encompass many different formats and technologies, each requiring highly specialized test requirements. Manufacturing test requires fast, highly accurate test equipment that is flexible by design, capable of changing between PHS and other formats. To meet this demand, Anritsu has developed the MT8801C Radio Communication Analyzer. It enables PHS mobile phone manufactures to increase their terminal production and provide the support to service for mobile phones purchased by subscribers. All of this is achieved while meeting the increased demands for reduced operation costs and test times in all areas.

Multi-system capable measurements in a single unit

The MT8801C combines the functionality of several instruments in one common unit to provide fast, accurate measurements including call processing functions for PHS systems. GPIB and RS-232C interfaces are standard allowing easy integration into existing automated production lines or systems. It also provides a high speed and flexible solution to meet the requirements for increased production and maintenance measuring instruments, and moreover, it contributes to the increased efficiency of measurement operations by providing multi-system support for not only PHS, but also PDC, GSM/DCS1800/ PCS1900, IS-136A and CDMA transmitter and receiver testing in one common unit user configurable by unique measurement softwares.

System type	Measurement software	Description
PHS	MX880117A	TX and RX measurements of PHS mobile stations including call processing
	MX880132A	TX and RX measurements of PHS mobile stations
PDC	MX880116A	TX and RX measurements of PDC mobile stations including call processing
	MX880131A	TX and RX measurements of PDC mobile stations
GSM DCS1800 PCS1900	MX880115A	TX and RX measurements of GSM system mobile stations including call processing
IS-136A	MX880113A	TX and RX measurements of IS-136A mobile stations including call processing (Note: requires Option 01)
IS-95A J-STD-008 ARIB RTD-T53 KOREA-PCS	MX880201A	TX and RX measurements CDMA mobile stations including call processing (Note: requires Option 12)

⋆Refer to the data sheets for the MT8801C (main frame) and Measurement Softwares (MX880113A/880115A/880116A/880131A/880132A/880201A)



The Versatile Solution for Manufacturing Test

MT8801C Main Features

- Wide frequency range between 300 kHz to 3 GHz
- Covering all PHS and WLL bands consisted of each country's frequency bands
- Fast, accurate transmitter measurements in less than 2 sec.
- Multi-system support PHS, PDC, GSM, DCS1800, PCS1900, IS-136A, CDMA
- Call processing capability
- Spectrum analyzer and audio testing capability (options)
- Large color TFT display for easy viewing

Fast, Accurate Testing of All Main PHS Mobile Phone Parameters

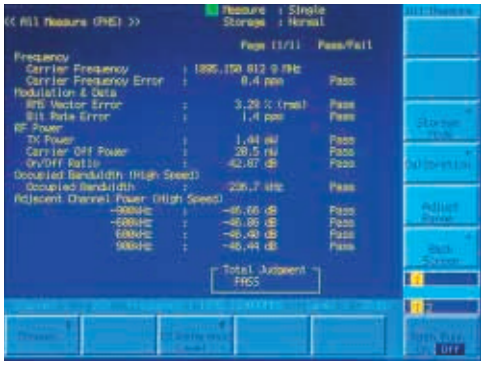
MX880117A provides call processing and TX and RX measurements for PHS mobile stations. Call processing provides call setup test, and allows TX measurements during communication state. The input level range (average power within burst) for the main connector is –5 to +40 dBm in order to test PHS while in call processing. Additional auxiliary input/output connectors are provided for phone and component test applications covering an input level range from –30 to +15 dBm.
All transmitter measurement items (excluding call processing) can be performed simultaneously on burst providing accurate, repeatable results. These measurements are performed in less than two seconds making the MT8801C the fastest measuring instrument of its type in today's market. Of course, it is possible to measure with ARIB/TELEC Standards method.

