Anritsu

MT8801C

Radio Communication Analyzer

300 kHz to 3 GHz



For Communications Systems Worldwide (GSM, CDMA, IS-136A, PDC, PHS, DECT)


Anritsu
MT8801C
Radio Communication Analyzer
< RF Power (GSM) >>
Storage : Average (10/ 10)
Call Proc: Communication
MS-HB
Template : Standard
TX Power :
14.87 dBm
Carrier Off Power :
-55.77 dBm
On/Off Ratio :
70.64 dB
Power Flatness :
MAX Power: 0.06dB
MIN Power: -0.08dB
On : Pass
GSM
Preset
Remote
Local
Panel Lock
Stby
On
F1
F2
F3
F4
F5
F6
F7
F8
F9
F10
F11
F12
OUT Interface



All in 1

1 unit for GSM, CDMA, IS-136A, PDC, PHS, and DECT systems

All basic transmission and reception measurements performed by 1 unit

For Worldwide Communications Systems

Every major radio communication system in the world, including GSM/DCS1800/PCS1900, CDMA, IS-136A, PDC, PHS and DECT, can be evaluated using just one MT8801C Radio Communication Analyzer, covering the 300 kHz to 3 GHz frequency band in one hardware platform, and the dedicated measurement software options. The call processing test and sensitivity test using loopback method are possible for GSM/DCS1800/PCS1900, CDMA, IS-136A and DECT. In addition, connection testing, as well as send testing while communicating, are also possible for PDC and PHS measurement by using the call processing function, and the PDC uplink RCH can be monitored (RSSI, estimated error rate) too. FM radio transmission/reception tests are simplified by using the optional analog measurement function, and the optional spectrum analyzer function covering 10 MHz to 3 GHz is very useful for maintaining as well as measuring spurious near carrier on production lines. 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

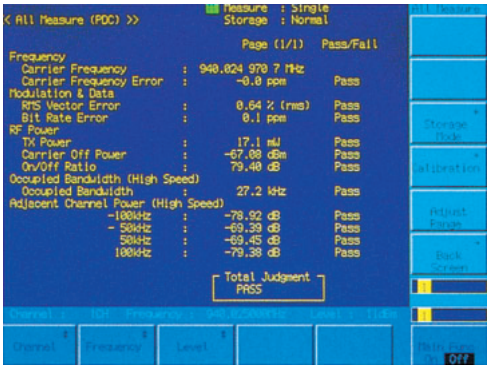
The time required for testing equipment on production lines is greatly reduced using the high-speed adjacent channel power and occupied bandwidth measurement functions based on Anritsu's proprietary measurement algorithm and DSP (Digital Signal Processing). Furthermore, major transmission test items such as transmission frequency, modulation accuracy (phase error), transmission power, rise/fall characteristics of burst wave, adjacent channel power, etc., can be measured and judged pass/fail for limit value of the each item.

System type	Measurement software/option	Description
IS-136A	MX880113A	Tx and Rx measurements of IS-136A mobile stations including call processing (Requires Option 01)
AMPS PCS1900	MX880114A	Tx and Rx measurements: AMPS analog mobile stations and PCS1900 digital mobile stations, including call processing (Requires Option 01)
GSM DCS1800 PCS1900	MX880115A	Tx and Rx measurements of GSM system mobile stations including call processing
DECT	MX880118A	Tx and Rx measurements of PP/FP including call processing (Requires Option 07)
PDC	MX880116A	Tx and Rx measurements of PDC mobile stations including call processing
	MX880131A	Tx and Rx measurements of PDC mobile stations
PHS	MX880117A	Tx and Rx measurements of PHS mobile stations including call processing
	MX880132A	Tx and Rx measurements of PHS base stations and mobile stations
GSM	Option 11	Audio test of GSM mobile stations including call processing (requires MX880115A and Option 01)
CDMA	Option 12	Tx and Rx measurements of mobile stations including call processing (Requires Option 01)

Rapid Measurement

Batch Measurements of Transmission Test Items

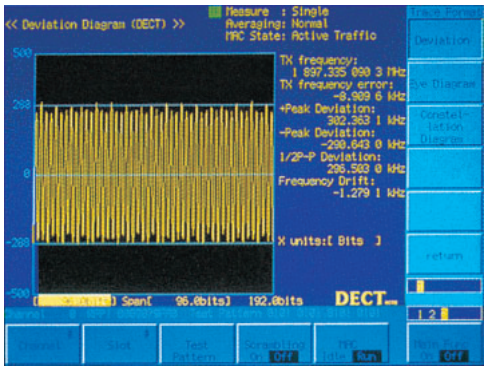
Example for PDC/PHS, only about 1 second is required to measure all major transmission test items, including frequency, modulation accuracy, origin offset, transmission rate, transmission power, leakage power during carrier-off, rise/fall edge characteristics, occupied bandwidth, and adjacent channel power. Pass/fail decisions for limit value of each test item can also be displayed.



Example of linked send measurement items (PDC)

Modulation Analysis

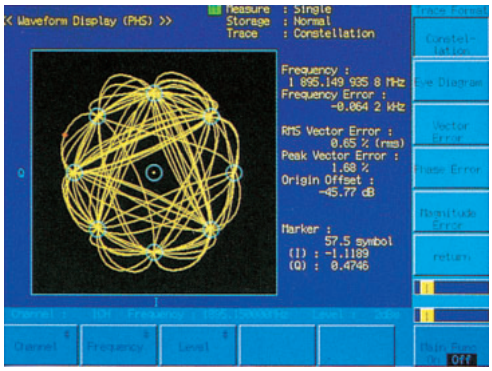
The user can display the waveform as either frequency deviation, eye diagram or constellation diagram to easily show any irregularities in the modulation.



Example of transmitter modulation (DECT)

Constellation Display Functions

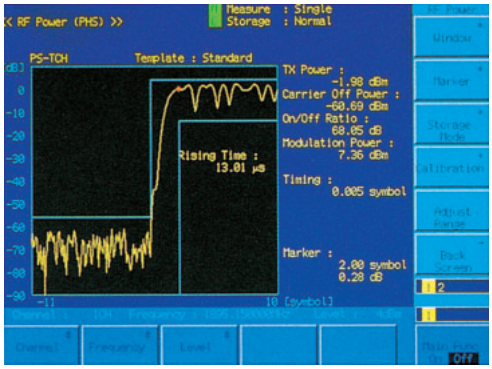
The I/Q vector components of measured signals are displayed. The frequency error, RMS/PEAK vector errors, and origin offset can be shown on the same screen.



Example of constellation display (PHS)

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 directly with 1/10 symbol resolution.



Example of burst rise characteristics (PHS)

Calibration Functions

A built-in thermocouple power sensor is used for calibration, providing accurate measurement of absolute values such as average power with burst signal 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

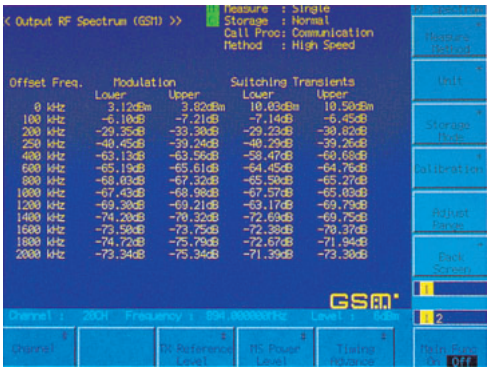
The power meter with built-in thermocouple power sensor can accurately measure power between 0 and +40 dBm.



Example of power measurement

Adjacent Channel Power Measurement

The MT8801C can measure adjacent channel power for each communication system at high speed.



Output RF spectrum measurement (GSM)

Receiver Sensitivity Measurement

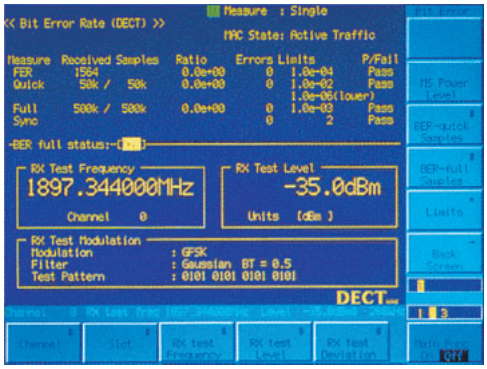
This function displays the error count and error rate in the RF input or DATA/CLOCK input measured signal.