Measurement Items
Transmitter
Burst power and burst power vs. time
Burst-off power and carrier-on/off ratio
Carrier frequency and frequency error
Modulation accuracy (RMS and peak vector error, origin offset)
Occupied bandwidth
Adjacent channel power
Receiver
TCH bit error rate (ARIB Standard method)
Call processing
Synchronization/registration
Call origination
Call termination
Communication
Handover (TCH switching-type)
Timing alignment control
Disconnection from personal station and network
Power level changes

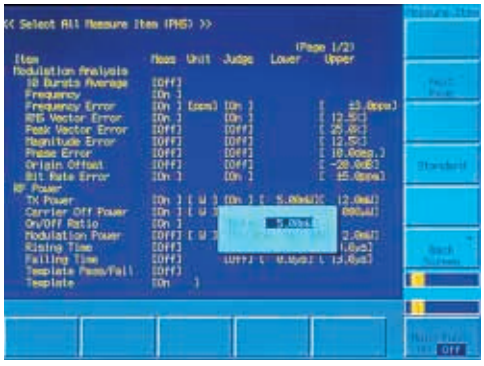
Rapid Measurement, High-Accurate Power Measurement

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 dBm.

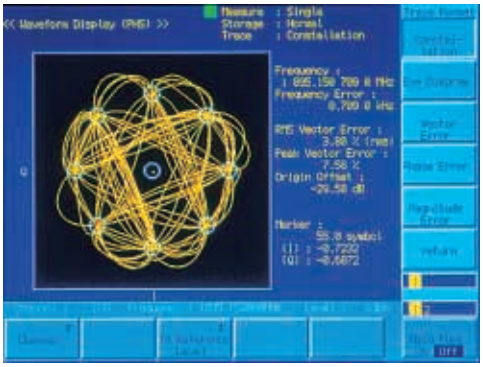
User CAL factor input

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

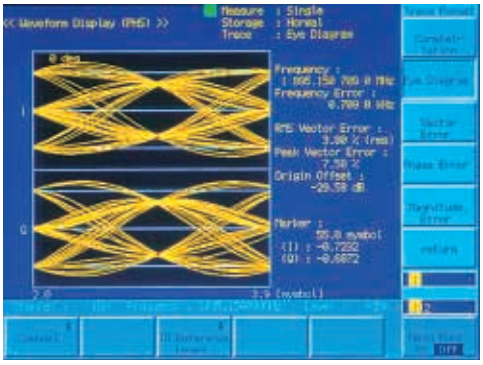
Constellation display function

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.

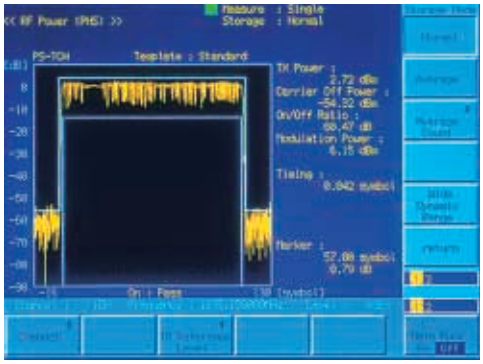


Vector errors at symbols

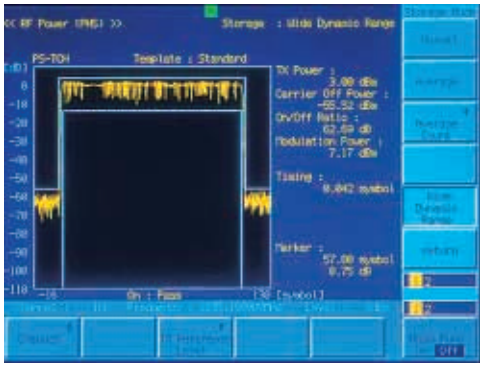
The vector errors at each symbol points are displayed.