Bit error rate measurement (IS-136A)

Adaptive BER Receiver Testing

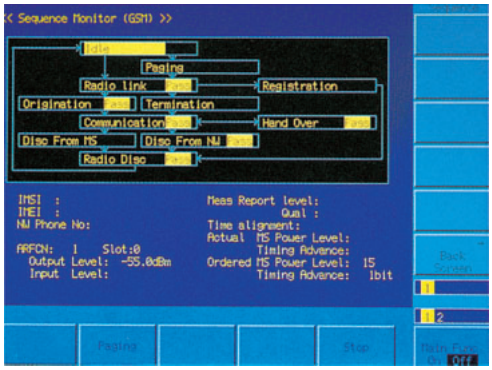
For DECT measurements, there are one FER and two BER measurements. The two measurements, one quick and the other full, allow the number of samples required to conclude a test to be adapted to suit the receiver being tested.



Example of bit error rate measurement (DECT)

Call Processing Function

The MT8801C acts as a pseudo base station permitting to judge pass/fail for registration, origination, termination, communication, handover (PHS: TCH switching type only), disconnection from network and disconnection from mobile station at the sequence monitor screen.



Sequence monitor display (GSM)

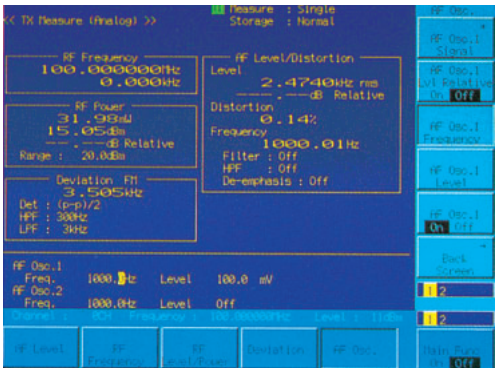
Analog Measurement

Analog Measurement Function (Option 01)

The MT8801C has general analog measurement functions too. Efficient FM TX/RX testing is made easy by built-in signal generator, AF oscillator, RF analyzer (power meter, frequency counter, FM measurement) and audio analyzer functions. This function is especially useful for the IS-136A analog test.

Transmission Measurement

Characteristics such as frequency, power, and frequency deviation can be measured easily.

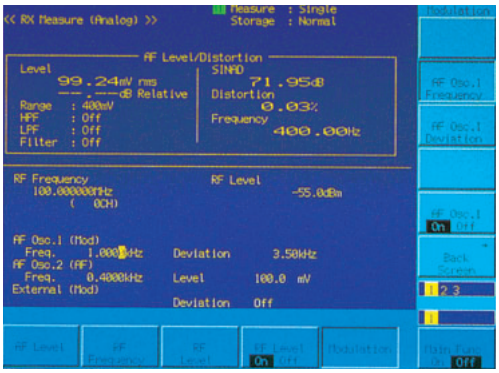


Transmission Measurement with SG Function

Transmission characteristics can be measured by outputting an FM RF signal from the built-in signal generator.

Reception Measurement

An FM modulated signal is output to permit measurement of the frequency and level of the AF signal from a receiver, as well as SINAD and distortion.



AF Measurement

An AF signal is output to measure the frequency, level and distortion of the AF signal at the DUT.



AF Low Impedance Output (Option 04)

This option converts the output impedance of the AF oscillator of the Option 01 Analog Measurement to low impedance. It permits direct driving of an external speaker connected to the AF output connector.

Spectrum Analysis

Spectrum Analyzer Function (Option 07)

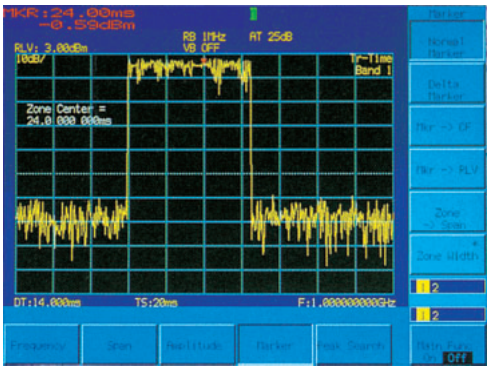
The spectrum analyzer with synthesized local covers a frequency range of 10 MHz to 3 GHz with a resolution of 1 Hz. In addition to a C/N of –115 dBc (100 kHz offset), the RBW can be set to 300 Hz to 1 MHz, the VBW to 3 to 100 kHz, and the sweep time in the frequency domain to 100 ms to 1000 s (1 ms to 1000 s in time domain).

High-Accuracy Measurement

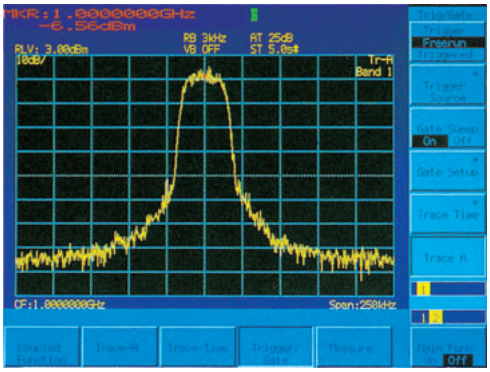
The total level accuracy is an astonishing ±1.5 dB due to the analyzer's excellent linearity, and the level calibration function. Moreover, the average noise level is just –85 dB max. (at 10 MHz to 1 GHz), and the secondary harmonic distortion is –60 dB max. (100 MHz to 1.5 GHz).

Convenient Functions

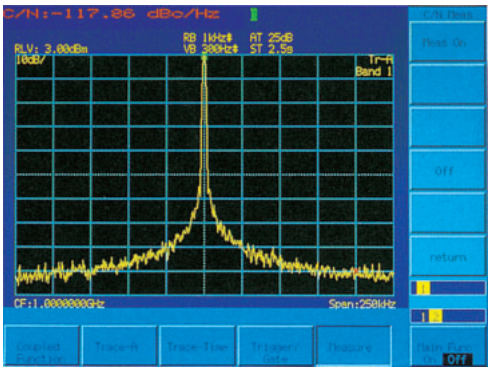
The analyzer has a full lineup of useful functions including marker, delta marker, and gate sweep functions. It also has advanced displays such as average, max. hold, cumulative and overwrite. Trace A and Trace B can be measured on a dual screen in the frequency domain, along with noise power, C/N, occupied bandwidth, adjacent channel power, and average power of burst signal.



Burst wave measurement in time domain



IS-136A modulated wave measurement



C/N measurement

GSM Audio Test (Option 11)

When using with the MX880115A GSM Measurement Software, speech Tx/Rx characteristics can be measured in accordance with GSM Rec. RPE LTP (Full Rate Speech CODEC).
The audio signal generated by the MT8801C is digitally processed and ideal audio signal is sent. In addition, this option can also be used to digitally process an audio signal sent from a GSM terminal for high-reliability and high-accuracy measurement.

Tx Audio Test

The MT8801C can decode an audio signal sent from a GSM terminal to measure the speech coding characteristics of the DUT.



Rx Audio Test

In this test, the audio signal from the MT8801C is decoded by the DUT and the speech signal decoding characteristics are measured.



Audio Echo Test

In this test, the audio signal from the DUT is looped back by the MT8801C and the characteristics of coding through encoding is measured.



CDMA Measurement

CDMA Measurement (Option 12)

The Option 12 can measure the following systems; USA 800-MHz cellular band (TIA/EIA/IS-95A standard), USA 1.9 GHz PCS band (ANSI J-STD-008 standard), Japan 800-MHz cellular band (ARIB STD-T53 standard).

The CDMA and analog dual mode standardized in the IS-95A standard are supported.

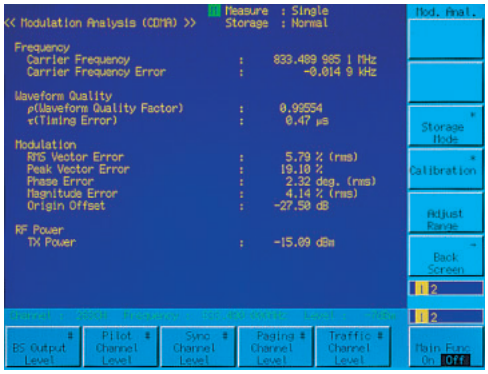
CDMA Measurement Items

CDMA transmission measurement
Access probe output power
Stand-by power
Burst power
Burst power vs. time
Burst off power
Carrier on/off ratio
Carrier frequency, frequency error
Waveform quality, timing error
Modulation accuracy (vector error, phase error, amplitude error, origin offset)
Open-loop power control time response
Occupied bandwidth
Spurious close to the carrier
Spurious

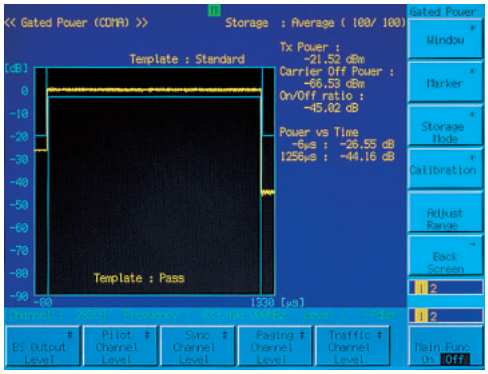
CDMA reception measurement
CDMA signal generator
Frame error ratio
AWGN generator

Analog transmission/reception measurement
Audio oscillator
Noise generator
Modulation analysis (modulation factor, distortion)
Frequency counter
FM signal generator

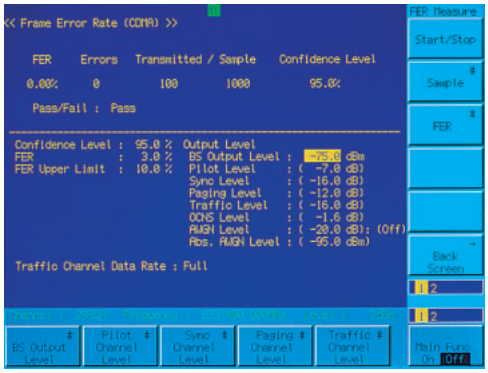
Call processing function
Registration
Call origination
Call termination
Conversation
Loopback
Frequency channel switching (IS-95A standard: dual mode)
Disconnection from mobile station and network