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

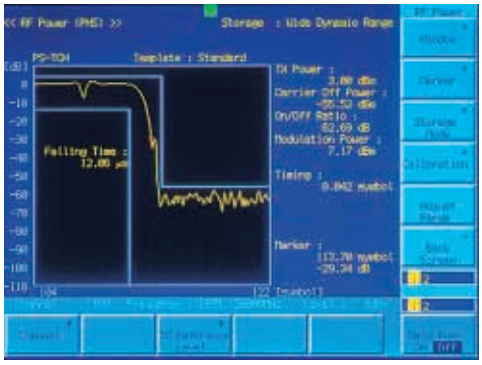


Wide-dynamic range mode

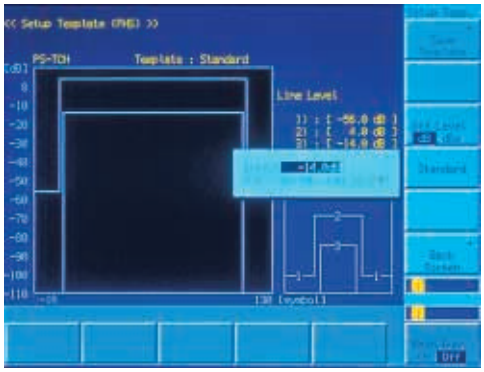
Measurement of antenna power rise/fall edge characteristics

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



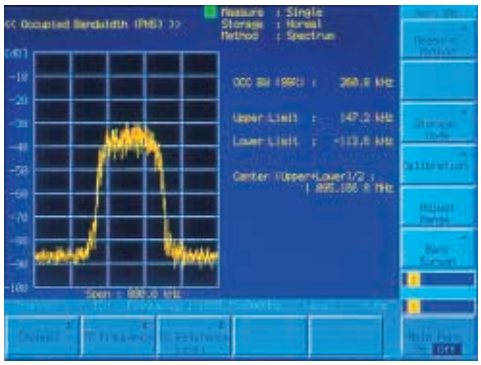
Fall edge characteristics



Template setting

Measurement of occupied bandwidth

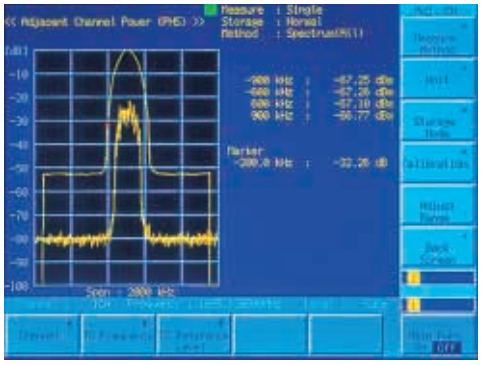
The standard measurement mode using the spectrum analyzer method, or the high-speed measurement mode, which reduces measurement time, can be used.



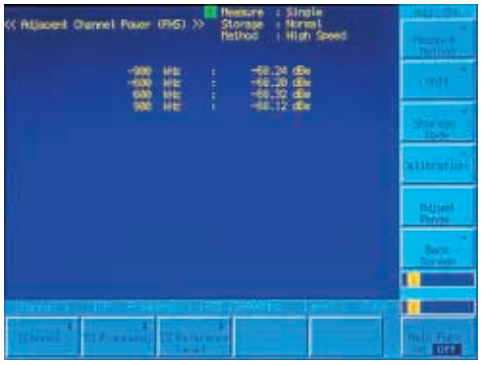
Standard measurement mode

Measurement of adjacent channel power

Either the standard measurement mode using the spectrum analyzer method (mobile stations cannot be measured during communications using the call processing function), or the high-speed measurement mode, which reduces measurement time, can be used.