Waveform quality measurement



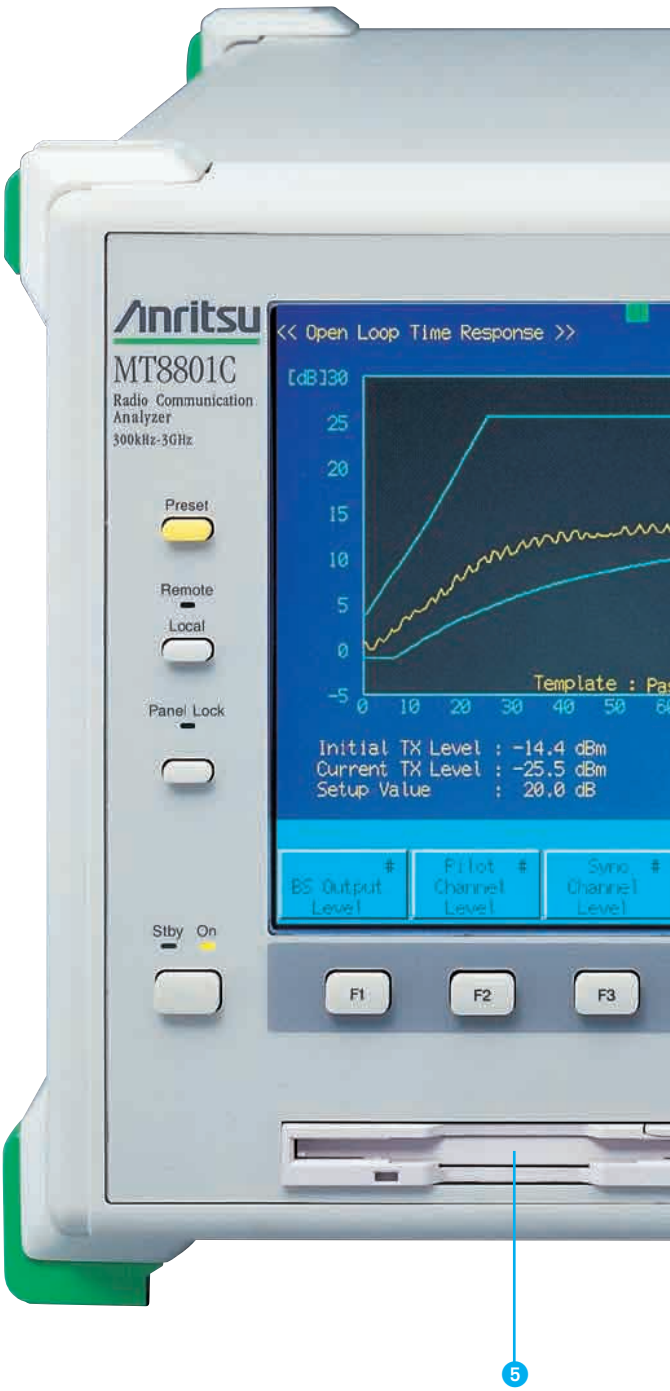
Gated output power measurement



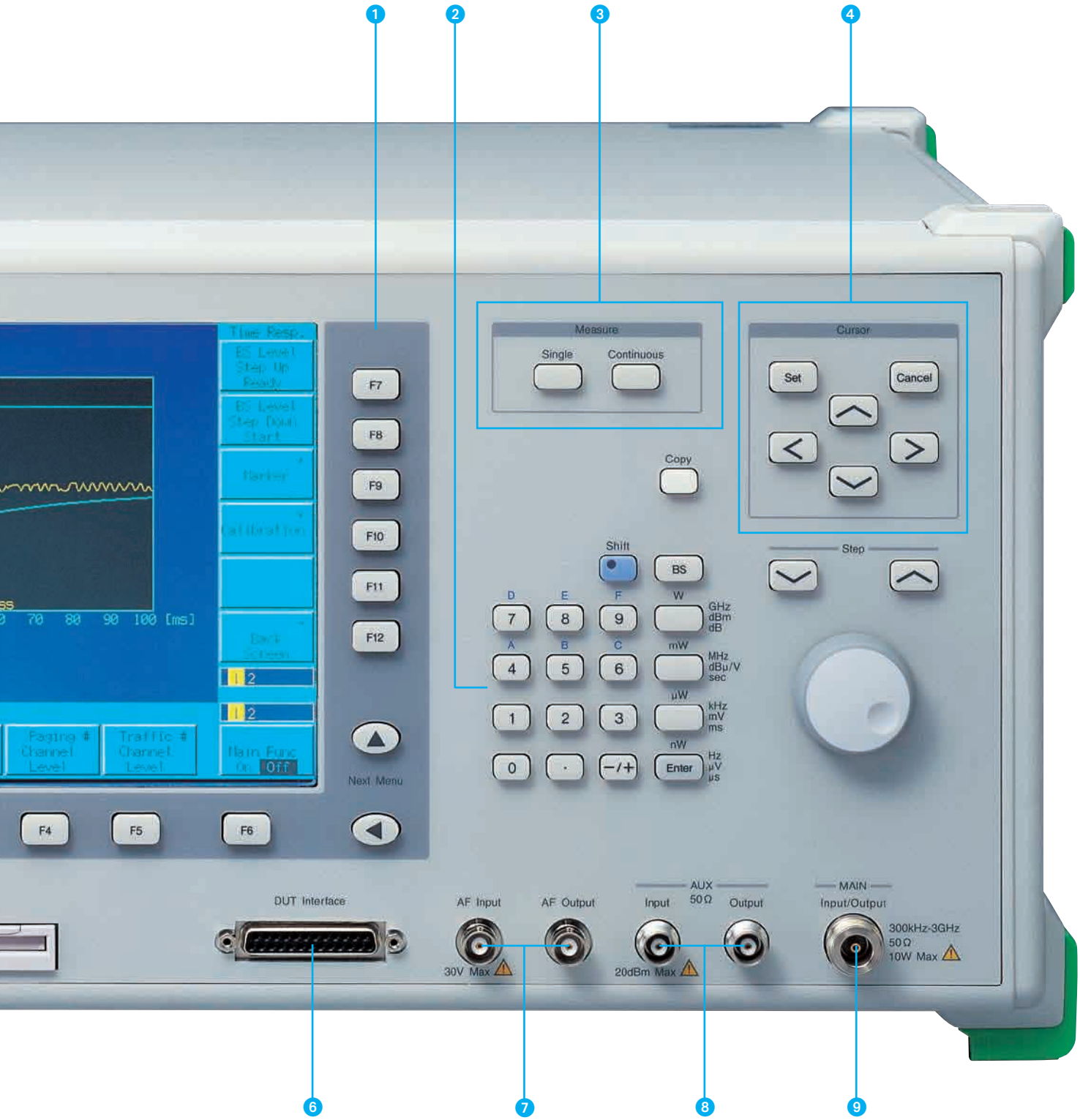
Frame error rate measurement

Intuitive Key Layout, Simple Operation

1. Keys corresponding to on-screen function keys. The number of displayed function keys can be increased using the Page key.
2. Keys for inputting measurement parameters.
3. Keys for selecting single or continuous measurement.
4. Keys for moving cursor and opening/closing the parameter setting window.
5. Floppy disk drive for saving and recalling measuring conditions. It is also used to upgrade measurement software by loading the upgrade software. (Measurement software resides in internal memory; the floppy disk drive is used when upgrading this software.)
6. Connector for input of data and clock for error rate measurements. (BNC connectors on the rear panel are also for data and clock input.)
7. Audio analyzer and AF Oscillator I/O Connector are used to evaluate FM radio equipment and AF circuits.
8. Auxiliary I/O connector for obtaining signal generator output at higher levels than provided by MAIN connector, or for analyzing low-level signals (No function is provided for calibration of absolute power measurements.)
9. Connector for antenna output of radio equipment for reception/transmission tests. It can also serve as input to the power meter.






1
2
3
4
Measure
Single
Continuous
Cursor
Set
Cancel
Copy
Shift
BS
Step
F7
F8
F9
F10
F11
F12
F4
F5
F6
Next Menu
D
E
F
W
GHz
dBm
dB
A
B
C
mW
MHz
dBµ/V
sec
µW
kHz
mV
ms
nW
Hz
µV
µs
7
8
9
4
5
6
1
2
3
0
·
−/+
Enter
DUT Interface
AF Input
AF Output
AUX
Input
50Ω
Output
MAIN
Input/Output
30V Max
20dBm Max
300kHz-3GHz
50Ω
10W Max
6
7
8
9

For Configuration of Automated Measurement Systems

GPIB Interface (standard)

All key operations except the power switch can be controlled remotely.

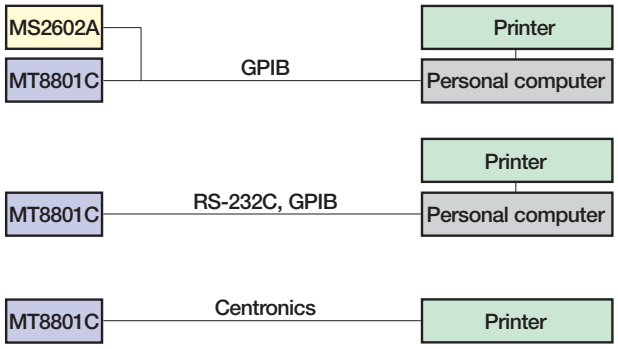
RS-232C Interface (standard)

All key operations except the power switch can be controlled remotely. The RS-232C interface can be used with notebook computers not having a GPIB port to configure a measurement system.

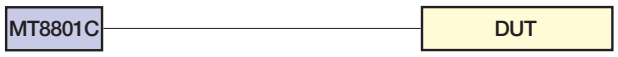
Parallel Interface (standard)

The parallel Centronics interface to print the MT8801C screen to a printer.

Spectrum Analyzer

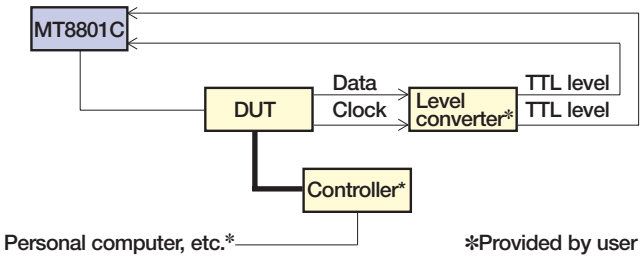


Connection with DUT (1): GSM, DECT



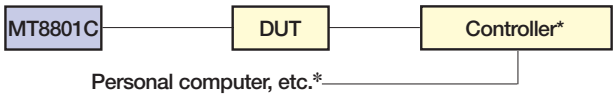
This setup also be used for IS-136A, CDMA, PDC and PHS transmitter test.

Connection with DUT (2): PDC, PHS



*Provided by user

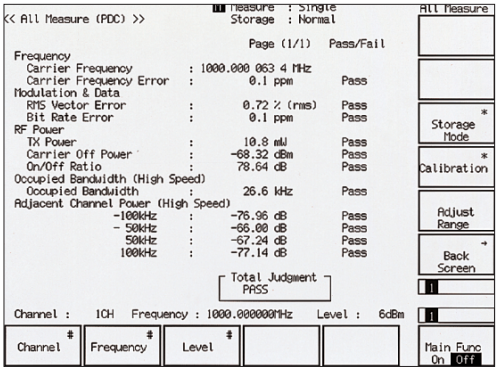
Connection with DUT (3): IS-136A



*Provided by user

Saving Screen

MT8801C screens can be saved to FD as bitmapped files (exclusive use with printer connected to parallel interface).



Example of bitmapped file

Specifications

◆ MT8801C

Frequency range	300 kHz to 3 GHz
Maximum input level	+40 dBm (10 W, MAIN connector), +20 dBm (100 mW, AUX connector)
Input/output connector	MAIN I/O connector Impedance: 50 Ω, N-type VSWR: ≤1.2 (≤2.2 GHz), ≤1.3 (>2.2 GHz) AUX input/output connector: TNC-type
Reference oscillator	Frequency: 10 MHz Starting characteristics: ≤5 × 10^{-8}/day (after 10 minutes of warm-up, referred to frequency after 24 hours warm-up) Aging rate: ≤2 × 10^{-8}/day, ≤1 × 10^{-7}/year (referred to frequency after 24 hours warm-up) Temperature characteristics: ≤5 × 10^{-8} (0° to 50°C, referred to frequency at 25°C) External standard input: 10 MHz or 13 MHz (±1 ppm), input level: 2 to 5 Vp-p
Power meter	Frequency range: 300 kHz to 3 GHz Level range: 0 to +40 dBm, –10 to +40 dBm (CDMA measurement) Level accuracy: ±10% (0 to +40 dBm, after zero-point calibration), ±10% (–10 to +40 dBm, 18° to 28°C, at average value, after zero-point calibration)
Signal generator	Frequency Range: 300 kHz to 3 GHz Resolution: 1 Hz Accuracy: Reference frequency accuracy ±100 mHz Output level Level range (no modulation or analog modulation): –13 to –133 dBm (Main), +7 to –133 dBm (AUX) Level accuracy: ±1 dB (10 MHz to 2.2 GHz, ≥–123 dBm, 18° to 28°C), ±3 dB (10 MHz to 2.2 GHz, ≥–133 dBm), ±2 dB (>2.2 GHz, ≥–123 dBm, 18° to 28°C), ±4 dB (>2.2 GHz, level: ≥–133 dBm) Radiated interference: 1 µV/50 Ω (carrier frequency measured, 25 mm from front panel with two-turn 25 mm diameter loop antenna) Signal purity Spurious: ≤–50 dBc (at CW, offset frequency 100 kHz to ≤50 MHz; where carrier frequency: other than 1300 to 1400 MHz and 2000 to 2100 MHz), ≤–40 dBc (for all band) Harmonics: ≤–25 dBc (at CW)
Others	Display: Color TFT-LCD, 7.8 size , 640 × 480 dots Hard copy: Enables data hard copy of the display through a parallel interface (applicable only for EPSON VP series or equivalent) GPIB: This equipment is specified as a device, can be controlled from external controller (excluding power switch and FD ejection key). No controller function Interface: SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0, E2) Parallel Conform to the Centronics. Outputs printing data to printer. Data line exclusive for output: 8 Control line: 4 (BUSY, $\overline{\text{DTSB}}$, $\overline{\text{ERROR}}$, PE) Connectors: D-sub 25 pins, female (equivalent to the connector of IBM-PC/AT built-in printer) RS-232C: All functions except power switch controlled by external controller (baud rate: 1200, 2400, 4800, 9600 bps)
Dimensions and mass	426(W) × 221.5(H) × 451(D) mm, ≤22 kg
Power	100 to 120/200 to 240 Vac (automatic voltage switch system), 47.5 to 63 Hz, ≤300 VA
Operating temperature	0° to 50°C
EMC	EN61326: 1997/A1: 1998 (Class A), EN61000-3-2: 1995/A2: 1998 (Class A) EN61326: 1997/A1: 1998 (Annex A)
LVD	EN61010-1: 1993/A2: 1995 (Installation Category Ⅱ, Pollution degree2)

◆ Option 01 (Analog Measurement)

RF signal generator	Frequency range: 10 MHz to 3 GHz Output level range: –133 to –13 dBm (MAIN connector), –133 to +7 dBm (AUX connector) FM deviation: 0 to 40 kHz (resolution: 10 Hz) Accuracy: Set value ±5% ±1 digit (internal modulation frequency: 1 kHz, excluding residual FM) Internal modulation: 20 Hz to 20 kHz External modulation: 20 Hz to 20 kHz (limited to 1 Vpeak into 600 Ω) Flatness: ±0.5 dB (referenced to 1 kHz between 0.3 to 3 kHz with 4 kHz deviation) ±1 dB (referenced to 1 kHz between 20 Hz to 20 kHz with 4 kHz deviation) Distortion: ≤–50 dB (internal modulation frequency: 1 kHz, demodulation bandwidth: 0.3 to 3 kHz, frequency deviation: 5 kHz)
AF Generator	Frequency range: 20 Hz to 20 kHz, Setting resolution: 0.1 Hz, Accuracy: Same as reference oscillator Output Level range: 0.1 mVrms to 3.0 Vrms (EMF, MAIN output impedance: 600 Ω) 0.1 mVrms to 0.3 Vrms (EMF, MAIN output impedance: 50 Ω) Setting resolution: 1 µV (output level: <4 mV), 10 µV (output level: <40 mV) 100 µV (output level: <0.4 V), 1 mV (output level: ≤3 V)

AF Generator		Accuracy (bandwidth: <30 kHz) Unbalanced output: ±0.5 dB (frequency: 1 kHz, output level: ≥1 mV) ±1 dB (frequency: 20 Hz to 20 kHz, output level: ≥1 mV) Floating output: ±2 dB (frequency: 1 kHz, output level: ≥1 mV) Output impedance MAIN output: 600 Ω, 50 Ω selectable (unbalanced, BNC connector) DUT interface microphone output: 600 Ω, floating Distortion: <–50 dBc (bandwidth: <30 kHz, frequency: 1 kHz, output level: 1 V) <–45 dBc (bandwidth: <30 kHz, frequency: 20 Hz to 20 kHz, output level: 1 V) Noise generator: White noise passed through a weighting filter (conforming to ITU-T Rec. G.227)
Transmission measurement	RF power meter	Frequency range: 300 kHz to 3 GHz Input range: 0 to +40 dBm (MAIN connector) Accuracy: ±10% (after zero calibration)
	IF level meter	Frequency range: 10 MHz to 3 GHz Input range: 0 to +40 dBm (MAIN connector) Accuracy: ≤10% (after calibration with internal RF power meter) Linearity: ±0.3 dB (0 to –30 dB)
	Frequency counter	Frequency range: 10 MHz to 3 GHz Input level range: –15 to +40 dBm (MAIN connector), –40 to +20 dBm (AUX connector) Resolution: 1 Hz Accuracy: ±(reference oscillator accuracy + 10 Hz) Method: IF frequency counting (bandwidth: ±30 kHz)
	Modulation	FM Frequency range: 10 MHz to 3 GHz Input level range: –15 to +40 dBm (MAIN connector), –40 to +20 dBm (AUX connector) Filters (3 dB cut-off frequency): HPF (300 Hz, 50 kHz), LPF (3 kHz, 15 kHz) Deviation: 0 to 20 kHz Demodulation frequency: 20 Hz to 20 kHz Accuracy: 1% + residual FM (demodulation frequency: 1 kHz) Frequency response: ±0.5 dB (referenced to 1 kHz) Residual FM: 8 Hz-rms (demodulation frequency: 0.3 to 3 kHz) Distortion: 0.3% (modulation frequency: 1 kHz, demodulation bandwidth: 0.3 to 3 kHz) øM Frequency range: 10 MHz to 3 GHz Input level range: –15 to +40 dBm (MAIN connector), –40 to +20 dBm (AUX connector) Filters (3 dB cut-off frequency): HPF (300 Hz, 50 kHz), LPF (3 kHz, 15 kHz) Deviation: 0 to 10 rad Demodulation frequency: 300 Hz to 3 kHz Accuracy: 1% + residual øM (modulation frequency: 1 kHz) Frequency response: ±0.5 dB (referenced to 1 kHz) Residual øM: 0.01 rad-rms (demodulation bandwidth: 0.3 to 3 kHz) Distortion: 0.5% (modulation frequency: 1 kHz, demodulation bandwidth: 0.3 to 3 kHz, deviation: 5 rad) FM demodulation output Deviation: 0 to 40 kHz (4/40 kHz range selectable) Demodulation frequency range: 50 Hz to 10 kHz Output level: 4 Vpeak (EMF, at full-scale range) Output impedance: 600 Ω Frequency response: ±1 dB Distortion: 1% (FM frequency: 1 kHz, demodulation bandwidth: 0.3 to 3 kHz, frequency deviation: 4 kHz) Filters (3 dB cut-off frequency): HPF (300 Hz), LPF (3 kHz) De-emphasis: 750 µs
Audio analyzer		Input impedance: 600 Ω/100 kΩ selectable (unbalanced, BNC connector) Bandpass filter HPF: 400 Hz (for tone rejection) De-emphasis: 750 µs Weighting filter: ITU-T P.53, C-MESSAGE AF Level meter Frequency range: 30 Hz to 20 kHz Level range: 1 mVrms to 30 Vrms Accuracy: ±0.5 dB AF frequency counter Frequency range: 30 Hz to 20 kHz Level range: 30 mVrms to 30 Vrms Accuracy: ±0.1 Hz Distortion meter Frequency range: 100 Hz to 5 kHz Level range: 30 mVrms to 30 Vrms Accuracy: ±1 dB (frequency: 1 kHz, distortion factor: 1%)
Mass		≤500 g

◆ Option 04: AF low impedance output

AF oscillator	Output impedance*1: ≤1 Ω (MAIN connector, unbalanced, BNC connector) Maximum output current: ≥100 mApeak (MAIN connector) Waveform distortion: –50 dBc (band: <30 kHz, 1 kHz, output level: 0.3 V), –45 dBc (band: <30 kHz, 20 Hz to 20 kHz, output level: 0.3 V)

*1: <1 Ω fixed (can not exchange to 50/600 Ω)