Standard measurement mode



High-speed measurement mode

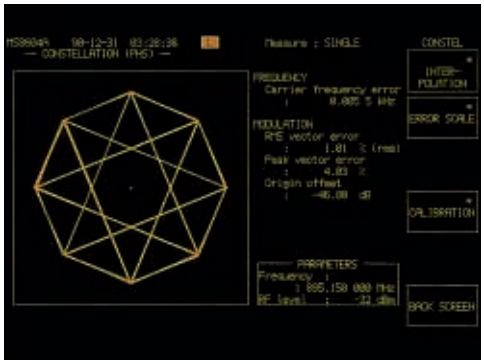
Receiver Sensitivity Measurement

Digital modulation signal generator

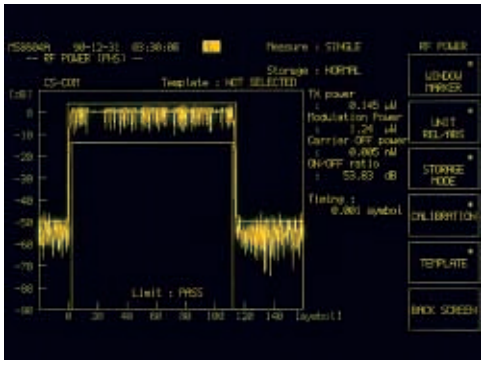
The MT8801C has a digital modulation signal generator covering 300 kHz to 3 GHz for reception sensitivity measurement.

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.



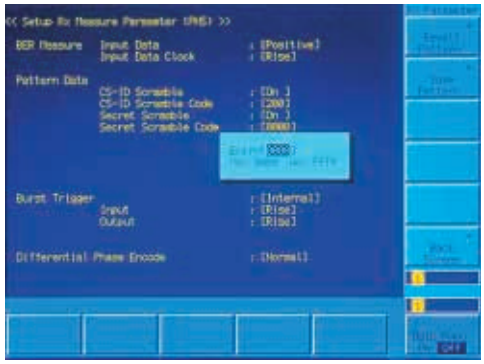
Constellation display



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 and mobile equipment.



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 π /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*1

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 parameters can be measured.

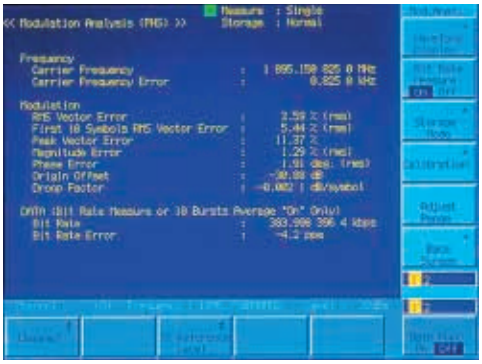
*1 Mobile stations cannot be measured during communications using the call processing function.

BER measurement

Call Processing Test and Transmission Test during Communication State

Send testing during communications

Send testing can be performed during communications using the call processing function. In addition to evaluating the connection condition with the base station, send measurement is possible without the effect of carrier- and manufacturer-dependent control restrictions for different tests. This function really demonstrates its usefulness in the production and maintenance fields.



Call processing sequence monitor

The call processing function provided as standard with the MX880117A Measurement Software also provides the ability to perform and verify the functional operation of the PHS personal station. The MT8801C can simulate a PHS base station and provides a sequence screen that quickly provides the user with a pass/fail evaluation of the following functions: registration, origination, termination, communication, handover (TCH switching-type), disconnection from network or personal station. In addition, the Personal Station Identifies (PS-ID) and PS number are also displayed on the screen along with the dialled network number.

Sequence monitor display

MX880117A PHS Measurement Software and items

Measurement item	ARIB STD-28	Technical Standard Conformity Certification (TELEC)	Anritsu's high-speed measurement	Test during communication state
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	✓	—		
Call processing	✓	—		✓

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

Specifications

MX880117A PHS Measurement Software with Call Processing

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 function	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), ramp-up and ramp-down 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)
Call processing function		Synchronization/registration, call origination, call termination, communication, disconnection from PS and network

Ordering Information

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

Model/Order No.	Name		Remarks
	— 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		
MX880201A-01	Soft handoff		Requires Option 12
W1330AE	MX880117A operation manual		Standard accessory for MX880117A (1 copy)
	— Optional accessories —		
J0127C	Coaxial cord (BNC-P • RG-58A/U • BNC-P), 0.5 m		
J0769	Coaxial adaptor (BNC-J • TNC-P)		
J0040	Coaxial adaptor (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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