◆ Option 07: Spectrum analyzer

Frequency	Frequency Frequency range: 0 Hz to 3 GHz (Band 0), 10 MHz to 3 GHz (Band 1) HPF: On/off switchable (band 1, 1.6 to 3 GHz) Frequency setting range: 0 Hz to 3 GHz (Band 0), 10 MHz to 3 GHz (Band 1) *Resolution: 1 Hz Accuracy Frequency display accuracy: ± (display frequency x reference frequency accuracy + span x span accuracy) Marker frequency accuracy Normal marker: Same as display accuracy, Delta marker: Same as span accuracy Frequency span Span setting range: 0 Hz or 10 kHz to 3 GHz (band 0), 0 Hz or 10 kHz to 2.99 GHz (band 1) Span accuracy: ±2.5% Resolution bandwidth Setting range: 300 Hz to 1 MHz (3 dB BW), 1-3 sequence Accuracy: ±2% (300 Hz to 300 kHz), ±10% (1 MHz) Selectivity (60 dB : 3 dB): ≤5 : 1 Video bandwidth: 3 Hz to 100 kHz (1-3 sequence), off *Setting range is limited by resolution bandwidth. Sideband noise: ≤–95 dBc/Hz (1 GHz, 10 kHz offset), ≤–115 dBc/Hz (1 GHz, 100 kHz offset)
Amplitude (band 1)	Maximum input level Continuous average power: +40 dBm (Main), +20 dBm (AUX) DC voltage: 0 V Average noise level (resolution bandwidth: 1 kHz, video bandwidth: 10 Hz) ≤–90 dBm (10 MHz to 2.2 GHz), ≤–85 dBm (>2.2 GHz) *Main, input attenuator: 20 dB ≤–110 dBm (10 MHz to 2.2 GHz), ≤–105 dBm (>2.2 GHz) *AUX, input attenuator: 0 dB Residual response: ≤–70 dBm (Main, input attenuator: 20 dB), ≤–90 dBm (AUX, input attenuator: 0 dB) Level accuracy: ±1.5 dB (Main, reference level: +10.1 to +40 dBm, 0 to –50 dB of reference level) ±1.5 dB (AUX, reference level: –9.9 to +20 dBm, 0 to –50 dB of reference level) Reference level Setting range: –60 to +50 dBm (Main), –80 to +30 dBm (AUX) Setting resolution: 0.1 dB Accuracy: ±0.5 dB (Main, +10.1 to +40 dBm), ±1.0 dB (Main, –60 to +10 dBm), ±0.5 dB (AUX, –9.9 to +20 dBm), ±1.0 dB (AUX, –80 to –10 dBm) *After calibration, frequency: 100 MHz, span: 2 MHz; Input attenuator, resolution bandwidth, video bandwidth, and sweep time: AUTO Resolution bandwidth switching error: ±0.1 dB (resolution bandwidth reference: 3 kHz) Frequency characteristics: ±0.5 dB [100 MHz reference, input attenuation: 30 dB (10 dB for AUX), 18˚ to 28˚C] Log linearity: ±0.5 dB (0 to –50 dB, resolution bandwidth: ≤1 MHz) ±1.0 dB (0 to –70 dB, resolution bandwidth: ≤30 kHz) ±1.0 dB (0 to –80 dB, resolution bandwidth: ≤1 kHz) *Frequency: 10 MHz to 2.2 GHz, Reference level: ≥0 dBm (Main), ≥–20 dBm (AUX) Spurious response: ≤–55 dBc (10 to 100 MHz), ≤–60 dBc (100 to 1500 MHz) *2nd harmonic distortion at mixer input: –30 dBm
Sweep	Sweep time: 100 ms to 1000 s (frequency domain sweep) 100 ms to 1000 s (time domain sweep, resolution bandwidth: ≤1 kHz) 10 ms to 1000 s (time domain sweep, 3 to 10 kHz) 1 ms to 1000 s (time domain sweep, resolution bandwidth: ≥30 kHz) Trigger switch: FREERUN, TRIGGERED Trigger source WIDE IF VIDEO [bandwidth (3 dB): ≥20 MHz, trigger slope: RISE/FALL] EXT trigger level: TTL, trigger slope: RISE/FALL Trigger delay Range: 0 µs to 100 ms, Resolution: 2 µs Gate sweep Displays spectrum of input signal at specified gate on frequency domain display Gate delay: 2 µs to 100 ms, Resolution: 2 µs Gate width: 2 µs to 100 ms, Resolution: 2 µs

Functions	Marker functions Signal search: PEAK → CF, PEAK → REF Zone marker: NORMAL, DELTA Marker function: MARKER → CF, MARKER → REF, ZONE → SPAN Peak search: PEAK, NEXT PEAK, NEXT RIGHT PEAK, NEXT LEFT PEAK Measure function Noise power: dBm/Hz, dBm/ch C/N: dBc/Hz, dBc/ch Occupied bandwidth: N% of power method, X-dB down method Adjacent channel power: Reference total power method, reference level method, channel designate display (2 channels x 2), graphic display Average power within a burst: Average power of time domain waveform within specified time
Others	Number of data points: 501 points Detector mode POS PEAK: Displays max. point between sample points NEG PEAK: Displays min. point between sample points SAMPLE: Displays momentary value at sample points Display memory Trace A: Displays frequency spectrum Trace B: Displays frequency spectrum Trace time: Displays time domain waveform at center frequency Storage function: NORMAL (refreshed), VIEW (frozen), MAX HOLD (displays maximum envelope), MIN HOLD (displays minimum envelope), AVERAGE, CUMULATIVE, OVER WRITE

◆ Option 11: GSM audio test

Tx measurement	Decoding characteristics	Frequency range: 50 Hz to 4 kHz Level range: 0 to 3.2768 V Accuracy: ±1 Hz (500 Hz to 2 kHz)
	AF oscillator	Frequency range: 50 Hz to 20 kHz Setting resolution: 50 Hz Accuracy: Same as reference oscillator Output level range: 50 mVrms to 3 Vrms (EMF) Setting resolution: 0.1 mV Accuracy (bandwidth: <30 kHz) Unbalanced output: ±0.5 dB (1 kHz, ≥1 mV), ±1 dB (20 Hz to 20 kHz, ≥1 mV) Floating output: ±2 dB (1 kHz, ≥1 mV) Output impedance Main output: 600 Ω, 50 Ω (unbalanced, BNC connector) Microphone input: 600 Ω (floating, DUT interface) Waveform distortion (bandwidth: <30 kHz): <–50 dBc (1 kHz, 1 Vrms), <–45 dBc (20 Hz to 20 kHz, 1 Vrms)
Rx measurement	Coded signal	Frequency range: 50 Hz to 4 kHz Setting resolution: 50 Hz Level range: 0 to 2.2 V Setting resolution: 0.1 mV
	AF level measurement	Frequency range: 30 Hz to 20 kHz Level range: 1 mVrms to 30 Vrms Accuracy: ±0.5 dB
	AF frequency measurement	Frequency range: 30 Hz to 20 kHz Level range: 30 mVrms to 30 Vrms Accuracy: ±0.1 Hz

◆ Option 12: CDMA Measurement (extracts)

Signal generator	Frequency range: 869.01 to 893.97 MHz (30 kHz step, IS-95A), 1930.00 to 1989.95 MHz (50 kHz step, J-STD-008), 832.0125 to 833.9875 MHz, 843.0125 to 845.9875 MHz, 860.0125 to 869.9875 MHz (12.5 kHz step, ARIB STD-T53) 1805.05 to 1870.00 MHz (50 kHz step, KORER-PCS) Level setting range: –18 to –133 dBm (Main, AWGN off), +2 to –133 dBm (AUX, AWGN off) –24 to –133 dBm (Main, AWGN on), –4 to –133 dBm (AUX, AWGN on) Relative level accuracy: ±0.2/20 dB (18˚ to 28˚C) ∗Relative level accuracy at level change in time response of open-loop power control Waveform quality: ρ >0.99 (pilot channel: 0 dB) Channel level accuracy: ±0.2 dB (relative level accuracy between any 2 channels) AWGN level accuracy: ±0.2 dB (relative level for forward traffic channel)
Reception measurement	FER measurement: FER measurement value, error frame number, test frame number, confidence limit pass/fail
Transmission measurement	Frequency range: 824.01 to 848.97 MHz (30 kHz step, IS-95A), 1850.00 to 1909.95 MHz (50 kHz step, J-STD-008), 887.0125 to 888.9875 MHz, 898.0125 to 900.9875 MHz, 915.0125 to 924.9875 MHz (12.5 kHz step, ARIB STD-T53) 1715.05 to 1780.00 MHz (50 kHz step, KORER-PCS) Modulation analysis Level range: +40 to –20 dBm (average power within a burst, main connector only) Waveform quality: Measurement range: 0.9 to 1.0, measurement error: ±0.003 (after executing adjust range) Residual vector error: <5% (after executing adjust range) Power measurement (IF level meter) Measurement range: +40 to –50 dBm Measurement accuracy: ±0.4 dB (+40 to 0 dBm, after executing power meter calibration) ±0.4 dB (+40 to –10 dBm, after executing power meter calibration, 18˚ to 28˚C) ±0.7 dB (+40 to –10 dBm, after executing internal oscillator calibration, 18˚ to 28˚C) Linearity: ±0.1 dB (0 to –10 dB), ±0.2 dB (–10 to –20 dB), ±0.5 dB (–20 to –40 dB) ∗Referred to reference level: ≥–10 dBm Input connector: Main connector only Occupied bandwidth measurement Level range: 0 to +40 dBm (average power within a burst, MAIN connector) –20 to +20 dBm (average power within a burst, AUX connector) Spurious close to the carrier measurement Level range: 0 to +40 dBm (average power within a burst, MAIN connector) –20 to +20 dBm (average power within a burst, AUX connector) Measurement range: ≥50 dB (900 kHz offset), ≥60 dB (1.98 MHz offset) Spurious measurement Level range: 0 to +40 dBm (average power within a burst, MAIN connector) –20 to +20 dBm (average power within a burst, AUX connector) Measurement range: ≥60 dB
Call processing	Functions: Registration, origination, termination, conversation, loopback, hard handoff, disconnection from network, disconnection from mobile station, CDMA → analog handoff (IS-95A), soft handoff (MX880201A-01), softer handoff (MX880201A-01) Protocol: IS-95A (CDMA, analog), J-STD-008, ARIB STD-T53

◆ MX880113A IS-136A Measurement Software (extracts)

Transmission measurement	Digital	Frequency/modulation measurement Frequency range: 10 MHz to 2.2 GHz Modulation accuracy: ±(2% of indicated value + 0.5%) Amplitude measurement Input level range: +10 to +40 dBm (average power with burst, MAIN connector) Transmitter power accuracy: ±10% (MAIN connector, after calibration) Adjacent channel power measurement Measurement range: ≥30 dB (30 kHz offset), ≥60 dB (60 kHz offset), ≥65 dB (90 kHz offset) Batch measurement functions Measurement time: ≤1.5 s (amplitude measurement in normal mode)
	Analog	Same as Option 01
Reception measurement	Digital	Signal generator Frequency range: 10 MHz to 3 GHz Level range: –133 to –13 dBm (MAIN connector), –133 to +7 dBm (AUX connector) Modulation accuracy: 3%rms Error rate measurement Measurement pattern: PN9 (measures TCH data of up communication burst at RF input) Number of measurement bits: 1 to 99999999
	Analog	Same as Option 01
Call processing		Pass/fail judgement of registration, origination, termination communication, handoff, disconnection from network, disconnection from mobile station

◆ MX880114A AMPS/PCS1900 Measurement Software (extracts)

Transmission measurement	Frequency/ modulation measurement	Frequency range: 10 MHz to 2.2 GHz Residual phase error accuracy: ≤0.5° rms, ≤2° peak
	Amplitude measurement	Input level range: –5 to +40 dBm (average power within burst, MAIN connector) Calibration input level range: +10 to +40 dBm (average power within burst, MAIN connector) Transmission power accuracy: ±0.4 dB (+10 to +40 dBm), ±0.7 dB (–5 to +40 dBm) *MAIN connector, after calibration by using built-in power meter with same Tx reference level as calibration
	Output RF spectrum measurement	Modulation portion measurement range: ≥50 dB (200 kHz offset), ≥66 dB (≥250 kHz offset) Transition portion measurement range: ≥57 dB (≥400 kHz offset)
	All measurement items	Measurement time: ≤2.0 s (amplitude measurement: normal mode, except MS report measurement)
Reception measurement	Signal generator	Frequency range: 10 MHz to 3 GHz Level range: –133 to –13 dBm (MAIN connector), –133 to +7 dBm (AUX connector) Phase error: ≤1° rms, ≤4° peak
	Error rate measurement	Measurement pattern: 10 test patterns selectable Number of measurement samples: 1 to 99999999 (FER, CIb, CII)
Call processing		Pass/fail judgment of registration, origination, termination, communication, hand-over, disconnection from network, disconnection from mobile station
Analog measurement		Same Option 01 for AMPS

◆ MX880115A GSM Measurement Software (extracts)

Transmission measurement	Frequency/ modulation measurement	Frequency range: 10 MHz to 2.2 GHz Residual phase error accuracy: ≤0.5° rms, ≤2° peak
	Amplitude measurement	Input level range: –5 to +40 dBm (average power within burst, MAIN connector) Calibration input level range: +10 to +40 dBm (average power within burst, MAIN connector) Transmission power accuracy: ±0.4 dB (+10 to +40 dBm), ±0.7 dB (–5 to +40 dBm) ∗MAIN connector, after calibration by using built-in power meter with same Tx reference level as calibration
	Output RF spectrum measurement	Modulation portion measurement range: ≥50 dB (200 kHz offset), ≥66 dB (≥250 kHz offset) Transition portion measurement range: ≥57 dB (≥400 kHz offset)
	All measurement items	Measurement time: ≤2.0 s (amplitude measurement: normal mode, except MS report measurement)
Reception measurement	Signal generator	Frequency range: 10 MHz to 3 GHz Level range: –133 to –13 dBm (MAIN connector), –133 to +7 dBm (AUX connector) Phase error: ≤1° rms, ≤4° peak
	Error rate measurement	Measurement pattern: 11 test patterns selectable Number of measurement samples: 1 to 99999999 (FER/CRC, CIb, CII, FAST)
Call processing		Pass/fail judgment of registration, origination, termination, communication, hand-over, disconnection from network, disconnection from mobile station
Analog measurement		Same as Option 01 for AMPS

◆ MX880116A PDC Measurement Software with Call Processing (extracts)

Transmission measurement	Frequency/ modulation measurement	Frequency range: 10 MHz to 2.2 GHz Modulation accuracy: ±(2% of indicated value + 0.5%)
	Amplitude measurement	Input level range: +10 to +40 dBm (average power with burst, MAIN connector) Transmitter power accuracy: ±10% (MAIN connector, after calibration by using built-in power meter)
	Adjacent channel power measurement	Measurement range: ≥60 dB (50 kHz offset), ≥65 dB (100 kHz offset)
	Batch measurement functions	Measurement time: ≤1.5 s (amplitude measurement in normal mode; occupied bandwidth and adjacent channel power measurement on high-speed mode)
Reception measurement	Signal generator	Frequency range: 10 MHz to 3 GHz Level range: –133 to –13 dBm (MAIN connector), –133 to +7 dBm (AUX connector) Modulation accuracy: ≤3%rms
	Error rate measurement	Measurement pattern: PN9, PN15 Number of measurement bits: 10^2, 10^3, 2556, 10^4, 10^5, 10^6, ∞
Call processing		Pass/fail judgment of registration, origination, termination, communication, hand-over, disconnection from network, disconnection from mobile station

◆ MX880117A PHS Measurement Software with Call Processing (extracts)

Transmission measurement	Frequency/ modulation measurement	Frequency range: 10 MHz to 2.2 GHz Modulation accuracy: ±(2% of indicated value + 0.7%)
	Amplitude measurement	Input level range: +10 to +40 dBm (average power with burst, MAIN connector) Transmitter power accuracy: ±10% (MAIN connector, after calibration by using built-in power meter, at +10 to +40 dBm)
	Adjacent channel power measurement	Measurement range: ≥60 dB (600 kHz offset), ≥65 dB (900 kHz offset)
	Batch measurement functions	Measurement time: ≤1.5 s (amplitude measurement in normal mode; occupied bandwidth and adjacent channel power measurement on high-speed mode)
Reception measurement	Signal generator	Frequency range: 10 MHz to 3 GHz Level range: –133 to –13 dBm (MAIN connector), –133 to +7 dBm (AUX connector) Modulation accuracy: ≤3%rms
	Error rate measurement	Measurement pattern: PN9, PN15 Number of measurement bits: 10^2, 10^3, 2556, 10^4, 10^5, 10^6, ∞
Call processing		Pass/fail judgment of registration, origination, termination, communication, hand-over, disconnection from network, disconnection from mobile station

◆ MX880118A DECT Measurement Software (extracts)

Transmission measurement	Frequency/ modulation measurement	Frequency: 10 MHz to 2.2 GHz RF carrier accuracy: ±250 Hz + reference oscillator accuracy Frequency drift measurement accuracy: ±250 Hz Modulation measurement accuracy: ±10 kHz
	Amplitude measurement	Input level range: –5 to +40 dBm (MAIN connector) Calibration input level range: +15 to +40 dBm (MAIN connector) Transmitter power accuracy: ±0.4 dB (+15 to +40 dBm), ±0.7 dB (–5 to +15 dBm) ∗MAIN connector, after calibration by using built-in power meter
	Adjacent channel power measurement	Emission due to modulation: –8 dBm/160 μW at M ±1, –30 dBm/1 μW at M ±2, –44 dBm/40 nW at M ±3, –47 dBm/20 nW at M ±4 and M ±5 Emission due to transmitter transient: –6 dBm/250 μW at M ±1, –13 dBm/40 μW at M ±2, –23 dBm/4 μW at M ±3, –30 dBm/1 μW at M ±4 and M ±5
	All measurement items	Frequency, deviation, frequency drift, Tx power, carrier-off power, template pass/fail, timing, adjacent channel emission
Reception measurement	Signal generator	Frequency range: 10 MHz to 3 GHz Level range: –133 to –13 dBm (MAIN connector), –133 to +7 dBm (AUX connector) Modulation error: ≦±8% (at 288 kHz deviation, frequency: 10 MHz to 2.2 GHz)
	Error rate measurement	Modes: FER, BER (quick mode), BER (full mode) Measurement pattern: 0000111100001111, 0011001100110011, 0101010101010101, 1010 64 × 1 64 × 0 1010, pseudorandom (D-2M), ETSI patterns Number of measurement bits: 1 k to 99000 k
Call processing		Bearer setup, bearer release, hand-over loop back

◆ MX880131A PDC Measurement Software (extracts)

Transmission measurement	Frequency/ modulation measurement	Frequency range: 10 MHz to 2.2 GHz Modulation accuracy: ±(2% of indicated value + 0.5%)
	Amplitude measurement	Input level range: +10 to +40 dBm (average power with burst, MAIN connector) Transmitter power accuracy: ±10% (MAIN connector, after calibration by using built-in power meter)
	Adjacent channel power measurement	Measurement range: ≥60 dB (50 kHz offset), ≥65 dB (100 kHz offset)
	Batch measurement functions	Measurement time: ≤1.5 s (amplitude measurement in normal mode; occupied bandwidth and adjacent channel power measurement on high-speed mode)
Reception measurement	Signal generator	Frequency range: 10 MHz to 3 GHz Level range: –133 to –13 dBm (MAIN connector), –133 to +7 dBm (AUX connector) Modulation accuracy: ≤3%rms
	Error rate measurement	Measurement pattern: PN9, PN15 Number of measurement bits: 10^2, 10^3, 2556, 10^4, 10^5, 10^6, ∞

◆ MX880132A PHS Measurement Software (extracts)

Transmission measurement	Frequency/ modulation measurement	Frequency range: 10 MHz to 2.2 GHz Modulation accuracy: ±(2% of indicated value + 0.7%)
	Amplitude measurement	Input level range: +10 to +40 dBm (average power with burst, MAIN connector) Transmitter power accuracy: ±10% (MAIN connector, after calibration by using built-in power meter)
	Adjacent channel power measurement	Measurement range: ≥60 dB (600 kHz offset), ≥65 dB (900 kHz offset)
	Batch measurement functions	Measurement time: ≤1.5 s (amplitude measurement in normal mode; occupied bandwidth and adjacent channel power measurement on high-speed mode)
Reception measurement	Signal generator	Frequency range: 10 MHz to 3 GHz Level range: –133 to –13 dBm (MAIN connector), –133 to +7 dBm (AUX connector) Modulation accuracy: ≤3%rms
	Error rate measurement	Measurement pattern: PN9, PN15 Number of measurement bits: 10^2, 10^3, 2556, 10^4, 10^5, 10^6, ∞

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 adaptor (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
W1671AE	MT8801C Option 01/07 operation manual		Standard accessory for MT8801C Option 01/07 (1 copy)
W1672AE	MT8801C Option 10/11 operation manual		Standard accessory for MT8801C Option 10/11 (1 copy)
W1673AE	MT8801C Option 12 operation manual		Standard accessory for MT8801C Option 12 (1 copy)
W1327AE	MX880113A operation manual		Standard accessory for MX880113A (1 copy)
W1531AE	MX880114A operation manual		Standard accessory for MX880114A (1 copy)
W1328AE	MX880115A operation manual		Standard accessory for MX880115A (1 copy)
W1329AE	MX880116A operation manual		Standard accessory for MX880116A (1 copy)
W1330AE	MX880117A operation manual		Standard accessory for MX880117A (1 copy)
W1705AE	MX880118A operation manual		Standard accessory for MX880118A (1 copy)
W1331AE	MX880131A operation manual		Standard accessory for MX880131A (1 copy)
W1332AE	MX880132A operation manual		Standard accessory for MX880132A (1 copy)
W1695AE	MX880201A-01 operation manual		Standard accessory for MX880201A-01 (1 copy)
	— Peripherals —		
MS8604A	Digital Mobile Radio Transmitter Tester		
MD6420A	Data Transmission Analyzer		
MG3681A	Digital Modulation Signal Generator		
	— 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.

ANRITSU CORPORATION
1800 Onna, Atsugi-shi, Kanagawa, 243-8555 Japan
Phone: +81-046-223-1111
Fax: +81-46-296-1264

● **U.S.A.**
ANRITSU COMPANY
North American Region Headquarters
1155 East Collins Blvd., Richardson, TX 75081, U.S.A.
Toll Free: 1-800-ANRITSU (267-4878)
Phone: +1-972-644-1777
Fax: +1-972-671-1877

● **Canada**
ANRITSU ELECTRONICS LTD.
700 Silver Seven Road, Suite 120, Kanata,
ON K2V 1C3, Canada
Phone: +1-613-591-2003
Fax: +1-613-591-1006

● **Brasil**
ANRITSU ELETRÔNICA LTDA.
Praca Amadeu Amaral, 27 - 1 andar
01327-010 - Paraiso, Sao Paulo, Brazil
Phone: +55-11-2283-2511
Fax: +55-21-2886940

● **U.K.**
ANRITSU LTD.
200 Capability Green, Luton, Bedfordshire LU1 3LU, U.K.
Phone: +44-1582-433280
Fax: +44-1582-731303

● **Germany**
ANRITSU GmbH
Grafenberger Allee 54-56, 40237 Düsseldorf, Germany
Phone: +49-211-96855-0
Fax: +49-211-96855-55

● **France**
ANRITSU S.A.
9, Avenue du Québec Z.A. de Courtabœuf 91951 Les Ulis Cedex, France
Phone: +33-1-60-92-15-50
Fax: +33-1-64-46-10-65

● **Italy**
ANRITSU S.p.A.
Via Elio Vittorini, 129, 00144 Roma EUR, Italy
Phone: +39-06-509-9711
Fax: +39-06-502-24-25

● **Sweden**
ANRITSU AB
Botvid Center, Fittja Backe 1-3 145 84 Stockholm, Sweden
Phone: +46-853470700
Fax: +46-853470730

● **Singapore**
ANRITSU PTE LTD.
10, Hoe Chiang Road #07-01/02, Keppel Towers, Singapore 089315
Phone: +65-6282-2400
Fax: +65-6282-2533

● **Hong Kong**
ANRITSU COMPANY LTD.
Suite 923, 9/F., Chinachem Golden Plaza, 77 Mody Road, Tsimshatsui East, Kowloon, Hong Kong, China
Phone: +852-2301-4980
Fax: +852-2301-3545

● **P. R. China**
ANRITSU COMPANY LTD.
Beijing Representative Office
Room 1515, Beijing Fortune Building, No. 5 North Road, the East 3rd Ring Road, Chao-Yang District
Beijing 100004, P.R. China
Phone: +86-10-6590-9230

● **Korea**
ANRITSU CORPORATION
8F Hyun Juk Bldg. 832-41, Yeoksam-dong, Kangnam-ku, Seoul, 135-080, Korea
Phone: +82-2-553-6603
Fax: +82-2-553-6604～5

● **Australia**
ANRITSU PTY LTD.
Unit 3/170 Forster Road Mt. Waverley, Victoria, 3149, Australia
Phone: +61-3-9558-8177
Fax: +61-3-9558-8255

● **Taiwan**
ANRITSU COMPANY INC.
7F, No. 316, Sec. 1, NeiHu Rd., Taipei, Taiwan
Phone: +886-2-8751-1816
Fax: +886-2-8751-1817

030508

Catalog No. MT8801C-E-A-1-(5.00) Printed in Japan 2003-5 20KL/M